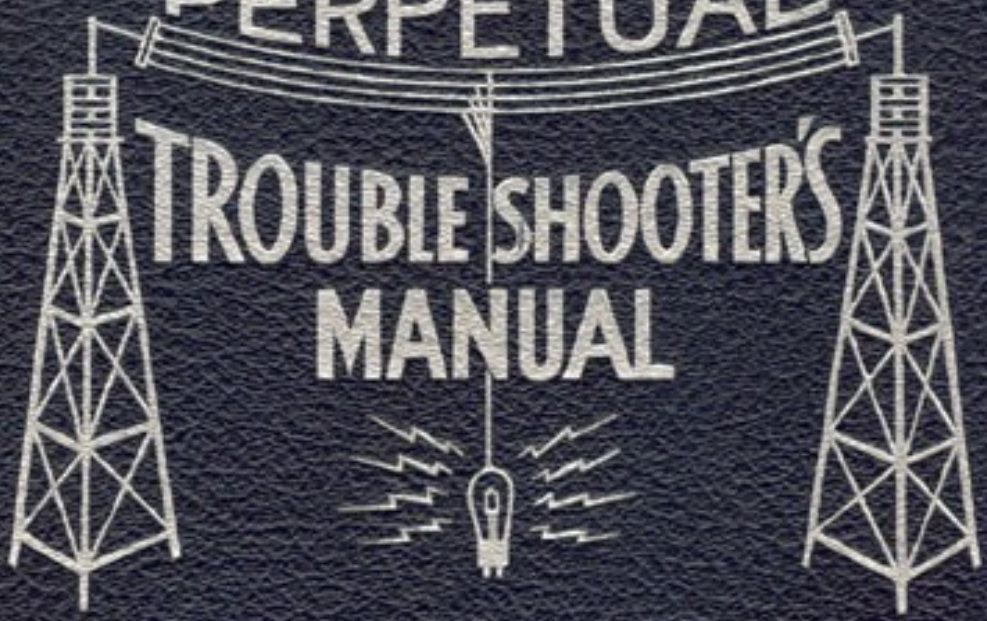
PERPETUAL TROUBLE SHOOTER'S MANUAL



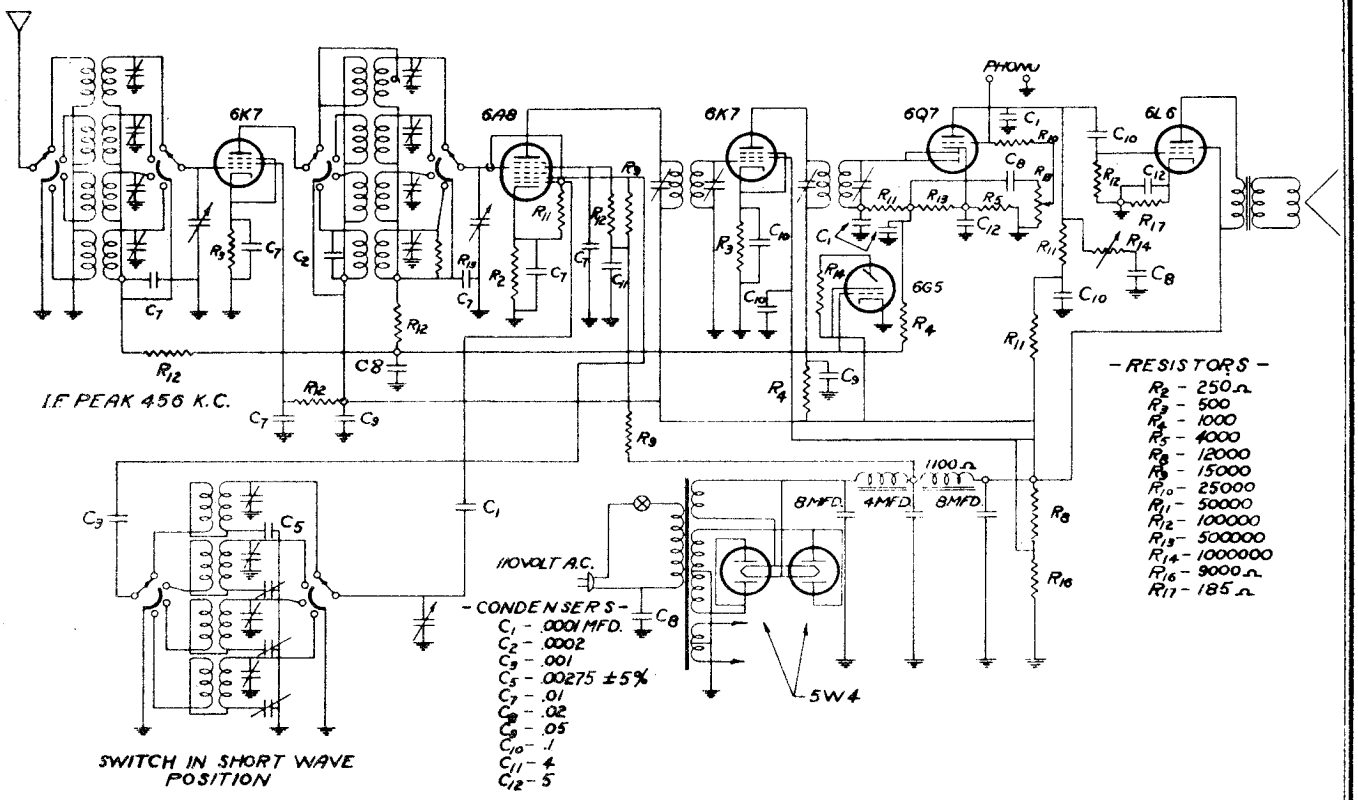
JOHN F. RIDER

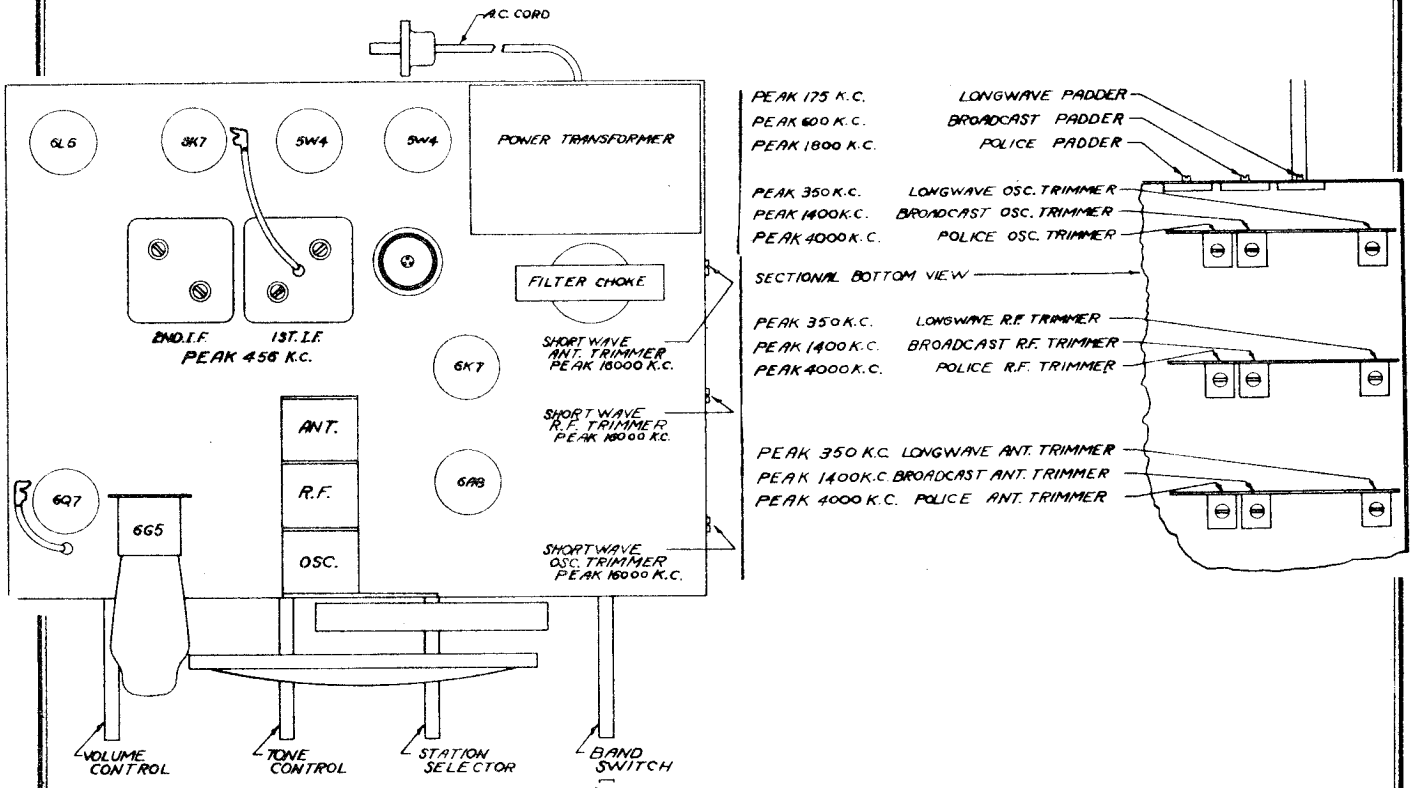
Rider's Perpetual Trouble Shooter's Manual

Volume 15

MODEL AM3

ADMIRAL CORPORATION





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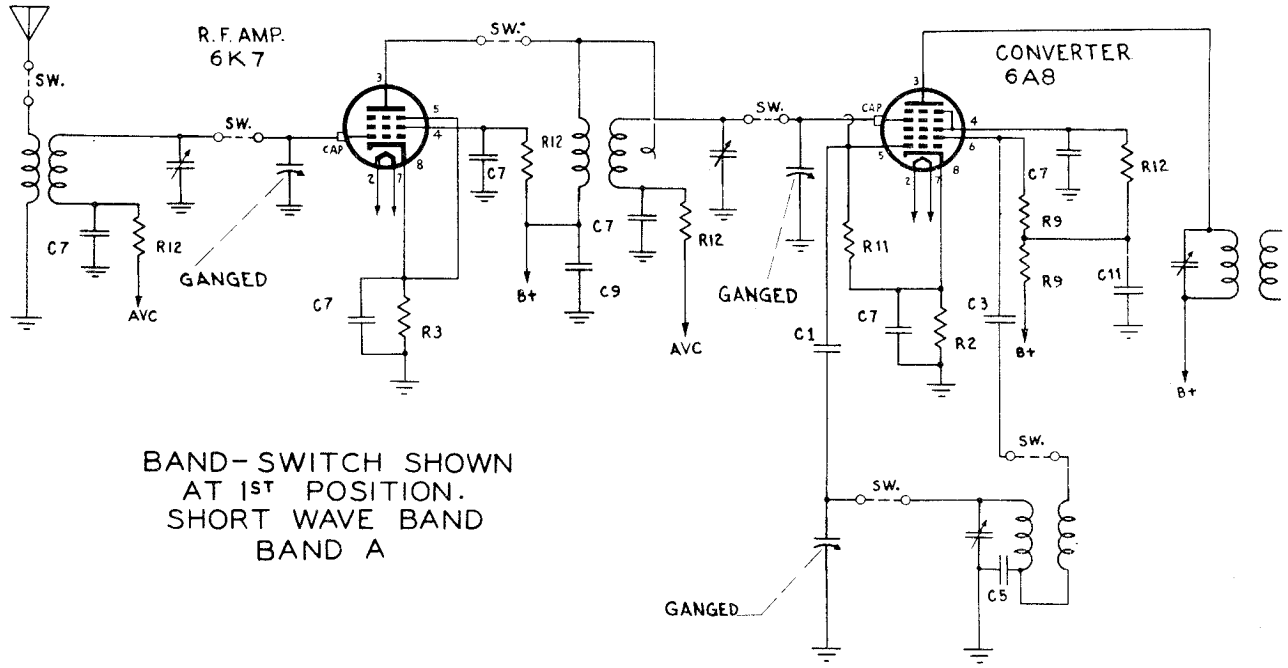
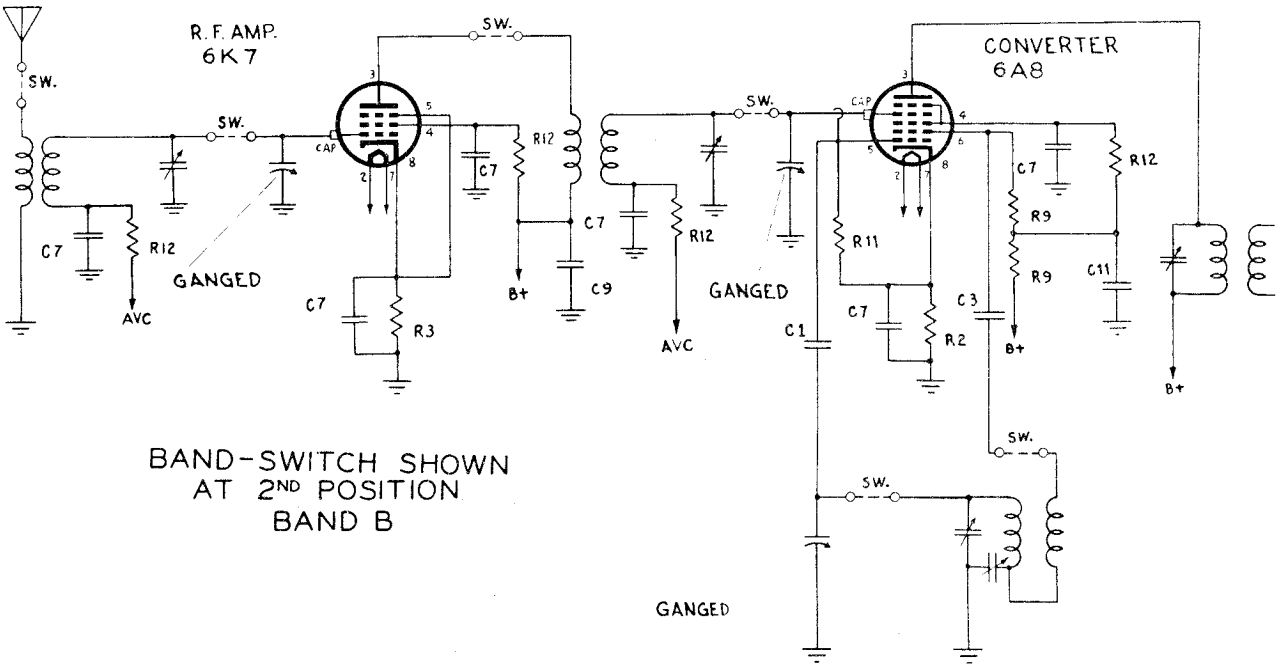
"clarified schematics"

MODEL AM3
MODEL AM6

ADMIRAL CORPORATION



BAND-SWITCH SHOWN
AT 1ST POSITION.
SHORT WAVE BAND
BAND A



BAND-SWITCH SHOWN
AT 2ND POSITION
BAND B

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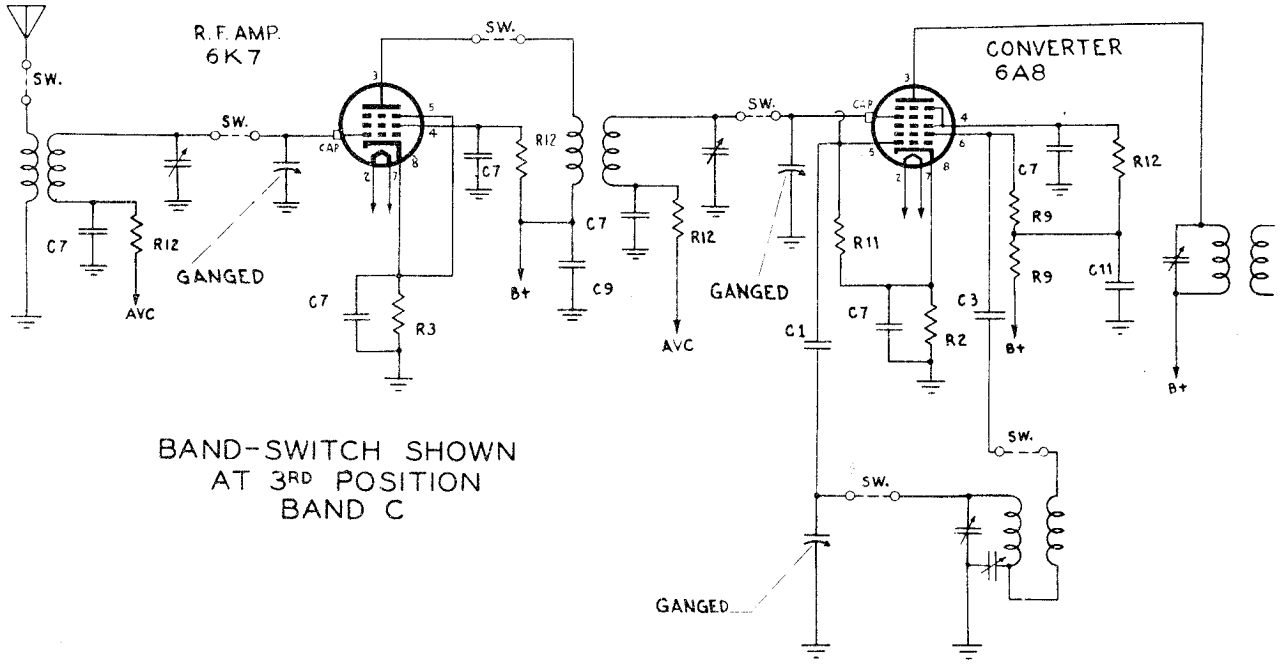
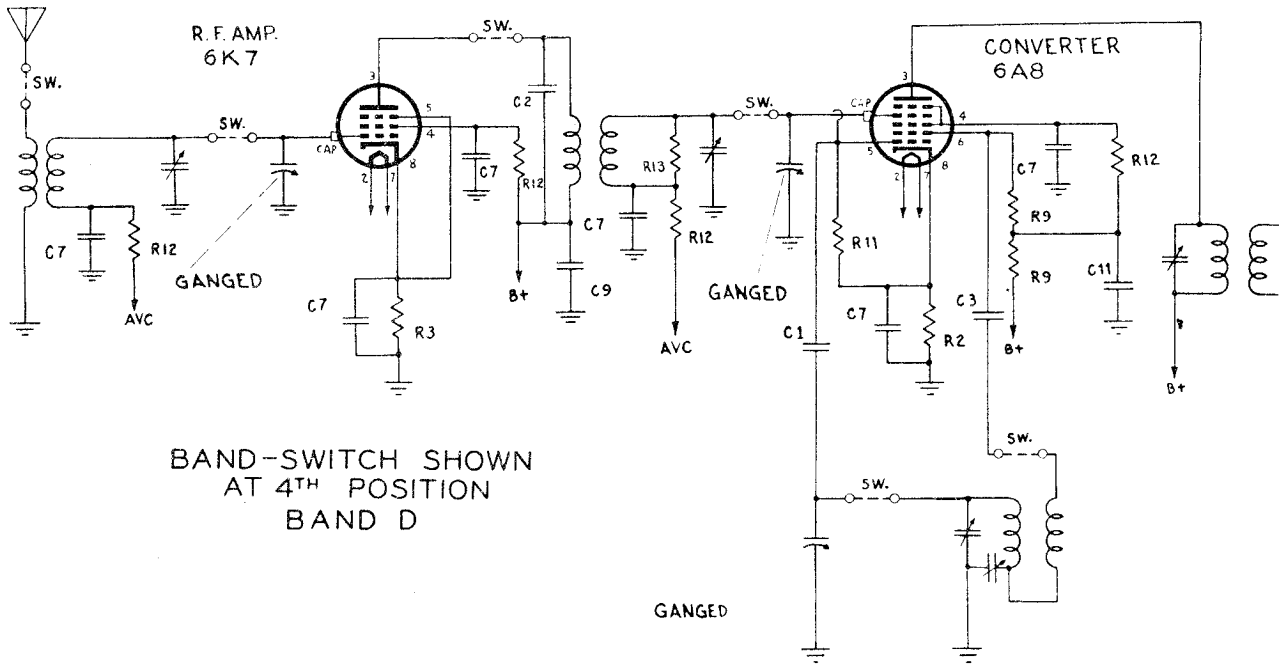
ADMIRAL CORPORATION

MODEL AM3
MODEL AM6



BAND-SWITCH SHOWN
AT 3RD POSITION
BAND C



BAND-SWITCH SHOWN
AT 4TH POSITION
BAND D

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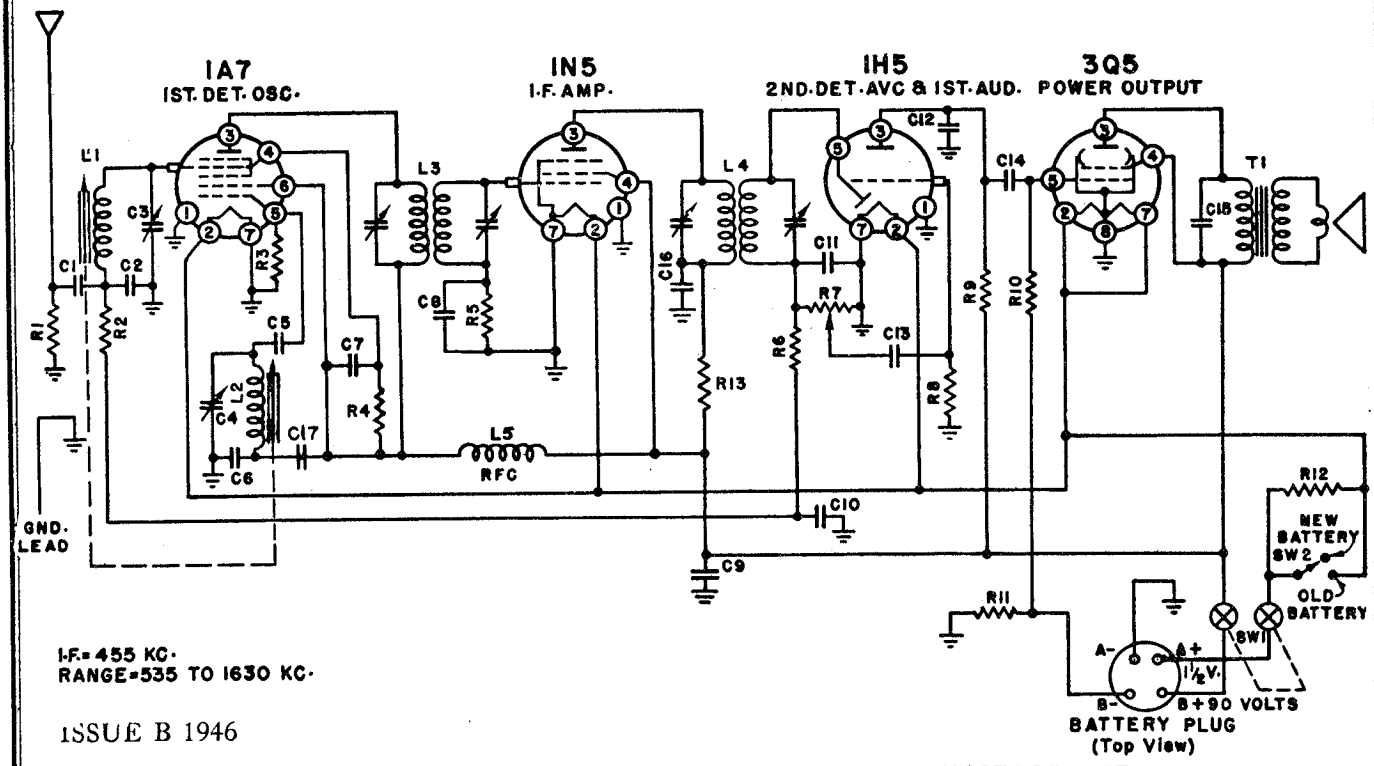
MODEL 4A1
Issue B

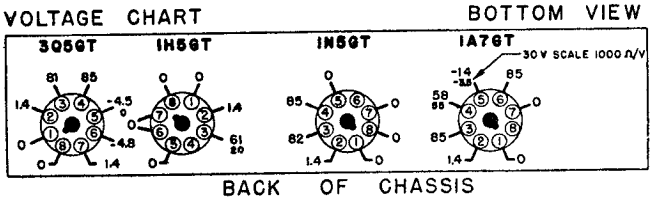
ADMIRAL CORPORATION



I.F.= 455 KC.
RANGE=535 TO 1630 KC.

ISSUE B 1946

VOLTAGE CHART — BOTTOM VIEW



VOLTAGE DATA

All readings made between tube socket terminals and chassis. Voltages indicated have been obtained using a Vacuum Tube Voltmeter. A second voltage reading is shown made with a 1000 ohm-per-volt meter, when use of this instrument would result in appreciable lower readings. Measured with a fresh battery, volume control full on, dial at the high frequency end, no signal.

OSCILLATION IN 4A1 BATTERY RADIO CHASSIS

Occasionally audio oscillation may occur in the 4A1 chassis with the volume control in an intermediate position. Should you encounter this trouble, reverse the leads of the primary of the output transformer or ground the speaker frame to the chassis. The speaker leads and the grid lead of the 1H5 should be kept as far as possible from the 3Q5 output tube.

REPLACEMENT PARTS

CONDENSERS

Symbol	Description	Part No.
C1	.01 mfd. 400 Volts	64B1-25
C2	.0008 mfd., Mica	65B5-31
C3	Trimmer, Antenna	66A21-1
C4	Trimmer, Oscillator	66A21-1
C5	.0001 mfd., Mica	65B7-17
C6	.0008 mfd., Mica	65B5-31
C7	.01 mfd., 400 Volts	64B1-25
C8	.002 mfd., 600 Volts	64B1-14
C9	4. mfd., 150 Volts (Elect)	67A4-2
C10	.05 mfd., 200 Volts	64B1-32
C11	.00025 mfd., Mica	65B7-22
C12	.00025 mfd., Mica	65B7-22
C13	.01 mfd., 400 Volts	64B1-25
C14	.01 mfd., 400 Volts	64B1-25
C15	.005 mfd., 600 Volts	64B1-12
C16	.01 mfd., 400 Volts	64B1-25
C17	.01 mfd., 400 Volts	64B1-25
	(C17 omitted in early models)	

RESISTORS

R1	15,000 ohm ½ w	60B8-153
R2	470,000 ohm ¼ w	60B2-474
R3	220,000 ohm ½ w	60B8-224
R4	33,000 ohm ½ w	60B8-333
R5, R8	4,700,000 ohm ¼ w	60B2-475
R6	2,200,000 ohm ¼ w	60B2-225
R7	1 meg. Vol. Control	75B1-1
R9, R10	1,000,000 ohm ¼ w	60B2-105
R11	390 ohm ¼ w	60B2-391
R12	.75 ohm ½ w (wire)	61A2-1
R13	2200 ohm ¼ w	60B2-222

TRANSFORMERS and COILS

Symbol	Description	Part No.
L1	Antenna Coil	AC105-1
L2	Oscillator Coil	A1020
L3	1st I.F. Transformer	72B5
L4	2nd I.F. Transformer	72B6
L5	Choke Coil (RF)	AB103-1
T1	Output Transformer	*

*Specify all numbers appearing on Output Trans. as well as speaker when ordering.

MISCELLANEOUS

Description	Part No.
Background, Dial	X22B1-1
Cable, Battery (complete with plug)	A1026
Cap, Grid	90A1-2
Cord, Dial (5" on tuner and 53" on dial drive)	50A1-3
Drum and Hub, Tuning	A1035
Iron Slug, with wire (Osc.)	71B1-3
Iron Slug, with wire (Ant.)	71B1-4
Knob	33A1-2

MISCELLANEOUS

Description	Part No.
Plug, Battery 5 Prong	88A4-4
Pointer, Dial	25A3
Pulley, Fibre Dial	17A1-3
Scale, Glass Dial	21B6-1
Screw studs (for iron cores)	27A4
Shield, Tube	87A8
Shaft, Tuning	28A1-1
Socket, octal tube	87A5-1
Speaker and output Transformer	78B3
Spring, Dial Drum Cord Tension	19A1-5
Spring, Tuner slide cord tension	19A1-4
Spring, Tuner slide pressure	18A9
Spring, Tuner, front bearing takeup	19A5
Spring, Tuner, back bearing takeup	19A6
Spring, Hairpin (To hold Ant-Osc. coils)	19A3-1
Switch, SPST (Economizer) SW2	77B1-6
Washer, C	4A4-1
Washer, spring (shaft)	4A6-3-0
Washer, spring (coils)	4A6-12-0

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ADMIRAL CORPORATION

MODEL 4A1
Issue B

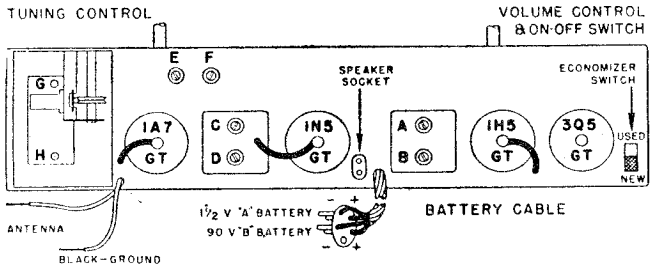
ALIGNMENT PROCEDURE

1. IMPORTANT—Check to see that dial pointer reaches each end of dial scale when Station Selector Control is turned from one end to the other.
2. Volume control—Maximum for all adjustments.
3. Connect radio chassis to ground post of signal generator with a short heavy lead.
4. Connect output meter across voice coil of speaker.
5. Connect dummy antenna value in series with generator output lead, when needed (see below).
6. Allow chassis and signal generator to "heat up" for several minutes
7. Use lowest Output setting of Signal Generator capable of producing adequate Output Meter indication and then proceed in the following sequence.

BAND	SIGNAL GENERATOR		Connection to Radio	Receiver Dial Setting	Trimmers Adjusted (In Order Shown)	Trimmer Function	Type of Adjustment
	Frenquency Setting	Dummy Antenna					
I.F.	455 KC.	.1 mfd.	Grid of 1A7 (Cap)	High Frequency end of dial	C-D—2nd I.F.	Output I.F.	Adjust to maximum output
I.F.	455 KC.	.1 mfd.	Grid of 1A7 (Cap)	High Frequency end of dial	A-B—1st I.F.	Input I.F.	Adjust to maximum output
Broad-cast	1630 KC.	.00020 mfd. Mica	Antenna Lead	High Frequency end of dial	E-(See note below) F-(See note below)	Oscillator Antenna	Adjust to maximum output
Broad-cast	1300 KC.	.00020 mfd. Mica	Antenna Lead	1300 KC.	G H	Oscillator Antenna	Adjust to maximum output

NOTE: Before adjusting trimmers "E" and "F," make sure that each iron core is 1⅜" or more outside of its coil form. If necessary, turn adjustments "G" and "H" to accomplish this.

TUBE AND TRIMMER LOCATION



CIRCUIT

Battery operated 4 Tube Superheterodyne with Single Tuning Range 535 KC. to 1630 KC. Covers standard broadcast band, using antenna and ground. Permeability tuning on Ant. and Osc. circuits. I.F. 455 KC.

POWER SUPPLY

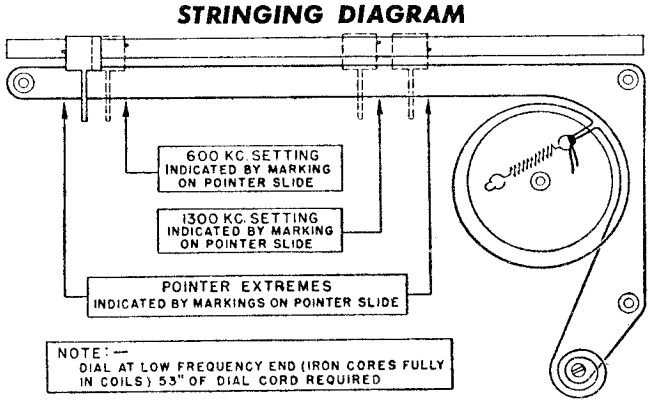
Single unit "AB" battery pack. 90 volt "B" 1½ volt "A." Plug in connection. Use Ensign AB48, Burgess 17G-D60, Eveready 748, General 60DL-11L, Ray-O-Vac AB-82, or Bond 0528 Battery or Equivalent.

ECONOMIZER SWITCH

The battery economizer switch is located on the top of the chassis, right side.

Always have this Economizer Switch in the "NEW" battery position when first placing radio in operation or when installing a new battery.

STRINGING DIAGRAM


600 KC. SETTING INDICATED BY MARKING ON POINTER SLIDE
1300 KC. SETTING INDICATED BY MARKING ON POINTER SLIDE
POINTER EXTREMES INDICATED BY MARKINGS ON POINTER SLIDE
NOTE:—
DIAL AT LOW FREQUENCY END (IRON CORES FULLY IN COILS) 53" OF DIAL CORD REQUIRED

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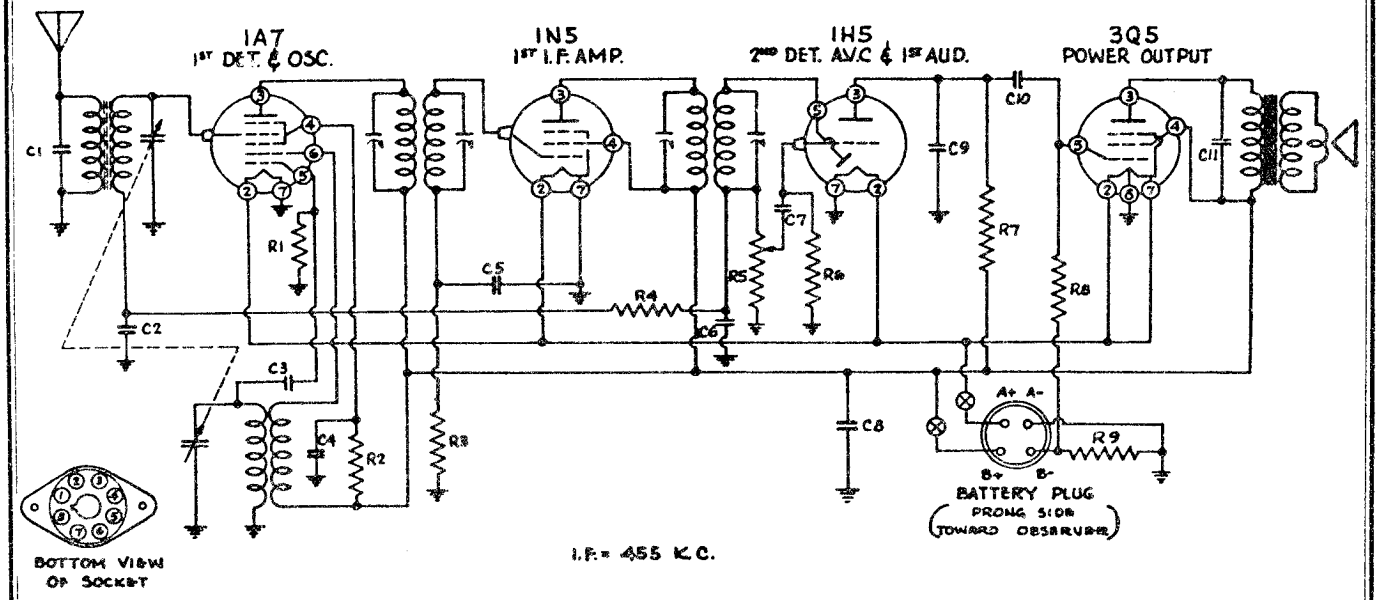
MODEL C4

ADMIRAL CORPORATION



RESISTORS						CONDENSERS					
No.	Ohms	Watts	No.	Ohms	Watts	No.	Capacity (Mfd.)	Volts	No.	Capacity (Mfd.)	Volts
R1	200,000	½	R6	15,000,000	½	C1	.00005	Mica	C8	.01	400
R2	50,000	½	R7	1,000,000	½	C2	.05	200	C9	6.0 (Elect.)	150
R3	5,000,000	½	R8	2,000,000	½	C3	.00005	Mica	C10	.00025	Mica
R4	2,000,000	½	R9	440—10%	½	C4	.05	200	C11	.005	400
R5	1,000,000	V.C.				C5	.001	200	C12	.002	600
						C7	.0001	Mica			

PAPER CONDENSERS

P3203 .001 mfd. 600 volt.....
P1193 .002 mfd. 400 volt.....
P1322 .005 mfd. 600 volt.....
P164 .01 mfd. 400 volt.....
P148 .05 mfd. 200 volt.....

MICA CONDENSERS

P1382 .00005 mfd. .....
P817 .00025 mfd. .....
P480 .0001 mfd. .....

ELECTROLYTIC CONDENSERS

P3024 6 mfd. 150 volt.....

VARIABLE CONDENSERS

P4310 Gang condenser .....

RESISTORS

P3817 440 ohm ½ watt.....
P3853 50,000 ohm ½ watt.....
P3864 200,000 ohm ½ watt.....
P3882 1,000,000 ohm ½ watt.....
P3883 2,000,000 ohm ½ watt.....
P3886 5,000,000 ohm ½ watt.....
P3891 15,000,000 ohm ½ watt.....

VARIABLE RESISTORS

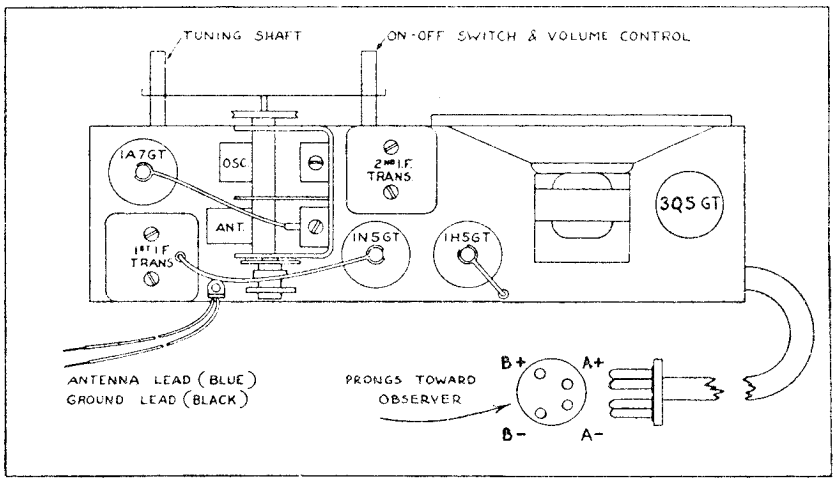
P4309 Volume control and switch...

TRANSFORMERS AND COILS

G6274 Antenna coil assembly .....
P4308 Oscillator coil .....
P4323 1st I.F. transformer .....
P3980 2nd I.F. transformer .....

MISCELLANEOUS

P3005 Tube socket .....
P1957 Battery plug .....
P3571 Tube shield .....
P4127 Drive shaft .....
P1399 Horseshoe washer .....
P2925 Cord tension spring .....
P470 Grid clip .....
P4925 Speaker and output transformer .....
P2149 Chassis mounting bolt, ½ doz.
P2863 Battery adapter cable .....



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ADMIRAL CORPORATION

MODEL C4
MODEL D4, Late

MODEL C4

ALIGNMENT DATA

GENERAL DATA

The alignment of this receiver requires the use of a signal generator that will cover the frequencies of 455, 600, 1400, and 1730, and an output meter to be connected across the primary or secondary of the output transformer. If possible, all alignments should be made with the volume control on maximum and the signal generator output as low as possible, to prevent the AVC from operating and giving false readings.

I.F. ALIGNMENT

Adjust the signal generator to 455 KC and connect the output to the grid of the first detector tube (1A7) thru a .05 or .1 mfd. condenser. The ground of the signal generator should be connected to the chassis ground. Align all I.F. trimmers to peak or maximum reading on the output meter.

BROADCAST BAND ALIGNMENT

Connect the output of the signal generator to the antenna and ground leads of the set through a .0002 condenser and adjust the signal generator to 1730 KC. Set the gang condenser to minimum capacity and adjust the oscillator trimmer to receive this signal. After this has been carefully done, the next step is to set the signal generator to 1400 KC and after tuning in the signal adjust the antenna trimmer to peak. The antenna and oscillator trimmers are located on the gang condenser. The trimmer toward the front on the gang condenser is the oscillator trimmer and the one toward the rear the antenna trimmer. This is all that is necessary for the alignment unless the plates of the gang condenser have been bent out of shape. In case of bent plates, set the signal generator and the receiver to 600 KC and bend the plates into the position for maximum sensitivity over the tuning range.

SERVICE INFORMATION

Speaker (Part No. P4925) 5" PM Type

D.C. voice coil resistance.....3.1 ohms
Voice coil impedance at 400 cycles.....3.5 ohms

Antenna Coil (Part No. G-6274)

Looking at the connection end starting at the chassis in a clockwise direction the terminals are: No. 1, AVC; No. 2, grid; No. 3, Ant.; No. 4, ground. No. 4 is grounded to the mounting bracket.

Primary—No. 3 and No. 4—Resistance 24.6 ohms.
Secondary—No. 1 and No. 2—Resistance 2.2 ohms.
A gimmik coil of 5.5 mmfd connects to terminals No. 2 and No. 3.

Oscillator Coil (Part No. P4308) (Red & Brown Dots)

Looking at the connection end (with dots) starting at the chassis in a clockwise direction the terminals are: No. 1, grid; No. 2, plate; No. 3, B+; No. 4, ground.

Primary—No. 2 and No. 3—Resistance 2.2 ohms.
Secondary—No. 4 and No. 1—Resistance 5.7 ohms.

First I.F. Transformer (Part No. P4323)

Primary—Blue white, plate; red white, B+ — Resistance 12.1 ohms
Secondary—White, grid; black white, AVC — Resistance 24.9 ohms

Second I.F. Transformer (Part No. P3980)

Primary—Blue white, plate; red white, B+ — Resistance 15.1 ohms
Secondary—White, grid; black white, AVC — Resistance 11.8 ohms

ALIGNMENT DATA

MODEL D4 Late

GENERAL DATA

The alignment of this receiver requires the use of a signal generator that will cover the frequencies of 455, 600, 1400 and 1730, and an output meter to be connected across the primary or secondary of the output transformer. If possible, all alignments should be made with the volume control on maximum and the signal generator output as low as possible, to prevent the AVC from operating and giving false readings.

I.F. ALIGNMENT

Remove the chassis from the cabinet, adjust the signal generator to 455 KC and connect the output to the grid of the first detector tube (1A7) thru a .05 or .1 mfd. condenser. The ground of the signal generator should be connected to the chassis ground. Align all I.F. trimmers to peak or maximum reading on the output meter.

BROADCAST BAND ALIGNMENT

Re-install the receiver completely in its cabinet. Connect the output of the signal generator to the antenna and ground terminals of the set through a .0002 condenser and adjust the signal generator to 1730 KC. Set the gang condenser to minimum capacity and adjust the gang condenser trimmer (oscillator) to receive this signal. After this has been carefully done, the next step is to set the signal generator to 1400 KC and after tuning in the signal adjust the antenna trimmer to peak. The antenna and oscillator trimmers are located on the gang condenser. The trimmer toward the front on the gang condenser is the oscillator trimmer and the one toward the rear the antenna trimmer. This is all that is necessary for the alignment unless the plates of the gang condenser have been bent out of shape. In case of bent plates, set the signal generator and the receiver to 600 KC and bend the plates into the position for maximum sensitivity over the tuning range.

SERVICE INFORMATION

Speaker (Part No. P4040) 6" PM Type

D.C. voice coil resistance.....2.6 ohms
Voice coil impedance at 400 cycles.....3.0 ohms

Antenna Coil (Part No. G-5724)

Looking at the connection end starting at the chassis in a clockwise direction the terminals are: No. 1, AVC; No. 2, grid; No. 3, Ant.; No. 4, ground. No. 4 is grounded to the mounting bracket.
Primary—No. 3 and No. 4—Resistance 24.6 ohms.
Secondary—No. 1 and No. 2—Resistance 2.2 ohms.
A gimmik coil of 5.5 mmfd. connects to terminals No. 2 and No. 3.

Oscillator Coil (Part No. 2412) (Red Dot)

Looking at the connection end (with dot) starting at the chassis in a clockwise direction. the terminals are: No. 1, grid; No. 2, plate; No. 3, B+; No. 4, ground.
Primary—No. 2 and No. 3—Resistance 2.2 ohms.
Secondary—No. 4 and No. 1—Resistance 5.3 ohms.

First I.F. Transformer (Part No. P3048)

Primary—Blue white, plate; red white B+ — Resistance 12.1 ohms
Secondary—White, grid; black white, AVC — Resistance 24.9 ohms

Second I.F. Transformer (Part No. P2606)

Primary—Blue white, plate; red white B+ — Resistance 15.1 ohms
Secondary—White, grid; black white, AVC — Resistance 11.8 ohms

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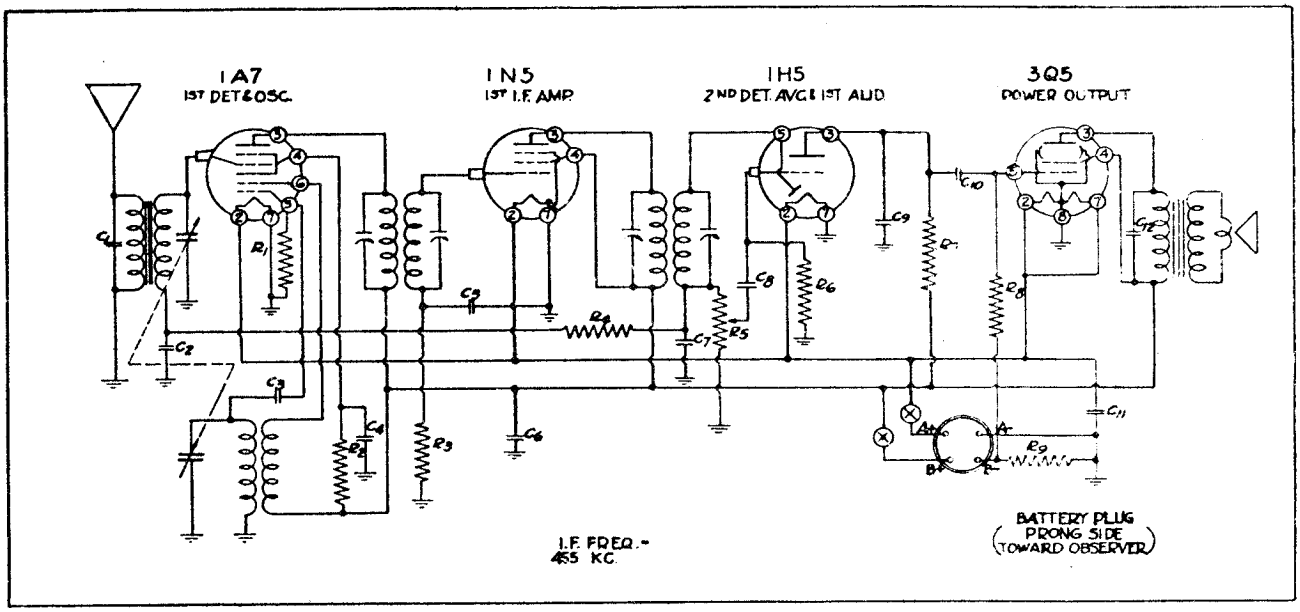
MODEL D4, Late

ADMIRAL CORPORATION



RESISTORS

No.	Ohms	Watts	No.	Ohms	Watts
R1	200,000	½	R6	5 Meg.	¼
R2	70,000	½	R7	250,000	¼
R3	5 Meg.	¼	R8	500,000	¼
R4	1 Meg.	¼	R9	440 10%	¼
R5	500,000	V.C.			

CONDENSERS

No.	Capacity (Mfd.)	Volts	No.	Capacity (Mfd.)	Volts
C1	.00005	Mica	C7	.00025	Mica
C2	.05	200	C8	.01	400
C3	.00005	Mica	C9	.00025	Mica
C4	.1	200	C10	.01	400
C5	.002	400	C11	20 (Elect.)	25
C6	.001	200	C12	005	400

PAPER CONDENSERS

P1193 .002 mfd. 400 volt.....
P1322 .005 mfd. 600 volt.....
P164 .01 mfd. 400 volt.....
P148 .05 mfd. 200 volt.....
P142 .1 mfd. 200 volt.....

MICA CONDENSERS

P1382 .00005 mfd. .....
P817 .00025 mfd. .....

ELECTROLYTIC CONDENSERS

P2602 20 mfd. 25 volt.....

VARIABLE CONDENSERS

P2596 Gang condenser .....

RESISTORS

P3817 440 ohm ½ watt.....
P3857 70,000 ohm ½ watt.....
P3864 200,000 ohm ½ watt.....
P3868 250,000 ohm ½ watt.....
P3876 500,000 ohm ½ watt.....
P3882 1,000,000 ohm ½ watt.....
P3886 5,000,000 ohm ½ watt.....

VARIABLE RESISTORS

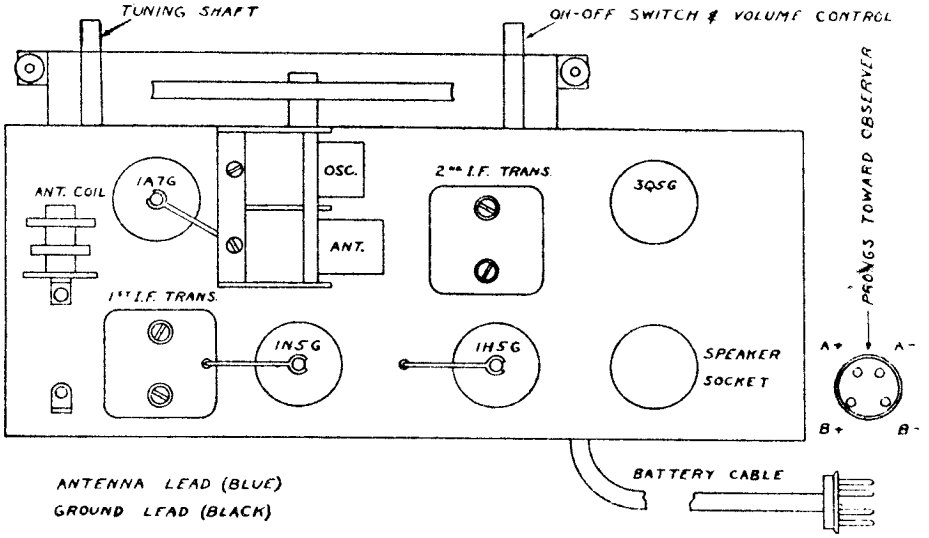
P2600 Volume control and switch...

TRANSFORMERS AND COILS

G5724 Antenna coil assembly .....
P2412 Oscillator coil .....
P3048 1st I.F. transformer.....
P2606 2nd I.F. transformer.....

MISCELLANEOUS

P3005 Tube socket .....
P2243 Drive shaft .....
P1587 Spring washer .....
P1399 Horseshoe washer .....
P2078 Cord tension spring .....
P4032 Dial pointer .....
P945 Speaker socket .....
P533 Tube shield base.....
P3571 Tube shield .....
P1957 Battery plug .....
P470 Grid clip .....
P3156 Dial background .....
P3993 Tenite escutcheon .....
P4033 Metal escutcheon, dial glass and dial scale.....
P4040 6" PM speaker.....
P3389 Knob, push on type.....
P3520 Knob, set screw type.....
P2863 Battery adapter cable.....



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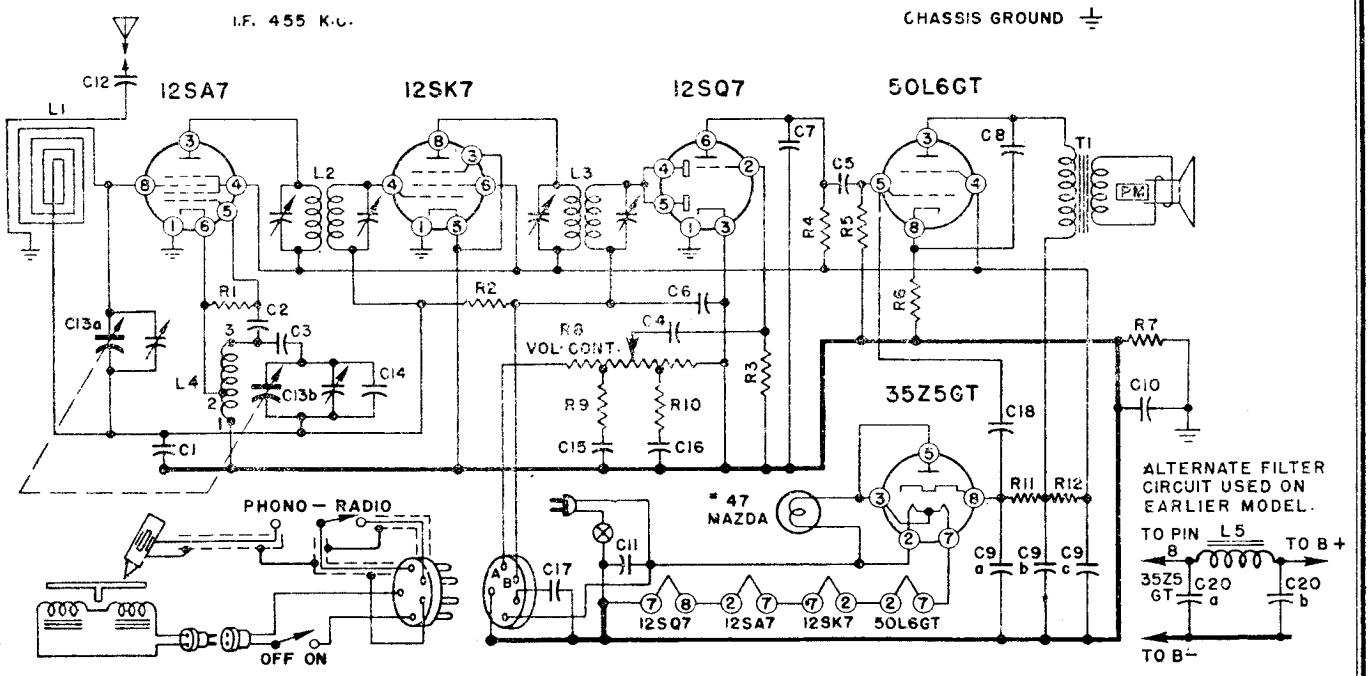
For Alignment, See P.15-7

ADMIRAL CORPORATION

MODEL 5B1 Phono
Issue A



NOTE: 1. In later production R11 and C9a are disconnected from pin No. 8 of the 35Z5 and a 33-ohm 1-watt resistor (R13) is connected between pin No. 8 and the junction of R11 and C9a. In these sets, condenser C18 was deleted.

2. The jumper between pins 4 and 5 on the 12SQ7 is removed and one pin is connected to the secondary of the second I.F. (L3) and the other pin is connected directly to the junction point of R2 and the secondary of the 1st I.F. (L2).

NOTE: Connect points "A" and "B" with jumper when testing chassis with phono plug removed.

ISSUE A 1946

CONDENSERS

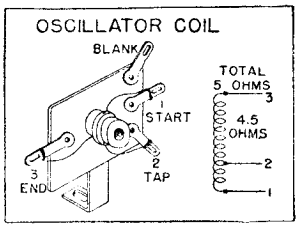
Symbol	Capacity	Type
C1	.1 mfd.	200 V.
C2	.00005 mfd.	Mica
C3	.02 mfd.	400 V.
C4	.01 mfd.	400 V.
C5	.01 mfd.	400 V.
C6	.00025 mfd.	Mica
C7	.0005 mfd.	Mica
C8	.02 mfd.	400 V.
C9a	.30. mfd. (Elect.)	150 V.
C9b	.30. mfd. (Elect.)	150 V.
C9c	.20. mfd. (Elect.)	150 V.
C10	.2 mfd.	400 V.
C11	.05 mfd.	400 V.
C12	.005 mfd.	600 V.
C13a	.00042 mfd. (max.)	Var.
C13b	.00018 mfd. (max.)	Var.
C14	.00002 mfd.	Mica
C15	.01 mfd.	400 V.
C16	.01 mfd.	400 V.
C17	.2 mfd.	400 V.
C18	.000035 mfd.	Mica
C20a	.30. mfd.	150 V.
C20b	.50. mfd.	150 V.

RESISTORS

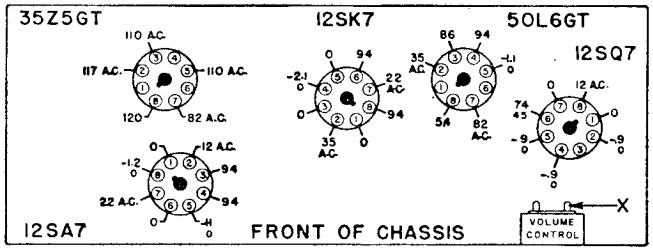
Symbol	Resistance	Type
R1	22,000 ohms	C½W
R2	1 megohm	C½W
R3	10 megohms	C½W
R4	220,000 ohms	C½W
R5	470,000 ohms	C½W
R6	150 ohms	C½W
R7	150,000 ohms	C½W
R8	½ megohm Volume Control. Tapped at 100,000 and 200,000 ohms from start.	
R9	47,000 ohms	C½W
R10	27,000 ohms	C½W
R11	150 ohms	C1W
R12	1,000 ohms	C1W
R13	33 ohms	C1W

COILS

Symbol	Description
L1	Loop
L2	1st I. F. Trans.
L2	2nd I. F. Trans.
L4	Osc. Coil
L5	Choke, Filter



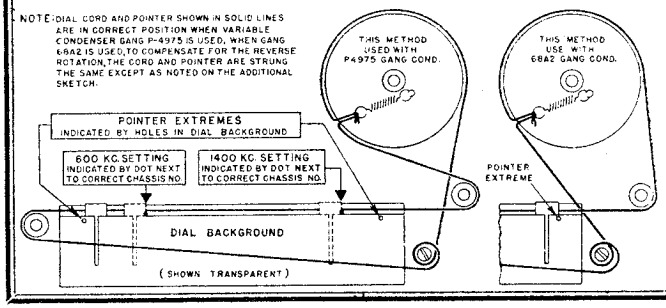
VOLTAGE DATA



Bottom View of Chassis, Showing Voltages

—All readings made between Tube Socket Terminals and Switch Lug on volume control (Point "X" on drawing).
—Measured on a 117 Volt A.C. line.
—Volume control full on.
—Dial tuned to low frequency end, no signal.
—Voltages obtained on Vacuum Tube voltmeter.
—A second voltage reading is shown made with a 1000 ohm-per-volt meter when use of this instrument would result in appreciably lower readings.

POINTER SETTINGS AND DIAL CORD STRINGING


NOTE: DIAL CORD AND POINTER SHOWN IN SOLID LINES ARE IN CORRECT POSITION WHEN VARIABLE CONDENSER GANG P-4975 IS USED. WHEN GANG 6B42 IS USED, TO COMPENSATE FOR THE REVERSE ROTATION, THE CORD AND POINTER ARE STRUNG THE SAME EXCEPT AS NOTED ON THE ADDITIONAL SKETCH.
THIS METHOD USED WITH P4975 GANG COND.
THIS METHOD USE WITH 6B42 GANG COND.
POINTER EXTREMES INDICATED BY HOLES IN DIAL BACKGROUND
600 KC. SETTING INDICATED BY DOT NEXT TO CORRECT CHASSIS NO.
1400 KC. SETTING INDICATED BY DOT NEXT TO CORRECT CHASSIS NO.
POINTER EXTREME
DIAL BACKGROUND
(SHOWN TRANSPARENT)

RECORD CHANGER SERVICE DATA

Complete service information and parts list are covered by a separate service manual. Check record changer for model number. The RC150 was used by all models having serial numbers below 500,000.

RADIO RECEPTION DURING PHONO

It is normal for strong radio stations to be heard faintly when switched to PHONO, unless the radio dial is tuned between stations. This interference can sometimes be reduced by moving condenser C4 as far from the 12SQ7 socket and as close to the chassis as possible. Also move the I.F. transformer wire, connected to pin 4 or 5 of 12SQ7, as far from condenser C4 and as close to the chassis as possible.

For Alignment and Parts, see P.15-12

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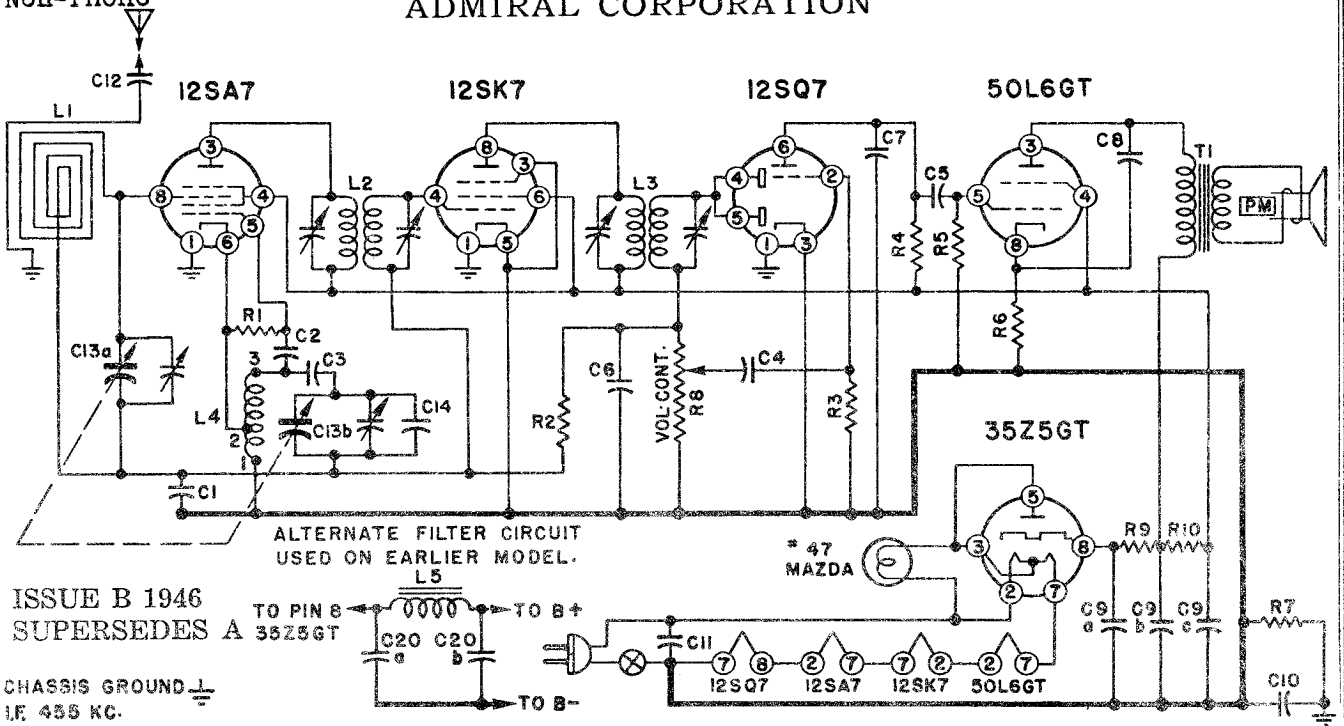
Record Changers: Admiral Models RC150, RC160, or RC160A

MODEL 581, Issue B
Non-Phono

ADMIRAL CORPORATION



ISSUE B 1946
SUPERSEDES A 35Z5GT

NOTE: 1. In later production R9 and C9a are disconnected from pin No. 8 of the 35Z5 and a 33-ohm 1-watt resistor (R11) is connected between pin No. 8 and the junction of R9 and C9a.

2. The jumper between pins 4 and 5 on the 12SQ7 is removed and one pin is connected to the secondary of the second I.F. (L3) and the other pin is connected directly to the junction point of R2 and the secondary of the 1st I.F. (2).

CONDENSERS

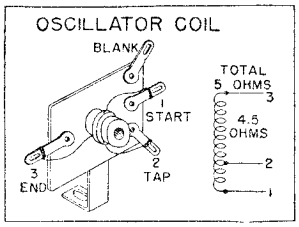
Symbol	Capacity	Type
C1	.1 mfd.	200 V
C2	.00005 mfd.	Mica
C3	.02 mfd.	400 V.
C4	.01 mfd.	400 V.
C5	.01 mfd.	400 V.
C6	.00025 mfd.	Mica
C7	.0005 mfd.	Mica
C8	.02 mfd.	400 V.
C9a	30. mfd. (Elect.)	150 V.
C9b	30. mfd. (Elect.)	150 V.
C9c	20. mfd. (Elect.)	150 V.
C10	.2 mfd.	400 V.
C11	.05 mfd.	400 V.
C12	.005 mfd.	600 V.
C13a	.00042 mfd. (max.)	Var.
C13b	.00018 mfd. (max.)	Var.
C14	.00002 mfd.	Mica
C20a	30. mfd. (Elect.)	150 V.
C20b	50. mfd. (Elect.)	150 V.

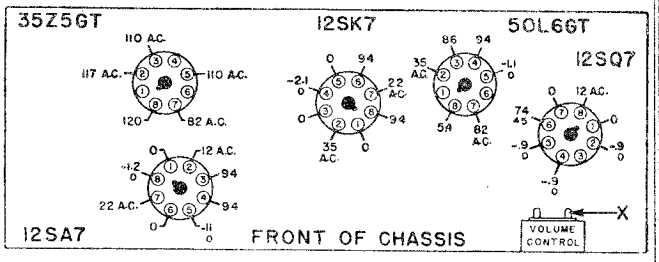
RESISTORS

Symbol	Resistance	Type
R1	22,000 ohms	C½W
R2	470,000 ohms	C½W
R3	10 meg ohms	C½W
R4	220,000 ohms	C½W
R5	470,000 ohms	C½W
R6	150 ohms	C½W
R7	150,000 ohms	C½W
R8	1 meg ohm Volume Control	
R9	150 ohms	C1W
R10	1,000 ohms	C1W
R11	33 ohms	C1W

COILS

Symbol	Description
L1	Loop
L2	1st I. F. Trans.
L3	2nd I. F. Trans.
L4	Osc. Coil
L5	Choke, Filter





Bottom View of Chassis, Showing Voltages

—All readings made between Tube Socket Terminals and Switch Lug on volume control (Point "X" on drawing).
—Measured on a 117 Volt A.C. line.
—Volume control full on.
—Dial tuned to low frequency end, no signal.
—Voltages indicated obtained on Vacuum Tube voltmeter.
—A second voltage reading is shown made with a 1000 ohm-per-volt meter when use of this instrument would result in appreciably lower readings.

SPECIFICATIONS

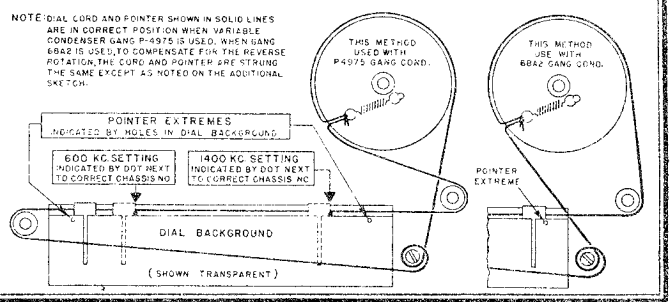
POWER SUPPLY:—

110-120 Volts A.C. or D.C. U.L. approved.
Frequency—50 to 60 cycles
Power consumption—30 watts

CIRCUIT:—

Chassis 5B1 A.C.—D.C. 5 Tube Superheterodyne with single tuning range, 540 Kc. to 1630 Kc., covering standard broadcast band; built-in AEROSCOPE loop antenna, with provision for connecting an external antenna.

POINTER SETTINGS AND DIAL CORD STRINGING


NOTE: DIAL CORD AND POINTER SHOWN IN SOLID LINES ARE IN CORRECT POSITION WHEN VARIABLE CONDENSER GANG P-4975 IS USED. WHEN GANG 6BA2 IS USED, TO COMPENSATE FOR THE REVERSE ROTATION, THE CORD AND POINTER ARE STRUNG THE SAME EXCEPT AS NOTED ON THE ADDITIONAL SKETCH.
THIS METHOD USED WITH P4975 GANG COND.
THIS METHOD USE WITH 6BA2 GANG COND.
POINTER EXTREMES INDICATED BY HOLES IN DIAL BACKGROUND
600 KC SETTING INDICATED BY DOT NEXT TO CORRECT CHASSIS NO
1400 KC SETTING INDICATED BY DOT NEXT TO CORRECT CHASSIS NO
POINTER EXTREME
DIAL BACKGROUND
(SHOWN TRANSPARENT)

For Alignment and Parts, see P. 15-12

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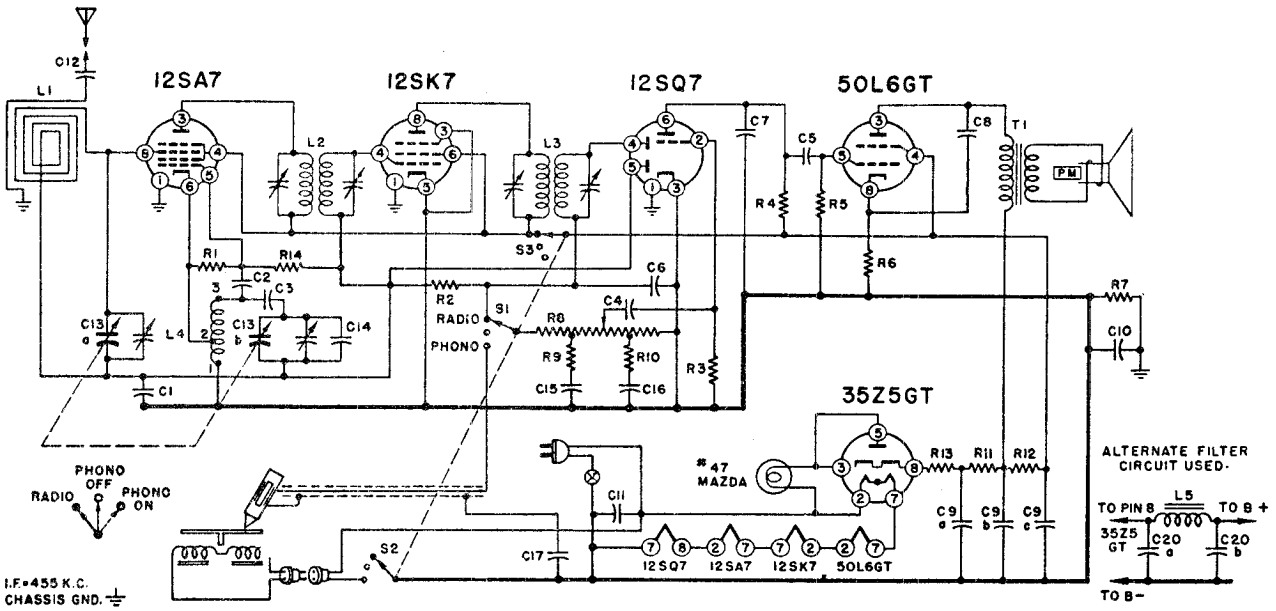
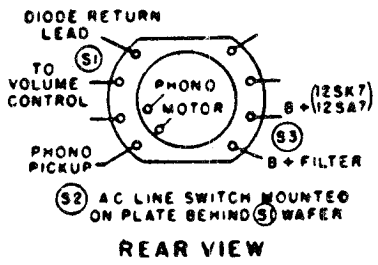
ADMIRAL CORPORATION

MODEL 5B1A
Issue B



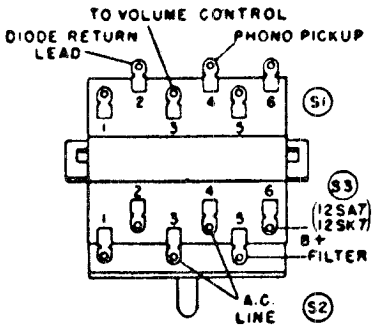
ISSUE B 1946

CONNECTION FOR SWITCH #77A8



REAR VIEW

CONNECTION FOR SWITCH #77A11



TOP VIEW

REPLACEMENT PARTS

CONDENSERS

Symbol	Description	Part Number
C1	.1 mfd., 200 Volts	64B1-30
C2	50 mmfd., Mica	65B7-11
C3	.02 mfd., 400 Volts	64B1-24
C4	.01 mfd., 400 Volts	65A3-10
C5	.01 mfd., 400 Volts	65A3-10
C6	250 mmfd., Mica	65B7-22
C7	500 mmfd., Mica	65B7-27
C8	.02 mfd., 400 Volts	64B1-24
C9a	30 mfd., 150 V. } Electrolytic	67A8
C9b	30 mfd., 150 V. } Electrolytic	
C9c	20 mfd., 150 V. } Electrolytic	
C10	.1 mfd., 400 Volts	64B1-20
C11	.05 mfd., 400 Volts	64B1-22
C12	.005 mfd., 600 Volts	64B1-12
C13a	.00042 mfd., Gang }	68A2 or
C13b	.00018 mfd., Gang }	P4975
C14	15 mmfd., Mica	65B5-3
C15	.01 mfd., 400 Volts	65A3-10
C16	.01 mfd., 400 Volts	65A3-10
C17	.05 mfd., 400 Volts	64B1-22
C20a	30 mfd., 150 V. } Electrolytic	67A3
C20b	50 mfd., 150 V. } Electrolytic	

RESISTORS

Symbol	Description	Part Number
R1	22,000 Ohms, ½ Watt	60B8-223
R2	1 Megohm, ½ Watt	60B8-105
R3	10 Megohm, ½ Watt	60B8-106
R4	220,000 Ohms, ½ Watt	60B8-224
R5	470,000 Ohms, ½ Watt	60B8-474
R6	150 Ohms, ½ Watt	60B8-151
R7	150,000 Ohms, ½ Watt	60B8-154

RESISTORS

Symbol	Description	Part Number
R8	½ Megohm, Volume Control and Switch. Tapped at approximately 100,000 and 200,000 ohms from start.	75B3-2
R9	47,000 Ohms, ½ Watt	60B8-473
R10	27,000 Ohms, ½ Watt	60B8-273
R11	150 Ohms, 1 Watt	60B28-1
R12	1,000 Ohms, 1 Watt	60B28-2
R13	33 Ohms, 1 Watt	60B28-3
R14	10 Meg., ½ Watt	60B9-106

TRANSFORMERS and COILS

L1	Antenna, Loop	69B6
L2	Transformer, 1st I. F.	72B3
L3	Transformer, 2nd I. F.	72B4
L4	Oscillator, Coil	69A5
L5	Choke Coil (Filter)	74A1
T1	Transformer, Output	98A4

PHONOGRAPH PARTS

See Record Changer Service Manual for Detailed Parts List.

Description	Part Number
Centerpost	G400A12
Crystal Cartridge	409A1
Idler Wheel (407B3 Motor)	G400A23
Idler Wheel (407B2 Motor)	G400A59
Idler Wheel (407B1 Motor)	G400A57
Motor, 60 cycle 115 volt, A.C. (Types 407B1 & 407B2 also used)	407B3

MISCELLANEOUS

Description	Part Number
Background, Dial	22B7-1
Buttons, Snap (Dial)	13A1-3-2
Cabinet Body less cover (6RT41A Mahogany)	34D2-11
Cabinet Cover (6RT41A Mahogany)	34D2-10
Cover Support	37A7-1
Dial Scale	21B4-1
Drum and Hub Assembly	A1012
Grommet, Rubber Insulating	12A1-1
Grommet, Rubber for Drum	12A1-2
Knob, Tuning, Volume Control	33A1-2
Knob, Radio-Phono Switch	33A11-5
Pilot Light No. 47	81A1-8
Pilot Light Socket and Leads	82A2-1
Plug, Button	13A2-1-57
Plug, Alden (Motor Leads)	88A8-1
Pointer	25A1-2
Pulley, Fibre Dial	17A1-3
Shaft, Tuning	28A1-1
Socket and Leads (Alden)	89A6-2
Socket, Octal Tube	87A5-1
Speaker, 5" PM & Output Transformer	78B13-1
Spring, Dial Cord Tension	19B1-7
Switch Rotary Radio-Phono	77A8
Transformer, Output	98A4
Washer, Flat Insulating	5A1-6
Washer, Offset Insulating	5A2-5
Washer, Spring	4A6-3-0

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Record Changer: Admiral Model RC160A

For Voltage, dial data, see P.15-9; for Alignment, see P.15-1

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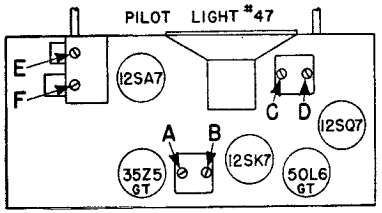
MODEL 5B1
MODEL 5B1A
MODEL 6A1, Issue B

ADMIRAL CORPORATION

MODEL 5B1A *ALIGNMENT PROCEDURE* MODEL 5B1

1. Be sure Radio Receiver and Signal Generator are thoroughly warmed up before starting alignment procedure.
2. Check setting of Pointer Extremes and note correct 600 K.C. and 1400 K.C. positions on Dial Background. (See Dial Diagram)
3. Connect Output Meter across Voice Coil.
4. Turn Receiver Volume Control—full on.
5. Use lowest Output setting of Signal Generator capable of producing adequate Output Meter indication and then proceed in the following sequence.
6. Repeat adjustments to insure final overall maximum results.

TOP VIEW — TUBE & TRIMMER LOCATION



BACK OF CHASSIS

Connect Signal Generator to—	Dummy Antenna Between Radio and Generator	Set Generator Frequency to—	Set Receiver Dial Frequency to—	Adjust Following Trimmers	Type of Adjustment
Tuning Condenser Antenna Stator	250 mmfd. Condenser	455 KC.	High frequency end of Dial	C—D 2nd I. F. A—B 1st I. F.	Adjust to maximum Output
Tuning Condenser Antenna Stator	250 mmfd. Condenser	1630 KC.	High frequency end of Dial	E—Osc.	Adjust to maximum Output
Loop radiator (or place pickup lead from gen. close to loop of set to obtain adequate signal).	No actual connection between set and generator.	1400 KC.	Tune in generator signal	F—Ant. (See Note)	Adjust to maximum Output

NOTE: Antenna trimmer "F" must be aligned after chassis and loop are mounted in the cabinet. This adjustment can be made by lifting up the top cover and removing the plug button which is directly above trimmer "F."

MODEL 5B1 - PHONO REPLACEMENT PARTS

PAPER CONDENSERS

Part No.	Symbol	Description
64B1-12	C12	.005 mfd., 600 V.
64B1-22	C11	.05 mfd., 400 V.
64B1-24	C8, C8	.02 mfd., 400 V.
64B1-25	C15, C16, C4, C5,	.01 mfd., 400 V.
64B1-30	C1	.1 mfd., 200 V.
64A2-1	C10, C17	.2 mfd., 400 V.

VARIABLE CONDENSERS

68A2	C13a, C13b	Condenser, Gang

CERAMIC OR MICA CONDENSERS

65B5-5	C14	Mica, 20 mmf. ±10%
65B6-10	C18	Ceramic, 35 mmf. ±20%
65B7-11	C2	Mica, 50 mmf. ±20%
65B7-22	C6	Mica, 250 mmf. ±20%
65B7-27	C7	Mica, 500 mmf. ±20%

ELECTROLYTIC CONDENSERS

67A3	C20a	30 mfd. 150 V.
	C20b	50 mfd. 150 V.
or	C9a	30 mfd. 150 V.
67A8	C9b	30 mfd. 150 V.
	C9c	20 mfd. 150 V.

RESISTORS

60B28-3	R13	33 ohm ±10%, 1 W.
60B8-151	R6	150 ohm ±10%, ½ W.
60B28-1	R11	150 ohm ±10%, 1 W.
60B28-2	R12	1000 ohm ±10%, 1 W.
60B8-223	R1	22,000 ohm ±10%, ½ W.
60B8-273	R10	27,000 ohm ±10%, ½ W.
60B8-473	R9	47,000 ohm ±10%, ½ W.
60B8-154	R7	150,000 ohm ±10%, ½ W.
60B8-224	R4	220,000 ohm ±10%, ½ W.

RESISTORS (Cont'd)

Part No.	Symbol	Description
60B8-474	R5	470,000 ohm ±10%, ½ W.
60B8-105	R2	1 meg ±10%, ½ W.
60B8-106	R3	10 meg ±10%, ½ W.
75B3-2	R8	½ meg Volume Control & Switch

TRANSFORMERS and COILS

69B6 or 69B10	L1	Antenna, Loop (6RT41 Cabinet)	
		Antenna, Loop (6RT42, 6RT43 Cabinet)	
72B3	L2	Transformer, 1st I. F.	
72B4	L3	Transformer, 2nd I. F.	
67A5	L4	Oscillator, Coil	
74A1	L5	Choke Coil (Filter)	
*	T1	Transformer, Output	

*(When ordering, specify all numbers on speaker and transformer.)

PHONOGRAPH PARTS

See Record Changer Service Manual for Detailed Parts List.

G400A12	Centerpost
169A1	Crystal Cartridge
G400A23	Idler Wheel (407B3 Motor)
G400A52	Idler Wheel (407B2 Motor)
G400A53	Idler Wheel (407B1 Motor)
407B3	Motor, 60 cycle Volt. A.C. (Types 407B1 & 407B2 also used)

MISCELLANEOUS

Part No.	Description
22B7-1	Background, Dial
13A1-3-2	Buttons, Snap (Cabinet back)

MISCELLANEOUS (Cont'd)

Part No.	Description
34D2-11	Cabinet Body less cover (6RT41 Mahogany)
34D2-10	Cabinet Cover (6RT41 Mahogany)
37A7-1	Cover Support
A1012	Drum and Hub Assembly
26A7-1	Escutcheon, On-Off
26A7-3	Escutcheon, Radio-Phono
12A1-2	Grommet, Rubber ⅜"x⅜"
406A2	Grommet, Rubber
33A1-2	Knob, Walnut-Mahog.
81A1-8	Pilot Light #47
82A2-1	Pilot Light Socket and Leads
88A3-5	Plug (Phono Leads)
13A2-1-57	Plug, Button
88A8-1	Plug, Alden (Motor Leads)
88A3-4	Plug Shell (Phono Leads)
25A2	Pointer, Dial Slide
25A3	Pointer less slide
17A1-3	Pulley, Fibre Dial
21B4-1	Scale, Plastic Dial
28A1-1	Shaft, Tuning
89A6-1	Socket and Leads (Aiden)
87A10-2	Socket, Octal Tube
78B4-3	Speaker, 5" PM & Output Transformer
19A1-3	Spring, Dial Cord Tension
77B1-11	Switch SPDT Radio-Phono
77B1-44	Switch SPST On-Off
5A1-6	Washer, Flat Insulating
5A2-5	Washer, Offset Insulating
4A4-1	Washer, C
4A8-3-0	Washer, Spring

REPLACEMENT PARTS — MODEL 5B1 - NON-PHONO

PAPER CONDENSERS

Part No.	Symbol	Description
64B1-12	C12	.005 mfd. 600 V.
64B1-22	C11	.05 mfd. 400 V.
64B1-24	C8, C8	.02 mfd. 400 V.
64B1-25	C4, C5	.01 mfd. 400 V.
64B1-30	C1	.01 mfd. 200 V.
64A2-1	C10	.2 mfd. 400 V.

VARIABLE CONDENSERS

P4975 or 68A2	C13a, C13b	Gang (2 Section)

(Specify correct part no. when ordering as gangs are not interchangeable)

MICA CONDENSERS

65B5-5	C14	Mica 20 mmf. ±10%
65B6-11	C2	Mica 50 mmf. ±20%
65B7-22	C6	Mica 250 mmf. ±20%
65B7-27	C7	Mica 500 mmf. ±20%

ELECTROLYTIC CONDENSERS

67A3	C20a	30 mfd. 150 V.
	C20b	50 mfd. 150 V.
or	C9a	30 mfd. 150 V.
67A8	C9b	30 mfd .150 V.
	C9c	20 mfd. 150 V.

RESISTORS

60B28-3	R11	33 ohm ±10%, 1 W.
60B8-151	R6	150 ohm ±10%, ½ W.
60B28-1	R9	150 ohm ±10%, 1 W.
60B28-2	R10	1000 ohm ±10%, 1 W.
60B8-223	R1	22,000 ohm ±10%, ½ W.
60B8-154	R7	150,000 ohm ±10%, ½ W.
60B8-224	R4	220,000 ohm ±10%, ½ W.
60B8-474	R5	470,000 ohm ±10%, ½ W.
60B8-105	R2	1 meg ±10%, ½ W.
60B8-106	R3	10 meg ±10%, ½ W.
75B1-6	R8	1 meg Volume Control & Switch

TRANSFORMERS and COILS

69B4	L1	Antenna, Loop
72B3	L2	Transformer, 1st I.F.
72B4	L3	Transformer, 2nd I.F.
67A5	L4	Oscillator Coil
74A1	L5	Choke Coil (Filter)
*	T1	Transformer, Output

*When ordering, specify all numbers on speaker and transformer.

MISCELLANEOUS

Part No.	Description
22B7-1	Background, Dial
15A14	Bracket, Loop Retainer

MISCELLANEOUS (Cont'd)

Part No.	Description
34D7-2	Cabinet (6T02 Mahog.)
43B3	Cover, Back (6T04 Wood)
43B6	Cover, Back (6T02 Plastic)
A1012	Drum and Hub Assembly
12A1-2	Grommet, Rubber ⅜" x ⅜"
33A1-1	Knob, Ivory
33A1-2	Knob, Walnut-Mahog.
81A1-8	Pilot Light #47
82A2-1	Pilot Light Socket and Leads
AA106	Pointer & Slide (Order pointer or pointer slide as needed)
13A1-2-47	Buttons (Cabinet Back), Snap
13A1-3-2	Buttons (Dial), Snap
34D7-1	Cabinet (6T02 Ivory)
25A2	Pointer Slide
25A3	Pointer less slide
17A1-3	Pulley, Fibre Dial
21B5-1	Scale, Glass Dial (6T02)
21B4-1	Scale, Plastic Dial
28A1-1	Shaft, Tuning
87A10-2	Socket, Octal Tube
78B4-1	Speaker (5" PM) and Output Transformer
19A1-3	Spring, Dial Cord Tension
5A1-6	Washer, Flat Fibre Insulating
5A2-5	Washer, Offset Fibre Insulating

DIAL DRUM POSITION — MODEL 6A1 - ISSUE B

If the dial drum position is disturbed, it should be carefully re-positioned to insure correct tuning of the permeability tuned coil: When the gang condenser is fully open, the drum will be properly positioned if the center of the condenser shaft and the dial cable hole on the drum are in a straight line parallel to the chassis base. Note that the dial cable hole should be on the left side (looking at front) of the chassis.

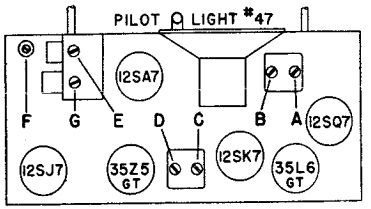
ALIGNMENT PROCEDURE

1. Be sure Radio Receiver and Signal Generator are thoroughly warmed up before starting alignment procedure.
2. Check setting of Pointer Extremes and note correct 600 K.C. and 1400 K.C. positions on Dial Background. (See Dial Diagram on reverse side.)
3. Connect Output Meter across Voice Coil.
4. Turn Receiver Volume Control full on.
5. Use lowest Output setting of Signal Generator capable of producing adequate Output Meter indication and then proceed as outlined in chart below.
6. Repeat adjustments to insure final overall maximum results.

R. F. SLUG POSITION

If the tuned coil slug needs replacing or re-positioning, first see that the dial drum is in its proper position. Then with the threaded stud half-way through the, bakelite, note that the top of the slug is flush with the top of coil form. Then re-align.

TOP VIEW — TUBE & TRIMMER LOCATION



BACK OF CHASSIS

Connect Signal Generator To—	*Dummy Antenna Between Radio and Generator*	*Set Generator Frequency To—*	*Set Receiver Dial Frequency To—*	*Adjust Following Trimmers*	*Type of Adjustment*
12SA7 Control Grid	250 mmfd. Mica Condenser	455 KC.	High frequency end of Dial	A and B—2nd I. F. C and D—1st I. F.	Adjust to maximum Output
External Antenna Wire on Loop	250 mmfd. Mica Condenser	1630 KC.	High frequency end of Dial	E—Osc.	Adjust to maximum Output
External Antenna Wire on Loop	250 mmfd. Mica Condenser	1400 KC.	Tune in Generator signal	F—R. F. (Iron Core)	See Note Below
Loop radiator (or place pickup lead from gen. close to loop of set to obtain adequate signal).	No actual connection between set and generator.	1400 KC.	Tune in Generator signal	G—Ant.	Adjust to maximum Output

NOTE: Adjustment F is the threaded stud at the top end of the slug wire. Screw stud up or down in the bakelite for maximum output. Alignment is correct if the output is reduced when the position of the lever arm is changed slightly in either direction (up or down).

PAPER CONDENSERS

Part No.	Symbol	Description
64B1-12	C-1	.005 mfd 600 V.
64B1-22	C-3, C-14	.05 mfd 400 V.
64B1-24	C-4, C-12	.02 mfd 400 V.
64B1-25	C-7, C-8, C-9, C-11	.01 mfd 400 V.
64B1-30	C-17	.1 mfd 200 V.
64A2-1	C-15	.2 mfd 400 V.

CERAMIC or MICA CONDENSERS

6585-5	C-18	20 mmfd ±10%
6587-11	C-5	50 mmfd ±20%
6587-22	C-6, C-16	250 mmfd ±20%
6587-27	C-10	500 mmfd ±20%
65B1-8	C-2	785 mmfd ±5%-(silver)

VARIABLE RESISTORS

7583-2	R-8	Volume Control (½ megohm) and Switch (Topped)

TRANSFORMERS, COILS, & CORES

69B4	L1	Aeroscope (Loop)
A1052	L2	R. F. Coil and Mounting
71B1-2		Slug, R.F. Iron Core
69A5	L3	Oscillator Coil
72B3	L4	1st I. F. Transformer
72B4	L5	2nd I. F. Transformer
74A1	L6	Choke, Filter
*	T1	Transformer, Output

*When ordering, specify all numbers on speaker and transformer.

ELECTROLYTIC CONDENSERS

Part No.	Symbol	Description
67A8	C-13a	30 mfd 150 V
	C-13b	30 mfd 150 V.
or	C-13c	20 mfd 150 V.
67A3	C-20a	30 mfd 150 V.
	C-20b	50 mfd 150 V.

VARIABLE CONDENSERS

68A2	C-19a, C-19b	Condenser, Gang

RESISTORS

60B28-3	R-16	33 ohm ±10%, 1 W.
60B8-101	R-4	100 ohm ±10%, ½ W.
60B8-151	R-12	150 ohm ±10%, ½ W.
60B14-151	R-14	150 ohm ±10%, 1 W.
60B14-102	R-15	1,000 ohm ±10%, 1 W.
60B8-103	R-1	10,000 ohm ±10%, ½ W.
60B8-223	R-3	22,000 ohm ±10%, ½ W.
60B8-273	R-7	27,000 ohm ±10%, ½ W.
60B8-473	R-6	47,000 ohm ±10%, ½ W.
60B8-154	R-13	150,000 ohm ±10%, ½ W.
60B8-274	R-10	270,000 ohm ±10%, ½ W.
60B8-474	R-11	470,000 ohm ±10%, ½ W.
60B8-105	R-5	1 meg ohm ±10%, ½ W.
60B8-475	R-9	4.7 meg ohm ±10%, ½ W.
60B8-106	R-2	10 meg ohm ±10%, ½ W.

MISCELLANEOUS

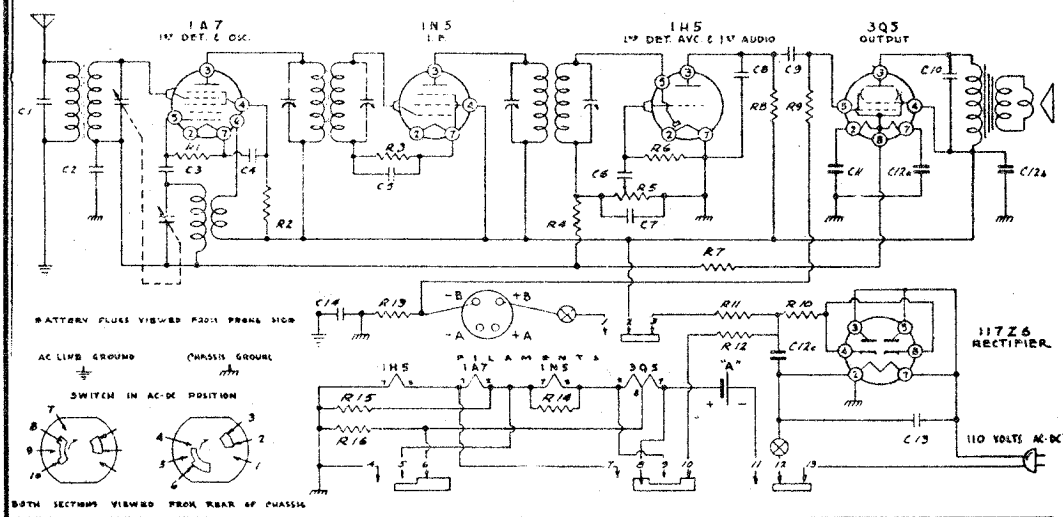
Part No.	Description
22B7-1	Background, Dial (Plastic)
13A1-2-47	Buttons, Snap (For Cabinet Back)

MISCELLANEOUS (Cont'd)

Part No.	Description
13A1-3-2	Buttons, Snap (Dial & R.F. Coil)
15A14	Bracket Plate, Loop Retainer
34D1-1	Cabinet, Plastic (6T01 Ivory)
34D1-2	Cabinet, Plastic (6T01 Mahog.)
43B5	Cover, Chipboard Back (For 6T01 Plastic)
43B3	Cover, Chipboard Back (For 6T05 Wood)
50A1-1	Cord, Dial (42")
A1049	Drum & Cam Assembly
12A1-2	Grommet, Rubber (3/16"x5/16")
33A1-1	Knob (Ivory)
33A1-2	Knob (Walnut or Mahog.)
A1050	Lever Arm Assembly (R.F.)
81A1-8	Pilot Light #47
82A2-1	Pilot Light Socket & Leads
AA106	Pointer and Slide (order pointer or pointer slide as needed)
25A3	Pointer (less slide)
25A2	Pointer Slide
17A1-3	Pulley, Fibre ⅛x½ O.D.
2184-1	Scale, Dial (Plastic)
28A1-1	Shaft Tuning
78B4-2	Speaker & Trans. 5" P.M.
19A1-3	Spring, Tension (Dial)
19A4	Spring, Lever Arm (R.F.)
29A2-3-21	Spacer, T (R.F.)
87A10-2	Socket, Octal Tube
27A4	Stud, Threaded Slug Adj. (R.F.)
4A4-1	Washer, C (Tuning Shaft)
5A1-6	Washer, Flat Fibre Insulating
5A2-5	Washer, Flat Fibre Insulating
4A6-3-0	Washer, Spring (Tuning Shaft)

MODEL E5

ADMIRAL CORPORATION



RESISTORS

No.	Ohms.	Watt.
R1	200,000	½
R2	50,000	½
R3	5,000,000	½
R4	3,000,000 V. C.	½
R5	1,000,000	½
R6	15,000,000	½
R7	10,000,000	½
R8	1,000,000	½
R9	2,000,000	½
R10	30	½
R11	3,500	2
R12	2,600	8
R13	440	½
R14	300	½
R15	300	½
R16	3,000	2

CONDENSERS

No.	Capacity (Mfd.)	Volts
C1	.00005	Mica
C2	.05	200
C3	.00005	Mica
C4	.01	400
C5	.001	600
C6	.001	600
C7	.00025	Mica
C8	.00025	Mica
C9	.01	400
C10	.002	600
C11	100.	10
C12a	100.	25
C12b	50.	150
C12c	30.	150
C13	.05	400
C14	.25	200

I.F. 455 Kc.

PAPER CONDENSERS

P3203	.001	mfd.	600	volt
P904	.002	mfd.	600	volt
P164	.01	mfd.	400	volt
P148	.05	mfd.	200	volt
P334	.05	mfd.	400	volt
P141	.25	mfd.	200	volt

MICA CONDENSERS

P1382	.00005	mfd.	mica
P817	.00025	mfd.	mica

ELECTROLYTIC CONDENSERS

P4831	100 mfd.	10	volt
P4860	Lug type	30 mfd.	150 volt
	or	50 mfd.	150 volt
P4860A	Lead type	100 mfd.	25 volt

VARIABLE CONDENSERS

P4310 Gang condenser

MISCELLANEOUS

P3005	Tube socket
P3783	Mounting base (for P4860)
P1957	Battery plug
P3571	Tube shield
P4127	Drive shaft
	Dial cord (per yard)
P1587	Spring washer
P1399	Horseshoe washer
P2925	Cord tension spring
P470	Grid clip
	Dial scale; order by name and model number
P1585	Snap button, for dial scale, dozen
	Dial glass; order by name and model number
	Pointer; order by name, model number and color
	Knobs; order by name, model number and color
P4925	Speaker and output transformer
P4953	Power change switch
P2215	Line cord
P2149	Chassis mounting bolt, ½ doz.
P2863	Battery adapter cable

RESISTORS

P2436	30 ohms wire wound
P3813	300 ohms ½ watt
P3817	440 ohms ½ watt
P4952	2,600 ohms 8 watt wire wound
P3833	3,000 ohms ½ watt
P3834	3,500 ohms ½ watt
P3853	50,000 ohms ½ watt
P3864	200,000 ohms ½ watt
P3882	1,000,000 ohms ½ watt
P3883	2,000,000 ohms ½ watt
P3884	3,000,000 ohms ½ watt
P3886	5,000,000 ohms ½ watt
P3889	10,000,000 ohms ½ watt
P3891	15,000,000 ohms ½ watt

TRANSFORMERS AND COILS

G6464	Antenna coil assembly
P4308	Oscillator coil
P4323	1st I.F. transformer
P3980	2nd I.F. transformer

VARIABLE RESISTORS

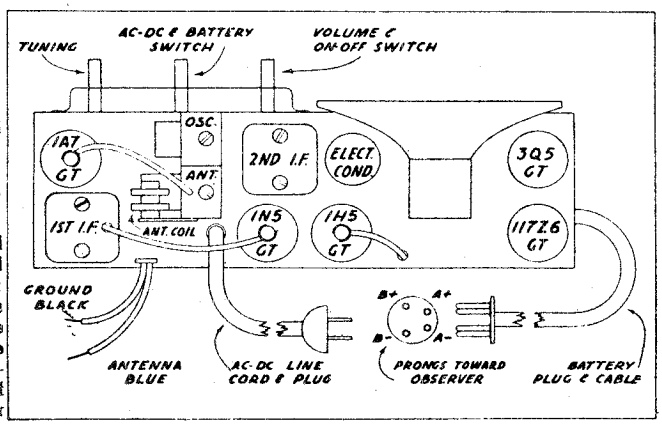
P4309 Volume control and switch

ALIGNMENT DATA

GENERAL DATA The alignment of this receiver requires the use of a signal generator that will cover the frequencies of 455, 600, 1400, and 1730, and an output meter to be connected across the primary or secondary of the output transformer. If possible, all alignments should be made with the volume control on maximum and the signal generator output as low as possible, to prevent the AVC from operating and giving false readings.

I.F. ALIGNMENT Adjust the signal generator to 455 KC and connect the output to the grid of the first detector tube (1A7) through a .05 or .1 mfd. condenser. The ground or the signal generator can be connected to the chassis ground. Align all I.F. trimmers to peak or maximum reading on the output meter.

BROADCAST BAND ALIGNMENT Adjust the signal generator to 1730 KC and connect the output to the antenna lead (Blue) through a .0002 mfd. mica condenser. Set the gang condenser to minimum capacity and adjust the oscillator trimmer to receive this signal. After this has been carefully done, the next step is to set the signal generator to 1400 KC and after tuning in the signal adjust the antenna trimmer to peak. This is all that is necessary for the alignment unless the plates of the gang condenser have been bent out of shape. In case of bent plates, set the signal generator and the receiver to 600 KC and bend the plates into the position for maximum output.



BATTERY OPERATION

This receiver is designed to operate on a single unit General 60B-6L or Burgess 6TA-60. The battery will fit inside the cabinet in back of the chassis.

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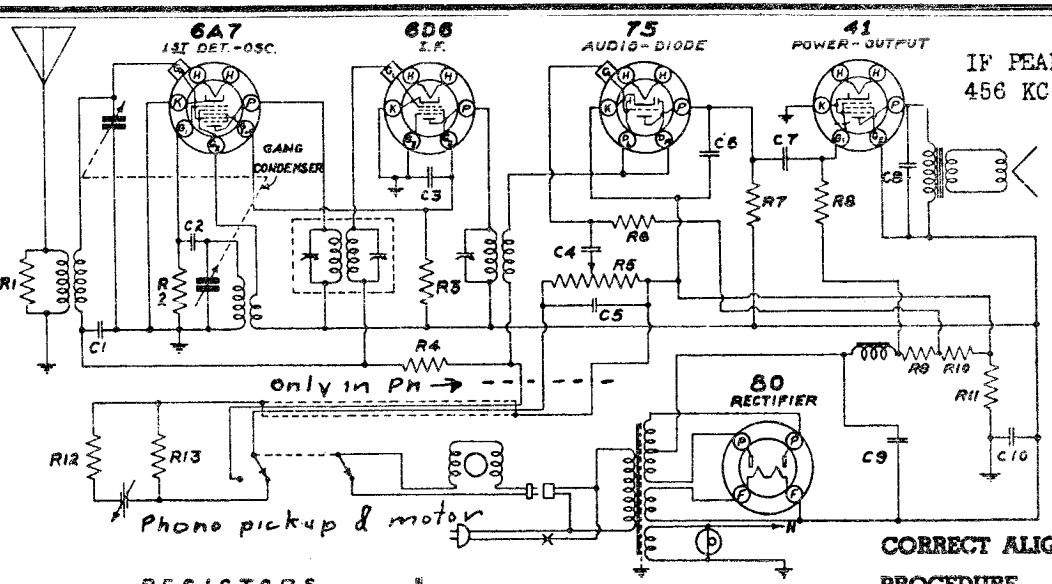
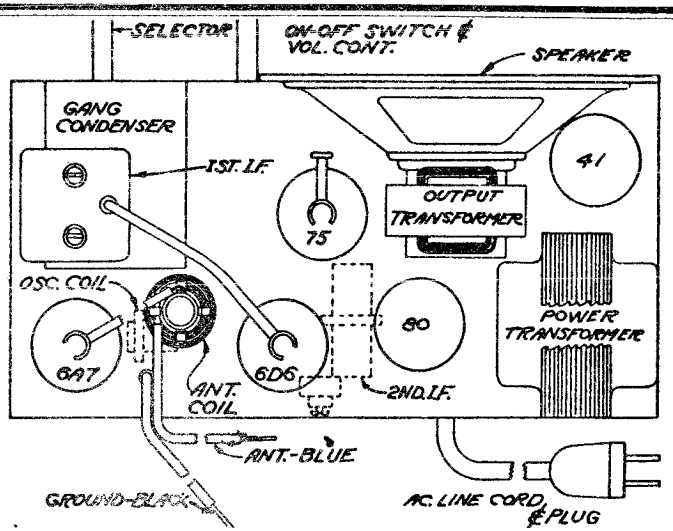




RESISTORS

№	OHMS	WATTS	№	OHMS	WATTS
R1	15,000	¼	R8	500,000	¼
R2	50,000	¼	R9	225 ±10%	½
R3	15,000	¼	R10	40 ±10%	½
R4	2,000,000	¼	R11	170	½
R5	500,000	VOL. CONT.	R12	1,000,000	¼
R6	2,000,000	½	R13	100,000	¼
R7	200,000	¼			

CAPACITORS

№	MFD.	TYPE	№	MFD.	TYPE
C1	.1	200V.	C6	.00025	MICA
C2	.0001	MICA	C7	.01	400V.
C3	.1	400V.	C8	.01	400V.
C4	.01	400V.	C9	8. (ELECT)	300V.
C5	.00025	MICA	C10	8. (ELECT.)	300V.

TRANSFORMERS AND COILS

P2484 1st I.F. Transformer
P2393 Antenna Coil
P2485 2nd I.F. Transformer
P2486 Oscillator Coil
P2453 Power Transformer

MISCELLANEOUS

P2450 Volume Control and Switch
P506 6A7 Tube Socket
P536 6D6 Tube Socket
P521 75 Tube Socket
P1277 41 Tube Socket
P492 80 Tube Socket
P531 Tube Shield Cap
P530 Tube Shield
P533 Tube Shield Base
P929 AC Line Cord
G5648 Dial and Drive Assembly
P1503 Pilot Light Socket
P1504 Pilot Light
P2454 Speaker and Output Transformer
P2459 Walnut Knobs
P2460 Ivory Knobs

PAPER CONDENSERS

P184 .01 Mfd. 400 V.
P142 .10 Mfd. 200 V.
P276 .10 Mfd. 400 V.

CARBON RESISTORS

P258 15,000 Ohm ¼ Watt
P2186 2,000,000 Ohm ½ Watt
P2340 40 Ohm ½ Watt ±10%
P1890 225 Ohm ½ Watt ±10%
P2488 170 Ohm ½ Watt ±10%
P137 500,000 Ohm ¼ Watt
P1220 200,000 Ohm ¼ Watt
P1114 2,000,000 Ohm ¼ Watt
P417 500,000 Ohm ¼ watt

MOULDED MICA CONDENSERS

P480 .0001 Mfd. Mica
P817 .00025 Mfd. Mica

ELECTROLYTIC CONDENSERS

P2456 8 Mfd. 300 W. V.

ADJUSTABLE CONDENSERS

P2448 Gang Condenser

CORRECT ALIGNMENT PROCEDURE

The intermediate frequency (I.F.) stage should be aligned properly as the first step. After the I.F. transformers have been properly adjusted and peaked, the Broadcast Band alignment should be the next procedure

I.F. ALIGNMENT

Adjust the test oscillator to 456 KC and connect the output to the grid of the first detector tube (6A7) through a .05 or .1 mfd. condenser. The ground on the test oscillator can be connected to the chassis ground. Align all three I.F. trimmers to peak or maximum reading on the output meter.

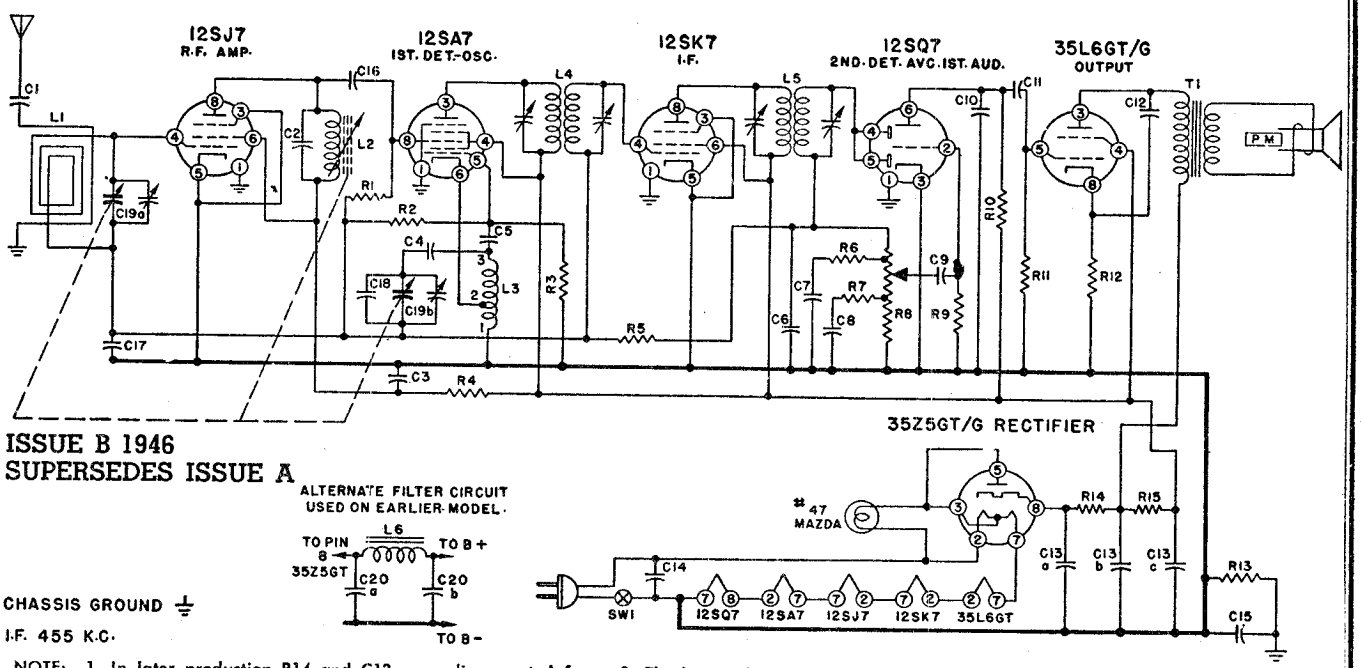
BROADCAST BAND ALIGNMENT

Adjust the oscillator to 1730 KC and connect the output to the antenna lead, through a .0002 mfd. mica condenser. Set the gang condenser to minimum capacity and adjust the gang condenser trimmer (oscillator) to receive this signal. After this has been carefully done, the next step is to set the generator to 1400 KC and after tuning in the signal adjust the antenna trimmer to peak. This is all that is necessary for the alignment unless the plates of the gang condenser have been bent out of shape. In case of bent plates, set the test oscillator and the receiver to 600 KC and bend the plates into the position for maximum output.

Reduce to 9⅞'

MODEL 6A1, Issue B

ADMIRAL CORPORATION



ISSUE B 1946
SUPERSEDES ISSUE A

NOTE: 1. In later production R14 and C13a are disconnected from pin #8 of the 35Z5 and a 33-ohm 1W resistor (R16) is connected from pin #8 to the junction of R14 and C13a. 2. The jumper between pins 4 and 5 on the 12SQ7 is removed and one pin is connected to the secondary of the second I.F. (L5) and the other pin is connected directly to the junction point of R5 and the secondary of the 1st I.F. (L4).

CONDENSERS

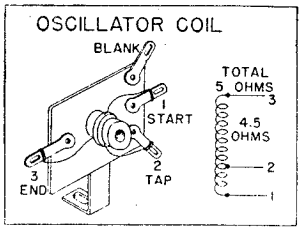
Symbol	Capacity	Type
C-1	.005 mfd	600 V.
C-2	785. mmfd	Mica
C-3	.05 mfd	400 V.
C-4	.02 mfd	400 V.
C-5	50. mmfd	Mica
C-6	250. mmfd	Mica
C-7	.01 mfd	400 V.
C-8	.01 mfd	400 V.
C-9	.01 mfd	400 V.
C-10	500. mmfd	Mica
C-11	.01 mfd	400 V.
C-12	.02 mfd	400 V.
C-13a	30. mfd	Elect. 150 V.
C-13b	30. mfd	Elect. 150 V.
C-13c	20. mfd	Elect. 150 V.
C-14	.05 mfd	400 V.
C-15	.2 mfd	400 V.
C-16	250. mmfd	Mica
C-17	.1 mfd	200 V.
C-18	20. mmfd	Mica
C-19a	420. mmfd	(max.) Var.
C-19b	180. mmfd	(max.) Var.
C-20a	30. mfd	Elect. 150 V.
C-20b	50. mfd	Elect. 150 V.

RESISTORS

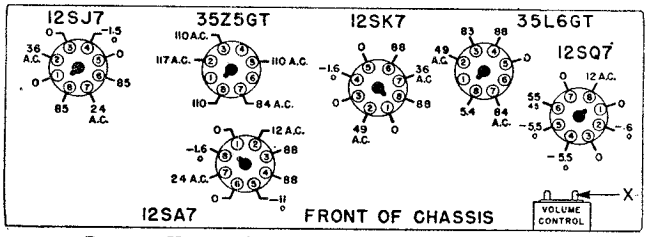
Symbol	Resistance	Type
R-1	10,000 ohms	C½W
R-2	10 meg ohm	C½W
R-3	22,000 ohms	C½W
R-4	100 ohms	C½W
R-5	1 meg ohm	C½W
R-6	47,000 ohms	C½W
R-7	27,000 ohms	C½W
R-8	500,000 ohm Volume Control, (Tapped at 1/3 and 2/3 of Rotation which is 100,000 ohms and 200,000 ohms from the start, due to the taper).	
R-9	5 meg ohm	C½W
R-10	270,000 ohms	C½W
R-11	470,000 ohms	C½W
R-12	150 ohms	C½W
R-13	150,000 ohms	C½W
R-14	150 ohms	C1W
R-15	1,000 ohms	C1W
R-16	33 ohms	C1W

COILS

Symbol	Description
L-1 (Sec. 2.3 ohms)	Loop
L-2 (2.5 ohms)	R. F. Coil
L-3	Osc. Coil
L-4	1st I. F. Trans.
L-5	2nd I. F. Trans.
L-6 (325 ohms)	Choke, Filter



VOLTAGE DATA:—



Bottom View of Chassis, Showing Voltages.

—All readings made between Tube Socket Terminals and Switch Lug on volume control (Point "X" on drawing).

—Measured on a 117 Volt A.C. line.

—Volume control full on.

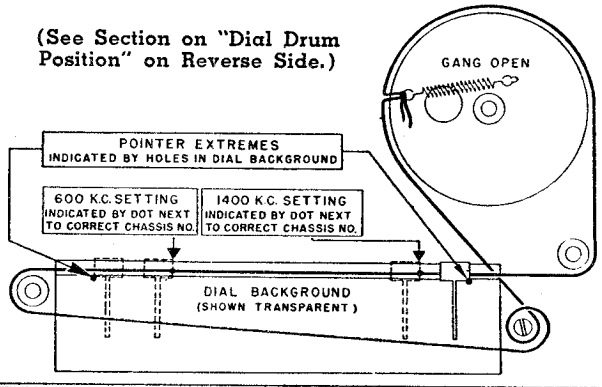
—Dial tuned to low frequency end, no signal.

—Voltages indicated obtained on Vacuum Tube voltmeter.

—A second voltage reading is shown made with a 1000 ohm-per-volt meter when use of this instrument would result in appreciably lower readings.

POINTER SETTINGS AND DIAL CORD STRINGING

(See Section on "Dial Drum Position" on Reverse Side.)


GANG OPEN
POINTER EXTREMES INDICATED BY HOLES IN DIAL BACKGROUND
600 K.C. SETTING INDICATED BY DOT NEXT TO CORRECT CHASSIS NO.
1400 K.C. SETTING INDICATED BY DOT NEXT TO CORRECT CHASSIS NO.
DIAL BACKGROUND (SHOWN TRANSPARENT)

SPECIFICATIONS

POWER SUPPLY:—

110-120 Volts A.C. or D.C.
Frequency 50-60 cycles.
Power Consumption—30 watts.

CIRCUIT:—

Chassis 6A1 A.C.—D.C. 6 Tube Superheterodyne, with R.F. stage; Single tuning range, 540 Kc. to 1630 Kc., covering standard broadcast band; built-in AEROSCOPE loop antenna, with provision for connecting an external antenna.

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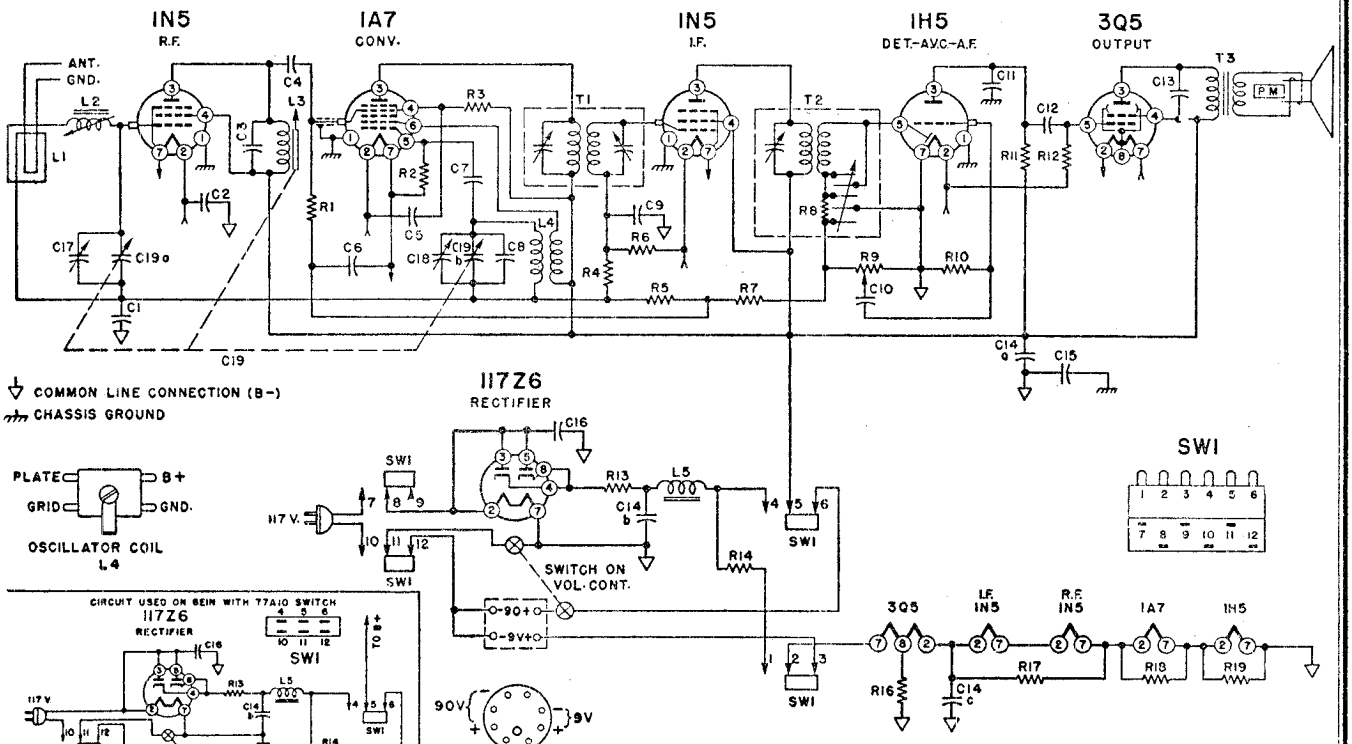
For Alignment and Parts, see P.15-12

MODELS 6B1, 6E1N

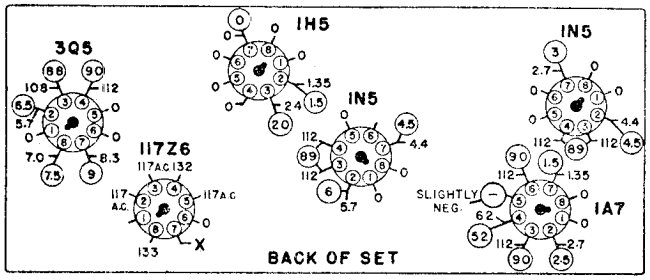
ADMIRAL CORPORATION



NOTES: I.F.= 455 K.C.
Power change switch (SWI) shown in battery operation position.
In earlier models (L2) was fixed.

ISSUE A 1946

VOLTAGE CHART



VOLTAGE DATA

1. Voltage readings circled (O) are for Battery Operation.
2. All reading made between Tube Socket Terminals and Terminal No. 7 on the 117Z6 (Point (X) on Voltage Chart).
3. A.C. Voltages measured on a 117 Volt A.C. line.
4. Battery Voltages measured with a fresh battery.
5. Dial turned to low frequency end, no signal.
6. All Voltages measured with a 1000 ohm per volt meter.

CONDENSERS

Symbol	Description	Part No.
C1	.05 Mfd. 200 Volt Paper	64B1-32
C2	.25 Mfd. 200 Volt Paper	64B1-28
C3	.00042 Mfd. Mica	65B1-9
C4-C11	.00025 Mfd. Mica	65B5-22
C5, C6, C9, C10, C12	.01 Mfd. 400 Volt Paper	64B1-25
C7	.00005 Mfd. Mica	65B5-11
C8	.000015 Mfd. Mica	65B5-3
C13	.002 Mfd. 600 Volt Paper	64B1-9
C14a	50 Mfd. 150 Volt	67C7-42
C14b	30 Mfd. 150 Volt Elect. Cond.	
C14c	100 Mfd. 25 Volt	
C15	.2 Mfd. 400 Volt Paper	64A2-1
C16	.05 Mfd. 400 Volt Paper	64B1-22
C17	Antenna Trimmer	66A12-5
C18	Oscillator Trimmer (Part of Gang)	
C19 (C19a, C19b)	Condenser Gang	68B4

RESISTORS

R1	100,000 Ohms ½ Watt Carbon	60B8-104
R2	220,000 Ohms ½ Watt Carbon	60B8-224
R3	47,000 Ohms ½ Watt Carbon	60B8-473
R4, R5	4.7 Megohms ½ Watt Carbon	60B2-475

RESISTORS

Symbol	Description	Part No.
R6	4.7 Megohms ½ Watt Carbon	60B2-475
R7	3.3 Megohms ½ Watt Carbon	60B2-335
R8	50,000 Ohms ½ Watt Carbon	60B8-503
R9	1 Megohm Volume Control	75B1-100
R10	15 Megohms ½ Watt Carbon	60B2-156
R11	1 Megohm ½ Watt Carbon	60B2-105
R12	2.2 Megohms ½ Watt Carbon	60B2-225
R13	22 Ohms Wire Wound ½ watt	61A2-2
R14	2,450 Ohms Wire Wound 5 watt	61A3-5
R16	1,500 Ohms ½ Watt Carbon	60B8-152
R17	560 Ohms ½ Watt Carbon	60B8-561
R18	220 Ohms ½ Watt Carbon	60B8-221
R19	120 Ohms ½ Watt Carbon	60B8-121

COILS & TRANSFORMERS

L2	Coil, Loop Loading, (fixed) (early)	AA114
	Coil, Loop Loading, (variable) (late)	AA115
L3	Iron Slug for plate coil	71B1-3
	Coil, Plate	70A1-30
L4	Oscillator Coil	69A7
L5	Choke Filter	74A5
T1	1st I.F. Transformer	72B9-2

COILS & TRANSFORMERS

Symbol	Description	Part No
T2	2nd I.F. Transformer	72B10-2
T3	Transformer, Output (When ordering furnish all numbers appearing on both the speaker and the transformer.)	
SW1	Switch, Power Change (6EI)	77A6
	Switch, Power Change (6EIN)	77A10

MISCELLANEOUS

Dial background	21A18-2
Dial Cord, 12"	50A1-3
Dial Cord Tension Spring	19A1-2
Dial Scale, Glass	23C11-1
Escutcheon	23C11-2
Knob, Tuning	33A14-4
Knob, Volume	33A14-3
Plug, Battery (9 prong)	88A3-3
Pointer, Tan Tenite	25A14-2
Rubber liner for Dial Scale	23C11-3
Speaker Grill	36A2
Speaker & Output Transformer	78B8
Tube Shields	87A8

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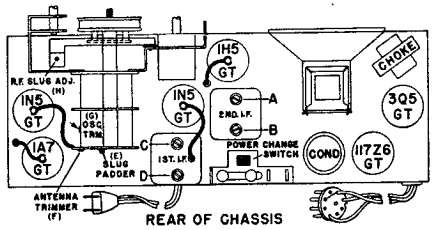
ALIGNMENT PROCEDURE

1. Be sure both set and signal generator are thoroughly warmed up before starting alignment.
2. Make alignment using a battery whenever possible.
3. Disconnect Loop Antenna leads from clips on set and remove chassis from cabinet.
4. Connect a 50,000 ohm carbon resistor across the two clips from which the Loop Antenna was removed.
5. Connect Output Meter across the Voice Coil.
6. Connect a fresh battery to the set.
7. Turn receiver Volume Control full on.

Dummy Antenna Used in Series with Signal Generator	Connect High Side Signal Generator to	Signal Generator Frequency	Receiver Gang Setting	Trimmer Designation and Description	Type of Adjustment
(1) .00025 Mfd. when using A.C. .1 Mfd. when using Battery	Grid Cap 1A7	455 K.C.	Any point where it does not affect Signal	2nd I.F. (A), (B). 1st I.F. (C), (D).	Maximum Deflection Then repeat
(2) .00025 Mfd. when using A.C. .1 Mfd. when using Battery	Grid Cap 1N5	1620 K.C.	Tuning Gang Wide Open	Oscillator Trimmer (G)	Maximum Deflection
(3) .00025 Mfd. when using A.C. .1 Mfd. when using Battery	Grid Cap 1N5	1400 K.C.	Tune in Generator Signal	R.F. Slug (H)	Maximum Deflection
(4)	Replace Set in Cabinet				
(5) .00025 Mfd.	Antenna and Ground Leads	1400 K.C.	Tune in Generator Signal	Antenna Trimmer (F)	Maximum Deflection
(6) Disregard the next two steps if the set being aligned is one of the earlier models with a fixed loop loading coil (L2)					
(7) .00025 Mfd.	Antenna and Ground Leads	600 K.C.	Tune in Generator Signal	Loop Loading Coil Slug (E)	Maximum Deflection
(8) .00025 Mfd.	Antenna and Ground Leads	1400 K.C.	Tune in Generator Signal	Reset Antenna Trimmer (F)	Maximum Deflection

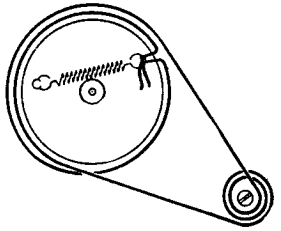
Seal adjusting screw on the loop loading coil with any quick drying cement.

TUBE AND TRIMMER LAYOUT



REAR OF CHASSIS

DIAL CORD STRINGING



CIRCUIT CHANGE TO ELIMINATE HUM IN PORTABLE 6E1 CHASSIS

Early production 6E1 chassis sometimes have a rough modulation hum whenever the user's hand is near to or touches certain parts of the cabinet. This happens only when the set is operated on AC power lines.

In most cases this hum can be eliminated or greatly reduced by reversing the power cord plug at the electric outlet. However, we have reports that some sets in some locations still hum excessively even though the line cord plug is reversed.

As soon as this condition was discovered, we changed the circuit slightly on our production line. This change completely eliminates the difficulty. The change is as follows:

The low ends of the loop aerial and variable condenser are disconnected from the AVC circuit and connected to the chassis. A .00025 mica condenser is connected in series with the grid of the 1N5 R.F. tube, and the grid is connected to the AVC circuit through a one megohm resistor.

If any sets are giving this trouble in the field, the circuit change can be easily made without removing the chassis by mounting a small terminal strip for the new parts on the back of the plate which is on the gang condenser. The procedure is as follows:

1. Remove the 1A7GT tube.
2. Remove the left hand screw that holds the mounting plate to the gang condenser. Install the terminal strip with this screw.
3. Mount the condenser (.00025 mfd.) and resistor (1 meg.) on strip. Connect them in series.
4. Remove the green grid lead of the 1N5GT tube from the trimmer condenser and connect it to the junction of the .00025 mfd. condenser and the 1 megohm resistor.
5. Connect the other end of the .00025 mfd. condenser to the trimmer terminal from which the green lead was removed.
6. Disconnect the orange wire that now goes to the lug on the tuning condenser and connect it to the open end of the 1 meg. resistor.
7. Connect a short wire from the tuning condenser stator to chassis.

REPLACING R.F. TUNING SLUG

If the R.F. Tuning Slug has to be changed use the following procedure. Set the gang condenser to the point where the plates are fully meshed. Screw the slug adjusting screw about halfway down. Place the slug in the coil in such a position that the top of the slug is flush with the top of the coil. Solder the slug wire to the adjusting screw. Be sure that the position of the slug does not change during the soldering and that the slug wire is straight. Proceed to realign the set as shown in the chart.

MODEL M6

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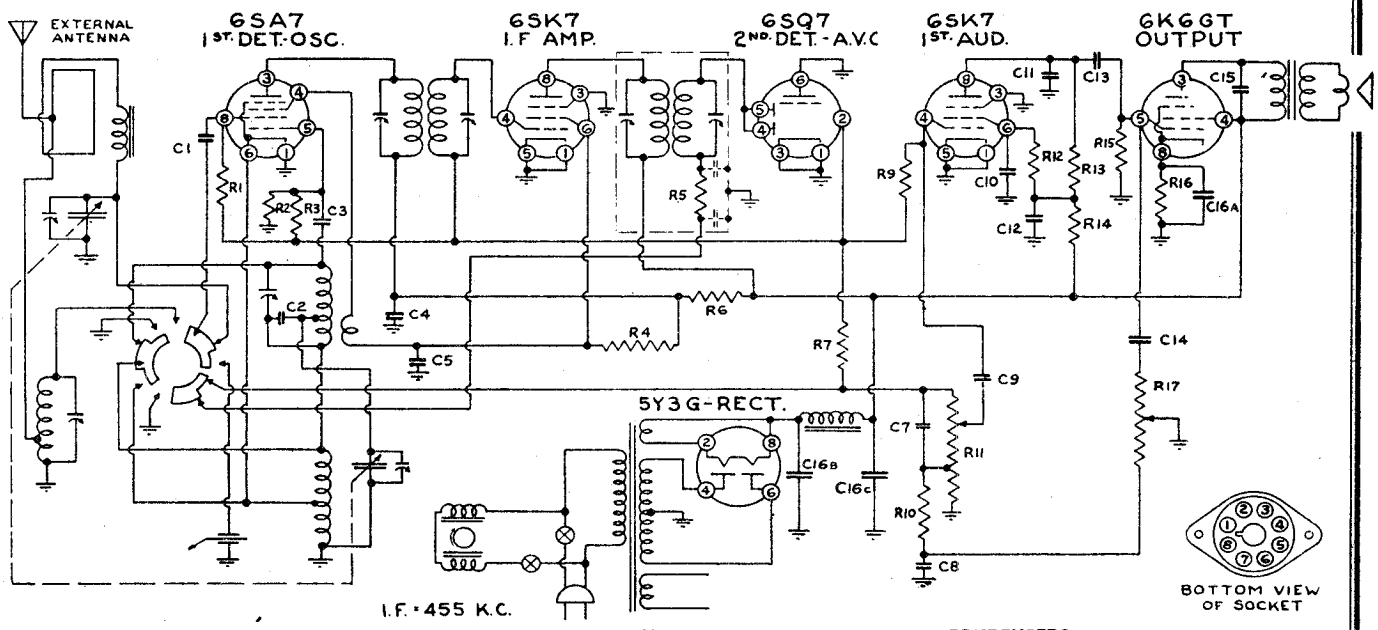

RESISTORS

No.	Ohms	Watts	No.	Ohms	Watts
R1	2,000,000	½	R10	20,000	½
R2	20,000	½	R11	500,000	V.C.
R3	10,000,000	½	R12	1,000,000	½
R4	15,000	1	R13	200,000	½
R5	70,000	½	R14	50,000	½
R6	100,000	½	R15	500,000	½
R7	1,000,000	½	R16	600,000	½
R8	1,000,000	½	R17	500,000	T.C.
R9	1,000,000	½			

CONDENSERS

No.	Capacity (Mfd.)	Volts	No.	Capacity (Mfd.)	Volts
C1	.00025	Mica	C10	.05	400
C2	.00025—5%	Mica	C11	.00025	Mica
C3	.00005	Mica	C12	.1	400
C4	.05	400	C13	.01	400
C5	.05	400	C14	.002	400
C6	.05	200	C15	.005	400
C7	.00025	Mica	C16a	20.	25
C8	.02	200	C16b	20.	350
C9	.01	400	C16c	20.	350

R8 and C6 were used only on early models.

Speaker (Part No. P5078) 10" Dyn.

D.C. voice coil resistance.....3.7 ohms
Field coil (hot) .....1000 ohms

B.C. and S.W. Oscillator Coil (Part No. P4804)

Looking at the mounting strip end in a clockwise direction starting at the chassis, the terminals are: No. 1, S.W. pri.; No. 2, B.C. pri.; other end, No. 3, B.C. tap; No. 4, S.W. pri.; No. 5, S.W. sec.; No. 6, S.W. sec. tap; No. 7, S.W. and B.C. sec:

S.W. Primary—No. 4 and No. 1—
Resistance ..... .2 ohm

S.W. Secondary—No. 7 and No. 5—
Resistance ..... .11 ohm

B.C. Primary—No. 2 and No. 3—
Resistance ..... .3 ohm

B.C. Secondary—No. 3 and No. 7—
Resistance ..... 3.7 ohms

First I.F. Transformer (Part No. P-4108)

Primary—Blue, plate; red, B+
Resistance .....18.2 ohms

Secondary—White, grid; black, AVC
Resistance .....15.1 ohms

Second I.F. Transformer (Part No. P-4858)

Primary—Blue, plate; red, B+
Resistance .....20.8 ohms

Secondary—White, diode; other end inside can
Resistance .....17.4 ohms

VOLTAGE CHART

All voltages measured with a 20,000 ohm per volt meter on the 300 volt scale. Line voltage 117 volts A.C. Volume control maximum and no signal tuned in. Power consumption 70 watts.

	Volts
6SA7 TUBE	
Plate (3) to ground	270
Screen (4) to ground	105
6SK7 (I.F.) TUBE	
Plate (8) to ground	270
Screen (6) to ground	105
6SK7 (A.F.) TUBE	
Plate (8) to ground	64
Screen (6) to ground	23
6K6GT TUBE	
Plate (3) to ground	270
Screen (4) to ground	245
Cathode (8) to ground	19
6X5GT TUBE	
Filament (8) to ground	340

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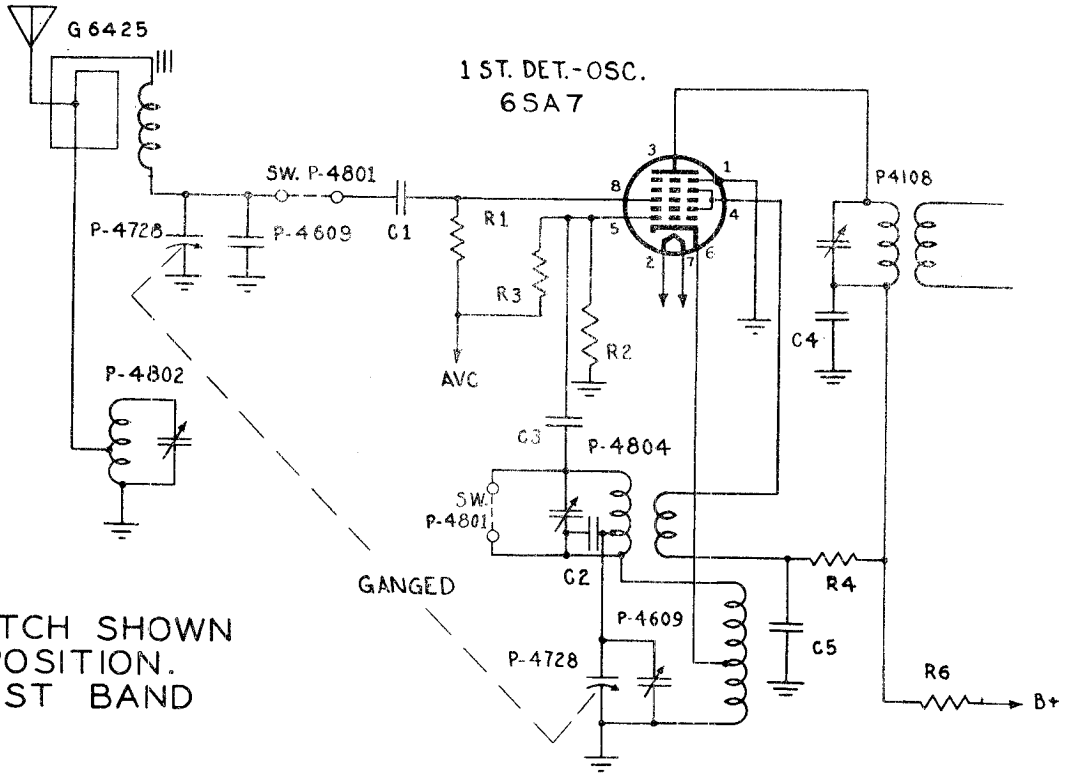
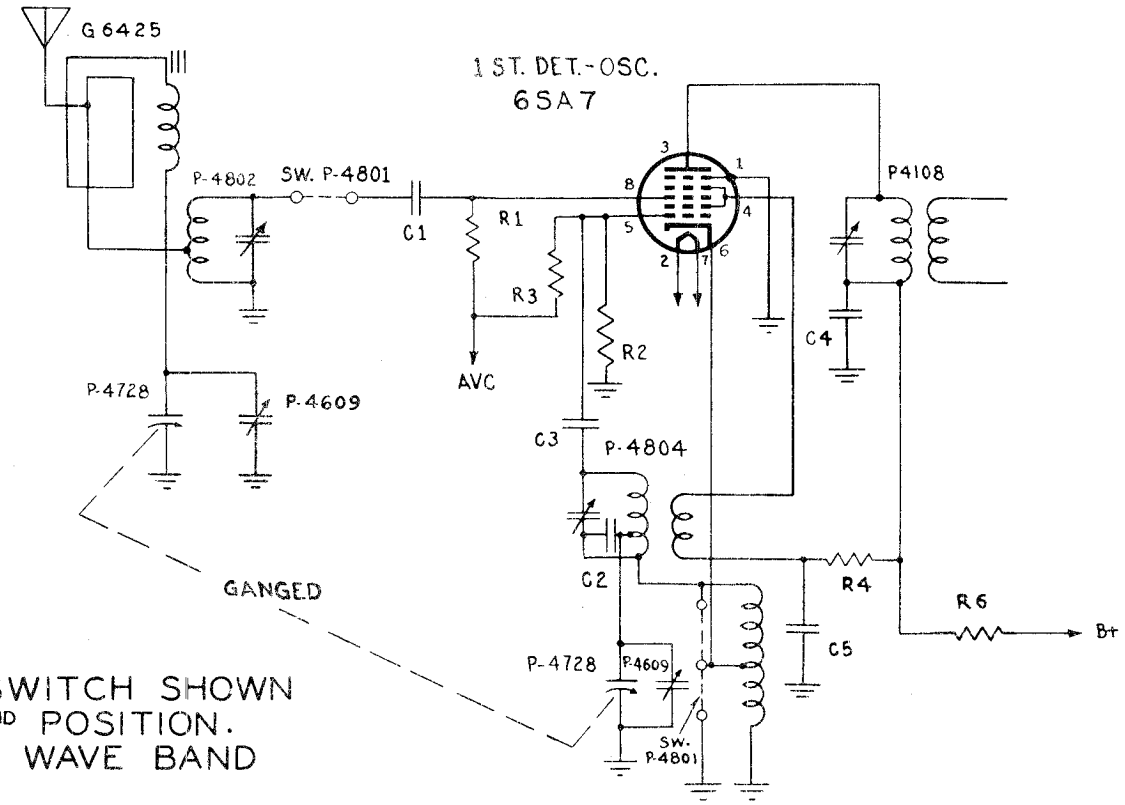
MODEL M6



BAND-SWITCH SHOWN AT 1ST POSITION. BROADCAST BAND



BAND-SWITCH SHOWN AT 2ND POSITION. SHORT WAVE BAND

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MODEL M6

ADMIRAL CORPORATION

ALIGNMENT DATA

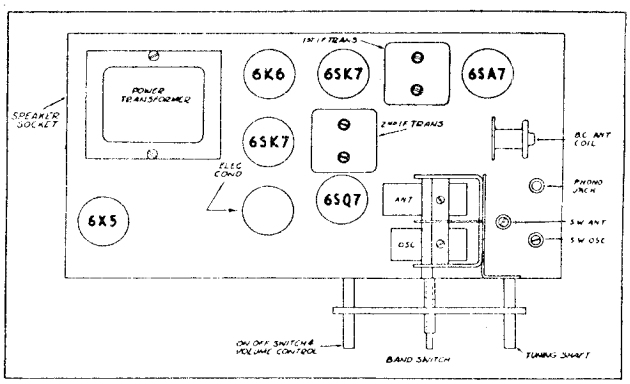

Fig. 2—Top View of Chassis

All of the adjustments have been very carefully set with signal generators at the factory and require no further adjustment, unless it becomes necessary to replace a coil or transformer, or if the adjustments have been tampered with in the field. Under no circumstances attempt any adjustments without first making certain that adjustment is necessary and only after voltages, tubes and condensers have been checked and found to be normal.

The alignment of this receiver requires the use of a signal generator that will cover the frequencies of 455, 1400, 1630 and 9500 kc., and an output meter to be connected across the primary or secondary of the output transformer. All alignments should be made with the volume control in the maximum position, to prevent the AVC from operating and giving false readings.

I.F. ALIGNMENT

Adjust the signal generator to 455 KC and connect the output to the grid of the first detector tube (6SA7) through a .05 or .1 mfd. condenser. Align all I. F. trimmers to peak or maximum reading on the output meter.

B.C. AND S.W. BAND ALIGNMENT

Disconnect loop leads and set the band switch to the broadcast position. Adjust signal generator to 1630 K.C. and connect thru a .0002 mfd. mica condenser to the green loop lead. Set the gang condenser to minimum capacity and adjust the B.C. oscillator trimmer (see fig. 2) to receive this signal. Set the band switch to the short wave position, adjust the signal generator to exactly 9,500 K.C. and connect thru a 400 ohm resistor to the green loop lead. Set the dial pointer at 9.5 megacycles and carefully peak S.W. oscillator trimmer and then peak S.W. antenna trimmer. Re-install chassis in cabinet and connect loop leads. Set the band switch to the broadcast position. Adjust the signal generator to 1400 K.C. and connect the output to a shielded loop radiator and place this loop about two feet from the loop antenna. If no loop radiator is available the output of the signal generator should be connected to the green loop lead thru a .0002 mfd. mica condenser. Tune signal and carefully peak the B.C. antenna trimmer.

PAPER CONDENSERS

P904	.002 mfd. 600 volt	
P1322	.005 mfd. 600 volt	
P164	.01 mfd. 400 volt	
P393	.02 mfd. 200 volt	
P148	.05 mfd. 200 volt	
P334	.05 mfd. 400 volt	
P276	.1 mfd. 400 volt	

MICA CONDENSERS

P1382	.00005 mfd.	
P817	.00025 mfd.	
P4806	.00025 mfd. 5%	

ELECTROLYTIC CONDENSERS

P4130	20 mfd. 25 volt 20 mfd. 350 volt 20 mfd. 350 volt	

VARIABLE CONDENSERS

P4728	Gang condenser	
P4609	Trimmer condenser	

RESISTORS

P3800	100 ohm ½ watt	
P3821	600 ohm ½ watt	
P4807	15,000 ohm 1 watt	
P3844	20,000 ohm ½ watt	
P3853	50,000 ohm ½ watt	
P3864	200,000 ohm ½ watt	
P3876	500,000 ohm ½ watt	
P3882	1,000,000 ohm ½ watt	
P3883	2,000,000 ohm ½ watt	
P3889	10,000,000 ohm ½ watt	

VARIABLE RESISTORS

P4089	Volume control and switch
P4729	Tone control
RC4010	Record changer mounting spring
RC7017	Record changer mounting screw
RC6008	Needle
RC3020	Center post
RC50	Record changer (60 cycle)
RC51	Record changer (50 cycle)
P3948	Chassis mounting screw

TRANSFORMERS AND COILS

G6425	B.C. antenna coil
P4802	S.W. antenna coil
P4804	B.C. and S.W. oscillator coil
P4108	1st I.F. transformer
P4858	2nd I.F. transformer
P3926	Filter choke
P4512	Power transformer (60 cycle)
P4513	Power transformer (50 cycle)

MISCELLANEOUS

P3005	Tube socket
P945	Speaker socket
P4138	Electrolytic mounting base
P4404	Phono jack
P929	Line cord
P3557	Line cord clamp
P4800	Dial background
	Pointer; order by name and model number
P4179	Drive shaft
P1399	Horseshoe washer (for drive shaft)
P1587	Spring washer (for drive shaft)
P2925	Takeup spring
	Knobs; order by name and model number
P4205	Band switch lever
P4197	Pilot light socket
P1713	Pilot light bulb
P4248	Pilot light reflector
P4801	Band switch
P4805	10" PM speaker and output transformer
P4784	Phono cable
P4542	Phono motor AC cord

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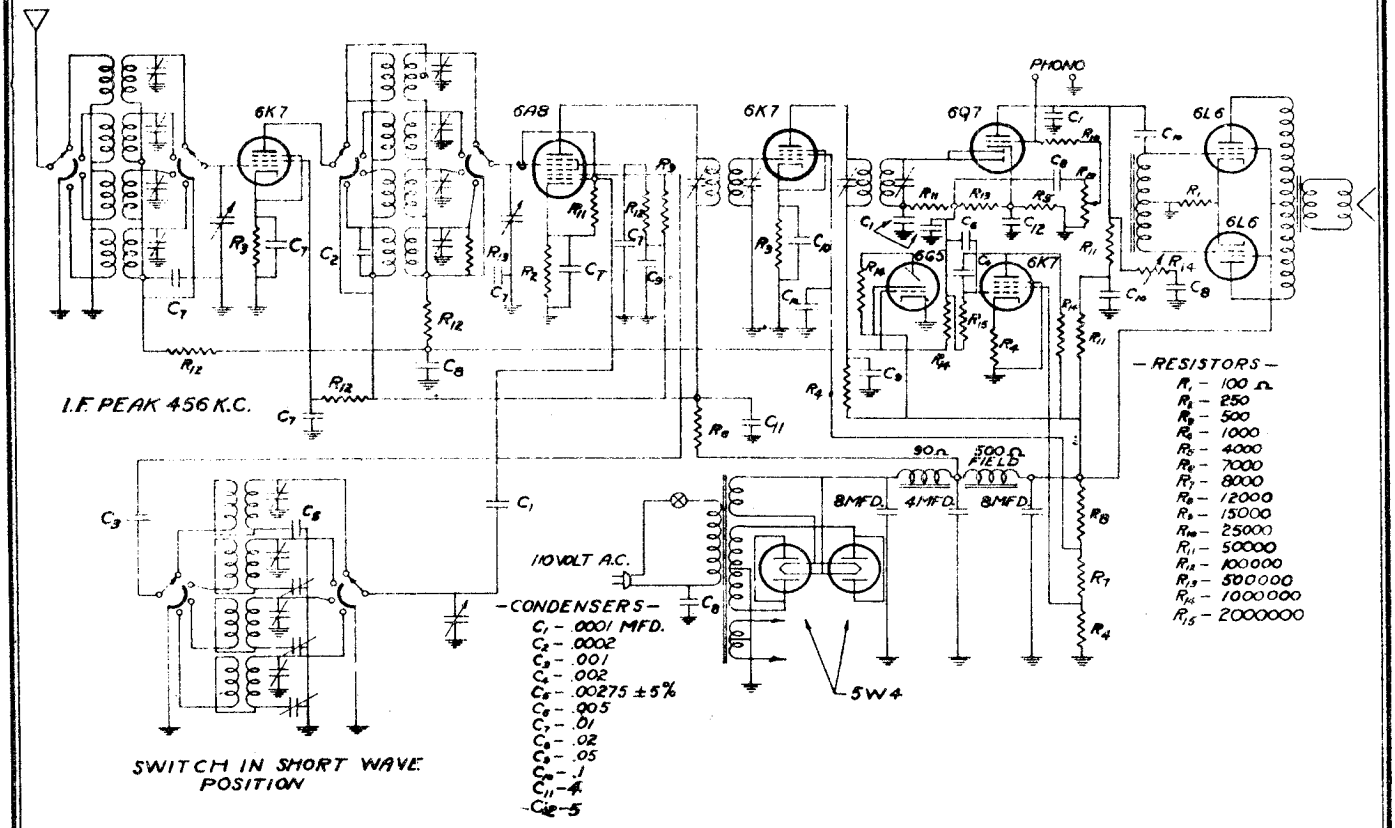
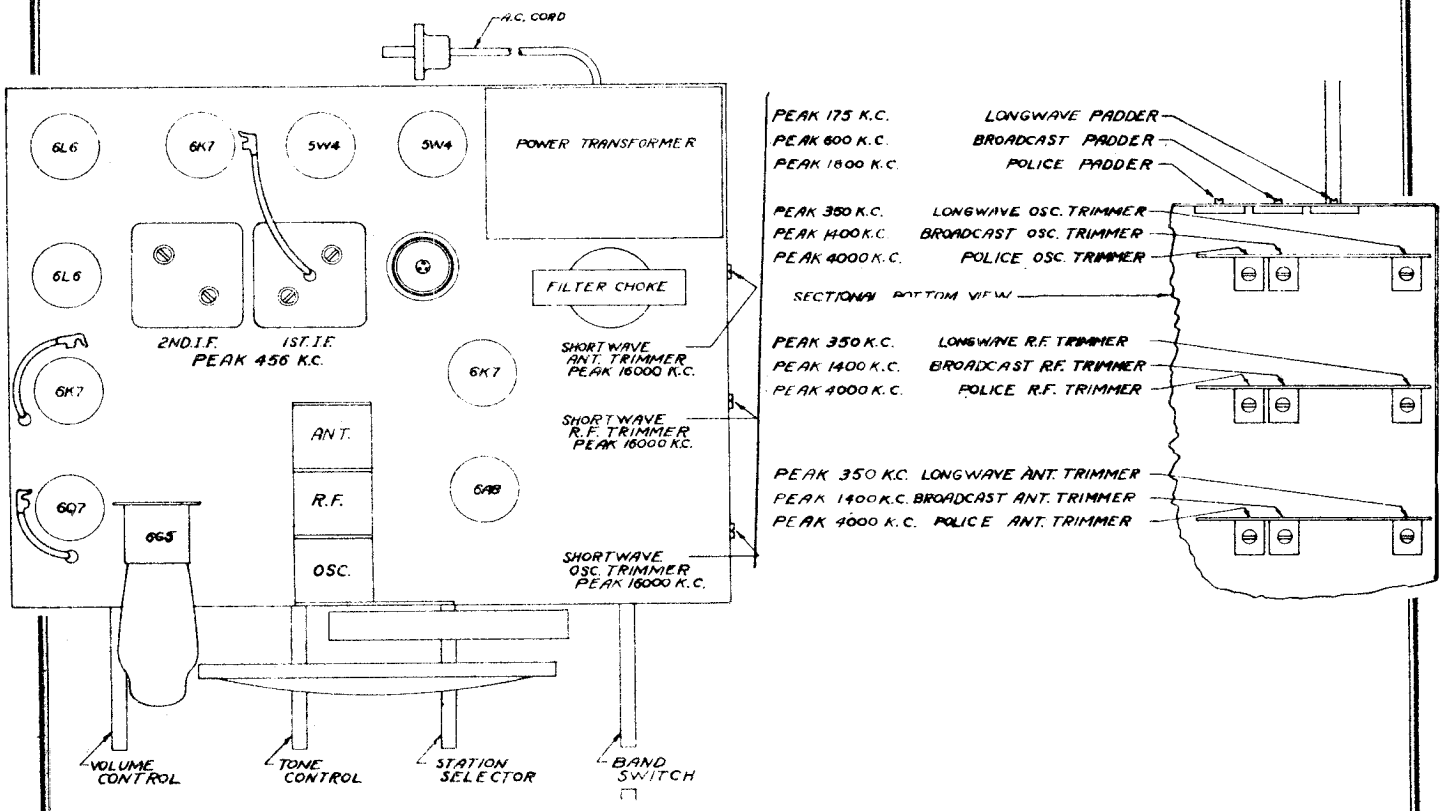
MODEL AM6





For Clarified Schematics, see Pp. 15-2 and 15-3

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MODEL 7K

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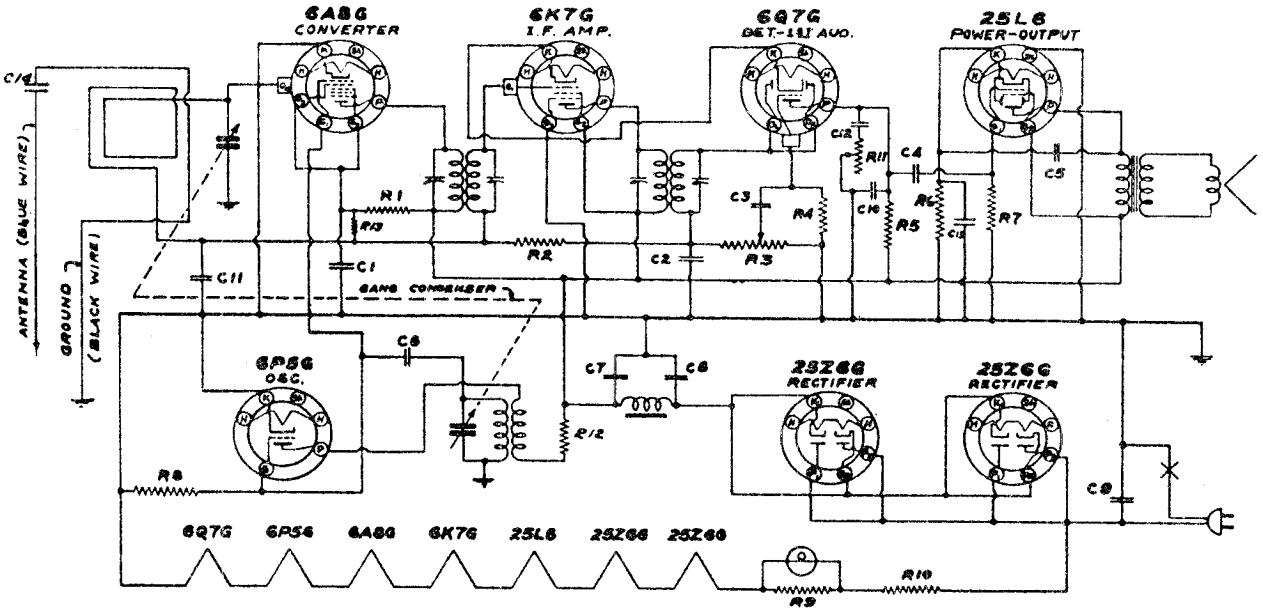


CAPACITORS

NO	Mfds.	VOLTS	NO	Mfds.	VOLTS
C1	.01	400	C8	20.0	150
C2	.00025	MICA	C9	.05	400
C3	.01	400	C10	.0005	MICA
C4	.01	400	C11	.05	200
C5	.005	600	C12	.008	600
C6	.00008	MICA	C13	20.0	25
C7	20.0	150	C14	.001	400

RESISTORS

NO	OHMS	WATTS	NO	OHMS	WATTS
R1	10,000	½	R7	½ MEG	½
R2	.2 MEG.	½	R8	50,000	½
R3	½ MEG.	VOL. CONT.	R9	30	7
R4	.5 MEG.	½	R10	42	7
R5	250,000.	½	R11	500,000	TONE C.
R6	150	½	R12	1000	½
			R13	13 MEG	½

I.F. – 455 K.C.

SCHEMATIC DIAGRAM
MODEL 7K

SERVICE INFORMATION

Speaker (Part No. P3284)

Field resistance ..... 450 ohms

D.C. voice coil resistance ..... 4.6 ohms

Voice coil impedance at 400 cycles ..... 5 ohms

Oscillator Coil (Part No. P3682)

Looking at the connection end (with dot) in a clockwise direction starting at the chassis the terminals are No. 1, grid;

Primary—No. 2 and No. 3—Resistance 1.5 ohms.

Secondary—No. 4 and No. 1—Resistance 4.5 ohms.

First I.F. Transformer (Part No. P3282)

Primary—Blue white, plate; red white B+—Resistance 24.2 ohms.

Secondary—White, grid; black white, AVC—Resistance 23.6 ohms.

Second I.F. Transformer (Part No. P3283)

Primary—Blue white, plate; red white, B+—Resistance 11.9 ohms.

Secondary—White, grid; black white, AVC—Resistance 16.9 ohms.

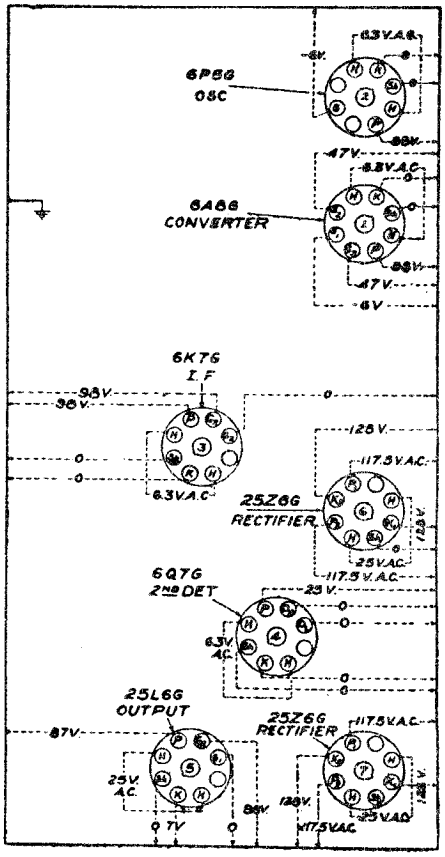
Electrolytic Condenser (Part No. P3531)

Red, 20 mfd., 150 volt; green, 20 mfd., 150 volt; yellow, 20 mfd., 25 volt; black, negative for all three sections.

Loop Antenna

Since the loop antenna acts also as the antenna coil the set will not operate with the loop antenna disconnected.

VOLTAGES AT SOCKETS



Bottom View of Chassis

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MODEL 7K

ALIGNMENT PROCEDURE

- Volume control—Maximum all adjustments.
- Connect radio chassis to ground post of signal generator with a short heavy lead.
- Connect dummy antenna value in series with generator output lead.
- Connect output meter across primary of output transformer.
- Allow chassis and signal generator to "heat up" for several minutes.

The following equipment is required for aligning:

- An all wave signal generator which will provide an accurately calibrated signal at the test frequencies as listed.
- Output indicating meter.
- Non-metallic screwdriver.
- Dummy antennas—.1 mfd., 200 mmf.

BAND	SIGNAL GENERATOR Frequency Setting	Dummy Antenna	Connection to Radio	Variable Condenser Setting	Trimmers Adjusted (In Order Shown)	Trimmer Function	Adjustment
I. F.	455 KC.	.1 MFD.	Grid of 6K7G I.F. tube	Rotor full open (Plates out of mesh)	Two trimmers on top (See Fig. 2)	Output I.F.	Adjust to maximum output
	455 KC.	.1 MFD.	Grid of 6A8G tube	Rotor full open (Plates out of mesh)	Two trimmers on top (See Fig. 2)	Input I.F.	Adjust to maximum output
BROAD-CAST	1730 KC.	200 mmf.	Antenna lead	Rotor full open (Plates out of mesh)	Trimmer—Top of Left section of gang (See Fig. 2)	Oscillator	Adjust to maximum output
	1400 KC.	200 mmf.	Antenna lead	Set dial at 1400 KC.	Trimmer—Top of Right section of gang (See Fig. 2)	Antenna	Adjust to maximum output

This is all that is necessary for the alignment unless the plates of the gang have been bent out of shape. In case of bent plates, set the signal generator and receiver to 600 KC and bend the plates into the position for maximum output.

Attenuate the signal from the signal generator to prevent the leveling off-action of the AVC. After each band is completed, repeat the procedure as a final check.

FREQUENCY RANGE

540 to 1630 KC

Power output 1 watt undistorted—1.7 watts maximum.

Intermediate Frequency 455 KC.

Power Consumption—50 watts.

REPLACEMENT PARTS LIST

PAPER CONDENSERS

P3203	C14	.001 mfd. 600 volt
P1322	C5, C12	.005 mfd. 600 volt
P334	C9	.05 mfd. 400 volt
P148	C11	.05 mfd. 200 volt
P164	C1, C3, C4	.01 mfd. 400 volt

MICA CONDENSERS

P817	C2	.00025 mfd.
P1382	C6	.00005 mfd.
P336	C10	.0005 mfd.

ELECTROLYTIC CONDENSERS

P3531	C7 C8, & C13	20 mfd. 150 volt
		20 mfd. 150 volt
		20 mfd. 25 volt

VARIABLE CONDENSERS

P3522	Gang Condenser and Tuner

RESISTORS

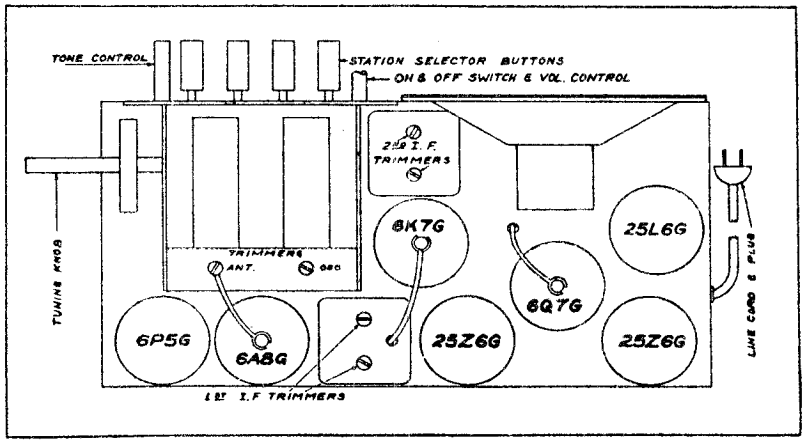
P3444	R9	30 ohm 7 watt
P3277	R10	42 ohm 7 watt
P3803	R6	150 ohm ¼ watt 10%
P3828	R12	1,000 ohm ¼ watt
P3841	R1	10,000 ohm ¼ watt
P3853	R8	50,000 ohm ¼ watt
P3868	R5	250,000 ohm ¼ watt
P3876	R7	500,000 ohm ¼ watt
P3883	R2	2,000,000 ohm ¼ watt
P3886	R4	5,000,000 ohm ¼ watt
P3891	R13	15,000,000 ohm ¼ watt

VARIABLE RESISTORS

P3527	R3	Volume Control and Switch.
P3528	R11	Tone Control

TRANSFORMERS AND COILS

P3682	Oscillator Coil
P3282	1st I. F. Transformer
P3283	2nd I. F. Transformer
P3278	Output Transformer
P2294	Pulley for Dial Bracket
P2325	Dial Takeup Spring
P3525	Dial Background
P2965	Dial Pointer
P470	Grid Clip
P1713	Pilot Light Bulb
P3681	Pilot Light Socket
G6081	Loop Antenna Assembly
P3284	Speaker
P3088	Rubber Speaker Ring
P3096	Call Letter Sheet
P3073	Push Button
P3078	Felt Washer (For Push Buttons)
P3644	Tuning Knob
P3358	Volume or Tone Knob
P3684	Escutcheon
P3089	Dial Clip
P3090	Escutcheon Screw
P3685	Dial Scale
P3635	Pressed Paper Back
P3673	Chassis Mounting Screw



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MODEL 7KS

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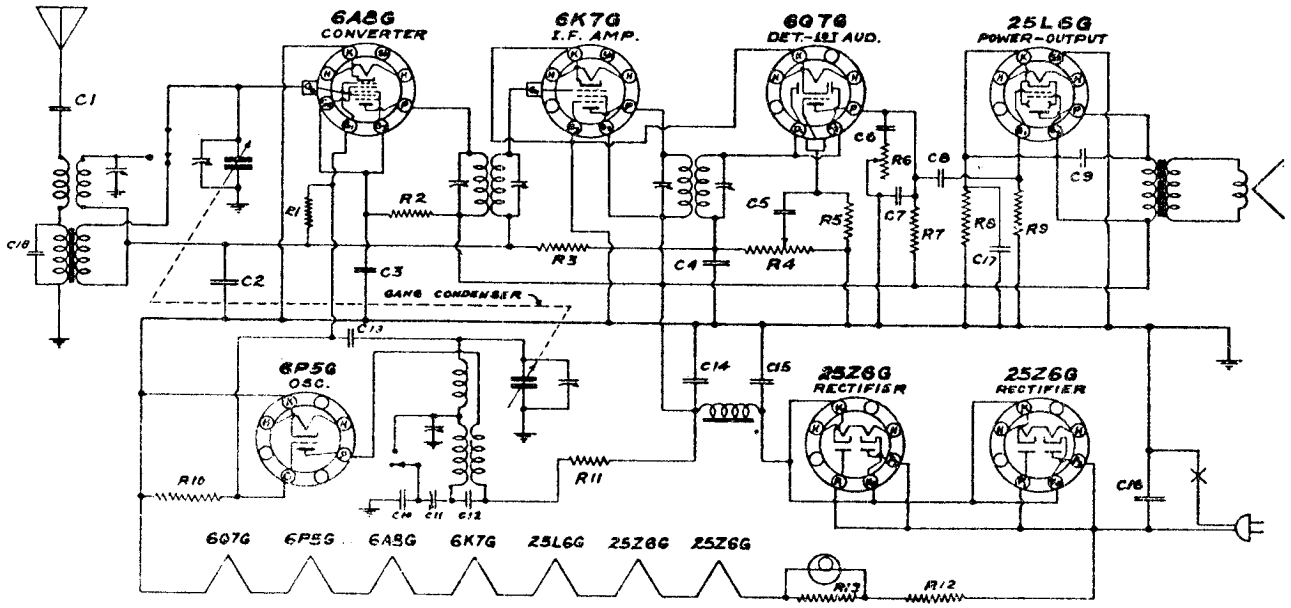


CAPACITORS

№	Mfds.	VOLTS	№	Mfds.	VOLTS
C1	.002	600	C10	.0022 ±5% MICA	
C2	.05	400	C11	.00062 VAR. PAD.	
C3	.01	400	C12	.005	600
C4	.00025	MICA	C13	.00005	MICA
C5	.01	400	C14	25.0	150
C6	.005	600	C15	25.0	150
C7	.0005	MICA	C16	.05	400
C8	.01	400	C17	20.0	25
C9	.005	600	C18	.00005	MICA

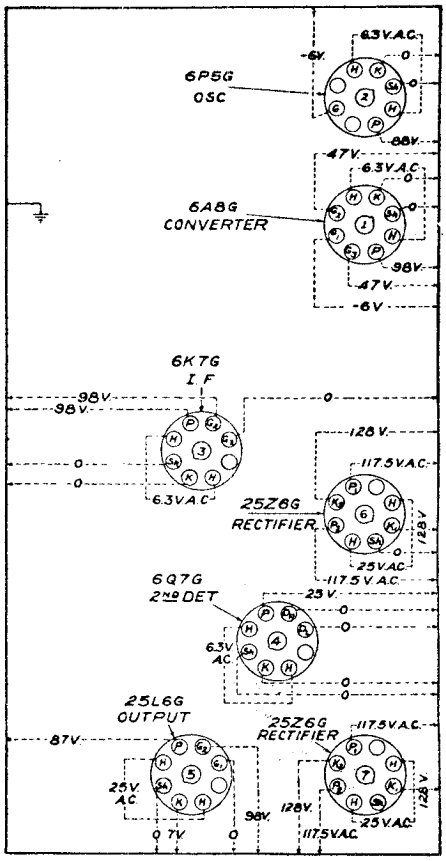
RESISTORS

№	OHMS	WATTS	№	OHMS	WATTS
R1	15 Meg.	½	R8	150	½
R2	10K.	½	R9	½ Meg.	½
R3	2 Meg.	½	R10	30K	½
R4	½ Meg.	V.C.	R11	10K	½
R5	.5 Meg.	½	R12	42	7
R6	½ Meg.	T.C.	R13	30	7
R7	½ Meg.	½			

SWITCHES IN BROADCAST POSITION

I.F. 455 K.C.

VOLTAGES AT SOCKETS



Bottom View of Chassis

Speaker (Part No. P3638)
Field resistance ..... 300 ohms
D.C. voice coil resistance ..... 4.6 ohms
Voice coil impedance at 400 cycles ..... 5 ohms

Antenna Coil (Part No. G5960).
Looking at the connection end starting at the mounting strip in a clockwise direction the terminals are: No. 1, (not used); No. 2, AVC; No. 3, grid; No. 4, antenna; No. 5, ground (grounded directly to mounting strip).
Primary—No. 4 and No. 5—Resistance 26 ohms.
Secondary—No. 2 and No. 3—Resistance 2 ohms.

Short Wave Antenna Coil (Part No. P3702)
Looking at the connection end starting at the mounting strip in a clockwise direction the terminals are: No. 1, grid; No. 2, ant.; No. 3, ground; No. 4 (on other end), AVC.
Primary—No. 2 and No. 3—Resistance .03 ohm
Secondary—No. 1 and No. 4—Resistance .1 ohm

Oscillator Coil (Part No. P3700)
Looking at the end with mounting strip, starting at the mounting strip in a clockwise direction the terminals are: No. 1, padder; No. 2, B+; No. 3, (not used); No. 4, switch; No. 5, plate; No. 6, grid.
Primary—No. 2 and No. 5—Resistance .85 ohm
Short Wave Secondary—No. 4 and No. 6—Resistance .07 ohm
Broadcast Secondary—No. 1 and No. 4—Resistance 5.1 ohms.

First I.F. Transformer (Part No. P3282)
Primary—Blue, white, plate; red white B+—Resistance 24.2 ohms.
Secondary—White, grid; black white, AVC—Resistance 23.6 ohms.

Second I.F. Transformer (Part No. P3283)
Primary—Blue white, plate; red white, B+—Resistance 11.9 ohms.
Secondary—White, grid; black white, AVC—Resistance 16.9 ohms.

Electrolytic Condenser (Part No. P3531)
Red, 20 mfd., 150 volt; green, 20 mfd., 150 volt; yellow, 20 mfd., 25 volt; black, negative for all three sections.

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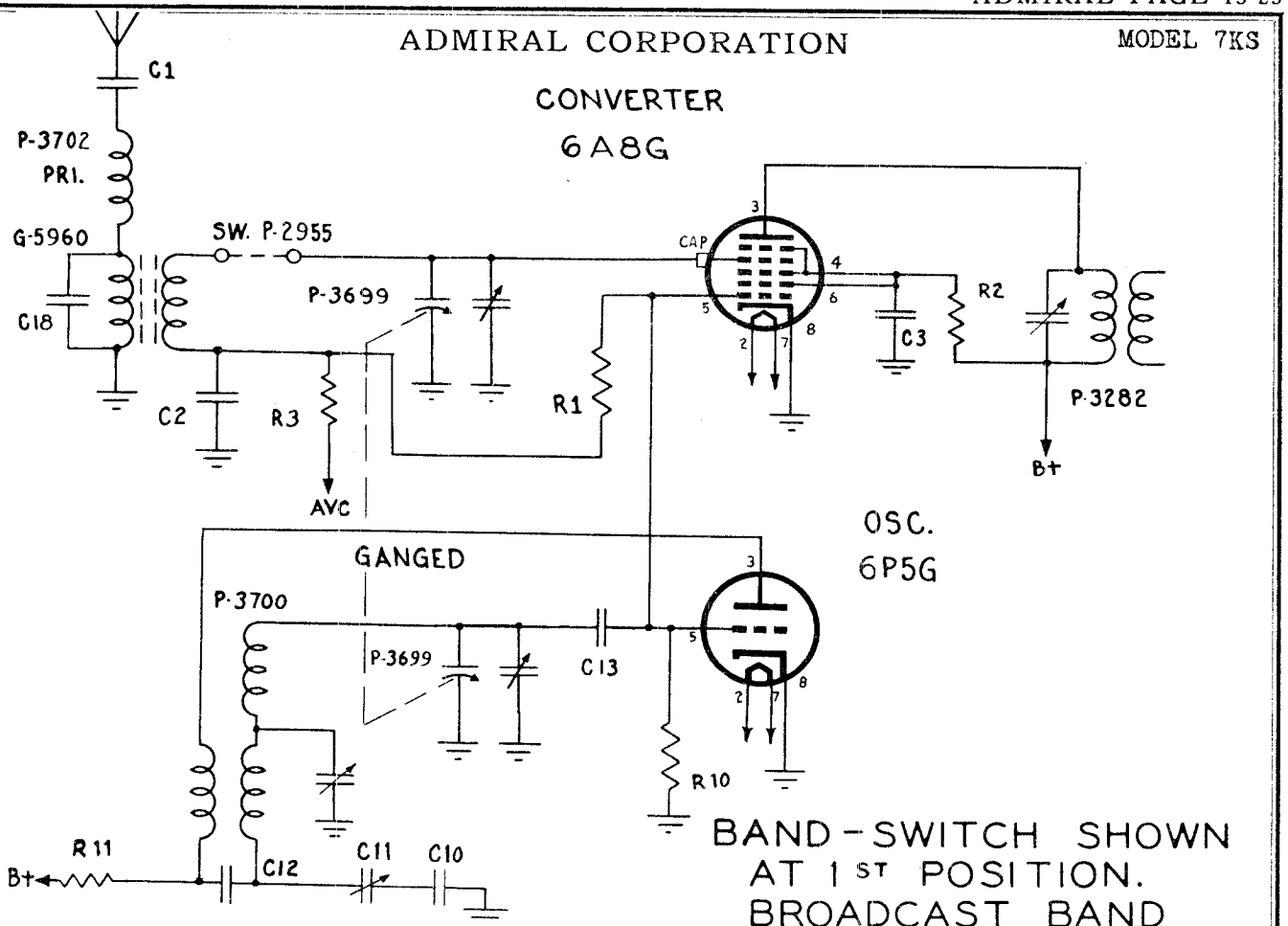
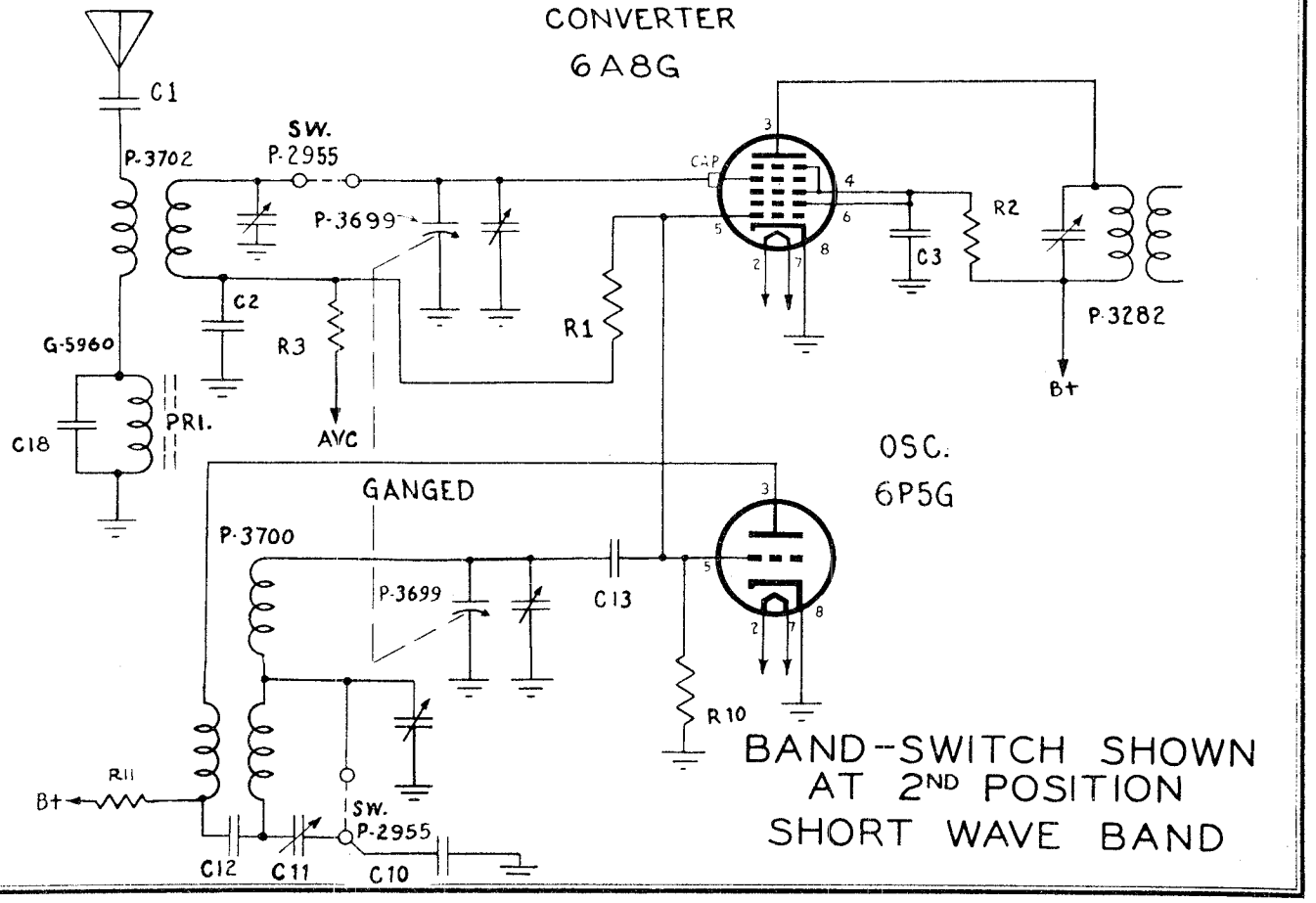
ADMIRAL CORPORATION

MODEL 7KS



BAND-SWITCH SHOWN AT 1ST POSITION. BROADCAST BAND



BAND-SWITCH SHOWN AT 2ND POSITION SHORT WAVE BAND

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SERVICE NOTES

Voltages taken from the different points of the circuit to chassis are measured with volume control in maximum position, all tubes in their sockets and with a volt meter having a resistance of 1000 ohms per volt, on the 150 volt scale. These voltages are clearly indicated on the voltage chart.

In order to prevent signal from acting upon A.V.C. and affecting accuracy of voltage measurements, aerial and ground leads shoulds be short circuited while making measurements.

All voltages should be measured with 117.5 volts A.C. input to receiver. Resistance and actual connections of coils and transformers, electrolytic condenser information and speaker data are given under Service Information.

To check for open by pass condensers, shunt each condenser with another condenser of the same capacity and voltage rating, which is known to be good until the defective unit is located.

Failure to operate, noisy or weak reception is usually due to defective tubes, the tubes making poor contact with sockets or grid clips making poor contact with the caps of the tubes.

ALIGNING INSTRUCTIONS

All of the adjustments have been very carefully set with signal generators at the factory and require no further adjustment, unless it becomes necessary to replace a coil or transformer, or if the adjustments have been tampered with in the field. Under no circumstances attempt any adjustments without first making certain that adjustment is necessary and only after voltages, tubes and condensers have been checked and found to be normal. To properly re-align this receiver, a signal generator as well as an output meter, must be used.

ALIGNMENT PROCEDURE

- Volume control—Maximum all adjustments.
- Connect radio chassis to ground post of signal generator with a short heavy lead.
- Connect dummy antenna value in series with generator output lead.
- Connect output meter across primary of output transformer.
- Allow chassis and signal generator to "heat up" for several minutes.

The following equipment is required for aligning:

- An all wave signal generator which will provide an accurately calibrated signal at the test frequencies as listed.
- Output indicating meter.
- Non-metallic screwdriver.
- Dummy antennas—.1 mfd., 200 mmf., 400 ohms.

BAND	SIGNAL GENERATOR Frequency Setting	SIGNAL GENERATOR Dummy Antenna	Connection to Radio	Variable Condenser Setting	Trimmers Adjusted (In Order Shown)	Trimmer Function	Adjustment
I. F.	455 KC.	.1 Mfd.	Grid of 6K7G I.F. tube	Rotor full open (Plates out of mesh)	Two trimmers on top (See Fig. 2)	Output I. F.	Adjust to maximum output
	455 KC.	.1 Mfd.	Grid of 6A8G tube	Rotor full open (Plates out of mesh)	Two trimmers on top (See Fig. 2)	Input I. F.	Adjust to maximum output
SHORT WAVE	18,100 KC.	400 ohms	Antenna lead	Rotor full open (Plates out of mesh)	Trimmer—Top of left section of gang (See Fig. 2)	Short Wave Oscillator	Adjust to receive signal
	16,000 KC.	400 ohms	Antenna lead	Tune signal	Trimmer—On right side of chassis, 3rd from front	Short Wave Antenna	Adjust to maximum output
BROADCAST	1730 KC.	200 Mmf.	Antenna lead	Rotor full open (Plates out of mesh)	Trimmer—On right side of chassis, 2nd from front	Broadcast Oscillator	Adjust to maximum output
	1400 KC.	200 Mmf.	Antenna lead	Set dial at 1400 KC.	Trimmer—Top of right section of gang (See Fig. 2)	Broadcast Antenna	Adjust to maximum output
	600 KC.	200 Mmf.	Antenna lead	Set dial at 600 KC.	Trimmer—On right side of chassis, 1st from front	Oscillator Series Pad.	Adjust to maximum rock dial See Note 'A'

Note "A"—Turn the dial back and forth slightly (rock) and adjust trimmer until the peak of intensity is obtained.

Attenuate the signal from the signal generator to prevent the leveling-off action of the A.V.C.

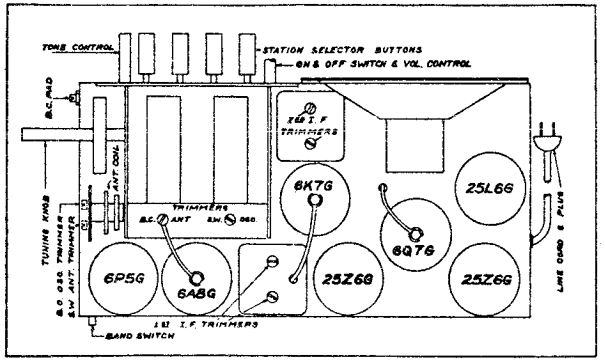
Do not bend variable condenser to correct tracking.

Frequency Range — 535 to 1730 and 5,700 to 18,100 K.C.

Power output 1 watt undistorted—1.7 watts maximum.

Intermediate Frequency 455 K.C.

Power Consumption—50 watts.



TUBE COMPLEMENT

The tube complement of this receiver consists of the following tubes.

1—Type 6A8G—Pentagrid Converter (First Detector)

1—Type 6P5G—Triode Amplifier (Oscillator)

1—Type 6K7G—Remote cut-off Pentode as an IF Amplifier (455 KC).

1—Type 6Q7G—Duplex Diode Triode Second Detector, A.V.C. and First Audio.

1—Type 25L6G—Tetrode Power Amplifier.

2—Type 25Z6G—Twin Diode High Vacuum Rectifiers.

Part No.	Circuit Reference	Description
PAPER CONDENSERS		
P-1322	C6, C9, C12	.005 mfd. 600 volt
P 334	C2, C16	.05 mfd. 400 volt
P-164	C3, C5, C8	.01 mfd. 400 volt
P-1193	C1	.002 mfd. 600 volt
MICA CONDENSERS		
P-817	C4	.00025 mfd.
P-1382	C13, C18	.00005 mfd.
P 3297	C10	.0022 mfd. 5%
P-336	C7	.0005 mfd.
ELECTROLYTIC CONDENSERS		
P-3531	C14, C15, C17	20 mfd. 150 volt; 20 mfd. 150 volt; 20 mfd. 25 volt
VARIABLE CONDENSERS		
P-3699		Gang condenser & tuner
P-3299		Double trimmer strip
P-3173	C11	Padding condenser
RESISTORS		
P-3444	R13	30 ohm 7 watt
P-3277	R12	42 ohm 7 watt
P-2339	R1	60 ohm (wire wound)
P-3803	R8	150 ohm ¼ watt 10%
P-3841	R2, R11	10,000 ohm ¼ watt
P-3853	R10	50,000 ohm ¼ watt
P-3868	R7	250,000 ohm ¼ watt
P-3876	R9	500,000 ohm ¼ watt
P-3883	R3	2,000,000 ohm ¼ watt
P-3886	R5	5,000,000 ohm ¼ watt
P-3891	R1	15,000,000 ohm ¼ watt
P-3527	R4	
P-3528	R6	

VARIABLE RESISTORS

- Volume control — G-5960
- Tone control — P-3702

TRANSFORMERS AND COILS

- Antenna coil assembly — P-3700
- Short Wave Antenna Coil — P-3282
- Oscillator coil — P-3283
- 1st IF transformer — P-3005
- 2nd IF transformer — P-1456
- Tube socket (octal) — P-1455
- Tube shield base — P-2215
- Tube shield — P-3557
- Line cord — P-2294
- Line cord clamp — P-2325
- Pulley for dial bracket — P-3525
- Dial takeup spring — P-2965
- Dial background — P-470
- Dial pointer — P-2955
- Grid clip — P-1713
- Band switch — P-3681
- Pilot light bulb — P-3638
- Pilot light socket — P-3088
- Speaker & output transformer — P-3096
- Rubber speaker ring — P-3073
- Call letter sheet — P 3078
- Push button — P-3644
- Felt washer (for push buttons) — P-3358
- Tuning knob — P-3684
- Volume or tone knob — P-3089
- Escutcheon — P-3090
- Dial clip — P-3703
- Escutcheon screw — P-3673
- Dial Scale
- Chassis mounting screw

PROCEDURE FOR SETTING UP PUSH BUTTONS

There are four push buttons by means of which four stations may be selected (See Fig. 1). Make a list of four stations tuned in regularly. Loosen one of the push buttons by turning the push button knob counter clockwise a half turn or less and push it in; while holding the button in, tune in a desired station by means of the station selector wheel. Turn the selector very slowly back and forth until the signal is clearest. Now while holding the push button in, tighten it by turning clockwise. Release the push button and turn the station selector to one end of the dial; then check the button by pushing it in and if the station is tuned to the center of the area on the dial covered by the station the adjustment is correct.

Release the push button and loosen another push button and repeat the above procedure, doing this for the remaining buttons.

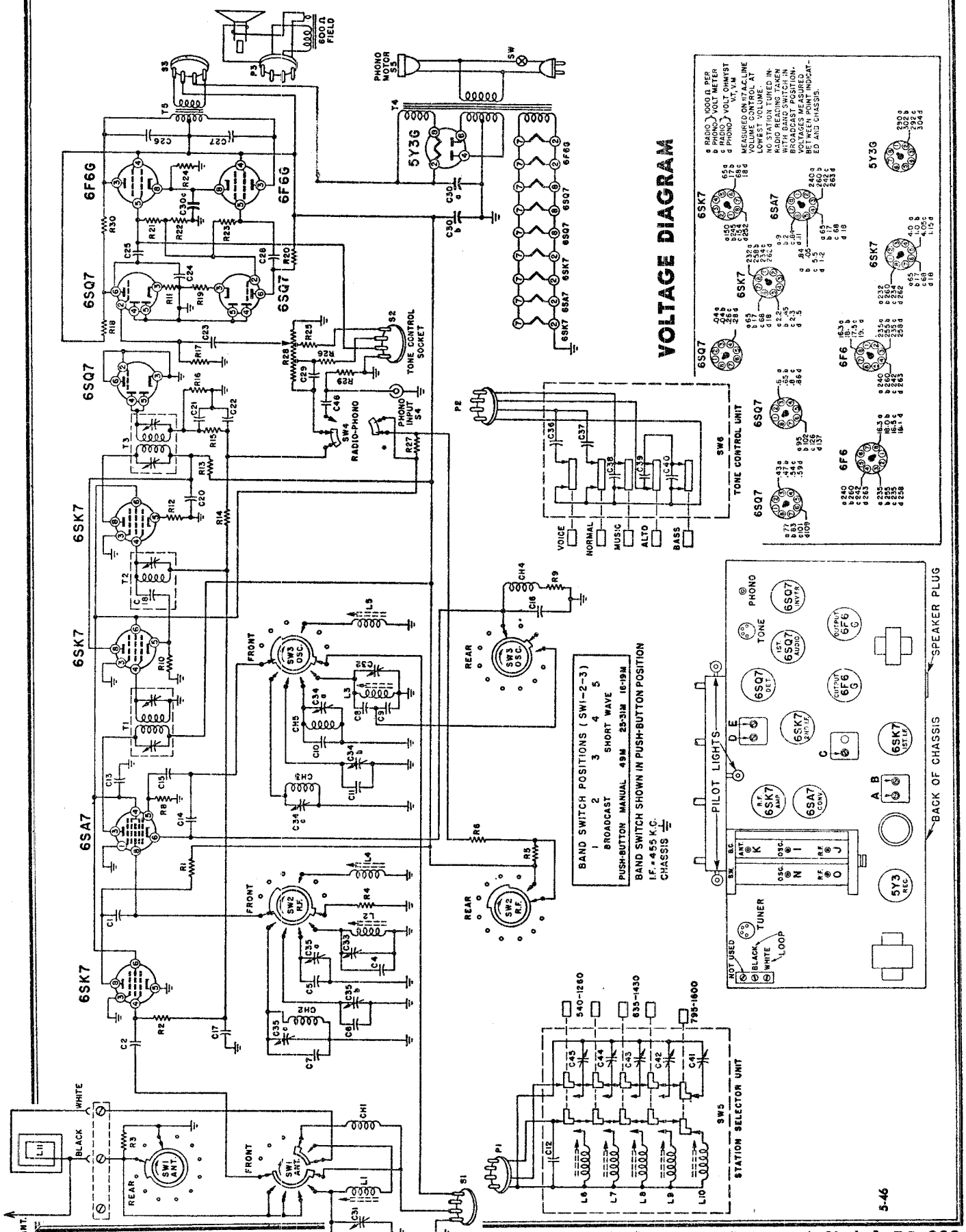
If it is desired to change a button to a different station simply loosen the push button and re-set.

Punch the correct station call letter tabs from the set of sheets supplied and insert them into the recesses above the push buttons.

The dial is now set up for quick tuning and all that is necessary is to push the button under the desired station all the way in and then release.

MODEL 10A1

ADMIRAL CORPORATION



Record Changer: Crescent Model RC-200

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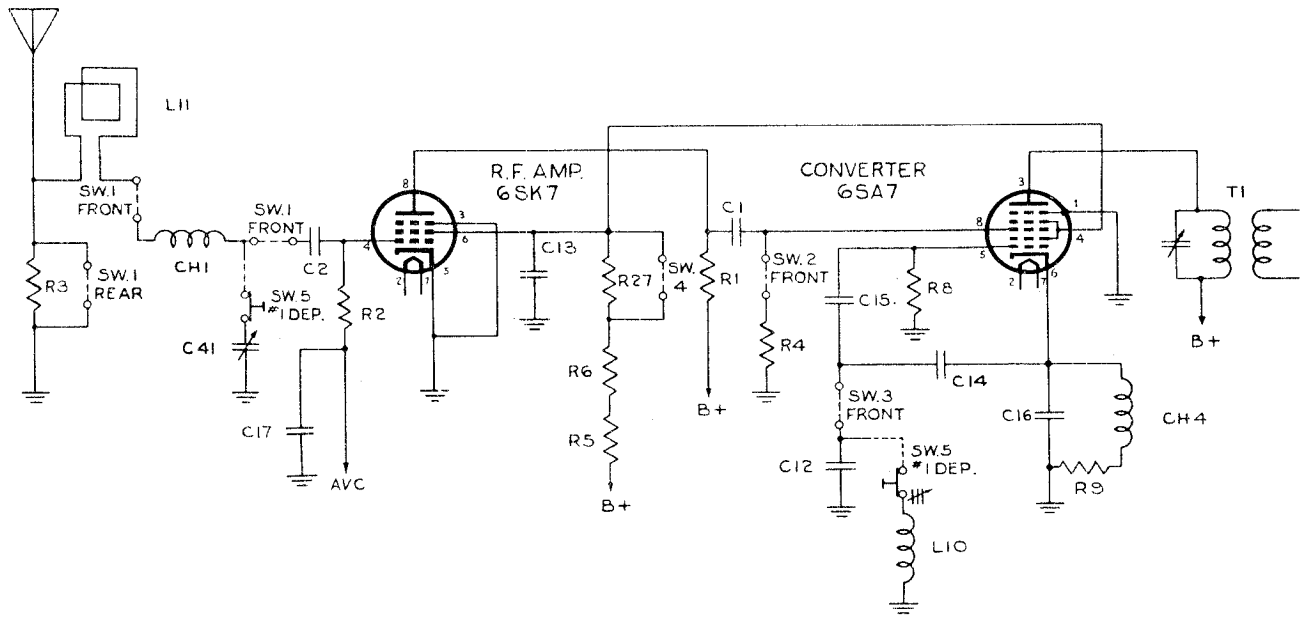
"clarified schematics"

MODEL 10A1

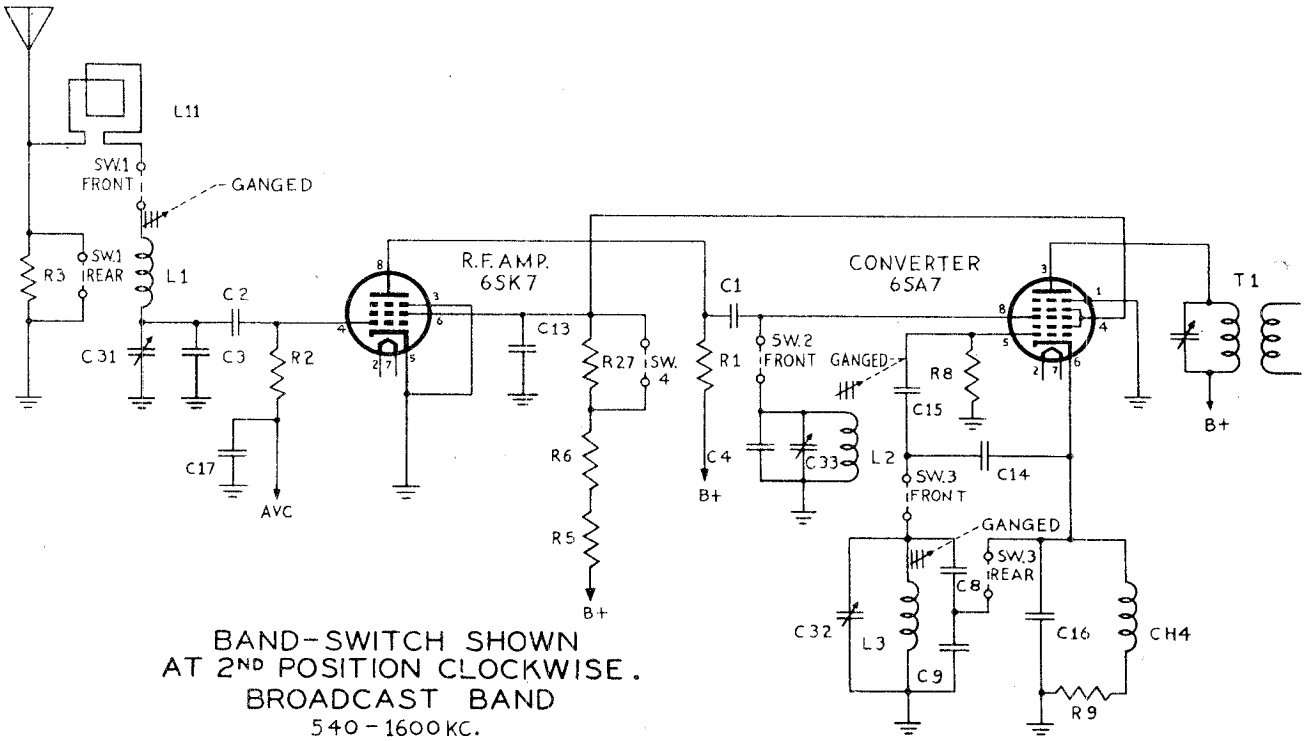
ADMIRAL CORPORATION



BAND-SWITCH SHOWN AT 1ST POSITION. PUSH BUTTON TUNING

(BUTTON #1 DEPRESSED)

795-1600 KC.



BAND-SWITCH SHOWN AT 2ND POSITION CLOCKWISE. BROADCAST BAND

540-1600 KC.

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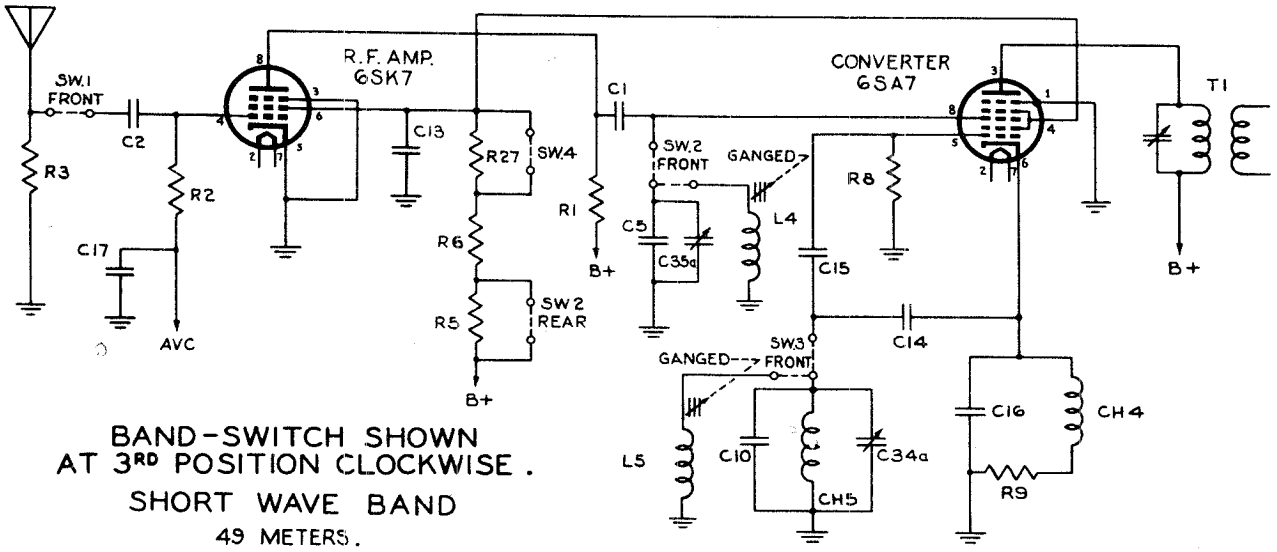
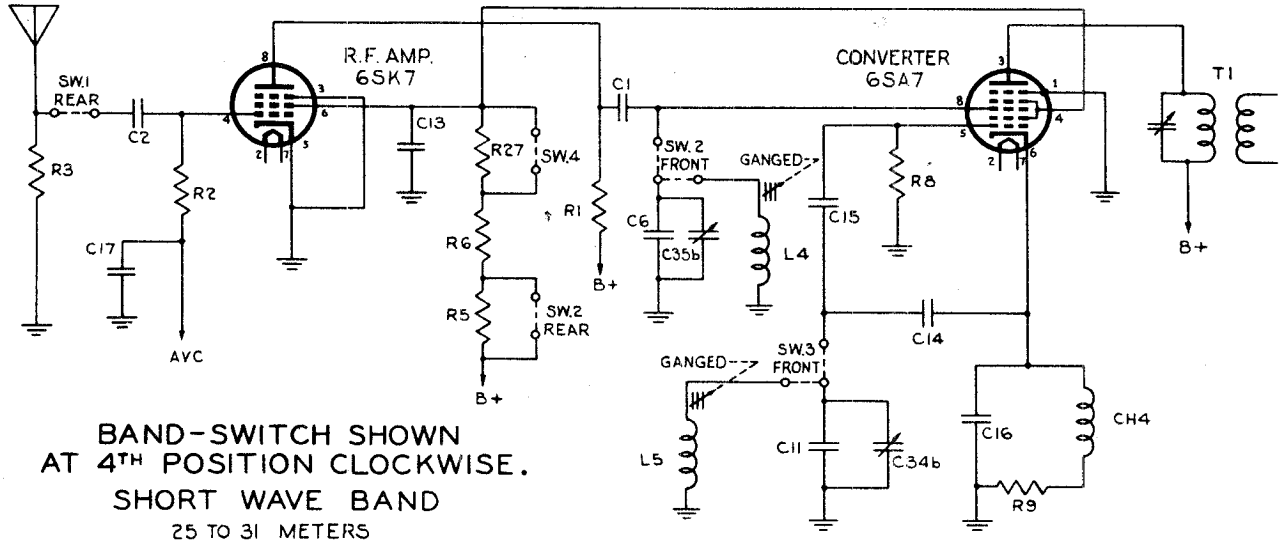
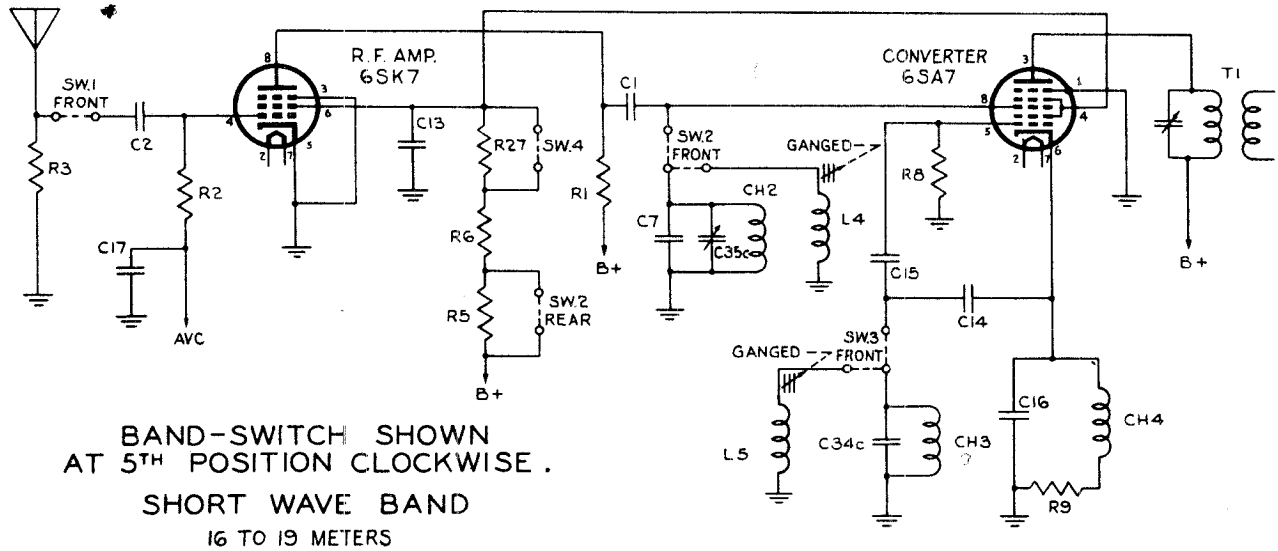
ADMIRAL CORPORATION MODEL 10A1



BAND-SWITCH SHOWN AT 3RD POSITION CLOCKWISE.
SHORT WAVE BAND
49 METERS.



BAND-SWITCH SHOWN AT 4TH POSITION CLOCKWISE.
SHORT WAVE BAND
25 TO 31 METERS



BAND-SWITCH SHOWN AT 5TH POSITION CLOCKWISE.
SHORT WAVE BAND
16 TO 19 METERS

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ALIGNMENT PROCEDURE

1. Loop must be connected during alignment. Check the set screws that hold the tuning drum to the shaft to see that they are tight and that the drum has not slipped on the shaft. The correct position of the drum can be seen on stringing diagram (A).
2. In the wide open position the stop on the rear of the dial drum must be against the stop post.
3. With the gang wide open, all slugs should be 1⅜ inches out of their coil forms. If there is any serious deviation of if there has been any tampering, turn the adjusting screws until this distance is corrected. (See paragraph on Tuning Slug Replacement.)
4. Be sure both the set and the signal generator are thoroughly warmed up before starting alignment.
5. Turn receiver Volume Control full on.
6. Use lowest output setting of signal generator that gives a satisfactory reading on meter.
7. Proceed in sequence as outlined below.

Step	Connect Signal Generator To	Dummy Antenna Between Radio and Signal Generator	Signal Generator Frequency	Tuning Gang Setting	Adj. Trimmers in Following Order To Max.
1	6SA7 Grid (Pin #8)	.1 MFD.	455 K.C.	Pointer to upper limit	E, D, C, B, A
2	Before proceeding to step 3 check pointer travel as outlined under paragraph below headed "Pointer Adjustment." Set Band Change Switch to Broadcast Position.				
3	White Loop Lead	10 MMFD. If not available wrap several turns of the generator lead around the white loop lead.	1605 K.C.	Pointer to upper limit	F, G, H
4	White Loop Lead		1300 K.C.	Set Pointer to 1300 mark on slide rail (See Dial Diagram A)	I, J, K
5	Set Band Change Switch to 49 Meter Position.				
6	White Loop Lead	400 Ohms	7.5 Mc.	Pointer to upper limit	L, M
7	White Loop Lead	400 Ohms	7.2 Mc.	Set Pointer to 1300 mark on slide rail	N, O
8	Set Band Change Switch to 31-25 Meter Position.				
9	White Loop Lead	400 Ohms	12.5 Mc.	Pointer to upper limit	P, Q
10	Set Band Change Switch to 19-16 Meter Position.				
11	White Loop Lead	400 Ohms	18.0 Mc.	Pointer to upper limit	R, S

STRINGING DIAGRAMS

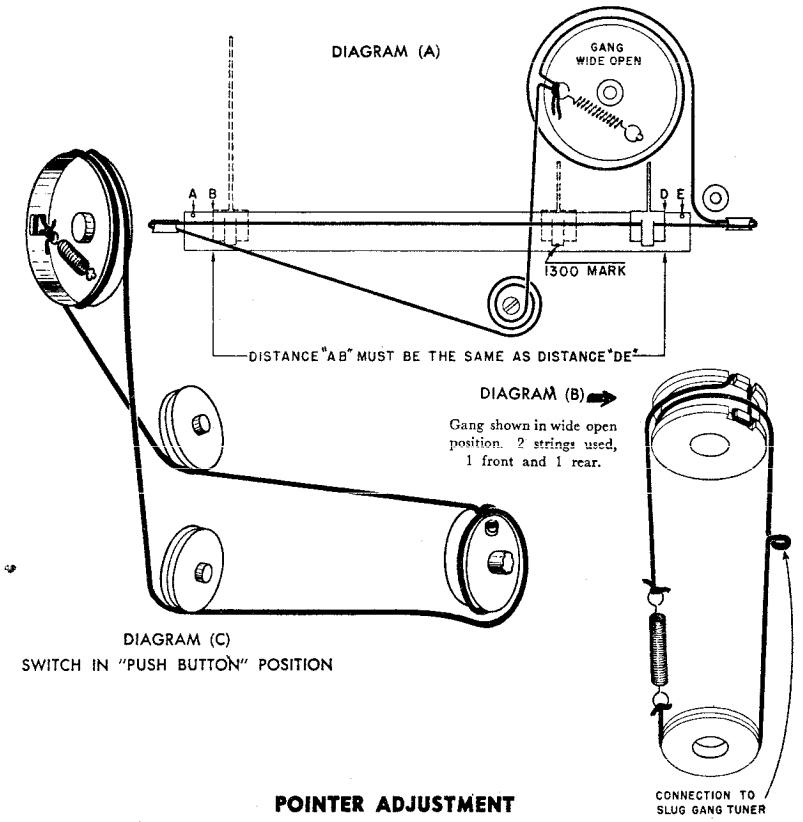
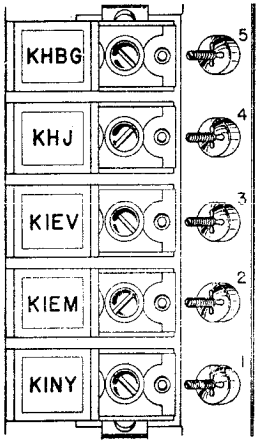


DIAGRAM (A)
GANG WIDE OPEN
A B
D E
1300 MARK
DISTANCE "AB" MUST BE THE SAME AS DISTANCE "DE"
DIAGRAM (B)
Gang shown in wide open position. 2 strings used, 1 front and 1 rear.
CONNECTION TO SLUG GANG TUNER
DIAGRAM (C)
SWITCH IN "PUSH BUTTON" POSITION

PROCEDURE FOR SETTING UP PUSH BUTTONS



Push Button	Frequency Range
1	795 K.C. - 1600 K.C.
2 & 3	635 K.C. - 1430 K.C.
4 & 5	540 K.C. - 1260 K.C.

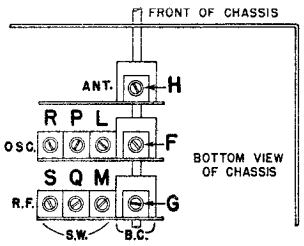
Remove the escutcheon covering the push button control unit. Pick the first of the 5 chosen stations. This should be of the proper frequency for button number 5. Set the band switch to broadcast and accurately tune in the station. Now turn the band switch to the push button position and adjust slug screw number 5 until the same station comes in with its loudest volume. Reduce the volume by means of the volume control and adjust the trimmer screw which is adjacent and to the left of the coil just adjusted. Again bring the station to its maximum volume. Set the rest of the push buttons in a like manner, one for each of the stations chosen.

NOTE: *Since each oscillator (slug) in the push button unit will tune over the entire broadcast band, (540 K.C.-1600 K.C.), care should be taken to set up stations* **within** *the frequency ranges associated with each button.*

POINTER ADJUSTMENT

Move the dial pointer by means of the tuning control knob to see that it reaches the upper and lower limits as shown on stringing diagram (A). In the upper limit position measure the distance D-E and in the lower limit position measure the distance A-B. The distance from A and B must be the same as the distance from D to E. If these distances are not equal, unclamp and move the pointer slide on the string until they are the same. The pointer should be checked again at the upper and lower limit to be sure that it is right. Take care to see that the pointer does not slip during this operation. Reclamp the pointer slide tightly to the string and seal with any quick-drying cement. Set the tuning gang wide open and proceed with operation 3.

TRIMMER LAYOUTS



REPLACING TUNING SLUG

If it becomes necessary to change a tuning slug proceed in the following manner: Set the gang to its wide open position, unsolder and remove the old slug. Set the slug adjusting screw about half way down. Place the new slug in such a position that 1⅜ inches of its length is above the coil form. Solder it in this position making sure that it does not slip during the operation and that the slug wire is straight. Proceed to realign the set as shown in the chart.

MODEL 10A1

ADMIRAL CORPORATION

REPLACEMENT PARTS

RESISTORS

Symbol	Description	Part Number
R1	10,000 Ohms, 1 Watt	60B14-103
R2	470,000 Ohms, ½ Watt	60B8-474
R3	47,000 Ohms, ½ Watt	60B8-473
R4	470,000 Ohms, ½ Watt	60B8-474
R5	8,200 Ohms, 1 Watt	60B14-822
R6	10,000 Ohms, 5 Watt	61A1-3
R8	22,000 Ohms, ½ Watt	60B8-223
R9	100 Ohms, ½ Watt	60B8-101
R10	1,500 Ohms, ½ Watt	60B8-152
R11	1,500 Ohms, ½ Watt	60B8-152
R12	470 Ohms, ½ Watt	60B8-471
R13	1,000 Ohms, ½ Watt	60B8-102
R14	470,000 Ohms, ½ Watt	60B8-474
R15	47,000 Ohms, ½ Watt	60B8-473
R16	270,000 Ohms, ½ Watt	60B8-274
R17	1.0 Megohm, ½ Watt	60B8-105
R18	270,000 Ohms, ½ Watt	60B8-274
R19	1,000 Ohms, ½ Watt	60B8-102
R20	270,000 Ohms, ½ Watt	60B8-274
R21	470,000 Ohms, ½ Watt	60B8-474
R22	470,000 Ohms, ½ Watt	60B8-474
R23	470,000 Ohms, ½ Watt	60B8-474
R24	270 Ohms, 2 Watt	60B20-271
R25	47,000 Ohms, ½ Watt	60B8-473
R26	100,000 Ohms, ½ Watt	60B8-104
R27	150,000 Ohms, ½ Watt	60B8-154
R28	1 Megohm Volume Control	75B3-3
R29	1 Megohm, ½ Watt	60B8-105
R30	1 Megohm, ½ Watt	60B8-105

CONDENSERS

Symbol	Description	Part Number
C1	20 mmfd. Mica	65B7-5
C2	200 mmfd. Mica	65B7-21
C3	35 mmfd. Silver Mica	65B1-30
C4	390 mmfd. Silver Mica	65B1-34
C5	250 mmfd. Silver Mica	65B1-35
C6	65 mmfd. Silver Mica	65B1-27
C7	40 mmfd. Silver Mica	65B1-36
C8	140 mmfd. Silver Mica	65B1-26
C9	1000 mmfd. Mica	65B7-33
C10	200 mmfd. Silver Mica	65B1-14
C11	15 mmfd. Silver Mica	65B5-3
C12	60 mmfd. Silver Mica	65B5-13
C13	.1 mfd. 400 Volts	64B1-20
C14	50 mmfd. Mica	65B5-11
C15	50 mmfd. Mica	65B5-11
C16	250 mmfd. Mica	65B5-22
C17	.05 mfd. 200 Volts	64B1-32
C18	20 mmfd. Mica	65B5-5
C20	.1 mfd. 400 Volts	64B1-20
C21	50 mmfd. Mica	65B5-11
C22	50 mmfd. Mica	65B5-11
C23	.002 mfd. 600 Volts	64B1-14
C24	500 mmfd. Mica	65B5-27
C25	.005 mfd. 600 Volts	64B1-12
C26	.005 mfd. 600 Volts	64B1-12
C27	.005 mfd. 600 Volts	64B1-12
C28	.005 mfd. 600 Volts	64B1-12
C29	250 mmfd. Mica	65B5-22
C30a	30 mfd. 350 Volts	
C30b	30 mfd. 350 Volts	Electrolytic 67C6-25
C30c	20 mfd. 25 Volts	
C31	3-40 mmfd.	
C32	3-40 mmfd.	Trimmer 66A12-5
C33	3-40 mmfd.	
C34a	3-40 mmfd.	
C34b	3-40 mmfd.	Trimmer 66B8-3
C34c	3-40 mmfd.	
C35a	3-40 mmfd.	
C35b	3-40 mmfd.	Trimmer 66B8-3
C35c	3-40 mmfd.	
C36	.002 mfd., 600 Volts	64B1-14
C37	.001 mfd., 600 Volts	64B1-15
C38	.005 mfd., 600 Volts	64B1-12
C39	.01 mfd., 400 Volts	64B1-25
C40	.005 mfd., 600 Volts	64B1-12
C41	12-170 mmfd. Trimmer	66A12-1
C42	25-290 mmfd. Trimmer	66A12-2
C43		
C44	40-400 mmfd. Trimmer	66A12-3
C45		
C46	.002-600 volts	64B1-14

CHOKES, COILS & TRANSFORMERS

Symbol	Description	Part Number
CH1	Choke, Antenna	AB103-6
CH2	Choke, R.F. S.W.	AB103-31
CH3	Choke, Oscillator, S. W.	AB103-31
CH4	Choke, Oscillator, Cathode	AB103-1
CH5	Choke, Oscillator, 49 Meter Shunt	AB103-5
L1	Coil, Tuning (Antenna B.C.)	AC105-2
L2	Coil, Tuning (B.C., R.F.)	AB100-1
L3	Coil, Tuning (B.C., Oscillator)	AC101-2
L4	Coil, Tuning (S.W., R.F.)	AD102-2
L5	Coil, Tuning (S.W., Oscillator)	AD102-4
L6		
L7		
L8	Coils, Push Button, Tuning	AB100-4
L9		
L10		
L11	Loop (B.C. Antenna)	AC112
T1	Transformer, 1st I.F.	72B7
T2	Transformer, 2nd I.F.	72B12
T3	Transformer, 3rd I.F.	72B8
T4	Transformer, Power	80B2
T5	Transformer, Output	79A1

SWITCHES, PLUGS & SOCKETS

SW1	Switch, Antenna Circuit	76B6-2
SW2	Switch, R.F. Circuit	76B6-4
SW3	Switch, Oscillator Circut	76B6-3
SW4	Switch, Phono Radio	76A3
SW5	Switch in Station Selector Unit	76B5
SW6	Switch in Tone Control Unit	76B4
S1	Socket, Station Selector Unit	87A4-1
P1	Plug, Station Selector Unit	88A3-1
S2	Socket, Tone Control Unit	87A4-1
P2	Plug, Tone Control Unit	88A3-1
S3	Socket, Speaker	87A6-1
P3	Plug, Speaker	98A2
S4	Socket, Phono Connector	88A1
S5	Phono Motor Cord & Socket	89A6-9

CABINET & SLIDE-A-WAY PARTS

Left Door Bracket	15B70-1
Right Door Bracket	15B70-2
Slide Rail	15A71
Bracket Stop	15A72
Hub, Door Bracket	27A13
Roller, Door Bracket	27A14
Hub, Slide Roller (Slide-A-Way)	27A11
Roller, Slide (Slide-A-Way)	27A12
Bracket Assembly (Slide-A-Way)	G400C42
Switch & Cover (Slide-A-Way)	77B1-44
Plug, Alden 20″ Leads (Slide-A-Way)	89A6-18
Escutcheon, Cover Plate (left)	23B4-1
Escutcheon, Cover Plate (right)	23B4-2
Escutcheon, Dial Mounting	23C3
Escutcheon, Lower Rail	23B5-2
Escutcheon, Switch (Slide-A-Way)	401A67

PHONOGRAPH PARTS

See Record Changer Service Manual for Detailed List

Centerpost	G400A12-2
Crystal Cartridge	409A1
Idler Wheel (407B3 Motor)	G400A23
Idler Wheel (407B2 Motor)	G400A59
Idler Wheel (407B1 Motor)	G400A57
Plug, Phonograph Output	88A2-1

MISCELLANEOUS

Bulbs, Pilot Light, Mazda No. 47	81A1-8
Dial Cord, 100 inches	50A1-3
Dial, Scale Glass	21C21
Drum, Band Indicator	A1200
Drum, Dial Tuning	A1194
Knobs (Walnut)	33A12-1
Letter, Call Push Button	42A1
Plug, Coil Mounting	32A3-1
Pointer, Dial	25A6-1
Push Button, Numbers 1 and 5	33B6-1
Push Button, Numbers 2 and 4	33B6-2
Push Button, Number 3	33B6-3

When Ordering Slugs Specify Color Code

Slug, Tuning (B.C., R.F.) (B.C., Osc.)	71B1-3
Slug, Tuning (B.C. Antenna)	71B1-13
Slug, Tuning (S.W., R.F.) (S.W., Osc.)	71B1-9
Slug, Push Button Unit	71B1-14
Socket, Pilot Light	82A2-1
Speaker, 10″ Dynamic	78B12
Spring, Hairpin for mounting coils	19A3-1
Stud, Slug Adjusting	27A4
Tube, Pilot Light Cover	82A5-1

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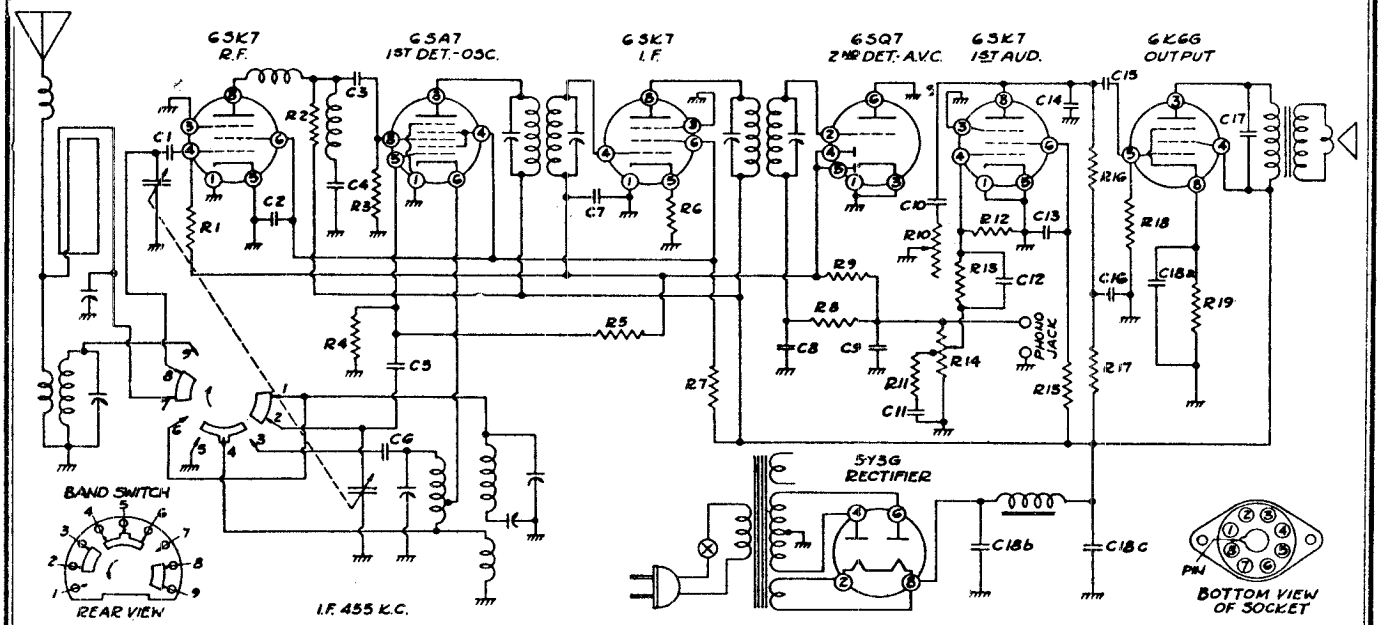
MODEL A77

ADMIRAL CORPORATION



RESISTORS

No.	Ohms	Watts	No.	Ohms	Watts
R1	500,000	¼	R11	15,000	¼
R2	2,500	½	R12	2,000,000	¼
R3	100,000	½	R13	2,000,000	¼
R4	25,000	½	R14	500,000	V.C.
R5	5,000,000	¼	R15	2,000,000	¼
R6	100	¼	R16	250,000	¼
R7	15,000	2	R17	50,000	¼
R8	50,000	¼	R18	500,000	¼
R9	1,000,000	¼	R19	600—10%	½
R10	500,000	T.C.			

CONDENSERS

No.	Capacity (Mfd.)	Volts	No.	Capacity (Mfd.)	Volts
C1	.0001	Mica	C11	.05	200
C2	.05	400	C12	.05	200
C3	.0001	Mica	C13	.25	400
C4	.00006—5%	Mica	C14	.00025	Mica
C5	.0001	Mica	C15	.01	400
C6	.003 —5%	Mica	C16	.25	400
C7	.05	200	C17	.002	600
C8	.00005	Mica	C18a	20.	25
C9	.0001	Mica	C18b	30.	350
C10	.002	600	C18c	30.	350

PAPER CONDENSERS

P1193	.002 mfd. 600 volt	.....
P1322	.005 mfd. 600 volt	.....
P164	.01 mfd. 400 volt	.....
P148	.05 mfd. 200 volt	.....
P334	.05 mfd. 400 volt	.....
P1789	.25 mfd. 400 volt	.....

MICA CONDENSERS

P1382	.00005 mfd.	.....
P3640	.00006 mfd. 5%	.....
P480	.0001 mfd.	.....
P817	.00025 mfd.	.....
P2565	.003 mfd. 5%	.....

ELECTROLYTIC CONDENSERS

P4264	20 mfd. 25 volt 30 mfd. 350 volt 30 mfd. 350 volt	.....

VARIABLE CONDENSERS

P4191	Gang condenser	.....
P3734	Trimmer condenser	.....
P3299	Trimmer condenser	.....
P3173	Padding condenser	.....

RESISTORS

P3800	100 ohm ½ watt	.....
P3821	600 ohm ½ watt	.....
P3832	2,500 ohm ½ watt	.....
P3843	15,000 ohm ½ watt	.....
P1944	15,000 ohm 2 watt	.....
P3845	25,000 ohm ½ watt	.....
P3853	50,000 ohm ½ watt	.....
P3860	100,000 ohm ½ watt	.....
P3868	250,000 ohm ½ watt	.....
P3876	500,000 ohm ½ watt	.....
P3882	1,000,000 ohm ½ watt	.....
P3883	2,000,000 ohm ½ watt	.....
P3886	5,000,000 ohm ½ watt	.....

VARIABLE RESISTORS

P4089	Volume control and switch.	
P4193	Tone control	.....

TRANSFORMERS AND COILS

G6252	Loop antenna assembly	.....
P3198	S. W. antenna coil	.....
P4194	B. C. and S. W. oscillator coil	
G6185	Wave trap coil	.....
P4108	1st I.F. transformer	.....
P4109	2nd I.F. transformer	.....
G6186	Short wave choke	.....
P3926	Iron core filter choke	.....
P4265	Power transformer	.....

MISCELLANEOUS

P4186	Push button shaft	.....
P4114	Call letter tab sheet	.....
P4192	Band switch	.....
P4283	Speaker and output transformer	.....
P4196	Dial pointer	.....
G6181	Pointer shaft and pulley	....
P4091	Horseshoe washer (pointer shaft)	.....
P2325	Take up spring (pointer)	....
P4105	Fibre pulley	.....
P4185	Dial background	.....
P4197	Pilot light socket	.....
P1713	Pilot light bulb	.....
P4248	Pilot light reflector	.....
P4101	Drive shaft	.....
P1399	Horseshoe washer (drive shaft)	.....
P3375	Takeup spring (drive)	.....
P945	Speaker socket	.....
P4138	Electrolytic mounting base	

All voltages measured with a 1,000 ohm per volt meter on the 300 volt scale. Line voltage 117 volts A.C. Volume control maximum and no signal tuned in. Power consumption 60 watts.

	Volts
6SK7 (RF) TUBE	
Plate (8) to ground	208
Screen (6) to ground	93
6SA7 TUBE	
Plate (3) to ground	255
Screen (4) to ground	93
6SK7 (IF) TUBE	
Plate (8) to ground	255
Screen (6) to ground	93
6SK7 (AF) TUBE	
Plate (8) to ground	20
Screen (6) to ground	10
6K6G TUBE	
Plate (3) to ground	240
Screen (4) to ground	258
Cathode (8) to ground	18
5Y3G TUBE	
Filament (8) to ground	266

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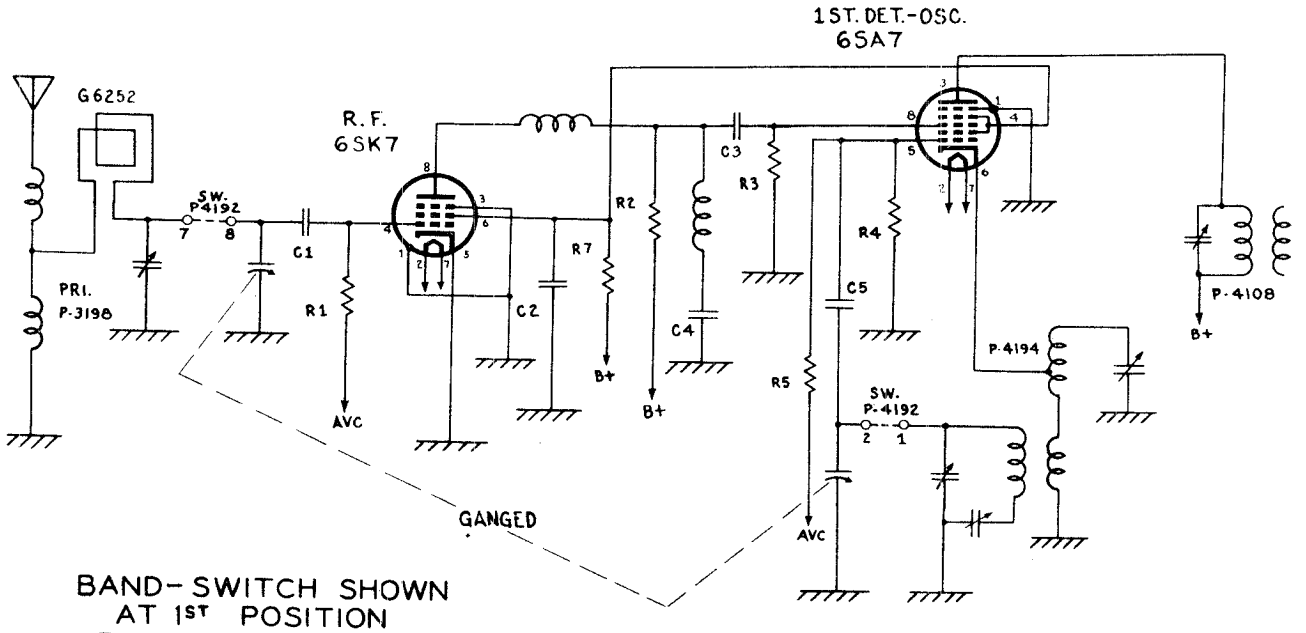
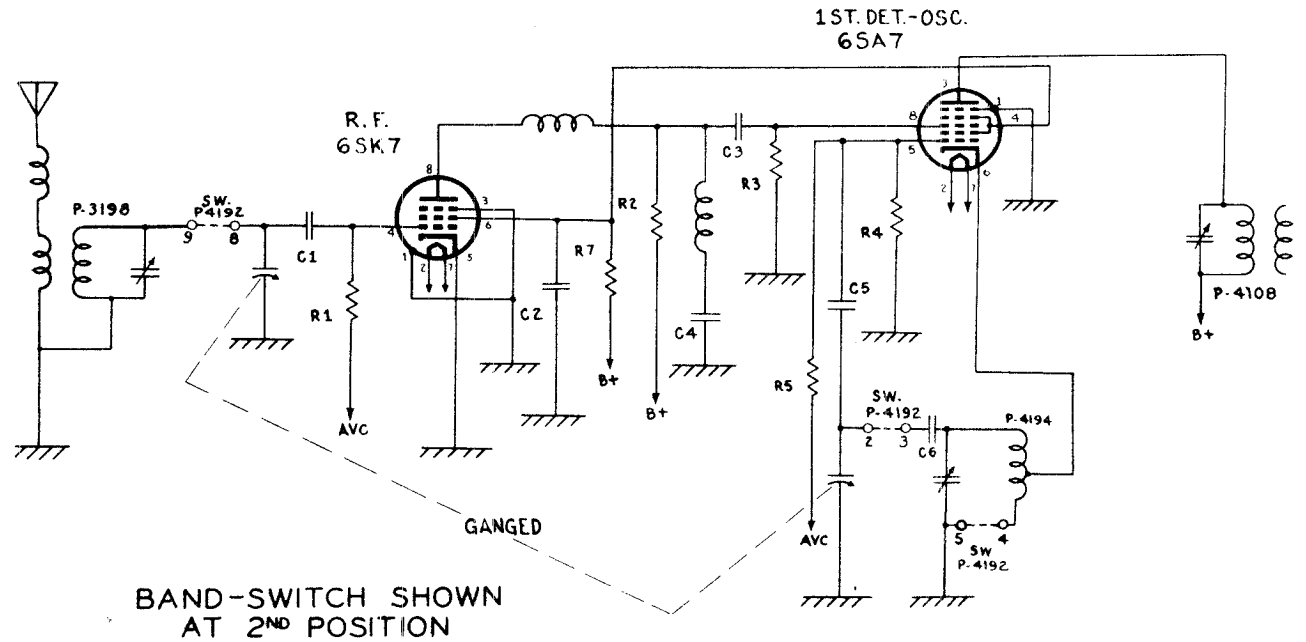
MODEL A77



BAND-SWITCH SHOWN
AT 1ST POSITION
BROADCAST BAND



BAND-SWITCH SHOWN
AT 2ND POSITION
SHORT WAVE BAND

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Band switch shown in broadcast position in schematic and in short wave position in pictorial view in lower left corner.

Speaker (Part No. P4283) 10" PM.

D. C. voice coil resistance	3.7 ohms
Voice coil impedance at 400 cycles	4.1 ohms

S. W. Antenna Coil (Part No. P3198)
Looking at the connection end starting at the chassis in a clockwise direction the terminals are: No. 1, plate; No. 2, B+; No. 3, grid; No. 4, pad.

Primary—No. 3 and No. 4—Resistance	.08 ohm
Secondary—No. 1 and No. 2—Resistance	.37 ohm

Oscillator Coil (Part No. P4194)
Looking at the mounting strip end in a clockwise direction starting at the chassis, the terminals are: No. 1, ground; No. 2, cathode; No. 3, open; No. 4, pad; No. 5, switch; No. 6, grid; No. 7, grid; No. 8, open.

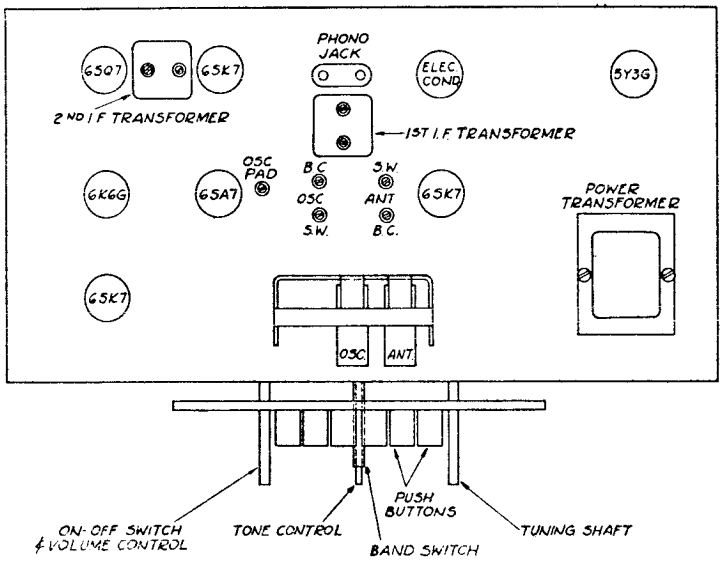
B.C. Primary—No. 1 and No. 5—Resistance	.29 ohm
S.W. Primary—No. 5 and No. 2—Resistance	.06 ohm
B.C. Secondary—No. 4 and No. 6—Resistance	5.7 ohms
S.W. Secondary—No. 2 and No. 7—Resistance	.08 ohm

First I.F. Transformer (Part No. P4108)

Primary—Blue, plate; red, B+—Resistance	18.2 ohms
Secondary—White, grid; black, AVC—Resistance	15.1 ohms

Second I.F. Transformer (Part No. P4109)

Primary—Blue, plate; red, B+—Resistance	20.8 ohms
Secondary—White, diode; black, AVC—Resistance	17.4 ohms



ALIGNMENT DATA

GENERAL DATA

The alignment of this receiver requires the use of a signal generator that will cover the frequencies of 445, 600, 1400, 1630, 6,000, 16,000 and 18,100 K.C., and an output meter to be connected across the primary or secondary of the output transformer. If possible, all alignments should be made with the volume control on maximum and the signal generator output as low as possible, to prevent the AVC from operating and giving false readings.

I.F. ALIGNMENT

Adjust the signal generator to 455 K.C. and connect the output to the grid of the first detector tube (6SA7) through a .05 or .1 mfd. condenser. Align all I.F. trimmers to peak or maximum reading on the output meter.

BROADCAST BAND ALIGNMENT

Adjust the signal generator to 1630 K.C. and connect the output to the antenna lead, through a .0002 mfd. mica condenser. Set the gang condenser to minimum capacity and adjust the B.C. oscillator trimmer to receive this signal. After this has been carefully done, the next step is to set the signal generator to 1400 K.C. and after tuning in the signal adjust the B.C. antenna trimmer to peak. Set the signal generator to 600 K.C., tune the signal and then slowly increase or decrease the B.C. oscillator padding condenser and at the same time continuously tune back and forth across the signal with the receiver until the maximum reading is obtained on the output meter.

Return to 1400 K.C. and again go over the adjustments of this frequency to be certain that they were not put slightly out of alignment when adjustment was made at 600 K.C.

SHORT WAVE BAND ALIGNMENT

Adjust the signal generator to 18,100 K.C. and connect the output to the antenna lead, through a 400 ohm resistor. Set the gang condenser to minimum capacity and adjust the S.W. oscillator trimmer to receive this signal. Set the signal generator to 16,000 K.C., tune signal and adjust the S.W. antenna trimmer to peak. As there is no variable low frequency padding condenser on this band, the sensitivity of the receiver should be checked at 6000 K.C. to determine whether the circuits are in line at this frequency. Should the receiver lack sensitivity at 6000 K.C., the antenna and oscillator coils, as well as the padding condenser, should be tested.

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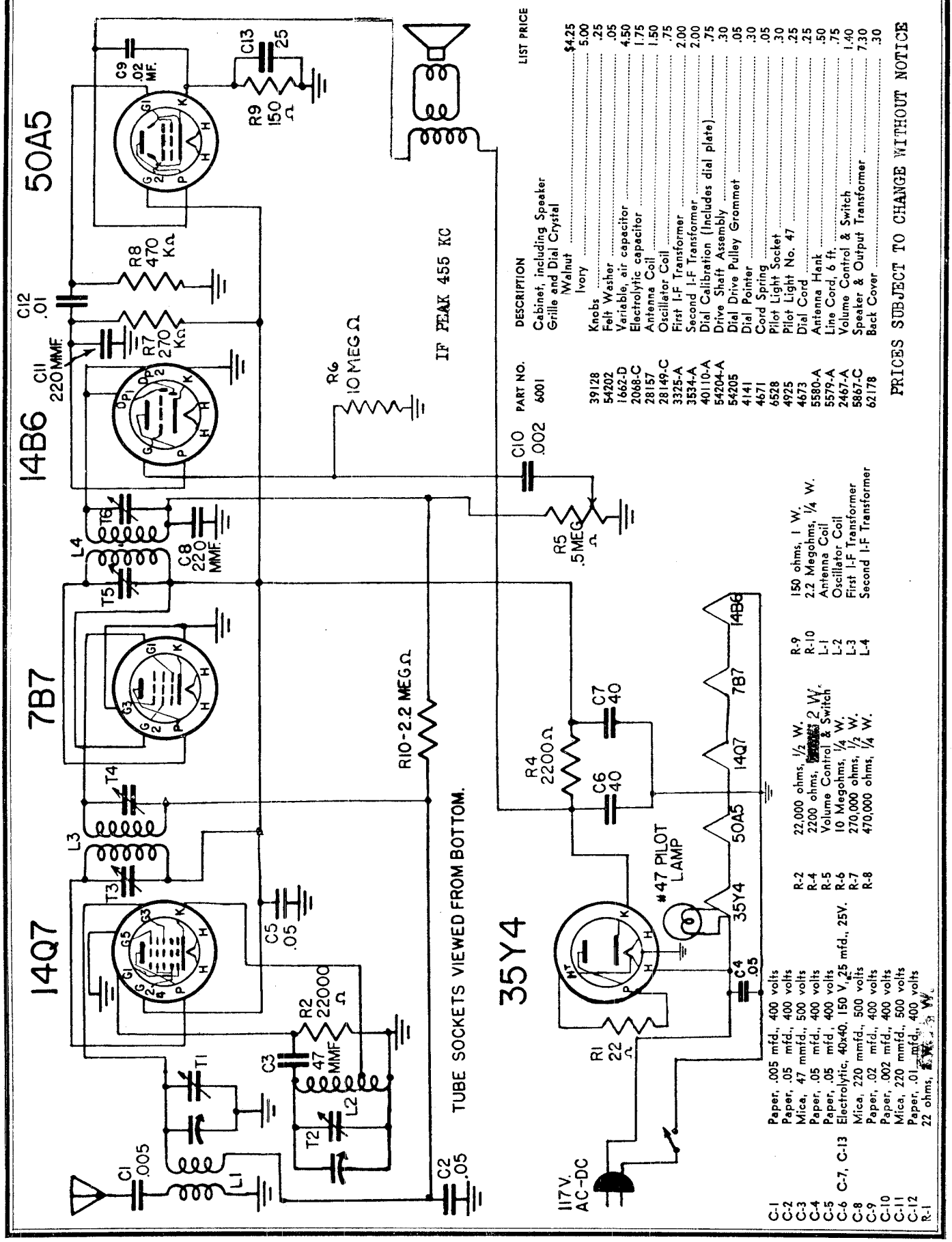
MODEL 4601



C-1	Paper, .005 mfd., 400 volts	R-2	22,000 ohms, ½ W.	R-9	150 ohms, 1 W.
C-2	Paper, .05 mfd., 400 volts	R-4	2200 ohms, [illegible] 2 W.	R-10	2.2 Megohms, ¼ W.
C-3	Mica, 47 mmfd., 500 volts	R-5	Volume Control & Switch	L-1	Antenna Coil
C-4	Paper, .05 mfd., 400 volts	R-6	10 Megohms, ¼ W.	L-2	Oscillator Coil
C-5	Paper, .05 mfd., 400 volts	R-7	270,000 ohms, ½ W.	L-3	First I-F Transformer
C-6 C-7, C-13	Electrolytic, 40x40, 150 V., 25 mfd., 25V.	R-8	470,000 ohms, ¼ W.	L-4	Second I-F Transformer
C-8	Mica, 220 mmfd., 500 volts				
C-9	Paper, .02 mfd., 400 volts				
C-10	Paper, .002 mfd., 400 volts				
C-11	Mica, 220 mmfd., 500 volts				
C-12	Paper, .01 mfd., 400 volts				
R-1	22 ohms, [illegible] W.				

DESCRIPTION	PART NO.	LIST PRICE
Cabinet, including Speaker	6001	$4.25
Grille and Dial Crystal		5.00
Walnut		.25
Ivory		.05
Knobs	39128	4.50
Felt Washer	54202	1.75
Variable, air capacitor	1662-D	1.50
Electrolytic capacitor	2068-C	.75
Antenna Coil	28157	2.00
Oscillator Coil	28149-C	2.00
First I-F Transformer	3325-A	.75
Second I-F Transformer	3534-A	.30
Dial Calibration (Includes dial plate)	40110-A	.05
Drive Shaft Assembly	54204-A	.30
Dial Drive Pulley Grommet	54205	.25
Dial Pointer	4141	.25
Cord Spring	4671	.50
Pilot Light Socket	6528	.75
Pilot Light No. 47	4925	1.40
Dial Cord	4673	7.30
Antenna Hank	5580-A	.30
Line Cord, 6 ft.	5579-A	
Volume Control & Switch	2467-A	
Speaker & Output Transformer	5867-C	
Back Cover	62178	

PRICES SUBJECT TO CHANGE WITHOUT NOTICE

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MODELS 4602, 4603
MODEL 4602B

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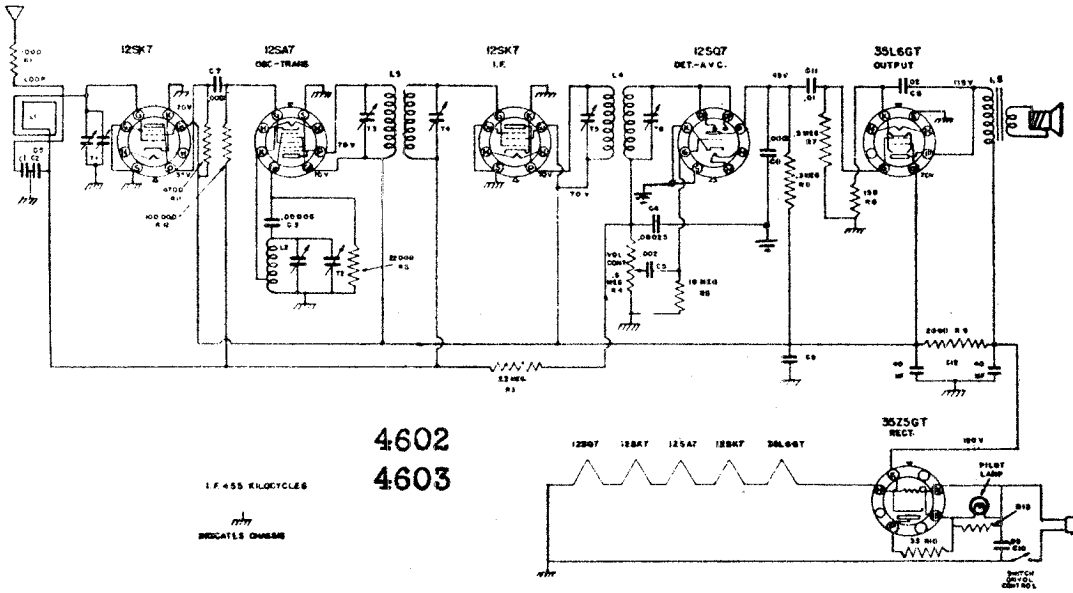

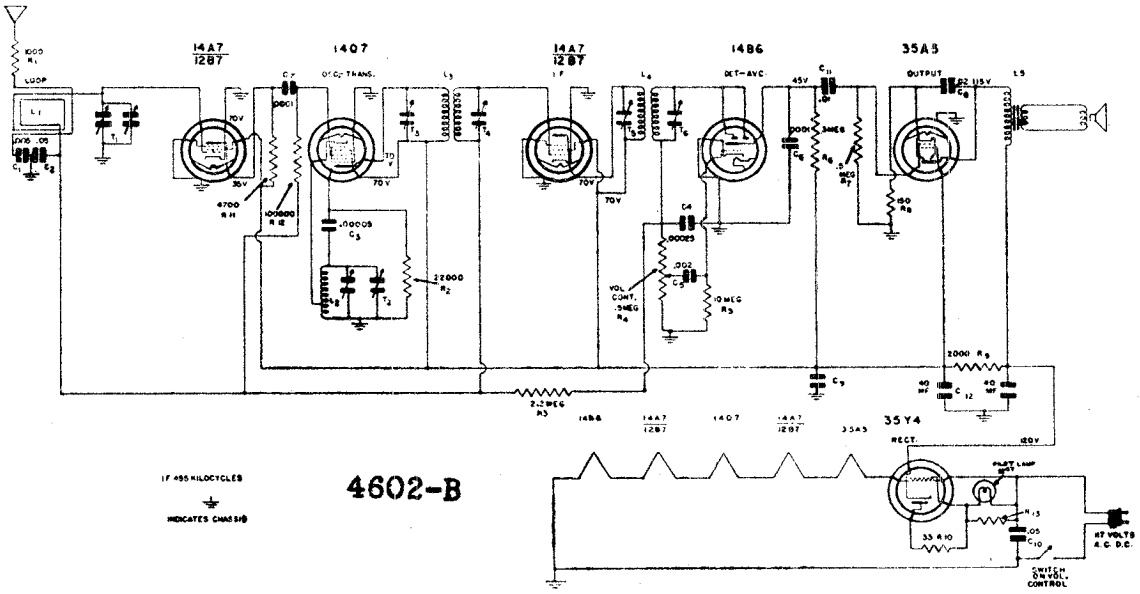

ALIGNMENT PROCEDURE

Output meter connections.....Across primary output transformer
Connection of generator ground.....Chassis
Generator modulation.....App. 30% @ 400 cycles
Position of volume control.....Fully Clockwise

POSITION OF DIAL POINTER	GENERATOR FREQUENCY	4602 4603 GENERATOR CONNECTION	4602-B GENERATOR CONNECTION	TRIMMERS ADJUSTED	TRIMMER FUNCTION
540 kc	455 kc	12SA7GT	14Q7	T3, T4, T5, T6	I. F.
1500 kc	1500 kc	* * * See Note Below	* * * See Note Below	T2, T1	Osc., R. F.

***Run a wire from the output terminal of the generator near the receiver. However, no connection is made between the signal generator and the receiver.

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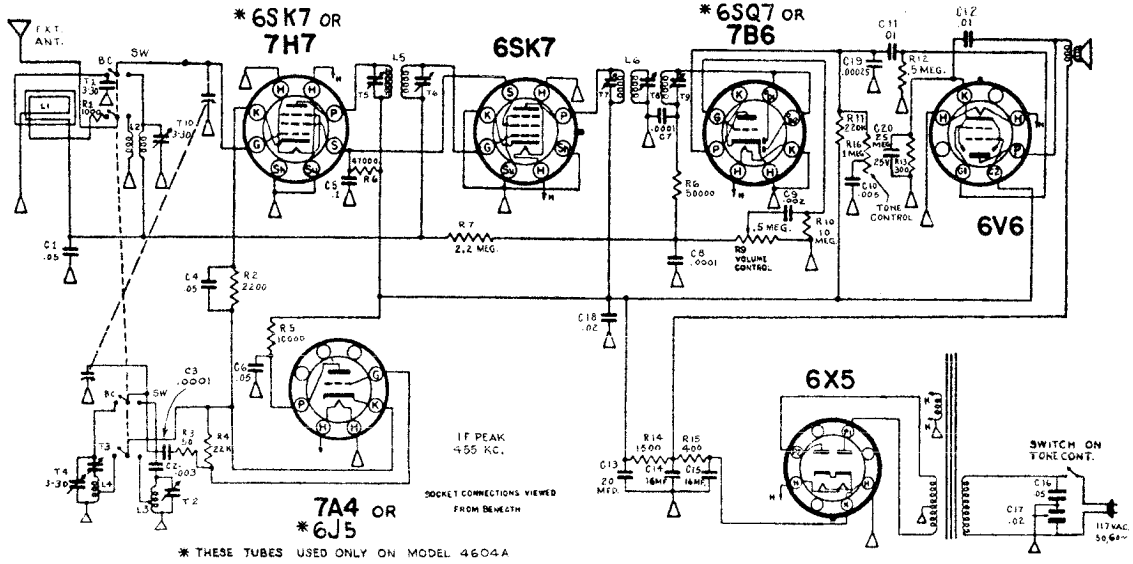


ALIGNMENT PROCEDURE

Output meter connection.....Across voice coil

Output meter reading to indicate ½ watt.....1.25V for 3.2 Ohm voice coil

Connection of generator ground.....Receiver chassis

Generator modulation.....Approximately 30% @ 400 cycles

Position of volume control.....Fully clockwise

Position of tone control.....High position

WAVE BAND SW.	POSITION OF DIAL POINTER	GEN. FREQ.	GEN. CONN.	DUMMY ANT.	TRIMMERS ADJ. IN ORDER SHOW	TRIMMER FUNCT.
B. C.	540 kc	455 kc	7H7 Grid	.1 mfd	T9-T7-T8-T6-T5	I. F.
	1500 kc	1500 kc	* note		T4-T1	Osc. - Ant.
	600 kc	600 kc	* note		T3-Rock Var. Cond.	Osc. - Padder
	1500 kc	1500 kc	* note		Readjust T4	Osc.
S. W.	18 mc	18 mc	Ant. Post	RMA Standard All Wave	T2 **	Osc.
	16 mc	16 mc	Ant. Post	RMA Standard All Wave	T10	Ant.

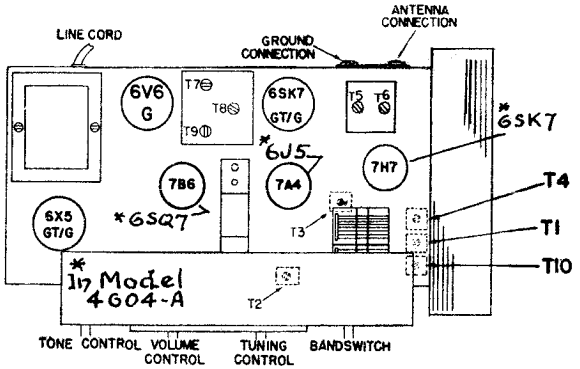
NOTE:

** If two peaks can be had the correct one is with the trimmer screw further out, the other peak is the image.

* Connect a piece of insulated wire to the generator output terminal and place the wire near the loop. Do not make a direct connection.

Schematic Location	Part No.	Description
	457	Cabinet
	62172	Cover — back
L1	28135	Coil, loop
L2	28137	Coil, SW — Ant.
L3	28138	Coil, SW osc with trimmer
L4	28136	Coil, BC osc with padder
C1, C4, C6, C16		Condenser, .05 mfd, 400 volts
C5		Condenser, .1 mfd, 400 volts
C9		Condenser, .002 mfd, 400 volts
C10		Condenser, .005 mfd, 400 volts
C11		Condenser, .01 mfd, 400 volts
C12		Condenser, .01 mfd, 800 volts
C18, C17		Condenser, .02 mfd, 400 volts
C3, C8, C7		Condenser, Mica, .0001 mfd, 400 v
C19		Condenser, Mica, 00025 — 400 volts
C2		Condenser, Mica, .003 — 400 volts
C	1655	Variable condenser
C13, C14, C15	20102	Condensers, electrolytic, 20 mfd, 16 mfd, 16 mfd, 350 volts
C20	20105	Condensers, electrolytic, 25 mf, 25 v
T1, T10, T4	1725	Condenser, trimmers on bracket (3) 3-30 mmfd
R9	2470	Control, volume, .5 megohm
R16	2521	Control, tone, .25 megohm with switch
	8581	Cord, power
	4579	Dial cord
	40109	Dial scale
	4140	Dial pointer
	4633	Dial spring
	39138	Knob, tone, off-on
	39139	Knob, SW - BC
	39140	Knob, tuning
	39141	Knob, volume
	4911	Lamp, dial #47 (2)
R1		1000 ohm, ½ watt
R2		2200 ohm, ½ watt
R3		47 ohm, ½ watt
R4		22,000 ohm, ½ watt
R5		10,000 ohm, ½ watt
R7		2.2 megohm, ½ watt
R6, R8		47,000 ohm, ½ watt
R11		220,000 ohm, ½ watt
R13		300 ohm, 1 watt, wire wound
R14		1500 ohm, 1 watt, wire wound
R15		400 ohm, 1 watt, wire wound
R10		10 megohm, ½ watt
R12		.5 megohm, ½ watt
	8107	Socket, pilot lamp (2)
	3784	Switch, band, BC - SW
	5866	Speaker, 5" output transformer
	1089	Transformer, power **
L5	3323	Transformer, I.F. Input
L6	3523	Transformer, I.F. Output

** For 115 - 230 volt operation use transformer #1090



105-125 VOLTS—40 WATTS—50-60 CYCLES

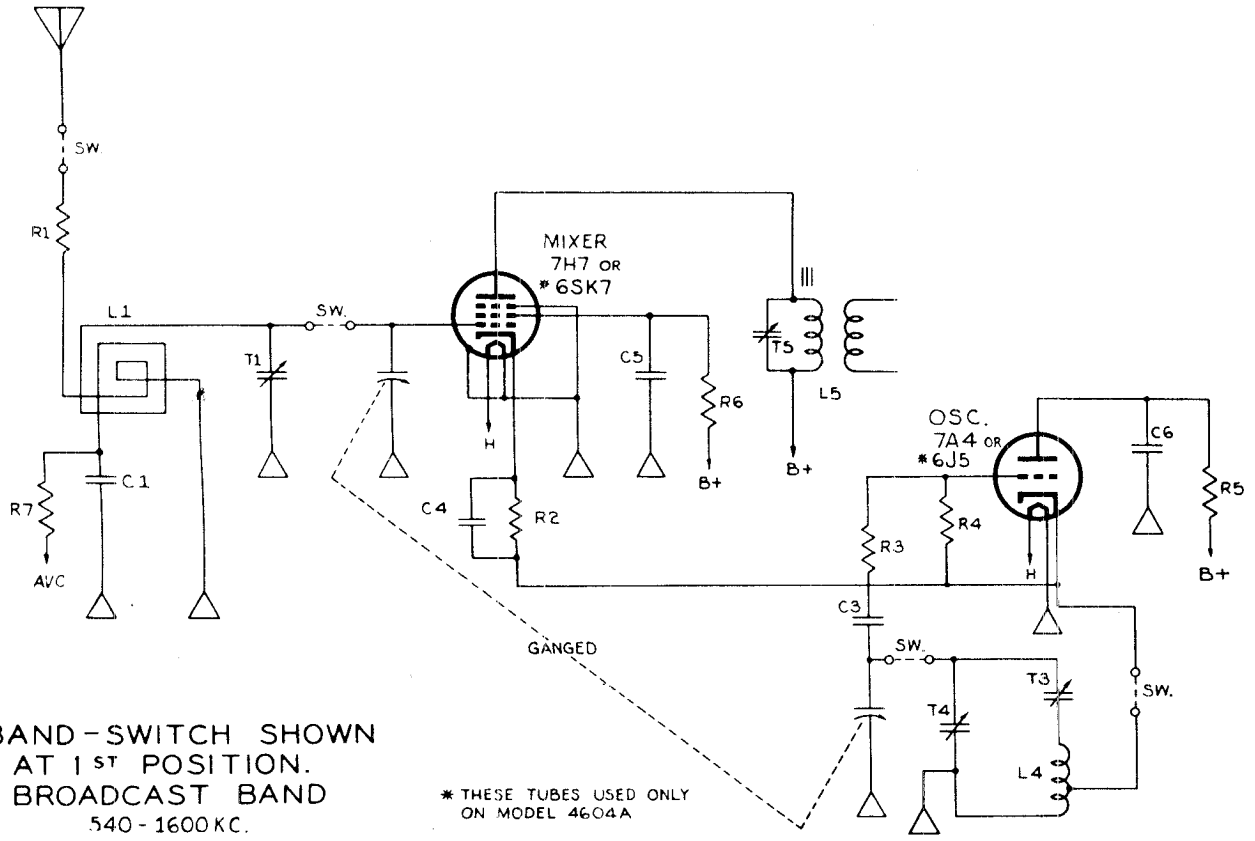
AIR KING PRODUCTS CO., INC.

MODELS 4604, 4604A

"clarified schematics"

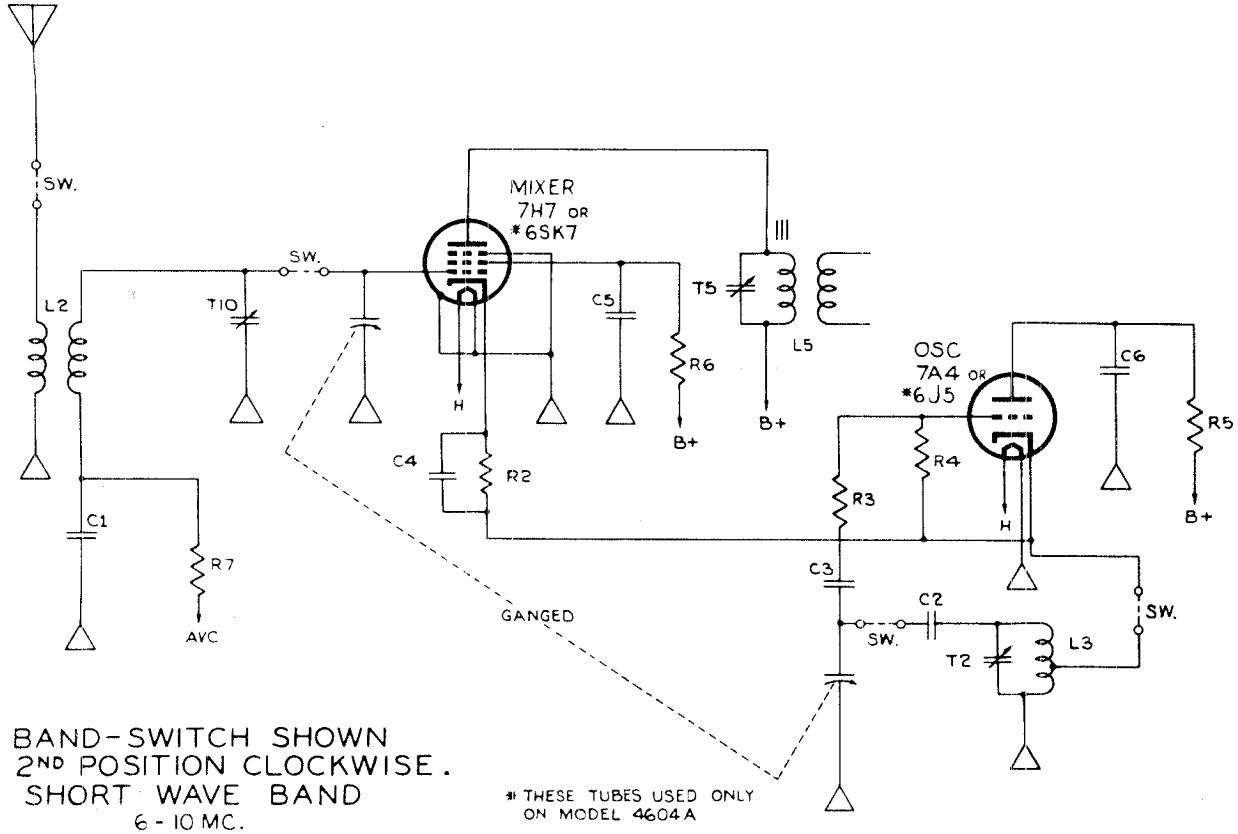
MODELS 4604, 4604A

AIR KING PRODUCTS CO., INC.



BAND-SWITCH SHOWN AT 1ST POSITION. BROADCAST BAND 540-1600 KC.

* THESE TUBES USED ONLY ON MODEL 4604A



BAND-SWITCH SHOWN AT 2ND POSITION CLOCKWISE. SHORT WAVE BAND 6-10 MC.

* THESE TUBES USED ONLY ON MODEL 4604A

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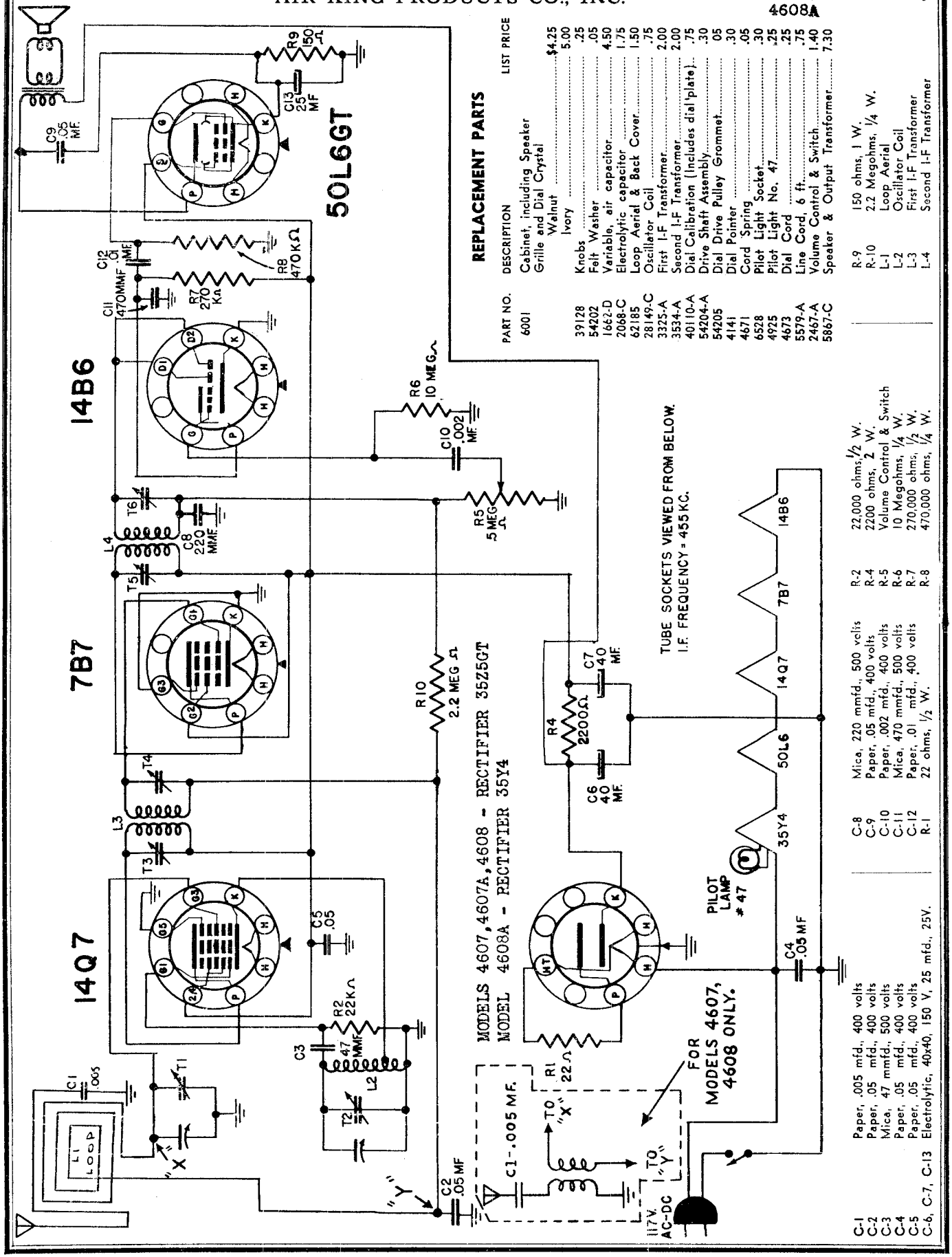
MODELS 4607, 4607A, 4608, 4608A



REPLACEMENT PARTS

PART NO.	DESCRIPTION	LIST PRICE
6001	Cabinet, including Speaker Grille and Dial Crystal	$4.25
	Walnut	5.00
	Ivory	
39128	Knobs	.25
54202	Felt Washer	.05
1662-D	Variable, air capacitor	4.50
2068-C	Electrolytic capacitor	1.75
62185	Loop Aerial & Back Cover	1.50
28149-C	Oscillator Coil	.75
3325-A	First I-F Transformer	2.00
3534-A	Second I-F Transformer	2.00
40110-A	Dial Calibration (Includes dial plate)	.75
54204-A	Drive Shaft Assembly	.30
54205	Dial Drive Pulley Grommet	.05
4141	Dial Pointer	.30
4671	Cord Spring	.05
6528	Pilot Light Socket	.30
4925	Pilot Light No. 47	.25
4673	Dial Cord	.25
5579-A	Line Cord, 6 ft.	.75
2467-A	Volume Control & Switch	1.40
5867-C	Speaker & Output Transformer	7.30

C-1	Paper, .005 mfd., 400 volts	C-8	Mica, 220 mmfd., 500 volts	R-2	22,000 ohms, ½ W.
C-2	Paper, .05 mfd., 400 volts	C-9	Paper, .05 mfd., 400 volts	R-4	2200 ohms, 2 W.
C-3	Mica, 47 mmfd., 500 volts	C-10	Paper, .002 mfd., 400 volts	R-5	Volume Control & Switch
C-4	Paper, .05 mfd., 400 volts	C-11	Mica, 470 mmfd., 500 volts	R-6	10 Megohms, ¼ W.
C-5	Paper, .05 mfd., 400 volts	C-12	Paper, .01 mfd., 400 volts	R-7	270,000 ohms, ½ W.
C-6, C-7, C-13	Electrolytic, 40x40, 150 V, 25 mfd., 25V.	R-1	22 ohms, ½ W.	R-8	470,000 ohms, ¼ W.
				R-9	150 ohms, 1 W.
				R-10	2.2 Megohms, ¼ W.
				L-1	Loop Aerial
				L-2	Oscillator Coil
				L-3	First I-F Transformer
				L-4	Second I-F Transformer

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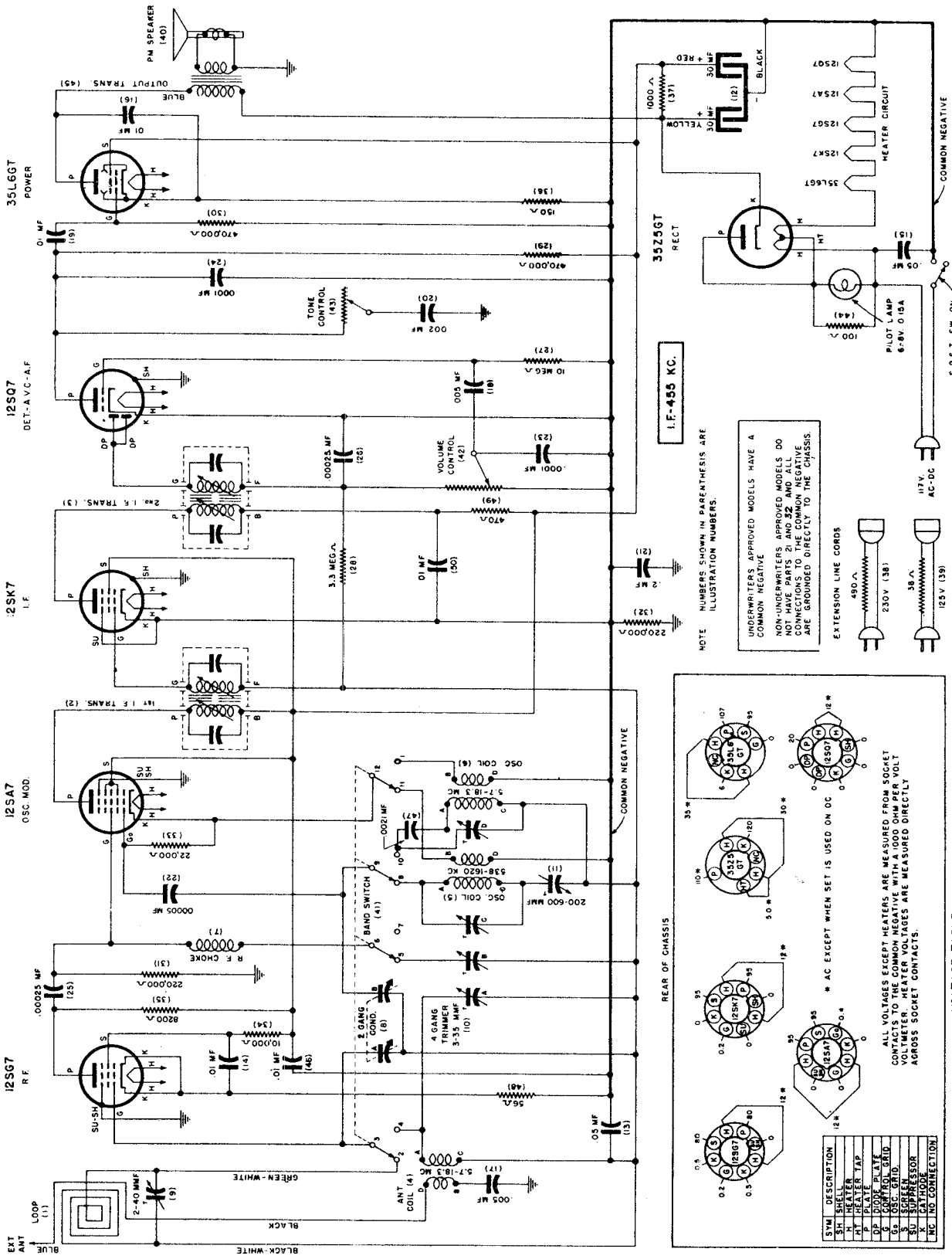
MODEL 6A-122

ALLIED RADIO CORP.


11-45
PM SPEAKER (40)
OUTPUT TRANS. (45)
35L6GT POWER
12SQ7 DET-AVC-A.F
12SK7 I.F
12SA7 OSC. MOD.
12SG7 R.F.
35Z5GT RECT.
2nd I.F. TRANS. (3)
1st I.F. TRANS. (2)
TONE CONTROL (43)
VOLUME CONTROL (42)
I.F. 455 KC.
HEATER CIRCUIT
COMMON NEGATIVE
PILOT LAMP 6.8V. 0.15A.
S.P.S.T. SW ON VOLUME CONTROL
117V. AC-DC
EXTENSION LINE CORDS
230V. (38)
125V. (39)
BAND SWITCH (41)
OSC. COIL (6)
OSC. COIL (5)
4 GANG TRIMMER 3-35 MMF (10)
2 GANG COND. (8)
ANT. COIL (4)
R.F. CHOKE (7)
LOOP (1)
EXT. ANT.
BLUE
BLACK
BLACK-WHITE
GREEN-WHITE
REAR OF CHASSIS
VOLTAGE TABLE
(BOTTOM VIEW OF CHASSIS)
* AC EXCEPT WHEN SET IS USED ON DC
ALL VOLTAGES EXCEPT HEATERS ARE MEASURED FROM SOCKET CONTACTS TO THE COMMON NEGATIVE WITH A 1000 OHM PER VOLT VOLTMETER. ALL TERMINAL VOLTAGES ARE MEASURED DIRECTLY ACROSS SOCKET CONTACTS.
SYM | DESCRIPTION
SH | SHELL
H | HEATER
HT | HEATER TAP
P | PLATE
DP | DIODE PLATE
G | CONTROL GRID
SG | SCREEN
SU | SUPPRESSOR
K | CATHODE
NC | NO CONNECTION
NOTE NUMBERS SHOWN IN PARENTHESIS ARE ILLUSTRATION NUMBERS.
UNDERWRITERS APPROVED MODELS HAVE A COMMON NEGATIVE
NON-UNDERWRITERS APPROVED MODELS DO NOT HAVE PARTS 21 AND 32 AND ALL CONNECTIONS TO THE COMMON NEGATIVE ARE GROUNDED DIRECTLY TO THE CHASSIS.

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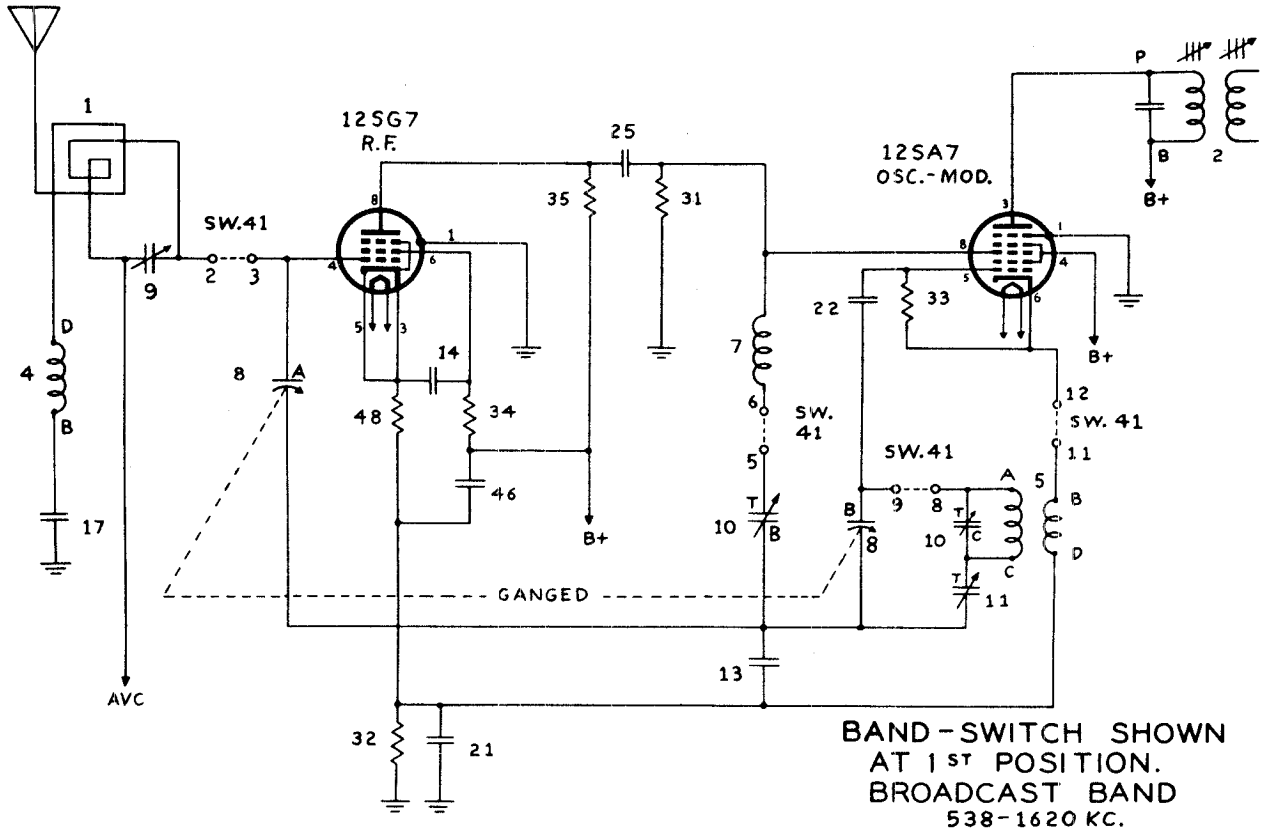
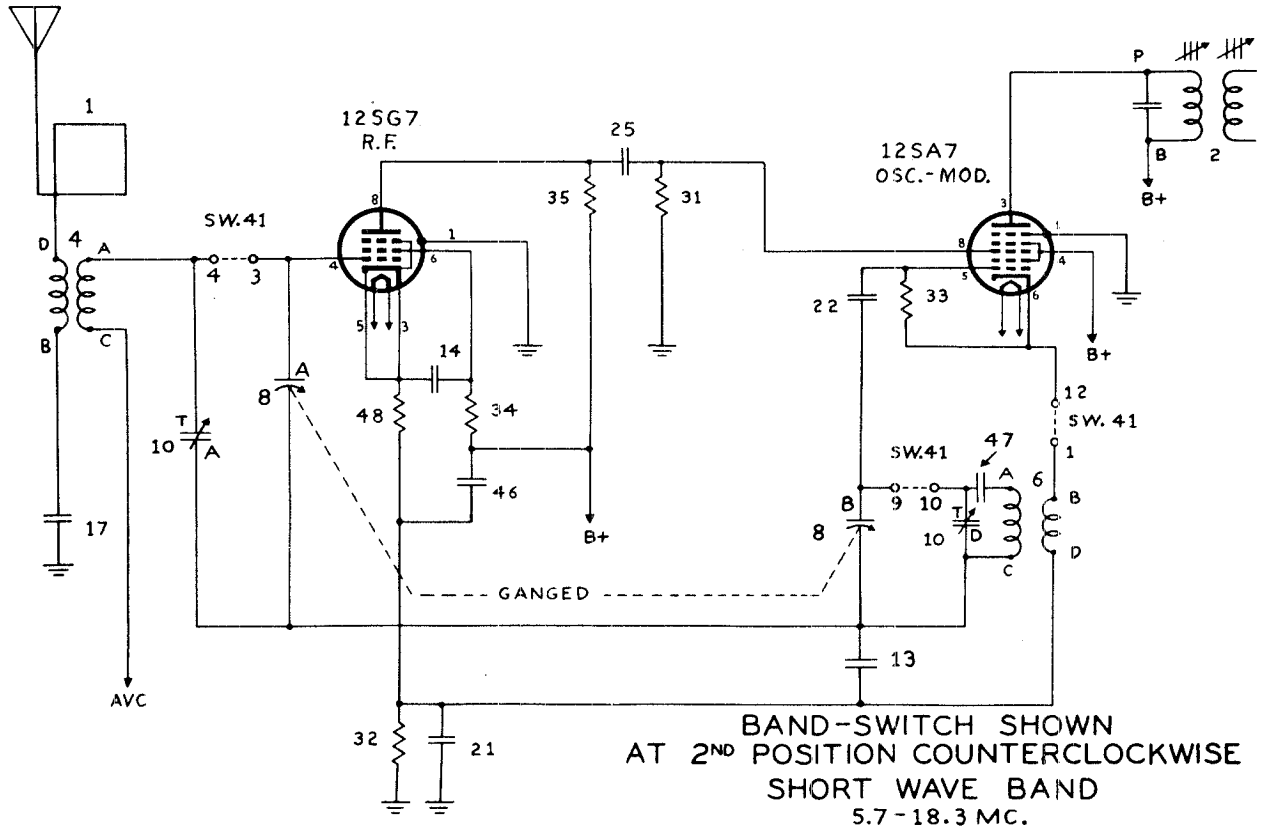
"clarified schematics"

MODEL 6A-122

ALLIED RADIO CORP.



BAND-SWITCH SHOWN
AT 1ST POSITION.
BROADCAST BAND
538-1620 KC.



BAND-SWITCH SHOWN
AT 2ND POSITION COUNTERCLOCKWISE
SHORT WAVE BAND
5.7-18.3 MC.

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Be sure to follow procedure carefully and in the order given—otherwise the receiver will be insensitive and the dial calibration incorrect. For alignment procedure read tabulations from left to right. Make the adjustment marked (1) first, (2) next, (3) third, etc.

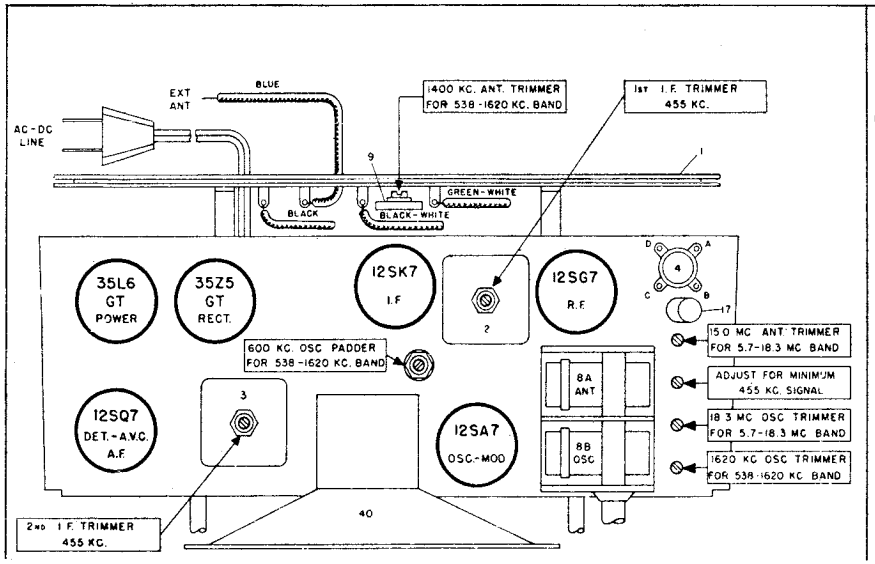
Before starting alignment:

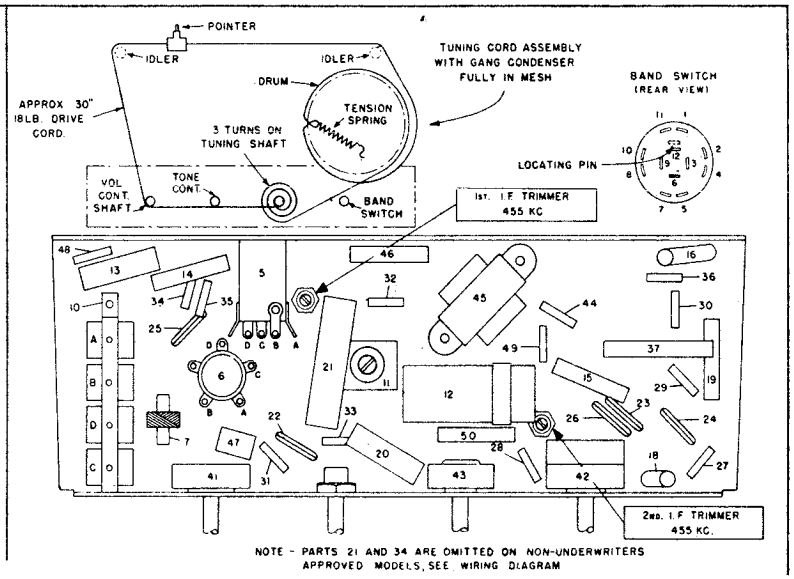
(a) Check tuning dial adjustment by tuning gang condenser until plates touch maximum capacity stop (completely in mesh) at which point the dial needle must be exactly even with the last line at the low frequency end of the dial calibration. If dial needle does not point exactly to last line move to correct position.

(b) Use an accurately calibrated test oscillator with some type of output measuring device.

(c) Place loop antenna in the same position it will be in when set is in the cabinet.

Steps	Place band switch for operation on:	Set receiver dial to:	TEST OSCILLATOR: Adjust test oscillator frequency to:	TEST OSCILLATOR: Use dummy antenna in series with output of test oscillator consisting of	TEST OSCILLATOR: Attach output of test oscillator to:	Refer to parts layout diagram for location of trimmers mentioned below:
1	I.F. alignment use any band position.	Any point where no interfering signal is received	Exactly 455 K.C.	0.2 Mfd. condenser	High side to rear stator plates of tuning condenser. Low side to frame of condenser through .01 Mfd. condenser	Adjust each of the second I.F. transformer trimmers for maximum output, then adjust each of the first I.F. transformer trimmers for maximum output.
2	1620 to 538 K.C. Band	Rotate gang condenser to Maximum Capacity	Exactly 455 K.C.	.00025 Condenser	High side to BLUE Antenna Lead. Low side to chassis through a .01 mfd. condenser.	Adjust R.F. coil trimmer for **minimum** 455 K.C. signal.
		Exactly 1620 K.C.	Exactly 1620 K.C.			Adjust 1620 K.C. oscillator trimmer for maximum output.
		Approx. 1400 K.C.	Approx. 1400 K.C.			While rocking gang condenser adjust 1400 K.C. loop trimmer for maximum output.
		Approx. 600 K.C.	Approx. 600 K.C.			While rocking gang condenser adjust 600 K.C. oscillator padder for maximum output.
3	5.7 to 18.3 M.C. Band	Exactly 18.3 M.C.	Exactly 18.3 M.C.	400 Ohm carbon resistor		Adjust 18.3 M.C. oscillator trimmer for maximum output.
		Approx. 15 M.C.	Approx. 15 M.C.	400 Ohm carbon resistor		While rocking gang condenser adjust 15 M.C. antenna trimmer for maximum output.

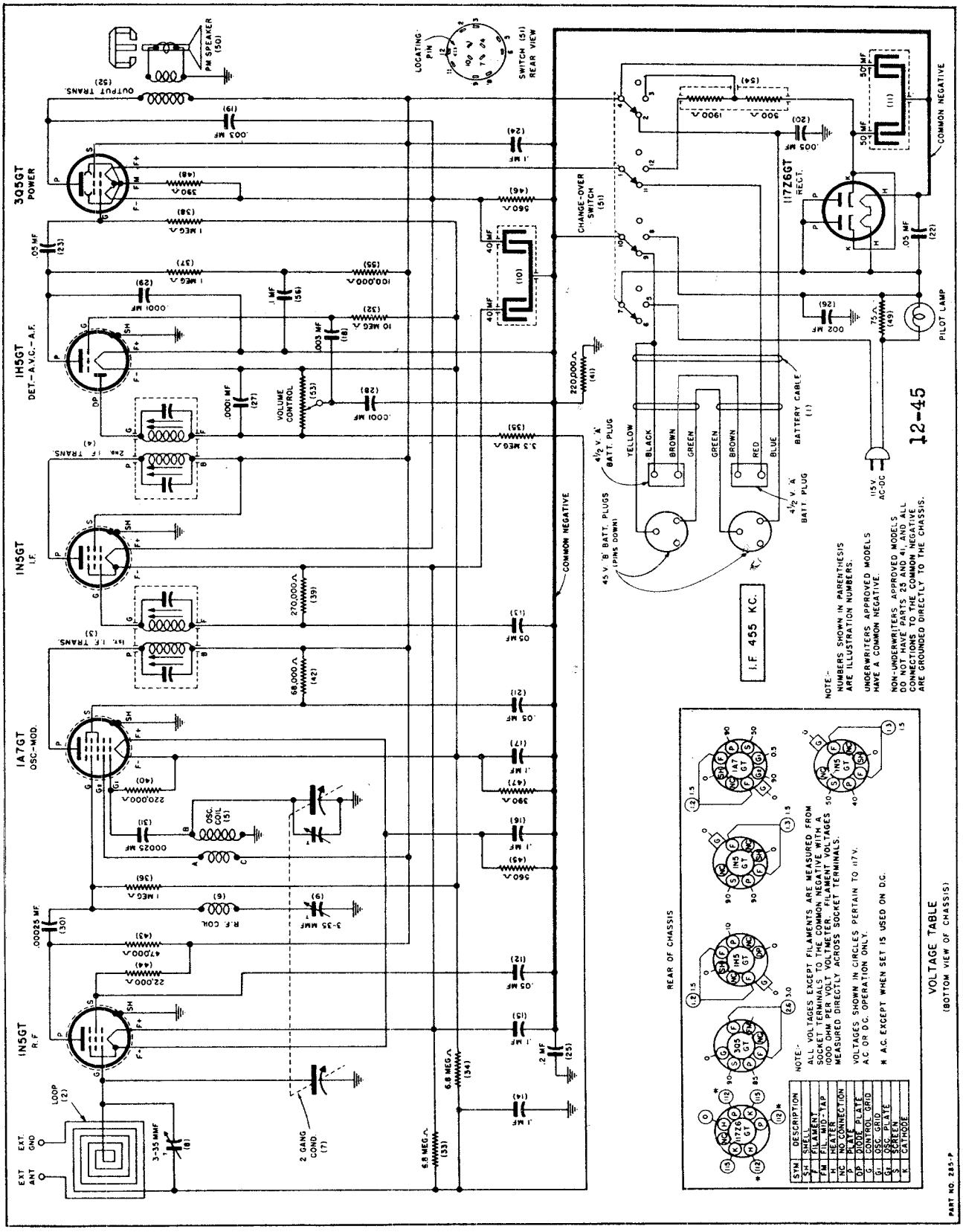




NOTE - PARTS 21 AND 34 ARE OMITTED ON NON-UNDERWRITERS APPROVED MODELS, SEE WIRING DIAGRAM

MODEL 6A-127

ALLIED RADIO CORP.


3Q5GT POWER
1H5GT DET.-A.V.C.-A.F.
1N5GT I.F.
1A7GT OSC.-MOD.
1N5GT R.F.
117Z6GT RECT.
PM SPEAKER (50)
OUTPUT TRANS. (52)
LOCATING PIN
SWITCH (51) REAR VIEW
CHANGE-OVER SWITCH (51)
VOLUME CONTROL (53)
COMMON NEGATIVE
PILOT LAMP
BATTERY CABLE (1)
4½ V. 'A' BATT. PLUG
45 V. 'B' BATT. PLUGS (PINS DOWN)
YELLOW
BLACK
BROWN
GREEN
RED
BLUE
115 V. A.C.-D.C.
I.F. 455 KC.
LOOP (2)
EXT. GND
EXT. ANT
2 GANG COND. (7)
R.F. COIL
OSC. COIL (5)
12-45
NOTE:- NUMBERS SHOWN IN PARENTHESIS ARE ILLUSTRATION NUMBERS.
UNDERWRITERS APPROVED MODELS HAVE A COMMON NEGATIVE.
NON-UNDERWRITERS APPROVED MODELS DO NOT HAVE PARTS 25 AND 41, AND ALL CONNECTIONS TO THE COMMON NEGATIVE ARE GROUNDED DIRECTLY TO THE CHASSIS.
REAR OF CHASSIS
VOLTAGE TABLE
(BOTTOM VIEW OF CHASSIS)
NOTE:- ALL VOLTAGES EXCEPT FILAMENTS ARE MEASURED FROM SOCKET TERMINALS TO THE COMMON NEGATIVE WITH A 1000 OHM PER VOLT VOLTMETER. FILAMENT VOLTAGES MEASURED DIRECTLY ACROSS SOCKET TERMINALS.
VOLTAGES SHOWN IN CIRCLES PERTAIN TO 117V. A.C. OR D.C. OPERATION ONLY.
* A.C. EXCEPT WHEN SET IS USED ON D.C.
SYM | DESCRIPTION
F | FILAMENT
FM | FIL. MID-TAP
H | HEATER
NC | NO CONNECTION
P | PLATE
DP | DIODE PLATE
G | CONTROL GRID
SG | SUPPRESSOR GRID
G1 | OSC. PLATE
S | SCREEN
K | CATHODE
PART NO. 285-P

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Before starting alignment:

(a) Check tuning dial adjustment by tuning gang condenser until plates touch maximum capacity stop (completely in mesh) at which point the dial needle must be exactly even with the last line at the low frequency end of the dial calibration. If dial needle does not point exactly to last line move to correct position.

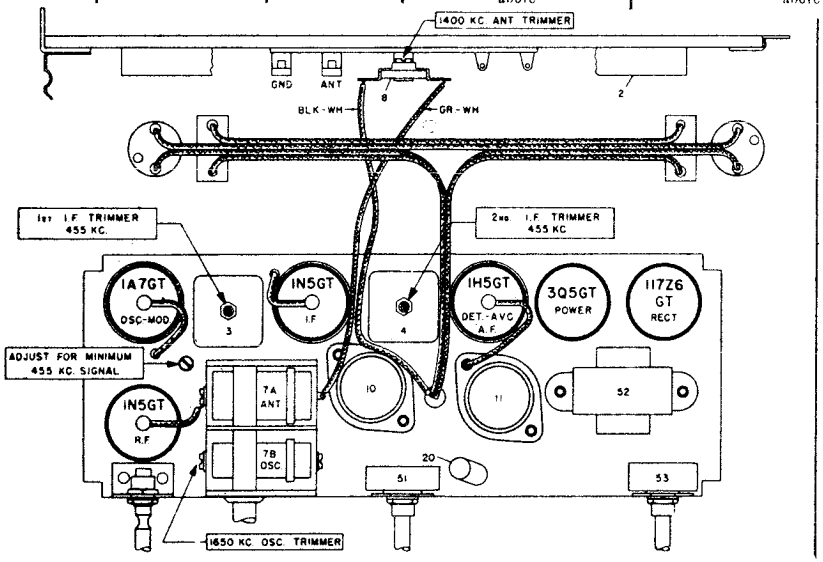
(b) Use an accurately calibrated test oscillator with some type of output measuring device.

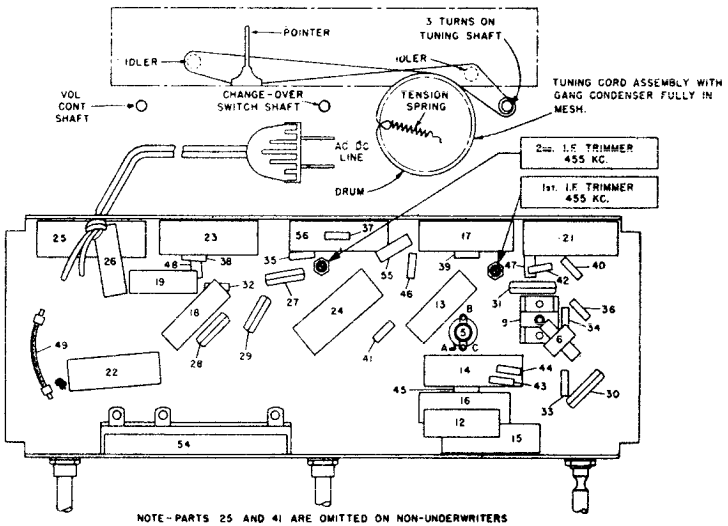
(c) WHEN ADJUSTING 1650 KC OSCILLATOR TRIMMER AND 455 KC TRIMMER remove chassis from cabinet and disconnect the white-green and white-black loop connection wires from the 1400 KC loop antenna trimmer. Attach a 1 megohm resistor across these wires and feed output of test oscillator across the 1 megohm resistor.

(d) THE 1400 KC LOOP ANTENNA TRIMMER is accessible through hole in cabinet back. It should be adjusted only after all other adjustments have been made and with the set mounted in the cabinet and the back IN CLOSED position. When aligning the 1400 KC trimmer connect test oscillator output to the "ANT" and "GND" clips that are attached to the inside of the cabinet back.

TEST OSCILLATOR

Steps	Set receiver dial to:	Adjust test oscillator frequency to:	Use dummy antenna in series with output of test oscillator consisting of:	Attach output of test oscillator to	Refer to parts layout diagram for location of trimmers mentioned below:
1	Any point where no interfering signal is received	Exactly 455 K. C.	0.2 Mfd. Condenser	High side to grid of 1A7GT tube, Low side to chassis (if non-Underwriter Approved) or Common Negative (if Underwriter Approved).	Adjust each of the 2nd I.F. transformer trimmer adjustment screws for maximum output, then adjust each of the 1st I.F. transformer trimmer adjustment screws for maximum output.
2	Rotate gang condenser to maximum capacity	Exactly 455 K. C.	See paragraph (C) above	See paragraph (C) above	Adjust R. F. coil trimmer for **minimum** 455 K. C. signal.
3	Rotate gang condenser to minimum capacity	Exactly 1650 K. C.			Adjust 1650 K. C. oscillator trimmer for maximum output.
4	Approximately 1400 K. C.	Approx. 1400 K. C.	See paragraph (D) above	See paragraph (D) above	Adjust 1400 K. C. antenna trimmer for maximum output.

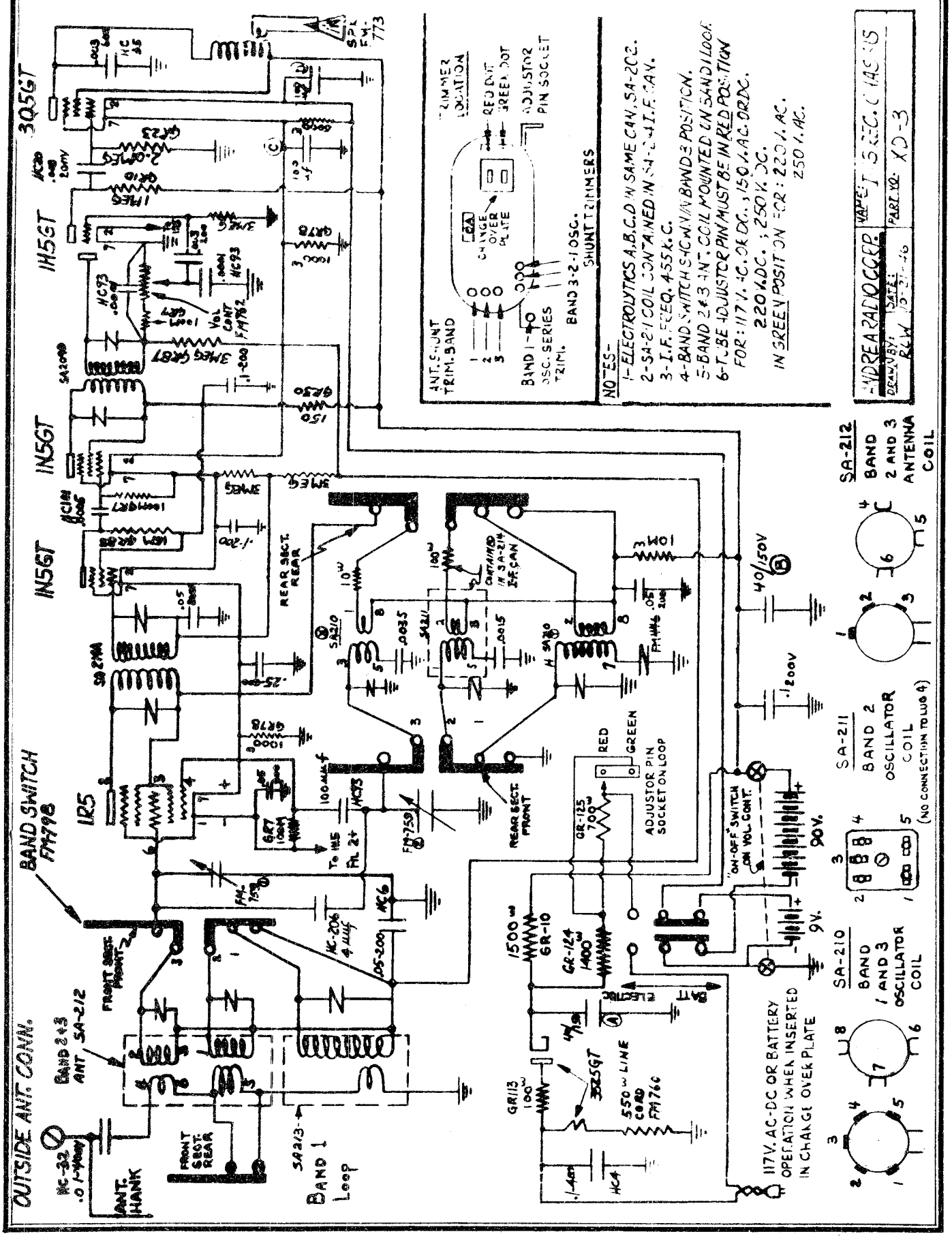




NOTE-PARTS 25 AND 41 ARE OMITTED ON NON-UNDERWRITERS APPROVED MODELS, SEE WIRING DIAGRAM.

MODEL PI-63

ANDREA RADIO CORP.


OUTSIDE ANT. CONN.
ANT. HANK
BAND SWITCH FM798
BAND 2+3 ANT SA-212
BAND 1 Loop
FRONT SECT. REAR
REAR SECT. REAR
REAR SECT. FRONT
FRONT SECT. FRONT
117V. AC-DC OR BATTERY OPERATION WHEN INSERTED IN CHARGE OVER PLATE
550 W LINE CORD FM760
ON-OFF SWITCH ON VOL. CONT.
ADJUSTOR PIN SOCKET ON LOOP
RED
GREEN
SA-210 BAND 1 AND 3 OSCILLATOR COIL
SA-211 BAND 2 OSCILLATOR COIL (NO CONNECTION TO LUG 4)
SA-212 BAND 2 AND 3 ANTENNA COIL
ANT. SHUNT TRIM. BAND
TRIMMER LOCATION
RED DOT
GREEN DOT
ADJUSTOR PIN SOCKET
CHANGE OVER PLATE
BAND 1 OSC. SERIES TRIM.
BAND 3-2-1 OSC. SHUNT TRIMMERS
NOTES-
1-ELECTROLYTICS A,B,C,D IN SAME CAN, SA-202.
2-SA-211 COIL CONTAINED IN SA-212 CAN.
3-I.F. FREQ. 455 K.C.
4-BAND SWITCH SHOWN IN BAND 3 POSITION.
5-BAND 2 ANT. COIL MOUNTED ON SAND LOOP.
6-TUBE ADJUSTOR PIN MUST BE IN RED POSITION FOR: 117 V. 40 CY. DC.; 150 V. AC-DC.
220 V. DC.; 250 V. DC.
IN GREEN POSITION FOR: 220 V. AC.
250 V. AC.
ANDREA RADIO CORP.
DRAWN BY: R.L.W.
DATE: 10-31-46
TITLE: SCHEMATIC DIAGRAM
PART NO: XD-3

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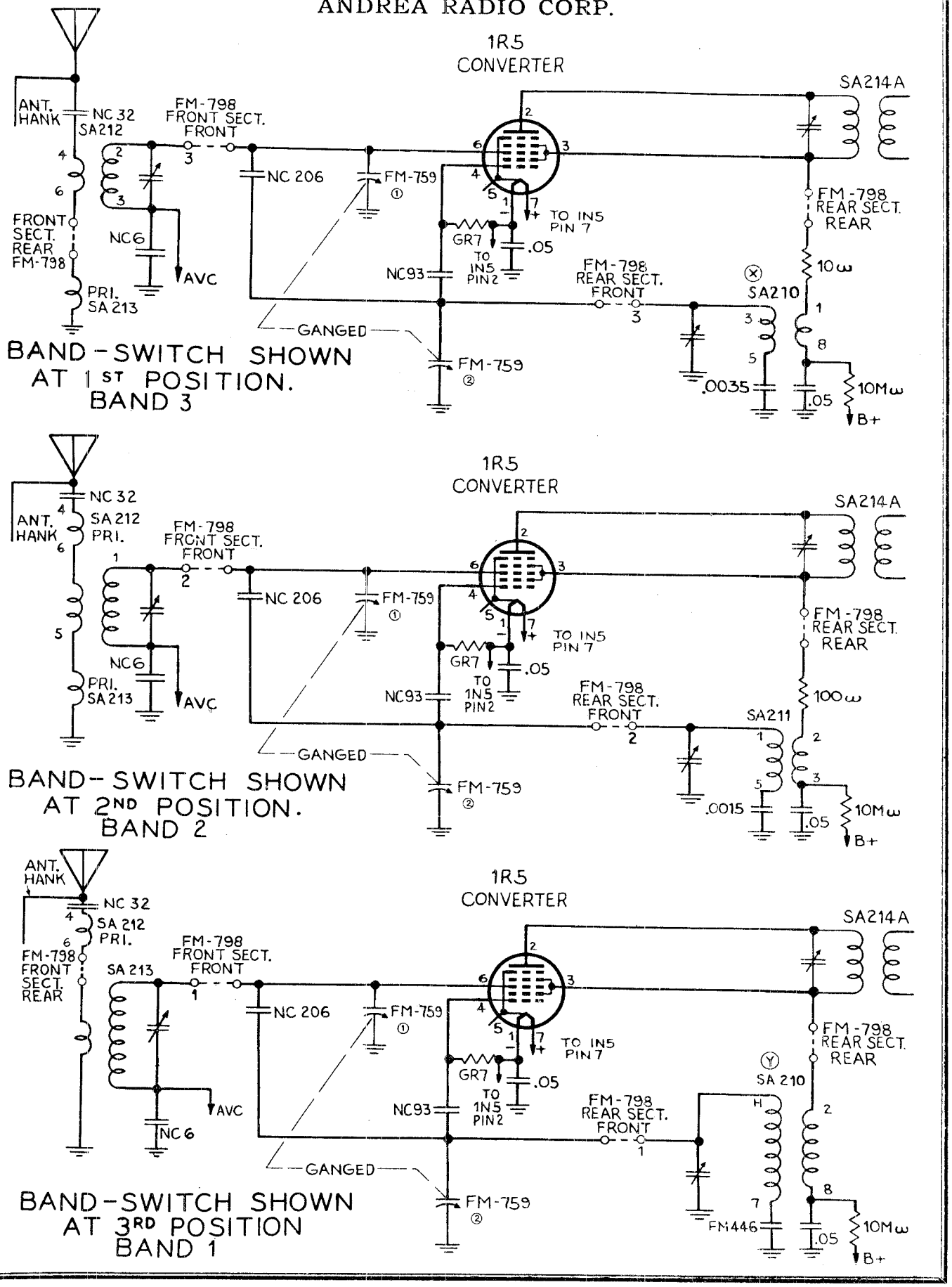
ANDREA RADIO CORP.



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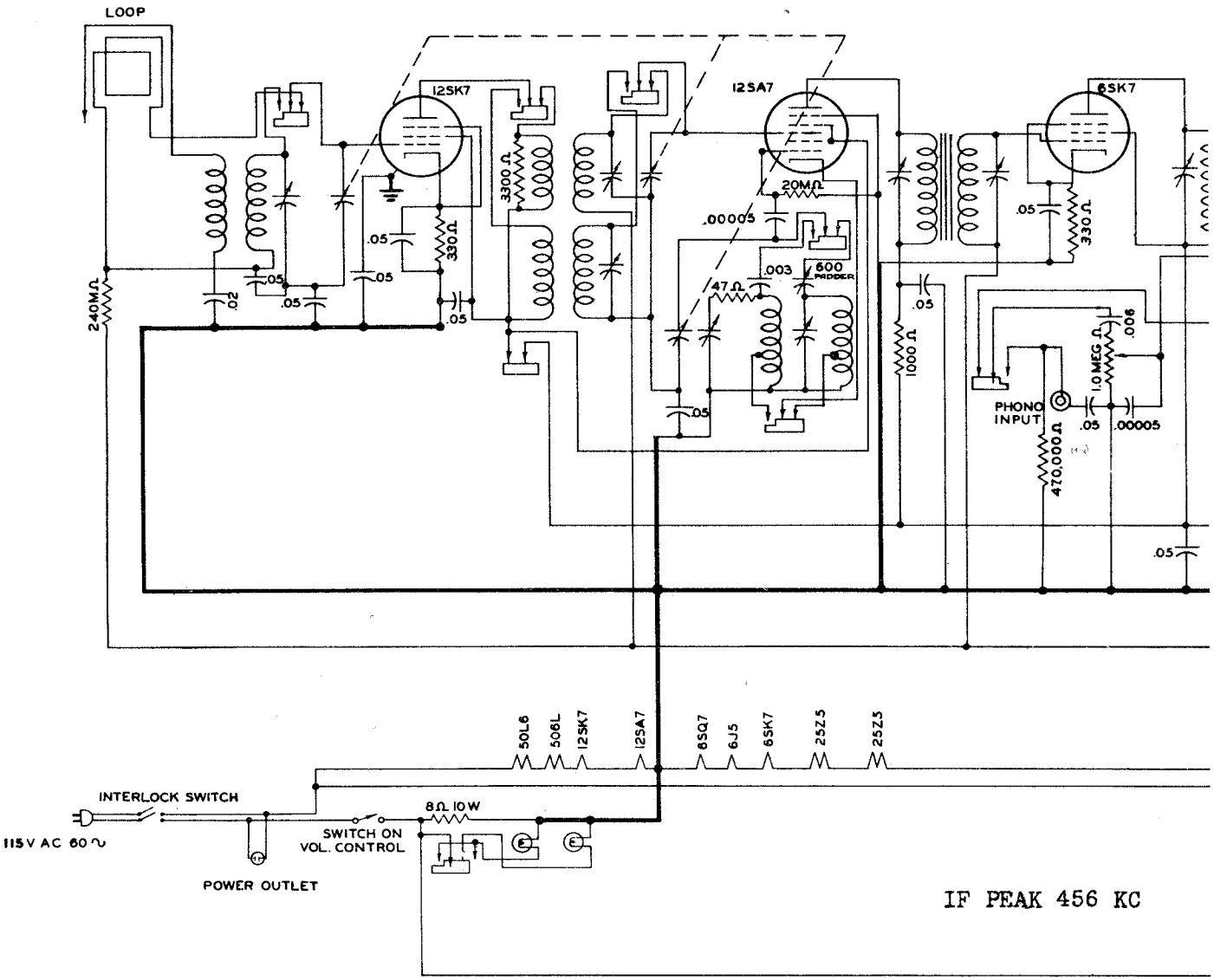

IF PEAK 456 KC

VALUE	QUAN.	DESCRIPTION	PART NO.
.00005 μfd	2	CAPACITOR MICA	CM-1
.0001 μfd	3	MICA	CM-4
.003 μfd	1	MICA	CM-5
.006 μfd	2	MICA	CP-9
.01 μfd	1	PAPER	CP-3
.02 μfd	1	DOMINO	CP-13
.05 μfd	7	PAPER	CP-6
.1 μfd	1	PAPER	CP-10
40. X 80. μfd	1	ELECTROLYTIC	CE-4
40 MFD	1	ELECTROLYTIC	CE-5
25 MFD	1	ELECTROLYTIC	CE-2
.05 MFD	6	CAPACITOR DOMINO	CM-11
200 TO 600 MMFD	1	PADDER CONDENSER	CT-4
4 TO 35 MMFD	1	5 GANG TRIMMER COND.	CT-5
0 TO 420 MMFD		3 GANG VARIABLE COND.	CV-3
1.0 MEGOHM	2	RESISTOR	RM-2
8 Ω 10 W	1		RW-9
12 Ω 1/2 WATT	1		RW-19
240Ω 1/2 WATT	1		RM-19
75Ω 2 WATT	1		RW-12
150Ω 25 WATT	1		RW-15
330Ω 1/2 WATT	2		RW-14

1000Ω	2		RM-9
3300Ω	1		RM-15
10,000Ω	1		RM-13
15,000Ω	1		RM-23
20,000Ω	1		RM-7
47,000Ω	1		RM-6
100,000	2		RM-5
210,000	2		RM-4
240,000	2		RM-3
470,000 1/2 WATT	1	RESISTOR	RM-26
	1	LOOP ANTENNA	LP-6
10 H 350 OHM DC	1	FILTER REACTOR	L1-1
8"-10 WATT	1	DYNAMIC SPEAKER	QS-4
#47	2	PILOT LIGHTS	IL-2
12SK7	1	TUBE	V-15
12SA7	1		V-17
6SK7	1		V-5
6SQ7	1		V-7
50L6GT	2		V-18
6J5	1		V-3
25Z5GT	2	TUBE	V-2
	1	POWER OUTLET	PP-1
1.0 MEGOHM	1	VOLUME CONTROL SWITCH	RP-7

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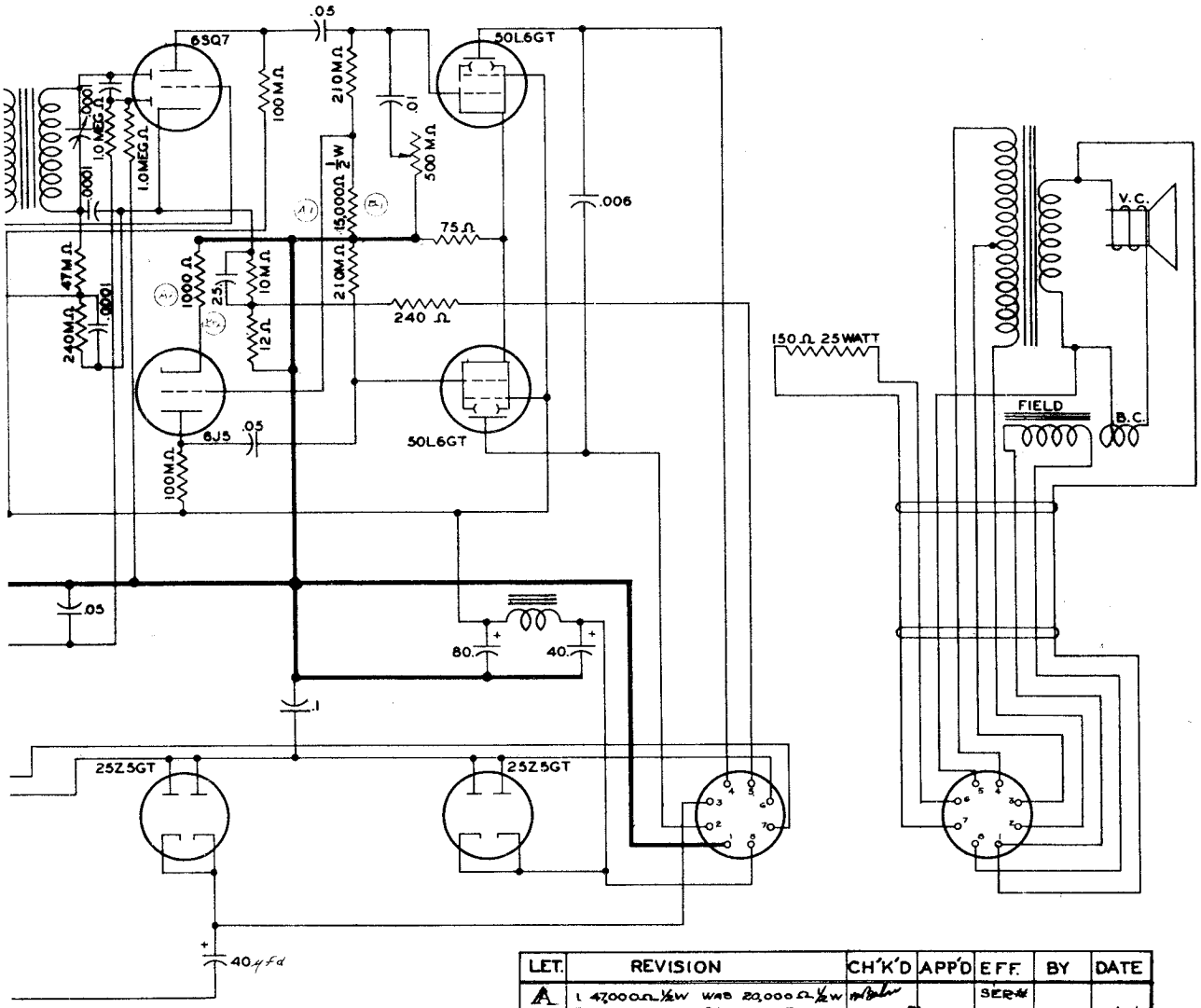
ADIO CORP.

MODEL 32



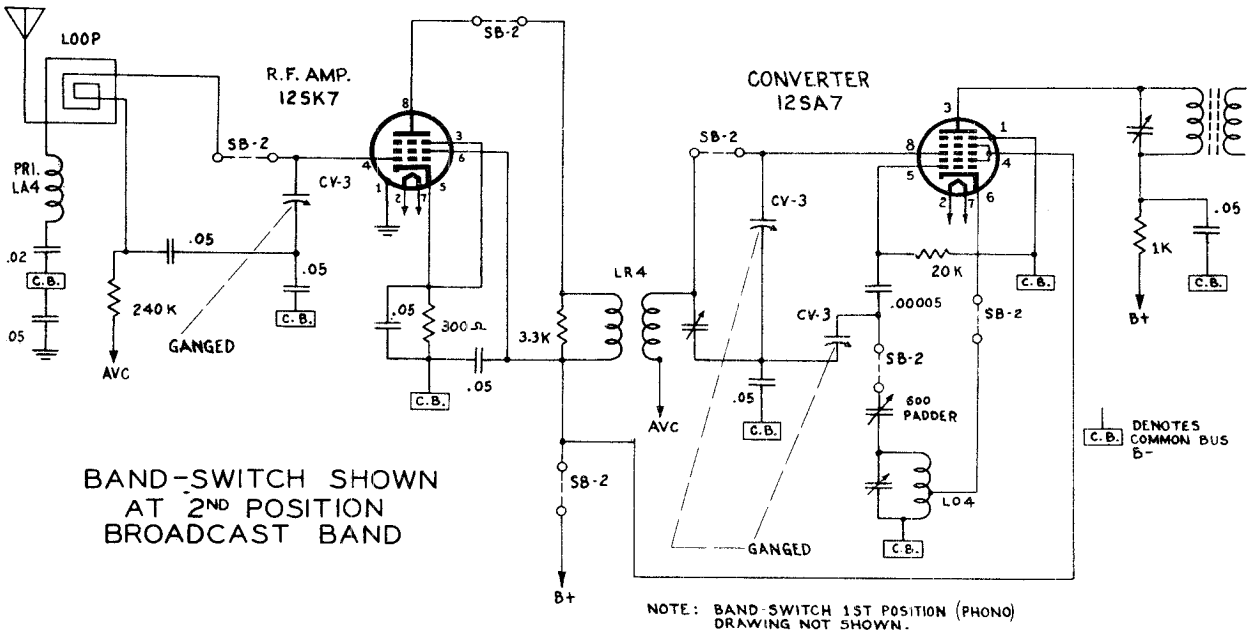
LET.	REVISION	CH'K'D	APP'D	E F F.	BY	DATE
A	1. 47000Ω 1/2W WAS 20,000Ω 1/2W 2. DELETE 25 μfd CATHODE BY-PASS CONDENSER	m. Baker W. Wenner		SER# A-1700	H.H.	9/3/42
B	1. 15,000Ω 1/2 W WAS 47,000Ω 1/2W 2. 1000Ω 1/2 W WAS 5000Ω 1/2 W 3. ADD 470,000Ω 1/2 W	m. Baker W. Wenner		SER# A-2701	H.H.	9/3/42

NOTE:

1. BAND SWITCH IN BROADCAST POSITION.
2. ALL CAPACITORS ARE MARKED IN MICROFARADS.
3. IN SERIAL NO'S. 3701 THRU 4700 THE VOLUME CONTROL, NORMALLY A 1 MEGOHM POTENTIOMETER, IS .5 MEGOHM AND THE 470,000 Ω 1/2 W RESISTOR ACROSS THE PHONO JACK TO BUS IS 1 MEGOHM 1/2 W.

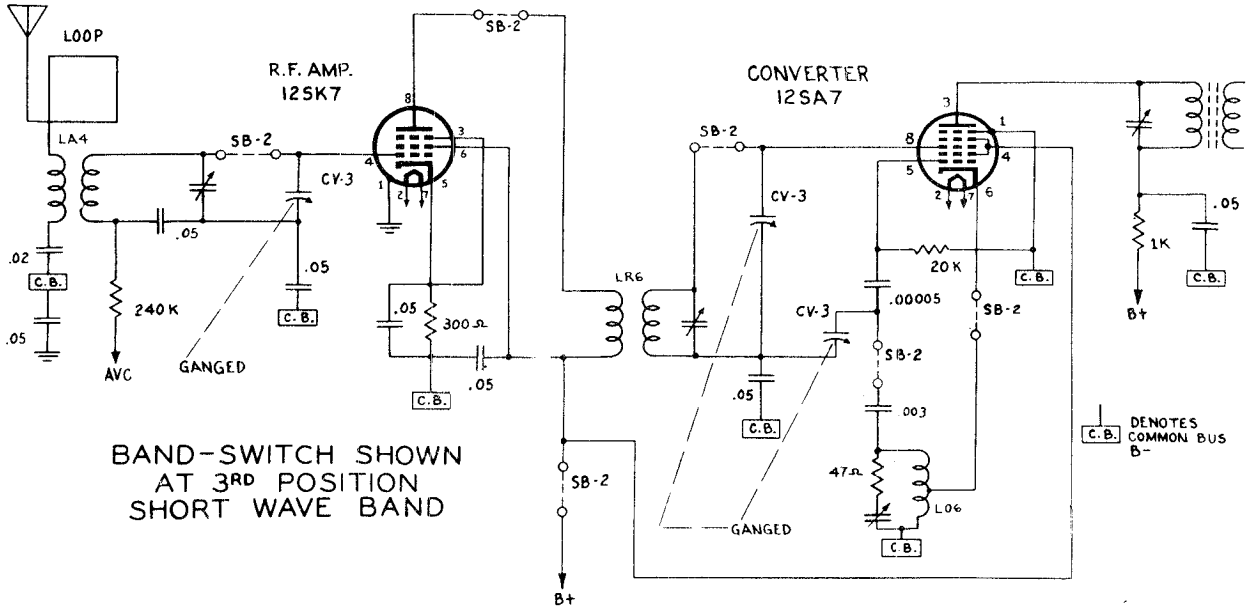
	1	PHONO INPUT JACK	J-2
500,000 Ω	1	TONE CONTROL	RP-8
	1	BAND CHANGE SWITCH	SB-2
	1	INTERLOCK SWITCH	SP-2
	1	I.F. TRANS. W/TRIMMER	T1-1
	1	I.F. TRANS. W/TRIMMER	T1-3
	1	BROADCAST OSC. COIL	LO-4
	1	SHORTWAVE OSC. COIL	LO-6
	1	BROADCAST R.F. COIL	LR-4
	1	SHORTWAVE R.F. COIL	LR-6
	1	SHORTWAVE R.F. COIL	LA-4

ANSLEY RADIO CORP. MODEL 32



BAND-SWITCH SHOWN AT 2ND POSITION BROADCAST BAND

NOTE: BAND-SWITCH 1ST POSITION (PHONO) DRAWING NOT SHOWN.



BAND-SWITCH SHOWN AT 3RD POSITION SHORT WAVE BAND

MODEL 32

ANSLEY RADIO CORP.

Alignment Instructions - Model 32

1. It is not necessary to remove the RF and IF/Audio Chassis from the housing to align the RF section. The IF section can be aligned, while in the case, by using an offset screwdriver.

2. After removing the metal case from the cabinet, the interlock switch, located on the IF/Audio chassis, must be closed. This can be done by jamming a wooden block between the chassis and the switch button.

3. Connect output meter across the voice coil. The simplest way of accomplishing this is to clip the meter leads on pins # 1 & 5 of the speaker plug socket - on the underside of the chassis.

4. Insert power plug in socket and turn volume control switch on.

5. Padder adjustments can be made by inserting a long thin - insulated shank - screwdriver, from the front, up under the RF chassis to the padder adjustment screw. Trimmer adjustments can be made directly from the front of the set. Location of the various trimmers from left to right (facing front of set) is as follows: SW Ant. Trimmer, SW RF Coil Trimmer, BC RF Coil Trimmer, SW Oscillator Coil Trimmer and BC Oscillator Coil Trimmer.

6. It is not necessary to connect the loop when aligning the set. To align the Broadcast band, connect the signal generator output across the green wire on the antenna terminal strip and bus. To align the Short Wave band, connect signal generator across the blue wire on the antenna terminal strip and bus.

7. Align set in accordance with the table below (Note: Signal generator should be set for 400 cycle 30% modulated output, receiver volume control is set at maximum, and all adjustments are made for maximum reading).

Dummy Antenna	Sig.Gen. Connection	Sig.Gen. Frequency	Band Sw. Position	Tuning Points	Remarks
.05 MFD	Mixer Grid and Bus	456KC	BC	IF Trimmers	Tuning Cond. at Max.
.05 MFD	Green Wire and Bus	620KC	BC	BC OSC Padder	Set Dial at 62 See Below **
.05 MFD	Green Wire and Bus	1620KC	BC	BC OSC Trimmer	Set Dial at 162 See Below **
.05 MFD	Green Wire and Bus	1620 KC	BC	BC RF Trimmer	Set Dial at 162 See Below *
400 ohms	Blue Wire and Bus	17.6	SW	SW OSC Trimmer	Set Dial at 17.6
400 ohms	Blue Wire and Bus	17.6	SW	SW RF Ant. Trimmers	Set Dial at 17.6 See Below *

* When aligning the SW band use caution not to align on the image frequency, which will be found lower on the dial.

** Repeat these steps as often as necessary until both ends of Broadcast Band are tracking perfectly.

8. Tracking Check Points are:

	620KC		6.7 MC
BC	- 1120KC	SW	- 12.2 MC
	1620KC		17.6 MC

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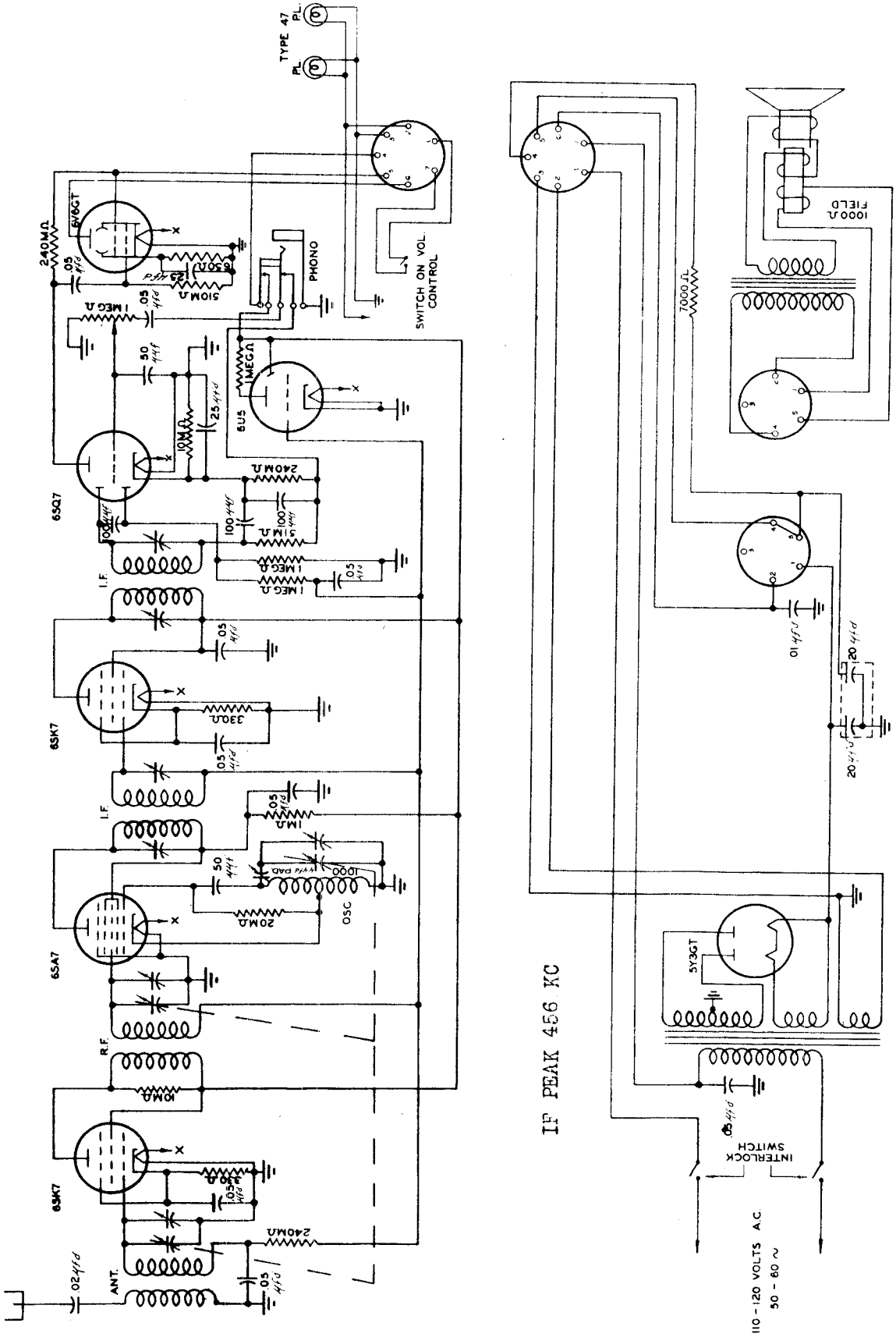
MODELS 41,41A

ANSLEY RADIO CORP.



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MODELS 41,41A

ANSLEY RADIO CORP.

Alignment Instructions - Model 41 & 41A (Paneltone)

To align the Models 41 & 41A, it is not necessary to remove the chassis from the panel. However, the interlock switch - located on the rectifier chassis must be closed. This can best be done by using a U clamp placed over the button and body of the switch. Such a clamp can be made of a piece of steel 3" x 3/4" x 3/33" bent to form a U with a width of 1 3/8".

To align the IF stages proceed as follows:

a. Connect signal generator across Mixer trimmer and chassis. Signal generator should be set for 456 kc, 400 cycle, 30% modulated output. The mixer section of the tuning condenser is the section nearest the tuning dial.

b. Connect output meter across voice coil.

c. Turn set on.

d. Adjust IF trimmers for maximum output.

To align the RF section proceed as follows:

a. Connect signal generator across antenna and ground terminals. Set generator for 620 kc. output (400 cycles, 30% modulated).

b. Set tuning dial at 62.

c. Peak oscillator padder at 620 kc. The oscillator padder is located directly under the tuning dial therefore it is necessary to tune the padder from the underside of the chassis, using either a flexible shaft or offset screwdriver.

d. Retune signal generator for 1670 kc. output and set tuning dial at 167.

e. Peak Oscillator and Mixer trimmers at 1670 kcs.

f. Repeat steps a, b, c, d, & e as often as necessary until set is tracking correctly.

g. Peak Antenna Trimmer at 1670 kcs.

Tracking check points are:- 620, 1140, and 1670 kcs.

Oscillations which develop during alignment of the RF section can usually be cured by keeping the lead from the Antenna Tuning Condenser to the Antenna coil close to the chassis.

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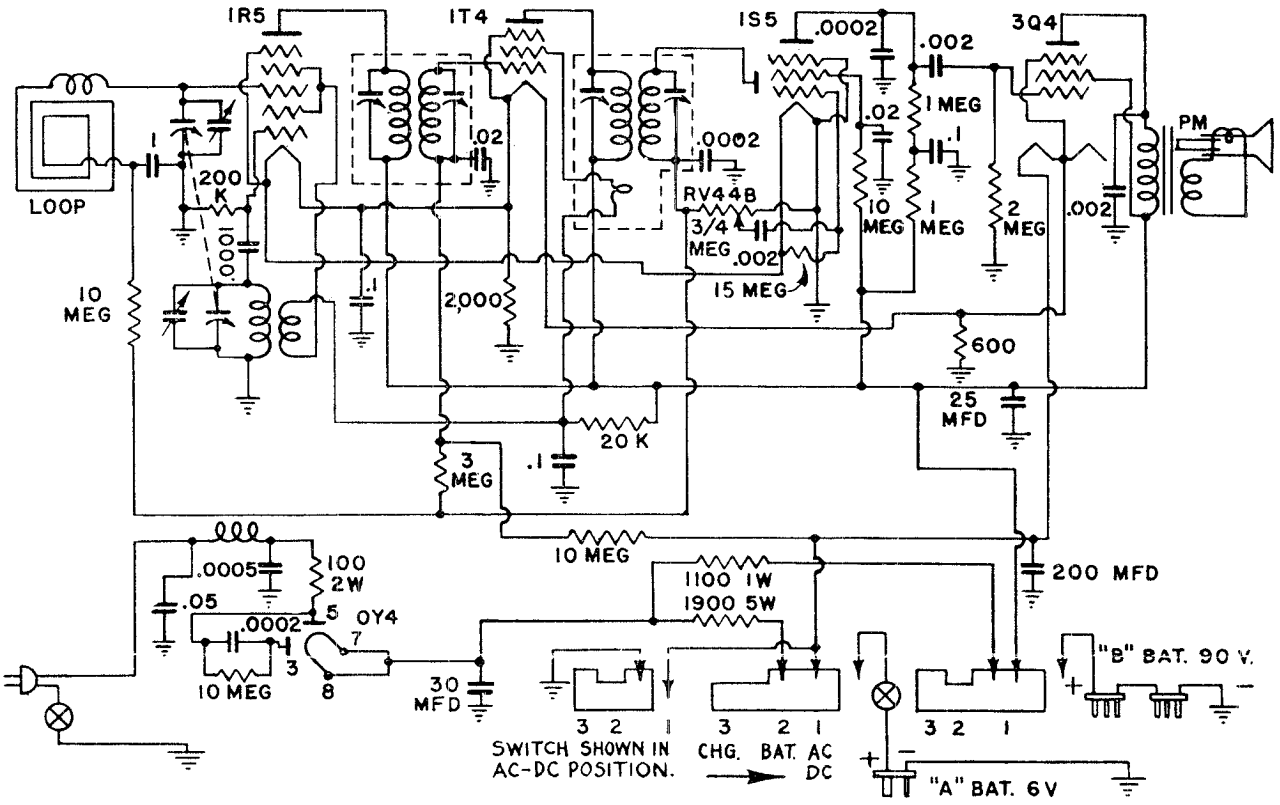
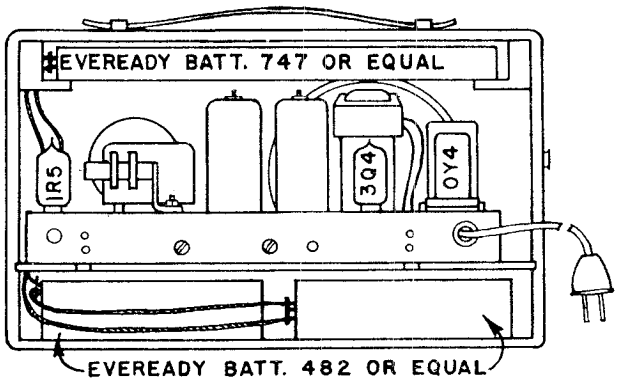
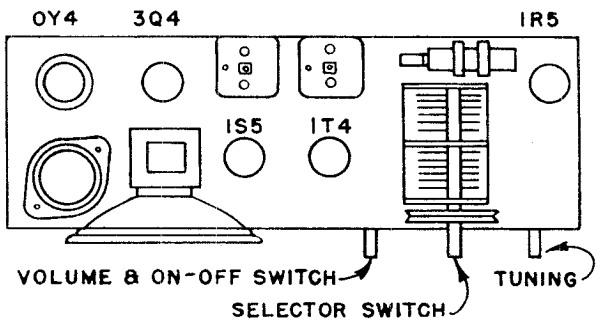
MODEL NO. C-60



IF PEAK 455 KC





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MODELS 601,602
MODEL 611
MODEL 612X
MODEL 630

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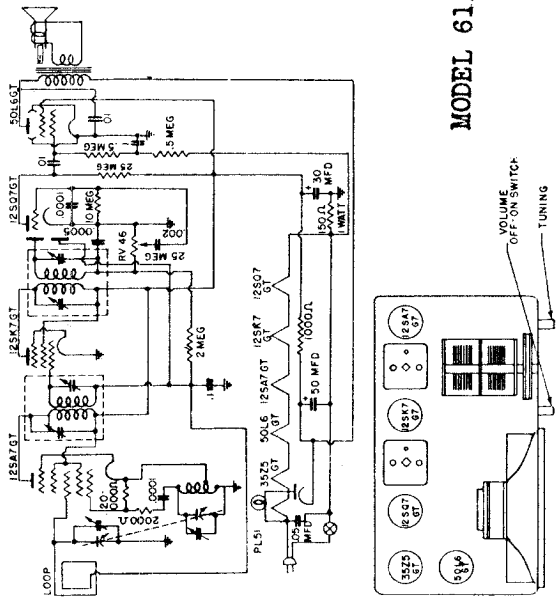
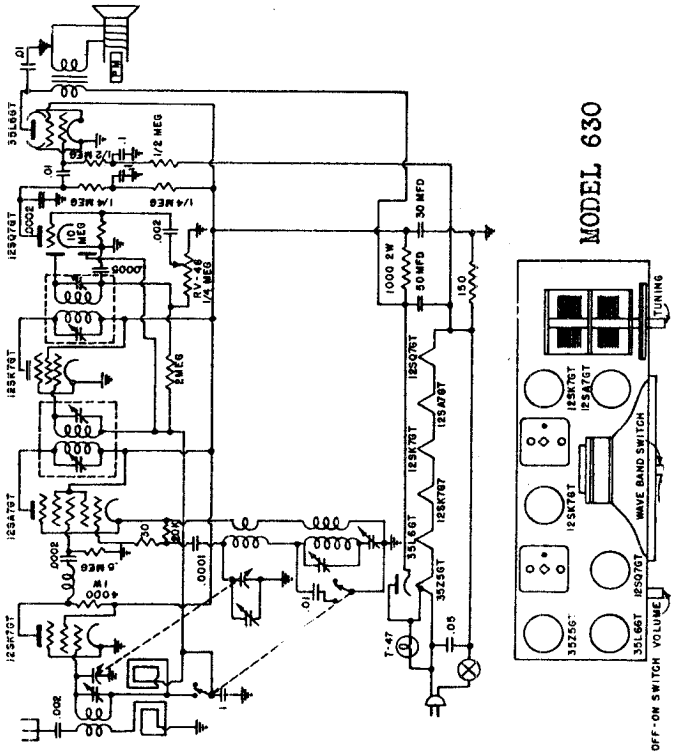
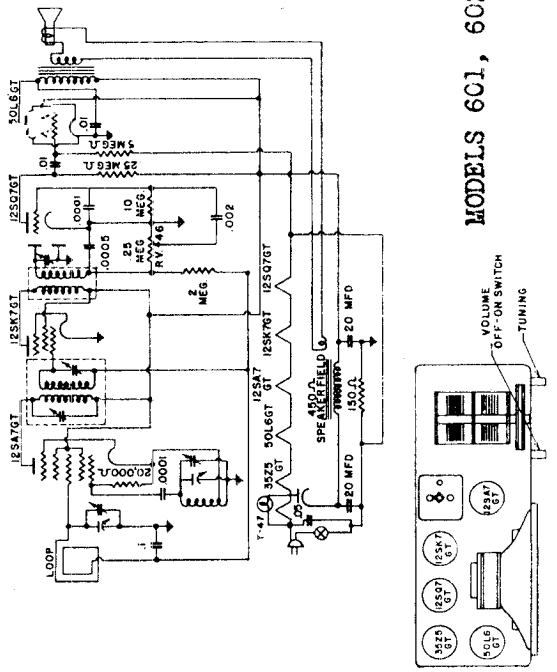
MODEL 611



MODEL 630

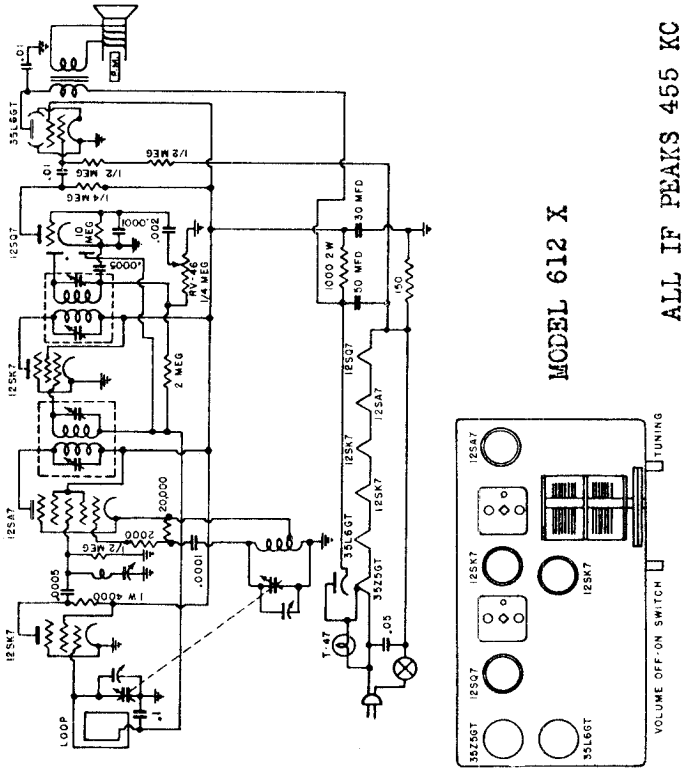


MODELS 601, 602



ALL IF PEAKS 455 KC

MODEL 612 X



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For Alignment, see P.15-4

MODEL 630

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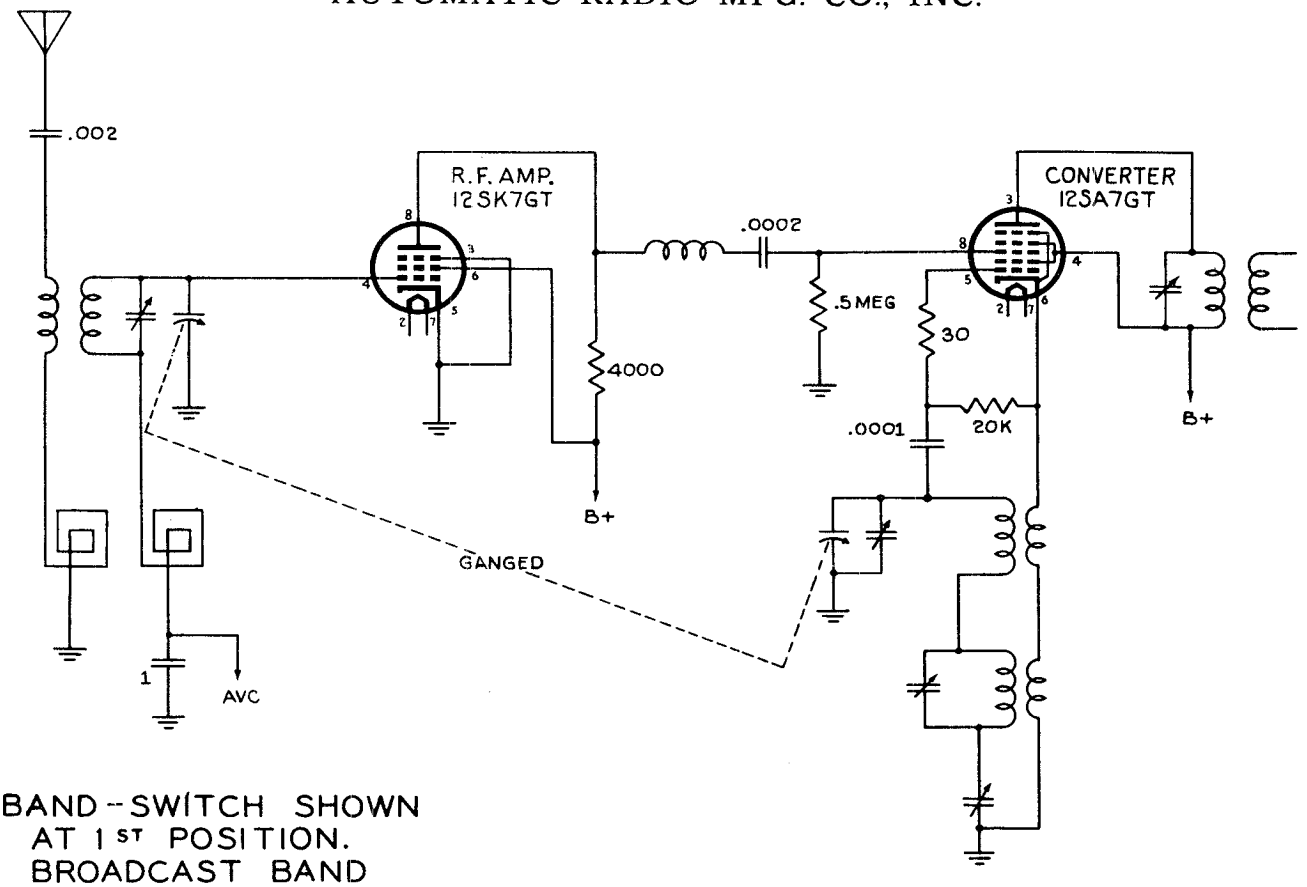
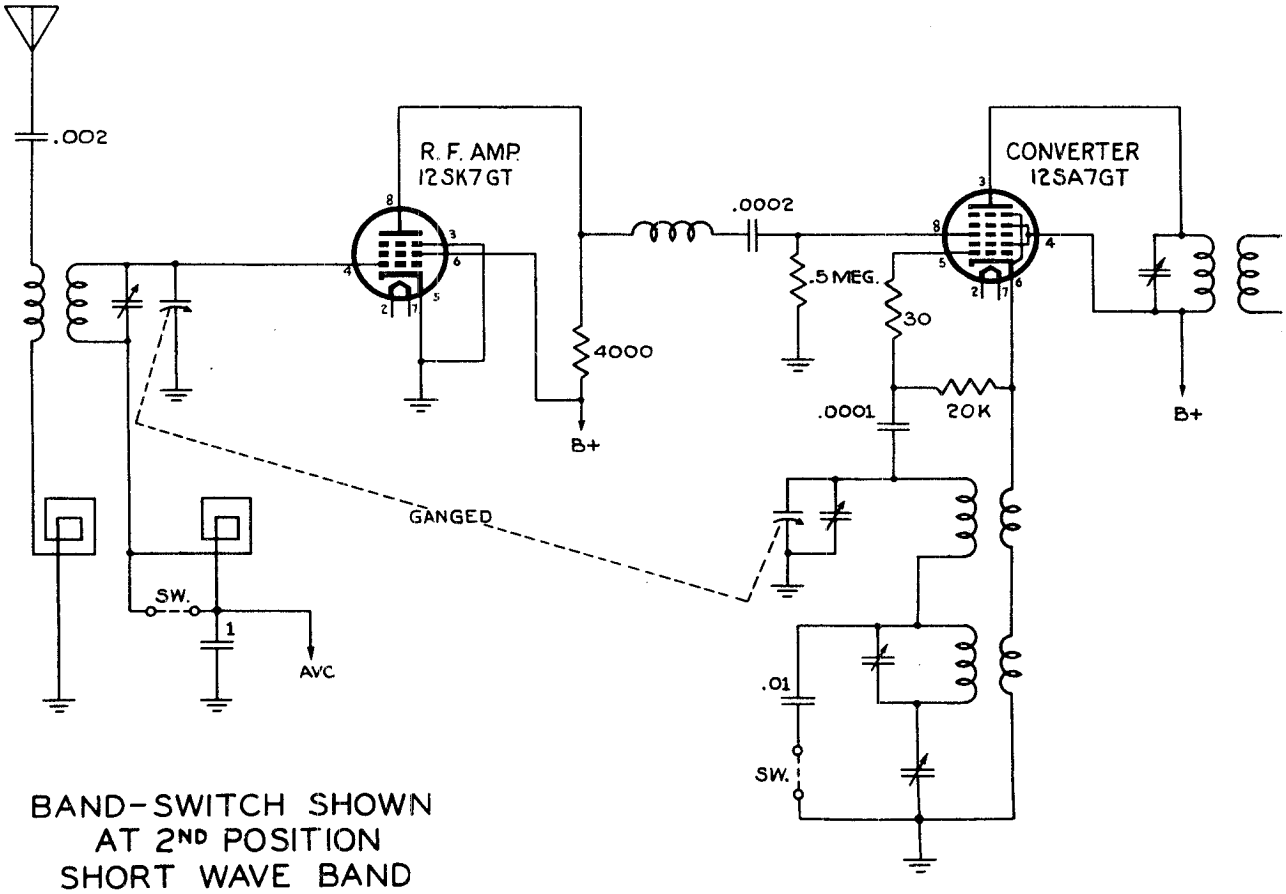


BAND-SWITCH SHOWN
AT 1ST POSITION.
BROADCAST BAND



BAND-SWITCH SHOWN
AT 2ND POSITION
SHORT WAVE BAND

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MODELS 601,602
MODEL 611
MODEL 612X
MODEL 613X
MODELS 614X,616X
MODEL 640
MODEL 650
MODEL 670
MODEL 677

AUTOMATIC RADIO MFG. CO., INC.

ALIGNMENT DATA

Models 601, 611, and 640 are aligned the same as the models listed below except no wave trap and no 12SK7 R. F. stage. I. F. and oscillator range setting to be all done from grid of the 12SA7 tube.

MODELS 612X, 613X, 614X, 616X, 650, 670, and 677

1. Connect signal generator, set at 455 KC, through a .1 mfd coupling condenser to the grid of the 12SA7GT tube.
2. Connect an output meter across speaker voice coil.
3. Adjust trimmers on I. F. transformers for a maximum output as indicated on the output meter.

NOTE:

a. Volume Control should be set at the full position.

b. Keep signal generator output at a low value so that receiver AVC action will not affect alignment.

4. Connect signal generator, still set at 455 KC, to grid of 12SK7 R. F. tube.
5. Adjust wave trap trimmer, located under chassis, for minimum output.
6. Set signal generator to 1685 KC.
7. Turn tuning condenser to the minimum capacity position, plates out.
8. Adjust front (oscillator) trimmer on tuning condenser until generator signal is picked up.
9. Set signal generator to 1400 KC.
10. Connect output leads of signal generator in the form of a single turn loop and place this loop several inches away from the receiver loop antenna.
11. Tune receiver until generator signal is picked up. (It may be necessary to adjust the signal generator output to a maximum in order for the receiver to pick the signal up in this fashion.)
12. Adjust rear (antenna) trimmer on tuning condenser for maximum output.

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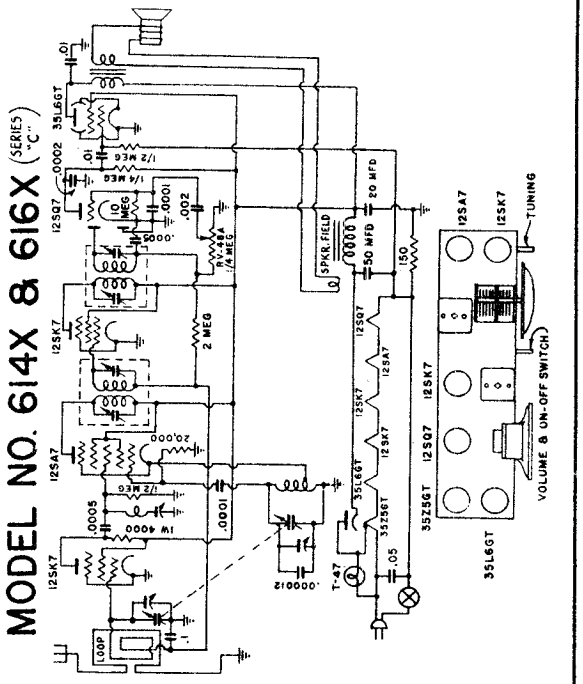
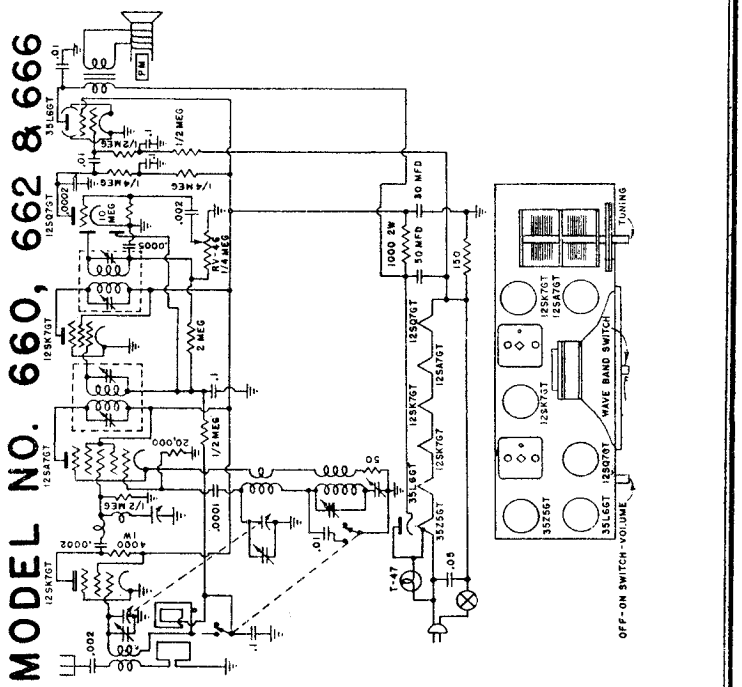
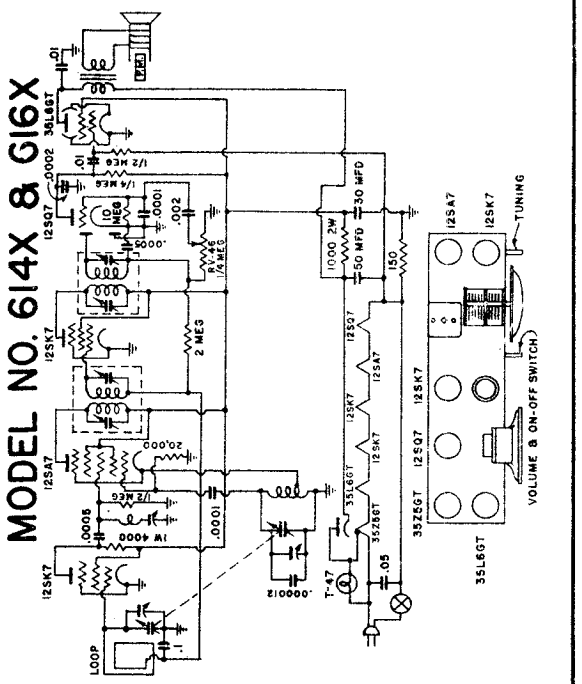
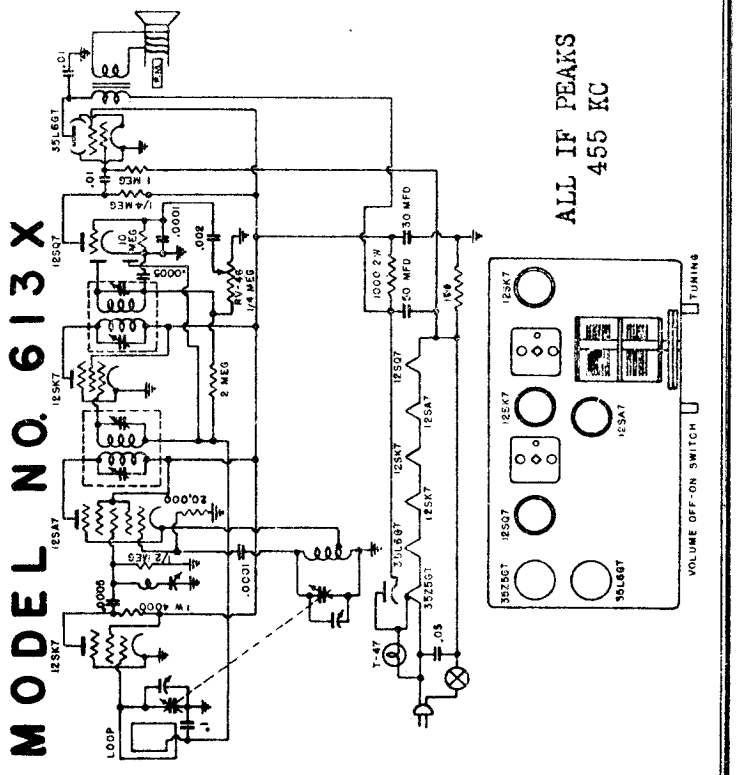
MODEL 613X
MODELS 614X,616X,
Early and Series C
MODELS 660,662,666









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For Alignment, see P.15-4

MODELS 660,662,666

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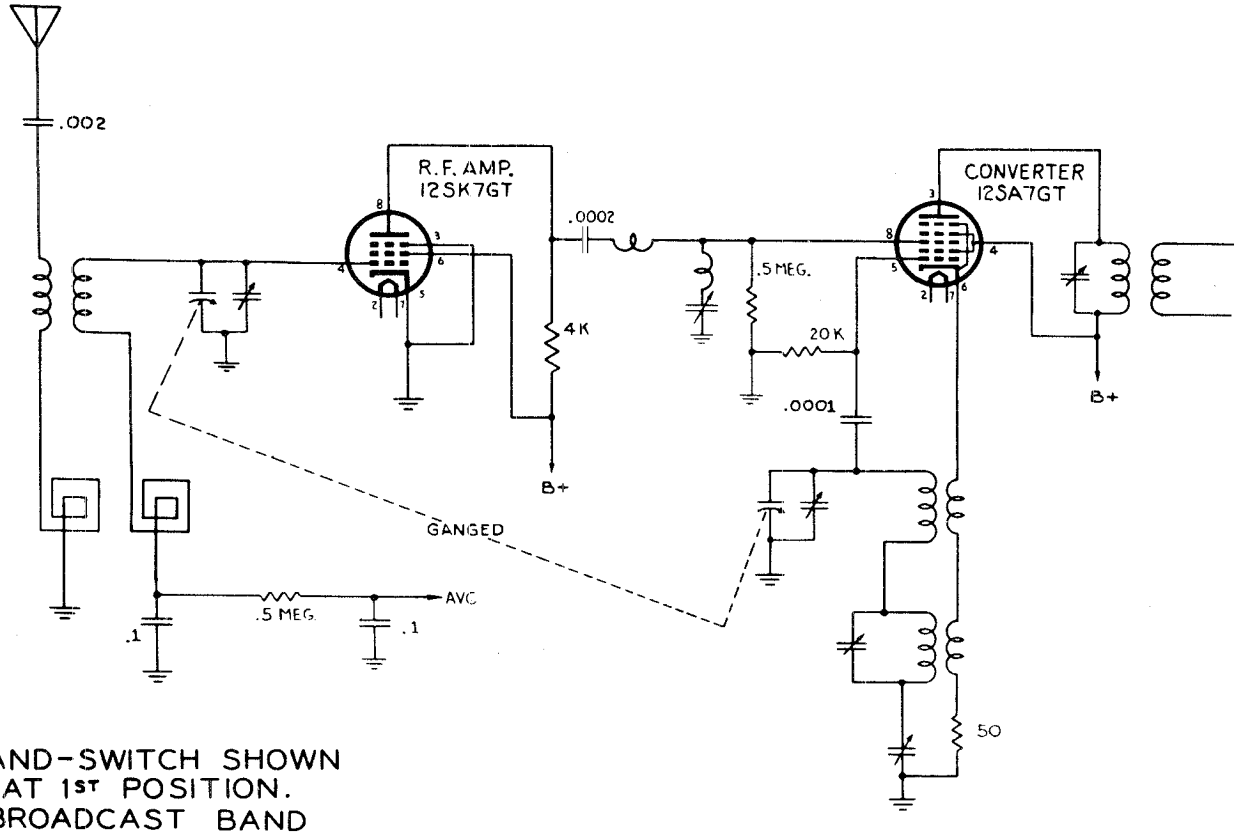
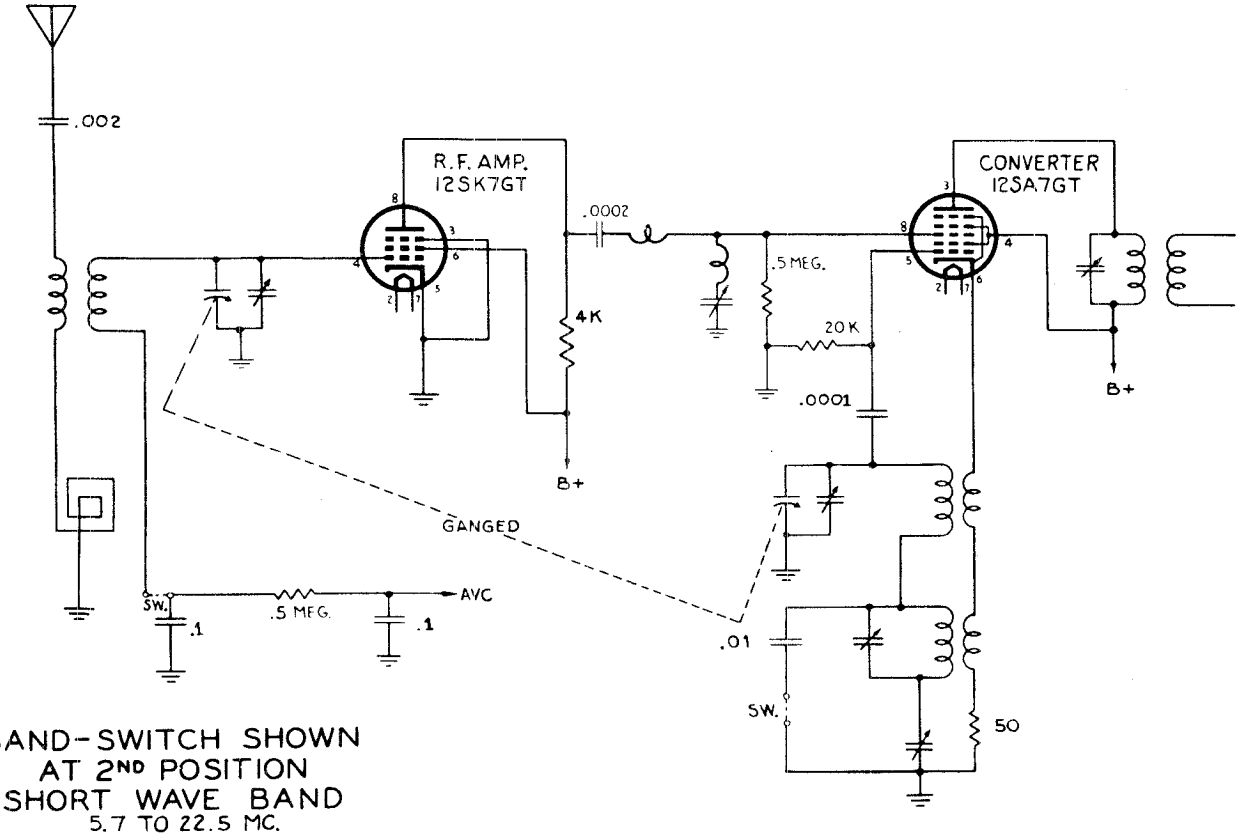


BAND-SWITCH SHOWN
AT 1ST POSITION.
BROADCAST BAND



BAND-SWITCH SHOWN
AT 2ND POSITION
SHORT WAVE BAND
5.7 TO 22.5 MC.

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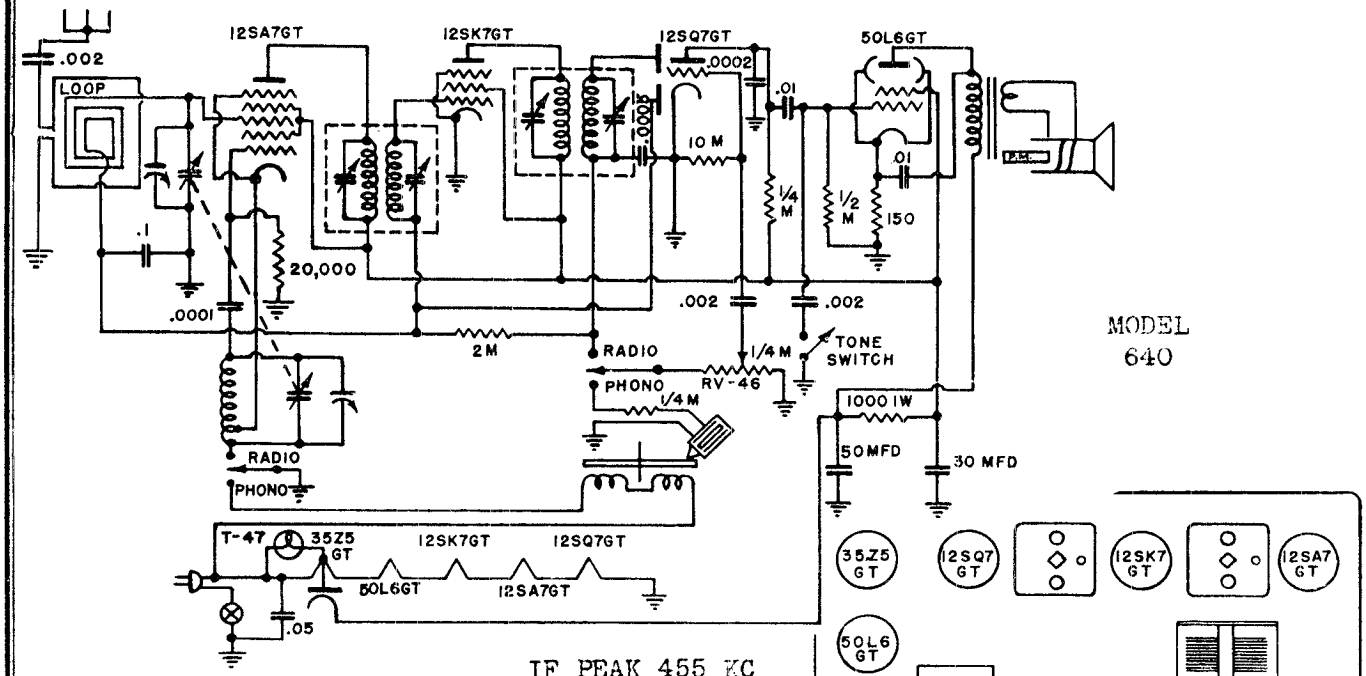
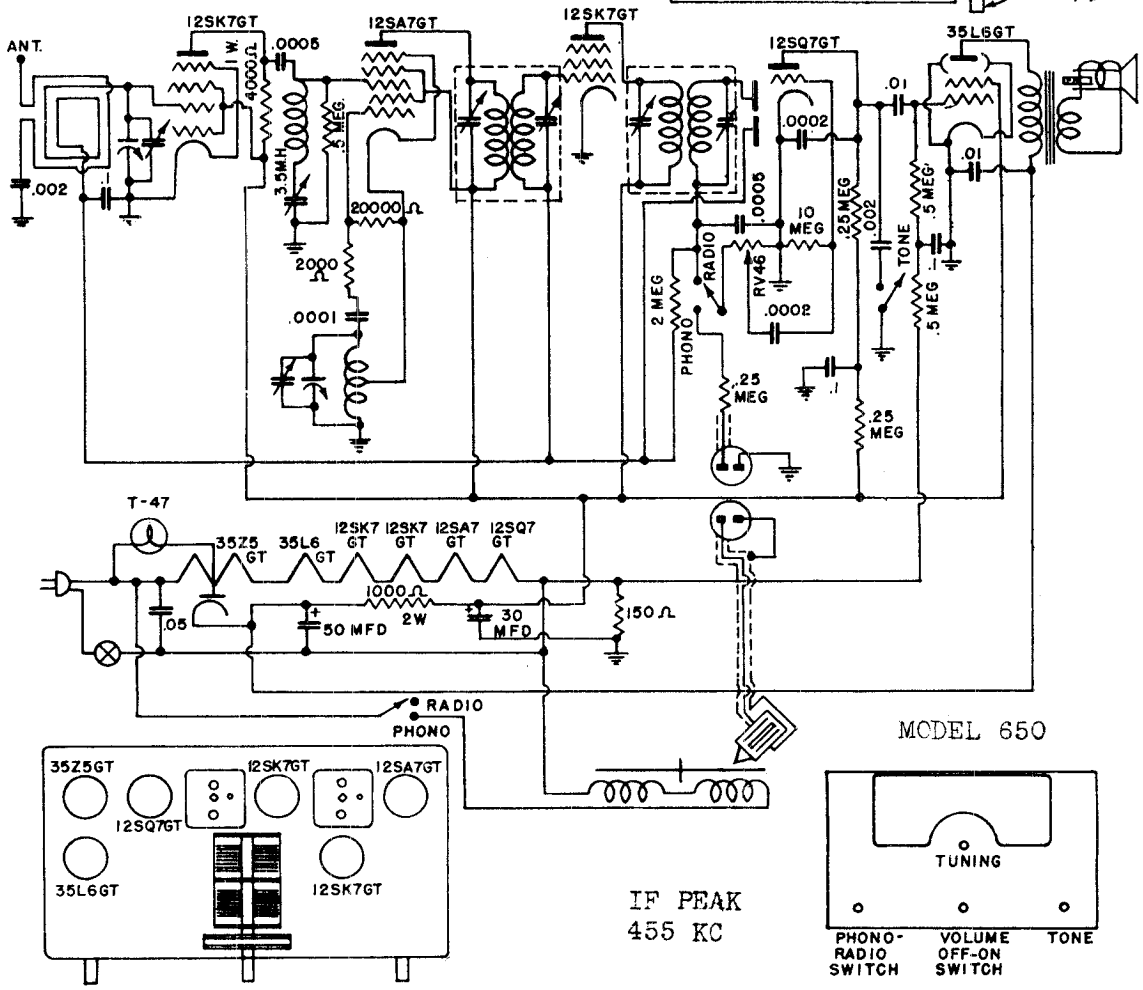
MODEL 640
MODEL 650

AUTOMATIC RADIO MFG. CO., INC.



MODEL 640

IF PEAK 455 KC



MODEL 650

IF PEAK 455 KC

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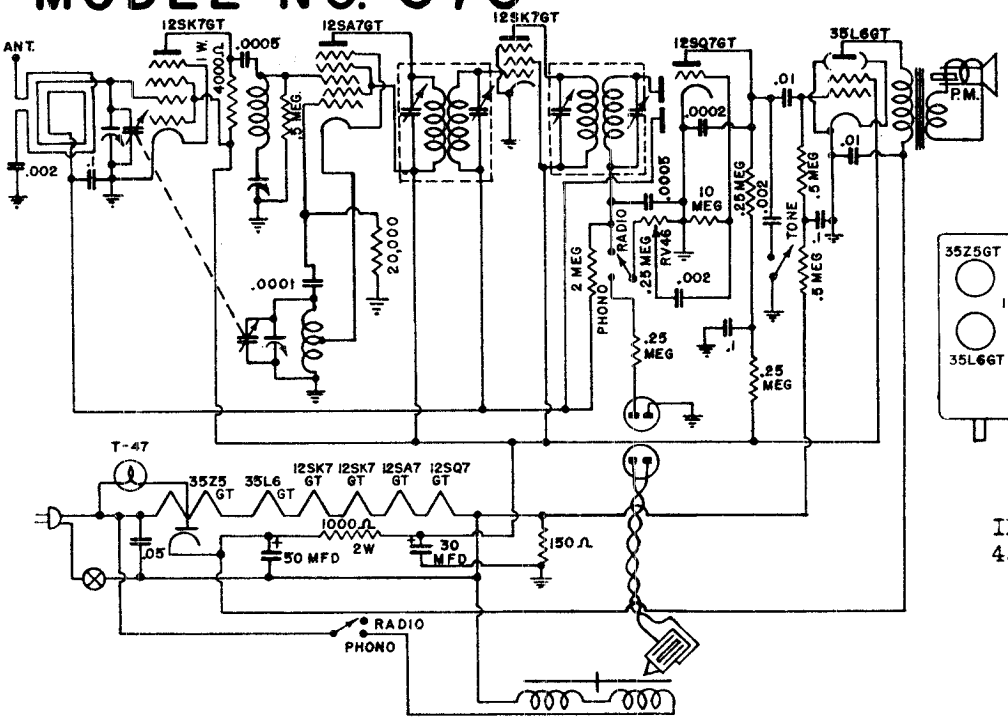
For Alignment, see P.15-4

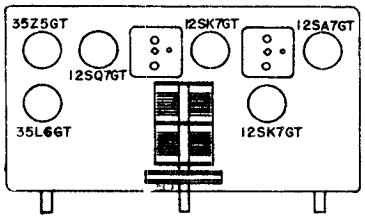
Record Changer for Model 650: Seeburg Model K

MODEL 670
MODEL 677

AUTOMATIC RADIO MFG. CO., INC.

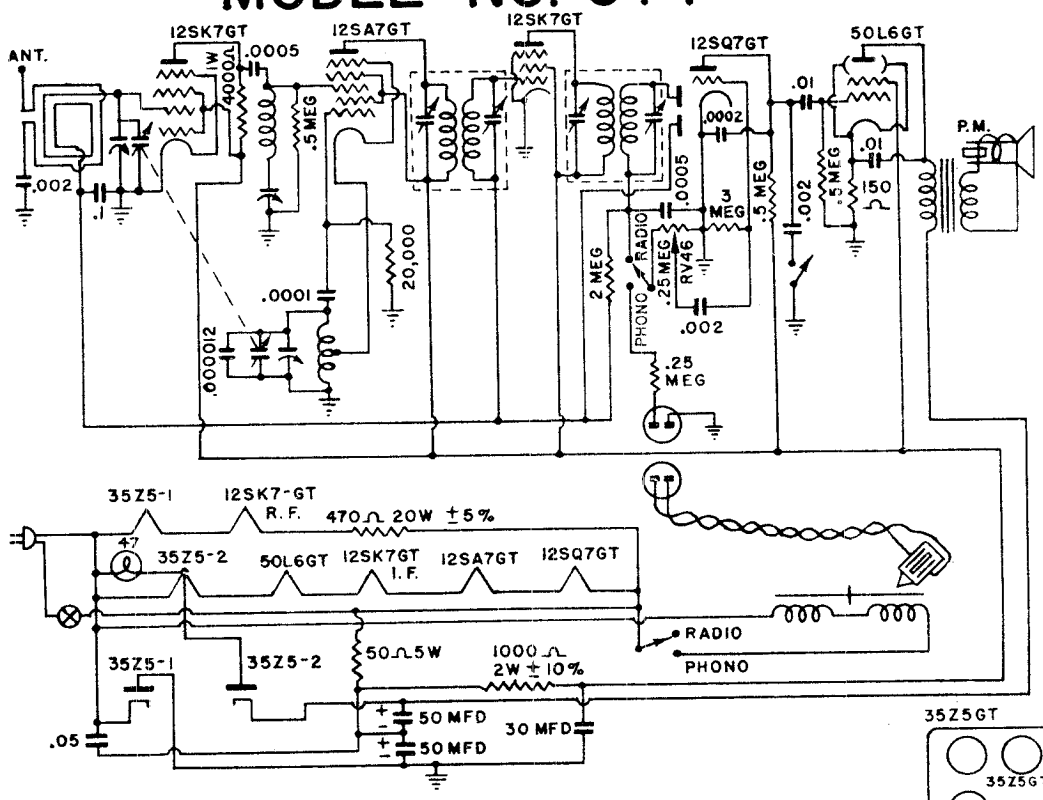
MODEL NO. 670

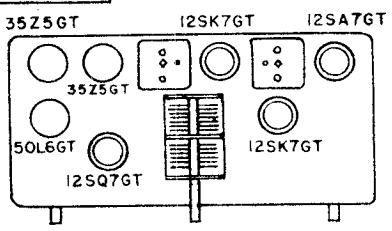




IF PEAK
455 KC

MODEL NO. 677





IF PEAK
455 KC

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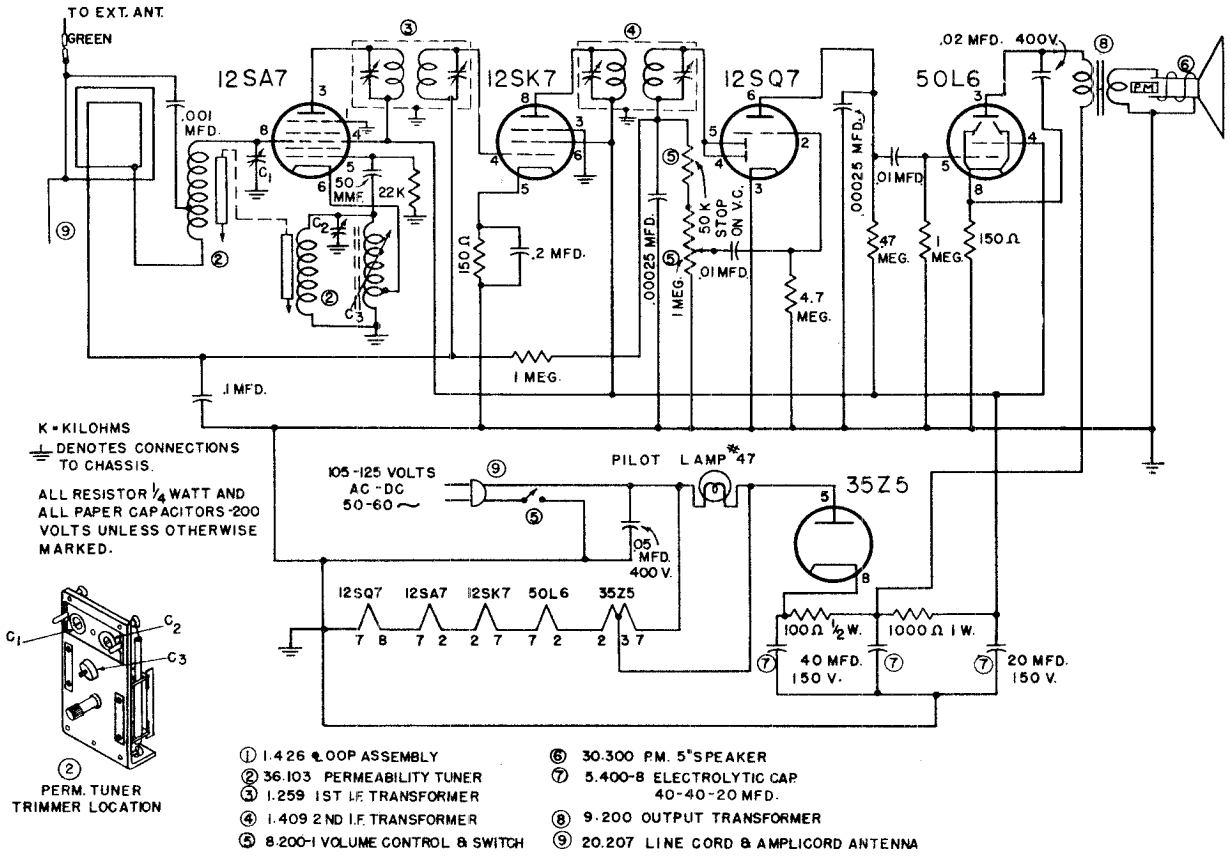
For Alignment, see P.15-4
Record Changer, both models: Seeburg Model K

BELLE ELECTRONICS CORP.

MODEL 125-P



ALIGNMENT: Should it become necessary at any time to check the alignment of this receiver, proceed as follows:

(1) Set the Signal Generator to 455 KC and connect to the Antenna Trimmer (C1) of the Permeability Tuner. Connect the Signal Generator ground lead to the chassis. Connect a suitable Output Meter across the Speaker Voice Coil Connections. Turn the Volume Control to the maximum position. Turn the Permeability Tuner to the extreme clockwise position (cores out of coils).

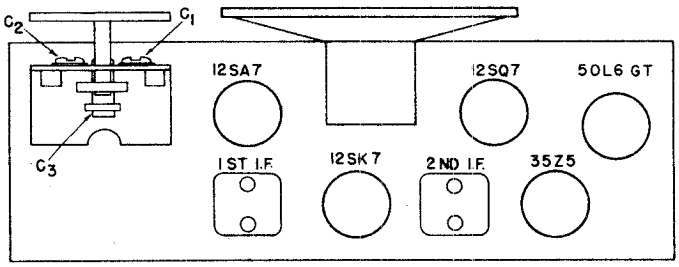
(2) Adjust the trimmers located at the top of the first and second I. F. Transformers for maximum output as indicated on the Output Meter.

(3) Set the Signal Generator to 1620 KC and loosely couple through a 2 or 3 turn loop to the receiver loop.

(4) With the Permeability Tuner set at the extreme clockwise position (cores out of coils), tune in the 1620 KC signal by means of the Oscillator Trimmer (C2).

(5) Set the Signal Generator to 1500 KC and turn the Tuning Control so that this frequency is indicated on the dial. Adjust the Antenna Trimmer (C1) on the Permeability Tuner for maximum output.

(6) Set the Signal Generator to 600 KC and turn the Tuning Control so that this frequency is indicated on the dial. Adjust the Oscillator Shunt Coil (C3) for maximum response while "rocking" the Signal Generator. Recheck the High Frequency Oscillator Trimmer (C2) and re-peak the Antenna Trimmer (C1) for maximum response.



TUBES:

12SA7	Converter
12SK7	I-F Amplifier
12SQ7	Detector, AVC, A-F Ampl.
50L6GT	Beam Power Amplifier
35Z5GT	Rectifier

NOTE: Oscillator and Antenna Coil Saddles have been set and adjusted at the factory. Do not attempt to readjust the Oscillator or Antenna Coil Saddles during the above alignment procedure or serious mis-tracking will occur, resulting in loss of sensitivity at various points in the band.

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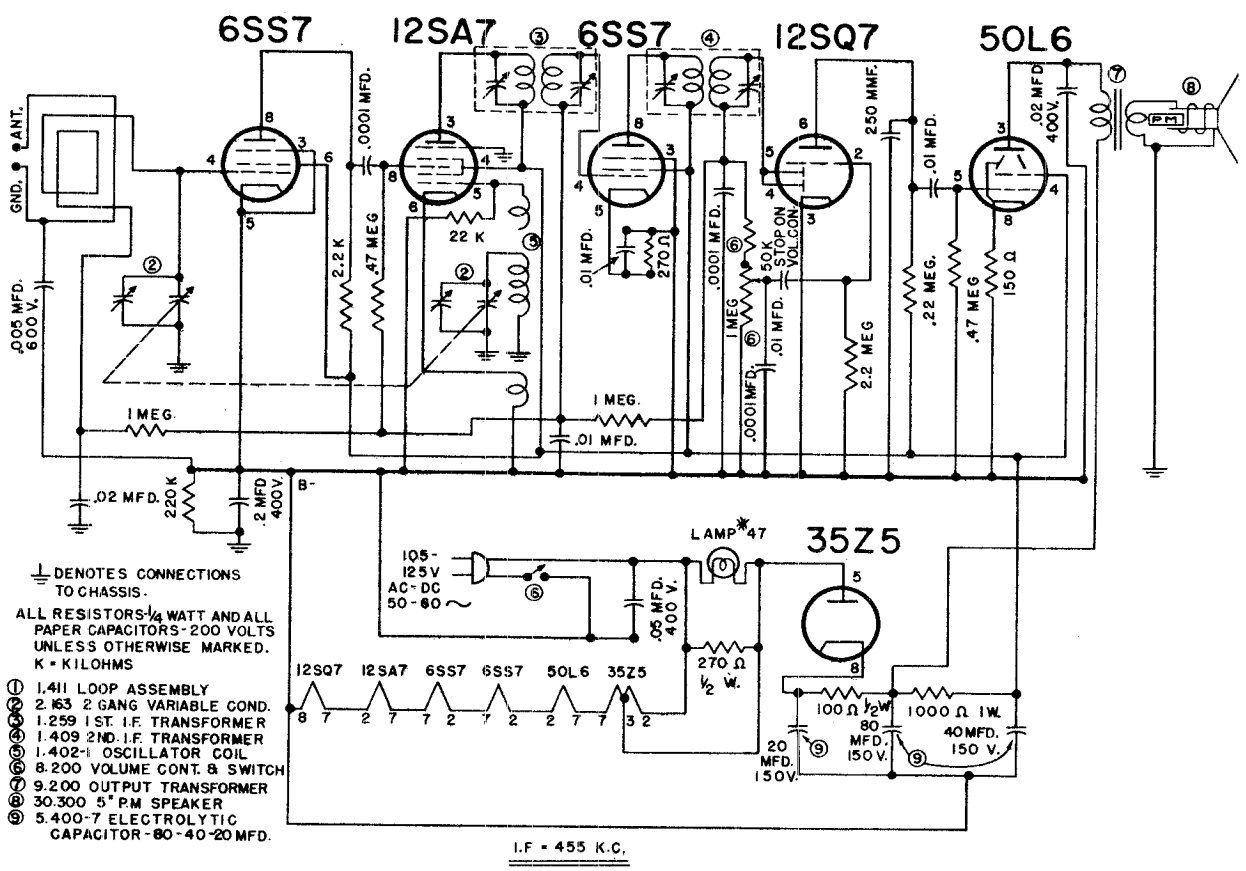
MODEL 126

BELLE ELECTRONICS CORP.



I.F = 455 K.C.

ALIGNMENT: Should it become necessary at any time to check the alignment of this receiver, proceed as follows:

(1) Set the Signal Generator to 455 KC and connect to the grid of the 6SS7 R. F. Amplifier, or to the Stator Lug on the rear section of the Variable Capacitor. Connect the Signal Generator Ground Lead to a "—B" point underneath the chassis. Connect a suitable output meter across the Speaker Voice Coil Connections. First turn the Volume Control to the maximum position. Turn the Variable Capacitor to the extreme clockwise position.

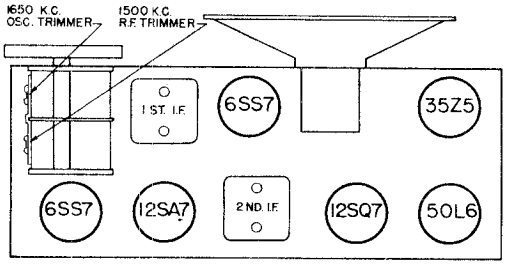
(2) Adjust the trimmers located at the top of the first and second I. F. Transformers for maximum output as indicated on the Output Meter.

(3) Loosely couple the Signal Generator lead to the Loop and set to 1650 KC.

(4) With the Variable Capacitor set at the extreme clockwise position, tune in the 1650 KC signal by means of the Oscillator Trimmer on the Variable Capacitor (front section).

(5) Set the Signal Generator to 1500 KC and turn the Tuning Control so that this frequency is indicated on the dial. Adjust the Antenna Trimmer on the Variable Capacitor (rear section) for maximum output. No other adjustments are necessary.

TUBES:
6SS7 R. F. Amplifier
12SA7 Converter
6SS7 I. F. Amplifier
12SQ7 Detector, Avc and Audio Amp.
50L6GT Beam Power Amplifier
35Z5GT Rectifier



TRIMMER AND TUBE LOCATION DIAGRAM

LINE VOLTAGE: This receiver is designed for operation on 105-125 Volts, 50-60 Cycles, either Alternating or Direct Current (AC-DC)

POWER CONSUMPTION: 30 Watts.

TUNING RANGE: Broadcast: 540 to 1650 Kilocycles (180 to 555 meters).

DIAL: The Dial Scale is calibrated in Kilocycles.

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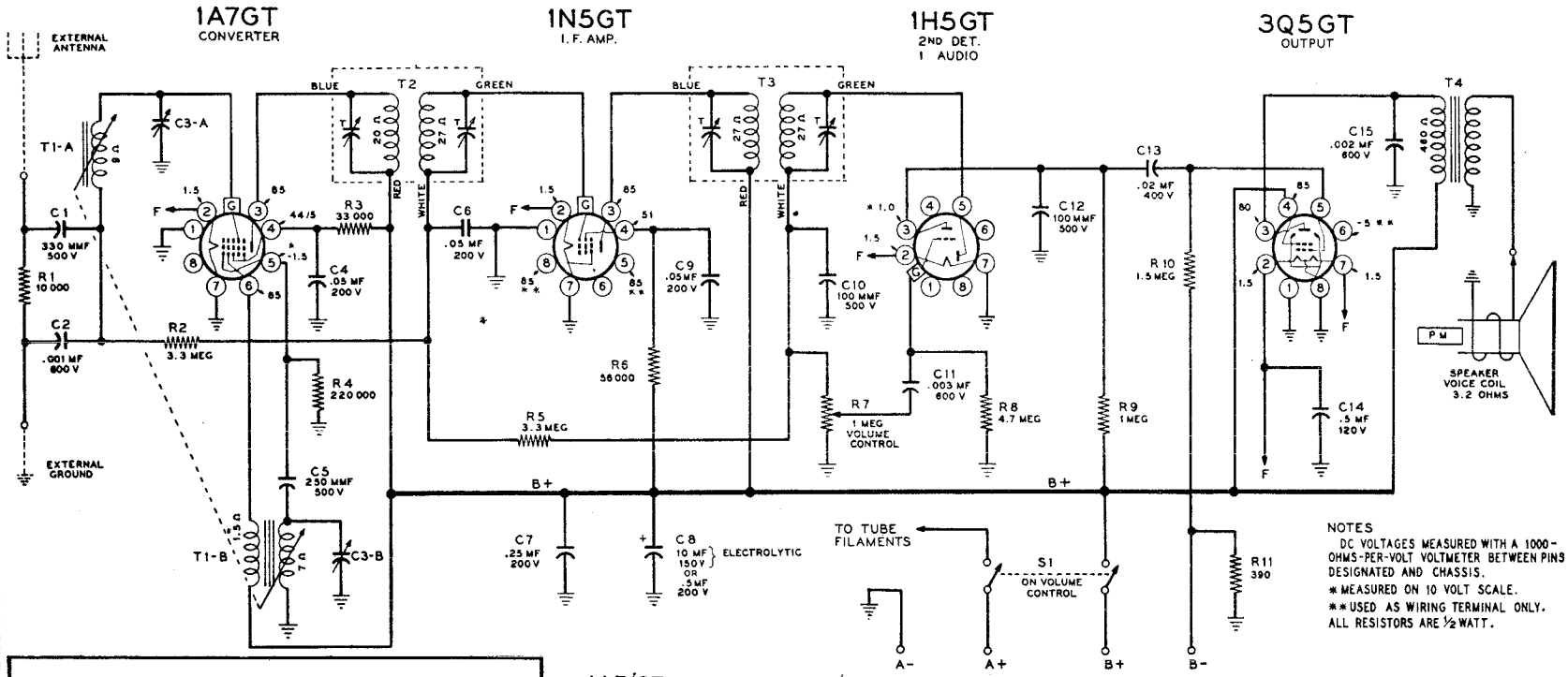
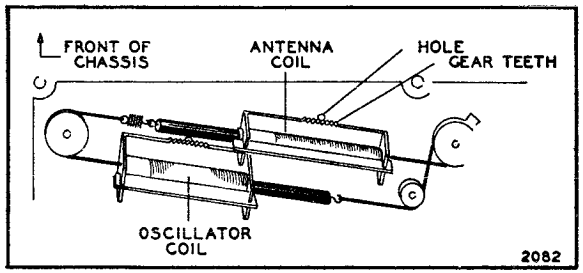


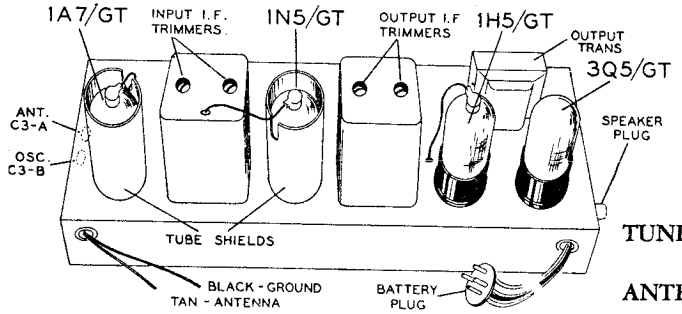


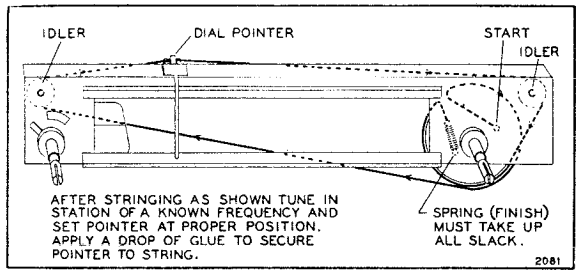
View of Coil Assembly

The antenna coil assembly is movable left or right. When making the adjustment as required in the alignment procedure, move the coil assembly very slowly, either by hand or by pivoting one edge of a screwdriver blade in the hole and engaging the blade in the gear teeth of the coil form.

POWER SUPPLY.....A Battery—1.5 volts, 250 ma.
B Battery—90 volts, 14 ma.
FREQUENCY RANGE.....535 to 1720 kc.
INTERMEDIATE FREQ....455 kc.

3-46




IDLER
DIAL POINTER
START
IDLER
AFTER STRINGING AS SHOWN TUNE IN STATION OF A KNOWN FREQUENCY AND SET POINTER AT PROPER POSITION. APPLY A DROP OF GLUE TO SECURE POINTER TO STRING.
SPRING (FINISH) MUST TAKE UP ALL SLACK.
2081

Replacement of Dial Pointer Drive Cord

TUNING.....Two permeability-tuned circuits.
ANTENNA.....External only. Also external ground.
SPEAKER.....5-inch; P.M., 1.5-ounce magnet; voice coil impedance 3.2 ohms.
POWER OUTPUT.....160 milliwatts undistorted. 250 milliwatts maximum.
SENSITIVITY.....20 microvolts average for 50-milliwatt output.
SELECTIVITY.....48 kc broad at 1000 times signal at 1000 kc.

MODEL 4B17
MODELS 4B112,4B113

BELMONT RADIO CORP.

ALIGNMENT INSTRUCTIONS FOR MODELS 4B17, 4B112, 4B113

- Output meter across 3.2-ohm output load.
- Align for maximum output. Reduce input as needed to keep output near 0.4 volts.
- Volume control at maximum for all adjustments.
- Connect ground post of signal generator to radio chassis.

SIGNAL GENERATOR			TUNER SETTING	ADJUST FOR MAXIMUM OUTPUT (in order shown)
Frequency	Dummy Antenna	Connection to Radio		
455 kc	.1 mf	Grid (top cap) of 1A7GT	Iron cores all the way out	Trimmers on output and input I.F. cans
1720 Kc, 4B17 1700 kc, 4B112, 4B113	.1 mf	Grid (top cap) of 1A7GT	Iron cores all the way out	Oscillator trimmer C3-B
1720 Kc, 4B17 1700 kc, 4B112, 4B113	200 mmf	Antenna lead	Iron cores all the way out	Antenna trimmer C3-A
1400 kc	200 mmf	Antenna lead	Turn dial to 1400 kc	Adjust postion of antenna coil (see coil view)*

* This adjustment and the previous adjustment are interlocking; therefore repeat the two adjustments alternately for best results.

REPLACEMENT PARTS LIST

MODEL 4B17

Ref. No.	Part No.	Description
		CAPACITORS *
C1	C-8F3-11	330 mmf, 20%, mica
C2	C-8D-10929	.001 mf, 600 volts, 10%
C3-A,-B	A-8H-10807	Dual trimmer; antenna (42-78 mmf) and oscillator (84-156 mmf)
C4,C6, C9	C-8D-10770	.05 mf, 200 volts, 20%
C5	C-8F3-10	220 mmf, 20%, mica
C7	C-8D-10775	.25 mf, 200 volts, +20%—10%
C8	C-8D-11270	.5 mf, 200 volts, +20%—10%
	or	
	119117	10 mf, 150 volts, electrolytic
C10,C12	C-8F3-113	100 mmf, 10%, mica
C11	C-8D-10786	.003 mf, 600 volts, 20%
C13	C-8D-10774	.02 mf, 400 volts, 20%
C14	10017	.5 mf, 120 volts, +50%—10%
C15	C-8D-10784	.002 mf, 600 volts, 25%
		RESISTORS *
R1	C-9B1-19	10,000 ohms, ½ watt, 20%
R2,R5	C-9B1-34	3.3 megohms, ½ watt, 20%
R3	C-9B1-80	33,000 ohms, ½ watt, 10%
R4	C-9B1-27	220,000 ohms, ½ watt, 20%
R6	C-9B1-83	56,000 ohms, ½ watt, 10%
R7,S1	A-10A-10155	Volume control (1 megohm) and on-off switch
R8	C-9B1-35	4.7 megohms, ½ watt, 20%
R9	C-9B1-31	1 megohm, ½ watt, 20%
R10	C-9B1-32	1.5 megohms, ½ watt, 20%
R11	C-9B1-57	390 ohms, ½ watt, 10%
		TRANSFORMERS AND COILS
T1-A,-B	C-211-10171	Tuning assembly complete, including antenna and oscillator coils
T2	108202C	Input I.F. coil, complete in can (range of trimmers: pri. 60-110 mmf, sec. 40-70 mmf)
T3	108153D	Output I.F. coil, complete in can (range of trimmers: 40-70 mmf each)
T4	10591B	Output transformer
		MISCELLANEOUS
	B-18A-10164	Speaker, 5", P.M.
	121210	Socket, for tubes (4 used)
	A-55A-7386-1	Connector, for speaker plug
	10724	Plug, on speaker leads
	B-14A-10152	Battery cable assembly
	A-2G-10162	Pointer, for dial
	115396	Tube shield (for 1N5GT, 1A7GT)
	A-5B-10170-1	Knob (volume control, tuning)
	B-6D-10618	Dial scale
	B-2M-7758	Snap-in rivet for dial scale
	A-6D-10163	Crystal for dial
	A-2F-10165	On-off indicator
	A-49A-10173	Spring for on-off indicator
	A-3A-10156	Tuning shaft
	A-53A-10576	Cord, for dial pointer drive (32")
	A-49A-11324	Spring for dial pointer drive cord

MODELS 4B112, 4B113

Ref. No.	Part No.	Description
		CAPACITORS *
C1	C-8F3-11	330 mmf, 20%, mica
C2	C-8D-10787	.001, 600 volts, 20%
C3-A,-B	124165	Dual trimmer, antenna and oscillator. Range of each: 84-156 mmf
C4,C6	C-8D-10770	.05 mf, 200 volts, 20%
C5	C-8F3-10	220 mmf, 20%, mica
C7	C-8D-10775	.25 mf, 200 volts, +20%—10%
C8	C-8D-11270	.5 mf, 200 volts, +20%—10%
	or	
	119117	10 mf, 150 volts, electrolytic
C9	129177	45 mmf, 5%, ceramicon
C10,C12	C-8F3-8	100 mmf, 20%, mica
C11	C-8D-11013	.003 mf, 600 volts, 10%
C13	C-8D-10774	.02 mf, 400 volts, 20%
C14	C-8D-11270	.5 mf, 200 volts, +20%—10%
C15	C-8D-10935	.005 mf, 600 volts, +40%—15%
C16	C-8D-10771	.1 mf, 200 volts, +20%—10%
		RESISTORS *
R1	C-9B1-19	10,000 ohms, ½ watt, 20%
R2,R5	C-9B1-34	3.3 megohms, ½ watt, 20%
R3	C-9B1-80	33,000 ohms, ½ watt, 10%
R4	C-9B1-27	220,000 ohms, ½ watt, 20%
R6	C-9B1-82	47,000 ohms, ½ watt, 10%
R7,S1	101250	Volume control (1 megohm) and on-off switch
R8	C-9B1-35	4.7 megohms, ½ watt, 20%
R9	C-9B1-31	1 megohm, ½ watt, 20%
R10	C-9B1-33	2.2 megohms, ½ watt, 20%
R11	C-9B1-57	390 ohms, ½ watt, 10%
		COILS AND TRANSFORMERS
T1-A,-B	1364	Tuning assembly complete, including antenna and oscillator coils
T2	108202	Input I.F. coil complete in can. Range of trimmers: primary, 60-110 mmf; secondary, 40-70 mmf
T3	108153B	Output I.F. coil complete in can. Range of trimmers: 40-70 mmf ea.
T4	10591B	Output transformer
		MISCELLANEOUS
	114238	Speaker, 5-inch, P.M.
	121210	Tube socket
	115396	Tube shield
	107361	Battery cable assembly
	128621-18	Cabinet, walnut
	128621-9	Cabinet, ivory
	128523-17	Knob, walnut
	128523-8	Knob, ivory
	128626B	Back for cabinet, walnut
	128626	Back for cabinet, ivory
	131356	Tee-pins for securing back
	112920	Dial scale
	13143	Snap-in rivets for dial scale
	112914	Crystal for dial
	112908B	Pointer
	A-53A-10989	Cord for dial pointer drive
	120184	Spring for drive cord
	112915	On-off indicator
	120405	Spring for indicator
	120409	Trip for indicator

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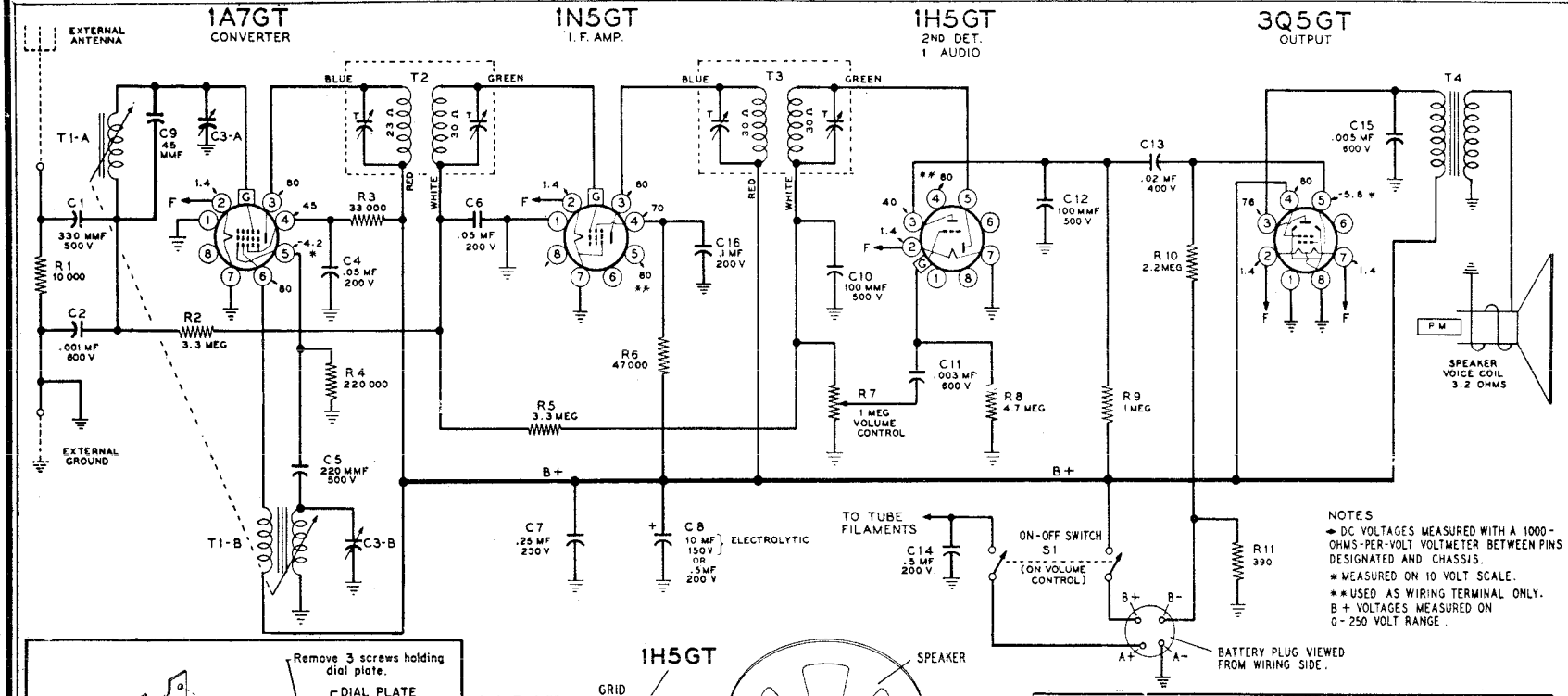
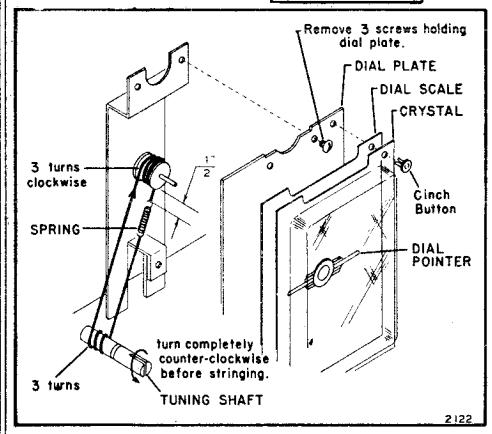
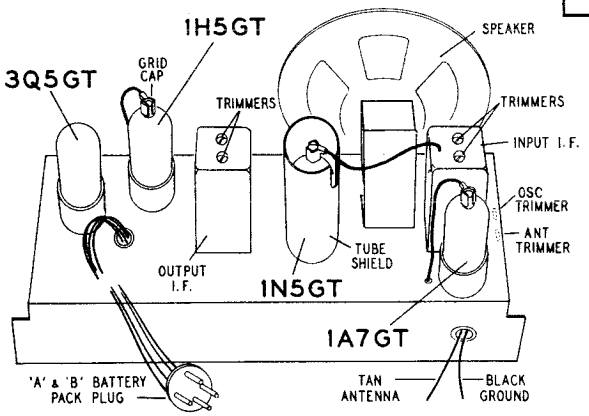
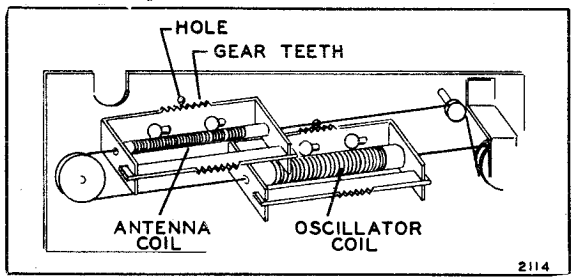




Replacement of Dial Pointer Drive Cord





View of Coil Assembly

The antenna coil assembly is movable left or right. When making the adjustment as required in the alignment procedure, move the coil assembly very slowly, either by hand or by pivoting one edge of a screwdriver blade in the hole and engaging the blade in the gear teeth of the coil form.

SENSITIVITY.....30 microvolts average for 50-milliwatt output.

SELECTIVITY.....48 kc broad at 1000 times signal at 1000 kc.

POWER SUPPLY.....A Battery—1.5 volts, 250 ma.
B Battery —90 volts, 14 ma.

FREQUENCY RANGE.....540 to 1700 kc.

INTERMEDIATE FREQ....455 kc.

TUNING.....Two permeability-tuned circuits.

ANTENNA.....External only. Also external ground.

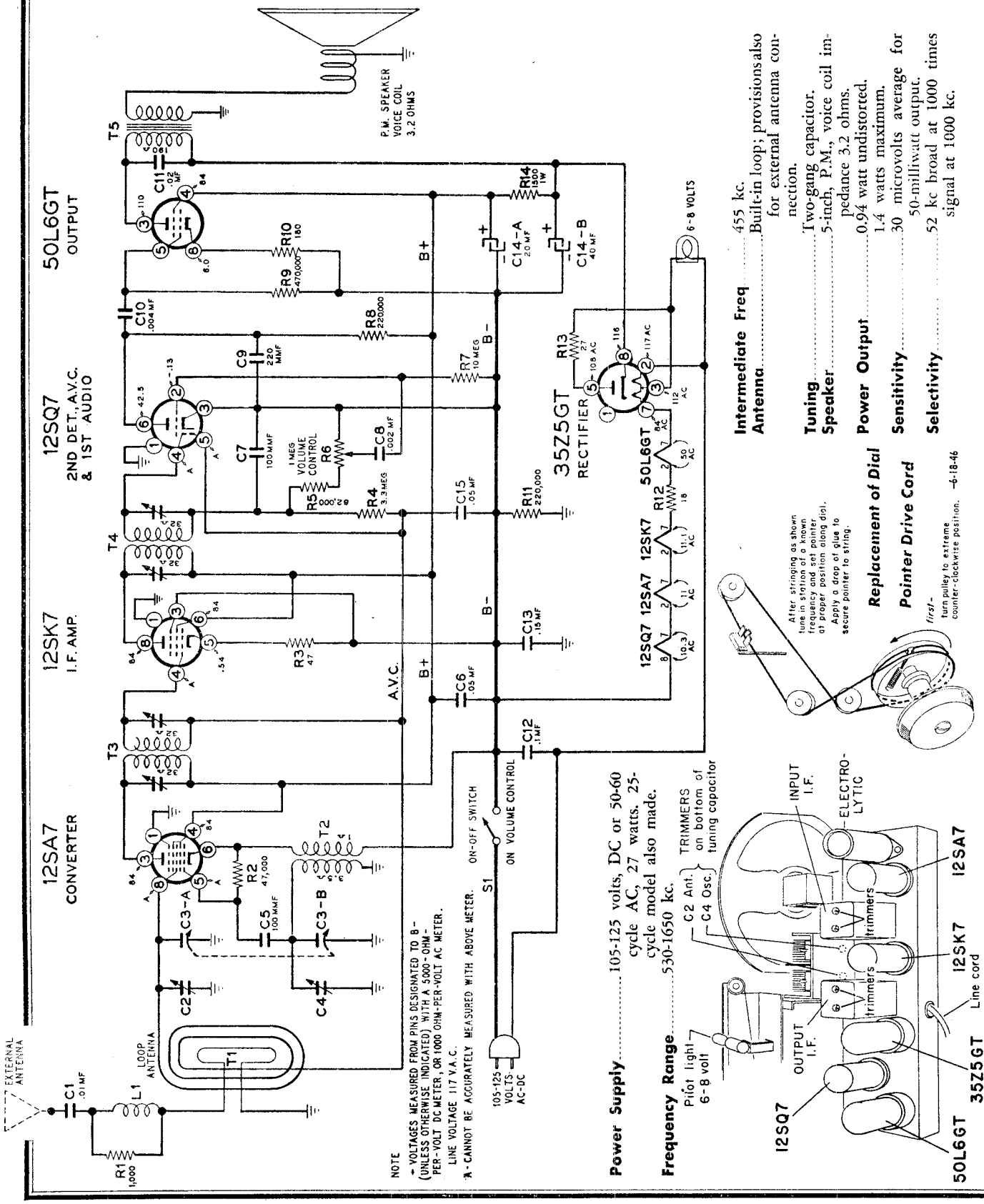
SPEAKER.....5-inch; P.M.; voice coil impedance 3.2 ohms.

POWER OUTPUT.....180 milliwatts undistorted. 300 milliwatts maximum.

4-22-46

MODEL 5D128

BELMONT RADIO CORP.


12SA7
CONVERTER
12SK7
I.F. AMP.
12SQ7
2ND DET., A.V.C. & 1ST AUDIO
50L6GT
OUTPUT
35Z5GT
RECTIFIER
P.M. SPEAKER VOICE COIL 3.2 OHMS
EXTERNAL ANTENNA
LOOP ANTENNA
ON-OFF SWITCH
ON VOLUME CONTROL
105-125 VOLTS AC-DC
1 MEGS VOLUME CONTROL
A.V.C.
B+
B-
6-8 VOLTS
NOTE
* VOLTAGES MEASURED FROM PINS DESIGNATED TO B- (UNLESS OTHERWISE INDICATED) WITH A 5000-OHM-PER-VOLT DC METER, OR 1000 OHM-PER-VOLT AC METER.
LINE VOLTAGE 117 V.A.C.
A - CANNOT BE ACCURATELY MEASURED WITH ABOVE METER.
Power Supply ..... 105-125 volts, DC or 50-60 cycle AC, 27 watts. 25-cycle model also made.
Frequency Range ..... 530-1650 kc.
Pilot light 6-8 volt
C2 Ant.
C4 Osc.
TRIMMERS on bottom of tuning capacitor
INPUT I.F.
OUTPUT I.F.
ELECTRO-LYTIC
trimmers
Line cord
Intermediate Freq ..... 455 kc.
Antenna ..... Built-in loop; provisions also for external antenna connection.
Tuning ..... Two-gang capacitor.
Speaker ..... 5-inch, P.M., voice coil impedance 3.2 ohms.
Power Output ..... 0.94 watt undistorted. 1.4 watts maximum.
Sensitivity ..... 30 microvolts average for 50-milliwatt output.
Selectivity ..... 52 kc broad at 1000 times signal at 1000 kc.
Replacement of Dial
After stringing as shown, tune in station of a known frequency and set pointer at proper position along dial. Apply a drop of glue to secure pointer to string.
Pointer Drive Cord
first - turn pulley to extreme counter-clockwise position.
-6-18-46

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BELMONT RADIO CORP.

ALIGNMENT PROCEDURE

- Output meter across 3.2-ohm output load.
- Volume control at maximum.
- Chassis must be removed from cabinet for proper alignment. Slight adjustments of the oscillator and antenna trimmers can be made, without removing the chassis, through holes provided on the bottom of the cabinet.
- Connect ground post of signal generator to B— of radio.
- Align for maximum output. Reduce input as needed to keep output near 0.4 volts.

SIGNAL GENERATOR			*TUNER SETTING*	*ADJUST TRIMMERS TO MAXIMUM OUTPUT (in order shown)*
Frequency	*Coupling Capacitor*	*Connection to Radio*		
455 kc	.1 mf	12SA7 grid	Rotor full open (plates out of mesh)	Input and output trimmers on IF cans
1650 kc	.1 mf	12SA7 grid	Rotor full open (plates out of mesh)	Oscillator trimmer C4
1400 kc†	None	See note below	1400 kc	Antenna trimmer C2

† For this adjustment chassis should be remounted in cabinet and loop connected. Lay generator lead near loop and turn up output. Loop will pick up energy. Antenna trimmer can be reached through a hole in the bottom of the cabinet.

REPLACEMENT PARTS LIST

When ordering parts, specify part number, model number, and series

Ref. No.	*Part No.*	*Description*
		CAPACITORS
C1	C-8D-10761	.01 mf, 400 volts, 20%
C3-A,-B C2,C4	B-8A-10754	Two-gang, including antenna and oscillator trimmers. Range of gang: 11-388 mmf (ant.) and 8.5-162 mmf (osc.)
C5,C7	C-8F3-8	100 mmf, 20%, mica
C6,C15	C-8D-10770	.05 mf, 200 volts, 20%
C8	C-8D-10789	.002 mf, 600 volts, 20%
C9	C-8F3-10	220 mmf, 20%, mica
C10	C-8D-10788	.004 mf, 600 volts, 20%
C11	C-8D-10774	.02 mf, 400 volts, 20%
C12	C-8D-10760	.1 mf, 400 volts, +20%—10%
C13	C-8D-10953	.15 mf, 400 volts, +20%—10%
C14-A,-B	11992 or 11993	Electrolytic, 60 cycles, 40 mf-20 mf, 150 volts Electrolytic, 25 cycles, 60 mf-40 mf, 150 volts
		RESISTORS*
R1	C-9B1-13	1000 ohms, ½ watt, 20%
R2	C-9B1-82	47,000 ohms, ½ watt, 10%
R3	C-9B1-46	47 ohms, ½ watt, 10%
R4	C-9B1-34	3.3 megohms, ½ watt, 20%
R5	C-9B1-85	82,000 ohms, ½ watt, 10%
R6,S1	101198	Volume control (1 megohm) and on-off switch
R7	C-9B1-37	10 megohms, ½ watt, 20%
R8,R11	C-9B1-27	220,000 ohms, ½ watt, 20%
R9	C-9B1-29	470,000 ohms, ½ watt, 20%
R10	C-9B1-53	180 ohms, ½ watt, 10%
R12	C-9B1-41	18 ohms, ½ watt, 10%
R13	C-9B1-43	27 ohms, ½ watt, 10%
R14	C-9B2-64	1500 ohms, 1 watt, 10%
		COILS AND TRANSFORMERS
L1	12311	Load coil
T1	C-212-10895	Loop antenna assembly, including coil L1, resistor R1, and capacitor C1
T2	A-13D-10748	Oscillator coil
T3	B-13B-10091	Input I.F. transformer, complete in can. Range of trimmers: 45-85 mmf each

NOTE ON TUBE REPLACEMENT

Replace a defective metal 12SK7 tube with another metal tube. Replace a glass 12SK7 tube with a metal tube or with an exact duplicate of the tube now in the set.

Ref. No.	*Part No.*	*Description*
T4	B-13B-10812	Output I.F. transformer complete in can. Range of trimmers: 56-104 mmf each
T5	B-12C-10735	Output transformer
		DIAL AND TUNING PARTS
	B-5B-10994-9	Tuning knob
	128523-8	Volume knob
	A-3F-10995	Locking screw for tuning knob
	120388	Locking spring for tuning knob
	128292B-8	Pushbutton
	A-6D-10758	Dial scale
	112857	Dial crystal
	112745	Dial pointer
	131211	Snap-in rivets for dial scale and crystal
	115361R	Lever and roller (roller faces away from gang)
	115361L	Lever and roller (roller faces gang)
	120283	Return spring for lever
	115146	Cams
	115143	Keywasher (11 used)
	1209	Cord for dial pointer drive (15")
	120285	Spring for drive cord
		MISCELLANEOUS
	114201	Speaker, 5-inch, P.M.
	A-15B-10440	Tube socket (all tubes but 12SK7)
	121171	Tube socket (for 12SK7)
	B-15B-10076	Socket for electrolytic
	10798	Line cord and plug
	107249	Pilot light, type T-47
	107342	Pilot light socket assembly
	128561-9	Cabinet
	131193	Snap-in rivets, for cabinet back
	134123	Rubber foot
	112784	Set of call letters
	112606	Acetate tabs for pushbuttons

* The values of the resistors listed above are based on RMA standards. Due to conditions beyond our control, some receivers have been shipped with resistors of pre-standardized values. This receiver will operate equally well with resistors of either group. An illustration of the difference follows: Pre-standardized value—200,000 ohms, 1/3 watt, 10%; RMA value—220,000 ohms, 1/2 watt, 10%

SETTING THE PUSHBUTTONS—The pushbuttons may be used, after proper adjustment, for the automatic tuning of any five stations on the standard broadcast band. They can be set up in any order.

1. Turn on the radio.

2. Push out the call letters of the five stations from the call-letter sheets supplied with this manual.

3. Insert one call-letter tab in the rectangular opening in the front of each pushbutton, in any order. Press an acetate tab (supplied in small envelope) into each of the pushbuttons.

4. With the screwdriver supplied, check to see that the locking screw in the center of the tuning knob (see front view) is loose. If it is not, turn it several turns to the left (counterclockwise).

5. Press the first pushbutton down *all the way*. With one hand hold the button down firmly and with the other carefully tune in the desired station. Release the pushbutton.

6. Follow this procedure for each of the four other buttons, setting each one for a different station.

7. Rotate the tuning knob on the side of the cabinet as far to the right as it will go. Tighten the locking screw in the center of the knob. ***It is important that this screw be tightened very firmly.***

8. The pushbuttons are now properly set for automatic tuning. Any of the five stations may be tuned in simply by pressing the proper button down as far as it will go. If you wish to reset any of the buttons for a new station, loosen the locking screw, set the pushbutton as described above, and re-tighten the locking screw.

REMOVAL OF CHASSIS—If for any reason you wish to remove the radio chassis from the cabinet, proceed as follows: First be sure the line cord is disconnected from the house power receptacle. Then take off the back as described under "Tubes" above.

Pull the volume control knob off its shaft. Unscrew the locking screw in the center of the tuning knob and pull the knob off its shaft. Remove the four chassis mounting screws from the bottom of the cabinet. The chassis can now be slipped out.

After the chassis is replaced the automatic pushbuttons will probably have to be reset.

DIAL LIGHT—If the dial lamp burns out the set should not be operated until a new lamp has been installed. Failure to heed this caution may result in a burned-out 35Z5GT tube. To replace the lamp it is necessary to remove the back (see under "Tubes" below). Use only a type T-47 lamp for replacement.

TUBES—Tubes which have weakened with age may cause poor or erratic reception; therefore have the tubes tested periodically and replace those which are weak. To reach the tubes, pry off the four snap-in rivets which secure the back to the cabinet. Take care not to break the connections of the three wires to the loop antenna on the inside of the back. Tubes are removed most easily by rocking them back and forth gently while lifting. When replacing tubes, refer to the Chassis View to make sure that the replacements are properly made. *IMPORTANT: See note in parts list concerning tube replacement.*

ANTENNA AND GROUND — If an external antenna is used, check it periodically to make sure that all connections are clean and tight and that the antenna is insulated from the ground at all points.

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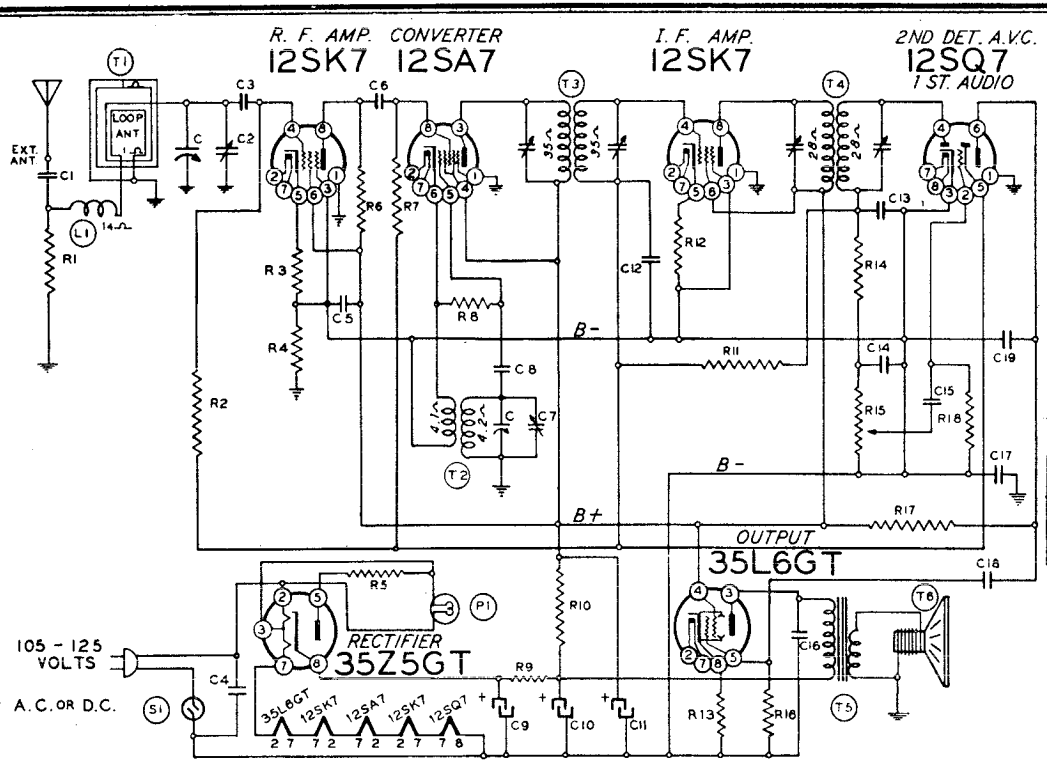
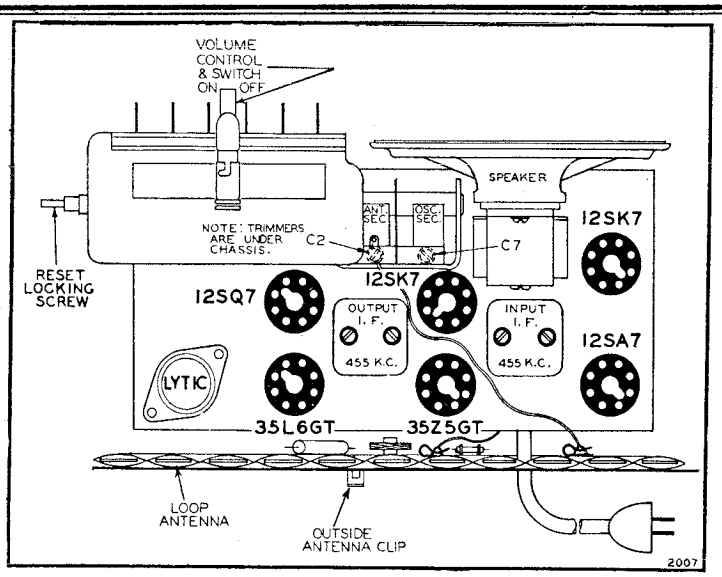
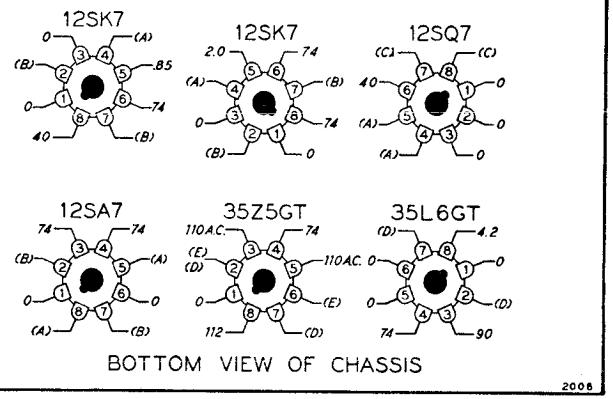




CHASSIS VIEW, SHOWING TUBE LOCATIONS

A - CANNOT BE MEASURED WITH VOLTMETER.
B - 12 VOLTS A.C. MEASURED ACROSS PINS 2 & 7.
C - 12 VOLTS A.C. MEASURED ACROSS PINS 7 & 8.
D - 30 VOLTS A.C. MEASURED ACROSS PINS 2 & 7.
E - 117 VOLTS A.C. MEASURED ACROSS PINS 2 & 6.

VOLTAGES MEASURED WITH 1000 OHM PER VOLT VOLTMETER BETWEEN SOCKET TERMINALS & B-. LINE VOLTAGE 117 VOLTS AC. VOLUME CONTROL AT MINIMUM.



VOLTAGES AT TUBE SOCKET TERMINALS

RESISTORS

R1	4700 ohms, ½ w., ±10%
R2	1 megohm, ½ w., ±20%
R3	100 ohms, ½ w., ±10%
R4	150,000 ohms, ½ w., ±20%
R5	22 ohms, ½ w., ±10%
R6	4700 ohms, ½ w., ±20%
R7	100,000 ohms, ½ w., ±20%
R8	47,000 ohms, ½ w., ±20%
R9	180 ohms, 1 w., ±10%
R10	1200 ohms, 1 w., ±10%
R11	3.3 megohms, ½ w., ±20%
R12	390 ohms, ½ w., ±10%
R13	150 ohms, ½ w., ±10%
R14	47,000 ohms, ½ w., ±20%
R15	Volume control, 1 megohm
R16	470,000 ohms, ½ w., ±20%
R17	220,000 ohms, ½ w., ±20%
R18	4.7 megohms, ½ w., ±20%

CONDENSERS

C	2 gang variable
C1	.002 x 600 volts
C2	Antenna trimmer on gang
C3	.0005 mica
C4	.1 x 400 volts
C5	.25 x 200 volts
C6	.0001 mica
C7	Oscillator trimmer on gang
C8	.0001 mica
C9	40 mfd lytic x 150 w.v.
C10	20 mfd lytic x 150 w.v.
C11	20 mfd lytic x 150 w.v.

NOTE: C9, C10, C11 are in same unit. In 25-cycle sets, values are 60 mfd., 40 mfd., 40 mfd.

C12	.05 x 200 volts
C13	.0001 mica
C14	.0001 mica
C15	.002 x 600 volts
C16	.02 x 400 volts
C17	.2 x 400 volts
C18	.004 x 600 volts
C19	.0001 mica

MISCELLANEOUS

L1	Loading coil
P1	Pilot light bulb, type T-47
S1	On-off switch on volume control
T1	Loop antenna, complete
T2	Oscillator coil
T3	Input I.F. coil, 455 Kc.
T4	Output I.F. coil, 455 Kc.
T5	Output transformer for speaker
T6	5-inch P.M. speaker

Sensitivity (for 0.05 watt output)..... 10 microvolts average
Intermediate frequency..... 455 Kc.
Power consumption..... 35 Watts

Selectivity..... 55 Kc. broad at 1000 x signal at 1000 Kc.
Power output (in voice coil)
Undistorted..... 0.8 watt
Maximum..... 1.0 watt
Voice coil impedance..... 3.2 ohms

BELMONT RADIO CORP.

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ALIGNMENT PROCEDURE

- No aligning adjustments should be attempted until all other possible causes of trouble have been checked.
- Chassis must be removed from cabinet for proper alignment. Slight adjustments of the oscillator and antenna circuits can be made, without removing the chassis, through two holes provided on the bottom of the cabinet. The two adjustment screws can be reached with a long insulated screwdriver.
- It is important that during alignment the loop antenna be maintained at the same distance from the chassis as when the chassis is installed in the cabinet.
- Turn volume control to maximum for all adjustments.
- Connect ground post of signal generator to B— of radio through a 0.1 mfd. condenser.
- Connect dummy antenna value in series with generator output lead.
- Connect output meter across primary of output transformer.

Band	Signal Generator Frequency Setting	Dummy Antenna	Connection to Radio	Tuning Condenser Setting	Adjust for Maximum Output (see chassis view)
I.F.	455 Kc.	0.1 mfd.	Grid of 12SA7	Rotor full open (plates out of mesh)	4 trimmers on input and output I.F. transformers
Broadcast	1650 Kc.	0.1 mfd.	Grid of 12SA7	Rotor full open (plates out of mesh)	Oscillator trimmer C7 on bottom of radio
	1400 Kc.	None	See note A	Set dial at 1400 Kc.	Antenna trimmer C2 on bottom of radio

Note A: Lay output lead of generator in back of loop antenna. Turn up generator output. Loop antenna will pick up energy.

REPLACEMENT PARTS LIST

When ordering parts, specify part number, schematic symbol when applicable, receiver model number, and series. Use only genuine factory replacement parts.

Part No.	Schematic Symbol	Description
		CONDENSERS
10025	C1, C15	.002 x 600 volts, ±25%
1292	C3	.0005, mica, ±20%
1001	C4	.1 x 400 volts, +50%, —10%
1006	C5	.25 x 200 volts, ±20%
1295	C6, C8, C19	.0001, mica, ±20%
11994	C9, C10, C11	Electrolytic (for 60-cycle sets), 40 mfd. x 150 volts, 20 mfd. x 150 volts, 20 mfd. x 150 volts.
11995	C9, C10, C11	Electrolytic (for 25-cycle sets), 60 mfd. x 150 volts, 40 mfd. x 150 volts, 40 mfd. x 150 volts.
1009	C12	.05 x 200 volts, ±25%
129161	C13, C14	Dual .0001, mica, ±10%
10026	C16	.02 x 400 volts, ±25%
100110	C17	.2 x 400 volts, +30%, —10%
100106	C18	.004 x 600 volts, ±10%
		RESISTORS *
A-9B1-70	R1	4700 ohms, ½ watt, ±10%
A-9B1-31	R2	1 megohm, ½ watt, ±20%
A-9B1-50	R3	100 ohms, ½ watt, ±10%
A-9B1-26	R4	150,000 ohms, ½ watt, ±20%
A-9B1-42	R5	22 ohms, ½ watt, ±10%
A-9B1-17	R6	4700 ohms, ½ watt, ±20%
A-9B1-25	R7	100,000 ohms, ½ watt, ±20%
A-9B1-23	R8, R14	47,000 ohms, ½ watt, ±20%
A-9B2-53	R9	180 ohms, 1 watt, ±10%
A-9B2-63	R10	1200 ohms, 1 watt, ±10%
A-9B1-34	R11	3.3 megohms, ½ watt, ±20%
A-9B1-57	R12	390 ohms, ½ watt, ±10%
A-9B1-52	R13	150 ohms, ½ watt, ±10%
A-9B1-29	R16	470,000 ohms, ½ watt, ±20%
A-9B1-27	R17	220,000 ohms, ½ watt, ±20%
A-9B1-35	R18	4.7 megohms, ½ watt, ±20%
		COILS
12310	L1	Load coil
B-13E-10242	T1	Loop antenna assembly, complete on back
A-13D-10215	T2	Oscillator coil
108140	T3	Input I.F. coil in can. 455 Kc.
108145	T4	Output I.F. coil in can, 455 Kc.
		SOCKETS
121210		8-prong octal tube sockets, molded
121171		8-prong socket for 12SK7, laminated
121216		Socket base, bakelite
107271		Pilot light socket assembly
		SPEAKER
114197	T6	5-inch P.M. speaker
105104	T5	Output transformer for speaker
		DIAL PARTS
115448		End plate (right hand bracket)
115448C		End plate (left hand bracket)
115146		Cams

NOTE ON TUBE REPLACEMENT

Replace a defective metal 12SK7 tube with another metal tube. Replace a glass 12SK7 tube with either a metal tube or with an exact duplicate of the tube now in the set.

Part No.	Schematic Symbol	Description
		DIAL PARTS (Contd.)
115143		Key washer (13 used on cam shaft)
117528		Brass spacer (one used on cam shaft
117602		Brass spacer (four used on cam shaft
131181		Spring washers, for locking collar
117604		Locking collar
117302		Brass spacer (next to locking collar)
115592		Key washer (holds drive cord on end of tuner shaft)
117600		Lever shaft
115561		Lever with roller
120283		Return spring for levers
115449B		Dial bracket assembly
112785		Pointer
1209		Drive cord, 6 inches used
120143		Take-up spring for drive cord
B-6D-10241		Dial scale
112659		Crystal, clear, for dial scale
A-2M-7758		Cinch buttons for fastening scale to bracket
117566-1		Brass spacer (at end of tuner shaft)
117833		Brass spacer (for spacing pointer from dial)
		MISCELLANEOUS
10798		Line cord and plug
101218	R15	Volume control and switch, 1 megohm
B-8A-10211	C	2-gang variable condenser
107249	P1	Pilot light bulb, type T-47
132108		Chassis screws, No. 6 x ½" hex. head
134123		Rubber bumper (bottom of cabinet)
128495		Cardboard back, brown
128495B		Cardboard back, ivory
131193		Cinch buttons, for fastening back to cabinet
13141		Cinch buttons, to cover trimmer holes in cabinet
128292-17		Pushbuttons, walnut
128292-8		Pushbuttons, ivory
112784		Station call letters, set
112606		Acetate tabs for call letters
128473-18		Cabinet, bakelite, walnut
128473-9		Cabinet, bakelite, ivory
128496-17		Knob, volume, walnut
128496-8		Knob, volume, ivory
128527-18		Knob, tuning, walnut
128527-9		Knob, tuning, ivory
117424		Locking screw for tuning knob. (Specify walnut or ivory.)
120388		Locking spring for tuning knob

REPLACING DIAL POINTER DRIVE CORD

Six inches of cord are required in the set. Use a piece slightly longer so that knots may be tied at each end. Numbers below correspond to circled numbers in diagram.

1. Rotate tuning knob to extreme clockwise position. This closes tuning condenser. Knob should remain in this position until installation is completed.

2. Tie knot at one end of cord and place it in key washer as shown. Wind cord one turn around shaft in direction shown.

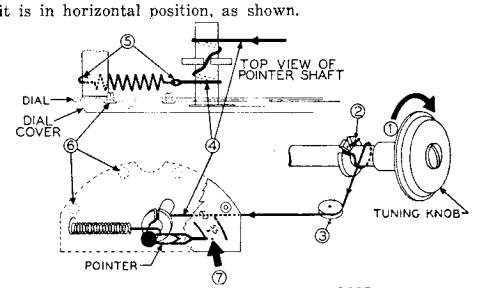
3. Pass cord over idler pulley.

4. Pass cord **over** pointer shaft; wind it one turn around shaft; pass it through key washer; wind it one more turn around shaft.

5. Hook spring over end of dial support. Tie cord to spring. **IMPORTANT:** Before tying knot stretch spring enough so that full contraction of spring will rotate pointer shaft at least one-half turn.

6. Remove dial crystal by removing Cinch buttons.

7. Make sure tuning knob is in extreme clockwise position. Then rotate pointer clockwise, against friction of shaft, until it is in horizontal position, as shown.



SETTING THE PUSHBUTTONS

The pushbuttons may be used, after proper adjustment, for the automatic tuning of any six stations which you select. They can be set up in any order.

1. Turn on the radio. Allow it to warm up for at least one minute.

2. Push out the call letters of the six stations from the call-letter sheets supplied with this manual. Press an acetate tab (supplied in small envelope) into each of the pushbuttons.

3. Insert one call-letter tab in the rectangular opening in each of the pushbuttons, in any sequence.

4. Check to see that the locking screw in the center of the tuning knob (see illustration) is loose. If it is not, turn it several turns to the left (counterclockwise). A coin may be used for this purpose.

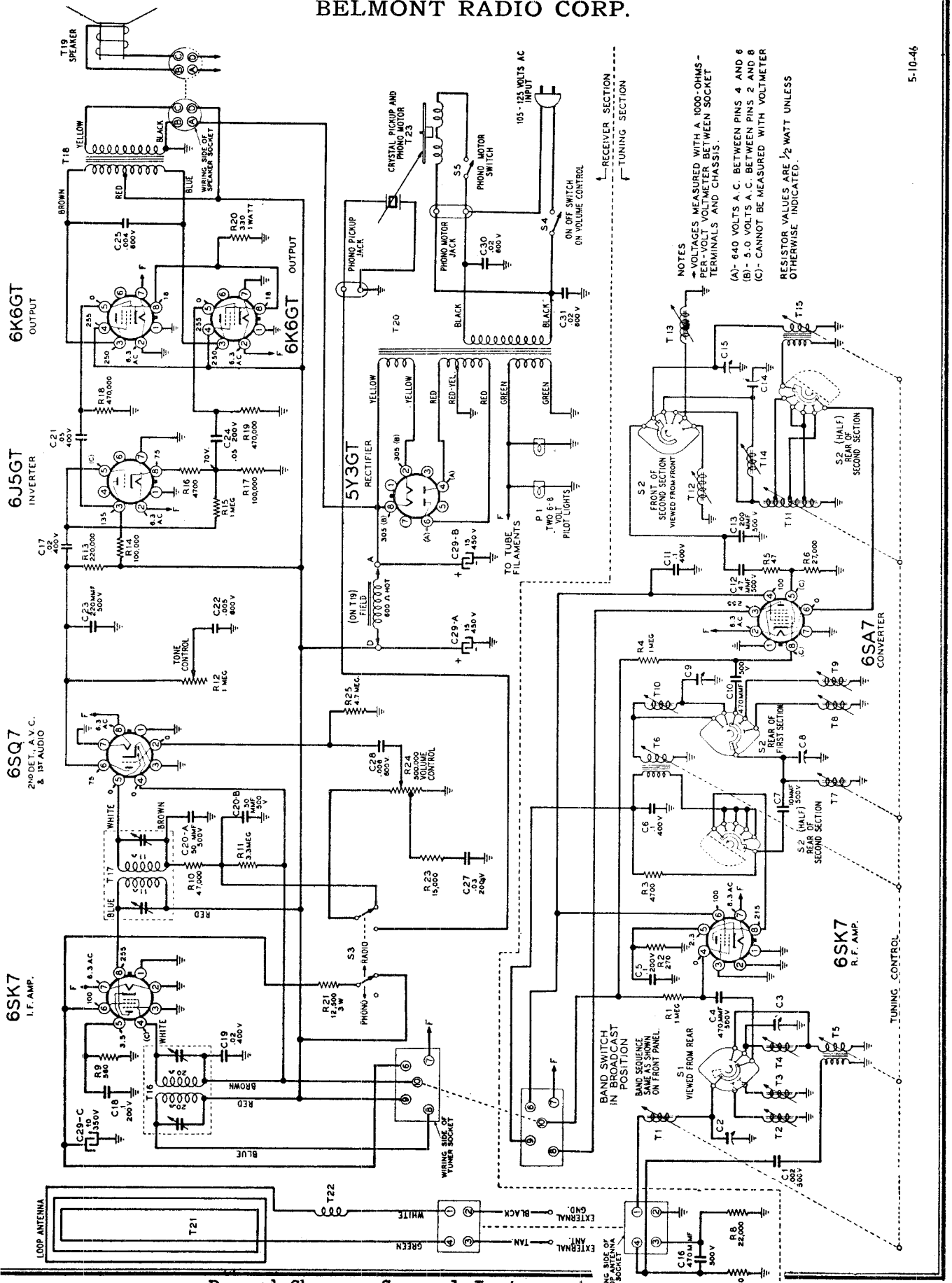
5. Press the first pushbutton down **all the way.** With one hand hold the button down **firmly** and with the other **carefully** tune in the desired station. Release the pushbutton.

6. Follow this procedure for each of the five other buttons, adjusting each one for a different station.

7. Rotate the tuning knob on the side of the cabinet as far to the right as it will go. Tighten the locking screw in the center of the knob. IT IS IMPORTANT THAT THIS SCREW BE TIGHTENED VERY FIRMLY.

MODEL 8A59

BELMONT RADIO CORP.


6K6GT OUTPUT
6J5GT INVERTER
6SQ7 2ND DET. A.V.C. & 1ST AUDIO
6SK7 I.F. AMP.
5Y3GT RECTIFIER
6SA7 CONVERTER
6SK7 R.F. AMP.
NOTES
VOLTAGES MEASURED WITH A 1000-OHMS-PER-VOLT VOLTMETER BETWEEN SOCKET TERMINALS AND CHASSIS.
(A)- 640 VOLTS A.C. BETWEEN PINS 4 AND 6
(B)- 5.0 VOLTS A.C. BETWEEN PINS 2 AND 8
(C)- CANNOT BE MEASURED WITH VOLTMETER
RESISTOR VALUES ARE 1/2 WATT UNLESS OTHERWISE INDICATED.
5-10-46
RECEIVER SECTION
TUNING SECTION
TUNING CONTROL
BAND SWITCH IN BROADCAST POSITION
BAND SEQUENCE SAME AS SHOWN ON FRONT PANEL.
VIEWED FROM REAR
LOOP ANTENNA
EXTERNAL GND.
EXTERNAL ANT.
WIRING SIDE OF SPEAKER SOCKET
WIRING SIDE OF TUNER SOCKET
WIRING SIDE OF LOOP ANTENNA SOCKET
CRYSTAL PICKUP AND PHONO MOTOR T23
PHONO PICKUP JACK
PHONO MOTOR JACK
PHONO MOTOR SWITCH
ON OFF SWITCH ON VOLUME CONTROL
105 - 125 VOLTS AC INPUT
TONE CONTROL
VOLUME CONTROL
TO TUBE FILAMENTS
TWO 6-8 VOLT PILOT LIGHTS
FIELD 600 Ω HOT
PHONO
RADIO

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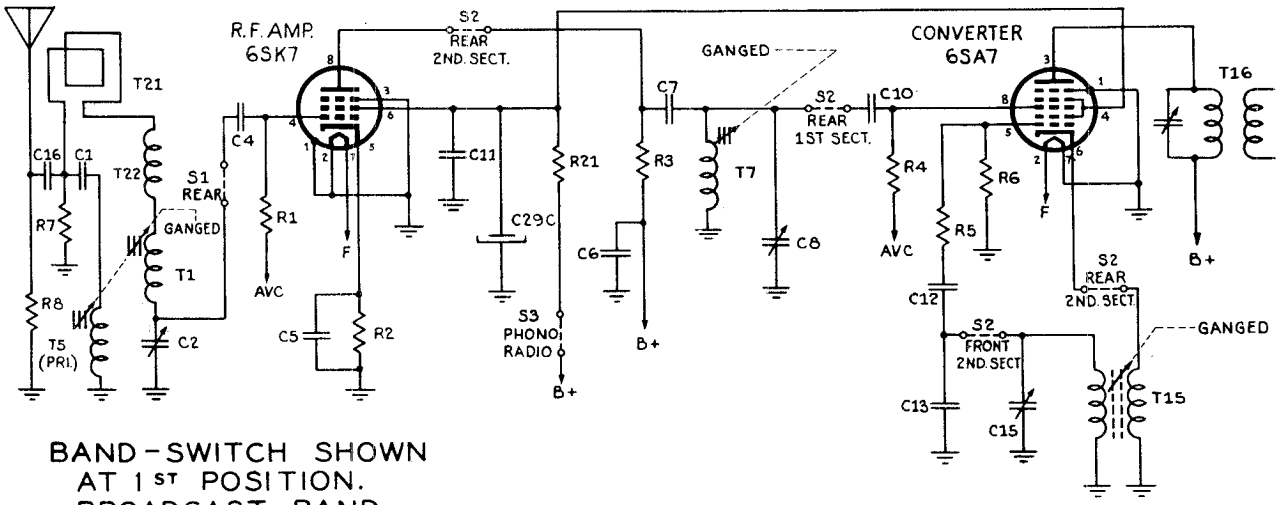
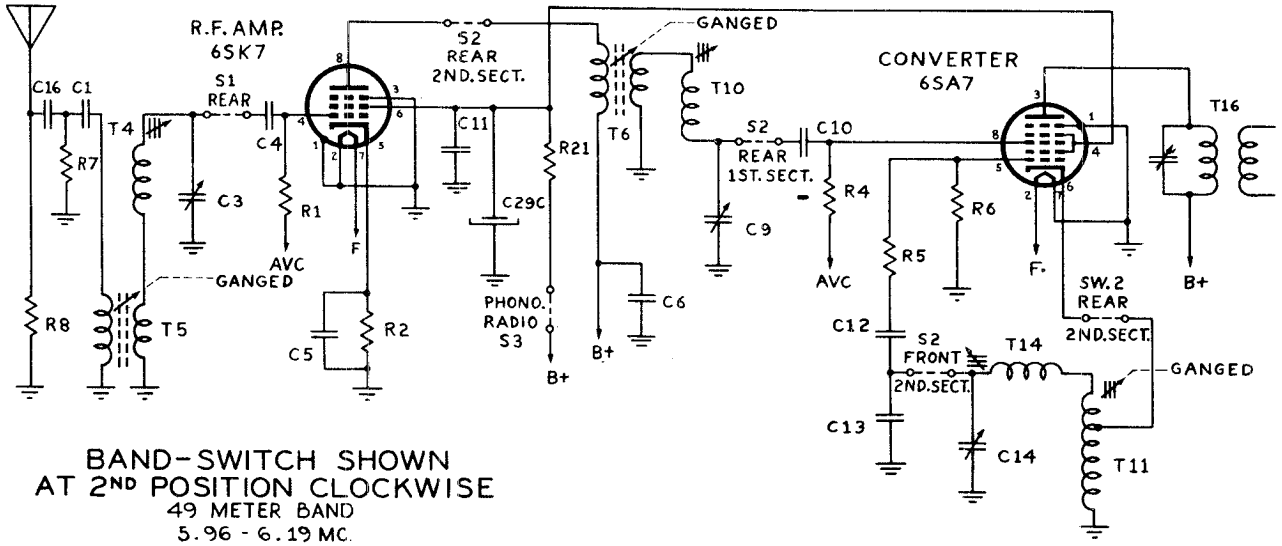
Record Changer: General Instrument Models 204 and 205

BELMONT RADIO CORP.

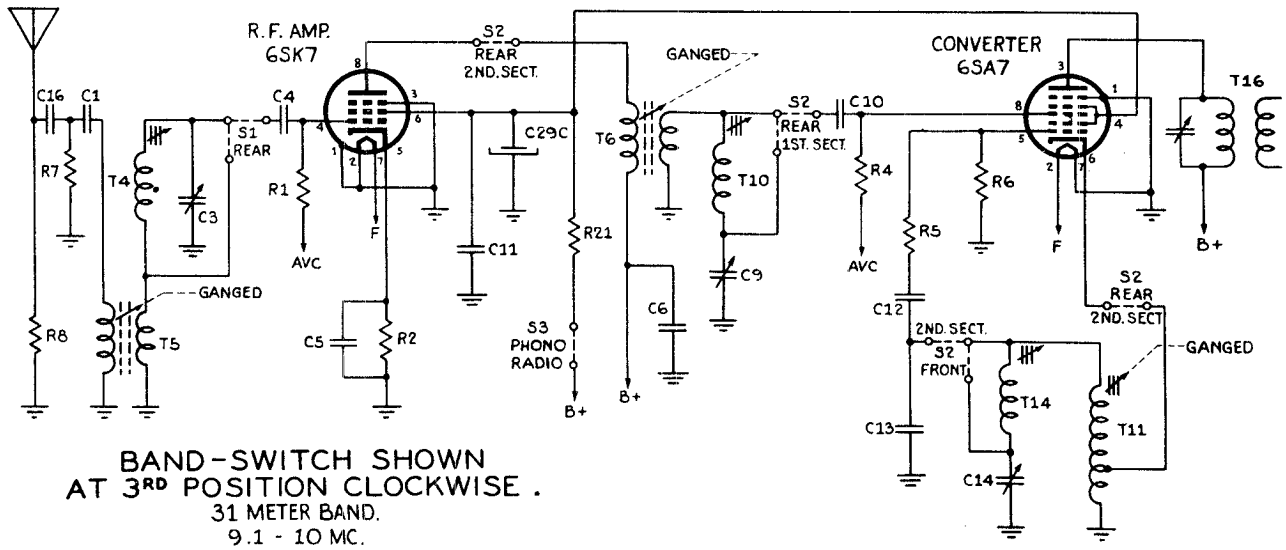
MODEL 8A59



BAND-SWITCH SHOWN
AT 1ST POSITION.
BROADCAST BAND
540-1600 KC



BAND-SWITCH SHOWN
AT 2ND POSITION CLOCKWISE
49 METER BAND
5.96 - 6.19 MC.



BAND-SWITCH SHOWN
AT 3RD POSITION CLOCKWISE.
31 METER BAND.
9.1 - 10 MC.

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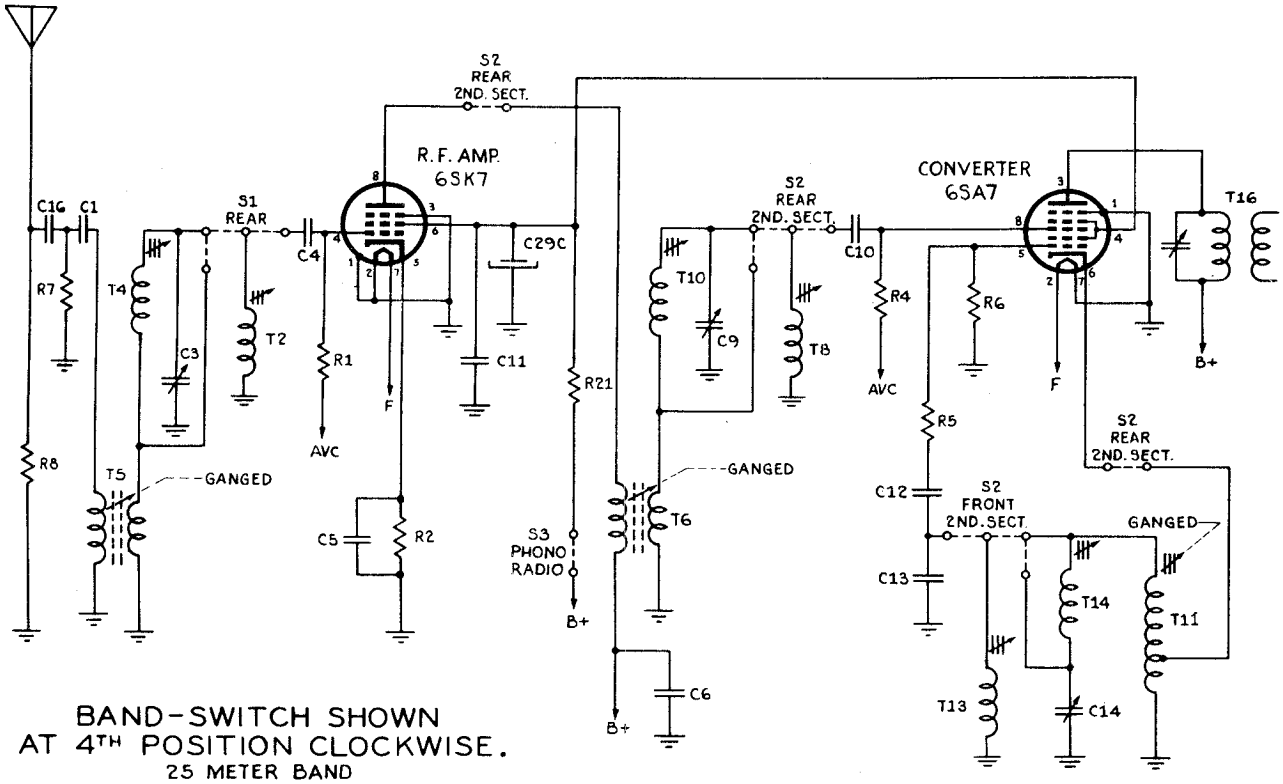
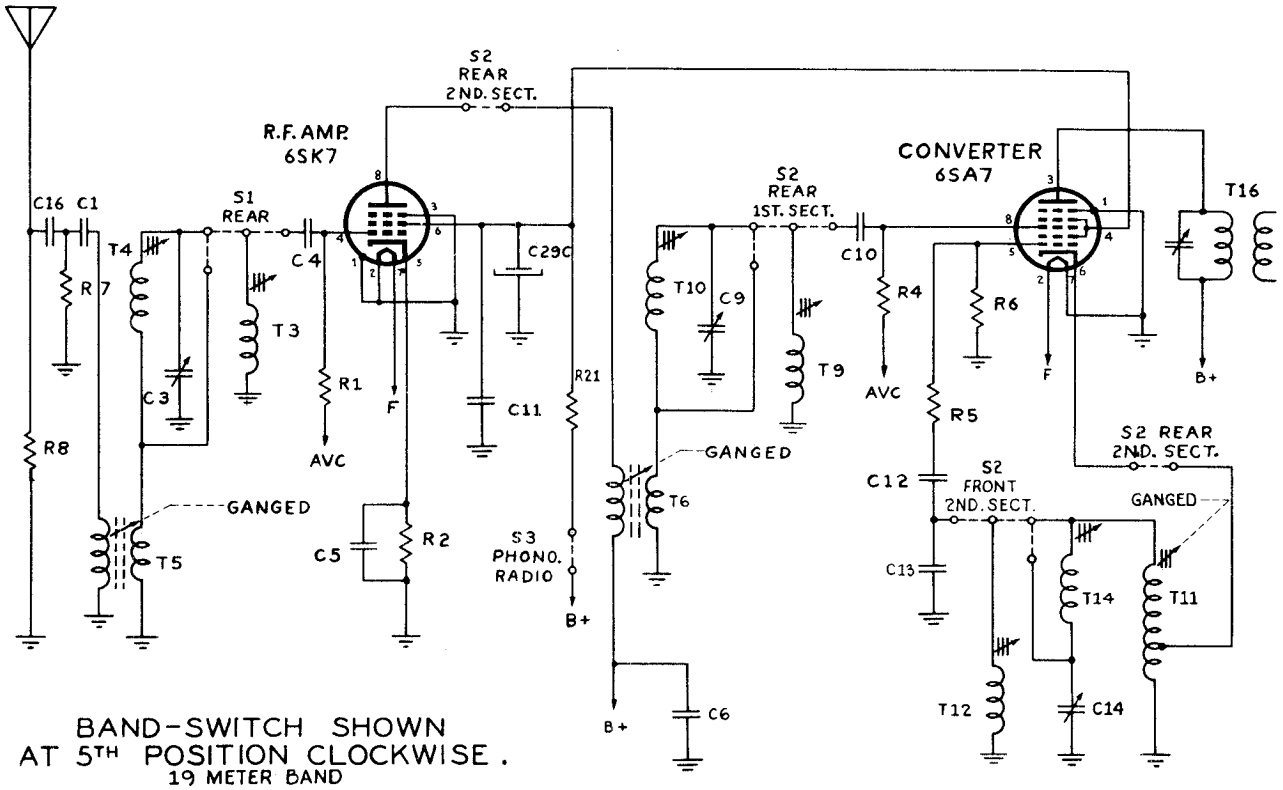
BELMONT RADIO CORP.



BAND-SWITCH SHOWN AT 4TH POSITION CLOCKWISE.
25 METER BAND
11.45 - 12.16MC.



BAND-SWITCH SHOWN AT 5TH POSITION CLOCKWISE.
19 METER BAND
14.94 - 15.46 MC.

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MODEL 8A59

BELMONT RADIO CORP.

MECHANICAL ADJUSTMENT—The core tuning bar (see illustration of iron cores) and dial pointer must be adjusted mechanically before any electrical alignment is attempted. Rotate the manual tuning control until the core bar is farthest from the coils. For proper adjustment the bar should be approximately 1/32 of an inch from the two rod guide angles.

With the core bar in this position, adjust the dial pointer to coincide with 1600 kc on the dial scale.

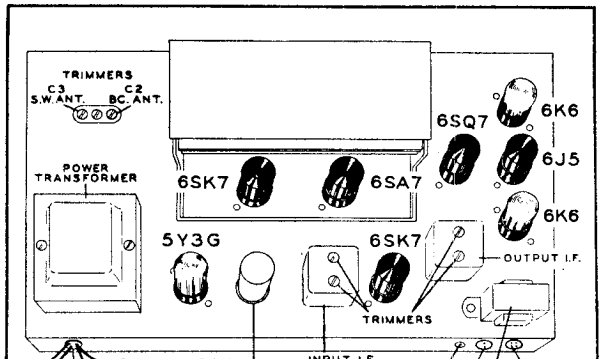
Rotate each of the three broadcast coils (see illustration) until the end of the coil is 1-5/32" from the end of the coil form. Rotate the three 9-mc coils until this dimension is 1-1/16" for these coils. After these adjustments have been made, the unit can be aligned electrically.

ELECTRICAL ADJUSTMENT—To align the set make the following preliminary adjustments: Set the tone pushbutton for treble tone; set the volume control at maximum; connect the ground post of the signal generator to the radio chassis; connect the output meter across a 3.2-ohm output load; and allow the receiver and signal generator to warm up for several minutes.

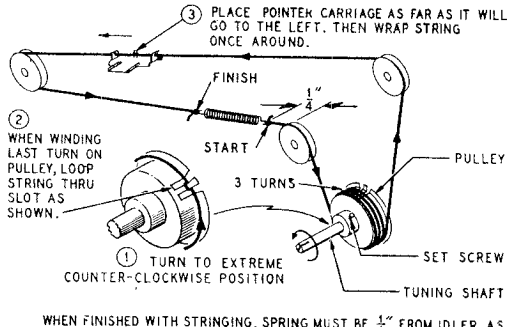
Align the set according to the sequence given in the chart. The indicated dummy antenna is to be connected in series between the signal generator output lead and the receiver. Adjust the set for maximum output; reduce the input as needed to keep the output near 1.3 volts.

Locations of all the trimmers and coils are shown in the illustrations below. After adjustment, seal the coil cores with collodion or a similar substance (do not use cement).

BAND SWITCH SETTING	*SIGNAL GENERATOR*			*DIAL POINTER SETTING*	*ADJUST TO MAXIMUM OUTPUT (in order shown)*
	Frequency	*Coupling Capacitor*	*Connection to Radio*		
Broadcast (for I. F.)	455 kc	.1 mf	Grid (pin 8) of converter (6SA7)	1600 kc	Trimmers on output and input I. F. cans
Broadcast	1600 kc	200 mmf	Antenna lead	1600 kc	BC Osc. trimmer C15 BC R. F. trimmer C8 BC Ant. trimmer C2
	1400 kc	200 mmf	Antenna lead	1400 kc	Rotate cores of BC R. F. coil T7 and BC Ant. coil T1
31 Meter	9.6 mc	400 ohms	Antenna lead	9.6 mc	9 mc Osc. trimmer C14 9 mc R. F. trimmer C9 9 mc Ant. trimmer C3
49 Meter	6.1 mc	400 ohms	Antenna lead	6.1 mc	6 mc Osc. coil T14 6 mc R. F. coil T10 6 mc Ant. coil T4
25 Meter	11.8 mc	400 ohms	Antenna lead	11.8 mc	12 mc. Osc. coil T13 12 mc R. F. coil T8 12 mc Ant. coil T2
19 Meter	15.2 mc	400 ohms	Antenna lead	15.2 mc	15 mc Osc. coil T12 15 mc R. F. coil T9 15 mc Ant. coil T3

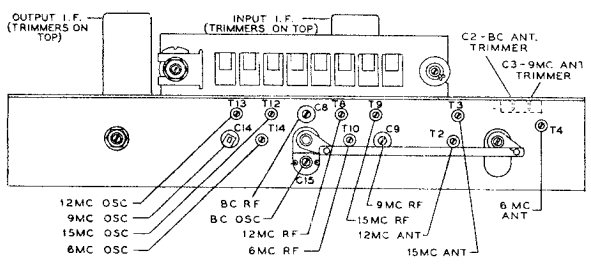


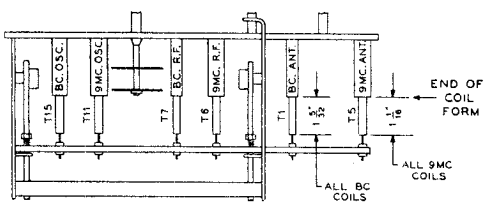
Chassis View


3 PLACE POINTER CARRIAGE AS FAR AS IT WILL GO TO THE LEFT. THEN WRAP STRING ONCE AROUND.
FINISH
1/4"
2 WHEN WINDING LAST TURN ON PULLEY, LOOP STRING THRU SLOT AS SHOWN.
START
PULLEY
3 TURNS
1 TURN TO EXTREME COUNTER-CLOCKWISE POSITION
SET SCREW
TUNING SHAFT

WHEN FINISHED WITH STRINGING, SPRING MUST BE 1/4" FROM IDLER AS SHOWN. TO DO THIS:

4. LOOSEN SET SCREW ON PULLEY.
5. HOLD TUNING SHAFT FIRM IN POSITION INDICATED AND TURN PULLEY BY HAND UNTIL SPRING IS 1/4" AWAY FROM IDLER.
6. TIGHTEN SET SCREW. NOW SPRING SHOULD TRAVEL BACK AND FORTH WITHOUT TOUCHING THE IDLERS.
7. REPLACE CHASSIS IN CABINET. REPLACE POINTER ON CARRIAGE. TUNE IN STATION OF KNOWN FREQUENCY. HOLD TUNING SHAFT FIRM AND SLIDE POINTER TO CORRECT POSITION ALONG DIAL.
8. GLUE POINTER TO STRING.





Coils and Trimmers

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REPLACEMENT PARTS LIST

When ordering parts, specify part number, model number, and series

REMOVABLE TUNER ASSEMBLY

CAPACITORS*

Ref. No.	Part No.	Description
C1	B-8F-10767	.002 mf, 500 volts, 10%, mica
C2, C3	124143	Dual, broadcast (67-123 mmf) and 9 mc (95-175 mmf) ant. trimmers
C4, C10	B-8F3-121	470 mmf, 500 volts, 10%, mica
C5	C-8D-10771	.1 mf, 200 volts, +20%—10%
C6, C11	C-8D-10760	.1 mf, 400 volts, +20%—10%
C7	B-8F5-101	10 mmf, 500 volts, 10%, silver mica
C8	A-8G-7205	Broadcast RF trimmer (120-220 mmf)
C9	A-8G-7206	9 mc RF trimmer (60-110 mmf)
C12	B-8F3-109	47 mmf, 500 volts, 10%, mica
C13	B-8F-10763	200 mmf, 500 volts, 3%, silver mica
C14	124145	9 mc oscillator trimmer (7-35 mmf)
C15	124144	Broadcast oscillator trimmer (15-27 mmf)

RESISTORS*

R1, R4	C-9B1-31	1 megohm, ½ watt, 20%
R2	C-9B1-55	270 ohms, ½ watt, 10%
R3	C-9B1-70	4700 ohms, ½ watt, 10%
R5	C-9B1-46	47 ohms, ½ watt, 10%
R6	C-9B1-79	27,000 ohms, ½ watt, 10%

Tubes are coded and guaranteed by the tube manufacturer. Better service can be rendered on adjustments if defective tubes are returned directly to the manufacturer rather than through our factory.

We cannot supply speaker cones or fields separately. We can repair or replace a damaged speaker if it is returned to our factory, transportation charges prepaid.

*The values of all resistors listed above are based on RMA standards. Due to conditions beyond our control some receivers have been shipped with resistors of pre-standardized values. This receiver will operate equally well with resistors of either group. An illustration of the difference follows:

Pre-standardized value—50,000 ohms, ±10%, 1/3 watt
RMA value—47,000 ohms, ±10%, 1/2 watt

COILS (complete with cores)

T1	111195	Broadcast antenna coil
T2	111191	12-mc antenna coil
T3	111192	15-mc antenna coil
T4	111189	6-mc antenna coil
T5	111190	9-mc antenna coil
T6	10959	9-mc RF coil
T7	10962	Broadcast RF coil
T8	10960	12-mc RF coil
T9	10961	15-mc RF coil
T10	10958	6-mc RF coil
T11	110157	9-mc oscillator coil
T12	110159	15-mc oscillator coil
T13	110158	12-mc oscillator coil
T14	110156	6-mc oscillator coil
T15	110161	Broadcast oscillator coil

MISCELLANEOUS

S1	B-20A-10964	Band switch, antenna
S2	B-20A-10965	Band switch, oscillator and RF
	121210	Socket, molded, for 6SA7
	121171	Socket, laminated, for 6SK7GT
	117907	Tuning shaft
	117798	Pinion gear on tuning shaft
	120393	Spring, intermediate link, under ends of treadle bar
	131251	Washer, "C," on slug tuning bar
	B-2C-7245	Gear segment
	A-2J-7439	Spring clip, for coils
	131316B	Washer "C", for 9-mc coils
	134134	Grommet for core mounting (all broadcast and 9-mc coils)
	134126	Grommet for coil mounting (broadcast RF and antenna coils)
	134125	Grommet for coil mounting (broadcast oscillator coil)
	A-25A-7619	Grommet for all 9-mc coils
	B-202-10475	Pushrod assembly
	120366	Spring, pushrod return
	121281	Plug, 5-prong
	128759-14	Pushbutton, walnut
	128759-41	Pushbutton, mahogany
	131210	Washer, "C", on end plate

NOTE: Before removing chassis, take off escutcheon and pull pointer from pointer carriage.

MAIN CHASSIS

CAPACITORS*

C16	C-8F3-12	470 mmf, 20%, mica
C17, C19	C-8D-10774	.02 mf, 400 volts, 20%
C18	C-8D-10771	.1 mf, 200 volts, +20%—10%
C20-A C20-B	129165B	Dual, 50 mmf each section, mica, 20%
C21	C-8D-10813	.05 mf, 400 volts, 20%
C22	C-8D-10935	.005 mf, 600 volts, +40%—15%
C23	C-8F3-10	220 mmf, 20%, mica
C24	C-8D-10770	.05 mf, 200 volts, 20%
C25	C-8D-10788	.004 mf, 600 volts, 20%
C27	C-8D-10992	.03 mf, 200 volts, 20%
C28	C-8D-10785	.006 mf, 600 volts, 20%
C29-A, -B, -C	119109	Electrolytic, 15 mf x 450 volts, 15 mf x 450 volts, 10 mf x 350 volts
C30, C31	C-8J-11321	.02 mf, 600 volts, 20%

RESISTORS*

R7, R8	C-9B1-21	22,000 ohms, ½ watt, 20%
R9	C-9B1-59	560 ohms, ½ watt, 10%
R10	C-9B1-23	47,000 ohms, ½ watt, 20%
R11	C-9B1-34	3.3 megohms, ½ watt, 20%
R12, S3	125180	Tone control (1 megohm) and radio-phono switch
R13	C-9B1-27	220,000 ohms, ½ watt, 20%
R14, R17	C-9B1-86	100,000 ohms, ½ watt, 10%
R15	C-9B1-31	1 megohm, ½ watt, 20%
R16	C-9B1-70	4700 ohms, ½ watt, 10%
R18, R19	C-9B1-29	470,000 ohms, ½ watt, 20%
R20	C-9B2-56	330 ohms, 1 watt, 10%
R21	10662	12,500 ohms, 3 watts, 10%
R23	C-9B1-20	15,000 ohms, ½ watt, 20%
R24, S4	A-10A-10586	Volume control (500,000 ohms) and on-off switch
R25	C-9B1-35	4.7 megohms, ½ watt, 20%

COILS AND TRANSFORMERS

T16	108177	Input IF coil complete in can (Range of trimmers: 110-210 mmf)
T17	108176	Output IF coil complete in can (Range of trimmers: 80-140 mmf)
T18	B-12C-10234	Output transformer
T20	104202B	Power transformer

SOCKETS

121200	Socket, 4-terminal, for loop antenna
121279	Socket, 5-terminal, for tuner
A-15B-11538	Socket, 4-terminal, for speaker
121280	Socket, 1-terminal, for phono pick-up
121199	Socket, 2-terminal, for phono motor
121210	Socket, octal, molded (all tubes except 6SK7, IF amp.)
121273	Socket, octal, laminated (for 6SK7, IF amplifier)
B-47A-10808	Socket assembly for dial light

MISCELLANEOUS

T19	B-18B-10617	Speaker, 10-inch, electrodynamic
T21	A-14MA-11066-3	Loop antenna (ribbon only)
T22	A-16A-11113	Choke on loop terminal board
	A-19A-11322	Plug on loop antenna leads
	107401	Phono motor cable assembly
	10724	Connector, for phono pickup leads
	B-6D-10984	Dial scale
	10794	Dial light, 6-8 volts, type T-44 (2 used)
	B-2G-10588-1	Dial pointer
	A-2J-11041	Pointer spring
	1121035	Pointer carriage
	B-53A-10989	String for dial pointer
	120377	Spring for dial pointer string
	107266	Line cord and plug (9 feet)
	112985-14	Escutcheon (for walnut cabinet)
	112985-41	Escutcheon (for mahogany cabinet)
	A-5B-10893-14	Knob, band switch or radio-phono-tone (for walnut cabinet)
	A-5B-10893-41	Knob, band switch or radio-phono-tone (for mahogany cabinet)
	128523-14	Knob, tuning or volume (for walnut cabinet)
	128523-41	Knob, tuning or volume (for mahogany cabinet)
	A-2L-11293	Bandswitch link
	112961	Station call letters

ELECTRICAL SPECIFICATIONS

Power Supply.....105 to 125 volts AC, 60 cycles; 95 watts (118 watts with phono motor operating).

Frequency Ranges....Broadcast band—540 to 1600 kc.
49-meter band—5.96 to 6.19 mc.
31-meter band—9.1 to 10 mc.
25-meter band—11.45 to 12.16 mc.
19-meter band—14.94 to 15.46 mc.

Intermediate Freq....455 kc.

Tuning.....All bands permeability-tuned.

Antenna.....Built-in; provisions also for external antenna and ground.

Speaker.....10" electrodynamic. Voice coil impedance 3.2 ohms.

Power Output.....5.5 watts undistorted.
7.5 watts maximum.

Sensitivity.....4 microvolts average for ½ watt output.

Selectivity.....35 kc. broad at 1000 times signal at 1000 kc.

Tube and Lamp Complement.....6SK7, tuned RF amplifier
6SA7, converter
6SK7, IF amplifier
6SQ7, detector, AVC, 1st audio
6J5GT, phase inverter
6K6GT, push-pull output
6K6GT, push-pull output
5Y3G, rectifier
T-44, dial lamp (2 used)

SETTING THE PUSHBUTTONS—The six pushbuttons may be used, after proper adjustment, for the automatic tuning of any six stations which you select. All the stations need not be in the same band, but probably you will want to set them up in the standard broadcast band. Proceed as follows:

1. Turn the radio on and turn the band switch to the "B.C." position.

2. From the call-letter sheets supplied with this manual, push out the call letters of your favorite six stations. Drop these into the six pushbuttons, preferably but not necessarily in order of frequency (as listed in your newspaper).

3. Next pull a button out as far as it will come.

4. *Very carefully* tune in the station corresponding to the pushbutton call letters.

5. Now push the button in *as far as it will go.*

6. Follow this procedure for each of the five other buttons, setting each one for a different station.

7. The setting of any pushbutton can be changed by following the procedure given above.

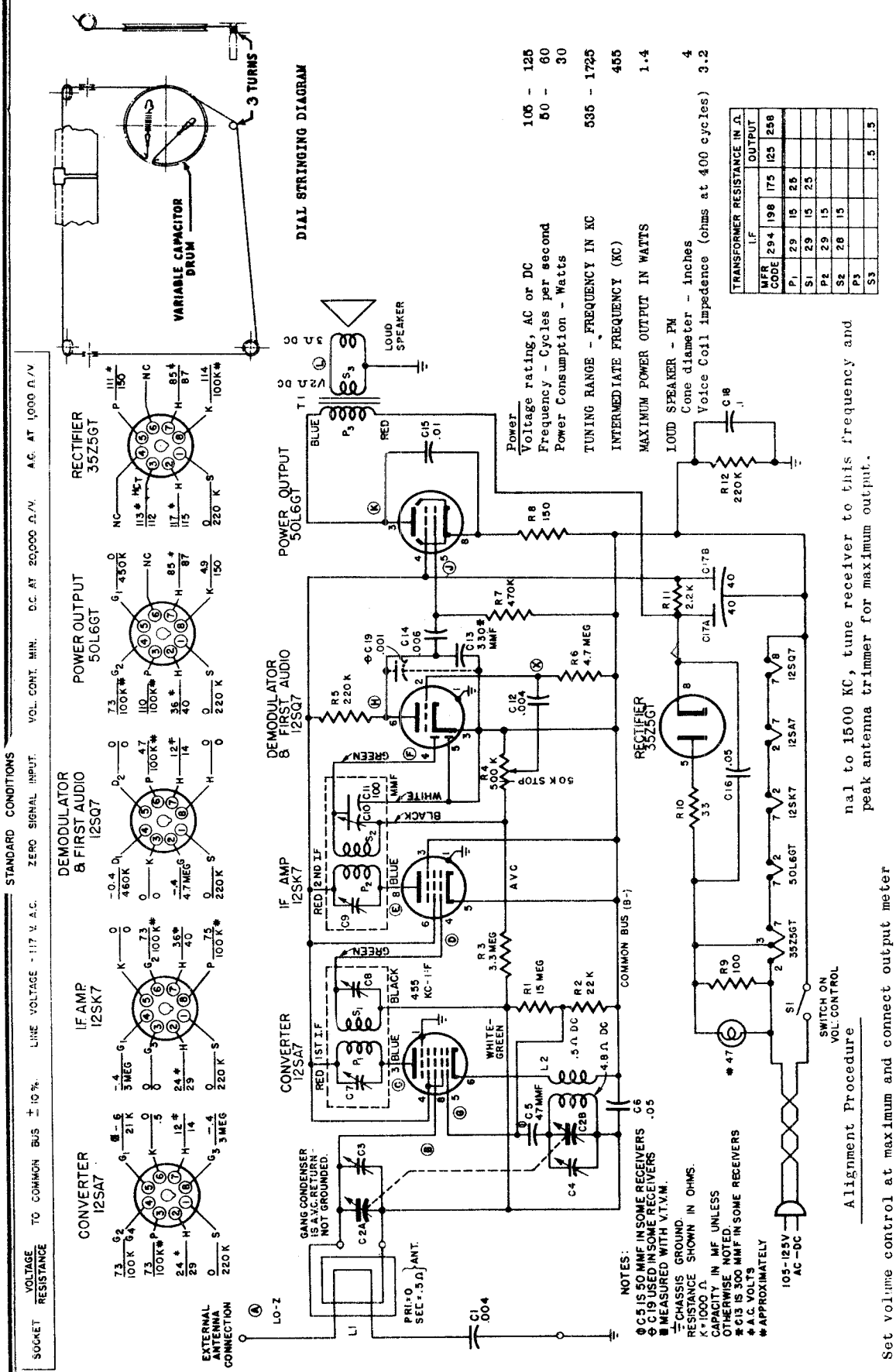
If any of the buttons is to be set for a short-wave station, turn the band switch to the proper position before adjustment. The switch must be turned to this position also whenever the pushbutton is used, since pressing the button does not change bands.

RECORD CHANGER

D-21H-10417	Model 204 (with automatic stop)
D-21H-10132	Model 205

BENDIX RADIO DIV.

MODELS 526A,-B,-C,-D,-E
Preliminary



Power	
Voltage rating, AC or DC	105 - 125
Frequency - Cycles per second	50 - 60
Power Consumption - Watts	30
TUNING RANGE - FREQUENCY IN KC	535 - 1725
INTERMEDIATE FREQUENCY (KC)	455
MAXIMUM POWER OUTPUT IN WATTS	1.4
LOUD SPEAKER - PM	
Cone diameter - inches	4
Voice Coil impedence (ohms at 400 cycles)	3.2

TRANSFORMER RESISTANCE IN Ω.					
	I.F.			OUTPUT	
MFR CODE	294	198	175	125	258
P1	29	15	25		
S1	29	15	25		
P2	29	15			
S2	28	15			
P3				.5	.5
S3					

Alignment Procedure

Set volume control at maximum and connect output meter across voice coil. Keep input as low as possible at all times. IF - Set signal generator at 455 KC and connect to converter grid through a .05 mfd. capacitor. Tune progressively the 2nd. and 1st. IF trimmers for maximum output.

RF - Set gang tuning condenser wide open. Set signal generator at 1750 KC and loosely couple to antenna. Tune oscillator coil for maximum output. Change signal to 1500 KC, tune receiver to this frequency and peak antenna trimmer for maximum output.

Precautions

An insolating transformer should be used between the power supply and the receiver if any of the test equipment is AC operated. The use of isolating capacitors is not recommended as AC through the capacitor may introduce hum modulation and if the capacitors should break down the test instruments will likely be damaged.

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MODELS 526A,-B,-C,-D,-E
Preliminary

BENDIX RADIO DIV.

REPLACEMENT PARTS LIST

Stock No.	Description	List Price
ALOC00	ANTENNA - Loop Assembly (L1).....	
CE2A00	CAPACITOR - Electrolytic - 40-40-150 W.V. (C17A, C17B).....	
CL2A00	CORD - AC Power.....	
CM5A14	CAPACITOR - 47 mmf. mica (C5).....	
CM5A34	CAPACITOR - 330 mmf. mica (C13).....	
CM5A46	CAPACITOR - .001 mmf mica 500 V.D.C. (C19)..	
CP4T20	CAPACITOR - .006 mfd. - 400 V.D.C. Paper (C14).....	
CP4T31	CAPACITOR - .01 mfd. - 400 V.D.C. Paper (C15).....	
CP4T40	CAPACITOR - .05 mfd. - 400 V.D.C. Paper (C6)	
CP4T51	CAPACITOR - .1 mfd. - 400 V.D.C. Paper (C18)	
CP6T16	CAPACITOR - .004 mfd. - 600 V.D.C. Paper (C1, C12).....	
CP6T40	CAPACITOR - .05 mfd. - 600 V.D.C. Paper (C16)	
CV0B01	CAPACITOR - Variable (C2A, C2B, C3RF - 25 mmf max. C4 Osc. 25 mmf. max.).....	
I01B00	COIL - Oscillator (L2).....	
RC1H40	RESISTOR - 22 K ohms, 1/4 W. Comp. (R2).....	
RC1H54	RESISTOR - 220 K ohms, 1/4 W. Comp. (R5,R12)	
RC1H58	RESISTOR - 470 K ohms, 1/4 W. Comp. (R7)....	
RC1H68	RESISTOR - 3.3 meg. 1/4 W. Comp. (R3).....	
RC1H70	RESISTOR - 4.7 meg. 1/4 W. Comp. (R6).....	
RC1H76	RESISTOR - 15 meg. 1/4 W. Comp. (R1).....	
RC3H12	RESISTOR - 100 ohms, 1 W. Comp. (R9).....	
RC4G28	RESISTOR - 2200 ohms, 2 W. Comp. (R11).....	
RV0S00	POTENTIOMETER - with switch - 500 K ohms (R4)	
RW1A06	RESISTOR - 33 ohms,1 W. W. W. (R10).....	
RW1B14	RESISTOR - 150 ohms, 1 W.W.W. (R8).....	
S00D00	SOCKET - Dial Lamp.....	
S08S00	SOCKET - Octal Tube.....	
TI0C00	TRANS. - Converter I.F. (1st).....	
TI0D00	TRANS. - Diode I.F. (2nd).....	
	SPEAKER AND COMPONENTS	
SP4R00	SPEAKER - 4" P.M.....	
CS4R00	CONE - 4" Cone & V.C. Assy. - Spkr. SP4R00, Code 252.....	
CS4R01	CONE - 4" Cone & V.C. Assy. - Spkr. SP4R00, Code 328.....	
CS4R02	CONE - 4" Cone & V.C. Assy. - Spkr. SP4R00, Code 277.....	
CS4R03	CONE - 4" Cone & V.C. Assy. - Spkr. SP4R00, Code 258.....	
CS4R04	CONE - 4" Cone & V.C. Assy. - Spkr. SP4R00, Code 191.....	
TA0000	TRANSFORMER - Output Trans.....	
	MECHANICAL COMPONENTS	
AD0B00	PLATE ASSEMBLY - Dial Back.....	
BT4S00	BOARD - Strip Terminal - 4 lugs.....	
CD0C01	CABLE - Dial 40½".....	
GR0S00	GROMMET - Cond. Shockmount.....	
HB0A00	BRACKET - Loop Antenna.....	
HC0C03	CLAMP - Cable Dial.....	
HC0S00	CLIP - Tuning Shaft Spring.....	
HN0P00	NUT 3/8 X 32 Palnut.....	
HR0S02	RIVET - Shoulder (.218).....	
HS0C00	SPRING - Dial Cable Tension.....	
HS6F00	SLEEVE - Spacer - Tuning Cond. Mtg.....	
IT0C00	TUBE - Capacitor Insulating.....	
MP0F00	PULLEY - Idler (Fiber).....	
MS0T00	SHAFT TUNING.....	
PI0C00	PLATE - Mounting Elect. Cap.....	
PI0P00	PLATE - Power Cord Insulator.....	

Stock No.	Description	List Price
	PARTS COMMON TO MODEL 0526A & B	
BTIT00	POST - Binding (Base Plate).....	
BZ0D00	BAFFLE - Corrugated Paper Speaker.....	
DS0A03	DIAL - Plastic Scale (54-170).....	
FZ0R00	FOOT - Rubber (Vinylite) Mtg.....	
HK0R00	RING - Knob Retainer Spring (.015).....	
HP0B00	PLATE - Base Assy.....	
HZ0S00	STUD - Trimount.....	
ID0M00	INDICATOR - Metal Dial (Pointer).....	
PI0B01	PLATE - Asbestos Base Insulator.....	
	PARTS FOR MODEL 0526A	
KC0B01	KNOB - Mottled Brown - Push on.....	
ZP0B01	CABINET - Mottled Brown Plastic.....	
	PARTS FOR MODEL 0526B	
KC0B03	KNOB - Mottled Brown - Push On.....	
ZP0101	CABINET - Ivory Plastic.....	
	PARTS COMMON TO MODELS 0526C & D	
BZ0B00	BACK - Teakwood - Catalin Cabinet.....	
GF0S00	GASKET - Felt 3/16" X 3-1/4" ID (spkr.).....	
FZ0R01	FOOT - Cabinet (Rubber).....	
GR0D00	GASKET - Rubber Dial (1/16" X 1/8" X 4").....	
GR0D01	GASKET - Rubber Dial (3/16" X 1/32" X 1/4")..	
HK0C00	CLIP - Knob Retainer Spring.....	
HZ0S01	STUD - Trimount.....	
ID0M01	INDICATOR - Metal Dial (Pointer).....	
	PARTS FOR MODEL 0526C	
DS0A00	DIAL - Glass Scale (54 - 170).....	
DX0R00	RETAINER - Dial, R.H. (Trim).....	
DX0R01	RETAINER - Dial, L.H. (Trim).....	
KC0G00	KNOB - Plain Push-on (Green).....	
ZC0G00	CABINET - Green & Black Catalin.....	
	PARTS FOR MODEL 0526D	
DS0A05	DIAL - Glass (54 - 170).....	
DX0R02	RETAINER - Dial, R.H. (Trim).....	
DX0R03	RETAINER - Dial, L.H. (Trim).....	
KC0G01	KNOB - Brown Push-ON.....	
ZC0B00	CABINET - Two-Tone Brown Catalin.....	
	PARTS FOR MODEL 0526E	
BZ0B01	BACK - Cabinet Teakwood.....	
BZ0D00	BAFFLE - Corrugated Card Board.....	
BZ0D02	BAFFLE - Paper.....	
DS0A07	DIAL GLASS (54-170 K.C.).....	
DX0R06	RETAINER - Metal Dial.....	
FZ0R02	FOOT - Black Rubber.....	
GF0S06	GASKET - Blk. Felt (1/16 X 1/4 X 5/8).....	
GF0S07	GASKET - Blk. Felt (1/16 X 3/16 X 8½).....	
GF0S08	GASKET - Blk. Felt (1/16 X 1/4 X 13/16).....	
GZ0C01	GRILL-CLOTH - (Dk. Br.).....	
HK0R00	RING - Retainer Spring (.015).....	
ID0M03	INDICATOR - Metal Dial Pointer.....	
KC0B07	KNOB - Dk. Mottled Brown (Cont'l).....	
PI0B01	PLATE - Asbestos Base Insulator.....	
ZW5A00	CABINET ASS'Y - (Wood) BW76.....	

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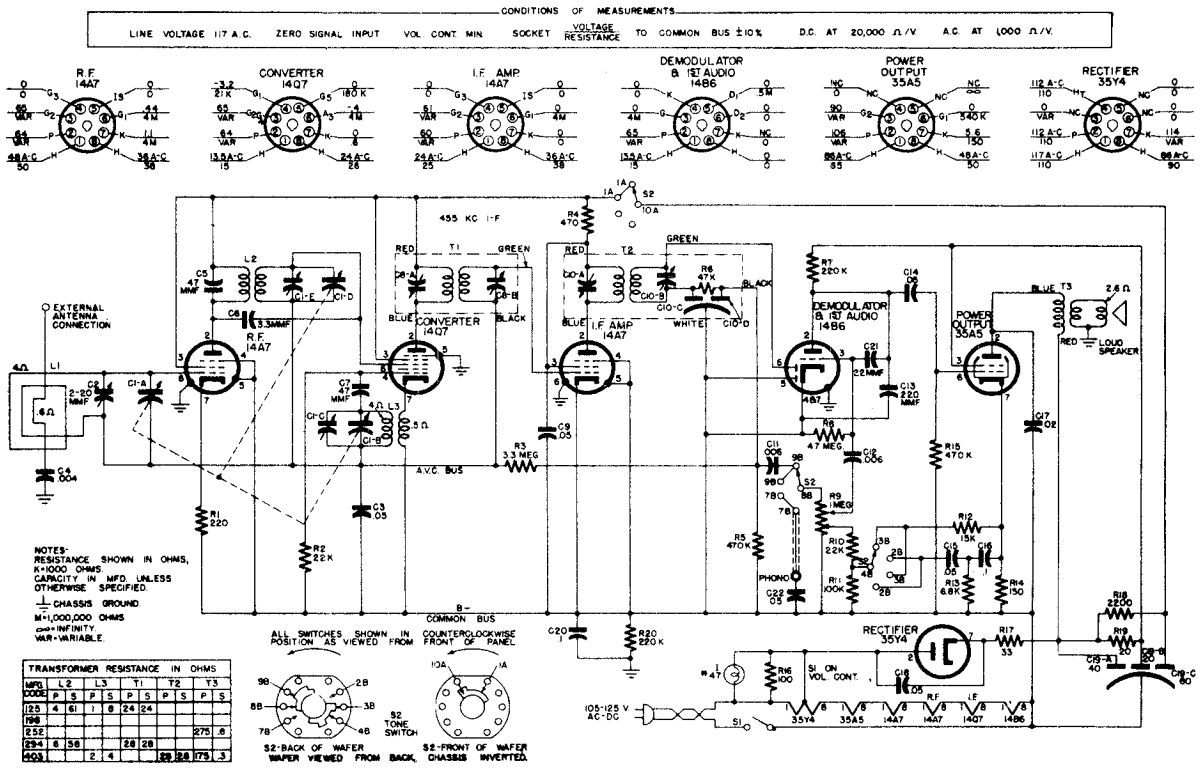
MODELS 636A,-C,-D

BENDIX RADIO DIV.



MFG. CODE	L2 P	L2 S	L3 P	L3 S	T1 P	T1 S	T2 P	T2 S	T3 P	T3 S
125	4	61	1	8	24	24				
198										
252									275	.8
254	6	56			28	28				
403			2	4			28	28	175	.3

Power Consumption-Watts. 30

TUNING RANGE—FREQUENCY IN KC 535-1725

INTERMEDIATE FREQUENCY (KC). 455

MAXIMUM POWER OUTPUT IN WATTS. 1.2

LOUD SPEAKER—PM-OVAL

Cone diameter—inches. 4x6

Voice Coil Impedence (ohms at 400 cycles) 3.2

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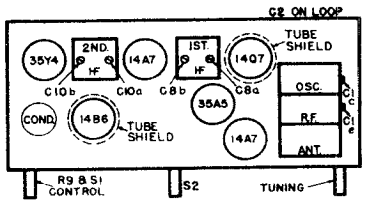

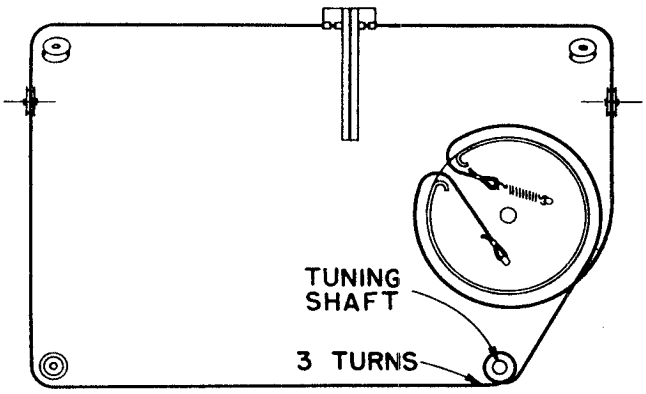

Alignment Procedure

Connect line cord plug to 117 volt, 60 cycles AC power source. Set volume control at maximum clockwise position and tone control (S2) in counterclockwise position. Connect output meter across voice coil. Adjust dial pointer by turning tuning control fully counterclockwise and sliding dial pointer on dial cord until it is exactly 2 3/16" from left end of dial back plate. Make all adjustments in order given in table and for maximum output. Dial Pointer Positions given measured from left hand end of dial back plate. Keep input as low as possible at all times.

Circuit Aligned	Input Freq.	Dial Pointer Position	Adjustments
IF	*455 KC	Max. to right	C10b, C10a C8b, C8a
OSC.	**1475 KC	6 3/4"	C1c
RF	**1475 KC	6 3/4"	C1e, C2
	**965 KC	5	Check
	**580 KC	2-23/32"	Calib.

* Applied to Antenna input .1 mfd. or less.

** Applied to Antenna input through 50 mmf. or less.

Precautions

An isolating transformer should be used between the power supply and the receiver if any of the test equipment is AC operated. The use of isolating capacitors is not recommended as AC through the capacitor may introduce hum modulation, and if the capacitors should break down the test instruments will likely be damaged.

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Model 636

Stock No.	Description	List Price
	ELECTRICAL COMPONENTS	
AL0C03*	ANTENNA-Loop	1.98
CC9A16	CAPACITOR-Ceramic 3.3 mmf. (C6)	.05
CE3A00	CAPACITOR-Electrolytic 20 x 40 x 60 mfd. 150 V	1.86
CL2A01	CORD-Power line	.47
CM5A05	CAPACITOR-Mica. 220 mmfd. (C13)	.18
CM5A14	CAPACITOR-Mica 47 mmfd. (C5, C7)	.19
CP2T51	CAPACITOR-Paper .1 mfd. 200 V (C16)	.17
CP4T20	CAPACITOR-Paper .006 mfd. 400 V (C11, C12)	.14
CP4T34	CAPACITOR-Paper .02 mfd. 400 V (C17)	.14
CP4T40	CAPACITOR .05 mfd. 400 V (C18, C3, C9, C14, C15, C22)	.16
CP4T51	CAPACITOR-Paper .1 mfd. 440 V (C20)	.18
CP6T16	CAPACITOR-Paper .004 mfd. 600 V (C4)	.13
CV0C00	CAPACITOR-Variable (C1a, C1b, C1c, C1d, C1e)	7.91
JR1S00	JACK-Phono (J1)	.06
LO6B00	COIL-Oscillator (L3)	.94
RC1H16	RESISTOR-220 ohms 1/4 W. Comp (R1)	.04
RC1H20	RESISTOR-470 ohms 1/4 W. Comp (R4)	.04
RC1H32	RESISTOR-4700 ohms 1/4 W. Comp (R19)	.04
RC1H34	RESISTOR-6800 ohms 1/4 W. Comp (R13)	.04
RC1H38	RESISTOR-15 K ohms 1/4 W. Comp (R12)	.06
RC1H40	RESISTOR-22 K ohms 1/4 W. Comp (R2, R10)	.04
RC1H51	RESISTOR-100 K ohms 1/4 W. Comp (R11)	.04
RC1H54	RESISTOR-220 K ohms 1/4 W. Comp (R7, R20)	.04
RC1H58	RESISTOR-470 K ohms 1/4 W. Comp (R15, R5)	.04
RC1H68	RESISTOR-3.3 meg. ohms 1/4 W. Comp (R3)	.04
RC1H70	RESISTOR-4.7 meg. ohms 1/4 W. Comp (R8)	.04
RC4G28	RESISTOR-2200 ohms 2 W. Comp (R18)	.14
RV4S00	Potentiometer-1 meg. ohms (R9, S1)	.02
RW1A06	RESISTOR-100 ohms 1 W.W.W. (R16)	.14
RW1B14	RESISTOR-150 ohms 1 W.W.W. (R14)	.08
SO0D01	SOCKET-Dial Lamp	.23
SO9S00	SOCKET-Locktal Tube	.19
SR4C00	SWITCH 3 pole, 4 position	.84
TI0C01	TRANSFORMER-I. F. 1st. (T1)	2.05
T10D01	TRANSFORMER-I. F. 2nd. (T2)	2.65
TR6L00	TRANSFORMER-R. F. Interstage (L2)	3.75
	SPEAKER AND COMPONENTS	
SP4O00	Speaker—4" x 6" P.M. Oval	5.70
CS4O00	CONE & V.C. ASS'Y. for SP4O00 Code 252	
CS4O01	CONE & V. C. ASS'Y. for SP4O00 Code 328	
CS4O02	CONE & V. C. ASSY'. for SP4O00 Code 270	
CS4O06	CONE & V. C. ASS'Y. for SP4O00 Code 191	
CS4O07	CONE & V. C. ASS'Y. for SP4O00 Code 371	
TA0O01	TRANSFORMER—Audio Output (T3)	.96
	MECHANICAL COMPONENTS	
AD0C00	ASSEMBLY-Dial Back	.81
BT1S00	BOARD-Terminal 1 lug	.02
BT2S00	BOARD-Terminal 2 lugs	.02
BT4S01	BOARD-Terminal 4 lugs	.05
CD0C02	CABLE-Dial (47 13/16")	.17
GR0S00	GROMMET-Variable Capacitor shockmount	.04
HB0A01	BRACKET-Loop	.03
HC0C00	CLIP-Coil mt'g	.65
HC0C03	CLAMP-Dial Cable	.43
HC0S00	CLIP-Tuning shaft spring	.01
HC0T00	CLAMP-Tube Shield	.01
HN9P45	NUT-3/8 x 32 Pal-nut	.60
HR0S01	RIVET-Shoulder	.02
HS0C00	SPRING-Dial Cable tension	.04
HS0P01	SPACER-Wood antenna	.01
HS6F00	SPACER-Flared Variable Capacitor mt'g.	.02
ID0M02	INDICATOR-Metal Dial pointer	.33
IT0C01	INSULATOR-Elect. Cap. paper tube	.04
MB0B00	BEARING-Tuning shaft	
MP0F00	PULLEY-Idler Fiber	.02
MS0T02	SHAFT-Tuning Capacitor	.15
PI0C00	PLATE-Capacitor mt'g. Insulator	.02
PI0P00	PLATE-Power Cord Insulator	.01
SM0T00	SHIELD-Metal tube	.05
	CABINET COMPONENTS	
BZ0B02	BACK-Cabinet (Tekwood)	.49
BZ0B02	BACK-Cabinet (Tekwood)	.49
DS0A01	DIAL-Glass (54-170 kc)	.99
DX0R04	RETAINER-Dial (Spring)	.04
FZ0R02	FOOT-Rubber cabinet	1.40
GC0D01	GASKET-Dial (cork 12 7/8")	.08
GZ0M02	GRILLE-Metal (cu. oxide)	3.53
HK0R00	RING-Knob Retainer Spring (.015)	.01
KC0B05	KNOB-Plain Push On Brown	.15
PI0B00	PLATE-Insulating Base Asbestos	.05
WF0Z02	WASHER-Felt (Brown)	.16
ZW6A02	CABINET-Walnut Table Model	24.25

*Subject to excise tax /c—Price per hundred

Prices subject to change without notice

MODEL 736-B

Stock No.	Description	List Price
	ELECTRICAL COMPONENTS	
AL0Z02*	ANTENNA—Loop (T1)	4.49
CC9A01	CAPACITOR—Ceramic 10 mmf. (C38)	.19
CC9A16†	CAPACITOR—Ceramic 3.3 mmf. 500 V (C7)	.05
CE2A01	CAPACITOR—Electrolytic 20, 20 mfd. 450 V (C14a, 14b)	1.96
CM3A46	CAPACITOR—Mica .001 mfd. 300V (C27)	.43
CM5A14	CAPACITOR—Mica 47 mmf. 500 V (C6)	.18
CM5A30†	CAPACITOR—Mica 220 mmf. 600V (C16)	.22
CM5A38	CAPACITOR—Mica 470 mmf. 550V (C3)	.21
CM6A14	CAPACITOR—Mica 47 mmf. 500 V (C9)	.21
CM8S47	CAPACITOR—360 mmf. (C31)	.42
CM8S50	CAPACITOR—Silver Mica 470 mmf. 500V (C21)	.51
CP2T56†	CAPACITOR—Paper .2 mfd. 200 V (C28)	.24
CP4T31†	CAPACITOR—Paper .01 mfd. 400 V (C15, C17, C26)	.13
CP4T34†	CAPACITOR—Paper .02 mfd. 400V (C5, C39)	.14
CP4T40†	CAPACITOR—Paper .05 mfd. 400V C11, C12, C22) (C40)	.16
CP6T12	CAPACITOR—Paper .002 mfd. 600V (C30)	.14
CP6T18†	CAPACITOR—Paper .005 mfd. (C29, C32)	.39
CP6T31	CAPACITOR—Paper .01 mfd. 600V (C18)	.16
CT1A00	TRIMMER & BRACKET—1.6—18 mmf. (C8)	.31
CT5A00	TRIMMER—Strip (C19, C20, C23, C24, C25)	1.33
CL2A05	CORD—A.C. Power	.67
CP2T36	CAPACITOR—.03 mfd. (C39)	.19
CV0C03	CAPACITOR—Variable 3 Gang (C4a, C4b, C4c)	6.98
JP1O00	PLUG—Connector J3, J4, J5 (P.B. Ass.)	.05
JP4O01	PLUG—Connector, 4 contact Antenna (J7)	.34
JR1S00	JACK—Receptacle, 1 Contact, Phono Jack (J1)	.06
JR2O04	JACK—Receptacle, 2 contacts, Phono Motor (J6)	.38
JR5O00	JACK—Receptacle, 5 Contacts, Speaker (J2)	.51
L07J00	OSCILLATOR—Coil (T7)	1.65
RC1G16	RESISTOR—220 ohms. 1/4W Comp. (R2)	.04
RC1G20	RESISTOR—470 ohms. 1/4W Comp. (R19, R20, R23)	.04
RC1G28	RESISTOR—2200 ohms. 1/4W Comp. (R11)	.06
RC1G32†	RESISTOR—4700 ohms. 1/4W Comp. (R3, R24)	.04
RC1G37	RESISTOR—12,000 ohms. 1/4W Comp. (R15)	.04
RC1G40†	RESISTOR—22,000 ohms. 1/4W Comp. (R5, R25)	.04
RC1G44	RESISTOR—47,000 ohms. 1/4W Comp. (R9, R18)	.04
RC1G54	RESISTOR—220,000 ohms. 1/4W Comp. (R10, R12, R13, R21)	.04
RC1H00	RESISTOR—10 ohms. 1/4W Comp. (R28)	.04
RC1H51†	RESISTOR—100,000 ohms. 1/4W Comp. (R26)	.04
	SPEAKER COMPONENTS	
SE0R00*	SPEAKER—Electrodynamic 10"	9.58
CS0R00	CONE & VOICE COIL ASS'Y—Code 191	
CS0R01	CONE & VOICE COIL ASS'Y—Code 285	
TA0O05	TRANSFORMER—Output (T5)	2.28
RC1H58†	RESISTOR—470,000 ohms. 1/4W Comp. (R4, R14, R17, R27)	.04
RC1H62†	RESISTOR—1 meg. 1/4W Comp. (R1, R7)	.04
RC1H74†	RESISTOR—10 meg. 1/4W Comp. (R6)	.04
RC4G36†	RESISTOR—10,000 ohms. 2W Comp. (R8)	.14
RV4S04	POTENTIOMETER—1-meg. with Switch (R22, S6)	.94
RW1B14†	RESISTOR—150 ohms. WW. 1W (R16)	.08
SO0D02	SOCKET—Dial Lamp	.11
SO8S00	SOCKET—Octal Tube	.13
SR4E00	SWITCH—Rotary 4 Pos. (Band)	2.64
SR6C01	SWITCH—Rotary 6 pos. (Tone Cont'l)	1.02
TI0C04	TRANSFORMER IF—1st (T3)	2.32
T10D05	TRANSFORMER IF—2nd (T4)	2.95
TP0F01	POWER TRANSFORMER—(T8)	7.11
TR6L04	TRANSFORMER B.C.—R.F.—Interstage (T2)	1.28
TR7I00	TRANSFORMER—Short Wave Antenna (T6)	1.65
#44	LAMP—Pilot	.09
	PUSHBUTTON ASS'Y & COMPONENTS	
AB0C00	ASS'Y—Complete Pushbutton Ass'y	9.50
BT3R00	BOARD—Receptacle Terminal	
CM8S47	CAPACITOR—360 mmf. 500V (C31)	.42
CT1A02	CAPACITOR—Auto Tune 4-70 mmf. (C-37)	.18
CT1A03	CAPACITOR—Auto Tune 12-160 mmf. (C36)	.22
CT1A04	CAPACITOR Auto Tune 45-370 mmf. (C34) (C35)	.28
CT1A05	CAPACITOR—Auto-Tune 120-580 mmf. (C33)	.34
HB0M04	BRACKET—Pushbutton, mtg.	.41
HCDC06	FASTENER—Coil, Pushbutton Clip mtg. (Auto Tune)	.02
LT0A00	COIL—Auto-Tune Blue Dot (540-925 KC) (L1)	.58
LT0A01	COIL—Auto-Tune White Dot (650-1250KC) (L2, L3)	.58
LT0A02	COIL—Auto-Tune Red Dot (900-1600KC) (L4, L5)	.58
SS5P00	SWITCH—Pushbutton	2.52
ST0100	SLUG—Iron Tuning	.12
	MECHANICAL COMPONENTS	
AD0D00	ASSEMBLY—Dial Back Plate	.39
BT1S00†	BOARD—Terminal Strip and 1 Lug	.02
BT2S00	BOARD—Terminal Strip and 2 Lugs	.02
BT4S01	BOARD—Terminal Strip and 4 Lugs	.05
CD0C06	CABLE—Dial	.19
FC0R00	FOOT—Chassis Mtg.	.09
GR0S01	GROMMET—Tuning Condenser Shockmount	.03
GR0S02	GROMMET—Chassis Shockmount	.04
HB0M02	BRACKET—Osc. Coil Mounting	.06
HC0C00	CLIP—Osc. & R. F. Coil Mtg.	.65/c
HC0C02	CLIP—Ant. Coil Mtg.	.90/c
HC0S00	CLIP—Tuning Shaft Spring	.01
HK0R00	RING—Knob Retainer Spring	.01
HK0R01	RING—Knob Retainer Spring	.01
HN8H25	NUT—Hex #8-32	.60/c
HN9P45	PALNUT—3/8 x 32	.60/c
HP8T00	PIN—Threaded Rear Chassis Mounting	.07
HR0S01	RIVETS—Shoulder	.02
HS0C00	SPRING—Dial Cable	.04
HS6F01	SPACER—Tuning Cond. Mtg.	.01
ID0L01	INDICATOR—Lucite Tuning	.66
MB0T00	BEARING—Tuning Shaft	.18
ML0M01	LINK—Band Switch	1.57
MP0F00	PULLEY—Fiber Dial Cord	.02
MS0S00	SHAFT—Band Switch Control	.23
MS0T05	SHAFT—Tuning	.29
PI0P00	PLATE—Power Cord Insulator	.01
	CABINET COMPONENTS	
BP0B00	PUSHBUTTON—(Brown)	.11
DS0E00	DIAL-Glass	1.15
DX0R07	RETAINER-Dial Metal	.03
EB0C00	ESCUTCHEON—Pushbutton	1.15
ED7E00	ESCUTCHEON—Dial	1.90
GZ0C04	GRILLE—Cloth & Cardboard Ass.	.91
HC0S06	CLIP—Fahnstock	.05
HS2Q00	SCREW—Wood #2 x 3/8 Phillips Antique Bronze (Escutcheon)	1.50/c
HS6W25	SCREW—Wood #6 x 5/8" F. H. (Stat. Br.) Hinge	.60/c
HS8Y60	SCREW—#8 x 1 1/4" Speaker Mtg.	.02
HZ0G01	GLIDE—Metal (Cabinet Foot)	.05
HZ0H00	HINGE—Lid (Stat. Br.)	.27
HZ0S02	LID SUPPORTS—Bronze	.93
KB0B01	KNOB—Indexed, Brown	.12
KC0B06	KNOB—Brown	.10
PF0B00	PAD—Felt (Lid)	.55/c
ZW7G00*	CABINET—Console Comb.	123.56
ZL7G00	LIDS—Cabinet, Pair	

Prices subject to change without notice

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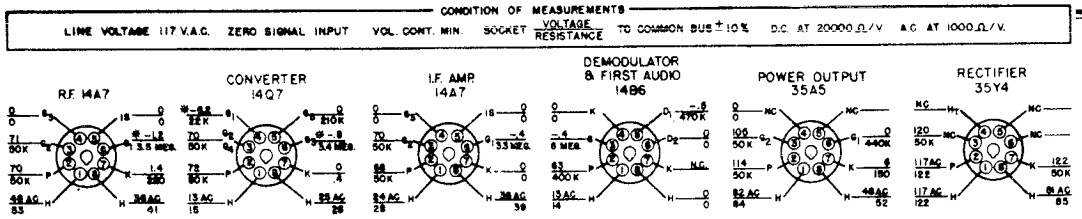
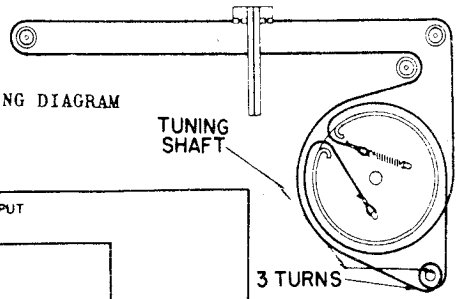
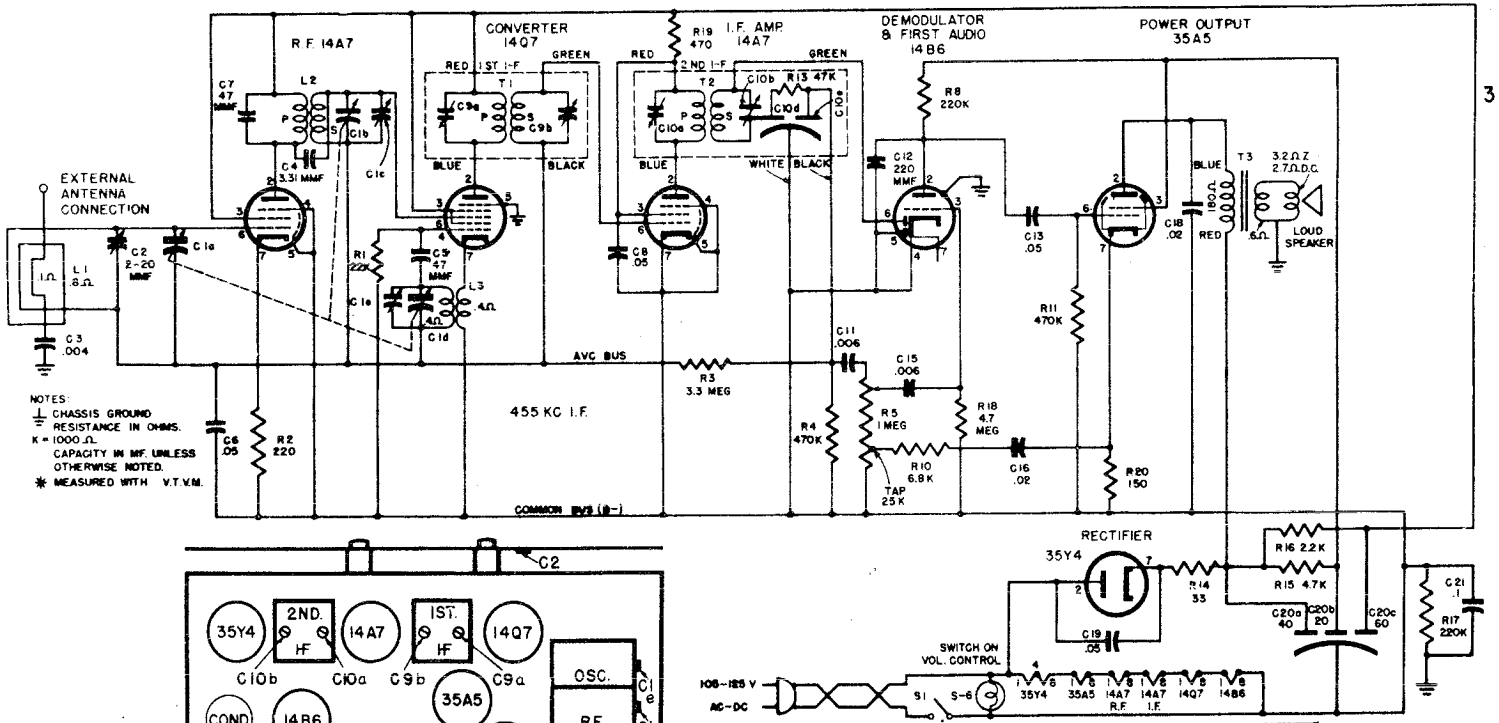
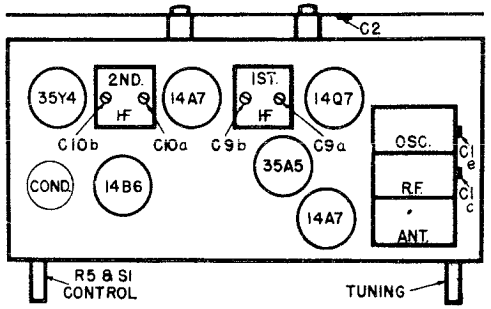

CONDITION OF MEASUREMENTS
LINE VOLTAGE 117 V.A.C. ZERO SIGNAL INPUT VOL. CONT. MIN. SOCKET VOLTAGE / RESISTANCE TO COMMON BUS ±10% D.C. AT 20000Ω/V A.C. AT 1000Ω/V.
R.F. 14A7
CONVERTER 14Q7
I.F. AMP 14A7
DEMODULATOR & FIRST AUDIO 14B6
POWER OUTPUT 35A5
RECTIFIER 35Y4







Alignment Procedure

Connect line cord plug to 117 volt AC power source. Set volume control at maximum and connect output meter across voice coil. Adjust dial pointer by turning tuning control fully counterclockwise and sliding dial pointer on dial cord until it is exactly 2-3/32" from left end of dial back plate. Make all adjustments in order given in table and for maximum output. Dial pointer position given in inches measured from left hand end of dial back plate. Keep input as low as possible at all times.

An isolating transformer should be used between the power supply and the receiver if any of the test equipment is AC operated. The use of isolating capacitors is not recommended as AC through the capacitor may introduce hum modulation, and if the capacitors should break down the test instruments will likely be damaged.

Circuit Aligned	Input Freq.	Dial Pointer Position	Adjustments
IF	*455 KC	Max. to right	C10B, C10A C9B, C9A
OSC.	**1550 KC	6-21/32"	C1e,
RF	**1550 KC	6-21/32	C1e, C2
	**965 KC	4-29/32	Check
	**580 KC	2-23/32	Calib.

* Applied to Antenna input through .1 mfd. or less.
** Applied to antenna input through 50 mmf. or less.

TRANSFORMER RESISTANCE IN Ω.						
MFG. CODE	L2		T1		T2	
	P	S	P	S	P	S
294	58	5	27	27	24	24
403	63	3.5				
198			15	15	15	15
175			24	24		
125						

MODEL 646A
Preliminary

BENDIX RADIO DIV.

Power			
Voltage Rating, AC or DC	105 - 125	MAXIMUM POWER OUTPUT IN WATTS	1.2
Frequency - Cycles per second	50 - 60		
Power Consumption - Watts	37	LOUD SPEAKER - PM	
		Cone diameter - inches	6
TUNING RANGE - FREQUENCY IN KC	535 - 1725	Voice Coil Impedence (ohms at 400 cycles)	3.2
INTERMEDIATE FREQUENCY (KC)	455		

REPLACEMENT PARTS LIST

Stock No.	Description	List Price
	ELECTRICAL COMPONENTS	
ALOCO3*	ANTENNA - Loop	1.95
CC9A16	CAPACITOR - Ceramic 3.3 mmf. (C4)	.05
CE3A00	CAPACITOR - Electrolytic (20-40-60 mfd.) 150V.D.C. (C20A, B, C)	1.86
CL2A01	CORD - A.C. Power Line	.47
CM5A14	CAPACITOR - Mica 47 mmf. (C5,C7)	.19
CM5A30	CAPACITOR - Mica 220 mmf. 500V (C12)	.55
CP4T20	CAPACITOR - Paper .006 mfd. 400V (C11,C15)	.15
CP4T34	CAPACITOR - Paper .02 mfd. 400V (C16,C18)	.14
CP4T40	CAPACITOR - Paper .05 mfd. 400V (C6,C8,C13, C19)	.16
CP4T51	CAPACITOR - Paper .1 mfd. 400V (C21)	.18
CP6T16	CAPACITOR - Paper .004 mfd. 600V (C3)	.29
CT2A01	TRIMMER - 2-20 mmfd. (C2)	
CVOC00	CAPACITOR - Variable (C1a,1b,1d)	7.50
LO6B00	OSCILLATOR - Coil Ass'y. (L3)	.94
RC1H16	RESISTOR -220Ω ±W Comp. (R2)	.04
RC1H20	RESISTOR -470Ω ±W Comp. (R19)	.04
RC1H32	RESISTOR - 4700Ω ±W Comp. (R15)	.04
RC1H34	RESISTOR - 6800Ω ±W Comp. (R10)	.04
RC1H40	RESISTOR - 22KΩ ±W Comp. (R1)	.04
RC1H54	RESISTOR - 220KΩ ±W Comp. (R17, R8)	.04
RC1H58	RESISTOR - 470KΩ ±W Comp. (R4, R11)	.04
RC1H68	RESISTOR - 3.3 Meg. ±W Comp. (R3)	.04
RC1H70	RESISTOR - 4.7 Meg. ±W Comp. (R18)	.04
RC4G28	RESISTOR - 2200Ω 2W Comp. (R16)	.14
RV4S02	POTENTIOMETER - with switch 1 Meg. (R5)	.94
RW1B14	RESISTOR - 150Ω 1W.W.W. (R20)	.08
RW2A06	RESISTOR - 33Ω 2W.W.W. (R14)	.10
S00D03	SOCKET - Dial Light	.40
S09S00	SOCKET - Locktal Tube	.15
TIOC01	I. F. TRANSFORMER - 1st (T1)	3.00
TIOD01	I. F. TRANSFORMER - 2nd (T2)	2.43
TR6L00	R. F. TRANSFORMER ASS'Y. - Interstage (L2)	3.75
	MECHANICAL COMPONENTS	
AD0C03	PLATE ASS'Y - Dial Back	.89
BT1S00	TERMINAL STRIP - 1 Soldering Lug	.02
BT2S00	TERMINAL STRIP - 2 Soldering Lugs	.02
BT4S01	TERMINAL STRIP - 4 Soldering Lugs	.05
CD0C03	CABLE - Dial (47 3/8")	.18
GR0S00	GROMMET - Cap Shockmount	.04
HB0A01	BRACKET - Loop	.03
HC0C00	CLIP - Coil Mtg.	.01
HC0C03	CLAMP - Cable	.04
HC0S00	CLIP - Spring	.01
HC0T00	CLAMP - Tube Shield	.01

Stock No.	Description	List Price
HN9P45	PALNUT - 3/8 X 32	.01
HR0S01	RIVET - Shoulder	.02
HS0C00	SPRING - Coil	.04
HS0P01	SPACER - Antenna	.01
HS6F00	SLEEVE - Spacer Flared	.02
HS6S01	SCREW - Self-Tapping 6 X ±	.32/C
IDOM05	INDICATOR - Metal Dial	.33
IT0C01	TUBE - Insulating (Cap)	.04
MP0F00	PULLEY - Idler (Fiber)	.02
MS0T04	SHAFT - Steel Tuning	.16
PI0C00	PLATE - Insulator Mtg.	.02
PI0P00	PLATE - Insulating Power Cord	.01
SM0T00	SHIELD - Metal Tubing	.05
	SPEAKER AND COMPONENTS	
SP6R00*	SPEAKER - 6 P.M. less transf.	5.79
CS6R00	CONE & V.C. ASS'Y - Code 285	
CS6R01	CONE & V.C. ASS'Y - Code 159	
CS6R02	CONE & V.C. ASS'Y - Code 270	
CS6R03	CONE & V.C. ASS'Y - Code 258	
CS6R04	CONE & V.C. ASS'Y - Code 191	
CS6R05	CONE & V.C. ASS'Y - Code 188	
CS6R06	CONE & V.C. ASS'Y - Code 371	
TA0003	TRANSFORMER - Output (T3)	1.95
	CABINET COMPONENTS	
BZ0D04	BAFFLE - Board (wood)	
DS0A04	DIAL - Glass (54-170)	4.80
GF0S04	GASKET - Felt (1/16 X 1/4 X 3-3/4)	.01
GZ0C02	GRILLE - Cloth	
HC0C04	CLAMP - Dial Light	.05
HK0R00	RING - Knob Retainer Spring	.01
HS6W25	SCREW - #6 X 5/8" F.H. (Statuary Br.	.65/C
HS6W26	SCREW - #6 X 1/2" F.H. (Statuary Br.	.60/C
HS8S50	SCREW - Self-Tapping #8 X1"	.56/C
HS8W51	SCREW - Wood F.H. #8 (Red iridete)	
HW8C00	WASHER - #8 Cup Type (D.K. oxidized)	
HZ0G00	GLIDE - Metal N.P.	.05
HZ0H01	HINGE - Table (D.K. oxidized)	.08
HZ0L01	SUPPORT - Table Drop Leaf	1.08/pr
JR2S01	RECEPTACLE - 2 contacts	.36
KY0M00	KNOB - Control (Engl. Antique)	.38
KY0M01	KNOB - Dummy (Engl. Antique)	.38
PI0B00	PLATE - Asbestos Insulator	.05
PI0B02	PLATE - Asbestos Insulator	.01
WF0Z00	WASHER - Felt	.16/C
XS0Z00	REFLECTOR - Strip Ass'y.	
ZW6A04*	CABINET - Mahogany	57.00

(Prices subject to change without notice)

* Subject to excise tax

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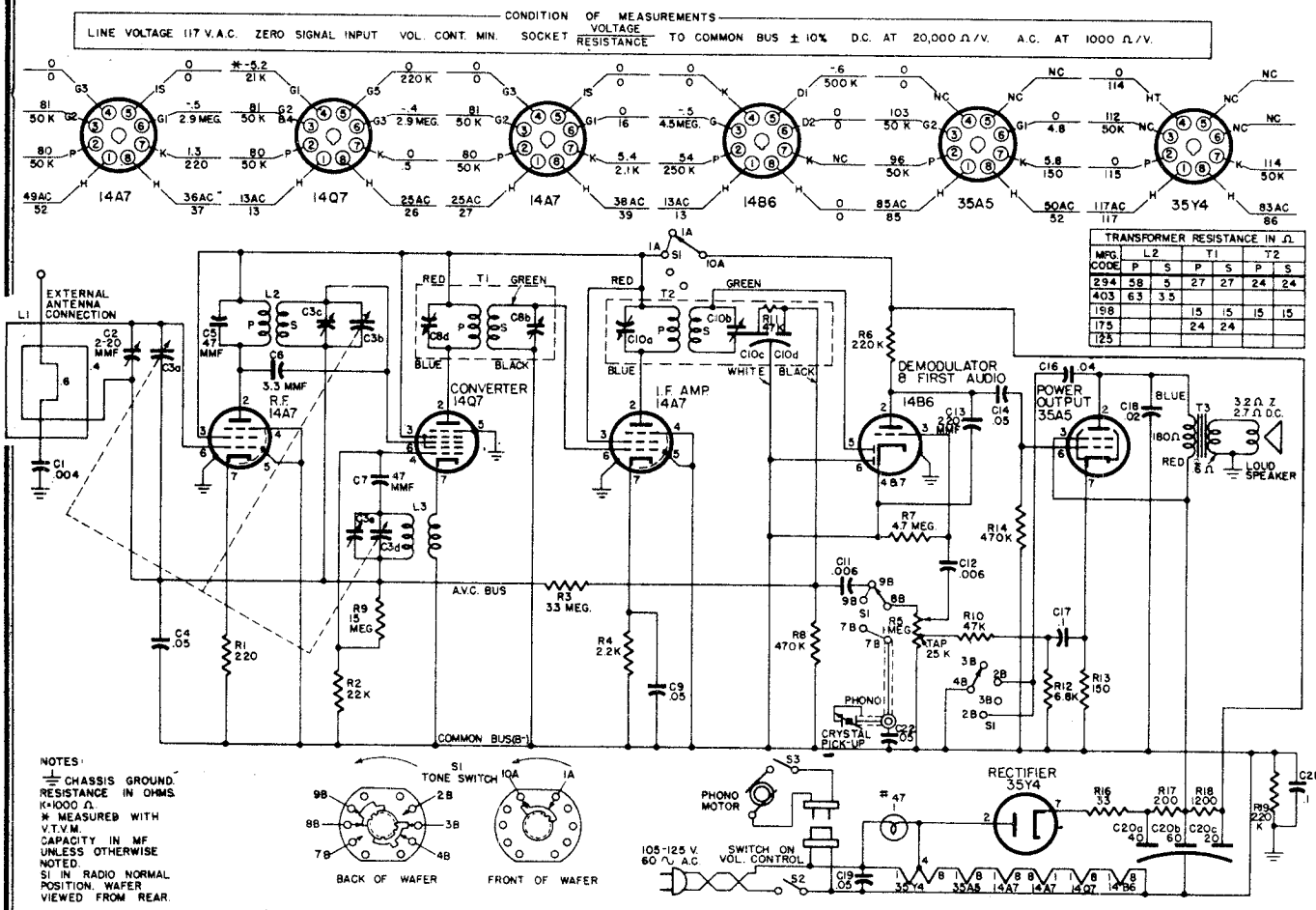
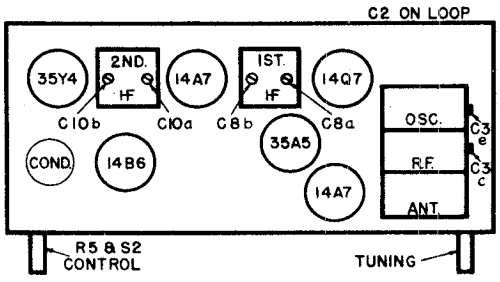
MODEL 656A
Preliminary

BENDIX RADIO DIV.





Power

Voltage Rating, 60 cycles AC	105-125
Power Consumption—Watts	65
Tuning Range—Frequency in KCS	535-1725
Intermediate Frequency—KCS	455
Maximum Power Output—Watts	1.2

Loud Speaker—PM

Cone Diameter—inches	6
Voice Coil Impedance (ohms at 400 cycles)	3.2

Alignment Procedure

Connect line cord plug to 117 volt AC power source. Set volume control at maximum and tone control in radio normal position. Connect output meter across voice coil. Adjust dial pointer by turning tuning control fully counterclockwise and sliding dial pointer on dial cord until it is exactly 2⅜" from left end of dial back plate. Make all adjustments in order given in table and for maximum output. Dial pointer position given in inches measured from left hand end of dial back plate. Keep input as low as possible at all times.

Precautions

An isolating transformer should be used between the power supply and the receiver if any of the test equipment is AC operated. The use of isolating capacitors is not recommended as AC through the capacitor may introduce hum modulation, and if the capacitors should break down the test instruments will likely be damaged.

Circuit Aligned	Input Frequency	Dial Pointer Position	Adjustments
IF	*455 KC	Max. to right	C10b, C10a C8b, C8a
OSC	**1550 KC	7	C3e
RF	**1550 KC ** 965 KC ** 580 KC	7 5¼ 3 1/16	C3e, C2 Check Calib.

*Applied to antenna input through .1 mfd. or less.
**Applied to antenna input through 50 mmf. or less.

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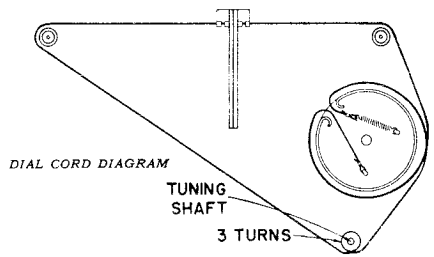
Record Changer: General Instrument Model 205

MODEL 656A
Preliminary
MODELS 676B, -C, -D

BENDIX RADIO DIV.

MODEL 656 A



Stock No.	Description	List Price
	MECHANICAL COMPONENTS Con't.	
HS6S01	SCREW—Self Tapping #6 x ¼"	.34/c
HS8S00	SCREW—Self Tapping #8 x ¼"	.48/c
ID0M04	INDICATOR—Metal Dial (Pointer)	.33
IT0C01	TUBE—Cap. Insulating Cover	.04
IW0F00	WASHER—Fishpaper Insulator	.20/c
JR1S00	JACK—Receptacle 1 Pin	.06
JR2S03	JACK—Receptacle 2 Pins	.38
MP0F00	PULLEY—Idler	.02
MS0T02	SHAFT—Tuning	.15
PI0C00	PLATE—Electrolytic Capacitor Mtg.	.02
PI0P00	PLATE—Line Cord Insulator	.01
SM0T00	SHIELD—Metal Tube	.05
S00D01	SOCKET—Dial light insulated	.23
S09S00	SOCKET—Loctal Tube	.19
SR4C00	SWITCH—3 Pole 4 Position Rotary (S1)	.84
	SPEAKER & COMPONENTS	
SP6R00*	SPEAKER—6" P.M.	5.79
CS6R00	CONE & V.C. ASS'Y.—for SP6R00 Code 285	
CS6R01	CONE & V.S. ASS'Y.—for SR6R00 Code 159	
CS6R02	CONE & V.C. ASS'Y.—for SP6R00 Code 270	
CS6R03	CONE & V.C. ASS'Y.—for SP6R00 Code 258	
CS6R04	CONE & V.C. ASS'Y.—for SP6R00 Code 191	
CS6R05	CONE & V.C. ASS'Y.—for SP6R00 Code 188	
CS6R06	CONE & V.C. ASS'Y.—for SP6R00 Code 371	
TA0O03	TRANSFORMER—Output for SP6R00 (T3)	1.95
	CABINET COMPONENTS	
BZ0A00	BASE—Tekwood	.59
DS0A08	DIAL—Glass	.95
DX0B00	BAFFLE—Light	.05
DX0R05	RETAINER—Dial	.02
DZ0F21	DECAL—Phono Comb 1 Band	.11
FZ0R02	FOOT—Rubber	.01
GC0D61	GASKET—Cork Dial (12⅞")	.09
HK0R00	RING—Knob Retainer Spring	.01
HS0P75	SCREW-Phillips Oval Head 10-24 x 1¼	.01
HS4W00	SCREW—Wood Rd. Hd. #4 x ¼"	.40/c
HS6SO2	SCREW—Self Tapping Phillips head #6 x ¼"	.01
HS6W25	SCREW—Wood #6 x ⅝" (Statuary Bronze)	.65/c
HS8W25	SCREW—Wood #8 x ⅝ F.H. (Statuary Bronze)	.78/c
HS8W26	SCREW—Wood #8 x 1½ F.H. (Statuary Bronze)	.70/c
HW8C01	WASHER—Cup Type #8 (Statuary Bronze)	.50/c
HZ0H00	HINGE—Lid (Statuary Bronze)	.23
HZ0L00	SUPPORT—Lid (Statuary Bronze)	.81
HZ0P00	PAD—Brown Felt ⅛ x ⅝	.55/c
JR2S02	RECEPTACLE—2 contacts (female)	.38
KB0B00	KNOB—Mottled Brown Index Push on	.11
KC0B04	KNOB—Mottled Brown Push on	.15
PI0B00	PLATE—Insulating (Asbestos)	.05
XS0Z00	CLAMP—Strips	.14/c
ZW6C00*	CABINET—Walnut	
	ELECTRICAL COMPONENTS	
AL0Z05*	ANTENNA LOOP	1.98
CC9A16	CAPACITOR—Ceramic 3.3 mmf.	.05
CE3A00	CAPACITOR—Electrolytic 20-40-60 Mfd. 150 V.D.C. (C20a, C20b, C20c)	1.86
CL2A01	CORD—Power Line	.47
CM5A14	CAPACITOR—Mica 47 mmfd. 500 V. (C7, C5)	.18
CM5A30	CAPACITOR—Mica 220 mmf. 500 V. (C13)	.22
CP2T51	CAPACITOR—Paper .1 mfd. 200 V. (C17)	.17
CP4T20	CAPACITOR—Paper .006 mfd. 400 V. (C11)	.14
CP4T34	CAPACITOR—Paper .02 mfd. 400 V. (C18)	.14
CP4T38	CAPACITOR—Paper .04 mfd. 400 V. (C16)	.15
CP4T40	CAPACITOR—Paper .05 mfd. 400 V. (C4, C14, C9, C19, C22)	.16
CP4T51	CAPACITOR—Paper .1 mfd. 400 V. (C21)	.23
CP6T16	CAPACITOR—Paper .044 mfd. 400 V. (C1)	.29
CV0C00	CAPACITOR—Variable 3 Gang (C3a, 3b, 3c)	7.91
L06B00	OSCILLATOR—Coil (L3)	.94
RC1H16	RESISTOR—220 ohms ¼W comp. (R1)	.04
RC1H28	RESISTOR—2200 ohms ¼W comp. (R4)	.04
RC1H34	RESISTOR—6800 ohms ¼W comp. (R12)	.04
RC1H40	RESISTOR—22K ohms ¼W comp. (R2)	.04
RC1H44	RESISTOR—47K ohms ¼W comp. (R11)	.04
RC1H54	RESISTOR—220K ohms ¼W comp. (R6, R19)	.04
RC1H58	RESISTOR—470 K ohms ¼W comp. (R14)	.04
RC1H68	RESISTOR—3.3 meg. ohms ¼W comp. (R3)	.04
RC1H70	RESISTOR—4.7 meg. ohms ½W comp. (R7)	.04
RC1H76	RESISTOR—15 meg. ohms ½W comp. (R9)	.04
RC3H25	RESISTOR—1200 ohms 1W comp. (R18)	.08
RC4G16	RESISTOR—200 ohms 2W comp. (R17)	.14
RV4S00	POTENTIOMETER with switch 1 meg. (S2, R5)	.86
RW1A06	RESISTOR—33 ohms 1 W.W.W. (R16)	.14
RW1B14	RESISTOR—150 ohms 1 W.W.W. (R13)	.08
TI0C01	TRANSFORMER—I. F. 1st (T1)	2.05
TI0D01	TRANSFORMER—I. F. 2nd (T2)	2.65
TR6L00	TRANSFORMER—R. F. Interstage (L2)	.38
	MECHANICAL COMPONENTS	
AD0C01	PLATE ASS'Y.—Dial Back	.46
AD0C02	SUPPORT ASS'Y.—Dial Back	1.00
BT1S00	STRIP—Terminal 1 lug	.02
BT2S00	STRIP—Terminal 2 lugs	.02
BT4S01	STRIP—Terminal 4 lugs	.05
CD0C04	CABLE—Dial (38¾")	.17
GR0S00	GROMMET—Condenser Shockmount	.04
HB0A03	BRACKET—Loop Antenna	.05
HC0C00	CLIP—Coil Mtg.	.65/c
HC0C03	CLAMP—Dial Cable	.04
HC0S00	CLIP—Tuning Shaft Spring	.01
HC0T00	CLAMP—Tube Shield	.88/c
HN9P45	NUT—⅜ x 32	.60/c
HR0S01	RIVET—Shoulder	.60/c
HS0C00	SPRING—Dial Cable Tension	.02
HS6F00	SPACER—Flared (Cond. Mtg.)	.02

MODELS 676B, C, D

Stock No.	Description	List Price
	Electrical Components	
AL0Z00*	ANTENNA-Loop	3.91
CC9A16	CAPACITOR-Ceramic 3.3 mmf. 500 V (C7)	.05
CE3A01	CAPACITOR-Electrolytic 20 x 20 x 20 mfd. 450 V (C29)	2.10
CL2A02	CORD.-A. C. line (Brown)	.48
CM3E00	CAPACITOR-Mica. 0082 mfd. 300 V (C12)	.87
CM5A14	CAPACITOR-Mica. 47 mmfd. 500 V (C8,C15)	.18
CM5A22	CAPACITOR-Mica. 100mmfd. 500 V (C24,C25)	.20
CM5A46	CAPACITOR-Mica. 1000 mmfd. 500 V (C27)	.27
CM8S50	CAPACITOR-Mica. 470 mmfd. 500 V (C10)	.51
CP2T51	CAPACITOR-Paper .1 mfd. 200 V (C6)	.17
CP2T56	CAPACITOR-Paper .2 mfd. 200 V (C28)	.19
CP4T34	CAPACITOR-Paper .02 mfd. 400 V (C4 C9, C18, C23)	.14
CP4T40	CAPACITOR-Paper .05 mfd. 400 V (C17, C19)	.16
CP6T18	CAPACITOR-Paper .005 mfd. 600 V (C.30)	.39
CP6T20	CAPACITOR-Paper .006 mfd. 600 (C21, C22, C26)	.15
CT2A02	CAPACITOR-Trimmer 3-30 mmfd. (C5)	.55
CT2A03	CAPACITOR-Trimmer 2 @ 20 mfd. (C11)	.55
CV0C01	CAPACITOR-Variable (C3a, C3b, C3c)	5.38
LO6G00	Oscillator Coil (T7)	1.40
RC1G14	RESISTOR 150 ohms ¼ W. Comp (R6)	.04
RC1G24	RESISTOR 1000 ohms ¼ W. Comp (R17)	.04
RC1G32	RESISTOR 4.7 K ohms ¼ W. Comp (R18)	.04
RC1G40	RESISTOR 22 K ohms ¼ W. Comp (R4)	.04
RC1H20	RESISTOR 470 K ohms ¼ W. Comp. (R3)	.04
RC1H51	RESISTOR 100 K ohms ¼ W. Comp (R15)	.04
RC1H54	RESISTOR 220 K ohms ¼ W. Comp (R8, R12)	.04
RC1H58	RESISTOR 470 K ohms ¼ W. Comp (R9, R13)	.04
RC1H62	RESISTOR 1 meg ohms ¼ W. Comp (R1, R2)	.04
RC1H66	RESISTOR 2.2 meg ohms ¼ W. Comp (R5)	.04
RC1H74	RESISTOR 10 meg ohms ¼ W. Comp (R11)	.04
RC3C17	RESISTOR 270 ohms ½ W. Comp (R14, R21)	.08
RC4G12	RESISTOR 100 ohms 2 W. (R19)	.19
RC4G26	RESISTOR 1500 ohms 2 W. (R20)	.19
RC4G72	RESISTOR 10 K ohms 2 W (R7)	.14
RV0S01	Potentiometer with switch 1 meg. (R16)	.80
S00D03	SOCKET-Dial lamp	.40
S08S00	SOCKET-Tube st'd.	.13
TI0C02	TRANSFORMER-I.F. 1st (T3)	2.09
TI0D02	TRANSFORMER-I.F. 2nd (T4)	2.35
TP0F00	TRANSFOMER-Power (T8)	6.00
TR0C00	TRANSFORMER-R. F. S.W. (T6)	1.16
TR6L01	TRANSFORMER-R.F. Int. (T2)	3.75
#47	LAMP-Bayonet Type Base	.09
	Speaker and Components	
SP6R00*	Speaker P. M. 6"	5.79
CS6R00	CONE & V.C. ASS'Y. for SP6R00 Code 285	
CS6R01	CONE & V.C. ASS'Y. for SP6R00 Code 159	
CS6R02	CONE & V.C. ASS'Y. for SP6R00 Code 270	
CS6R03	CONE & V.C. ASS'Y. for SP6R00 Code 258	
CS6R04	CONE & V.C. ASS'Y. for SP6R00 Code 191	
CS6R05	CONE & V.C. ASS'Y. for SP6R00 Code 188	
CS6R06	CONE & V.C. ASS'Y. for SP6R00 Code 371	
TA0002	TRANSFORMER-Output	2.15
	Mechanical Components	
AD0C05	ASSEMBLY Dial Back Plate	1.65
BT1S00	BOARD-Terminal strip 1 soldering lug	.02
BT1S01	BOARD-Terminal strip 1 soldering lug	.02
BT2S00	BOARD-Terminal strip 2 soldering lug	.02
BT3S00	BOARD-Terminal Strip 3 soldering lug	.03
BT4S01	BOARD-Terminal strip 4 soldering lug	.05
CD0C05	CABLE-Dial (51 3/16")	.18
GR0S00	GROMMET-Condenser shockmount	.04
HC0C00	CLIP-Coil mt'g	.65/c
HC0C02	CLIP-Coil mt'g	.90/c
HC0C03	CLAMP-Dial Cable	.43/c
HC0S00	CLIP-Spring	.01
HN9P45	NUT-3/8 x 32	.60/c
HR0S01	RIVET-Shoulder	.02
HS0C00	SPRING-Cable tension	.04
HS6F00	SLEEVE-#6 Spaced flared	.02
HS6S01	SCREW-Self tapping #6 x ¼"	.34/c
HS6S02	SCREW-Self tapping #6 x ¼"	.01
HW2F00	WASHER-Flat #2 N.F.	.24/c
ID0L00	INDICATOR-Dial lucite	.65
JP2M00	JACK-Plug 2 Contacts	.19
JR1S00	JACK-Receptacle 1 Contact	.06
JR2S03	JACK-Receptacle 2 Contacts	.38
JR4S00	JACK-Receptacle 4 Contacts	.08
MB0B00	BEARING-Brass Bushing	.18
MP0F00	PULLY-Idler Fiber	.02
MS0T03	SHAFT-Tuning	.62
PI0P00	PLATE-line cord insulator	.01
SR2B00	SWITCH-Rotary 2.P.2.P.	.90
SR6C00	SWITCH-Rotary 3.P.6.P.	1.06
	Cabinet Parts	
BZ0A01	BOTTOM-Motorboard (Chipboard)	.06
BZ0B03	BACK-Cabinet 1	.20
BZ0D05	BAFFLE-Dial (Fishpaper)	.60/c
DS0C02	DIAL-Glass, 2 band	1.33
DX0R05	RETAINER-Dial (metal)	.02
DZ0F03	DECAL-Functional (Panel)	.27
FZ0R04	STOP-Rubber door	.02
GR0D03	GASKET-Rubber Dial (7")	.03
GZ0C03	GRILLE-Cloth	.53
GZ0M04	GRILLE-Metal	2.30
HK0R00	RING-Knob Retainer Spring	.01
HS4W26	SCREW-Wood #5 x 5/8 Rd. Hd.	.56/c
HS5Q84	SCREW-¼-20 x 1¼ Phillips (Antique")	.02
HS6W26	SCREW-Wood #6 x 1/2" F.H. (Stat. Br.)	.60/c
HS6W28	SCREW-Wood #6 x 3/4" F.H. (Stat. Br.)	.75/c
HS8W26	SCREW-Wood #8 x 5/8" F.H. (Stat. Br.)	.79/c
HS8W27	SCREW-Wood #8 x 7/8" F. H.	.68/c
HS8W28	SCREW-Wood #8 x 1/2" c. p.	.56/c
HS8W29	SCREW-Wood #8 x 5/8 copper-flash	.60/c
HS8Y60	SCREW-Speaker #8-32 x 1¼"	.02
HS0R50	SCREW-10-24 x 3/4 R. H. C. A.	.52/c
HW8C02	WASHER-#8 cup type (Dk. oxidized)	.45/c
HW8F03	WASHER-#8 x 1/32 flat steel c.p.	.28/c
HZ0C00	CATCH-Door (Bullet)	.07
HZ0G01	GLIDE-Metal	.05
HZ0H00	HINGE-Lid (Statuary Bronze)	.23
HZ0H03	HINGE-Door	.18
HZ0L00	SUPPORT-Lid	.81
HZ0P00	PADS-Brown felt	.55
JP4M00	JACK-Plug—4 contacts	.14
JR2S01	JACK-Receptacle 2 contacts	.36
KZ0S00	KNOB-Door Cabinet	.57
XS0Z02	STRIP—Fishpaper (Clamp)	.60/c
XS0Z03	STRIP—Fishpaper	.25/c
	Parts Common to Models 676 B & D	
KC0B06	KNOB-Cont'l.	.10
KB0B01	KNOB-Cont'l. Indexed	.39
	Parts for Model 676B	
ZW6G01*	CABINET—Consolette (Walnut)	117.92
	Parts for Model 676C	
GZ0M03	GRILLE-Metal	2.45
KB0B02	KNOB-Indexed (Brown)	.12
KC0B07	KNOB-Cont'l. (Brown)	.10
ZW6G02*	CABINET-Consolette (Knotty Pine)	
	Parts for Model 676D	
GC0D02	GASKET-Cork Dial	.09
ZW6G00*	CABINET-Consolette (mahogany)	117.92

*Subject to excise tax /c—Price per hundred Prices subject to change without notice

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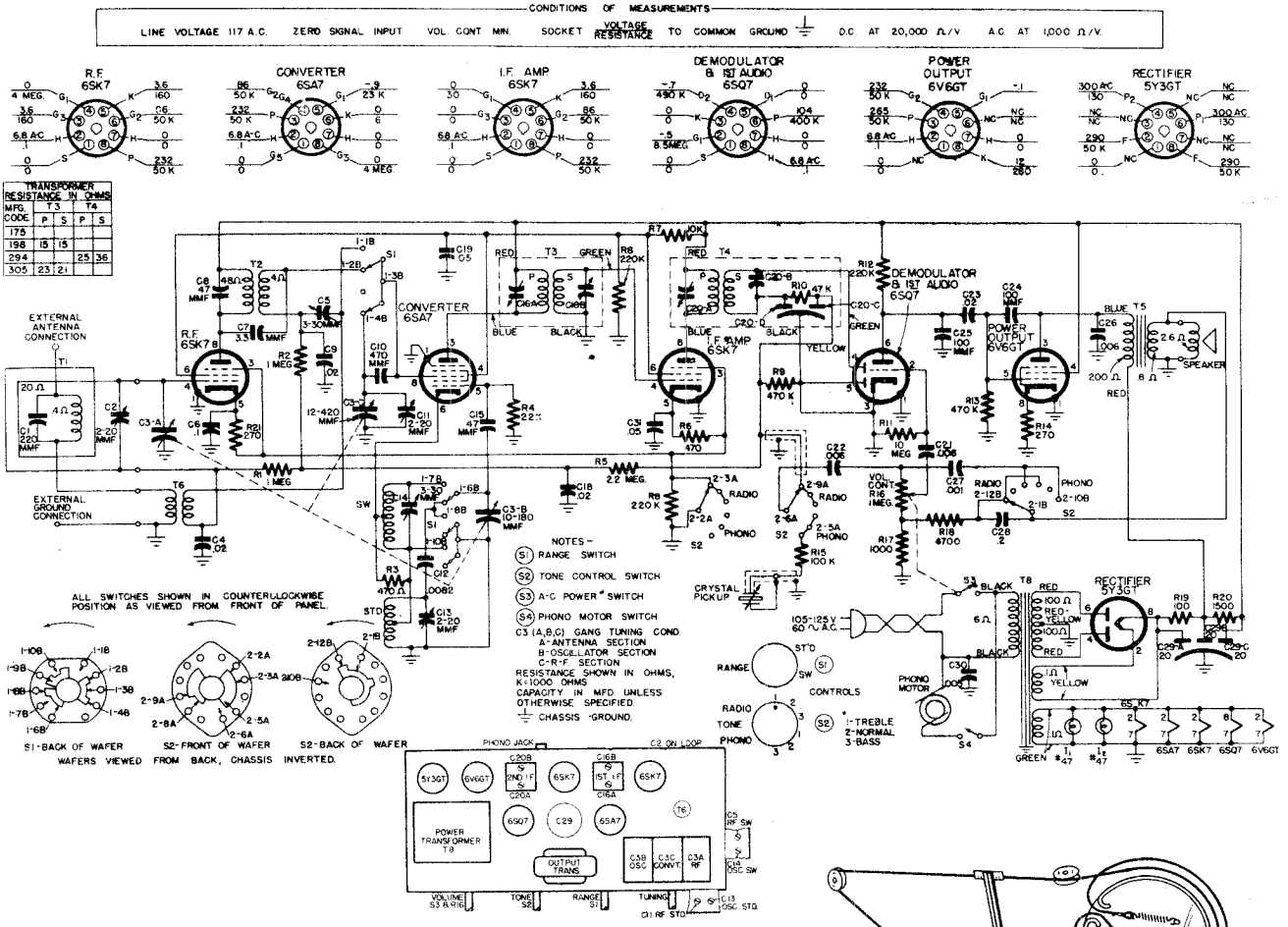
MODELS 676B,-C,-D

BENDIX RADIO DIV.



Power

Voltage Rating, 60 cycles AC 105-125
Power Consumption, including record changer — Watts 95

Tuning Range

Standard Broadcast—Frequency in KCS 540-1620
Shortwave—Frequency in MCS 6-12
Intermediate Frequency—KCS 455
Maximum Power Output—Watts 4
LOUD SPEAKER—Electro dynamic Cone diameter—inches 6
Voice Coil Impedence—(ohms of 400 cycles) 3.2

Alignment Procedure

Connect line cord plug to 117 volt, 60 cycles AC power source. Set volume control at maximum clockwise position and tone control (S2) in counterclockwise (Radio 1) position. Connect output meter across voice coil. Adjust dial pointer by turning tuning control fully counterclockwise and sliding dial pointer on dial cord until it is exactly 2 3/4" from left end of dial back plate. Make all adjustments in order given in table and for maximum output. Dial Pointer Positions given measured from left hand end of dial back plate. Keep input as low as possible at all times. Range switch (S1) in ST'D position except as noted in table.

Circuit Aligned	Input Frequency	Dial Pointer Position	Adjustments
IF	* 455KCS	Max. to right	C20B, C20A C16B, C16A
OSC Broadcast	**1475KCS	7 3/4"	C13
RF Broadcast	**1475KCS **965KCS· **580KCS	7 3/4" 5 15/16" 3 3/8"	C11, C2 Check Calib.
+OSC Shortwave	**11MCS	7 3/4"	C14
+RF Shortwave	**11MCS 9MCS 6MCS	7 3/4" 6 9/16" 3 1/2"	C5 Check Calib.

*Applied to antenna through .1 mfd. or less.

**Applied to antenna through 200 mmf. or less.
+Range switch (S1) in SW position.

Record Changer: General Instrument Model 205

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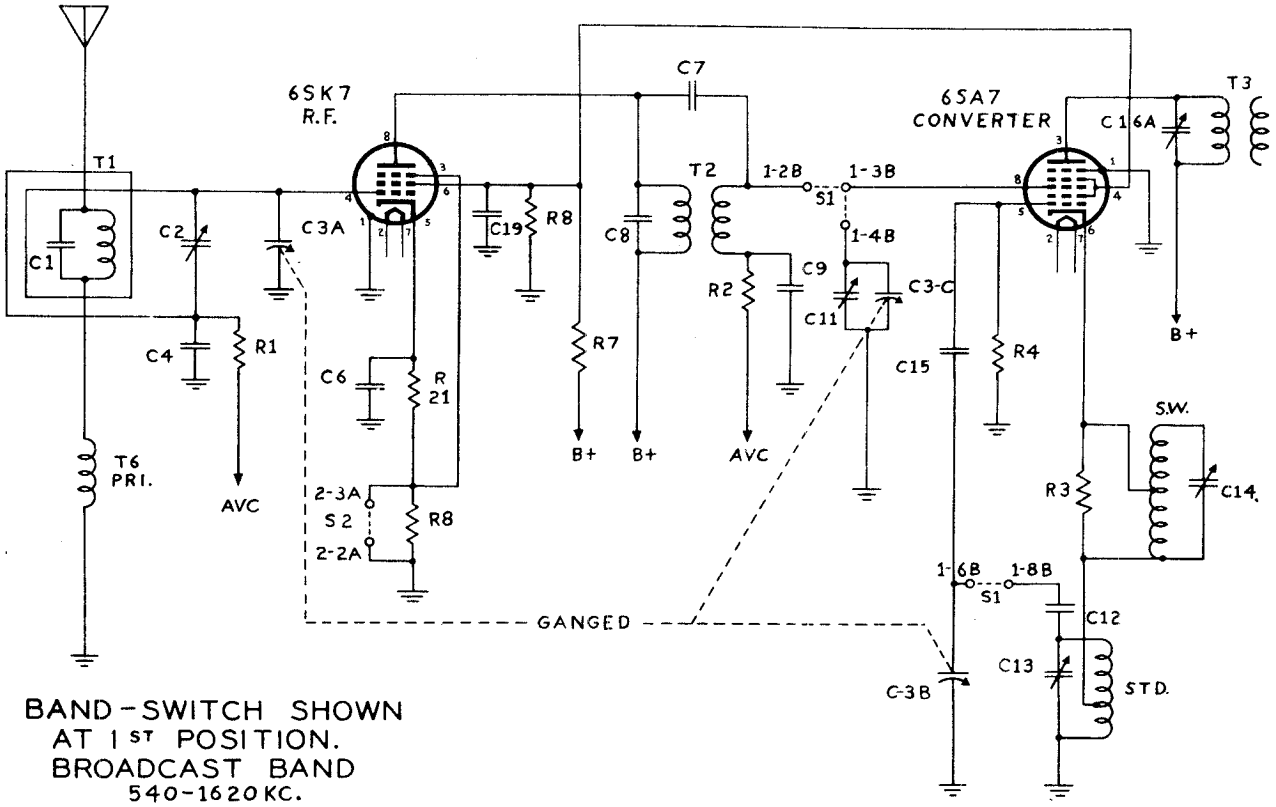
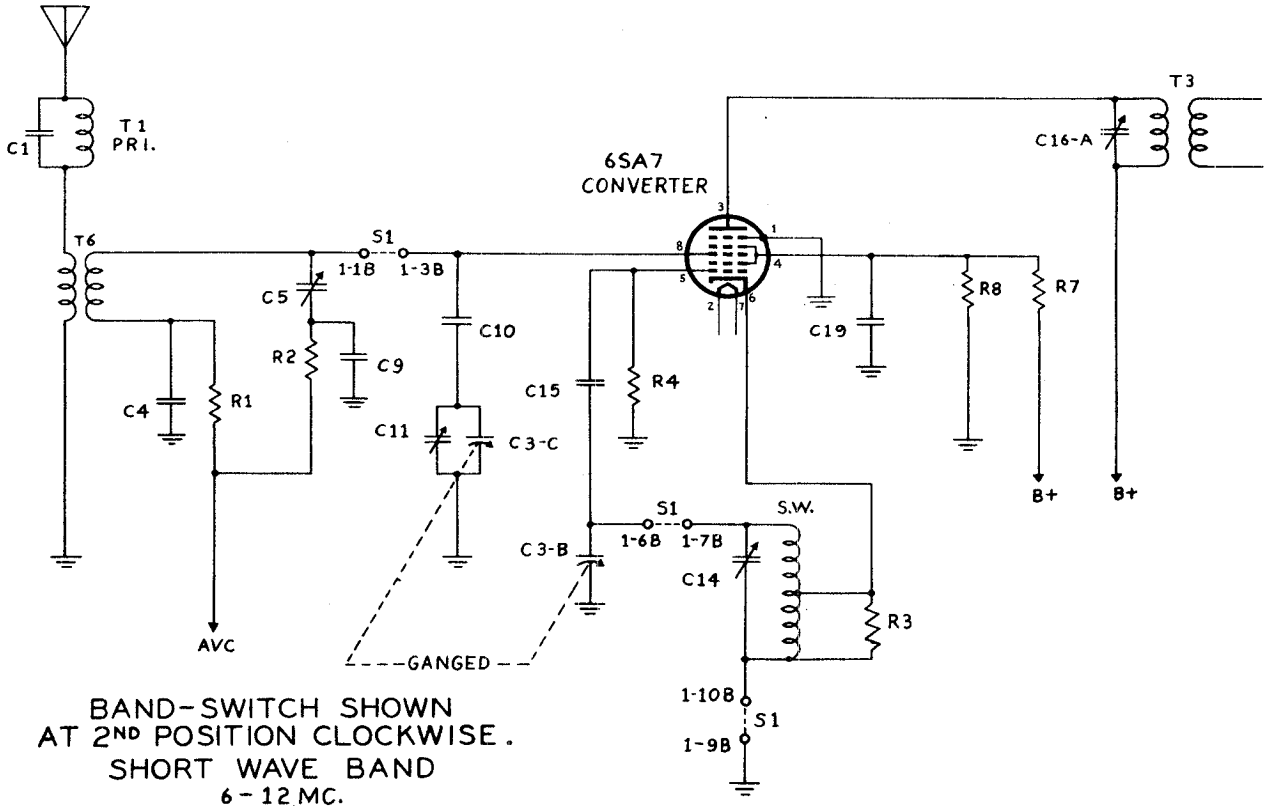
"clarified schematics"

MODELS 676B,-C,-D

BENDIX RADIO DIV.



BAND-SWITCH SHOWN
AT 1ST POSITION.
BROADCAST BAND
540-1620 KC.



BAND-SWITCH SHOWN
AT 2ND POSITION CLOCKWISE.
SHORT WAVE BAND
6-12 MC.

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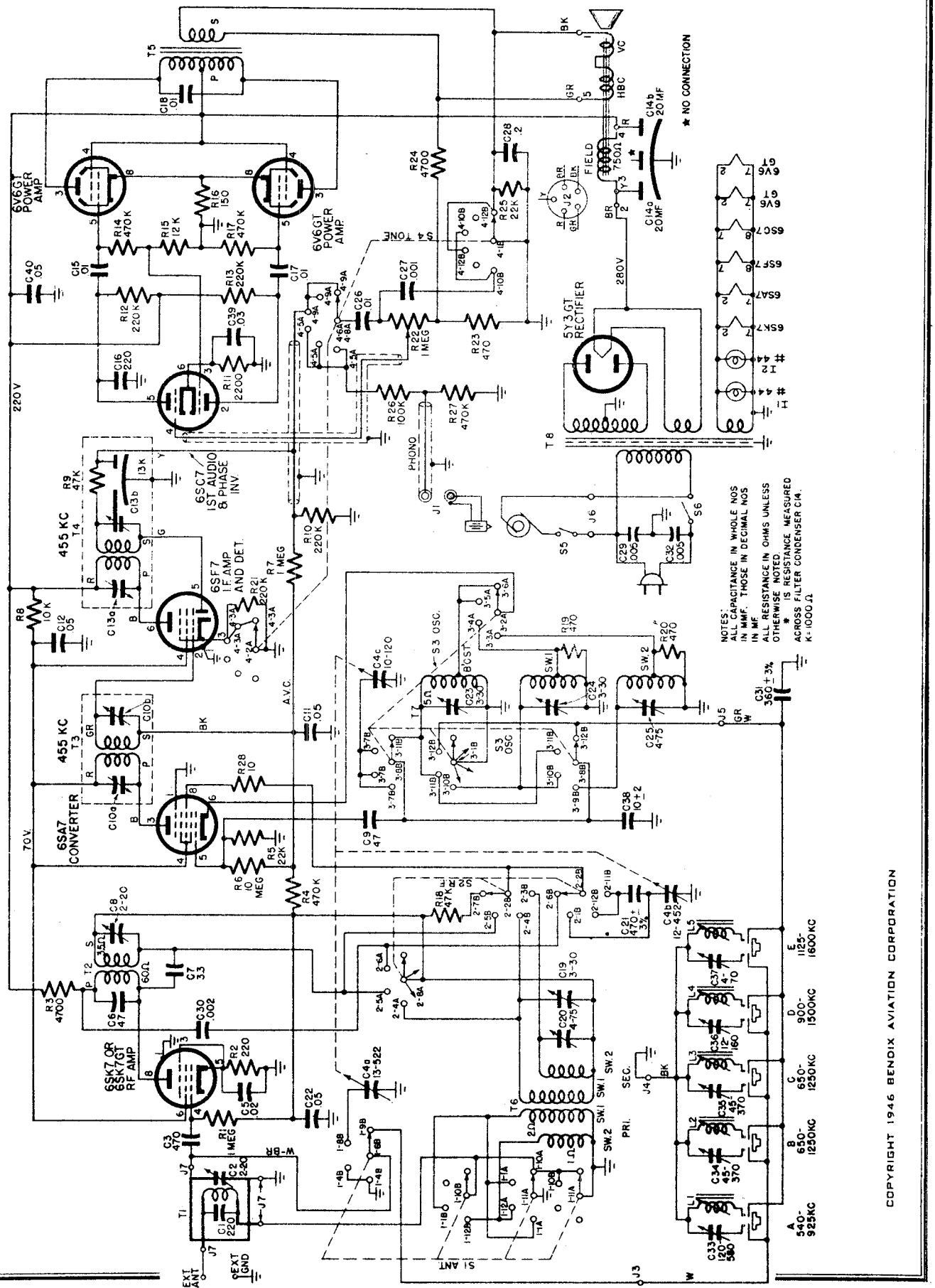
BENDIX RADIO DIV.

MODEL 736B



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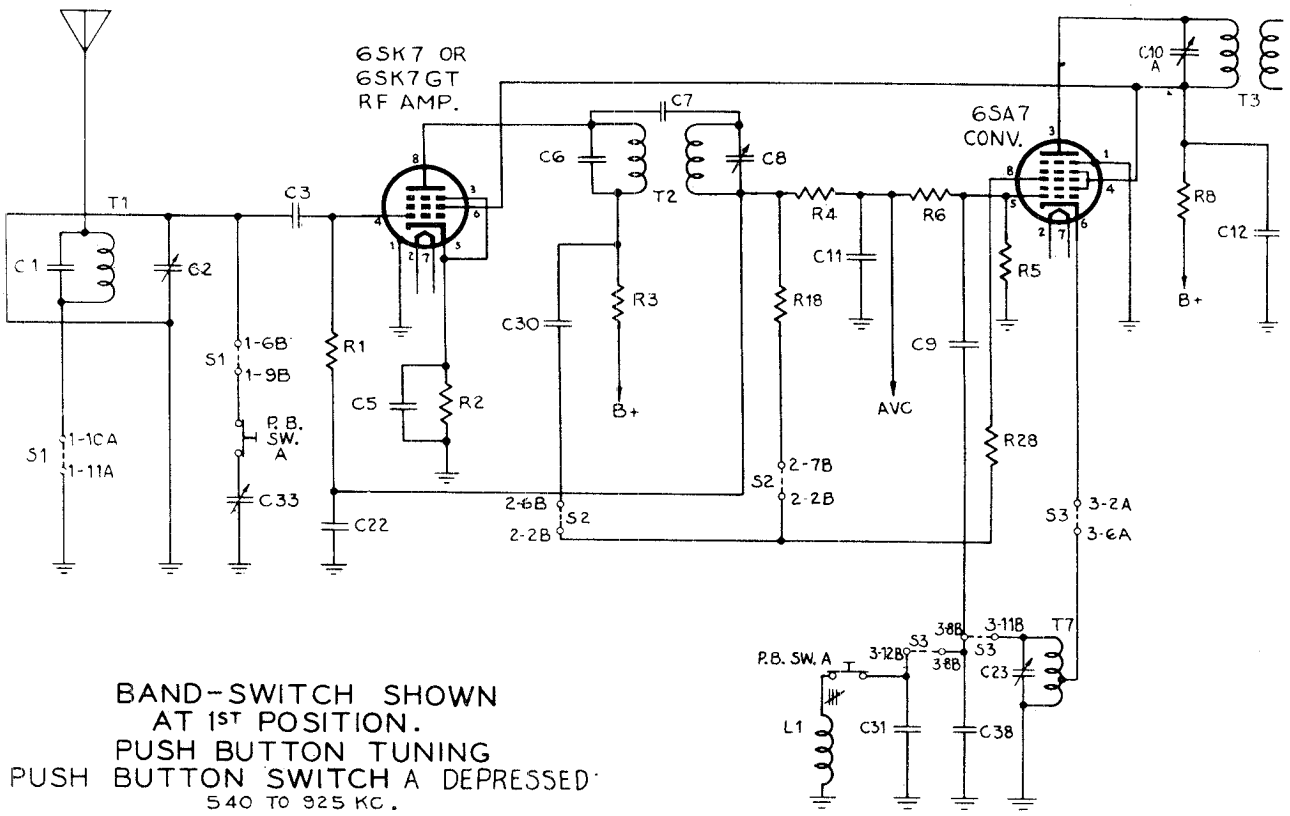
For Parts List, see P.15-4

Record Changer: General Instrument Model 205

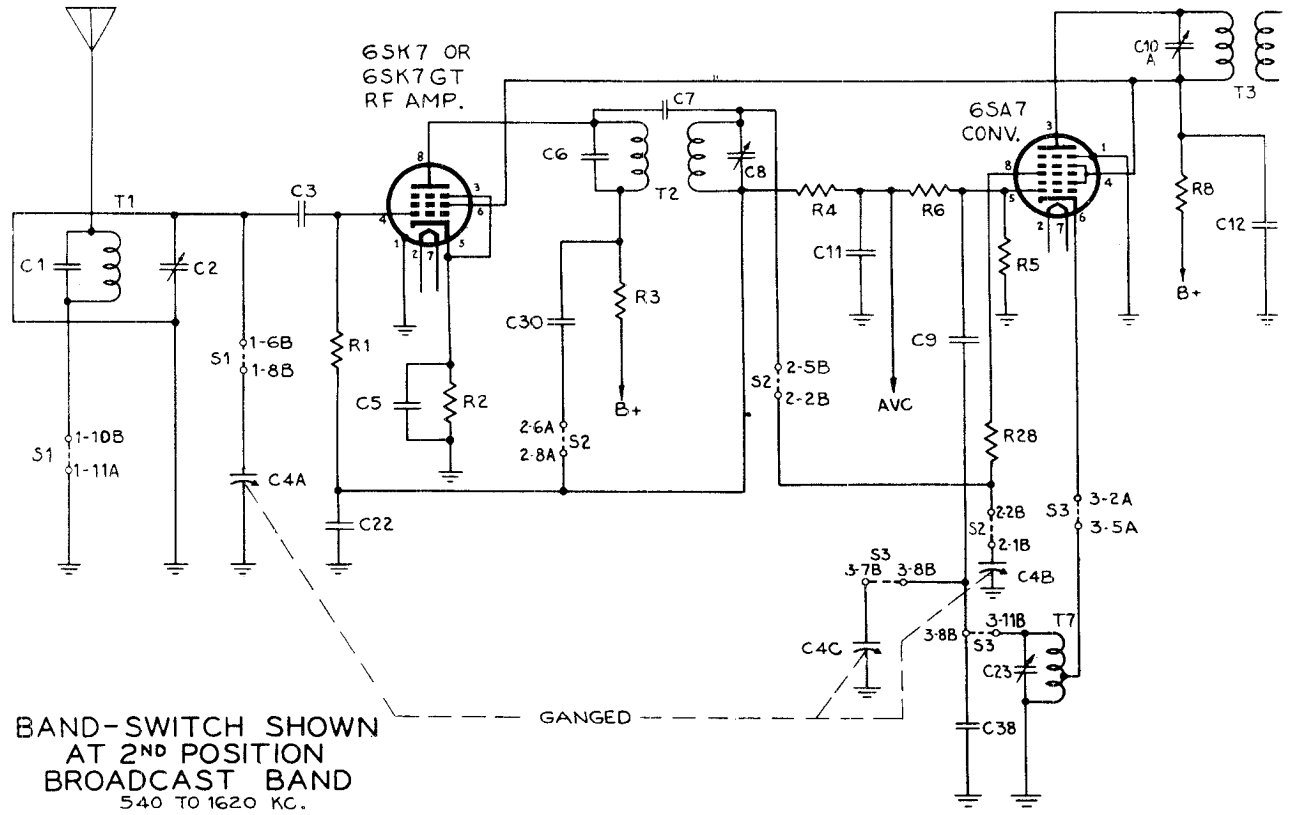
"clarified schematics"

MODEL 736B

BENDIX RADIO DIV.



BAND-SWITCH SHOWN
AT 1ST POSITION.
PUSH BUTTON TUNING
PUSH BUTTON SWITCH A DEPRESSED
540 TO 925 KC.



BAND-SWITCH SHOWN
AT 2ND POSITION
BROADCAST BAND
540 TO 1620 KC.

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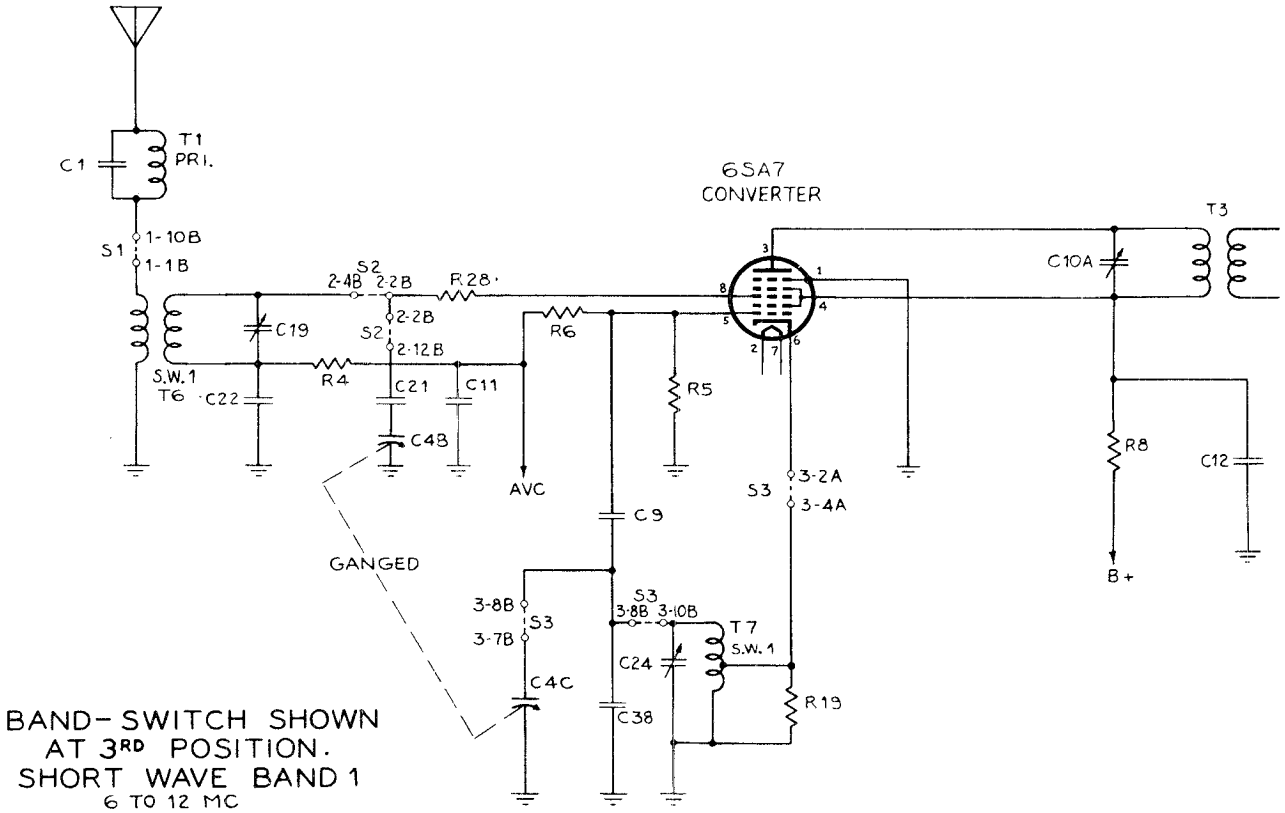
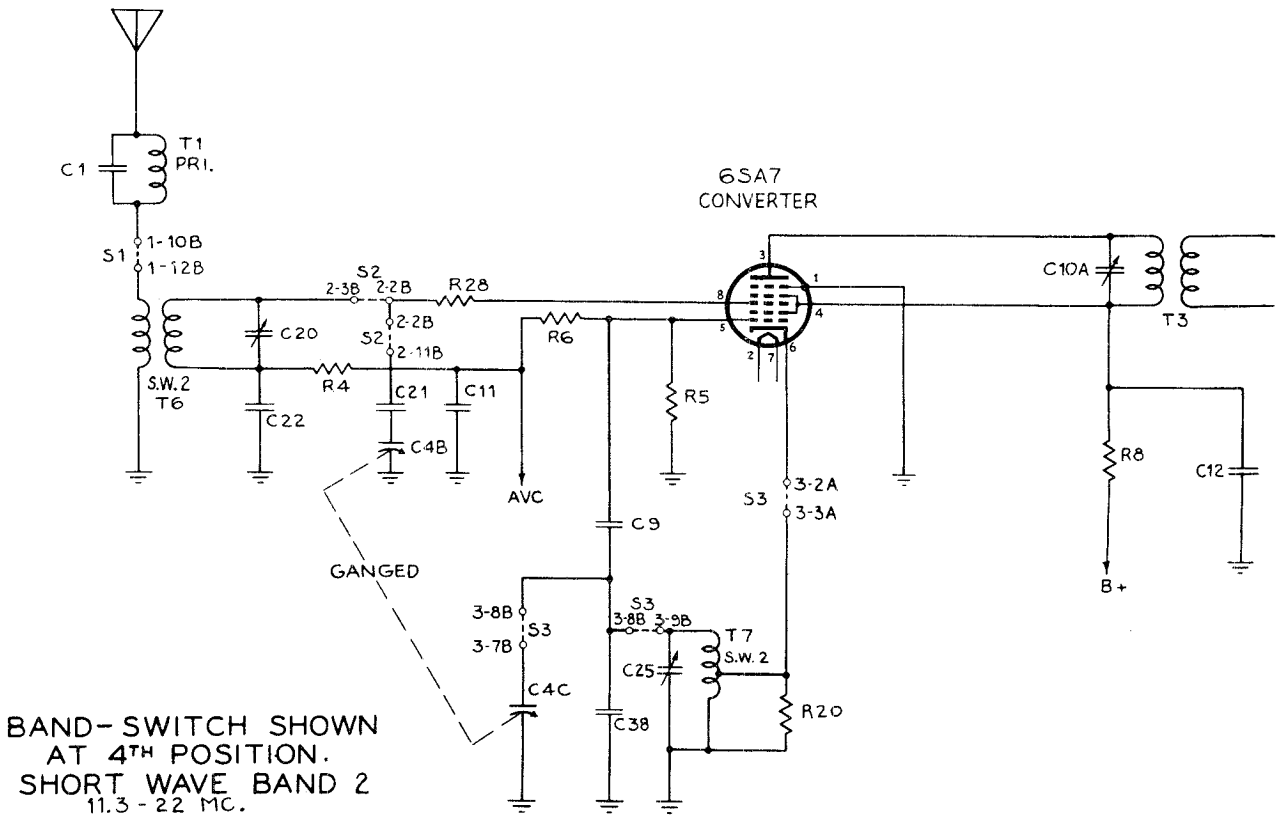
BENDIX RADIO DIV.

MODEL 736B



BAND-SWITCH SHOWN AT 3RD POSITION. SHORT WAVE BAND 1 6 TO 12 MC



BAND-SWITCH SHOWN AT 4TH POSITION. SHORT WAVE BAND 2 11.3 - 22 MC.

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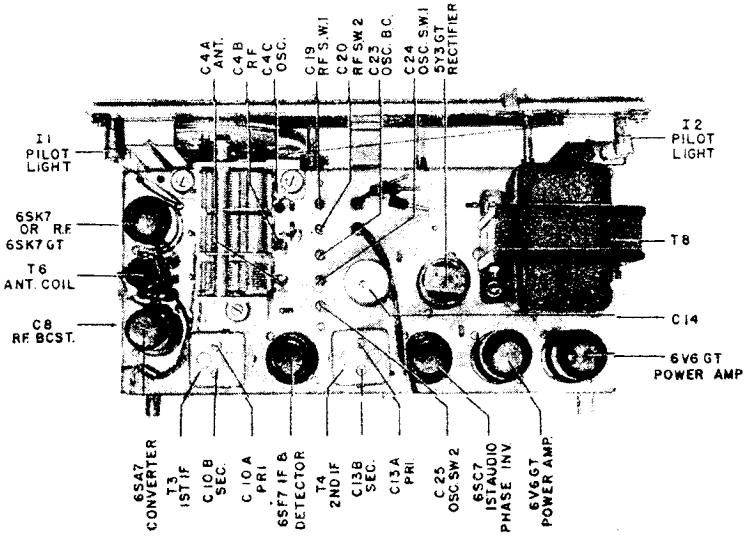

Chassis—Top View

Fig. 6

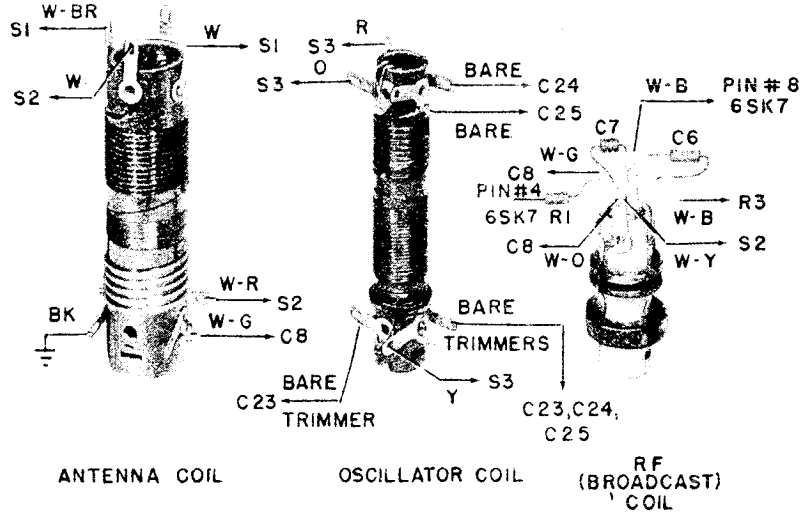

Fig. 8 Coil Connections

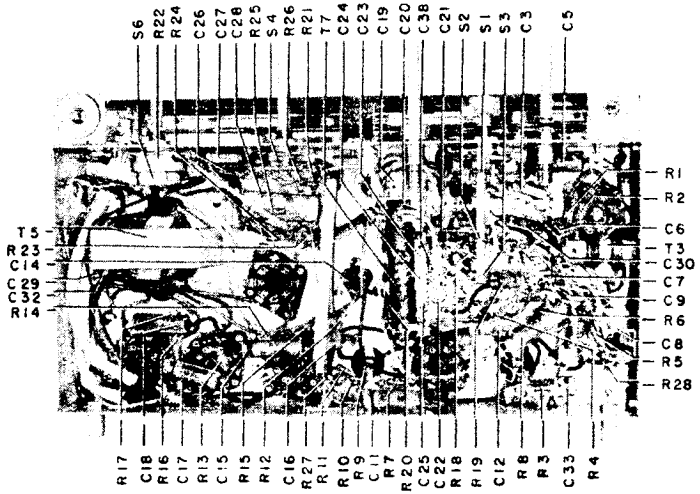

Fig. 7 Chassis—Bottom View

ALIGNMENT PROCEDURE

CIRCUIT	CONTROL POSITIONS	APPLY	THRU	TO	ADJUST
I. F.	Volume—Maximum Tone—Radio Treble Band Switch—Manual Broadcast Tuning Condenser—Fully Meshed (Adjust pointer to reference mark)	455KC	.01 mfd.	Grid 6SF7 I.F. Amp. Grid 6SA7 Conv.	C13b C13a C10b C10a
Broadcast	Pointer at Mark D	1450	200 mmf.	External Antenna Connection	C23 C8 C2
Short Wave Band No. 1	Band Switch—Short Wave No. 1 Pointer at Mark E	12 mc	400 ohms. in series with .01 mfd.	External Antenna Connection	C24 C19
Short Wave Band No. 2	Band Switch—Short Wave No 2 Pointer at Mark F	22mc	400 ohms. in series with .01 mfd.	External Antenna Connection	C25 C20

1. Alignment markers placed along bottom of dial back plate and left edge of pointer used as reference point.
2. Minimum input signal used for perceptible output.
3. After alignment, repeat process for possible slight readjustments.
4. Check calibration of Point A for 600 KC, Point B for 6mc and Point C for 11.5mc. If calibration is inaccurate check gang plates for bending or failure of components.

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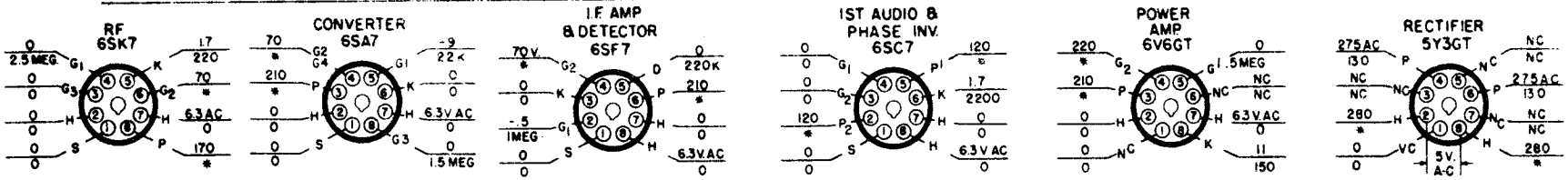
CONDITIONS OF MEASUREMENTS

LINE VOLTAGE 117 A.C. — ZERO SIGNAL INPUT — VOL. CONT. MIN. — SOCKET VOLTAGE / RESISTANCE TO COMMON GROUND ⏚ — DC AT 20,000 Ω/V — AC AT 1,000 Ω/V



TRANSFORMER RESISTANCE IN OHMS						
	I.F.				POWER	OUTPUT
SYMBOL	T3		T4		T8	T5
CODE	125	294	125	305	125	125
PRI.	22	30	23	25	7	500
SEC.	22	30	23	25	4V/260	

RESISTANCES OF COILS LESS THAN 1 Ω NOT SHOWN

Pushbuttons — The first counterclockwise position of the band switch provides pushbutton operation on the broadcast band. Pushbutton frequency ranges are as indicated in following diagram. The Pushbuttons may be removed by pulling from shaft thereby giving access to adjustment screws. The Osc. and Ant. adjustment screws are indicated in figure 3.

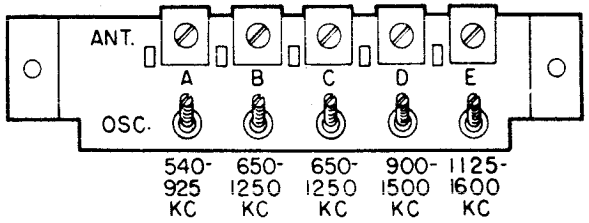
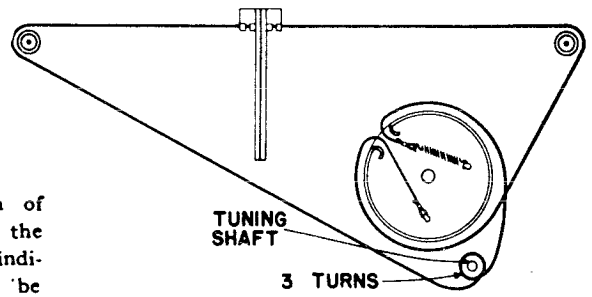
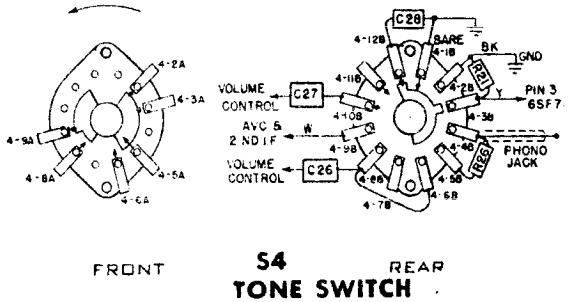


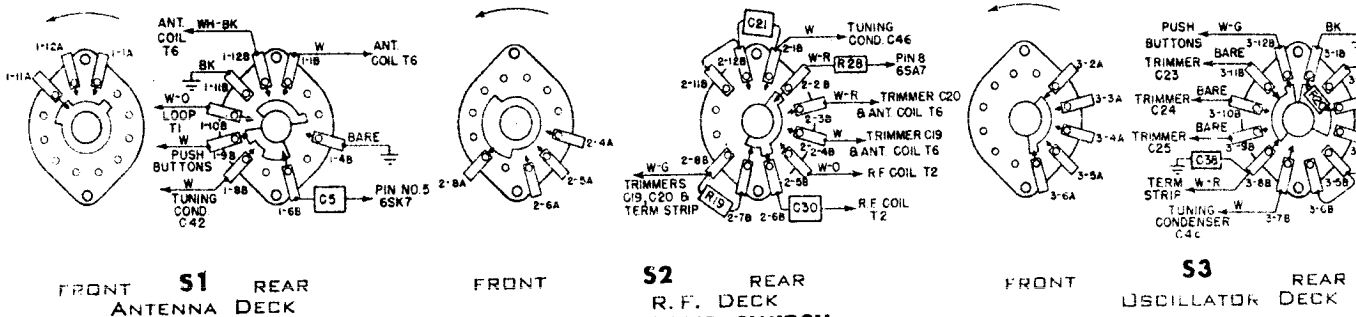
Fig. 3



DIAL STRINGING DIAGRAM

Fig. 4

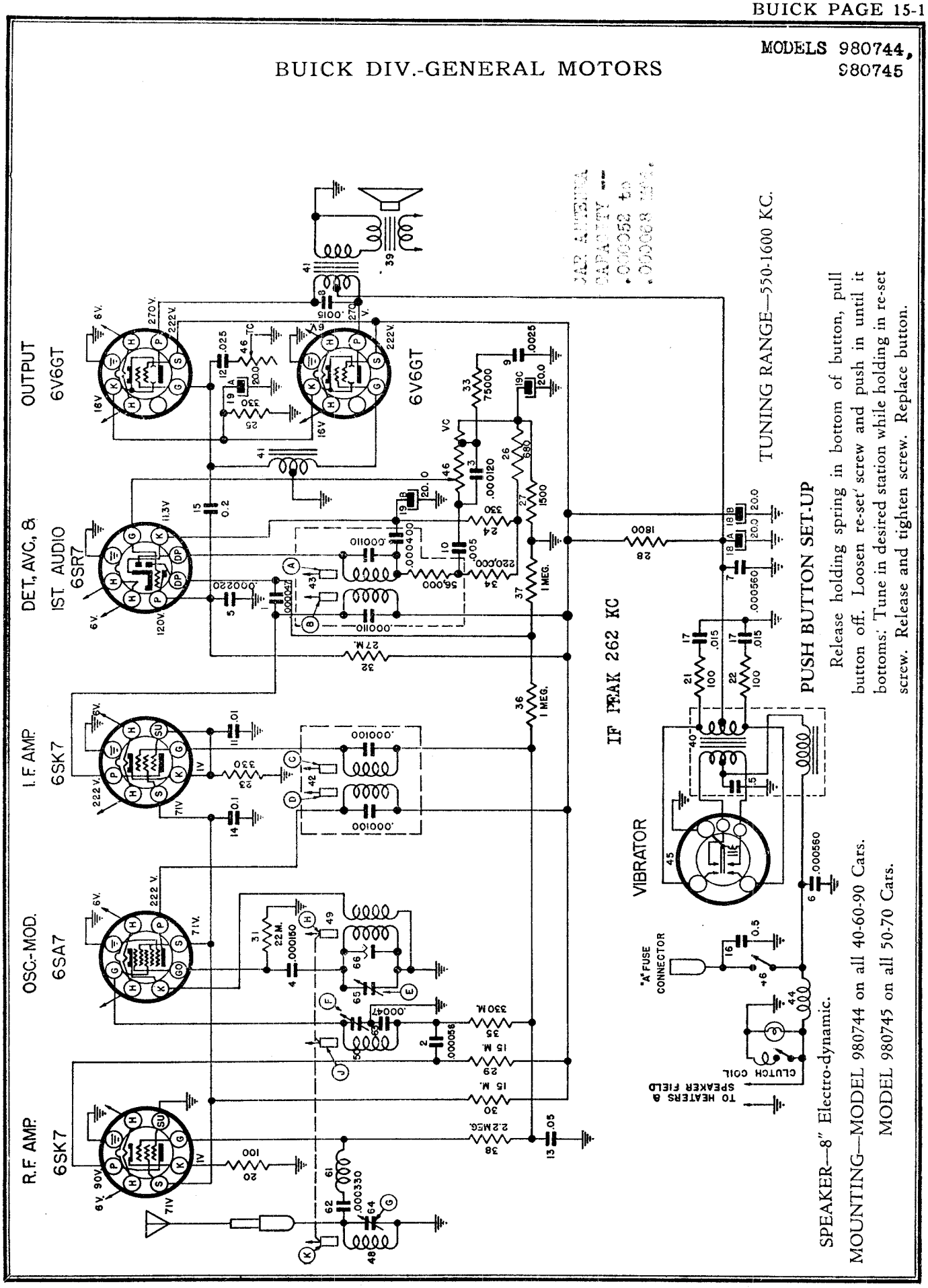




POWER	
Voltage Range	105-125
Frequency—Cycles	60
Consumption—Watts	110
TUNING RANGE	
Broadcast—KCs.	540-1620
Shortwave No. 1—Mcs.	6-12
Short Wave No. 2—Mcs.	11.3-22
POWER OUTPUT—WATTS	
Maximum	7
At 10% Distortion	5
INTERMEDIATE FREQUENCY (KCs)	455
TUNING RATIO	12:1
POINTER TRAVEL	6 in.
LOUDSPEAKER—Electrodynamic	
Cone Diameter-Inches	10
Voice Coil Impedance (Ohms at 400 cycles)	3.2
RECORD PLAYER	Model G-205

BUICK DIV.-GENERAL MOTORS

MODELS 980744, 980745


R.F. AMP. 6SK7
OSC.-MOD. 6SA7
I.F. AMP. 6SK7
DET., AVC., & 1ST AUDIO 6SR7
OUTPUT 6V6GT
6V6GT
VIBRATOR
IF PEAK 262 KC
TUNING RANGE—550-1600 KC.
PUSH BUTTON SET-UP
Release holding spring in bottom of button, pull button off. Loosen re-set' screw and push in until it bottoms. Tune in desired station while holding in re-set screw. Release and tighten screw. Replace button.
SPEAKER—8" Electro-dynamic.
MOUNTING—MODEL 980744 on all 40-60-90 Cars.
MODEL 980745 on all 50-70 Cars.
"A" FUSE CONNECTOR
TO HEATERS & SPEAKER FIELD
CLUTCH COIL

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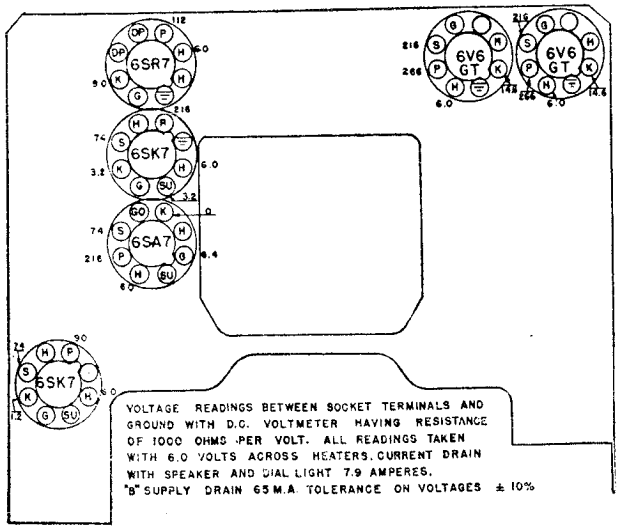
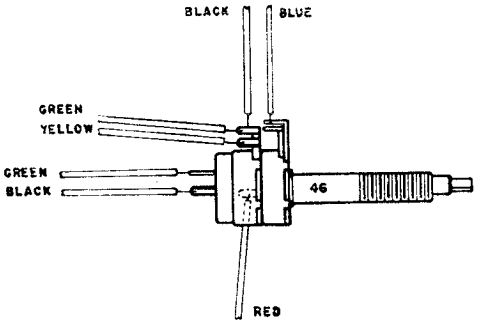
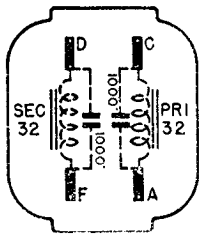

6SR7
6V6 GT
6V6 GT
6SK7
6SA7
6SK7
VOLTAGE READINGS BETWEEN SOCKET TERMINALS AND GROUND WITH D.C. VOLTMETER HAVING RESISTANCE OF 1000 OHMS PER VOLT. ALL READINGS TAKEN WITH 6.0 VOLTS ACROSS HEATERS. CURRENT DRAIN WITH SPEAKER AND DIAL LIGHT 7.9 AMPERES.
"B" SUPPLY DRAIN 65 M.A. TOLERANCE ON VOLTAGES ± 10%

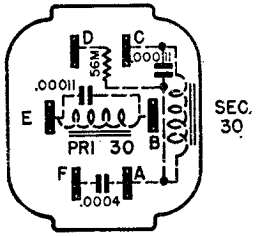
TUBE SOCKET VOLTAGE CHART



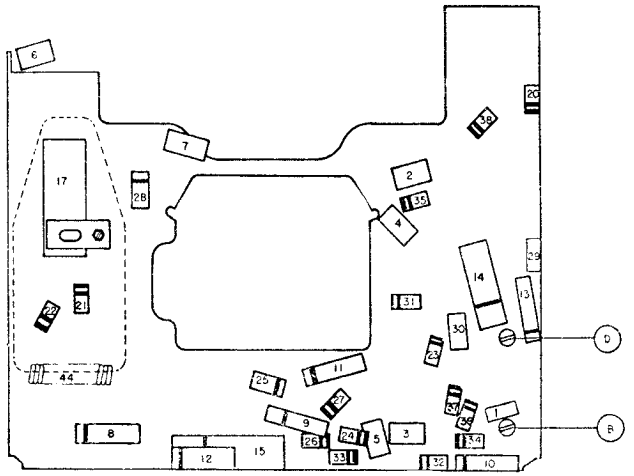
DUAL CONTROL



1st I. F. TRANS.



2nd I. F. TRANS.



PARTS LAYOUT—CHASSIS VIEW

ALIGNMENT PROCEDURE

Volume Control Maximum.

Signal Generator output minimum for satisfactory output indication.

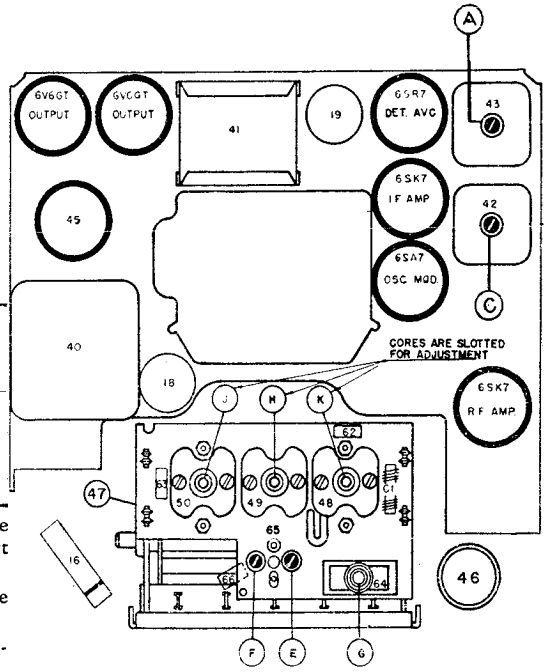
Series Condenser or Dummy Antenna	Connect To	Tune Receiver To	Signal Generator Frequency	Adjust Screws In Order
0.1 Mfd.	6SA7 Pin #8	No Broadcast Sig.	262 KC	A B C D
*.000060 Mfd.	Antenna Connector	Extreme Hi. Freq. End of Dial	1615 KC	E F G
***.000060 Mfd.	Antenna Connector	Signal Generator	1430 KC	**J K

*Before making this adjustment turn core screws J, K, H by means of a bakelite screwdriver, so that the rear end of the cores are 1 1/8" from the rear of the coil form. The purpose of this adjustment is to set the cores at the correct starting point with respect to the windings.

**Cores J and K are adjusted by means of a bakelite screwdriver through the rear end of the coils. There must not be any metal in part of screwdriver inserted in the coil.

***Should it be necessary to calibrate the pointer after this adjustment, tune signal generator to 1300 KC and the receiver to the signal. Loosen dial cord pulley set screws and adjust pointer to 1300 KC. Tighten set screws.

Adjust trimmer G to match car antenna (at approx. 1400 KC) when radio is installed.

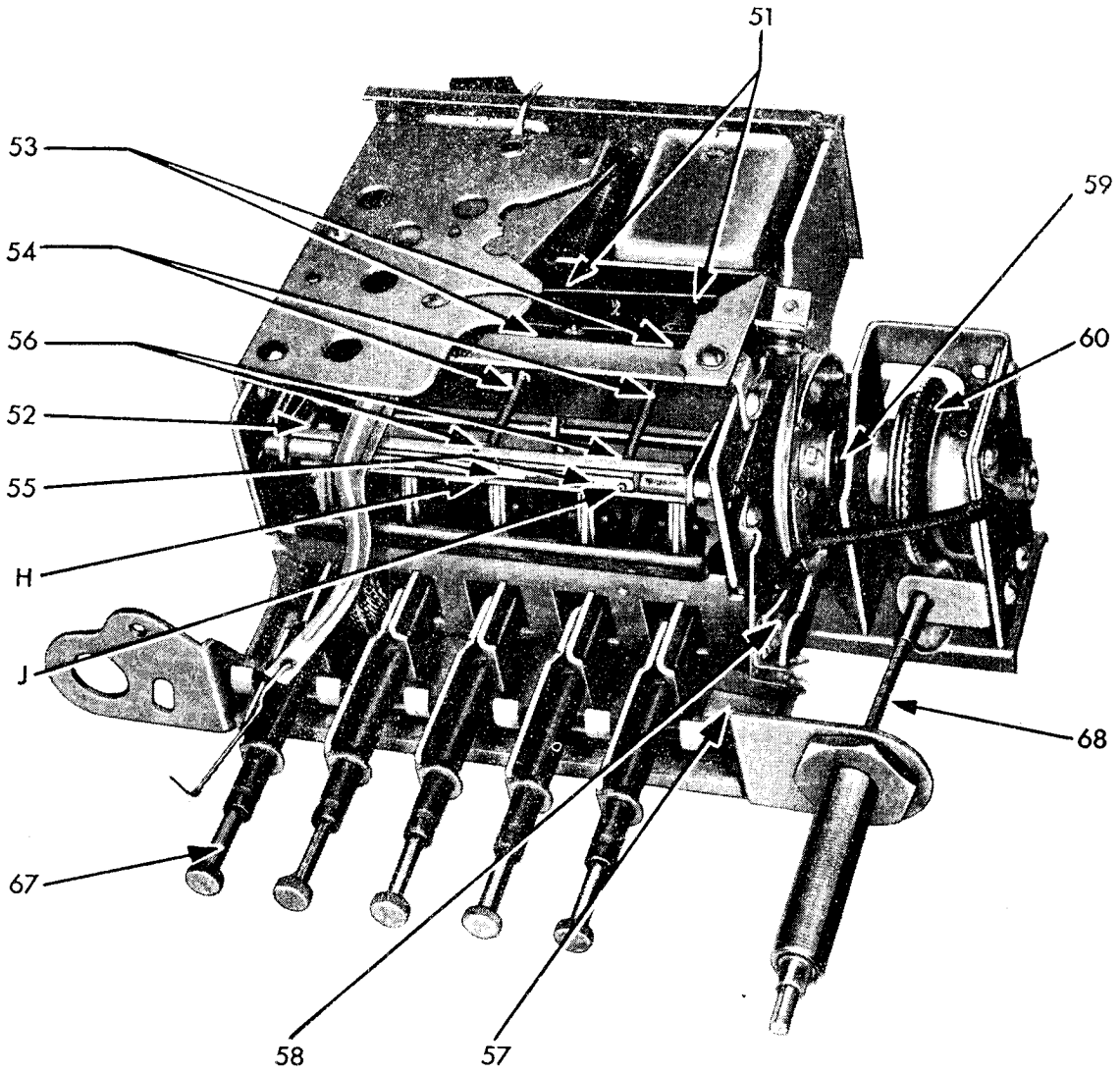


PARTS LAYOUT—TUBE VIEW

BUICK DIV.-GENERAL MOTORS

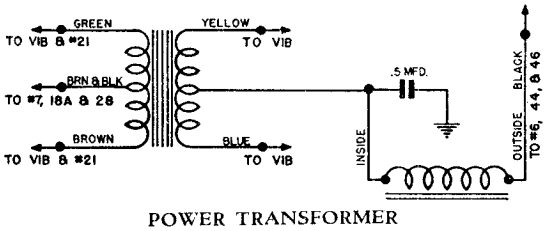
MODELS 980744, 980745

ESCUTCHEON CROSS SECTION

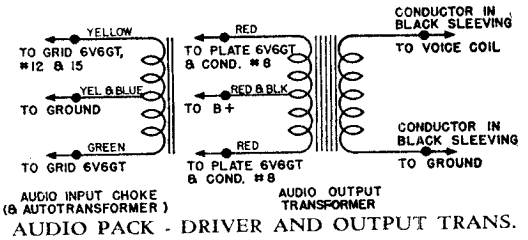


TUNER PICTURE

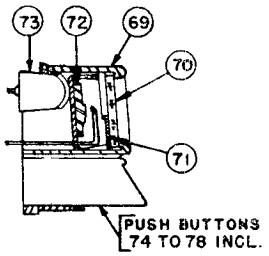
TRANSFORMER CONNECTIONS



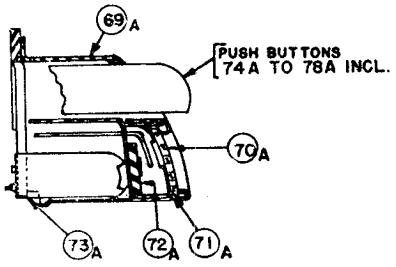
POWER TRANSFORMER



AUDIO PACK - DRIVER AND OUTPUT TRANS.



MODEL 980744



MODEL 980745

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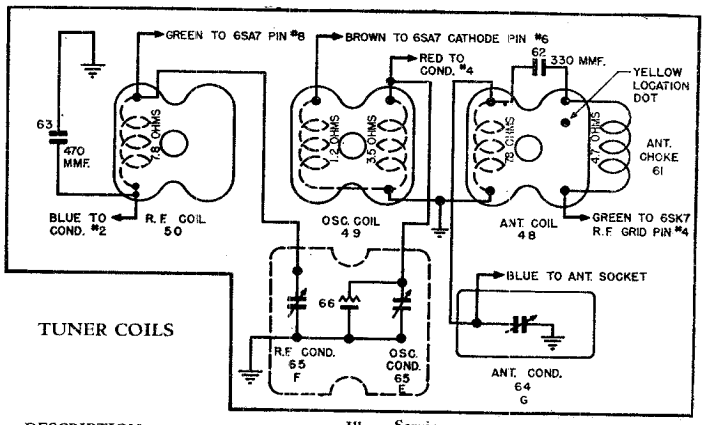
MODELS 980744, 980745

BUICK DIV.-GENERAL MOTORS



TUNER COILS

Illus. No.	Service Parts No.	DESCRIPTION
		CONDENSERS
1	7233313	.000047 Mfd. Molded
2	1215188	.000056 Mfd. Molded
3	7240577	.000120 Mfd. Molded
4	7230893	.000150 Mfd. Molded
5	7236105	.000220 Mfd. Molded
6	7240566	.000560 Mfd. Mica
7	7240566	.000560 Mfd. Mica
Alt. for 6 & 7	7255665	.000560 Mfd. Mica—Molded
8	7236134	.0015 Mfd. 800 V. Tubular
9	7240578	.0025 Mfd. 400 V. Tubular
10	7230912	.005 Mfd. 600 V. Tubular
11	1208600	.01 Mfd. 600 V. Tubular
12	1211232	.025 Mfd. 400 V. Tubular
13	7230592	.05 Mfd. 600 V. Tubular
14	1207908	.1 Mfd. 400 V. Tubular
15	7240579	.2 Mfd. 400 V. Tubular
16	7236621	.5 Mfd. 200 V. Tubular
17	7236075	.015 x .015 1500 V. Dual Tubular
18	7240612	Electrolytic—2 Section 20-20 Mfd. 400 V.
19	7238553	Electrolytic—3 Section 20-20-20 Mfd. 25 V.
62	7232957	.000330 Mfd. Molded
63	7238879	.000470 Mfd. Molded
64	7242984	Antenna Trimmer } Included in Tuner Assembly Complete
65	7244037	Dual Trimmer
66	7255725	Compensating
		RESISTORS
20	1213217	100 Ohms ½ W. Insulated
21	1213217	100 Ohms ½ W. Insulated
22	1213217	100 Ohms ½ W. Insulated
23	1213224	330 Ohms ½ W. Insulated
24	1213224	330 Ohms ½ W. Insulated
25	1214572	330 Ohms 2 W. Insulated
26	1214543	680 Ohms ½ W. Insulated
27	1213237	1500 Ohms ½ W. Insulated
28	1214573	1800 Ohms 2 W. Insulated
29	7237595	15,000 Ohms 1 W. Insulated
30	7233653	15,000 Ohms 2 W. Insulated
31	1214550	22,000 Ohms ½ W. Insulated
32	1213342	27,000 Ohms 1 W. Insulated
33	1213844	68,000 Ohms ½ W. Insulated
34	1214555	220,000 Ohms ½ W. Insulated
35	1214557	330,000 Ohms ½ W. Insulated
36	1213282	1 Megohm ½ W. Insulated
37	1213282	1 Megohm ½ W. Insulated
38	1214563	2.2 Megohm ½ W Insulated
		MOUNTING AND INSTALLATION PARTS
	7255666	Control Knob Kit Tuning Knobs—2 Dummy Knob Tone Control Knob Washers—2 Hex. Nuts—2
	1321177	"A" Lead Cable Assembly—Model 980744
	1321178	"A" Lead Cable Assembly—Model 980745
	120151	Fuse
	1286759	Static Collector Assembly
	1880659	Generator Condenser
	1207820	Distributor Suppressor
	1853686	Suppressor Adaptor
	1324056	Bracket—R. H.—Model 980744
	1324057	Bracket—L. H.—Model 980744
	1323926	Bracket—R. H.—Model 980745
	1323927	Bracket—L. H.—Model 980745
	1320624	Washer
	120380	Lockwasher
	120375	Hex. Nut
	123291	Screw
		MISCELLANEOUS ELECTRICAL PARTS
39	7240469	Speaker—8" Electrodynamic
40	7240519	Power Transformer Assembly
41	7240464	Audio Pack-Driver and Output Transformer Assembly
42	7238546	First I. F. Transformer Assembly
43	7240467	Second I. F. Transformer Assembly
44	7241708	"A" Filter Choke
45	8630	Vibrator—Synchronous
46	7241967	Volume & Tone Control with Switch—Model 980744
46A	7241928	Volume & Tone Control with Switch—Model 980745
61	7240251	Antenna Choke Coil (Included in Tuner Assembly Complete)

Illus. No.	Service Parts No.	DESCRIPTION
		TUNER, DIAL, AND ESCUTCHEON PARTS
47	7244052	Tuner Assembly Complete—Model 980744
47A	7244027	Tuner Assembly Complete—Model 980745
48	7244056	Antenna Coil Assembly
49	7244058	Oscillator Coil Assembly
50	7244057	R. F. Coil Assembly
51	7255779	Grommet
52	7244034	Spring—Connecting Link
	7256014	Iron Core Parts Package
53		Iron Core
54		Spring—Core Tension
55		Nut—Core Coupling
56		Washer
57	7240410	Declutching Switch Lever Assembly
	7242961	Shaft—Declutching Switch Lever
	7242962	Spring—Declutching Switch Lever
	7255698	Retainer Spring
58	7240397	Switch Assembly—Declutching
59	7240396	Drive Drum Assembly
60	7240471	Clutch Assembly Complete
	7237174	Universal Joint Spring
61	7240251	Antenna Choke Coil
62	7232957	Condenser—.000330 Mfd. Molded
63	7238879	Condenser—.000470 Mfd. Molded
64	7242984	Antenna Trimmer Condenser
65	7244037	Dual Trimmer Condenser
66	7255725	Compensating Condenser
	7242167	Cord and Spring Assembly
	7242168	Cord and Link Assembly
67	7240368	Reset Screw Assembly
68	7241981	Tuning Shaft Assembly
69	7241966	Escutcheon
70	7242981	Dial
71	7240508	Dial Shield
72	7240509	Backplate Assembly
73	7238513	Dial Clamp
74	7242221	Button Assembly "B"
75	7242222	Button Assembly "U"
76	7242223	Button Assembly "I"
77	7242224	Button Assembly "C"
78	7242225	Button Assembly "K"

Parts Included in Tuner Assembly Complete, Part No. 7244052, Model 980744, Which Are Also Serviced Separately.

	7242005	Cord and Spring Assembly
	7242006	Cord and Link Assembly
67A	7241982	Reset Screw Assembly
68A	7241980	Tuning Shaft Assembly
69A	7242039	Escutcheon Assembly
70A	7244046	Dial
71A	7241992	Dial Shield
72A	7241987	Backplate Assembly
73A	7242093	Dial Clamp
74A	7242226	Button Assembly "B"
75A	7242227	Button Assembly "U"
76A	7242228	Button Assembly "I"
77A	7242229	Button Assembly "C"
78A	7242230	Button Assembly "K"

Parts Included in Tuner Assembly Complete, Part No. 7244027, Model 980745, Which Are Also Serviced Separately.

		TUBE COMPLEMENT
1213637	6V6GT	Push-Pull Output
7240267	6SR7	Detector, A. V. C. and First Audio
7237887	6SK7	I. F. Amplifier
7237887	6SK7	R. F. Amplifier
7237886	6SA7	Oscillator Modulator

		MISCELLANEOUS PARTS
7242034		"A" Lead Connector Assembly
7242035		Antenna Lead Connector Assembly
7238539		Vibrator Socket
7236279		Octal Tube Socket
7240408		Dial Light Assembly (Includes Dial Lamp)
125588		Bulb—Dial Lamp

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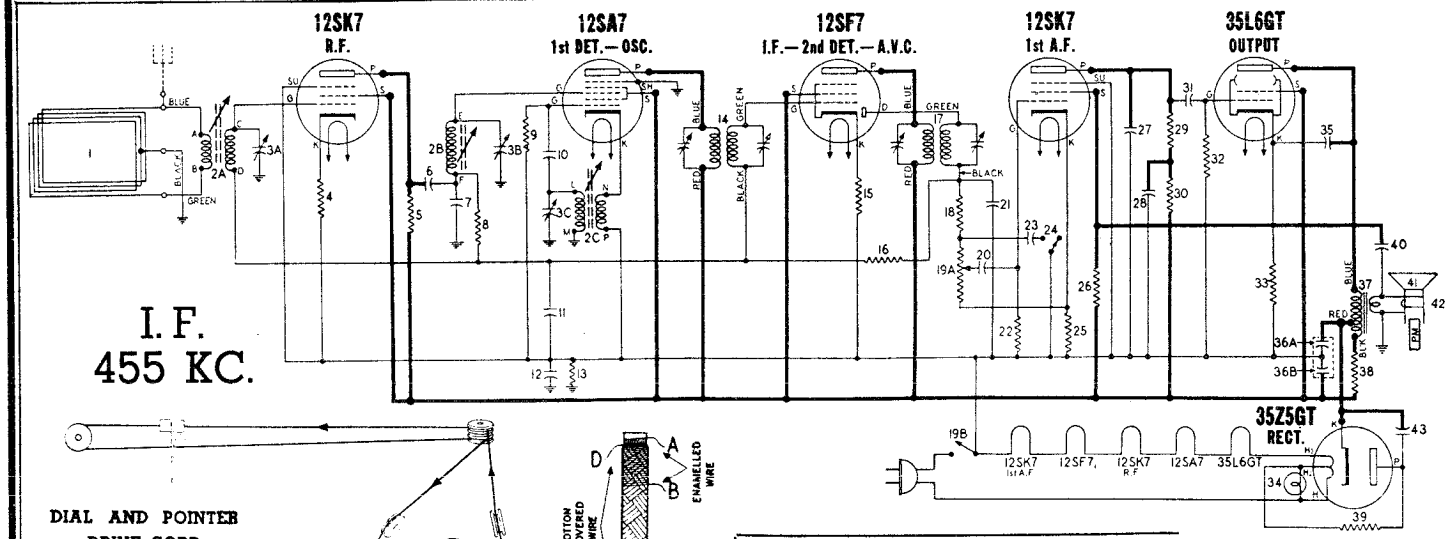
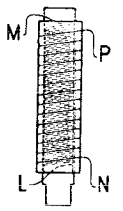
BUTLER BROS.

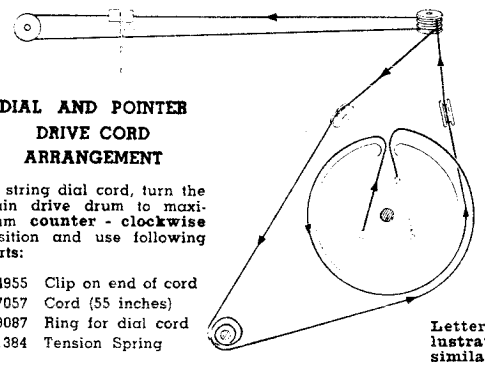
MODELS N5-RD-250, Chas. 9022N; N5-RD-251, Chas. 9022H



R.F. COIL 504214



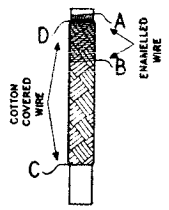
OSCILLATOR COIL 504212



DIAL AND POINTER DRIVE CORD ARRANGEMENT

To string dial cord, turn the main drive drum to maximum **counter - clockwise** position and use following parts:

114955	Clip on end of cord
117057	Cord (55 inches)
119087	Ring for dial cord
161384	Tension Spring



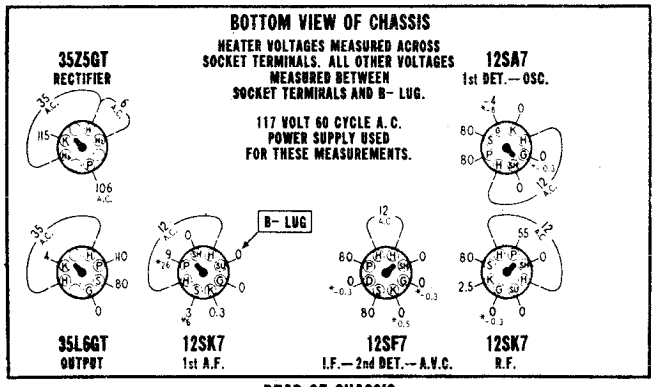
ANTENNA COUPLING COIL 504210

Lettered terminals in illustrations correspond to similarly lettered terminals on the circuit diagram.

SOCKET VOLTAGES

Measured with voltmeter having sensitivity of 1000 ohms per volt except where indicated by (*).

VOLUME ON FULL WITH NO SIGNAL **DIAL TUNED TO 540 KC.**


BOTTOM VIEW OF CHASSIS
HEATER VOLTAGES MEASURED ACROSS SOCKET TERMINALS. ALL OTHER VOLTAGES MEASURED BETWEEN SOCKET TERMINALS AND B- LUG.
117 VOLT 60 CYCLE A.C. POWER SUPPLY USED FOR THESE MEASUREMENTS.
35Z5GT RECTIFIER
12SA7 1st DET.—OSC.
B- LUG
35L6GT OUTPUT
12SK7 1st A.F.
12SF7 I.F.—2nd DET.—A.V.C.
12SK7 R.F.
REAR OF CHASSIS

*—Measured with vacuum tube voltmeter

DIAGRAM NO.	PART NO.	DESCRIPTION
		CONDENSERS
3-A, B, C	504086	Condenser trimmer assembly ..... A 10 to 160 Mmfd. B 20 to 270 Mmfd. C 20 to 270 Mmfd.
6	502271	Condenser—mica 260 Mmfd. 500 volt
7	502165	Condenser—mica 1,000 Mmfd. 500 volt
10	502159	Condenser—mica 50 Mmfd. 500 volt
11	502155	Condenser—.1 Mfd. 200 volt
12	502158	Condenser—.2 Mfd. 400 volt
20	502453	Condenser—.002 Mfd. 400 volt
21	502160	Condenser—mica 110 Mmfd. 500 volt
23	502470	Condenser—.0008 Mfd. 400 volt
27	502160	Condenser—mica 110 Mmfd. 500 volt
28	502153	Condenser—.05 Mfd. 200 volt
31	502156	Condenser—.004 Mfd. 400 volt
35	502151	Condenser—.01 Mfd. 400 volt
36-A, B	500256	Condenser—electrolytic ..... A—40 Mfd. 150 volt B—20 Mfd. 150 volt
40	502152	Condenser—.02 Mfd. 400 volt
43	502157	Condenser—.05 Mfd. 400 volt
		RESISTORS
4	502140	Resistor—carbon 390 ohms ¼ watt
5	502291	Resistor—carbon 4700 ohms ¼ watt
8	502134	Resistor—carbon 470,000 ohms ¼ watt
9	502130	Resistor—carbon 22,000 ohms ¼ watt
13	502133	Resistor—carbon 220,000 ohms ¼ watt
15	502264	Resistor—carbon 47 ohms ¼ watt
16	502269	Resistor—carbon 3.3 Meg. ¼ watt
18	502131	Resistor—carbon 47,000 ohms ¼ watt
19-A, B	502145	Volume control 500,000 ohms (with switch)
22	502136	Resistor—carbon 10 Meg. ¼ watt
25	502128	Resistor—carbon 2200 ohms ¼ watt
26	502135	Resistor—carbon 2.2 Meg. ¼ watt
29, 30	502133	Resistor—carbon 220,000 ohms ¼ watt
32	502134	Resistor—carbon 470,000 ohms ¼ watt
33	502138	Resistor—carbon 130 ohms ¼ watt
38	502469	Resistor—carbon 1500 ohms 1 watt
39	502574	Resistor—carbon 33 ohms ½ watt
		COIL & TRANSFORMERS
1	502246	Loop antenna
2-A, B, C	504096	Tuning unit; complete assembly
2-A	504210	Coil—antenna (less slug)
2-B	504214	Coil—R.F. (less slug)
2-C	504212	Coil—oscillator (less slug)
	504211	Slug core for Ant. coil (yellow end)
	504213	Slug core for Osc. coil (white end)
	504215	Slug core for R.F. coil (purple end)
14	502102	Transformer—1st I.F.
17	502103	Transformer—2nd I.F.
37	502213	Transformer—output (for R-502998 spkr.)
	502904	Transformer—output (for A-502998 spkr.)
	504244	Transformer—output (for W-502998 spkr.)
		OTHER ELECTRICAL PARTS
24	500546	Switch—tone control
34	502473	Lamp—dial (Mazda 47) 6-8 V. 150 Ma.
41	502214	Cone & voice coil for R-502998 spkr.
	502903	Cone & voice coil for A-502998 spkr.
	504245	Cone & voice coil for W-502998 spkr.
42	502998	Speaker—P.M. dynamic (5 inch)
		MISCELLANEOUS PARTS
	502185	Back for cabinet
	116467	Base for mtg. electrolytic condenser
	502556	Cabinet—ivory (Model 9022-H)
	502557	Cabinet—mahogany (Model 9022-N)
	500261	Clamp—dial scale mtg.
	500497	Clip—retainer for cabinet back
	114955	Clip—retainer on end of dial cord
	116563	Connector—for antenna leads
	117057	Cord—dial drive (55 in. required)
	500324	Cover—cardboard, for elect. cond.
	504145	Dial scale—glass
	501186	Grounding plate (under I.F. trans. can)
	502553	Knob—ivory (Model 9022-H)
	502551	Knob—mahogany (Model 9022-N)
	502367	Pointer
	81145	Retaining ring for tuning shaft
	85078	Rubber grommet; Ant. & R.F. coil mtg.
	504045	Rubber grommet; Osc. coil mtg.
	119087	Ring for dial cord
	17064	Screw—No. 4 x 7/32
	114628	Screw—No. 8 x ½ chassis mtg.
	502173	Shaft—tuning control
	116690	Socket—octal base
	160392	Socket—octal (rectifier)
	500499	Socket—dial lamp (with leads)
	504012	Spring for tuning slug drive cord
	161384	Spring—dial cord tension
	111456	Washer—spring washer for tuning shaft

MODELS N5-RD-250, Chas. 9022N;
N5-RD-251, Chas. 9022H

BUTLER BROS.

ALIGNMENT PROCEDURE

1. Remove chassis and loop from cabinet. Solder approximately 8" of insulated wire to any B— connection (see voltage chart on opposite side for convenient B— location). Then reinstall chassis and loop in cabinet. The B— lead should extend from under the chassis at the back.
2. Connect ground lead of signal generator to B— lead.
3. Connect output meter across the speaker voice coil (terminals at back of speaker.)
4. Turn the tuning control knob clockwise as far as it will go (tuner mechanism is now in maximum open position with tuning slugs almost completely withdrawn from coils). Dial pointer should then point to 1600 Kc mark on scale. If it is set incorrectly, release pointer clip on dial cord and reposition pointer.
5. Set volume control at maximum volume position and use a weak signal from the signal generator.

DUMMY ANT. IN SERIES WITH SIGNAL GENERATOR	CONNECT HIGH SIDE OF GENERATOR TO	SIGNAL GENERATOR FREQUENCY	RECEIVER DIAL SETTING	TRIMMER NUMBER	TRIMMER DESCRIPTION	TYPE OF ADJUSTMENT
Set tuner mechanism to maximum open position by turning the tuning control knob clockwise as far as it will go (Dial pointer at 1600 Kc). Then check whether the positions of the tuning slugs correspond to the positions shown in Fig. 1 below. If settings are incorrect, rotate the individual core and threaded stem until desired position is reached. Note that threaded stem is prevented from moving by a dab of speaker cement at top.						
.1 MFD. Condenser	Ungrounded terminal of trimmer No. 6 (see Fig. 2 below for location of trimmer.)	455 KC	Any point where it does not affect the signal.	1-2	2nd I.F.	Adjust for maximum output. Then repeat adjustment.
				3-4	1st I.F.	
300 MMFD. Mica Condenser	External Antenna Clip on Loop Frame	1600 KC	1600 KC	5	Broadcast Oscillator (Shunt)	Adjust for maximum output.
300 MMFD. Mica Condenser	External Antenna Clip on Loop Frame	1600 KC	Tune to 1600 KC generator signal	6	Broadcast R.F.	Adjust for maximum output.
				7	Broadcast Antenna	Adjust for maximum output.
300 MMFD. Mica Condenser	External Antenna Clip on Loop Frame	1400 KC	Tune to 1400 KC generator signal	Ant. coil tuning slug		Adjust position of slug for maximum output.
				R.F. coil tuning slug		Adjust position of slug for maximum output.
300 MMFD. Mica Condenser	External Antenna Clip on Loop Frame	1600 KC	Tune to 1600 KC generator signal	6	Broadcast R.F.	Recheck adjustment for maximum output.
				7	Broadcast Antenna	Recheck adjustment for maximum output.
Apply a coating of speaker cement at top of each tuning core stem to prevent movement.						

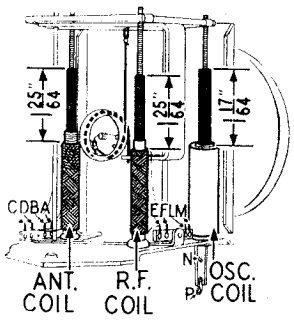


FIG. 1

SLUG TUNER ASSEMBLY
(Drive Parts)

117057 Cord (8")
114955 Clip on cord
504012 Spring

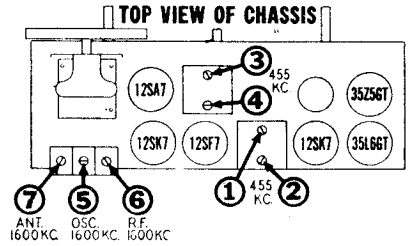


FIG. 2

AUDIO OSCILLATION

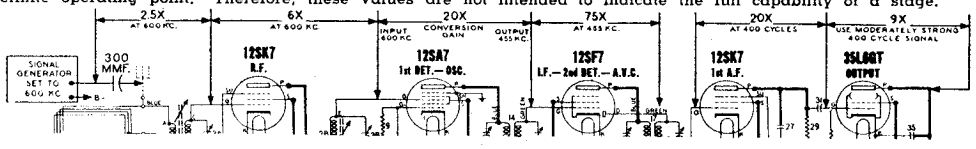
The audio system of this receiver utilizes a two stage type of inverse feed-back arrangement and, should it ever be necessary to replace the speaker or output transformer, it is important to maintain a definite phase relationship in the feed-back circuit. If the connections to the output transformer are reversed or if the feed-back connection is made to the wrong side of the output transformer secondary, the system will become regenerative instead of degenerative. Under those conditions audio oscillation may result. If that occurs, oscillation may be prevented by reversing the connections to the secondary of the output transformer.

APPROXIMATE STAGE GAIN DATA

Be sure R.F. and I.F. stages are accurately aligned before measuring gain. R.F. gains can be measured with a "channel" type instrument containing a tuned and calibrated R.F. amplifier. A vacuum tube voltmeter may be used for audio gain measurements. Observe following precautions:

1. For all gain measurements connect signal generator as shown. Use 600 KC. signal with 400 cycle modulation (use nearby frequency if local station interferes.)
2. For R.F. and I.F. measurements connect negative terminal of a 3 volt battery (two 1½ volt cells in series) to A.V.C. lead and positive terminal to B—. This provides a definite operating point. IMPORTANT: Disconnect battery when measuring audio stage gains.
3. Be sure radio is carefully tuned to generator signal (use weak signal for sharp tuning.)
4. When using a "channel" type instrument carefully tune it for maximum output at desired frequency before making measurements.

The R.F. and I.F. stage gains shown below are less than under normal operating conditions due to the use of 3 volts fixed bias in order to establish a definite operating point. Therefore, these values are not intended to indicate the full capability of a stage.


2.5X AT 600 KC.
6X AT 600 KC.
20X INPUT 600 KC. CONVERSION GAIN OUTPUT 455 KC.
75X AT 455 KC.
20X AT 400 CYCLES
9X USE MODERATELY STRONG 400 CYCLE SIGNAL
SIGNAL GENERATOR SET TO 600 KC.
300 MMF.
12SK7 R.F.
12SA7 1st DET.—OSC.
12SF7 I.F.—2nd DET.—A.V.C.
12SK7 1st A.F.
35L6GT OUTPUT

Differences in tube characteristics, tolerance of parts, adjustment of tuned circuits, and variations of line voltage will influence stage gain. Accuracy of measurements is dependent upon careful tuning of receiver to generator signal and experience in using your test equipment. These factors may create considerable variation in gain measurements.

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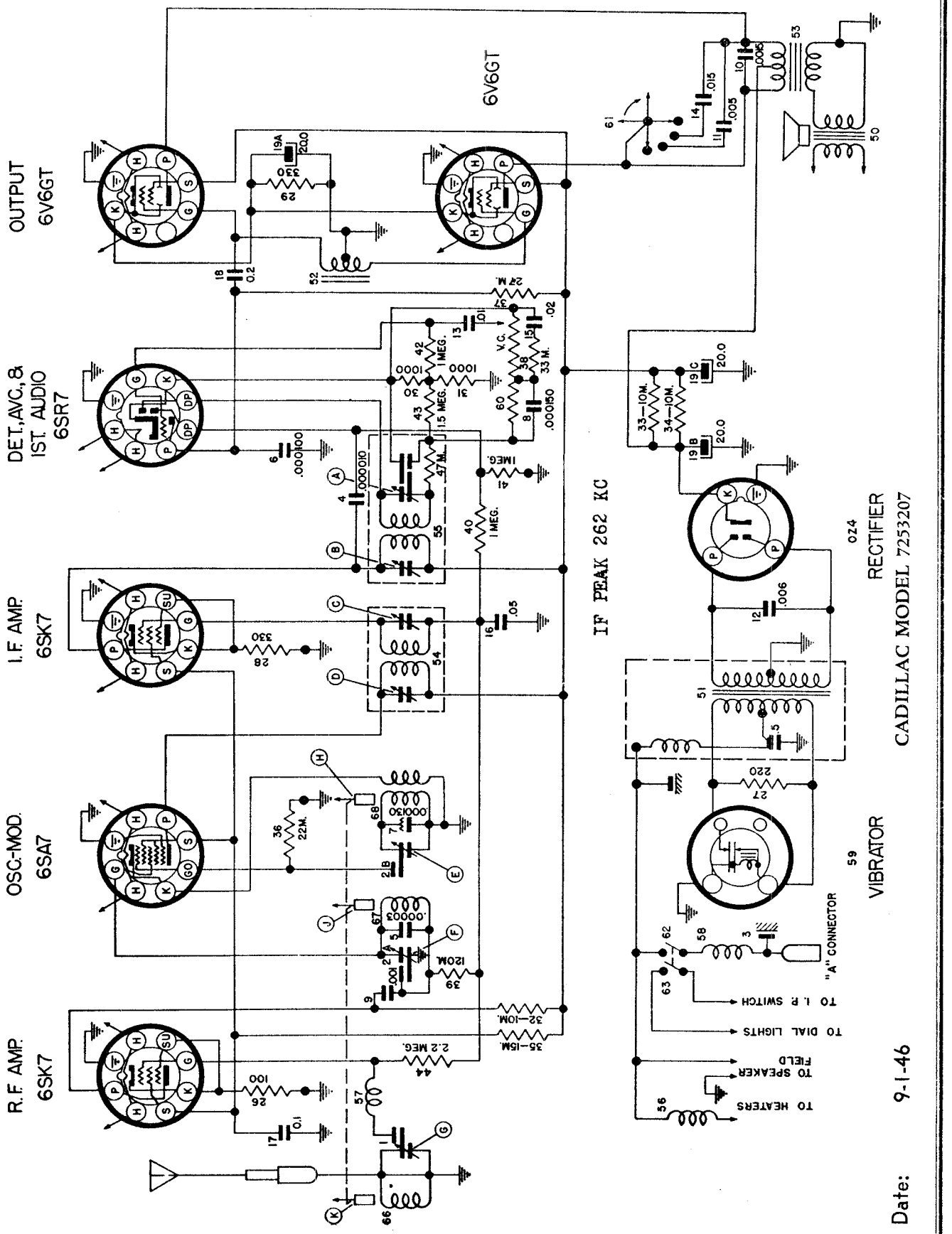
MODEL 7253207

CADILLAC DIV.-GENERAL MOTORS



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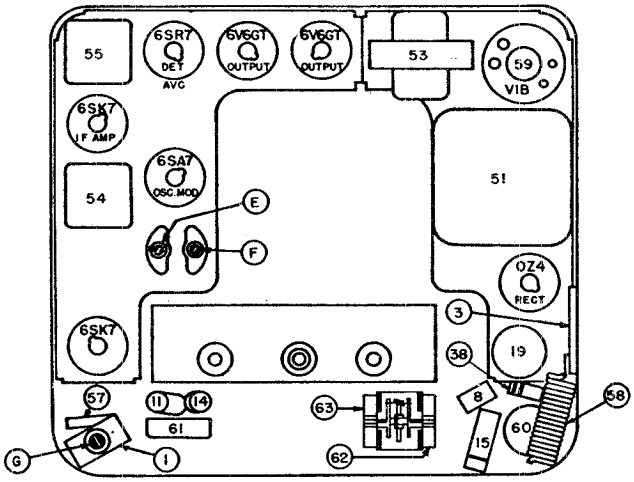
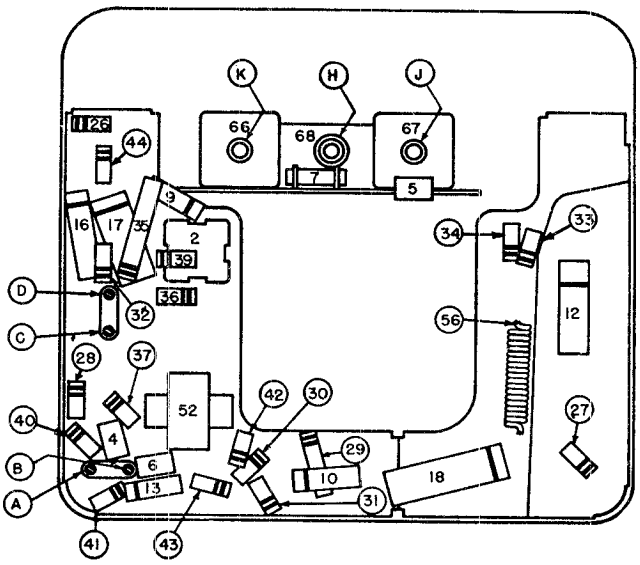
MODEL 7253207

CADILLAC DIV.-GENERAL MOTORS



PARTS LAYOUT—TUBE VIEW



PARTS LAYOUT—CHASSIS VIEW

PUSH BUTTON SET-UP

Push button in and latch. Turn button until desired station is brought in. Do not hold button in beyond normal latching position while adjusting.

ALIGNMENT PROCEDURE

Volume Control Maximum.

Signal Generator output minimum for satisfactory output indications.

Series Condenser or Dummy Antenna	Connect To	Signal Generator Frequency	Adjust Screws In Order
0.1 Mfd	Pin #8 of 6SA7	262 KC	A B C D
.000070 Mfd	Antenna Connector	1615 KC	E
.000070 Mfd	Antenna Connector	1430 KC	F G

Adjust trimmer G to match car antenna (1430 KC) when radio is installed.

SPECIAL INSTRUCTIONS

Alignment of Iron Cores: Tune to stop at H. F. end of dial. Adjust cores H, J and K to extend $1\frac{5}{32}$" from end of their coil forms. Adjust trimmers E, F and G (SG at 1615 KC). Adjust cores J and K (SG at 1430 KC). Repeat alignment adjustment of trimmers at 1615 KC. and of cores J and K at 1430 KC.

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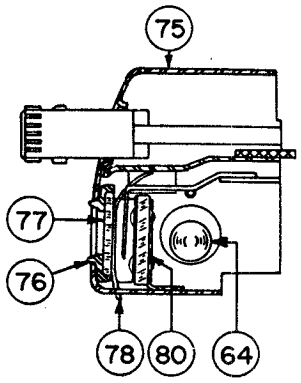
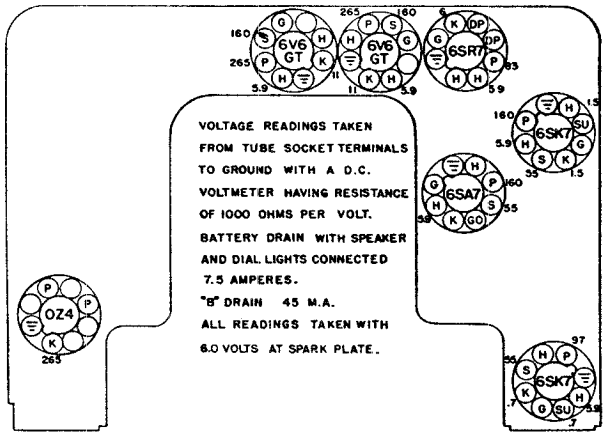
MODEL 7253207

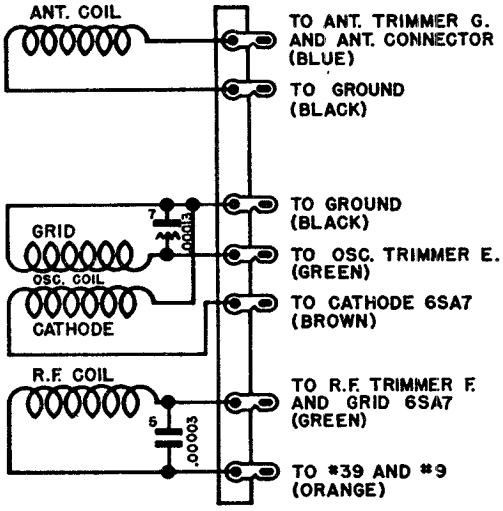
CADILLAC DIV.-GENERAL MOTORS



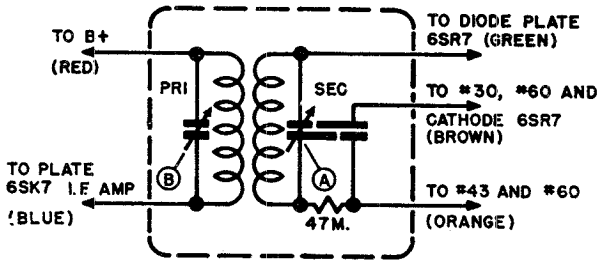
ESCUTCHEON
CROSS SECTION


6V6 GT
6V6 GT
6SR7
6SK7
6SA7
6SK7
OZ4
VOLTAGE READINGS TAKEN FROM TUBE SOCKET TERMINALS TO GROUND WITH A D.C. VOLTMETER HAVING RESISTANCE OF 1000 OHMS PER VOLT.
BATTERY DRAIN WITH SPEAKER AND DIAL LIGHTS CONNECTED 7.5 AMPERES.
"B" DRAIN 45 M.A.
ALL READINGS TAKEN WITH 6.0 VOLTS AT SPARK PLATE.

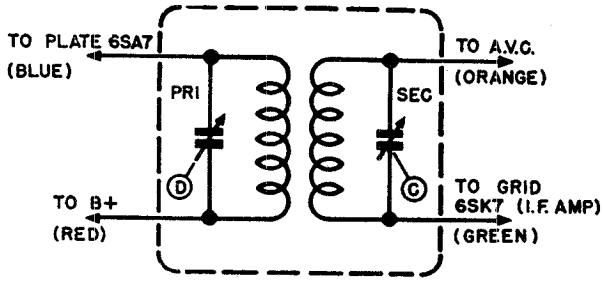
TUBE SOCKET VOLTAGE CHART



TUNER COILS

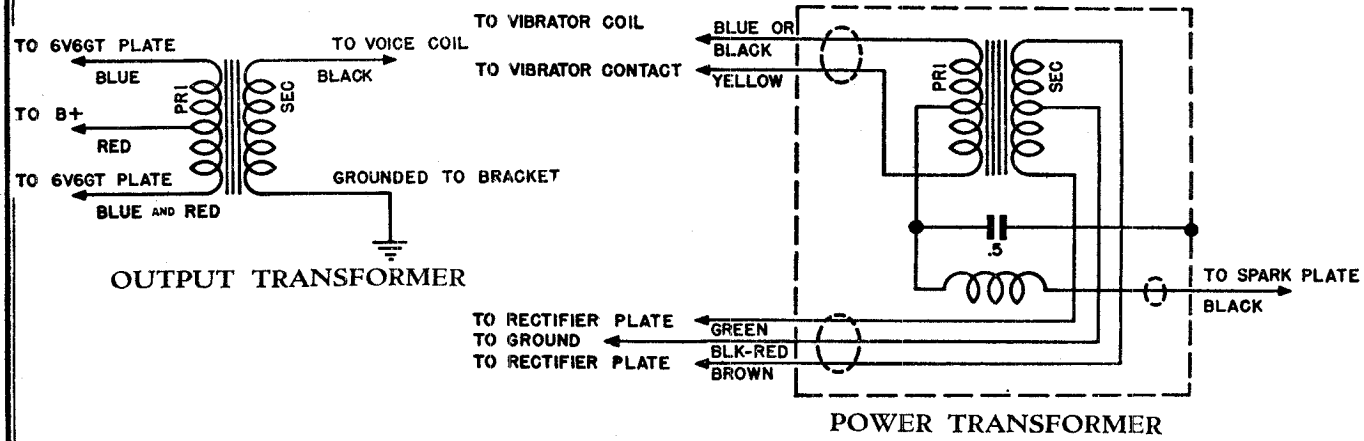


SECOND I. F. TRANSFORMER



FIRST I. F. TRANSFORMER

COIL CONNECTIONS



OUTPUT TRANSFORMER

POWER TRANSFORMER

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MODEL 7253207

CADILLAC DIV-GENERAL MOTORS

GENERAL

MOUNTING—All 1946 Cadillac Cars.

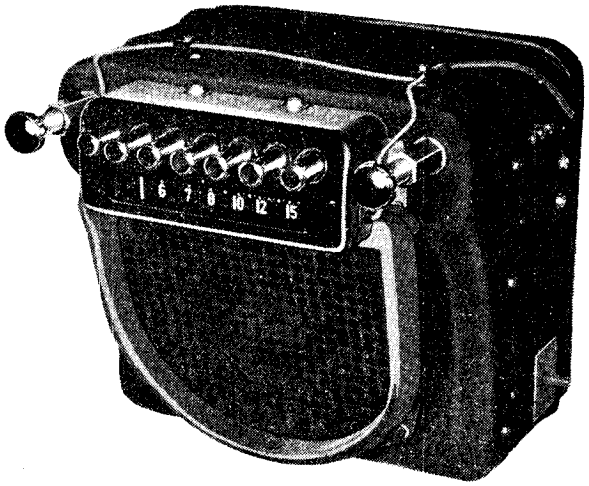
TUBES—Seven—6SK7 (2), 6SA7, 6SR7, 6V6GT (2), 0Z4.

SPEAKER—8" Dynamic.

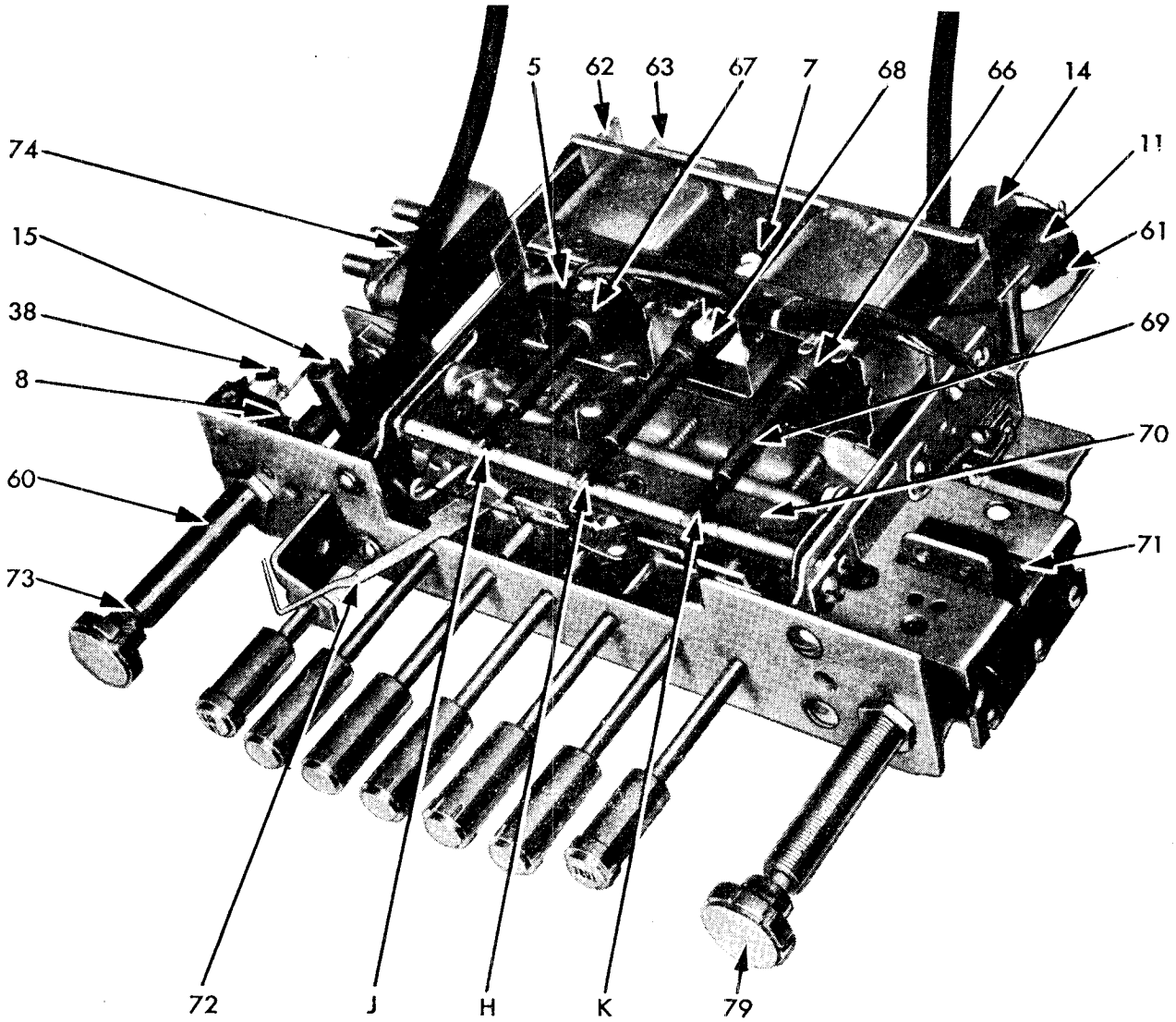
TUNING—Manual and 5 P. B.

CAR ANTENNA CAPACITY—.000065 to .000075 Mfd.

TUNING RANGE—550 - 1600 KC.



MODEL 7253207



TUNER PICTURE

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Illus. No.	Service Part No.	Description
		CONDENSERS
1	7242472	Antenna Trimmer
2	7242454	Dual Trimmer
3	7241259	Spark Plate Assembly
4	1215189	.000010 Mfd. Molded
5	1213016	.000030 Mfd. Molded (Included in Tuner Assy.)
6	1210275	.000100 Mfd. Molded
7	7237839	.000130 Compensating (Included in Tuner Assy.)
8	7230893	.000150 Mfd. Molded (Included in Tuner Assy.)
9	1212097	.001 Mfd. 800 V. Tubular
10	7236134	.0015 Mfd. 800 V. Tubular
11	7233769	.005 Mfd. 1000 V. Tubular (Included in Tone Control Switch Assembly)
12	7240906	.006 Mfd. 1600 V. Tubular
13	1208600	.01 Mfd. 600 V. Tubular
14	7237719	.015 Mfd. 600 V. Tubular (Included in Tone Control Switch Assembly)
15	1212099	.02 Mfd. 600 V. Tubular (Included in Tuner Assembly)
16	7230592	.05 Mfd. 600 V. Tubular
17	1207908	0.1 Mfd. 400 V. Tubular
18	7242404	0.2 Mfd. 400 V. Tubular
19	7240724	Electrolytic 3 Section
19A		20 Mfd. 25 V.
19B		20 Mfd. 400 V.
19C		20 Mfd. 400 V.
		RESISTORS
26	1213217	100 Ohms ½ W. Insulated
27	7237994	220 Ohms 1 W. Insulated
28	1213224	330 Ohms ½ W. Insulated
29	7233773	330 Ohms 1 W. Insulated
30	1213235	1,000 Ohms ½ W. Insulated
31	1213235	1,000 Ohms ½ W. Insulated
32	1211085	10,000 Ohms 1 W. Insulated
33	7237838	10,000 Ohms 2 W. Insulated
34	7237838	10,000 Ohms 2 W. Insulated
35	7233653	15,000 Ohms 2 W. Insulated
36	1214550	22,000 Ohms ½ W. Insulated
37	1213342	27,000 Ohms 1 W. Insulated
38	1213845	33,000 Ohms ½ W. Insulated (Included in Tuner Assy.)
39	1213271	120,000 Ohms ½ W. Insulated
40	1213282	1 Megohm ½ W. Insulated
41	1213282	1 Megohm ½ W. Insulated
42	1213282	1 Megohm ½ W. Insulated
43	1213283	1.5 Megohm ½ W. Insulated
44	1214563	2.2 Megohm ½ W. Insulated
		MISCELLANEOUS ELECTRICAL PARTS
50	7242556	Speaker—8" P. M. (Use only with #7242474 Trans.)
50A	7242557	Speaker—8" Electrodynamic (Use only with #7242558 Trans.)
51	7255881	Power Transformer Assembly
52	7242312	Input Transformer Assembly
53	7242474	Output Transformer Assembly (Use only with #7242556, Speaker)
53A	7242558	Output Transformer Assembly (Use only with #7242557, Speaker)
54	7242079	First I. F. Transformer Assembly Complete
55	7242533	Second I. F. Transformer Assembly Complete
56	7241708	"A" Filter Choke
57	7240251	Antenna Choke Coil
58	7241701	"A" Spark Choke
59	8638	Vibrator—Non Synchronous
60	7242296	Volume Control (Included in Tuner Assembly)
61	7242482	Tone Control Switch Assembly (Included in Tuner Assembly)
62	7242529	Switch and Guide Bracket Assembly (Included in Tuner Assembly)
63	7242537	Lamp Switch and Bracket Assembly (Included in Tuner Assembly)
64	7242560	Dial Lamp and Lead Assembly (Includes Lamp Bulb 187189)
	187189	Lamp Bulb
		MISCELLANEOUS CHASSIS PARTS
	5274994	Volume Control Cable (Included in Tuner Assembly)
	7242478	"A" Lead and Connector—Set to Fuse
	7239475	Antenna Connector Socket
	7236279	Octal Base Tube Socket
	7233944	Vibrator Socket

Illus. No.	Service Part No.	Description
		TUNER AND ESCUTCHEON PARTS
	7253132	Tuner Assembly Complete
	7241870	Rubber Grommet (Ant. and R. F. Coil)
	7242183	Rubber Grommet (Osc. Coil)
66	7242192	Antenna Coil Assembly
67	7242192	R. F. Coil Assembly
68	7242479	Oscillator Coil Assembly
69	7242578	Iron Core Assembly
70	7241045	Spring—Core Coupling
71	7240893	Clutch Assembly
72	7242392	Pointer Assembly (Includes Cord)
	7242520	Cord Assembly
62	7242529	Switch and Guide Bracket Assembly
	7242513	Spring—Switch Coupling
63	7242537	Lamp Switch and Bracket Assembly
61	7242482	Tone Control Switch Assembly (Includes Ill. 11 and 14)
11	7233769	Condenser—.005 Mfd. 1000 V. Tubular
14	7237719	Condenser—.015 Mfd. 600 V. Tubular
60	7242296	Volume Control
73	7242502	Shaft and Pin Assembly—Volume Control
74	7240845	Vacuum Valve
	7240812	Spring—Vacuum Valve Yoke
	7242426	Latching Button
	7236481	Hex Nut—Control Bushing
	5274994	Volume Control Cable
5	1213016	Condenser—.000030 Mfd. Molded
7	7237839	Condenser—.000130 Compensating
8	7230893	Condenser—.000150 Mfd. Molded
15	1212099	Condenser—.02 Mfd. 600 V. Tubular
38	1213845	Resistor—33,000 Ohms ½ W. Insulated
75	7242393	Escutcheon
76	7242277	Frame—Dial Glass
77	7242285	Dial Glass
78	7242286	Retainer Spring
79	7241389	Knob Assembly
80	7242494	Calibration Dial Assembly (Includes Dial Lamp)
	115273	Dial Lamp Bulb

TUBE COMPLEMENT

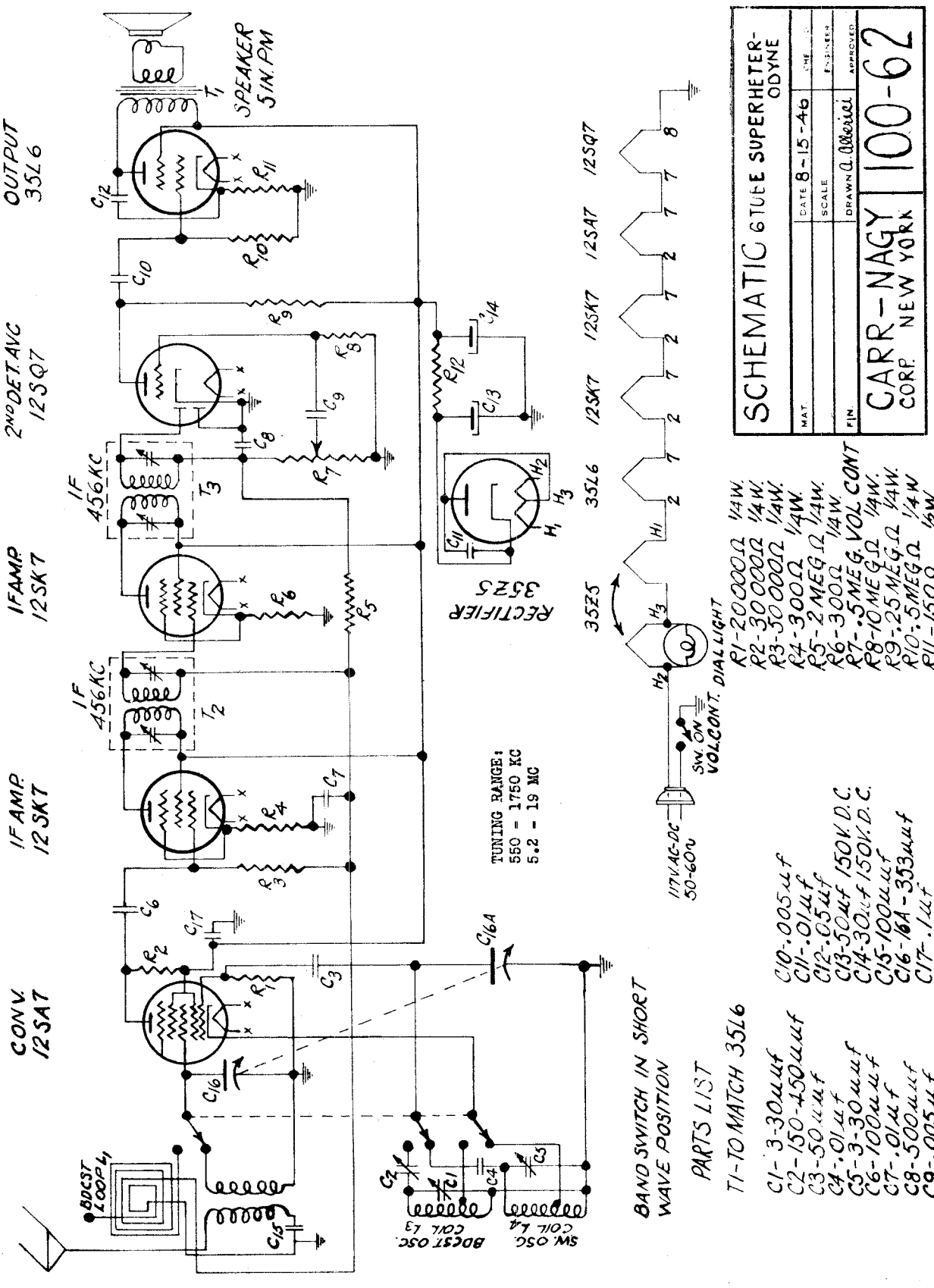
7237887	6SK7	R. F. Amplifier
7237886	6SA7	Oscillator—Modulator
7237887	6SK7	I. F. Amplifier
7240267	6SR7	Det., A. V. C. and First Audio
1213637	6V6GT	Push Pull Output
7237180	0Z4	Rectifier

MOUNTING AND INSTALLATION PARTS

7242412	Bracket—Radio Support
1880659	Generator Condenser
1879526	Coil Condenser
1435482	Distributor Suppressor
7255849	Spark Plug Suppressor
1207821	Spark Plug Suppressor
7240138	Front Wheel Static Collector
7242886	Grounding Spring
7241646	Grounding Spring
5274049	Ground Strap
7240761	Serrated Washer
7240808	Insulating Ferrule
7238456	"A" Lead Assembly
147685	Fuse
7242335	Escutcheon Assembly—Control Knob
1305217	Hex. Nut

MODEL 100-62

CARR-NAGY CORP.



SCHEMATIC 6 TUBE SUPERHETERODYNE

MAT.	DATE 8-15-46	CHK.	
	SCALE	ENGINEER	
FIN.	DRAWN O. Olberiel	APPROVED	

CARR-NAGY CORP. NEW YORK | 100-62

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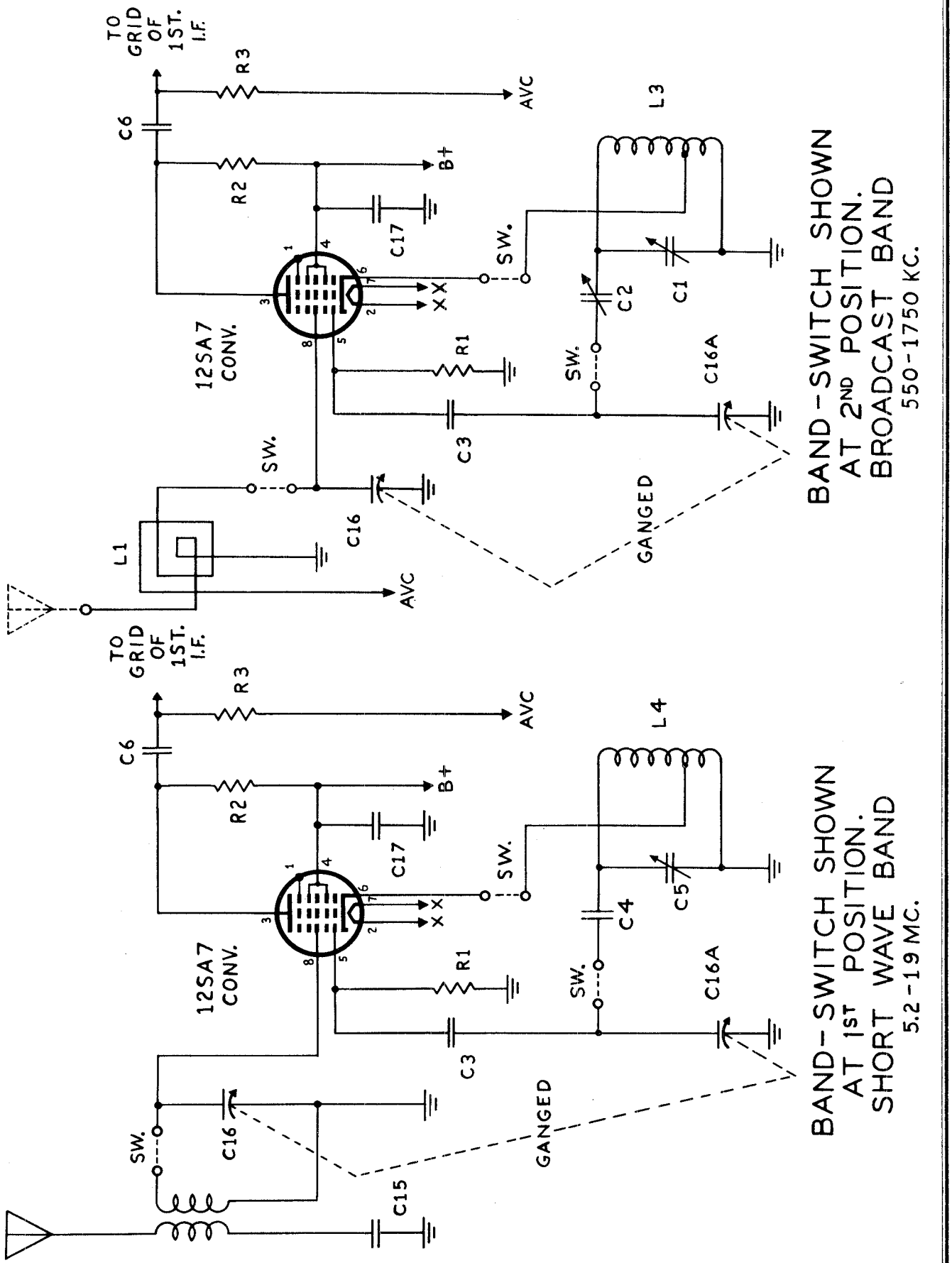
"clarified schematics"

MODEL 100-62

CARR-NAGY CORP.



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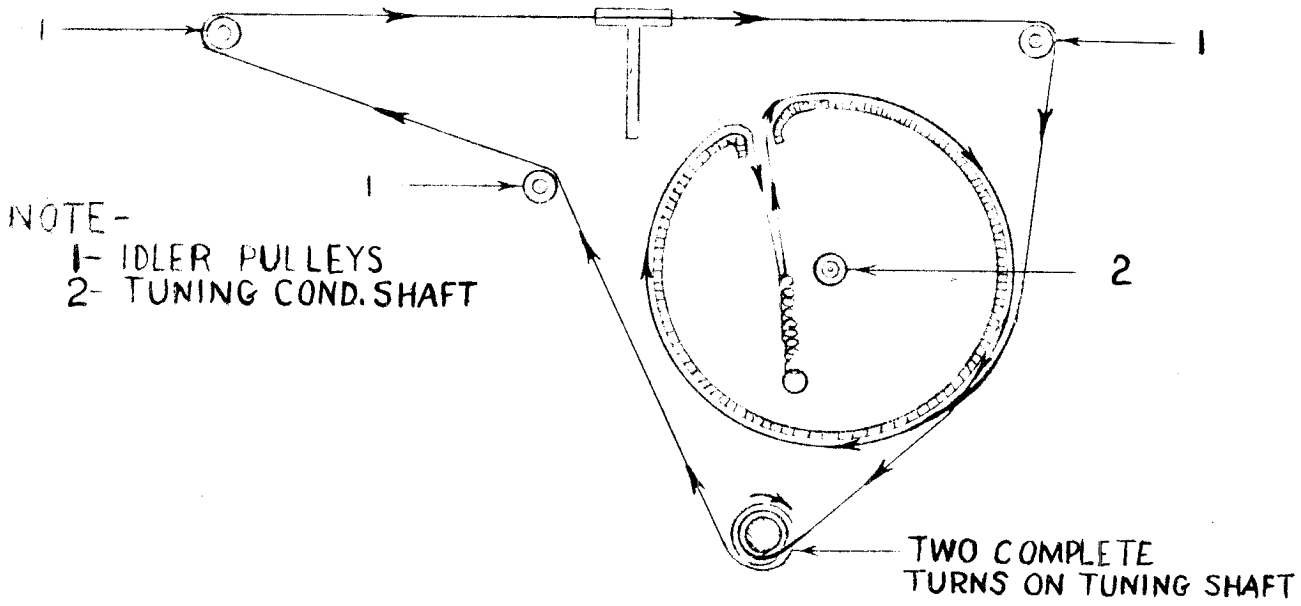
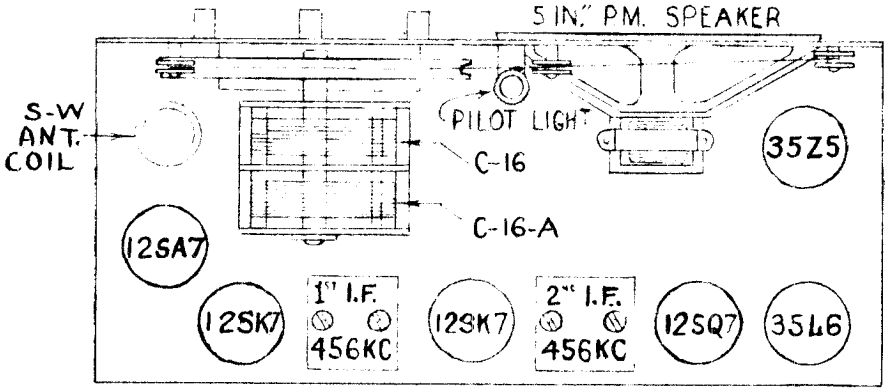
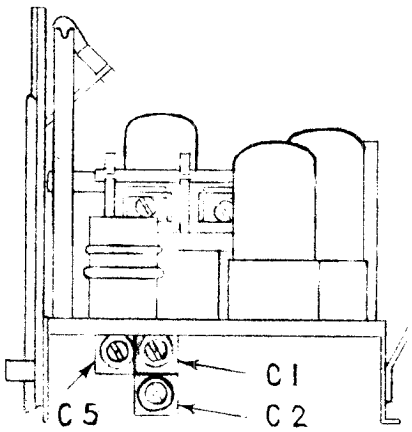
MODEL 100-62

CARR-NAGY CORP.





TOP VIEW



SIDE VIEW

ALIGNMENT PROCEDURE: Volume control - full on.

I-F ADJUSTMENT: Set Signal Generator at 456 kc. and connect it through a 0.1-mf condenser to pin No.4 of 2nd i-f tube, 12SK7. Peak for maximum response.
Connect generator lead to pin No.4 of 1st i-f tube, 12SK7 and peak first i-f transformer for maximum response.
Repeat above procedure.

OSCILLATOR TRACKING ADJUSTMENT: Set Signal Generator to 600 kc and connect it to independent loop antenna. Place this loop near loop in receiver. Set dial pointer to 600 kc on scale. Adjust C-2 for maximum response, while rocking gang condenser each side of frequency.

R-F ALIGNMENT: Set Signal Generator to 1600 kc. Set dial pointer to 1600 kc on scale.
Adjust C-1 for maximum response.
Disconnect generator lead from loop and connect to Short-Wave Antenna coil primary.
Set frequency of generator to 18 mc. Set dial pointer to 18 mc on SW scale. Turn Band Switch to "SW" position.
Adjust C-5 for maximum response.

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MODEL 985986

CHEVROLET DIV.-GENERAL MOTORS

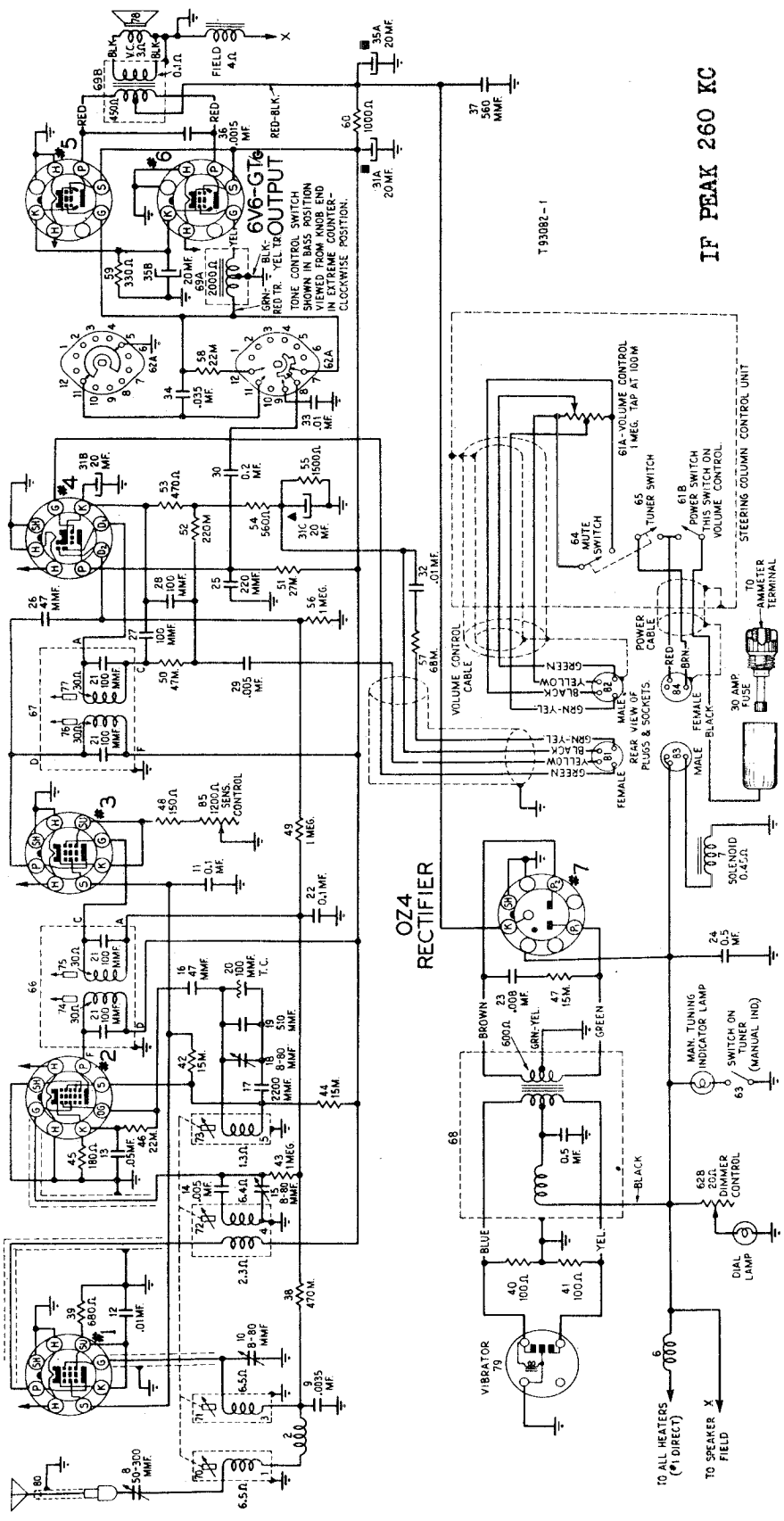

FIG. 1—CIRCUIT DIAGRAM—RADIO

Date 5-1-46

Antenna System: There are two antenna systems available for use with this receiver; the cowl rod antenna, and the telescopic reel type antenna. Either of these antennas will operate efficiently with this Chevrolet radio. After installation, the adjustment described in Paragraph 1 should be made.

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Circuit Description

The circuit used in this receiver is a conventional superheterodyne type with a stage of tuned RF amplification utilizing a 6SK7 tube, a 6SA7 converter, a 6SK7 IF amplifier, a 6SR7 second detector, audio amplifier and automatic volume control, a push-pull output stage, utilizing two 6V6GT/G tubes, and a rectifier, the rectifier socket being so wired as to permit optional use of either a 0Z4 or a 6X5 type.

The input circuit of the 6SK7 RF amplifier consists of permeability tuned antenna and R.F. coils, with a variable trimmer condenser (10) connected in parallel with the R.F. coil. Connected in series with the antenna lead is a variable trimmer condenser (8) which functions to compensate for slight variations in capacity of the antenna and the shielded antenna cable. The tuned input circuit is kept above ground d.c. potential, to permit application of AVC voltage to the 6SK7 grid. A 680 ohm resistor (39) is in series with the cathode to furnish residual bias for the tube. The output is inductively coupled to the grid circuit of the 6SA7 converter.

The 6SA7 converter has in its input circuit a permeability tuned coil (4) isolated by a blocking condenser (14), and shunted by a variable trimmer (15). AVC voltage is applied to the 6SA7 grid through a 1 Meg. resistor (43). The 180 ohm resistor (45) in series with the cathode is used to furnish residual bias. The oscillator portion of the 6SA7 is a modified Colpitts circuit, consisting of the oscillator coil (5), a fixed series padder condenser (17), and shunt condensers (18, 19 and 20); 20 is a negative temperature coefficient condenser employed to minimize oscillator drift due to temperature variations.

The 260 KC output from the 6SA7 is coupled to the 6SK7 IF amplifier by means of a permeability tuned IF transformer (66).
The 1200 ohm potentiometer (85) in the 6SK7 cathode circuit is a sensitivity control, factory adjusted for standard I.F. amplifier gain. By means of another permeability tuned I.F. transformer (67) the output of the 6SK7 is coupled to the signal diode of the 6SR7 2nd detector. Some signal from the 6SK7 I.F. amplifier plate is coupled to the AVC diode plate of the 6SR7 through a 47 mmf condenser (26). The triode section of the 6SR7 is used for audio amplification.

The AVC voltage is developed across the 1 meg. resistor (56). Since the cathode of the 6SR7 is at a positive potential equal to the sum of the voltage drops in the cathode resistors (53, 54, 55), no AVC voltage is developed until the signal exceeds the 6SR7 cathode potential. The audio signal developed across a 220 M resistor (52) is effectively placed in shunt with the manual volume control (61A). A portion of the audio voltage appearing across the volume control is applied to the grid of the triode section of the 6SR7. Tone compensation is accomplished by means of a tap on the volume control and the compensating resistor and condenser combination (32, 57). A muting switch (64) is mechanically coupled to the tuner switch, and electrically connected in shunt with the volume control, such that when the tuner switch is operated, the audio input to the 6SR7 grid is shorted, and thus the receiver is silent during tuning.

The amplified audio signal from the 6SR7 triode plate is applied to the 6V6GT/G output tubes by way of a four position tone control switch (62A). Phase inversion is accomplished in the center-tapped reactor (69A).

Bias for the 6V6GT/G tubes is obtained through the 330 ohm cathod resistor (59) which is bypassed by a 20 mfd. condenser (35B). The output signal is fed to the speaker by the output transformer (69B).

Tone Control

The four positions of the tone control are: Bass, Soft, Music and Voice. The tone control and its tone compensating network in the circuit are between the audio amplifier and the output stage, as shown in Figure 2. When the switch is in the "Bass" position, a .035 mf. condenser (34) shunts the output of the 6SR7 a.f. amplifier stage, bypassing a large portion of the high audio frequencies to ground, and resulting in minimum high audio frequency response. In the "Soft" position a .01 mf. condenser (33) shunts the output of the 6SR7, but due to it being lower in capacity than 34, the reduction of high frequency response is not so pronounced as in the "Bass" position. In the "Music" position, no shunting capacity is employed, thus resulting in a maximum of high and low frequency response.

In the "Voice" position, the output of the 6SR7 is shunted to ground with a .01 mfd. condenser (33), thus bypassing some of the high frequencies. Simultaneously, a parallel combination of a 22,000 ohm resistor (58), and a .035 mfd. condenser (34) is placed in series with the output of the 6SR7, resulting in reduced low frequency response, thus some attenuation of both high and low frequencies is accomplished, and optimum tone balance for speech programs is reached.

1. Adjusting Antenna Compensating Condenser

This adjustment should be made after the receiver has been properly installed in the car. Tune the receiver to a weak signal at the high frequency end of the band, at about 1200 kilocycles. This signal should be just audible with the volume control on full. Adjust the antenna compensating condenser (8) for maximum signal strength.

Note: When making this adjustment, be sure that the antenna is fully extended.

2. Circuit Alignment

The adjustable condensers and cores in the tuned circuits of this receiver have been carefully adjusted at the factory, and should require no further adjustment unless tempering has occurred, or a defective unit has been replaced. Should the receiver require re-alignment, the following procedure is recommended:

1. **Aligning the IF Stages at 260 KC.** (Refer to Figure 7 for location of adjusting screws, etc.)

   (a) Connect an output meter across the voice coil of the speaker; or connect one terminal of the output meter in series with a .01 mf. condenser to the plate of one of the 6V6 output tubes, and the other terminal of the output meter to the chassis frame.

   (b) Connect output lead of the signal generator through a 0.1 mf. condenser to the grid (pin No. 4) of the 6SK7 IF tube, and the ground lead of the signal generator to the receiver chassis. Set the signal generator to 260 KC.

   NOTE: It is important that the signal generator output be kept as low as possible to avoid AVC action in the receiver.

   (c) Turn receiver volume control full ON.

   (d) Tune receiver dial off any broadcast signal which may be present.

   NOTE: It is more satisfactory to eliminate the possibility of RF-IF beat-note interference by suppressing the oscillator section of the 6SA7 completely. This may be accomplished by temporarily connecting a .01 mf. (or larger) condenser from the 6SA7 oscillator grid (pin No. 5) to the receiver chassis.

   (e) Set sensitivity control 85 to mid position.

   (f) Adjust 2nd IF transformer cores 77 and 76 for maximum output meter reading.

   (g) Connect the signal generator output through the 0.1 mf. condenser to the 6SA7 signal grid (pin No. 8), and adjust the 1st IF transformer core screws 75 and 74 for maximum reading.

CONT'D

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2. Aligning the RF, Detector and Oscillator Circuits. (Refer to Figure 7 for location of adjusting screws, etc.)

NOTE: In the following outline of RF, Det. and Osc. circuit alignment, it is important that the output of the signal generator be kept at the minimum level required to obtain a reasonable indication on the output meter. This is to avoid AVC action and resultant broad peaking of the circuits.

(a) Tune receiver dial to the extreme high frequency end of the band.

(b) Turn each of the core adjustment screws 70, 71, 72, 73, several turns in a counterclockwise direction until the threaded stud extends $\frac{5}{8}$" through the core bar. This is done in order to remove the cores from the coil windings so that the cores will have no effect on the frequency of the circuits during initial trimmer adjustments.

(c) Connect the output of the signal generator to the antenna input socket through a 72 mmf. condenser.

(d) Set frequency of signal generator to 1645 KC, and peak trimmers 18, 15, 10, 8, reducing signal generator output as needed to prevent AVC action.

(e) Without changing the receiver dial setting, change frequency of signal generator to 1620 KC, then adjust core screws 73, 72, 71, 70 for maximum signal output.

(f) Change frequency of signal generator to 1200 KC, and tune receiver dial for maximum signal output at 1200 KC.

(g) Re-adjust core screws 72, 71, 70 for maximum signal output.

(h) Change frequency of signal generator to 600 KC and tune receiver dial for maximum signal output at 600 KC.

(i) Re-adjust trimmers 15, 10, 8 for maximum signal output.

(j) Reset frequency of signal generator to 1200 KC and tune receiver for maximum signal output at 1200 KC.

(k) Re-adjust core screws 72, 71, 70 for maximum signal output.

(l) A tabulated summary of the foregoing procedure is given below:

Serial Condenser (Dummy Antenna)	Connect To	Signal Generator Frequency	Tune Receiver To	Adjust Screws in Order Shown
0.1 MF.	6SK7 1F Grid (Pin 4)	260 K.C.	*Quiet point in Broadcast Band	77, 76
	6SA7 Grid (Pin 8)		*Quiet point in Broadcast Band	75, 74
72 mmf.	Antenna Socket	1645 K.C.	Extreme high frequency end	18, 15, 10, 8
72 mmf.	Antenna Socket	1620 K.C.	Extreme high frequency end	73, 72, 71, 70
72 mmf.	Antenna Socket	1200 K.C.	Signal Generator	72, 71, 70
72 mmf.	Antenna Socket	600 K.C.	Signal Generator	15, 10, 8
72 mmf.	Antenna Socket	1200 K.C.	Signal Generator	72, 71, 70

*Or connect a 0.01 mf., or larger, capacitor between the oscillator grid (pin No. 5 of 6SA7 converter) and chassis frame.

3. Tuning Cores in RF Tuned Circuits (Method of Replacement)

In order to provide optimum tracking over the tuning range and thus insure highest sensitivity at all frequencies, **matched** tuning cores are used in items 70, 71, 72, 73.

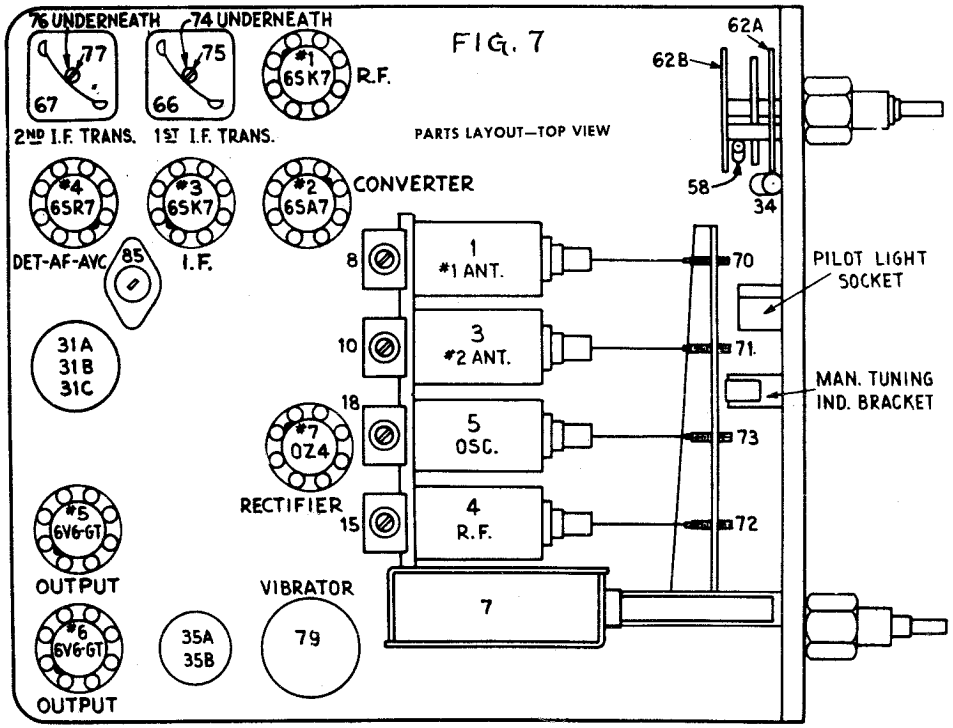

FIG. 7

These cores are coded with a spot of red, yellow, or green paint on the stud end of the core. As these cores are supplied in matched sets, **they positively should not be replaced individually.** To replace the cores, proceed as follows:

a. Remove the escutcheon by removing its four attaching screws.

b. Remove the fibre light baffle from the face plate by disengaging the lower part of the baffle from the lances which secure the baffle to the face plate. The baffle can then be moved downward and removed. Care should be exercised that the dial pointer is not bent.

c. Using a small thin-bladed screw driver, turn the core adjustment screw in a clockwise direction until the screw is disengaged from the core carriage. The tuning core can then be removed by carefully pushing it out through the rear of the coil.

d. Care should be exercised that undue pressure is not applied to the new core when the adjustment screw is engaged into the core carriage.

4. Removal of R.F. Coil Assembly

(a) Remove 6SA7 and OZ4 tubes.

(b) Unsolder the shielded antenna lead to the trimmer condenser (8) and the ground connection from tuner frame to chassis.

CONT'D

(c) Unsolder the four leads from the chassis to the R.F. and oscillator coils.

(d) Remove the two screws located at the top rear of the tuner frame, located near the shielded antenna lead.

(e) Remove the three screws through the holes provided in the chassis (bottom side); two located directly behind the speaker field, and one at the rear of the vibrator transformer can.

(f) The assembly can then be removed by carefully moving toward the rear of the chassis to disengage the coils from the tuning cores.

NOTE: Only in rare cases will it be necessary to remove the entire coil assembly inasmuch as the cores, coils, and coil shield cans can quite easily be removed individually

5. Removal of R.F. Coils

(a) Remove bottom cover of the receiver.

(b) Remove 6SA7, 6SK7, and OZ4 tubes.

(c) Adjust dial pointer to 600 KC.

(d) Unsolder the leads from the base lugs of coil or coils to be changed.

(e) Remove the two screws fastening the fibre coil base to the coil bracket.

(f) Very carefully remove the coil by pulling toward the rear of the chassis until the coil is disengaged from the tuning core.

6. Removal of Tuner Assembly

a. Remove screw from tuner frame located at rear of turret assembly.

b. Remove 6SA7, 6SK7 IF, and OZ4 tubes and vibrator.

c. Unsolder ground lead from tone control assembly to chassis and disengage the tone control from the tuner assembly.

d. Unsolder leads from chassis to RF and oscillator coils and ground strap from tuner frame to chassis.

e. Remove the two ½" x 28 hex. nuts from the tuning and tone control bushings on the front of the receiver.

f. The tuner unit can then be removed by lifting the assembly backwards and upwards from the chassis.

7. Removal of Turret Assembly

a. Remove tuner as described above. (Paragraph 6.)

b. Remove solenoid coil and bracket assembly as described in Paragraph 10.

c. Remove the two screws which fasten the rear turret and core carriage shaft bracket to the tuner frame and remove core carriage return spring.

d. Carefully note locations of the felt washers, then remove the core carriage shaft from the rear of the tuner.

e. Carefully push the core carriage toward the coil shields as far as possible.

f. Carefully move the turret assembly back and forth until the front portion of the shaft is disengaged from the shaft housing. The assembly can then be removed upward and out at the front of the tuner.

NOTE: Extreme care should be exercised during the above operations to prevent damage to the tuning cores and RF coils.

8. Removal of Tuning Shaft Clutch Assembly

a. Remove turret assembly as outlined in Paragraph 7.

b. Remove the "C" washer, spring retaining washer and spring from the front of the tuning shaft.

c. Remove the tuning shaft assembly from the rear of the tuning shaft bushing.

d. Replace with a new tuning shaft assembly.

9. Removal of Dial Pointer Assembly

a. Remove the escutcheon by removing its four attaching screws.

b. Remove the dial face plate by removing its two attaching screws.

c. Remove the two screws which fasten the pointer assembly to the tuner frame.

d. Carefully remove the pointer assembly through the front of the receiver.

10. Removal of Solenoid Coil and Bracket Assembly

a. Remove screw, lock and flat washer and fibre washers from front of plunger.

b. Unsolder coil lead at solder lug on terminal.

c. Using a long thin bladed screw driver, remove the two screws which fasten the solenoid bracket to the tuner frame by inserting the blade between the RF coil shield and underside of the solenoid. Be careful not to bend the RF coil shield down and thereby possibly injure the RF coil and tuning core.

11. Erratic Tuning

a. Weak core carriage spring. Replace spring if weak.

b. Weak turret return leaf spring. Spring is located at rear of turret shaft. Replace with new spring.

c. Lack of lubricating at turret shaft front bushing and at rear bracket.

d. Bent turret guide shaft.

e. Damaged turret setup screw threads. Replace turret assembly.

f. Inability to adjust pre-set positions or tune manually may be due to the tuning shaft clutch slipping. Correct by replacing tuning shaft and clutch assembly.

12. Dial Pointer Sticks

a. This is sometimes caused by lack of lubrication on the pointer assembly and core carriage guide shaft. Use a very light lubrication which is not affected by low temperature conditions.

b. Bent core carriage guide shaft.

c. Pointer rubbing on the inside surface of the escutcheon. This can be corrected by moving the pointer back slightly after loosening the screw provided in the pointer holder.

d. Weak pointer return spring. This spring is located underneath the assembly in a central location. Replace spring.

13. Solenoid Armature Sticks

a. Improper adjustment of the armature adjusting screw. To adjust, turn this screw out of the core several turns, then manually push the armature into the core as far as it will go. Then turn the adjustment screw "in" until it contacts the armature. Then turn the screw out six turns and lock it with the lock nut provided.

CONT'D

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MODEL 985986

CHEVROLET DIV.-GENERAL MOTORS

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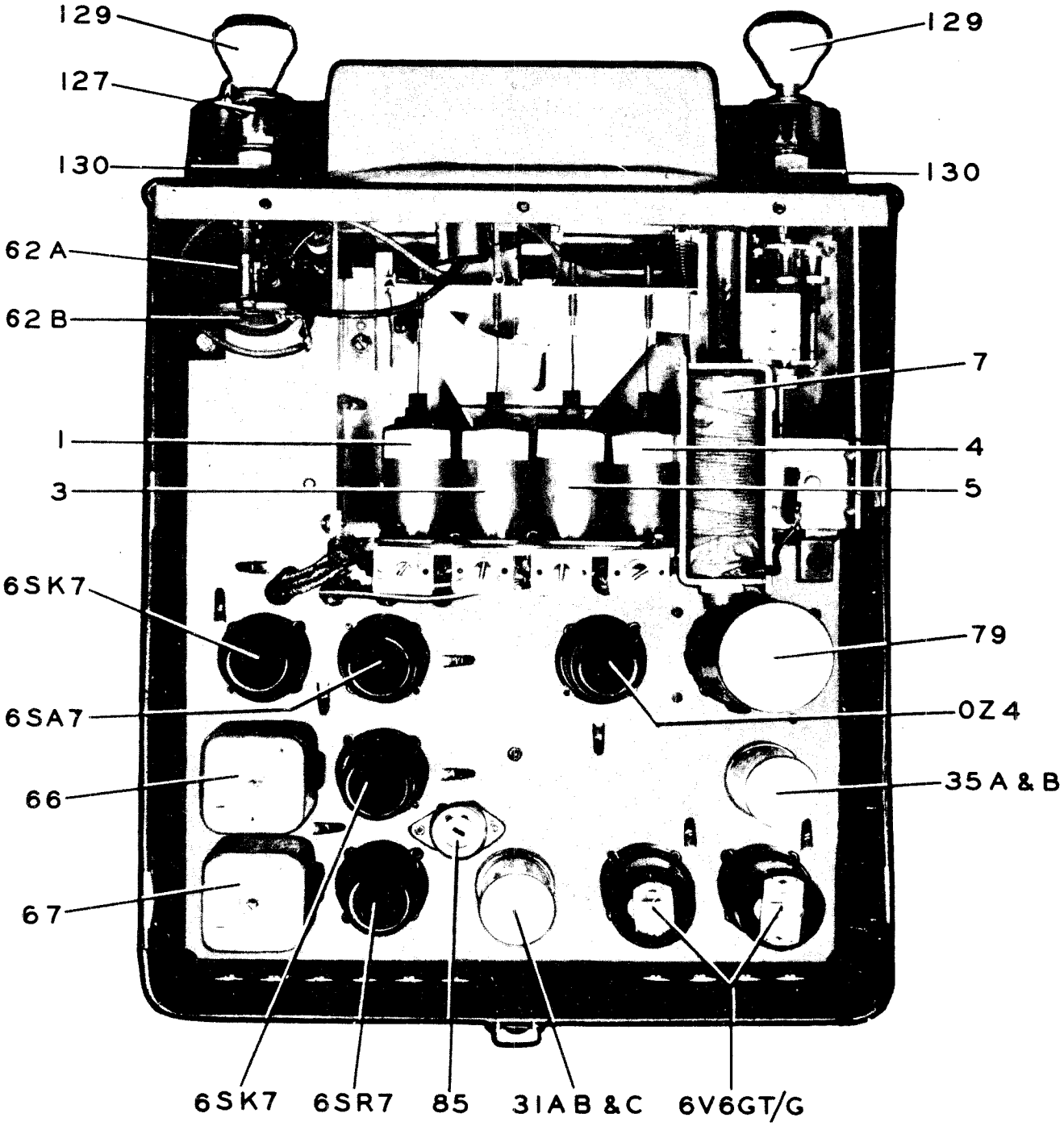

TOP VIEW

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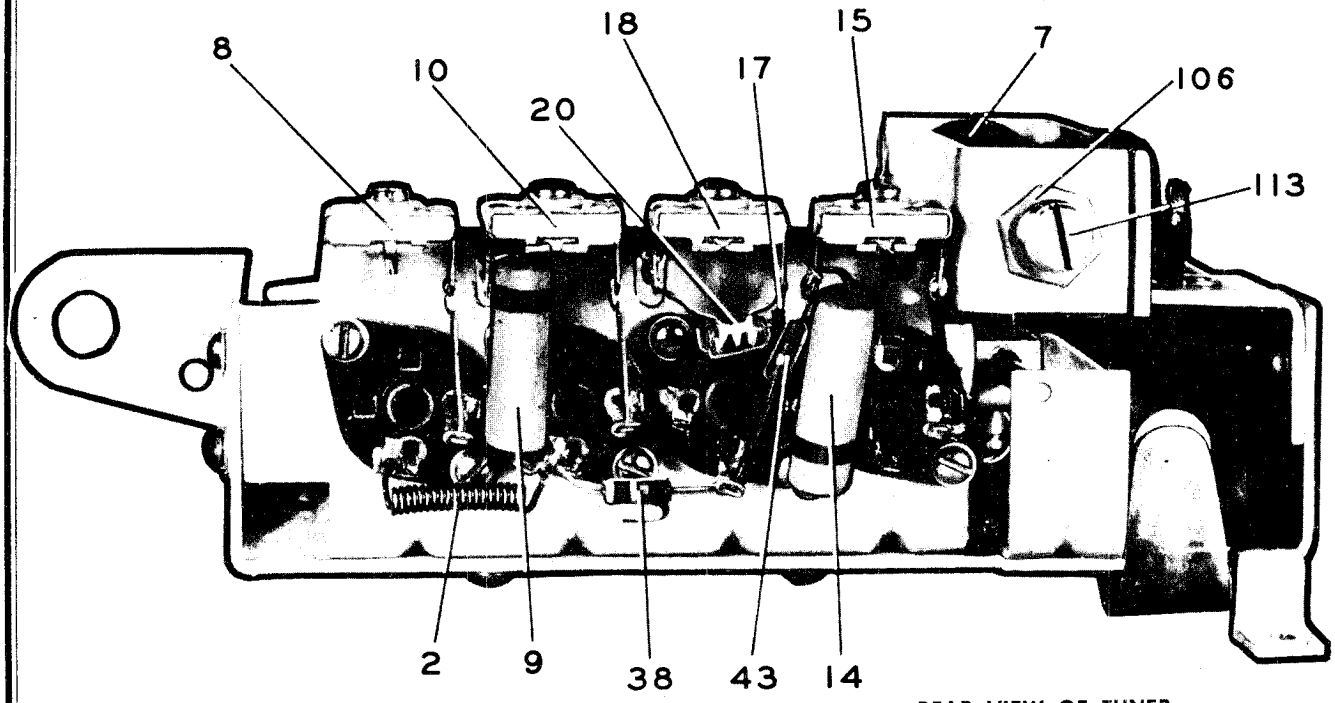
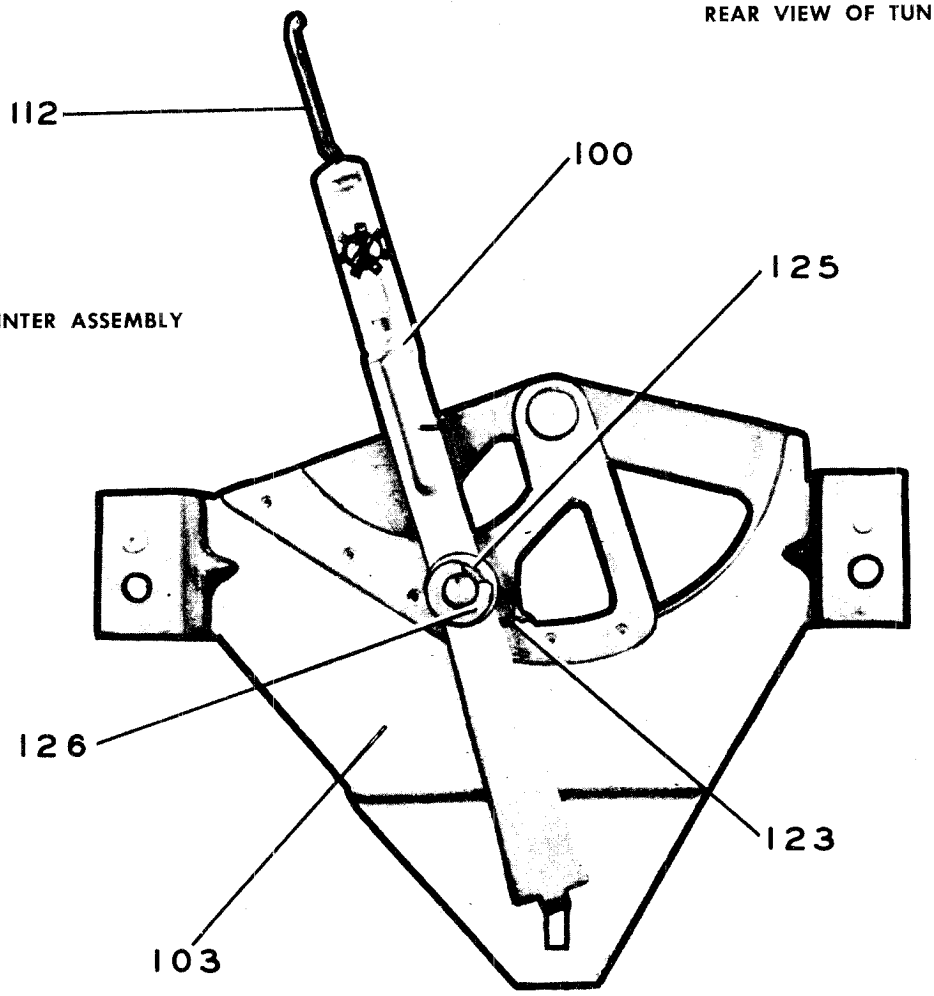
CHEVROLET DIV.-GENERAL MOTORS



REAR VIEW OF TUNER

DIAL POINTER ASSEMBLY



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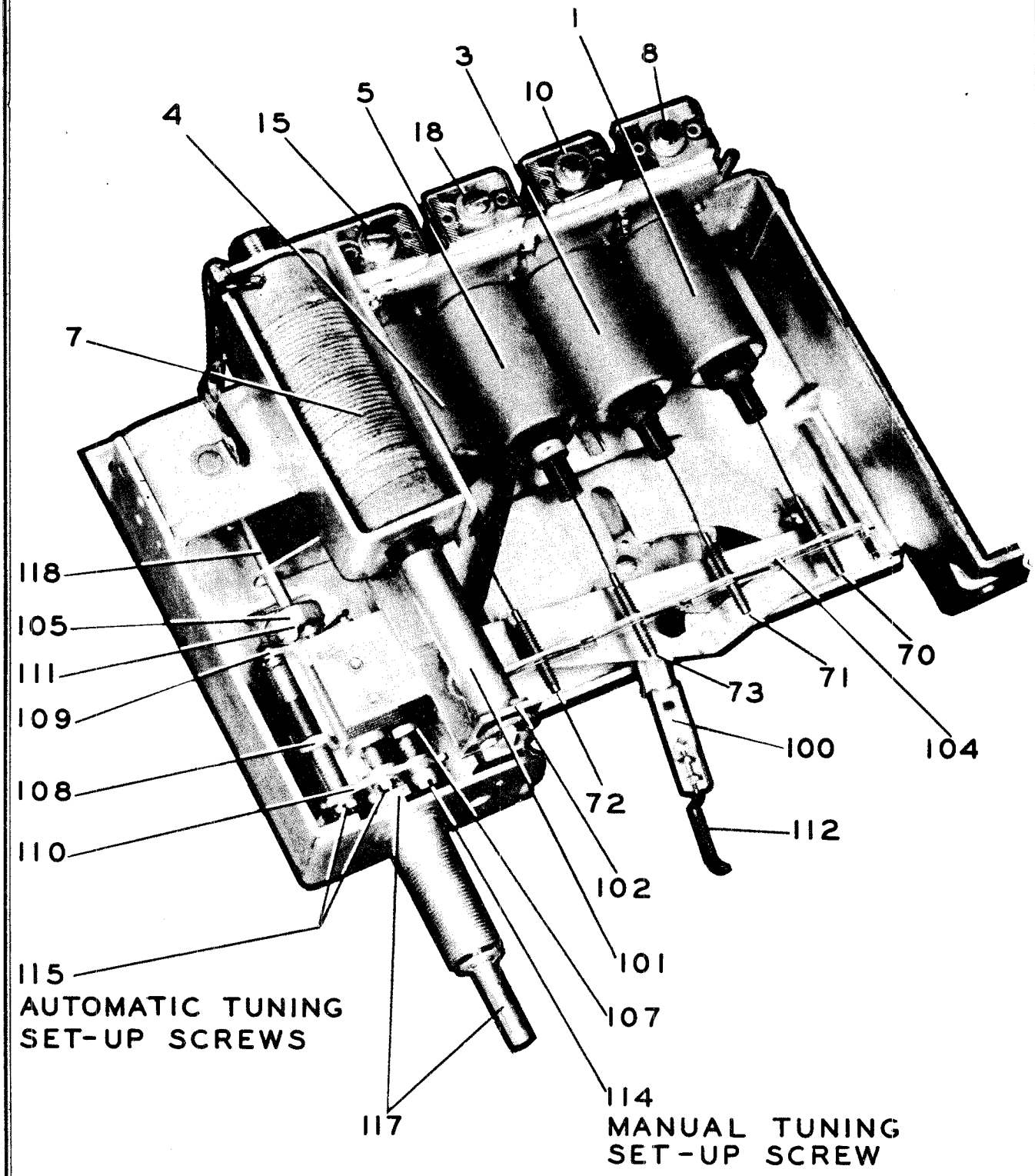

TOP VIEW OF TUNER

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Production Part No.	Service Part No.	Part Name	Description—Function	Illus. No.
1215800	.....	Coil	Antenna coil and terminal board less shield can	1
1215801	.....	Coil	Choke coil-ignition filter	2
1215800	.....	Coil	Antenna coil and terminal board less shield can	3
1215802	.....	Coil	R.F. coil and terminal board less shield can	4
1215804	.....	Coil	Oscillator coil and terminal board less shield can	5
1216864	.....	Coil	Choke coil	6
1216852	.....	Coil	Solenoid coil	7
1215074	.....	Condenser	Trimmer—50-300 mmf.	8
1216636	.....	Condenser	Tubular—.0035 mfd., 700 volts, RF AVC	9
1214456	.....	Condenser	Antenna Coil Trimmer—8-80 mmf.	10
1207908	.....	Condenser	Tubular—0.1 mfd., 400 volts, R.F. screen	11
1208600	.....	Condenser	Tubular—.01 mfd., 600 volts, R.F. cathode	12
7230592	.....	Condenser	Tubular—.05 mfd., 600 volts, converter cathode	13
7230912	.....	Condenser	Tubular—.005 mfd., 800 volts, converter grid blocking	14
1214456	.....	Condenser	R.F. Coil Trimmer—8-80 mmf.	15
7233313	.....	Condenser	Moulded .000047 mfd., oscillator grid blocking	16
1216883	.....	Condenser	Moulded—.0022 mfd., oscillator pad	17
1214456	.....	Condenser	Oscillator Coil Trimmer—8-80 mmf.	18
1216881	.....	Condenser	Moulded—.00051 mfd., oscillator grid tuning	19
1216120	1214932	Condenser	Ceramic—.0001 mfd., oscillator grid temperature compensator	20
1210275	.....	Condenser	Mica—.0001 mfd., I.F. circuit (See Ill. 66 and 67)	21
1207908	.....	Condenser	Tubular—0.1 mfd., 400 volts AVC filter	22
1215191	.....	Condenser	Tubular—.008 mfd., volts, .024 buffer	23
1212100	.....	Condenser	Tubular—0.5 mfd., 400 volts, 6 volt by-pass	24
7238792	1209055	Condenser	Moulded—.00022 mfd., Audio plate by-pass	25
7233313	.....	Condenser	Moulded—.000047 mfd., AVC source	26
1210275	.....	Condenser	Moulded—.0001 mfd., Diode lead by-pass	27
1210275	.....	Condenser	Moulded—.0001 mfd., Audio filter	28
7230912	.....	Condenser	Tubular—.005 mfd., 600 volts, audio coupling	29
7240579	7235836	Condenser	Tubular—0.2 mfd., 400 volts, audio coupling	30
1214490	.....	Condenser	Electrolytic	31
			A-20 mfd., 350 volts—"B" filter	...
			B-20 mfd., 25 volts—cathode by-pass	...
			C-20 mfd., 25 volts—delay resistor by-pass	31
1208600	.....	Condenser	Tubular—.01 mfd., 800 volts, Tone compensator	32
1208600	.....	Condenser	Tubular—.01 mfd., 200 volts, Tone control	33
1216641	7242448	Condenser	Tubular—.035 mfd., 400 volts, Tone Control	34
1214489	.....	Condenser	Electrolytic	35
1216880	.....	Condenser	Tubular—.0015 mfd., 1500 volts, output plate	36
1216882	1216881	Condenser	Moulded—.00051 mfd., R.F. by-pass	37
7240588	1210470	Resistor	Insulated—500,000 ohms, ½ w. R.F. (6SK7) AVC filter	38
1214543	1211222	Resistor	Insulated—500 ohms, ½ w., R.F. (6SK7) cathode	39
1213217	1211000	Resistor	Insulated—100 ohms, ½ w., Vibrator suppressor	40
1213217	1211000	Resistor	Insulated—100 ohms, ½ w., Vibrator suppressor	41
1211089	.....	Resistor	Insulated—15,000 ohms, ½ w., R.F. & I.F. screen dropping	42
1209885	.....	Resistor	Insulated—1 megohm, ½ w., Converter tube, AVC filter	43
7233653	.....	Resistor	Insulated—15,000 ohms, 2 w., Oscillator screen	44
1215559	1211006	Resistor	Insulated—200 ohms, ½ watt, Converter tube cathode	45
1211192	1215182	Resistor	Insulated—22,000 ohms, ½ w., oscillator grid	46
1211089	.....	Resistor	Insulated—15,000 ohms, ½ w., OZ4 buffer	47
1213220	1211003	Resistor	Insulated—150 ohms, ½ w., I.F. (6SK7) cathode	48
1209885	.....	Resistor	Insulated—1 megohm, ½ w., AVC filter	49
1211193	1210116	Resistor	Insulated—50,000 ohms, ½ w., Audio filter	50
1213342	.....	Resistor	Insulated—27,000 ohms, 1 w., 6SR7 plate load	51
1214570	1210119	Resistor	Insulated 220,000 ohms, ½ w., Diode load	52
1214575	1213486	Resistor	Insulated—470 ohms, ½ w., Squelch	53
7233314	.....	Resistor	Insulated—560 ohms, ½ w., 6SR7 bias	54
1211041	.....	Resistor	Insulated—1500 ohms, ½ w., AVC delay	55
1209885	.....	Resistor	Insulated—1 megohm, ½ w., AVC developer	56
1216884	.....	Resistor	Insulated—68,000 ohms, ¼ w., Tone compensator	57
1210882	1215182	Resistor	Insulated—22,000 ohms, ½ w., Tone control	58
1214572	.....	Resistor	Insulated—330 ohms, 2 w., 6 V6GT	59
1215183	.....	Resistor	Insulated—1000 ohms, 2 w., "B" filter	60
1215610	.....	Control	Volume Control—Steering post includes:	
			A—Volume control	.....
			B—Power switch	61
1217035	.....	Switch	Tone Control—Switch—Includes:	
			A—Tone control switch	.....
			B—Dimmer Control switch	62
1216844	.....	Switch	Manual indicator lamp switch	63
1216859	.....	Switch	Muting switch	64
1216064	.....	Switch	Steering post tuning switch	65
1214491	.....	Transformer	First I.F. transformer	66
1214491	.....	Transformer	Second I.F. transformer	67
1216628	.....	Transformer	Vibrating transformer	68
1216629	.....	Transformer	Audio transformer	
			A—Driver	.....
			B—Output	69
1217045	.....	Core	Tuning core for coils—yellow	70
1217045	.....	Core	Tuning core for coils—yellow	71
1217045	.....	Core	Tuning core for coils—yellow	72
1217045	.....	Core	Tuning core for coils—yellow	73
1217046	.....	Core	Tuning core for coils—green	70
1217046	.....	Core	Tuning core for coils—green	71
1217046	.....	Core	Tuning core for coils—green	72

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Pro-duction	Service	Part Name	Description—Function	No.
1217046	.....	Core	Tuning core for coils—green	73
1217047	.....	Core	Tuning core for coils—red	70
1217047	.....	Core	Tuning core for coils—red	71
1217047	.....	Core	Tuning core for coils—red	72
1217047	.....	Core	Tuning core for coils—red	73
1216627	.....	Speaker	Complete elliptical speaker	78
1215198	7239439	Vibrator	Plug-in vibrator	79
1215179	.....	Control	Sensitivity control	85

Chassis Miscellaneous Parts

1216867	.....	Cable	Antenna lead-in cable and socket	80
1217033	.....	Dial	Dial Assembly	....
1216868	.....	Escutcheon	Escutcheon	131
125588	.....	Lamp	Mazda 55	....
1216842	604275	Nut	Hex. nut (½-28 x 21/32") for tone switch tuning shaft	130
1216866	.....	Pad	Felt pad for dial window glass	....
1216231	.....	Socket	Power cable socket (3 prong male)	83
1213439	.....	Socket	Tube socket	....
1216224	.....	Socket	Volume control cable socket (4 contact)	81
1216860	.....	Window	Dial glass window only	....

Tuner Miscellaneous Parts

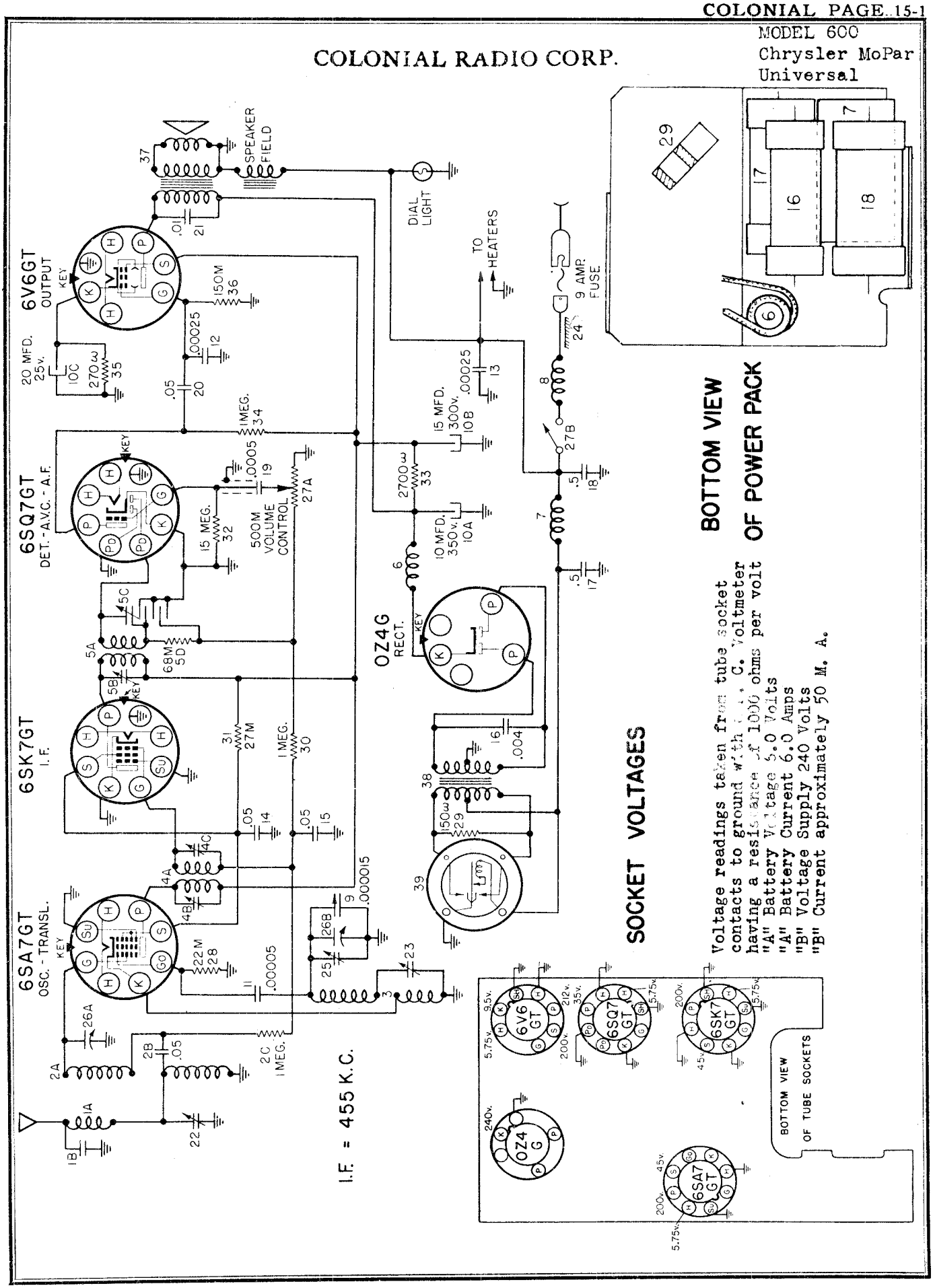
1216843	.....	Armature	Solenoid armature	101
1216861	.....	Bracket	Actuating bracket for solenoid armature	102
1216846	.....	Bracket	Pointer assembly mounting bracket and cam	103
1216845	.....	Carriage	Tuning coil carriage	104
1216840	.....	Nut	Hex. nut on rear of turret shaft to lock rear plate and spring plate	105
1216865	.....	Nut	Locknut for solenoid pole piece	106
1216838	.....	Nut	Manual tuning nut (.1640 dia. triple thread)	107
1216837	.....	Nut	Stop-nut for set-up screw (No. 8-32)	108
.....	.....	Plate	Turret rear plate	109
1216836	.....	Plate	Turret front plate	110
1216839	.....	Plate	Turret spring plate	111
1216828	.....	Pointer	Dial pointer and holder	112
1216848	.....	Pole Piece	Solenoid pole piece	113
1216835	.....	Screw	Manual tuning screw (.1640 dia. triple thread)	114
1216834	.....	Screw	Set-up screw (No. 8-32)	115
1217028	.....	Shaft	Tuning coil core carriage guide shaft	116
1216851	.....	Shaft	Tuning knob shaft and key	117
1216841	.....	Shaft	Turret shaft	118
1216862	.....	Spacer	Flat bakelite spacer for mounting solenoid armature in front of bracket	119
1216863	.....	Spacer	Shoulder bakelite spacer for mounting solenoid armature in rear of bracket	120
1216847	.....	Spacer	Tuning screw spacer (fibre)	121
1216853	.....	Spring	Coil core carriage return spring	122
1216849	.....	Spring	Pointer return spring	123
1216855	.....	Spring	Tuning shaft return spring	124
1216856	.....	Spring	Turret return spring	124
1216833	.....	Washer	Bearing washer for pointer arm	125
1214609	.....	Washer	"C" washer for mounting pointer arm to bracket and cam	126

Steering Post Control Miscellaneous Parts

1216211	.....	Cable	Power cable complete with socket, female fuse connector, ferrule and spring	....
1216204	.....	Cable	Volume control cable with plug	....
1216212	.....	Connector	Female fuse connector	....
1216213	.....	Connector	Male section fuse connector	....
.....	.....	Cover	Steering post control housing cover	....
.....	.....	Cushion	Rubber cushion for steering post control strap	....
1216216	.....	Ferrule	Ferrule and bushing for fuse connector	....
147686	603460	Fuse	30 ampere	....
1216217	.....	Grommet	Rubber grommet for steering post control housing	....
.....	.....	Housing	Steering post control housing and strap less cover and rubber pad	....
1216220	.....	Plug	Power cable plug (3 contact female)	84
1216219	.....	Plug	Volume control cable plug (4 contact)	82
1216228	.....	Screw	No. 4 x 3/16" binder head screw for steering post housing cover	....
111583	.....	Screw	No. 2 x 5/8" self-tapping screw to fasten sleeve to volume control shaft	....
100978	.....	Screw	No. 10-32 x 1¼" oval head screw to fasten steering post control to steering column	....
1216222	.....	Shaft	Steering post control flexible shaft and knob	....
1216221	.....	Sleeve	Steering post tuning shaft actuating sleeve	....
1836876	.....	Spring	Fuse connector spring	....
1216223	.....	Spring	Steering post actuating sleeve spring	....
115543	.....	Washer	No. 6 internal lockwasher for volume control bracket screws	....

Installation Parts

1216729	.....	Steering Post Control Assembly		....
1216634	.....	.....	Cover—Cable	....
1215227	Package No. 1	.....	Receiver Installation Kit	....
605052	.....	.....	Brace—Lower (1)	....
605053	.....	.....	Brace—Lower (1)	....
604273	.....	.....	Washer—Serrated (1)	....
604274	.....	.....	Bolt—hex. hd. 5/16-24 x 2 (1)	....
120518	.....	.....	Bolt—Carriage ¼-20 x ¾ (2)	....
134556	120376	.....	Nut—hex. 5/16-18" (1)	....
134551	124818	.....	Nut—hex. ¼-20" (2)	....
.....	Package No. 2	.....	Knob Kit	....
604275	.....	.....	Mounting nut ½-28" (2)	....
609635	.....	.....	Knob-wing (1)	127
609634	.....	.....	Knob—Dummy (1)	128
605070	.....	.....	Washer (2)	....
605319	.....	.....	Spring Washer (1)	....
7242249	.....	.....	Control Knob (2)	129
.....	Package No. 3	.....	Suppressor Kit	....
1882272	.....	.....	Condenser—Ignition Coil (.03 mfd.) (1)	....
1882053	.....	.....	Clip—Ground (1)	....
1882054	.....	.....	Washer—Ignition Coil Condenser (1)	....
1887829	7230032	.....	Suppressor—Distributor (1)	....
1888204	1853686	.....	Adapter—Distributor (1)	....
986035	.....	.....	Power—Tire static (1)	....
1908848	605302	.....	Condenser—Generator (0.1 mfd.) (1)	....
.....	Package No. 5	.....	Static Collector Kit	....
494786	.....	.....	Static collector (2)	....
.....	Package No. 6	.....	Steering Post Control Mounting Kit	....
606347	.....	.....	Spring (1)	....
120614	.....	.....	Nut—10-32" (1)	....


COLONIAL RADIO CORP.
MODEL 600
Chrysler MoPar
Universal
6V6GT
OUTPUT
6SQ7GT
DET.-A.V.C.-A.F.
6SK7GT
I.F.
6SA7GT
OSC.-TRANSL.
OZ4G
RECT.
SPEAKER FIELD
DIAL LIGHT
TO HEATERS
9 AMP. FUSE
20 MFD. 25v.
270Ω
150M
.00025
.05
1MEG.
15 MFD. 300v.
10 MFD. 350v.
2700Ω
500M VOLUME CONTROL
15 MEG.
68M
22M
150Ω
.0005
.004
.00005
.000015
I.F. = 455 K.C.
BOTTOM VIEW
OF POWER PACK
SOCKET VOLTAGES
Voltage readings taken from tube socket contacts to ground with A. C. Voltmeter having a resistance of 1000 ohms per volt
"A" Battery Voltage 6.0 Volts
"A" Battery Current 6.0 Amps
"B" Voltage Supply 240 Volts
"B" Current approximately 50 M. A.
BOTTOM VIEW OF TUBE SOCKETS

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MODEL 600
Chrysler MoPar
Universal

COLONIAL RADIO CORP

CIRCUIT ALIGNMENT

1. Alignment of I. F. at 455 KC.

   (a) Connect test oscillator lead through a .1 mfd. capacitor to the control grid of the 6SA7GT tube (see parts layout - terminal "X" on gang capacitor).

   (b) Connect ground terminal of test oscillator to set chassis.

   (c) If a conventional output meter is used, connect across the speaker voice coil or secondary of the output transformer.

   (d) Turn volume control to maximum.

   (e) Set test oscillator to exactly 455 KC.

   (f) Adjust all of the trimmers on the I. F. transformers (see parts layout - Items 4 and 5) for maximum. These adjustments should be made several times keeping the output of the test oscillator as low as is consistent with obtaining a readable indication on the output meter.

2. Alignment at 1520 KC.

   (a) Leave the test oscillator leads connected the same as for aligning I. F. circuits.

   (b) Turn rotor plates of gang capacitor all the way out against the high frequency stop.

   (c) Set test oscillator to 1520 KC.

   (d) Adjust the oscillator trimmer (see parts layout - Item 25) for maximum output. (It is very important that this frequency be set accurately as a slight missetting will cause the receiver to be out of track over the high frequency end of the dial).

3. Alignment of Antenna Stage.

   (a) Remove the signal lead of the test oscillator from the grid of the 6SA7GT tube and connect to the antenna terminal of the receiver through a .00005 mfd. capacitor connected in place of the .01 capacitor previously used. (It is very important that a .00005 mfd. capacitor be used when aligning the antenna stage of these receivers in order that this circuit can be made to track properly.

   (b) Set the test oscillator to 1400 KC.

   (c) Turn the station selector knob until this frequency is tuned in with maximum output, again keeping the input signal at a low value.

   (d) Adjust the antenna trimmer (see parts layout - Item 22) for maximum output.

4. Alignment at 600 KC.

   (a) Set the test oscillator at 600 KC.

   (b) Turn the station selector knob until the signal from the test oscillator is tuned in with maximum output.

   (c) Maintain a low input signal and adjust the oscillator padding capacitor (Item 23) while turning the station selector knob back and forth tuning through the 600 KC signal. This operation should be continued until no further increase in output can be obtained.

   (d) After the above operation, turn the station selector knob until the rotor plates of the variable capacitors are against the high frequency stop. Check the 1520 KC setting and if necessary readjust the oscillator trimmer. Return to 1400 KC repeating operation 3b, 3c, 3d above.

IMPORTANT NOTE

When the entire alignment procedure has been accomplished accurately, the receiver should be uniformly sensitive over the entire frequency range.

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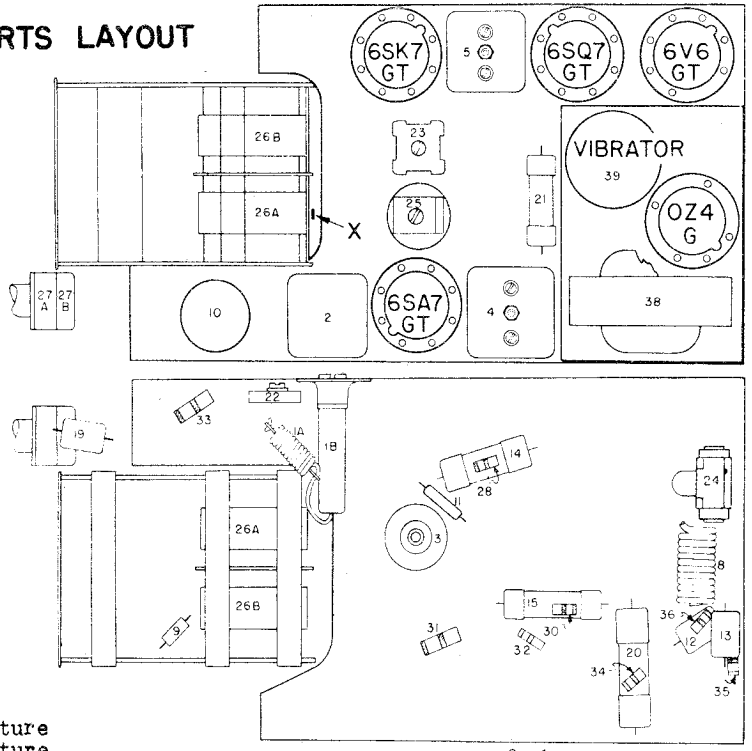
COLONIAL RADIO CORP.

MODEL 600
Chrysler MoPar
Universal

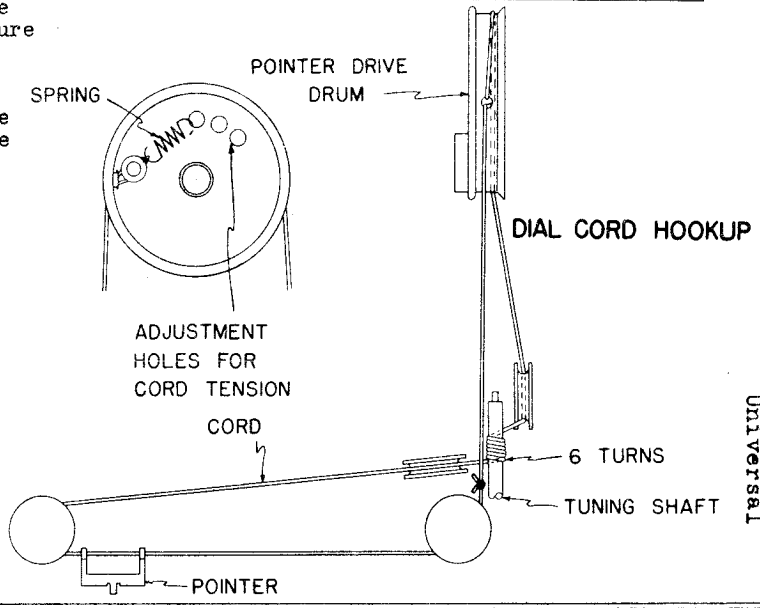
PARTS LIST

Schematic Location	Colonial Part No.	Part Name	Description
1	R15986G	Coil Assembly	Antenna, Filter and Choke
1A			Antenna Choke
1B			Connector and Filter Assembly
2	R42229	Coil Assembly	Antenna Transformer
2A			Antenna Coil
2B			Capacitor AVC Blocking
2C			Resistor AVC Filter
3	R41041	Coil	Oscillator
4	R42230	Coil Assembly	1st I. F.
4A			I. F. Transformer
4B			Primary Trimmer
4C			Secondary Trimmer
5	R42231	Coil Assembly	2nd I. F.
5A			I. F. Transformer
5B			Primary Trimmer
5C			Secondary Trimmer and Filter
5D			68,000 Ohm Diode Filter
6	R5114CM	Coil Assembly	Hash Choke
7	R9044E	Coil Assembly	Filament Choke
8	R5220CH	Coil	Spark Choke
9	R42261	Capacitor	.000015 Mfd. Compensating
10	R42260	Capacitor	Electrolytic
10A			10 Mfd. - 350 Volt
10B			15 Mfd. - 300 Volt
10C			20 Mfd. - 25 Volt
11	R14255	Capacitor	.00005 Mfd. Mica
12	R20548	Capacitor	.00025 Mfd. Mica
13	R20548	Capacitor	.00025 Mfd. Mica
14	R42204	Capacitor	.05 Mfd. 200 Volt - High Temperature
15	R42204	Capacitor	.05 Mfd. 200 Volt - High Temperature
16	R42211	Capacitor	.004 Mfd. 1500 Volt - High Temperature
17	R21019	Capacitor	.5 Mfd. 100 Volt - High Temperature
18	R21019	Capacitor	.5 Mfd. 100 Volt - High Temperature
19	R40122	Capacitor	.0005 Mfd. Mica
20	R42225	Capacitor	.05 Mfd. 400 Volt - High Temperature
21	R42304	Capacitor	.01 Mfd. 600 Volt - High Temperature
22	R41046	Capacitor	Antenna Padder
23	R42235	Capacitor	Oscillator Padder
24	R42271	Capacitor	Spark Plate
25	R41481	Capacitor	Oscillator Trimmer
26	R42218	Capacitor	Tuner Unit
27	R41996	Control	Volume and On-Off
27A			Volume Control 500,000 Ohm
27B			On-Off Switch
28	XY32231	Resistor	22,000 Ohm 1/3 Watt
29	ZY31512	Resistor	150 Ohm 1 Watt
30	XY31052	Resistor	1 Megohm 1/3 Watt
31	ZY32731	Resistor	27,000 Ohm 1 Watt
32	XY31562	Resistor	15 Megohm 1/3 Watt
33	ZY32721	Resistor	2,700 Ohm 1 Watt
34	XY31052	Resistor	1 Megohm 1/3 Watt
35	ZY32711	Resistor	270 Ohm 1 Watt
36	XY31541	Resistor	150,000 Ohm 1/3 Watt
37	R42391	Speaker	Dynamic with Output Transformer
38	R42232	Transformer	Power Supply
39	R42697	Vibrator	Plug In

PARTS LAYOUT



DIAL CORD HOOKUP



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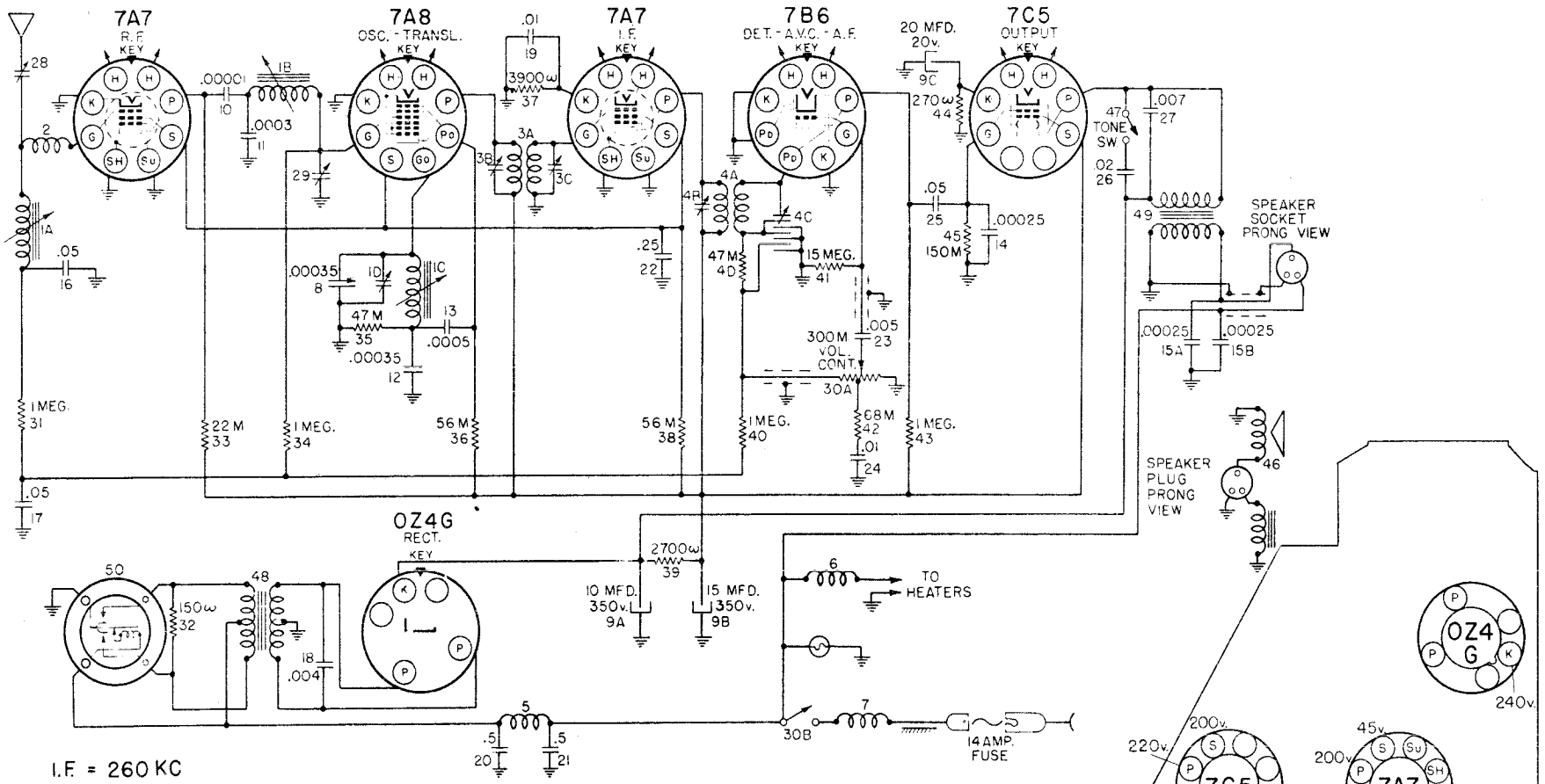


I.F. = 260 KC

Date 3/21/46

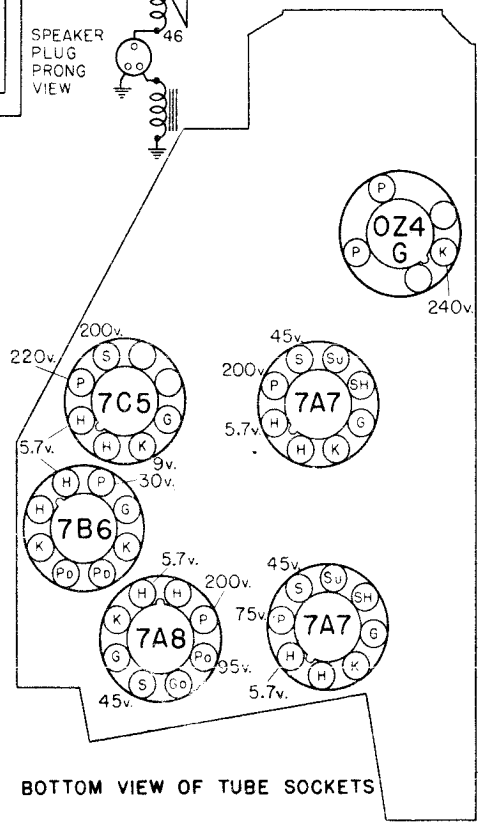
SCHEMATIC DIAGRAM - MOPAR MODEL 600

The power supply uses a gaseous rectifier tube, 0Z4G, in conjunction with a primary four prong, plug in, full wave vibrator.

SOCKET VOLTAGES

Voltage readings taken from tube socket contacts to ground with a D. C. Voltmeter having a resistance of 1000 ohms per volt.

"A" Battery Voltage 6.0 Volts
"A" Battery Current 6.0 Amps.
"B" Voltage Supply 240 Volts
"B" Current 48 M.A. to 54 M.A.



BOTTOM VIEW OF TUBE SOCKETS

COLONIAL RADIO CORP.

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All capacity adjustments, with the exception of the antenna matching capacitor, are carefully made at the factory and should require no further adjustment. The iron cores in the permeability tuning unit are set at the time the receiver is originally calibrated, and are sealed to eliminate possibility of turning due to vibration. No adjustment of these cores should be necessary unless a core or coil must be replaced. If realignment is found to be necessary the circuits can be properly adjusted only with the use of a calibrated test oscillator or signal generator and an output meter using the procedure outlined below:

1. Alignment of I. F. at 260 KC.

   (a) Connect test oscillator lead through a .1 mfd. capacitor to the control grid of the 7A8 oscillator tube (see parts layout - hot terminal of Item 29).

   (b) Connect ground terminal of test oscillator to set chassis.

   (c) If a conventional output meter is used, connect across the speaker voice coil or secondary of the output transformer.

   (d) Turn volume control to maximum.

   (e) Set test oscillator at exactly 260 KC.

   (f) Adjust padders 3B and 3C on first I. F. transformer and 4B and 4C on second I. F. transformer for maximum output. These adjustments should be made several times, keeping the output of the test oscillator as low as is consistent with obtaining a readable indication on the output meter.

2. Alignment at 1610 KC.

   (a) Remove the signal lead of the test oscillator from the grid of the 7A8 tube and connect to the antenna terminal of the receiver through a .00005 mfd. MICA CAPACITOR connected in place of the .1 mfd. capacitor previously used. (It is very important that a .00005 mfd. mica capacitor be used when aligning the antenna stage of these receivers in order that this circuit can be made to track properly).

   (b) Remove high frequency stop (see parts layout - Illustration "A"). This is no longer required.

   (c) Set the test oscillator to 1610 Kilocycles.

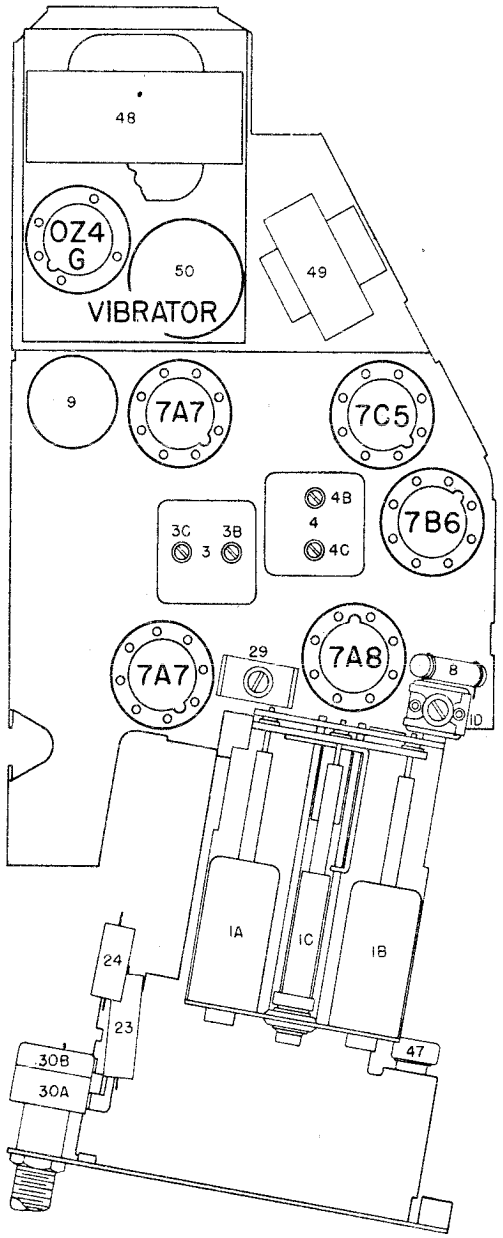
   (d) Turn station selector knob clockwise to the high frequency stop (1610 KC). Adjust the oscillator trimmer capacitor (see parts layout - Item 1D) for maximum output. (It is very important that this frequency be set accurately as a slight missetting will cause the receiver to be out of track over the high frequency end of the dial).

   (e) Set test oscillator to 1410 KC and tune receiver to this frequency. (Do <u>not</u> readjust oscillator trimmer).

   (f) Adjust the R. F. trimmer capacitor (see parts layout - Item 29) for maximum output.

   (g) Adjust the antenna trimmer capacitor (see parts layout - Item 28) for maximum output.

With the type of permeability tuning employed, the usual low frequency adjustments are not necessary.



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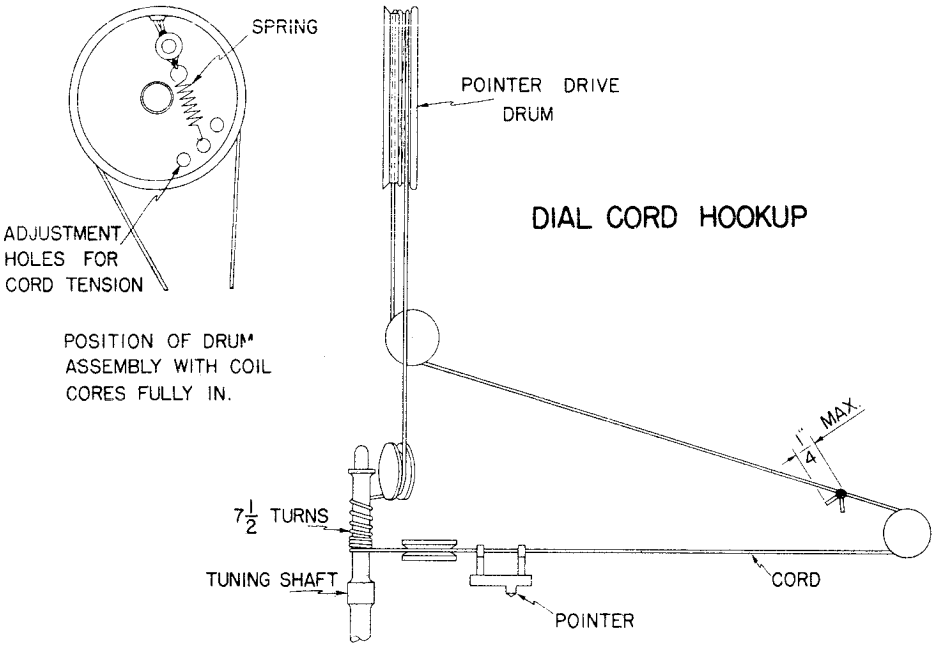
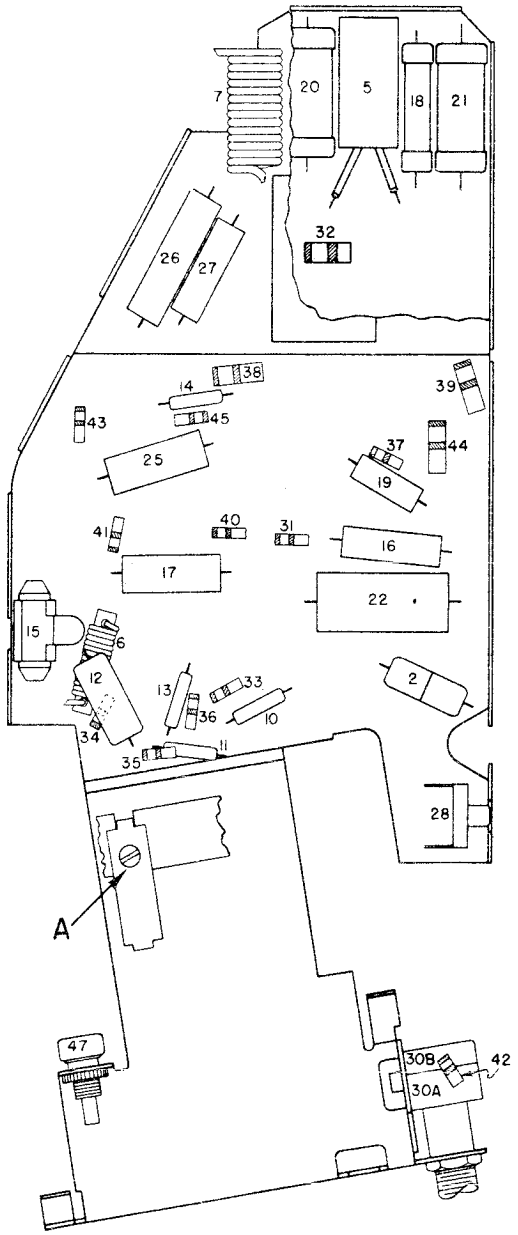


Schematic Location	Colonial Part No.	Part Name	Description
1	R43699	Coil Assembly	Chrysler, DeSoto, Plymouth
1A			Antenna Coil & Core) Not to be
1B			R. F. Coil & Core) serviced
1C			Oscillator Coil & Core) individually
1D			Oscillator Trimmer
1	R44664	Coil Assembly	Dodge Only
1A			Antenna Coil & Core) Not to be
1B			R. F. Coil & Core) serviced
1C			Oscillator Coil & Core) individually
1D			Oscillator Trimmer
2	R43382	Coil	Antenna Choke
3	R43775	Coil Assembly	1st I. F.
3A			I. F. Transformer
3B			Primary Trimmer
3C			Secondary Trimmer
4	R43776	Coil Assembly	2nd I. F.
4A			I. F. Transformer
4B			Primary Trimmer
4C			Secondary Trimmer
4D			47000 Ohm Diode Filter
5	R9044E	Coil Assembly	Hash Choke
6	R5115E	Coil Assembly	Filament Choke
7	R5220CH	Coil	Spark Choke
8	R43380	Capacitor	.00035 Mfd. Compensating
9	R43691	Capacitor	Electrolytic
9A			10 Mfd. 350 Volts
9B			15 Mfd. 350 Volts
9C			20 Mfd. 20 Volts

PARTS LAYOUT



COLONIAL RADIO CORP.

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Schematic Location	Colonial Part No.	Part Name	Description
10	R41777	Capacitor	.00001 Mfd. Mica
11	R43685	Capacitor	.0003 Mfd. Mica
12	R44561	Capacitor	.00035 Mfd. Mica
13	R40122	Capacitor	.0005 Mfd. Mica
14	R20548	Capacitor	.00025 Mfd. Mica
15	R43696	Capacitor	Dual
15A			.00025 Mfd. Mica
15B			.00025 Mfd. Mica
16	R42204	Capacitor	.05 Mfd. 200 Volt - High Temperature
17	R42204	Capacitor	.05 Mfd. 200 Volt - High Temperature
18	R42211	Capacitor	.004 Mfd. 1500 Volt - High Temperature
19	R41478	Capacitor	.01 Mfd. 200 Volt - High Temperature
20	R21019	Capacitor	.5 Mfd. 100 Volt - High Temperature
21	R21019	Capacitor	.5 Mfd. 100 Volt - High Temperature
22	R41377	Capacitor	.25 Mfd. 200 Volt - High Temperature
23	R42878	Capacitor	.005 Mfd. 400 Volt - High Temperature
24	R42206	Capacitor	.01 Mfd. 100 Volt - High Temperature
25	R43661	Capacitor	.05 Mfd. 200 Volt - High Temperature
26	R43786	Capacitor	.02 Mfd. 600 Volt - High Temperature
27	R42445	Capacitor	.007 Mfd. 600 Volt - High Temperature
28	R43695	Capacitor	Antenna Trimmer
29	R43694	Capacitor	R. F. Trimmer
30	R44662	Control	Chrysler,DeSoto with Tuning Clutch,Dodge
30A			Volume Control 300,000 Ohm
30B			On-Off Switch
30	R43689	Control	Chrysler, DeSoto without Tuning Clutch, and Plymouth
30A			Volume Control 300,000 Ohm
30B			On-Off Switch
31	XY31052	Resistor	1 Megohm 1/3 Watt
32	ZY31512	Resistor	150 Ohm 1 Watt
33	WY32231	Resistor	22,000 Ohm 1/2 Watt
34	XY31052	Resistor	1 Megohm 1/3 Watt
35	XY34732	Resistor	47,000 Ohm 1/3 Watt
36	XY35631	Resistor	56,000 Ohm 1/3 Watt
37	XY33921	Resistor	3,900 Ohm 1/3 Watt
38	ZY35631	Resistor	56,000 Ohm 1 Watt
39	ZY32721	Resistor	2,700 Ohm 1 Watt
40	XY31052	Resistor	1 Megohm 1/3 Watt
41	XY31562	Resistor	15 Megohm 1/3 Watt
42	XY36831	Resistor	68,000 Ohm 1/3 Watt
43	XY31052	Resistor	1 Megohm 1/3 Watt
44	ZY32711	Resistor	270 Ohm 1 Watt
45	XY31541	Resistor	150,000 Ohm 1/3 Watt
46	R45914	Speaker	7" Dynamic
47	R43693	Switch	Tone Control
48	R43787	Transformer	Power Supply
49	R43692	Transformer	Audio Output
50	R43697	Vibrator	Plug In
	R43679	Button	Tone, Chrysler, DeSoto, Dodge
	R44080	Button	Tone, Plymouth
	R43687-1	Button	Push with Adjusting Screw, Chrysler, and DeSoto
	R44077A	Button	Push with Adjusting Screw, Plymouth
	R44449-1	Button	1st Push with Adjusting Screw, Dodge
	R44449-2	Button	2nd Push with Adjusting Screw, Dodge
	R44449-3	Button	3rd Push with Adjusting Screw, Dodge
	R44449-4	Button	4th Push with Adjusting Screw, Dodge
	R43688	Cable	Speaker
	R43648D	Case	Center Section with Covers
	R43785	Connector	Antenna
	R43681	Dial	Station, Chrysler, DeSoto, Plymouth
	R44428	Dial	Station, Dodge
	R43673	Escutcheon	Chrysler, DeSoto, Plymouth, No Clutch
	R44777	Escutcheon	Chrysler, DeSoto, With Clutch
	R44444	Escutcheon	Dodge

Schematic Location	Colonial Part No.	Part Name	Description
	R17392	Fuse	14 Amp. SFE
	R14914	Lamp	Dial Light #44
	R9578BN	Lead	Ammeter End
	R9578BP	Lead	Set End
	R43779	Nut Wing	Cover Retaining
	R43781	Pointer	Dial, Chrysler, DeSoto, Plymouth
	R44450	Pointer	Dodge
	R43416	Pulley	Wood
	R43423	Pulley	Wood
	R44055	Shoe	Cam Locking
	R42477	Socket	Octal 8 Prong
	R43701	Socket	Rectifier
	R43698	Socket	Vibrator 4 Prong
	R43790	Socket	Pilot Light
	R43818	Spring	Dial Glass Retaining
	R44545	Spring	Tone Button
	R41472C	String	Pointer Drive with Spring
	R43687	Tuner Unit	Includes Push Buttons, Chrysler, DeSoto
	R43653	Tuner Unit	Includes Push Buttons, Plymouth Only
	R44449	Tuner Unit	Includes Push Buttons, Dodge Only
	R41328	Tube	7A7
	R41362	Tube	7A8
	R41363	Tube	7B6
	R41331	Tube	7C5
	R16314	Tube	0Z4G

MOUNTING PARTS

R44064	Bolt	5/16 x 2¼ Bracket to Brace Mounting
R43810	Bracket	Rear Receiver Mounting
R44177A	Cable	Bonding Strap
R44065	Capacitor	Generator Suppressor
R45183	Clip	Fuse Case Holder
R43830	Filter	Fuel Gauge
R43682	Knob	Volume Control, Station Selector, Chrysler, DeSoto, Dodge
R44083	Knob	Volume Control, Station Selector, Plymouth Only
R43811P	Knob	Dummy
R44066	Nut	5/16-18 Hex Rear Receiver Mounting
R43955	Nut	7/16-18 Hex Front Receiver Mounting
R411-8	Nut	Speaker Mounting
R44067	Spacer	Receiver Bracket to Brace
R43954A	Stud	Speaker Mounting
R43765	Suppressor	Distributor
R401-8	Washer	Lock #8 Speaker Mounting
R44068	Washer	Flat - Bracket to Brace Mounting
R400-18	Washer	Lock - 5/16 Split
R15284	Washer	Flat - Bracket to Receiver

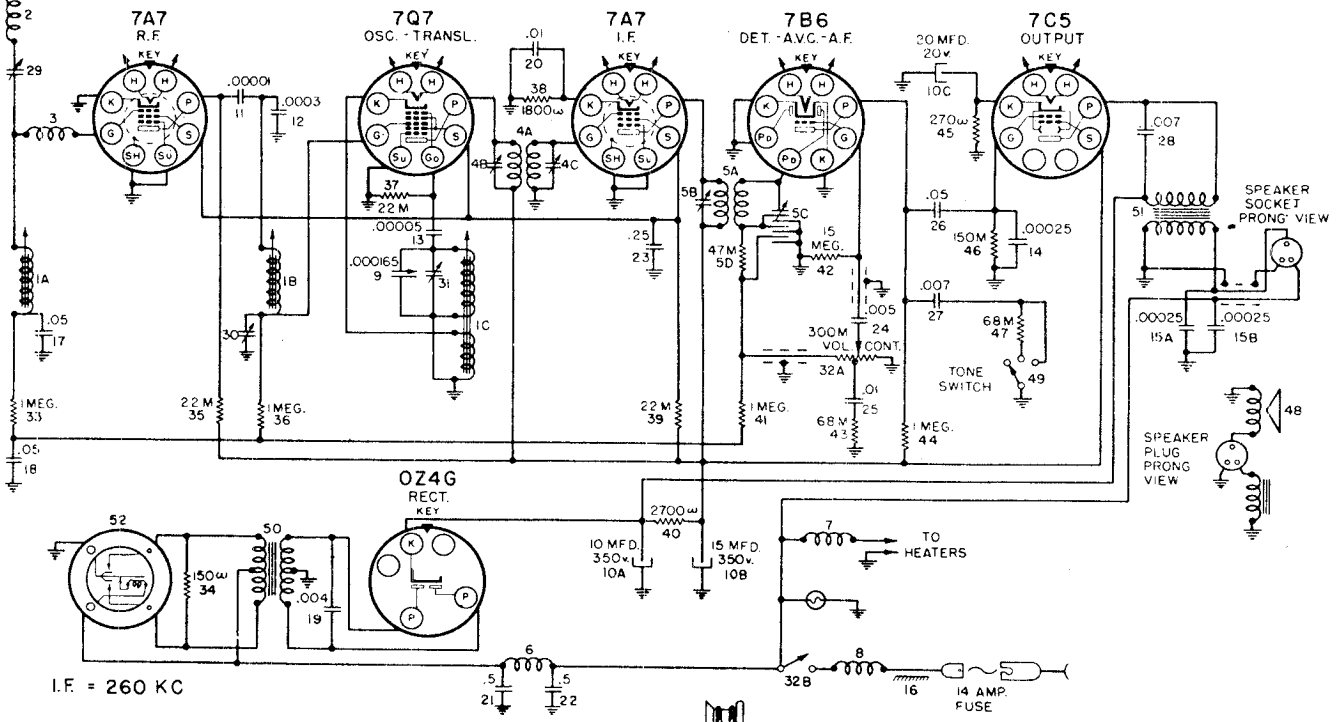
IMPORTANT NOTE

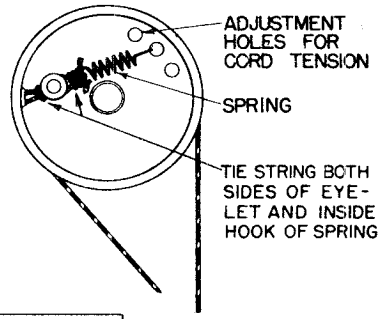
Two versions of the MoPar 600, though identical electrically, differed slightly in the mechanical tuning mechanism. These sets differ mechanically only in that one version employs a clutch in the tuning unit. Where this clutch is used, a change of appearance items are necessary and these will differ depending on the car in which the set is installed.

It is important, therefore, to carefully examine the receiver and determine the correct version before ordering replacement parts.

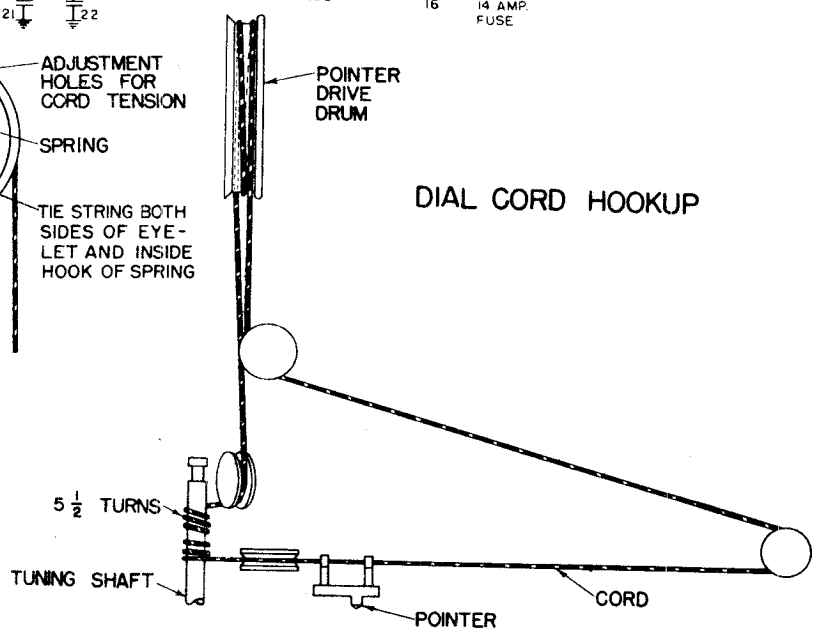
MODELS 671,671A
Chrysler MoPar 601,602

COLONIAL RADIO CORP.

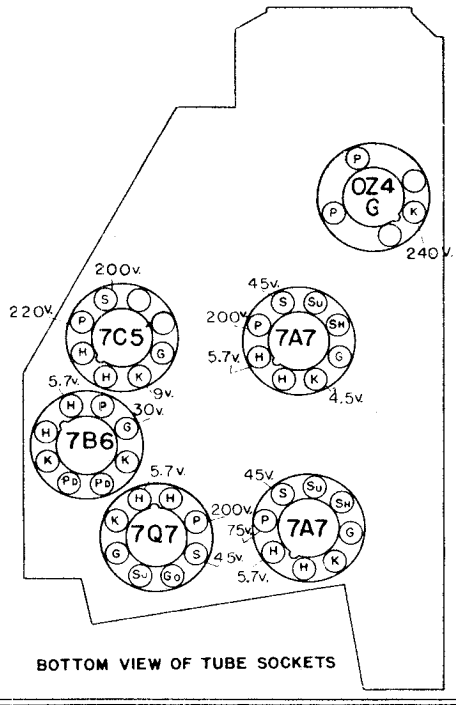




POSITION OF DRUM ASSEMBLY WITH COIL CORES FULLY IN.



DIAL CORD HOOKUP



SOCKET VOLTAGES

Voltage readings taken from tube socket contacts to ground with a D. C. Voltmeter having a resistance of 1000 ohms per volt.

"A" Battery Voltage 6.0 Volts

"A" Battery Current 6.0 Amps.

"B" Voltage Supply 240 Volts

"B" Current 48 M.A.to 54 M.A.

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All capacity adjustments, with the exception of the antenna matching capacitor, are carefully made at the factory and should require no further adjustment. The iron cores in the permeability tuning unit are set at the time the receiver is originally calibrated, and are sealed to eliminate possibility of turning due to vibration. No adjustment of these cores should be necessary unless a core or coil must be replaced. If realignment is found to be necessary the circuits can be properly adjusted only with the use of a calibrated test oscillator or signal generator and an output meter using the procedure outlined below.

1. Alignment of I. F. at 260 KC.

   (a) Connect test oscillator lead through a .1 mfd. capacitor to the control grid of the 7Q7 oscillator tube (see parts layout - hot terminal of item 30).

   (b) Connect ground terminal of test oscillator to set chassis.

   (c) If a conventional output meter is used, connect across the speaker voice coil or secondary of the output transformer.

   (d) Turn volume control to maximum.

   (e) Set test oscillator at exactly 260 KC.

   (f) Adjust padders 4B and 4C on first I. F. transformer and 5B and 5C on second I. F. transformer for maximum output. These adjustments should be made several times, keeping the output of the test oscillator as low as is consistent with obtaining a readable indication on the output meter.

2. Alignment at 1610 KC.

   (a) Remove the signal lead of the test oscillator from the grid of the 7Q7 tube and connect to the antenna terminal of the receiver through a .00006 mfd. MICA CAPACITOR connected in place of the .1 mfd. capacitor previously used. (It is very important that a .00006 mfd. mica capacitor be used when aligning the antenna stage of these receivers in order that this circuit can be made to track properly).

   (b) Set the test oscillator to 1610 Kilocycles.

   (c) Turn station selector knob clockwise to the high frequency stop (1610 KC). Adjust the oscillator trimmer capacitor (see parts layout - item 31) for maximum output. (It is very important that this frequency be set accurately as a slight missetting will cause the receiver to be out of track over the high frequency end of the dial).

   (d) Set test oscillator to 1410 KC and tune receiver to this frequency. (Do <u>not</u> readjust oscillator trimmer).

   (e) Adjust the R. F. trimmer capacitor (see parts layout - item 30) for maximum output.

   (f) Adjust the antenna trimmer capacitor (see parts layout - item 29) for maximum output.

IMPORTANT NOTE

With the type of permeability tuning employed, the usual low frequency adjustments are not necessary.

When the entire alignment procedure has been accomplished accurately, the receiver should be uniformly sensitive over the entire frequency range.

CIRCUIT DESCRIPTION

Aspecial compensating capacitor in the oscillator circuit miimizes frequency drift due to normal variations in car voltage and temperature. The antenna, high gain radio and oscillator circuits are tuned by varying the inductance of the coils with special iron cores (permeability tuning). Frequency range 540 KC. to 1610 KC.
The circuit employed is of the conventional superheterodyne type with an intermediate frequency of 260 KC.
The triode section of the second detector is a driver resistance coupled tothe 7C5 audio output tube.

POWER SUPPLY

The power supply uses a gaseous rectifier tube, 0Z4G, in conjunction with a primary four prong, plug in, full wave vibrator.

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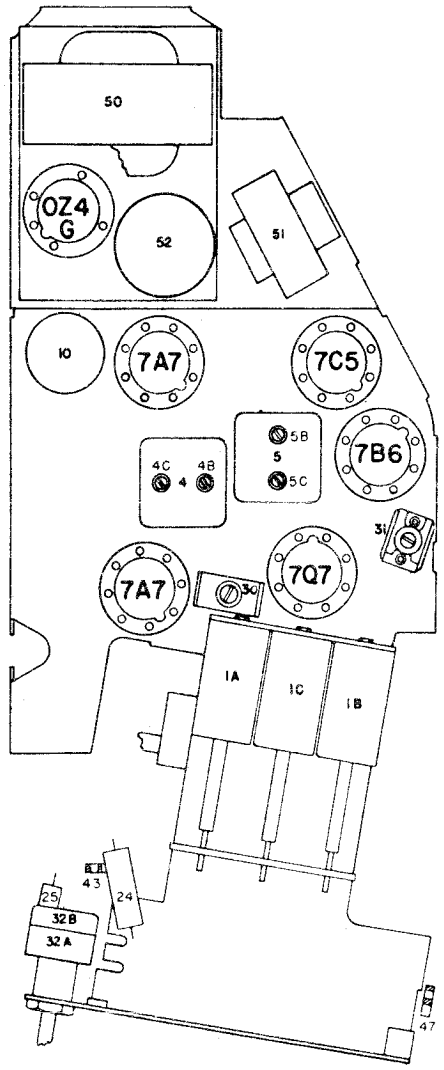
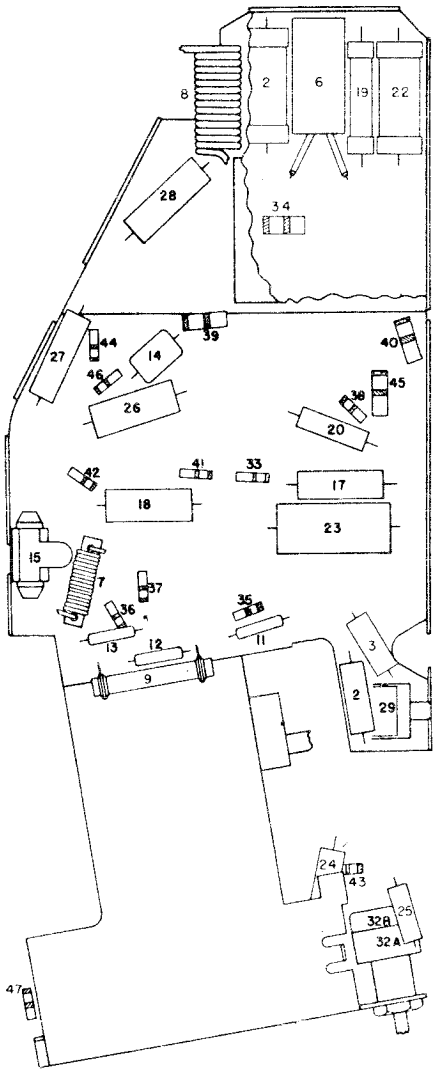
Schematic Location	Colonial Part No.	Part Name	Description
1	R45812	Coil Assembly	
1A			Antenna Coil & Core) Not to be
1B			R. F. Coil & Core) serviced
1C			Oscillator Coil & Core) individually
2	R46023A	Coil	Antenna Choke
3	R48820	Coil	Grid Filter Choke
4	R43775	Coil Assembly	1st I. F.
4A			I. F. Transformer
4B			Primary Trimmer
4C			Secondary Trimmer
5	R43776	Coil Assembly	2nd I. F.
5A			I. F. Transformer
5B			Primary Trimmer
5C			Secondary Trimmer & Filter
5D			68,000 Ohm Diode Filter
6	R9044E	Coil Assembly	Hash Choke
7	R5115E	Coil Assembly	Filament Choke
8	R5220CH	Coil	Spark Choke
9	R46462	Capacitor	.000165 Mfd. Compensating
10	R43691	Capacitor	Dry Electrolytic
10A			10 Mfd. - 350V
10B			15 Mfd. - 350V
10C			20 Mfd. - 20V
11	R41777	Capacitor	.00001 Mfd. Mica
12	R43685	Capacitor	.0003 Mfd. Mica
13	R14255	Capacitor	.00005 Mfd. Mica
14	R20548	Capacitor	.00025 Mfd. Mica
15	R43696	Capacitor	Dual
15A			.00025 Mfd. Mica
15B			.00025 Mfd. Mica
16	R43522A	Capacitor	Spark Plate
17	R42204	Capacitor	.05 Mfd. 200V - High Temperature
18	R42204	Capacitor	.05 Mfd. 200V - High Temperature
19	R42211	Capacitor	.004 Mfd. 1500V - High Temperature
20	R42877	Capacitor	.01 Mfd. 400V - High Temperature
21	R21019	Capacitor	.5 Mfd. 100V - High Temperature
22	R21019	Capacitor	.5 Mfd. 100V - High Temperature
23	R41377	Capacitor	.25 Mfd. 200V - High Temperature
24	R42227	Capacitor	.005 Mfd. 400V - High Temperature
25	R42206	Capacitor	.01 Mfd. 100V - High Temperature
26	R42204	Capacitor	.05 Mfd. 200V - High Temperature
27	R42445	Capacitor	.007 Mfd. 600V - High Temperature
28	R42445	Capacitor	.007 Mfd. 600V - High Temperature
29	R43695	Capacitor	Antenna Trimmer
30	R43694	Capacitor	R. F. Trimmer
31	R45850	Capacitor	Oscillator Trimmer
32	R44662	Control	Volume and On-Off
32A			Volume Control 300,000 Ohm
32B			On-Off Switch
33	XY31052	Resistor	1 Megohm 1/3 Watt
34	ZY31512	Resistor	150 Ohm 1 Watt
35	WY32231	Resistor	22,000 Ohm 1/2 Watt
36	XY31052	Resistor	1 Megohm 1/3 Watt
37	XY32232	Resistor	22,000 Ohm 1/3 Watt
38	XY31821	Resistor	1800 Ohm 1/3 Watt
39	ZY32231	Resistor	22,000 Ohm 1 Watt
40	ZY32721	Resistor	2700 Ohm 1 Watt
41	XY31052	Resistor	1 Megohm 1/3 Watt
42	XY31562	Resistor	15 Megohm 1/3 Watt
43	XY36831	Resistor	68,000 Ohm 1/3 Watt
44	XY31052	Resistor	1 Megohm 1/3 Watt
45	ZY32711	Resistor	270 Ohm 1 Watt
46	XY31541	Resistor	150,000 Ohm 1/3 Watt
47	XY36831	Resistor	68,000 Ohm 1/3 Watt
48	R45914	Speaker	7" Dynamic Complete
49	R45764A	Switch	Tone
50	R43787	Transformer	Power
51	R43692	Transformer	Output
52	R43697	Vibrator	

PARTS LAYOUT



PARTS LAYOUT



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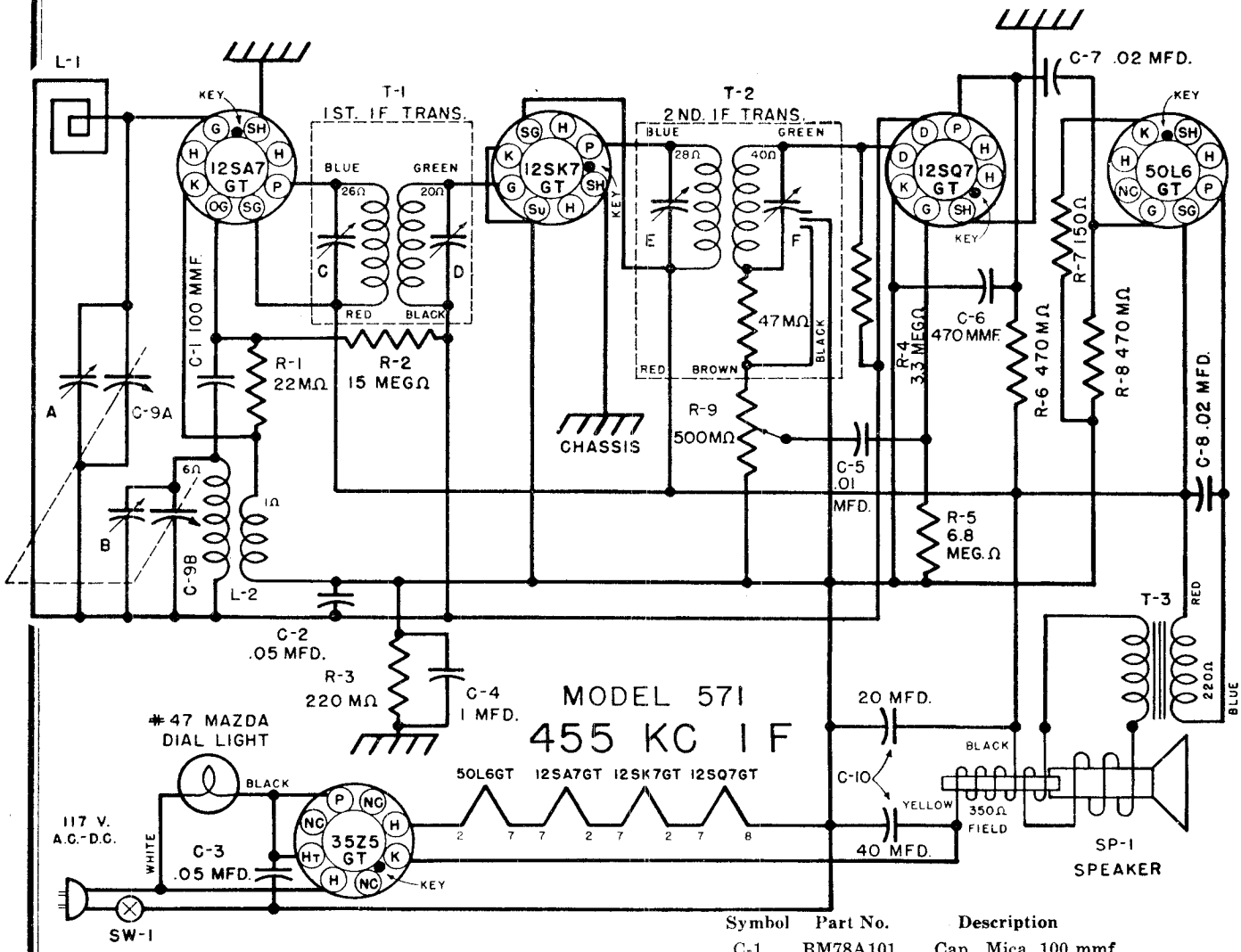
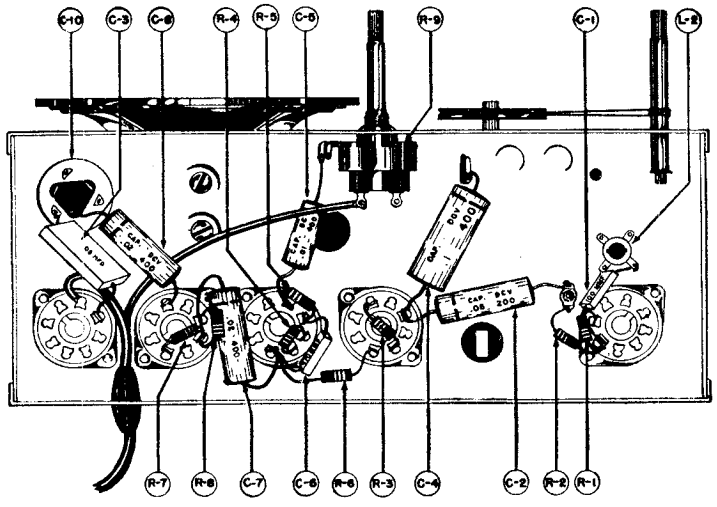
CONCORD RADIO CORP.

MODEL 6D51B,Ch.571;
MODEL 6D51I,Ch.571A;
MODEL 6D51W,Ch.571B



ALL TUBE SOCKETS SHOWN FROM PIN END VIEW



Parts Layout
Chassis Models 571, 571A
and 571B

Symbol	Part No.	Description
C-1	BM78A101	Cap., Mica, 100 mmf.
C-2	BD210503	Cap., Paper, .05 mfd., 200 v.
C-3	BC31B503	Cap., Mold., Paper, .05 mfd.
C-4	BD410104	Cap., Paper, .1 mfd., 400 v.
C-5	BD410103	Cap., Paper, .01 mfd., 400 v.
C-6	BM78A471	Cap., Mica, 470 mmf.
C-7, 8	BD410203	Cap., Paper, .02 mfd., 400 v.
C-9	C-51155-1	Cap., Variable, 2 Section
C-10	A-8948	Cap., Electro., 40-20 mfd., 150 v.
L-2	B-51159	Coil, Osc. Assembly
R-1	BR17B223	Resistor, 22M ohm 1/3 w.
R-2	BR17B156	Resistor, 15 meg. 1/3 w.
R-3	BR17B224	Resistor, 220M ohm 1/3 w.
R-4	BR17B335	Resistor, 3.3 meg. 1/3 w.
R-5	BR17B685	Resistor, 6.8 meg. 1/3 w.
R-6, 8	BR17B474	Resistor, 470M ohm 1/3 w.
R-7	BR16C151	Resistor, 150 ohm. 1/2 w.
R-9	B-9051-1	Control, Vol. & Sw. 500M ohm.
T-1	B-51010-1	Trans., Assembly, 1st IF
T-2	B-51011-1	Trans., Assembly, 2nd IF
SP-1	C-51014	Speaker, 5" Dynamic, 350 ohm.
	A-2163	Cable, Drive
	A-6158	Lamp, Pilot No. 47 Mazda 6.3 v.
	A-51160-1	Cord, AC-DC Line, 6 ft.
	B-51162-1	Shaft, Drive
	A-51163	Clip, Spring
	B-51177	Brkt. Assy., Dial (571A-571B only)
	A-51202	Link, Insulating
	A-51206	Arm, Dial Drive
	B-51330-1	Channel, Rubber (571 only)
	A-51331	Spring, Dial Bracket
	C-51335	Bracket, Dial (571 only)
	A-51787	Spring, Cable

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MODEL 6D51B,Ch.571;
MODEL 6D51I,Ch.571A;
MODEL 6D51W,Ch.571B

CONCORD RADIO CORP.

Electrical and Mechanical Specifications

Frequency Range ..... 540-1600 kc.
Intermediate Frequency ..... 455 kc.
Power Supply ..... 105-125 volts AC-DC
Loudspeaker ..... Dynamic
V.C. Impedance ..... 3.5 ohms at 400 cycles

Power Output (Undistorted) ..... .75 watts
Power Output (Maximum) ..... 1.5 watts
Tuning Drive Ratio ..... 3 to 1
Weight 7¼ lbs. (net) ..... 10 lbs. (shipping)

1—12SA7GT Oscillator and Mixer tube
1—12SK7GT IF Amplifier tube
1—50L6GT Power Output tube
1—35Z5GT Rectifier tube
1—12SQ7GT Second Detector and First Audio tube

NOTE: The above glass tubes are interchangeable with their metal equivalent.

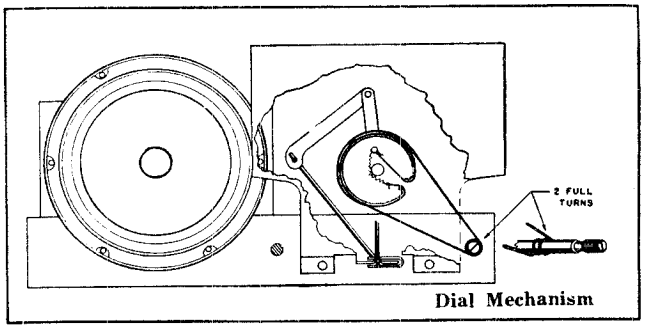
ALIGNMENT PROCEDURE

The following equipment is necessary to properly align this chassis:

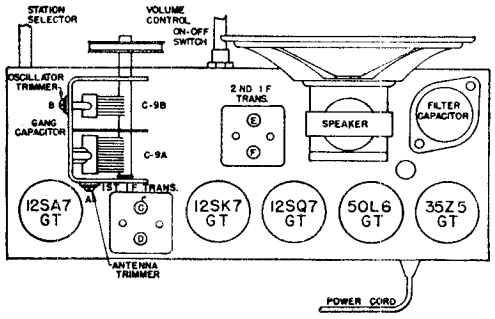
1. A signal generator which will provide an accurately calibrated signal at the frequencies listed.
2. An output meter.
3. A non-metallic screwdriver.
4. Dummy antenna: — .1 mfd., — RMA loop.

NOTE: Intermediate Frequency and Oscillator adjustments may be made with the loop disconnected provided a resistor of 10,000 to 50,000 ohms is substituted to close the 12SA7GT grid circuit. The loop alignment must be done with the loop and chassis mounted in operating position in the cabinet. A single turn loosely coupled to loop may be substituted for RMA loop.

GENERATOR	CONNECTION AT RADIO	DUMMY ANTENNA	DIAL	TO TUNE TRIMMERS	REMARKS
IF 455 kc.	12SA7GT grid	.1 mfd.	HF end	IF trimmers C D E F	Tune to max.
1620 kc.	Through loop	RMA loop	HF end	Osc. trimmer B	Set limit of band
1400 kc.	Through loop	RMA loop	1400 kc.	Ant. trimmer A	Tune to max.

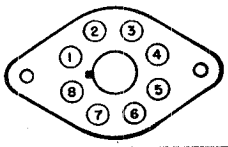


Dial Mechanism



SOCKET VOLTAGES

TUBE	POSITION	1	2	3	4	5	6	7	8
12SA7GT	Osc. and Mixer	0	37.5 AC	99	99	4.2	0	24.5 AC	0
12SK7GT	IF Amplifier	0	24.5 AC	0	0	0	99	12.5 AC	99
12SQ7GT	2nd Det.—1st Audio	0	0	0	0	0	16	12.5 AC	0
50L6GT	Power Output	0	85 AC	91.5	99	0	0	37.5 AC	5.9
35Z5GT	Rectifier	0	117 AC	112 AC	0	112 AC	0	85 AC	112



NOTE: All DC voltages measured with a 1000 ohm per volt meter from ON-OFF switch (—B) to socket contact indicated. All AC voltages are measured from ON-OFF switch (—B) to socket contact indicated.
All voltages are positive DC unless otherwise marked.
Volume control full on.
Line voltage 117 volts AC.

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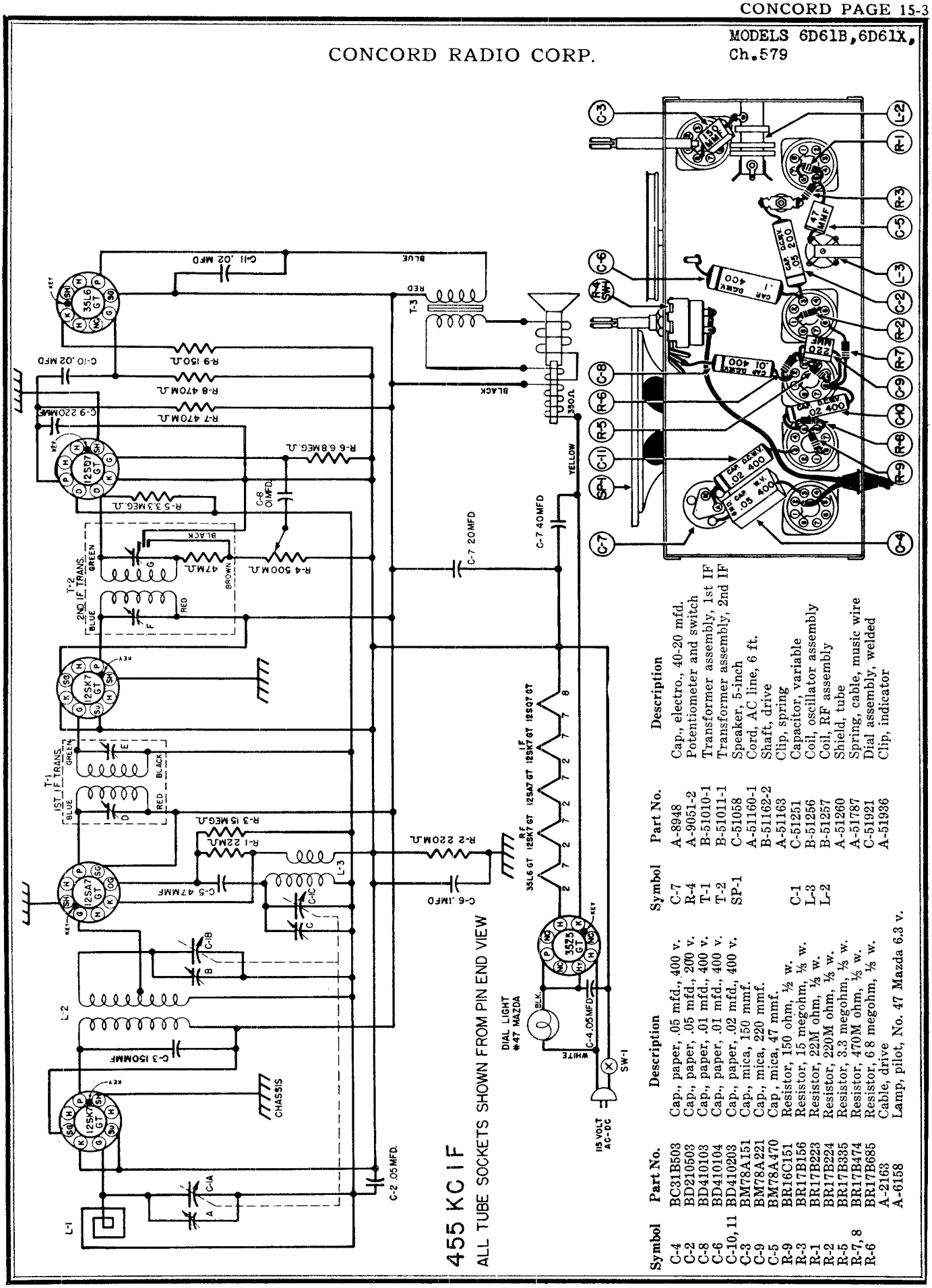
CONCORD RADIO CORP.

MODELS 6D61B, 6D61X, Ch. 579



Symbol	Part No.	Description	Symbol	Part No.	Description
C-4	BC31B503	Cap., paper, .05 mfd., 400 v.	C-7	A-8948	Cap., electro., 40-20 mfd.
C-2	BD210503	Cap., paper, .05 mfd., 200 v.	R-4	A-9051-2	Potentiometer and switch
C-8	BD410103	Cap., paper, .01 mfd., 400 v.	T-1	B-51010-1	Transformer assembly, 1st IF
C-6	BD410104	Cap., paper, .01 mfd., 400 v.	T-2	B-51011-1	Transformer assembly, 2nd IF
C-10, 11	BD410203	Cap., paper, .02 mfd., 400 v.	SP-1	C-51058	Speaker, 5-inch
C-3	BM78A151	Cap., mica, 150 mmf.		A-51160-1	Cord, AC line, 6 ft.
C-9	BM78A221	Cap., mica, 220 mmf.		B-51162-2	Shaft, drive
C-5	BM78A470	Cap., mica, 47 mmf.		A-51163	Clip, spring
R-9	BR16C151	Resistor, 150 ohm, ½ w.		C-51251	Capacitor, variable
R-3	BR17B156	Resistor, 15 megohm, ⅓ w.	C-1	B-51256	Coil, oscillator assembly
R-1	BR17B223	Resistor, 22M ohm, ⅓ w.	L-3	B-51257	Coil, RF assembly
R-2	BR17B224	Resistor, 220M ohm, ⅓ w.	L-2	A-51260	Shield, tube
R-5	BR17B335	Resistor, 3.3 megohm, ⅓ w.		A-51787	Spring, cable, music wire
R-7, 8	BR17B474	Resistor, 470M ohm, ⅓ w.		C-51921	Dial assembly, welded
R-6	BR17B685	Resistor, 6.8 megohm, ⅓ w.		A-51936	Clip, indicator
	A-2163	Cable, drive			
	A-6158	Lamp, pilot, No. 47 Mazda 6.3 v.			

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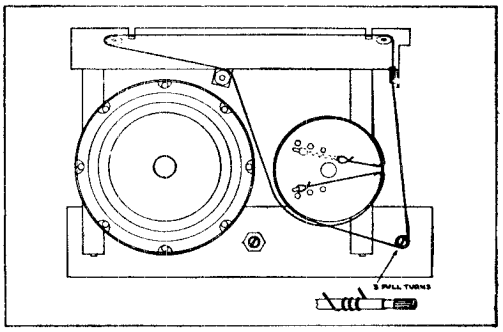
MODELS 6D61B, 6D61X,
Ch. 579

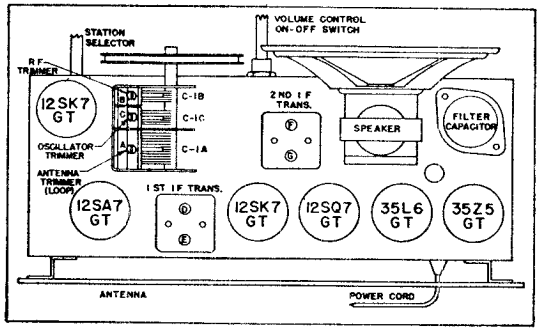
CONCORD RADIO CORP.

Frequency Range	540-1600 kc.	V.C. Impedance	3.5 ohms at 400 cycles
Intermediate Frequency	455 kc.	Power Output (Undistorted)	.65 watts
Power Supply	105-125 volts AC-DC	Power Output (Maximum)	1.4 watts
Loudspeaker	Dynamic	Tuning Drive Ratio	6 to 1
1—12SK7GT	RF Amplifier tube	1—12SQ7GT	Detector and 1st Audio tube
1—12SA7GT	Converter tube	1—35L6GT	Output tube
1—12SK7GT	IF Amplifier tube	1—35Z5GT	Rectifier tube

NOTE: The above glass tubes are interchangeable with their metal equivalent.



Dial Mechanism



Tube Layout

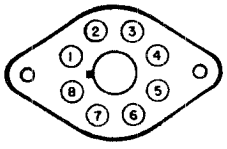
The following equipment is necessary to properly align this chassis:

1. A signal generator which will provide an accurately calibrated signal at the frequencies listed.
2. An output meter.
3. A non-metallic screwdriver.
4. Dummy antenna: .1 mfd. — RMA loop.

NOTE: Intermediate Frequency and Oscillator adjustments may be made with the loop disconnected provided a resistor of 10,000 to 50,000 ohms is substituted to close the 12SK7GT grid circuit. The loop alignment must be done with the loop and chassis mounted in operating position in the cabinet. A single turn loosely coupled to loop may be substituted for RMA loop.

CONNECT TEST OSCILLATOR TO	DUMMY ANTENNA	INPUT SIGNAL FREQUENCY	SET DIAL AT	TRIMMERS	PURPOSE
12SA7GT grid	.1 mfd.	455 kc.	HF end	D E F G	Align IF
12SK7GT RF grid	.1 mfd.	1620 kc.	HF end	C	Set limit of band
12SK7GT RF grid	.1 mfd.	1400 kc.	1400 kc.	B	Align RF
RMA loop	Through loop	1400 kc.	1400 kc.	A	Align antenna

TUBE	POSITION	1	2	3	4	5	6	7	8
12SK7GT	RF Amplifier	0	50 AC	0	0	0	97	38 AC	97
12SA7GT	Converter	0	25 AC	97	97	-6	0	38 AC	0
12SK7GT	IF Amplifier	0	25 AC	0	0	0	97	12 AC	97
12SQ7GT	Detector, 1st Audio	0	0	0	0	0	30	12 AC	0
35L6GT	Output	0	85 AC	92	97	0	0	50 AC	5.7
35Z5GT	Rectifier	0	117 AC	112 AC	0	112 AC	0	86 AC	125



NOTE: All DC voltages measured with a 1000 ohm-per-volt meter from ON-OFF switch (—B) to socket contact indicated. All AC voltages are measured from ON-OFF switch (—B) to socket contact indicated.
All voltages are positive DC unless otherwise marked.
Volume Control full on. No signal.
Line voltage 117 volts AC.

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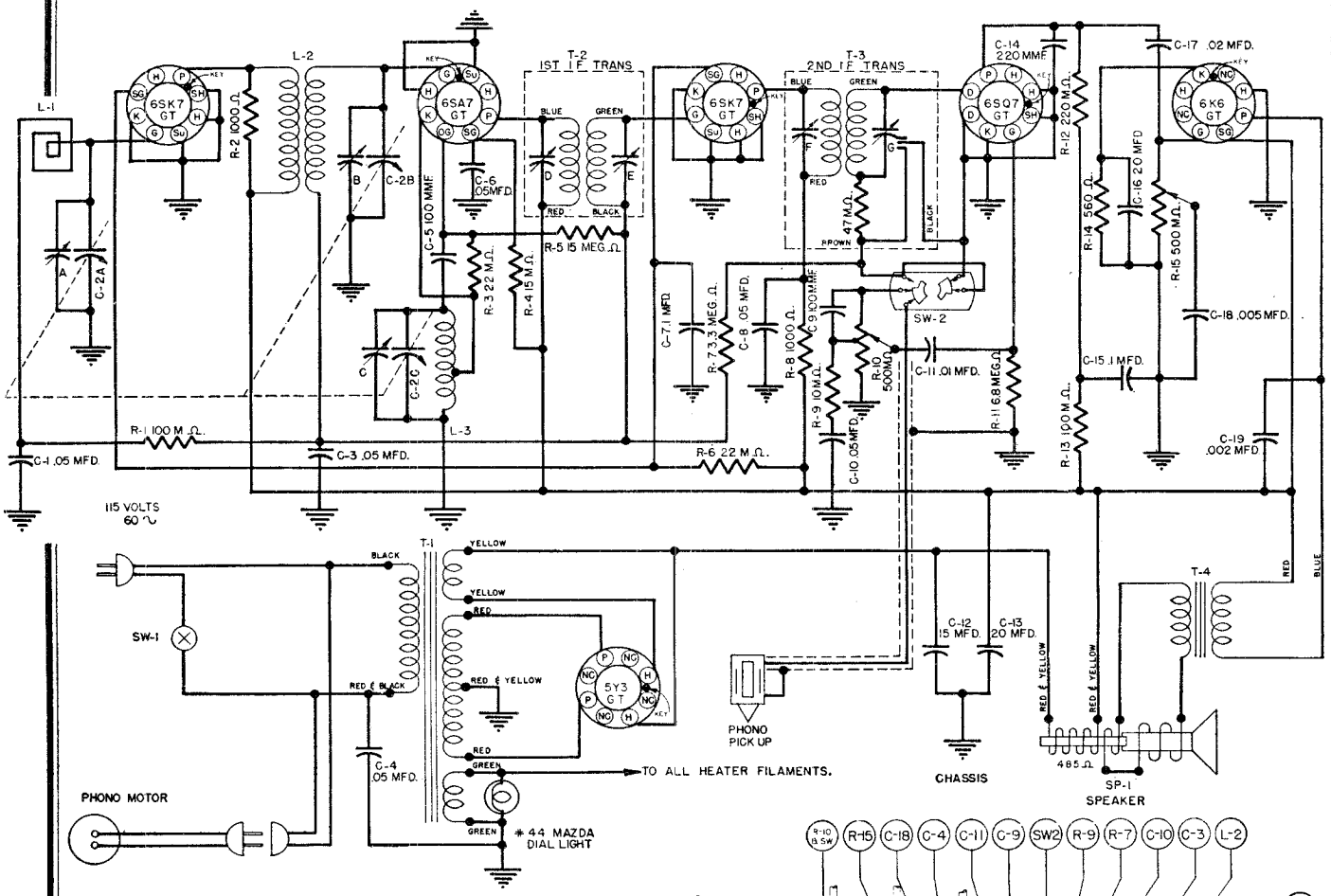
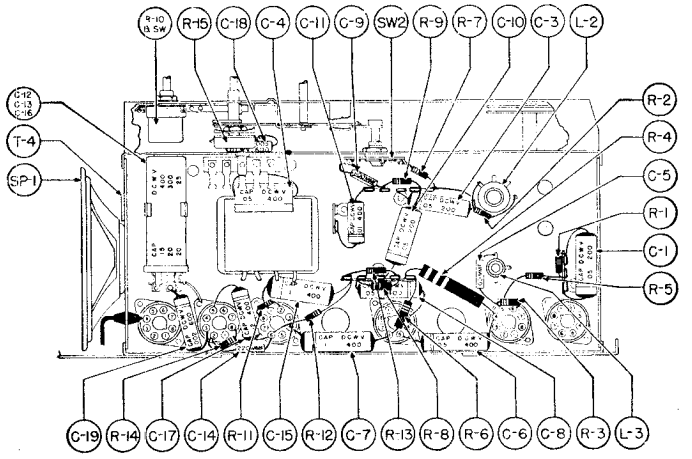
MODEL 6D61P, Ch. 554

CONCORD RADIO CORP.



455 KC IF

ALL TUBE SOCKETS SHOWN FROM PIN END VIEW.
ALL SWITCHES SHOWN IN COUNTERCLOCKWISE POSITION, SHAFT END VIEW.



Symbol	Part No.	Description
C-4	BC31B503	Cap., Molded, .05 mfd., 400 v.
C-1, 3, 10	BD210503	Cap., Paper, .05 mfd., 200 v.
C-11	BD410103	Cap., Paper, .01 mfd., 400 v.
C-7, 15	BD410104	Cap., Paper, .1 mfd., 400 v.
C-17	BD410203	Cap., Paper, .02 mfd., 400 v.
C-6, 8	BD410503	Cap., Paper, .05 mfd., 400 v.
C-19	BD610202	Cap., Paper, .002 mfd., 600 v.
C-18	BD610502	Cap., Paper, .005 mfd., 600 v.
C-5, 9	BM78A101	Cap., Mica, 100 mmf.
C-14	BM78A221	Cap., Mica, 220 mmf.
R-14	BR16E561	Resistor, 560 ohm, 1 w.
R-2, 8	BR17B102	Resistor, 1000 ohm, ⅓ w.
R-9	BR17B103	Resistor, 10M ohm, ⅓ w.
R-1, 13	BR17B104	Resistor, 100M ohm, ⅓ w.
R-5	BR17B156	Resistor, 15 meg., ⅓ w.
R-3	BR17B223	Resistor, 22M ohm, ⅓ w.
R-12	BR17B224	Resistor, 220M ohm, ⅓ w.
R-7	BR17B335	Resistor, 3.3 meg., ⅓ w.
R-11	BR17B685	Resistor, 6.8 meg., ⅓ w.
R-6	BR17E223	Resistor, 22M ohm, 1 w.
R-4	BR17G153	Resistor, 15M ohm, 2 w.
	A-2163	Cable, Dial
	A-3123	Clamp, Cable
	A-9285	Lamp, Pilot, Mazda No. 44
	A-51160-3	Cord, Power, 6 ft.
	A-51163	Clip, Spring
C-12, 13	A-51356	Cap., Electro., 15-20-20 mfd.
C-2	C-51501-1	Capacitor, Variable, 3-section
T-1	C-51502	Transformer, Power
L-2	B-51511	Coil, Assembly, RF
SP-1	C-51512	Speaker, 5" Dynamic, 485 ohm
L-3	B-51522	Coil Assembly, Osc.
	A-51531	Shaft, Drive
T-2	B-51416-2	Trans. Assembly, 1st IF
T-3	B-51417-2	Trans. Assembly, 2nd IF
	B-51591	Spring, Dial Bracket
	A-51787	Spring, Cable
	A-51801	Rivet, Pronged, 3/32 x 1/8
	B-55300-1	Channel, Rubber
SW-2	B-55500-1	Switch (Radio-Phono)
R-15	B-55550-1	Potentiometer, 500M ohm
R-10	B-55575-1	Potentiometer & Switch, 500M ohm

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Record Changer: Concord Model 6D3ARC

MODEL 6D61P, Ch. 554

CONCORD RADIO CORP.

1—6SK7GT	RF Amplifier tube	1—6SQ7GT	Detector—AVC—1st Audio tube
1—6SA7GT	Converter tube	1—6K6GT	Power Output tube
1—6SK7GT	IF Amplifier tube	1—5Y3GT	Rectifier tube

NOTE: The above glass tubes are interchangeable with their metal equivalent.

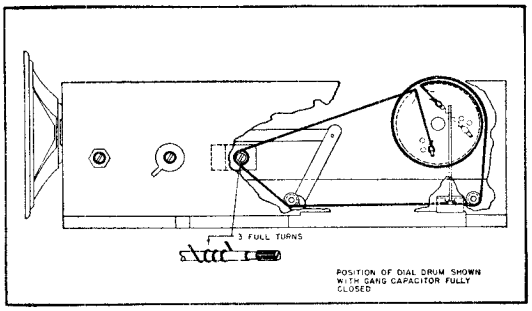
Frequency Range	540-1600 kc.	V.C. Impedance	3.5 ohms at 400 cycles
Intermediate Frequency	455 kc.	Power Output (Undistorted)	1 watt
Power Supply	105-125 volts, 60 cycle A.C.	Power Output (Maximum)	4 watts
Loudspeaker	Electrodynamic	Tuning Drive Ratio	4¾ to 1

ALIGNMENT PROCEDURE

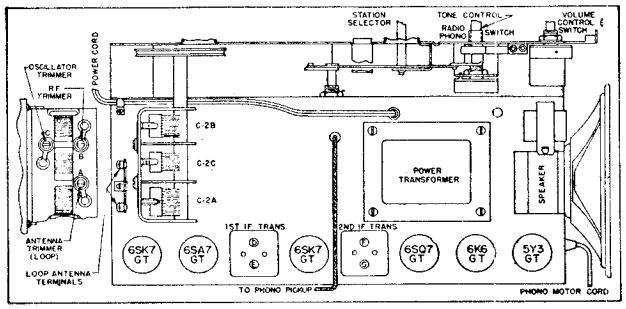
The following equipment is necessary to properly align this chassis:

1. A signal generator which will provide an accurately calibrated signal at the frequencies listed.
2. An output meter.
3. A non-metallic screwdriver.
4. Dummy antenna: — .1 mfd. — RMA loop.

CONNECT GENERATOR TO	DUMMY ANTENNA	INPUT SIGNAL FREQUENCY	BAND	SET DIAL AT	TRIMMERS	PURPOSE
6SA7GT grid	.1 mfd	455 kc.	Broadcast	HF end	D E F G	Align IF
6SK7GT RF grid	.1 mfd	1620 kc.	Broadcast	HF end	C	Set limit of band
6SK7GT RF grid	.1 mfd	1400 kc.	Broadcast	1400 kc.	B	Align RF
RMA loop	Through loop	1400 kc.	Broadcast	1400 kc.	A	Align antenna

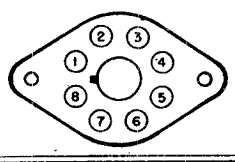


Dial Mechanism



Tube Layout

TUBE	POSITION	1	2	3	4	5	6	7	8
6SK7GT	RF Amplifier	0	0	0	0	0	93	6.3 AC	270
6SA7GT	Converter	0	6.3 AC	270	113	-7.5	0	0	0
6SK7GT	IF Amplifier	0	0	0	0	0	93	6.3 AC	260
6SQ7GT	Detector—AVC—1st Audio	0	0	0	0	0	88	6.3 AC	0
6K6GT	Power Output	0	0	250	270	0	175	6.3 AC	19
5Y3GT	Rectifier	0	310	0	290 AC	0	290 AC	0	310



NOTE: All voltages measured from chassis to socket contact indicated.
DC voltages measured with a 1000 ohm-per-volt meter.
All voltages are positive DC unless otherwise marked.
Volume control full on. No signal.
Tone Control in clockwise position.
Line Voltage 117 volts AC.

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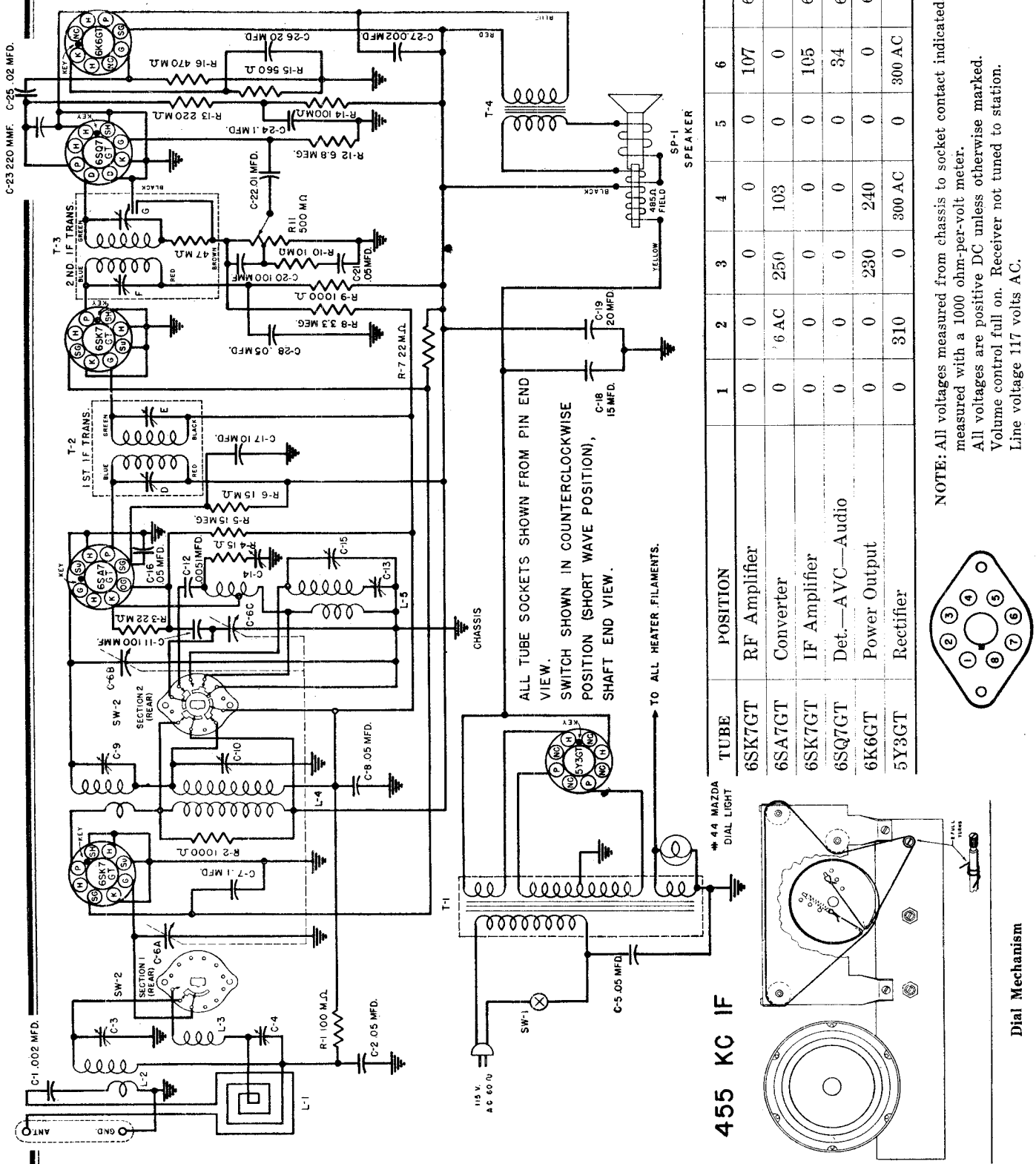
MODEL 6D62W, Ch. 572

CONCORD RADIO CORP.



TUBE	POSITION	1	2	3	4	5	6	7	8
6SK7GT	RF Amplifier	0	0	0	0	0	107	6 AC	255
6SA7GT	Converter	0	6 AC	250	103	0	0	0	0
6SK7GT	IF Amplifier	0	0	0	0	0	105	6 AC	237
6SQ7GT	Det.—AVC—Audio	0	0	0	0	0	34	6 AC	0
6K6GT	Power Output	0	0	230	240	0	0	6 AC	18
5Y3GT	Rectifier	0	310	0	300 AC	0	300 AC	0	310

NOTE: All voltages measured from chassis to socket contact indicated. DC voltages measured with a 1000 ohm-per-volt meter.
All voltages are positive DC unless otherwise marked.
Volume control full on. Receiver not tuned to station.
Line voltage 117 volts AC.

Dial Mechanism

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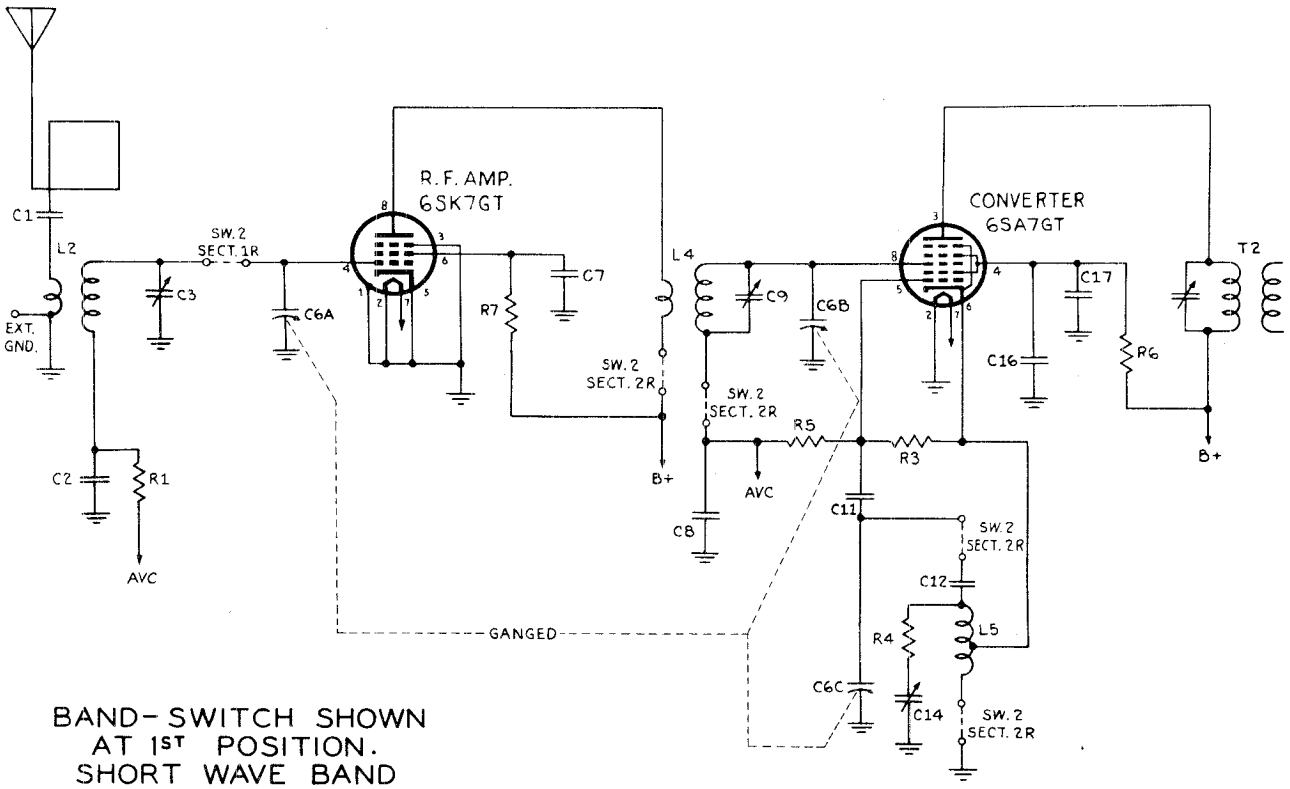
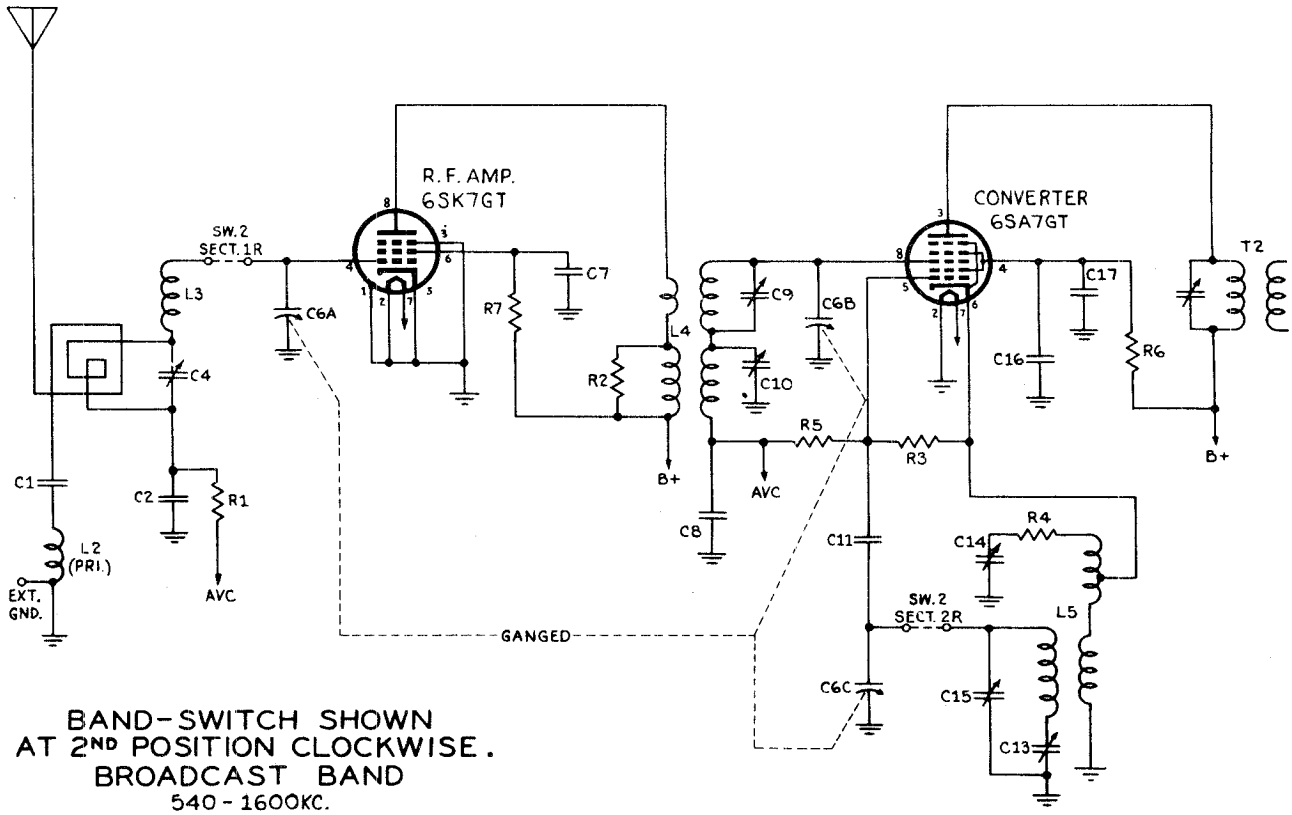
"clarified schematics"

MODEL 6D62W, Ch. 572

CONCORD RADIO CORP.



BAND-SWITCH SHOWN
AT 1ST POSITION.
SHORT WAVE BAND
6 - 18 MC.



BAND-SWITCH SHOWN
AT 2ND POSITION CLOCKWISE.
BROADCAST BAND
540 - 1600KC.

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MODEL 6D62W,Ch.572

CONCORD RADIO CORP.

Frequency Range ..... 540-1600 kc., 6-18 mc.
Intermediate Frequency ..... 455 kc.
Power Supply ..... 105-125 volts, 60 cycle AC
Loudspeaker Type ..... 5" Electro Dynamic
V.C. Impedance ..... 3.2 ohms
1—6SK7GT ..... RF Amplifier tube
1—6SA7GT ..... Converter tube
1—6SK7GT ..... IF Amplifier tube
Power Output (Undistorted) ..... 1 watt
Power Output (Maximum) ..... 4 watts
Weight 15¾ lbs. (net) ..... 18½ lbs. (shipping)
Tuning Drive Ratio ..... 6 to 1
1—6SQ7GT ..... Detector—AVC—Audio tube
1—6K6GT ..... Power Output tube
1—5Y3GT ..... Rectifier tube

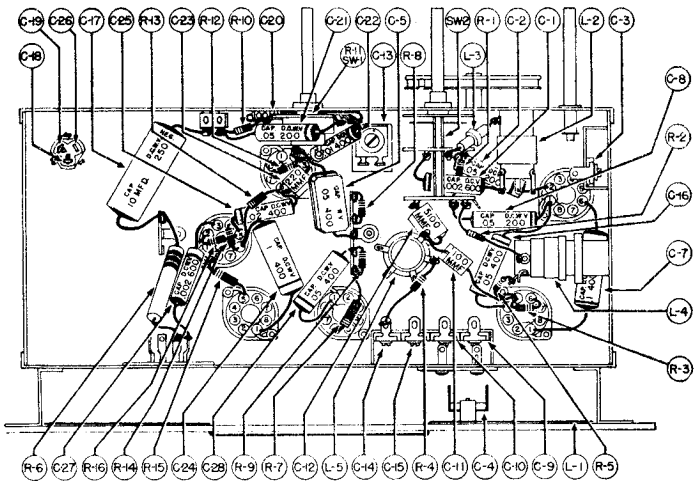
The following equipment is necessary to properly align this chassis:

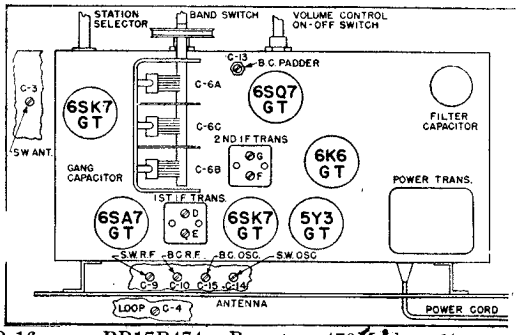
A signal generator which will provide an accurately calibrated signal at the frequencies listed.

An output meter.

3. A non-metallic screwdriver.
4. Dummy antenna: .1 mfd. — 400 ohm resistor—RMA loop.

CONNECT TEST OSCILLATOR TO	DUMMY ANTENNA	INPUT SIGNAL FREQUENCY	BAND	SET DIAL AT	TRIMMERS	PURPOSE
6SA7GT grid	.1 mfd.	455 kc.	Broadcast	HF end	D E F G	Align IF
6SK7GT RF grid	.1 mfd.	18.3 mc.	Short wave	HF end	C-14	Set limit of band
6SK7GT RF grid	.1 mfd.	16 mc.	Short wave	16 mc.	C-9	Align RF
Antenna post	400 ohms	16 mc.	Short wave	16 mc.	C-3	Align antenna
6SK7GT RF grid	.1 mfd.	1620 kc.	Broadcast	HF end	C-15	Set limit of band
6SK7GT RF grid	.1 mfd.	1400 kc.	Broadcast	1400 kc.	C-10	Align RF
6SK7GT RF grid	.1 mfd.	600 kc.	Broadcast	600 kc.	C-13	Rock gang and adjust to max.
RMA loop	Through loop	1400 kc.	Broadcast	1400 kc.	C-4	Align antenna





Symbol	Part No.	Description
C-5	BC31B503	Cap., .05 mfd., 400 v. paper
C-2, 8, 21	BD210503	Cap., .05 mfd., 200 v. paper
C-22	BD410103	Cap., .01 mfd., 400 v. paper
C-7, 24	BD410104	Cap., .1 mfd., 400 v. paper
C-25	BD410203	Cap., .02 mfd., 400 v. paper
C-16, 28	BD410503	Cap., .05 mfd., 400 v. paper
C-1, 27	BD610202	Cap., .002 mfd., 600 v. paper
C-12	BM58D512	Cap., 5100 mmf., mica
C-11, 20	BM78A101	Cap., 100 mmf., mica
C-23	BM78A221	Cap., 220 mmf., mica
R-15	BR16E561	Resistor, 560 ohm, 1 w.
R-2, 9	BR17B102	Resistor, 1000 ohm, ⅓ w.
R-10	BR17B103	Resistor, 10M ohm, ⅓ w.
R-1, 14	BR17B104	Resistor, 100M ohm, ⅓ w.
R-4	BR17B150	Resistor, 15 ohm, ⅓ w.
R-5	BR17B156	Resistor, 15 meg., ⅓ w.
R-3	BR17B223	Resistor, 22M ohm, ⅓ w.
R-13	BR17B224	Resistor, 220M ohm, ⅓ w.
R-8	BR17B335	Resistor, 3.3 meg , ⅓ w.
R-16	BR17B474	Resistor, 470M ohm, ⅓ w.
R-12	BR17B685	Resistor, 6 8 meg., ⅓ w.
R-7	BR17E223	Resistor, 22M ohm, 1 w.
R-6	BR17G153	Resistor, 15M ohm, 2 w.
	A-2163	Cable, drive
	A-9285	Lamp, pilot, Mazda No. 44
	A-51160-1	Cord, power, 6 ft.
	B-51162-3	Shaft, drive
	A-51163	Clip, spring
	A-51260	Shield, tube
C-18,19,26	A-51356	Cap., electro., 15-20-20 mfd.
C-6	C-51401-1	Capacitor, variable
SP-1	C-51413	Speaker assembly, 5-inch
T-2	B-51416-1	Trans. assembly, 1st IF
T-3	B-51417-1	Trans. assembly, 2nd IF
C-17	A-51419	Cap., electro., 10 mfd., 250 v.
L-5	B-51420	Coil assembly, oscillator
T-1	C-51421	Transformer, power
L-3	B-51422	Coil assembly, antenna loading
L-4	B-51425	Coil assembly, RF
C-13	B-51428-5	Capacitor, padder
L-2	B-51430	Coil assembly, SW antenna
SW-2	B-51435-1	Switch assembly, 2-band
R-11	B-51445-1	Control, Pot. & switch 500,000 ohm.
C-9, 10, 14, 15	A-51656	Cap. assembly, trimmer (4)
C-3	A-51657	Cap. assembly, trimmer (spec.)
	A-51787	Spring, cable
C-4	B-51859-1	Cap. assembly, Ant.—BC

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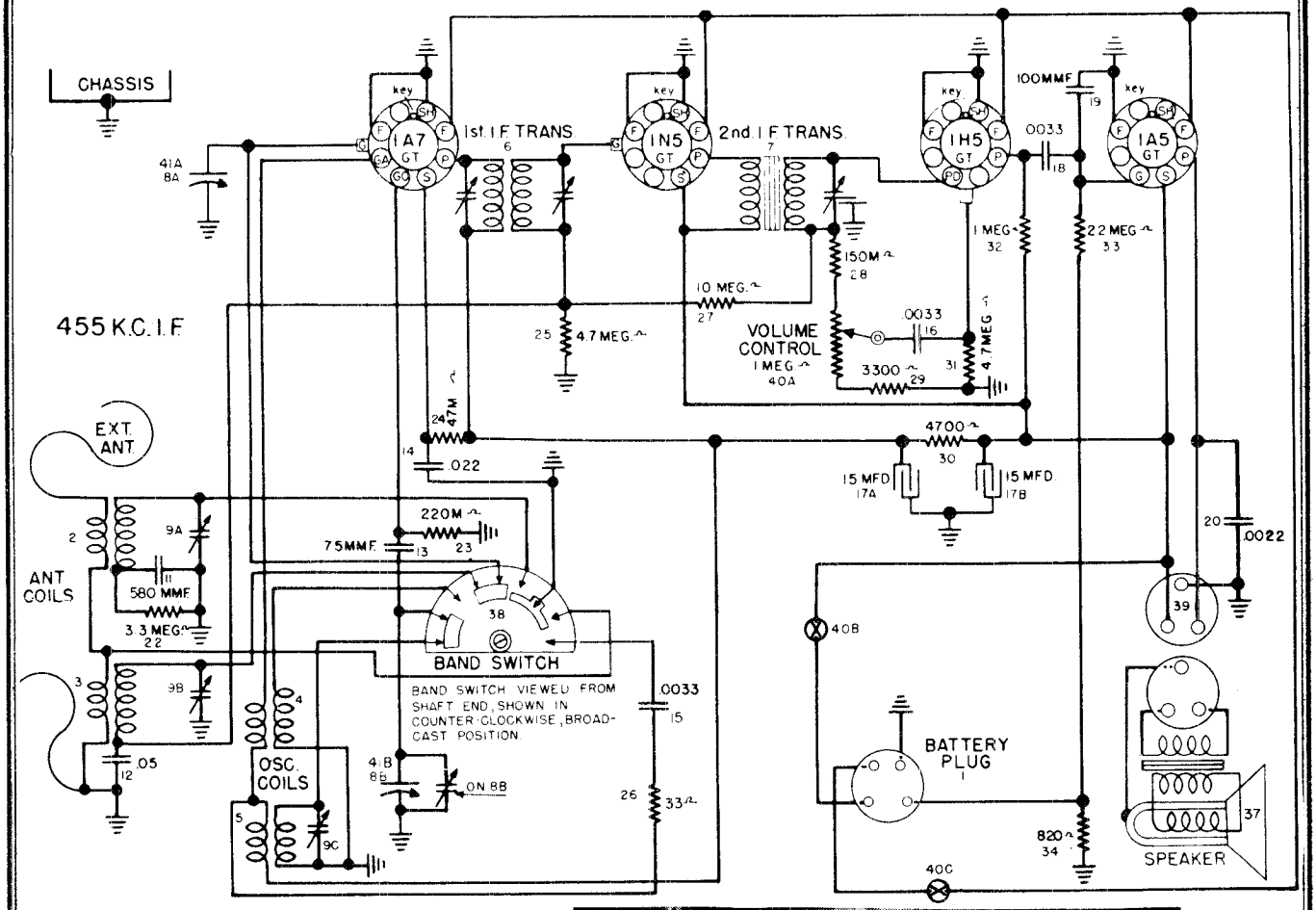
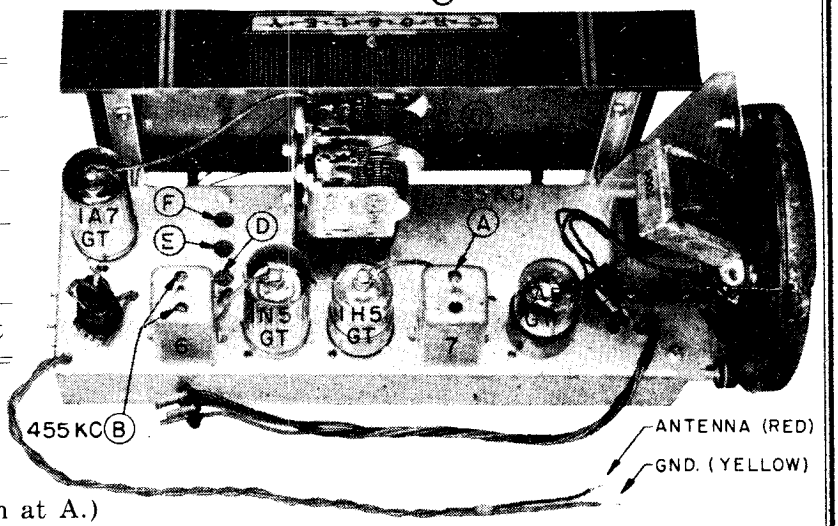
MODELS 46FA, 46FB

THE CROSLEY CORP.



Type	Function
1A7GT/G	Mixer
1N5GT/G	I.F. Amplifier
1H5GT/G	Detector, AVC, 1st A.F. Amplifier
1A5GT/G	A.F. Power Output



FREQUENCY RANGE: American Band, 540 to 1600 kc. (Selector Switch at A.)

Overseas Short-wave Band, 5.8 to 15 mc. (Selector Switch at 0.)

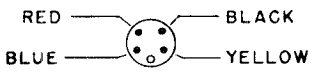
INTERMEDIATE FREQUENCY: 455 kc.

POWER SUPPLY: Crosley "A-B" Battery Pack, CR69.

VOLTAGE RATING: 1½ v. "A"; 90 v. "B"

POWER OUTPUT: 120 mw. minimum.

(A) – 2ND. I.F. TRIMMER
(B) – 1ST. I.F. TRIMMER
(C) – "OVERSEAS" OSC. TRIM.
(D) – "OVERSEAS" ANT. TRIM.
(E) – "AMERICAN" OSC. TRIM.
(F) – "AMERICAN" ANT. TRIM.



PIN END OF BATTERY PLUG

Speaker mounted on cabinet on Model 46FB

For satisfactory operation it is necessary that an antenna and ground be connected to this receiver.

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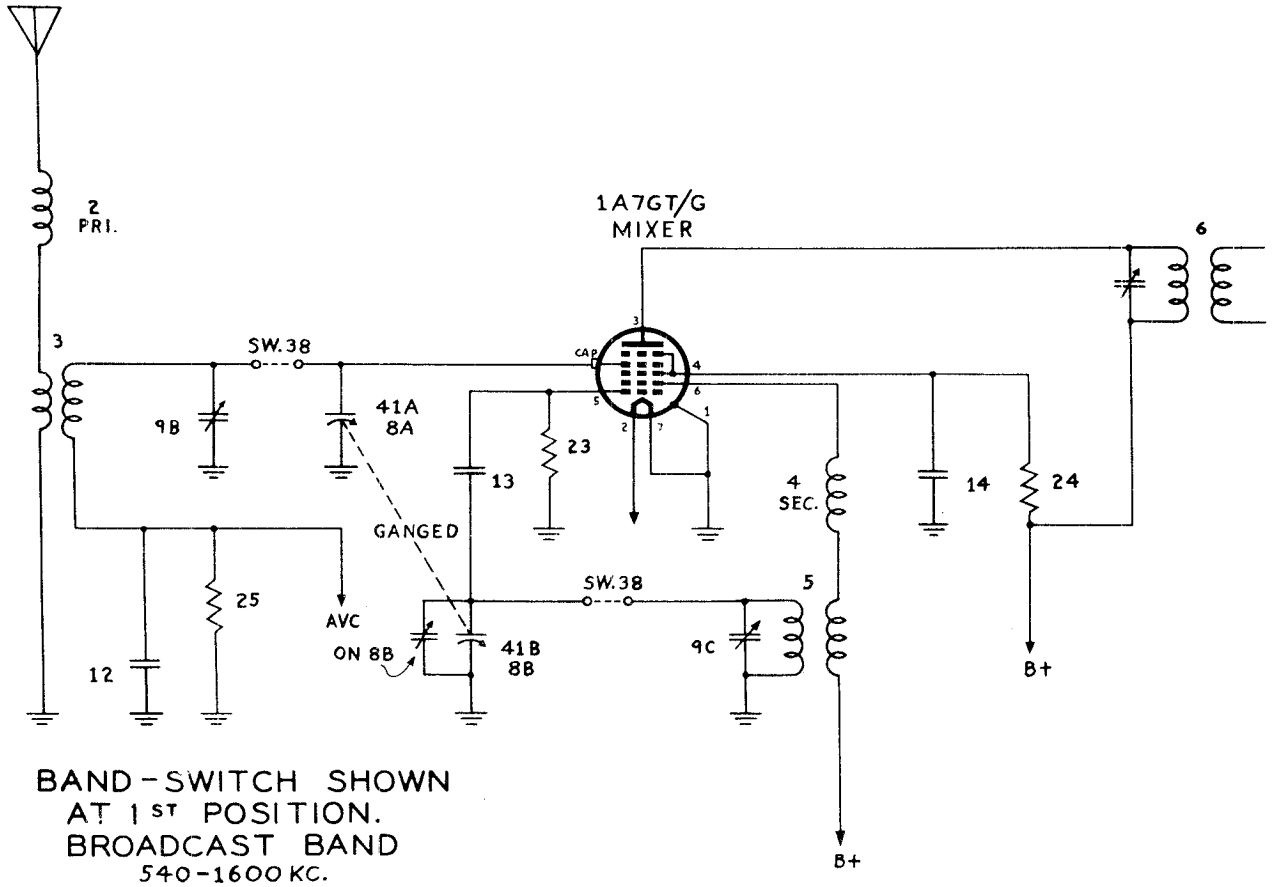
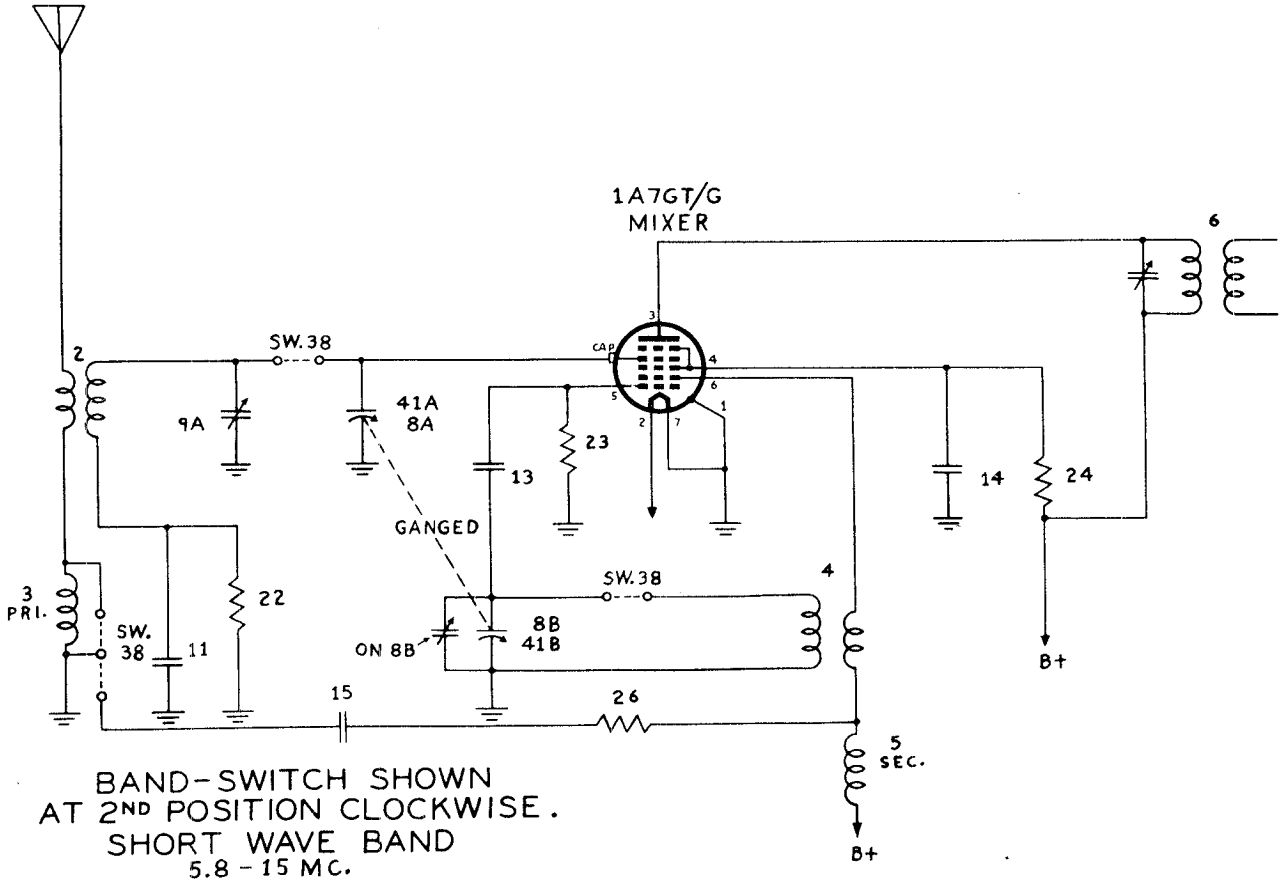
"clarified schematics"

MODELS 46FA, 46FB

THE CROSLEY CORP.



BAND-SWITCH SHOWN
AT 1ST POSITION.
BROADCAST BAND
540-1600 KC.



BAND-SWITCH SHOWN
AT 2ND POSITION CLOCKWISE.
SHORT WAVE BAND
5.8 - 15 MC.

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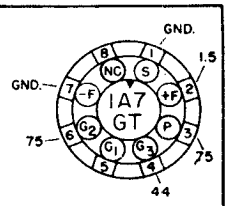
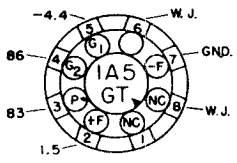
THE CROSLEY CORP.

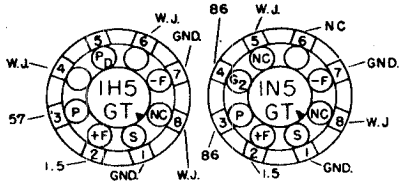
SOCKET VOLTAGE CHART

NOTES:-

1. THESE ARE BOTTOM VIEWS OF SOCKETS.
2. MEASURE VOLTAGES FROM SOCKET LUGS TO CHASSIS (-B, -A, GROUND).
3. THESE VOLTAGES MEASURED USING AN ELECTRONIC VOLTMETER.
4. W.J. - WIRING JUNCTION.
5. NC - NO CONNECTION.
6. SOCKET VOLTAGE TOLERANCE, 10%.







ALIGNMENT PROCEDURE

1. Turn the tuning condenser to the completely closed position against the stop and set the dial pointer to the reference line at the end of the dial scale.
2. Connect the output meter across the speaker voice coil.
3. The r.f. signal input from the signal generator should be connected to the antenna lead (red) as indicated in the alignment chart. Connect the low side (ground) of the signal generator to the chassis.
4. Turn the volume control on full and adjust the signal generator output to produce approximately mid-scale deflection of the output meter, but maintain signal generator output as low as possible to prevent AVC action in the receiver.

Alignment Sequence	Signal Generator Output			Position of		Adjust for Maximum Output
	Frequency in kc.	In Series with	To	Band Switch	Tuning Dial	
1	455	200 mmf.	Ant.	A	1,620	A & B
2	15,300	400 ohms	Ant.	O	15,300	C*
3	15,000	400 ohms	Ant.	O	15,000	D
4	1,620	200 mmf.	Ant.	A	1,620	E
5	1,400	200 mmf.	Ant.	A	1,400	F

* **NOTE:** When aligning the short-wave oscillator trimmer (C), be sure that the circuit is aligned at the correct frequency and not at the image frequency which is 910 kilocycles lower as indicated by the receiver dial. To check: Tune in the generator frequency, then increase the generator output and tune in the image frequency. The image frequency should be weaker than the fundamental and audible 910 kilocycles lower on the receiver dial. If the image cannot be tuned in, the oscillator trimmer is adjusted to the wrong peak; i.e., the oscillator trimmer may be adjusted to the image or one of the harmonics instead of the fundamental frequency. The correct peak is the second one heard as the trimmer adjustment screw is opened from the completely closed position.

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MODELS 46FA, 46FB

Item No.	Part No.	Description
1	B-130493	Battery Cable and Plug
2	AW-133777	Coil, H. F. Antenna
3	AW-133783	Coil, B. C. Antenna
4	AW-133757	Coil, H. F. Osc. Dual
5		Coil, B. C. Osc. Coil
6	AW-134348	1st. I. F. Transformer
7	AW-134349	2nd. I. F. Transformer
8A	B-134995	Variable Condenser (Ant.) Two
8B		Variable Condenser (Osc.) Section
9A	B-132386-5	Trimmer Condenser Three
9B		Trimmer Condenser Section
9C		Trimmer Condenser
11	GC-210685-143	Condenser, 580 mmf., Mica
12	39001-65	Condenser, .05 mfd., 200 v., Paper
13	39004-6	Condenser, 75 mmf., Mica
14	39001-63	Condenser, .022 mfd., 200 v., Paper
15	39001-10	Condenser, .0033 mfd., 600 v., Paper
16	39001-10	Condenser, .0033 mfd., 600 v., Paper
17A	W-49664	Condenser, 15 mfd., 140 v. Two Section
17B		Condenser, 15 mfd., 140 v. Elect. Filter
18	39001-10	Condenser, .0033 mfd., 600 v., Paper
19	39004-7	Condenser, 100 mmf., Mica
20	39001-9	Condenser, .0022 mfd., 600 v., Paper
22	39281-34	Resistor, 3.3 Megohm, ½ w.
23	39281-27	Resistor, 220,000 Ohm, ½ w.
24	39281-23	Resistor, 47,000 Ohm, ½ w.
25	39281-35	Resistor, 4.7 Megohm, ½ w.
26	39281-4	Resistor, 33Ohm, ½ w.
27	39281-37	Resistor, 10 Megohm, ½ w.
28	39281-26	Resistor, 150,000 Ohm, ½ w.
29	39281-16	Resistor, 3,300 Ohm, ½ w.
30	39281-17	Resistor, 4,700 Ohm, ½ w.
31	39281-35	Resistor, 4.7 Megohm, ½ w.
32	39281-31	Resistor, 1 Megohm, ½ w.
33	39281-33	Resistor, 2.2 Megohm, ½ w.
34	39279-24	Resistor, 820 Ohm, ½ w.
37	C-133786	Speaker
38	W-133712	Band Change Switch
39	W-132822-1	Speaker Plug and Cable
40A	B-130520-3	Volume Control, 1 Megohm
40B		Power Switch ("B" Supply) Assembly
40C		Power Switch ("A" Supply)
	R-134593	Plastic Cabinet- Brown (46FA)
	R-134594	Wood Cabinet (46FB)
	CR69	"A-B" Battery Pack
	C-132688	Dial Lens
	W-130197	Knob
	W-134596	Spacer (46FA)
	W-132709	Grille Cloth (46FA)
	W-48200	Trimount Stud, Dial Lens (46FA)
	AW-134799	Dial Face Assembly
	B-134571	Dial Pointer
	W-51752	Dial Cord Spring
	W-134917	Drive Shaft
	W-134667	Dial Pointer Clip
	W-134916	Spring Washer
	W-51071	Retaining Ring
	G-39204	Tube Socket
	W-46447-1	Tube Shield
	W-134055	Grommet

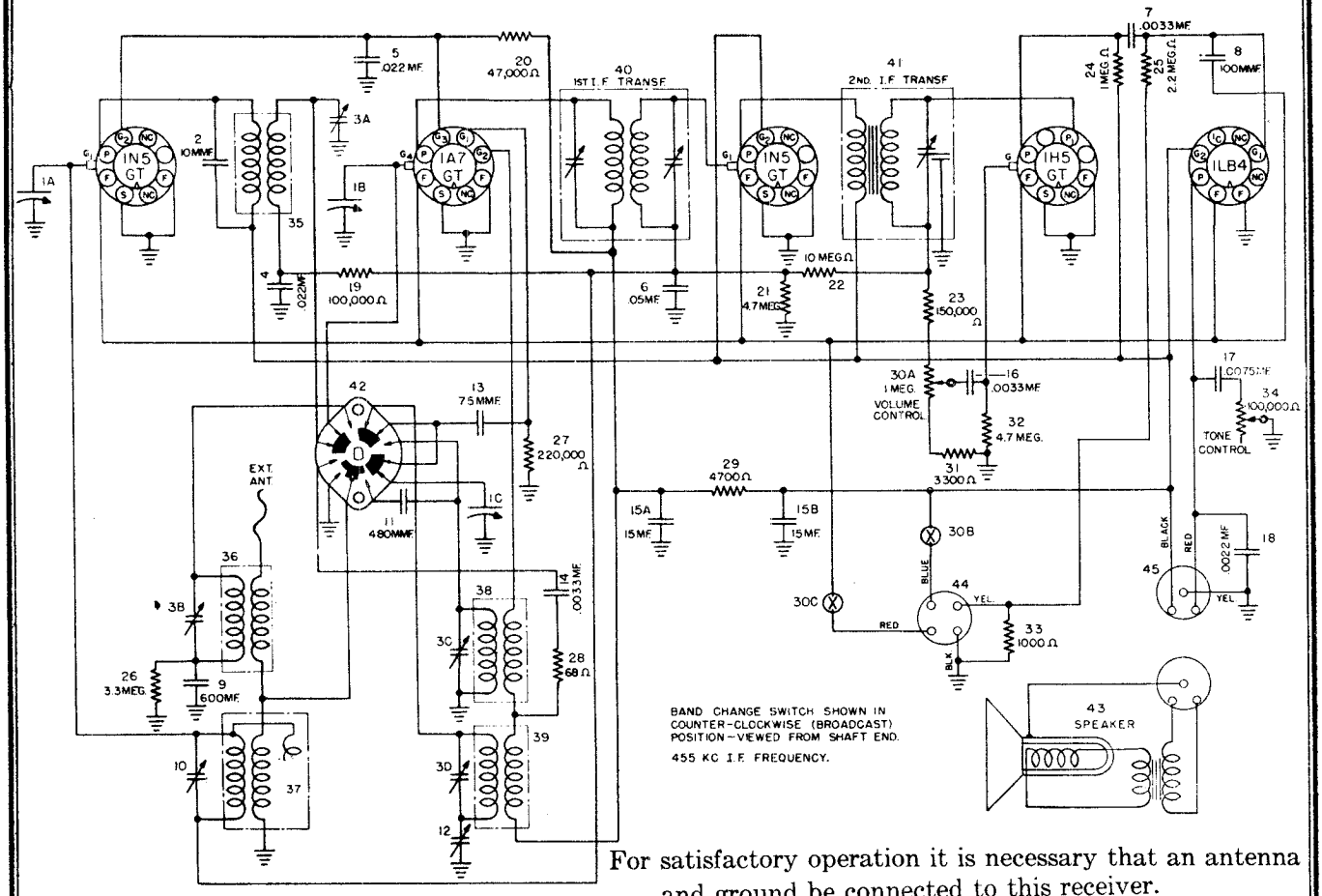
MODELS 56FA, 56FB

Item No.	Part No.	Description
1A	AC-134898	Condenser (Variable) Three
1B		Condenser (Variable) Section
1C		Condenser (Variable) Assembly
2	39004-1	Condenser, 10 mmf., 500 v., Mica
3A	B-132386-12	Condenser (Trimmer) Four
3B		Condenser (Trimmer) Section
3C		Condenser (Trimmer) Assembly
3D		Condenser (Trimmer)
4	39001-63	Condenser, .022 mfd., 200 v., Paper
5	39001-63	Condenser, .022 mfd., 200 v., Paper
6	39001-65	Condenser, .05 mfd., 200 v., Paper
7	39001-10	Condenser, .0033 mfd., 600 v., Paper
8	39004-7	Condenser, 100 mmf., 500 v., Mica
9	GC-210685-99	Condenser, 600 mmf., 300 v., Mica
10	W-49652-15	Condenser (Trimmer)
11	GC-210685-138	Condenser, 480 mmf., 500 v., Mica
12	W-135130	Condenser (Padder)
13	39004-6	Condenser, 75 mmf., 500 v., Mica
14	39001-10	Condenser, .0033 mfd., 600 v., Paper
15A	W-49664	Condenser, 15 mfd., 140 v. Two Section
15B		Condenser, 15 mfd., 140 v. Elect. Filter
16	39001-10	Condenser, .0033 mfd., 600 v., Paper
17	39001-12	Condenser, .0075 mfd., 600 v., Paper
18	39001-9	Condenser, .0022 mfd., 600 v., Paper
19	39281-25	Resistor, 100,000 ohm, ½ w.
20	39281-23	Resistor, 47,000 ohm, ½ w.
21	39281-35	Resistor, 4.7 megohm, ½ w.
22	39281-37	Resistor, 10 megohm, ½ w.
23	39281-26	Resistor, 150,000 ohm, ½ w.
24	39281-31	Resistor, 1.0 megohm, ½ w.
25	38281-33	Resistor, 2.2 megohm, ½ w.
26	39281-34	Resistor, 3.3. megohm, ½ w.
27	39281-27	Resistor, 220,000 ohm, ½ w.
28	39281-6	Resistor, 68 ohm, ½ w.
29	39281-17	Resistor, 4700 ohm, ½ w.
30A	B-130520-3	Control, Volume (1.0 megohm) Assembly
30B		Switch (Plate Supply)
30C		Switch (Filament Supply)
31	39281-16	Resistor, 3300 ohm, ½ w.
32	39281-35	Resistor, 4.7 megohm, ½ w.
33	39279-25	Resistor, 1,000 ohm, ½ w.
34	B-135198	Control, Tone (100,000-ohm)
35	AW-135133	Coil Assembly (R. F.)
36	AW-135147	Coil Assembly (H. F. Ant.)
37	AW-135134	Coil Assembly (B. C. Ant.)
38	AW-135140	Coil Assembly (H. F. Osc.)
39	AW-135141	Coil Assembly (B. C. Osc.)
40	AW-132803	Transformer (1st I. F.)
41	AW-132804	Transformer (2nd I. F.)
42	B-135079	Switch (Band Change)
43	C-135199	Speaker
44	B-130493	Cable and Plug (Battery)
45	W-132822-2	Cable and Plug (Speaker)
	W-135371	Socket (1LB4 Tube)
	G-39204	Socket (Tube)
	W-46447-1	Shield (Tube)
	CR 69	"A-B" Battery Pack
	AW-135172	Dial Face Assembly (56FA)
	AW-135173	Dial Face Assembly (56FB)
	B-134571	Pointer (Dial)
	W-134667	Clip (Dial Pointer)
	W-134917	Shaft (Drive)
	W-51071	Ring (Retaining)
	W-134916	Washer (Spring)
	W-51752	Spring (Dial Cord)
	R-134592	Cabinet (56FA)
	D-133930	Cabinet (56FB)
	C-132688	Lens, Dial (56FA)
	C-134773	Lens, Dial (56FB)
	W-132709	Grille Cloth (56FA)
	W-130197	Knob
	W-45580	Rubber Mtg.
	39220-38	Screw (Chassis Mtg.)

Figures in first column correspond to figures in schematic diagram.

MODELS 56FA, 56FB

THE CROSLEY CORP.

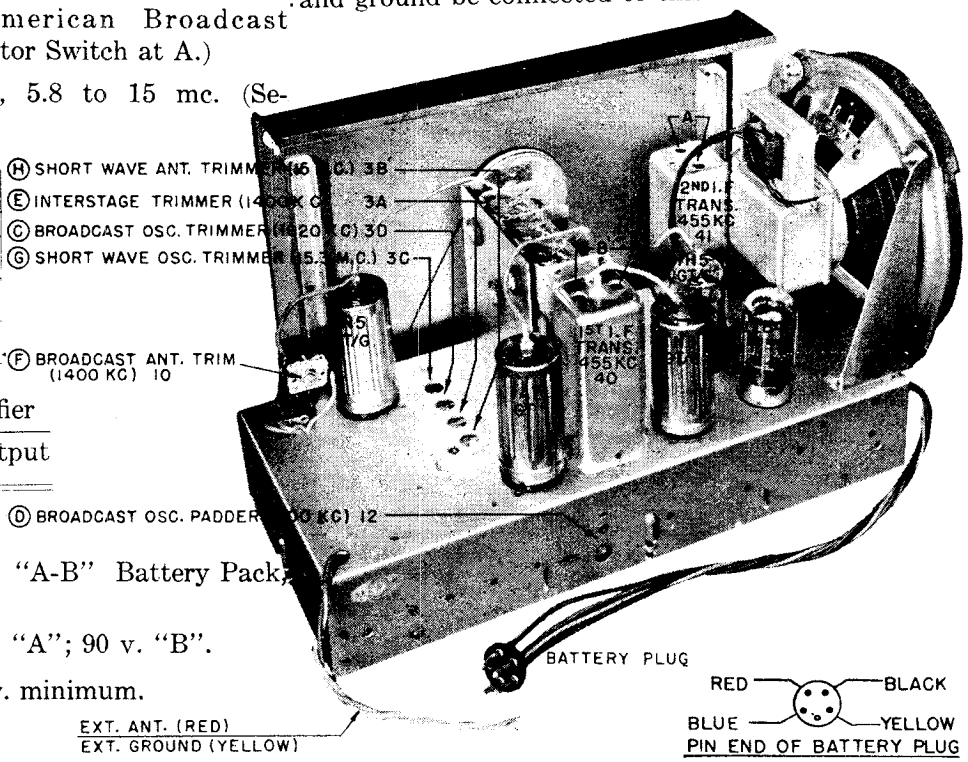


For satisfactory operation it is necessary that an antenna and ground be connected to this receiver.

FREQUENCY RANGE: American Broadcast Band, 540 to 1600 kc. (Selector Switch at A.)

Overseas Short-wave Band, 5.8 to 15 mc. (Selector Switch at 0.)

Type	Function
1A7GT/G	Mixer
1N5GT/G	I. F. Amplifier,
1N5GT/G	R. F. Amplifier
1H5GT/G	Detector, AVC 1st A. F. Amplifier
1LB4	A. F. Power Output


(H) SHORT WAVE ANT. TRIMMER (15 MC.) 3B
(E) INTERSTAGE TRIMMER (1400 KC.) 3A
(C) BROADCAST OSC. TRIMMER (1220 KC.) 3D
(G) SHORT WAVE OSC. TRIMMER (5.3 MC.) 3C
(F) BROADCAST ANT. TRIM (1400 KC) 10
(D) BROADCAST OSC. PADDER (1220 KC) 12
2ND I.F. TRANS. 455 KC 41
1ST I.F. TRANS. 455 KC 40
BATTERY PLUG
EXT. ANT. (RED)
EXT. GROUND (YELLOW)
RED
BLACK
BLUE
YELLOW
PIN END OF BATTERY PLUG

POWER SUPPLY: Crosley "A-B" Battery Pack, CR69.

VOLTAGE RATING: 1½ v. "A"; 90 v. "B".

POWER OUTPUT: 170 mw. minimum.

FEBRUARY, 1946

Speaker mounted on cabinet on Model 56FB

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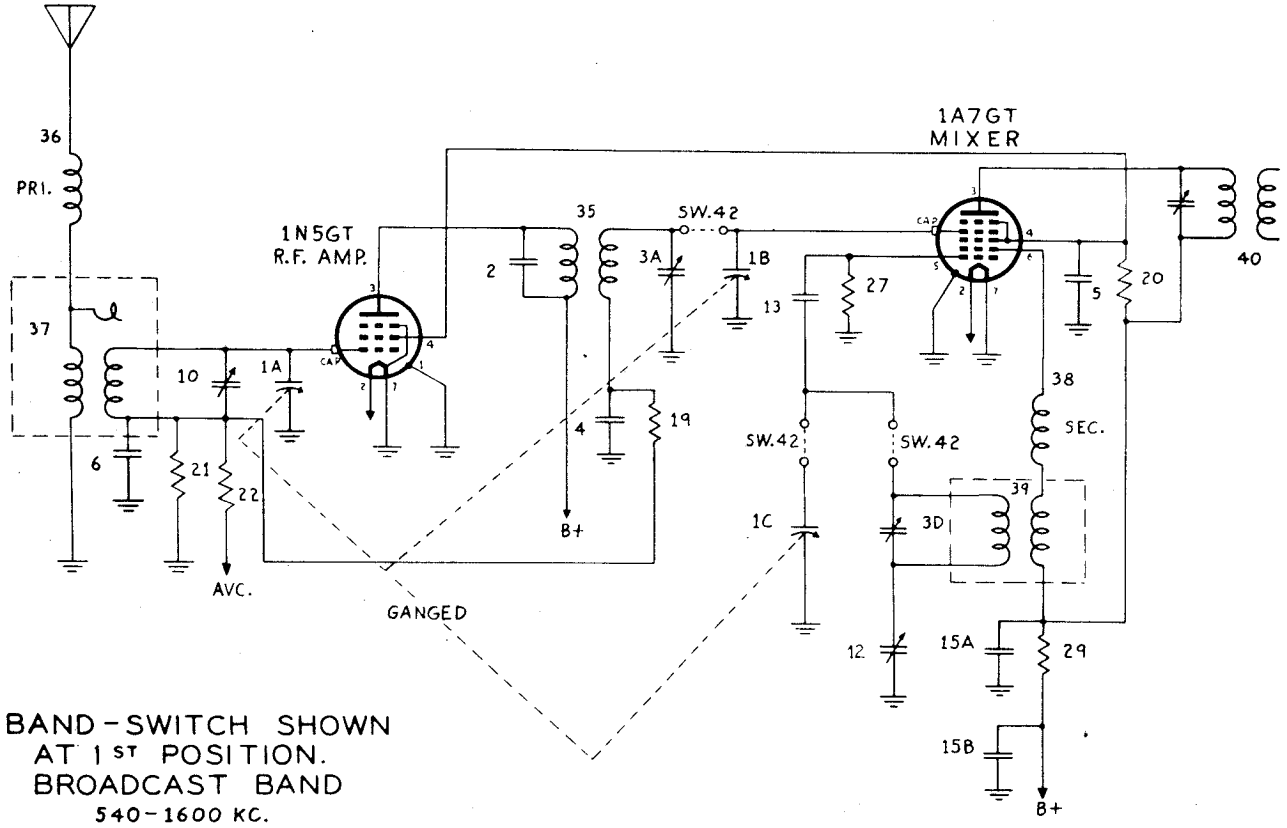
For Parts List, see P.15-4

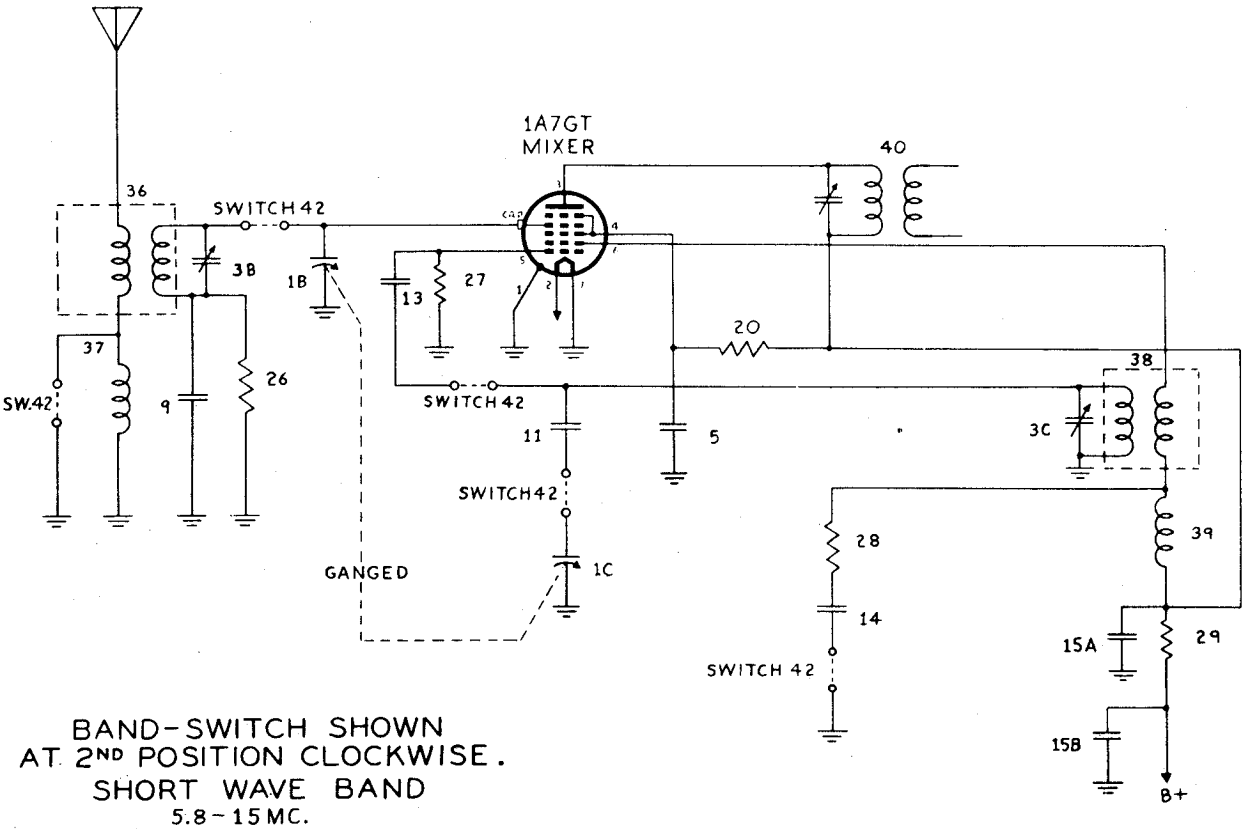
"clarified schematics"

MODELS 56FA, 56FB

THE CROSLEY CORP.



BAND-SWITCH SHOWN
AT 1ST POSITION.
BROADCAST BAND
540-1600 KC.



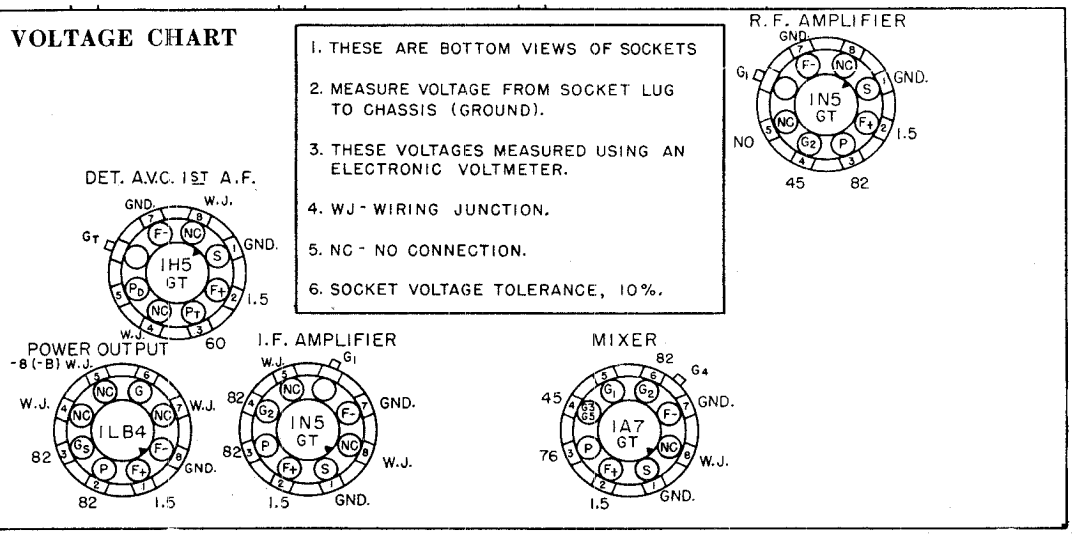
BAND-SWITCH SHOWN
AT 2ND POSITION CLOCKWISE.
SHORT WAVE BAND
5.8-15 MC.

©John F. Rider

THE CROSLEY CORP.

SOCKET VOLTAGE CHART

1. THESE ARE BOTTOM VIEWS OF SOCKETS
2. MEASURE VOLTAGE FROM SOCKET LUG TO CHASSIS (GROUND).
3. THESE VOLTAGES MEASURED USING AN ELECTRONIC VOLTMETER.
4. WJ - WIRING JUNCTION.
5. NC - NO CONNECTION.
6. SOCKET VOLTAGE TOLERANCE, 10%.



1. Turn the tuning condenser to the completely closed position against the stop and set the dial pointer to the reference line at the end of the dial scale.
2. Connect the output meter across the speaker voice coil.
3. The r.f. signal input from the signal generator should be connected to the antenna lead (red) as indicated in the alignment chart. Connect the low side (ground) of the signal generator to the chassis.
4. Turn the volume control on full and adjust the signal generator output to produce approximately mid-scale deflection of the output meter, but maintain signal generator output as low as possible to prevent AVC action in the receiver.

Alignment Sequence	Signal Generator Output			Position of		Adjust for Maximum Output
	Frequency in kc.	In Series with	To	Band Switch	Tuning Dial	
1	455	200 mmf.	Ant.	A	1,620	A & B
2	1,620	200 mmf.	Ant.	A	1,620	C
3	600	200 mmf.	Ant.	A	600	D
4	1,620	200 mmf.	Ant.	A	1,620	C
5	1,400	200 mmf.	Ant.	A	1,400	E & F
6	600	200 mmf.	Ant.	A	600	D
7	15,300	400 ohms	Ant.	O	15,300	G*
8	15,000	400 ohms	Ant.	O	15,000	H

* **NOTE:** When aligning the short-wave oscillator trimmer (G), be sure that the circuit is aligned at the correct frequency and not at the image frequency which is 910 kilocycles lower as indicated by the receiver dial. To check: Tune in the generator frequency, then increase the generator output and tune in the image frequency. The image frequency should be weaker than the fundamental and audible 910 kilocycles lower on the receiver dial. If the image cannot be tuned in, the oscillator trimmer is adjusted to the wrong peak; i.e., the oscillator trimmer may be adjusted to the image or one of the harmonics instead of the fundamental frequency. The correct peak is the second one heard as the trimmer adjustment screw is opened from the completely closed position.

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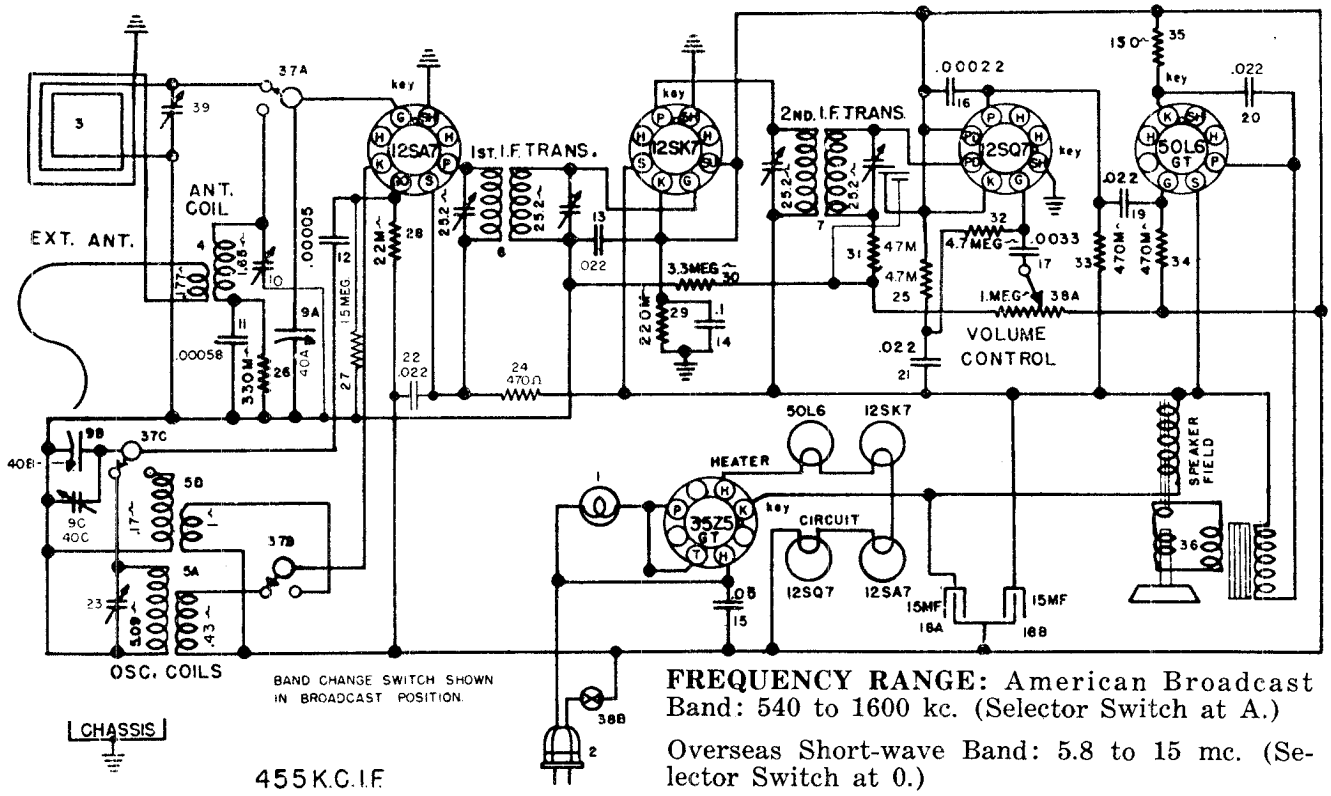
MODELS 56TA, 56TC, 56TW

THE CROSLEY CORP.



FREQUENCY RANGE: American Broadcast Band: 540 to 1600 kc. (Selector Switch at A.)

Overseas Short-wave Band: 5.8 to 15 mc. (Selector Switch at 0.)

INTERMEDIATE FREQUENCY: 455 kc.

POWER SUPPLY: a.c—d.c.

VOLTAGE RATING: 105-125 volts.

POWER CONSUMPTION: 35 watts nominal.

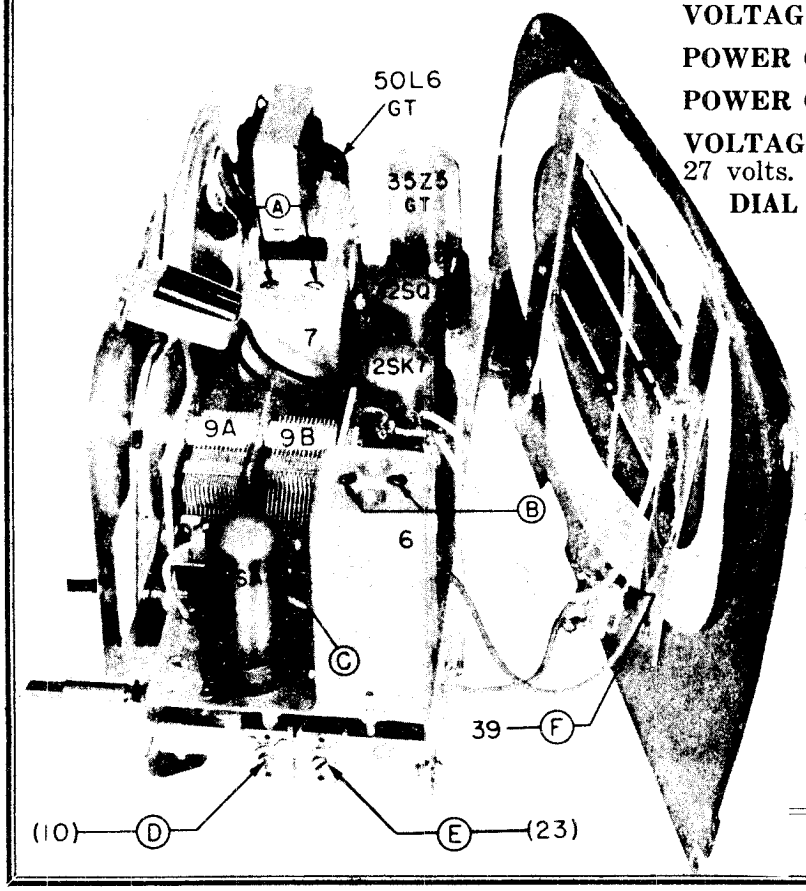
POWER OUTPUT: 1 watt maximum.

VOLTAGE DROP ACROSS SPEAKER FIELD: 27 volts.

DIAL BULB: Type 47, 6.3 volts, .15 amp.

RESISTANCE OF SPEAKER FIELD: 450 ohms.

SPEAKER FIELD CURRENT: 60 ma.



CHASSIS, SIDE VIEW—

-MODELS 56TA, 56TW, 56TC

Type	Function
12SA7 (or GT/G)	Mixer
12SK7 (or GT/G)	I.F. Amplifier
12SQ7 (or GT/G)	Detector, AVC, 1st A.F. Amplifier
50L6GT	A.F. Power Output
35Z5GT/G	Rectifier

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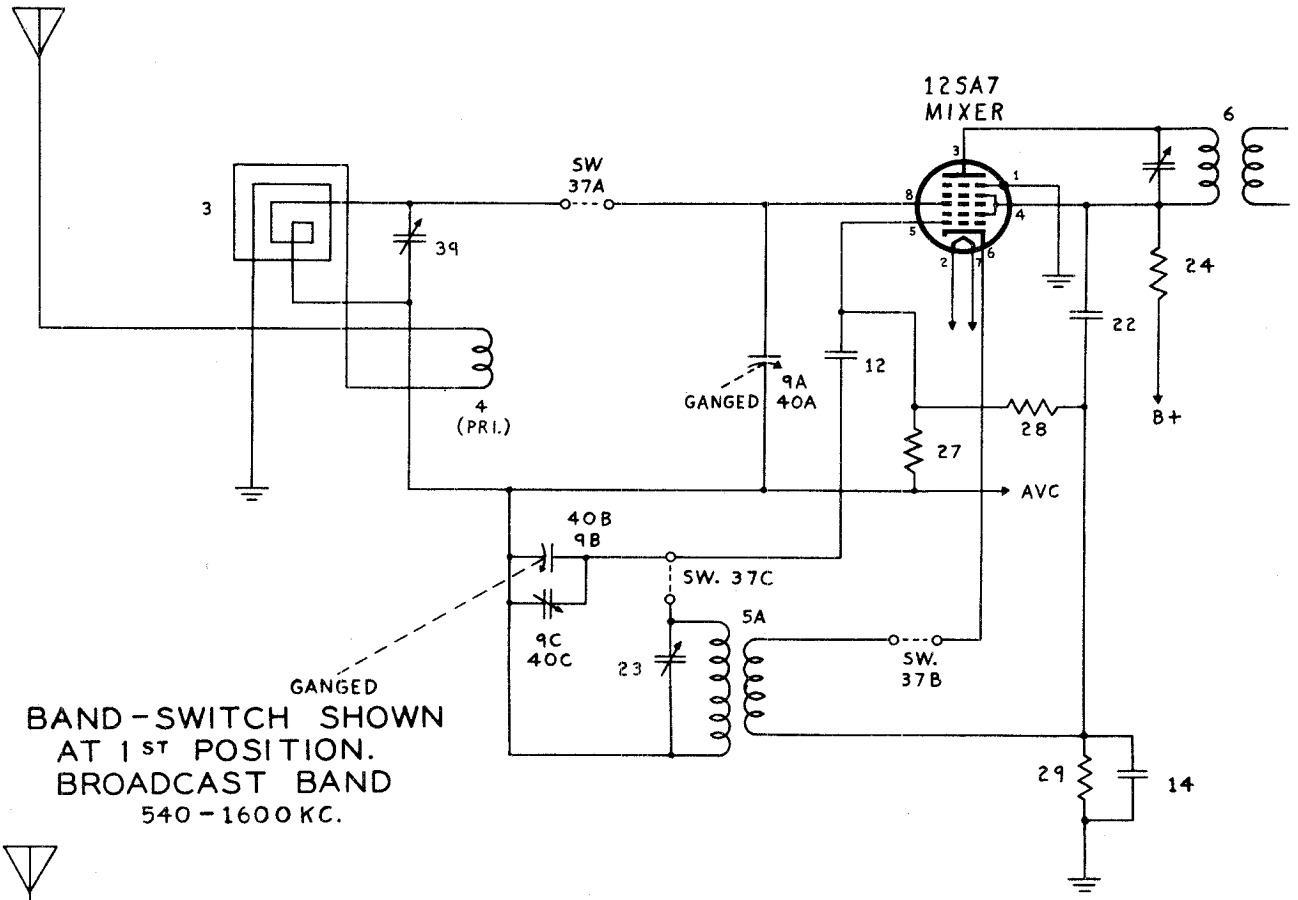
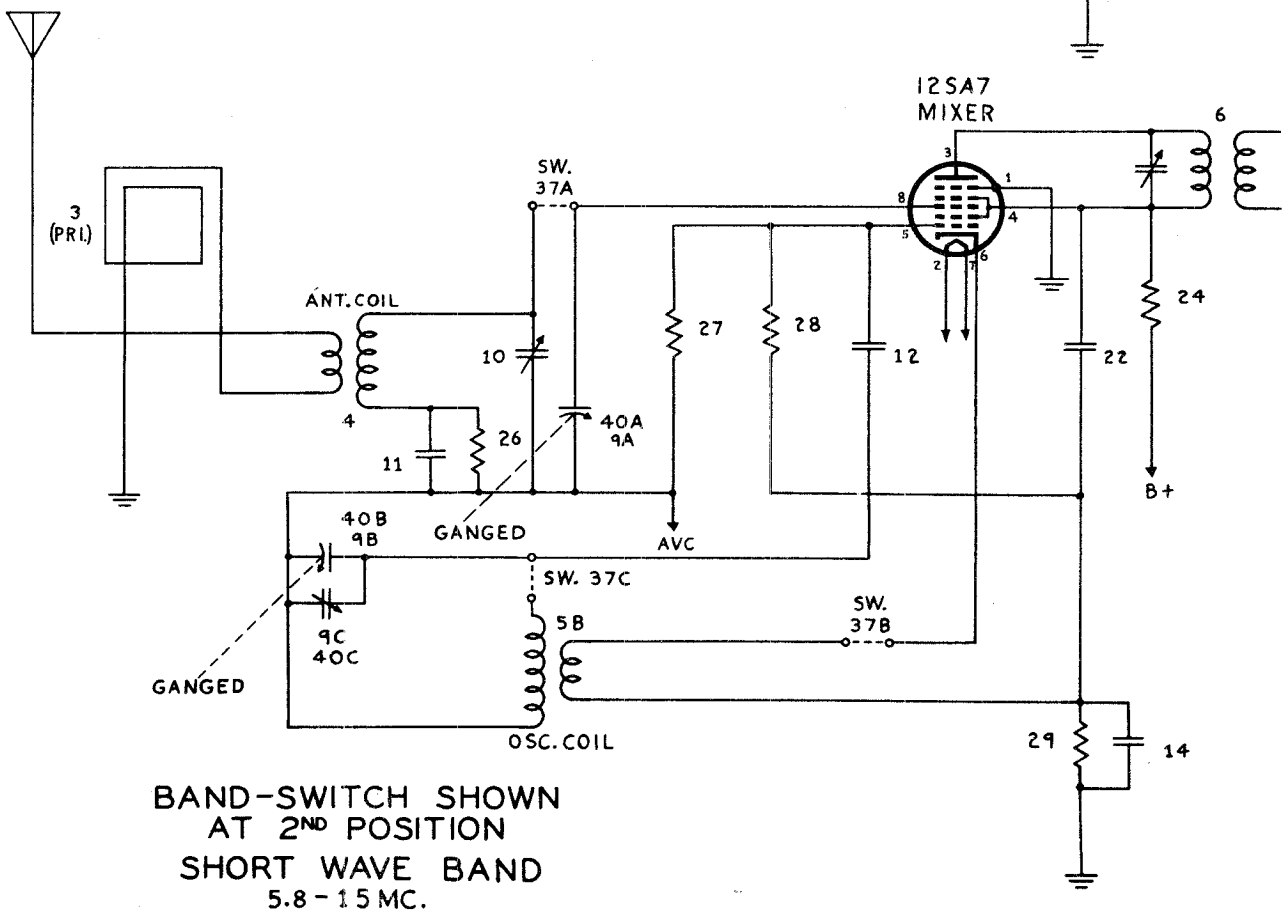
For Parts List, see P.15-13

THE CROSLEY CORP.

MODELS 56TA, 56TC, 56TW



BAND-SWITCH SHOWN AT 1ST POSITION. BROADCAST BAND 540-1600 KC.



BAND-SWITCH SHOWN AT 2ND POSITION SHORT WAVE BAND 5.8-15 MC.

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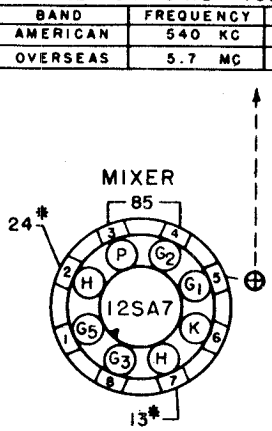
MODELS 56TA,56TC,56TW
MODELS 56TA-L,56TC-L,
56TW-L

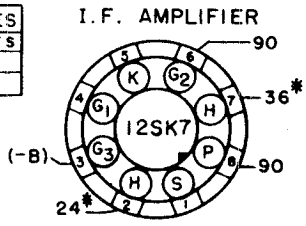
THE CROSLEY CORP.

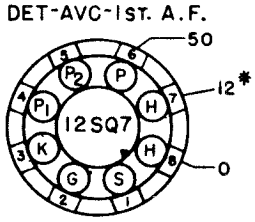
MODELS 56TA, 56TW, 56TC

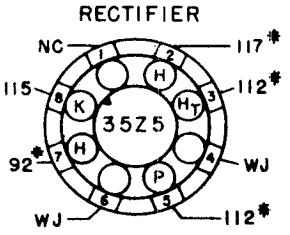
⊕OSCILLATOR GRID VOLTAGES

BAND	FREQUENCY	VOLTS
AMERICAN	540 KC	-4.6
OVERSEAS	5.7 MC	-2.8

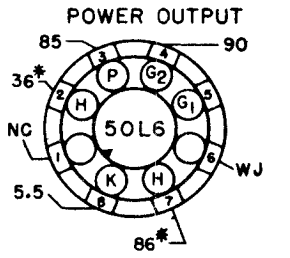








NOTES:
1. THESE ARE BOTTOM VIEWS OF SOCKETS.
2. MEASURE VOLTAGES FROM SOCKET LUGS TO -B (PIN 3 ON THE 12SK7)
3. THESE VOLTAGES MEASURED USING AN ELECTRONIC VOLTMETER.
4. WJ - WIRING JUNCTION.
5. NC - NO CONNECTION.
6. * - 60 CYCLE AC VOLTAGE.
7. SOCKET VOLTAGE TOLERANCE, 10%



ALIGNMENT PROCEDURE

MODELS 56TA, 56TW, 56TC — **MODELS 56TA-L, 56TW-L, 56TC-L**

1. Turn the tuning condenser to the completely closed position against the stop and set the dial pointer to the reference line at the end of the dial scale.
2. Connect the output meter across the speaker voice coil.
3. The r.f. signal input from the signal generator should be connected to the external antenna lead. Connect the signal generator ground through a 0.1 mfd. condenser to —B (pin 3 on 12SK7 tube socket Models 56TA, 56TW, 56TC) (pin 4 on 14A7 tube socket Models 56TA-L, 56TW-L, 56TC-L).
4. Turn the volume control on full and adjust the signal generator output to produce approximately mid-scale deflection of the output meter, but maintain signal generator output as low as possible to prevent AVC action in the receiver.

Alignment Sequence	Signal Generator Output			Position of		Adjust for Maximum Output
	Frequency in kc.	In Series with	To	Band Switch	Tuning Dial	
1	455	200 mmf.	Ant.	A	1,620	A & B
2	15,300	400 ohms	Ant.	O	15,300	C
3	15,000	400 ohms	Ant.	O	15,000	D
4	1,400	200 mmf.	Ant.	A	1,400	E & F

NOTE: When aligning the short-wave oscillator trimmer (C), be sure that the circuit is aligned at the correct frequency and not at the image frequency which is 910 kilocycles lower as indicated by the receiver dial. To check: Tune in the generator frequency, then increase the generator output and tune in the image frequency. The image frequency should be weaker than the fundamental and audible 910 kilocycles lower on the receiver dial. If the image cannot be tuned in, the oscillator trimmer is adjusted to the wrong peak; i.e., the oscillator trimmer may be adjusted to the image or one of the harmonics instead of the fundamental frequency. The correct peak is the second one heard as the trimmer adjustment screw is opened from the completely closed position.

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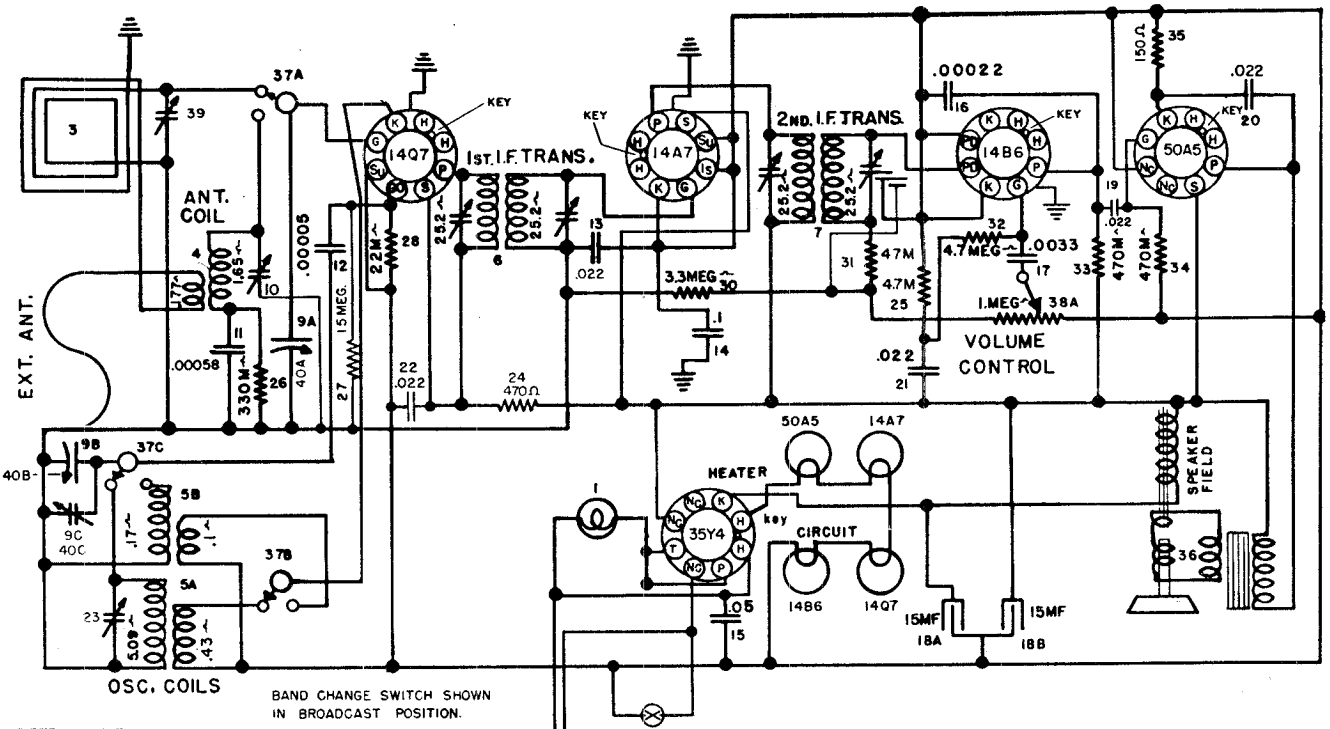
THE CROSLEY CORP.

MODELS 56TA-L, 56TC-L, 56TW-L

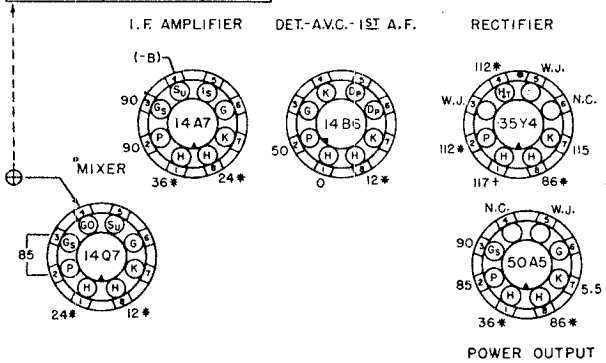


INTERMEDIATE FREQUENCY: 455 kc.
POWER SUPPLY: a.c.—d.c.
VOLTAGE RATING: 105-125 volts.
POWER CONSUMPTION: 35 watts nominal.
POWER OUTPUT: 1 watt minimum.
VOLTAGE DROP ACROSS SPEAKER FIELD: 27 volts.
RESISTANCE OF SPEAKER FIELD: 450 ohms.
DIAL BULB: Type 47, 6.3 volts, .15 amp.

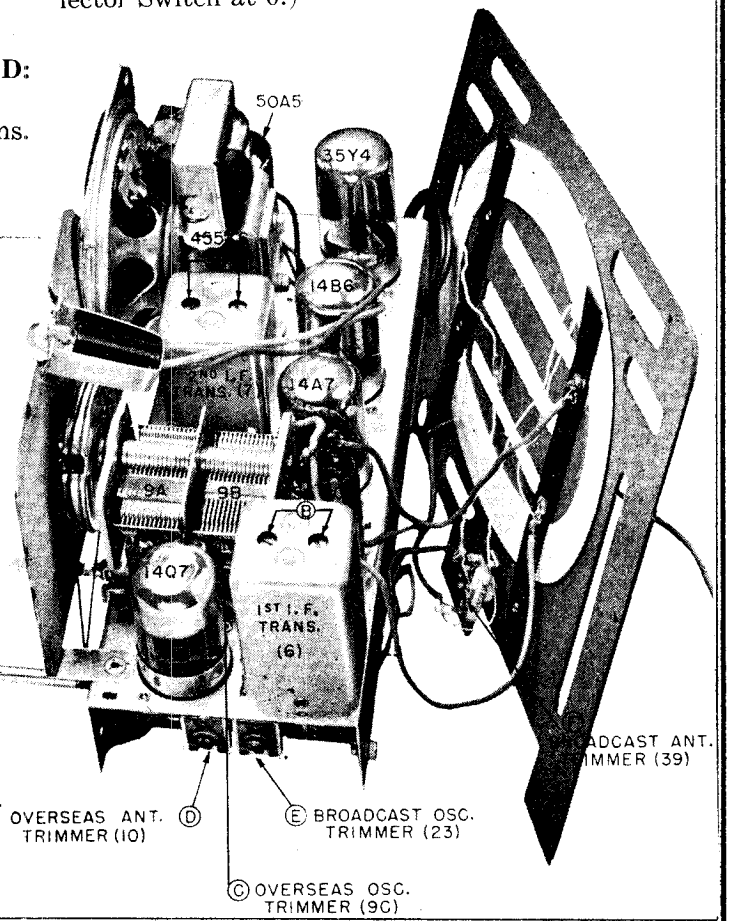
FREQUENCY RANGE: American Broadcast Band, 540 to 1600 kc. (Selector Switch at A.)

Overseas Short-wave Band. 5.8 to 15 mc. (Selector Switch at 0.)

⊕ OSCILLATOR GRID VOLTAGES		
BAND	FREQUENCY	VOLTS
AMERICAN	550 KC	-4.6
OVERSEAS	5.8	-2.8



NOTES:
1. THESE ARE BOTTOM VIEWS OF TUBE SOCKETS.
2. MEASURE VOLTAGES FROM SOCKET LUGS TO -B (PIN 4 ON THE 14A7).
3. THESE VOLTAGES WERE MEASURED USING AN ELECTRONIC VOLTMETER.
4. W.J. — WIRING JUNCTION.
5. N.C. — NO CONNECTION.
6. * — 60 CYCLE A.C. VOLTAGES.
7. SOCKET VOLTAGE TOLERANCE, 10%.



For Alignment, see P.15-10
For Parts List, see P.15-13

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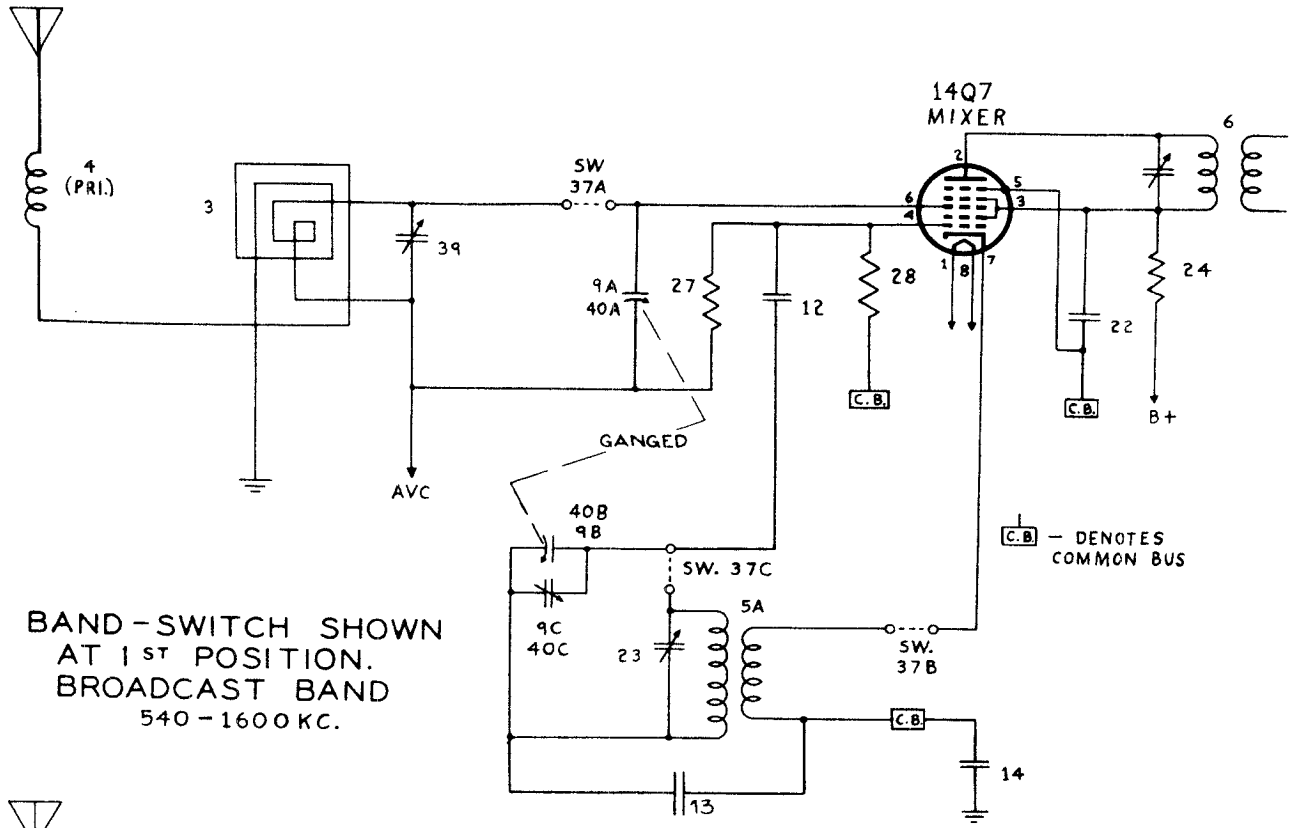
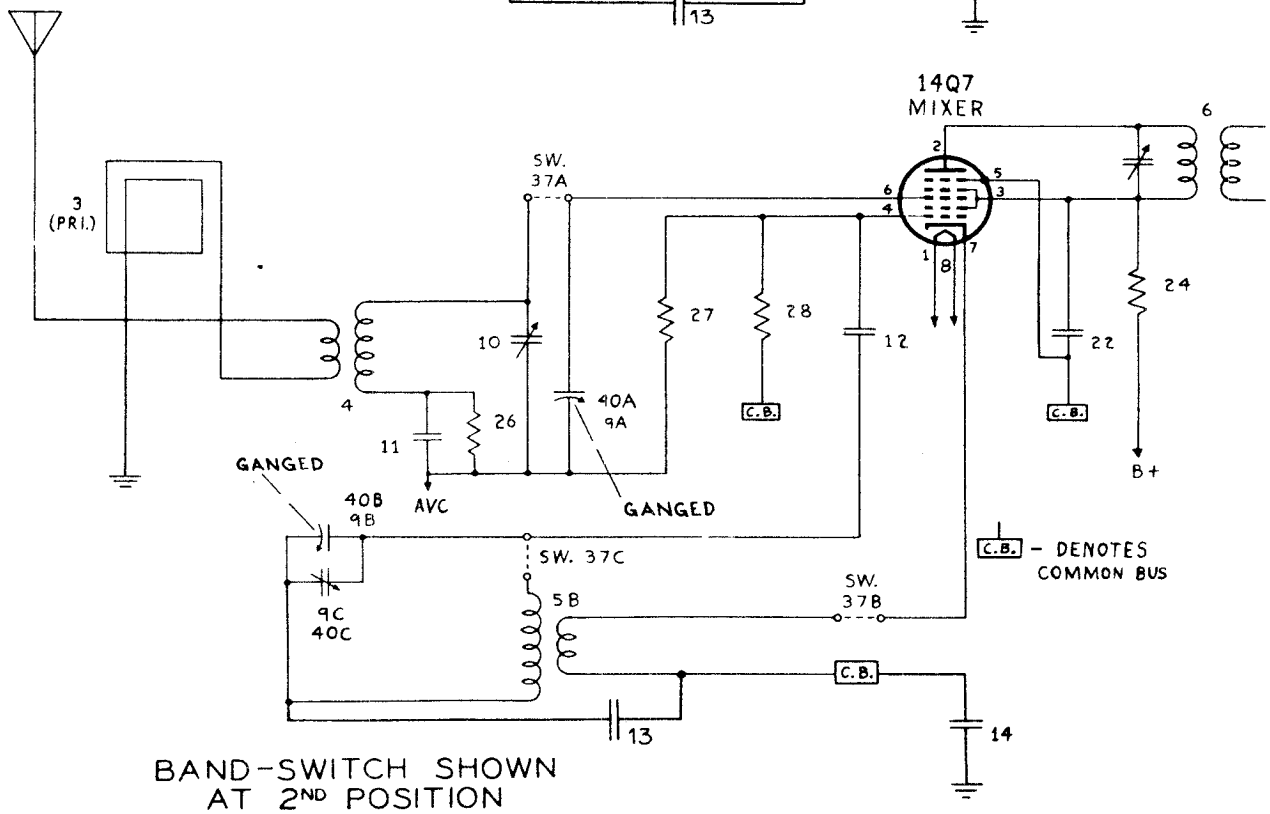
"clarified schematics"

MODELS 56TA-L, 56TC-L, 56TW-L

THE CROSLEY CORP.



BAND-SWITCH SHOWN AT 1ST POSITION. BROADCAST BAND 540-1600 KC.



BAND-SWITCH SHOWN AT 2ND POSITION SHORT WAVE BAND 5.8-15 MC.

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MODELS 56TA, 56TW, 56TC

Item No.	Part No.	Description
1	W-48858	Dial Light, 6.3 V.
2	C-132300-1	Power Cable and Plug
3		Ant. Loop, (Part of Antenna Loop and Back Assembly. See Cabinet Parts.)
4	AW-134994	H. F. Ant. Coil
5A	AW-134993	B. C. Osc. Coil (Dual
5B		H. F. Osc. Coil (Coil
6	AW-134065	1st I. F. Transformer
7	AW-134158	2nd I. F. Transformer
9A	B-134995	Variable Condenser (Two
9B		Variable Condenser (Section
10	AB-135088	H. F. Ant. Trimmer
11	GC-210685-143	Condenser, 580 mmf., 300 V. Mica
12	39004-5	Condenser, 50 mmf., Mica
13	39001-63	Condenser, .022 mfd., 200 V. Paper
14	39001-67	Condenser, .1 mfd., 200 V. Paper
15	39001-65	Condenser, .05 mfd., 200 V. Paper
16	39004-9	Condenser, 220 mmf., Mica
17	39001-10	Condenser, .0033 mfd., 600 V. Paper
18A	W-134177	Condenser, 15 mfd., 140 V. (Two Section Elect. Filter
18B		Condenser, 15 mfd., 120 V. (Two Section Elect. Filter
19	39001-63	Condenser, .022 mfd., 200 V. Paper
20	39001-63	Condenser, .022 mfd., 200 V. Paper
21	39001-63	Condenser, .022 mfd., 200 V. Paper
22	39001-63	Condenser, .022 mfd., 200 V. Paper
23	Part of Item #10	B. C. Osc. Trimmer
24	39281-11	Resistor, 470 Ohm, ½ W.
25	39281-17	Resistor, 4700 Ohm, ½ W.
26	39281-28	Resistor, 330,000 Ohm, ½ W.
27	39281-38	Resistor, 15 Megohm, ½ W.
28	39281-21	Resistor, 22,000 Ohm, ½ W.
29	39281-27	Resistor, 220,000 Ohm, ½ W.
30	39281-34	Resistor, 3.3 Megohm, ½ W.
31	39281-23	Resistor, 47,000 Ohm, ½ W.
32	39281-35	Resistor, 4.7 Megohm, ½ W.
33	39281-29	Resistor, 470,000 Ohm, ½ W.
34	39281-29	Resistor, 470,000 Ohm, ½ W.
35	39281-8	Resistor, 150 Ohm, ½ W.
36	GC-49675-9	Speaker
37A	49772-3	Band Change Switch (Three Section
37B		Band Change Switch (Three Section
37C		Band Change Switch (Three Section
38A	C-46846-6	Control, Volume (1 Megohm) (Assy.
38B		Switch (Power) (Assy.
39	Part of Item #3	B. C. Ant. Trimmer
	W-47577	Cable Lock Plate
	C-135175	Dial Face
	B-134570	Dial Pointer
	W-134667	Dial Pointer Clip
	W-51752	Dial Cord Spring
	39017-4	Dial Light Socket Assembly
	W-134917	Drive Shaft
	W-51071	Retaining Ring
	W-134916	Spring Washer
	G-39204	Tube Socket
	W-49770	Trimount Stud, (Dial Face and Chassis Bottom Cover)
	W-134055	Grommet
	W-135164	Rubber Bumper
	W-46662	Palnut (⅜-32)
	D-132136-1	Plastic Cabinet—Brown (56TA)
	AW-134738	Plastic Cabinet—Ivory (56TW)
	D-134586	Wood Cabinet (56TC)
	AC-134618	Ant. Loop and Back Assembly (56TA, 56TW)
	AC-134288	Ant. Loop and Back Assembly (56TC)
	B-134610	Dial Lens
	W-134882	Knob (56TA, 56TC)
	W-134883	Knob (56TW)
	39220-32	Mounting Screw
	W-136630	Trimount Stud (Dial Lens, 56TA, 56TW)
	W-132124	Trimount Stud (Ant. Loop and Back Assembly, 56TA, 56TW)

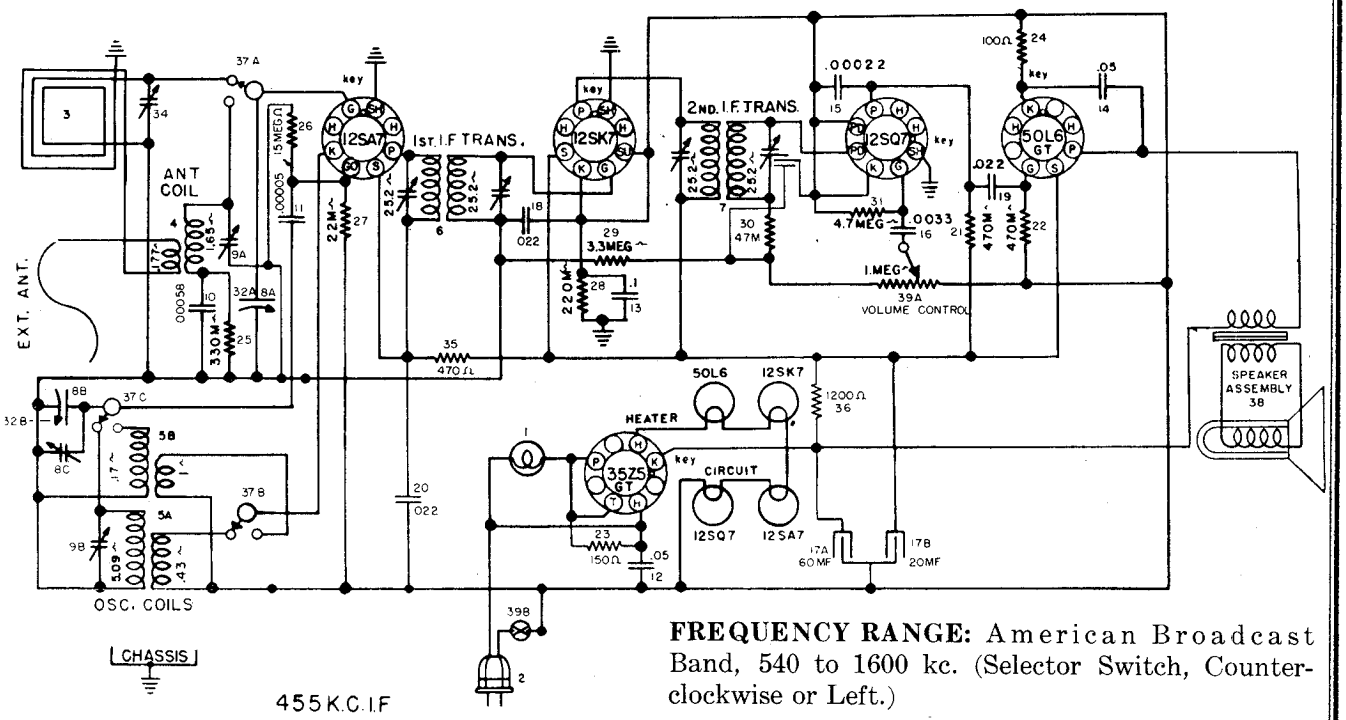
MODELS 56TA-L, 56TW-L, 56TC-L

Item No.	Part No.	Description
1	W-48858	Dial Light, 6.3 v.
2	C-132300-1	Power Cable and Plug
3		Ant. Loop (Part of Antenna Loop and Back Assembly. See Cabinet Parts.)
4	AW-134994	H. F. Ant. Coil
5A	AW-134993	B. C. Osc. Coil (Dual
5B		H. F. Osc. Coil (Coil
6	AW-134065	1st I. F. Transformer
7	AW-134158	2nd I. F. Transformer
9A	B-134995	Variable Condenser (Two
9B		Variable Condenser (Section
10	AB-135088	H. F. Ant. Trimmer
11	GC-210685-143	Condenser, 580 mmf., 300 v., Mica
12	39004-5	Condenser, 50 mmf., 500 v., Mica
13	39001-63	Condenser, .022 mfd., 200 v., Paper
14	39001-67	Condenser, .1 mfd., 200 v., Paper
15	39001-65	Condenser, .05 mfd., 200 v., Paper
16	39004-9	Condenser, 220 mmf., 500 v., Mica
17	39001-10	Condenser, .0033 mfd., 600 v., Paper
18A	W-134177	Condenser, 15 mfd., 140 v. (Two Section Elect. Filter
18B		Condenser, 15 mfd., 120 v. (Two Section Elect. Filter
19	39001-63	Condenser, .022 mfd., 200 v., Paper
20	39001-63	Condenser, .022 mfd., 200 v., Paper
21	39001-63	Condenser, .022 mfd., 200 v., Paper
22	39001-63	Condenser, .022 mfd., 200 v., Paper
23	Part of Item #10	B. C. Osc. Trimmer
24	39281-11	Resistor, 470 Ohm, ½ w.
25	39281-17	Resistor, 4700 Ohm, ½ w.
26	39281-28	Resistor, 330,000 Ohm, ½ w.
27	39281-38	Resistor, 15 Megohm, ½ w.
28	39281-21	Resistor, 22,000 Ohm, ½ w.
30	39281-34	Resistor, 3.3 Megohm, ½ w.
31	39281-23	Resistor, 47,000 Ohm, ½ w.
32	39281-35	Resistor, 4.7 Megohm, ½ w.
33	39281-29	Resistor, 470,000 Ohm, ½ w.
34	39281-29	Resistor, 470,000 Ohm, ½ w.
35	39281-8	Resistor, 150 Ohm, ½ w.
36	GC-49675-9	Speaker
37A	49772-3	Band Change Switch (Three Section
37B		Band Change Switch (Three Section
37C		Band Change Switch (Three Section
38A	C-46846-6	Control, Volume (1 Megohm) (Assy.
38B		Switch (Power) (Assy.
39	Part of Item #3	B. C. Ant. Trimmer
	W-47577	Cable Lock Plate
	C-135175	Dial Face
	B-134570	Dial Pointer
	W-134667	Dial Pointer Clip
	W-51752	Dial Cord Spring
	39017-4	Dial Light Socket Assembly
	W-134917	Drive Shaft
	W-51071	Retaining Ring
	W-134916	Spring Washer
	W-135371	Tube Socket
	W-49770	Trimount Stud (Dial Face and Chassis Bottom Cover)
	W-134055	Grommet
	W-135164	Rubber Bumper
	W-46662	Palnut (⅜-32)
	D-132136-1	Plastic Cabinet—Brown (56TA-L)
	AW-134738	Plastic Cabinet—Ivory (56TW-L)
	D-134586	Wood Cabinet (56TC-L)
	AC-134618	Ant. Loop and Back Assembly (56TA-L, 56TW-L)
	AC-134288	Ant. Loop and Back Assembly (56TC-L)
	B-134610	Dial Lens
	W-134882	Knob (56TA-L, 56TC-L)
	W-134883	Knob (56TW-L)
	39220-32	Mounting Screw
	W-136630	Trimount Stud (Dial Lens, 56TA-L, 56TW-L)
	W-132124	Trimount Stud (Ant. Loop and Back Assembly, 56TA-L, 56TW-L)

Figures in first column correspond to figures in Schematic Diagram

MODEL 56TX

THE CROSLEY CORP.



FREQUENCY RANGE: American Broadcast Band, 540 to 1600 kc. (Selector Switch, Counter-clockwise or Left.)

Overseas Short-wave Band: 5.8 to 15 mc. (Selector Switch, Clockwise or Right.)

INTERMEDIATE FREQUENCY: 455 kc.

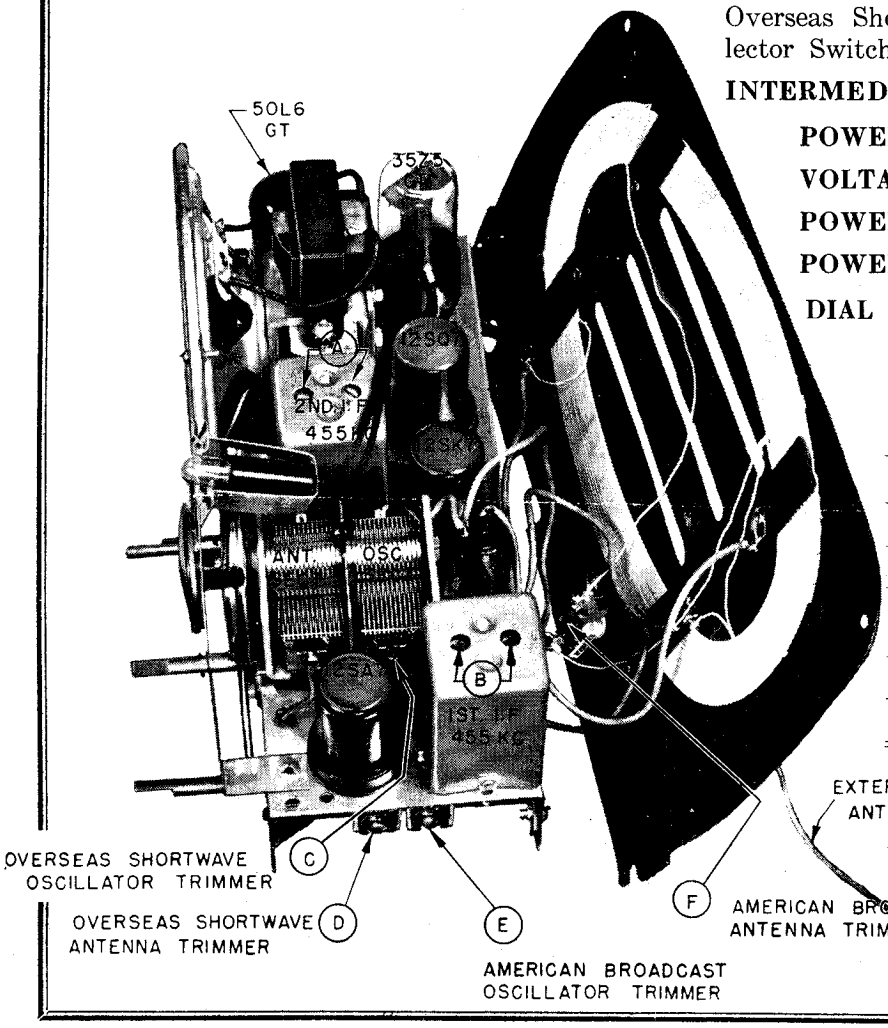
POWER SUPPLY: a.c—d.c.

VOLTAGE RATING: 105-125 volts.

POWER CONSUMPTION: 35 watts nominal.

POWER OUTPUT: 1.5 watts minimum.

DIAL BULB: Type 47, 6.3 volts, .15 amp.



TUBE COMPLEMENT:

Type	Function
12SA7 (or GT/G)	Mixer
12SK7 (or GT/G)	I.F. Amplifier
12SQ7 (or GT/G)	Detector, AVC, 1st A.F. Amplifier
50L6GT	A.F. Power Output
35Z5GT/G	Rectifier

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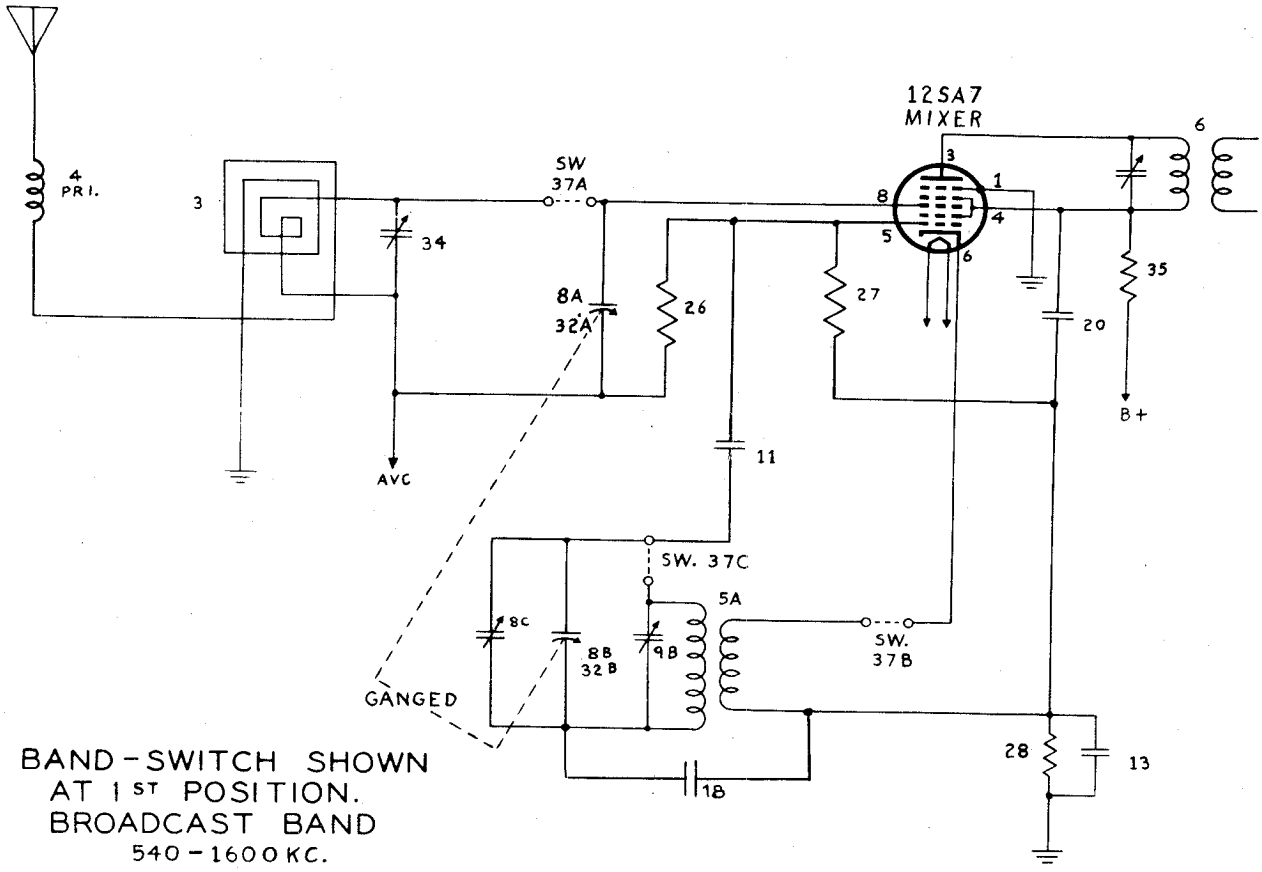
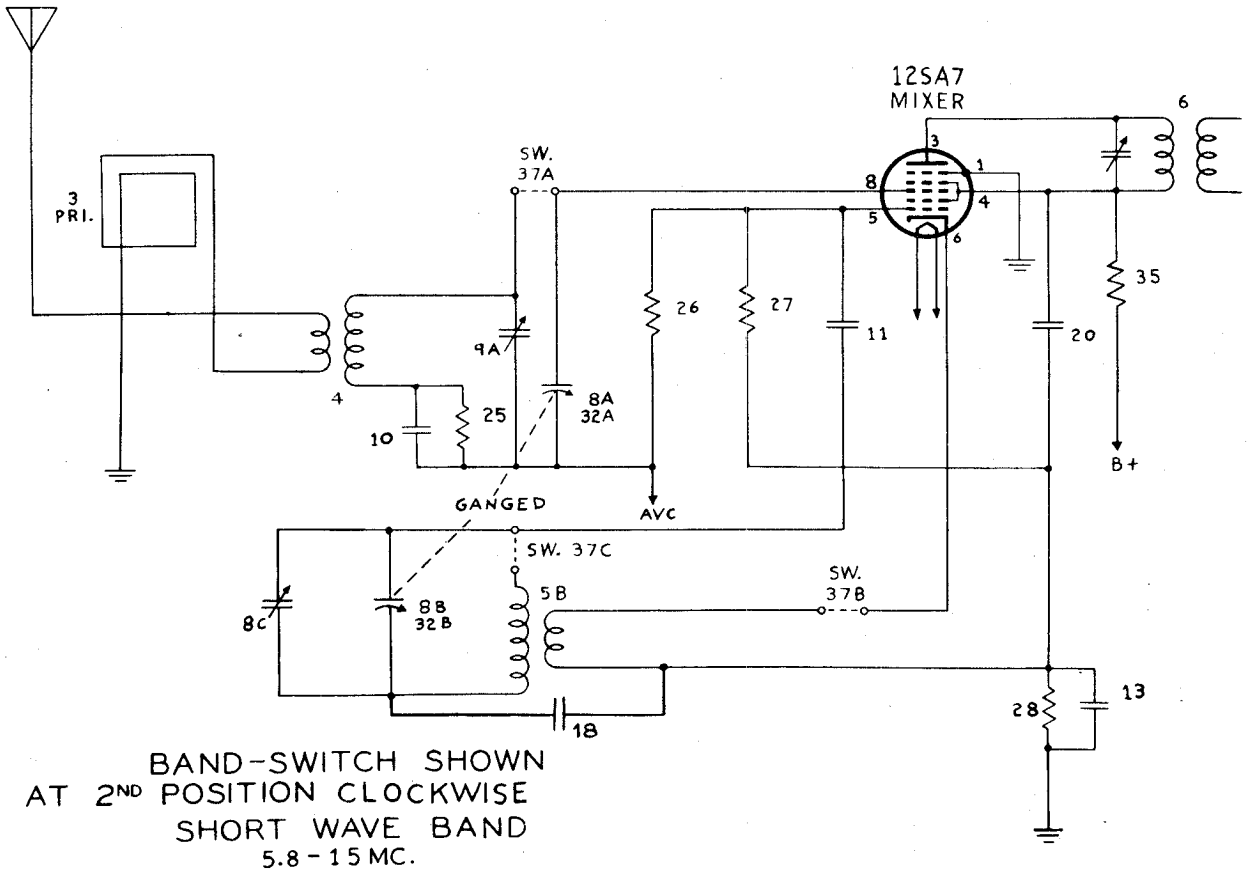
MODEL 56TX

THE CROSLEY CORP.



BAND-SWITCH SHOWN
AT 1ST POSITION.
BROADCAST BAND
540-1600 KC.



BAND-SWITCH SHOWN
AT 2ND POSITION CLOCKWISE
SHORT WAVE BAND
5.8-15 MC.

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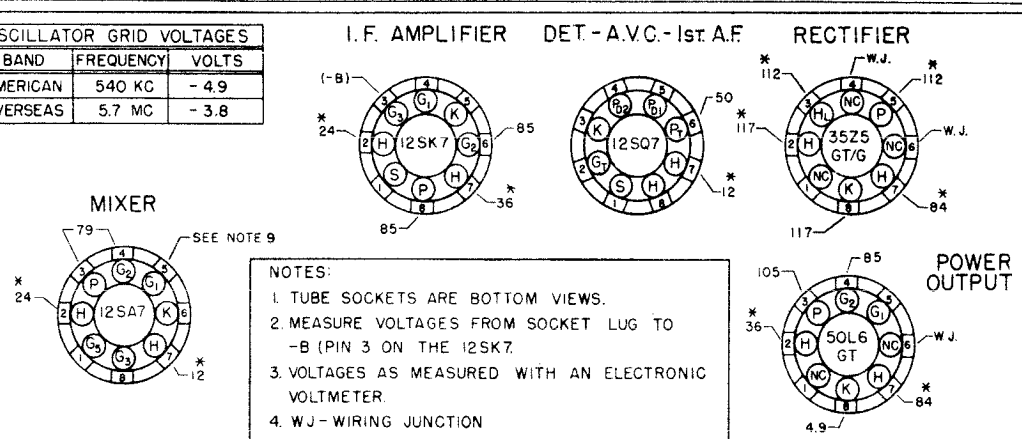
Item No.	Part No.	Description
1	W-48858	Bulb (Dial Light), Type 47, 6.3v., .15 amp.
2	C-132300-1	Cable and Plug (power)
3	AC-134618	Antenna Loop Assembly
4	AW-134994	Antenna Coil Assembly
5A	AW-134993	Coil (B.C. Oscillator) } Two
5B		Coil (H.F. Oscillator) } Section
6	AW-134065	Transformer (1st I.F.)
7	AW-134158	Transformer (2nd I.F.)
8A	B-134995	Condenser (Variable) } Two
8B		Condenser (Variable) } Section
8C	Part of Item #8B	Condenser (Trimmer)
9A	AB-135088	Condenser (Trimmer) } Two
9B		Condenser (Trimmer) } Section
10	GC-210685-143	Condenser, 580 mmf., 300v., Mica
11	39004-5	Condenser. 50 mmf., 500v., Mica
12	39001-65	Condenser. .05 mfd., 200v., Paper
13	39001-67	Condenser, .1 mfd., 200v., Paper
14	39001-65	Condenser, .05 mfd., 200v., Paper
15	39004-9	Condenser, 220 mmf., 500v., Mica
16	39001-10	Condenser, 3300 mmf., 600v., Paper } Two
17A	W-134988	Condenser, 60 mfd., 150 w.v. } Section
17B		Condenser, 20 mfd., 100 w.v. } Elect. Filter
18	39001-63	Condenser, .022 mfd., 200v., Paper
19	39001-63	Condenser, .022 mfd., 200v., Paper
20	39001-63	Condenser, .022 mfd., 200v., Paper
21	39281-29	Resistor. 470,000 ohms, ½ w.
22	39281-29	Resistor, 470,000 ohm, ½ w.
23	39281-8	Resistor, 150 ohm, ½ w.
24	39281-7	Resistor, 100 ohm, ½ w.
25	39281-28	Resistor, 330,000 ohm, ½ w.
26	39281-38	Resistor, 15 megohm, ½ w.
27	39281-21	Resistor, 22,000 ohm, ½ w.
28	39281-27	Resistor, 220,000 ohm, ½ w.
29	39281-34	Resistor, 3.3 megohm, ½ w.
30	39281-23	Resistor. 47,000 ohm, ½ w.
31	39281-35	Resistor, 4.7 megohm, ½ w.
34	Part of Item #3	Condenser (Antenna Trimmer)
35	39281-11	Resistor, 470 ohm, ½ w.
36	39015-26	Resistor, 1200 ohm, 1 w.
37A	W-49772-3	Switch (Band Change) } Three
37B		Switch (Band Change) } Section
37C		Switch (Band Change) }
38	B-134942	Speaker
39A	C-46846-6	Control, Volume (1 megohm) } Assembly
39B		Switch (power) }
	B-134940	Transformer (Output)
	G-39204	Socket (Tube)
	39017-4	Socket Assembly (Dial Light)
	C-135175	Face (Dial)
	B-134952	Pointer (Dial)
	W-134667	Clip (Dial Pointer)
	W-134917	Shaft (Drive)
	W-51071	Ring (Retaining)
	W-134916	Washer (Spring)
	51752	Spring (Dial Cord)
	W-134055	Grommet
	AW-134738	Cabinet
	B-134610	Lens (Dial)
	W-134883	Knob
	W-136630	Stud, Trimount
	W-132124	Stud, Trimount

NOTE 9

OSCILLATOR GRID VOLTAGES		
BAND	FREQUENCY	VOLTS
AMERICAN	540 KC	- 4.9
OVERSEAS	5.7 MC	- 3.8



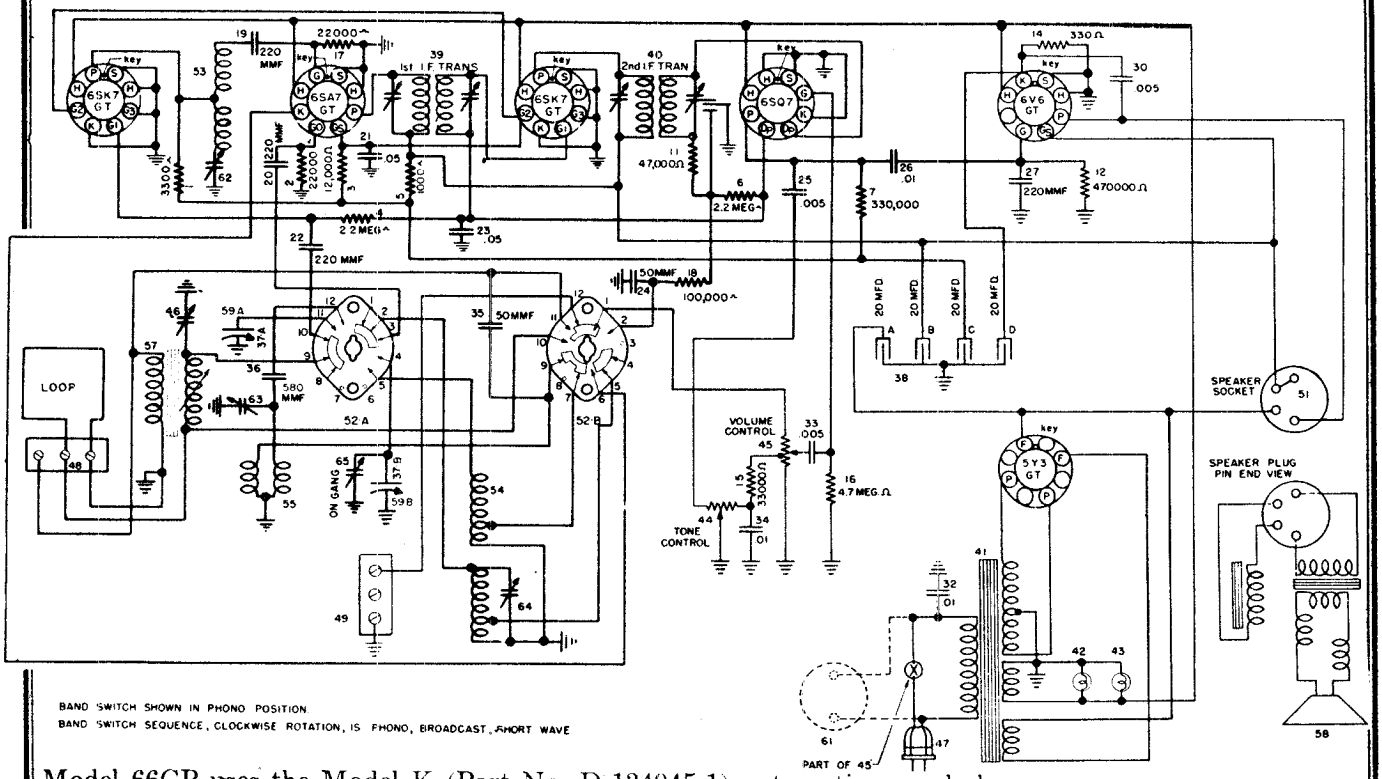
NOTES:
1. TUBE SOCKETS ARE BOTTOM VIEWS.
2. MEASURE VOLTAGES FROM SOCKET LUG TO -B (PIN 3 ON THE 12SK7.
3. VOLTAGES AS MEASURED WITH AN ELECTRONIC VOLTMETER.
4. WJ - WIRING JUNCTION
5. NC - NO CONNECTION
6. * - AC VOLTAGES
7. VOLTAGE TOLERANCE, 10%
8. LINE VOLTAGE 117V, 60 ~ AC

Alignment Sequence	Signal Generator Output			Position of		Adjust for Maximum Output
	Frequency in kc.	In Series with	To	Band Switch	Tuning Dial	
1	455	200 mmf.	Ant.	Left	1,620	A & B
2	15,300	400 ohms	Ant.	Right	15,300	C
3	15,000	400 ohms	Ant.	Right	15,000	D
4	1,400	200 mmf.	Ant.	Left	1,400	E & F

1. Turn the tuning condenser to the completely closed position against the stop and set the dial pointer to the reference line at the end of the dial scale.
2. Connect the output meter across the speaker voice coil.
3. The r.f. signal input from the signal generator should be connected to the external antenna lead. Connect the signal generator ground through a 0.1 mfd. condenser to —B (pin 3 on 12SK7 tube socket).
4. Turn the volume control on full and adjust the signal generator output to produce approximately mid-scale deflection of the output meter, but maintain signal generator output as low as possible to prevent AVC action in the receiver.

MODELS 66CA, 66CP, 66CQ

THE CROSLEY CORP.

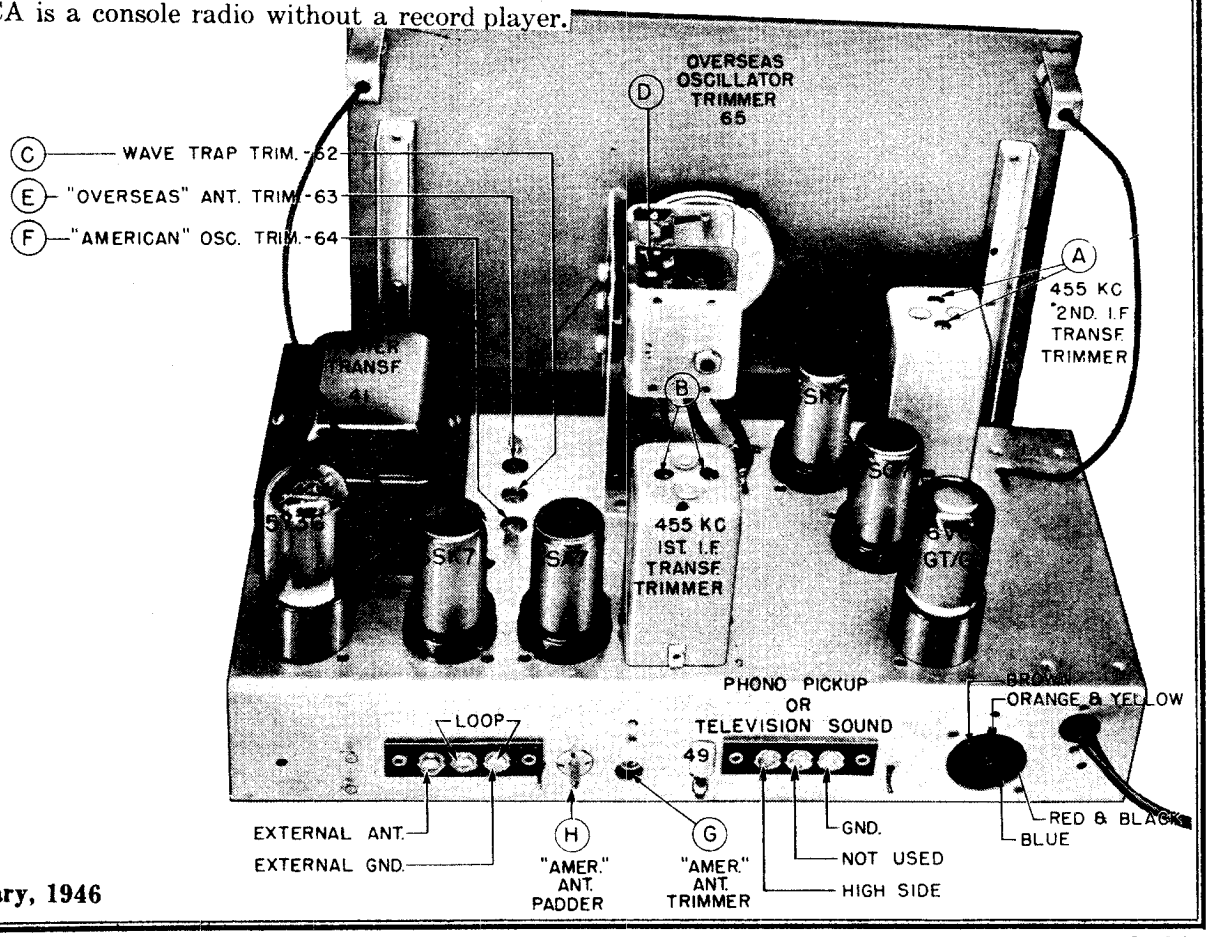


BAND SWITCH SHOWN IN PHONO POSITION
BAND SWITCH SEQUENCE, CLOCKWISE ROTATION, IS PHONO, BROADCAST, SHORT WAVE

Model 66CP uses the Model K (Part No. D-134945-1) automatic record changer.

Model 66CQ uses the Model G (Part No. D-135039) automatic record changer.

Model 66CA is a console radio without a record player.



January, 1946

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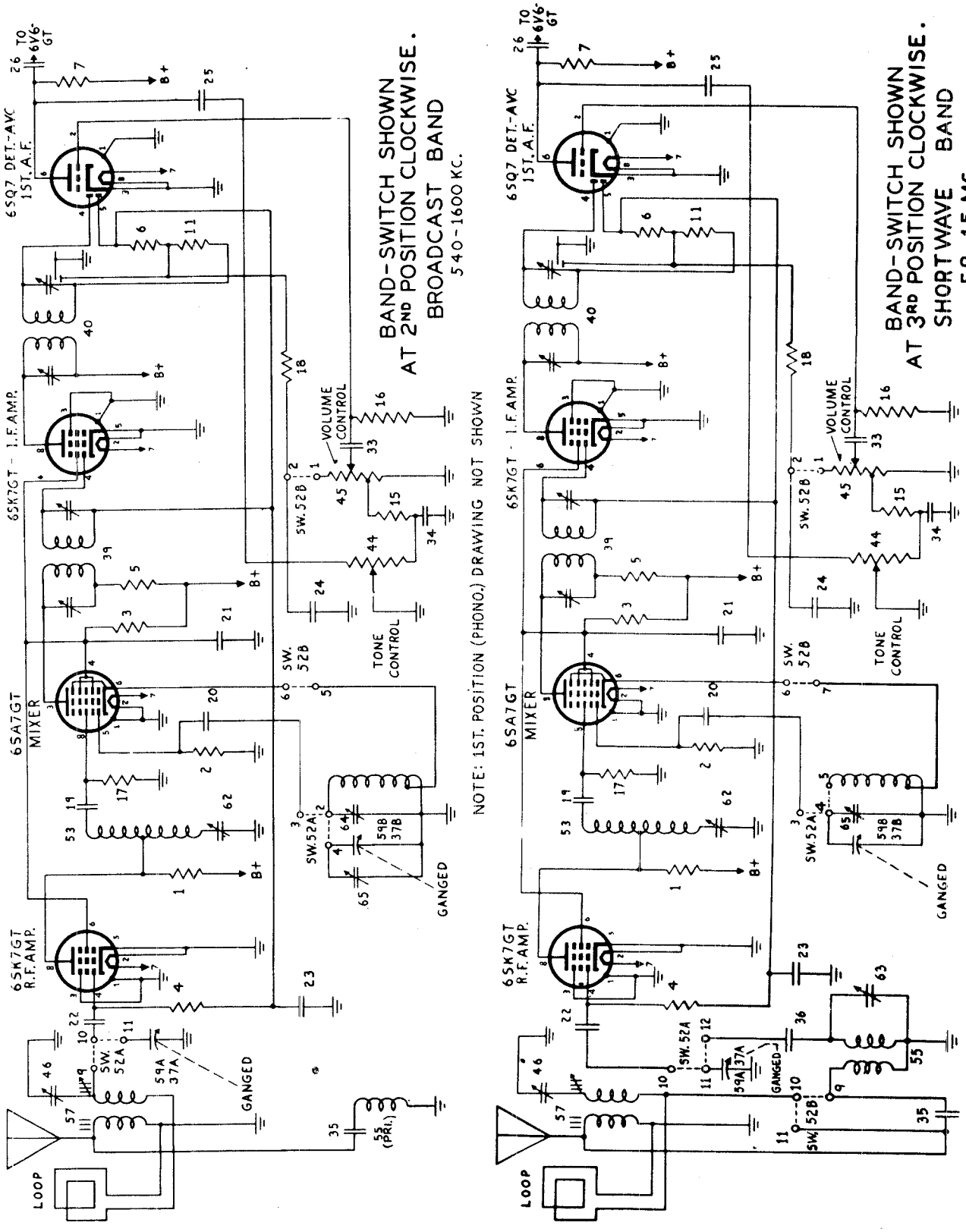
Record Changers for Model 66CP: Seeburg Model K and Gen. Inst Model 204
Record Changer for Model 66CQ: Gen. Instrument Model 204

"clarified schematics"

MODELS 66CA,66CP,66CQ
MODELS 66TA,66TC,66TW

THE CROSLEY CORP.



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THE CROSLEY CORP.

ALIGNMENT PROCEDURE

Turn the tuning condenser to the completely closed position against the stop and set the dial pointer to the reference line at the end of the dial scale.

Connect the output meter across the speaker voice coil.

The r. f. signal input from the signal generator should be connected to the external antenna post as indicated in the alignment chart. Connect the low side (ground) of the signal generator to the chassis.

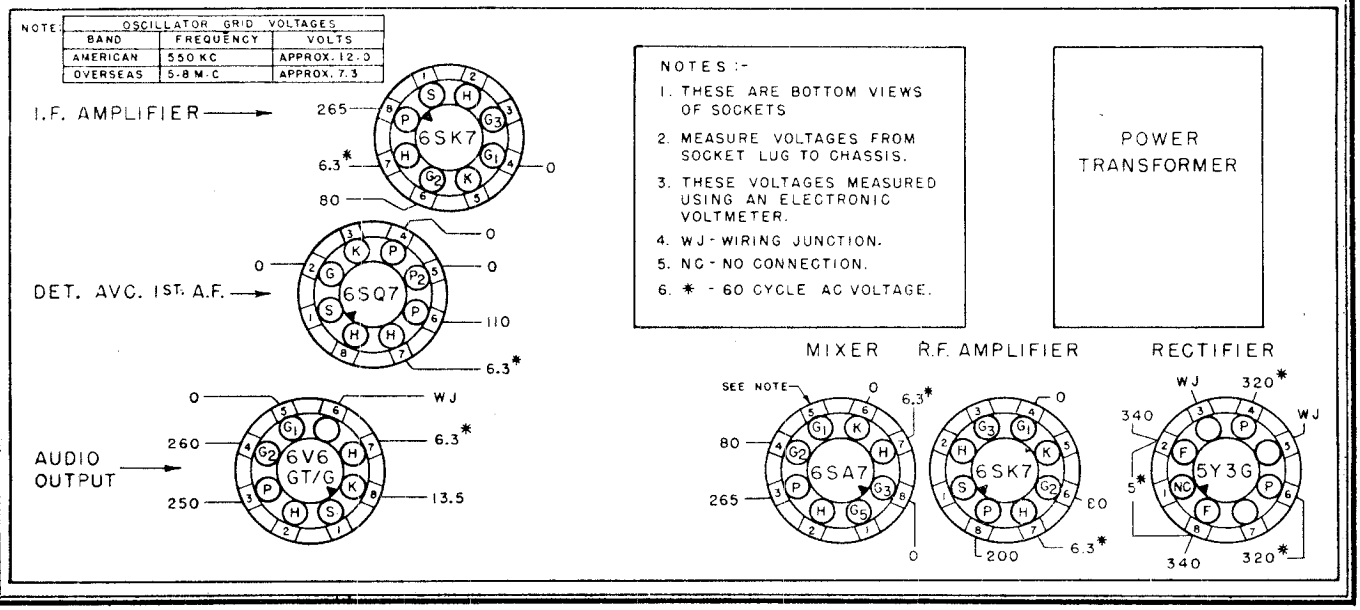
Turn the volume control on full and adjust the signal generator output to produce approximately mid-scale deflection of the output meter, but maintain the signal generator output as low as possible to prevent AVC action in the receiver.

Alignment Sequence	Signal Generator Output			Position of		Adjust for Maximum Output
	Frequency in kc.	In Series With	To	Band Switch	Tuning Dial	
1	455	200 mmf.	Ant.	A	1620	A & B
2	455	200 mmf.	Ant.	A	1620	C*
3	15,300	400 ohms	Ant.	O	15,300	D
4	15,000	400 ohms	Ant.	O	15,000	E
5	1620	200 mmf.	Ant.	A	1620	F
6	1400	200 mmf.	Ant.	A	1400	G
7	600	200 mmf.	Ant.	A	600	H
8	1400	200 mmf.	Ant.	A	1400	Recheck G

*Adjust for Minimum Output (Wave Trap).

NOTE: When aligning the "Overseas" oscillator trimmer (D), be sure that the circuit is aligned at the correct frequency and not at the image frequency which is 910 kilocycles lower as indicated by the receiver dial. To check: tune in the generator frequency, then increase the generator output and tune in the image frequency. The image frequency should be weaker than the fundamental and audible 910 kilocycles lower on the receiver dial. If the image cannot be tuned in, the oscillator trimmer is adjusted to the wrong peak of the trimmer from the closed position.

SOCKET VOLTAGE CHART



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MODELS 66CA, 66CP, 66CQ

THE CROSLEY CORP.

FREQUENCY RANGE: American Broadcast Band, 540 to 1600 kc. (Selector Switch at A.)

Overseas Short-wave Band. 5.8 to 15 mc. (Selector Switch at 0.)

INTERMEDIATE FREQUENCY: 455 kc.

POWER SUPPLY: 60 cycle a. c. only.

VOLTAGE RATING: 105-125 volts.

POWER CONSUMPTION: 60 watts maximum.

POWER OUPUT: 4.5 watts minimum.

VOLTAGE DROP ACROSS SPEAKER FIELD: 76 volts.

RESISTANCE OF SPEAKER FIELD: 900 ohms.

DIAL BULB: Type 51, 7.5 volts, .25 amp.

PARTS LIST—MODELS 66CA, 66CP, 66CQ

Figures in first column correspond to figures in Schematic Diagram.

Item No.	Part Number	Description
1	39281-16	Resistor, 3300 ohm, ½ w.
2	39281-21	Resistor, 22,000 ohm, ½ w.
3	39016-38	Resistor, 12,000 ohm, 2 w.
4	39281-33	Resistor, 2.2 megohm, ½ w.
5	39040-13	Resistor, 1,000 ohm, 1 w.
6	39281-33	Resistor, 2.2 megohm, ½ w.
7	39281-28	Resistor, 330,000 ohm, ½ w.
11	39281-23	Resistor, 47,000 ohm, ½ w.
12	39281-29	Resistor, 470,000 ohm, ½ w.
14	39015-19	Resistor, 330 ohm, 1 w.
15	39281-22	Resistor, 33,000 ohm, ½ w.
16	39281-35	Resistor, 4.7 megohm, ½ w.
17	39281-21	Resistor, 22,000 ohm, ½ w.
18	39281-25	Resistor, 100,000 ohm, ½ w.
19	39004-9	Condenser, 220 mmf., 500 v., Mica
20	39004-9	Condenser, 220 mmf., 500 v., Mica
21	39001-41	Condenser, .05 mfd., 400 v., Paper
22	39004-9	Condenser, 220 mmf., 500 v., Mica
23	39001-65	Condenser, .05 mfd., 200 v., Paper
24	39004-5	Condenser, 50 mmf., 500 v., Mica
25	39001-11	Condenser, .005 mfd., 600 v., Paper
26	39001-37	Condenser, .01 mfd., 400 v., Paper
27	39004-9	Condenser, 220 mmf., 500 v., Mica
30	39001-11	Condenser, .005 mfd., 600 v., Paper
32	W-30805	Condenser, .01 mfd., 400 v., Paper
33	39001-11	Condenser, .005 mfd., 600 v., Paper
34	39001-61	Condenser, .01 mfd., 200 v., Paper
35	39004-5	Condenser, 50 mmf., 500 v., Mica
36	GC-210685-143	Condenser, 580 mmf., 300 v., Mica
37A	B-134995	Condenser (variable) } Two
37B		Condenser (variable) } Section
38A	B-132807	Condenser, 20 mfd., 360 w.v. } Four
38B		Condenser, 20 mfd., 275 w.v. } Section
38C		Condenser, 20 mfd., 245 w.v. } Elect.
38D		Condenser, 20 mfd., 25 w.v. } Filter
39	AW-134065	Transformer (1st I. F.)
40	AW-134158	Transformer (2nd I. F.)
41	B-134625	Transformer (Power)
42	W-43567	Bulb (Dial Light, Type 51, 7.5 v., .25 amp.)
43	W-43567	Bulb (Dial Light, Type 51, 7.5 v., .25 amp.)
44	B-135651	Control, Tone (3 megohm)
45	B-135859	Control, Volume (1 megohm) & Switch
46	W-132267-1	Condenser (Trimmer)
47	B-132300-1	Cable and Plug (Power)
48	39019-3	Terminal Board Assembly
49	39019-3	Terminal Board Assembly
51	W-134968-1	Socket (Speaker)
52A	B-134639	Switch (Band Change) } Two
52B		Switch (Band Change) } Section
53	AW-135907	R. F. Coil Assembly
54	AW-135908	Oscillator Coil Assembly
55	AW-135909	Antenna Coil Assembly
57	AW-135910	Antenna Loading Coil Assembly
58	B-134700	Speaker
62	B-132386-7	Condenser (Trimmer) } Three
63		Condenser (Trimmer) } Section
64		Condenser (Trimmer) } Assembly
	G-39012-8	Core (Iron)
	G-39204	Socket (Tube)
	39017-3	Socket (Dial Light)
	AW-134793	Dial Face Assembly
	B-134571	Pointer (Dial)
	W-134667	Clip (Dial Pointer)
	W-51752	Spring (Dial Cord)
	W-134917	Shaft (Drive)
	W-51071	Ring (Retaining)
	W-134916	Washer (Spring)
	W-132366-2	Nut (Iron Core Locking)
	39196-29	Screw (Dial Mtg.)
	W-134055	Grommet (Variable Condenser Mtg.)
	R-135237	Cabinet (66CA)
	R-134957	Cabinet (66CP)
	R-134350	Cabinet (66CQ)
	C-134773	Lens (Dial)
	AC-135299	Antenna Loop Assembly (66CA)
	AC-134782	Antenna Loop Assembly (66CP)
	AC-135100	Antenna Loop Assembly (66CQ)
	D-134945-1	Record Changer (66CP)
	D-135039	Record Changer (66CQ)
	AB-134935	Floating Jewel Needle Assembly (66CP, 66CQ)
	W-134959	Cable, Phono (66CP)
	W-135128	Cable, Phono (66CQ)
	W-130197	Knob (66CA, 66CQ)
	W-135248	Knob (66CP)
	W-45056	Rubber Mtg. (66CA, 66CQ Chassis Mtg.)
	W-45580	Rubber Mtg. (66CA, 66CP, 66CQ Speaker Mtg., 66CP Chassis Mtg.)
	W-136539	Lid Support, Cabinet (66CP, 66CQ)

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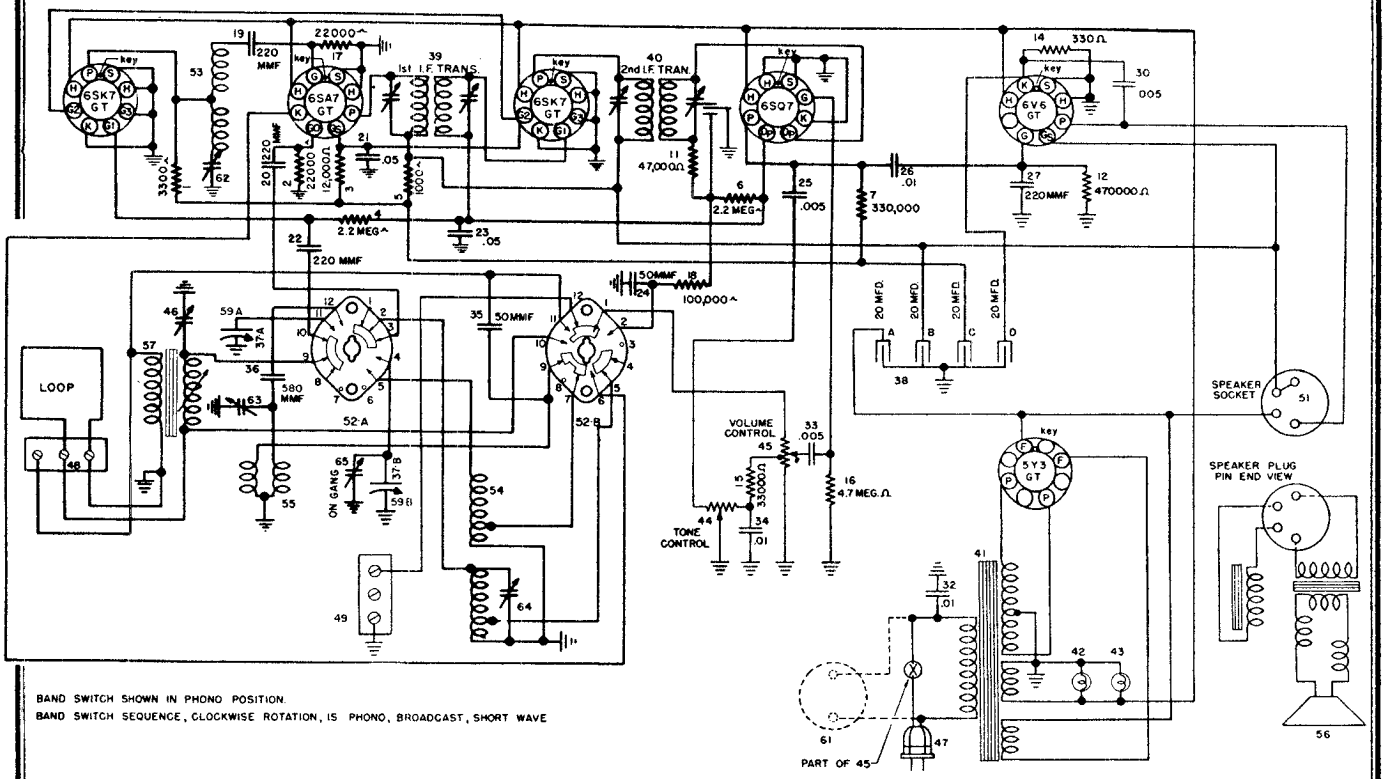
MODELS 66TA, 66TC, 66TW

THE CROSLEY CORP.



BAND SWITCH SHOWN IN PHONO POSITION.
BAND SWITCH SEQUENCE, CLOCKWISE ROTATION, IS PHONO, BROADCAST, SHORT WAVE

FREQUENCY RANGE: American Broadcast Band: 540 to 1600 kc. (Selector switch at A.)

Overseas Short-wave Band: 5.8 to 15 mc. (Selector switch at 0.)

INTERMEDIATE FREQUENCY: 455 kc.

POWER SUPPLY: 60 cycle a.c. only.

VOLTAGE RATING: 110-120 volts.

POWER CONSUMPTION: 60 watts maximum.

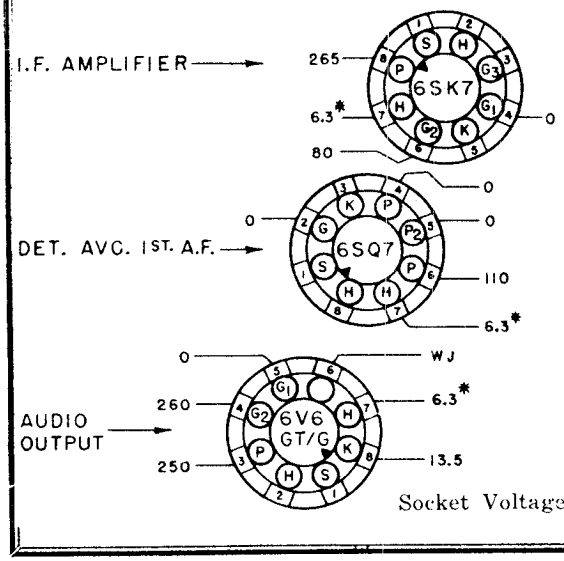
POWER OUTPUT: 4.5 watts minimum.

VOLTAGE DROP ACROSS SPEAKER FIELD: 76 volts.

RESISTANCE OF SPEAKER FIELD: 900 ohms.

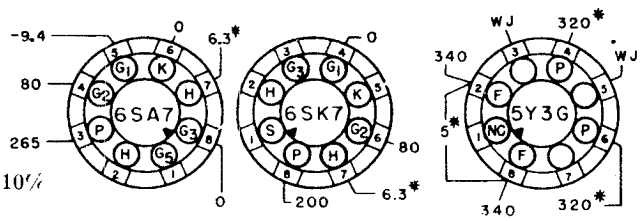
DIAL BULB: Type 51, 7.5 volts, 0.2 amp.

September, 1945



NOTES:-
1. THESE ARE BOTTOM VIEWS OF SOCKETS.
2. MEASURE VOLTAGES FROM SOCKET LUG TO CHASSIS.
3. THESE VOLTAGES MEASURED USING AN ELECTRONIC VOLTMETER.
4. WJ - WIRING JUNCTION.
5. NC - NO CONNECTION.
6. * - 60 CYCLE AC VOLTAGE.

POWER TRANSFORMER



Socket Voltage Tolerance: 10%

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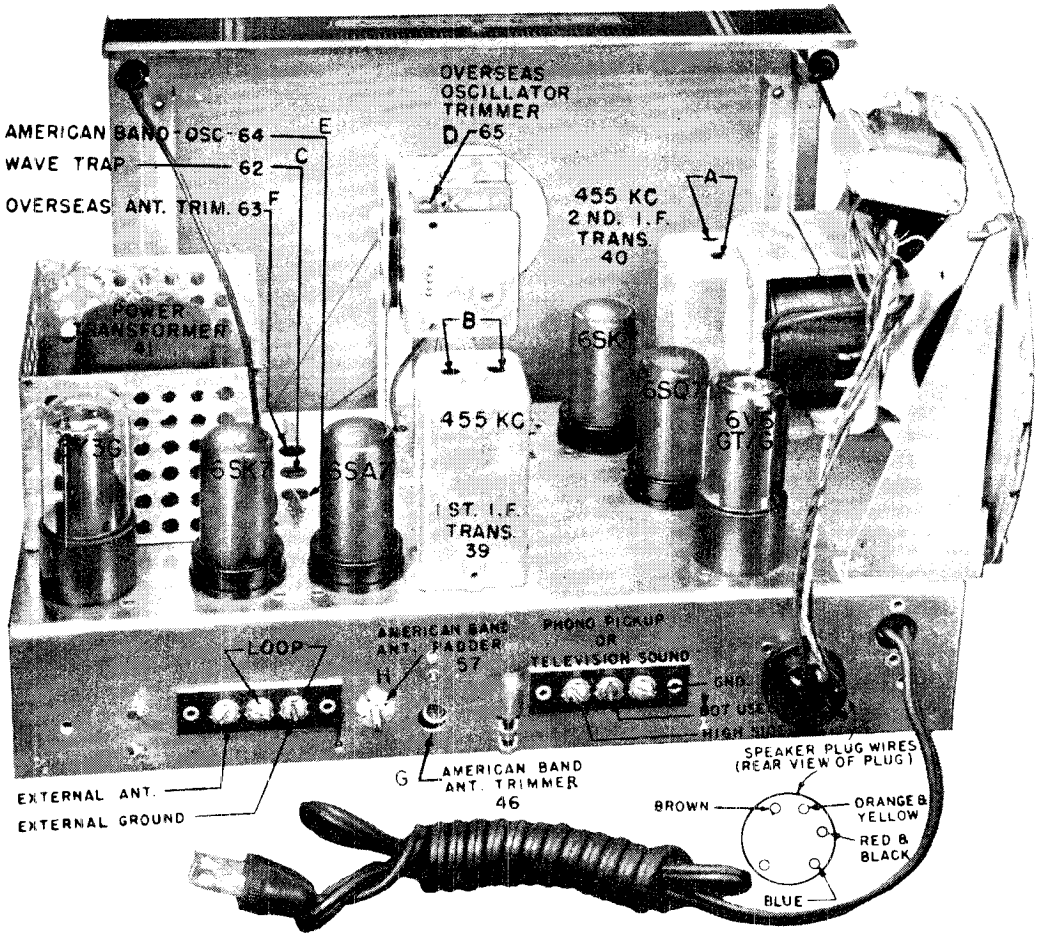
For Clarified schematics, see P.15-18

MODELS 66TA, 66TC, 66TW

THE CROSLEY CORP.



CHASSIS, REAR VIEW - MODELS 66TA, 66TW, 66TC

Alignment Sequence	Signal Generator Output			Position of		Adjust for Maximum Output
	Frequency in kc.	In Series with	To	Band Switch	Tuning Dial	
1	455	200 mmf	Ant.	A	1620	A & B
2	455	200 mmf	Ant.	A	1620	C*
3	15,300	400 ohms	Ant.	O	15,300	D
4	15,000	400 ohms	Ant.	O	15,000	E
5	1620	200 mmf	Ant.	A	1620	F
6	1400	200 mmf	Ant.	A	1400	G
7	600	200 mmf	Ant.	A	600	H

*Adjust for minimum output (wavetrap).

NOTE: When aligning the short-wave oscillator trimmer (D), be sure that the circuit is aligned at the correct frequency and not at the image frequency which is 910 kilocycles lower as indicated by the receiver dial. To check: Tune in the generator frequency, then increase the generator output and tune in the image frequency. The image frequency should be weaker than the fundamental and audible 910 kilocycles lower on the receiver dial. If the image cannot be tuned in, the oscillator trimmer is adjusted to the wrong peak; i.e., the oscillator trimmer may be adjusted to the image or one of the harmonics instead of the fundamental frequency. The correct peak is the second one heard as the trimmer adjustment screw is opened from the completely closed position.

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MODELS 66TA,66TC,66TW

THE CROSLEY CORP.

ALIGNMENT PROCEDURE

Turn the tuning capacitor to the completely closed position against the stop, and set the dial pointer to the reference line at the end of the dial scale.

Turn the tone control to the high or treble position.

Connect the output meter across the speaker voice coil.

The r.f. signal input from the signal generator should be connected to the external antenna post. Connect the signal generator ground to the chassis.

Turn the volume control on full, and adjust the signal generator output to produce approximately mid-scale deflection of the output meter, but maintain signal generator output as low as possible to prevent AVC action in the receiver.

CHASSIS PARTS

Item No.	Part No.	Description
1	39281-16	Resistor, 3,300 Ohm, ½ W.
2	39281-21	Resistor, 22,000 Ohm, ½ W.
3	39016-38	Resistor, 12,000 Ohm, 2 W.
4	39281-33	Resistor, 2.2 Megohm, ½ W.
5	39040-13	Resistor, 1,000 Ohm, 1 W.
6	39281-33	Resistor, 2.2 Megohm, ½ W.
7	39281-28	Resistor, 330,000 Ohm, ½ W.
11	39281-23	Resistor, 47,000 Ohm, ½ W.
12	39281-29	Resistor, 470,000 Ohm, ½ W.
14	39015-19	Resistor, 330 Ohm, 1 W.
15	39281-22	Resistor, 33,000 Ohm, ½ W.
16	39281-35	Resistor, 4.7 Megohm, ½ W.
17	39281-21	Resistor, 22,000 Ohm, ½ W.
18	39281-25	Resistor, 100,000 Ohm, ½ W.
19	39004-9	Condenser, 220 mmf., Mica
20	39004-9	Condenser, 220 mmf., Mica
21	39001-41	Condenser, .05 mfd., 400 V., Paper
22	39004-9	Condenser, 220 mmf., Mica
23	39001-65	Condenser, .05 mfd., 200 V., Paper
24	39004-5	Condenser, 50 mmf., Mica
25	39001-11	Condenser, .005 mfd., 600 V., Paper
26	39001-37	Condenser, .01 mfd., 400 V., Paper
27	39004-9	Condenser, 220 mmf., Mica
30	39001-11	Condenser, .005 mfd., 600 V., Paper
32	W-30805	Condenser, .01 mfd., 400 V., Paper
33	39001-11	Condenser, .005 mfd., 600 V., Paper
34	39001-61	Condenser, .01 mfd., 200 V., Paper
35	39004-5	Condenser, 50 mmf., Mica
36	GC-210685-143	Condenser, 580 mmf., Mica
37A	B-134995	Variable Condenser
37B		Variable Condenser
38A	D-132807	Condenser, 20 mfd., 360 W.V. — Four Section Elect. Filter
38B		Condenser, 20 mfd., 275 W.V. — Four Section Elect. Filter
38C		Condenser, 20 mfd., 245 W.V. — Four Section Elect. Filter
38D		Condenser, 20 mfd., 25 W.V. — Four Section Elect. Filter
39	AW-134065	1st I. F. Coil Assembly
40	AW-134158	2nd I. F. Coil Assembly
41	B-134625	Power Transformer
42	W-43567	Dial Light, Type 51, 7.5 V., 0.2 Amp.
43	W-43567	Dial Light, Type 51, 7.5 V., 0.2 Amp.
44	B-135651	Tone Control, 3 Megohm
45	B-135859	Volume Control (1 Megohm) and Switch
46	W-132267-1	Condenser (Trimmer)
47	B-132300-1	Cable and Plug
48	39019-3	Terminal Board Assembly
49	39019-3	Terminal Board Assembly
51	W-134968-1	Speaker Socket
52A	B-134639	Two Section Band Change Switch
52B		Two Section Band Change Switch
53	AW-135907	R. F. Coil Assembly
54	AW-135908	Oscillator Coil Assembly
55	AW-135909	Antenna Coil Assembly
56	C-135374	Speaker
57	AW-135910	Antenna Loading Coil Assembly
62	B-132386-7	Three Section Trimmer Condenser
63		Three Section Trimmer Condenser
64		Three Section Trimmer Condenser

MECHANICAL PARTS

Item No.	Part No.	Description
	W-47577	Cable Lock Plate
	AW-134807	Dial Face Assembly
	W-51752	Dial Cord Spring
	B-134571	Dial Pointer
	G-39012-8	Iron Core
	W-132366-2	Locking Nut
	W-134667	Dial Pointer Clip
	39017-3	Dial Light Socket
	G-39204	Tube Socket
	39196-29	Screw, Dial Mounting
	W-46662	Palnut ⅜-32
	W-134055	Grommet
	B-134896	Transformer Shield
	W-134917	Drive Shaft
	W-51071	Retaining Ring
	W-134916	Spring Washer

CABINET PARTS

Item No.	Part No.	Description
	R-134592	Plastic Cabinet—Brown (66TA)
	AW-134737	Plastic Cabinet—Ivory (66TW)
	R-135025	Wood Cabinet (66TC)
	AC-134673	Antenna Loop and Back Assembly (66TA, 66TW)
	AC-134672	Antenna Loop and Back Assembly (66TC)
	C-132688	Dial Lens (66TA, 66TW, 66TC)
	W-132709	Grille Cloth (66TA)
	W-132766	Grille Cloth (66TW)
	W-130197	Knob (66TA, 66TC)
	W-134635	Knob (66TW)
	W-136630	Trimount Stud (66TA, 66TW)
	W-132124	Trimount Stud (66TA, 66TW)
	39220-38	Screw Mounting– 8 x 1¼ Hex. Hd. (66TA, 66TW, 66TC)
	W-45580	Rubber Mounting (66TC)
	W-136584	Rubber Washer (66TA, 66TW Chassis Mtg.)

Figures in first column correspond to figures in Schematic Diagram

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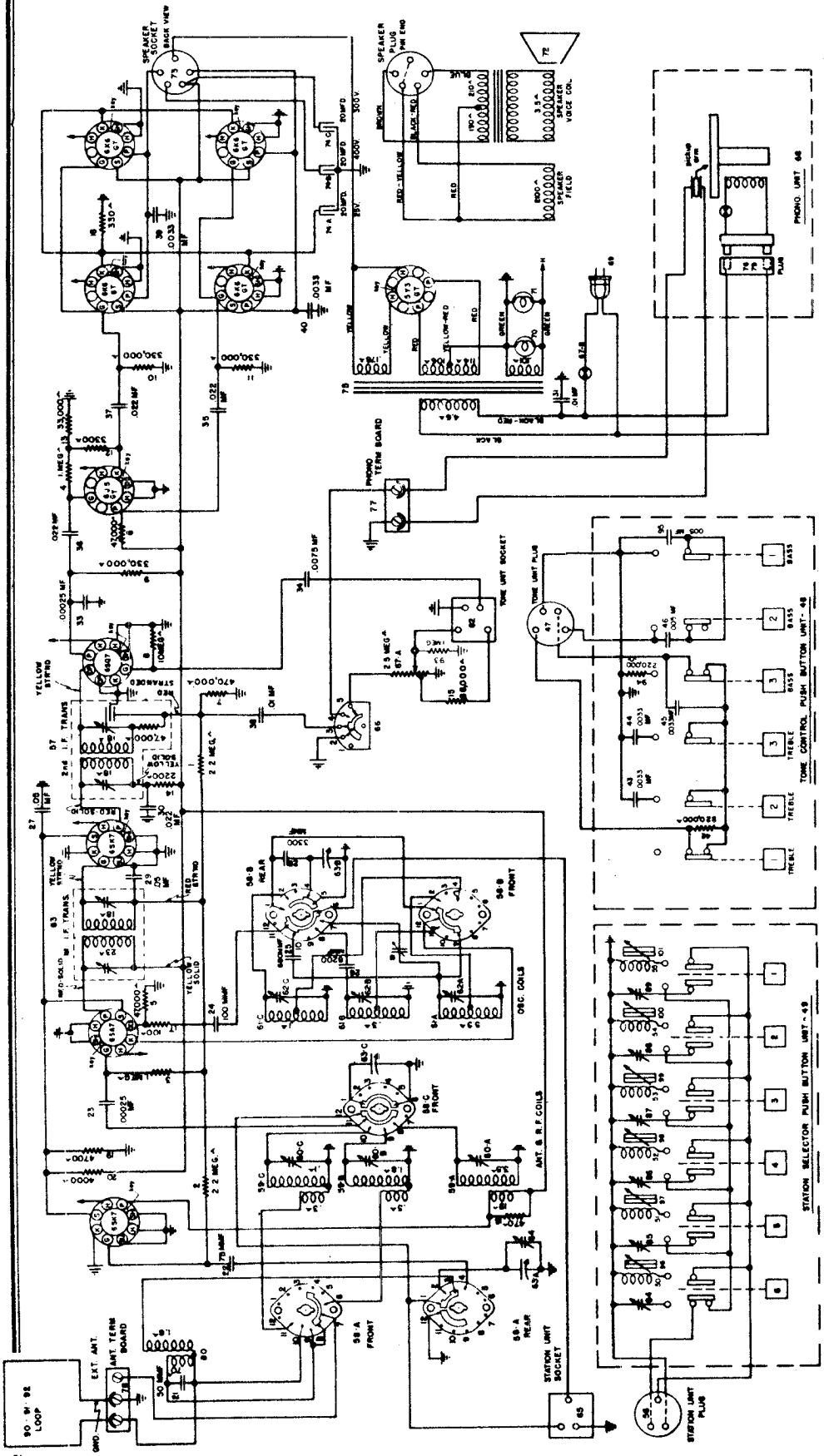
MODEL 106CP

THE CROSLEY CORP.



Model 106CP uses the Model SL (Part No. D-134946-1) automatic record changer.

TYPE: Ten-tube, three-band, superheterodyne.

FREQUENCY RANGE: American Broadcast Band, 540 to 1600 kc. (Selector Switch at AMERICAN position.)

Police Broadcast Band, 2.2 to 6 mc. (Selector Switch at POLICE position.)

Overseas Short-wave Band, 5.8 to 18 mc. (Selector Switch at O'SEA position.)

DIAL BULB: Type 51, 7.5 volts, .25 amp.

INTERMEDIATE FREQUENCY: 455 kc.

POWER SUPPLY: 60 cycle ac. only.

VOLTAGE RATING: 105-125 volts.

POWER CONSUMPTION: 85 ~~watts~~

POWER OUTPUT: 8.5 watts minimum.

VOLTAGE DROP ACROSS SPEAKER FIELD: 130 volts.

RESISTANCE OF SPEAKER FIELD: 2100 ohms.

May, 1946

Record Changer: Seeburg Model L

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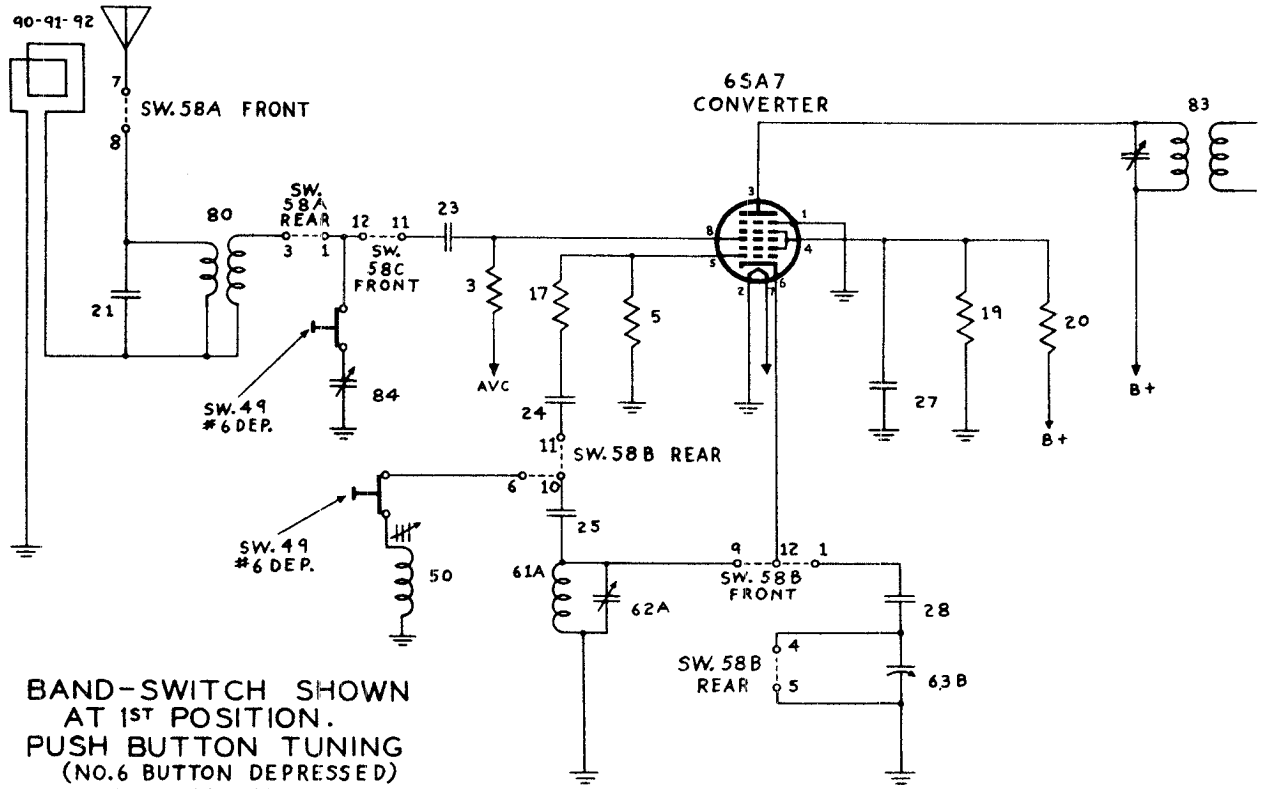
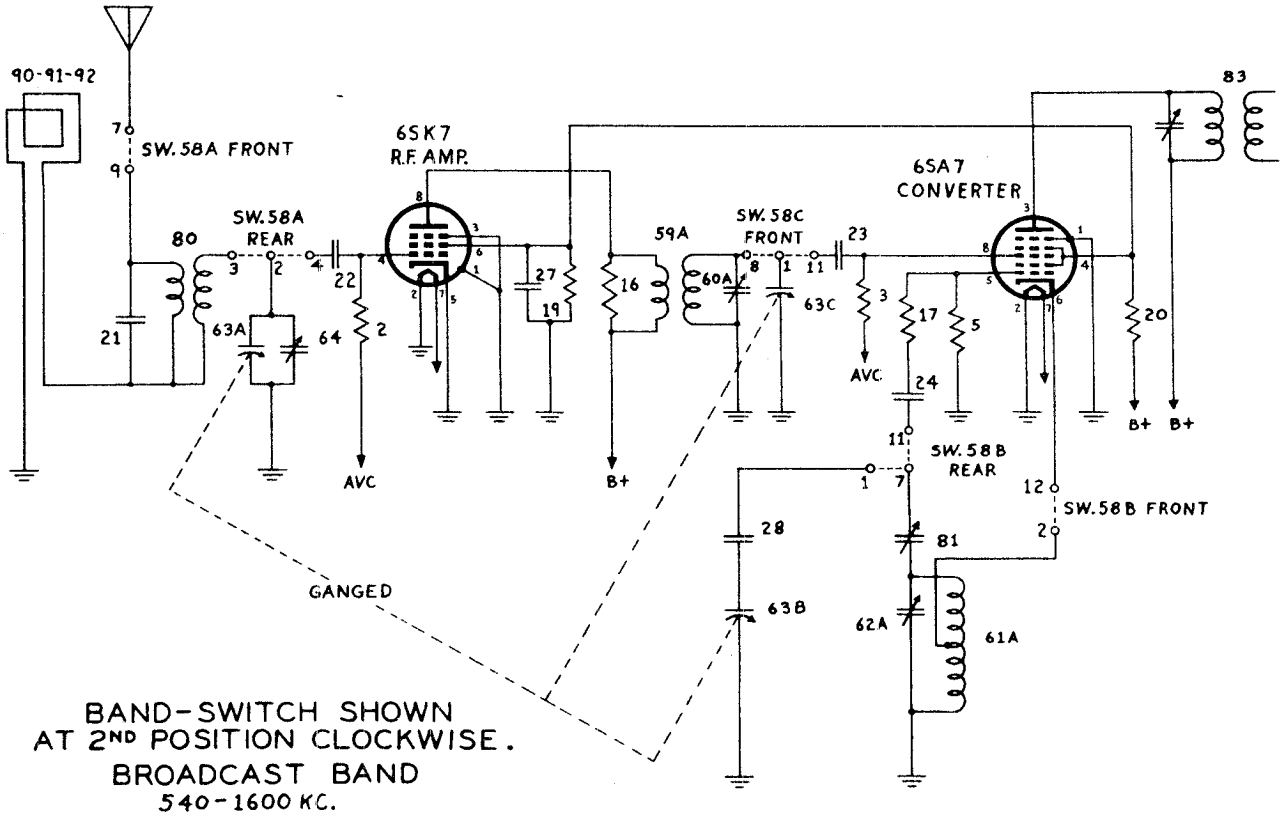
MODEL 106CP

THE CROSLEY CORP.



BAND-SWITCH SHOWN AT 1ST POSITION. PUSH BUTTON TUNING (NO.6 BUTTON DEPRESSED) 1000-1620 KC.



BAND-SWITCH SHOWN AT 2ND POSITION CLOCKWISE. BROADCAST BAND 540-1600 KC.

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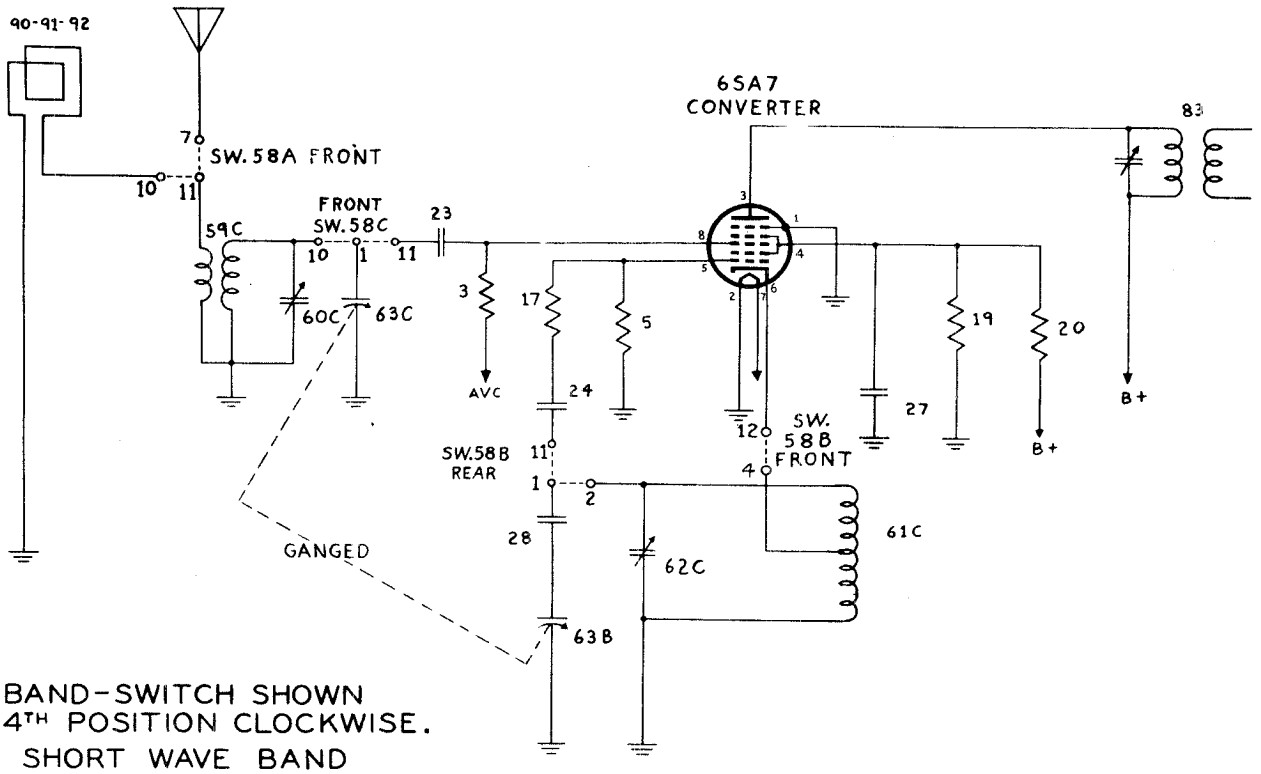
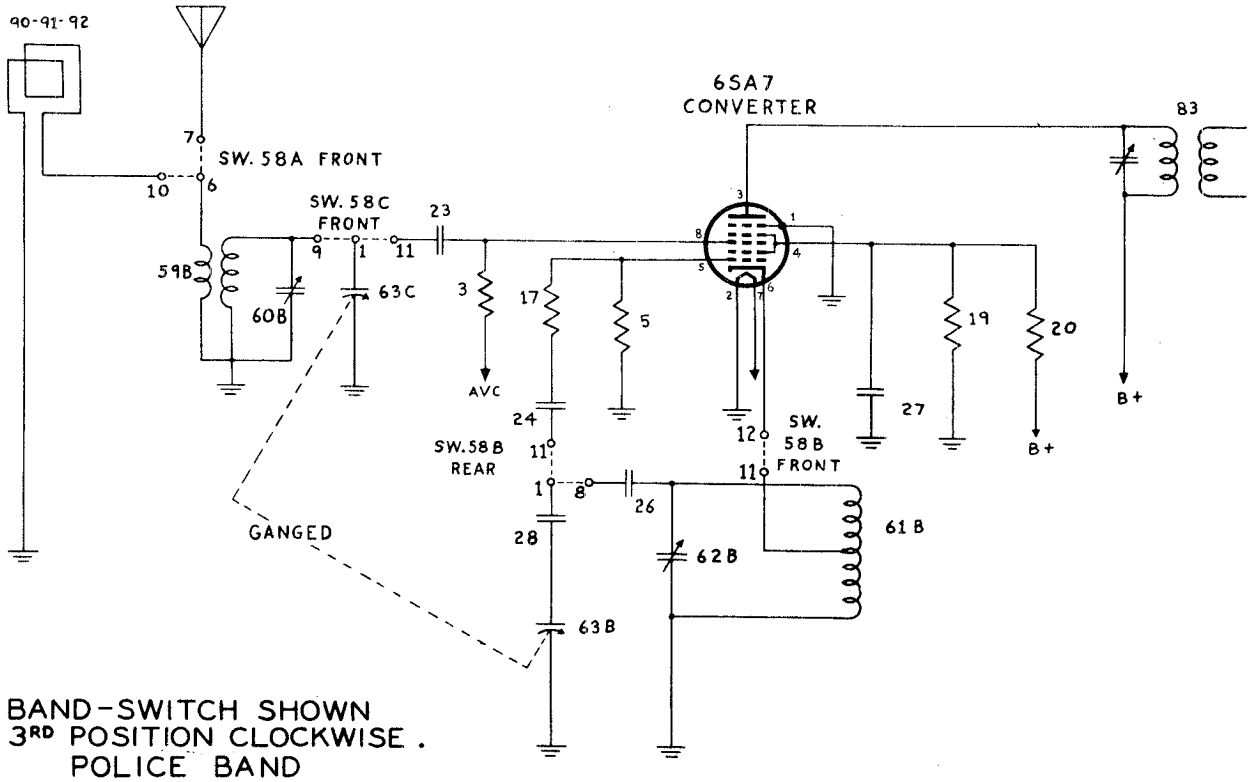
"clarified schematics"

MODEL 106CP

THE CROSLEY CORP.



BAND-SWITCH SHOWN AT 4TH POSITION CLOCKWISE.
SHORT WAVE BAND
5.8 - 18 MC



BAND-SWITCH SHOWN AT 3RD POSITION CLOCKWISE.
POLICE BAND
2.2 - 6 MC.

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MODEL 106CP

THE CROSLEY CORP.

ALIGNMENT PROCEDURE

Turn the tuning capacitor to the completely closed position against the stop, anl set the dial pointer to the reference line at the end of the dial scale.

Set the tone control buttons all the way out.

NOTE: If the chassis is removed from the cabinet, connect the shorting bar from the volume control (67A) to the coupling capacitor (34) on the tone unit socket.

Connect the output meter across the speaker output transformer connections on the 6K6 tubes.

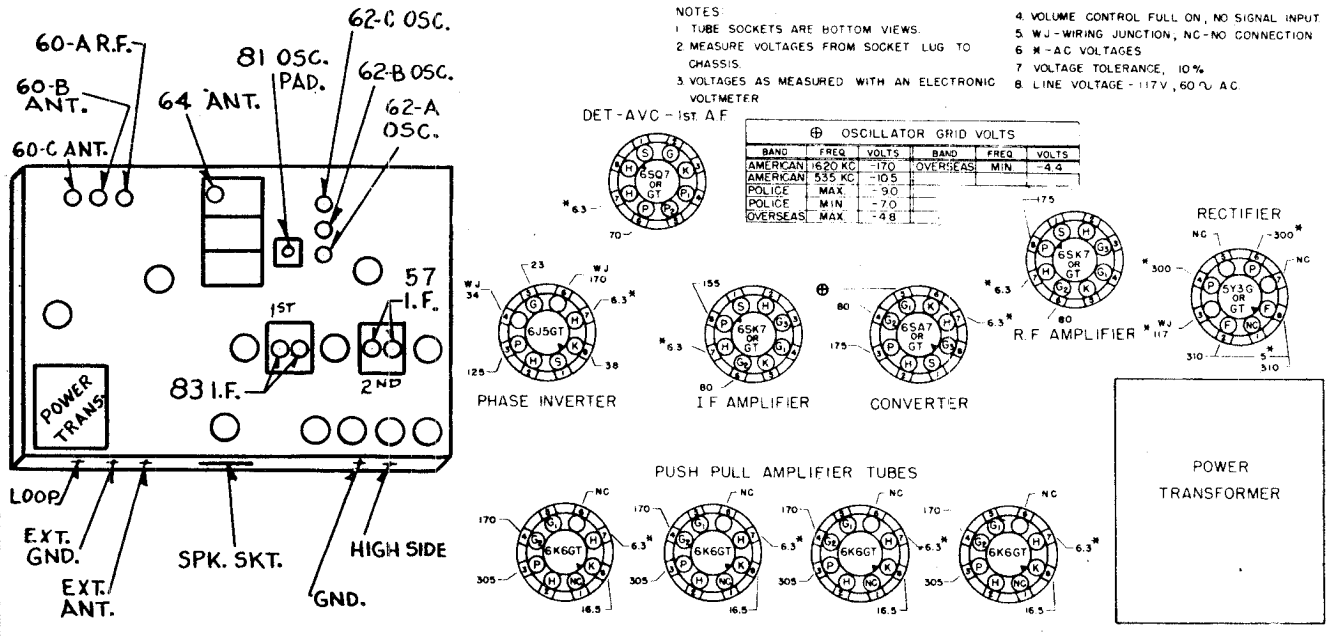
The r. f. signal input from the signal generator should be connected as indicated in the alignment chart. Connect the low side (ground) of the signal generator to the chassis.

Turn the volume control on full and adjust the signal generator output to produce a noticeable output meter reading.

Alignment Sequence	Signal Generator Output			Position of		Adjust for Maximum Output
	Frequency in kc.	In Series With	To	Band Switch	Tuning Dial	
1	455	200 mmf.	Rear Gang Section	American BC	Fully Open	57 & 83
2	1400	200 mmf.	Ext. Ant.	American BC	1400	62-A
3	1400	200 mmf.	Ext. Ant.	American BC	1400	60--A&64
4	600	200 mmf.	Ext. Ant.	American BC	600	81
5	6500	400 ohms	Ext. Ant.	Police	Fully Open	62-B
6	6000	400 ohms	Ext. Ant.	Police	6000	60-B
*7	18,300	400 ohms	Ext. Ant.	Overseas	Fully Open	62 C
8	18,000	400 ohms	Ext. Ant.	Overseas	18,000	60-C

The American Broadcast Band must be aligned with the loop antenna connected.

*NOTE: When aligning the short-wave oscillator trimmer (62C), be sure that the circuit is aligned at the correct frequency and not at the image frequency which is 910 kilocycles lower as indicated by the receiving dial. To check: tune in the generator frequency, then increase the generator output and tune in the image frequency. The image frequency should be weaker than the fundamental and audible 910 kilocycles lower on the receiver dial. If the image cannot be tuned in, the oscillator trimmer is adjusted to the wrong peak; i. e., the oscillator trimmer may be adjusted to the image or one of the harmonics instead of the fundamental frequency. The correct peak is the second one heard as the trimmer adjustment screw is opened from the completely closed position.



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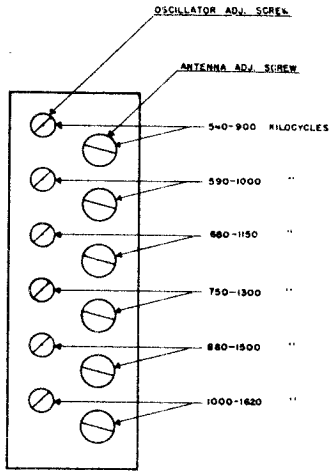
MODEL 106CP

THE CROSLEY CORP.

Each of the six push buttons, for automatic tuning, has two adjusting screws by which it may be set to any nearby American broadcast station whose frequency in kilocycles is within the kilocycle range covered by that button. To gain access to these screws, carefully pry off the push button cover.

To set the top push button to a desired position, proceed as follows:

1. Turn the ANTENNA ADJ. SCREW clockwise until moderately tight, then turn the OSCILLATOR ADJ. SCREW counter-clockwise until the threaded portion extends approximately ¾ inch.. **Use a small screw-driver and do not exert pressure.**
2. Turn the band selector switch to the "AMERICAN" position and manually tune in the station to which the push button is to be set. The frequency of the station selected must be between 540 and 900 kilocycles. Carefully adjust the tuning control to the point of clearest reception.
3. Turn the band selector switch to the "AUTOMATIC" position and slowly turn the OSCILLATOR ADJ. SCREW clockwise until the same station is heard. Adjust the screw for the maximum volume.
4. Adjust the ANTENNA ADJ. SCREW for the maximum volume.
5. Turn the band selector switch from "AUTOMATIC" to "AMERICAN" and back again to check if the adjustment has been correctly made. There should be no change in tone quality when switched from one to the other.
6. Place the tab with the call letters of the station, to which the push button has been set, in a celluloid "V" and slide it into the button from the side.
7. The remaining push buttons may be set in a similar manner. No adjustment of master tone control push buttons is required.



Item No.	Part No.	DESCRIPTION
1	39281-33	Resistor, 2.2 megohm, ½ w.
2	39281-33	Resistor, 2.2 megohm, ½ w.
3	39281-31	Resistor, 1.0 megohm, ½ w.
4	39281-31	Resistor, 1.0 megohm, ½ w.
5	39281-23	Resistor, 47,000 ohm, ½ w.
6	39281-23	Resistor, 47,000 ohm, ½ w.
7	39281-29	Resistor, 470,000 ohm, ½ w.
8	39281-37	Resistor, 10 megohm ½ w.
9	39281-28	Resistor, 330,000 ohm, ½ w.
10	39281-28	Resistor, 330,000 ohm, ½ w.
11	39281-28	Resistor, 330,000 ohm, ½ w.
12	39281-16	Resistor, 3,300 ohm, ½ w.
13	39281-22	Resistor, 33,000 ohm, ½ w.
14	39281-15	Resistor, 2,200 ohm, ½ w.
15	39281-24	Resistor, 68,000 ohm, ½ w.
16	39281-11	Resistor, 470 ohm, ½ w.
17	39281-7	Resistor, 100 ohm, ½ w.
18	39244-19	Resistor, 330 ohm, 2 w.
19	39016-33	Resistor, 4,700 ohm, 2 w.
20	W-132458	Resistor, 4,000 ohm, 3 w.
21	B-226638-53	Condenser, 50 mmf., 500 v., Ceramic
22	B-226638-54	Condenser, 75 mmf., 500 v., Ceramic
23	39001-73	Condenser, 250 mmf., 500 v., Paper
24	39004-7	Condenser, 100 mmf., 500 v., Mica
25	G-131502-20	Condenser, 680 mmf., 400 v., Silver, Mica
26	GC-210685-171	Condenser, .0082 mfd., 300 v., Mica
27	39001-41	Condenser, .05 mfd., 400 v., Paper
28	GC-210685-168	Condenser, .0033 mfd., 500 v., Mica
29	39001-65	Condenser, .05 mfd., 200 v., Paper
30	39001-39	Condenser, .022 mfd., 400 v., Paper
31	W-30805	Condenser, .01 mfd., 400 v., Paper
33	39001-73	Condenser, 250 mmf., 500 v., Paper
34	39001-12	Condenser, .0075 mfd., 600 v., Paper
35	39001-39	Condenser, .022 mfd., 400 v., Paper
36	39001-39	Condenser, .022 mfd., 400 v., Paper
37	39001-39	Condenser, .022 mfd., 400 v., Paper
38	39001-13	Condenser, .01 mfd., 600 v., Paper
39	39001-10	Condenser, .0033 mfd., 600 v., Paper
40	39001-10	Condenser, .0033 mfd., 600 v., Paper
*42	39281-27	Resistor, 220,000 ohm, ½ w.
*43	39001-10	Condenser, .0033 mfd., 600 v., Paper
*44	39001-10	Condenser, .0033 mfd., 600 v., Paper
*45	39001-10	Condenser, .0033 mfd., 600 v., Paper
*46	39001-11	Condenser, .005 mfd., 600 v., Paper
*47	AG-132437-5	Cable & Plug Assembly (Tone Control Unit)
*	AW-135072	Switch & Bracket Assembly (P.B. Tone Control)
48	AW-134088	Tone Control Push Button Unit
**	AW-132427	Switch, Bracket & Trimmer As'y (P.B. Sta. Selector)
49	AW-134087	Station Selector Push Button Unit
**50	AW-134091	Oscillator Coil (1000 to 1620 kc.) P.B. No. 6
**51	AW-134090	Oscillator Coil (880 to 1500 kc.) P.B. No. 5
**52	AW-134231	Oscillator Coil (750 to 1300 kc.) P.B. No. 4
**53	AW-134230	Oscillator Coil (680 to 1150 kc.) P.B. No. 3
**54	AW-134089	Oscillator Coil (590 to 1000 kc.) P.B. No. 2
**55	AW-134092	Oscillator Coil (540 to 900 kc.) P.B. No. 1
**56	AG-132437-2	Cable & Plug Assembly (Station Selector, P.B. Unit)
57	AW-134066	Transformer (2nd I.F.)
58A	B-134054	Switch (Band Change) Three
58B		Switch (Band Change) Section
58C		Switch (Band Change) Assembly
59A	AW-135031	Coil, R.F. (B.C.) Three
59B		Coil, Ant. (Police) Section
59C		Coil, Ant. (S.W.) Assembly
60A	B-132386-5	Condenser (Trimmer) Three
60B		Condenser (Trimmer) Section
60C		Condenser (Trimmer) Assembly
61A	AW-135033	Coil, Oscillator Three
61B		Coil, Oscillator Section
61C		Coil, Oscillator Assembly
62A	B-132386-5	Condenser (Trimmer) Three
62B		Condenser (Trimmer) Section
62C		Condenser (Trimmer) Assembly

*Part of Item 48
**Part of Item 49

Item No.	Part No.	DESCRIPTION
63A	B-135036	Condenser (Variable) Three
63B		Condenser (Variable) Section
63C		Condenser (Variable) Assembly
64	Part of Item 63A	Condenser (Trimmer)
65	W-47133	Socket (Station Selector Unit)
66	B-135049	Switch (Radio-Phono.)
67A	B-132299-3	Control, Volume (1 megohm)
67B		Switch, Power Assembly
68	D-134946-1	Record Changer
69	C-132300-1	Cable and Plug (power)
70	W-43567	Bulb (Dial) Type 51, 7.5 v., .25 amp.
71	W-43567	Bulb (Dial) Type 51, 7.5 v., .25 amp.
72	GC-131880-7	Speaker
73	W-134968-1	Socket (Speaker)
74A	W-134999	Condenser, 20 mfd., 400 w.v. Three
74B		Condenser, 20 mfd., 300 w.v. Section Elect
74C		Condenser, 20 mfd., 25 w.v. Filter
75	B-135018	Transformer (power)
76	W-135174	Cable and Plug (Phono.)
77	39019-2	Terminal Board (Phono.)
78	39019-3	Terminal Board (Antenna)
80	AW-135028	Coil (Antenna Loading)
81	W-49652-3	Condenser (Padder)
82	W-132303	Socket (Tone Control Unit)
83	AW-135024	Transformer (1st I.F.)
84	Part of AW-132427	Condenser (Trimmer)
85	Part of AW-132427	Condenser (Trimmer)
86	Part of AW-132427	Condenser (Trimmer)
87	Part of AW-132427	Condenser (Trimmer)
88	Part of AW-132427	Condenser (Trimmer)
89	Part of AW-132427	Condenser (Trimmer)
90	AC-135157	Antenna Loop Assembly
93	39281-31	Resistor, 1.0 megohm, ½ w.
*94	39281-27	Resistor, 220,000 ohm, ½ w.
*95	39001-11	Condenser, .005 mfd., 600 v., Paper
**96	G-39012-7	Iron Core (P.B. Osc. Coils)
**97	G-39012-7	Iron Core (P.B. Osc. Coils)
**98	G-39012-7	Iron Core (P.B. Osc. Coils)
**99	G-39012-7	Iron Core (P.B. Osc. Coils)
**100	G-39012-7	Iron Core (P.B. Osc. Coils)
**101	G-39012-7	Iron Core (P.B. Osc. Coils)
**	W-132366-2	Locking Nut (P.B. Iron Cores)
	G-39204	Socket (Tube)
	AW-135042	Face (Dial Assembly)
	W-51752	Spring (Drive Cord)
	AW-134979	Flywheel Adapter Assembly
	AB-135052	Toggle Arm & Link Assembly (Phono. Switch)
	AW-135053	Toggle Arm & Link Assembly (Band Switch)
	W-49829	Spring (Lock)
	B-134572	Pointer (Dial)
	W-134064	Clip (Dial Pointer)
	W-134977	Shaft (Drive)
	39017-3	Socket Assembly (Dial Light)
	W-134055	Grommet
	R-135022	Cabinet
	AD-134762	Dial Glass and Escutcheon
	C-134929	Plate (R.H. Push Button)
	C-134745	Plate (L.H. Push Button)
	B-134763	Button, Tone (2 Bass)
	B-134764	Button, Tone (1 Bass)
	B-134765	Button, Tone (3 Bass)
	B-134766	Button, Tone (3 Treble)
	B-134767	Button, Tone (1 Treble)
	B-134768	Button, Tone (2 Treble)
	B-134769	Button (Station)
	W-134074-3	Knob (Large)
	W-134951	Knob (Small)
	W-45580	Grommet
	W-132322	Spring, Chassis Mtg. (Top)
	W-132323	Spring, Chassis Mtg. (Bottom)
	AB-134935	Needle, Floating Jewel Assembly
	W-135129	Screw (No. 10—24x2¼ Hex. Hd. Pilot Pt. Mach.)
	W-132434-3	Call Letter Sheet
	W-134140-1	Call Letter Cover

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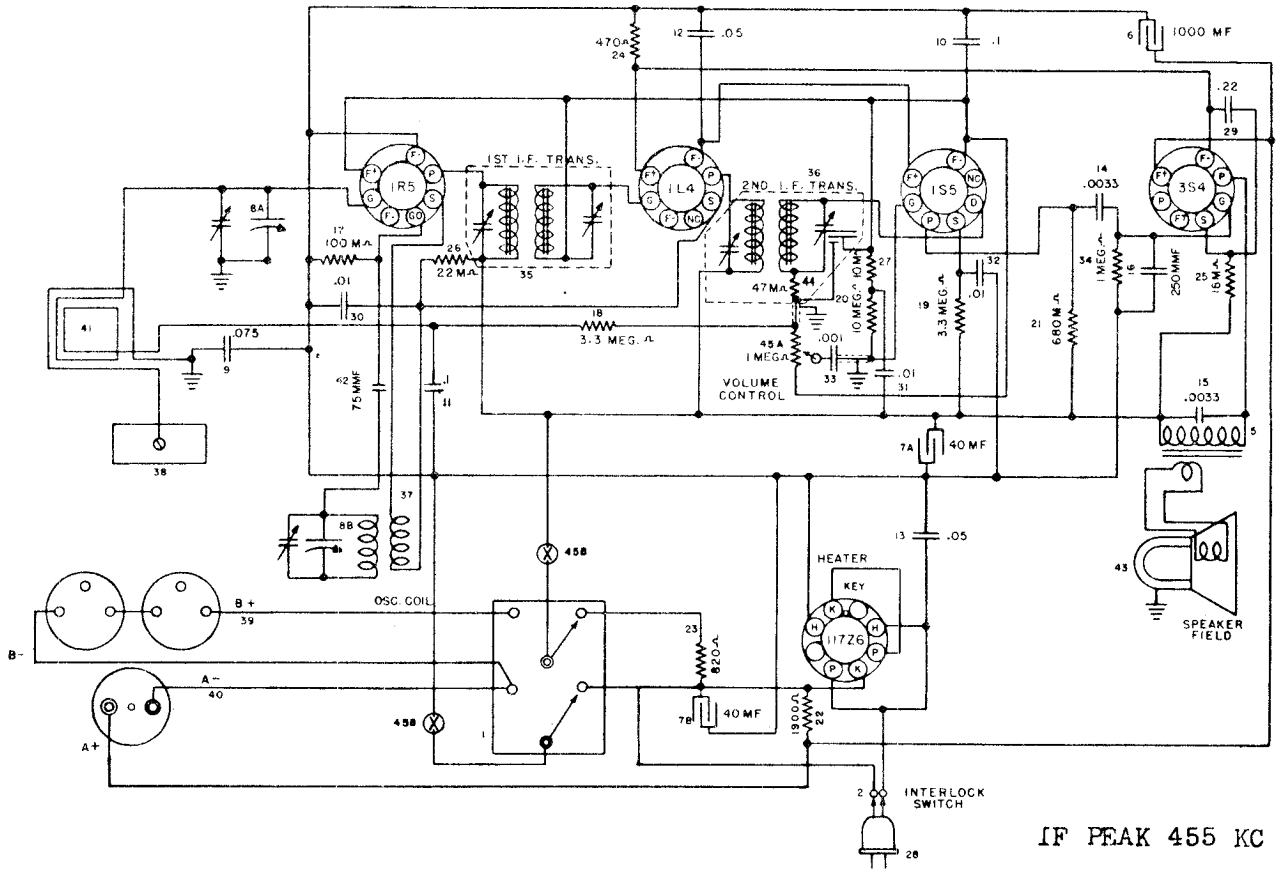
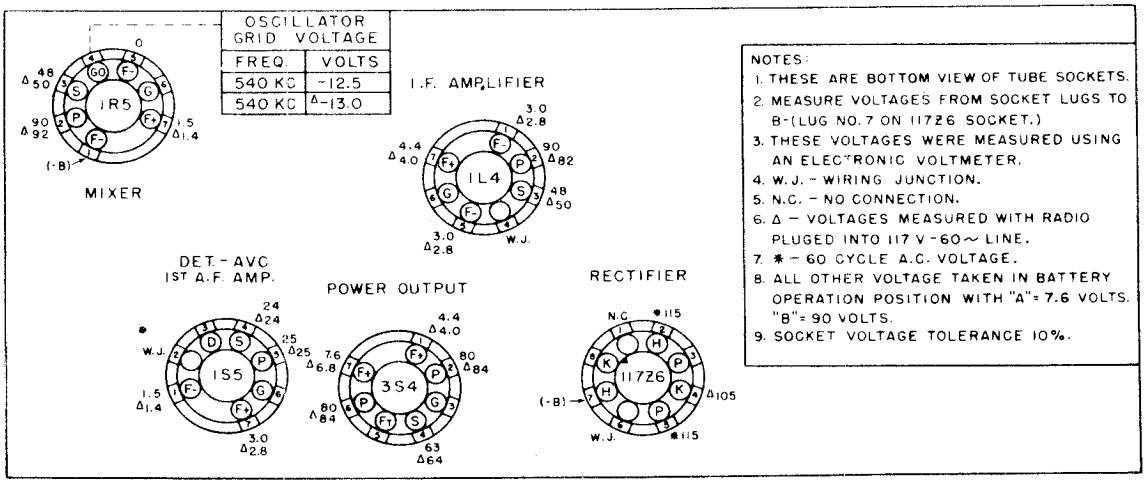


SCHEMATIC DIAGRAM—MODELS 56PA and 56PB

SOCKET VOLTAGE CHART


OSCILLATOR GRID VOLTAGE
FREQ. VOLTS
540 KC -12.5
540 KC Δ-13.0
MIXER
I.F. AMPLIFIER
DET.-AVC 1ST A.F. AMP.
POWER OUTPUT
RECTIFIER
NOTES:
1. THESE ARE BOTTOM VIEW OF TUBE SOCKETS.
2. MEASURE VOLTAGES FROM SOCKET LUGS TO B-(LUG NO. 7 ON 117Z6 SOCKET.)
3. THESE VOLTAGES WERE MEASURED USING AN ELECTRONIC VOLTMETER.
4. W.J. - WIRING JUNCTION.
5. N.C. - NO CONNECTION.
6. Δ - VOLTAGES MEASURED WITH RADIO PLUGED INTO 117 V - 60~ LINE.
7. * - 60 CYCLE A.C. VOLTAGE.
8. ALL OTHER VOLTAGE TAKEN IN BATTERY OPERATION POSITION WITH "A"= 7.6 VOLTS. "B"= 90 VOLTS.
9. SOCKET VOLTAGE TOLERANCE 10%.

October, 1946

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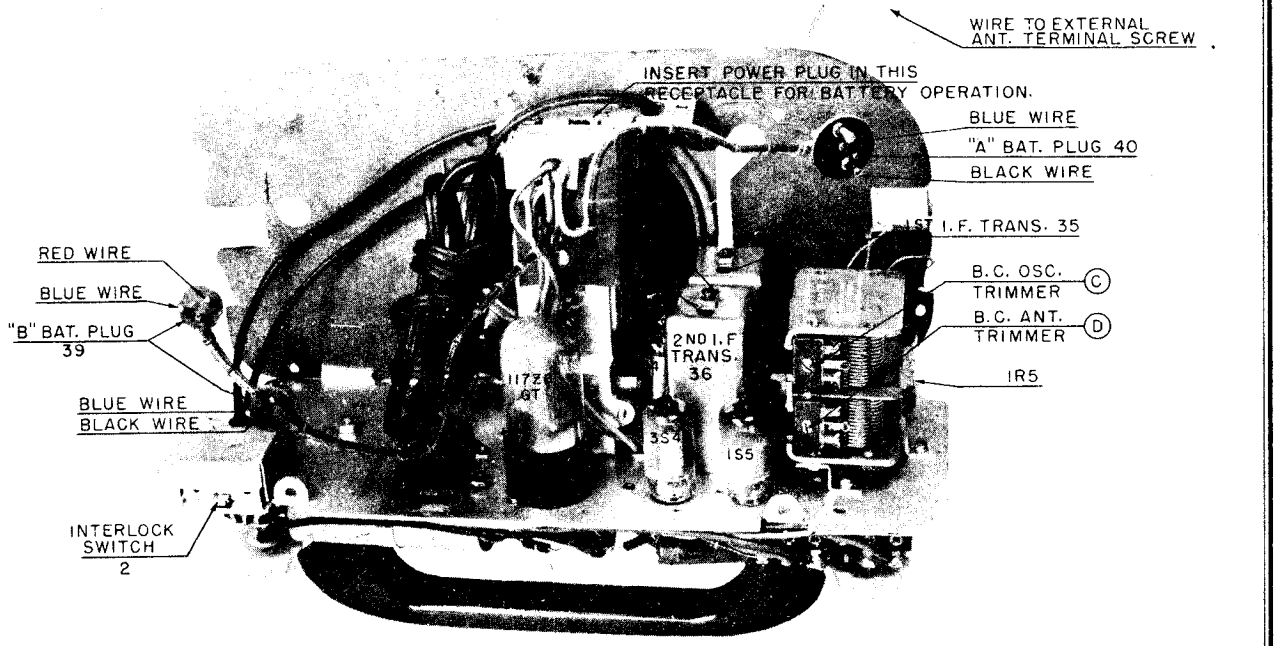

CHASSIS VIEW—MODELS 56PA and 56PB

ALIGNMENT PROCEDURE

1. Turn the tuning condenser to the completely closed position against the stop and set the dial pointer to the reference line at the end of the dial scale.
2. Connect the output meter across the speaker voice coil.
3. Connect the high side of the signal generator to the external antenna wire of the loop, that connects to the terminal screw on the bottom of the cabinet, as indicated in the alignment chart. Connect signal generator ground through a O. 1 mt. condenser to B—. (No. 1 pin on 1R5 tube).
4. Turn the volume control on full and adjust the signal generator output to produce approximately mid-scale deflection of the output meter, but maintain signal generator output as low as possible to prevent AVC action in the receiver.

Alignment Sequence	Signal Generator Output			Position of Tuning Dial KC	Adjust for Maximum Outout
	Frequency in KC	In Series with	To		
1	455	200 mmf.	Ant.	1620	A & B
2	1620	200 mmf.	Ant.	1620	C
3	1400	200 mmf.	Ant.	1400	*D

***NOTE:** Batteries should be placed against battery stop in front half of cabinet when making loop alignment to avoid error due to capacity effect of batteries. If receiver is to be used on AC or DC only (without batteries) it will be necessary to realign loop adjustment "D" for maximum output, after batteries have been removed.

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TYPE: Five-tube, combination, battery Portable and AC-DC Superheterodyne.

FREQUENCY RANGE: 540 to 1600 kilocycles.

INTERMEDIATE FREQUENCY: 455 kc.

POWER SUPPLY: AC-DC or BATTERY.

VOLTAGE RATING: AC-DC, 110 to 120 volts. Battery "A" 7½ volts "B" 90 volts.

POWER OUTPUT: 180 M.W. maximum.

POWER CONSUMPTION: 25 watts.

BATTERIES USED: one Crosley CR 90, 7.5 volt "A" Battery. Two Crosley CR 77, 45 volt "B" Batteries.

PARTS LIST—MODELS 56PA, 56PB

Item No.	Part No.	Description
1	W-135359	Switch (A.C., D.C. or Battery)
2	W-135355	Switch (Interlock)
5	B-135878	Transformer (Output.)
6	B-135459	Condenser, 1000 mfd., 10 w, v., Elect.
7A	B-135555	Condenser, 40 mfd., 100 w.v. Two Section
7B		Condenser, 40 mfd., 150 w.v. Elect. Filter
8A	AB-136366	Condenser, Variable Two
8B		Condenser, Variable Section
9	39001-17	Condenser, .05 mfd., 600 v., paper.
10	39001-19	Condenser, .1 mfd., 600 v., paper
11	39001-19	Condenser, .1 mfd., 600 v., paper
12	39001-17	Condenser, .05 mfd., 600 v., paper
13	39001-17	Condenser, .05 mfd., 600 v., paper
14	39001-76	Condenser, .003 mfd., 600 v., paper
15	39001-76	Condenser, .003 mfd., 600 v., paper
16	39001-73	Condenser, 250 mmf., 600 v., paper
17	39294-25	Resistor, 100,000 ohm, ½ w.
18	39294-34	Resistor, 3.3 megohm, ½ w.
19	39294-34	Resistor, 3.3 megohm, ½ w.
20	39294-37	Resistor, 10 megohm, ½ w.
21	39294-30	Resistor, 680,000 ohm, ½ w.
22	W-132502	Resistor, 1900 ohm, 5w. (Candohm)
23	39014-24	Resistor, 820 ohm, ½ w.
24	39294-11	Resistor, 470 ohm, ½ w.
25	39014-40	Resistor, 18,000 ohm, ½ w.
26	39294-21	Resistor, 22,000 ohm, ½ w.
27	39294-19	Resistor, 10,000 ohm, ½ w.
28	C-132300-3	Cable and Plug (Power)
29	39001-87	Condenser, .25 mfd., 600 v., paper
30	39001-13	Condenser, .01 mfd., 600 v., paper
31	39001-13	Condenser, .01 mfd., 600 v., paper
32	39001-13	Condenser, .01 mfd., 600 v., paper
33	39001-7	Condenser, .001 mfd., 600 v., paper
34	39294-31	Resistor, 1.0 megohm, ½ w.
35	AW-135774	Transformer (1st. I.F.)
36	AW-135769	Transformer (2nd. I.F.)
37	AW-135620	Coil (Oscillator)
38	39017-7	Terminal Board
39	W-47353	Plug ("B" Cable)
40	W-136099	Plug ("A" Cable)
41	AC-136082	Antenna loop and Back Assembly
42	B-226638-54	Condenser 75 mmf., 500 v., ceramic
43	AD-136156	Speaker (Less Transformer)
44	Part of Item 36	Resistor 47,000 ohm, ½ w.
45A	B-135353	Control, Volume (1 megohm) Assembly
45B		Switch (Power) Assembly
*	39368-14	Control (Volume)
	39369-2	Switch (Power)
	36232	Socket (Tube) 117Z6
	W-131346	Socket (Tube)
	AB-135453	Background Assembly (Dial)
	W-51535	Pulley, Idler (Dial Cord)
	B-135307	Pointer (Dial)
	W-51752	Spring (Dial Cord)
	W-136630	Trimount Stud
	W-48200	Trimount Stud
	B-134926	Cover (Switch)
	W-135349	Insulator (Switch Cover)
	R-134910	Cabinet Half (Back, 56PA)
	R-134911	Cabinet Half (Front, 56PA)
	R-135305	Cabinet Half (Front, 56PB)
	R-135306	Cabinet Half (Back, 56PB)
	C-135318	Handle (56PA)
	C-135595	Handle (56PB)
	W-135571	Insert (Handle)
	W-135342	Screw, Special (56PA Cabinet)
	W-136053	Screw, Special (56PB Cabinet)
	B-135376	Dial Glass (56PA)
	B-137229	Dial Glass (56PB)
	W-135345	Knob (56PA)
	W-135590	Knob (56PB)
	1-CR 90	"A" Battery
	2-CR 77	"B" Battery

*These parts will replace the original equipment parts.

MODELS 56TG,56TH,56TJ
56TG-O,56TH-O.56TJ-O

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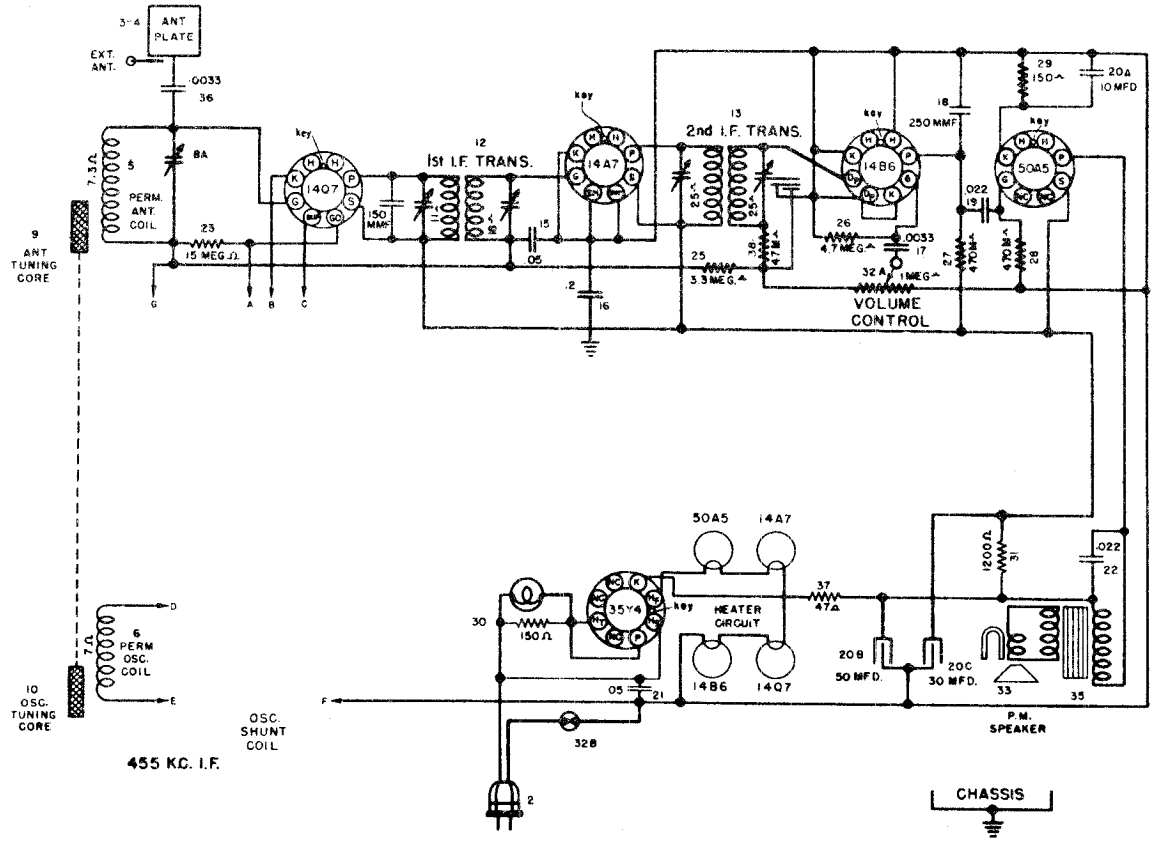
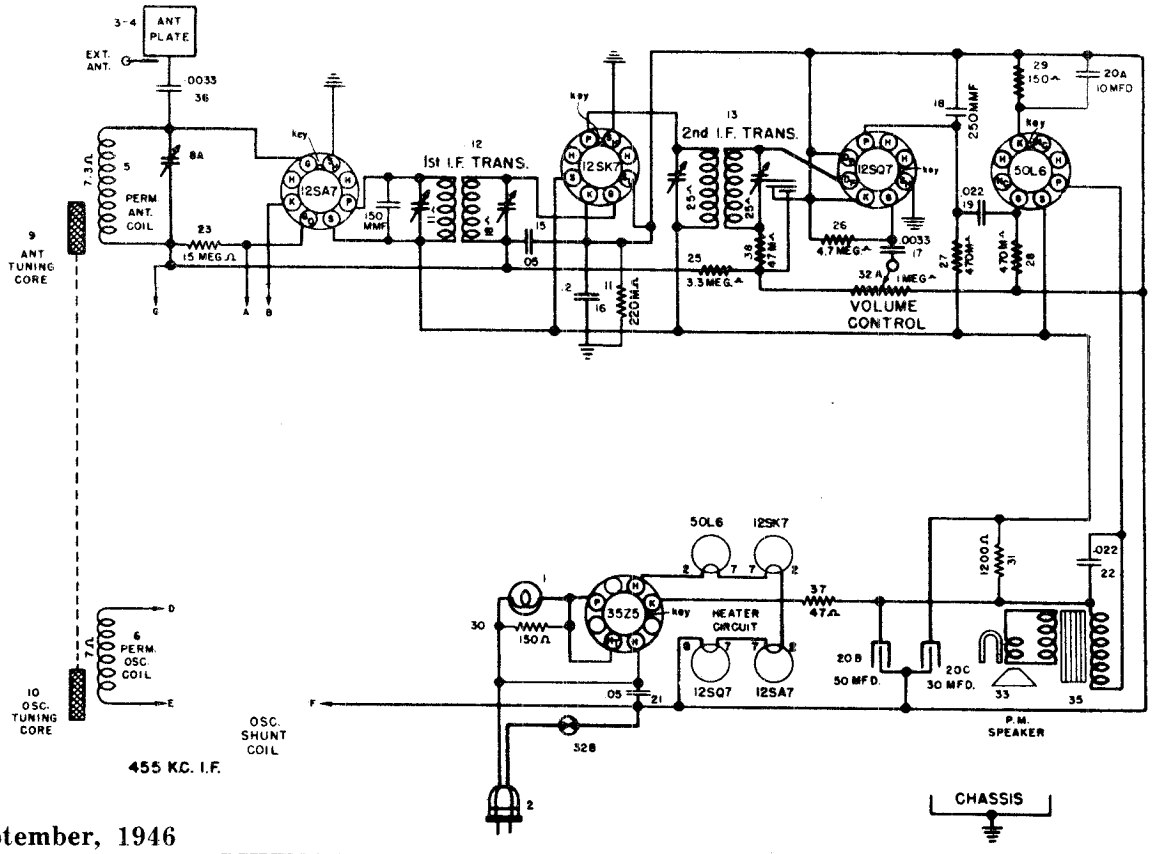


SCHEMATIC DIAGRAM—MODEI 56TG, 56TH, 56TJ (LOCTAL)



September, 1946

SCHEMATIC DIAGRAM—MODEL 56TG-O, 56TH-O, 56TJ-O (OCTAL)

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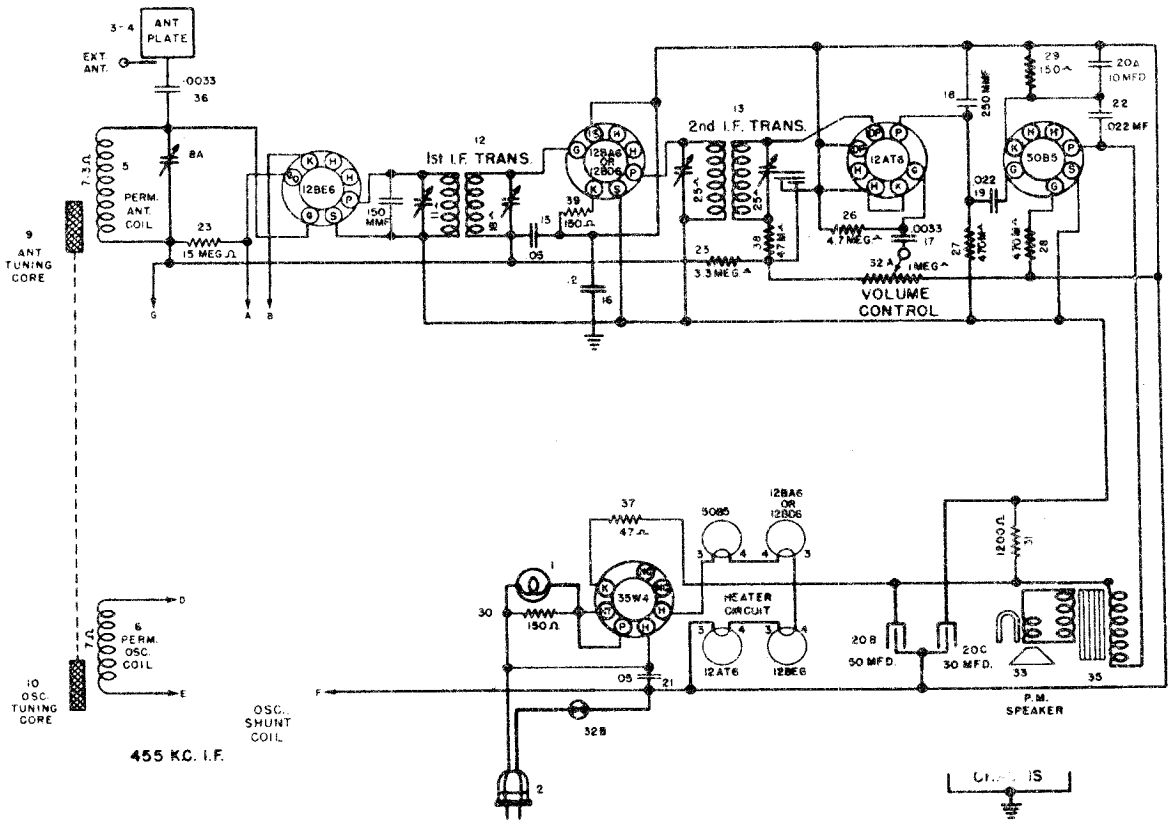
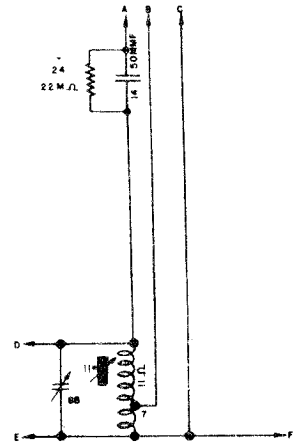
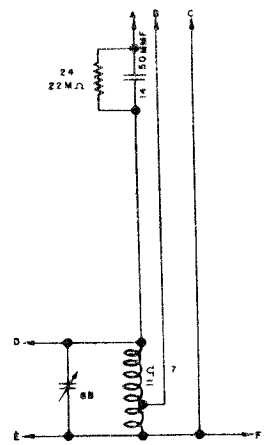


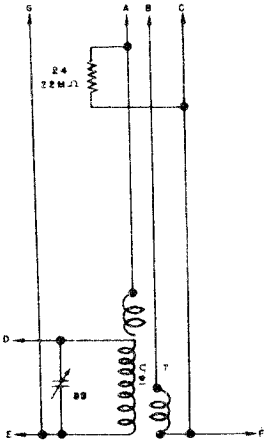
SCHEMATIC DIAGRAM—MODEL 56TG-M, 56TH-M, 56TJ-M (MINIATURE)



THE ABOVE OSCILLATOR SHUNT COIL IS USED IN THE FIRST PRODUCTION MODELS. IT IS MOUNTED ON THE PERMEABILITY TUNER AND USES AN ADJUSTABLE IRON CORE. "G" IS NOT USED WITH A MINIATURE OR AN OCTAL TUBE.



THIS OSCILLATOR SHUNT COIL IS USED IN THE SECOND PRODUCTION MODELS. IT IS MOUNTED ON THE REAR OF THE PERMEABILITY TUNER AND DOES NOT USE AN ADJUSTABLE IRON CORE. "G" IS NOT USED WITH A MINIATURE OR AN OCTAL TUBE.



THIS OSCILLATOR SHUNT COIL IS USED IN THE THIRD PRODUCTION MODELS. IT IS MOUNTED UNDER THE CHASSIS AND DOES NOT USE AN ADJUSTABLE IRON CORE. "G" IS NOT USED WITH A MINIATURE OR AN OCTAL TUBE.

OSCILLATOR SHUNT COIL CHARTS

To check circuits and parts find the socket in the preceding SCHEMATIC DIAGRAMS which correspond to the socket in the radio. Connection "G" is used only on 3rd production sets. To check the oscillator shunt coil circuit, choose the circuit (which corresponds to the radio being serviced) from the 3 circuits shown above.

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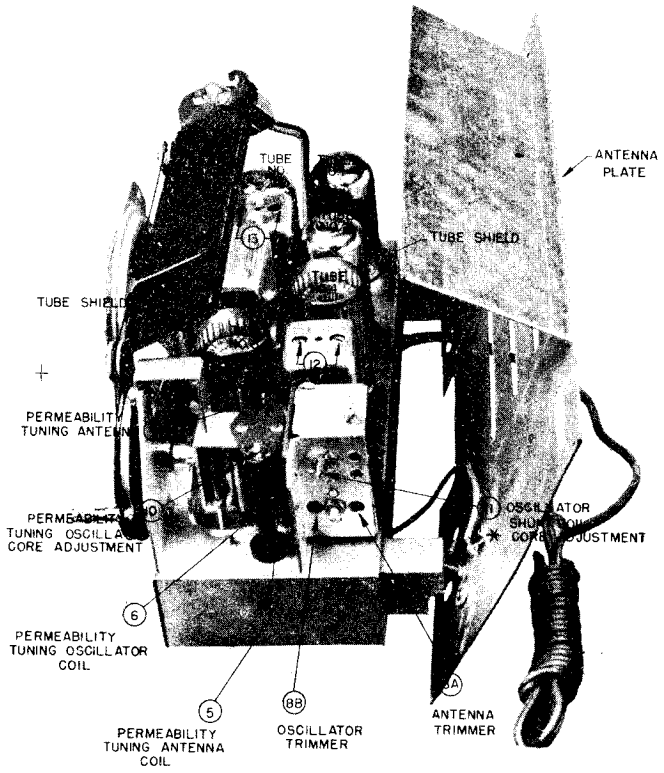
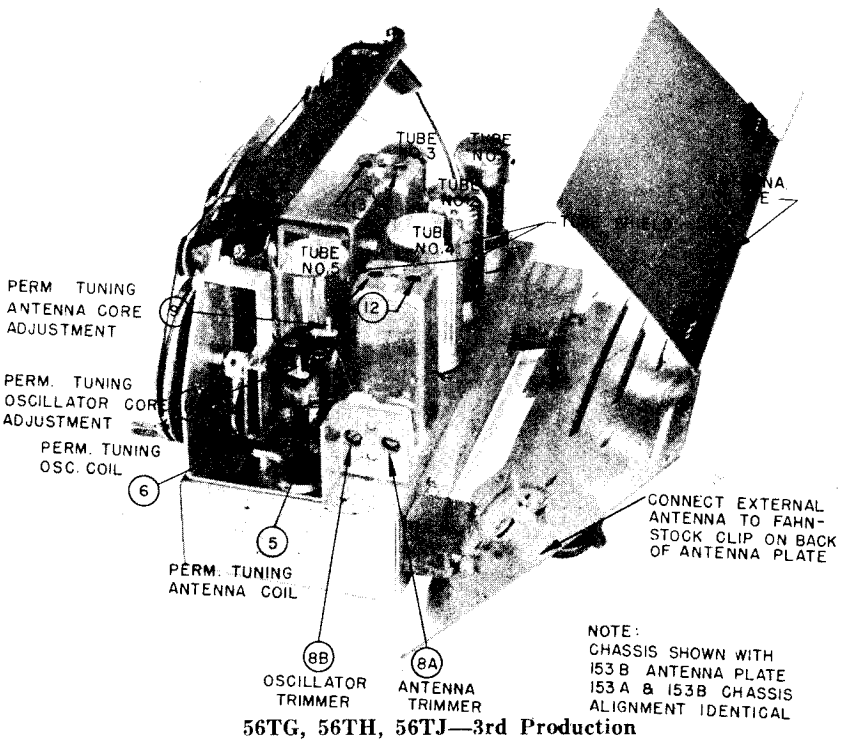
MODELS 56TG,56TH,56TJ
1st, 2nd Production
3rd Production

THE CROSLEY CORP.
CHASSIS SIDE VIEWS



*The second production models do not have an Oscillator Shunt Core. The alignment procedure is identical to the 3rd production procedure.

56TG, 56TH, 56TJ—1st and 2nd Production


TUBE NO.3
TUBE NO.2
TUBE NO.4
TUBE NO.5
PERM TUNING ANTENNA CORE ADJUSTMENT
PERM. TUNING OSCILLATOR CORE ADJUSTMENT
PERM. TUNING OSC. COIL
PERM. TUNING ANTENNA COIL
CONNECT EXTERNAL ANTENNA TO FAHNSTOCK CLIP ON BACK OF ANTENNA PLATE
OSCILLATOR TRIMMER
ANTENNA TRIMMER
NOTE: CHASSIS SHOWN WITH 153B ANTENNA PLATE 153A & 153B CHASSIS ALIGNMENT IDENTICAL

56TG, 56TH, 56TJ—3rd Production

The tube numbers 1, 2, 3, 4, 5, which are not circled in the above charts, correspond to the tube numbers in the first column of the TUBE COMPLEMENT COMPARISON CHART shown on page 1.

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When using direct current it may be necessary to reverse the position of the power plug in the electric outlet for correct polarity.

Reversing the position of the power plug when alternating current is used may reduce power hum.

Under no circumstances should a ground be connected to the receiver.

ALIGNMENT PROCEDURE

(1st Production Models)

1. With the tuning knob turned to the extreme right against the stop, set the dial pointer to the last reference line at the 540 kilocycle end of the dial.
2. Connect the output of a signal generator directly to the receiver antenna clip. Connect the ground of the signal generator through a .01 mfd. condenser to the receiver chassis.
3. Connect the output meter across the speaker voice coil.
4. Turn the volume control on full and adjust the signal generator output to produce approximately mid-scale deflection of the output meter, but maintain signal generator output as low as possible to prevent AVC action in the receiver.
5 Set the signal generator to 455 Kc. Set the receiver dial pointer against the stop at 1600 Kc. end of the dial. Adjust the 2nd I.F. trimmers (13) and the 1st I.F. trimmers (12), for maximum output. (See CHASSIS SIDE VIEW at top of P.15-34 for adjustment locations.)
6. Open oscillator trimmer (8B) approximately one-half turn from the closed position. Adjust oscillator shunt core (11) to its extreme outer position.
7. Set the dial pointer against the stop at the low frequency (540 Kc.) end of the dial. Tune the signal generator until the signal is heard in speaker of the receiver. The frequency of this signal from the signal generator should be between 500 Kc. and 800 Kc.

   NOTE: Check to make sure the circuit is aligned at the correct frequency and not the image frequency which is a weaker signal, 910 Kc. higher as indicated by the receiver dial.
8. With the dial pointer set against the stop at the 540 Kc. end of the dial, adjust the oscillator iron core (10) to its minimum frequency.
9. Set the signal generator to 535 Kc. and adjust the oscillator shunt core (11) for maximum output.
10. Set the dial pointer against the stop at the high frequency (1600 Kc.) end of dial. Set the signal generator to 1620 Kc. and adjust the oscillator trimmer (8B), for maximum output.

    NOTE: Repeat steps 9 and 10 until correct dial calibration is obtained.
11. Tune both the receiver and the signal generator to 1400 Kc. Adjust the antenna trimmer (8A) for maximum output.
12. Tune both the receiver and the signal generator to 600 Kc. Adjust the antenna trimmer (8A) for maximum output.

    NOTE: If it is necessary to adjust trimmer (8A) closer together, the antenna inductance change is too small and must be increased by adjusting the antenna core (9), farther out of the antenna coil.

    If it is necessary to adjust trimmer (8A) farther apart, the antenna inductance change is too great and must be reduced by adjusting the antenna core (9), farther into the antenna coil.
13. Repeat steps 11 and 12 until (8A) is properly adjusted for maximum output at 600 Kc., as it is at 1400 Kc.

ALIGNMENT PROCEDURE

(2nd and 3rd Production Models)

1. With the tuning knob turned to the extreme right against the stop, set the dial pointer to the last reference line at the 540 Kc. end of the dial.
2. Connect the output of a signal generator directly to the receiver antenna clip. Connect the ground of the signal generator through a .01 mfd. condenser to the receiver chassis.
3. Connect the output meter across the speaker voice coil.
4. Turn the volume control on full and adjust the signal generator output to produce approximately mid-scale deflection of the output meter, but maintain signal generator output as low as possible to prevent AVC action in the receiver.
5. Set the signal generator to 455 Kc. Set the receiver dial pointer against the stop at the high frequency (1600 Kc.) end of the dial. Adjust the 2nd I.F. trimmers (13) and the 1st I.F. trimmers (12) for maximum output. (See CHASSIS SIDE VIEW at bottom of P.15-34 for adjustment locations.)
6. Set the dial pointer against the stop at the low frequency (540 Kc.) end of the dial. Preset the antenna tuning core (9) and the oscillator tuning core (10) so that the top of each core is approximately 1/16-inch below the upper edge of the coil form.
7. Set the signal generator to 535 Kc. and with the dial pointer against the stop at the 540 Kc. end of dial, adjust the oscillator trimmer (8B) for maximum output.
8. Set the signal generator to 1620 Kc. Set the dial pointer against the stop at the high frequency (1600 Kc.) end of the dial. Adjust the oscillator tuning core (10) for maximum output.

   NOTE: Repeat steps 7 and 8 until the correct dial calibration is obtained.
9. Tune both the signal generator and the receiver to 600 Kc. and adjust the antenna trimmer (8A) for maximum output.
10. Tune both the signal generator and the receiver to 1400 Kc. and adjust the antenna tuning core (9) for maximum output.

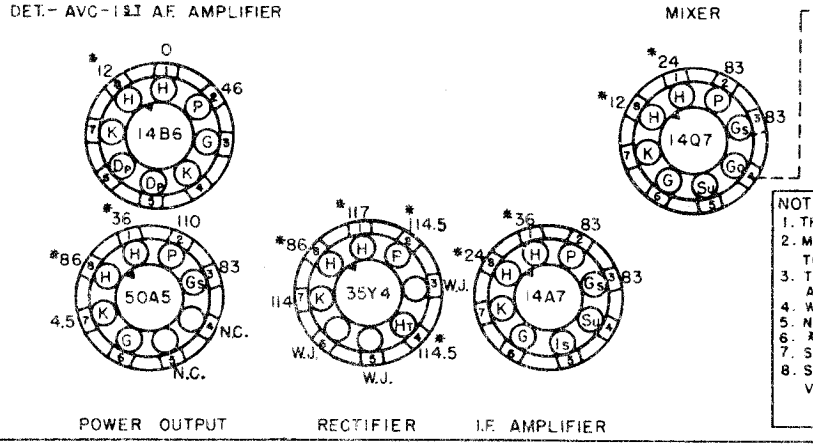
    NOTE: Repeat steps 9 and 10 until the antenna trimmer (8A) is properly adjusted for maximum output at 1400 Kc. as it is at 600 Kc.

    When the receiver is to be used without an external antenna, disconnect the signal generator output from the receiver. Tune in a weak signal between 1400 Kc. and 1000 Kc. and adjust the antenna trimmer (8A) for maximum output.

MODELS 56TG, 56TH, 56TJ,
56TG-O, 56TH-O, 56TJ-O,
56TG-M, 56TH-M, 56TJ-M

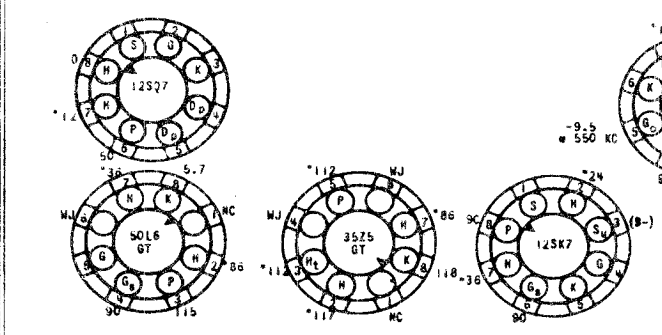
THE CROSLEY CORP.
SOCKET VOLTAGE CHARTS

OSCILLATOR GRID VOLTAGE		
BAND	FREQUENCY	VOLTS
AMERICAN	550 KC	-8.4



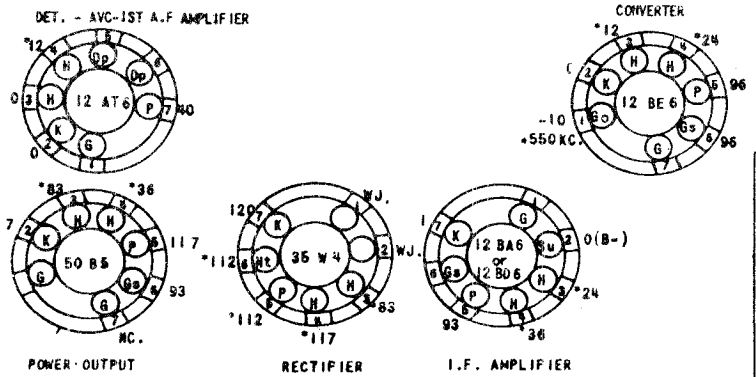
NOTES:
1. THESE ARE BOTTOM VIEWS OF TUBE SOCKETS.
2. MEASURE VOLTAGES FROM SOCKET LUGS TO -B (PIN 4 ON THE 14A7)
3. THESE VOLTAGES WERE MEASURED USING AN ELECTRONIC VOLTMETER.
4. W.J.- WIRING JUNCTION
5. N.C.- NO CONNECTION
6. * - 60 CYCLE A.C. VOLTAGES.
7. SOCKET VOLTAGE TOLERANCE, 10%.
8. SOCKET VOLTAGES MEASURED USING 117 VOLTS, 60 CYCLE LINE VOLTAGE.

56TG, 56TH, 56TJ (LOCTAL)



NOTES:
1. BOTTOM VIEW OF SOCKETS.
2. MEASURE VOLTAGE FROM SOCKET LUGS TO B- (PIN 3 ON THE 12SK7).
3. VOLTAGES MEASURED WITH AN ELECTRONIC VOLTMETER.
4. W.J. =WIRING JUNCTION.
5. N.C. = NO CONNECTION
6. * = 60 CYCLE A.C. VOLTAGES.
7. SOCKET VOLTAGES MEASURED USING 117 VOLTS, 60 CYCLE POWER SUPPLY.
8. SOCKET VOLTAGE TOLERANCE 10%.

56TG-O, 56TH-O, 56TJ-O (OCTAL)



NOTES:
1. These are bottom views of tube sockets.
2. Measure voltages from socket lugs to -B (Pin 2 on the 12 BA6 or 12B06).
3. These voltages were measured with an electronic voltmeter.
4. W.J. - Wiring Junction
5. N.C. - No Connection.
6. * - 60 Cycle A.C. Voltage
7. Socket Voltage Tolerance 10%
8. Socket Voltages Measured at normal line Voltage. (117 Volts- 60 Cycle)

56TG-M, 56TH-M, 56TJ-M (MINIATURE)

NOTE: To check voltages, find the socket in the above charts which corresponds to the socket in the radio.

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THE CROSLEY CORP.

MODELS 56TG,56TH,56TJ,
56TG-O,56TH-O,56TJ-O,
56TG-M,56TH-M,56TJ-M

FREQUENCY RANGE: 540 to 1600 Kc.
INTERMEDIATE FREQUENCY: 455 Kc.
POWER SUPPLY: a.c.-d.c.
VOLTAGE RATING: 105-125 volts.
POWER CONSUMPTION: 35 watts nominal.
POWER OUTPUT: 1.75 watts minimum.

PARTS LIST

MODEL 56TG, 56TG-O, 56TG-O1234, 56TG-M, 56TG(M12), 56TG-O(M12), 56TG(M12)034
MODEL 56TH, 56TH-O, 56TH-O1234, 56TH-M, 56TH(M12), 56TH-O(M12), 56TH(M12)034
MODEL 56TJ, 56TJ-O, 56TJ-O1234, 56TJ-M, 56TJ(M12), 56TJ-O(M12), 56TJ(M12)034

Figures in first column correspond to figures in Schematic Diagram

ITEM No.	PART No.	DESCRIPTION
1	W-48858	Bulb (dial), Type 47, 6.3 v., 15 amp.
2	C-132300-1	Cord and Plug (Power)
3	AW-136476	Ant. Plate (56TJ Series)
4	AW-136574	Ant. Plate (56TG, 56TH Series)
5	AW-136438	Coil, Ant. Tuning
6	AW-136657	Coil, Osc. Tuning
7	*AW-136658	Coil, Osc. Shunt (Part of AD-136695, 1st Production)
7	*AW-137532	Coil, Osc. Shunt (Part of AD-136695-H, 2nd Production)
7	*AW137720	Coil, Osc. Shunt (3rd Production)
8A	W-136699	Trimmer, Ant.
8B		Trimmer, Osc.
9	G-39012-49	Iron Core, Ant. Tuning
10	G-39012-49	Iron Core, Osc. Tuning
11	*G39012-48	Iron Core. Osc. Shunt (Part of AD-136695, 1st Production)
11	39294-27	Resistor, 220,000 ohm, ½ w. (56TG-O, 56TH-O, 56TJ-O)
12	AW-137658	Transformer, 1st I.F.
13	AW-137667	Transformer, 2nd I.F.
14	*B-226638-53	Condenser, 50 mmf. (1st and 2nd Production)
15	39001-65	Condenser, .05 mfd., 200 v., paper
16	39001-105	Condenser, .2 mfd., 200 v., paper
17	39001-10	Condenser, 3300 mmf., 200 v., paper
18	39001-73	Condenser, 250 mmf., 600 v., paper
19	39001-63	Condenser, .022 mfd., 200 v., paper
20A	B-136769	Condenser, 10 mfd., 25 v. } Three
20B		Condenser, 50 mfd., 150 v. } Section
20C		Condenser, 30 mfd., 150 v. } Filter
21	39001-65	Condenser, .05 mfd., 200 v., paper
22	39001-63	Condenser, .022 mfd., 200 v., paper
23	39294-38	Resistor, 15 megohm, ½ w.
24	39294-21	Resistor, 22,000 ohm, ½ w.
25	39294-34	Resistor, 3.3 megohm, ½ w.
26	39294-35	Resistor, 4.7 megohm, ½ w.
27	39294-29	Resistor, 470,000 ohm, ½ w.
28	39294-29	Resistor, 470,000 ohm, ½ w.
29	39294-8	Resistor, 150 ohm, ½ w.
30	39294-8	Resistor, 150 ohm, ½ w.
31	39015-26	Resistor, 1200 ohm, 1 w.
32A	C-135127	Control, Volume (1 megohm) } Assembly
32B		Switch (Power) } Assembly
33	B-136768	Speaker
35	B-135077	Transformer (Output)
36	*39001-10	Condenser, 3300 mmf., 200 v., paper (2nd and 3rd Production)
37	*W-137367	Resistor, 47 ohm, 1 w. (2nd and 3rd Production)
38	Part of Item 13	Resistor, 47,000 ohm, ½ w.
39	39294-8	Resistor, 150 ohm, ½ w. (56TG-M, 56TH-M, 56TJ-M)
	W-135371	Socket, Loctal Tube
	W-131346	Socket, Miniature Tube
	39204	Socket, Octal Tube
	39017-5	Socket, Dial Light
	W-46447-1	Shield, Tube
	*AD-136695	Permeability Tuner, Complete Assy. (1st Production)
	*AD-136695-H	Permeability Tuner, Complete Assy. (2nd Production)
	*AW-137722	Permeability Tuner, Complete Assy. (3rd Production)
	AW-137689	Slide Assy. Permeability Tuner
	AW-137688	Hub and Cam Assy., Permeability Tuner
	W-136520	Spring, Retractor (Permeability Tuner)
	W-136533	Grommet, Ant. Coil Mtg. (Permeability Tuner)
	W-45580	Grommet, Osc. Coil Mtg. (Permeability Tuner)
	*W-132366-2	Nut, Iron Core Locking (Part of AD-136695, 1st Production)
	W-51993	Fastener, Iron Core
	W-52063	Spring, Iron Core
	AB-135135	Plate Assy., Dial
	W-135074	Pulley, Idler
	B-135094	Pointer, Dial
	B-135075	Shaft, Drive
	W-134916	Washer, Spring
	W-51071	Ring Retaining
	W-136630	Trimount Stud
	W-131154-1	Cotter, External
	D-137263	Cabinet (56TJ Series)
	R-135404	Cabinet (56TG Series)
	AB-135446	Cabinet and Handle Assy. (56TH Series)
	B-135403	Handle (Part of AB-135446)
	AW-135444	Cabinet (Part of AB-135446)
	B-136633	Dial Glass
	W-135455	Knob (56TG, 56TJ Series)
	W-135454	Knob (56TH Series)
	W-132124	Trimount Stud (56TH, 56TG Series)

*1st Production models are identified by the adjustable Iron Core in the Oscillator Shunt Coil which is mounted on rear of the Tuner. 2nd Production models do not have the adjustable Iron Core in the Oscillator Shunt Coil which is mounted on the rear of the Tuner. 3rd Production models do not have the adjustable Iron Core in the Oscillator Shunt Coil which is mounted under the chassis.

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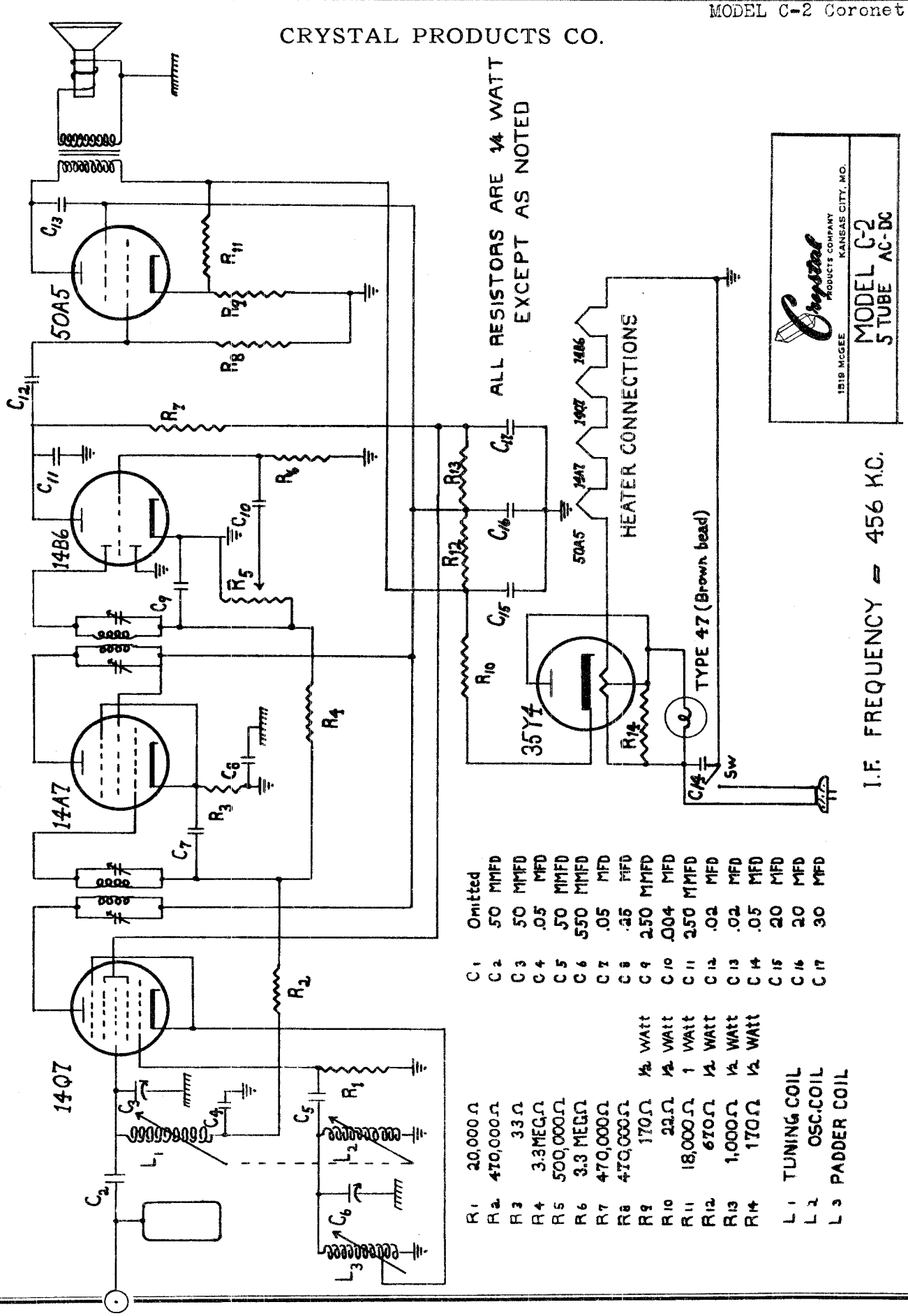
MODEL C-2 Coronet

CRYSTAL PRODUCTS CO.



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MODEL C-2 Coronet

CRYSTAL PRODUCTS CO.

CORONET MODEL C-2 PARTS

C-1—Omitted
C-2—50 mmfd. mica capacitor
C-3—50 mmf. nominal trimmer, range 55-75
C-4—.05 mfd., 400v paper capacitor
C-5—50 mmfd. mica capacitor
C-6—Nominal 550 mmf. range 450-700 trimmer
C-7—.05 mfd., 400v paper capacitor
C-8—.25 mfd., 200v paper capacitor
C-9—250 mmfd. mica capacitor
C-10—.004 mfd., 200v paper capacitor
C-11—250 mmfd. mica capacitor
C-12—.02 mfd., 600v paper capacitor
C-13—.02 mfd., 600v paper capacitor
C-14—.05 mfd., 400v paper capacitor
C-15, C-16, C-17—20-20-30 mfd., 150v electrolytic condenser
R-1—20,000 ohm, ¼ w resistor
R-2—470,000 ohm, ¼ w resistor
R-3—33 ohm. ¼ w resistor
R-4—3.3 meg., ¼ w resistor
R-5—500,000 ohm standard taper potentiometer
R-6—3.3 meg., ¼ w resistor
R-7—470,000 ohm, ¼ w resistor
R-8—470,000 ohm, ¼ w resistor
R-9—170 ohm, ½ w resistor
R-10—22 ohm, ½ w resistor
R-11—18,000 ohm, ½ w resistor
R-12—670 ohm, ½ w resistor
R-13—1,000 ohm, ½ w resistor
R-14—170 ohm, ½ w resistor
L-1—Antenna Tuning
L-2—Oscillator Tuning
L-3—Oscillator Padder

Line Cord 560 ohm for 220-volt operation.

TECHNICAL DATA

Tuning range.....540 to 1700 Kc.
Intermediate frequency.....456 Kc.
Power consumption.....35 watts
Sensitivity (for 0.05 watt output).....15 microvolts average
Power output (in voice coil)
Undistorted .....0.8 watts
Maximum .....1.0 watts
Voice coil impedance.....3.2 ohms

ALIGNMENT PROCEDURE

No aligning adjustments should be attempted until all other possible causes of trouble have been checked.
Turn volume control to maximum for all adjustments.
Keep signal generator output low as possible.
Connect ground post of signal generator to chassis of radio through an 0.1 mfd. condenser.
Connect signal generator output leads to antenna leads.
Connect output meter across secondary of output transformers.

Band	Signal Generator Frequency Setting	Dummy Antenna	Connection to Radio	Tuning Condenser Setting	Adjust for Maximum Output
I.F.	456 Kc.	0.1 mfd.	Grid of 14Q7	Slugs out of coil 1700 Kc.	4 trimmers on input and output transformers
Broadcast	1700 Kc.	Antenna lead		Slugs out of coil 1700 Kc.	Osc. slugs, L2, L1, and C6
Broadcast	600 Kc.	Antenna lead		Slugs in coil 600 Kc.	L3
Broadcast	1400 Kc.	Antenna lead		Set dial at 1400 Kc.	C3

FINAL ADJUSTMENT

With the top off the radio, place the band around the set and connect antenna lead to the band and adjust C-3 for greatest noise level at 800 Kc.

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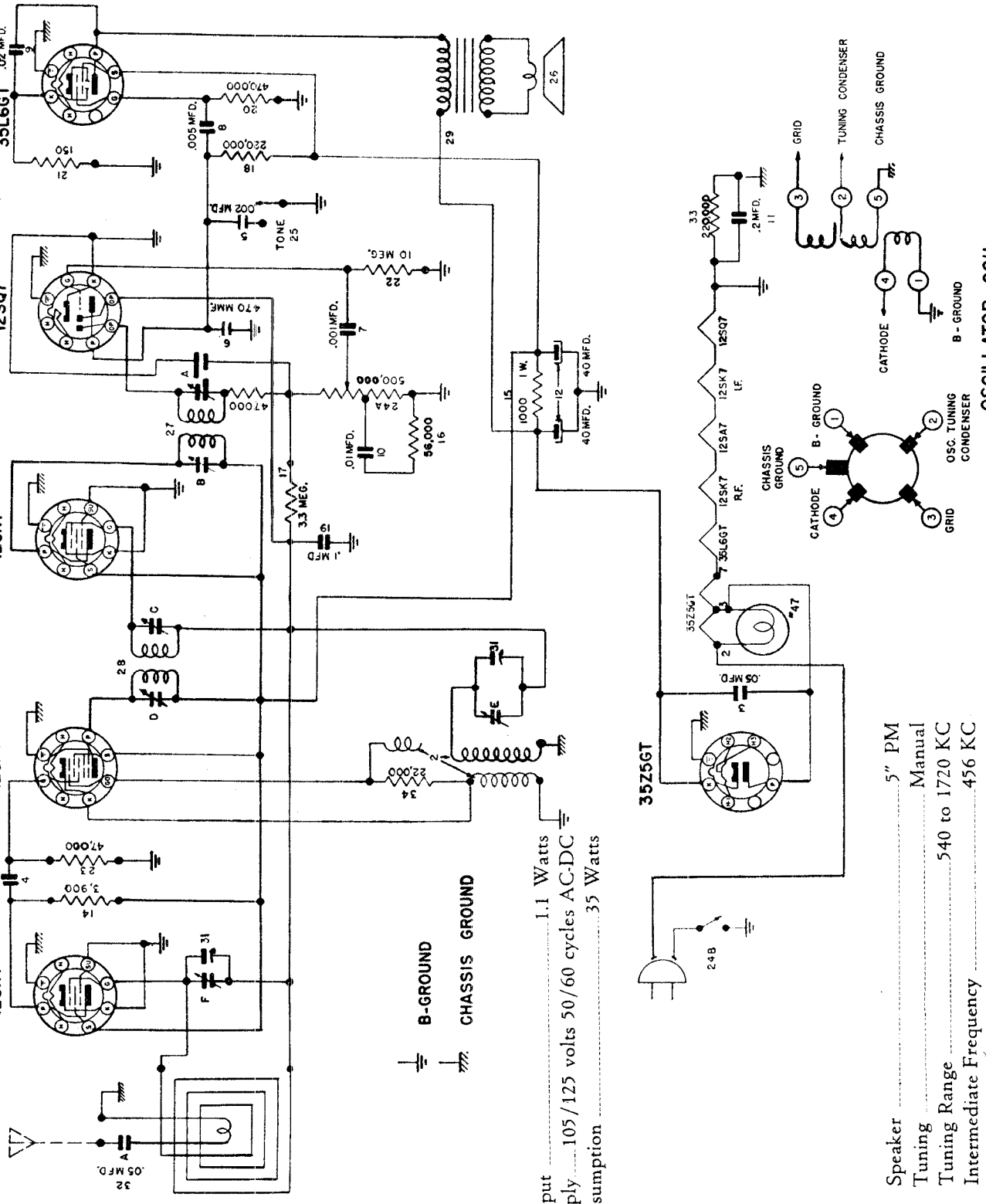
DELCO RADIO DIV.-GENERAL MOTORS

MODELS R-1234, R-1235



Power Output ..... 1.1 Watts
Power Supply ..... 105/125 volts 50/60 cycles AC-DC
Power Consumption ..... 35 Watts

Speaker ..... 5" PM
Tuning ..... Manual
Tuning Range ..... 540 to 1720 KC
Intermediate Frequency ..... 456 KC

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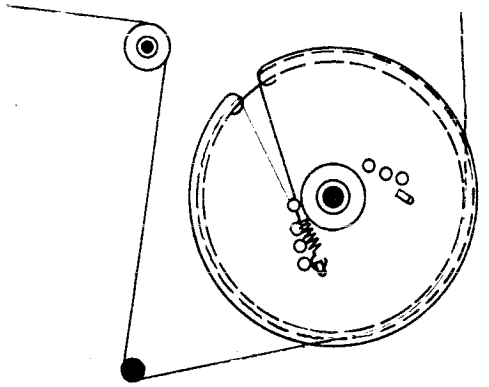
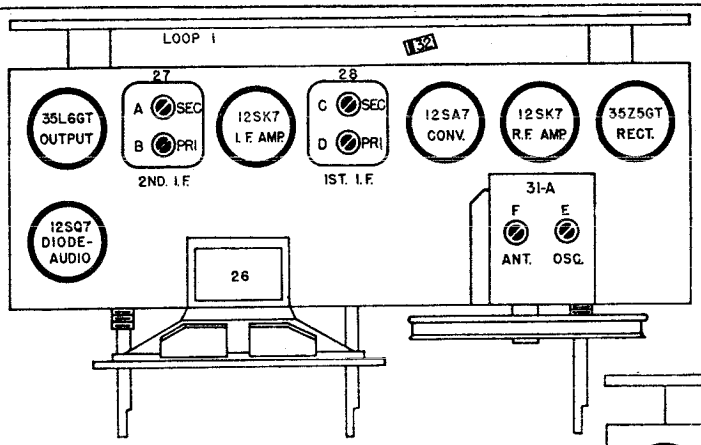
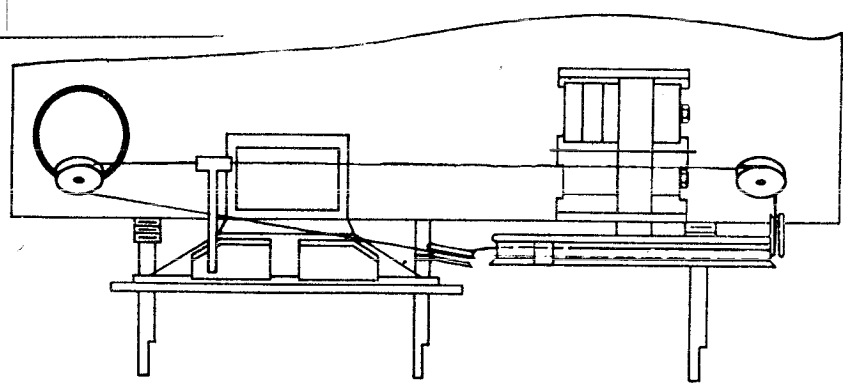
Output Meter Connections ..... Plate and Screen of 35L6
Generator Ground ..... To Chassis through .01 MFD
Dummy Antenna ..... In Series with generator
Volume Control Position ..... Fully on

Steps	Series Condenser or Dummy Antenna	Connect Signal Generator To	Adjust Signal Generator To	Turn Radio Dial To	Adjust Trimmers
1	.02 Mfd. Cond.	12SA7 Grid (Pin #8)	456 KC	Quiet Point near H. F. end	A-B (2nd IF Trans) C-D (1st IF Trans)
2	200 Mmf Cond.	Ant. lead	1720 KC	1720 KC	E (Osc.)
3	200 Mmf Cond.	Ant. lead	1400 KC	1400 KC	F (Ant.)



DIAL STRING DRAWING

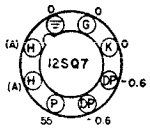


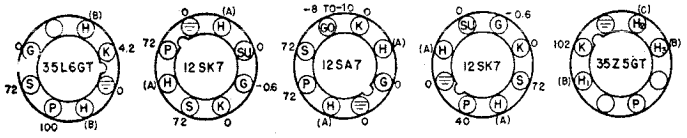


PARTS LAYOUT — TUBE VIEW
TRIMMERS ON TOP OF TUNING CONDENSER

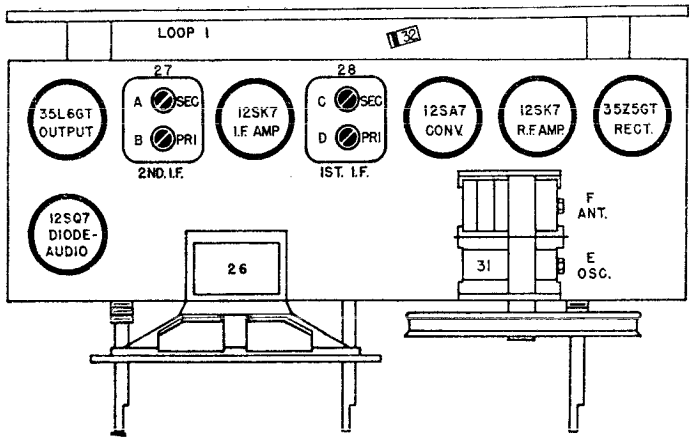
BOTTOM VIEW OF CHASSIS

DC VOLTAGES MEASURED WITH ELECTRONIC VOLTMETER BETWEEN SOCKET TERMINALS AND B-.
(A) 12 VOLTS BETWEEN PINS H & H
(B) 35 VOLTS BETWEEN PINS H & H
(C) 6 VOLTS BETWEEN PINS 2 & 3
AC LINE VOLTAGE 117 VOLTS





TUBE SOCKET VOLTAGE CHART

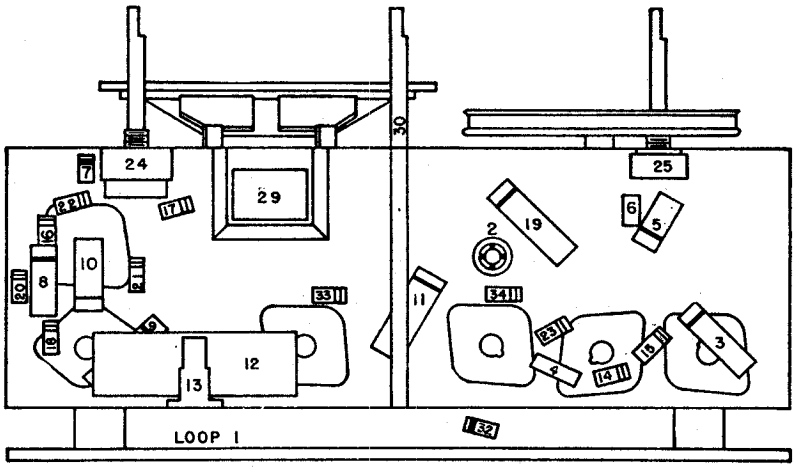


PARTS LAYOUT — TUBE VIEW
TRIMMERS ON SIDE OF TUNING CONDENSER

DELCO RADIO DIV.-GENERAL MOTORS

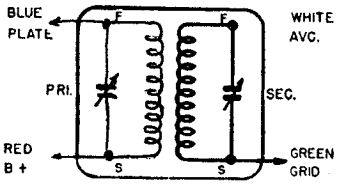
MODELS R-1234, R-1235

Illus. No.	Service Part No.	Name	Description
1	1216621	Antenna Assembly	Loop and Back Cover
2	1216915	Coil	Oscillator Coil Complete
3	7230592	Condenser	.05 Mfd. 600 V. Tubular
4	7230893	Condenser	150 MMF Moulded
5	1209148	Condenser	.002 Mfd. 800 V. Tubular
6	7238879	Condenser	470 MMF Moulded
7	1212097	Condenser	.001 Mfd. 800 V. Tubular
8	7230912	Condenser	.005 Mfd. 600 V. Tubular
9	1212099	Condenser	.02 Mfd. 600 V. Tubular
10	1208600	Condenser	.01 Mfd. 600 V. Tubular
11	7231594	Condenser	.25 Mfd. 400 V. Tubular
12	1217026	Condenser	40-40 Mfd. 150 V. Electrolytic
13	1216559	Clip	Condenser Clip
14	1214546	Resistor	3,900 Ohms ½ Watt Insulated
15	1211037	Resistor	1,000 Ohms 1 Watt Insulated
16	1213267	Resistor	56,000 Ohms ½ Watt Insulated
17	1214564	Resistor	3.3 Meg. ½ Watt Insulated
18	1214555	Resistor	220,000 Ohms ½ Watt Insulated
19	1207908	Condenser	.10 Mfd. 400 V. Tubular
20	1214559	Resistor	470,000 Ohms ½ Watt Insulated
21	1213220	Resistor	150 Ohms ½ Watt Insulated
22	1215548	Resistor	10 Meg. ½ Watt Insulated
23	1214553	Resistor	47,000 Ohms ½ Watt Insulated
24	1216505	Control and Switch	Volume Control and Switch
25	1216544	Switch	Tone Control
26	1217361	Speaker	Speaker (5" P. M.) and Brkt. Assy.
27	1216570	Coil	2nd I. F. Coil Assembly
28	1216605	Coil	1st I. F. Coil Assembly
29	1216557	Transformer	Output Transformer Complete
30	1216650	Shaft	Drive Shaft
	7245333	Washer	"C" Washer
31	1217414	Condenser and Pulley Parts Package Variable Condenser and Pulley Assembly Grommet (3) — Lockwasher (2) Spacer - Sleeve (3) — Solder Lug Screw (3)	
31A	1217415	Condenser and Pulley Parts Package (Alt. for 1217414) Variable Condenser and Pulley Assembly Grommet (3) — Lockwasher (2) Spacer - Sleeve (3) — Solder Lug Screw (3)	
32	7230592	Condenser	.05 Mfd. 600 V. Tubular
33	1214555	Resistor	220,000 Ohms ½ Watt Insulated
34	1214550	Resistor	22,000 Ohms ½ Watt Insulated
	1216512	Cord	Power Cord
	1212233	Cord	Dial Drive (49" Length)
	1216562	Indicator	Dial Pointer
	47	Lamp	Dial Light (Mazda #47)
	1216564	Socket	Dial Light Assy. (Includes Mazda #47)
	7236279	Socket	Tube Socket
	1217323	Spring	Cord Tension
	1213813	Tube	12SQ7
	1213809	Tube	12SA7
	1213812	Tube	12SK7
	1213848	Tube	35Z5GT
	1213818	Tube	35L6GT

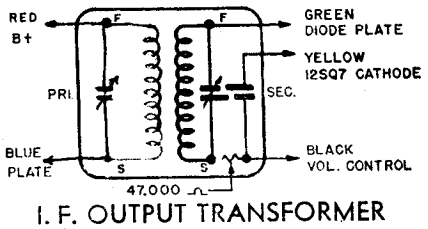


PARTS LAYOUT — CHASSIS VIEW

COIL CONNECTIONS



I. F. INPUT TRANSFORMER



I. F. OUTPUT TRANSFORMER

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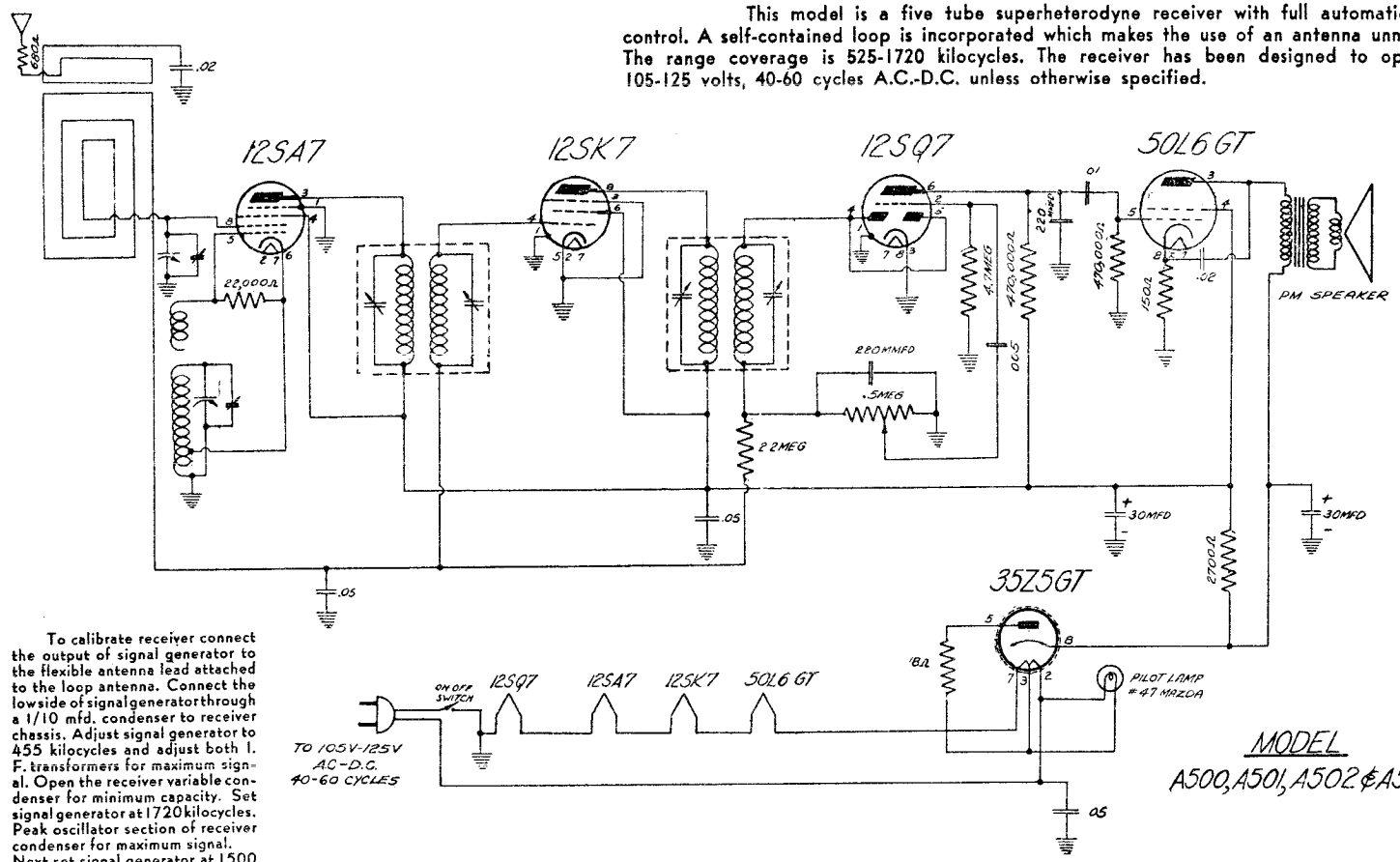
DEWALD RADIO MFG. CORP.

MODELS A500, A501, A502, A503

This model is a five tube superheterodyne receiver with full automatic volume control. A self-contained loop is incorporated which makes the use of an antenna unnecessary. The range coverage is 525-1720 kilocycles. The receiver has been designed to operate at 105-125 volts, 40-60 cycles A.C.-D.C. unless otherwise specified.



To calibrate receiver connect the output of signal generator to the flexible antenna lead attached to the loop antenna. Connect the lowside of signal generator through a 1/10 mfd. condenser to receiver chassis. Adjust signal generator to 455 kilocycles and adjust both I. F. transformers for maximum signal. Open the receiver variable condenser for minimum capacity. Set signal generator at 1720 kilocycles. Peak oscillator section of receiver condenser for maximum signal. Next set signal generator at 1500 kilocycles. Tune in this signal. Adjust R. F. section of receiver variable condenser for maximum signal strength. Keep the signal generator output as low as possible when making all of these measurements.

IF PEAK 455 KC

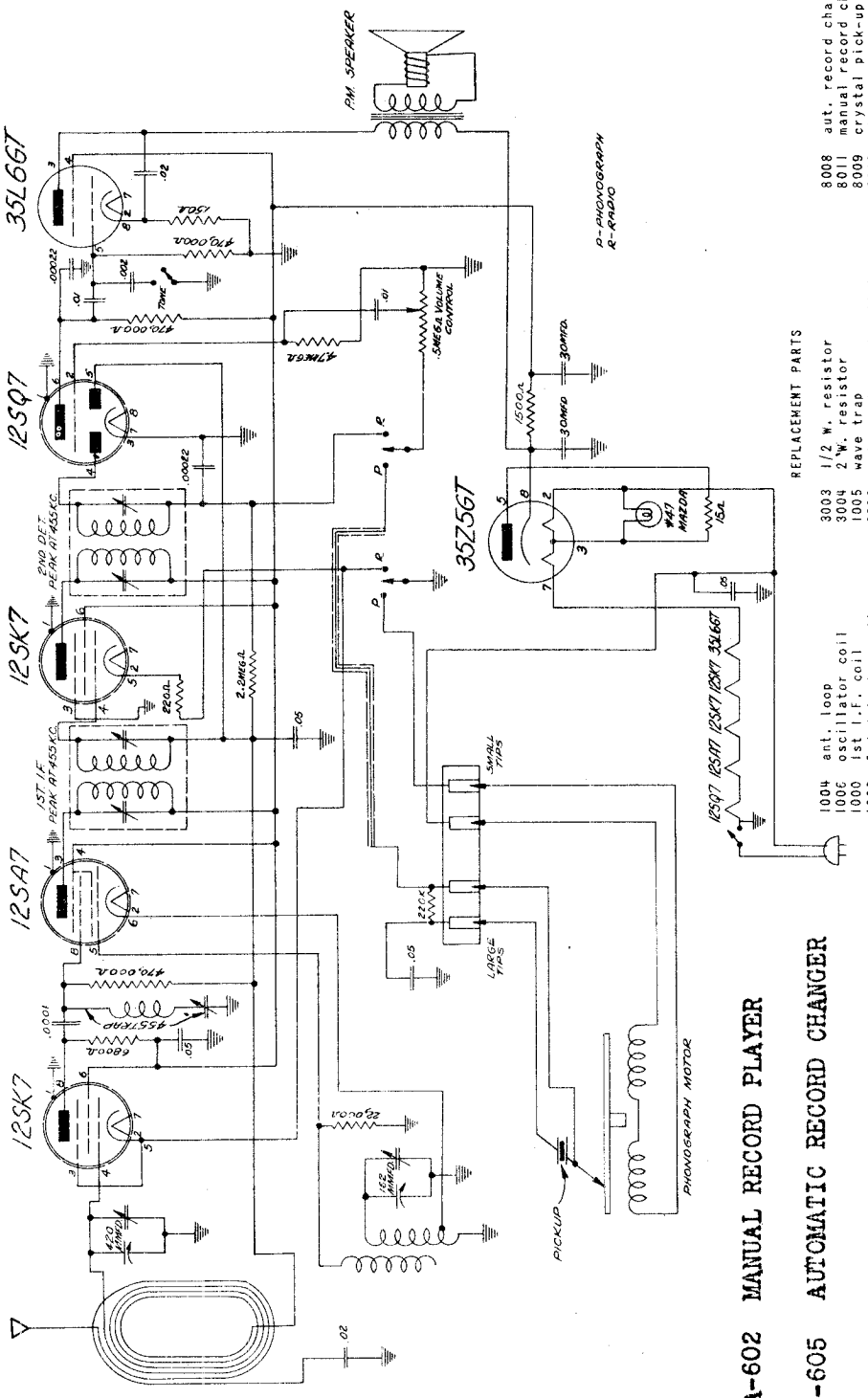
REPLACEMENT PARTS

1001 ant. loop
1003 oscillator coil
1000 1st I.F. coil
1002 2nd detector coil
2000 paper condensers
2001 mica condensers
2002 comb. electrolytic
2003 var. condenser
3000 1/4 W. resistors
3001 2 W. resistors
3002 vol. cont. and switch
5000 line cord
6000 dial scale
7000 speaker
8001 pilot lamp socket
9000 shaft
9002 bushing
9762 drive spring
#20 dial cord
#47 pilot lamp

	A-500	A-501	A-502	A-503
CABINET	4004	4281B	4000	4016
KNOB	4017	4010	4003	4017
BACK	4018	4013	4019	4020

MODELS A602,A605

DEWALD RADIO MFG. CORP.



REPLACEMENT PARTS

1004	ant. loop	3003	1/2 W. resistor	8008	aut. record changer
1006	oscillator coil	3004	2 W. resistor	8011	manual record changer
1000	1st I.F. coil	1005	wave trap	8009	crystal pick-up
1032	2nd detector coil	3002	vol. contr. and switch	9010	shaft
2000	paper condenser	8003	tone contr. and switch	9818	bushing
2001	mica condenser	8004	phono. switch	9762	drive spring
2005	comb. electrolytic	5000	line cord	#20	dial cord
2003	var. condenser	6002	dial scale	#47	pilot lamp
2006	trimmer condenser	7001	speaker	4017	knob
3000	1/4 W. resistor	8001	pilot lamp socket		
			A-602	A-603	
		CABINET	4005	4007	
		BACK	4022	4021	

MODEL A-602 MANUAL RECORD PLAYER

MODEL A-605 AUTOMATIC RECORD CHANGER

ALIGNMENT INSTRUCTIONS

Connect signal generator to flexible antenna lead attached to the loop antenna; connect low side of signal generator through 0.1-mf condenser to receiver chassis. Open wavetrap condenser. Set signal generator to 455 kc; adjust both i-f transformers for maximum signal. Repeak wavetrap condenser for minimum 455-kc signal. Open receiver variable condenser for minimum capacity. Set signal generator to 1720 kc. Peak oscillator section of variable condenser for maximum signal. Set Signal Generator to 1500 kc; tune in this signal. Adjust r-f section of receiver variable condenser for maximum signal strength. Keep signal generator output to minimum.

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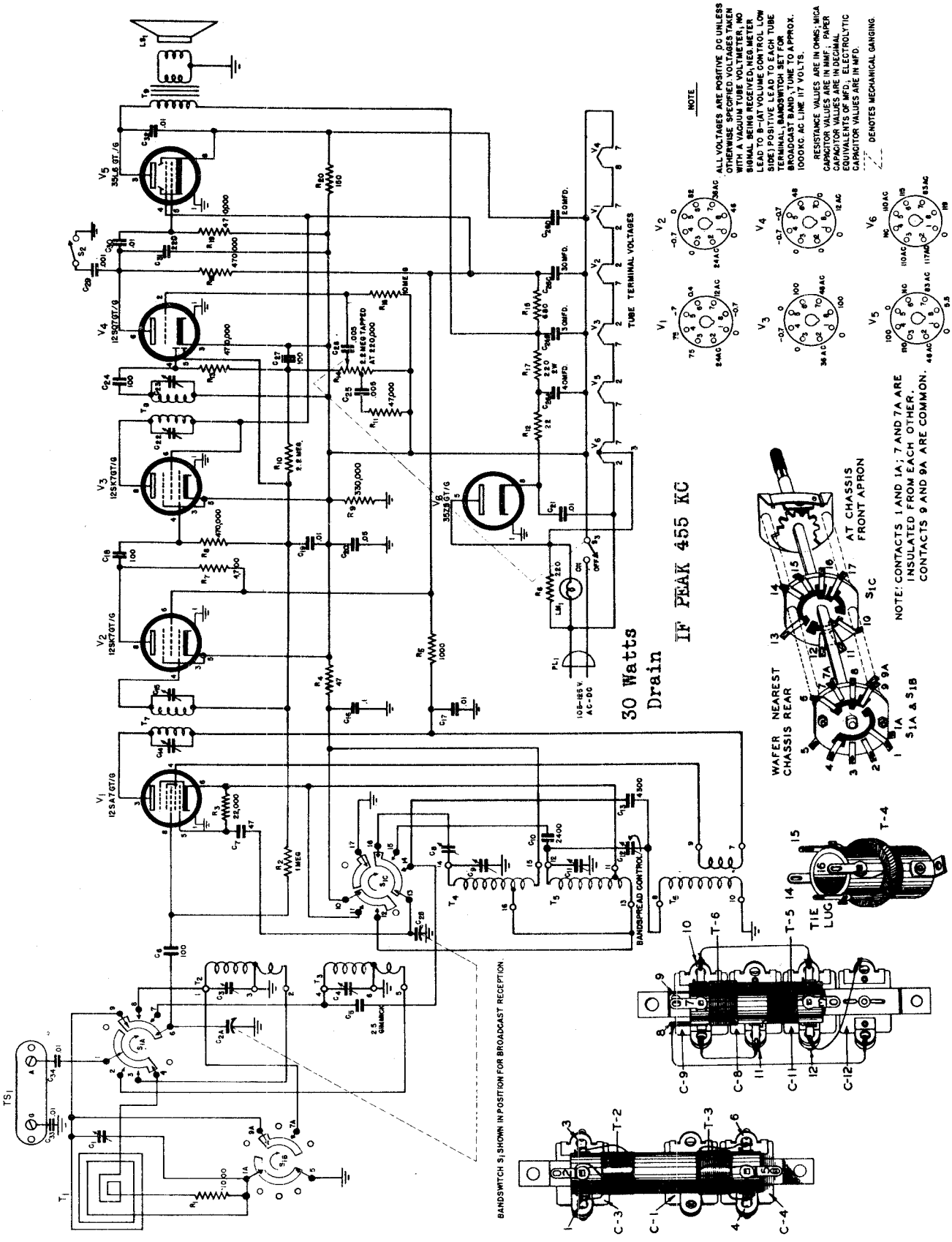
ECHOPHONE RADIO
A HALLICRAFTERS PRODUCT

MODELS EC-112, EC-113


30 Watts
Drain
IF PEAK 455 KC
TUBE TERMINAL VOLTAGES
NOTE
ALL VOLTAGES ARE POSITIVE DC UNLESS OTHERWISE SPECIFIED. VOLTAGES TAKEN WITH A VACUUM TUBE VOLTMETER, NO SIGNAL BEING RECEIVED. NEG METER LEAD TO B-(AT VOLUME CONTROL, LOW SIDE) POSITIVE LEAD TO EACH TUBE TERMINAL. BANDSWITCH SET FOR BROADCAST BAND, TUNE TO APPROX. 1000 KC. AC LINE 117 VOLTS.
RESISTANCE VALUES ARE IN OHMS; MICA CAPACITOR VALUES ARE IN MMF; PAPER CAPACITOR VALUES ARE IN DECIMAL EQUIVALENTS OF MFD; ELECTROLYTIC CAPACITOR VALUES ARE IN MFD.
DENOTES MECHANICAL GANGING.
PIN VIEW OF SOCKETS
NOTE: CONTACTS 1 AND 1A; 7 AND 7A ARE INSULATED FROM EACH OTHER. CONTACTS 9 AND 9A ARE COMMON.
WAFER NEAREST CHASSIS REAR
AT CHASSIS FRONT APRON
S1C
S1A & S1B
BANDSPREAD CONTROL
TIE LUG
BANDSWITCH S1 SHOWN IN POSITION FOR BROADCAST RECEPTION.

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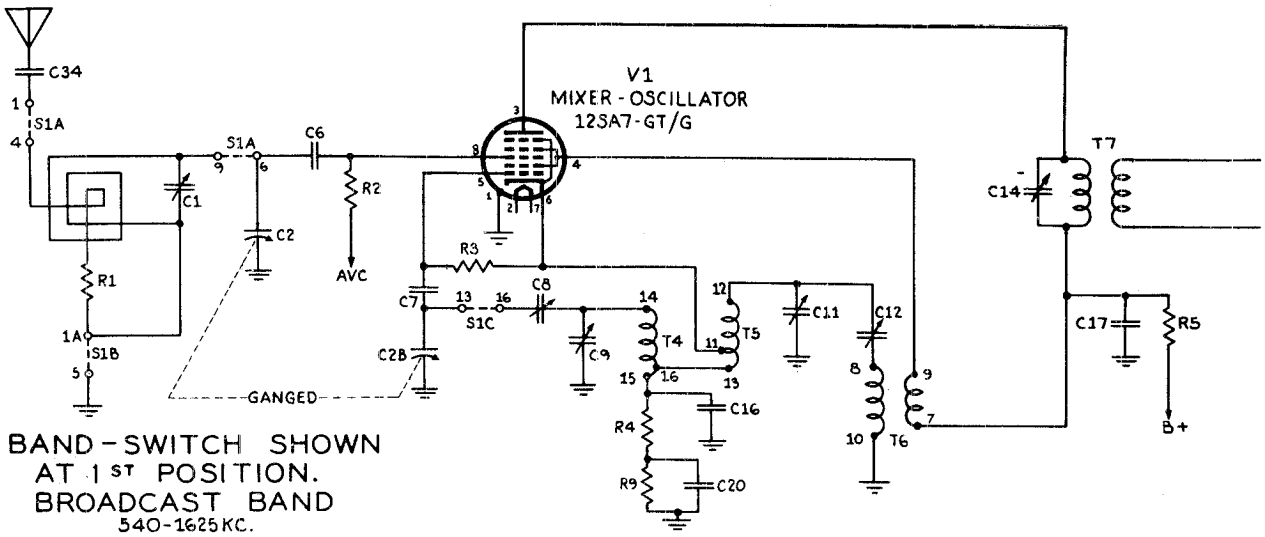
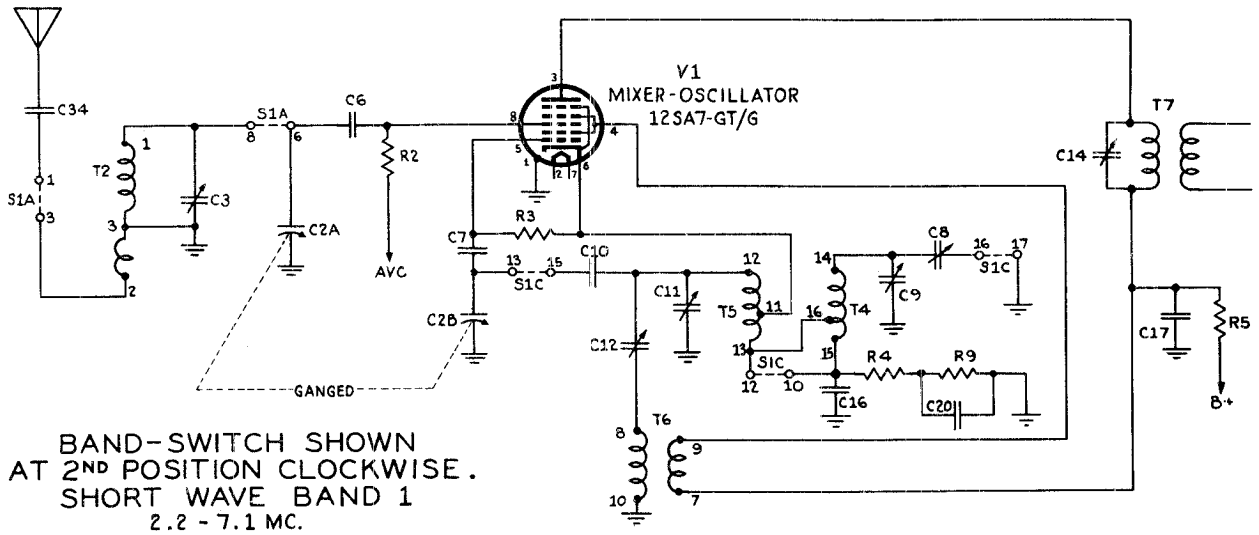
MODELS EC-112, EC-113

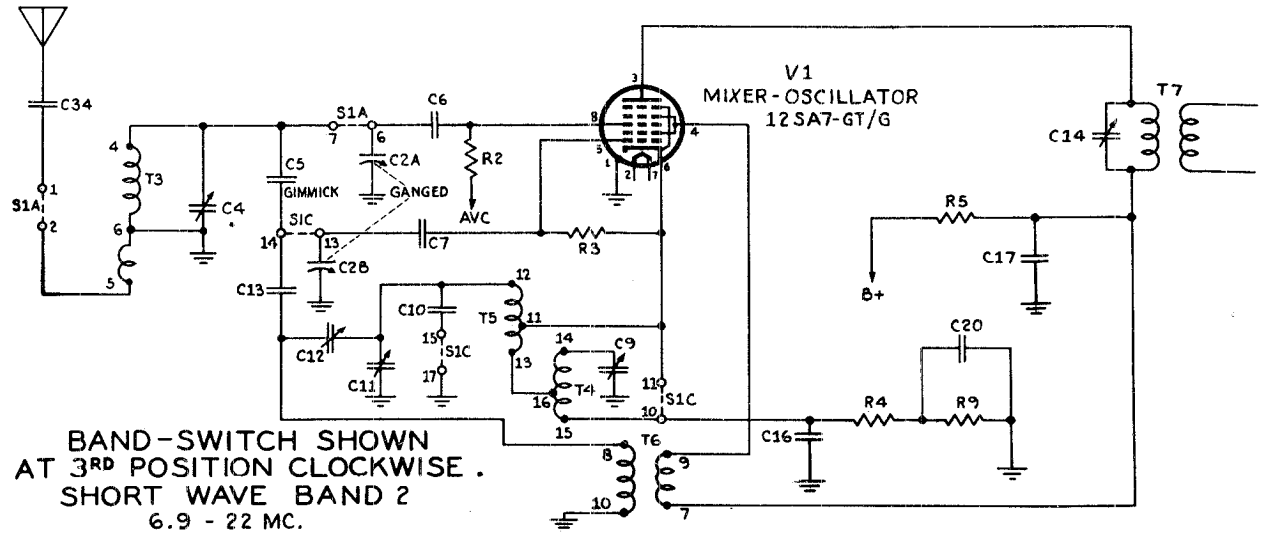
ECHOPHONE RADIO
HALLICRAFTERS PRODUCT



BAND-SWITCH SHOWN AT 1ST POSITION. BROADCAST BAND 540-1625 KC.



BAND-SWITCH SHOWN AT 2ND POSITION CLOCKWISE. SHORT WAVE BAND 1 2.2 - 7.1 MC.



BAND-SWITCH SHOWN AT 3RD POSITION CLOCKWISE. SHORT WAVE BAND 2 6.9 - 22 MC.

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EQUIPMENT:

1. Signal Generator capable of ranges indicated in the ALIGNMENT CHART, including a 400 cycle audio modulator.
2. Output meter capable of handling 1 watt of audio power.
3. Standard RMA dummy antenna consisting of a 200 mmf condenser in series with a 20uh r-f choke, the choke being shunted by a 400 mmf condenser in series with a 400 ohm carbon resistor.
4. Non-metal screw-driver.

CONNECTIONS: Connect the Sig. Gen. "cold" lead to "G" on the antenna terminal strip except for i-f adjustments (see chart below); the "hot" lead is connected as indicated in the chart.

Connect the output meter across voice coil of the speaker and adjust the meter for 3 ohm impedance.

Caution: Set the meter at a sufficiently high range to prevent possible damage from overload. Band 3 must be aligned before band 2 in all instances.

CONTROL SETTINGS: After allowing about a ten minute warm up period, set the receiver's control as follows:

VOLUME control at full clockwise.

BANDSPREAD tuning control at "0", (min. cap.).

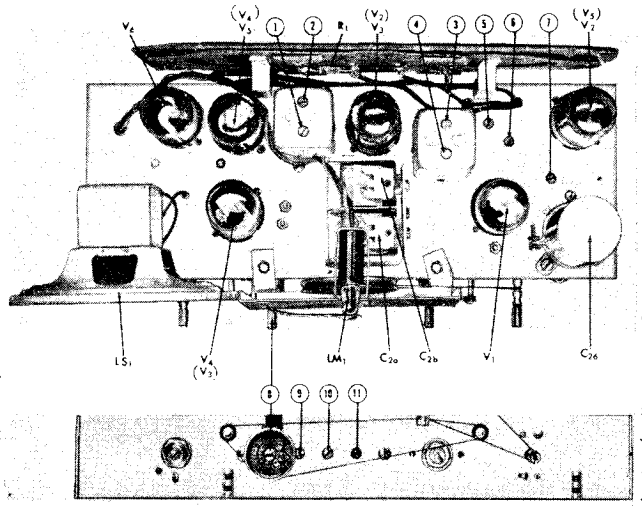

Fig. 6. Top and front views of the receiver showing tube locations and location of padder, trimmer and i-f adustment points.

NOTE: Bandspread indicator MUST be at ZERO when making all adj. Band 2 osc. trim. (9) must be set AFTER bandspread trim. (8) (Range 3 osc. trim.) is aligned. *Standard RMA dummy ant. consists of a 200mmf cond. in series with a 20uh r-f choke, the choke being shunted by a 400mmf cond. in series with a 400 ohm carbon res. **Connect Sig. Gen. ground lead to receiver negative return, not to chassis. This applies only to I-F adjustment.

ALIGNMENT CHART

DUMMY ANT. IN SERIES WITH SIG. GENERATOR	CONNECTION OF SIG. GENERATOR OUTPUT TO RECEIVER	SIGNAL GEN. FREQUENCY SETTING	BAND SWITCH SETTING	RECEIVER DIAL SETTING	ADJUST SLUG PADDER, OR TRIMMER NO.	TRIMMER DESCRIPTION	TYPE OF ADJUSTMENT MAKE ADJUSTMENT FOR:	STEP NO.
IF ADJUSTMENT								
None	**On mixer section stator of tuning condenser gang	455kc	Range 1 (Broadcast)	1625kc	3 & 4 1 & 2	Diode IF Input IF	Maximum output Maximum Output Repeat steps 1 & 2	1 2 3
RANGE 1 (Broadcast band)—								
Standard	Couple to loop	1500kc	Range 1	1500kc	11	Osc. Trimmer	Maximum output	4
RMA	aerial	1500kc	(Broadcast)	1500kc	6	Antenna shunt trimmer	Maximum output	5
Dummy*		600kc		600kc	10	Osc. padder	Maximum output Repeat step 4	6 7
RANGE 3 (Short wave range 6.9 to 22mc)—Align oscillator for this band with bandspread indicator drive pulley set screw loose and pointer set at zero. After completing the OSCILLATOR alignment, tighten the screws securely without changing the pointer setting from zero.								
Standard								
RMA	"A" on antenna	22mc	Range 3	22mc	8	Bandspread & Osc. trimmer	Maximum output	8
Dummy*	terminal strip	20mc		20mc	†5	Antenna shunt trimmer	Maximum output	9
RANGE 2 (Short wave range 2.2 to 7.1mc,)—								
Standard*	"A" on antenna	6mc	Range 2	6mc	9	Osc. trimmer	Maximum output	10
RMA	terminal strip	6mc		6mc	7	Antenna shunt trimmer	Maximum output	11
Dummy*								

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DETAILED SERVICE INFORMATION

IF FREQUENCY	RECEIVER OVERALL SELECTIVITY	IMAGE RATIO	*RECEIVER OVERALL SENSITIVITY	AUDIO OUTPUT
455kc	8.5kc wide at 6db down 16kc wide at 20db down 32kc wide at 40db down (for 500 milliwatt output)	65:1 at 1000kc (loop) 20:1 at 2.5mc (ant.) 8:1 at 7.0mc (ant.) 6:1 at 15.0mc (ant.) 3:1 at 20.0mc (ant.)	45 microvolt at 1000 kc 80 microvolt at 2.5 mc 35 microvolt at 6mc 140 microvolt at 8mc 50 microvolt at 20mc	0.8 watt with less than 10% distortion

*Readings for 500 milliwatt constant output. Speaker disconnected and replaced with a 3.2 ohm load resistor. Signal from generator modulated 30% at 400 cycles.

To restring the main tuning dial cord, cut a 25" length of 18 lb test dial cord and tie one end to the tension spring of the main tuning capacitor drive pulley at position "A" on the diagram. Following the letters "A" through "S", wind the cord on the pulley and knob drive shaft. At position "S", stretch the tension spring and tie the cord securely. Cut off the excess cord. Note that three turns are wound on the knob drive shaft.

To restring the bandspread tuning dial cord, cut a 30" length of the dial cord and follow the procedure as explained above, except start at position "1" on the diagram and proceed through position "14". Then turn knob pulley maximum clockwise, slide pointer to 100 and insert cord in clip on pointer. Note that the knob pulley has two turns.

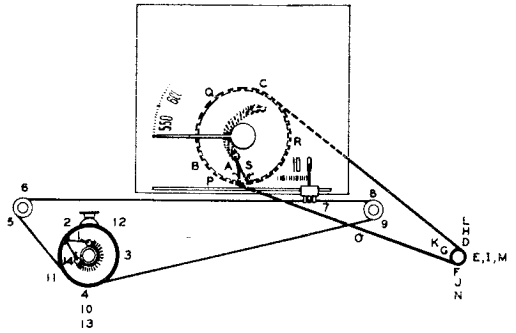
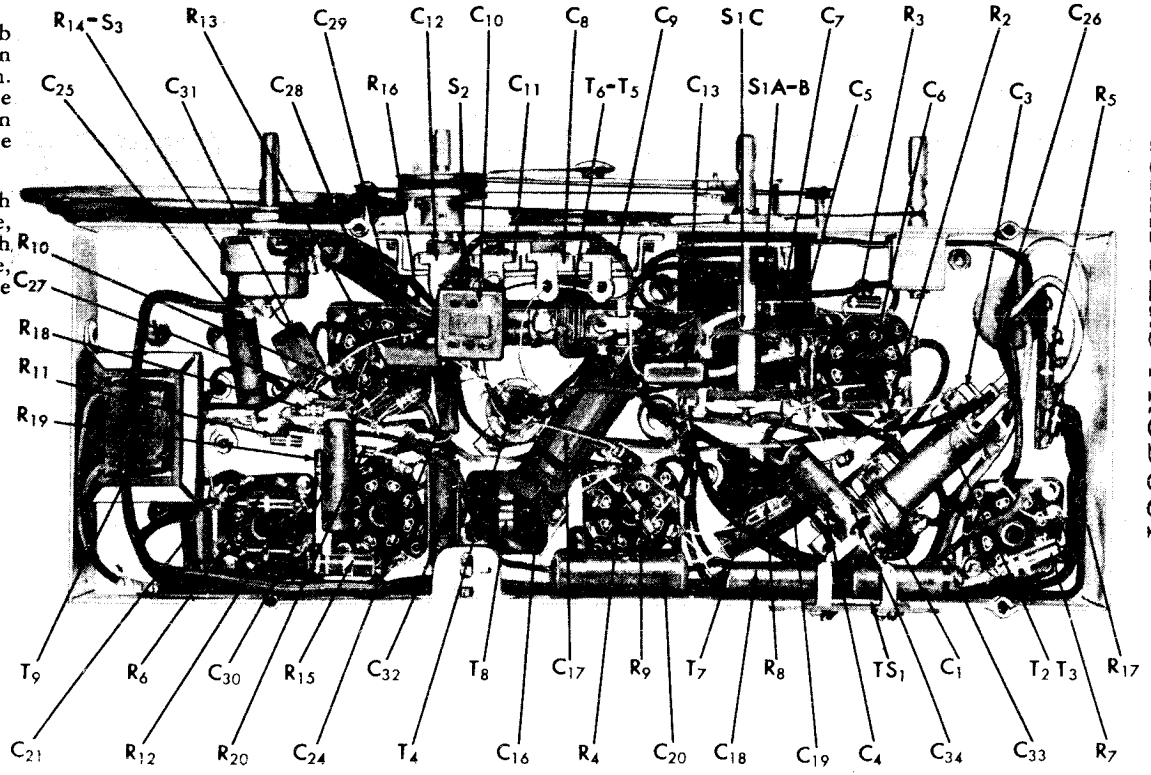


Fig. 3. Dial cable stringing procedure; main tuning is indicated by letters, and band spread tuning is indicated by numbers.



Model EC-112 and EC-113 bottom view of chassis showing location of component parts.

ECHOPHONE RADIO
A HALLICRAFTERS PRODUCT

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REF. NO.	DESCRIPTION	HALLICRAFTER'S PART NUMBER	LIST PRICE PER COMPONENT
	CAPACITORS		
C-1, 3 & 4	Antenna trimmers; 3 section unit	44A162	$ .40
C-2	Main tuning capacitor; 2 sections, ganged; 12.3 to 354.6 mmf, each section; air	48B165	2.17
C-5	2.5 mmf gimmick; twisted insulated leads. NOT FURNISHED AS A REPLACEMENT PART SHOWN FOR REFERENCE ONLY.		
C-6, 18, 24 & 27	100 mmf; 20%; 500 vdcw; mica	CM20A101M	.10
C-7	47 mmf; 20%; 500 vdcw; mica	CM20A470M	.10
C-8, 9, 11 & 12	Oscillator trimmer; 4 section	44B161	*
C-10	2400 mmf; 20%; 500 vdcw; mica	CM30A242M	.25
C-13	4300 mmf; 10%; 500 vdcw; mica	CM35A432K	.35
C-14 & 15	Trimmers for IF transformer, T-7. NOT A REPLACEABLE PART. Furnished with replacement transformer T-7. SEE LISTING REF. No. T-7.		
C-16	0.1 mfd; +40-15%; 600 vdcw; tubular paper	46AX104J	.10
C-17, 19, 21 30 & 32	0.01 mfd; 20%; 600 vdcw; tubular paper	46AX103F	.10
C-28	0.001 mfd; +40 —15%; 600 vdcw; tubular paper	46AZ502J	.10
C-20	0.05 mfd; +40 —15%; 600 vdcw; tubular paper	46AY503J	.15
C-22 & 23	Trimmers for IF transformer, T-8. NOT A SEPARATE REPLACEMENT PART. FURNISHED WITH REPLACEMENT TRANSFORMER T-8. SEE LISTING REF. NO. T-8.		
C-26A, B, C & D	Electrolytic; 4 section unit; sect. A— 40 mfd, 150 vdcw; sect. B & C—are each 30 mfd, 150 vdcw; Sect. D—20 mfd, 25 vdcw	45B095	1.10
C-29	0.001 mfd; 20%; 600 vdcw; tubular paper	46AZ102H	.10
C-31	220 mmf; 20%; 500 vdcw; mica	CM20A221M	.15
C-25	0.005 mfd; 20%; 600 vdcw; tubular paper	46AZ502J	.10
	PILOT LAMPS		
LM-1	6/8 volt @ 150 ma; brown bead; bayonet base; G.E. type 47	39A004	.10
	LOUD SPEAKER		
LS-1	Loud Speaker	85B038	3.02
	PLUGS		
PL-1	Line cord with two prong plug; 6 ft cord	87A078	.35
	RESISTORS		
R-1 & 5	1000 ohm; 20%; ½ watt; carbon; (NOTE: R-1 is included with antenna loop transformer ref. no. T-1, but is available as a separate replacement part.)	RC20A102M	.10
R-2	1 megohm; 20%; ½ watt; carbon	RC20AE105M	.10
R-3 & 11	47,000 ohm; 20%; ½ watt; carbon	RC20AE473M	.10
R-4	47 ohm; 20%; ½ watt; carbon	RC20AE470M	.10
R-6	220 ohm; 20%; 1 watt; carbon	RC20AE221M	.10
R-7	4700 ohm; 20%; 1 watt; carbon	RC20AE472M	.10
R-8, 13, 18 & 19	470,000 ohm; 20%; ½ watt; carbon	RC20AE474M	.10
R-9	330,000 ohm; 20%; ½ watt; carbon	RC20AE334M	.10
R-10	2.2 megohm; 20%; ½ watt; carbon	RC20AE225M	.10
R-12	22 ohm; 20%; 1 watt; carbon	RC30AE220M	.10
R-14 & S-3	VOLUME control; 2.2 megohm, tapped at 220,000 ohm, variable; includes SPST toggle action switch, S-3 on rear	25A561	.80
R-15	680 ohm; 20%; 1 watt; carbon	RC30AE681M	.10
R-16	10 megohm; 20%; ½ watt; carbon	RC20AE106M	.10
R-17	470 ohm; 20%; ½ watt; carbon	RC20AE471M	.10
R-20	150 ohm; 20%; ½ watt; carbon	RC20AE151M	.10

REF. NO.	DESCRIPTION	HALLICRAFTER'S PART NUMBER	LIST PRICE PER COMPONENT
	SWITCHES		
S-1	Banswitch; rotary; 2 section, 3 position	60B050	$ 1.35
S-2	Tone control switch	60A246	.25
S-3	Receiver on/off switch; part of resistor R-14 assembly. NOT FURNISHED AS A SEPARATE REPLACEMENT PART. SEE LISTING REF. NO. R-14.		
	TRANSFORMERS		
T-1	Antenna loop assembly; includes resistor R-1	57C104	1.05
T-2 & 3	Mixer coil assembly for short wave bands, both short wave ranges	51B814	.93
T-4	Oscillator coil for local broadcast band	51A811	.45
T-5 & 6	Oscillator coil assembly for short wave bands, both short wave ranges	51B815	.93
T-7	Input IF transformer; 455kc; trimmer tuned	50B196-5	.95
T-8	Diode IF transformer; 455kc; trimmer tuned	50B196-2	.95
T-9	Audio output transformer; matches output tube to 3 ohm voice coil of PM speaker	55B080-2	.80
	TERMINAL STRIPS		
TS-1	External antenna and ground connector strip	88A569	.10

MISCELLANEOUS COMPONENTS COMMON TO BOTH MODELS

QUANT. IN EQUIPMENT	DESCRIPTION	HALLICRAFTER'S PART NUMBER	LIST PRICE PER COMPONENT
1	Pilot lamp dial socket; bayonet base	86A036-1	.15
1	Bracket; tuning capacitor mounting	67B581	.10
1	Bracket; tuning shaft mounting	67A582	.10
1	Steel tuning shaft	74A176	.10
1	Acetate dial window	22B161	.25
1	Main tuning dial scale pointer	82A106	.15
1	Bandspread tuning dial scale pointer	82A107	.15
1	Calibrated dial scale	83B271	.68
1	Drive pulley	28A022	*
2	Idler pulley	28A023	.10
1	Line cord lock	76A299	.10
1	Electrolytic capacitor (C-26) hold down clamp	76A300	.10
1	Cam for switch, S—	77A207	.10
6	Tube sockets; octal; Amphenol type MIP-8	6A256	.10

MISCELLANEOUS COMPONENTS FOR MODEL EC-112 ONLY

1	Cabinet; bakelite; walnut finish	66E307-2	*
3	Knob; bakelite; walnut finish	15B067-2	.10
1	Knob; bakelite; walnut finish with dot	15B075-2	.10
1	Cabinet; bakelite; ivory finish	66E307-3	*
3	Knob; bakelite; ivory finish	15B067-1	.10
1	Knob; bakelite; ivory finish with dot	15B075-1	.10
1	Cabinet bottom plate	63C246	.40

MISCELLANEOUS COMPONENTS FOR MODEL EC-113 ONLY

1	Cabinet; wood	66E316	*
4	Knob; wood	15B075-4	.10
1	Dial escutcheon; brass	7C027	.73
1	Cabinet back; cardboard	32C339	.10

* Prices available on request.
When ordering, please specify Model number of receiver and part number of item.
NOTE: All prices subject to change without notice.

POWER SUPPLY DATA: Both receiver models are designed to operate from a line voltage of 105 to 125 volts AC/DC with a power drain of 30 watts nominal. Power to the receivers is supplied through the line cord extending from the rear of the cabinets.

TUBE TYPES AND FUNCTIONS: 12SA7GT/G-mixer-oscillator; 2-12SK7GT/G's as I-F amplifiers; 12SQ7GT/G-Detector, AVC and First audio amplifier; 35L6GT/G-Audio power amplifier; 35Z5GT/G-Power rectifier for a-c operation.

MODEL EC-600

ECHOPHONE RADIO
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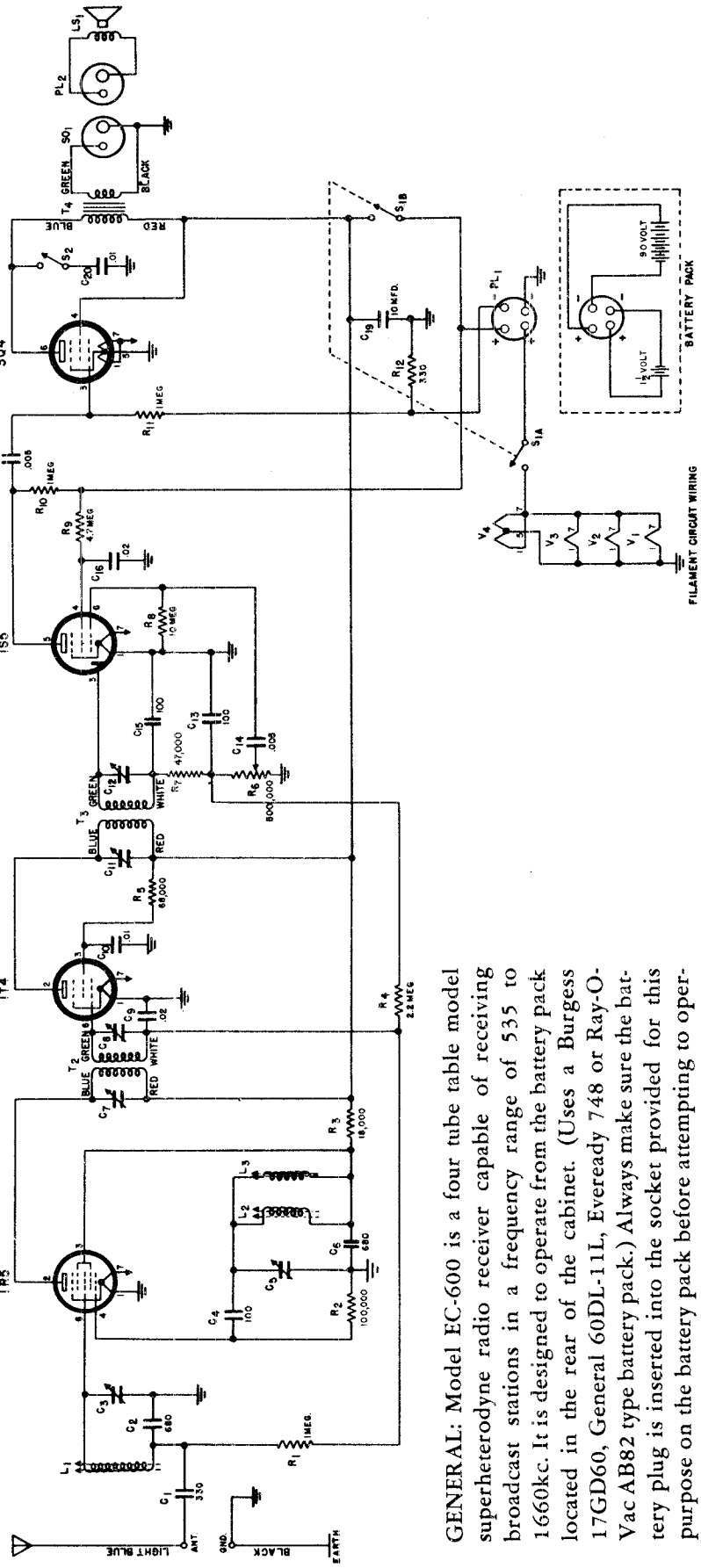

GENERAL: Model EC-600 is a four tube table model superheterodyne radio receiver capable of receiving broadcast stations in a frequency range of 535 to 1660kc. It is designed to operate from the battery pack located in the rear of the cabinet. (Uses a Burgess 17GD60, General 60DL-11L, Eveready 748 or Ray-O-Vac AB82 type battery pack.) Always make sure the battery plug is inserted into the socket provided for this purpose on the battery pack before attempting to operate the receiver. The filament current drain is 0.25 amp.; B plus drain is 14 ma. Leads are provided at rear of chassis for connection to an external antenna and ground. Note that the loudspeaker is connected to the receiver through the plug on the rear of the chassis. Always make sure the speaker is plugged in before turning the set on.

TUBES, TYPES and FUNCTIONS:
Type 1R5-mixer/oscillator
Type 1T4- IF amplifier
Type 1S5- detector, AVC, audio amplifier
Type 3Q4- audio power amp.

DETAILED SERVICE INFORMATION

IF FREQUENCY	RECEIVER OVERALL SELECTIVITY	IMAGE RATIO	RECEIVER OVERALL SENSITIVITY	AUDIO OUTPUT
455 kc	6 kc wide at 6 db down 13 kc wide at 20 db down 41 kc wide at 60 db down (1000 kc input to the antenna; output constant)	83:1 at 1000 kc	50 microvolt at 1000 kc for 0.05 watt output	0.15 watt with less than 10% distortion. Audio section bandpass: 45 to 10,000 C.P.S.

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EQUIPMENT:

1. Signal generator capable of the ranges indicated on the alignment chart, including a 400 cycle audio modulator.
2. Output meter capable of handling 1.5 watts of audio power.
3. *Standard RMA dummy antenna.
4. Non-metallic screw driver.

*Standard RMA dummy antenna consists of a 200 mmf condenser in series with a 20uh r-f choke which is shunted by a 400mmf condenser in series with a 400 ohm carbon resistor.

CONNECTIONS: Connect the signal generator "cold" lead to the receiver chassis, the "hot" lead as indicated in the chart.

Connect the output meter across the speaker voice coil.

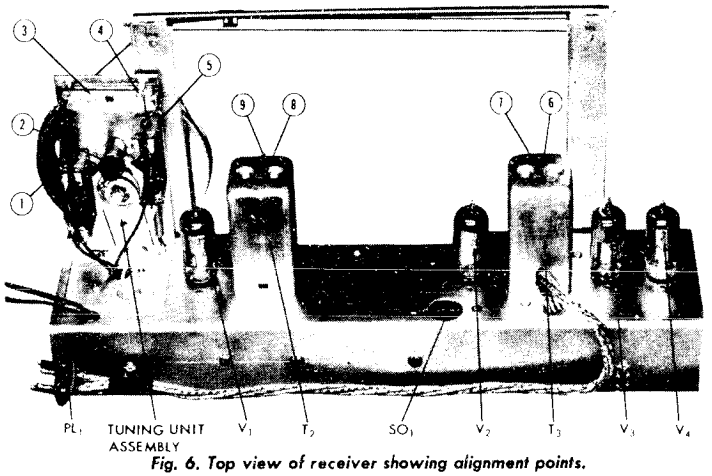


Fig. 6. Top view of receiver showing alignment points.

CONTROL SETTINGS: After allowing about a ten minute warm up period, set the receiver controls as follows: Volume control—maximum clockwise; tuning control is set as indicated in the chart.

ALIGNMENT CHART

DUMMY ANT. IN SERIES WITH SIG. GENERATOR	CONNECTION OF SIG. GENERATOR OUTPUT TO RECEIVER	SIGNAL GEN. FREQUENCY SETTING	RECEIVER DIAL SETTING	ADJUST SLUG, PADDER, OR TRIMMER NO.	DESCRIPTION	TYPE OF ADJUSTMENT MAKE ADJUSTMENT FOR	STEP NO.
			IF ADJUSTMENT				
None	Antenna lead at chassis rear	455kc	1000kc	6 & 7	Diode IF	Maximum output	1
				8 & 9	Input IF	Maximum output	2
						Repeat steps 1 & 2	3
			BROADCAST BAND ADJUSTMENT				
Standard RMA Dummy	Antenna lead at chassis rear	1660kc	Maximum clockwise	3	Osc. Trimmer	Maximum output	4
		1660kc	Maximum clockwise	4	Ante. Trimmer	Maximum output	5
		1400kc	1400kc	5	Ant. coil	Maximum output by moving coil mounting up or down on chassis	6
						Repeat step 4	7
		600kc	600kc	22	Osc. Padder slug	* Maximum output	8

NOTE: Repeat adjustments 4 through 7 as often as necessary, in order listed.
Do NOT change the position of the OSCILLATOR coil (ref. 1 on Fig. 2). Adjusting the ANTENNA coil location is sufficient.
* Rotate the tuning control when making this adjustment.

MODEL EC-600

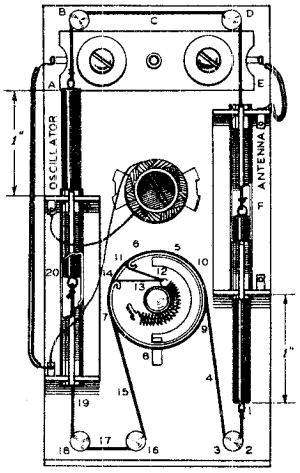
ECHOPHONE RADIO
A HALLICRAFTERS PRODUCT

HOW TO RESTRING TUNING ASSEMBLY DRIVE CORDS

Cut a 6″ length of 18 lb. test dial cord and tie one end to osc. coil slug eye at point "A" as shown in diagram. Following letters "A" through "F" tie other end to antenna coil slug at point "F". When complete, be sure slugs take the position shown in diagram. Cut off excess cord.

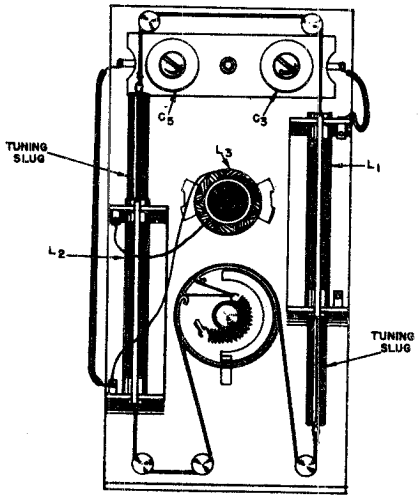
To restring cord at other end of slugs, cut a 9″ length of 18 lb. test dial cord and tie one end to slug eye at position "1" as shown on diagram. Following the numbers "1" through "20" bring cord under post, around pulley, through slot to tension spring, back out through slot, then under the two posts to slug eye on oscillator coil slug at position "20." Pull on cord so as to put tension on spring and tie securely. Cut off excess cord.

Receiver calibration will depend on relative position of slugs in coils. Slugs must be in position as shown on drawing.

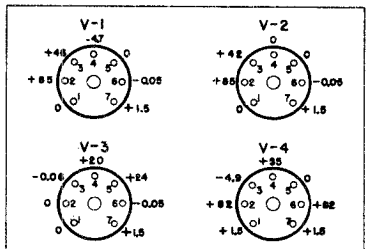


NOTE: TUNING SLUGS FOR L_1 AND L_2 ARE MECHANICALLY GANGED

PICTORIAL VIEW OF TUNING UNIT



TUBE TERMINAL AND VOLTAGE INFORMATION



VOLTAGE READINGS WERE TAKEN WITH AN ELECTRONIC VOLTMETER; NO SIGNAL BEING RECEIVED; CONTROLS SET AS FOLLOWS:

BATTERY SWITCH — CLOCKWISE ("ON")
VOLUME CONTROL — (MIN) COUNTER CLOCKWISE
TONE — COUNTER CLOCKWISE ("NORMAL")
TUNING — SET AT 1000KC ON TUNING DIAL

ALL VOLTAGES ARE POSITIVE D.C. UNLESS OTHERWISE SPECIFIED.

NEG. METER LEAD TO CHASSIS; POS. METER LEAD TO EVERY TERMINAL OF EACH TUBE.

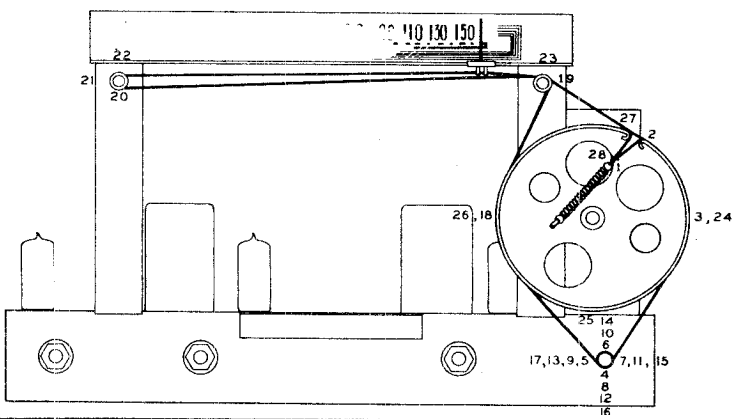
NOTE

RESISTANCE VALUES ARE IN OHMS; MICA CAPACITOR VALUES ARE IN MMF, PAPER CAPACITOR VALUES ARE IN DECIMAL EQUIVALENTS OF MFD. ELECTROLYTIC CAPACITOR VALUES ARE IN MFD.

DENOTES MECHANICAL GANGING.

HOW TO RESTRING DIAL CORD

To restring the main dial cord, cut a 35″ length of 18 lb. test dial cord and tie one end to the tension spring of the main tuning dial drive pulley at position "1" on the diagram. Following the numbers 1 through 28, wind the cord on the pulley, knob drive shaft and two pointer drive pulleys. At position "28" stretch the tension spring and tie the cord securely. Cut off the excess cord. Note that four complete turns are wound on the knob drive shaft.



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ECHOPHONE RADIO
A HALLICRAFTERS PRODUCT

MODEL EC-600

REF. NO.	DESCRIPTION	HALLICRAFTER'S PART NUMBER	LIST PRICE
	CAPACITORS		
C-1	330 mmf; 20%; 500 vdcw; mica	CM20A331M	.15
C-2 & 6	680 mmf; 20%; 500 vdcw; mica	CM20A681M	.20
C-3	Trimmer for mixer coil; part of tuning unit assembly; shown for reference only; NOT AVAILABLE AS A SEPARATE REPLACEMENT PART		
C-4, 13 & 15	100 mmf; 20%; 500 vdcw; mica	CM20A101M	.10
C-5	Trimmer for oscillator coil; part of tuning unit assembly; shown for reference only; NOT AVAILABLE AS A SEPARATE REPLACEMENT PART.		
C-7 & 8	Trimmer for input IF transformer T-2; shown for reference only; NOT AVAILABLE AS A SEPARATE REPLACEMENT PART.		
C-9 & 16	0.02 mfd; 20%; 200 vdcw; tubular paper	46AU203F	.10
C-10 & 20	0.01 mfd; 20%; 200 vdcw; tubular paper	46AU103F	.10
C-11 & 12	Trimmer for diode IF transformer, T-3; shown for reference only; NOT AVAILABLE AS A SEPARATE REPLACEMENT PART.		
C-14 & 17	0.005 mfd; +40—10%; 200 vdcw; tubular paper	46AU502J	.10
C-18	0.05 mfd; 20%; 200 vdcw; tubular paper	46AU503F	.10
C-19	Electrolytic; 10 mfd; 150 vdcw; dry	45B098	.36
	PLUGS		
PL-1	Battery connector plug and cable assembly	87A1555	*
PL-2	Loudspeaker voice coil connector plug; part of speaker assembly, LS-1; also is available as a separate replacement part	10A243	.10
	LOUDSPEAKER		
LS-1	6" diam. cone; PM type; 3 ohm voice coil; includes two connector cable and plug for connection to output transformer secondary winding through socket SO-1	85C039	3.43
	RESISTORS		
R-1, 10 & 11	1 megohm; 20%; ½ watt; carbon	RC20AE105M	.10
R-2	100,000 ohm; 10%; ½ watt; carbon	RC20AE104K	.10
R-3	18,000 ohm; 10%; ½ watt; carbon	RC20AE183K	.10
R-4	2.2 megohm; 20%; ½ watt; carbon	RC20AE225M	.10
R-5	68,000 ohm; 20%; ½ watt; carbon	RC20AE683M	.10
R-6	Volume Control; 500,000 ohm; no taps	25A567	.58
R-7	47,000 ohm; 20%; ½ watt; carbon	RC20AE473M	.10
R-8	10 megohm; 20%; ½ watt; carbon	RC20AE106M	.10
R-9	4.7 megohm; 20%; ½ watt; carbon	RC20AE475M	.10
R-12	330 ohm; 20%; ½ watt; carbon	RC20AE331M	.10

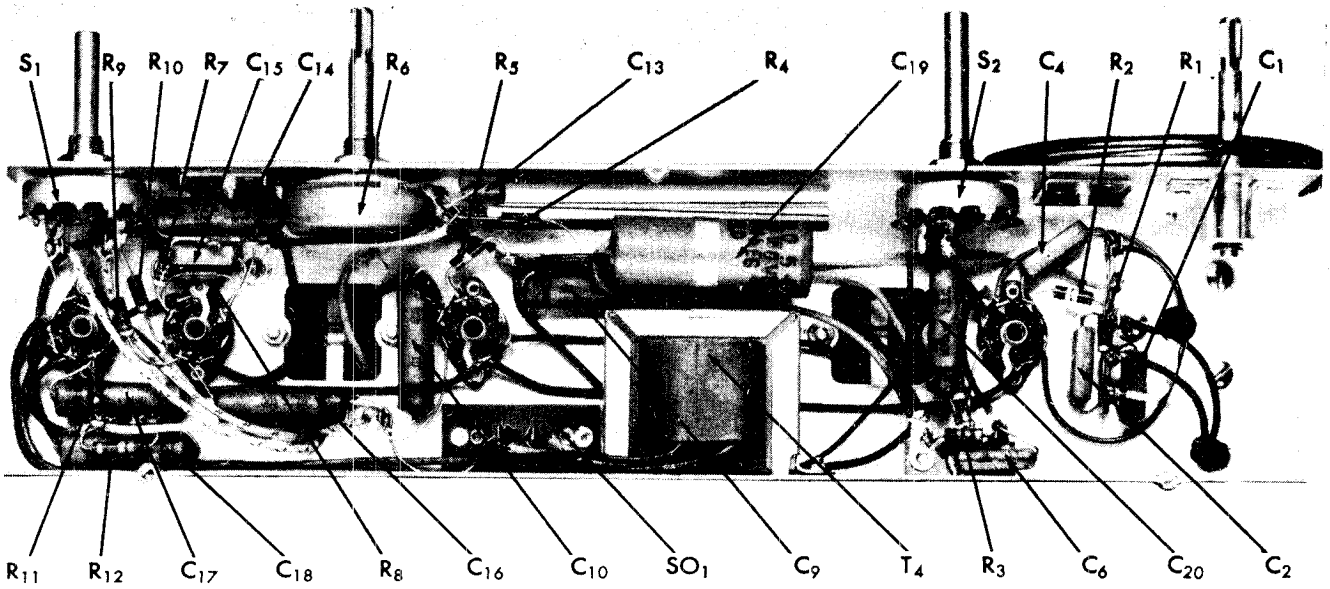
REF. NO.	DESCRIPTION	HALLICRAFTER'S PART NUMBER	LIST PRICE PER COMPONENT
	SWITCHES		
S-1A & B	On/Off battery switch; DPST; rotary action	60A258	.54
S-2	Normal/Bass tone switch; SPST; Rotary action	60A259	.48
	TUNING UNIT ASSEMBLY		
	Complete tuning unit; includes mixer coil L-1 and its trimmer C-3; also oscillator coil L-2, its trimmer C-5 and its padding adjustment slug tuned coil L-3; supplied as one complete assembly only	50B199	*
	TRANSFORMERS		
T-2	Input IF transformer; 455 kc; includes trimmer capacitors C-7 and C-8	50C196-3	.95
T-3	Diode IF transformer; 455 kc; includes trimmer capacitors C-11 and C-12	50C196-4	.95
T-4	Audio output transformer; matches the output of a tube type 3Q4 to the voice coil of a 3 ohm, PM type loudspeaker	55B085	1.08

MISCELLANEOUS MECHANICAL COMPONENTS

QUANTITY IN EQUIPMENT	DESCRIPTION	HALLICRAFTER'S PART NUMBER	LIST PRICE PER COMPONENT
4	Tube socket; 7 prong miniature; bakelite	6A219	.10
3	Idler pulley; bakelite	28A023	.10
1	Dial pointer; painted metal	82A113	.15
1	Calibrated dial scale plate	83B272	.73
1	Glass dial window	22B163	.10
2	Dial window mounting bracket	67A617	.10
2	Dial plate mounting bracket	67B612	.15
1	Tuning shaft mounting bracket	67A582	.10
1	Tuning shaft; steel	74A192	.10
1	Drive pulley; for tuning unit assembly	28A025	.10
1	Dial tension spring for drive pulley	75A102	.10
3	Knobs; bakelite; walnut	15B068-1	.10
1	Cabinet; wood; walnut	66F328	*
1	Knob; bakelite; walnut with dot	15B077-1	.10

* Price available on request.

NOTE: Prices subject to change without notice. When ordering parts, specify model number of set and part number of item.



Radio Receiver Model EC-600, bottom view showing location of components.

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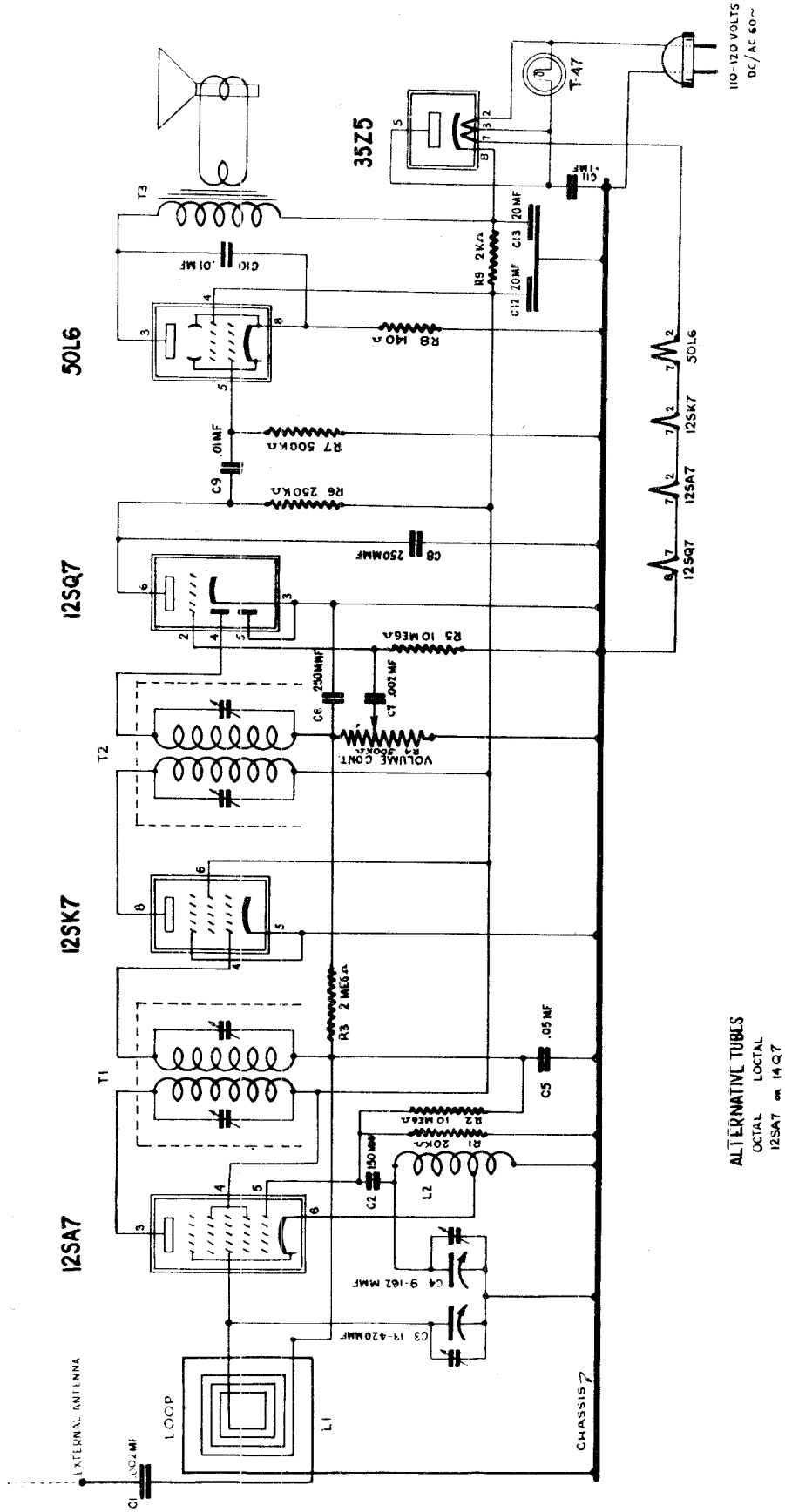
MODEL AR-501



ALTERNATIVE TUBES

OCTAL	LOCTAL
12SA7	14Q7
12SK7	14A7/12B7
12SQ7	14B6
50L6	50A5
35Z5	35Y4

MODEL AR-501
—IN—
I.F.-455KC
INPUT POWER-30 WATTS

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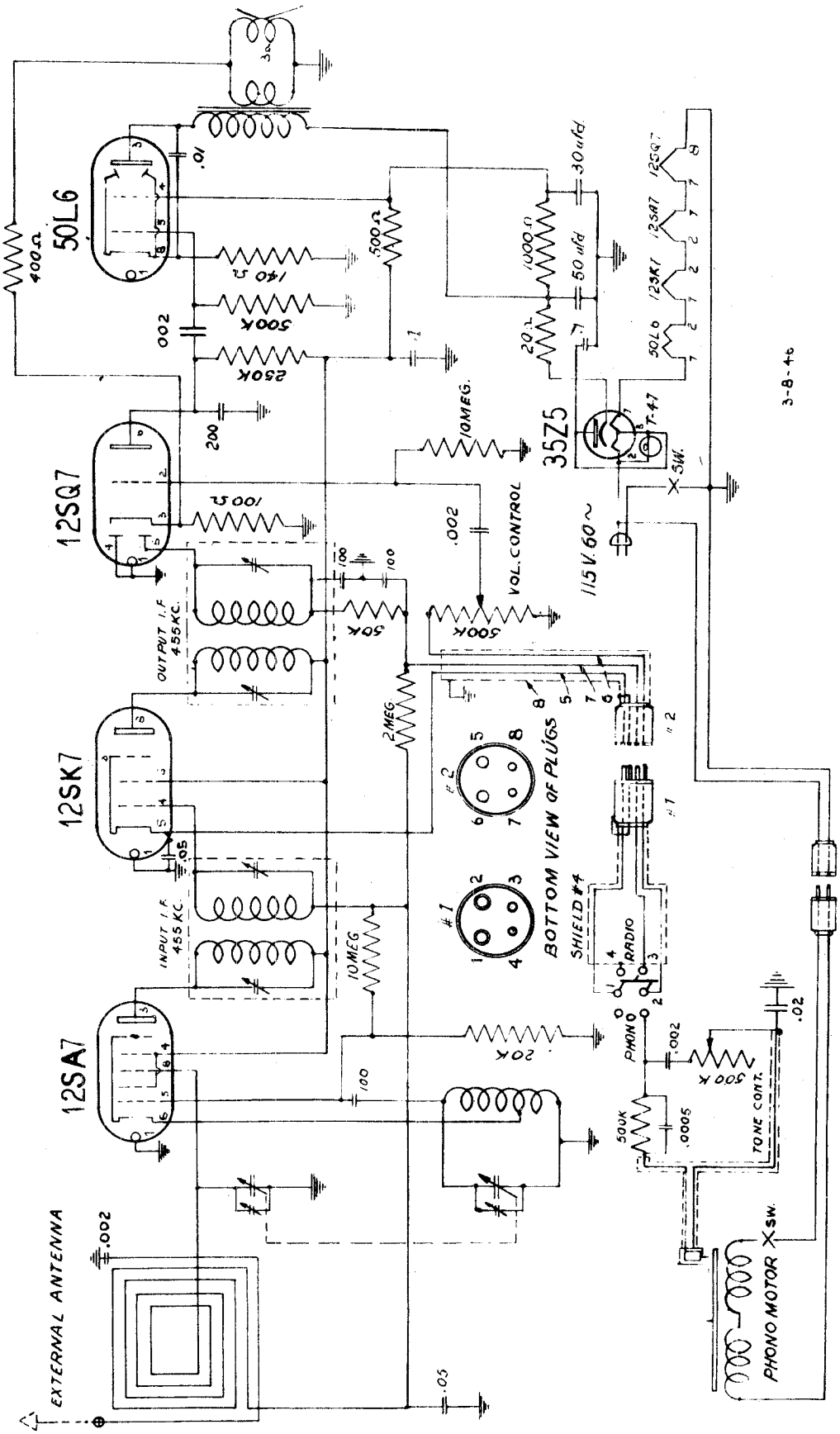
MODEL 512

ELECTROMATIC MFG. CORP.



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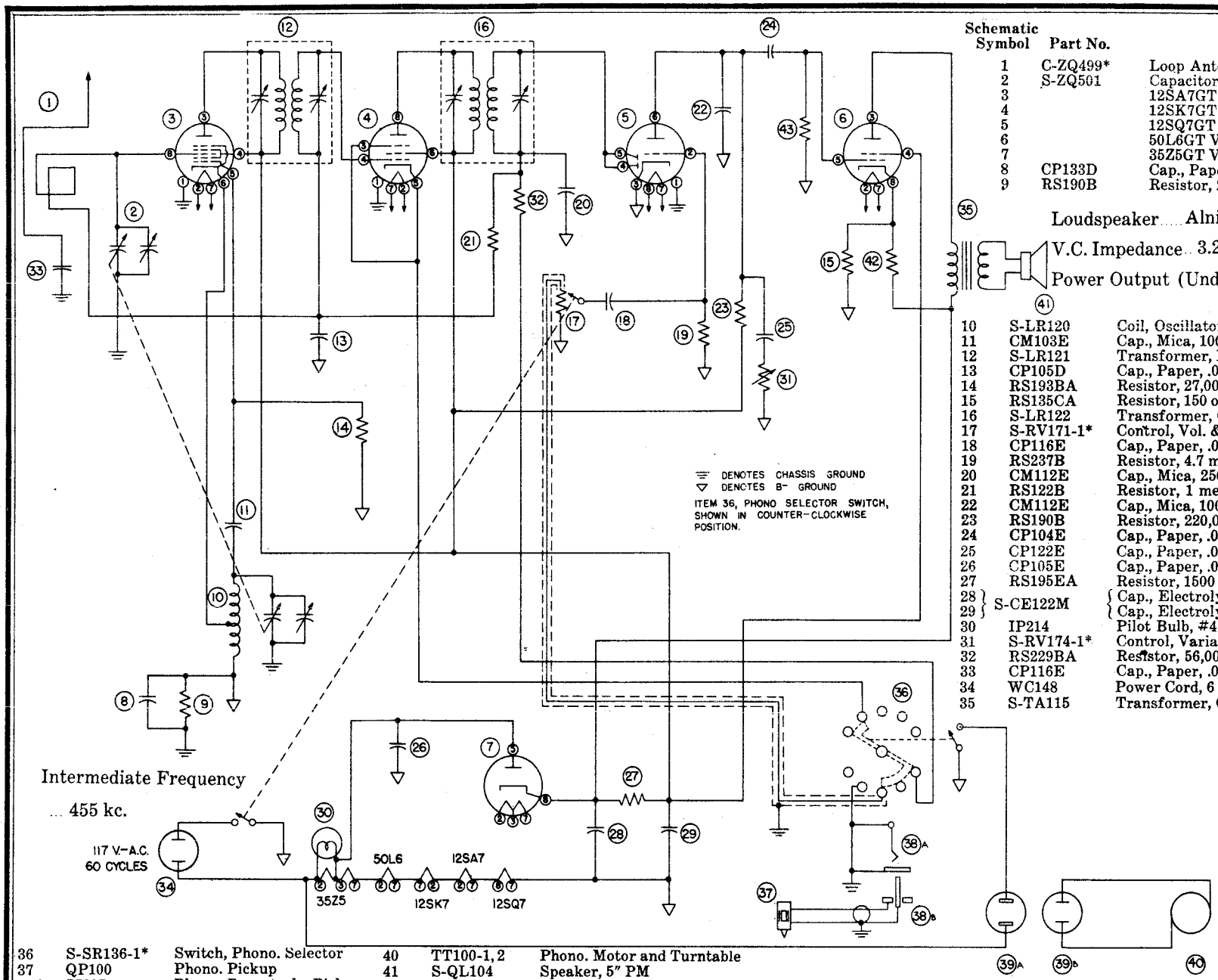
MODELS 104, 105, 106
Early



Schematic Symbol	Part No.	Description
1	C-ZQ499*	Loop Antenna
2	S-ZQ501	Capacitor, Variable
3		12SA7GT Vacuum Tube
4		12SK7GT Vacuum Tube
5		12SQ7GT Vacuum Tube
6		50L6GT Vacuum Tube
7		35Z5GT Vacuum Tube
8	CP133D	Cap., Paper, .2 mfd., 200 v.
9	RS190B	Resistor, 220,000 ohm, ¼ w.

Loudspeaker.....Alnico V PM Dynamic
V.C. Impedance..3.2 ohms at 400 cycles
Power Output (Undistorted)...1.0 watt

10	S-LR120	Coil, Oscillator
11	CM103E	Cap., Mica, 100 mmf.
12	S-LR121	Transformer, Input IF
13	CP105D	Cap., Paper, .05 mfd., 200 v.
14	RS193BA	Resistor, 27,000 ohm, ¼ w.
15	RS135CA	Resistor, 150 ohm, ½ w.
16	S-LR122	Transformer, Output IF
17	S-RV171-1*	Control, Vol. & Sw., 500,000 ohm
18	CP116E	Cap., Paper, .005 mfd., 400 v.
19	RS237B	Resistor, 4.7 megohm, ¼ w.
20	CM112E	Cap., Mica, 250 mmf.
21	RS122B	Resistor, 1 megohm, ¼ w.
22	CM112E	Cap., Mica, 100 mmf.
23	RS190B	Resistor, 220,000 ohm, ¼ w.
24	CP104E	Cap., Paper, .02 mfd., 400 v.
25	CP122E	Cap., Paper, .002 mfd., 400 v.
26	CP105E	Cap., Paper, .05 mfd., 400 v.
27	RS195EA	Resistor, 1500 ohm., 2 w.
28 }	S-CE122M	{ Cap., Electrolytic, 50 mfd., 150 v.
29 }		{ Cap., Electrolytic, 30 mfd., 150 v.
30	IP214	Pilot Bulb, #47 Mazda
31	S-RV174-1*	Control, Variable Tone
32	RS229BA	Resistor, 56,000 ohm, ¼ w.
33	CP116E	Cap., Paper, .005 mfd., 400 v.
34	WC148	Power Cord, 6 ft., with Male Plug
35	S-TA115	Transformer, Output
36	S-SR136-1*	Switch, Phono. Selector
37	QP100	Phono. Pickup
38A	JJ237	Phono. Receptacle, Pickup
38B	JJ241	Phono. Plug, Pickup
39A	JJ236	Phono. Motor Receptacle
39B	JJ240	Phono. Motor Plug
40	TT100-1, 2	Phono. Motor and Turntable
41	S-QL104	Speaker, 5" PM
42	RS193DA	Resistor, 27,000 ohm, 1 w.
43	RS189BA	Resistor, 470,000 ohm, ¼ w.
	WC147	Dial Cord
	A-AQ589	Dial Cord Spring

*For Model 105, substitute the following:
B-ZQ587 for C-ZQ499
S-RV171-2 for S-RV171-1
S-RV174-2 for S-RV174-1
S-SR136-2 for S-SR136-1

Record Changer: General Instrument Model 205
For Alignment, see P.15-6

MODELS 104,105,106
Early

ELECTRONIC CORP. OF AMERICA

ALIGNMENT PROCEDURE

The following equipment is necessary to properly align this chassis:

1. A signal generator which will provide an accurately calibrated signal at the frequencies listed.
2. An output meter.
3. A non-metallic screwdriver.
4. Any loop similar to the one used in the receiver.

PROCEDURE

1. Mount the loop in a vertical position on a block of wood so that it may be coupled parallel to the set loop.
2. Connect the loop to the output terminals of the signal generator.

INPUT SIGNAL	DISTANCE BETWEEN GEN. AND SET LOOP	SET DIAL AT	TRIMMERS	PURPOSE
455 kc.	Close	HF end	1 2 3 4	Align IF
1720 kc.	Close	HF end	5	Set limit of band
1400 kc.	1½'	1400 kc.	6	Align antenna

SOCKET VOLTAGES

TUBE	POSITION	1	2	3	4	5	6	7	8
12SA7GT	Oscillator and Mixer	0	24 AC	84	84	–11*	0	125 AC	0
12SK7GT	IF Amplifier	0	24 AC	0	0	0	84	35 AC	84
12SQ7GT	2nd Det.–1st Audio	0	0	0	0	0	18	0	125 AC
50L6GT	Power Output	0	83 AC	108	84	0	0	35 AC	6
35Z5GT	Rectifier	0	117 AC	111 AC	0	111 AC	0	83 AC	117

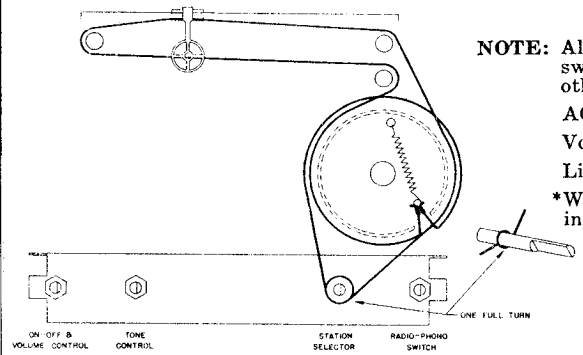
NOTE: All DC voltages measured with a 1000 ohm-per-volt meter from ON-OFF switch (—B) to socket contact indicated. All voltages are positive DC unless otherwise marked.

AC switch on.

Volume control in minimum position; no signal.

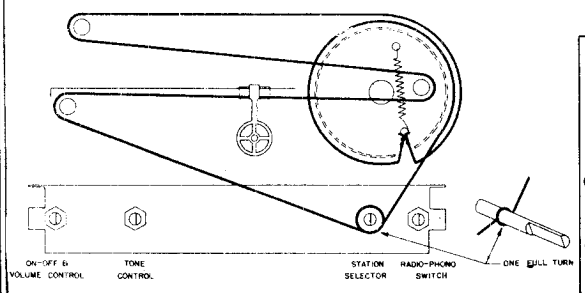
Line voltage 117 volts AC.

*When a vacuum tube voltmeter with approximately 10 megohms or higher input resistance is used.



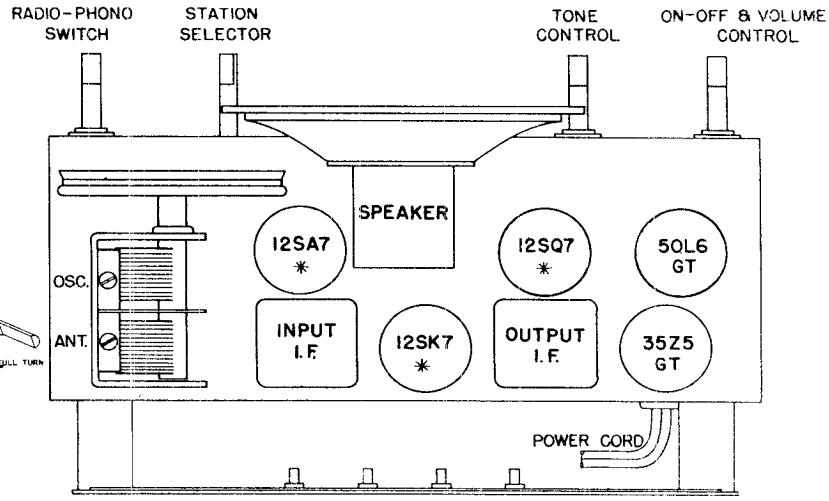
Dial Mechanism

Models 104, 106



Dial Mechanism

Model 105



Tube Layout

* GLASS & METAL TUBE INTERCHANGEABLE

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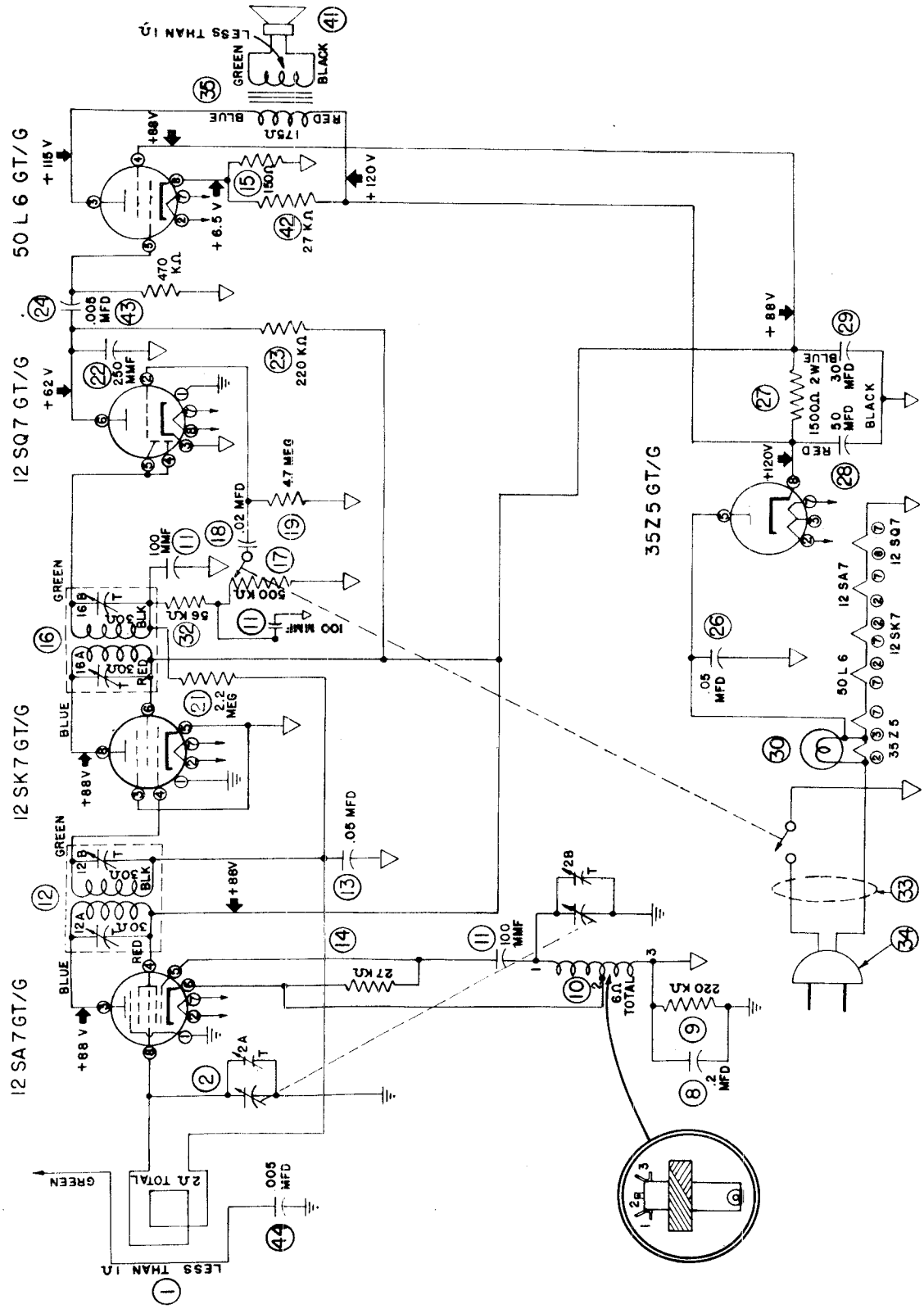
MODELS 101,102,133
Ch. AA



For Alignment, see P.15-6

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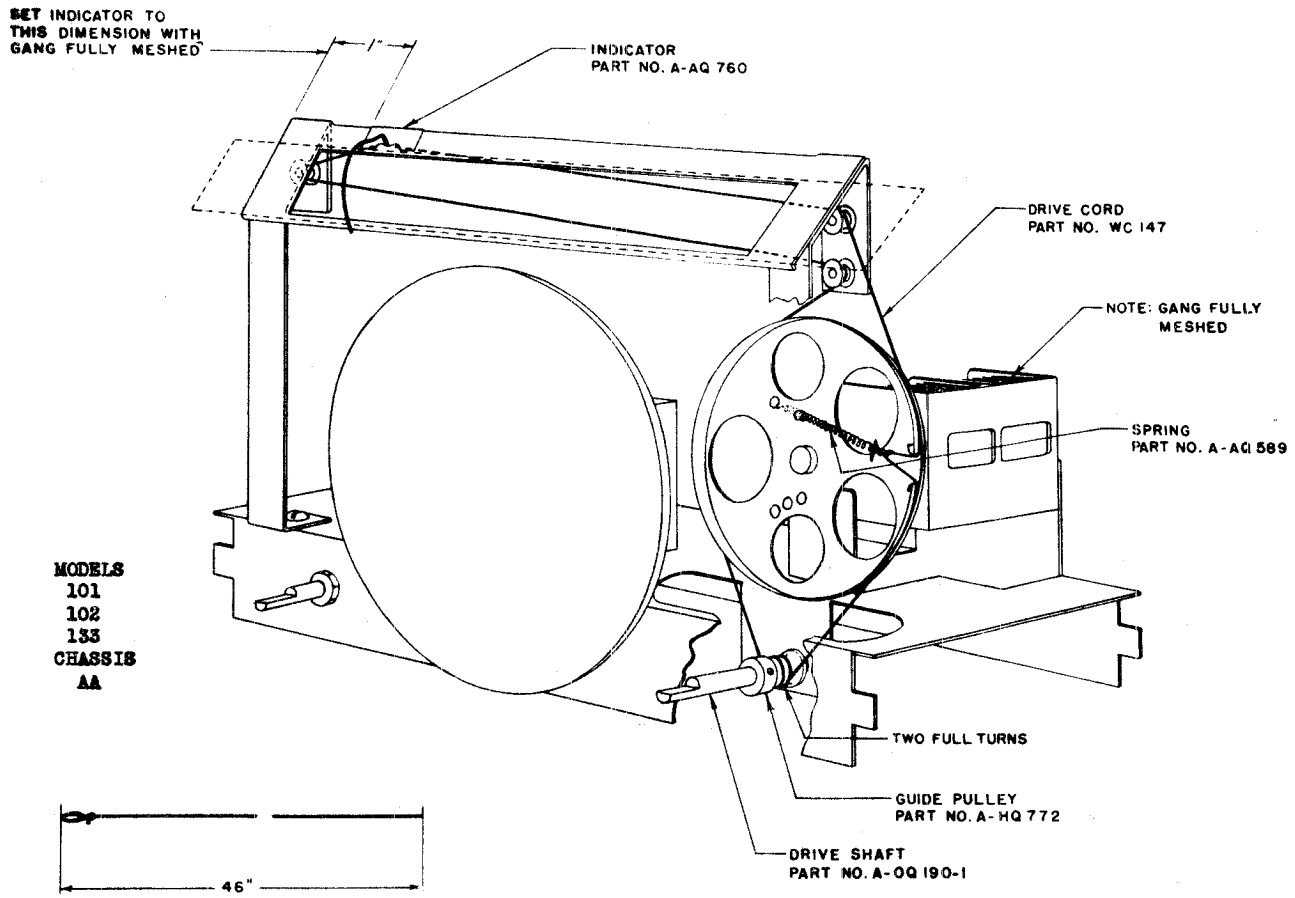
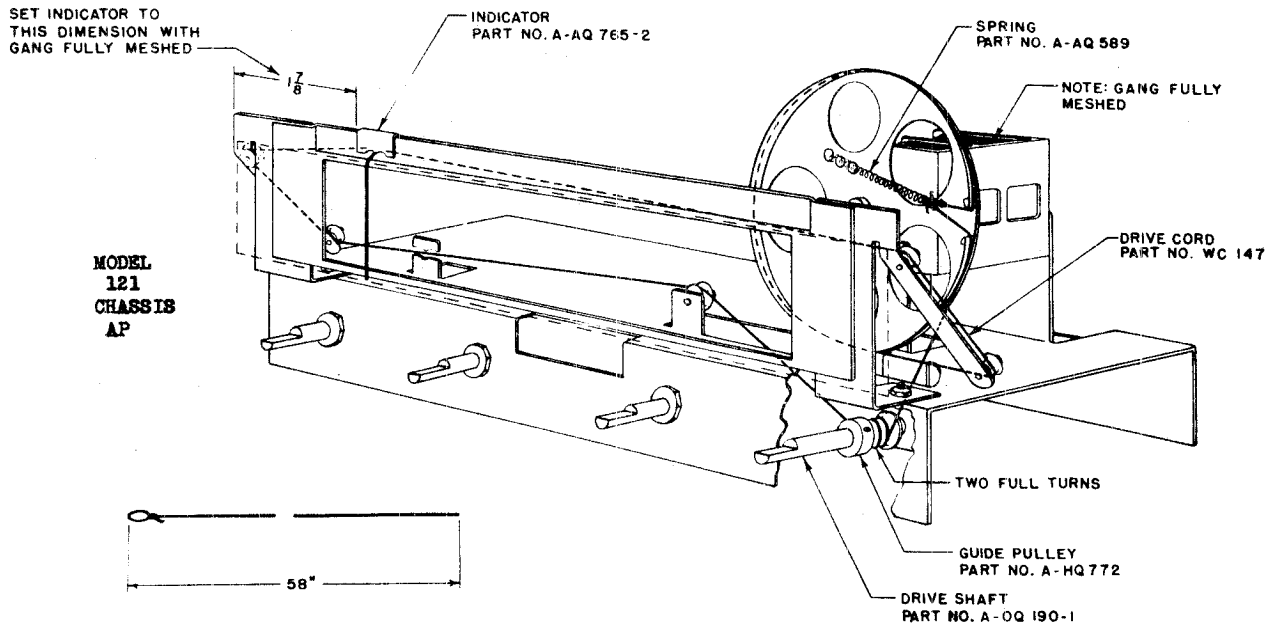
MODELS 101,102,133
MODEL 121

ELECTRONIC CORP. OF AMERICA


SET INDICATOR TO THIS DIMENSION WITH GANG FULLY MESHED
1"
INDICATOR PART NO. A-AQ 760
DRIVE CORD PART NO. WC 147
NOTE: GANG FULLY MESHED
SPRING PART NO. A-AQ 589
MODELS 101 102 133 CHASSIS AA
TWO FULL TURNS
GUIDE PULLEY PART NO. A-HQ 772
DRIVE SHAFT PART NO. A-OQ 190-1
46"


SET INDICATOR TO THIS DIMENSION WITH GANG FULLY MESHED
1 7/8
INDICATOR PART NO. A-AQ 765-2
SPRING PART NO. A-AQ 589
NOTE: GANG FULLY MESHED
DRIVE CORD PART NO. WC 147
MODEL 121 CHASSIS AP
TWO FULL TURNS
GUIDE PULLEY PART NO. A-HQ 772
DRIVE SHAFT PART NO. A-OQ 190-1
58"

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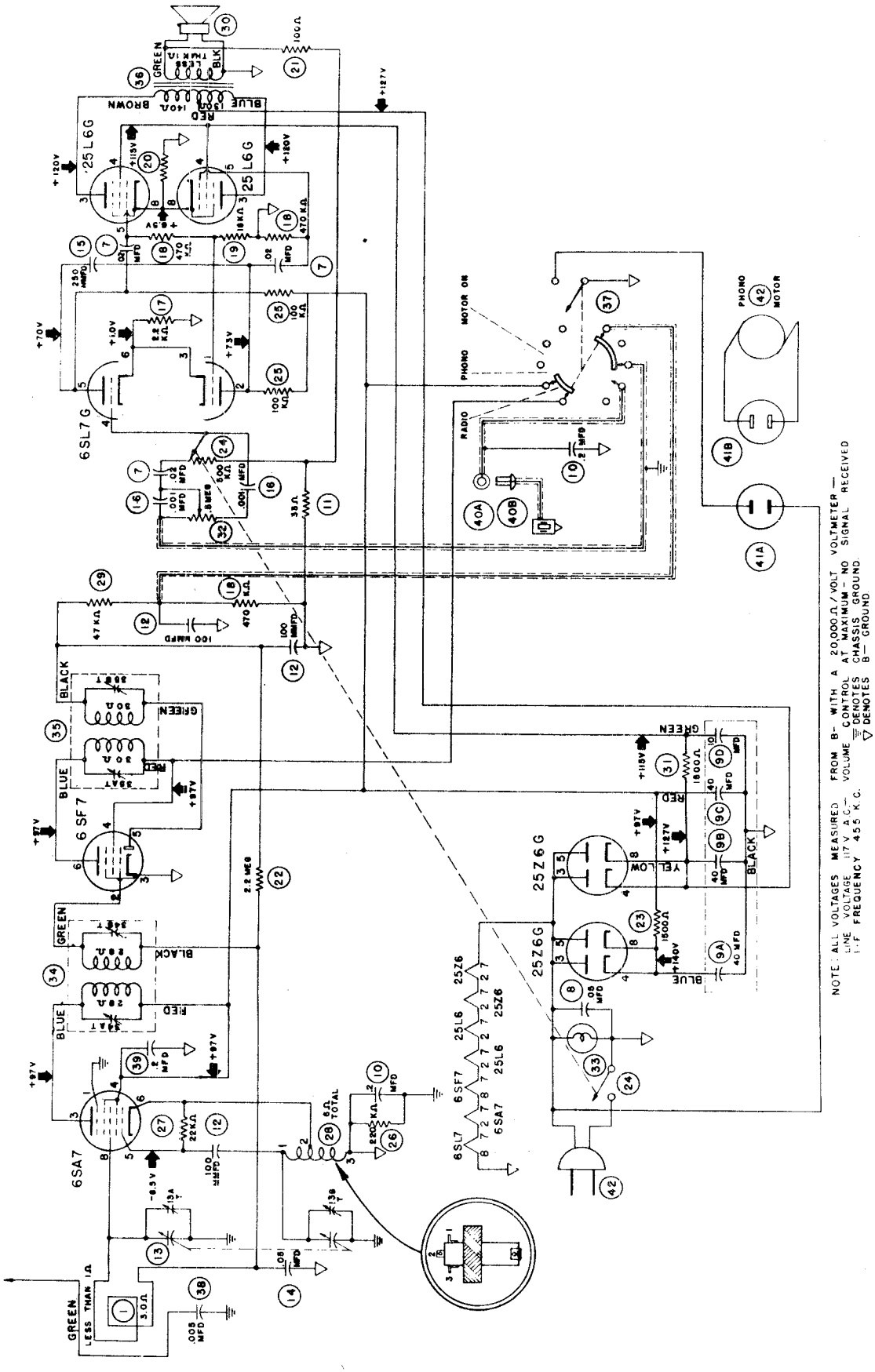
ELECTRONIC CORP. OF AMERICA

MODEL 121,,Ch.AP


6SL7 G
6SF 7
6SA7
25L6G
25Z6G
PHONO MOTOR ON
RADIO
PHONO MOTOR
NOTE: ALL VOLTAGES MEASURED FROM B- WITH A 20,000Ω/VOLT VOLTMETER —
LINE VOLTAGE 117 V. A.C. — VOLUME CONTROL AT MAXIMUM — NO SIGNAL RECEIVED
I.F. FREQUENCY 455 K.C. ⏚ DENOTES CHASSIS GROUND
▽ DENOTES B— GROUND

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MODELS 101,102,133
MODELS 104,105,106
MODEL 121

ELECTRONIC CORP. OF AMERICA

In order to make a proper alignment, the following equipment is required:

1. A signal generator capable of providing a modulated radio frequency output over the frequencies required.
2. A suitable output meter or sensitive AC voltmeter with a .1 mfd series blocking condenser.
3. A coupling loop, made of three turns of stiff hookup wire, 4 inches in diameter, mounted on a suitable block of wood or stand.
4. A non-metallic screwdriver.

With the receiver on and the volume control at maximum, connect the signal generator to the coupling loop and bring the loop close to the receiver chassis. Adjust the signal generator output to minimum necessary to give a suitable indication on the output meter, which should be connected from B minus to the plate of one output tube. CAUTION: Make sure the output meter is isolated from DC by a series blocking condenser.

ALIGNMENT DATA

MODELS 104, 105, 106, 102, 101, 133

I.F. FREQ. - 455KC.

SET SIGNAL GENERATOR AT	SET GANG	LOOP DISTANCE	ADJUST TRIMMER	TUNE FOR	OPERATION
455 KC	Fully Meshed	Close	12a 12b 16a 16b	Max.	Align I.F.
1720 KC	Fully Open	Close	2b	Max.	Set Osc.
1400 KC	1400 KC	Close	2a	Max.	Align R.F.

MODEL 121

I.F. FREQ. - 455 KC.

SET SIGNAL GENERATOR AT	SET GANG	LOOP DISTANCE	ADJUST TRIMMER	TUNE FOR	OPERATION
455 KC	Fully Meshed	Close	34a 34b 35a 35b	Max.	Align I.F.
1720 KC	Fully Open	Close	13b	Max.	Set Osc.
1400 KC	1400 KC	Close	13a	Max.	Align R.F.

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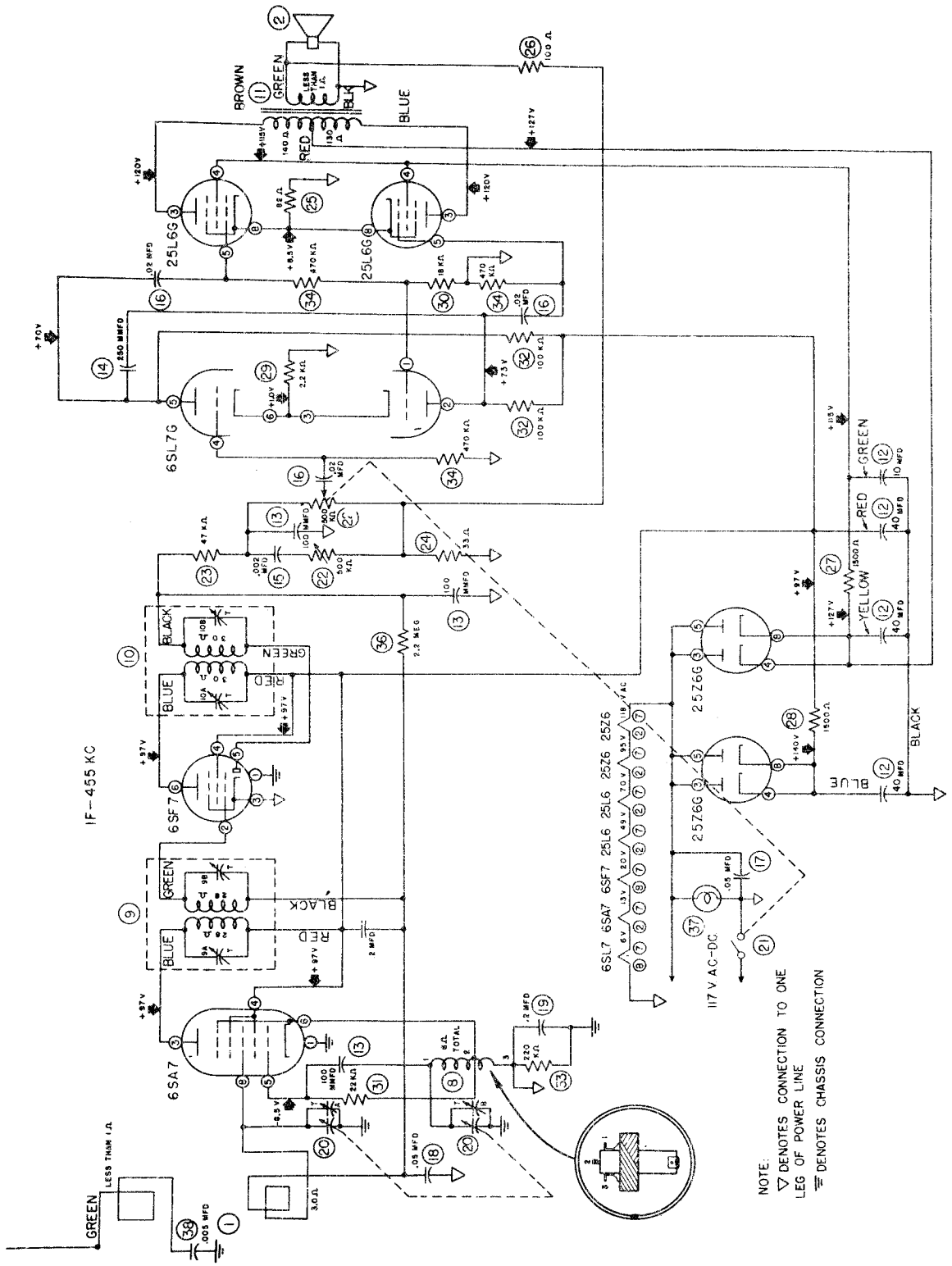

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ELECTRONIC CORP OF AMERICA

In order to make a proper alignment, the following equipment is required:

1. A signal generator capable of providing a modulated radio frequency output over the frequencies required.

2. A suitable output meter or sensitive AC voltmeter with a .1 mfd series blocking condenser.

3. A coupling loop, made of three turns of stiff hookup wire, 4 inches in diameter, mounted on a suitable block of wood or stand.

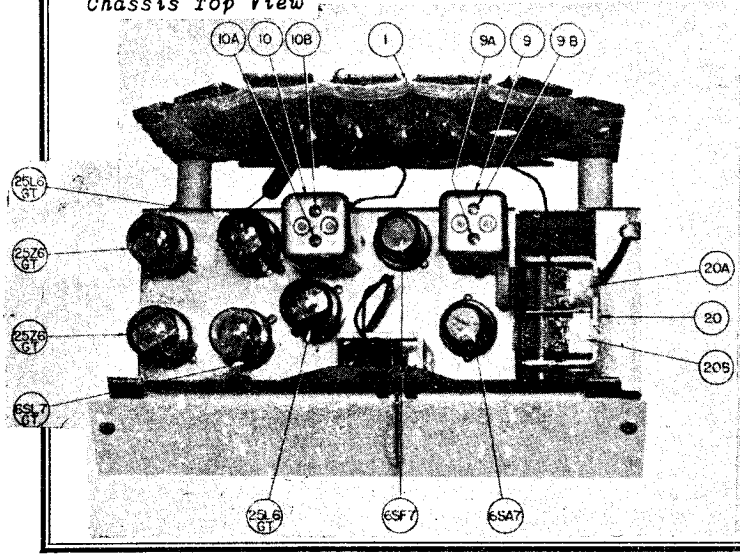
4. A non-metallic screwdriver.

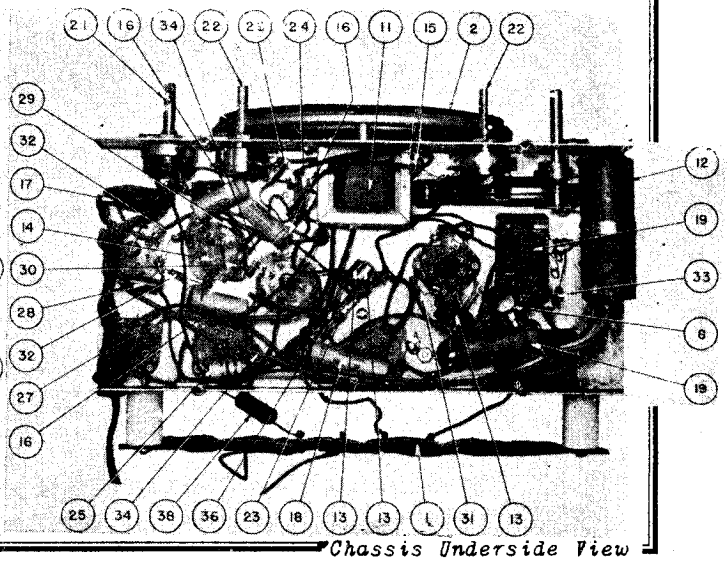
With the receiver on and the volume control at maximum, connect the signal generator to the coupling loop and bring the loop close to the receiver chassis. Adjust the signal generator output to minimum necessary to give a suitable indication on the output meter, which should be connected from B minus to the plate of one output tube. CAUTION: Make sure the output meter is isolated from DC by a series blocking condenser.

With the gang condenser fully meshed, adjust the pointer so that the left hand edge of the pointer saddle is one inch from the end of the dial frame. *(See Dial Installation drawing)* Using the dial scale contained in this Service Bulletin, align the pointer to the indicated reference mark with the pointer set as above. Then proceed with the alignment in accordance with the chart below:

SET SIGNAL GENERATOR AT	SET GANG	LOOP DISTANCE	ADJUST TRIMMER	TUNE FOR	OPERATION
455 KC	Meshed	Close	9a 9b 10a 10b	Max.	Align - I.F.
1720 KC	Fully Open	Close	20a	Max.	Align Oscillator
1400 KC	1400 KC	Close	20b	Max.	Align - R.F.

Chassis Top View





Chassis Underside View

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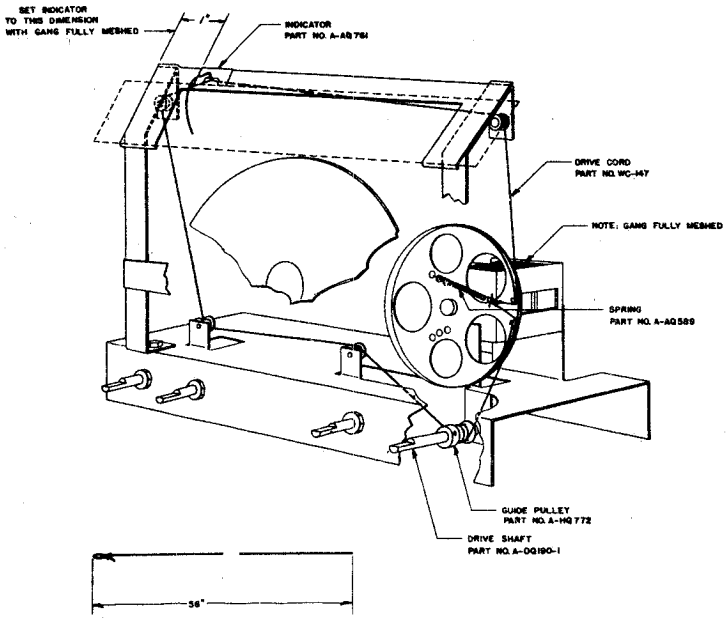
Replacement of Dial Drive Cord

Completely remove remainder of defective dial cord. Inspect all pulleys and make sure they revolve freely. Determine that no grease or oil is present on any pulley surface. Attach the cord spring, part #A-AQ589, to one end of the drive cord. Fully mesh the gang condenser and hook the spring to the hole closest to the cord cutout on the dial drum. Proceed to string dial cord in accordance with the detail drawing. Take two full turns around the drive drum, part #A-HQ772. Pull the cord snug at this point. Wrap one complete turn around gang drum and pull cord snug. Securely tie free end of cord to the cord spring. Next, adjust spring tension by moving the hook end of the spring into the next spring hole.

Clip the pointer on to the dial cord with sufficient tension so as to prevent slippage and adjust pointer position, so that with fully meshed gang, the left edge of the pointer saddle is one inch from the edge of the dial support frame. Insert chassis in cabinet and check pointer and scale agreement. Then make final adjustment of pointer position. Remove the chassis and firmly crimp the pointer prongs on the dial cord, and secure with a small drop of speaker cement.


SET INDICATOR TO THIS DIMENSION WITH GANG FULLY MESHED
1"
INDICATOR PART NO. A-AQ754
DRIVE CORD PART NO. WC-147
NOTE: GANG FULLY MESHED
SPRING PART NO. A-AQ589
GUIDE PULLEY PART NO. A-HQ772
DRIVE SHAFT PART NO. A-DQ180-1
36"

Replacement of Audio Output Transformers

When replacing the audio output transformer, original lead dress must be maintained. If either primary or secondary windings are reversed, the set will have a a severe audio oscillation, due to the inverse feedback network.

Replacement of I.F. Transformers

When replacing intermediate frequency transformers, either input or output, use caution to observe original lead dress.

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MODEL 108

ELECTRONIC CORP. OF AMERICA

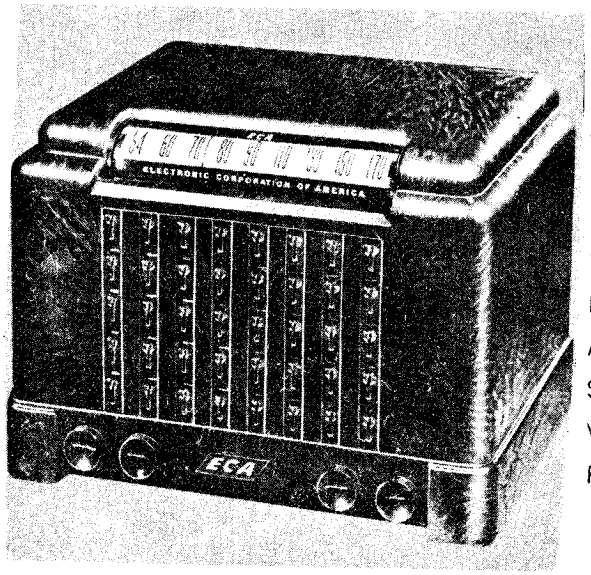
Service Parts List

No.	PART NAME	PART NO.
1	Loop Antenna	C-ZQ-522*
2	Speaker	S-QL-105E*
8	Oscillator Coil	S-LR-120*
9	Input I.F. Transformer	S-LR-127*
10	Output I.F. Transformer	S-LR-128*
11	Output Transformer	S-TA-116*
12	Electrolytic Condenser	S-CE-126M*
13	Condenser, Mica, 100 mmf.	CM-103E
14	" " 250 mmf.	CM-112E
15	" Paper, .002 mf., 400 v.	CP-122E
16	" " .02 mf.	CP-104E
17	" " .05 mf.	CP-105E
18	" " .05 mf., 200 v.	CP-105D
19	" " .2 mf., 200 V.	CP-133D
20	Variable Capacitor and Drum	S-ZQ-500*
21	On-off Switch	S-SR-137*
22	Vol.Control, Tone Control, 500K ohms	S-RV-174-1*
23	Resistor, Fixed, 47K ohm, 1/4 w.	RS-186B
24	" " 33 " 1/4 w.	RS-220B
25	" " 82 " 1 w., 10%	RS-221D
26	" " 100 " 1/4 w.	RS-114B
27	" " 1500 " 1/2 w.,10%	RS-195C
28	" " 1500 " 2 w., 10%	RS-195E
29	" " 2.2K " 1/4 w.	RS-185B
30	Resistor,Fixed, 18K ohm, 1/4 w.,10%	RS-222B
31	" " 22K " 1/4 w.	RS-197B
32	" " 100K " 1/4 w.,10%	RS-120B
33	" " 220K " 1/4 w.	RS-190B
34	" " 470K " 1/4 w.,10%	RS-189B
36	" " 2.2 meg.	RS-223B
37	Pilot Bulb, G.E., 3 w., 110 v.	IP-115
38	Condenser, Paper, .005 mf., 200 v.	CP-116D
	Cabinet, Bakelite	E-AQ-640*
	Knob Assembly	A-ZQ-577*
	Dial Scale	C-NP-157-3*
	Pointer	A-AQ-761*
	Dial Cord Spring	A-AQ-589*
	Tuning Shaft	A-OQ-190-1*
	"C" Washer	HN-405*
	Dial Cord Bushing	A-HQ-772*
	Pilot Light Socket	S-XQ-164*
	Dial Background Plate	B-AQ-758*
	Loop Spacer Block	A-AQ-637*
	Felt Knob Washers	HN-365*
	Dial and Speaker Support	C-ZQ-619*
	5 Lug Terminal Panel	EQ-380*
	Line Cord and Plug	WC-148*

Note: All items followed by an asterisk (*) will be stocked by the Electronic Corporation of America. All unmarked items may be replaced by any high quality component of equal electrical value.

All DC voltage measurements in this Service Bulletin have been made with a 20,000 ohms per volt voltmeter, using B minus as a common reference point. All AC voltage measurements are with 1000 ohms per volt voltmeter. Line voltage was maintained at 117 volts for all voltage measurements. The condenser gang should be fully meshed and the volume control at its minimum point. Voltages may vary ±10% from the indicated nominal value.

Measurements of oscillator grid bias voltage should be made with a 50,000 ohm resistor in series with the negative probe of the meter, and the positive prod connected to B minus. Rotate the tuning condenser throughout its complete range with the meter connected. Absence of bias voltage at any point is an indication that the oscillator is not functioning.



CABINET . . . . . Plastic, Walnut Finish
CIRCUIT . . . . . 7 Tube, Superheterodyne
FREQUENCY RANGE . . . 540 to 1720 KC
INTERMEDIATE FREQ. . 455 KC
POWER INPUT . . . . . 110 to 125 V. AC-DC
POWER CONSUMPTION . . 60 Watts
ANTENNA . . . . . Built-in Loop
SPEAKER . . . . . Alnico V PM Dynamic 6"
V.C. IMPEDANCE . . . . 3.2 ohms at 400 Cycles
POWER OUTPUT . . . . 3 Watts Undistorted

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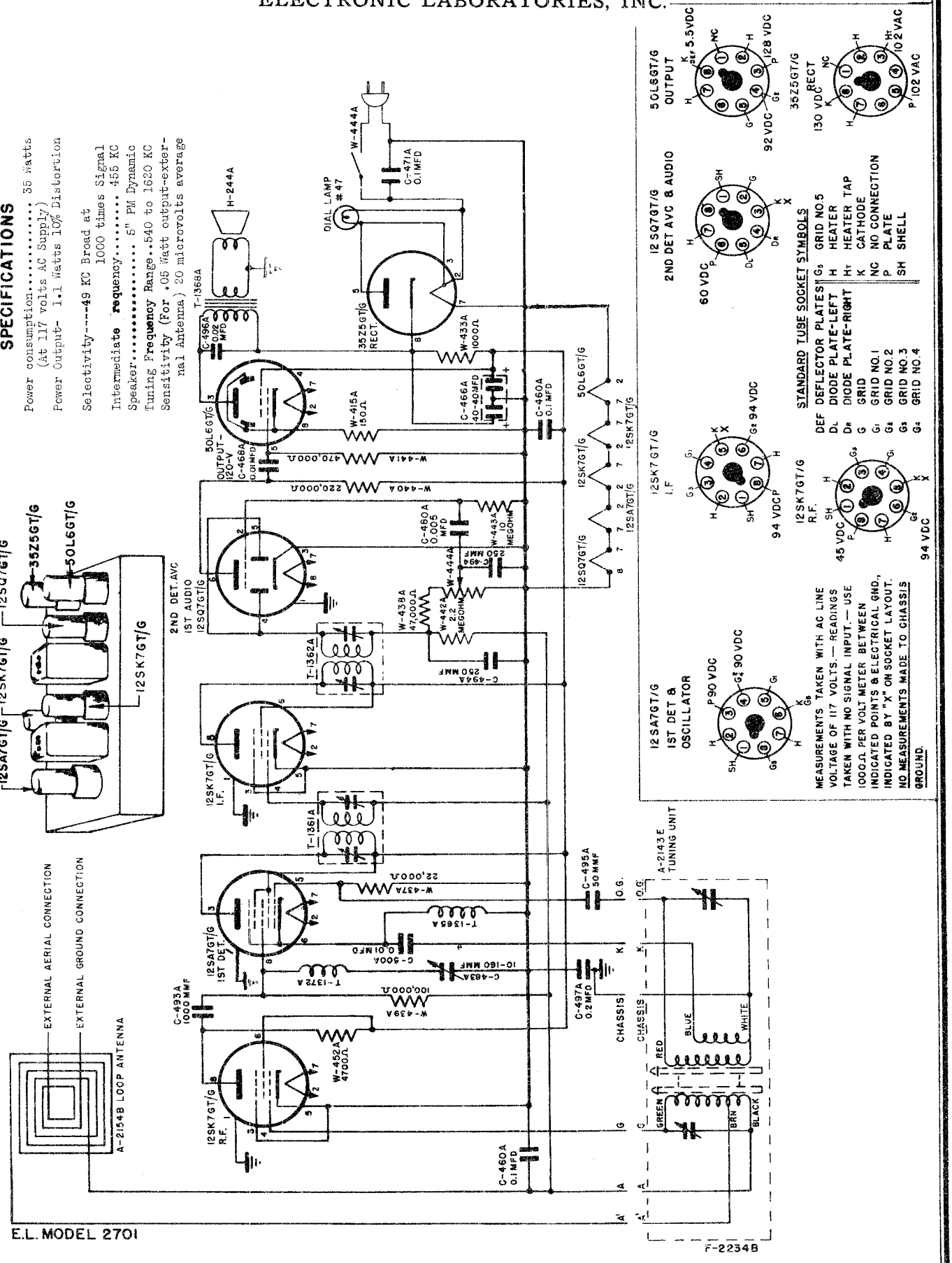
MODEL 2701

ELECTRONIC LABORATORIES, INC.

SPECIFICATIONS

Power consumption..... 35 Watts
(At 117 volts AC Supply)
Power Output- 1.1 Watts 10% Distortion

Selectivity----49 KC Broad at 1000 times Signal
Intermediate Frequency..... 455 KC
Speaker..... 5" PM Dynamic
Tuning Frequency Range..540 to 1620 KC
Sensitivity (For .05 Watt output-external Antenna) 20 microvolts average



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MODEL 2701

ELECTRONIC LABORATORIES, INC.

ALIGNMENT PROCEDURE

Volume Control-Maximum All Adjustments.

Allow Chassis and Signal Generator to "Heat Up" for several minutes.

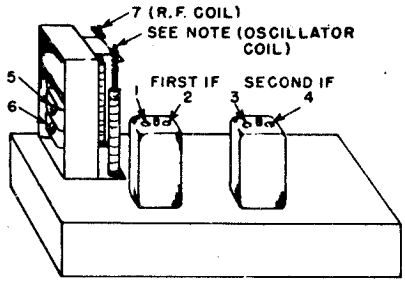
The equipment in column at right is required for Aligning:

Signal Generator which will provide an accurately calibrated signal at test frequencies as listed.

Output Indicating Meter; Non-Metallic Screwdriver.

Dummy Antennas-.01 mf., and 400 ohms.

SIGNAL GENERATOR FREQUENCY SETTING	ANTENNA CONNECTION	COUPLING	DUMMY ANTENNA	TUNER SETTING	TRIMMER ADJUSTMENT (SEE DIAGRAM)	NOTES
I.F. 455 KC	Grid of RF tube 12SK7	Ground generator to chassis	0.01 mfd	Out	Adjust for Max. 1, 2, 3 and 4	No signal will be heard unless trimmer condenser under chassis is unscrewed and reduced from original setting
I.F. 455 KC	Grid of RF tube 12SK7	Ground generator to chassis	0.01 mfd	Out	Trim condenser under chassis for Min. output.	If it is found that regeneration prevails when the loop antenna is put in its normal position close to the tubes, then the under chassis trimmer is incorrectly set, and should be adjusted to prevent the regenerative condition.
1620 KC	Inductive Coupling to Loop	Loop coupling with leads brought out	400 ohms in series with Antenna & Gnd.leads	Out	Adjust Osc. #5 per Max. signal	
1400 KC	Inductive Coupling to Loop	Loop coupling with leads brought out	400 ohms in series with Antenna & Gnd.leads	Dial set for 1400KC	Adjust RF trimmer #6 per Max. Signal.	
700 KC	Inductive Coupling to Loop	Loop Coupling with leads brought out	400 ohms in series with Antenna & Gnd.leads	Dial set for 700KC	Adjust RF tuning core #7 for Max. (care should be taken not to disturb carriage position of tuner)	



ALIGNMENT NOTES

A. MECHANICAL ALIGNMENT:- The following mechanical adjustments should be made before alignment:

1. Rotate shaft of tuning unit until carriage is against top stop position.
2. Space oscillator coil slug 1-5/32" out from top of oscillator coil form.
3. Space R.F. coil slug 1-29/64" out from top end of R.F.coil winding. (Note:-The distance 1 and 2 should be measured from mounted end of the slug)
4. Adjust screw on trimmer of wave trap towards open position so that condenser plates are open at least 1/32".

B. I.F. ALIGNMENT PROCEDURE

1. Feed I.F. frequency from the signal generator through a 0.01 mfd condenser to the control grid of the R. F. tube.
2. No signal will be heard unless trimmer condenser under chassis is unscrewed and reduced from original setting.
3. Turn volume control full on.
4. Make preliminary I.F.adjustment with signal level approximately 50 Mv.
5. Tune I.F. trimmers for maximum signal, reducing I.F. signal input to coupling loop to keep output voltage less than 0.5 V.
6. When maximum output has been secured, adjust trimmer condenser in the I.F. trap (under chassis) by turning clockwise to the minimum signal.

C. R.F. ALIGNMENT PROCEDURE

1. Volume control full on.
2. Adjust tuning unit to top stop position.
3. Feed 1620 kc signal into external loop. Hold audio output below 0.5 V. Adjust the oscillator trimmer condenser to maximum output.
4. Move slugs in by means of tuning dial so that pointer is approximately 1" from the stop end, and a signal received from the external loop on a frequency of 1400 kc. Adjust lower trimmer (R.F. trimmer) to maximum output. Reduce R.F.input to keep signal output voltage below 0.5 V.
5. Rotate tuning shaft until pointer is approximately 1" from the other end of the scale. Feed to the external loop a test signal at 700 kc. Adjust the R. F. coil slug by rotation to maximum output.

D

1. Alternately adjust R.F. trimmers at 1400 kc. and R.F. slug at 700 Kc. until maximum sensitivity is attained at both frequencies.

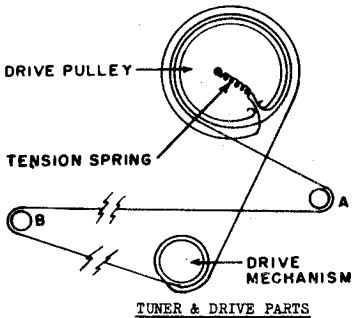
E. When set is correctly aligned, the low frequency end of the tuning range should fall at 540 Kc.

CAUTION: Extreme care should be taken in the 700 kc. position to make sure that the tuner carriage is not moved by the adjusting tools or hand pressure on the slug screw. Carriage should not be held against the frame, but should be allowed to assume its normal position when adjusting the R.F. coil slug.

DRIVE CORD REPLACEMENT

Turn the tuner to the fully open position. Use a new cord 50" long and tie one end to the tension spring. Fasten the other end of the tension spring to the drive pulley. Pass cord through slot in pulley ring; add spring tension and continue one and one-half turns counterclockwise over top of pulley Then pass cord around idler pulley A, starting over top and going around clockwise. Pass cord over idler pulley B, starting over top and going around counter clockwise.. Wind one full turn counterclockwise around drive mechanism Then wind one full turn counterclockwise around drive pulley, pass through slot in pulley and tie string to tension spring. Cut off excess string.

Attach dial pointer to cord.



TUNER & DRIVE PARTS

A-2143E	Tuner Assembly
L-2450A	Pulley-Drive
L-2451A	Pulley-Idler
U-1442A	Shoulder Rivet
H-247B	Glass Dial
H-246A	Translucent Screen
U-1445A	Snaps for Screen
U-1461A	Pointer
U-1444A	Spring
S-599A	Pilot Light Socket Assembly
A-2155A	Dial Drive Assembly

RESISTORS

W-415A	150 ohm, 0.5 Watt	Carbon
W-452A	4700 ohm, 0.5 Watt	Carbon
W-433A	1000 ohm, 1.0 Watt	Carbon
W-437A	22,000 ohm, 0.25 Watt	Carbon
W-438A	47,000 ohm, 0.25 Watt	Carbon
W-439A	100,000 ohm, 0.25 Watt	Carbon
W-440A	220,000 ohm, 0.25 Watt	Carbon
W-441A	470 ohm, 0.25 Watt	Carbon
W-442A	2.2 megohm, 0.25 Watt	Carbon
W-443A	10 megohm, 0.25 Watt	Carbon
W-444A	Switch & Pot,500,000 ohm,	Carbon

COILS

A-2154B	Antenna & Back Cover Assembly	
T-1361A	1st I.F. Transformer	455 KC
T-1362A	2nd I.F. Transformer	455 KC
T-1365A	R. F. Choke Coil	1.4 MH
T-1368A	Audio Transformer	
T-1372A	R.F. Choke Coil	3.0 MH

CAPICATORS

C-471A	0.1 mfd, 400 V	Tubular
C-493A	1000 mmf, 350 V	Ceramic
C-494A	250 mmf, 350 V	Ceramic
C-495A	50 mmf, 500 V	Ceramic
C-480A	0.005 mfd, 400 V	Tubular
C-466A	40-40 mfd, 150 V	Electrolytic
C-483A	10-160 mmf	Trimmer
C-496A	0.02 mfd, 200 V	Tubular
C-460A	0.1 mfd, 200 V	Tubular
C-497A	0.2 mfd, 400 V	Tubular
C-500A	0.01 mfd, 400 V	Molded

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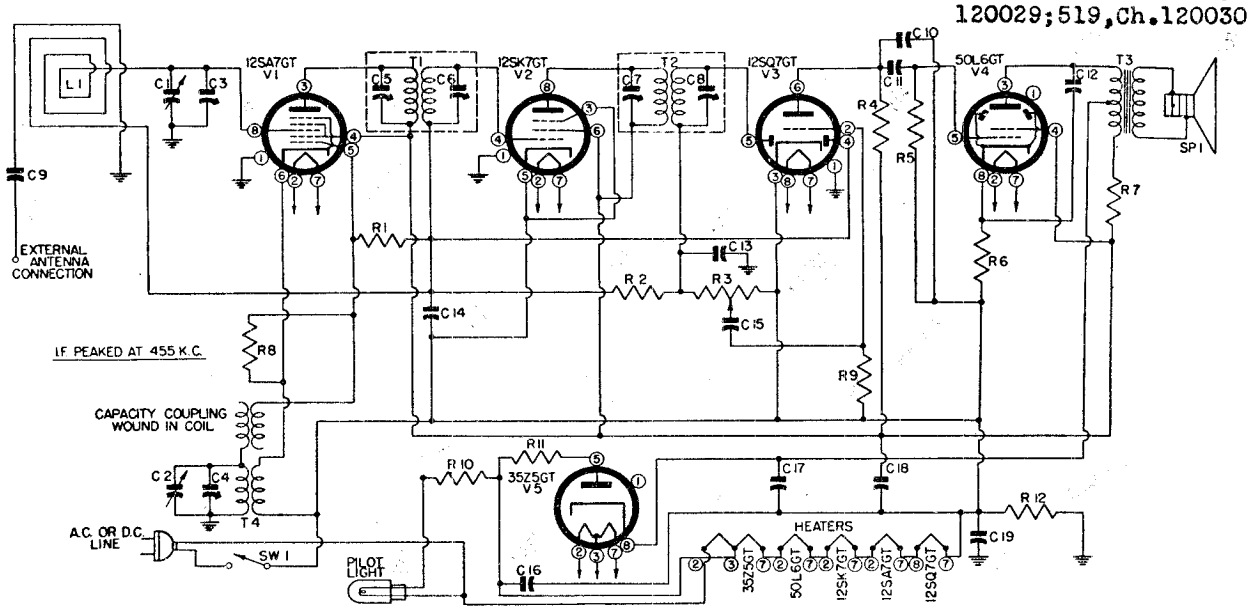
EMERSON RADIO & PHONO. CORP.

MODELS 501,502,503,504, 510,520,Ch.120,000, 120029;519,Ch.120030



The following voltage readings are d-c measurements taken from B— (line switch) in the indicated tube-socket pin. A 1000 ohms-per-volt meter should be used for all readings except those indicated by an asterisk (*), which should be taken with a d-c vacuum-tube voltmeter. Line voltage for these readings was 117 volts, 60 cycles, a.c. Measurements made with 117 volts d.c. will be lower than those given below. Take readings with the volume control set at minimum and the variable condenser closed.

	PIN NUMBER							
TUBE	1	2	3	4	5	6	7	8
12SA7			89	89	*-10			*-1.6
12SK7				*-1.6		89		89
12SQ7		*-0.7		*-1.6	-0.5	37.5		
50L6GT			110	89				6.2
35Z5GT				116		116		117

An oscillator with frequencies of 455, 600 and 1425 kc is required.

An output meter should be connected across the primary or secondary of the output transformer for observing maximum response.

Always use as weak a test signal as possible when aligning the receiver.

Plug the receiver into the power supply outlet in such a way that the ground side of the power line is connected to the receiver B—.

Location of Coils and Trimmer Adjustments

The first i-f transformer (T1) is mounted on top of the chassis deck to the right of the variable condenser. The trimmers (C5, C6) are accessible through holes in the top of the can.

The second i-f transformer (T2) is mounted on top of the chassis between the variable condenser and the speaker. The trimmers (C7, C8) are accessible through holes in the top of the can.

The trimmer for the antenna (C3) and the trimmer for the oscillator coil (C4) are located on the variable condenser. The trimmer on the front section is for the oscillator coil.

The oscillator coil (T4) is located underneath the chassis. The loop antenna acts as the antenna coil.

FREQUENCY RANGE: 540-1620 kc.

NUMBER OF TUBES: Five.

TYPE OF TUBES:
1—12SA7, pentagrid oscillator-modulator
1—12SK7, first i-f amplifier
1—12SQ7, diode detector, a-f amplifier, a.v.c.
1—50L6GT, beam power output
1—35Z5GT, half-wave rectifier

I-F Alignment

1. Rotate the variable condenser to the minimum capacity position.
2. Feed 455 kc to the converter grid (stator of the r-f section of the variable condenser) and adjust the four i-f trimmers (C5, C6, C7, C8) for maximum response.

R-F Alignment

1. Connect the oscillator to a coil composed of three to four turns of wire wound in a circle approximately 12" in diameter. This coil should be held parallel to and in line with the loop antenna of the receiver at a distance of 15 to 20 inches.
2. Radiate a signal at 1425 kc, set the dial indicator to 1425 kc, and adjust the trimmers on the variable condenser (C3, C4) for maximum response.
3. Radiate a 600 kc signal and tune in the signal on the receiver. Adjust the loose outside turn of the loop antenna for maximum response. This loose turn may be moved to either side of the center. Fasten it in the position which gives maximum response.
4. Repeat steps 2 and 3 until no further improvement is evident.

POWER SUPPLY: A.C. or D.C.

VOLTAGE RATING: 105-125 volts.

POWER CONSUMPTION: 30 watts.

DIAL CORD REPLACEMENT

Draw the cord snugly around the condenser pulley and knot it, with no slack, near the notch in the pulley, after which the spring may be hooked to the cord and pulley.

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The color coding of the i-f transformer leads is as follows:
Grid—green Plate—blue
Grid return—black B+—red

All models have self-contained antennas and do not require additional antenna connections. For permanent home installations, however, if it is desired to improve reception of weak stations, an additional outdoor antenna may be used. For this purpose a lead has been brought out of the rear near the line cord.

Models using 120000 chassis use a dial plate on which the frequency is calibrated through 320°. The dial plate on 120029 chassis is calibrated through 180°.

If replacements are made or the wiring disturbed in the r-f section of the circuit, the receiver should be carefully realigned.

In operating the receiver on d.c., it may be necessary to reverse the line plug for correct polarity.

PARTS LIST FOR MODELS 501,502,503,504,510,519,520 WITH EXCEPTIONS AS NOTED BELOW

Schematic Symbol	Part No.	DESCRIPTION	PRICE
C1, C2	900170	Two-gang variable condenser (120000 chassis)	$
C1, C2	900290	Two-gang variable condenser (120029 chassis), or,	
C1, C2	900160	Two-gang variable condenser (120029 chassis) and 120030 Chassis	4.50
C3		Trimmer, part of variable condenser	
C4		Trimmer, part of variable condenser	
C5, C6		Trimmers, part of first i-f transformer	
C7, C8		Trimmers, part of second i-f transformer	
C9, C15	920010	0.002 mfd., 600 volt condenser	.20
C10	920170	0.001 mfd., 600 volt condenser	.20
C11, C12	920020	0.02 mfd., 400 volt condenser	.20
C13	910000	0.00022 mfd. mica condenser	.20
C14	920040	0.1 mfd., 200 volt condenser	.20
C16	920030	0.05 mfd., 400 volt condenser	.20
C17, C18	925000	30-50 mfd., 150 V. dual dry-electrolytic condenser; C17—30 mfd., C18—50 mfd.	1.25
C19	920050	0.2 mfd., 200 volt condenser	.25
L1	700000	Loop antenna, or	1.05
L1	700200	Loop antenna	1.25
R1, R9	397000	15 meg., ¼ watt resistor	.12
R2	321330	3.3 meg., ¼ watt resistor	.12
R3	390010	0.5 meg. volume control	1.10
R4, R5	321130	470,000 ohms, ¼ watt resistor	.12
R6	340290	150 ohms, ½ watt resistor	.14
R7	370490	1000 ohms, 1 watt resistor	.16
R8	310810	22,000 ohms, ¼ watt resistor	.12
R10	340010	10 ohms, ½ watt resistor	.14
R11	397040	15 ohms, 1 watt wire-wound resistor	.16
R12	321050	220,000 ohms, ¼ watt resistor	.12
SP1	180000	P.M. speaker	5.00
SW1		Line switch, part of volume control	
T1	720000	First i-f transformer	1.65
T2	720100	Second i-f transformer	1.65
T3	734000	Output transformer	1.85
T4	716010	Oscillator coil	1.00
	140000	Cabinet, catalin (Models 501, 502)	9.75
	140005	Cabinet, walnut (Model 504)	9.00
	140006	Cabinet, mahogany (Model 504)	9.00
	460000	Lucite front, square holes	5.00
	460010	Lucite front, round holes	5.00
	460370	Rear cover (Models 501, 502)	1.35
	460380	Rear cover (Model 504), or	1.35
	450040	Rear cover (Model 504)	1.35
	460470	Knob	.10
		DIAL PARTS	
	807000	Pilot light	.09
	507100	Pilot light socket	.20
	520019	Dial backplate (120000 chassis)	1.00
	520500	Dial backplate (120029 chassis)	
	525010	Dial pointer assembly	.10
	280103	Drive shaft	.20
	280330	Shaft extension (for use with 900160 variable condenser)	.15
	587000	Pully spring	.05

(Specify part numbers when ordering. List price each effective as of January 1, 1946. (Subject to change without notice.)

MODEL 503

140001	Cabinet, walnut	9.00	140031
140014	Cabinet, mahogany	9.00	450040
620000	Rear cover, walnut	1.35	460380
620001	Rear cover, mahogany	1.35	460140
460140	Knob	.10	
520080	Dial crystal	.20	525120
520200	Dial crystal escutcheon	.45	520470
			520200

MODEL 510

140005	Cabinet, walnut	9.00	
140006	Cabinet, mahogany	9.00	140000
450330	Black plastic front, square holes	1.25	450230
450040	Rear cover, or	1.35	450250
460380	Rear cover	1.35	460370
460470	Knob	.10	460150
520080	Dial crystal	.20	520080

MODEL 519

Cabinet, walnut	9.00	
Rear cover, or	1.35	
Rear cover	1.35	
Knob	.10	
Dial backplate	.35	412600
Dial pointer assembly	.20	
Dial crystal	.65	
Dial crystal escutcheon	.45	

MODEL 520

Cabinet, onyx catalin	9.75	
Ivory plastic front, square hole	2.00	
Ivory plastic front, round hole	2.00	
Rear cover	1.35	
Knob	.10	
Dial crystal	.20	

Specify part numbers when ordering. List price each effective as of January 1, 1946. (Subject to change without notice.)

Schematic Symbol	Part No.	DESCRIPTION	PRICE
		MODELS: 507, 509, 518	
C1, C2	900160	Two-gang variable condenser	$4.50
*C3, C4		Trimmers, part of variable condenser	
*C5, C6, C7, C8		Trimmers, part of i-f transformers	
C9, C15	920010	0.002 mfd., 600 V. paper condenser	.20
C10	920240	500 mmfd., 600 V. paper condenser	.20
C11, C12	920020	0.02 mfd., 400 V. paper condenser	.20
C13	910000	220 mmfd., 600 V. mica condenser	.20
C14	920040	0.1 mfd., 200 V. paper condenser	.20
C16	920030	0.05 mfd., 400 V. paper condenser	.20
C17, C18	925000	Dual electrolytic condenser, 150 V.; C20—30 mfd., C21—50 mfd.	1.25
C19	920050	0.2 mfd., 200 V. paper condenser	.25
L1	700000	Loop antenna assembly, or	1.05
L1	700200	Loop antenna assembly	1.25
R1, R9	397000	15 meg., ¼ watt carbon resistor	.12
R2	321330	3.3 meg., ¼ watt carbon resistor	.12
R3	390000	Volume control with line switch 0.5 megohm	1.10
R4, R5	321130	470,000 ohms, ¼ watt carbon resistor	.12
R6	340290	150 ohms, ½ watt carbon resistor	.14
R7	370490	1000 ohms, 1 watt carbon resistor	.16
R8	310810	22,000 ohms, ¼ watt carbon resistor	.12
R10	340010	6.8 ohms, ½ watt carbon resistor	.12
R11	397040	15 ohms, 1 watt wire-wound resistor	.16
R12	321050	220,000 ohms, ¼ watt carbon resistor	.12
SP1	180000	Speaker, 5" permanent magnet (less output transformer)	5.00
*SW1		Line switch, part of R3	
T1	720000	Double-tuned 455 kc. first i-f transformer	1.65
T2	720100	Double-tuned 455 kc. second i-f transformer	1.65
T3	734000	Output transformer	1.85
T4	716010	Oscillator coil	1.00
	140007	Cabinet (Model 507, ivory)	4.35
	140015	Cabinet (Model 507, mottled brown)	2.55
	140010	Cabinet (Model 509, black)	2.55
	140016	Cabinet (Model 509, mottled brown)	2.55
	140034	Cabinet (Model 518)	2.55
	460150	Knob for 140007 cabinet	.10
	460140	Knob for 140015 and 140034 cabinets	.10
	460470	Knob for 140010 and 140016 cabinet	.10
	450050	Molded back for 140007 cabinet	1.30
	450060	Molded back for 140015 cabinet	.65
	450070	Molded back for 140010 cabinet	.65
	450080	Molded back for 140016 and 140034 cabinets	.65
	560120	Masonite back for 140007 cabinet	.50
	560110	Masonite back for 140015 cabinet	.50
	560130	Masonite back for 140010 cabinet	.50
	560140	Masonite back for 140016 cabinet	.50
	560220	Masonite back for 140034 cabinet	.25
	583010	Line cord	.60
		DIAL PARTS	
	507090	Pilot light socket	.20
	807000	Pilot light, 6.3 V., 0.15 amp., Mazda No. 47	.09
	520009	Dial backplate	.20
	525080	Dial pointer	.10
	520190	Dial crystal (Models 507 and 509), or	.50
	520350	Dial crystal (Models 507 and 509)	.75
	520440	Dial crystal (Model 518)	.45
	587000	Drive cord spring	.05
	280003	Drive shaft	.15

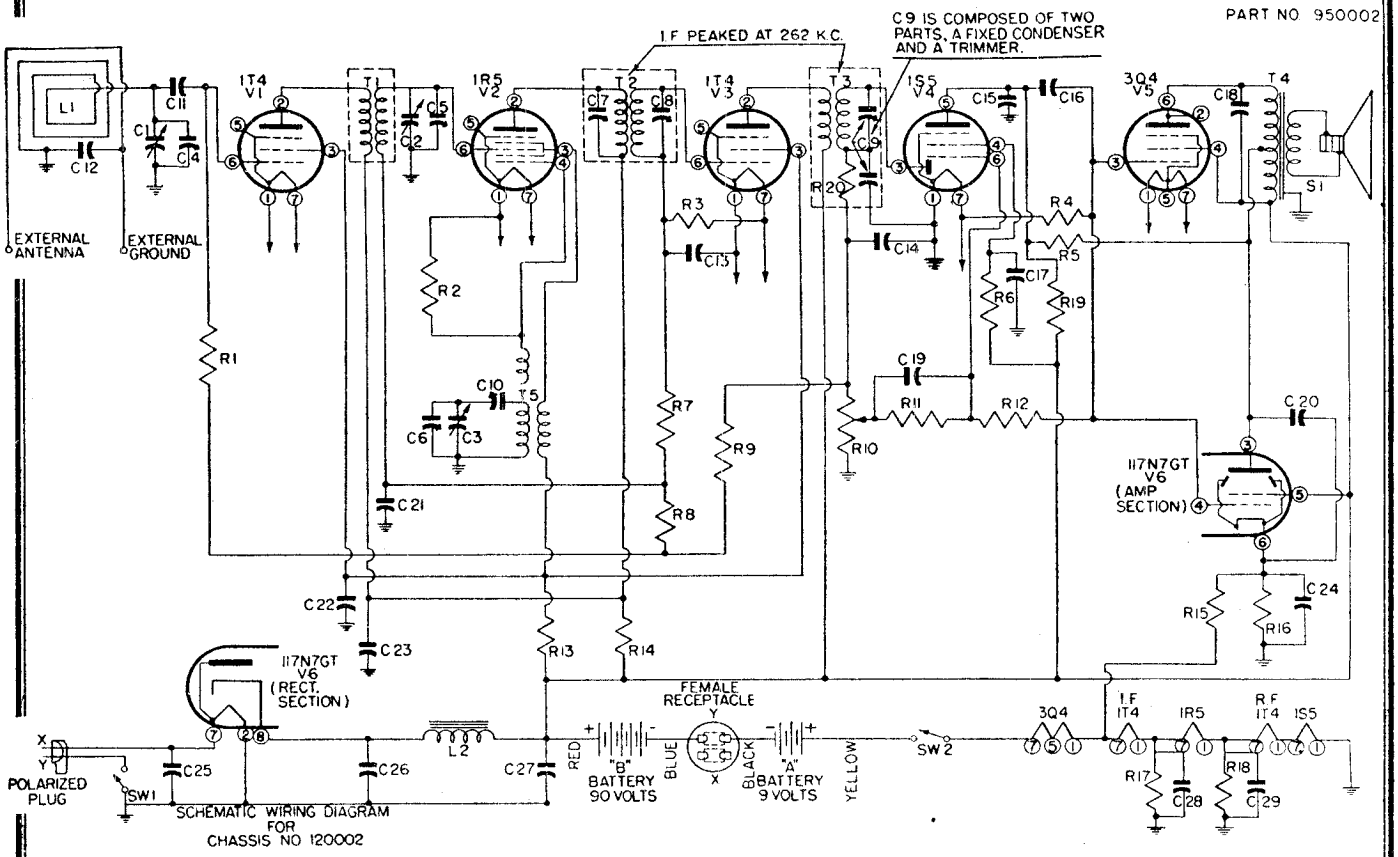
*Not supplied separately.

MODEL: 511*

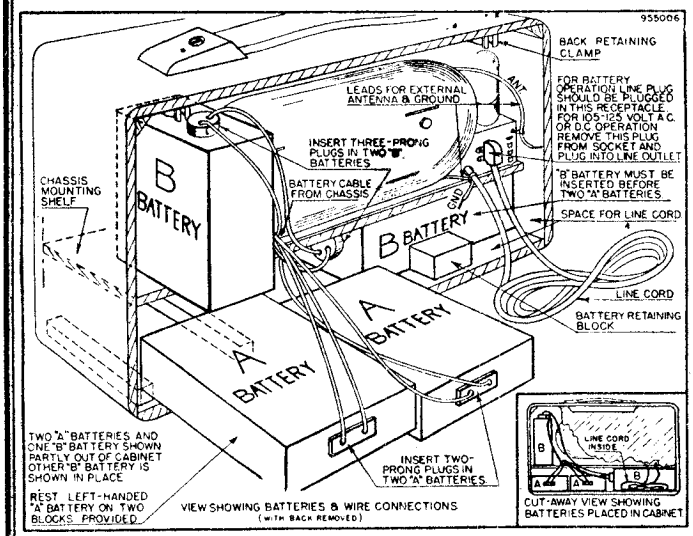
*PARTS LIST OF MODEL 511 SAME AS THAT OF MODEL 507 WITH THE FOLLOWING EXCEPTIONS:

C1, C2	900280	Two-gang variable condenser	$4.50
C10	920000	200 mmfd., 600 V. paper condenser	.20
R3	390090	Volume control with line switch 0.5 megohm	1.10
T4	716010	Oscillator coil	1.00
	140017	Cabinet, walnut	2.95
	450110	Knob	.10
	470020	Bottom cover assembly	.80
	583010	Line cord	.60
		DIAL PARTS	
	507120	Pilot light socket	.20
	807000	Pilot light, 6.3 V., 0.15 amp., Mazda No. 47	.09
	525140	Dial pointer assembly	.35
	520240	Dial crystal	.50
	587000	Drive cord spring	.05
	280203	Drive shaft	.15

EMERSON RADIO & PHONO. CORP. MODEL 505, Ch. 120002



Battery Installation


955006
BACK RETAINING CLAMP
LEADS FOR EXTERNAL ANTENNA & GROUND
FOR BATTERY OPERATION LINE PLUG SHOULD BE PLUGGED IN THIS RECEPTACLE FOR 105-125 VOLT A.C. OR D.C. OPERATION REMOVE THIS PLUG FROM SOCKET AND PLUG INTO LINE OUTLET
INSERT THREE-PRONG PLUGS IN TWO "B" BATTERIES
BATTERY CABLE FROM CHASSIS
"B" BATTERY MUST BE INSERTED BEFORE TWO "A" BATTERIES
SPACE FOR LINE CORD
CHASSIS MOUNTING SHELF
B BATTERY
A BATTERY
LINE CORD
BATTERY RETAINING BLOCK
TWO "A" BATTERIES AND ONE "B" BATTERY SHOWN PARTLY OUT OF CABINET OTHER "B" BATTERY IS SHOWN IN PLACE
REST LEFT-HANDED "A" BATTERY ON TWO BLOCKS PROVIDED
INSERT TWO-PRONG PLUGS IN TWO "A" BATTERIES
VIEW SHOWING BATTERIES & WIRE CONNECTIONS (WITH BACK REMOVED)
LINE CORD INSIDE
CUT-AWAY VIEW SHOWING BATTERIES PLACED IN CABINET

TYPE OF TUBES:

1—1R5, oscillator-modulator

2—1T4, r-f and i-f amplifiers

1—1S5, 2nd detector, a.v.c., a-f amplifier

1—3Q4, beam power output (battery operation)

1—117N7, beam power output and half-wave rectifier (line operation)

POWER SUPPLY: Battery, a.c. or d.c.

VOLTAGE RATING: 105-125 volts a.c.-d.c. (line operation).

POWER CONSUMPTION: 20 watts (line operation).

CURRENT DRAIN:

"A" Battery—0.05 amp.

"B" Battery—0.01 amp.

BATTERY COMPLEMENT

The cabinet is designed to house the complete set of batteries. The battery complement should be as follows:

Battery Type	Number Required	Eveready Part No.	Rayovac Part No.	Burgess Part No.
4½ volt "A"	2	746 (plug-in type)	P83A or EM-83 (plug-in type)	3G (plug-in type)
45 volt "B"	2	482 Minimax (plug-in type)	———	———

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MODEL 505,Ch.120002

EMERSON RADIO & PHONO. CORP.

Schematic Symbol	Part No.	DESCRIPTION	PRICE
C1, C2, C3	900080	Three-gang variable condenser	$5.50
*C4		Trimmer part of C1	
*C5		Trimmer, part of C2	
*C6		Trimmer, part of C3	
*C7, C8		Trimmers, part of T2	
*C9		Trimmer and fixed condenser, part of T3	
C10	900110	Padding condenser	.45
C11, C13	920060	0.05 mfd., 200 V. condenser	.20
C12, C18	920010	0.002 mfd., 600 V. condenser	.20
C14	910010	110 mmfd., mica condenser	.20
C15	910050	400 mmfd., mica condenser	.25
C16, C19, C21, C22, C29	920100	0.02 mfd., 200 V. condenser	.20
C17, C20	920090	0.01 mfd., 400 V. condenser	.20
C23	920020	0.02 mfd., 400 V. condenser	.20
C24	925090	100 mfd., 25 V. electrolytic condenser	.90
C25	920030	0.05 mfd., 400 V. condenser	.20
C26, C27	925050	20-40 mfd., 135 V. dual electrolytic condenser	1.20
C28	920110	0.25 mfd., 100 V. condenser	.25
L1	700090	Loop antenna	1.20
L2	737010	Filter choke	1.95
R1, R3, R5, R6, R7, R8	311330	3.3 meg., ¼ watt resistor	.12
R2	310970	100,000 ohms, ¼ watt resistor	.12
R4, R19	321130	470,000 ohms, ¼ watt resistor	.12
R9	321290	2.2 meg. ¼ watt resistor	.12
R10	390020	Volume control, 500,000 ohms	1.10
R11	311390	5.6 meg., ¼ watt resistor	.12
R12	321450	10 meg., ¼ watt resistor	.12
R13	340770	15,000 ohms, ½ watt resistor	.14
R14	340630	3,900 ohms, ½ watt resistor	.14
R15	310130	33 ohms, ¼ watt resistor	.12
R16	310610	3,300 ohms, ¼ watt resistor	.12
R17	310570	2,200 ohms, ¼ watt resistor	.12
R18	310450	680 ohms, ¼ watt resistor	.12
*R20		47,000 ohms, ¼ watt resistor, part of T4	
S1	180006	Permanent magnet speaker, 5"	5.00
*SW1		Line switch on volume control R10	
*SW2		Battery switch on volume control R10	
T1	713000	R.F. coil	1.60
T2	720170	First i-f transformer	1.65
T3	720190	Second i-f transformer	2.20
T4	734040	Output transformer	1.85
T5	716030	Oscillator coil	1.10
	140002	Cabinet	7.50
	460470	Knob	.10
*Not supplied separately.		DIAL PARTS	
	280133	Drive shaft	.15
	587000	Drive cord spring	.05
	520039	Dial backplate	.10
	525120	Pointer assembly	.20
	460040	Dial crystal	.75

List price each effective as of January 1, 1946. (Prices subject to change without notice.)

GENERAL NOTES

1. The color coding of the i-f transformer leads is as follows:
   Grid—green Plate—blue
   Grid return—black B+—red
2. The color coding of the battery cable is as follows:
   Red—B+, 90 Volts Yellow—A+, 9 Volts
   Blue—B— Black—A—
3. If replacements are made in the r-f section of the circuit, the receiver should be carefully realigned.
4. A.C.-D.C. Operation: Remove the rear cover; it is held in place by two spring latches. Take out the line cord, removing the plug from its receptacle at the rear of the chassis. Insert the plug in the wall outlet. If the power supply is d.c. and the receiver does not operate at first, remove the plug from the wall outlet, turn it half way around and reinsert it in the outlet, thus obtaining the proper polarity.

An oscillator with frequencies of 262, 600 and 1425 kc is required.

An output meter should be connected across the primary or secondary of the output transformer for observing maximum response.

Always use as weak a test signal as possible, turning down the output of the test oscillator as the alignment of the receiver progresses.

Plug the receiver into the power supply in such a way that the ground side of the power line is connected to the receiver B—.

Location of Coils and Trimmer Adjustments

The oscillator coil (T5) is located beneath the chassis. The trimmer for the oscillator (C6) is on the middle section of the variable condenser.

The interstage coil (T1) is the shielded coil located beneath the chassis. Its trimmer (C5) is on the front section of the variable condenser.

The trimmer for the loop antenna (C4) is on the last section of the variable condenser (the section nearest the loop).

The i-f transformers are mounted on top of the chassis. The first i-f transformer (T2) is mounted next to the loop. The second i-f transformer (T3) is mounted next to the dial.

The series padder (C10) is located on the chassis between the variable condenser and the shielded 1T4 tube.

I-F Alignment

Rotate the variable condenser to the minimum capacity position. Feed 262 kc to the converter grid and adjust the three i-f trimmers for maximum response.

Interstage Alignment

1. Set the dial indicator to 1425 kc, feed 1425 kc to the r-f grid, and adjust the oscillator and interstage trimmers for maximum response.
2. Set the dial indicator to 600 kc, feed 600 kc to the r-f grid, and adjust the oscillator padding trimmer by rocking in the signal for maximum response.
3. Repeat steps 1 and 2 until no further improvement is possible.

Loop Alignment

Connect the test oscillator to a coil composed of three or four turns of wire wound in a loop approximately 12" in diameter. This coil should be held parallel to and in line with the receiver's loop at a distance of 15 to 20 inches.

1. Radiate a signal at 1425 kc, tune in the signal on the receiver, and adjust the loop trimmer for maximum response.
2. Radiate a signal at 600 kc, tune in the signal on the receiver, and adjust the loose outside turn of the loop antenna for maximum response. This loose turn may be moved to either side of the center. Fasten it in the position which gives maximum response.
3. Repeat steps 1 and 2 until no further improvement is possible.

	PIN NUMBER							
TUBE	1	2	3	4	5	6	7	8
1T4(VI)	1.2	88	56		1.2	*0.3	2.4	
1R5	2.4	88	56	-8	2.4	*1.5	3.7	
1T4(V2)	3.7	98	56		3.7	*2.3	4.9	
1S5	0		*-0.3	*19	*50	*-0.2	1.2	
3Q4	4.9	92	*1.1	98	4.9	92	4.9	
117N7			92	*1.1	98	6.25		125

The following voltage readings are d-c measurements taken with a line voltage of 117 volts, 60 cycles from B— (chassis) to the indicated tube-socket pin. A 1000 ohms-per-volt meter should be used for all readings except those indicated by an asterisk (*), which should be taken with a d-c vacuum-tube voltmeter. Take readings with the volume control set at minimum and the variable condenser closed.

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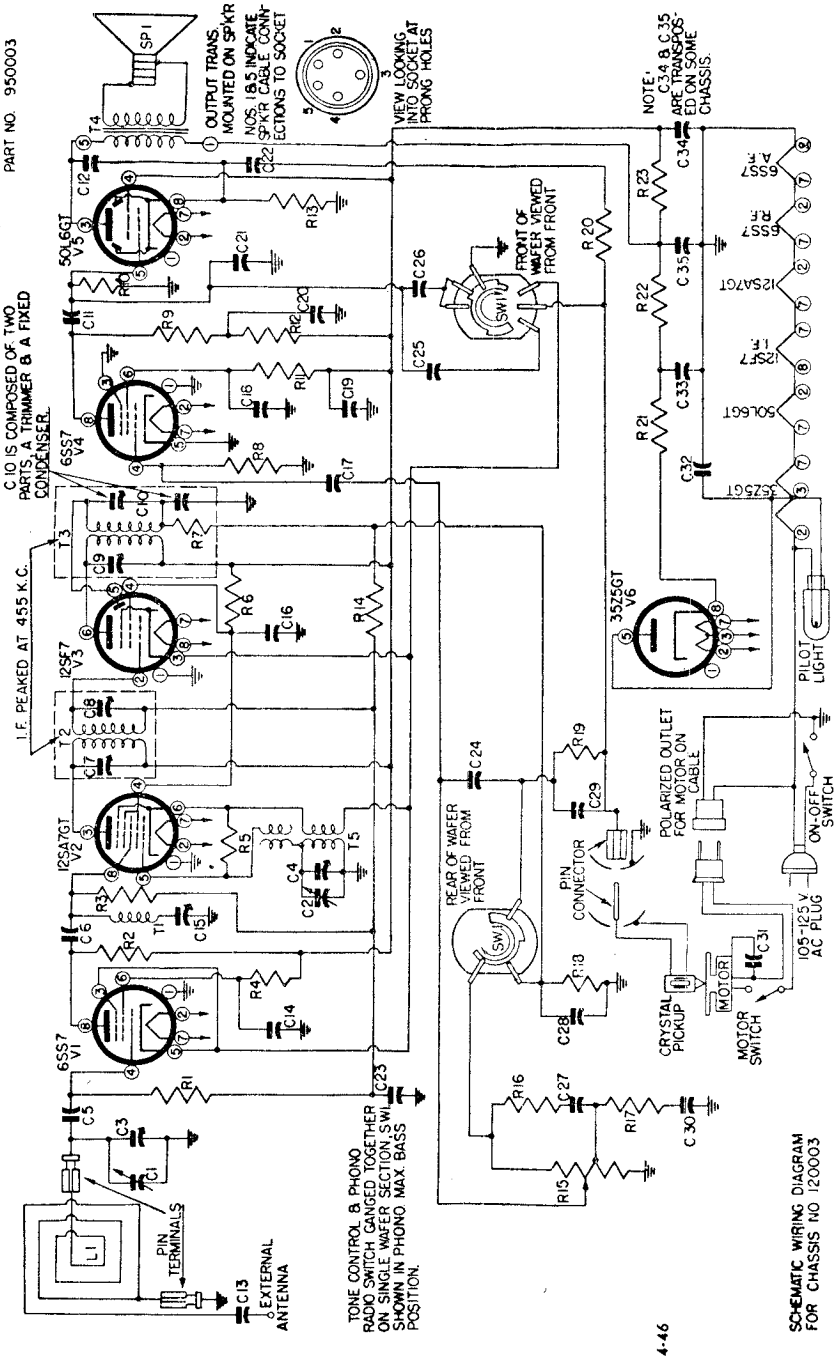
MODEL 506, Ch. 120003

EMERSON RADIO & PHONO. CORP.


PART NO. 950003
C.10 IS COMPOSED OF TWO PARTS, A TRIMMER & A FIXED CONDENSER.
I.F. PEAKED AT 455 K.C.
6SS7 V1
12SA7GT V2
12SF7 V3
6SS7 V4
50L6GT V5
3525GT V6
OUTPUT TRANS. MOUNTED ON SPKR
NOS. 1 & 5 INDICATE SPKR. CABLE CONNECTIONS TO SOCKET
VIEW LOOKING INTO SOCKET AT PRONG HOLES
NOTE: C34 & C35 ARE TRANSPOSED ON SOME CHASSIS.
FRONT OF WAFER VIEWED FROM FRONT
REAR OF WAFER VIEWED FROM FRONT
PIN CONNECTOR
POLARIZED OUTLET FOR MOTOR ON CABLE
PILOT LIGHT
ON-OFF SWITCH
105-125 V AC PLUG
CRYSTAL PICKUP
MOTOR
MOTOR SWITCH
PIN TERMINALS
EXTERNAL ANTENNA
TONE CONTROL & PHONO RADIO SWITCH GANGED TOGETHER ON SINGLE WAFER SECTION, S.W. SHOWN IN PHONO, MAX. BASS POSITION.
4-46
SCHEMATIC WIRING DIAGRAM FOR CHASSIS NO. 120003

The following voltage readings are d-c measurements taken from B— (chassis) to the indicated tube-socket pin. A 1000 ohms-per-volt meter should be used for all readings except those indicated by an asterisk (*), which should be taken with a d-c vacuum-tube voltmeter. Line voltage for these readings was 117 volts, 60 cycles, a.c. Take readings with the volume control set at minimum, the variable condenser closed, and the phonograph-radio switch in the treble radio position.

The color coding of the i-f transformer leads is as follows:
Grid return—black
Grid—green
Plate—blue
B+—red

TUBE	PIN NUMBER							
	1	2	3	4	5	6	7	8
6SS7 (V1)				*-0.9		55		52
12SA7			92	84	*-8.6			*-0.82
12SF7				84		92		
6SS7 (V4)				*-7.5		*9		*42
50L6GT			100	93		75		5.6
35Z5GT				115		108		120

2—6SS7, r-f and a-f amplifiers
1—12SA7, pentagrid oscillator-modulator
1—12SF7, diode detector, i-f amplifier, a.v.c.
1—50L6GT, beam power output
1—35Z5GT, half-wave rectifier

POWER SUPPLY: A.C. only, 60 cycles.

VOLTAGE RATING: 105-125 volts.

POWER CONSUMPTION:
30 watts for the receiver.
20 watts for the phono motor.

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An oscillator with frequencies of 455, 600, and 1425 kc is required.

An output meter should be connected across the primary or secondary of the output transformer for observing maximum and minimum response, as required.

Always use as weak a test signal as possible, turning down the output of the test oscillator as the alignment of the receiver progresses.

Turn the volume control on full and set the tone control in the most brilliant position.

Location of Coils and Trimmer Adjustments

The first i-f transformer (T2) is mounted on top of the chassis deck next to the 12SA7 tube. The trimmers (C7, C8) are accessible through holes in the top of the can.

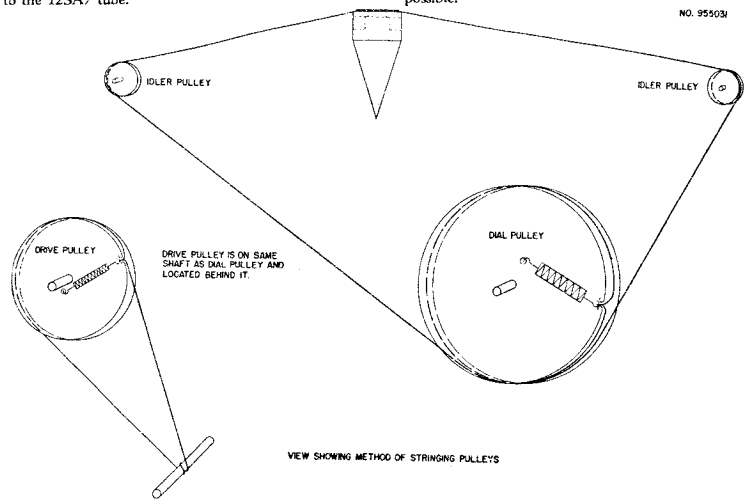
The second i-f transformer (T3) is mounted on top of the chassis next to the 50L6 tube. The trimmers (C9, C10) are accessible through holes in the top of the can.

The trimmer (C2) for the oscillator coil (T5) is located on the rear section of the variable condenser.

The antenna trimmer (C3) is mounted on the variable condenser mounting bracket.

The oscillator coil is located underneath the chassis. The loop antenna acts as the antenna coil.

The wave trap (T1) is located on the top deck of the chassis base adjacent to the 12SA7 tube.



VIEW SHOWING METHOD OF STRINGING PULLEYS

I-F Alignment and Wave Trap Alignment

1. Set the variable condenser to the minimum capacity position.
2. Feed 455 kc to the grid (pin 8) of the 12SA7 tube through a 0.01 mfd. condenser and adjust the four i-f trimmers (C7, C8, C9, C10) for maximum response.
3. Feed 455 kc to the external antenna lead and adjust the wave trap (T1, C15) for minimum response.

R-F Alignment

1. Set the variable condenser at maximum capacity and the front edge of the pointer opposite the maximum capacity marker on the lower edge of the dial plate. The markers are small triangular indentations on the front edge. Looking at the front of the set from left to right are calibration points for maximum capacity, 600 kc, 1425 kc, and 1600 kc.
2. Connect the test oscillator to a coil composed of three or four turns of wire wound in a circle approximately 12" in diameter. Place the coil parallel to and in line with the receiver loop at a distance of approximately 15 to 20 inches. During alignment procedure, make sure the relative positions of the receiver and loop are similar to actual operating positions when mounted on the cabinet.
3. Radiate a signal at 1425 kc, set the dial indicator opposite the 1425 kc marker, and adjust both oscillator and antenna trimmers for maximum response.
4. Radiate a 600 kc signal, tune in the signal on the receiver, and adjust the loose outside turn of the loop antenna for maximum response. This loose turn may be moved to either side of the center. Fasten it in the position which gives maximum response.
5. Repeat steps (3) and (4) until no further improvement is possible.

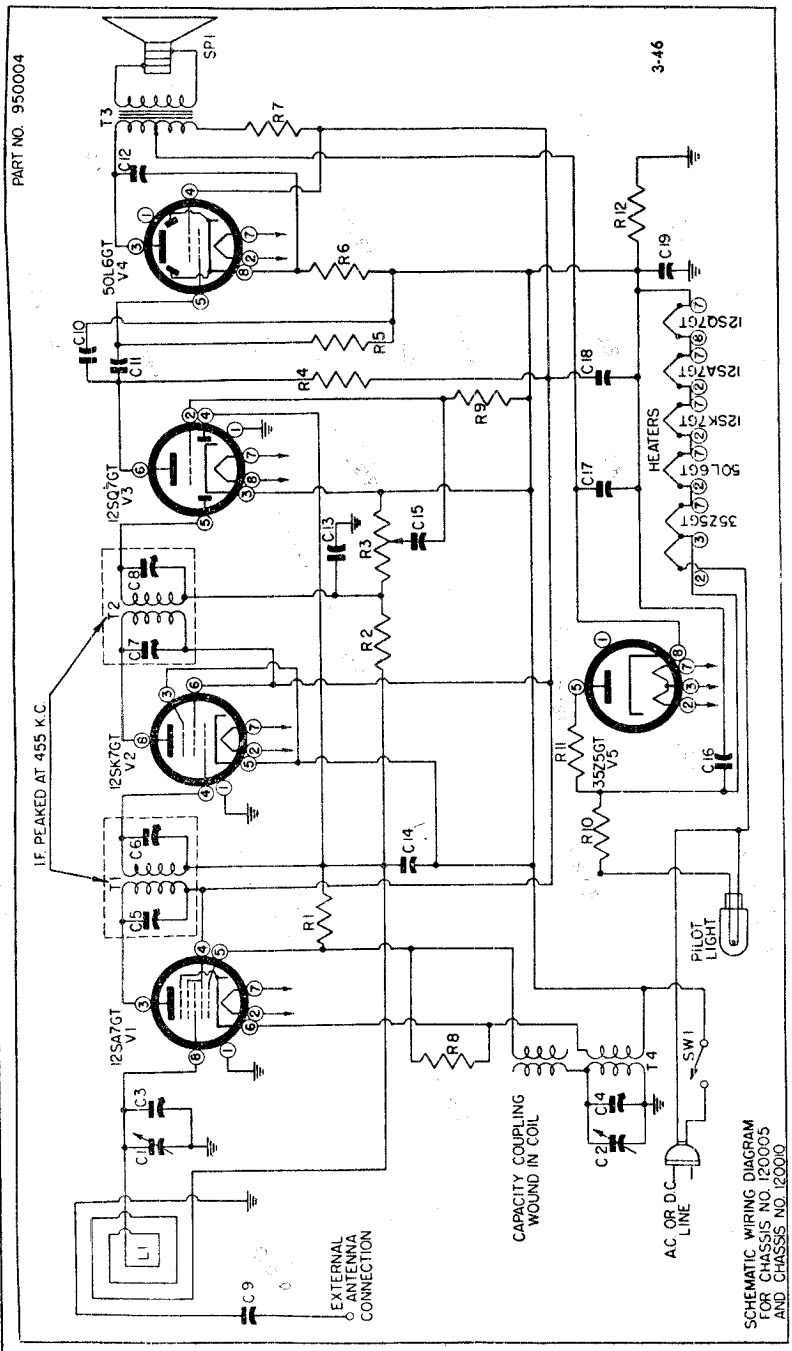
Schematic Symbol	Part No.	DESCRIPTION	PRICE
C1, C2	900180	Two-gang variable condenser	$4.50
C3	900190	1.6 - 12 mmfd. trimmer	.25
C4		Trimmer, part of C2	
C5, C28	910000	0.00022 mfd. mica condenser	.20
C6, C29	910010	0.00011 mfd. mica condenser	.20
*C7, C8		Trimmers, part of T2	
*C9		Trimmer, part of T3	
*C10		Trimmer and fixed condenser, part of T3	
C11	920020	0.02 mfd., 400 V. condenser	.20
C12, C25	920180	0.005 mfd., 400 V. condenser	.20
C13, C17	920010	0.002 mfd., 600 V. condenser	.20
C14, C18, C19, C20, C22	920060	0.05 mfd., 200 V. condenser	.20
*C15		Trimmer, part of T1	
C16	925100	8 mfd. 150 V. electrolytic condenser	.60
C21	910050	0.0004 mfd. mica condenser	.25
C23	920040	0.1 mfd., 200 V. condenser	.20
C24	910030	0.000026 mfd. mica condenser	.20
C26	920010	0.002 mfd., 600 V. condenser	.20
C27	910040	0.00025 mfd. mica condenser	.20
C30	920170	0.001 mfd., 600 V. condenser	.20
C31	920500	0.05 mfd., 200 V. condenser	.20
C32	920030	0.05 mfd., 400 V. condenser	.20
C33, C34, C35	925080	20, 40, 80 mfd., 150 V. multiple electrolytic condenser; C33—40 mfd., C34—20 mfd., C35—80 mfd.	1.75
L1	700070	Loop antenna	1.25
R1	321210	1 meg., ¼ watt resistor	.12
R2	310730	10,000 ohms, ¼ watt resistor	.12
R3, R5	310810	22,000 ohms, ¼ watt resistor	.12
R4	310850	33,000 ohms, ¼ watt resistor	.12
R6	340490	1,000 ohms, ½ watt resistor	.14
*R7		47,000 ohms, ¼ watt resistor, part of T3	.12
R8	321450	10 meg., ¼ watt resistor	.12
R9	321050	220,000 ohms, ¼ watt resistor	.12
R10, R16, R18, R19	321130	470,000 ohms, ¼ watt resistor	.12
R11, R20	321290	2.2 meg., ¼ watt resistor	.12
R12	310890	47,000 ohms, ½ watt resistor	.12
R13	340290	150 ohms, ½ watt resistor	.14
R14	321330	3.3 meg., ¼ watt resistor	.12
R15	390050	2.5 meg. volume control and switch	1.15
R17	320970	100,000 ohms, ¼ watt resistor	.12
R21	310050	15 ohms, ¼ watt resistor	.12
R22	397010	180 ohms, 1 watt ceramic resistor	.16
R23	370410	470 ohms, 1 watt resistor	.16
SP1	180004	Speaker, 6½" permanent magnet (less output transformer)	7.00
SW1	510100	Phono and tone switch	1.15
T1	708000	Wave trap	.90
T2	720270	First i-f transformer	1.65
T3	720370	Second i-f transformer	2.00
T4	734030	Output transformer	2.00
T5	716050	Oscillator coil, or	.80
T5	716060	Oscillator coil	.80
	583090	Line cord	.60
	140003	Cabinet, walnut	42.50
	140011	Cabinet, mahogany	42.50
	460470	Knob, volume and selector	.10
	460300	Knob, phono-radio	.10
	560080	Bottom cover	.85
	819005	Record changer, or	45.00
	819003	Record changer	40.00
		DIAL PARTS	
	807010	Pilot light No. 51	.09
	507110	Pilot light socket	.20
	411070	Dial plate	.40
	525100	Pointer	.30
	280153	Drive shaft	.15
	587000	Drive cord spring, dial	.05
	587070	Drive cord spring, variable condenser	.05

*Not supplied separately.

Specify part numbers when ordering. List price each effective as of January 1, 1946. (Prices subject to change without notice.)

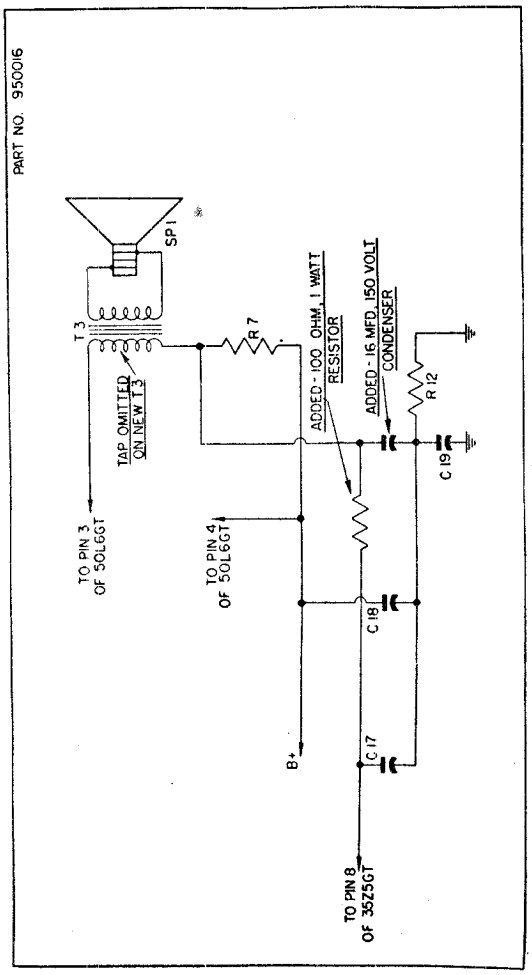
EMERSON RADIO & PHONO. CORP.

MODELS 507,509,511, 518,Ch.120005,120010



NOTE

Some 120005 chassis have a modified filter circuit and untapped output transformer. The partial schematic circuit diagram at the left indicates the revision.



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For Parts List, see P.15-2

MODELS 507,509,511, 518,Ch.120005,120010 EMERSON RADIO & PHONO. CORP.

An oscillator with frequencies of 455, 600, and 1425 kc. is required.

An output meter should be connected across the primary or secondary of the output transformer for observing maximum response.

Plug the receiver into the power supply outlet in such a way that the ground side of the power line is connected to the receiver B—.

Always use as weak a test signal as possible, turning down the output of the test oscillator as the alignment of the receiver progresses.

Location of Coils and Trimmer Adjustments

The first i-f transformer (T2) is mounted on top of the chassis deck to the right of the variable condenser. The trimmers (C6, C7) are accessible through holes in the top of the can.

The second i-f transformer (T3) is mounted on top of the chassis between the variable condenser and the speaker. The trimmers (C8, C9) are accessible through holes in the top of the can.

The trimmer for the antenna (C5) and the trimmer for the oscillator coil (C11) are located on the variable condenser. The trimmer on the front section is for the oscillator coil.

The oscillator coil (T4) is located underneath the chassis. The loop antenna acts as the antenna coil.

TYPE: Single-band superheterodyne.

FREQUENCY RANGE: 540-1620 kc.

NUMBER OF TUBES: Five.

TYPE OF TUBES:

1—12SA7, pentagrid oscillator-modulator

1—12SK7, first i-f amplifier

1—12SQ7, diode detector, a-f amplifier, a.v.c.

1—50L6, beam power output

1—35Z5, half-wave rectifier

POWER SUPPLY: A.C. or D.C.

VOLTAGE RATING: 105-125 volts.

POWER CONSUMPTION: 30 watts.

I-F Alignment

1. Rotate the variable condenser to the minimum capacity position.
2. Feed 455 kc. to the converter grid (stator of the r-f section of the variable condenser) and adjust the four i-f trimmers for maximum response.

R-F Alignment

1. Connect the oscillator to a coil composed of three to four turns of wire wound in a circle approximately 12" in diameter. This coil should be held parallel to and in line with the loop antenna of the receiver at a distance of 15 to 20 inches.
2. Radiate a signal at 1425 kc., set the dial indicator to 1425 kc., and adjust the trimmers on the variable condenser (C5, C11) for maximum response.
3. Radiate a 600 kc. signal and tune in the signal on the receiver. Adjust the loose outside turn of the loop antenna for maximum response. This loose turn may be moved to either side of the center. Fasten it in the position which gives maximum response.
4. Repeat steps (2) and (3) until no further improvement is evident.

1. If replacements are made or the wiring disturbed in the r-f section of the circuit, the receiver should be carefully realigned.
2. In operating the receiver on d.c., it may be necessary to reverse the line plug for correct polarity.
3. The color coding of the i-f transformer leads is as follows:

Grid—green	Plate—blue
Grid return—black	B+—red

4. All models have self-contained antennas and do not require additional antenna connections. For permanent home installations, however, if it is desired to improve reception of weak stations, an additional outdoor antenna may be used. For this purpose a lead has been brought out of the rear of the chassis near the line cord.
5. Some models have the loop antenna molded into the rear cover and others have a separate loop antenna assembly. Both antennas have directional properties. It is important, therefore, once the station is tuned in, to rotate the cabinet back and forth through a quarter of a circle (90 degrees), leaving it at the position where the station is received with maximum volume.

VOLTAGE ANALYSIS

The following voltage readings are d-c measurements taken from B— (line switch) to the indicated tube-socket pin. A 1000 ohms-per-volt meter should be used for all readings except those indicated by an asterisk (*), which should be taken with a d-c vacuum-tube voltmeter. Line voltage for these readings was 117 volts, 60 cycles, a.c. Measurements made with 117 volts d.c. will be lower than those given below. Take readings with the volume control set at minimum and the variable condenser closed.

	PIN NUMBER							
TUBE	1	2	3	4	5	6	7	8
12SA7			89	89	*-10			*-1.6
12SK7				*-1.6		89		89
12SQ7		*-0.7		*-1.6	*-0.5	37.5		
50L6			110	89				6.2
35Z5				116		116		117

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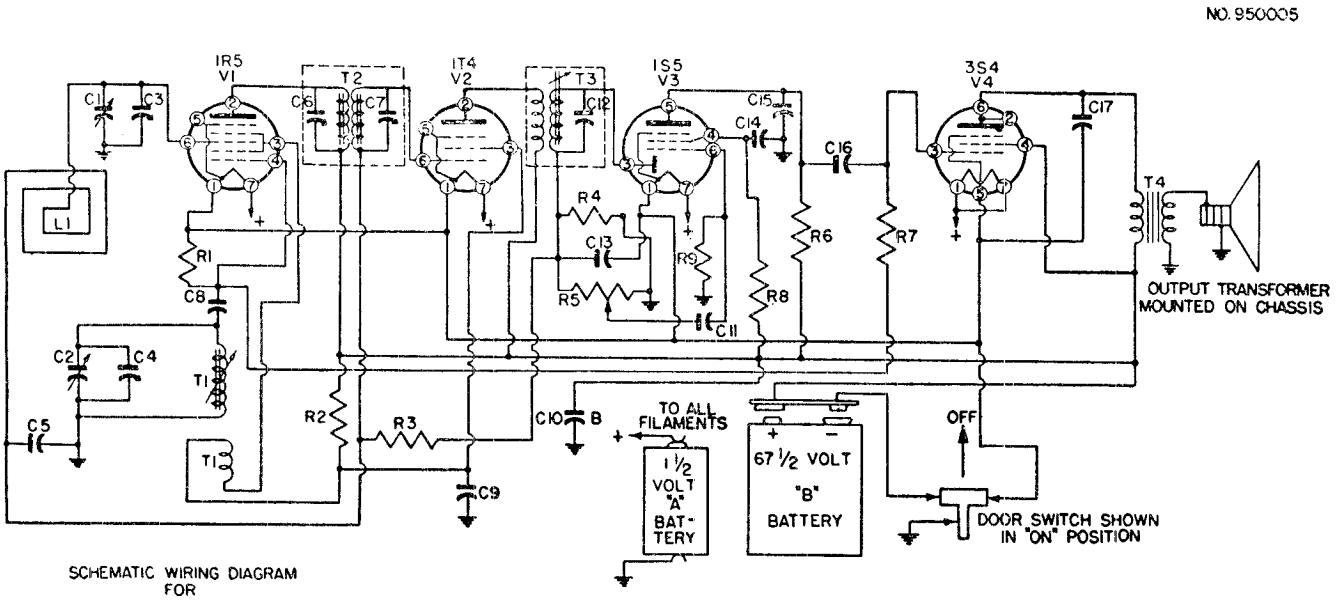
EMERSON RADIO & PHONO. CORP.

MODEL 508, Ch. 120008



SCHEMATIC WIRING DIAGRAM FOR CHASSIS NO. 120008

FREQUENCY RANGE: 540-1600 kc.

NUMBER OF TUBES: Four.

TYPE OF TUBES:
1—1R5, oscillator-modulator
1—1T4, i-f amplifier
1—1S5, 2nd detector, a.v.c., a-f amplifier
1—3S4, pentode output

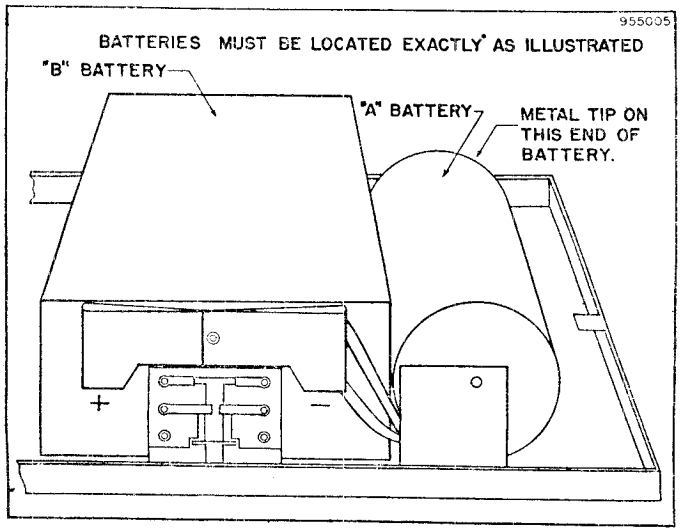
POWER SUPPLY: "A" and "B" batteries.

VOLTAGE RATING:
"A" Battery—1.5 volts
"B" Battery—67.5 volts

CURRENT DRAIN:
"A" Battery—0.25 amp.
"B" Battery—0.0075 amp.

1. Slide the button on the catch near the handle in the direction of the arrow. This loosens the rear cover, making the batteries accessible.
2. Insert batteries as shown in the accompanying diagram.
3. To reassemble fit the two slots on the end of the plastic shell opposite the handle to the tongues on the lower end of the metal frame. Keep the "B" battery in place.
4. Carefully close the shell until it fits and catches in place.

The receiver is turned on when the door is open and turned off when the door is closed.



VOLTAGE ANALYSIS

The following voltage readings are d-c measurements taken from B— (chassis) to the indicated tube-socket pin. A 1000 ohms-per-volt meter should be used for all readings except those indicated by an asterisk (*), which should be taken with a d-c vacuum-tube voltmeter. Take readings with the volume control set at minimum and the variable condenser closed. Use fresh batteries.

	PIN NUMBER						
TUBE	1	2	3	4	5	6	7
1R5		67.5	40	*-7.0		*-0.3	1.5
1T4		67.5	40			*-0.3	1.5
1S5			*-0.35	*16.5	*39	*-0.3	1.5
3S4	1.5	65	*-7.0	67.5		65	1.5

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MODEL 508,Ch.120008

EMERSON RADIO & PHONO. CORP.

An oscillator with frequencies of 455, 600, 1500, and 1610 kc is required.

An output meter should be connected across the primary or secondary of the output transformer for observing maximum response..

Always use as weak a test signal as possible, turning down the output of the test oscillator as the alignment of the receiver progresses.

Turn the volume control on full.

Location of Coils and Trimmer Adjustments

The first i-f transformer (T2) is located next to the output transformer (T4). The trimmers (C6, C7) are accessible through holes in the top of the can.

The second i-f transformer (T3) is located between the 1T4 and 1S5 tubes. The single trimming core screw (C12) extends from the end of the can.

The oscillator coil (T1) is located next to the first i-f transformer. The trimmer for the oscillator (C4) is located on the smaller variable condenser section. The 600 kc oscillator core adjustment is the brass screw protruding from the end of the oscillator coil.

The loop antenna acts as the antenna coil. The trimmer for the loop (C3) is located on the larger section of the variable condenser.

I-F Alignment

1. Rotate the variable condenser to the minimum capacity position.
2. Feed 455 kc to the grid (pin 6) of the 1R5 tube through a 0.01 mfd. condenser.
3. Adjust the three i-f trimmer screws (C6, C7, C12) for maximum response. (Clip the test signal lead to the stator of the larger capacity section of the variable condenser.)

R-F Alignment

1. Connect the test oscillator to a coil composed of three or four turns of wire wound in a circle approximately 12 inches in diameter. This coil should be placed parallel to and in line with the receiver loop at a distance of approximately 15 to 20 inches.
2. Radiate a signal at 1610 kc, rotate the variable condenser to minimum capacity, and adjust the oscillator trimmer (C4), on the smaller section of the variable condenser, for maximum response.
3. Radiate a signal at 1500 kc, tune in the 1500 kc signal, and adjust the antenna trimmer (C3), on the larger section of the variable condenser, for maximum response.
4. Radiate a signal at 600 kc, set the dial indicator to 60, and adjust the oscillator coil core trimmer while rocking the variable condenser for maximum response.
5. Return to 1610 kc and check alignment. If readjustment is necessary, repeat steps (2) to (4) until no further improvement is noted.

Battery Type	Number Required	Model
1½-volt "A"	1	Standard D-size flashlight cell (1 5/8" diameter)
67½-volt "B"	1	Eveready "Minimax" No. 467

Specify part numbers when ordering. List price each effective as of January 1, 1946. (Prices subject to change without notice.)

Schematic Symbol	Part No.	DESCRIPTION	PRICE
C1, C2	900120	Variable condenser, or	$2.50
C1, C2	900140	Variable condenser	3.50
*C3, C4		Trimmers, part of C1, C2	
C5, C9, C14	920120	0.02 mfd., 100 V. roll-type condenser	.60
*C6, C7		Trimmers, part of T2	
C8	910110	0.0002 mfd. mica condenser, or	.20
C8	928020	0.0002 mfd. ceramic condenser	.20
C10	925070	8 mfd., 100 V. dry electrolytic condenser	.60
C11, C17	920140	0.003 mfd., 150 V. roll-type condenser	.25
*C12		Condenser, part of T3	
C13, C15	928010	0.0001 mfd., ceramic condenser	.25
C16	920130	0.001 mfd., 100 V. flat roll-type condenser	.25
L1	700030	Loop assembly	.65
R1	320970	100,000 ohms, ¼ watt resistor	.12
†R2	310730	10,000 ohms, ¼ watt resistor	.12
R3	321330	3.3 meg., ¼ watt resistor	.12
R4, R7	321210	1 meg., ¼ watt resistor	.12
R5	390040	Volume control 3 megohms	.65
R6	321130	0.47 meg., ¼ watt resistor	.12
R8	321370	4.7 meg., ¼ watt resistor	.12
R9	321450	10 meg., ¼ watt resistor	.12
T1	716040	Oscillator coil	1.20
T2	760240	First i-f transformer	2.20
T3	720260	Second i-f transformer	1.75
T4	734090	Output transformer	1.80
	180002	Permanent magnet dynamic speaker	5.00
	585000	"B" battery cable	.45
	510040	Lid switch	.50
	460020	Plastic shell (black)	1.35
	460030	Plastic door	.75
	630000	Plastic loop cover (black)	.25
	410389	Metal front (maroon)	2.25
	460050	Plastic tuning wheel (black)	.20
	460060	Plastic volume wheel (black)	.20
	595000	Leather handle	.25
	410969	Release catch, male	.20
	410959	Release catch, female	.40

†Some units contain R2 resistors varying in value from 8200 to 22,000 ohms, as selected in production. *Not supplied separately

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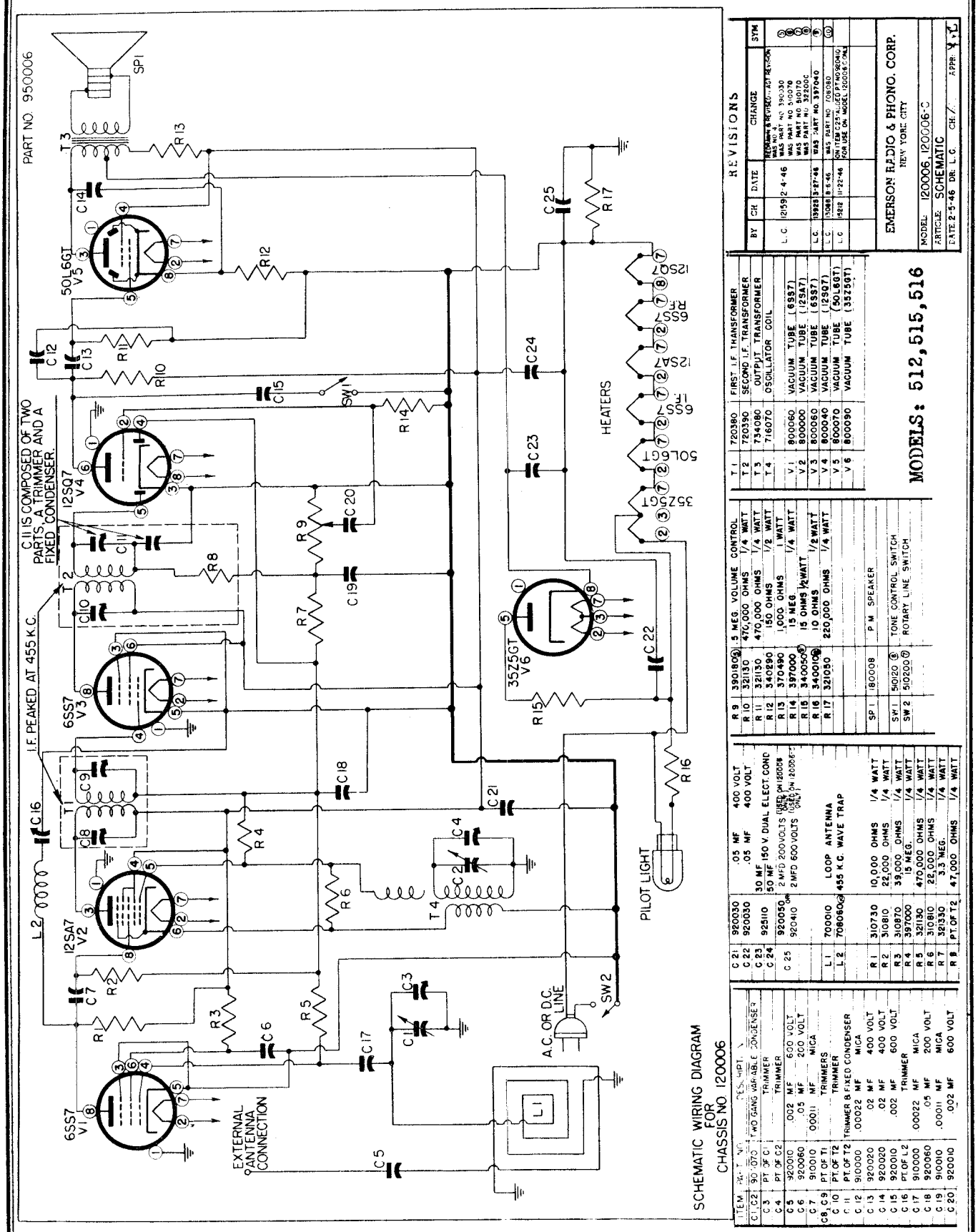
EMERSON RADIO & PHONO. CORP.

MODELS 512,515, 516,Ch.120006



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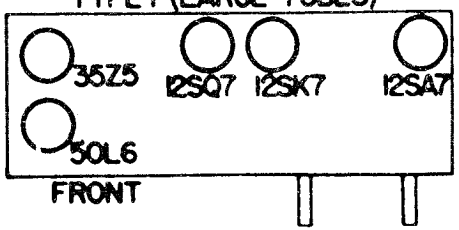
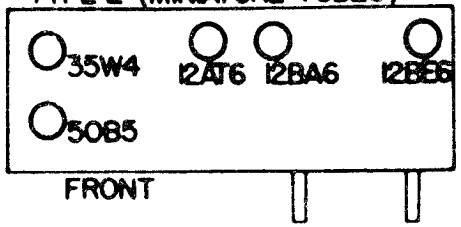
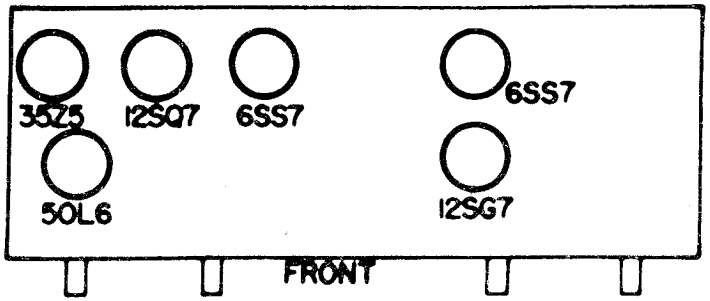
TYPE 1 (LARGE TUBES)



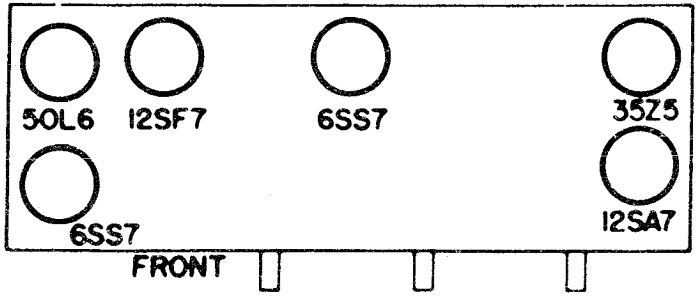
TYPE 2 (MINIATURE TUBES)



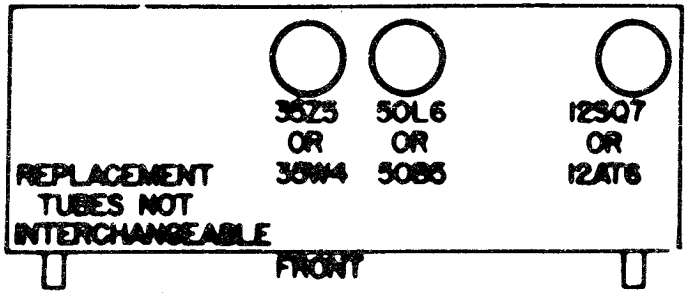
MODELS: 501,502,503,504,507,509,510,511, 517,518,519,520,525,539,541



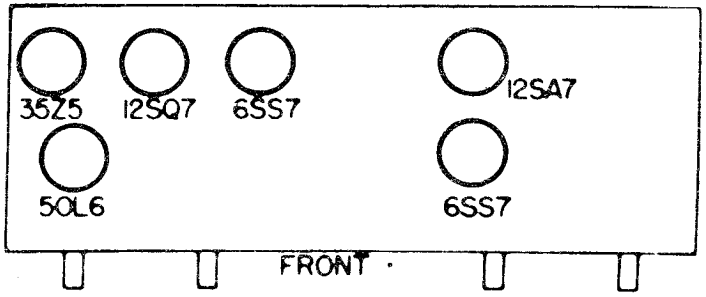
MODELS: 513,514



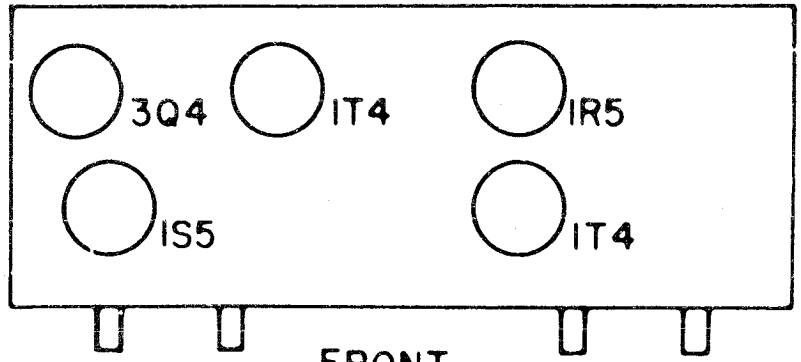
MODEL 506



MODELS: 521,542



MODELS: 512,515,516



MODELS: 531,532,533

EMERSON RADIO & PHONO. CORP.

MODELS 505,523
MODEL 508

FOR BATTERY OPERATION:

Insert plug in socket on chassis. Place hanked cord into space under shelf.

IMPORTANT

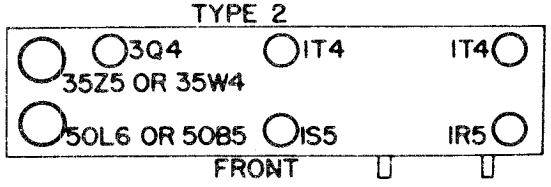
Remove batteries from receiver as soon as they are exhausted.

Batteries for Use with this Receiver

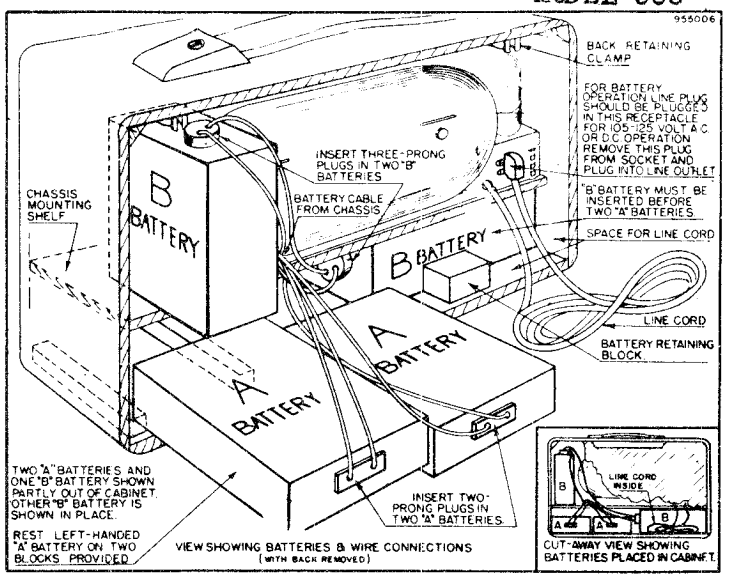
M'f'r.	4½ V. "A"	45 V. "B"
Eveready	746 2 required	482 Minimax 2 required
Ray-O-Vac	P-83A or EM-83 2 required	—
Burgess	G3 2 required	—

FOR 105-125 V. A.C. OR D.C. OPERATION:

Remove plug from chassis and insert it in wall outlet. On d.c. if set does not operate, reverse line plug in wall outlet.



35Z5 AND 35W4 NOT INTERCHANGEABLE
50L6 AND 50B5 NOT INTERCHANGEABLE

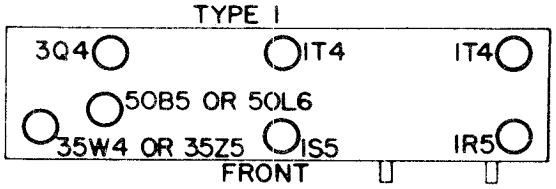

955006
BACK RETAINING CLAMP
FOR BATTERY OPERATION LINE PLUG SHOULD BE PLUGGED IN THIS RECEPTACLE FOR 105-125 VOLT A.C. OR D.C. OPERATION REMOVE THIS PLUG FROM SOCKET AND PLUG INTO LINE OUTLET
"B" BATTERY MUST BE INSERTED BEFORE TWO "A" BATTERIES
SPACE FOR LINE CORD
LINE CORD
BATTERY RETAINING BLOCK
INSERT THREE-PRONG PLUGS IN TWO "B" BATTERIES
BATTERY CABLE FROM CHASSIS
CHASSIS MOUNTING SHELF
B BATTERY
A BATTERY
TWO "A" BATTERIES AND ONE "B" BATTERY SHOWN PARTLY OUT OF CABINET. OTHER "B" BATTERY IS SHOWN IN PLACE.
REST LEFT-HANDED "A" BATTERY ON TWO BLOCKS PROVIDED
INSERT TWO-PRONG PLUGS IN TWO "A" BATTERIES
VIEW SHOWING BATTERIES & WIRE CONNECTIONS (WITH BACK REMOVED)
LINE CORD INSIDE
CUT-AWAY VIEW SHOWING BATTERIES PLACED IN CABINET

BATTERY INSTALLATION

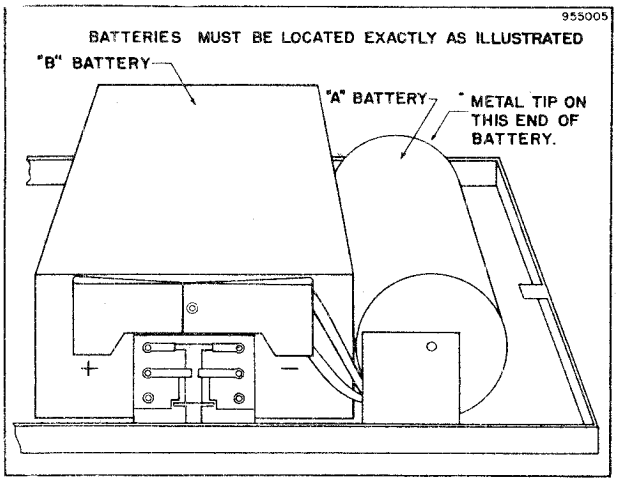
NOTE: Plug with Red Lead Should be connected to "B" Battery at Side of Chassis.

TUBE LOCATIONS

MODELS: 505,523 — 7 TUBES



EMERSON RADIO MODEL 508



TO REASSEMBLE THE CASE

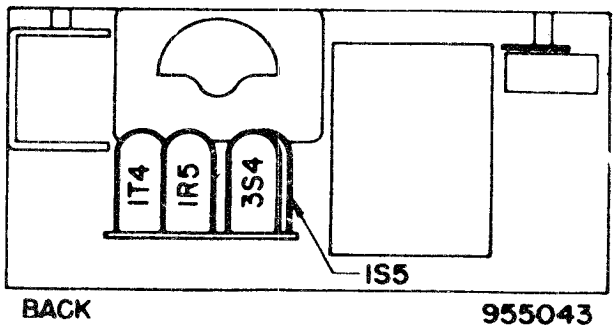
1. Hold the chassis face down with the batteries in place *and the plastic door open.*
2. Note the two tongues at one end of the metal front. Place the plastic housing over the chassis so that these two tongues fit into the corresponding slots at one end of the plastic housing.
3. Press the other end of the housing so that it snaps into place.

BATTERIES USED IN THIS RECEIVER

TYPE	MANUFACTURER'S NUMBER
1½ Volt "A"	Standard "D" size (1 5/16" diameter) flashlight unit cell.
67½ Volt "B"	Eveready Minimax No. 467.

IMPORTANT: Remove batteries as soon as they are exhausted. The "A" battery will require more frequent replacement than the "B" battery.

TUBE LOCATIONS



955043

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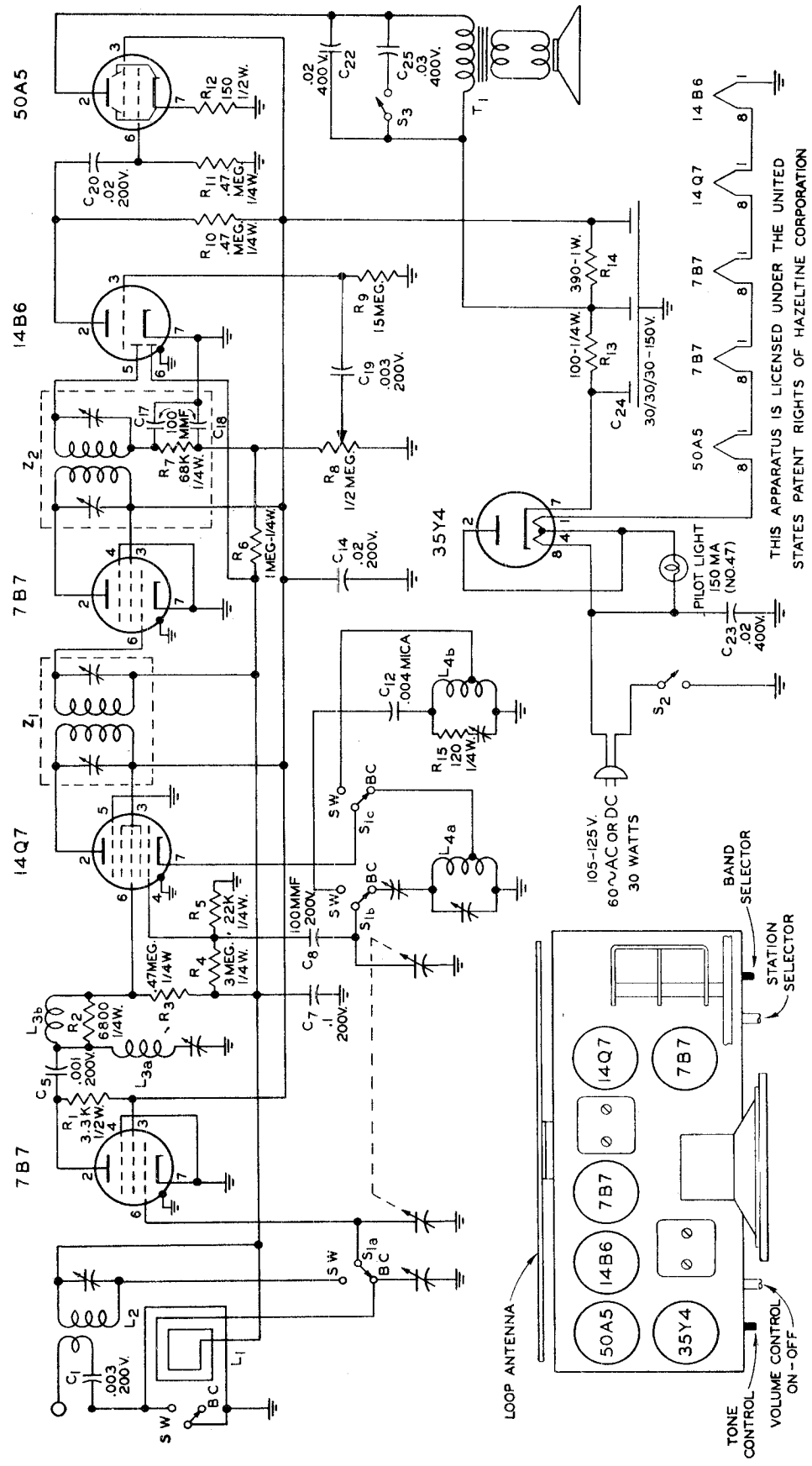
MODEL RR-13L

ESPEY MFG. CO. INC.



MODEL NO. RR-13L

THIS APPARATUS IS LICENSED UNDER THE UNITED STATES PATENT RIGHTS OF HAZELTINE CORPORATION

NOTICE: IF SET IS INOPERATIVE ON DC REVERSE LINE PLUG

CAUTION:

TO REPLACE TUBES, REMOVE SCREW & WASHER AT CENTER OF LOOP ANTENNA, AFTER FIRST REMOVING PLUG FROM CURRENT OUTLET

THIS APPARATUS USES INVENTIONS OF UNITED STATES PATENTS LICENSED BY RADIO CORPORATION OF AMERICA

PATENT NUMBERS SUPPLIED UPON REQUEST.

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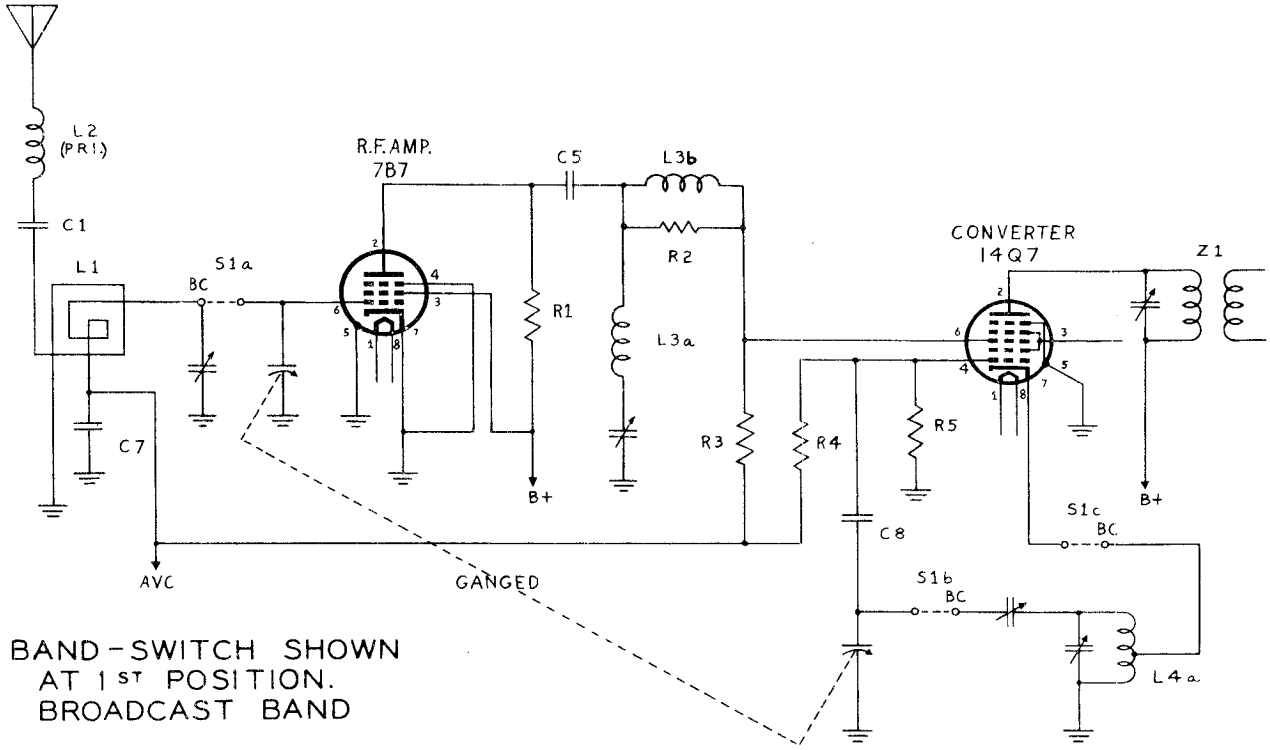
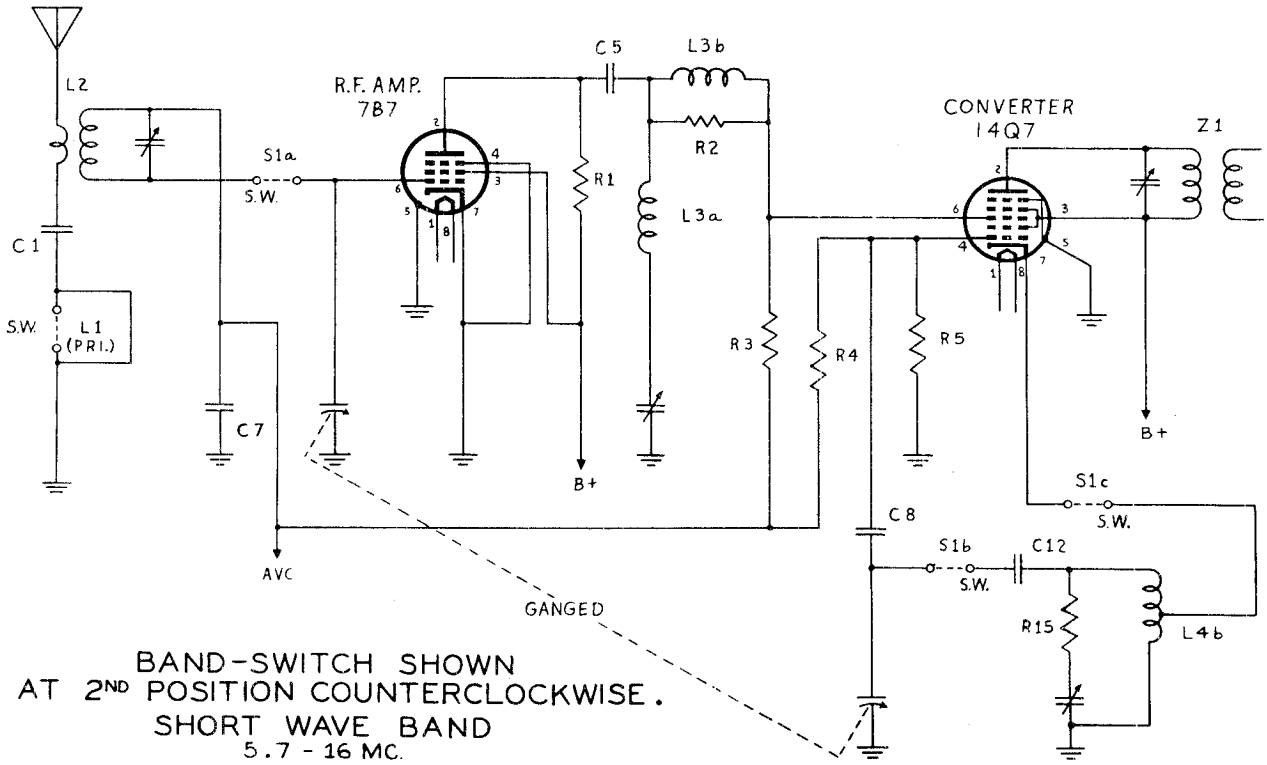
"clarified schematics"

MODEL RR-13L

ESPEY MFG. CO. INC.



BAND-SWITCH SHOWN AT 1ST POSITION. BROADCAST BAND



BAND-SWITCH SHOWN AT 2ND POSITION COUNTERCLOCKWISE. SHORT WAVE BAND 5.7 - 16 MC.

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MODEL RR-14

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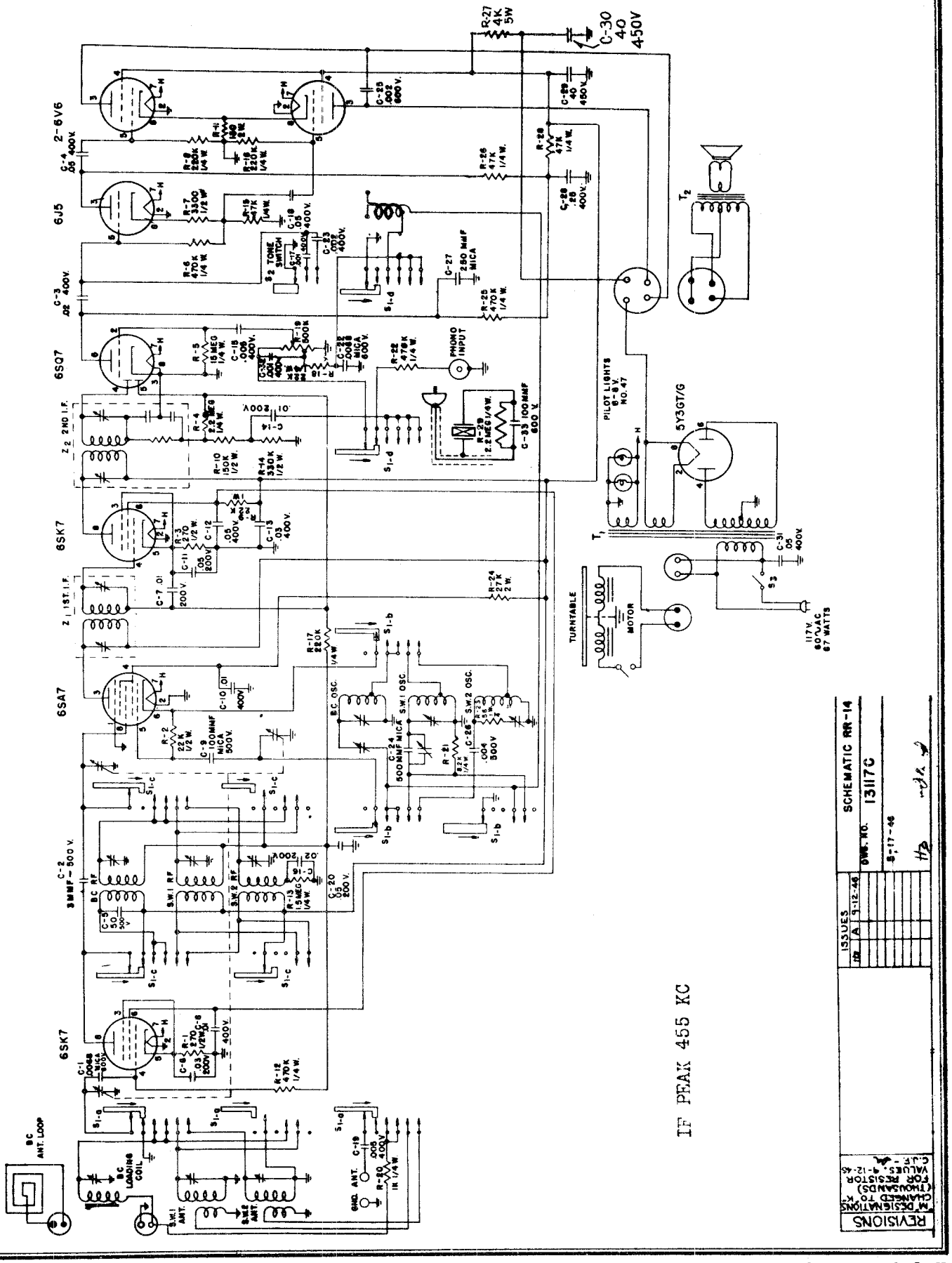

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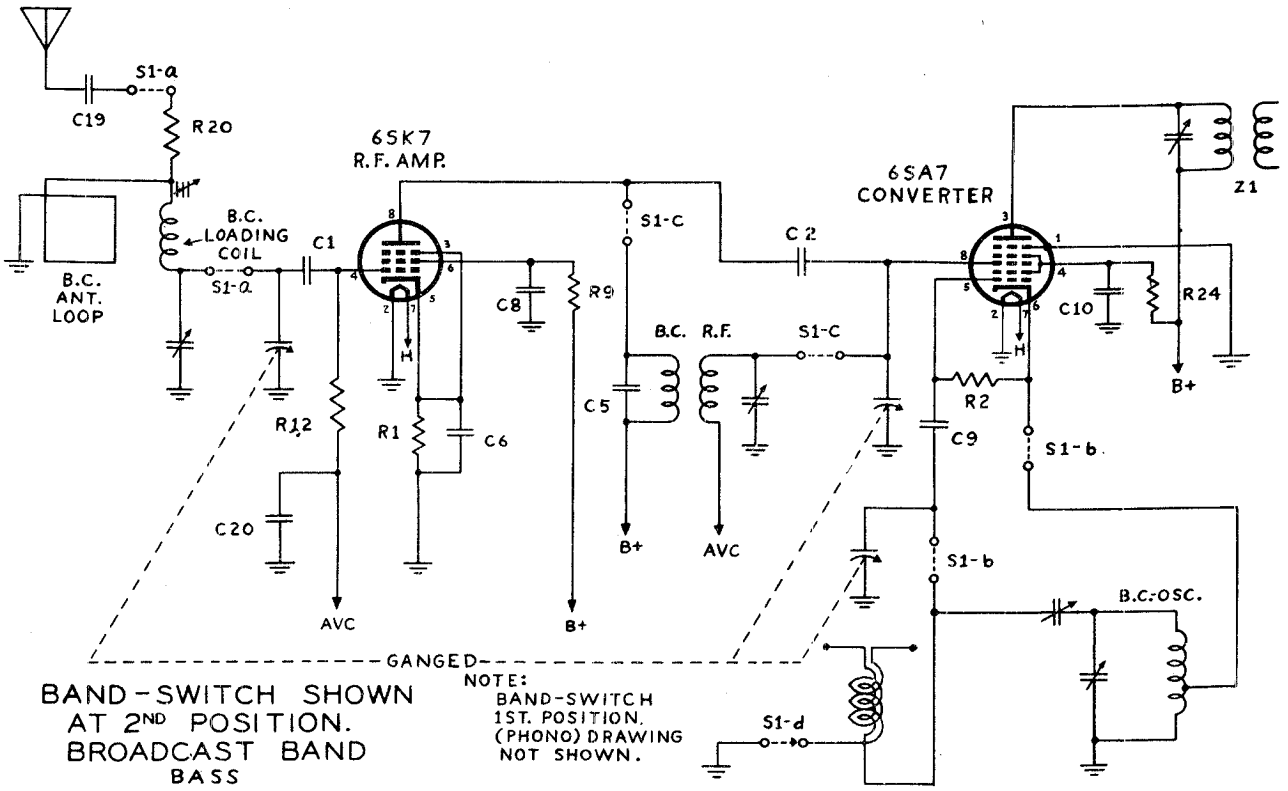
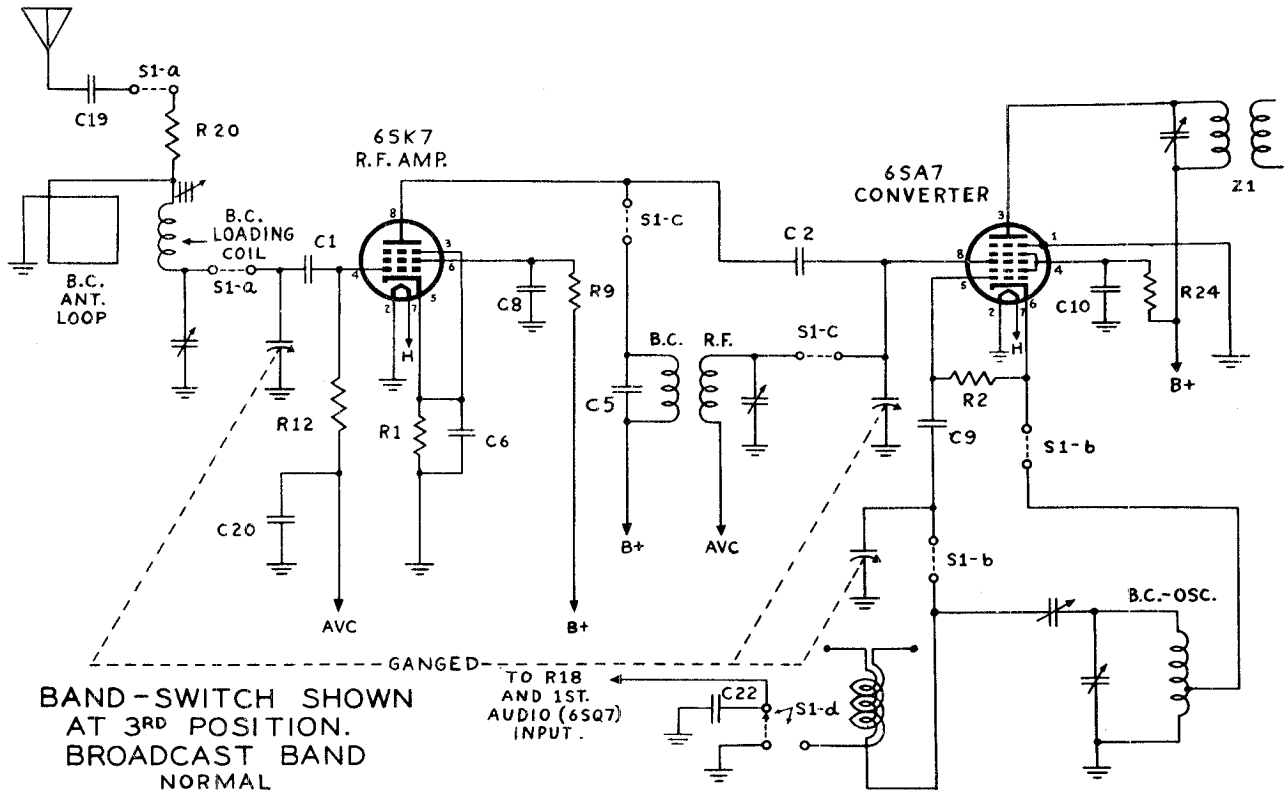
Record Changer: Seeburg Model K

MODEL RR-14

ESPEY MFG. CO. INC.





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MODEL RR-14

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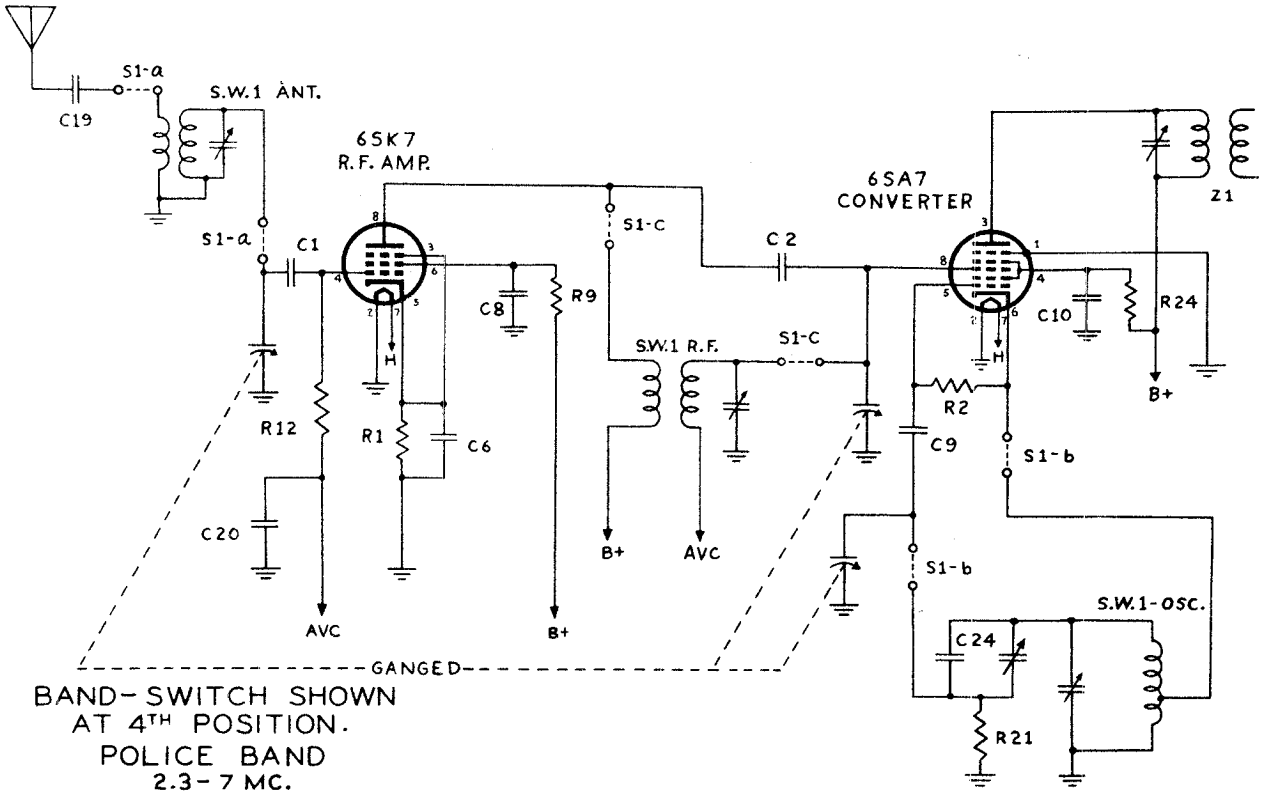
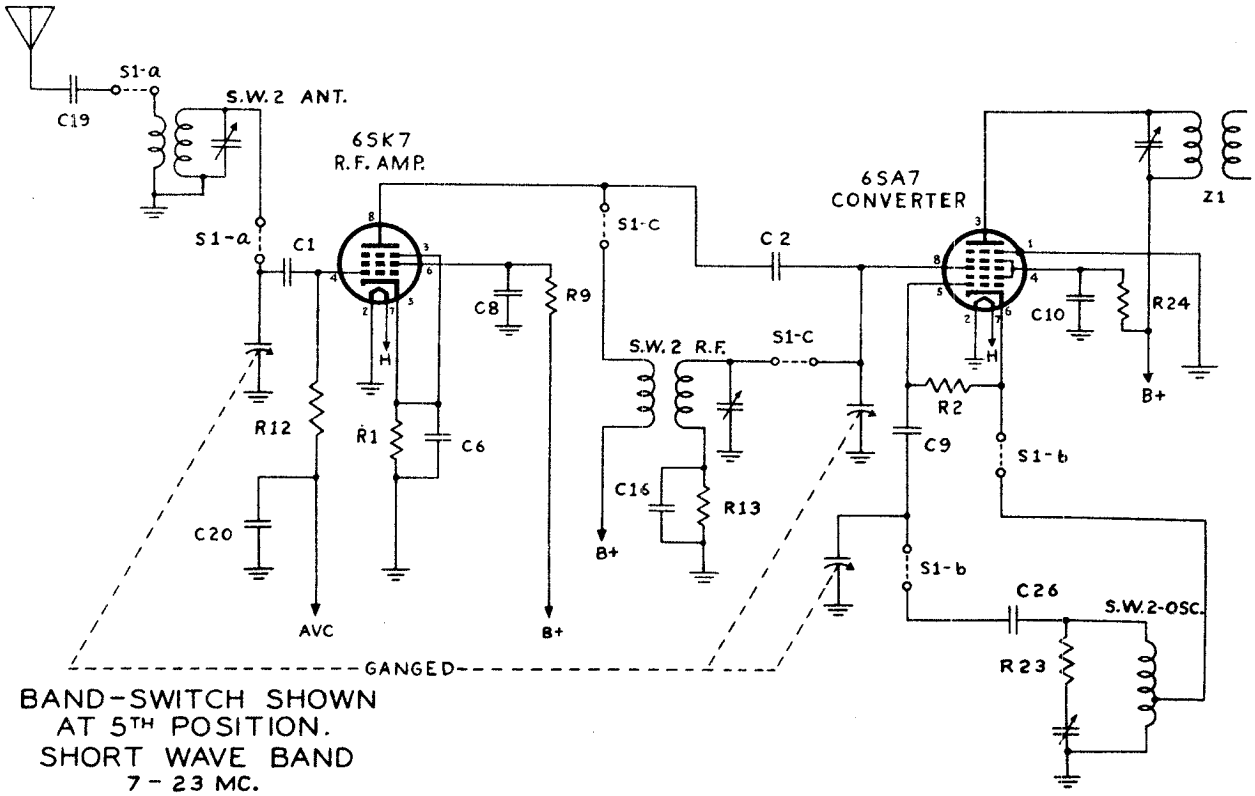


BAND-SWITCH SHOWN
AT 4TH POSITION.
POLICE BAND
2.3-7 MC.



BAND-SWITCH SHOWN
AT 5TH POSITION.
SHORT WAVE BAND
7 - 23 MC.

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MODEL RR-14
MODELS 6611,6613,6630,
6632,6634

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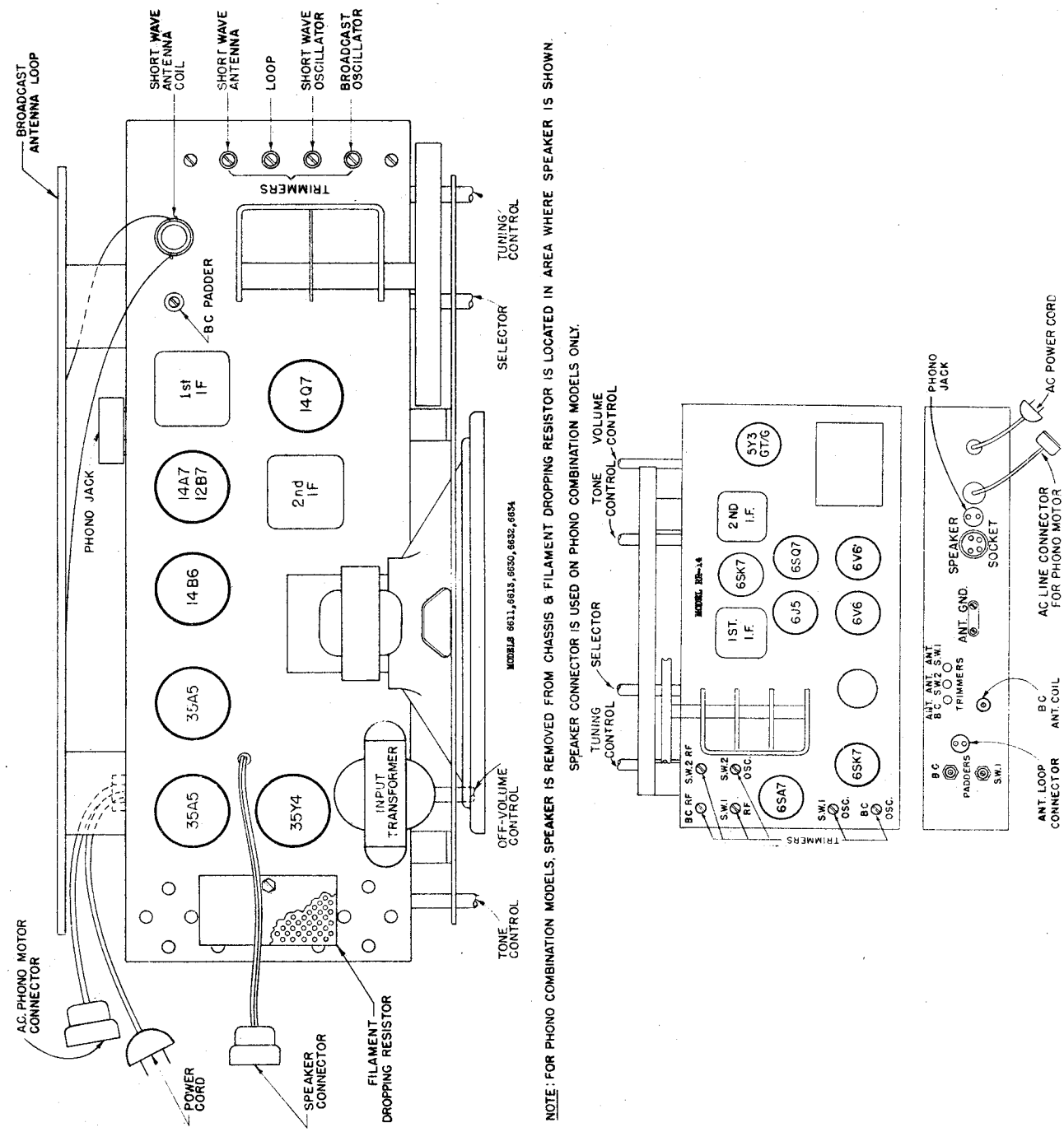

NOTE: FOR PHONO COMBINATION MODELS, SPEAKER IS REMOVED FROM CHASSIS & FILAMENT DROPPING RESISTOR IS LOCATED IN AREA WHERE SPEAKER IS SHOWN.
SPEAKER CONNECTOR IS USED ON PHONO COMBINATION MODELS ONLY.

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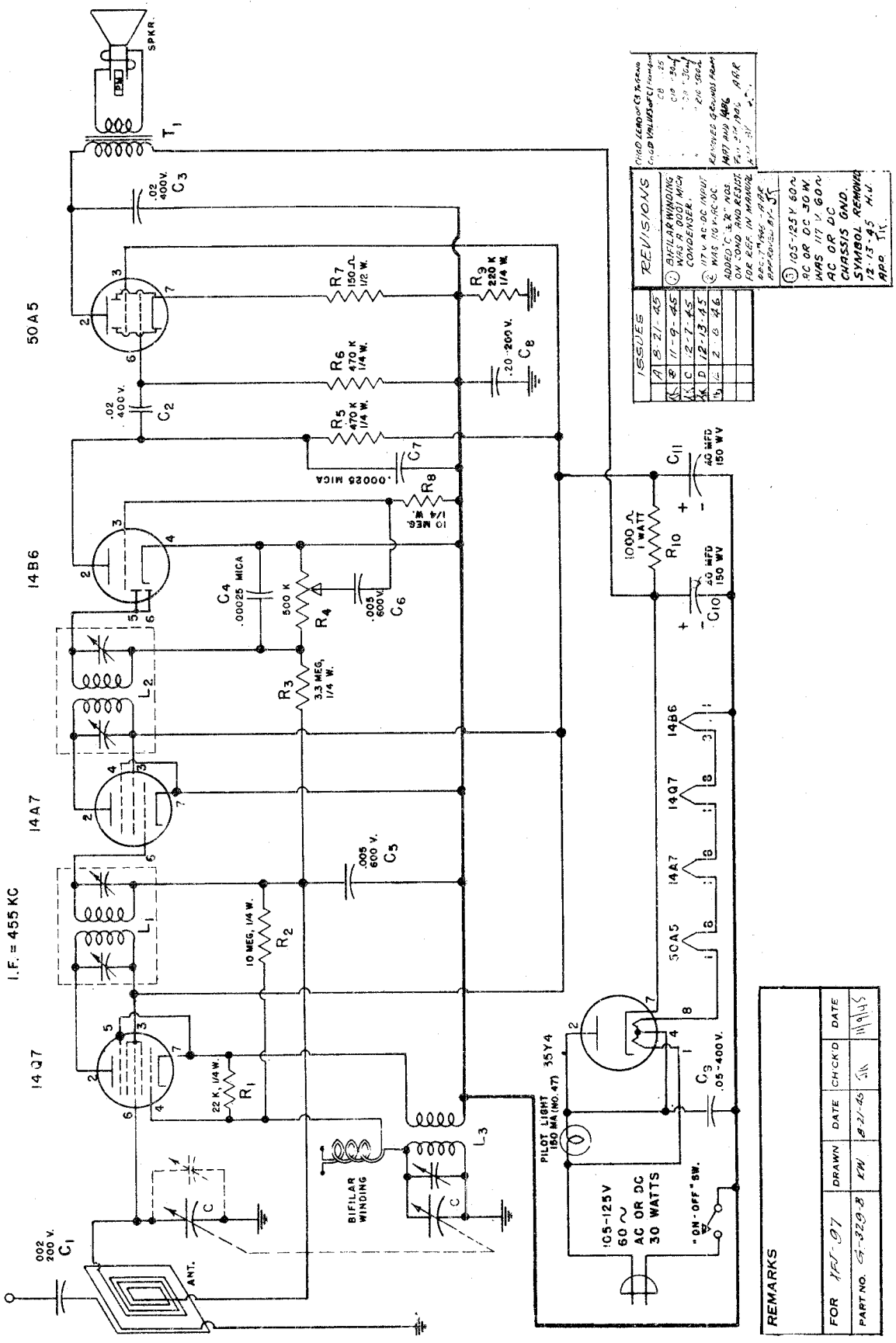
MODEL XFJ-97

ESPEY MFG. CO. INC.



ISSUES		
A	8-21-45	
B	11-9-45	
C	2-7-45	
D	12-13-45	
E	2-18-46	

REVISIONS

① BIFILAR WINDING WAS R 0001 MICA CONDENSER.

② 117 V AC DC INPUT WAS 110 V AC DC

ADDED "C" & "R" ACROSS ON/OFF SWITCH FOR BEST PERFORMANCE

③ 105-125 V 60 ~ 90 OR DC 30 W WAS 117 V 60 ~ AC OR DC CHASSIS GND. SYMBOL REMOVED 12-13-45 H.J. APP. J.F.R.

REMARKS					
FOR XFJ-97	DRAWN	DATE	CHK'D	DATE
PART NO. 7-329-B	KW	8-21-45	JFR	11/9/45

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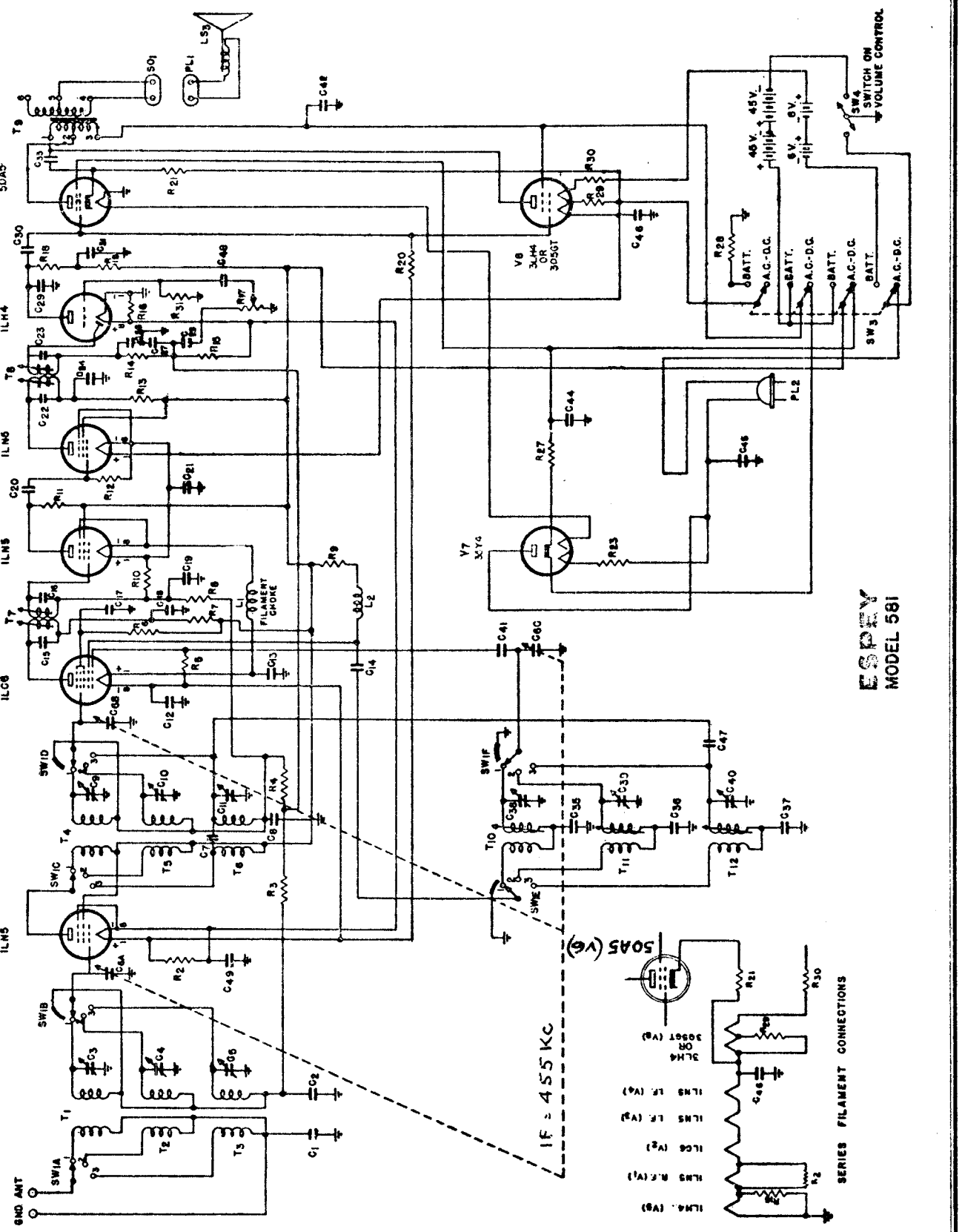
MODEL 581

ESPEY MFG. CO. INC.



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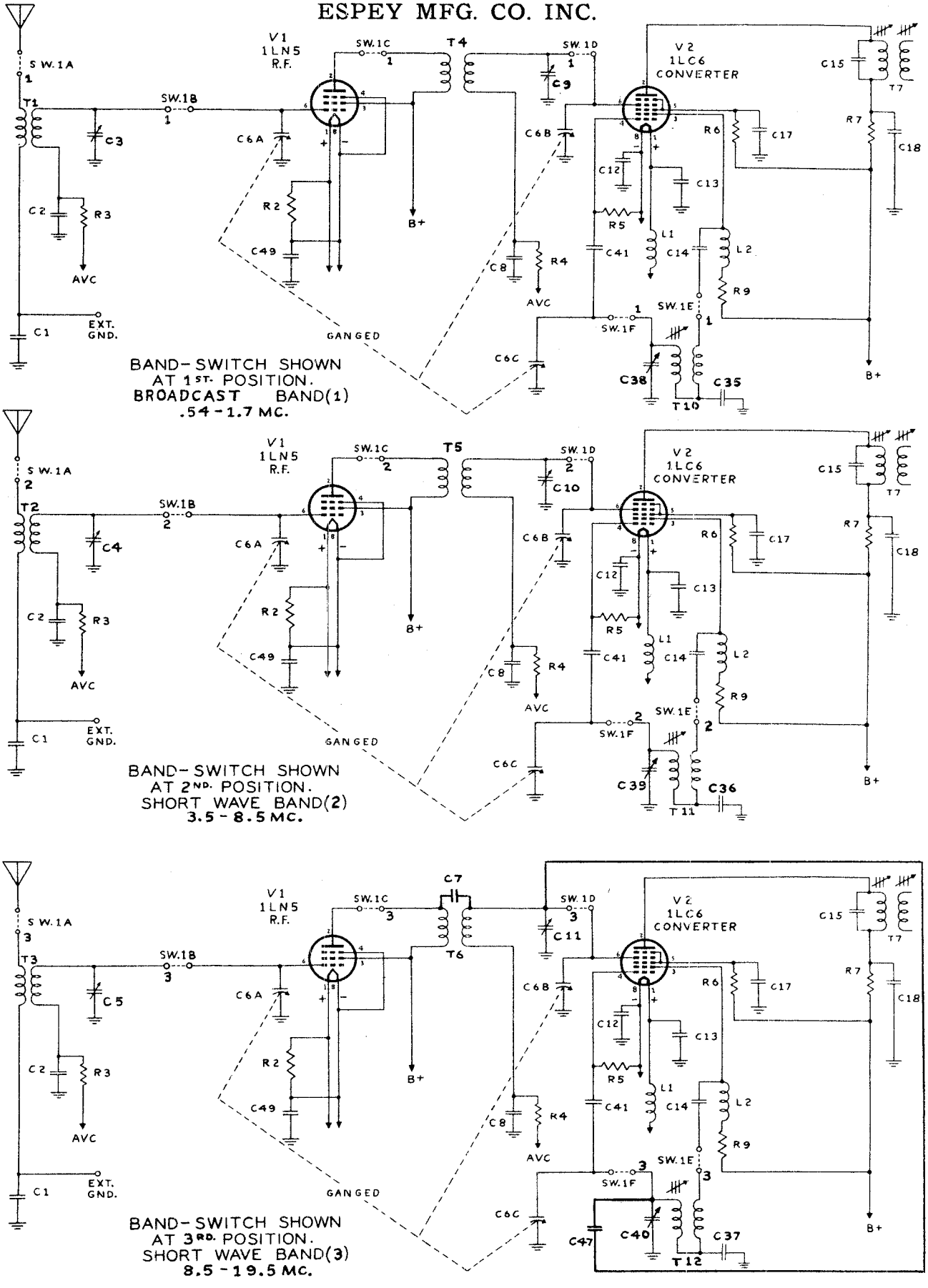
MODEL 581

ESPEY MFG. CO. INC.



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The Espey Model #581 is an eight-tube superheterodyne designed to operate on:

(a) 105-125 Volts A.C., 60 cycle.
(b) 105-125 Volts D.C.
(c) Self contained batteries.

The instrument provides for commercial broadcast and short wave reception in the following frequency ranges:

(a) .54-1.7 M.C.
(b) 3.5-8.5 M.C.
(c) 8.5-19.5 M.C.

Electric Operation:

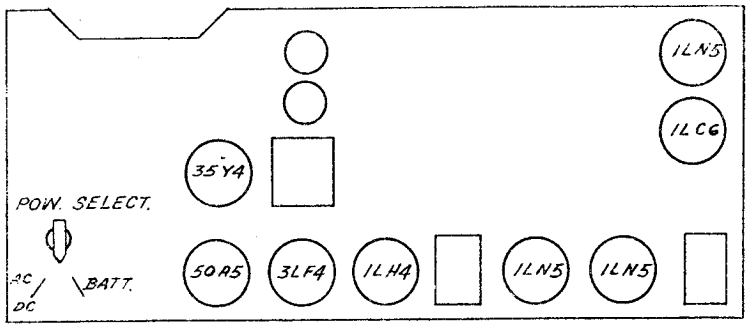
Set the power selector switch mounted on the rear left hand side of the chassis to "A.C.-D.C." for electric operation.

Battery Operation:

For battery operation, the power selector switch is set to the position marked "Batt". This switch is easily accessible through a door in the rear of the cabinet.

Two six (6) volt "A" batteries and two forty five (45) volt batteries are required for self-contained operation. These batteries are located under the chassis and may be inserted or replaced by removing the machine screw on either side of the cabinet holding the battery plate in place. The "A" batteries will provide approximately 30 hours of normal operation allowing the batteries to recuperate after several hours use. The "B" batteries will normally outlast two sets of "A" batteries. Batteries should be removed if radio set is to be stored for more than sixty (60) days.

Tube Location:



Batteries:

Suitable batteries for use with this Receiver are:
"A" Batteries: 6 Volt; Length, $3\frac{15}{16}$"; Width, $2\frac{3}{4}$"; Height, $5\frac{1}{2}$"; such as: Ever-Ready #718 or equivalent.
"B" Batteries: 45 Volt; Length, $4\frac{3}{16}$"; Width, $2\frac{19}{32}$"; Height, $5\frac{3}{8}$": such as: Ever-Ready #762-S, Burgess #5308, or equivalent.

Location of Parts:

C1—.006 mfd., ±20%, 600v., paper
C2—.01 mfd., +20 —10%, 200v., paper
C3—Ceramic trimmer (7-35-mmf.)
C4—Ceramic trimmer (35-55-mmf.)
C5—Ceramic trimmer (35-55-mmf.)
C6A—Variable 3 gang
C6B—Variable 3 gang
C6C—Variable 3 gang
C7—15 mmf., 20%, 500v., ceramic
C8—.05 mfd., +20 —10%, 200v., paper
C9—Ceramic trimmer (7-35-mmf.)
C10—Ceramic trimmer (7-35-mmf.)
C11—Ceramic trimmer (35-55 mmf.)
C12—.1 mfd., +40 —10%, 400v., paper
C13—.1 mfd., +40 —10%, 400v., paper
C14—.0022 mfd., 10%, 500v., mica
C15—150 mmf., 5%, 500v., mica
C16—82 mmf., 5%, 500v., mica
C17—.02 mfd., +40 —10%, 200v., paper
C18—.05 mfd., ±20%, 600v., paper
C19—.02 mfd., +40 —10%, 200v., paper
C20—220 mmf., 20%, 500v., mica
C21—.1 mfd., +40 —10%, 400v., paper
C22—51 mmf., 5%, 500v., mica
C23—82 mmf., 5%, 500v., mica
C24—.05 mfd., +40 —10%, 600v., paper
C26—100 mmf., 20%, 500v., mica
C27—100 mmf., 20%, 500v., mica
C28—.006 mfd., ±20%, 600v., paper
C29—100 mmf., 20%, 400v., mica
C30—.006 mfd., ±20%, 600v., paper
C31—.1 mfd., +40 —10%, 400v., paper
C33—.01 mfd., +40 —10%, 600v., paper
C35—430 mmf., 2%, 500v., mica
C36—2,200 mmf., 5%, 500v., mica
C37—4,300 mmf., 5%, 500v., mica
C38—Ceramic trimmer (7-35-mmf.)
C39—Ceramic trimmer (7-35-mmf.)
C40—Ceramic trimmer (7-35-mmf.)
C41—100 mmf., 20%, 500v., mica
C42 & C44—40 mfd., 250v. (dual electrolytic)
C45—.05 mfd., ±20%, 600v., paper
C46—1000 mfd., 15wv. (electrolytic)
C47—2 mmf., ±15%, 500v., bakelite
C48—.006 mfd., ±20%, 600v., paper
C49—.1 mfd., +40 —10%, 400v., paper

L1—Choke coil, line filter
L2—Choke, R. F.
LS3—Speaker, 6" P. M. dynamic

PL1—Plug, speaker
PL2—Plug, line cord

R2—270 ohms, 10%, ¼w.
R3—3.3 megohms, 10%, ¼w.
R4—3.9 megohms, 10%, ¼w.
R5—220,000 ohms, 20%, ¼w.
R6—68,000 ohms, 10%, ¼w.
R7—1,000 ohms, 20%, ¼w.
R8—3.3 megohms, 10%, ¼w.
R9—22,000 ohms, 10%, ¼w.
R10—3.3 megohms, 10%, ¼w.
R11—22,000 ohms, 10%, ¼w.
R12—470,000 ohms, 20%, ¼w.
R13—1,000 ohms, 20%, ¼w.
R14—47,000 ohms, 20%, ¼w.
R15—470,000 ohms, 20%, ¼w.
R16—330 ohms, 10%, ¼w.
R17—1 megohm, 20%—volume control
R18—470,000 ohms, 20%, ¼w.
R19—100,000 ohms, 20%, ¼w.
R20—470,000 ohms, 10%, ¼w.
R21—50 ohms, 5%, ½w.
R23—220 ohms, 5%, 30w.
R27—500 ohms, 10%, 1w.
R28—820 ohms, 10%, ¼w.
R29—330 ohms, 10%, ¼w.
R30—27 ohms, 10%, ¼w.
R31—12 megohms, 10%, ¼w.

SO1—Receptacle speaker
SW1A & B—C & D—Switch wafer
SW1E & F—Switch wafer
SW3—Switch AC-DC battery
SW4—Switch D.P.S.T.

T1—Transformer, band 1 Ant.
T2—Transformer, band 2 Ant.
T3—Transformer, band 3 Ant.
T4—Transformer, band 1 R.F.
T5—Transformer, band 2 R.F.
T6—Transformer, band 3 R.F.
T7—Transformer, 1st I.F.
T8—Transformer, 2nd I.F.
T9—Transformer, speaker output
T10—Transformer, band 1 osc.
T11—Transformer, band 2 osc.
T12—Transformer, band 3 osc.

V1, 3 & 4—R.F., 1st & 2nd I.F. 1LN5
V2—Converter 1LC6
V5—2nd Detector—1st audio 1LH4
V6—Output (power line) 50A5
V7—Rectifier 35Y4
V8—Output (batt.) 3LH4 or 3Q5GT

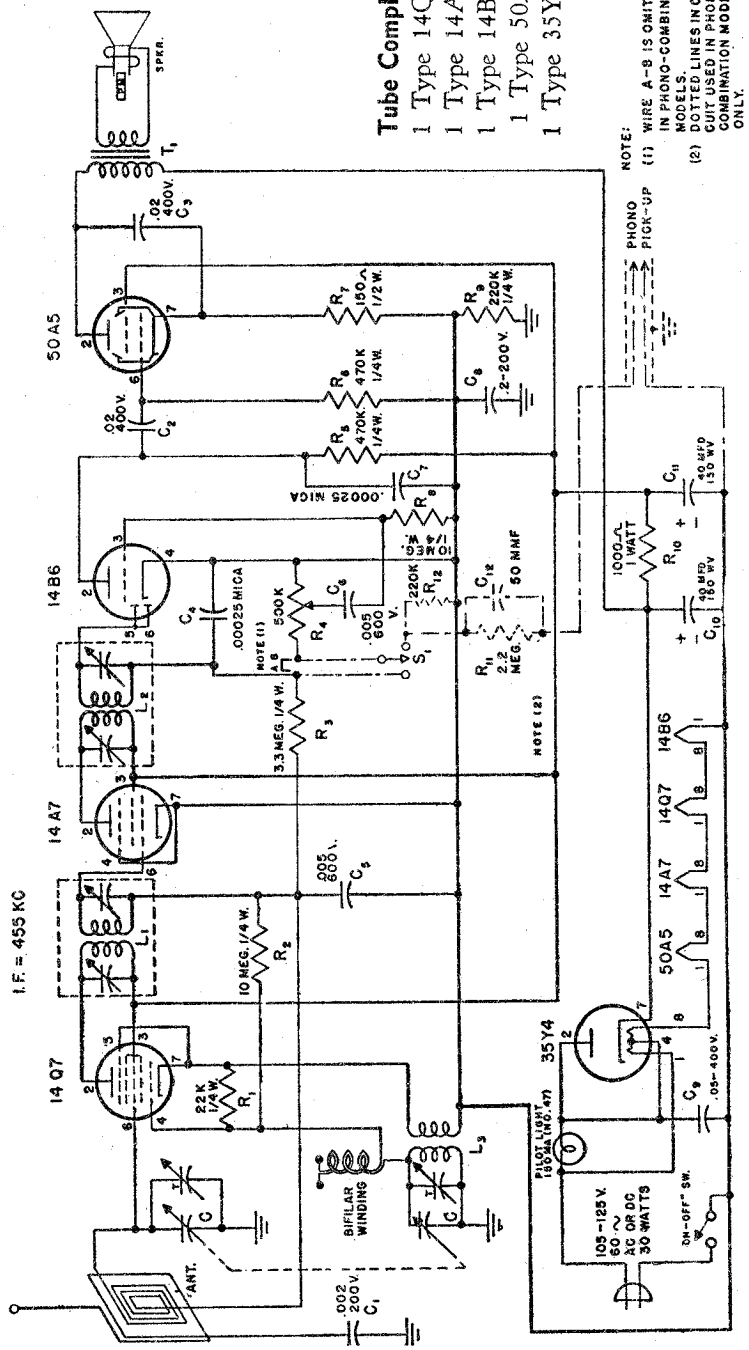
Miscellaneous
Adapter C.D. Wood No. 2053
Adapter C.D. Wood No. 2064
Adapter C.D. Wood No. 2073
Adapter C.D. Wood No. 2089
Binding post mounting board
Binding posts TM-150
Chassis anchoring stud assembly
Control knob for C6
Control knob for R17 & SW1
Dial cord
Dial pointer
Dial plate
Dial window

ESPEY MFG. CO. INC.

MODELS 651,652,653,6511
6511/2,6514,6516,6520,
6541,6545,6547,Ch.FJ97

Tube Complement:

1 Type 14Q7—Oscillator—Converter.
1 Type 14A7—I. F. Amplifier.
1 Type 14B6—Det. A.V.C. and Amp.
1 Type 50A5—Power Amp.
1 Type 35Y4—Rectifier.



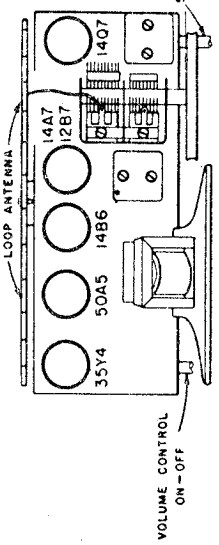


Fig. 1—Tube and Trimmer locations:

Alignment Procedure:

Steps	Connect output of oscillator to	Tune osc. to	Tune radio dial to	Adjust the following for max. peak output
1.	Tuning condenser stator (ant.) in series with .01 mfd.	455	Quiet point at high frequency end of dial.	1st and 2nd I. F. Transformers
2.	Antenna term. of Ant. loop in series with 100 mmf.	1720	Full clockwise (out of mesh)	Osc. trimmer
3.	Antenna term. of Ant. loop in series with 100 mmf.	1500	1500	Ant. trimmer

Output meter is connected across voice coil. Receiver volume is turned to maximum. NOTE: Trimmers may be located on either long or short side of variable condenser.

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Nylon cord of the tuning and dial system may be replaced by following the diagram below

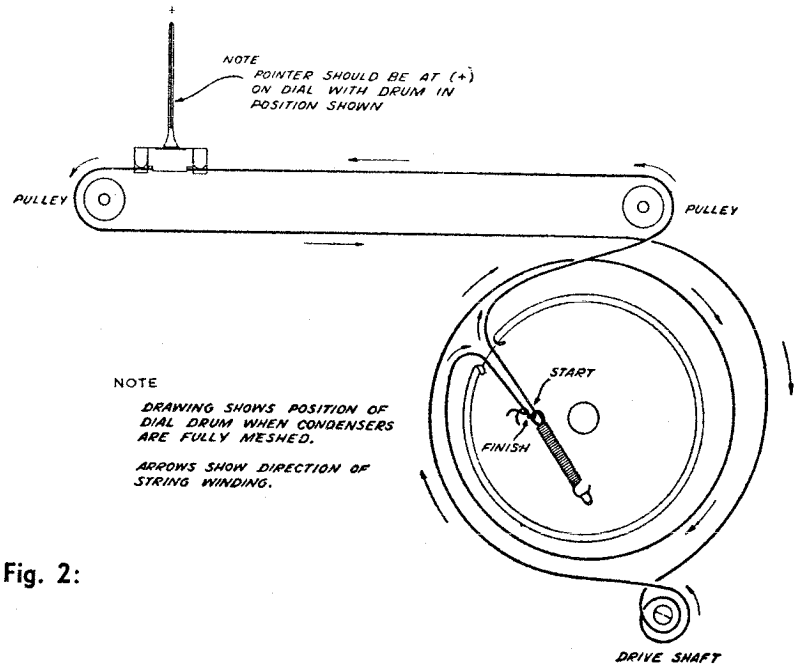

Fig. 2:

Parts List:	**Part No.**
C —Two gang variable cond. with trimmers.	C-6.032
C 1— 002 Mfd., 200V paper	
C 2— 02 Mfd., 400V paper	
C 3— 02 Mfd., 400V paper	
C 4— 00025 Mfd., mica	
C 5— 005 Mfd., 600V paper	
C 6—.005 Mfd., 400V (or 600V) paper	
C 7—.00025 Mfd., mica	
C 8—.25 Mfd. (or .20 Mfd.), 200V paper	
C 9—.05 Mfd., 400V, molded bakelite	
C10, 11—Dual 40 Mfd., 150V	A-25.019
*C12—50 Mmf., 20%	
R 1—22K, ¼W, 20%	
R 2—10 meg, ¼W, 20%	
R 3—3.3 meg, ¼W, 20%	
R 4—500K variable, audio taper, with SPST	A-9.066
R 5—470K, ¼W, 20%	
R 6—470K, ¼W, 20%	
R 7—150 ohms, ½W, 10%	
R 8—10 meg, ¼W, 20%	
R 9—220K, ¼W, 20%	
R10—1000 ohms, 2W (or 1W), 20%	
*R11—2.2 meg, ¼W, 20%	
*R12—220K, ¼W, 20%	
L 1—Transformer, IF input, 455KC	C-2.191-1
L 2—Transformer, IF output, 455KC	C-2.191-2
L 3—Coil, oscillator	B-2.192
Antenna, loop	B-5.006
Loudspeaker, PM, 5", Transformer to match 50A5	B-11.037
Pilot light, Mazda No. 47, 150 Ma.	

* Used in phono combinations only.

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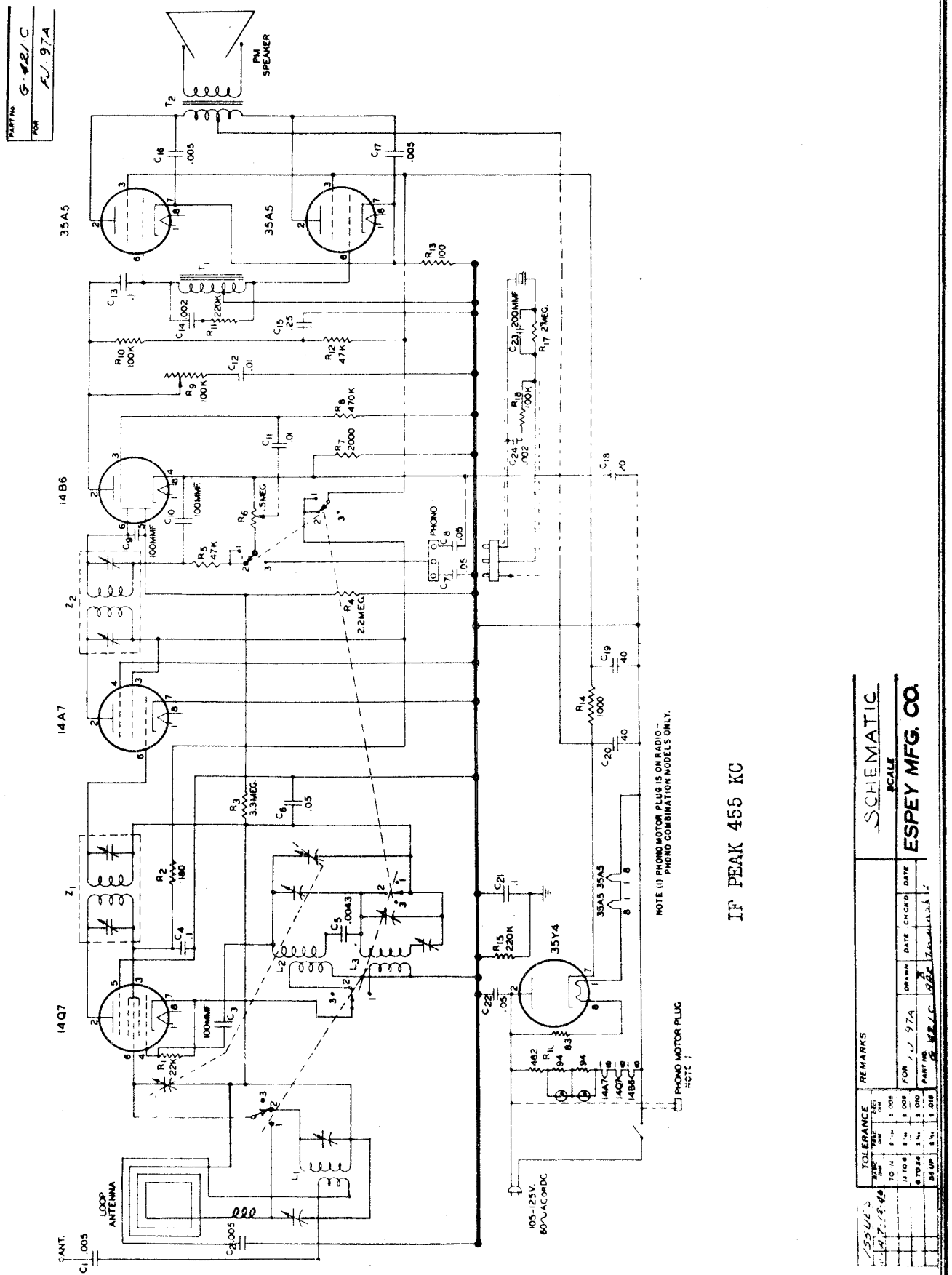
MODELS 6611,6613,6630,6632, 6634, Ch. FJ-97A



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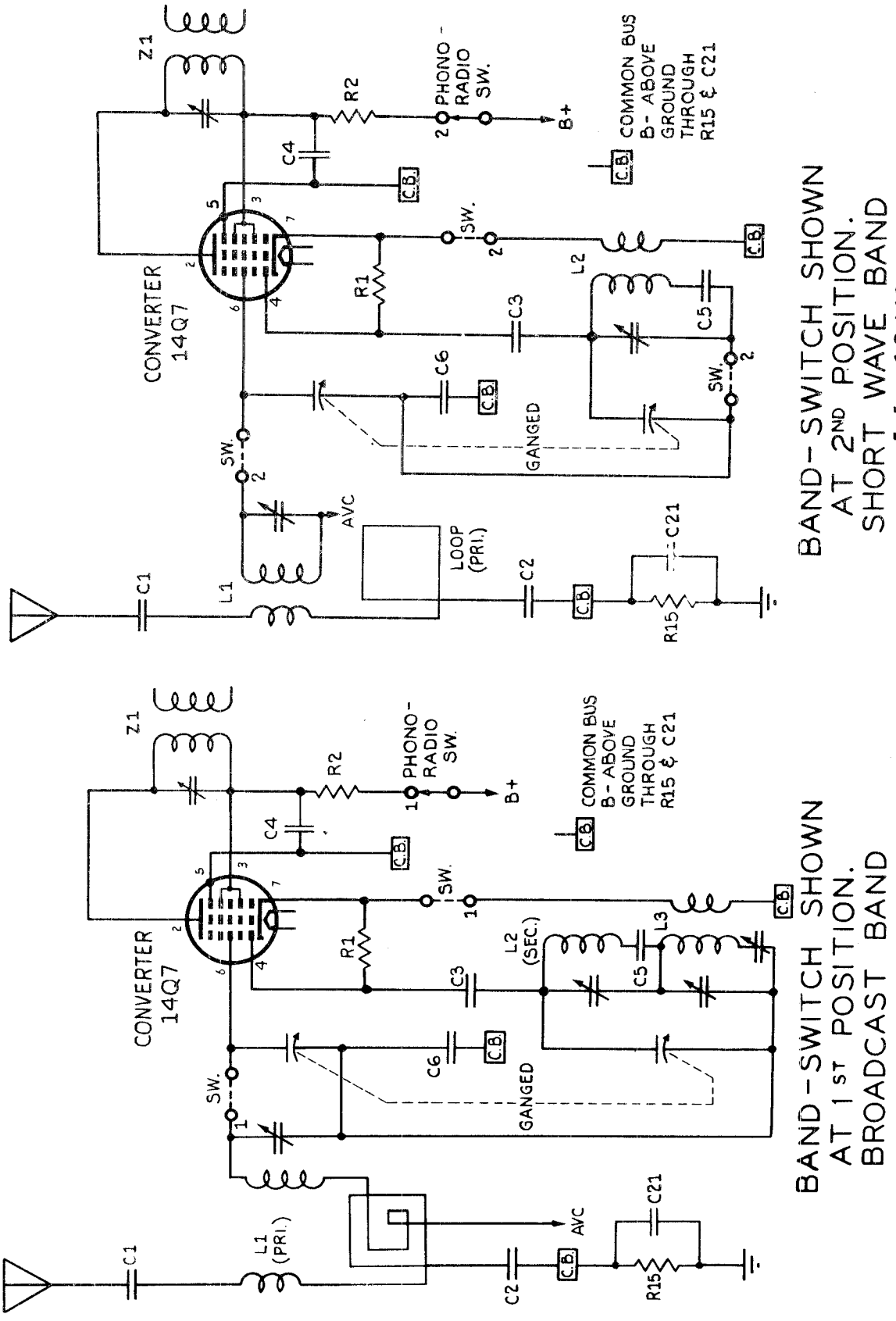
Record Changer: Seeburg Model K
For Layout, see P.15-6

"clarified schematics"

MODELS 6611,6613,6630,
6632,6634, Ch.FJ-97A

ESPEY MFG. CO. INC.



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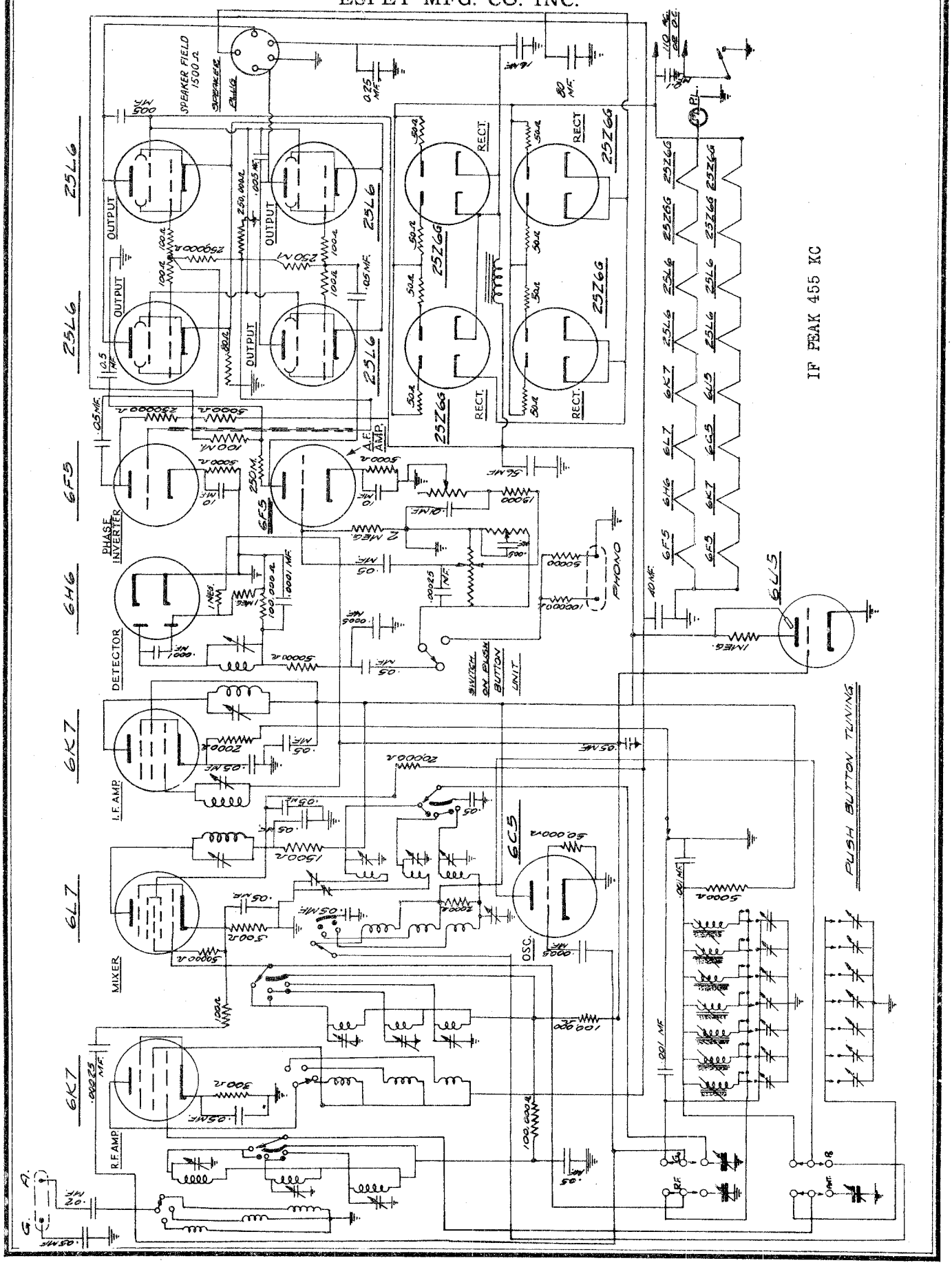
MODEL 9162

ESPEY MFG. CO. INC.



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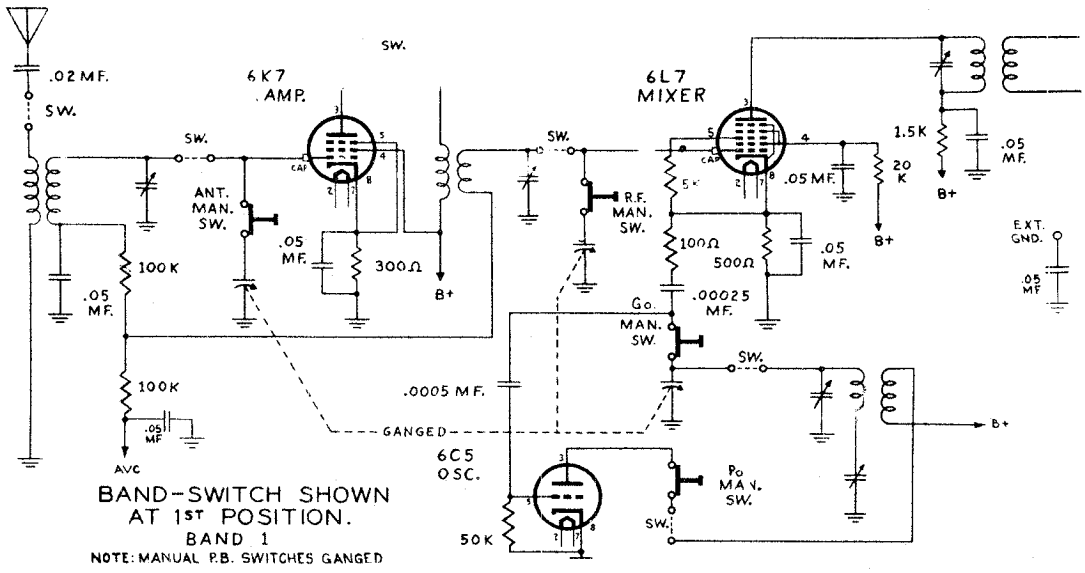
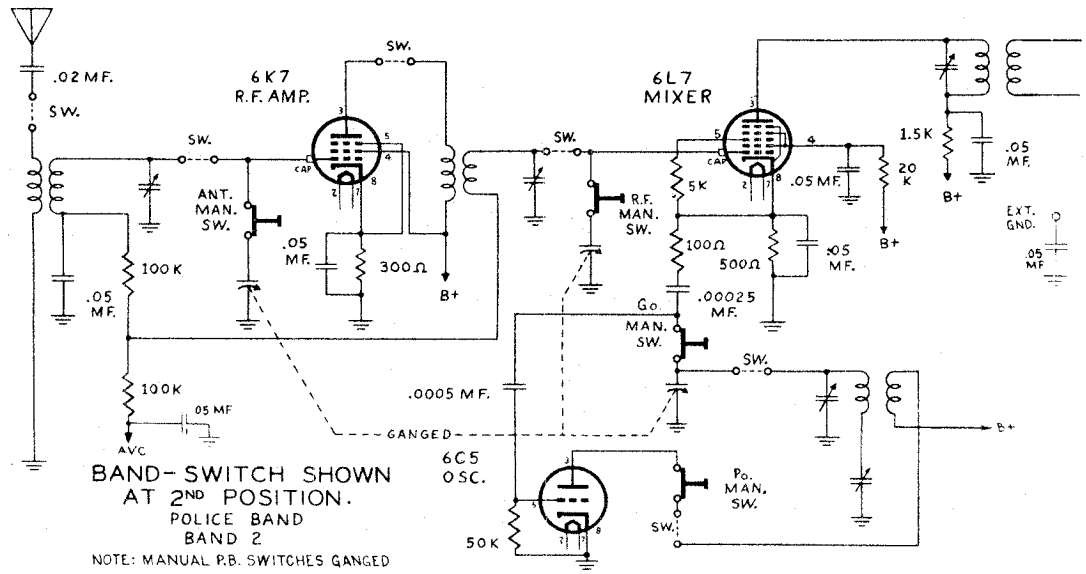
"clarified schematics"

MODEL 9162

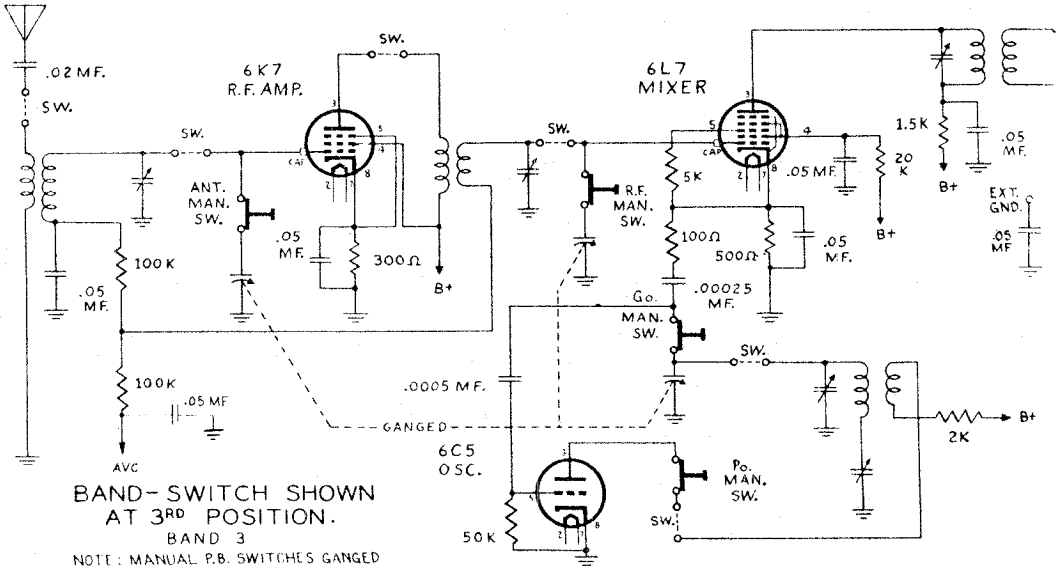
ESPEY MFG. CO. INC.



BAND-SWITCH SHOWN AT 1ST POSITION.
BAND 1
NOTE: MANUAL P.B. SWITCHES GANGED



BAND-SWITCH SHOWN AT 2ND POSITION.
POLICE BAND
BAND 2
NOTE: MANUAL P.B. SWITCHES GANGED



BAND-SWITCH SHOWN AT 3RD POSITION.
BAND 3
NOTE: MANUAL P.B. SWITCHES GANGED

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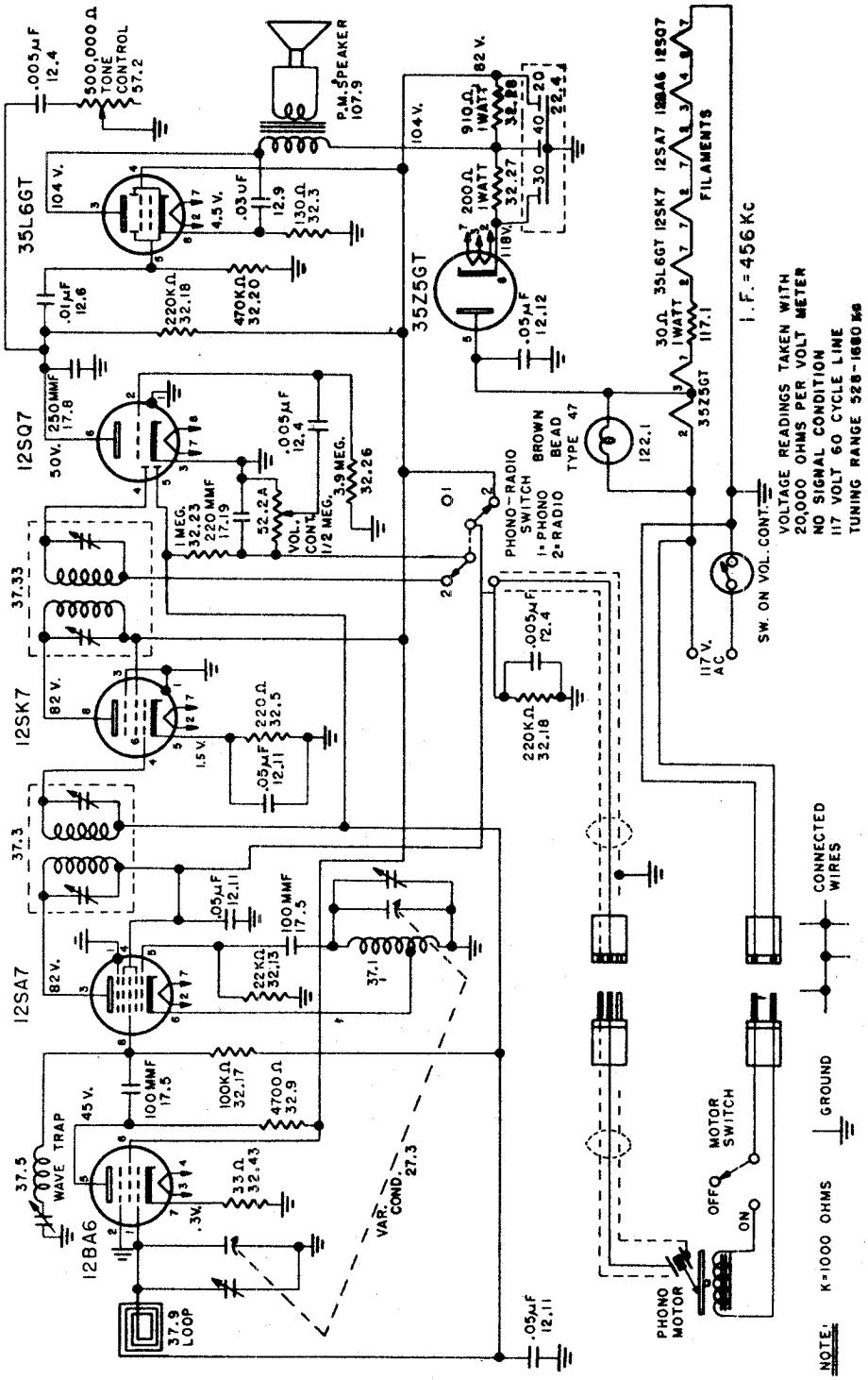
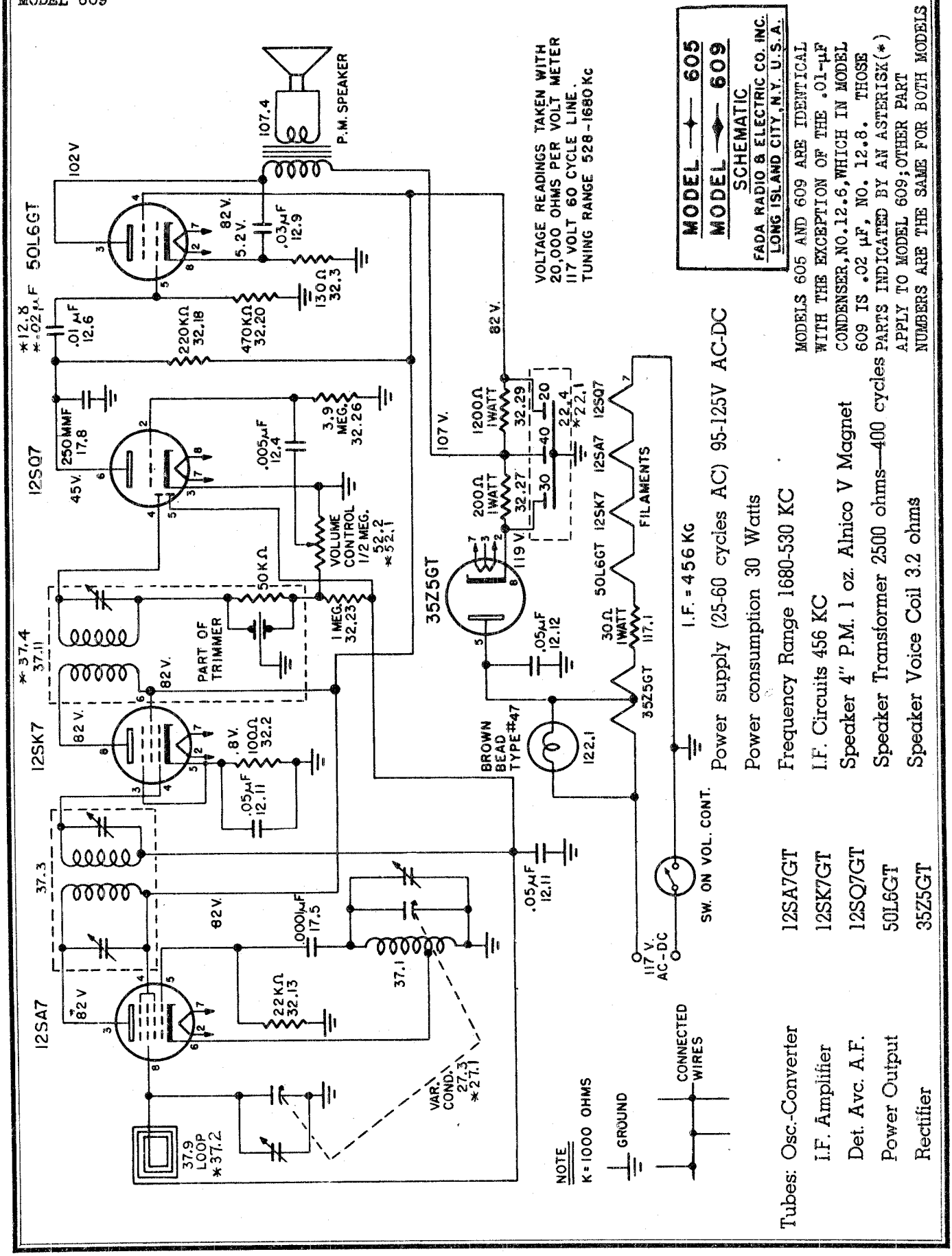
FADA RADIO & ELEC. CO. INC.



MODEL 605
MODEL 609

FADA RADIO & ELEC. CO. INC.



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ALIGNMENT PROCEDURE

No attempt should be made to realign the various circuits until all other causes have been checked, unless the condition is so obvious as to indicate that realignment is necessary. Then proceed as follows:
Volume Control full on.
Low range A.C. meter connected across voice coil to indicate output.
Keep signal generator attenuated so as to maintain ½ scale reading on output meter.
Make certain that dial pointer is exactly on index line (top left side of dial plate) when variable condenser is fully meshed.

MODELS 605 AND 609

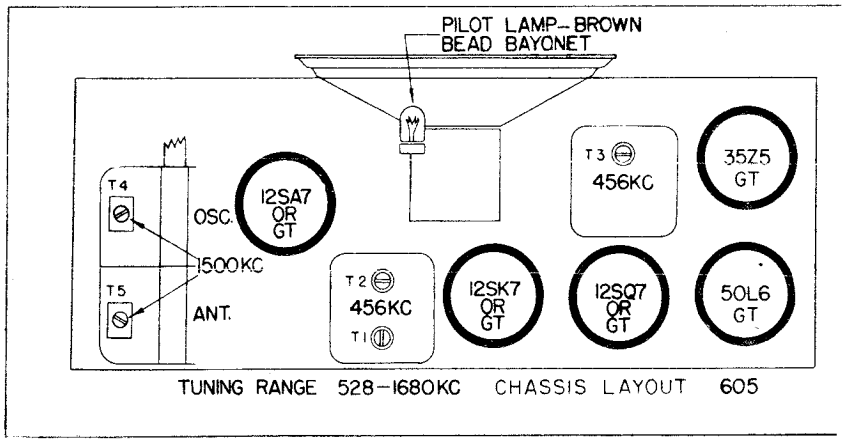
Receiver Dial at:	Signal Generator	Dummy Antenna	Connect Signal Generator to:	Refer to Chassis Layout for Location of Trimmers
1 Full Open	Exactly 456 KC	.1 MF	Control Grid 12SA7 Tube (Top) Rear Section Variable Condenser	Adjust for Maximum Output T1, T2 & T3
2 Exactly 1680 KC	Exactly 1680 KC		Radiating Loop (½ meter) 20" from Receiver Loop	Adjust for Maximum Output T4
3 Approx. 1500 KC	Approx. 1500 KC		Radiating Loop (½ meter) 20" from Receiver Loop	Adjust for Maximum Output T5
4 Approx. 600 KC	Aprox. 600 KC		Radiating Loop (½ meter) 20" from Receiver Loop	Check tracking and bend slotted end plate (rear section) of variable if necessary.
5				

605 SERIES PARTS LIST

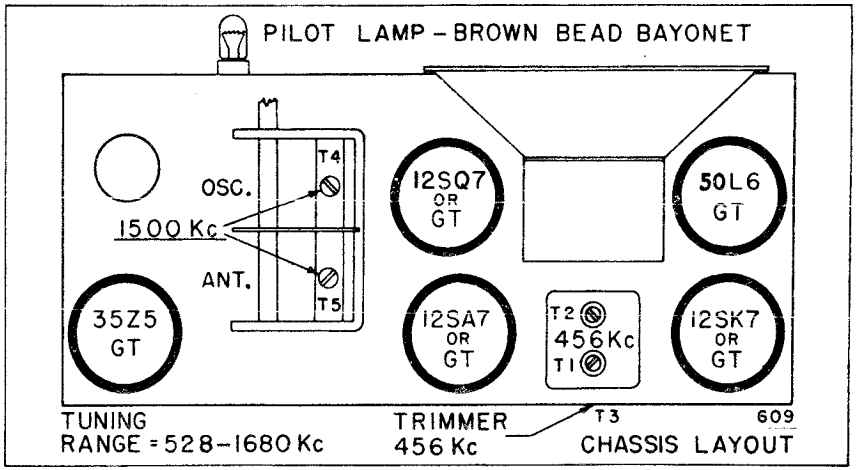
Part No.	Description
12.4	Tubular Condenser .005 mf 600 V
12.6	Tubular Condenser .01 mf 400 V
12.9	Tubular Condenser .03 mf 400 V
12.11	Tubular Condenser .05 mf 200 V
12.12	Tubular Condenser .05 mf 400 V
17.5	Mica Condenser 100 mmf ± 10%
17.8	Mica Condenser 250 mmf ± 20%
22.4	3 Section Electrolytic Condenser
27.3	Variable Condenser 30-40-20 mf
37.1	Oscillator Coil 150 W.V.
37.9	Loop Antenna
37.3	Input I.F. Transformer complete
37.11	Output I.F. Transformer complete
52.2	Volume Control w/switch
72.1	Power Cord (Approved)
77.16	Dial Pointer
77.18	Dial Scale (Calibrated)
97.12W	Cabinet—Walnut Bakelite
142.4W	Cabinet Knobs—Walnut
97.11	Cabinet Back
107.4	4" P.M. Speaker with Transformer
107.41	4" P.M. Speaker less Transformer
42.1	Speaker Transformer for Above
117.1	30 ohm 1 W Resistor

609 SERIES PARTS LIST

Part No.	Description
12.4	Tubular Condenser .005 mf 600 V
12.8	Tubular Condenser .02 mf 400 V
12.9	Tubular Condenser .03 mf 400 V
12.11	Tubular Condenser .05 mf 400 V
12.12	Tubular Condenser .05 mf 200 V
17.5	Mica Condenser 100 mmf ± 10%
17.8	Mica Condenser 250 mmf ± 20%
22.1	3 Section Electrolytic Condenser
27.1	Variable Condenser 30-40-20 mf
37.1	Oscillator Coil 150 W.V.
37.2	Loop Antenna
37.3	Input I.F. Transformer complete
37.4	Output I.F. Transformer complete
52.1	Volume Control with Switch
72.1	Power Cord (Aproved)
77.1	Dial Scale (Calibrated)
77.6	Dial Pointer
77.7	Dial Crystal
97.2W	Cabinet Bakelite—Walnut
97.2V	Cabinet Bakelite—Ivory
97.3	Cabinet Back
142.4W	Cabinet Knobs—Walnut
142.4V	Cabinet Knobs—Ivory
107.1	4" P.M. Speaker with Transformer
107.2	4" P.M. Speaker less Transformer
42.1	Speaker Transformer for above
117.1	30 ohm 1 W. Resistor



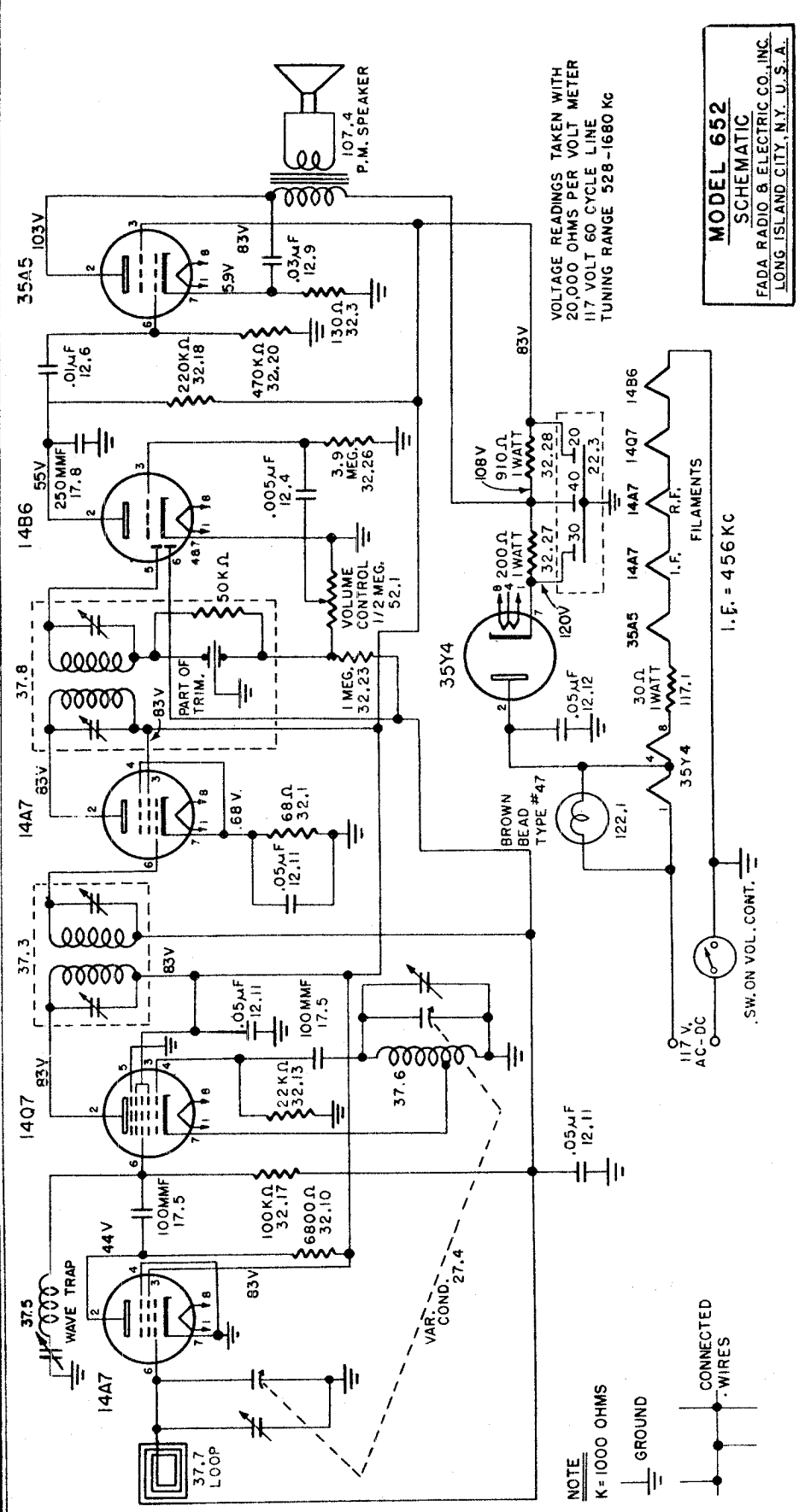
TUNING RANGE 528-1680KC CHASSIS LAYOUT 605



TUNING RANGE = 528-1680 Kc TRIMMER 456 Kc 609 CHASSIS LAYOUT

MODEL 652

FADA RADIO & ELEC. CO. INC.



Power consumption 30 Watts

Frequency Range 1680-530 KC

Tubes: R.F. Amplifier 14A7

Osc. Converter 14Q7

I.F. Amplifier 14A7

Det. Avc. A.F. 14B6

Power Output 35A5

Rectifier 35Y4

Power supply (25-60 cycles AC) 95-125V AC-DC

Speaker 4" P.M. 1 oz. Alnico V Magnet

Speaker Transformer 2500 ohms—400 cycles

Speaker Voice Coil 3.2 ohms

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ALIGNMENT PROCEDURE MODELS 652 AND 1000

No attempt should be made to realign the various circuits until all other causes have been checked, unless the condition is so obvious as to indicate that realignment is necessary. Then proceed as follows:

Volume Control full on.

Low range A.C. meter connected across voice coil to indicate output.

Keep signal generator attenuated so as to maintain ½ scale reading on output meter.

Make certain that dial pointer is exactly on index line (top left side of dial plate) when variable condenser is fully meshed.

ALIGNMENT DATA FOR MODELS 652 AND 1000 ARE SIMILAR WITH EXCEPTION OF STEPS 2 AND 3 IN COLUMNS SHOWING GENERATOR CONNECTIONS

MODEL 652 MODEL 1000

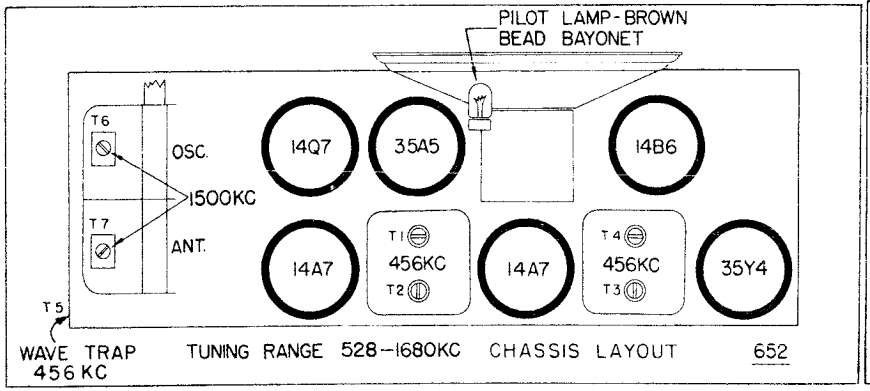
Receiver Dial at:	Signal Generator	Dummy Antenna	Connect Generator to:	Connect Signal Generator to:	Refer to Chassis Layout for Location of Trimmers
1 Full Open	Exactly 456 KC	.1 MF	Control Grid 14Q7 Tube Pin No. 6 on 14Q7 Socket	Control Grid 12SA7 Tube Pin No. 8 on 12SA7 Socket	Adjust for Maximum Output T1, T2, T3 & T4
2 Full Open	Exactly 456 KC	.1 MF	Control Grid 14A7 Tube (RF) (Top) Rear Section Variable Condenser	Control Grid 12SK7 Tube (R.F.) (Top) Rear Section Variable Condenser	Adjust for Minimum Output T5
3 Exactly 1680 KC	Exactly 1680 KC		Radiating Loop (½ meter) 20" from Receiver	Radiating Loop (½ meter) 20" from Receiver	Adjust for Maximum Output T6
4 Exactly 1500 KC	Exactly 1500 KC		Radiating Loop (½ meter) 20" from Receiver	Radiating Loop (½ meter) 20" from Receiver	Adjust for Maximum Output T7
5 Approx. 600 KC	Approx. 600 KC		Radiating Loop (½ meter) 20" from Receiver	Radiating Loop (½ meter) 20" from Receiver	Check tracking and bend slotted end plate (rear section) of variable if necessary.
6					

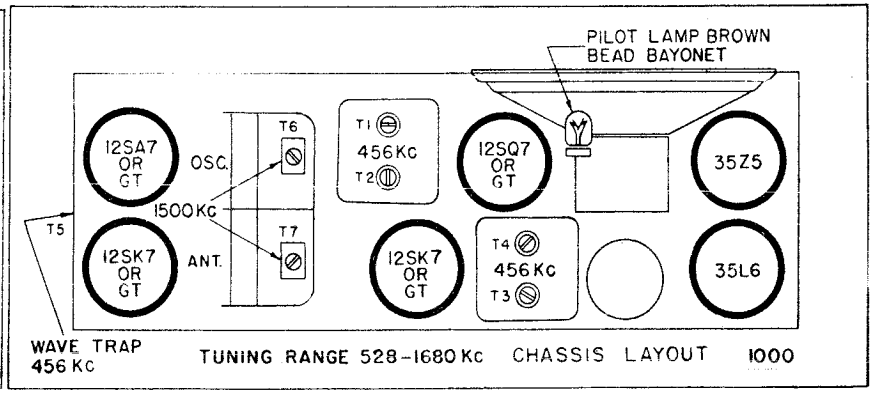
PARTS LIST 652 SERIES

Part No.	Description	Part No.	Description
12.4	Tubular Condenser .005 mf 600 V	77.12	Dial Pointer
12.6	Tubular Condenser .01 mf 400 V	77.10	Dial Scale (Calibrated)
12.9	Tubular Condenser .03 mf 400 V	97.7A	Cabinet—Alabaster
12.11	Tubular Condenser .05 mf 200 V	97.7B	Cabinet—Red & Alabaster
12.12	Tubular Condenser .05 mf 400 V	97.7C	Cabinet—Blue & Alabaster
17.5	Mica Condenser 100 mmf ± 10%	97.7D	Cabinet—Maroon & Alabaster
17.8	Mica Condenser 250 mmf ± 20%	97.7E	Cabinet—Onyx
22.3	3 Section Electrolytic Condenser 30-40-20 mf	97.8	Cabinet Back
27.4	Variable Condenser 150 W.V.	142.3A	Cabinet Knobs Alabaster
37.6	Oscillator Coil	142.3B	Cabinet Knobs Onyx
37.7	Loop Antenna	142.3C	Cabinet Knobs Red
37.3	Input I.F. Transformer complete	107.4	4" Speaker with Transformer
37.8	Output I.F. Transformer complete	107.41	4" Speaker less Transformer
37.5	I.F. Trap	42.1	Speaker Transformer for above
52.3	Volume Control with Switch	117.1	30 ohm 1 W Resistor
72.1	Power Cord (approved)		

PARTS LIST 1000 SERIES

Part No.	Description	Part No.	Description
12.4	Tubular Condenser .005 mf 600 V		
12.6	Tubular Condenser .01 mf 400 V		
12.9	Tubular Condenser .03 mf 400 V		
12.11	Tubular Condenser .05 mf 200 V		
12.12	Tubular Condenser .05 mf 400 V		
17.5	Mica Condenser 100 mmf ± 10%		
17.8	Mica Condenser 250 mmf ± 20%		
22.1	3 Section Electrolytic Condenser 30-40-20 mf 150 W.V.		
27.5A	Variable Condenser		
37.1	Oscillator Coil		
37.10	Loop Antenna		
37.3	Input I.F. Transformer complete		
37.33	Output I.F. Transformer complete		
37.5	I.F. Trap		
52.5	Volume Control with Switch		
72.1	Power Cord (Approved)	97.16D	Cabinet Maroon & Alabaster
77.6	Dial Pointer	97.16E	Cabinet Onyx
77.21	Dial Scale (Calibrated)	142.5A	Cabinet Knobs Alabaster
77.22	Dial Crystal	142.5B	Cabinet Knobs Onyx
97.16A	Cabinet Alabaster	142.5C	Cabinet Knobs Red
97.16B	Cabinet Red & Alabaster	107.1	4" P.M. Speaker with Transformer
97.16C	Cabinet Blue & Alabaster	42.1	Speaker Transformer for above



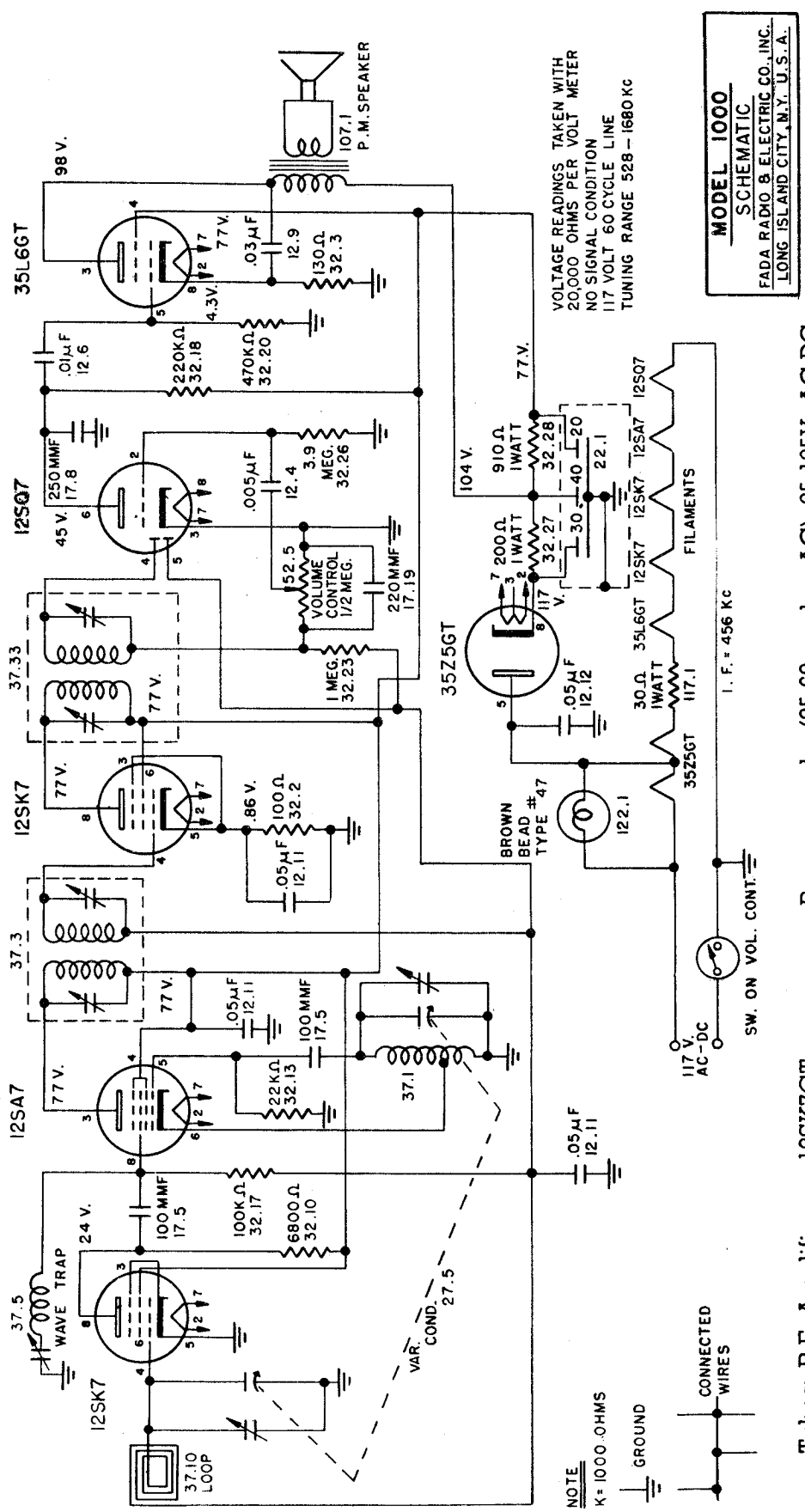


FADA RADIO & ELEC. CO. INC.

MODEL 652
MODEL 1000

MODEL 1000

FADA RADIO & ELEC. CO. INC.



Tubes: R.F. Amplifier 12SK7GT
Osc. Converter 12SA7GT
I.F. Amplifier 12SK7GT
Det. Avc. A.F. 12SQ7GT
Power Output 35L6GT
Rectifier 35Z5GT
Speaker 4" P.M. 1 oz. Alnico V Magnet
Speaker Transformer 2500 ohms—400 cycles
Speaker Voice Coil 3.2 ohms

Power supply (25-60 cycles AC) 95-125V AC-DC
Power consumption 30 Watts
Frequency Range 1680-528 KC
I.F. Circuits 456 KC

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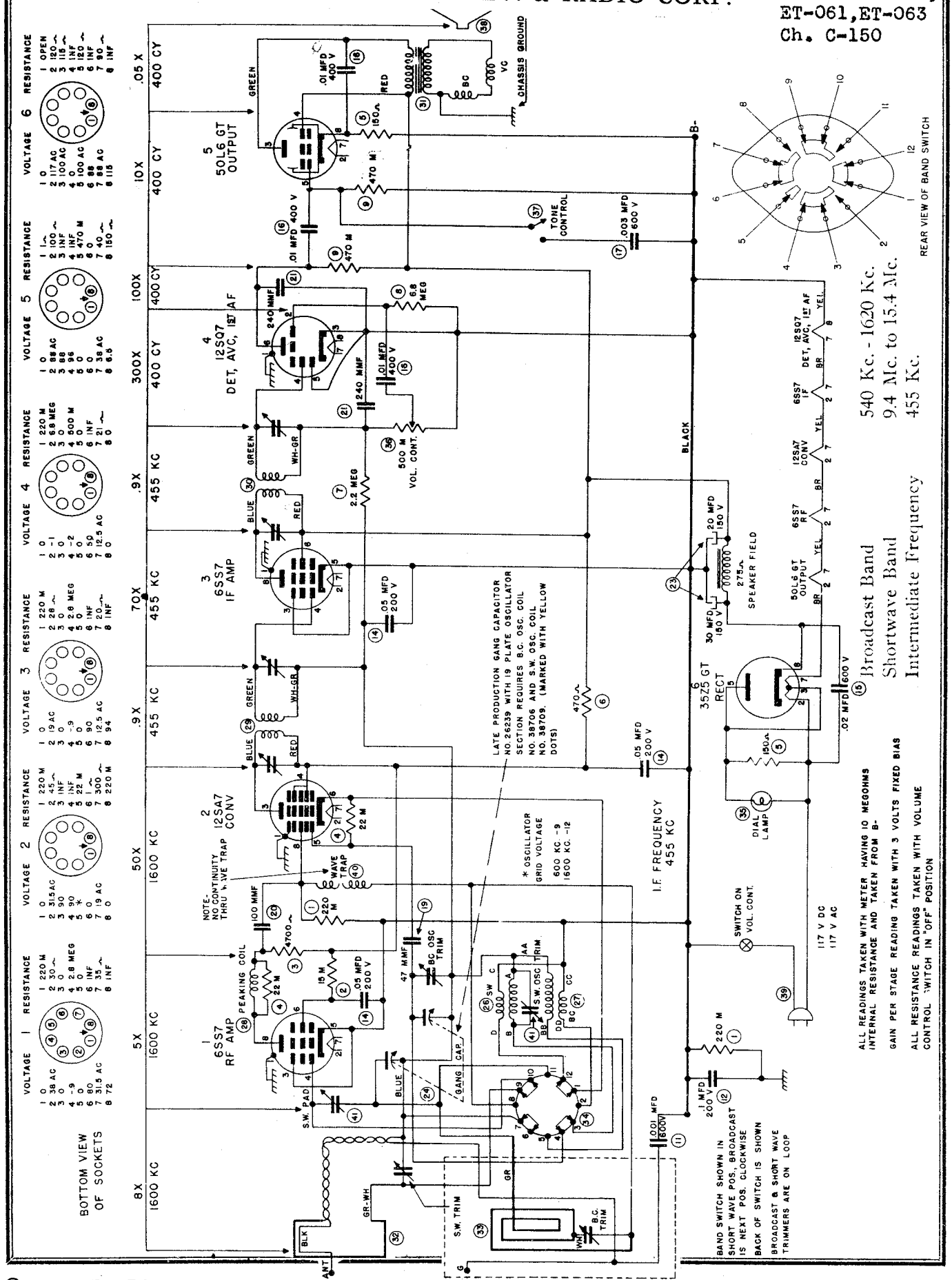
For Alignment, trimmers, etc., see P.15-5

FARNSWORTH TELEV. & RADIO CORP.

MODELS ET-060, ET-061, ET-063
Ch. C-150


1 6SS7 RF AMP
2 12SA7 CONV
3 6SS7 IF AMP
4 12SQ7 DET, AVC, 1ST AF
5 50L6 GT OUTPUT
6 35Z5 GT RECT
BOTTOM VIEW OF SOCKETS
VOLTAGE 1 RESISTANCE
VOLTAGE 2 RESISTANCE
VOLTAGE 3 RESISTANCE
VOLTAGE 4 RESISTANCE
VOLTAGE 5 RESISTANCE
VOLTAGE 6 RESISTANCE
5X 1600 KC
50X 1600 KC
.9X 455 KC
70X 455 KC
.9X 455 KC
300X 400 CY
100X 400 CY
10X 400 CY
.05 X 400 CY
8X 1600 KC
I.F. FREQUENCY 455 KC
* OSCILLATOR GRID VOLTAGE
600 KC. -9
1600 KC. -12
LATE PRODUCTION GANG CAPACITOR NO. 26239 WITH 19 PLATE OSCILLATOR SECTION REQUIRES B.C. OSC. COIL NO. 38706 AND S.W. OSC. COIL NO. 38709. (MARKED WITH YELLOW DOTS)
NOTE- NO CONTINUITY THRU WAVE TRAP
PEAKING COIL
GANG CAP.
S.W. TRIM
B.C. TRIM
S.W. OSC TRIM
B.C. OSC TRIM
SWITCH ON VOL. CONT.
TONE CONTROL
VOL. CONT.
SPEAKER FIELD
DIAL LAMP
CHASSIS GROUND
117 V DC
117 V AC
BLACK
B-
ANT
G
REAR VIEW OF BAND SWITCH
Broadcast Band 540 Kc. - 1620 Kc.
Shortwave Band 9.4 Mc. to 15.4 Mc.
Intermediate Frequency 455 Kc.
ALL READINGS TAKEN WITH METER HAVING 10 MEGOHMS INTERNAL RESISTANCE AND TAKEN FROM B-
GAIN PER STAGE READING TAKEN WITH 3 VOLTS FIXED BIAS
ALL RESISTANCE READINGS TAKEN WITH VOLUME CONTROL SWITCH IN "OFF" POSITION
BAND SWITCH SHOWN IN SHORT WAVE POS., BROADCAST IS NEXT POS. CLOCKWISE
BACK OF SWITCH IS SHOWN
BROADCAST & SHORT WAVE TRIMMERS ARE ON LOOP

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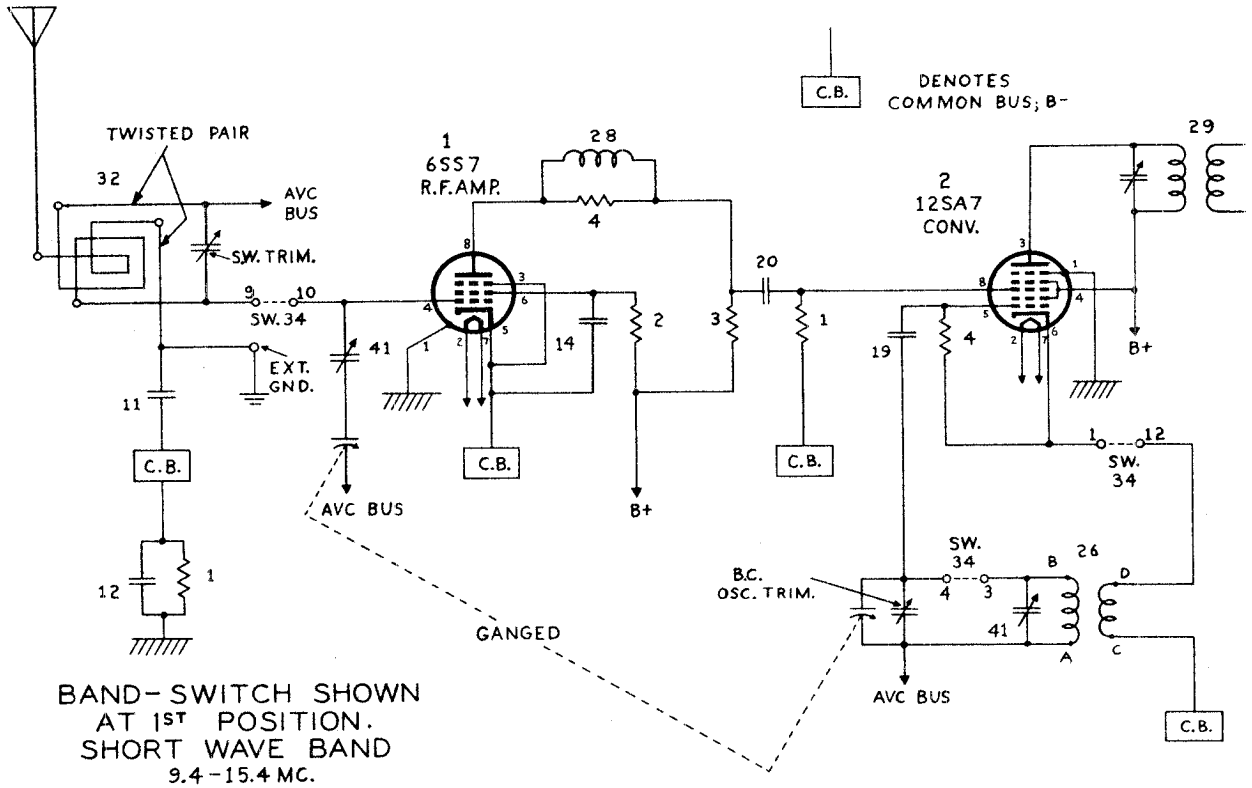
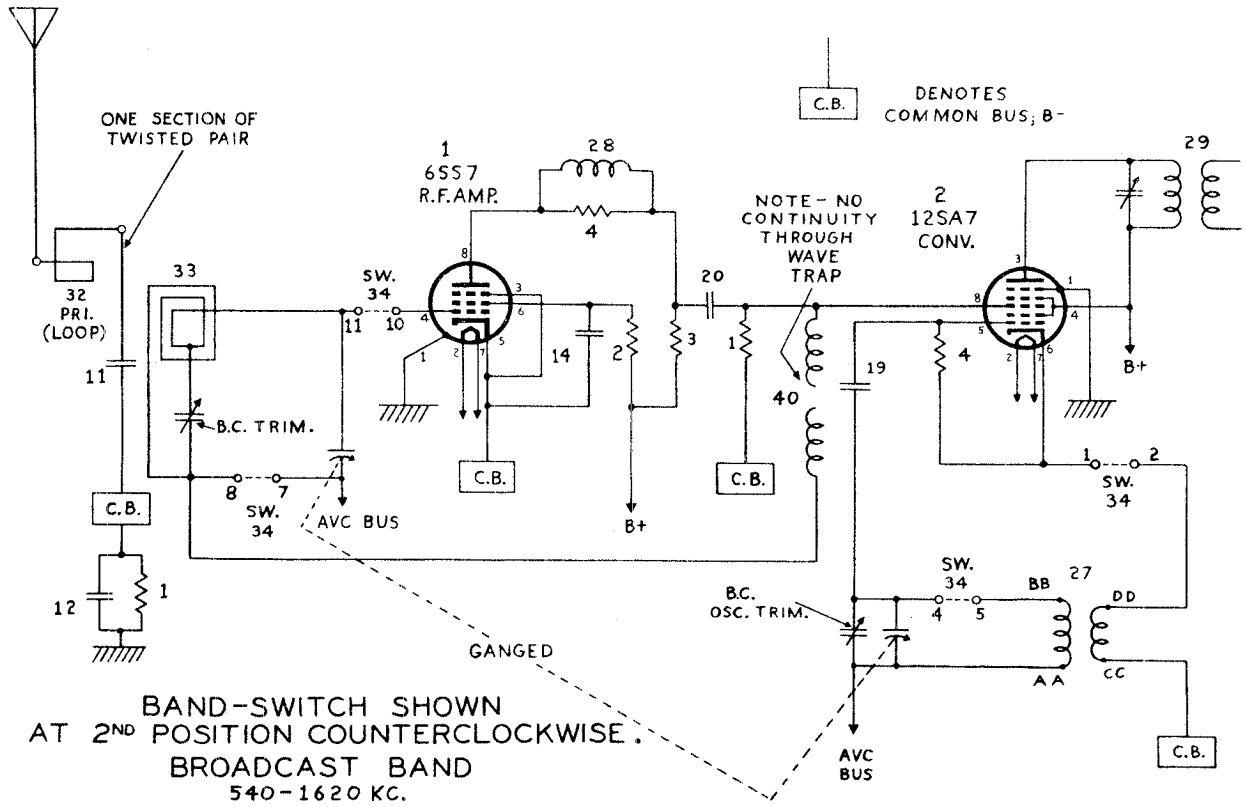
MODELS ET-060,
ET-061,ET-063
Ch. C-150

FARNSWORTH TELEV. & RADIO CORP.



BAND-SWITCH SHOWN
AT 1ST POSITION.
SHORT WAVE BAND
9.4-15.4 MC.



BAND-SWITCH SHOWN
AT 2ND POSITION COUNTERCLOCKWISE.
BROADCAST BAND
540-1620 KC.

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FARNSWORTH TELEV. & RADIO CORP.

MODELS ET-060
ET-061, ET-063

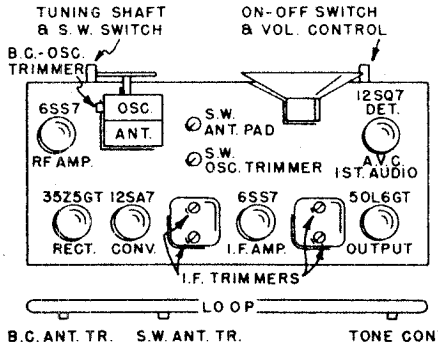
A Signal Generator calibrated at 455 Kc., 600 Kc., 1000 Kc., 1500 Kc., 15 Mc., 12.5 Mc., and 10 Mc., and an output indicator are required to properly align this receiver. All adjustments should be made with the volume control set for maximum, keeping the signal generator output as low as possible to prevent AVC action and incorrect adjustments.

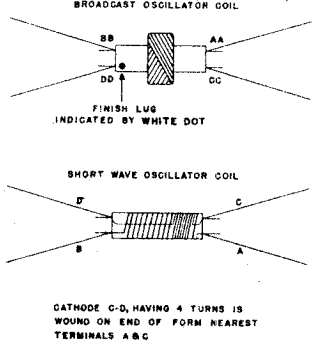
Connect the low side of the Signal Generator to the chassis through a .1 Mfd. condenser. Connect the high side to antenna lead at rear of set through dummy load of 100 MMF for Broadcast and 400 ohms for Shortwave.

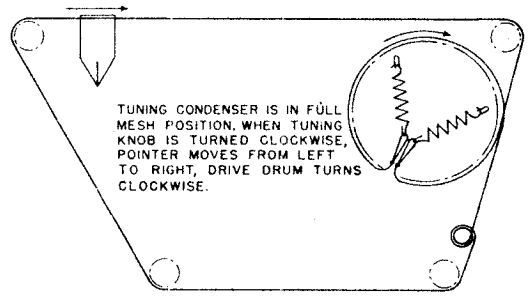
The loop antenna should be placed in approximately the position relative to chassis as when chassis is installed in cabinet.

When aligning the Shortwave Oscillator, use the peak found farthest out from maximum capacity on the oscillator trimmer. Use the peak nearest maximum capacity on the loop trimmer.

STEPS	DUMMY ANTENNA	SET GENERATOR AT	SET GANG AT	ADJUST	LOCATED	TO OBTAIN
1	SET VOLUME CONTROL FOR MAXIMUM OUTPUT					
2	100 MMF	455 Kc.	Minimum Capacity	2nd. I.F. Trimmers	Top of I.F. Transformer	Maximum Output
3				1st. I.F. Trimmers		
4		1500 Kc.	1500 Kc.	B.C. Osc. Trimmer	On Tuning Capacitor	
5		1500 Kc.	1500 Kc.	B.C. Ant. Trimmer	*On Loop Antenna	
6	Check Pointer for Calibration at 1000 Kc. and 600 Kc.					
	SHORT WAVE BAND					
7	400 Ohms	15 Mc.	Minimum Capacity	S.W. Osc. Trimmer	*Chassis Near Rear	Maximum Output
8		12.5 Mc.	12.5 Mc. Rock Gang	S.W. Ant. Trimmer	*On Loop	
9	Check	10 Mc.	10 Mc. Rock Gang	S.W. Ant. Padder	*Chassis Near Front	






TUNING CONDENSER IS IN FULL MESH POSITION. WHEN TUNING KNOB IS TURNED CLOCKWISE, POINTER MOVES FROM LEFT TO RIGHT, DRIVE DRUM TURNS CLOCKWISE.

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MODELS ET-060, ET-061, ET-063

FARNSWORTH TELEV. & RADIO CORP.

Refer. No.	Part No.	DESCRIPTION	List Price
1	77216	220 M Ohms	$ .15
2	77265	15 M Ohms	.15
3	77211	4700 Ohms	.15
4	77266	22 M Ohms	.15
5	77259	150 Ohms	.15
6	77261	470 Ohms	.15
7	77270	2.2 Megohms	.15
8	77273	6.8 Megohms	.15
9	77217	470 M Ohms	.15
11	25197	.001 Mfd. 600 V.	.15
12	25215	.1 Mfd. 600 V.	.20
14	25196	.05 Mfd. 600 V.	.30
15	25195	.02 Mfd. 600 V.	.20
16	25194	.01 Mfd. 600 V.	.20
17	25184	.003 Mfd. 600 V.	.20
19	25193	47 Mmf. Mica	.30
20	25188	100 Mmf. Mica	.25
21	25187	240 Mmf. Mica	.30
23	25022	20 Mfd.—30 Mfd.—150 V. Elect. Cap.	1.15
24	26154	Gang Capacitor	4.45
24	26239	Gang Capacitor, (see note)	3.95
26	38549	S. W. Oscillator Coil (White dot) for 26154	.70
26	38709	S. W. Oscillator Coil (Yellow dot) for 26239 (see note)	.70
27	38483	B. C. Oscillator Coil (White dot) for 26154	.60
27	38707	B. C. Oscillator Coil (Yellow dot) for 26239 (see note)	.60
28	38550	Peaking Coil	.40
29	38536	1st. I. F. Transformer	1.70
30	38537	2nd. I. F. Transfomer	1.70
31	94091	Output Transformer	1.50
32	38535	S. W. Loop Assembly	.60
33	38465	B. C. Loop and Back Cover Ass'y ET-060 and ET-061	3.15
33	38480	B. C. Loop and Back Cover Ass'y ET-063	3.20
34	90095	Band Switch	1.50
35	42186	Dial Lamp (Mazda 47)	.15
36	78070	Volume Control	1.10
37	90073	Tone Control Slide Switch	.20
38	81091	Speaker	6.35
39	27118	Line Cord	.70
40	38484	Wave Trap	.55
41	26214	B. C. and S. W. Antenna Trimmer Strip	.60
	31276	Dial Background	.35
	31319	Dial Window	.50
	07334	Dial Pointer Assembly	.95
	31277	Dial Scale for ET-060 and ET-061	.40
	31279	Dial Scale for ET-063	.45
	41106	Universal Drive Cord Kit	.40
	56994	Drive Drum	.15
	09195	Knob and Set Screw for ET-060 and ET-063	.45
	09196	Knob and Set Screw for ET-061 Red	50
	09224	Knob and Set Screw for ET-061 Blue	.50
	09225	Knob and Set Screw for ET-061 Black	.50
	54118	Band Switch Lever ET-060 and ET-061	.15
	54091	Band Switch Lever ET-063	.15
	H-231	Cabinet and Packing for ET-060	6.15
	H-254	Cabinet and Packing for ET-061	8.75
	59168	Grille for ET-060	2.00
	59190	Grille for ET-061 Red	2.00
	59247	Grille for ET-061 Bue	2.00
	59248	Grille for ET-061 Black	2.00

NOTE: Models with R.F. trimmer on loop require removal of R. F. trimmer from gang capacitor having such trimmer. Late production gang capacitor 26239 (identified by red dot) with 19 plate oscillator section requires B.C. Oscillator Coil 38706 and S.W. Oscillator Coil 38709 (Marked with yellow dots).

The Service Department policy is to furnish ½ Watt 5% Carbon Resistors and 600 Volt Tub-

The parts shortage has resulted in the substitution of various types of tuning capacitors without change in part numbers stamped on them. In ordering replacement tuning capacitors for ET-060, 061, 063, 064, 065, 066, 069; EK-263, 264, and 265 the following suggestions should be observed:

Gang Capacitor with 21 plate oscillator section requires the removal of trimmer from R.F. section of gang if the loop antenna has a R. F. trimmer located on it. This capacitor uses B. C. oscillator coil No. 38483 and if a S. W. oscillator coil is used, requires S. W. oscillator coil No. 38549. Both of these coils have a white dot to indicate finish lug.

No. 23239 gang capacitor with 19 plate oscillator section (identified by red dot on rear) may require the removal of R. F. trimmer as explained above. This capacitor requires B. C. oscillator coil No. 38706 and S. W. oscillator coil (if used) No. 38709. These oscillator coils are marked with a yellow dot at the finish lug.

Prices subject to change without notice.

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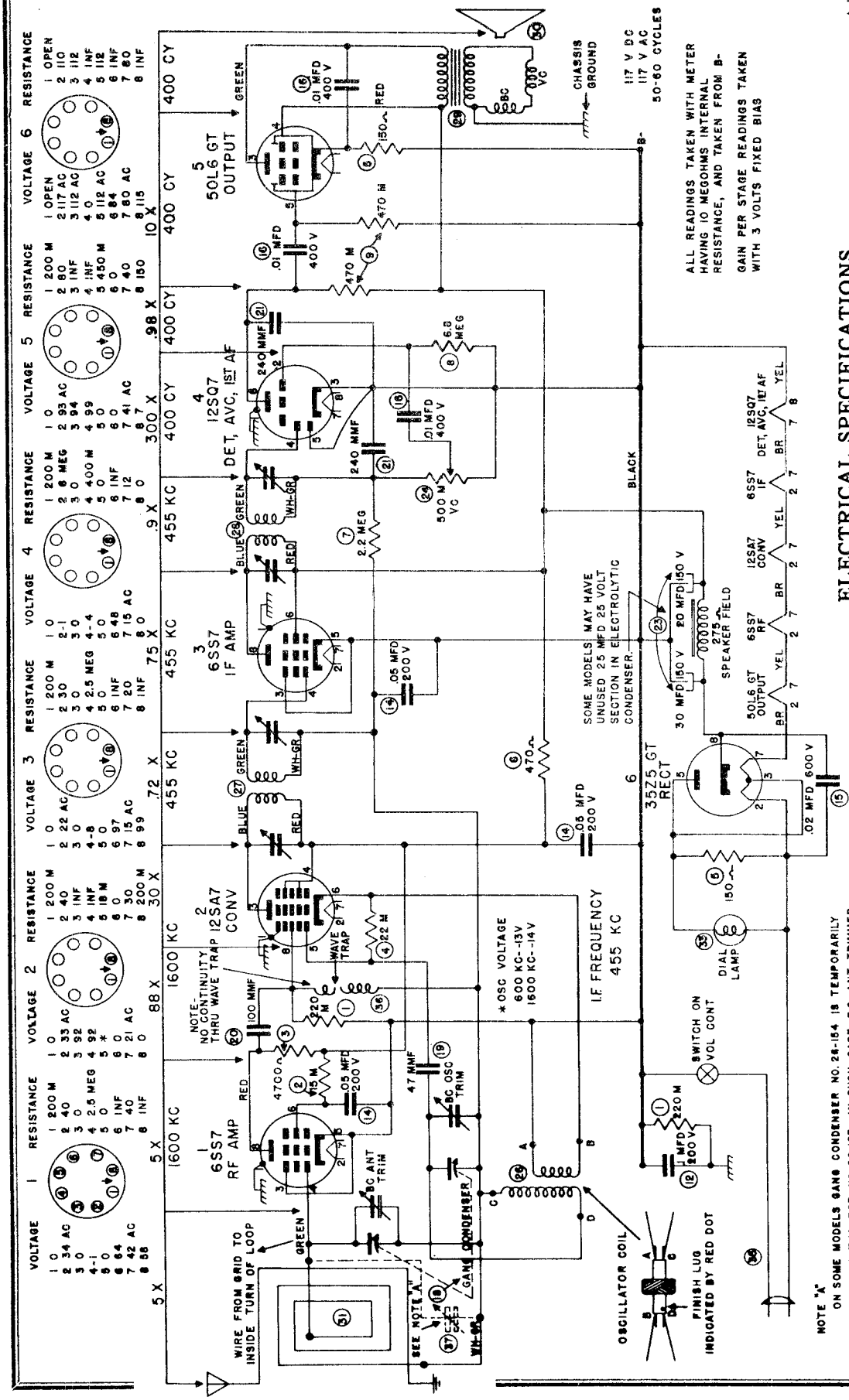
FARNSWORTH TELEV. & RADIO CORP.

MODELS ET-064, ET-065, Ch. C-158; ET-066, Ch. C-159


1 6SS7 RF AMP
2 12SA7 CONV
3 6SS7 IF AMP
4 12SQ7 DET, AVC, 1ST AF
5 50L6 GT OUTPUT
6 35Z5 GT RECT
I.F. FREQUENCY 455 KC
* OSC VOLTAGE 600 KC--13V 1600 KC--14V
SOME MODELS MAY HAVE UNUSED 25 MFD 25 VOLT SECTION IN ELECTROLYTIC CONDENSER.
ALL READINGS TAKEN WITH METER HAVING 10 MEGOHMS INTERNAL RESISTANCE, AND TAKEN FROM B-
GAIN PER STAGE READINGS TAKEN WITH 3 VOLTS FIXED BIAS
117 V DC 117 V AC 50-60 CYCLES
CHASSIS GROUND
SPEAKER FIELD
SWITCH ON VOL CONT
DIAL LAMP
OSCILLATOR COIL
WIRE FROM GRID TO INSIDE TURN OF LOOP
FINISH LUG INDICATED BY RED DOT
NOTE-NO CONTINUITY THRU WAVE TRAP
NOTE "A" ON SOME MODELS GANG CONDENSER NO. 26-154 IS TEMPORARILY SUBSTITUTED FOR NO. 26-163. IN SUCH CASE B.C. ANT. TRIMMER WILL BE FOUND ON LOOP.

ELECTRICAL SPECIFICATIONS

Watts	at 117 Volts A. C.	30
Voltage	A. C. or D. C.	105-125

Six Tube A. C. — D. C. Single Band Superheterodyne

Broadcast Band	540 Kc — 1620 Kc
Intermediate Frequency	455 Kc

MODEL	CHASSIS	SPEAKER
ET-064	C-158	81091
ET-065	C-158	81091
ET-066	C-159	81091

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MODELS ET-064,
ET-065,Ch.C-158;
ET-066,Ch.C-159

FARNSWORTH TELEV. & RADIO CORP.

EQUIPMENT AND PROCEDURE FOR ALIGNMENT

To properly align this receiver, a signal generator calibrated at 455 Kc., 600 Kc., and 1500 Kc., and an output indicator are required. All adjustments should be made with the volume control set for maximum volume, keeping the signal generator output as low as possible to prevent A. V. C. action and incorrect alignment.

Connect the low side of the signal generator to one of the wires found at the rear of the set. The high side of the signal generator is connected to the other lead.

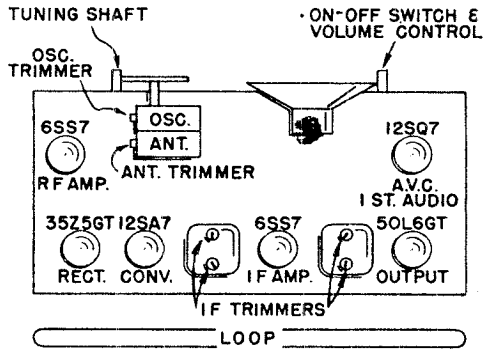
The loop should be spaced 3/4 inch from the chassis or the approximate position relative to the chassis as when installed in cabinet.

TABULATION FOR ALIGNMENT

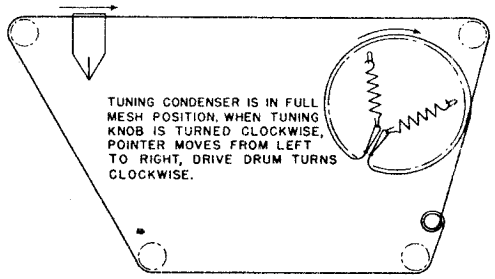
Steps	Dummy Antenna	Set Generator At	Set Gang At	Adjust	Located	To Obtain
1	Set Volume Control For Maximum Output					
2	100 MMF	455 Kc.	Minimum Capacity	2nd. I.F. Trimmers	Top of I.F. Transformer	Maximum Output
3				1st. I. F. Trimmers		
4		1500 Kc.	1500 Kc.	Osc. Trimmer	On Tuning Condenser	
5		1500 Kc.	1500 Kc.	Ant. Trimmer	On Tuning Condenser*	
6	Check Pointer Calibration at 600Kc.					

*On models using gang condenser #26154, the antenna trimmer is located on loop.

SIX TUBE LAYOUT



DIAL STRINGING


TUNING CONDENSER IS IN FULL MESH POSITION. WHEN TUNING KNOB IS TURNED CLOCKWISE, POINTER MOVES FROM LEFT TO RIGHT, DRIVE DRUM TURNS CLOCKWISE.

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MODELS EC-260, EK-262, EK-263, EK-264, EK-265

FARNSWORTH TELEV. & RADIO CORP.

MODELS ET-064, ET-065, ET-066

PARTS PRICE LIST

ET-064, ET-065, ET-066

Refer. No.	Part No.	Description	List Price
		PRICES NOT AVAILABLE AT PRESENT	
1	77216	220 M Ohms	
2	77265	15 M Ohms	
3	77211	4700 Ohms	
4	77266	22 M Ohms	
5	77259	150 Ohms	
6	77261	470 Ohms	
7	77270	2.2 Meg Ohms	
8	77273	6.8 Meg Ohms	
9	77217	470 M Ohms	
12	25215	.1 Mfd. 600 V	
14	25196	.05 Mfd. 600 V	
15	25195	.02 Mfd. 600 V	
16	25194	.01 Mfd. 600 V	
18	09130	Two Gang Condenser & Drive Drum	
19	25193	47 Mmfd. Mica	
20	25188	100 Mmfd. Mica	
21	25187	240 Mmfd. Mica	
23	25022	Elect. Cond. 30 Mfd. & 20 Mfd.	
24	78048	500 M Volume Control	
26	38483	Oscillator Coil Assembly	
27	38536	1st. I.F. Transformer	
28	38537	2nd. I.F. Transformer	
29	94091	Output Transformer	
30	81091	Speaker	
31	38478	Loop and Back Cover Assembly	
31	38479	Loop and Back Cover Assembly for ET-066	
33	42186	Dial Lamp	
35	27118	Line Cord	
36	38484	Wave Trap	
37	26233	Antenna Trimmer used with Gang Cond. #26154 Only	
	41106	Drive Cord Assembly	
	07316	Dial Pointer Assembly	
	31265	Dial Scale	
	31278	Dial Scale for ET-066	
	59193	Knob	
	59134	Knob fo ET-066	
	H-239	Cabinet and Packing for ET-064	
	H-240	Cabinet and Packing for ET-065	
	H-235	Cabinet and Packing for ET-066	

The Service Department policy is to furnish 1/2 Watt 5% Carbon Resistors and 600 Volt Tubular Condensers.

Prices subject to change without notice.

PARTS PRICE LIST

EC-260, EK-262, EK-263, EK-264, EK-265

PRICES NOT AVAILABLE AT PRESENT

Reference No.	Part No.	DESCRIPTION	List Price
1	77214	100 M Ohms	
2	77211	4700 Ohms	
3	77266	22 M Ohms	
4	77281	470 Ohms 2 Watt	
5	77155	12 M Ohms 2 Watt	
6	77270	2.2 Megohms	
7	77216	220 M Ohms	
8	77213	47 M Ohms	
9	77217	470 M Ohms	
10	77273	6.8 Megohms	
11	77174	270 Ohms 1 Watt	
12	77258	100 Ohms	
14	77301	2200 Ohms 2 Watt	
16	25196	.05 Mfd. Tubular 600 V	
17	25215	.1 Mfd. Tubular 600 V	
18	25194	.01 Mfd. Tubular 600 V	
20	25183	.005 Mfd. Tubular 600 V	
21	25185	.002 Mfd. Tubular 600 V	
22	25184	.003 Mfd. Tubular 600 V	
23	25031	.005 Mfd. Line Buffer 600 V	
25	25188	100 Mmf. Mica	
26	25187	240 Mmf. Mica	
27	25193	47 Mmf. Mica	
28	25180	Electrolytic Capacitor 30 Mf. 350 V. - 20 Mf. 300 V. - 20 Mf. 250 V.	
30	15136	Gang Condenser and Drive Drum	
31	78071	Volume Control	
32	90148	Tone Control and Phono Switch	
33	38484	Wave Trap	
34	38483	Oscillator Coil	
35	38536	1st. I. F. Transformer	
36	38537	2nd. I. F. Transformer	
38	94025	Power Transformer	
39	94197	Output Transformer EC-260, EK-265	
39	94198	Output Transformer EK-262	
39	94199	Output Transformer EK-263, EK-264	
40	26032	Antenna Trimmer	
41	38533	Loop Antenna for EK-262 and EK-264	
41	38545	Loop Antenna for EC-260, EK-263 and EK-265	
42	27118	Line Cord	
43	11210	Phono A.C. Cable and Plug	
45	42185	Dial Lamp Mazda 44	
46	80030	Phono Input Socket	
47	81125	Speaker EC-260, EK-265	
47	81124	Speaker EK-263, EK-264	
47	81123	Speaker EK-262	
48	80256	Antenna Socket	
	80252	Antenna Plug	
	80139	Molded Octal Tube Socket	
	07348	Dial Pointer Assembly	
	41106	Universal Drive Cord Kit	
	31318	Dial Glass for EC-260, EK-264	
	31280	Dial Glass for EK-262, EK-263, EK-265	
	59211	Dial Escutcheon EC-260, EK-264	
	59199	Dial Escutcheon EK-262, EK-263, EK-265	
	58006	Dial Background for EK-262, EK-263, EK-265	
	58039	Dial Background for EC-260, EK-264	
	64360	Dial Light Current Supply Spring	
	H-236	Cabinet and Packing for EC-260	
	H-221	Cabinet and Packing for EK-262	
	H-222-1	Cabinet and Packing for EK-263 Walnut	
	H-222-2	Cabinet and Packing for EK-263 Blonde	
	H-223	Cabinet and Packing for EK-265	
	H-220-1	Cabinet and Packing for EK-264 Walnut	
	H-220-2	Cabinet and Packing for EK-264 Blonde	
	59134	Knob for EC-260, EK-262, EK-263 Walnut, EK-264 Walnut, EK-265	
	59243	Knob for EK-263 Blonde, EK-264 Blonde	
	71223	Phono Needle	
	22147	P. U. Cable	

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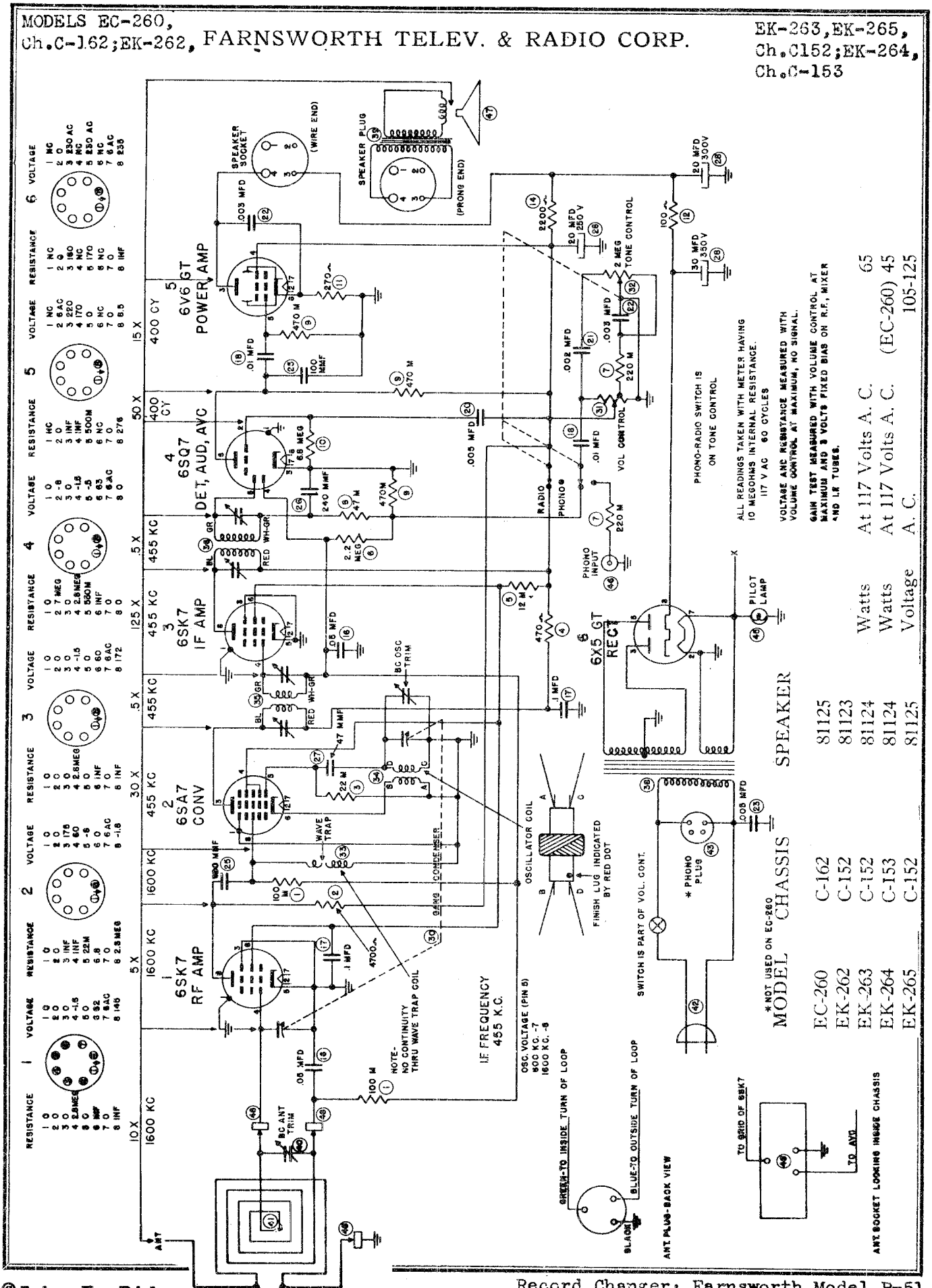
MODELS EC-260, Ch.C-162; EK-262, Ch.C-162; EK-263, EK-265, Ch.C152; EK-264, Ch.C-153

FARNSWORTH TELEV. & RADIO CORP.


6SK7 RF AMP
6SK7 CONV
6SA7 IF AMP
6SK7 DET, AUD, AVC
6SQ7 POWER AMP
6V6 GT RECT
6X5 GT
SPEAKER
PHONO-RADIO SWITCH IS ON TONE CONTROL
ALL READINGS TAKEN WITH METER HAVING 10 MEGOHMS INTERNAL RESISTANCE. 117 V AC 60 CYCLES
VOLTAGE AND RESISTANCE MEASURED WITH VOLUME CONTROL AT MAXIMUM, NO SIGNAL.
GAIN TEST MEASURED WITH VOLUME CONTROL AT MAXIMUM AND 3 VOLTS FIXED BIAS ON R.F., MIXER AND I.F. TUBES.
I.F. FREQUENCY 455 K.C.
OSC. VOLTAGE (PIN 6) 900 KC. -7 1600 KC. -8
NOTE- NO CONTINUITY THRU WAVE TRAP COIL
SWITCH IS PART OF VOL. CONT.
FINISH LUG INDICATED BY RED DOT
ANT PLUG-BACK VIEW
ANT SOCKET LOOKING INSIDE CHASSIS
GREEN-TO INSIDE TURN OF LOOP
BLUE-TO OUTSIDE TURN OF LOOP
TO GRID OF 6SK7
TO AVC

	Watts	At 117 Volts A. C.	65
	Watts	At 117 Volts A. C.	(EC-260) 45
	Voltage	A. C.	105-125

EC-260	C-162	81125
EK-262	C-152	81123
EK-263	C-152	81124
EK-264	C-153	81124
EK-265	C-152	81125

*NOT USED ON EC-260

MODEL CHASSIS

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Record Changer: Farnsworth Model P-51

FARNSWORTH TELEV. & RADIO CORP.

MODELS EC-260, Ch.C-162;EK-262, EK-263,EK-265, Ch.C-152;EK-264, Ch.C-153

A Signal Generator calibrated at 455 Kc., 600 Kc. and 1500 Kc., and an output indicator are necessary to properly align this set. All adjustments should be made with the volume control set for maximum and the tone control for maximum treble, keeping the signal generator output as low as possible to prevent A.V.C. action and false settings.

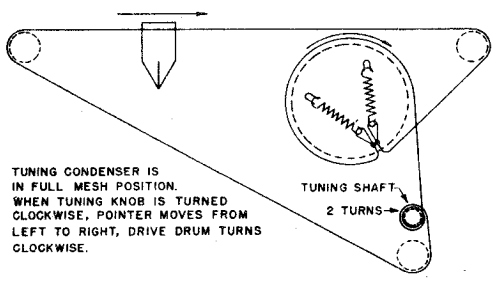
The low side of the signal generator is connected to the chassis.

TABULATION FOR ALIGNMENT

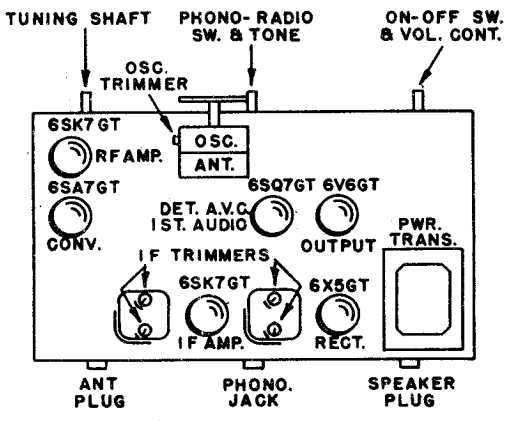
Steps	Connect High Side of Generator to	Set Generator At	Set Gang At	Adjust	Located	To Obtain
1	Set Volume Control at Maximum and Tone Control at Maximum Treble					
2	Stator of Ant. Section of Gang with .1 Mf. In Series	455 Kc.	Minimum	2nd. I.F. Transformer	Top of 2nd. I.F. Transformer	Maximum Output
3				1st. I. F. Transformer	Top of 1st. I.F. Transformer	
4	Ant. Lead With 250 Mmf. In Series*	1500 Kc.	1500 Kc.	Osc. Trimmer	On Gang	
5		1500 Kc.	1500 Kc.	Ant. Trimmer	On Loop	
6	Check Pointer Calibration on 600 Kc.					

*Antenna wire protrudes from loop.

DIAL STRINGING


TUNING CONDENSER IS IN FULL MESH POSITION. WHEN TUNING KNOB IS TURNED CLOCKWISE, POINTER MOVES FROM LEFT TO RIGHT, DRIVE DRUM TURNS CLOCKWISE.
TUNING SHAFT
2 TURNS

CHASSIS LAYOUT



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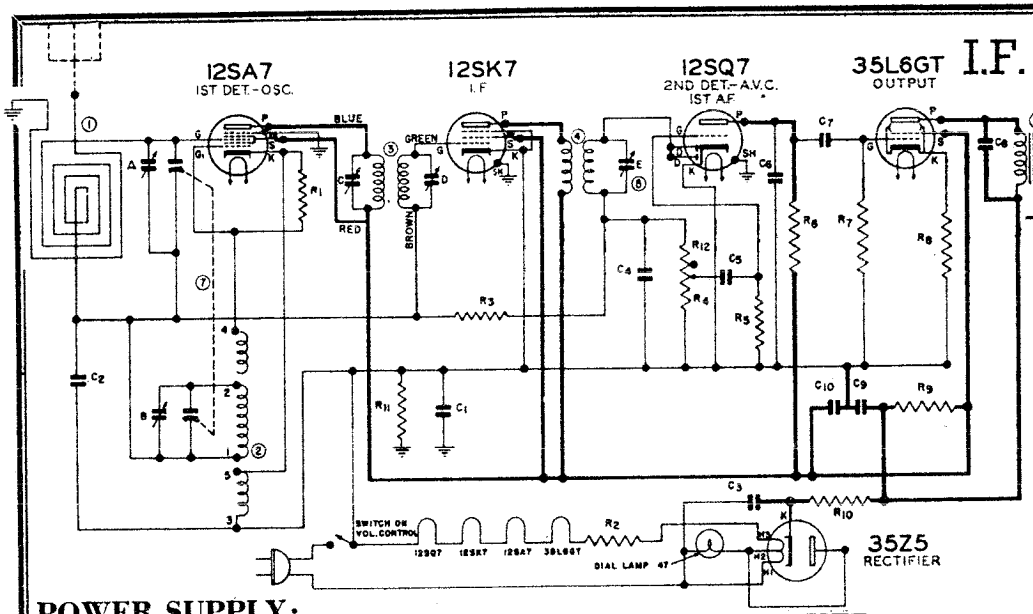
I.F. 455 KC.



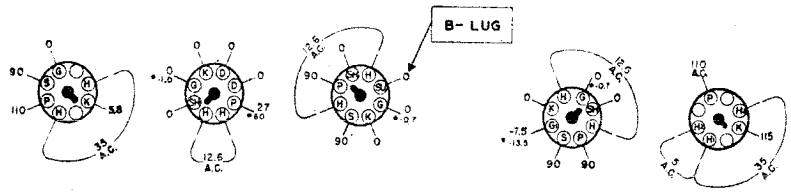
SOCKET VOLTAGES

Measured with voltmeter having sensitivity of 1000 ohms per volt except where indicated by (*).

VOLUME ON FULL WITH NO SIGNAL DIAL TURNED TO 540 KC.

BOTTOM VIEW OF CHASSIS

HEATER VOLTAGES MEASURED ACROSS SOCKET TERMINALS. ALL OTHER VOLTAGES MEASURED BETWEEN SOCKET TERMINALS AND B- LUG.



117 VOLT 60 CYCLE A.C. POWER SUPPLY USED FOR THESE MEASUREMENTS.

POWER SUPPLY:

117 volts
50-60 cycles A.C. or D.C.
30 watts

SPEAKER:

4 inch P-M Dynamic
Voice coil impedance—3.2 ohms

PARTS LIST

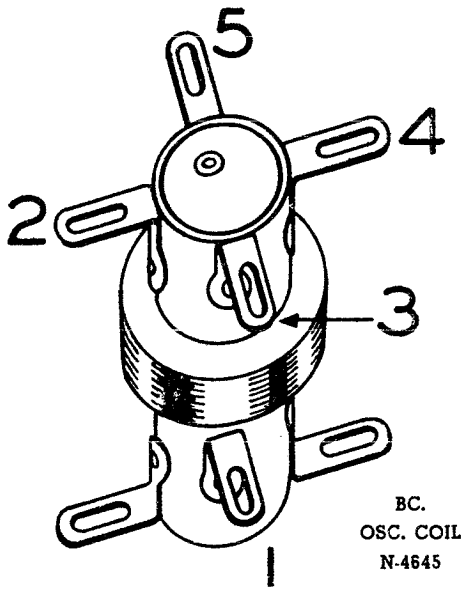
DIA-GRAM NO.	PART NO.	DESCRIPTION	LIST PRICE
		CONDENSERS	
C1	N-1345	Condenser .05 MFD 200 Volt	$
C2	N-1345	Condenser .05 MFD 200 Volt	
C3	N-1346	Condenser .05 MFD 400 Volt	
C4	N-1374	Condenser—Mica .0001 MFD 500 Volt	
C5	N-4894	Condenser .005 MFD 600 Volt	
C6	N-4890	Condenser .0005 MFD 600 Volt	
C7	N-1344	Condenser .01 MFD 400 Volt	
C8	N-1376	Condenser .02 MFD 400 Volt	
C9-C10	N-3302	Condenser—Electrolytic C9—35 MFD 150 Volt; C10—30 MFD 150 Volt	
		RESISTORS	
R1	N-4025	Resistor—Carbon 22,000 Ohm .5 Watt	$
R2	N-4023	Resistor—Carbon 82 Ohm 2.0 Watt	
R3	N-1262	Resistor—Carbon 1.0 Megohm .5 Watt	
R4	N 4843	Vol. Con., 500,000 ohm with switch—no shaft	
	N-4999	Vol. Con., 500,000 ohm with switch & shaft	
R5	N-4028	Resistor—Carbon 6.8 Megohm .5 Watt	
R6	N-4026	Resistor—Carbon 220,000 Ohm .5 Watt	
R7	N-4027	Resistor—Carbon 470,000 Ohm .5 Watt	
R8	N-4024	Resistor—Carbon 220,000 Ohm .5 Watt	
R9	N-3341	Resistor—Carbon 1,000 Ohm .5 Watt	
R10	N-4022	Resistor—Carbon 33 Ohm .5 Watt	
R11	N-4026	Resistor—Carbon 220,000 Ohm .5 Watt	
R12		Resistor—Carbon (In Volume Control)	

DIA-GRAM NO.	PART NO.	DESCRIPTION	LIST PRICE
		OTHER ELECTRICAL PARTS	
1	N-3875	Coil—Loop with Cabinet Back	$
2	N-4645	Coil—Oscillator	
3	N-4813	Coil—1st I.F.	
4	N-4846	Coil—2nd I.F.	
5	N-4990	Speaker—4" P.M. Dynamic	
6	N-3899	Transformer—Output	
7A, 7B	N-5290	Condenser—Variable, 2 Gang & Pulley Assy	
8	N-4048	Condenser—Trimmer—70 to 130 MMFD	
		MISCELLANEOUS PARTS	
143		Cabinet	$
N-5250		Cord, Dial Drive (3 feet required)	$
N-4749		Knob	
N-1147		Lamp, Dial—Mazda 47 6-8 V. 150 Ma.	
N-3881		Pointer, Dial	
N-3879		Pulley, Idler	
N-3926		Scale, Dial	
N-3872		Shaft, Tuning	
N-5184		Shaft, Volume Control—Use with N-4843 Vol. Control	
N-3882		Socket, Dial Lamp—with leads	
N-4666		Socket, Tube—Laminated	
N-3229		Socket, Tube—Molded	
N-4864		Speednut	
N-2656		Spring, Dial Cord	
N-4854		Terminal, Screw	
N-3243		Washer, "C"—For Tuning Shaft	

PRICE SUBJECT TO CHANGE WITHOUT NOTICE

REAR OF CHASSIS

*—Measured with vacuum tube volt meter.



NUMBERED TERMINALS IN ILLUSTRATION CORRESPOND TO SIMILARLY NUMBERED TERMINALS ON THE CIRCUIT DIAGRAM.

For Gain data, see P. 15-6

MODEL 4A2,
Commentator

THE FIRESTONE TIRE & RUBBER CO.

ALIGNMENT PROCEDURE

1. Remove the chassis and loop antenna from the cabinet at the same time. To accomplish this remove the two fasteners holding the top of the back to the cabinet and remove the two screws on the rear apron of the chassis.

2. Note that there are five calibrating lines stamped into the metal dial frame. When gang condenser is fully meshed, dial pointer should be in the position indicated by first line at the left. If it is set incorrectly, release pointer clip on dial cord and reposition pointer.

3. Connect an output meter across the speaker voice coil or from plate of 35L6GT tube to B— through a .1 Mfd. condenser (see voltage chart for convenient B— connection).

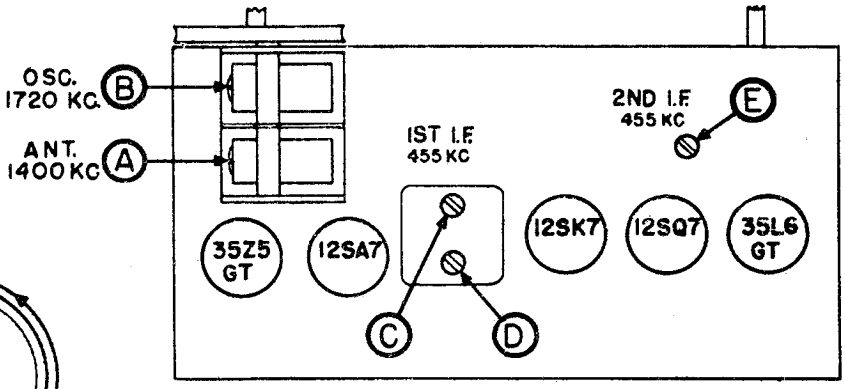
4. Connect ground lead from signal generator to B— through a .25 Mfd. condenser.

5. Set volume control at maximum volume position and use a weak signal from the signal generator.

IMPORTANT—Align this receiver in exactly the order shown below.

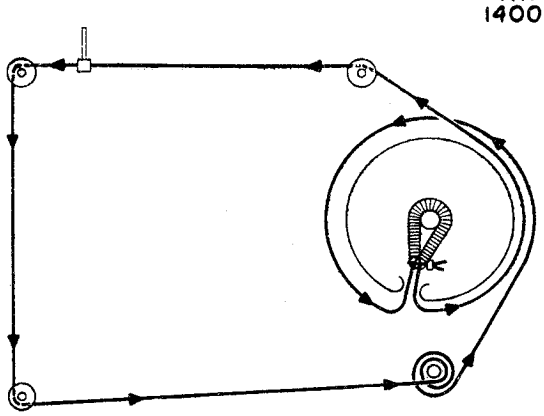
DUMMY ANT. IN SERIES WITH SIGNAL GENERATOR	CONNECT HIGH SIDE OF GENERATOR TO	SIGNAL GENERATOR FREQUENCY	RECEIVER DIAL SETTING	TRIMMER NUMBER	TRIMMER DESCRIPTION	TYPE OF ADJUSTMENT
.05 MFD. Paper Condenser	Control Grid of 12SA7	455 KC	Any point where it does not affect the signal.	E	2nd I.F.	Adjust for maximum output. Then repeat adjustment.
				C-D	1st I.F.	
100 MMFD. Mica Condenser	External Antenna Blue Lead on Loop	1720 KC	Set pointer to extreme right.	B	Oscillator	Adjust for maximum output.
100 MMFD Mica Condenser	External Antenna Blue Lead on Loop	1400 KC	Tune to 1400 KC generator signal.	A	Antenna	Adjust for maximum output.
100 MMFD. Mica Condenser	External Antenna Blue Lead on Loop	600 KC	Tune to 600 KC generator signal.	—	———	Check sensitivity.

TOP VIEW OF CHASSIS



POWER OUTPUT:

Undistorted — 1.0 watts
Maximum — 1.3 watts



DIAL AND POINTER DRIVE CORD ARRANGEMENT

To string dial cord, set gang condenser to fully meshed position and use following parts:
N-2656 Tension Spring
N-5250 Cord (3 feet)

FREQUENCY RANGES:

Standard Broadcast Band } 535-1720 K.C.

TUBE COMPLEMENT:

12SA7.....Osc.—1st Det.
12SK7.....I.F. Amp.
12SQ7.....2nd Det.—A.V.C.—1st Audio
35L6GT.....Power Output
35Z5GT.....Rectifier

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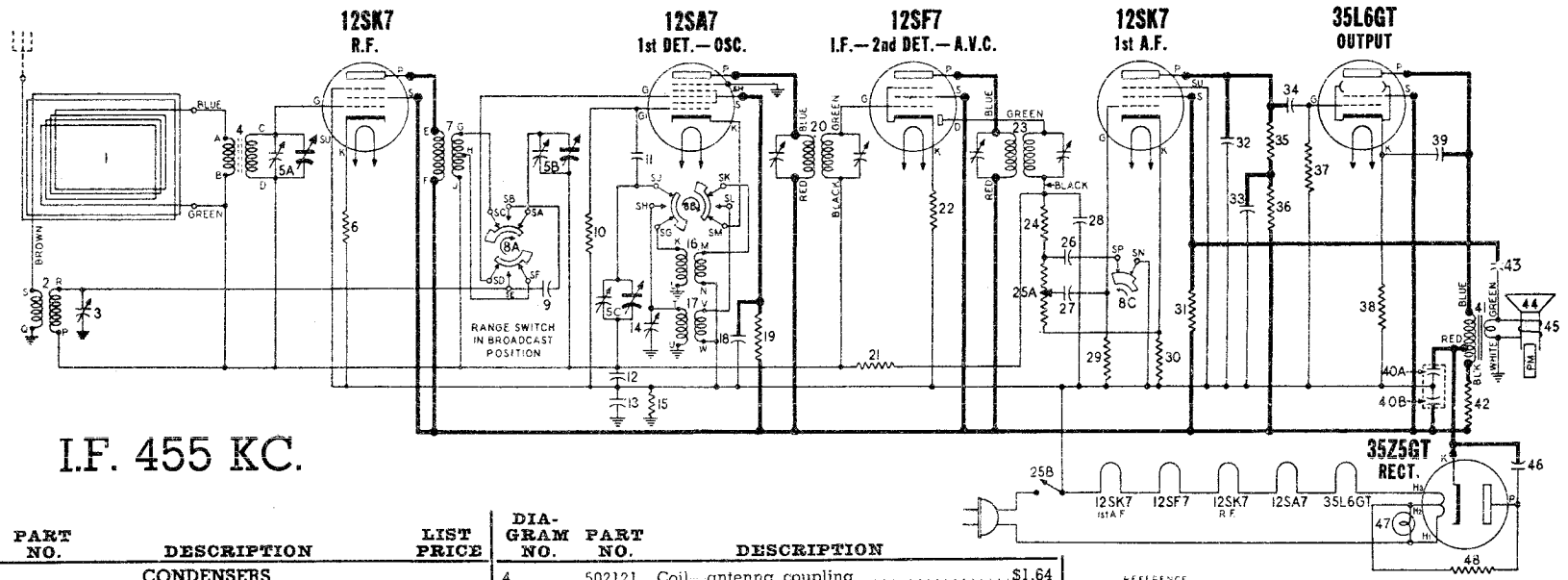
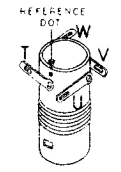


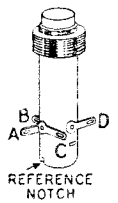
I.F. 455 KC.

DIA-GRAM NO.	PART NO.	DESCRIPTION	LIST PRICE
		CONDENSERS	
3	502172	Condenser—trimmer; 25 to 100 Mmfd.	$0.36
5A-5B-5C	502123	Condenser—variable gang (with drum)	4.60
9	502162	Condenser—315 Mmfd. 500 volt	.45
11	502159	Condenser—mica—50 Mmfd. 500 volt	.24
12	502155	Condenser—.1 Mfd. 200 volt	.30
13	502158	Condenser—.2 Mfd. 400 volt	.36
14	502172	Condenser—trimmer; 25 to 100 Mmfd.	.36
18	502262	Condenser—.25 Mfd. 200 volt	.36
26	502470	Condenser—.0008 Mfd. 400 volt	.20
27	502453	Condenser—.002 Mfd. 400 volt	.20
28	502160	Condenser—mica—110 Mmfd. 500 volt	.24
32	502160	Condenser—mica—110 Mmfd. 500 volt	.24
33	502153	Condenser—.05 Mfd. 200 volt	.24
34	502156	Condenser—.004 Mfd. 400 volt	.20
39	502151	Condenser—.01 Mfd. 400 volt	.20
40A-40B	500256	Condenser—electrolytic A-40 Mfd. 150 volt / B-20 Mfd. 150 volt	1.50
43	502152	Condenser—.02 Mfd. 400 volt	.24
46	502157	Condenser—.05 Mfd. 400 volt	.24
		RESISTORS	
6	502140	Resistor—carbon 390 ohms ¼ watt	.12
10	502130	Resistor—carbon 22,000 ohms ¼ watt	.12
15	502133	Resistor—carbon 220,000 ohms ¼ watt	.12
19	502291	Resistor—carbon 4700 ohms ¼ watt	.12
21	502269	Resistor—carbon 3.3 Meg. ¼ watt	.12
22	502264	Resistor—carbon 47 ohms ¼ watt	.12
24	502131	Resistor—carbon 47,000 ohms ¼ watt	.12
25A-25B	502145	Volume control 500,000 ohms (with switch)	1.25
29	502136	Resistor—carbon 10 Meg. ¼ watt	.12
30	502128	Resistor—carbon 2200 ohms ¼ watt	.12
31	502135	Resistor—carbon 2.2 Meg. ¼ watt	.12
35-36	502133	Resistor—carbon 220,000 ohms ¼ watt	.12
37	502134	Resistor—carbon 470,000 ohms ¼ watt	.12
38	502138	Resistor—carbon 130 ohms ¼ watt	.12
42	502469	Resistor—carbon 1500 ohms 1 watt	.16
48	502574	Resistor—carbon 33 ohms ½ watt	.12
		COILS & TRANSFORMERS	
1	502196	Loop antenna	3.95
2	502740	Coil—S. W. antenna	1.12

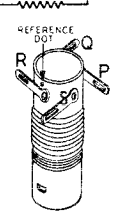
DIA-GRAM NO.	PART NO.	DESCRIPTION	
4	502121	Coil—antenna coupling	$1.64
7	502142	Coil—BC. R.F.	2.26
16	502198	Coil—BC. oscillator	1.32
17	502197	Coil—S.W. oscillator	1.12
20	502102	Transformer—1st I.F.	2.30
23	502103	Transformer—2nd I.F.	2.30
41	500617 / 502906	Transformer—output for R-500616 spkr. / Transformer—output for A-500616 spkr.	2.50
		OTHER ELECTRICAL PARTS	
8A-8B-8C	502199	Switch-tone & range	2.00
44	500587 / 502905	Cone and voice coil for R-500616 spkr. / Cone and voice coil for A-500616 spkr.	2.00
45	500616	Speaker—P.M. dynamic (5 inch)	8.40
47	502473	Lamp-dial (Mazda 47) 6-8V. 150 Ma.	.22
		MISCELLANEOUS PARTS	
	116467	Base for mtg. electrolytic condenser	.04
	502115	Back for cabinet	.60
	502192	Cabinet	15.30
	501732	Clamp—dial scale mtg.	.05
	112745	Clip—coil mtg.	.01
	114955	Clip—retainer on end of dial cord	.01
	116563	Connector—for antenna leads	.01
	117057	Cord—dial drive (57 in. required) per ft.	.05
	500324	Cover—cardboard, for elect. cond.	.04
	502220	Dial scale—glass	1.00
	501186	Grounding plate (under I.F. trans. can)	.10
	501778	Knob—volume or tuning	.12
	501779	Knob—tone & band switch	.14
	502367	Pointer	.16
	81145	Retaining ring for tuning shaft	.01
	14771	Screw—No. 6x3/8; holds frame to cab.	.02
	83047	Screw—No. 8x7/8; chassis mtg.	.02
	500734	Screw—No. 4x5/16; holds clamps to cab.	.02
	501777	Screw—No. 4x1/2; for mtg. loop & back	.02
	502173	Shaft—tuning control	.15
	116690	Socket—octal base	.12
	160392	Socket—octal (rectifier)	.16
	500499	Socket—dial lamp (with leads)	.44
	161384	Spring—dial cord tension	.06
	111456	Washer—spring washer for tuning shaft	.005
	500487	Washer—felt; for knobs	.01



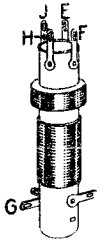
S.W. OSC. COIL 502197



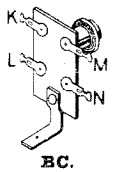
BC. ANTENNA COUPLING COIL 502121



S.W. ANTENNA COIL 502740

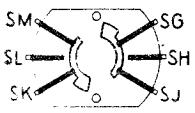


R.F. COIL 502142

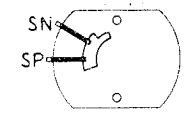


BC. OSC. COIL 502198

REAR DECK FRONT VIEW



FRONT DECK FRONT VIEW



FRONT DECK REAR VIEW

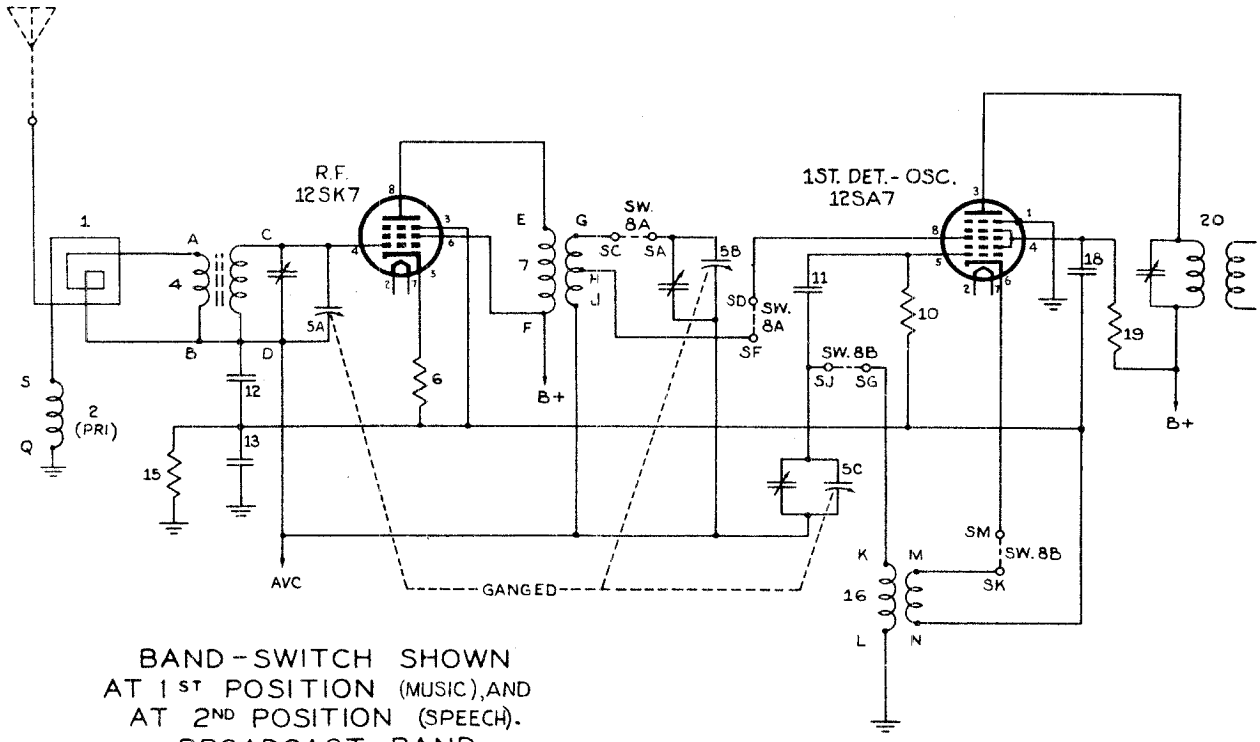
RANGE AND TONE SWITCH
502199

PRICES SUBJECT TO CHANGE WITHOUT NOTICE

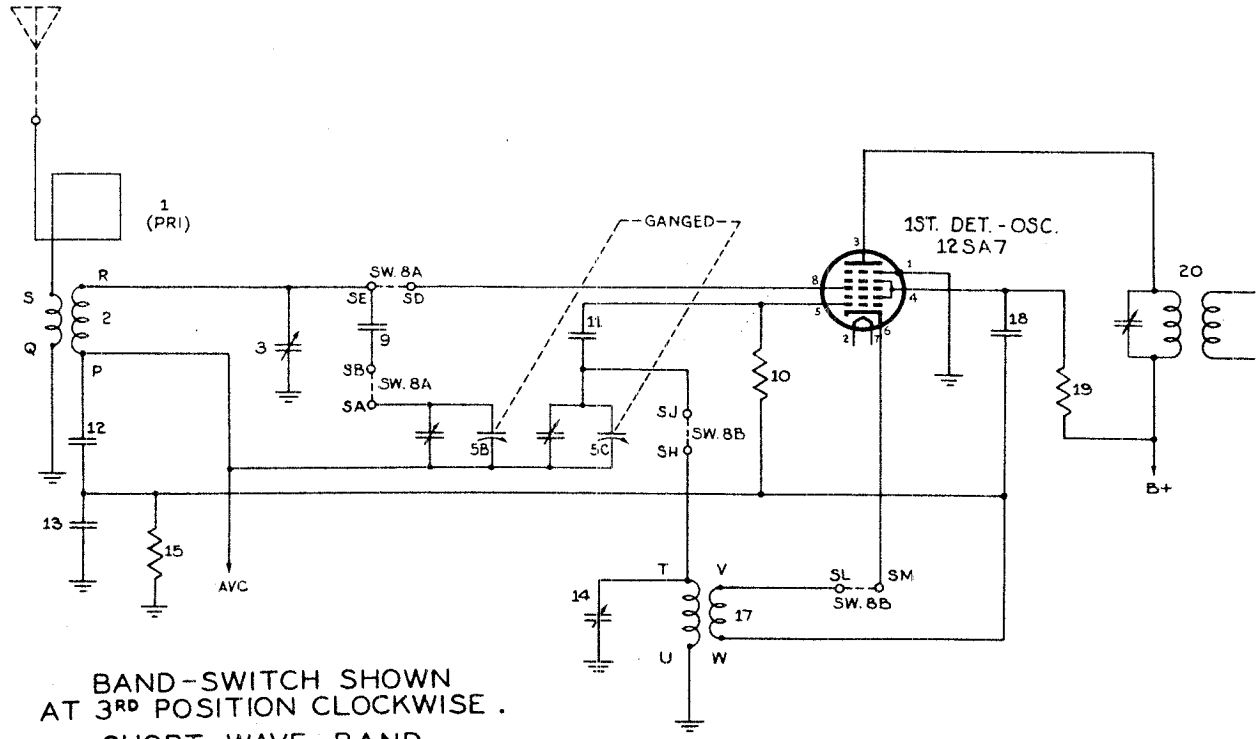
"clarified schematics"

MODEL 4A20

THE FIRESTONE TIRE & RUBBER CO.



BAND-SWITCH SHOWN
AT 1ST POSITION (MUSIC), AND
AT 2ND POSITION (SPEECH).
BROADCAST BAND
540-1650KC.



BAND-SWITCH SHOWN
AT 3RD POSITION CLOCKWISE.
SHORT WAVE BAND
9-12 MC

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THE FIRESTONE TIRE & RUBBER CO. MODEL 4A20

ALIGNMENT PROCEDURE

Remove chassis and loop antenna from cabinet (do not remove loop of wire stapled to cabinet.) After chassis has been removed, replace loop antenna in cabinet. Stand the chassis on one end and space it approximately same distance from loop as when installed in cabinet. Then reconnect all leads to loop antenna and to loop of wire stapled on cabinet.

Note that there are four calibrating lines stamped into the metal dial frame. When gang condenser is fully meshed, dial pointer should be in the position indicated by first line at the left. If it is set incorrectly, release pointer clip on dial cord and reposition pointer.

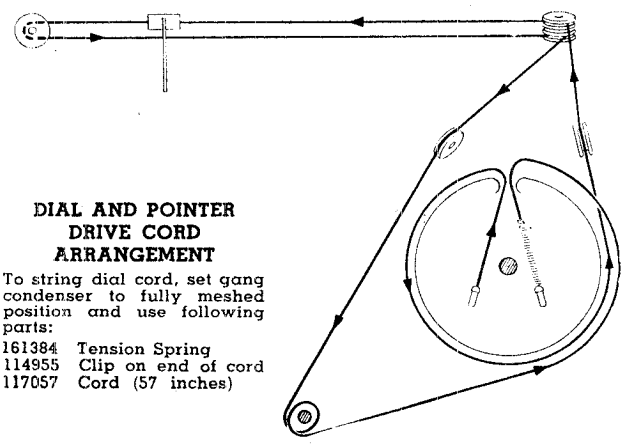
Connect an output meter across the speaker voice coil or from plate of 35L6GT tube to B— through a .1 Mfd. condenser (see voltage chart for convenient B— connection).

Connect ground lead from signal generator to B— through a .25 Mfd. condenser.

Set volume control at maximum volume position and use a weak signal from the signal generator.

IMPORTANT:—Align this receiver in exactly the order shown below. Broadcast band must be aligned before short wave band.

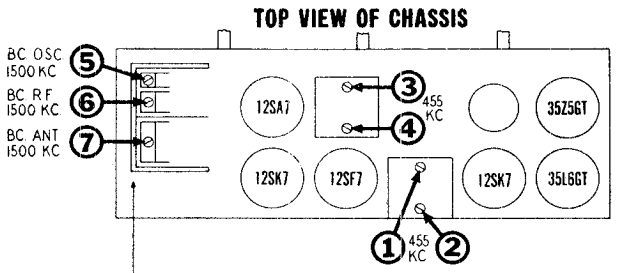
DUMMY ANT. IN SERIES WITH SIGNAL GENERATOR	CONNECT HIGH SIDE OF GENERATOR TO	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POSITION	RECEIVER DIAL SETTING	TRIMMER NUMBER	TRIMMER DESCRIPTION	TYPE OF ADJUSTMENT
200 MMFD. Mica Condenser	Control Grid of 12SA7	455 KC	Broadcast	Any point where it does not affect the signal	1-2	2nd I.F.	Adjust for maximum output. Then repeat adjustment.
					3-4	1st I.F.	
200 MMFD. Mica Condenser	External Antenna Clip on Loop Frame	1500 KC	Broadcast	Set pointer to 1500 KC reference line stamped into metal dial plate (first line at the right)	5	Broadcast Oscillator (Shunt)	Adjust for maximum output.
200 MMFD. Mica Condenser	External Antenna Clip on Loop Frame	1500 KC	Broadcast	Tune to 1500 KC generator signal	6	Broadcast R.F.	Adjust for maximum output.
200 MMFD. Mica Condenser	External Antenna Clip on Loop Frame	1500 KC	Broadcast	Tune to 1500 KC generator signal	7	Broadcast Antenna	Adjust for maximum output.
400 OHM Resistor	External Antenna Clip on Loop Frame	12 MC	Short Wave	Set pointer to 12 MC. Reference line stamped into metal dial plate (second line from the right)	8	Short Wave Oscillator	Adjust to bring in signal. Check to see if proper peak was obtained by tuning in image at approx. 11.1 MC. If image does not appear, realign at 12 MC. with trimmer screw farther out. Recheck image.
400 OHM Resistor	External Antenna Clip on Loop Frame	12 MC	Short Wave	Tune to 12 MC generator signal	9	Short Wave Antenna	Adjust for maximum output. Try to increase output by detuning trimmer and retuning receiver dial until maximum output is obtained.

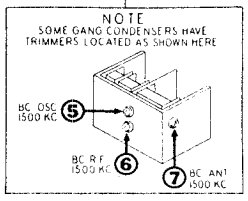


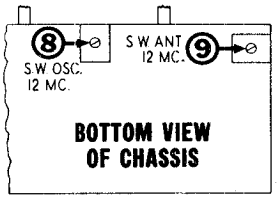
DIAL AND POINTER DRIVE CORD ARRANGEMENT

To string dial cord, set gang condenser to fully meshed position and use following parts:

161384 Tension Spring
114955 Clip on end of cord
117057 Cord (57 inches)







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MODEL 4A2
MODEL 4A20

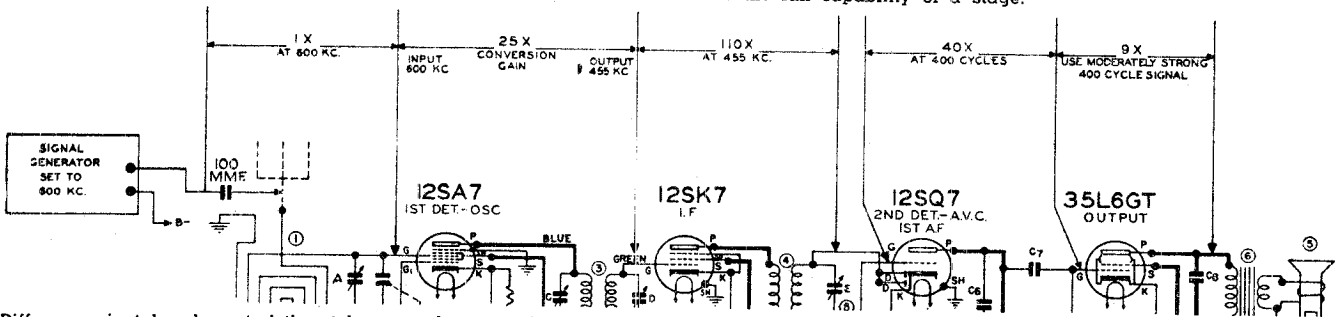
THE FIRESTONE TIRE & RUBBER CO.

APPROXIMATE STAGE GAIN DATA MODEL 4A2

Be sure Ant. and I.F. stages are accurately aligned before measuring gain. R.F. gains can be measured with a "channel" type instrument containing a tuned and calibrated R.F. amplifier. A vacuum tube voltmeter may be used for audio gain measurements. Observe following precautions:

1. For all gain measurements connect signal generator as shown. Use 600 KC. signal with 400 cycle modulation (use nearby frequency if local station interferes).
2. For I.F. measurements connect negative terminal of a 3 volt battery (two 1½ volt cells in series) to A.V.C. lead and positive terminal to B—. This provides a definite operating point.
   IMPORTANT: Disconnect battery when measuring audio stage gains.
3. Be sure radio is carefully tuned to generator signal (use weak signal for sharp tuning.
4. When using a "channel" type instrument carefully tune it for maximum output at desired frequency before making measurements.

I.F. stage gains shown below are less than under normal operating conditions due to the use of 3 volts fixed bias in order to establish a definite operating point. Therefore, these values are not intended to indicate the full capability of a stage.



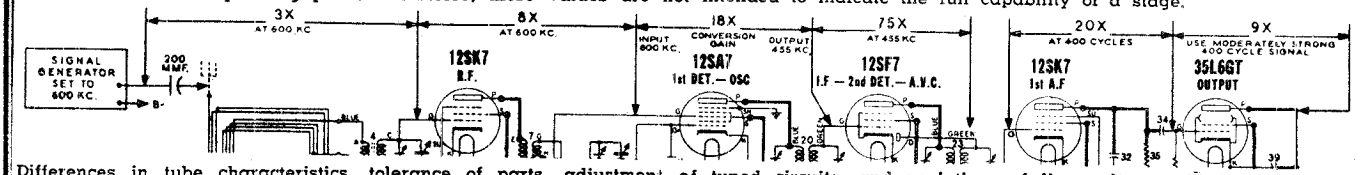
Differences in tube characteristics, tolerance of parts, adjustment of tuned circuits, and variations of line voltage will influence stage gain. Accuracy of measurements is dependent upon careful tuning of receiver to generator signal and experience in using your test equipment. These factors may create considerable variation in gain measurements.

APPROXIMATE STAGE GAIN DATA- MODEL 4A20

Be sure R.F. and I.F. stages are accurately aligned before measuring gain. R.F. gains can be measured with a "channel" type instrument containing a tuned and calibrated R.F. amplifier. A vacuum tube voltmeter may be used for audio gain measurements. Observe following precautions:

1. For all gain measurements connect signal generator as shown. Use 600 KC. signal with 400 cycle modulation (use nearby frequency if local station interferes.)
2. For R.F. and I.F. measurements connect negative terminal of a 3 volt battery (two 1½ volt cells in series) to A.V.C. lead and positive terminal to B—. This provides a definite operating point.
   IMPORTANT: Disconnect battery when measuring audio stage gains.
3. Be sure radio is carefully tuned to generator signal (use weak signal for sharp tuning.)
4. When using a "channel" type instrument carefully tune it for maximum output at desired frequency before making measurements.

The R.F. and I.F. stage gains shown below are less than under normal operating conditions due to the use of 3 volts fixed bias in order to establish a definite operating point. Therefore, these values are not intended to indicate the full capability of a stage.



Differences in tube characteristics, tolerance of parts, adjustment of tuned circuits, and variations of line voltage will influence stage gain. Accuracy of measurements is dependent upon careful tuning of receiver to generator signal and experience in using your test equipment. These factors may create considerable variation in gain measurements.

MODEL 4A20

FREQUENCY RANGES:

Standard Broadcast Band — 540-1650 KC.
Short Wave Band — 9-12 MC.

POWER SUPPLY:

117 volts
50-60 cycles A.C. or D.C.
30 watts

POWER OUTPUT:

Undistorted — 1.0 watts
Maximum — 1.6 watts

SPEAKER:

5 inch P-M Dynamic
Voice coil impedance—3.5 ohms

SOCKET VOLTAGES

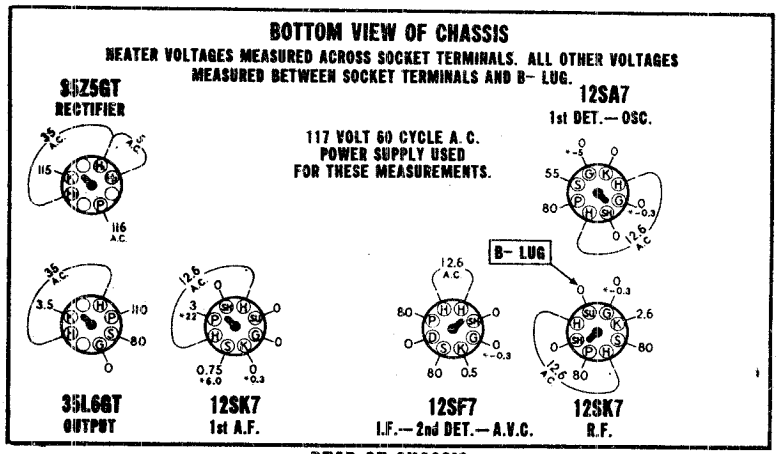
Measured with voltmeter having sensitivity of 1000 ohms per volt except where indicated by (*).

VOLUME ON FULL WITH NO SIGNAL — DIAL TUNED TO 540 KC.

BOTTOM VIEW OF CHASSIS

HEATER VOLTAGES MEASURED ACROSS SOCKET TERMINALS. ALL OTHER VOLTAGES MEASURED BETWEEN SOCKET TERMINALS AND B- LUG.

117 VOLT 60 CYCLE A. C. POWER SUPPLY USED FOR THESE MEASUREMENTS.



REAR OF CHASSIS

*—Measured with vacuum tube voltmeter

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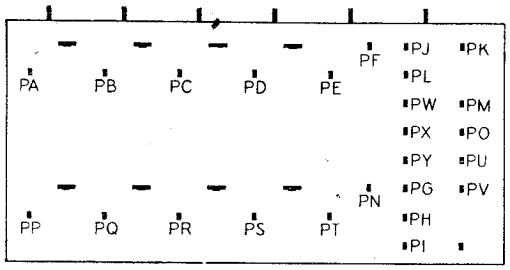
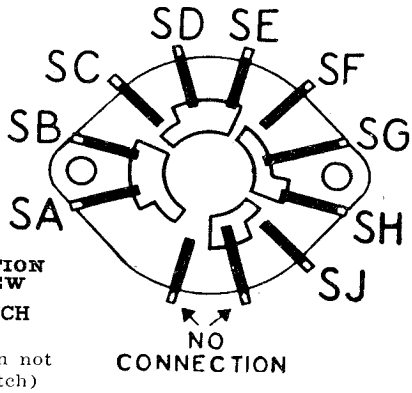
PUSH-BUTTON RANGES:

Button No. 1 —540-1000 KC.
Button No. 2 & 3—650-1300 KC.
Button No. 4 & 5—975-1600 KC.

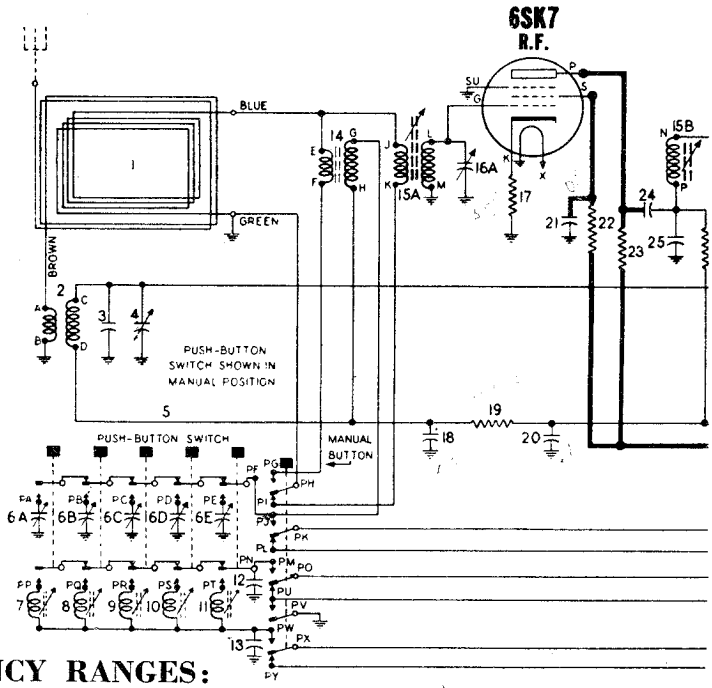


PUSH-BUTTON SWITCH
502177



REAR SECTION
REAR VIEW

BAND SWITCH
502147
(Front section not used as switch)



FREQUENCY RANGES:

Standard Broadcast Band } 540-1600 KC.

Short Wave Band } 9.35-9.88 MC.

The above circuit applies to chassis which ha number. Early production chassis without th

If a broad tuning peak or a dead spot is enco trimmer No. 5 at 1600 Kc. (in chassis witho oscillation resulting from extraneous coupling 69 at position shown in above circuit.

DIA-GRAM NO.	PART NO.	DESCRIPTION	LIST PRICE
		CONDENSERS	
3	502884	Condenser—mica 120 Mmfd. 500 volt	$0.24
4	502171	Condenser—trimmer; 5 to 35 Mmfd.	.24
6A to E	502910	Condenser—trimmer assem. for P-B tuner	3.00
12	502161	Condenser—mica 270 Mmfd. 500 volt	.45
13	502165	Condenser—mica 1,000 Mmfd. 500 volt	.45
16A, B, C	504096	Condenser—trimmer assembly: A — 20 to 270 Mmfd. B — 40 to 370 Mmfd. C — 40 to 370 Mmfd.	1.10
18	502153	Condenser—.05 Mfd. 200 volt	.24
20	502155	Condenser—.1 Mfd. 200 volt	.30
21	502157	Condenser—.05 Mfd. 400 volt	.24
24	502271	Condenser—mica 260 Mmfd. 500 volt	.24
25	502165	Condenser—mica 1,000 Mmfd. 500 volt	.45
27	502159	Condenser—mica 50 Mmfd. 500 volt	.24
30	502172	Condenser—trimmer; 25 to 100 Mmfd.	.36
31	502159	Condenser—mica 50 Mmfd. 500 volt	.24
33	502151	Condenser—.01 Mfd. 400 volt	.20
38	502157	Condenser—.05 Mfd. 400 volt	.24
43	502271	Condenser—mica 260 Mmfd. 500 volt	.24
44	502150	Condenser—.004 Mfd. 600 volt	.20
45	502157	Condenser—.05 Mfd. 400 volt	.24
49	502160	Condenser—mica 110 Mmfd. 500 volt	.24
50	502152	Condenser—.02 Mfd. 400 volt	.24
52	502410	Condenser—.1 Mfd. 400 volt	.30
55	502405	Condenser—.25 Mfd. 400 volt	.36
59A, B, C	502207	Condenser—electrolytic: A — 20 Mfd. 400 volt B — 10 Mfd. 400 volt C — 20 Mfd. 25 volt	2.20
60	502150	Condenser—.004 Mfd. 600 volt	.20
61	502154	Condenser—.05 Mfd. 600 volt	.24
		RESISTORS	
17	502127	Resistor—carbon 560 ohms ¼ watt	.12
19	502134	Resistor—carbon 470,000 ohms ¼ watt	.12
22	502132	Resistor—carbon 100,000 ohms ¼ watt	.12
23	502291	Resistor—carbon 4700 ohms ¼ watt	.12
26	502134	Resistor—carbon 470,000 ohms ¼ watt	.12
28	502130	Resistor—carbon 22,000 ohms ¼ watt	.12
34	502466	Resistor—carbon 33,000 ohms 1 watt	.16
36	502135	Resistor—carbon 2.2 Meg. ¼ watt	.12
37	502264	Resistor—carbon 47 ohms ¼ watt	.12
39	502467	Resistor—carbon 68,000 ohms ½ watt	.12
41	502131	Resistor—carbon 47,000 ohms ¼ watt	.12
42A, B	502148	Volume control 500,000 ohms (with switch)	1.25
46	502468	Resistor—carbon 4.7 Meg. ¼ watt	$ .12
47	502128	Resistor—carbon 2200 ohms ¼ watt	.12
51	502133	Resistor—carbon 220,000 ohms ¼ watt	.12
53	502132	Resistor—carbon 100,000 ohms ¼ watt	.12
54	502134	Resistor—carbon 470,000 ohms ¼ watt	.12
56	502135	Resistor—carbon 2.2 Meg. ¼ watt	.12
62	502291	Resistor—carbon 4700 ohms ¼ watt	.12
63	502127	Resistor—carbon 560 ohms ¼ watt	.12
65	502137	Resistor—wire wound 330 ohms 2 watt	.25
69	502264	Resistor—carbon 47 ohms ¼ watt	.12
		COILS & TRANSFORMERS	
1	502247	Loop antenna	4.15
2	504296	Coil—S. W. antenna	1.35
	502025	Complete coil and trimmer assembly for push-button tuner	8.80
7	502907	Coil less slug (540-1000 Kc.)	1.50
8, 9	502908	Coil less slug (650-1300 Kc.)	1.50
10, 11	502909	Coil less slug (975-1600 Kc.)	1.50
	502911	Slug for coils, 502907, 502908, 502909	.25
	501151	Clip—for mtg. push-button coils	.08
14	502112	Coil—B.C. antenna (for push-button)	1.70
15 A,B,C,D	504294	Tuning unit; complete assembly	10.60
15A	504210	Coil—B.C. antenna coupling (less slug)	1.20
15B	504214	Coil—R.F. (less slug)	.85
15C	504295	Coil—B.C. oscillator (less slug)	1.00
15D	504342	Coil—S.W. oscillator (less slug)	.75
	504211	Slug for B.C. antenna coupling or S.W. osc. coil (yellow end)	.45
	504213	Slug for B.C. oscillator coil (white end)	.45
	504215	Slug for R.F. coil (purple end)	.45
32	502111	Coil—S.W. oscillator (air core)	1.10
35	502102	Transformer—1st I.F.	2.30
40	502103	Transformer—2nd I.F.	2.30
48	502174	Transformer—power	7.50
68	502170	Transformer—output for R-502168 speaker	2.00
	504061	Transformer—output for M-502168 speaker	2.00
	504122	Transformer—output for D-502168 speaker	2.00
		OTHER ELECTRICAL PARTS	
5	502177	Switch—push button	4.10
29	502147	Switch—band	2.00
57, 58	110629	Lamp—dial (Mazda #44) 6.3 V 0.25 Amps.	.15
64	502146	Switch—tone control	.70
66	502168	Speaker—Electro-Dynamic (6 inch)	9.50
67	502169	Cone & voice coil for R-502168 speaker	2.75
	504062	Cone & voice coil for M-502168 speaker	2.75
	504123	Cone & voice coil for D-502168 speaker	2.75

DIA-GRAM NO.	PART NO.	
		MI
	502249	Bac
	502229	Bac
	116467	Bas
	502194	Cab
	502195	Cab
	119739	Call
	119559	Clar
	112745	Clip
	114955	Clip
	116563	Con
	117057	Cor
	504292	Dial
	500283	Esc
	501496	Esc
	502704	Kno
	502705	Kno
	502706	Kno
	502707	Kno
	504097	Plu
	502601	Poi
	501497	Pus
	501651	Pus
	81145	Re
	119087	Rin
	85078	Rub C
	116584	Rub
	504045	Rub B
	83552	Scr
	114914	Scr
	501777	Scr
	118606	Sha
	112818	Soc
	116690	Soc
	160392	Soc
	502210	Soc
	161384	Spr
	504012	Spr
	119911	Ter
	111456	Wa
	500487	Wa

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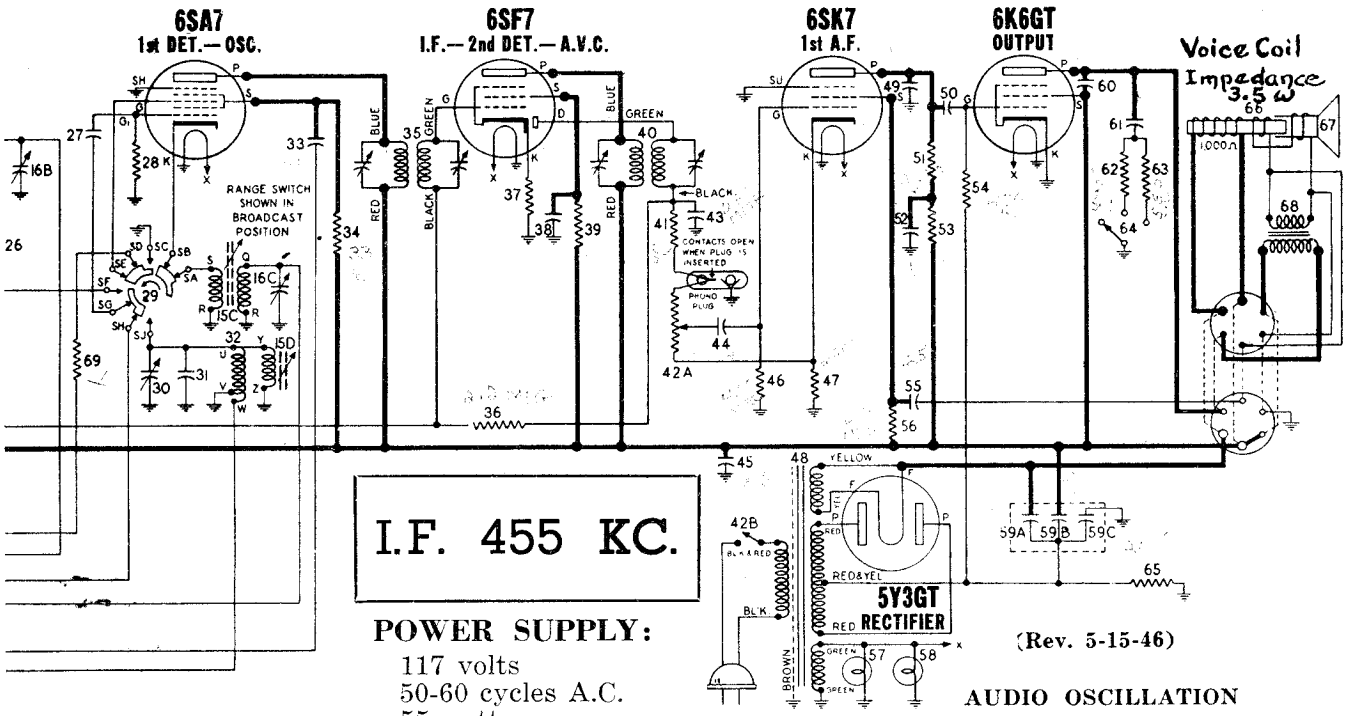
RE & RUBBER CO.

MODELS 4A21, 4A22
Adam



I.F. 455 KC.

POWER SUPPLY:

117 volts
50-60 cycles A.C.
55 watts

(Rev. 5-15-46)

NOTE

ve a letter "S" stamped on rear surface adjacent to model e "S" designation do not contain Resistor No. 69.

ıntered when attempting to align Broadcast Band oscillator ıt "S" designation), this action is probably due to spurious between leads. To prevent this condition, add Resistor No.

AUDIO OSCILLATION

The audio system of this receiver utilizes a two stage type of inverse feed-back arrangement and, should it ever be necessary to replace the speaker or output transformer, it is important to maintain a definite phase relationship in the feed-back circuit. If the connections to the output transformer are reversed or if the feed-back connection is made to the wrong side of the output transformer secondary, the system will become regenerative instead of degenerative. Under those conditions audio oscillation may result. If that occurs, oscillation may be prevented by reversing the connections to the primary of the output transformer.

POWER OUTPUT:

Undistorted — 2.3 watts
Maximum — 4.0 watts

DESCRIPTION	LIST PRICE
CELLANEOUS PARTS	
: for cabinet	$0.80
ground for dial	.16
for mtg. electrolytic condenser	.04
inet (Model 4-A-21)	14.10
inet (Model 4-A-22)	14.10
letter tabs for push-buttons	.48
ıp—dial glass	.08
—coil mtg.	.01
—retainer on end of dial cord	.01
ıector—antenna leads	.01
(—dial drive (54 in. required) per ft.	.05
scale—glass	1.10
tcheon—(Model 4-A-22)	1.15
tcheon—(Model 4-A-21)	1.15
—volume or tuning (Model 4-A-21)	.16
)—tone or band switch (Model 4-A-21)	.20
)—volume or tuning (Model 4-A-22)	.16
)—tone or band switch (Model 4-A-22)	.20
)—speaker	.25
er	.18
-button (Model 4-A-21)	.15
-buttor (Model 4-A-22)	.15
inin: ıng for tuning shaft	.01
for dial cord	.01
ɔer grommet for mtg. B.C. Ant.	
ıupling and R.F. coils	.03
ɔer spacer for mtg. dial scale	.02
ɔer grommet for mtg. S.W. osc. and Osc. coils	.04
w—No. 10x7/8"; for mtg. chassis	.03
w—No. 2x3/8"; for mtg. escutcheon	.02
w—No. 4x1½"; for mtg. loop & back	.02
t—tuning control	.18
et—dial lamp with lead	.10
et—octal base	.12
et—octal (rectifier)	.16
et—speaker	.25
ıg—dial cord tension	.06
ıg—tuning slug drive cord	.05
ıinal strip—phono	.16
her—spring washer for tuning shaft	.005
her—felt; for knobs	.01

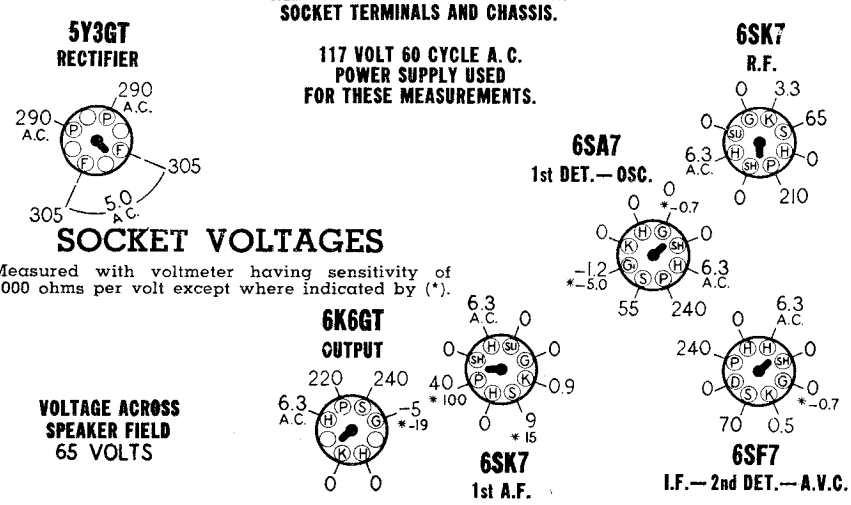
VOLUME ON FULL WITH NO SIGNAL
BAND SWITCH IN BROADCAST POSITION

DIAL TUNED TO 540 KC.
MANUAL BUTTON PUSHED IN

BOTTOM VIEW OF CHASSIS

ALL VOLTAGES MEASURED BETWEEN SOCKET TERMINALS AND CHASSIS.

117 VOLT 60 CYCLE A.C. POWER SUPPLY USED FOR THESE MEASUREMENTS.



VOLTAGE ACROSS SPEAKER FIELD 65 VOLTS

SOCKET VOLTAGES

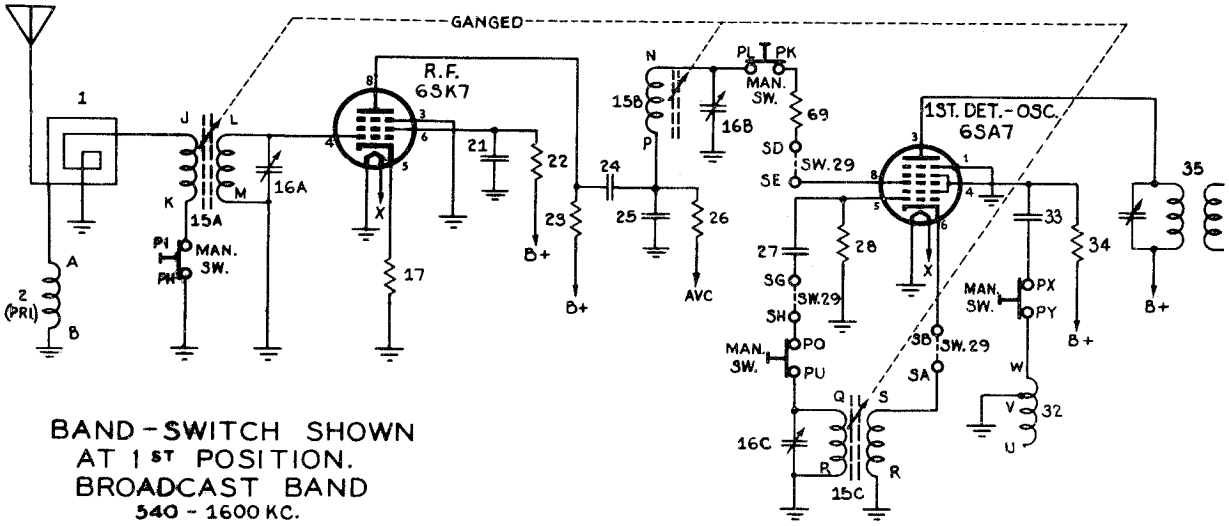
Measured with voltmeter having sensitivity of 1000 ohms per volt except where indicated by (*).

REAR OF CHASSIS

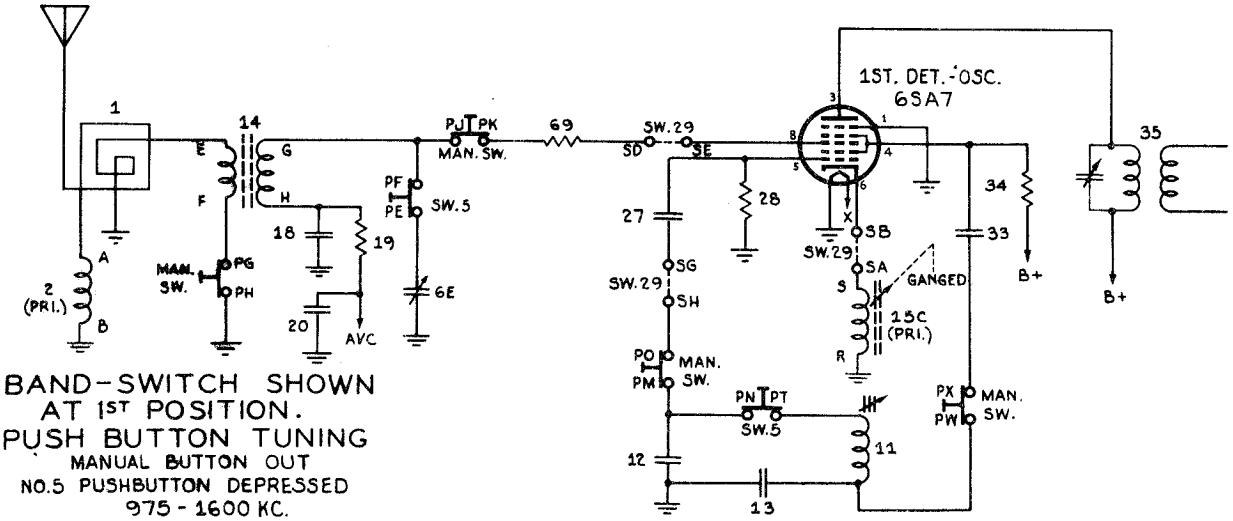
NOTE:—The 6K6GT grid bias of —19 volts can be measured across resistor No. 65.
*—Measured with vacuum tube voltmeter.

MODELS 4A21,4A22,
Adam

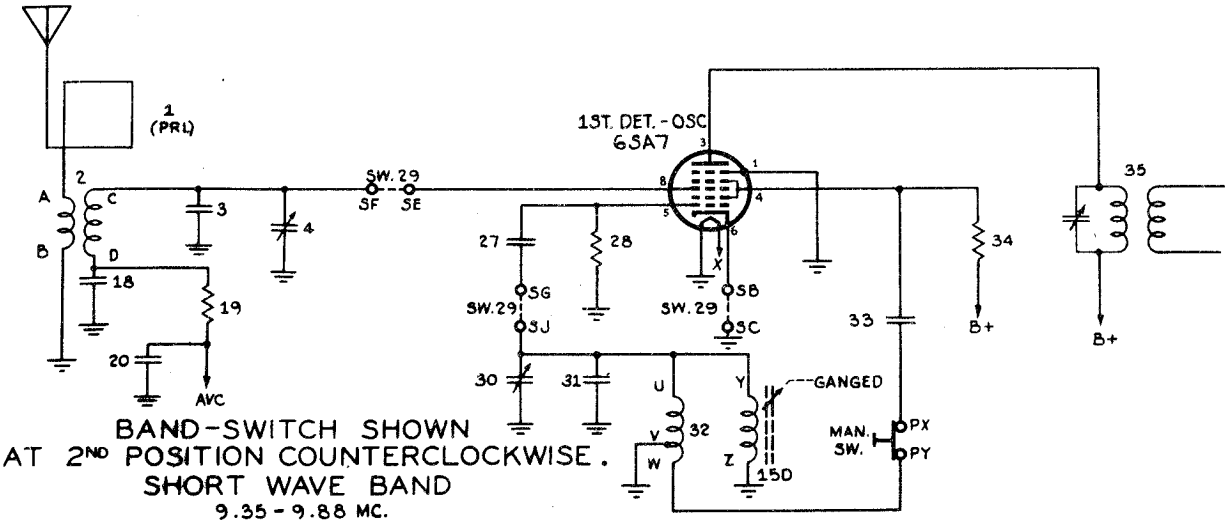
THE FIRESTONE TIRE & RUBBER CO.



BAND-SWITCH SHOWN
AT 1ST POSITION.
BROADCAST BAND
540 - 1600 KC.



BAND-SWITCH SHOWN
AT 1ST POSITION.
PUSH BUTTON TUNING
MANUAL BUTTON OUT
NO.5 PUSHBUTTON DEPRESSED
975 - 1600 KC.



BAND-SWITCH SHOWN
AT 2ND POSITION COUNTERCLOCKWISE.
SHORT WAVE BAND
9.35 - 9.88 MC.

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MODELS 4A21,4A22
Adam

THE FIRESTONE TIRE & RUBBER CO.

ALIGNMENT PROCEDURE

1. Remove chassis and loop antenna from cabinet (do not remove loop of wire stapled to cabinet). After chassis has been removed, replace loop antenna in cabinet. Stand the chassis on one end and space it approximately same distance from loop as when installed in cabinet. Then reconnect all leads to loop antenna and to loop of wire stapled on cabinet.
2. Turn the tuning control knob clockwise as far as it will go (tuner mechanism is now in maximum open position with tuning slugs almost completely withdrawn from coils). Dial pointer should then point to 1600 KC mark on scale. If it is set incorrectly, release pointer clip on dial cord and reposition pointer.
3. Connect output meter across speaker voice coil or from 6K6GT plate to chassis through a .1 Mfd. condenser.
4. Connect the ground lead of the signal generator to the receiver chassis.
5. Set volume control at maximum volume position and use a weak signal from the signal generator.
6. Push in the manual button and leave it in that position throughout the alignment procedure.

IMPORTANT:—Align this receiver in exactly the order shown below.

DUMMY ANT. IN SERIES WITH SIGNAL GENERATOR	CONNECT HIGH SIDE OF SIGNAL GENERATOR TO	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POSITION	RECEIVER DIAL SETTING	TRIMMER NUMBER	TRIMMER DESCRIPTION	TYPE OF ADJUSTMENT
Set tuner mechanism to maximum open position by turning the tuning control knob clockwise as far as it will go (Dial pointer at 1600 KC). Then check whether the positions of the tuning slugs correspond to the positions shown in Fig. 2. If settings are incorrect, rotate the individual core and threaded stem until desired position is reached. Note that threaded stem is prevented from moving by a dab of speaker cement at top and this seal must be removed before stem can be rotated.							
.1 MFD. Condenser	Terminal "N" on Tuner Unit (See Fig. 2).	455 KC	Broadcast (Clockwise)	Any point where it does not affect the signal.	1-2	2nd I.F.	Adjust for maximum output. Then repeat adjustment.
					3-4	1st I.F.	
500 MMFD. Mica Condenser	External Antenna Clip on Loop Frame	1600 KC	Broadcast (Clockwise)	1600 Kc.	5	Broadcast Oscillator	Adjust for maximum output.
				Tune to 1600 Kc. generator signal.	6	Broadcast R.F.	Adjust for maximum output.
					7	Broadcast Ant.	Adjust for maximum output.
500 MMFD. Mica Condenser	External Antenna Clip on Loop Frame	1400 KC	Broadcast (Clockwise)	Set pointer to 1400 Kc. mark on dial scale. Do not attempt to tune to generator signal.	BC. Osc. coil tuning slug		Adjust position of slug for maximum output.
					BC. R.F. coil tuning slug		Adjust position of slug for maximum output.
					BC. Ant. coil tuning slug		Adjust position of slug for maximum output.
500 MMFD. Mica Condenser	External Antenna Clip on Loop Frame	1600 KC	Broadcast (Clockwise)	Set pointer to 1600 Kc. mark on dial scale. Do not attempt to tune to generator signal.	5	Broadcast Oscillator	Adjust for maximum output.
				Tune to 1600 Kc. generator signal.	6	Broadcast R.F.	Adjust for maximum output.
					7	Broadcast Antenna	Adjust for maximum output.
500 MMFD Mica Condenser	External Antenna Clip on Loop Frame	1400 KC	Broadcast (Clockwise)	Tune to 1400 Kc. generator signal.	BC. R.F. coil tuning slug		Adjust position of slug for maximum output.
					BC. Ant. coil tuning slug		Adjust position of slug for maximum output.
400 OHM Carbon Resistor	External Antenna Clip on Loop Frame	9.6 MC	Short wave (Counter-Clockwise)	9.6 Mc.	8	S.W. Oscillator	Adjust for maximum output. Check to see if proper peak was obtained by setting the signal generator to 10.5 Mc. and then tune radio in vicinity of 9.6 Mc. If image signal is not heard, realign at 9.6 Mc. with trimmer screw farther out. Recheck image.
400 OHM Carbon Resistor	External Antenna Clip on Loop Frame	9.6 MC	Short wave (Counter-Clockwise)	Tune to 9.6 Mc. generator signal.	9	S.W. Antenna	Adjust for maximum output. Try to increase output by detuning trimmer and retuning receiver dial until maximum output is obtained.
Apply a coating of speaker cement at top of each tuning core stem to prevent movement.							

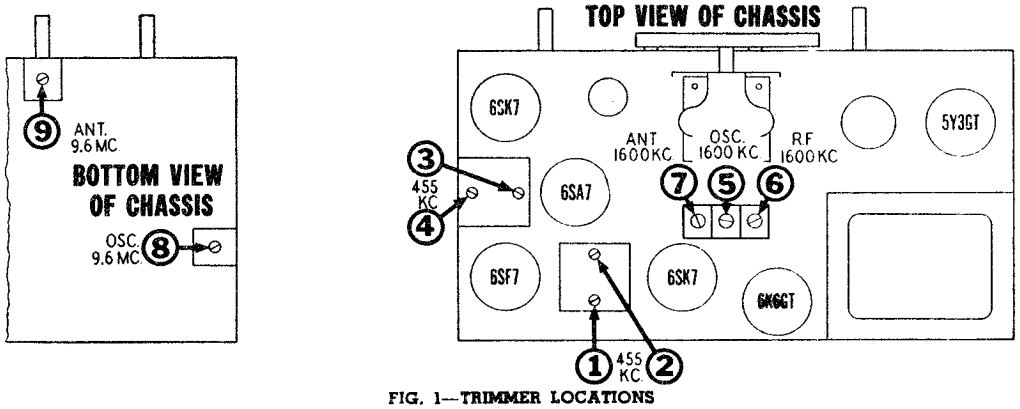

FIG. 1—TRIMMER LOCATIONS

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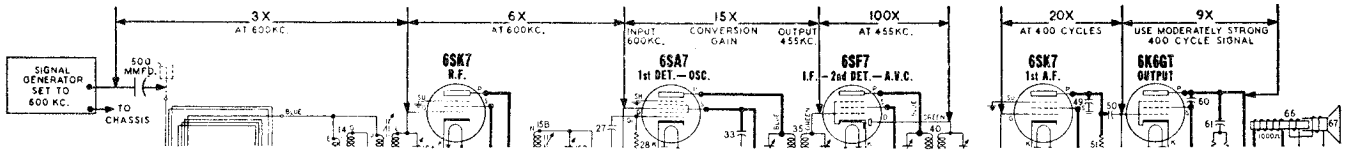
THE FIRESTONE TIRE & RUBBER CO. MODELS 4A21, 4A22 Adam

APPROXIMATE STAGE GAIN DATA

Be sure R.F. and I.F. stages are accurately aligned before measuring gain. R.F. gains can be measured with a "channel" type instrument containing a tuned and calibrated R.F. amplifier. A vacuum tube voltmeter may be used for audio gain measurements. Observe following precautions:

1. For all gain measurements connect signal generator as shown. Use 600 KC. signal with 400 cycle modulation (use nearby frequency if local station interferes.)
2. For R.F. and I.F. measurements connect negative terminal of a 3 volt battery (two 1½ volt cells in series) to A.V.C. lead at terminal "D" of S.W. Ant. coil. Then connect positive battery lead to receiver chassis. This provides a definite operating point. IMPORTANT: Disconnect battery when measuring audio stage gains.
3. Be sure radio is carefully tuned to generator signal (use weak signal for sharp tuning.)
4. When using a "channel" type instrument carefully tune it for maximum output at desired frequency before making measurements.

The R.F. and I.F. stage gains shown below are less than under normal operating conditions due to the use of 3 volts fixed bias in order to establish a definite operating point. Therefore, these values are not intended to indicate the full capability of a stage.



Differences in tube characteristics, tolerance of parts, adjustment of tuned circuits, and variations of line voltage will influence stage gain. Accuracy of measurements is dependent upon careful tuning of receiver to generator signal and experience in using your test equipment. These factors may create considerable variation in gain measurements.

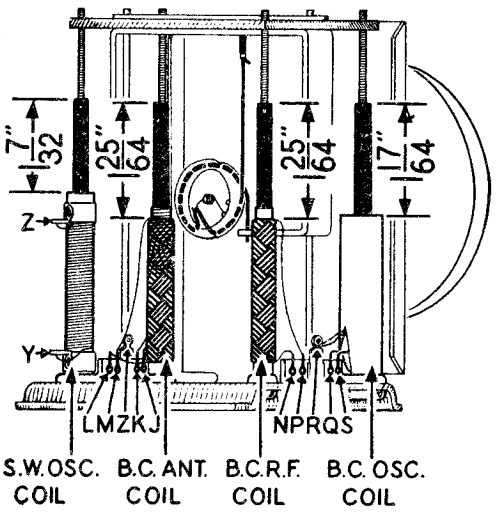
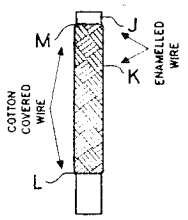


FIG. 2—SLUG TUNER ASSEMBLY (Rear View)

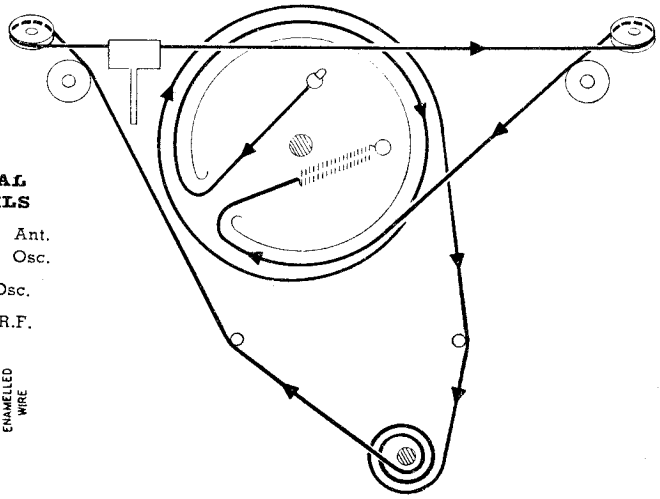
(Drive Parts)
117057 Cord (8")
114955 Clip on cord
504012 Spring

SLUGS FOR MANUAL TUNING COILS

504211—For B.C. Ant. and S.W. Osc.
504213—For B.C. Osc.
504215—For B.C. R.F.



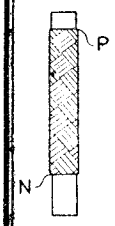
B.C. ANTENNA COUPLING COIL 504210



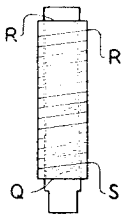
DIAL AND POINTER DRIVE CORD ARRANGEMENT

To string dial cord, turn the main drive drum to maximum **counter-clockwise** position and use following parts:

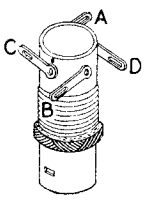
114955 Clip on end of cord
117057 Cord (54 inches)
119087 Ring for dial cord
161384 Tension Spring



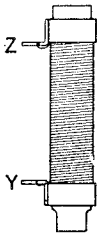
B.C. R.F. COIL 504214



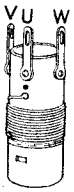
B.C. OSCILLATOR COIL 504295



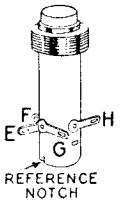
S.W. ANTENNA COUPLING COIL 504296



S.W. OSCILLATOR COIL 504342



S.W. OSCILLATOR COIL 502111



B.C. ANT. COUPLING COIL (PUSH-BUTTON) 502112

Lettered terminals in illustrations correspond to similarly lettered terminals on the circuit diagram.

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Ill. No.	Part No.	Part Name	Description
1	20E24	Antenna	Loop
2	20E21	Coil	1st I.F. Transformer
3	20E22	Coil	2nd I.F. Transformer
4	20E13	Coil	Oscillator
5	24E2 or 24E18	Condenser	Tuning, 2 Gang (3 Hole Mtg.) Tuning, 2 Gang (2 Hole Mtg.)
7	**25E1**	**Condenser**	**Dry Electrolytic, 50-50 Mfd. 150 V.**
9	23E416	Condenser	Tubular, .05 Mfd. 400 Volts
10	23E218	Condenser	Tubular, .1 Mfd. 200 Volts
11	23E211	Condenser	Tubular, .01 Mfd. 200 Volts
12	23E211	Condenser	Tubular, .01 Mfd. 200 Volts
13	23E211	Condenser	Tubular, .01 Mfd. 200 Volts
14	23E39	Condenser	Mica, .0001 Mfd.
15	23E39	Condenser	Mica, .0001 Mfd.
16	23E39	Condenser	Mica, .0001 Mfd.

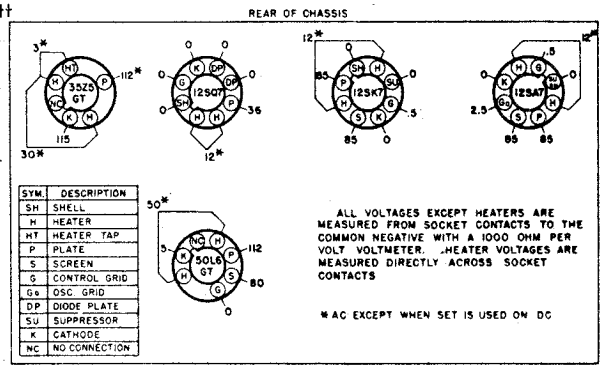
Ill. No.	Part No.	Part Name	Description
17	27E106	Resistor	Carbon, 10 Megohm 1/3 Watt
18	27E335	Resistor	Carbon, 3.3 Megohm 1/3 watt
19	27E335	Resistor	Carbon, 3.3 Megohm 1/3 Watt
20	27E474	Resistor	Carbon, 470,000 Ohm. 1/3 Watt
21	27E224	Resistor	Carbon, 220,000 Ohm 1/3 Watt
23	27E223	Resistor	Carbon, 22,000 Ohm 1/3 Watt
24	27E222-3	Resistor	Carbon, 2,200 Ohm 1 Watt
25	27E151	Resistor	Carbon, 150 Ohm 1/3 Watt
26	27E101	Resistor	Carbon, 100 Ohm 1/3 Watt
27	27E470-2	Resistor	Carbon, 47 Ohm 1/2 Watt
30	1E9	Speaker	5" PM
31	**28E1**	**Volume Control**	**With S.P.S.T. Switch**
32	22E2	Transformer	Output for Speaker
40	23E39	Condenser	Mica, .0001 Mfd.
42	27E683	Resistor	Carbon, 68,000 Ohm, 1/3 W...

MISCELLANEOUS PARTS

Part No.	Part Name	Description
7E76-2	**Cabinet**	**Ivory Plastic**
7E83	Cabinet Back	For Ivory Plastic Cabinet
41E1	Cord	6 Ft. Rubber Line Cord
20E12	Dial Plate Assem.	Dial Back Plate Assem. Less Scale
4E1	Dial Cord	30" of 18 lb. Dial Drive Cord
36E23	Dial Scale	Calibrated Scale
68E1	Dial Shaft	Drive Shaft

Part No.	Part Name	Description
19E3	Dial Shaft Bearing	Bearing for Drive Shaft
35E8	Dial Pointer	Dial Indicator
65E2	Dial Spring	Tension Spring For Drive Cord
37E27-19	Knob	For Ivory Cabinet
20E43	Pilot Lamp Socket	Pilot Lamp Socket Assembly
40E1	**Pilot Lamp**	**6-8 Volt .150 Amp. Type 47 Lamp**

VOLTAGE READINGS AND PARTS LIST FOR MODEL 4 A 25



VOLTAGE TABLE
(BOTTOM VIEW OF CHASSIS)

SETTING-UP THE PUSH-BUTTONS MODELS 4A21 AND 4A22

1. Set band switch to "AM" position and allow set to operate 15 minutes before making adjustments.

2. Note two rows of adjusting screws on back of radio chassis (visible and accessible through opening in cabinet back). Each **vertical pair** of adjusting screws is used to tune in a station for one of the push-buttons. A label under the row of screws specifies the frequency or tuning range that each screw will cover.

3. Select five powerful stations, each of which falls within the frequency range of the adjusting screw to be used to tune in that station.

4. Push in "MANUAL" button and listen to the program of the lowest frequency station you selected.

5. Now push in the first button **on the left.** Return to rear of radio and use vertical pair of adjusting screws **on extreme right** to tune in the same station. Adjust bottom screw first until desired station is heard. If station is not heard, change setting of top screw to a position where the slight static noise or rushing sound is the loudest. Then try adjusting bottom screw again; repeat this procedure until desired station is found. After locating station, carefully set bottom screw for deepest tone and top screw for maximum volume.

6. The set-up of the first push-button is now complete. Use a similar procedure to set-up the remaining buttons.

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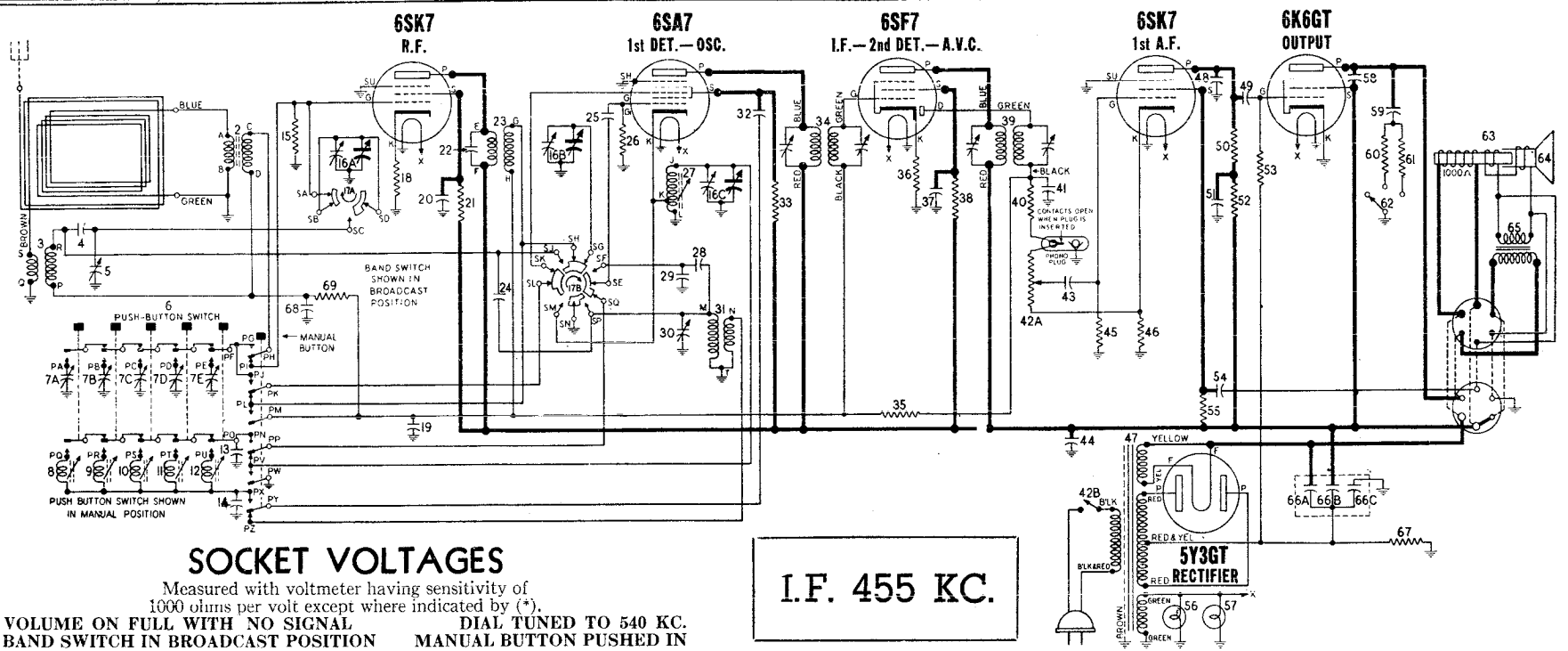


SOCKET VOLTAGES

Measured with voltmeter having sensitivity of 1000 ohms per volt except where indicated by (*).

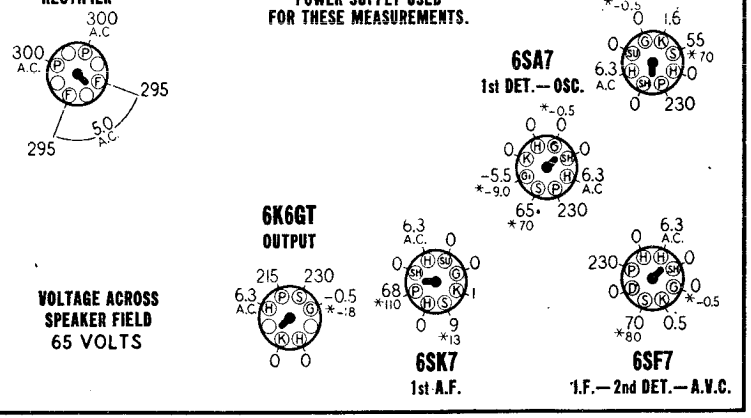
VOLUME ON FULL WITH NO SIGNAL — DIAL TUNED TO 540 KC.
BAND SWITCH IN BROADCAST POSITION — MANUAL BUTTON PUSHED IN

I.F. 455 KC.

BOTTOM VIEW OF CHASSIS

ALL VOLTAGES MEASURED BETWEEN SOCKET TERMINALS AND CHASSIS.

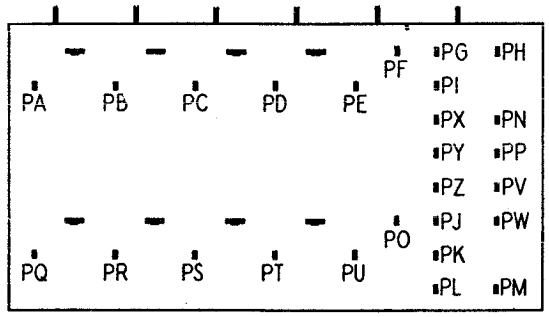
117 VOLT 60 CYCLE A.C. POWER SUPPLY USED FOR THESE MEASUREMENTS.



VOLTAGE ACROSS SPEAKER FIELD 65 VOLTS

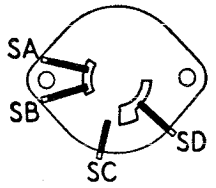
REAR OF CHASSIS

NOTE:—The 6K6GT grid bias of — 18 volts can be measured across resistor No. 67,
*—Measured with vacuum tube voltmeter.

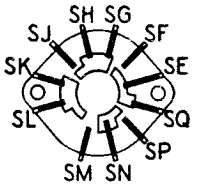


PUSH-BUTTON SWITCH
502177

LETTERED TERMINALS IN ILLUSTRATIONS CORRESPOND TO SIMILARLY LETTERED TERMINALS ON THE CIRCUIT DIAGRAM,



FRONT SECTION
REAR VIEW



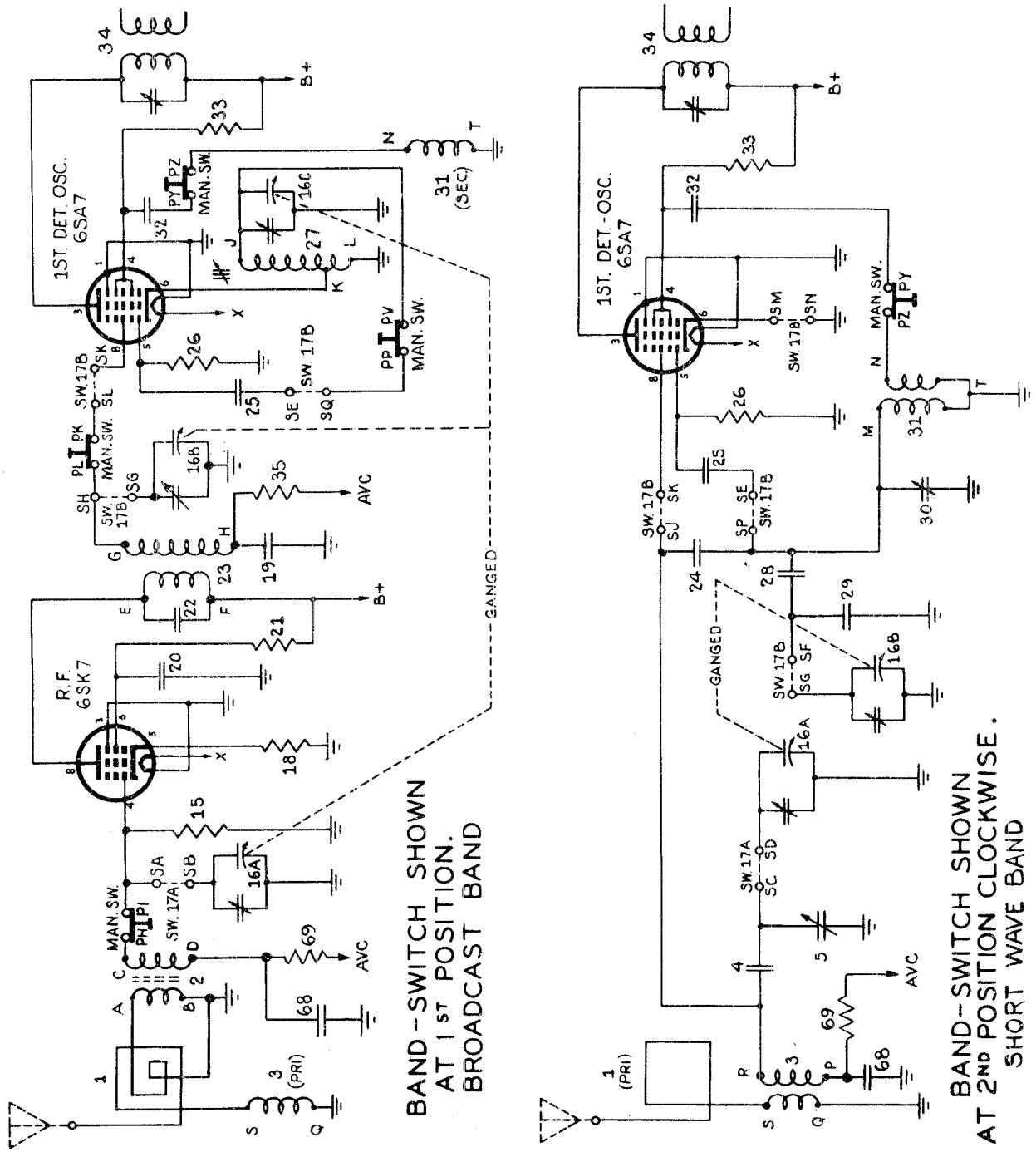
REAR SECTION
REAR VIEW

BAND SWITCH
502147

Oct. 1, 1946

MODELS 4A21X, 4A22X

THE FIRESTONE TIRE & RUBBER CO.



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MODELS 4A21X, 4A22X

THE FIRESTONE TIRE & RUBBER CO.

ALIGNMENT PROCEDURE

1. Remove chassis and loop antenna from cabinet (do not remove loop of wire stapled to cabinet). After chassis has been removed, replace loop antenna in cabinet. Stand the chassis on one end and space it approximately same distance from loop as when installed in cabinet. Then reconnect all leads to loop antenna and to loop of wire stapled on cabinet.

2. With the gang condenser fully meshed, dial pointer should be in the position indicated by the last division below 55 on the dial. If it is set incorrectly, release pointer clip on dial cord and reposition pointer.

3. Connect output meter across speaker voice coil or from plate of 6K6GT tube to chassis through a .1 Mfd. condenser.

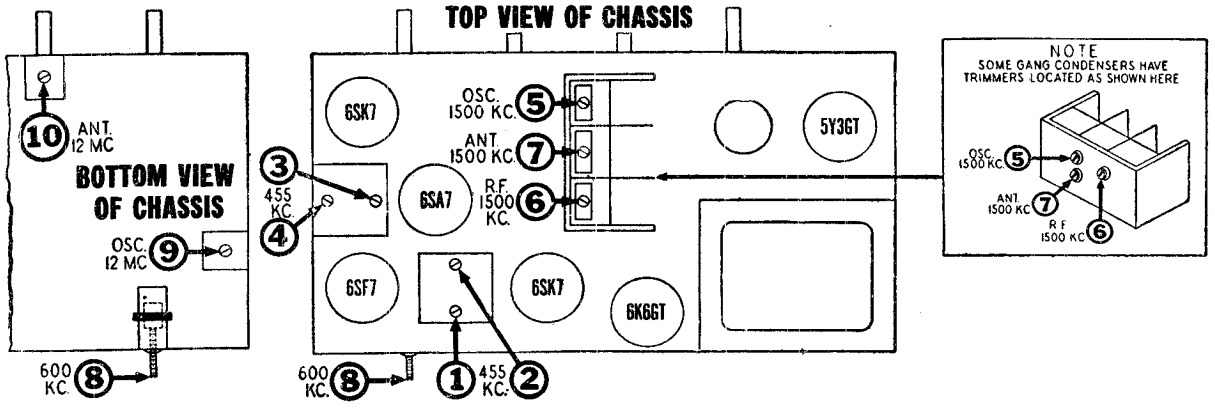
4. Connect the ground lead of the signal generator to the receiver chassis.

5. Set volume control at maximum volume position and use a weak signal from the signal generator.

6. Push in the manual button and leave it in that position throughout the alignment procedure.

IMPORTANT:—Align this receiver in exactly the order shown below. Broadcast band must be aligned before short wave band.

DUMMY ANT. IN SERIES WITH SIGNAL GENERATOR	CONNECT HIGH SIDE OF SIGNAL GENERATOR TO	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POSITION	RECEIVER DIAL SETTING	TRIMMER NUMBER	TRIMMER DESCRIPTION	TYPE OF ADJUSTMENT
.1 MFD. Condenser	Trimmer on rear section of gang	455 KC	Broadcast (Clockwise)	Any point where it does not affect the signal.	1-2	2nd I.F.	Adjust for maximum output. Then repeat adjustment.
					3-4	1st I.F.	
500 MMFD. Mica Condenser	External Antenna Clip on Loop Frame	1500 KC	Broadcast (Clockwise)	1500 KC	5	Broadcast Oscillator (Shunt)	Adjust for maximum output.
500 MMFD. Mica Condenser	External Antenna Clip on Loop Frame	1500 KC	Broadcast (Clockwise)	Tune to 1500 Kc. generator signal.	6	Broadcast R.F.	Adjust for maximum output.
500 MMFD. Mica Condenser	External Antenna Clip on Loop Frame	1500 KC	Broadcast (Clockwise)	Tune to 1500 Kc. generator signal.	7	Broadcast Antenna	Adjust for maximum output.
500 MMFD. Mica Condenser	External Antenna Clip on Loop Frame	600 KC	Broadcast (Clockwise)	Tune to 600 Kc. generator signal.	8	Adjustable core of Broadcast Oscillator Coil.	Adjust for maximum output. Try to increase output by rotating core in and out and retuning receiver dial until maximum output is obtained.
500 MFD. Mica Condenser	External Antenna Clip on Loop Frame	Repeat adjustment of trimmers 5, 6 and 7 at 1500 Kc. Then re-check adjustment of trimmer 8 at 600 Kc.					
400 OHM Carbon Resistor	External Antenna Clip on Loop Frame	12 MC	Short wave (Counter-Clockwise)	12 MC	9	S.W. Oscillator	Adjust for maximum output. Check to see if proper peak was obtained by tuning in image at approx. 11.1 MC. If image does not appear, realign at 12 MC, with trimmer screw farther out. Recheck image.
400 OHM Carbon Resistor	External Antenna Clip on Loop Frame	12 MC	Short wave (Counter-Clockwise)	Tune to 12 MC. generator signal.	10	S.W. Antenna	Adjust for maximum output. Try to increase output by detuning trimmer and retuning receiver dial until maximum output is obtained.



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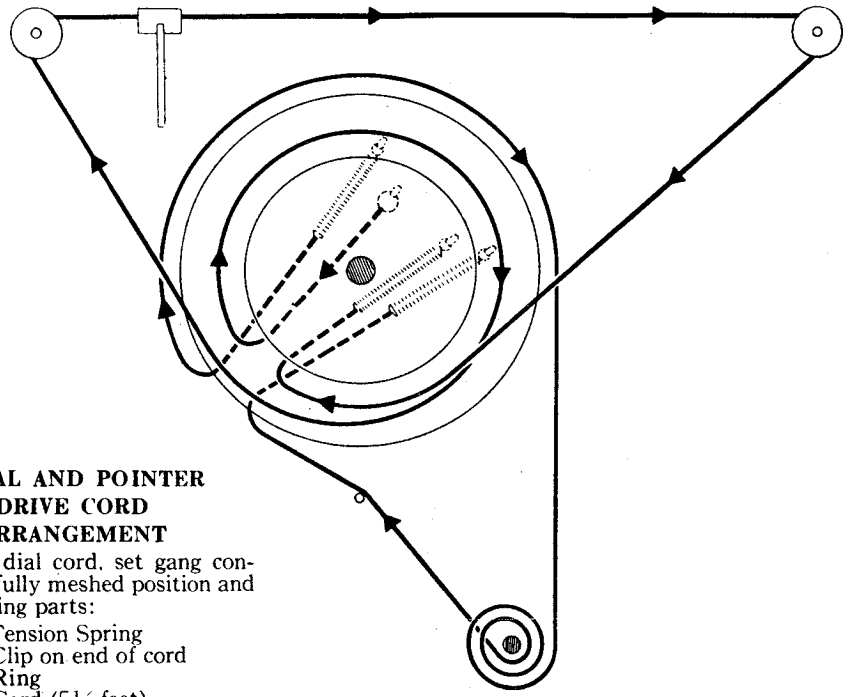


DIAL AND POINTER DRIVE CORD ARRANGEMENT

To string dial cord, set gang condenser to fully meshed position and use following parts:

113177 Tension Spring
114955 Clip on end of cord
119087 Ring
117057 Cord (5½ feet)
3 feet for pointer drive
2½ feet for tuning drive

POWER SUPPLY:

117 volts
50-60 cycles A.C.
55 watts

POWER OUTPUT:

Undistorted—2.3 watts
Maximum —3.5 watts

SPEAKER:

6 inch Electro-Dynamic
Voice coil impedance—3.5 ohms

BUILT-IN ANTENNA:

Noise reducing
low impedance loop

FREQUENCY RANGES:

Standard Broadcast Band	540-1725 KC.	Short Wave Band	9-12 MC.

PUSH-BUTTON RANGES:

Button No. 1 · —540-1000 KC.
Button No. 2 & 3—650-1300 KC.
Button No. 4 & 5—975-1600 KC.

SETTING-UP THE PUSH-BUTTONS

1. Set band switch to "AM" position and allow set to operate 15 minutes before making adjustments.

2. Note two rows of adjusting screws on back of radio chassis (visible and accessible through opening in cabinet back). Each **vertical pair** of adjusting screws is used to tune in a station for one of the push-buttons. A label under the row of screws specifies the frequency or tuning range that each screw will cover.

3. Select five powerful stations, each of which falls within the frequency range of the adjusting screw to be used to tune in that station.

4. Push in "MANUAL" button and listen to the program of the lowest frequency station you selected.

5. Now push in the first button **on the left,** Return to rear of radio and use vertical pair of adjusting screws **on extreme right** to tune in the same station. Adjust bottom screw first until desired station is heard. If station is not heard, change setting of top screw to a position where the slight static noise or rushing sound is the loudest. Then try adjusting bottom screw again; repeat this procedure until desired station is found. After locating station, carefully set bottom screw for deepest tone and top screw for maximum volume.

6. The set-up of the first push-button is now complete. Use a similar procedure to set-up the remaining buttons.

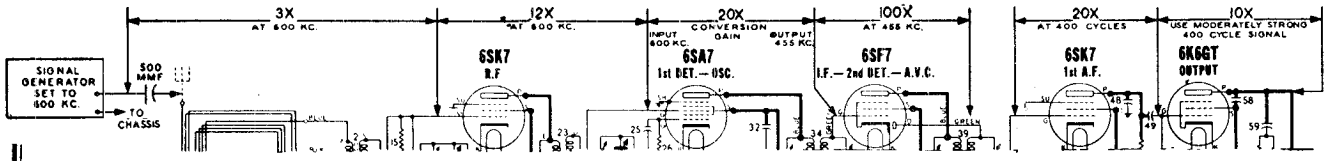
MODELS 4-A-21X, 4-A-22X

APPROXIMATE STAGE GAIN DATA

Be sure R.F. and I.F. stages are accurately aligned before measuring gain. R.F. gains can be measured with a "channel" type instrument containing a tuned and calibrated R.F. amplifier. A vacuum tube voltmeter may be used for audio gain measurements. Observe following precautions:

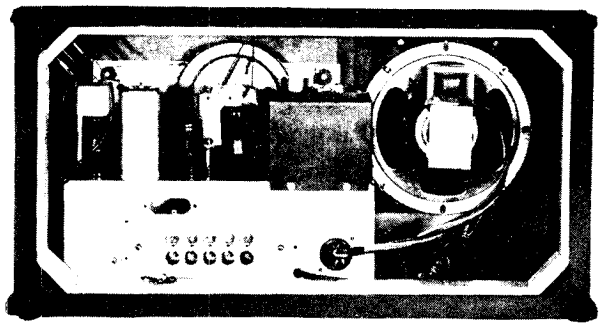
1. For all gain measurements connect signal generator as shown. Use 600 KC. signal with 400 cycle modulation (use nearby frequency if local station interferes.)
2. For R.F. and I.F. measurements connect negative terminal of a 3 volt battery (two 1½ volt cells in series) to A.V.C. lead at terminal "P" of short wave antenna coil; then connect positive battery lead to chassis. This provides a definite operating point.
   IMPORTANT: Disconnect battery when measuring audio stage gains.
3. Be sure radio is carefully tuned to generator signal (use weak signal for sharp tuning.)
4. When using a "channel" type instrument carefully tune it for maximum output at desired frequency before making measurements.

The R.F. and I.F. stage gains shown below are less than under normal operating conditions due to the use of 3 volts fixed bias in order to establish a definite operating point. Therefore, these values are not intended to indicate the full capability of a stage.



AUDIO OSCILLATION

The audio system of this receiver utilizes a two stage type of inverse feed-back arrangement and, should it ever be necessary to replace the speaker or output transformer, it is important to maintain a definite phase relationship in the feed-back circuit. If the connections to the output transformer are reversed or if the feed-back connection is made to the wrong side of the output transformer secondary, the system will become regenerative instead of degenerative. Under those conditions audio oscillation may result. If that occurs, oscillation may be prevented by reversing the connections to the primary of the output transformer.



MODEL 4-A-24

Illus. No.	Part No.	Part Name	Description
1	20E58	Cable	Battery, with 4 Prong Plug
2	20E32	Coil	Antenna
3	20E21	Coil	1st I.F. Transformer
4	20E35	Coil	2nd I.F. Transformer
5	20E77	Coil	Oscillator
6	24E4	Condenser	Tuning 2 Gang, 3 hole mounting
	or		
6	24E19	Condenser	Tuning 2 Gang, 2 hole mounting
7	**25E9**	**Condenser**	**Tubular, Dry Elect. 10 Mfd. 100 V.**
8	23E224	Condenser	Tubular, .5 Mfd. 200 V.
9	23E224	Condenser	Tubular, .5 Mfd. 200 V.
10	23E216	Condenser	Tubular, .05 Mfd. 200 V.
11	23E216	Condenser	Tubular, .05 Mfd. 200 V.
12	23E151	Condenser	Tubular, .01 Mfd. 120 V.
13	23E151	Condenser	Tubular, .01 Mfd. 120 V.
14	23E204	Condenser	Tubular, .001 Mfd. 200 V.
15	23E42	Condenser	Mica, .00025
16	23E11	Condenser	Fixed Ceramic, .0001 Mfd.
17	23E11	Condenser	Fixed Ceramic, .0001 Mfd.
18	27E475	Resistor	Carbon, 4.7 Megohm, 1/3 W.
19	27E335	Resistor	Carbon, 3.3 Megohm, 1/3 W.
20	27E106	Resistor	Carbon 10 Megohm, 1/3 W.
21	27E335	Resistor	Carbon, 3.3 Megohm, 1/3 W.
22	27E105	Resistor	Carbon, 1 Megohm, 1/3 W.
23	27E104	Resistor	Carbon, 100,000 Ohm, 1/3 W.
24	27E223	Resistor	Carbon, 22,000 Ohm, 1/3 W.
25	27E561	Resistor	Carbon, 560 Ohm, 1/3 W.
26	1E15	Speaker	6" P. M.
27	**28E15**	**Volume Control**	**With D.P.S.T. Switch**
28	**22E4**	**Transformer**	**Output**
29	27E470	Resistor	Carbon, 47 Ohm, 1/3 W.

MISCELLANEOUS PARTS

Part No.	Part Name	Description
7E57	Cabinet	Wood Table Model
4E1	Dial Cord	18 Lb. Drive Cord
65E2	Dial Cord Spring	Dial Cord Tension Spring
68E1	Dial Shaft	Drive Shaft
36E21	Dial Scale	Calibrated Scale
35E10	Dial Pointer	Dial Needle
36E20	Dial Indicator	"On-Off" Indicator
9E7	Dial Crystal	Clear Acetate Crystal
19E3	Dial Shaft Bearing	Bearing for Drive Shaft
65E3	Dial Indicator Spring	Tension Spring for "On-Off" Indicator
12E103-F10	Dial Shaft Washer	"C" Retainer Washer for Drive Shaft
37E30-1	Knob	
17E3-4	Plug	4-Prong Battery Plug
46E5	Throw Arm	Operates "On-Off" Indicator

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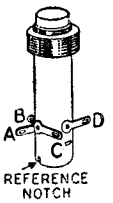
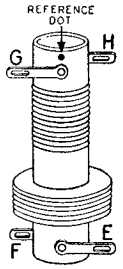
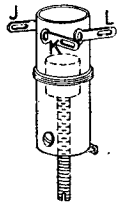


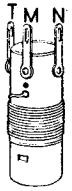
BC. ANTENNA COUPLING COIL 502112



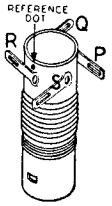
R.F. COIL 502113



BC. OSCILLATOR COIL 502114



S.W. OSCILLATOR COIL 502111



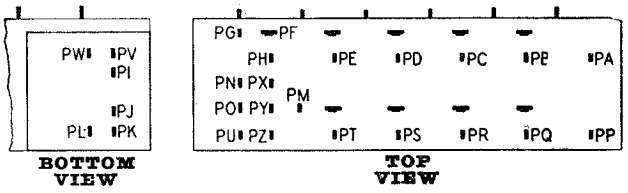
S.W. ANTENNA COIL 502110

Lettered terminals in illustrations correspond to similarly lettered terminals on the circuit diagram.

DIAGRAM NO.	PART NO.	DESCRIPTION	LIST PRICE
		CONDENSERS	
4	502202	Condenser—ceramic 150 Mmfd. 500 volt	$0.50
5	502172	Condenser—trimmer; 25 to 100 Mmfd.	.36
7A to E	502910	Condenser—trimmer assem. for P-B tuner	3.00
13	502161	Condenser—mica 270 Mmfd. 500 volt	.45
14	502165	Condenser—mica 1,000 Mmfd. 500 volt	.45
16A, B, C	502122	Condenser—variable gang	6.60
19	502155	Condenser—.1 Mfd. 200 volt	.30
20	502157	Condenser—.05 Mfd. 400 volt	.24
22	502295	Condenser—ceramic 10 Mmfd. 500 volt	.30
24	502411	Condenser—2 Mmfd. 500 volt	.10
25	502159	Condenser—mica 50 Mmfd. 500 volt	.24
28	502201	Condenser—ceramic 130 Mmfd. 500 volt	.50
29	502182	Condenser—ceramic 39 Mmfd. 500 volt	.40
30	502171	Condenser—trimmer; 5 to 35 Mmfd.	.24
32	502151	Condenser—.01 Mfd. 400 volt	.20
37	502157	Condenser—.05 Mfd. 400 volt	.24
41	502271	Condenser—mica 260 Mmfd. 500 volt	.30
43	502150	Condenser—.004 Mfd. 600 volt	.20
44	502157	Condenser—.05 Mfd. 400 volt	.24
48	502160	Condenser—mica 110 Mmfd. 500 volt	.24
49	502152	Condenser—.02 Mfd. 400 volt	.24
51	502410	Condenser—.1 Mfd. 400 volt	.30
54	502405	Condenser—.25 Mfd. 400 volt	.36
58	502150	Condenser—.004 Mfd. 600 volt	.20
59	502154	Condenser—.05 Mfd. 600 volt	.24
66A, B, C	502207	Condenser—electrolytic A—20 Mfd. 400 volt B—10 Mfd. 400 volt C—20 Mfd. 25 volt	2.20
68	502153	Condenser—.05 Mfd. 200 volt	.24
		RESISTORS	
15	502468	Resistor—carbon 4.7 Meg. ¼ watt	.12
18	502125	Resistor—carbon 220 ohms ¼ watt	.12
21	502132	Resistor—carbon 100,000 ohms ¼ watt	.12
26	502130	Resistor—carbon 22,000 ohms ¼ watt	.12
33	502466	Resistor—carbon 33,000 ohms 1 watt	.16
35	502135	Resistor—carbon 2.2 Meg. ¼ watt	12
36	502264	Resistor—carbon 47 ohms ¼ watt	.12
38	502467	Resistor—carbon 68,000 ohms ½ watt	.12
40	502131	Resistor—carbon 47,000 ohms ¼ watt	.12
42A, B	502148	Volume control 500,000 ohms (with switch)	$1.25
45	502468	Resistor—carbon 4.7 Meg. ¼ watt	.12
46	502128	Resistor—carbon 2200 ohms ¼ watt	.12
50	502133	Resistor—carbon 220,000 ohms ¼ watt	.12
52	502132	Resistor—carbon 100,000 ohms ¼ watt	.12
53	502134	Resistor—carbon 470,000 ohms ¼ watt	.12
55	502135	Resistor—carbon 2.2 Meg. ¼ watt	.12
60	502291	Resistor—carbon 4700 ohms ¼ watt	.12
61	502127	Resistor—carbon 560 ohms ¼ watt	.12
67	502137	Resistor—wire wound 330 ohms 2 watt	.25
69	503134	Resistor—carbon 470,000 ohms ¼ watt	.12
		COILS & TRANSFORMERS	
1	502247	Loop antenna	4.15
2	502112	Coil—B.C. antenna	1.70
3	502110	Coil—S.W. antenna	1.10
	502025	Complete coil and trimmer assembly for push-button tuner	8.80
8	502907	Coil less slug (540-1000 Kc.)	1.50
9, 10	502908	Coil less slug (650-1000 Kc.)	1.50
11, 12	502909	Coil less slug (975-1600 Kc.)	1.50
	502911	Tuning slug for coils, 502907, 502908, 502909	.25
	501151	Clip—for mtg. push-button coils	.08
23	502113	Coil—B.C. R.F.	1.85
27	502114	Coil—B.C. oscillator	1.45
31	502111	Coil—S.W. oscillator	1.10
34	502102	Transformer—1st I.F.	2.30
39	502103	Transformer—2nd I.F.	2.30
47	502174	Transformer—power	7.50
65	502170	Transformer—output for R-502168 spkr	2.00
	504061	Transformer—output for M-502168 spkr	2.00
	504122	Transformer—output for D-502168 spkr	2.00
		OTHER ELECTRICAL PARTS	
6	502177	Switch—push-button	4.10
17A, B	502147	Switch—band	2.00
56, 57	110629	Lamp—(Mazda No. 44) 6.3 V. 0.25 Amps.	.15
62	502146	Switch—tone control	.70
63	502168	Speaker—Electro-Dynamic (6 inch)	9.50
64	502169	Cone & voice coil for R-502168 spkr	2.75
	504062	Cone & voice coil for M-502168 spkr	2.75
	504123	Cone & voice coil for D-502168 spkr	2.75

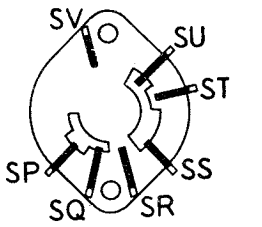
PART NO.	DESCRIPTION	LIST PRICE
	MISCELLANEOUS PARTS.	
502249	Back for cabinet	$0.80
502229	Background for dial	.16
116467	Base for mtg. electrolytic condenser	.04
502194	Cabinet for (Model 4-A-21X)	14.10
502195	Cabinet for (Model 4-A-22X)	14.10
119739	Call letter tabs for push-buttons	.48
119559	Clamp—for dial glass	.08
112745	Clip—coil mtg.	.01
114955	Clip—retainer on end of dial cord	.01
501151	Clip—for mtg. push-button coils	.08
116563	Connector—for antenna lead	.01
117057	Cord—dial drive (5½ ft. required) per ft.	.05
502218	Dial scale—glass	1.00
117029	Drum—for dial drive	.70
500283	Escutcheon (Model 4-A-22X)	1.15
501496	Escutcheon (Model 4-A-21X)	1.15
502704	Knob—volume or tuning (Model 4-A-21X)	.16
502706	Knob—volume or tuning (Model 4-A-22X)	.16
502705	Knob—tone or band switch (Mode 4-A-21X)	.20
502707	Knob—tone or band switch (Model 4-A-22X)	.20
504097	Plug for speaker	.25
502601	Pointer	.18
501497	Push-button (Model 4-A-21X)	.15
501651	Push-button (Model 4-A-22X)	.15
81145	Retaining ring for tuning shaft	.01
119087	Ring—for dial cord	.01
116584	Rubber spacer for mtg. dial scale	.02
83552	Screw—No. 10x⅞"; for mtg. chassis	.03
85827	Screw—No. 8-32 for dial drum	.02
114914	Screw—No. 2x⅜"; for mtg. escutcheon	.02
501777	Screw—No. 4x½"; for mtg. loop & back	.02
118606	Shaft—tuning control	.18
112818	Socket—dial lamp with lead	.10
116690	Socket—octal base	.12
160392	Socket—octal (rectifier)	.16
502210	Socket for speaker	.25
113177	Spring—dial cord tension	.09
119911	Terminal strip-phono	.16
111456	Washer—spring washer for tuning shaft	.005
119886	Washer—felt; for knobs	.005

PRICES SUBJECT TO CHANGE WITHOUT NOTICE



PUSH BUTTON SWITCH 502120

FREQUENCY RANGES:

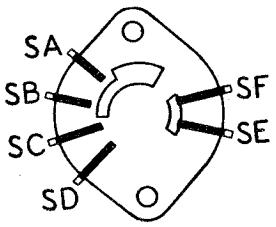


REAR SECTION REAR VIEW

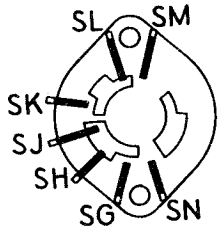
Standard Broadcast Band } 540-1725 KC.

Foreign Band } 11.4-15.5 MC.

31-M Band } 5.9-10.0 MC.



FRONT SECTION REAR VIEW

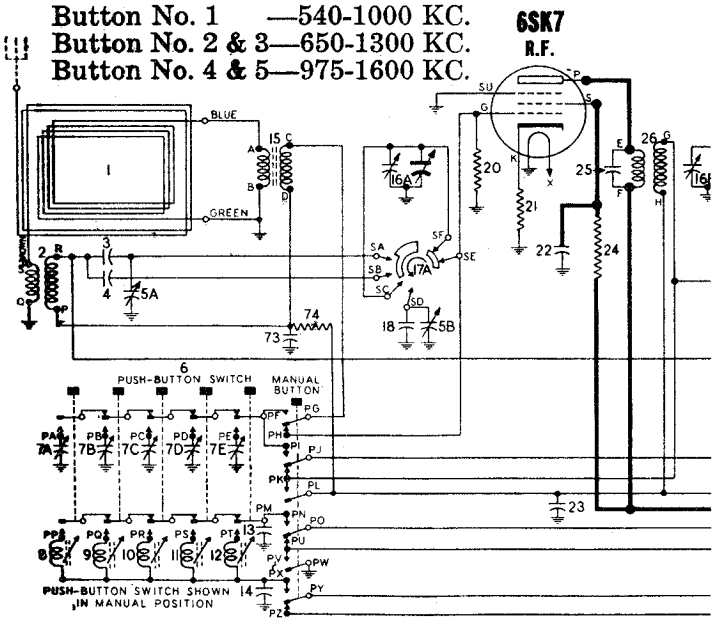


REAR SECTION FRONT VIEW

BAND SWITCH 502119

PUSH-BUTTON RANGES:

Button No. 1 —540-1000 KC.
Button No. 2 & 3—650-1300 KC.
Button No. 4 & 5—975-1600 KC.



NOTE

The above circuit applies to chassis which have a lett
cent to model number. Early production chassis whic
have the following circuit differences.

1. Terminal D of B.C. Antenna Coil No. 15 and termi
connected to ground and not to A.V.C. as shown
2. Condenser No. 73 and resistor No. 74 are omitted

Improved sensitivity on Push-Button tuning and Short
chassis that do not contain the "S" designation by c
shown on this page and adding parts No. 73 and No.

Lettered terminals in illustrations correspond to similarly lettered terminals on the circuit diagram.

DIAGRAM NO.	PART NO.	DESCRIPTION	LIST PRICE
		CONDENSERS	
3	502166	Condenser—ceramic 82 Mmfd. 500 volt	$0.30
4	502164	Condenser—mica 670 Mmfd. 500 volt	.70
5A, B	502109	Condenser—trimmer assembly Section A 2 to 15 Mmfd. Section B 10 to 40 Mmfd.	.65
7A to E	502910	Condenser—trimmer assem. for P-B tuner	3.00
13	502161	Condenser—mica 270 Mmfd. 500 volt	.45
14	502165	Condenser—mica 1,000 Mmfd. 500 volt	.45
16A, B, C	502122	Condenser—variable gang	6.60
18	502182	Condenser—ceramic 39 Mmfd. 500 volt	.40
22	502157	Condenser—.05 Mfd. 400 volt	.24
23	502155	Condenser—.1 Mfd. 200 volt	.30
25	502235	Condenser—ceramic 10 Mmfd. 500 volt	.30
27	502159	Condenser—mica 50 Mmfd. 500 volt	.24
29	502411	Condenser—2 Mmfd. 500 volt	.10
31A, B	502108	Condenser—trimmer assem. Section A 2 to 15 Mmfd. Section B 2 to 15 Mmfd.	.75
32	502182	Condenser—ceramic 39 Mmfd. 500 volt	.40
33	502167	Condenser—ceramic 68 Mmfd. 500 volt	.40
34	502163	Condenser—mica 430 Mmfd. 500 volt	.60
37	502151	Condenser—.01 Mfd. 400 volt	.20
42	502157	Condenser—.05 Mfd. 400 volt	.24
46	502271	Condenser—Mica 260 Mmfd. 500 volt	.30
48	502150	Condenser—.004 Mfd. 600 volt	.20
49	502157	Condenser—.05 Mfd. 400 volt	.24
53	502160	Condenser—mica 110 Mmfd. 500 volt	.24
54	502152	Condenser—.02 Mfd. 400 volt	.24
56	502410	Condenser—.1 Mfd. 400 volt	.30
59	502405	Condenser—.25 Mfd. 400 volt	.36
63	502150	Condenser—.004 Mfd. 600 volt	.20
64	502154	Condenser—.05 Mfd. 600 volt	.24
71A, B, C	502207	Condenser—Electrolytic A—20 Mfd. 25 volt B—20 Mfd. 400 volt C—10 Mfd. 400 volt	2.20
73	502153	Condenser—.05 Mfd. 200 volt	.24
		RESISTORS	
20	502468	Resistor—carbon 4.7 Meg. 1/4 watt	.12
21	502127	Resistor—carbon 560 Ohms 1/4 watt	.12
24	502132	Resistor—carbon 100,000 Ohms 1/4 watt	.12
28	502130	Resistor—carbon 22,000 Ohms 1/4 watt	.12
38	502466	Resistor—carbon 33,000 Ohms 1 watt	.16
40	502125	Resistor—carbon 220 Ohms 1/4 watt	.12
41	502135	Resistor—carbon 2.2 Meg. 1/4 watt	.12
43	502467	Resistor—carbon 68,000 Ohms 1/2 watt	.12
45	502131	Resistor—carbon 47,000 Ohms 1/4 watt	.12
47A, B	502117	Volume control 500,000 ohms (with switch)	1.25
50	502468	Resistor—carbon 4.7 Meg. 1/4 watt	.12
51	502128	Resistor—carbon 2200 Ohms 1/4 watt	.12
55	502133	Resistor—carbon 220,000 Ohms 1/4 watt	.12
57	502132	Resistor—carbon 100,000 Ohms 1/4 watt	.12
58	502134	Resistor—carbon 470,000 Ohm 1/4 watt	.12
60	502135	Resistor—carbon 2.2 Meg. 1/4 watt	.12
65	502291	Resistor—carbon 4700 Ohms 1/4 watt	.12
66	502127	Resistor—carbon 560 Ohms 1/4 watt	.12
72	502137	Resistor—wire wound 330 Ohms 2 watt	.25
74	502134	Resistor—carbon 470,000 Ohms 1/4 watt	.12
		COILS & TRANSFORMERS	
1	502186	Loop antenna	3.15
2	502110	Coil—S.W. antenna	1.10
	502025	Complete coil—trimmer assem. for P-B tuner	8.80
8	502907	Coil less slug (540-1000 Kc.)	1.50
9, 10	502908	Coil less slug (650-1300 Kc.)	1.50
11, 12	502909	Coil less slug (975-1600 Kc.)	1.50
	502911	Slug for coils 502907, 502908, 502909	.25
	501151	Clip—for mtg. push button coils	.08
15	502112	Coil—BC. antenna	1.70
26	502113	Coil—BC. R.F.	1.85
30	502114	Coil—BC. oscillator	1.45
36	502111	Coil—S.W. oscillator	1.10
39	502102	Transformer—1st I.F.	2.30
44	502103	Transformer—2nd I.F.	2.30
52	502174	Transformer—power	7.50
68	504206	Transformer—output for M-504205 speaker	2.00
	504208	Transformer—output for R-504205 speaker	2.00
	504124	Transformer—output for D-504205 speaker	2.00
		OTHER ELECTRICAL PARTS	
6	502120	Switch—push-button	4.00
17A, B, C	502119	Switch—band	2.80
61, 62	110629	Lamp—dial (Mazda 44) 6.3 V. 250 Ma.	.15
67	502118	Switch—tone control	.70
69	504205	Speaker—Electro-dynamic (6 inch)	9.00
70	504209	Cone & Voice coil for R-504205 speaker	3.00
	504207	Cone & Voice coil for M-504205 speaker	3.00
	504125	Cone & Voice coil for D-504205 speaker	3.00

DIAGRAM NO.	PART NO.	MIS
	502228	Back
	116467	Base
	502193	Cabi
	502046	Cabi
	117315	Call
	500420	Clan
	112745	Clip
	114955	Clip
	501151	Clip
	116563	Con
	117057	Cord
	502215	Dial
	113402	Drur
	502699	Escu
	502704	Knol
	502705	Knol
	160620	Poin
	501495	Push
	81145	Reta
	119087	Ring
	116584	Rubl
	502702	Rubl
	83552	Scre
	85827	Scre
	501777	Scre
	502116	Shaf
	114876	Sock
	119791	Sock
	500459	Sock
	502980	Spac
	113177	Spri
	119911	Tern
	111456	Was
	119886	Was

PRICES SUBJECT TO CHANGE WITHOUT NOTICE

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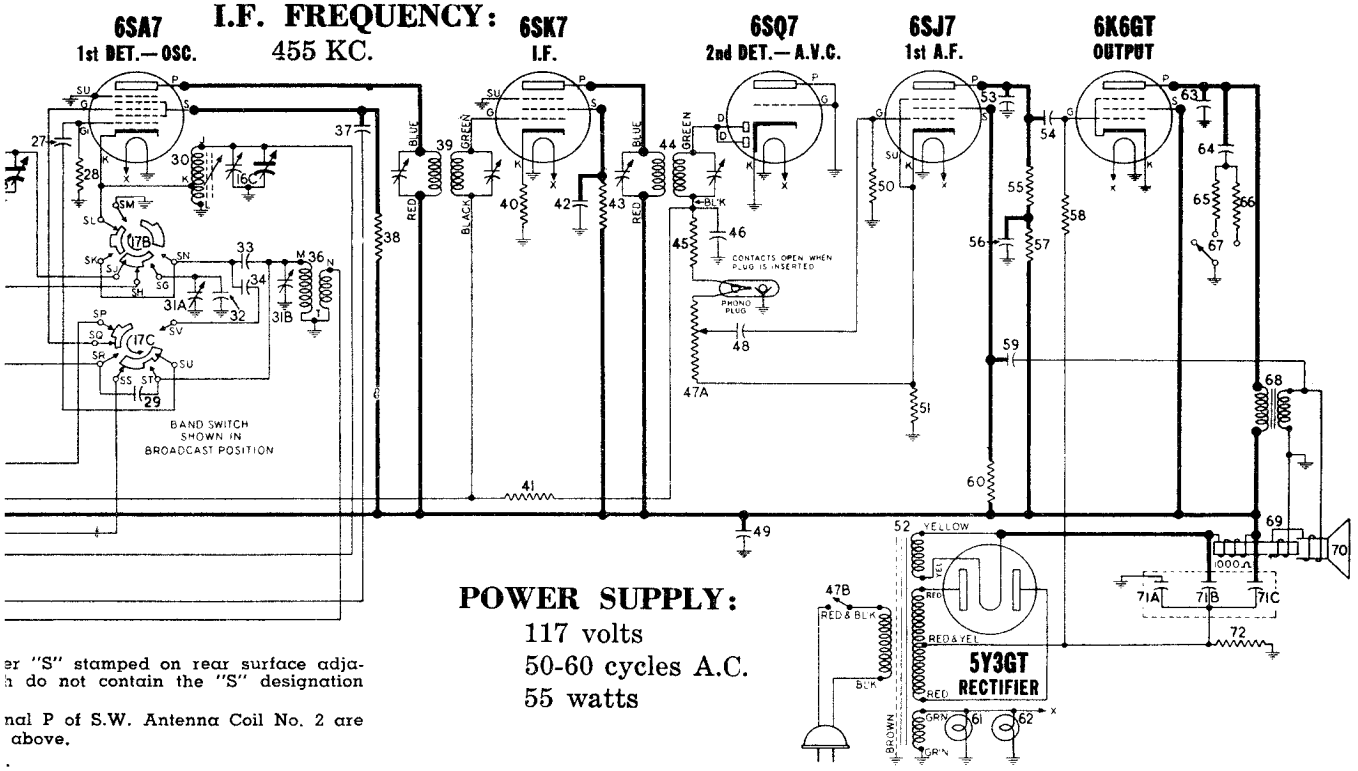
MODEL 4A23, Intercepter



er "S" stamped on rear surface adja-
h do not contain the "S" designation

nal P of S.W. Antenna Coil No. 2 are
above.

Wave operation may be obtained for
onnecting coils No. 2 and No. 15 as
74.

POWER SUPPLY:

117 volts
50-60 cycles A.C.
55 watts

POWER OUTPUT:

Undistorted — 2.3 watts
Maximum — 3.5 watts

SPEAKER:

6 inch Electro-Dynamic
Voice coil impedance—3.5 ohms

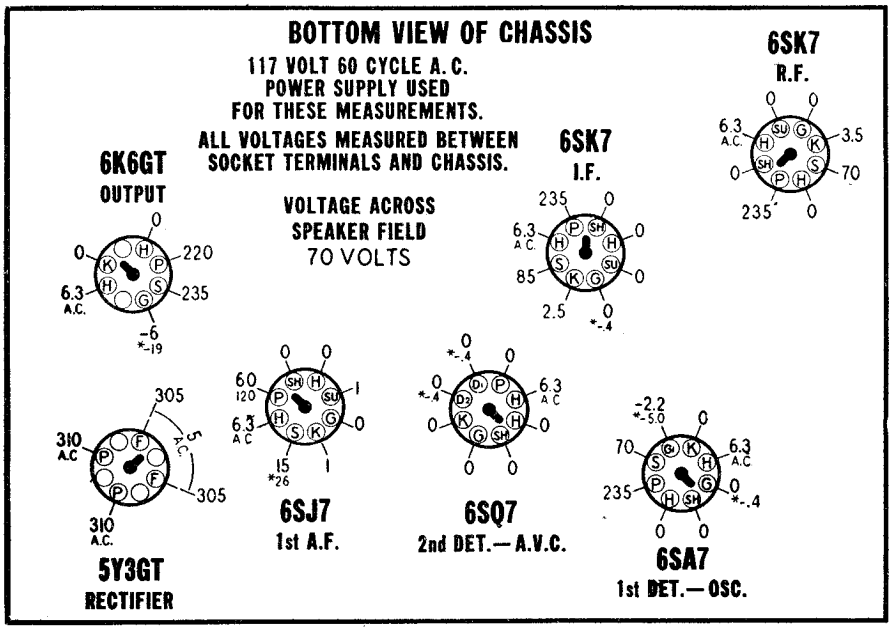
DESCRIPTION	LIST PRICE
CELLANEOUS PARTS	
ground for dial	$0.15
for mtg. electrolytic condenser	.04
net	14.50
net back	.70
letter tabs for push-button	.55
ip—for dial glass	.15
—coil mtg.	.01
—retainer on end of dial cord	.01
—for mtg. push-button coils	.08
ector—for antenna leads	.01
—dial drive (102 in. required), per ft.	.05
scale—glass	3.85
n—for dial drive	.70
tcheon for push-buttons	1.70
)—volume or tuning	.16
)—tone or band switch	.20
:er	.22
-button	.15
ining ring for tuning shaft	.01
for dial cord	.01
)er spacer for mtg. dial scale	.02
)er spacer on frame behind escutcheon	.04
w—No. 10x7/8"; for mtg. chassis	.03
w—No. 8-32 for dial drum	.02
w—No. 4x1/2"; for mtg. loop & back	.02
t—tuning control	.10
et—octal base (rectifier)	.15
et—octal base	.12
et—dial lamp (with mtg. bracket)	.15
:er for leads to push-button switch	.10
ng—dial cord tension	.09
inal strip—phono	.16
her—spring; for tuning shaft	.005
her—felt; for knobs	.005

SOCKET VOLTAGES

Measured with voltmeter having sensitivity of 1000 ohms per volt except where indicated by (*).

VOLUME ON FULL WITH NO SIGNAL
RANGE SWITCH IN BROADCAST POSITION

DIAL TUNED TO 540 KC.
MANUAL BUTTON PUSHED IN

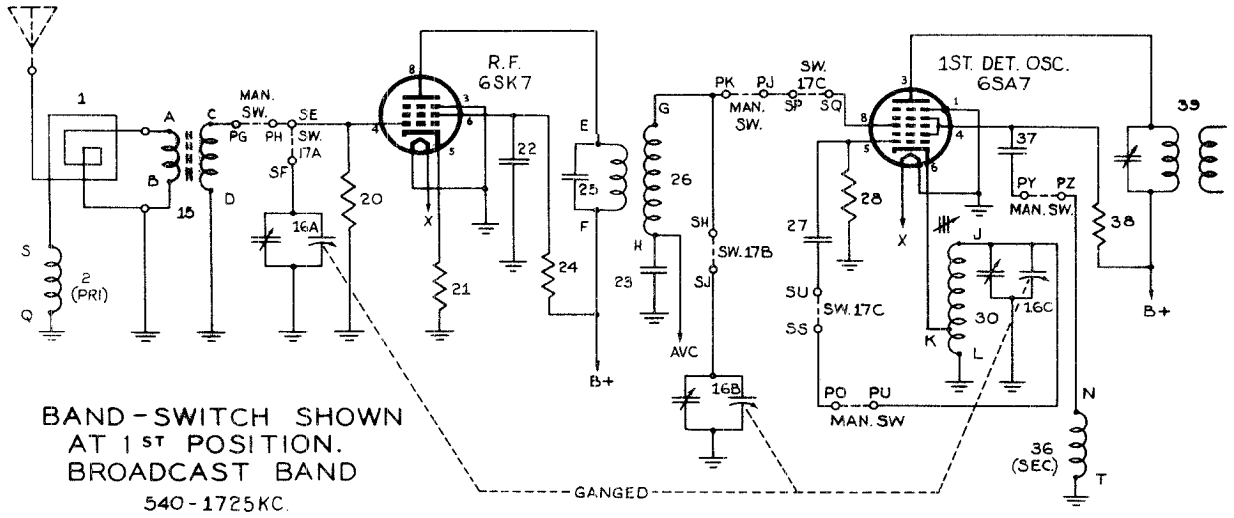

BOTTOM VIEW OF CHASSIS
117 VOLT 60 CYCLE A.C. POWER SUPPLY USED FOR THESE MEASUREMENTS.
ALL VOLTAGES MEASURED BETWEEN SOCKET TERMINALS AND CHASSIS.
VOLTAGE ACROSS SPEAKER FIELD 70 VOLTS
6K6GT OUTPUT
6SK7 I.F.
6SK7 R.F.
6SJ7 1st A.F.
6SQ7 2nd DET.— A.V.C.
6SA7 1st DET.— OSC.
5Y3GT RECTIFIER

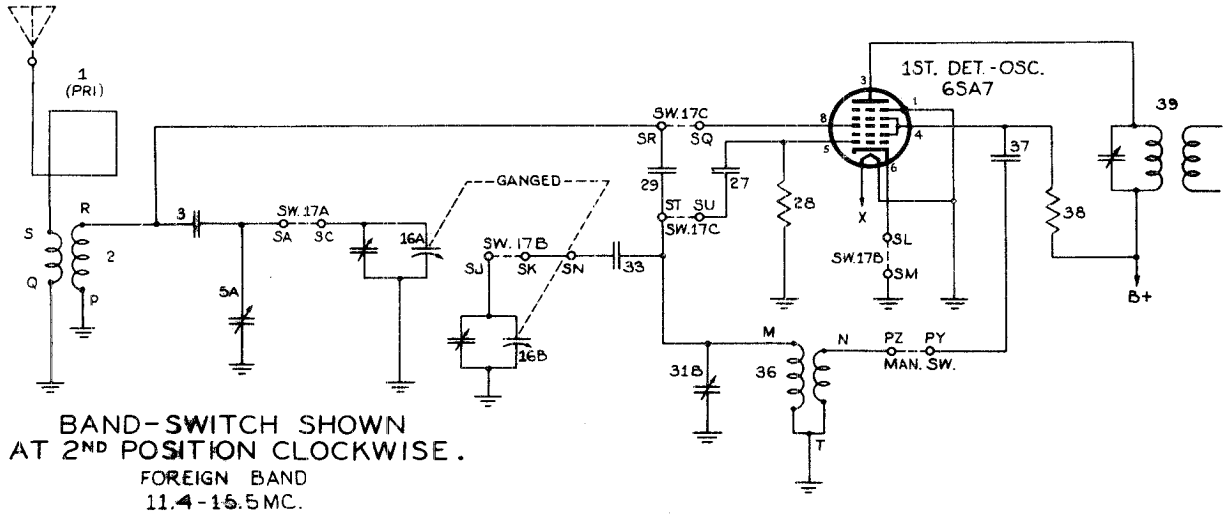
REAR OF CHASSIS

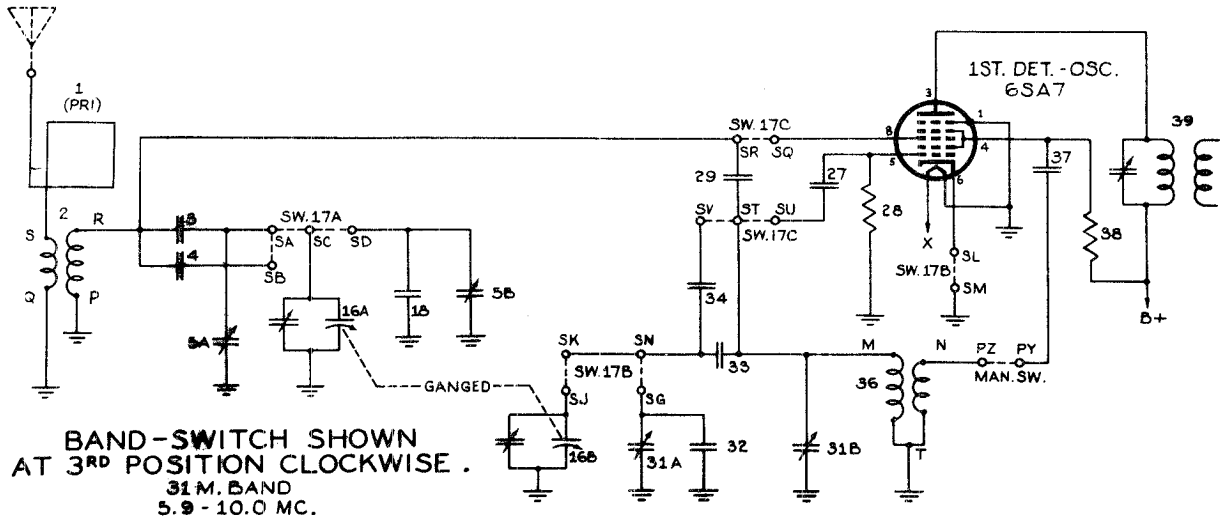
NOTE:—The 6K6GT grid bias of —19 volts can be measured across resistor No. 72.
*—Measured with vacuum tube voltmeter.

MODEL 4A23, Interceptor

THE FIRESTONE TIRE & RUBBER CO.







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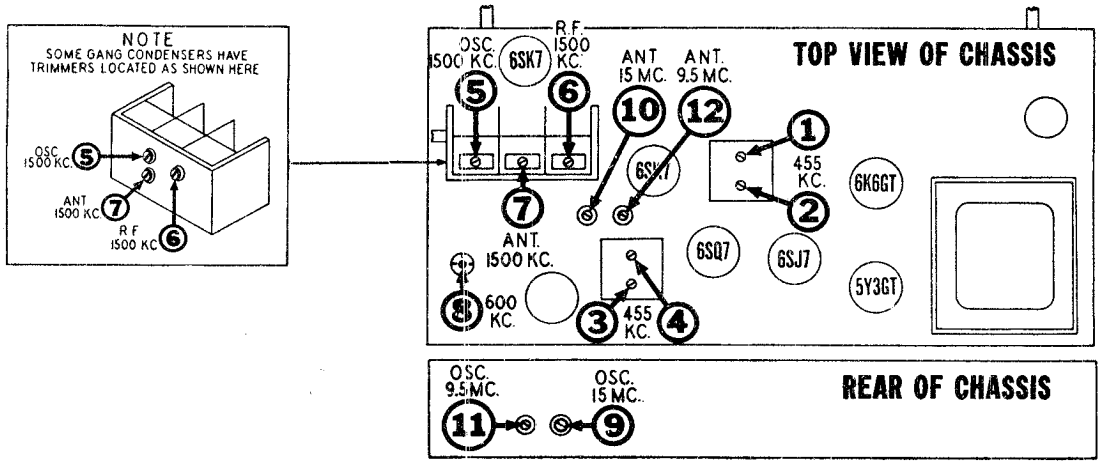
MODEL 4A23,
Interceptor

THE FIRESTONE TIRE & RUBBER CO.

1. The chassis and loop antenna should remain in their normal position in the cabinet throughout the following procedure.
2. Check arrangement of leads to push-button switch as shown in illustration on following page.
3. With the gang condenser fully meshed, dial pointer should be in the position indicated by the last division below 55 on the dial. If it is set incorrectly, release pointer clip on dial cord and reposition pointer.
4. Connect output meter across speaker voice coil.
5. Connect the ground lead of the signal generator to the receiver chassis.
6. Set volume control at maximum volume position and use a weak signal from the signal generator.
7. Push in the manual button and leave it in that position throughout the alignment procedure.

IMPORTANT:—Align this receiver in exactly the order shown below. Broadcast band must be aligned before short wave bands.

DUMMY ANT. IN SERIES WITH SIGNAL GENERATOR	CONNECT HIGH SIDE OF SIGNAL GENERATOR TO	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POSITION	RECEIVER DIAL SETTING	TRIMMER NUMBER	TRIMMER DESCRIPTION	TYPE OF ADJUSTMENT
.1 MFD. Condenser	Trimmer on rear section of gang	455 KC	Broadcast (counter-clockwise)	Any point where it does not affect the signal.	1-2	2nd I.F.	Adjust for maximum output. Then repeat adjustment.
					3-4	1st I.F.	
.003 MFD. Condenser	External Antenna Clip on Loop Frame	1500 KC	Broadcast (counter-clockwise)	1500 KC	5	Broadcast Oscillator (Shunt)	Adjust for maximum output.
.003 MFD. Condenser	External Antenna Clip on Loop Frame	1500 KC	Broadcast (counter-clockwise)	Tune to 1500 KC Generator Signal	6	Broadcast R.F.	Adjust for maximum output.
.003 MFD. Condenser	External Antenna Clip on Loop Frame	1500 KC	Broadcast (counter-clockwise)	Tune to 1500 KC Generator Signal	7	Broadcast Antenna	Adjust for maximum output.
.003 MFD. Condenser	External Antenna Clip on Loop Frame	600 KC	Broadcast (counter-clockwise)	Tune to 600 KC Generator Signal	8	Adjustable core of Broadcast Oscillator Coil.	Adjust for maximum output. Try to increase output by rotating core in and out and retuning receiver dial until maximum output is obtained.
.003 MFD. Condenser	External Antenna Clip on Loop Frame	Repeat adjustments of trimmers 5, 6 and 7 at 1500 Kc. Then re-check adjustment of trimmer 8 at 600 Kc.					
400 OHM Carbon Resistor	External Antenna Clip on Loop Frame	15 MC	Short wave	15 MC	9	S.W. Oscillator	Adjust for maximum output. Check to see if proper peak was obtained by tuning in image at approx. 14.1 MC. If image does not appear, realign at 15 MC. with trimmer screw farther out. Recheck image.
400 OHM Carbon Resistor	External Antenna Clip on Loop Frame	15 MC	Short wave	Tune to 15 MC Generator Signal	10	S.W. Antenna	Adjust for maximum output. Try to increase output by detuning trimmer and retuning receiver dial until maximum output is obtained.
400 OHM Carbon Resistor	External Antenna Clip on Loop Frame	9.5 MC	31 M (Clockwise)	9.5 MC	11	31 M Oscillator	Adjust for maximum output. Check to see if proper peak was obtained by tuning in image at approx. 8.6 MC. If image does not appear, realign at 9.5 MC. with trimmer screw farther out. Recheck image.
400 OHM Carbon Resistor	External Antenna Clip on Loop Frame	9.5 MC	31 M (Clockwise)	Tune to 9.5 MC Generator Signal	12	31 M Antenna	Adjust for maximum output. Try to increase output by detuning trimmer and retuning receiver dial until maximum output is obtained.



AUDIO OSCILLATION

The audio system of this receiver utilizes a two stage type of inverse feed-back arrangement and should it ever be necessary to replace the speaker or output transformer it is important to maintain a definite phase relationship in the feedback circuit. If the connections to the output transformer are reversed or if the feed-back connection is made to the wrong side of the output transformer secondary, the system will become regenerative instead of degenerative. Under those conditions audio oscillation may result. If that occurs, oscillation may be prevented by reversing the connections to the primary of the output transformer.

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THE FIRESTONE TIRE & RUBBER CO.

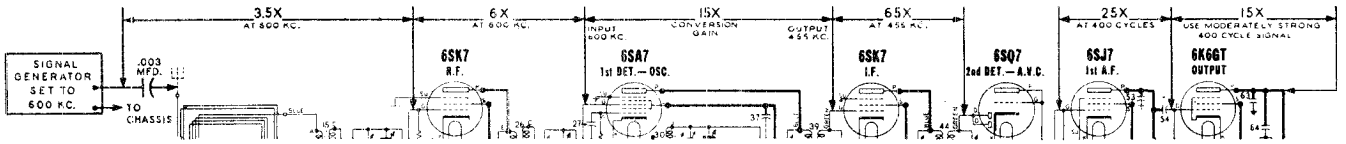
MODEL 4A23, Interceptor

APPROXIMATE STAGE GAIN DATA

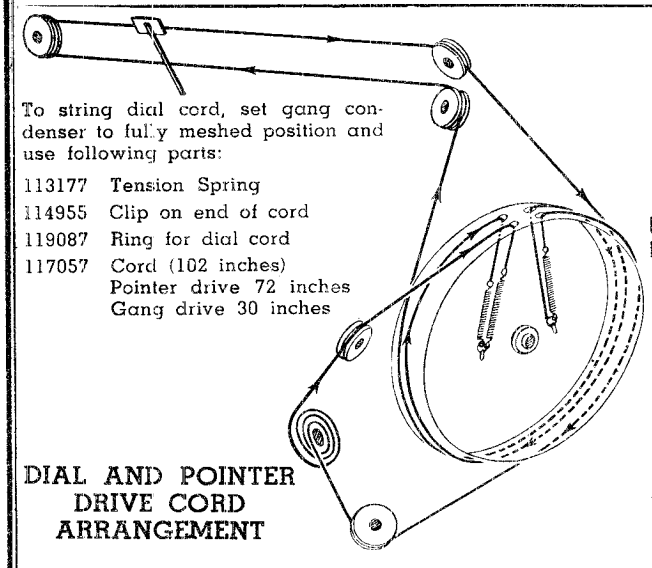
Be sure R.F. and I.F. stages are accurately aligned before measuring gain. R.F. gains can be measured with a "channel" type instrument containing a tuned and calibrated R.F. amplifier. A vacuum tube voltmeter may be used for audio gain measurements. Observe following precautions:

1. For all gain measurements connect signal generator as shown. Use 600 KC. signal with 400 cycle modulation (use nearby frequency if local station interferes.)
2. For R.F. and I.F. measurements connect negative terminal of a 3 volt battery (two 1½ volt cells in series) to A.V.C. lead and positive terminal to chassis. This provides a definite operating point. IMPORTANT: Disconnect battery when measuring audio stage gains.
3. Be sure radio is carefully tuned to generator signal (use weak signal for sharp tuning.)
4. When using a "channel" type instrument carefully tune it for maximum output at desired frequency before making measurements.

The R.F. and I.F. stage gains shown below are less than under normal operating conditions due to the use of 3 volts fixed bias in order to establish a definite operating point. Therefore, these values are not intended to indicate the full capability of a stage.



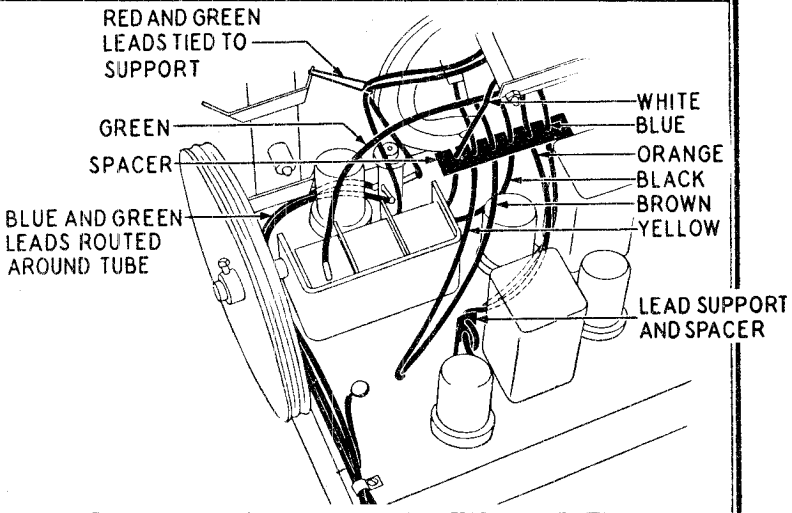
Differences in tube characteristics, tolerance of parts, adjustment of tuned circuits, and variations of line voltage will influence stage gain. Accuracy of measurements is dependent upon careful tuning of receiver to generator signal and experience in using your test equipment. These factors may create considerable variation in gain measurements.



To string dial cord, set gang condenser to fully meshed position and use following parts:

113177	Tension Spring
114955	Clip on end of cord
119087	Ring for dial cord
117057	Cord (102 inches) Pointer drive 72 inches Gang drive 30 inches

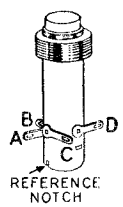
DIAL AND POINTER DRIVE CORD ARRANGEMENT



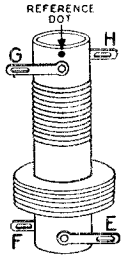
IMPORTANCE OF MAINTAINING FIXED POSITIONS FOR LEADS AT TOP OF CHASSIS

The wires shown in the above illustration are associated with tuned circuits which carry radio frequency currents. Therefore, care must be exercised to insure that they are properly routed and spaced. Anchoring and fixing spacing of wires minimizes freedom of movement and is utilized to maintain a stable arrangement.

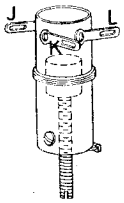
Since the relative positions of these wires may affect tuned circuits it is important to avoid any change in arrangement after the receiver has been aligned. If the position of the wires has been disturbed, it is advisable to re-check alignment



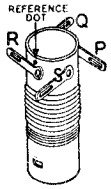
BC. ANTENNA COUPLING COIL 502112



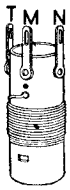
R.F. COIL 502113



BC. OSCILLATOR COIL 502114



S.W. ANTENNA COIL 502110



S.W. OSCILLATOR COIL 502111

Lettered terminals in illustrations correspond to similarly lettered terminals on the circuit diagram.

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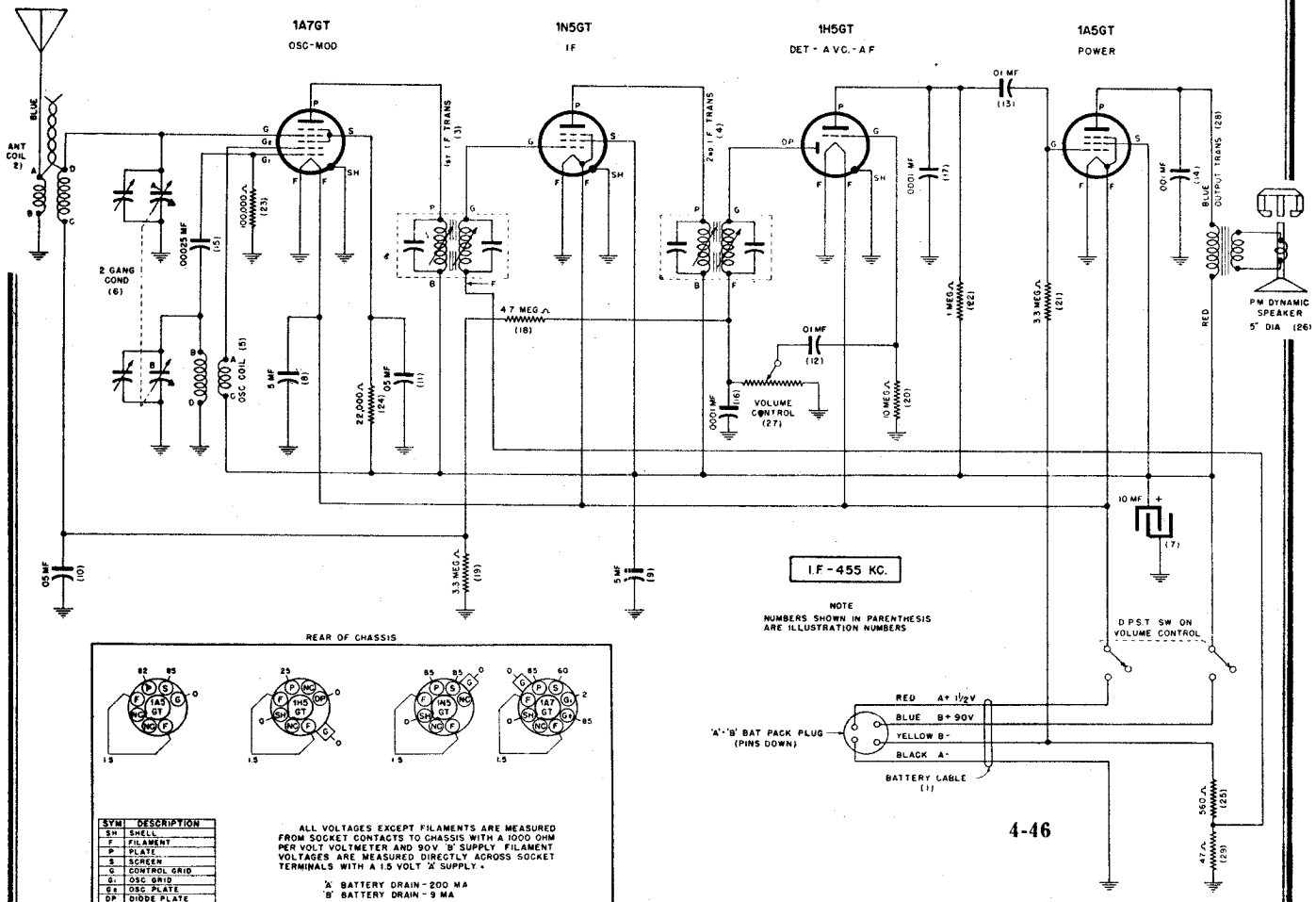
MODEL 4A24

THE FIRESTONE TIRE & RUBBER CO.



REAR OF CHASSIS
SYM DESCRIPTION
SH SHELL
F FILAMENT
P PLATE
S SCREEN
G CONTROL GRID
G1 OSC GRID
G2 OSC PLATE
DP DIODE PLATE
NC NO CONNECTION
ALL VOLTAGES EXCEPT FILAMENTS ARE MEASURED FROM SOCKET CONTACTS TO CHASSIS WITH A 1000 OHM PER VOLT VOLTMETER AND 90V 'B' SUPPLY. FILAMENT VOLTAGES ARE MEASURED DIRECTLY ACROSS SOCKET TERMINALS WITH A 1.5 VOLT 'A' SUPPLY.
'A' BATTERY DRAIN - 200 MA
'B' BATTERY DRAIN - 9 MA

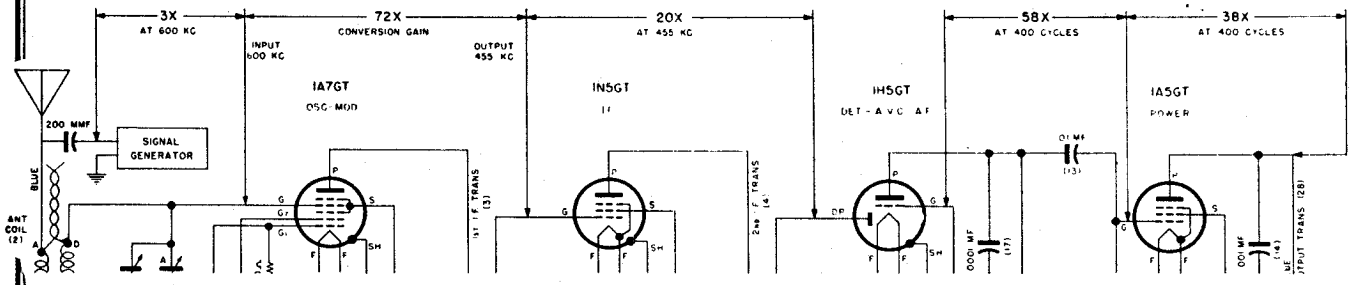
VOLTAGE TABLE
(BOTTOM VIEW OF CHASSIS)

PART NO. 4-A-24

POWER OUTPUT Undistorted- 100 milliwatts
Maximum - 200 milliwatts

VOICE COIL IMPEDANCE 3.2 ohm at 400~

TUNING RANGE 528 to 1730 KC



Be sure R. F. and I. F. stages are accurately aligned before measuring gain. R. F. gains can be measured with a "channel" type instrument containing a tuned and calibrated R. F. amplifier. A vacuum tube voltmeter may be used for audio gain measurements. Observe the following precautions:

1. For all gain measurements connect signal generator as shown. Use 600 KC. signal with 400 cycle modulation (use nearby frequency if local station interferes.)
2. Be sure radio is carefully tuned to generator signal (use weak signal for sharp tuning.)
3. When using a "channel" type instrument carefully tune it for maximum output at desired frequency before making measurements.

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For Parts List, see P.15-17

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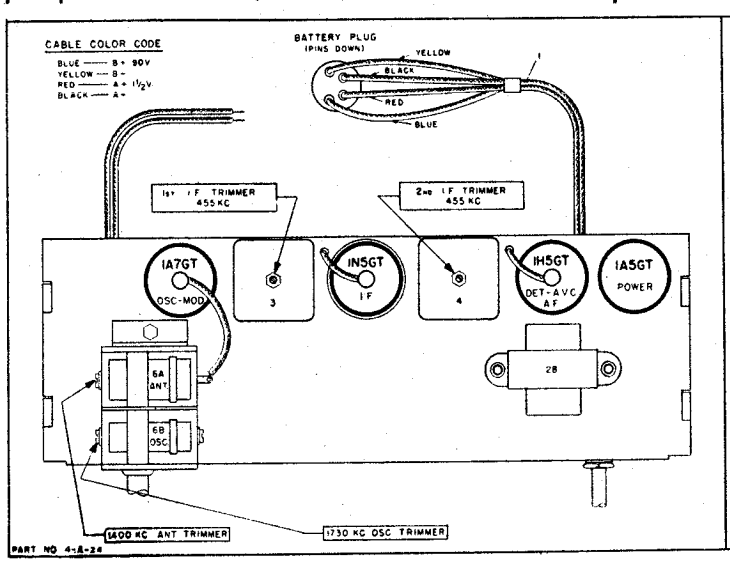
Be sure to follow procedure carefully and in the order given—otherwise the receiver will be insensitive and the dial calibration incorrect. For alignment procedure read tabulations from left to right. Make the adjustment marked (1) first, (2) next, etc.

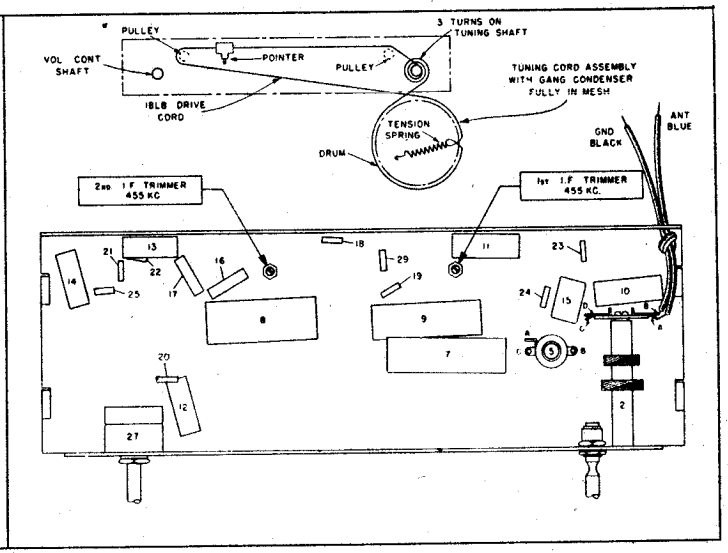
Before starting alignment:

(a) Check tuning dial adjustment by tuning gang condenser until plates touch maximum capacity stop (completely in mesh) at which point the dial needle must be exactly even with the last line at the low frequency end of the dial calibration. If dial needle does not point exactly to last line move to correct position.

(b) Use an accurately calibrated test oscillator with some type of output measuring device.

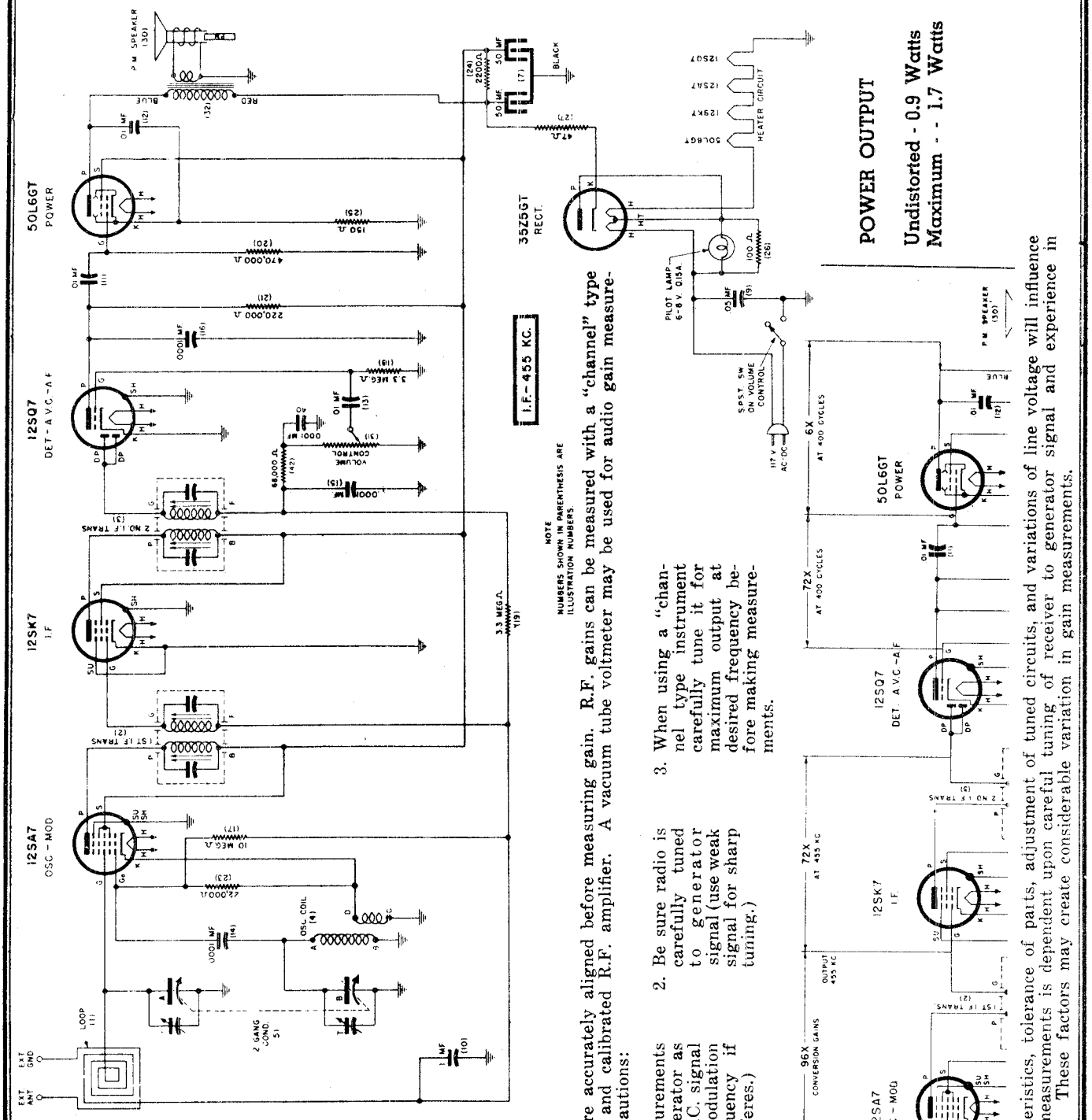
Steps	Set receiver dial to:	TEST OSCILLATOR			Refer to parts layout diagram for location of trimmers mentioned below:
		Adjust test oscillator frequency to:	Use dummy antenna in series with output of test oscillator consisting of:	Attach output of test oscillator to:	
1	I.F. Any point where no interference signal is received	455 K. C.	.02 MFD. condenser	High side to grid terminal of 1A7GT tube DO NOT REMOVE CAP. Low side to receiver black ground lead.	Adjust each of the second I.F. transformer trimmers for maximum output—then adjust each of the first I.F. trimmers for maximum output.
2	Exactly 1730 K. C.	Exactly 1730 K. C.	.00025 MFD. condenser	Receiver blue antenna lead Receiver black ground lead	Adjust 1730 K. C. oscillator trimmer for maximum output.
3	Exactly 1400 K. C.	Exactly 1400 K. C.	.00025 MFD. condenser	Receiver blue antenna lead Receiver black ground lead	While rocking gang condenser adjust 1400 K. C. antenna trimmer for maximum output.





MODEL 4A25

THE FIRESTONE TIRE & RUBBER CO.



POWER OUTPUT

Undistorted - 0.9 Watts
Maximum - - 1.7 Watts

LOUD SPEAKER

VOICE COIL IMPEDANCE

3.2 OHM at 400 Cycles

Be sure R.F. and I.F. stages are accurately aligned before measuring gain. R.F. gains can be measured with a "channel" type instrument containing a tuned and calibrated R.F. amplifier. A vacuum tube voltmeter may be used for audio gain measurements. Observe following precautions:

1. For all gain measurements connect signal generator as shown. Use 600 KC. signal with 400 cycle modulation (use nearby frequency if local station interferes.)
2. Be sure radio is carefully tuned to generator signal (use weak signal for sharp tuning.)
3. When using a "channel" type instrument carefully tune it for maximum output at desired frequency before making measurements.

Differences in tube characteristics, tolerance of parts, adjustment of tuned circuits, and variations of line voltage will influence stage gain. Accuracy of measurements is dependent upon careful tuning of receiver to generator signal and experience in using your test equipment. These factors may create considerable variation in gain measurements.

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For Voltage and Parts List, see P.15-12

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ALIGNMENT PROCEDURE

For alignment procedure read tabulations from left to right, and make the adjustment marked (1) first, (2) next, (3) third.

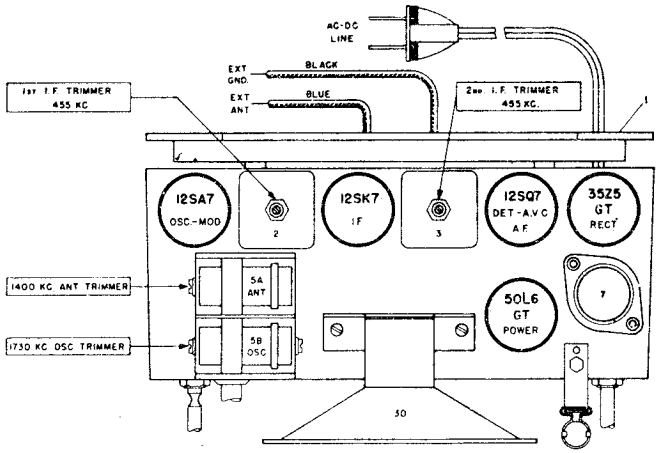
Before starting alignment:

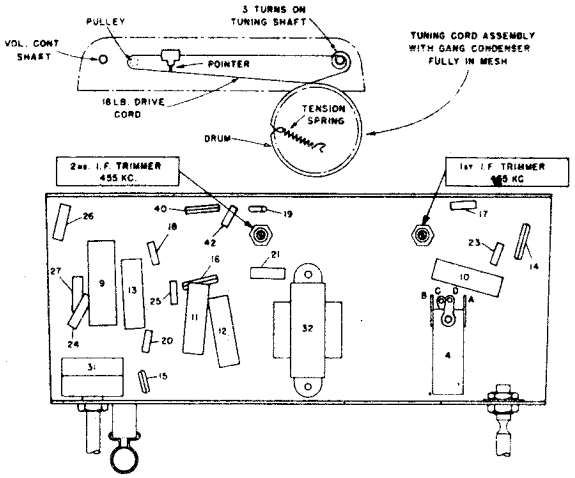
(a) Check tuning dial adjustment by tuning gang condenser until plates touch maximum capacity stop (completely in mesh) at which point the dial needle must be exactly even with the last line at the low frequency end of the dial calibration. If dial needle does not point exactly to last line move to correct position.

(b) Use an accurately calibrated test oscillator with some type of output measuring device.

(c) PLACE LOOP ANTENNA IN THE SAME POSITION IT WILL BE IN WHEN THE SET IS IN THE CABINET.

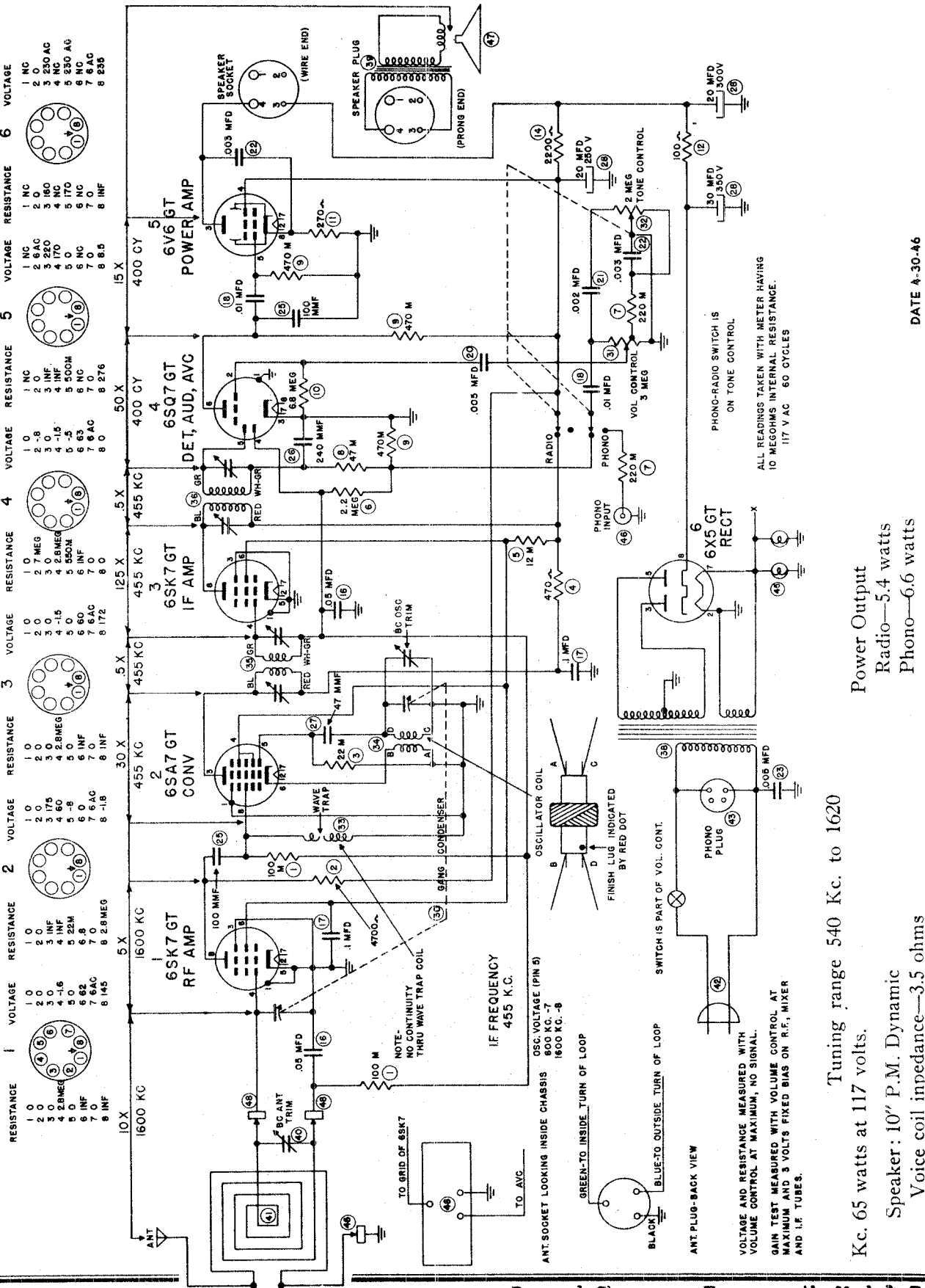
Steps	Set receiver dial to:	TEST OSCILLATOR			Refer to parts layout diagram for location of trimmers mentioned below:
		Adjust test oscillator frequency to:	Use dummy antenna in series with output of test oscillator consisting of:	Attach output of test oscillator to:	
1	Any point where no interfering signal is received.	455 K. C.	.02 MFD. condenser	High side to front stator plates of tuning condenser. Low side to frame of condenser through a .02 Mfd. blocking condenser.	Adjust each of the second I. F. transformer trimmers for maximum output—then adjust each of the first I. F. trimmers for maximum output.
2	Exactly 1730 K. C.	Exactly 1730 K. C.	.00025 MFD. condenser	Receiver blue antenna lead Receiver black ground lead	Adjust 1730 K. C. oscillator trimmer for maximum output.
3	Approx. 1400 K. C.	Approx. 1400 K. C.	.00025 MFD. condenser	Receiver blue antenna lead Receiver black ground lead	While rocking gang condenser adjust 1400 K. C. antenna trimmer for maximum output.





MODEL 4A31,
Rhapsody

THE FIRESTONE TIRE & RUBBER CO.


1 6SK7 GT RF AMP
2 6SA7 GT CONV
3 6SK7 GT IF AMP
4 6SQ7 GT DET, AUD, AVC
5 6V6 GT POWER AMP
6 6X5 GT RECT
1600 KC
455 KC
400 CY
I.F. FREQUENCY 455 K.C.
GANG CONDENSER
WAVE TRAP
OSCILLATOR COIL
SPEAKER SOCKET
SPEAKER PLUG
PHONO PLUG
PHONO INPUT
VOL. CONTROL 3 MEG
TONE CONTROL
PHONO-RADIO SWITCH IS ON TONE CONTROL
ALL READINGS TAKEN WITH METER HAVING 10 MEGOHMS INTERNAL RESISTANCE. 117 V AC 60 CYCLES
ANT. SOCKET LOOKING INSIDE CHASSIS
ANT. PLUG-BACK VIEW
VOLTAGE AND RESISTANCE MEASURED WITH VOLUME CONTROL AT MAXIMUM, NO SIGNAL.
GAIN TEST MEASURED WITH VOLUME CONTROL AT MAXIMUM AND 3 VOLTS FIXED BIAS ON R.F., MIXER AND I.F. TUBES.
NOTE- NO CONTINUITY THRU WAVE TRAP COIL
SWITCH IS PART OF VOL. CONT.
FINISH LUG INDICATED BY RED DOT
DATE 4-30-46

Tuning range 540 Kc. to 1620 Kc. 65 watts at 117 volts.

Speaker: 10" P.M. Dynamic
Voice coil inpedance—3.5 ohms

Power Output
Radio—5.4 watts
Phono—6.6 watts

Record Changer: Farnsworth Model P-51

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PARTS PRICE LIST

STOCK No. 4-A-31. CODE No. 177-5-4A31

Refer. No.	Part No.	DESCRIPTION	List Price
1	77214	100 M Ohms	$ .15
2	77211	4700 Ohms	.15
3	77266	22 M Ohms	.15
4	77261	470 Ohms	.15
5	77155	12 M Ohms 2 Watt	.25
6	77270	2.2 Megohms	.15
7	77216	220 M Ohms	.15
8	77213	47 M Ohms	.15
9	77217	470 M Ohms	.15
10	77273	6.8 Megohms	.15
11	77174	270 Ohms 1 Watt	.15
12	77258	100 Ohms	.15
14	77301	2200 Ohms 2 Watt	.20
16	25196	.05 Mfd. Tubular 600 V.	.20
17	25215	.1 Mfd. Tubular 600 V.	.20
18	25194	.01 Mfd. Tubular 600 V.	.20
20	25183	.005 Mfd. Tubular 600 V.	.15
21	25185	.002 Mfd. Tubular 600 V.	.15
22	25184	.003 Mfd. Tubular 600 V.	.20
23	25031	.005 Mfd. Line Buffer 600 V.	.30
25	25188	100 Mmf. Mica	.25
26	25187	240 Mmf. Mica	.30
27	25193	47 Mmf. Mica	.30
28	25180	Electrolytic Cap. 30 Mf. 350 V.—20 Mf. 300 V.—20 Mf. 250 V.	1.95
30	15154	Gang Condenser and Drive Drum	4.35
31	78119	Volume Control	1.20
32	90148	Tone Control and Phono Switch	1.05
33	38484	Wave Trap	.55
34	38483	Oscillator Coil	.60
35	38536	1st. I. F. Transformer	1.70
36	38537	2nd. I. F. Transformer	1.70
38	94025	Power Transformer	4.75
39	94199	Output Transformer	3.45
40	26032	Antenna Trimmer	.20
41	38652	Loop Antenna	3.35
42	27118	Line Cord	.70
43	11274	Phono A. C. Cable and Plug	.75
45	42185	Dial Lamp (Mazda 44) 6.3 V. 250 Ma. (Two required)	.15
46	80030	Phono Input Socket	.10
47	81124	Speaker	13.25
48	80256	Antenna Socket	.10
	80230	Speaker Socket	.10
	80252	Antenna Plug	.10
	80139	Molded Octal Tube Socket	.15
	11259	Dial Pointer Assembly	.85
	05090	Drive Cord Assembly	.20
	31287	Dial Glass	1.05
	04038	Dial Background	.40
	59264	Knob	.25
	71223	Phono Needle	1.20
	22147	P. U. Cable	1.00

Prices subject to change without notice

EQUIPMENT AND PROCEDURE FOR ALIGNMENT

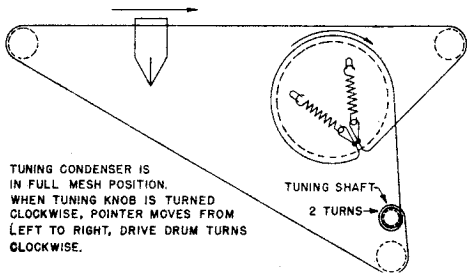
A Signal Generator calibrated at 455 Kc., 600 Kc. and 1500 Kc., and an output indicator are necessary to properly align this set. All adjustments should be made with the volume control set for maximum and the tone control for maximum treble, keeping the signal generator output as low as possible to prevent A.V.C. action and false settings.

The low side of the signal generator is connected to the chassis.

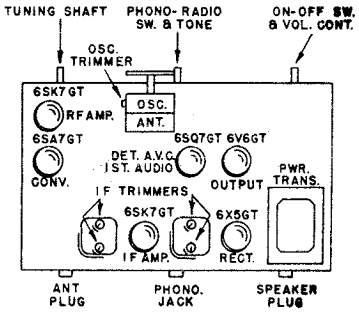
Steps	Connect High Side of Generator to	Set Generator At	Set Gang At	Adjust	Located	To Obtain
1	Set Volume Control at Maximum and Tone Control at Maximum Treble.					
2	Stator of Ant. Section of Gang with .1 Mf. In Series	455 Kc.	Minimum	2nd. I.F. Trimmers	Top of 2nd. I.F. Transformer	Maximum Output
3				1st. I.F. Trimmers	Top of 1st. I.F. Transformer	
4	Ant. Lead With 250 Mmf. In Series*	1500 Kc.	1500 Kc.	Osc. Trimmer	On Gang	
5		1500 Kc.	1500 Kc.	Ant. Trimmer	On Loop	
6	Check Pointer Calibration on 600 Kc.					

*Antenna wire protrudes from loop.

DIAL STRINGING

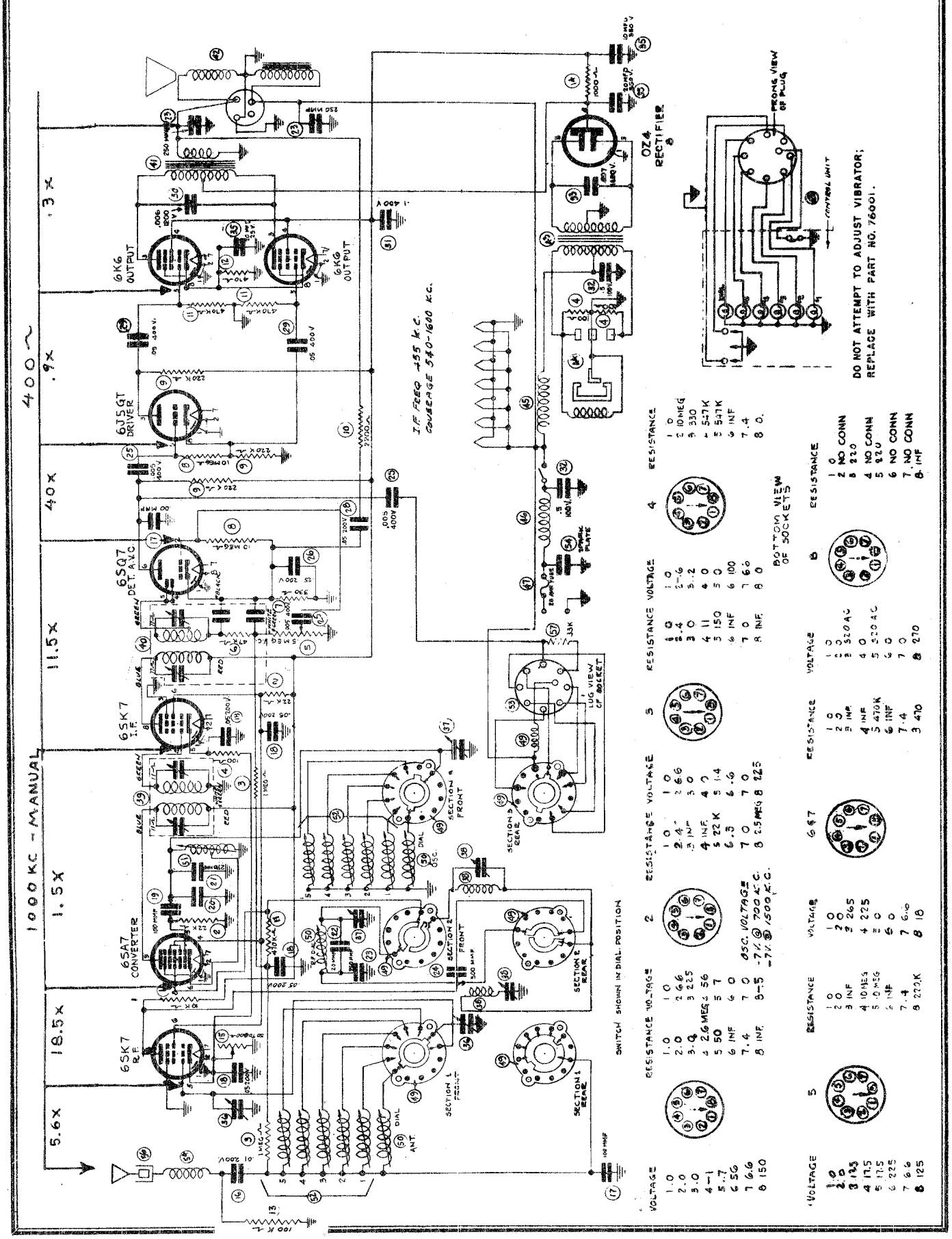

TUNING CONDENSER IS IN FULL MESH POSITION. WHEN TUNING KNOB IS TURNED CLOCKWISE, POINTER MOVES FROM LEFT TO RIGHT, DRIVE DRUM TURNS CLOCKWISE.
TUNING SHAFT
2 TURNS

CHASSIS LAYOUT



MODEL 4B1, Supreme

THE FIRESTONE TIRE & RUBBER CO.



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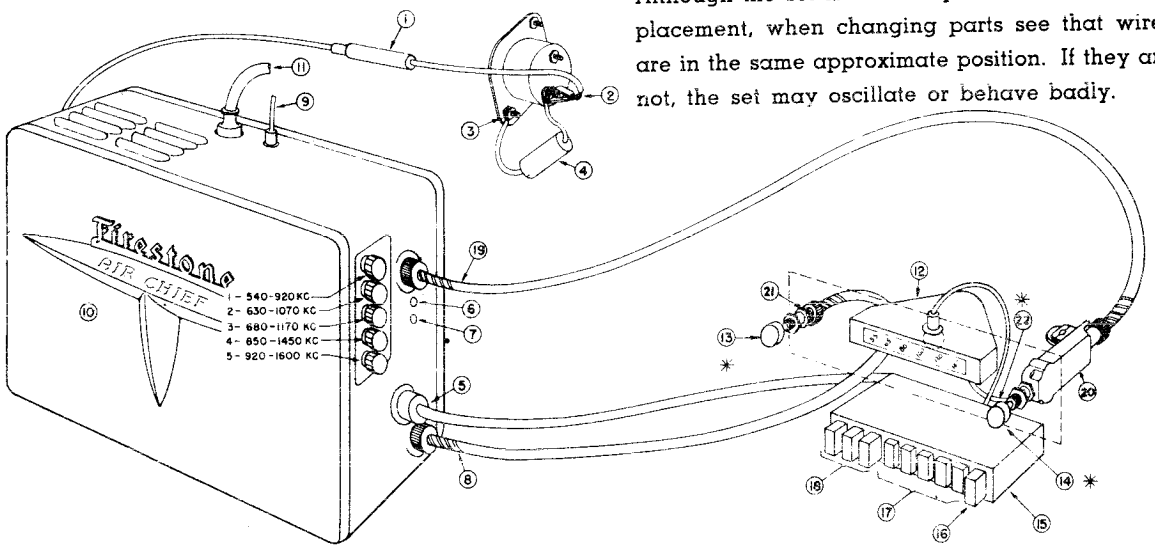


Fig. 3

1. Fuse Holder } Part No. 11160
2. "A" Power Lead }
3. Ground Connection
4. Ignition Interference Capacitor, Part No. 25120
5. Plug for Monomatic Tuner, Part of Part No. 15536
6. Antenna Trimmer, Manual Tuning
7. Antenna Trimmer, Automatic Tuning
8. Volume Control Flexible Cable, Part No. 15057
9. Antenna Lead (Part of Antenna)
10. Receiver PM-15
11. Speaker Cable, Part No. 27178
12. Slide Rule Dial, Part No. 13428
13. Volume Control Knob } Part No. 59314
14. Manual Control Knob }
15. Monomatic Tuner, Part No. 15536
16. Push Button Station Selector, Part of Part No. 15536
17. Station Indicators, Part of Part No. 15536
18. Tone Control Push Buttons, Part of Part No. 15536
19. Manual Tuning Control Cable, Part No. 15057
20. Tuning Control "Worm Reduction", Part No. 13538
21. Volume Control Shaft Bushing, Part No. 13537
22. Dial Drive Flexible Cable, Part No. 27298

All items except 13, 14, and 22 are packed with the receiver, other items are packed with the control kit.

PUSH BUTTON ADJUSTMENT

It is advisable to adjust the push buttons while set is still on the bench. With set operating and connected to the antenna, make a list of the five stations for which you desire Monomatic tuning. The stations chosen must be such that each will come within a different frequency range, as indicated by the following list. For example, it would not be possible to choose both a 550 kc station and a 600 kc station, since 600 kc does not come within the range of position #2. Arrange the stations in order of their frequency; that is, the station of lowest frequency will be #1; of next higher frequency, #2, next.

STATION	FREQUENCY RANGE
#1	540 to 920 kc
#2	680 to 1170 kc
#3	850 to 1450 kc
#4	850 to 1450 kc
#5	920 to 1570 kc

Operate the Monomatic button (marked Push) until the dial becomes illuminated, indicating that the receiver is adjusted for Dial Tuning. Then tune your #5 station, using the Station Selector knob. Operate the Monomatic button until the #5 station indicator (furthest right of the station indicators) becomes illuminated.

Turn the knob, located on the side of the set, which has the range 920-1570 kc indicated below it, until the desired station is heard at maximum volume.

After setting button #5, the antenna should be matched by adjusting the screw marked P. B. Antenna Trimmer in Figure 3, as #7. This screw is covered by a snap button. Slowly turn this screw until maximum volume is secured.

Return to Manual then tune in until your #1 indicator becomes illuminated. Then proceed to adjust the knob for this station until maximum signal is heard.

Assuming the lid is removed, place a $\frac{5}{16}$ open end wrench on adjusting nut immediately ahead of heavy compression spring and adjust for further increase in signal, then readjust red knob for maximum signal. This is actually a tracking operation and will give optimum performance. This operating should be repeated for each button position.

After the car installation is made, it is recommended that all the red buttons be rechecked for maximum response.

After this re-check is completed, it is necessary to adjust the manual antenna trimmer, see #6. The adjusting screw for this is accessible after removing the snap button.

Return the set to dial tuning, turn the manual tuning control until a station near 1400 kc is heard, then adjust this screw for maximum volume. Now with set in car, depress monomatic button until #5 station is again illuminated. Check #7 trimmer for maximum signal.

MODEL 4-B-1 CODE 7-C-PM15

	Part No.	Name of Part		Part No.	Name of Part
1.	77180	10 K. Ohms	37.	26114	Trimmer Ass'y
2.	77169	22 K. Ohms	38.	38276	R. F. Coil Ass'y
3.	77181	1 Meg. Ohms	39.	38274	1st I. F. Ass'y
4.	77176	100 Ohms	40.	38275	2nd I. F. Ass'y
5.	78042	.5 Meg. Vol. Control	41.	94111	Output Transformer
6.	77172	47 K. Ohms	42.	11163	Speaker & Cable Ass'y
7.	77179	330 Ohms	43.	94078	Power Transformer
8.	77182	10 Meg. Ohms	44.	76001	Vibrator
9.	77178	220 K. Ohms	45.	38277	Vibrator Choke
10.	77194	2200 Ohms	46.	38278	A. Choke
11.	77173	470 K. Ohms	47.	48007	Fuse, 20 Amp.
12.	77125	470 Ohms, 1 Watt	48.	41100	Control Unit
13.	77167	100 K. Ohms	49.	90070	Switch & Stepper Ass'y
14.	77123	1000 Ohms, W. W., 1 W.	50.	38273	Permeability Tuner
15.	78031	Sensitivity Control	51.	38280	Shunt Tracking Coil
16.	25112	.01-200 V.	52.	38311	P. B. Coil Ass'y
17.	25188	100 MMF.	53.	80136	Control Socket
18.	25111	.05-200	54.	38279	Ant. Spark Choke
19.	25106	100 MMF., XM-262	56.	561367	Ant. Cable Recp.
20.	25117	Compensating Cap		41084	Monomatic Tuner with Extra Length Cable
21.	25190	270 MMF., Sil. Mica Cap		41083	Extra Length Control Cable Kit
22.	25121	20 MMF.		15100	Extra Length Control Cable
23.	25187	250 MMF.	57.	77183	33 K. Ohms
24.	25189	500 MMF.	58.	11160	Fuse Holder
25.	25105	.005-400 V.	59.	11160	"A" Power Lead
26.	25114	.25-200 V.	60.	25120	Ignition Interference Capacitor
27.	25116	.005-400 V.	61.	15057	Volume Control Flexible Cable
28.	25102	.05-200	62.	27178	Speaker Cable
29.	25105	.05-400	63.	13428	Slide Rule Dial
30.	25110	.006-1200 V.	64.	59314	Volume Control Knob
31.	25103	.1-400 V.	65.	59314	Manual Control Knob
32.	25118	.5-100 V.	66.	15536	Monomatic Tuner
33.	25109	.007-1600 V.	67.	15057	Manual Tuning Control Cable
34.	25100	Spark Plate	68.	13538	Tuning Control "Worm Reduction"
35.	25099	Electrolytic	69.	13537	Volume Control Shaft Bushing
36.	26113	Trimmer	70.	27298	Dial Drive Flexible Cable

MODEL 4-B-2 CODE 7-6-PM14

	Part No.	Name of Part		Part No.	Name of Part
1.	77180	10 M Ohm	29.	25112	.01-200 V.
2.	78031	Sensitivity C	30.	25189	500 MMF.
3.	77181	1 Meg.	31.	561367	Antenna Cable Recp.
4.	77069	22 M Ohm, ½ W.	32.	38279	Antenna Spark Choke
5.	77172	47 M Ohm	33.	38281	Permeability Tuner
6.	78042	.5 Meg. Vol. Control	34.	38280	Shunt Tracking Coil
7.	77182	10 Meg.	35.	26116	Trimmer Assembly
8.	77178	220 M Ohm	36.	26115	Antenna Trimmer
9.	77173	470 M Ohm	37.	38274	1st I. F. Assembly
10.	77179	330 Ohm	38.	38275	2nd I. F. Assembly
11.	77123	1000 Ohm	39.	94080	Output Transformer
12.	77176	100 Ohm	40.	11164	Speaker & Cable
13.	77183	33 M Ohm	41.	94078	Power Transformer
14.	77069	22 M Ohm, 1 W.	42.	76001	Vibrator
15.	25111	.05-200 V.	43.	38277	Vibrator Choke
16.	25102	.05-200 V.	44.	38278	A. Choke
17.	25188	100 MMF.	45.	48007	Fuse, 20 Amp.
18.	25104	.005-400 V.	46.	25124	Silver Mica Cond., 420 MMF.
19.	25116	.005-400 V.	47.	41083	Extra Length Control Cable
20.	25113	.01-400 V.	48.	11160	Fuse Holder
21.	25119	.002-200 V.	49.	11160	"A" Lead Assembly
22.	25103	.1-400 V.	50.	25120	Capacitor
23.	25099	Electrolytic	51.	15057	Flexible Shaft Tuning
24.	25110	.006-1200 V.	52.	15057	Flexible Shaft Volume Control
25.	25109	.007-1600 V.	53.	11172	Pilot Light and Cable Assembly
26.	25118	.5-100 V.	54.	13428	Slide Rule Dial
27.	25100	Spark Plate	55.	13538	Tuning Control Worm Reduction
28.	25121	20 MMF.	56.	13537	Volume Control Shaft Bushing

Volume control full on, tone control on speech position. Keep generator input low except as noted (*) below.

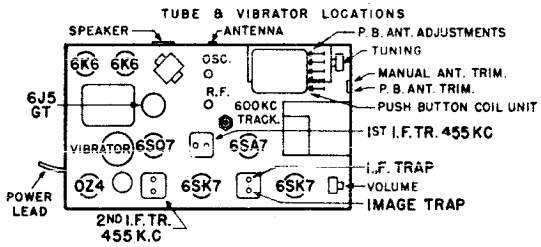
Connect output meter across voice coil of speaker.

Connect signal generator ground lead to receiver chassis.

Connect signal generator output lead to antenna.

To adjust image rejector, return set to button #5. Set generator to 1500 kc. Adjust button for maximum signal at 1500 kc. Then set generator to image frequency 24100 and adjust image rejector for minimum signal. Use high generator output.

Dial	Generator Frequency	Dummy Antenna	Adjustments
540 kc	455 kc	.1 Mfd	1st & 2nd IF
*540 kc	455 kc	.1 Mfd	IF Trap
Highest Frequency	1600 kc	.0001 Mfd	Osc., RF, Antenna
600 kc	600 kc	.0001 Mfd	600 kc Track



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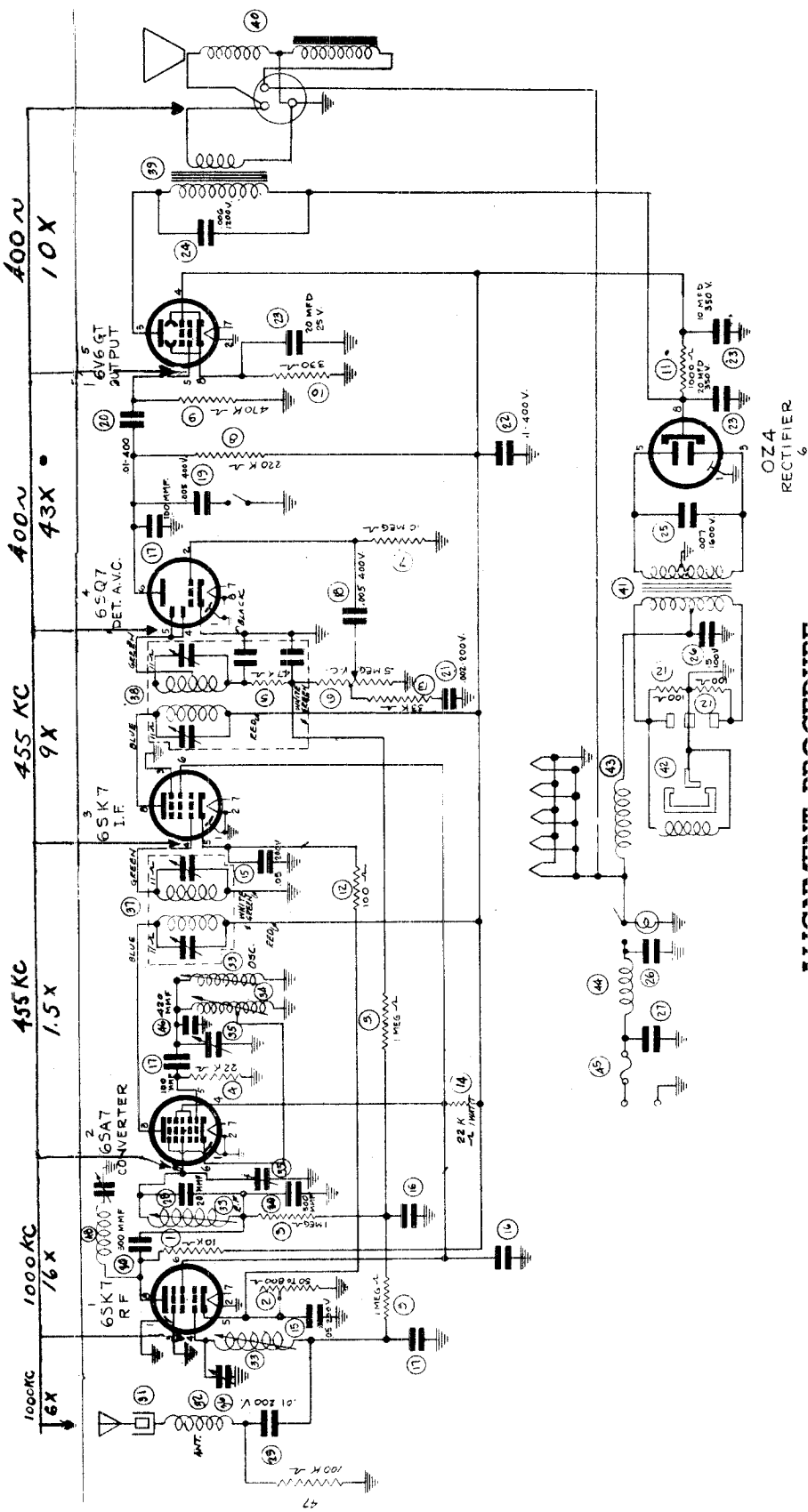
MODEL 4B2, DeLuxe

THE FIRESTONE TIRE & RUBBER CO.



ALIGNMENT PROCEDURE

	Dial	Generator Frequency	Dummy Antenna	Adjustments
1. Volume control full on, tone control on speech position. Keep generator input low except as noted by (*) below.	540 kc	455 kc	.1 Mfd.	1st & 2nd IF
2. Connect output meter across voice coil of speaker.	*540 kc	455 kc	.1 Mfd.	IF Trap
	Highest Frequency	1600 kc	.0001 Mfd.	Osc., RF, Antenna
3. Connect signal generator ground lead to receiver chassis.	600 kc	600 kc	.0001 Mfd.	600 kc Track

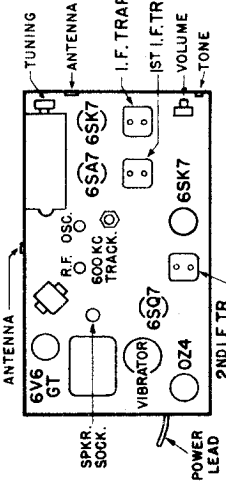
Repeat Alignment procedure to insure accuracy.

4. Connect signal generator output lead to antenna.

*Keep generator input low except as noted by (*).

DO NOT ATTEMPT TO ADJUST VIBRATOR; REPLACE WITH PART NO. 76001.

TUBE & VIBRATOR LOCATIONS



For Parts List, see P.15-32

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MODEL 4B2, DeLuxe

THE FIRESTONE TIRE & RUBBER CO.

CONNECTING THE RECEIVER

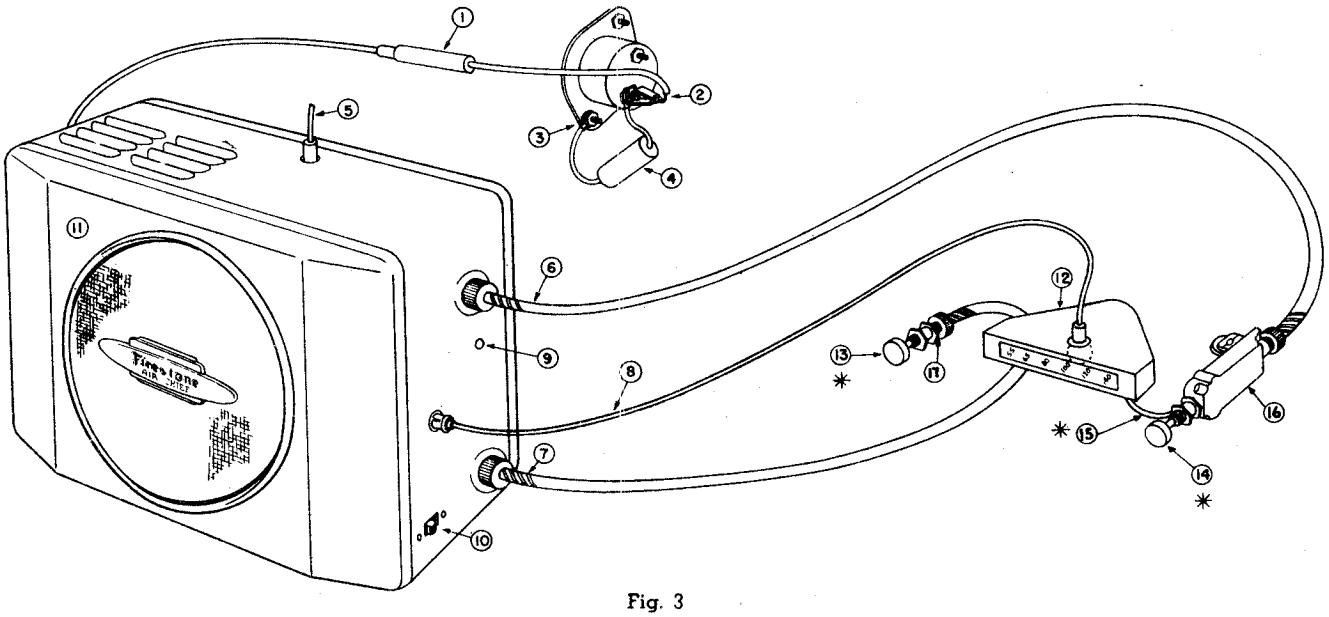


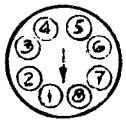
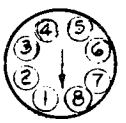
Fig. 3

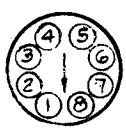
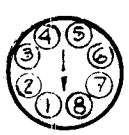
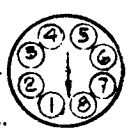
	Name	Part No.
1.	Fuseholder	11160
2.	Ammeter Connector	36621
3.	Ground Connection	64270
4.	Capacitor	25120
5.	Antenna Lead	——
6.	Flexible Tuning Shaft	15057
7.	Flexible Volume Control Shaft	15057
8.	Pilot Light Lead	11172
9.	Antenna Trimmer Adjustment Hole	——
10.	Tone Control	90071
11.	Receiver	PM-14
12.	Slide Dial Assembly	13428

The following items are supplied by Crowe Nameplate:

13.	Volume Control Knob	Included in Crowe
14.	Tuning Control Knob	Assy. #A-11540-C
15.	Flexible Dial Coupling Shaft	
16.	Dial Drive Tuning Assembly	Assy. #A-11827

SOCKET VOLTAGES

VOLTAGE	1	RESISTANCE	VOLTAGE	2	RESISTANCE	VOLTAGE	3	RESISTANCE
1. 0		1. 0	1. 0		1. 0	1. 0		1. 0
2. 0		2. 0	2. 0		2. 0	2. 0		2. 0
3. 0		3. 0	3. 224		3. INF.	3. 0		3. 0
4. -1		4. 2.6 MEG.	4. 58		4. INF.	4. 0		4. 11 Ω
5. .7		5. 50 Ω	5. 0		5. 22 K Ω	5. 1.4		5. 150 Ω
6. 58		6. INF.	6. 0		6. .2	6. .6		6. INF.
7. 6.6		7. .4 Ω	7. 6.6		7. .4	7. 6.6		7. .4
8. 150		8. INF.	8. -.5		8. 2.5 MEG.	8. 224		8. INF.

VOLTAGE	4	RESISTANCE	VOLTAGE	5	RESISTANCE	VOLTAGE	6	RESISTANCE
1. 0		1. 0	1. 0		1. 0	1. 0		1. 0
2. -6		2. 10 MEG.	2. 0		2. 0	2. 0		2. NO CONN.
3. 0		3. 0	3. 265		3. INF.	3. 320 A.C.		3. 220 Ω
4. 0		4. 550 K Ω	4. 225		4. INF.	4. 0		4. NO CONN.
5. 0		5. 550 K Ω	5. 0		5. 470 K Ω	5. 320 A.C.		5. 220 Ω
6. 100		6. INF.	6. 0		6. INF.	6. 0		6. NO CONN.
7. 6.6		7. .4	7. 6.6		7. .4	7. 0		7. NO CONN.
8. 0		8. 0	8. 12		8. 330 Ω	8. 270		8. INF.

BOTTOM VIEW OF SOCKETS

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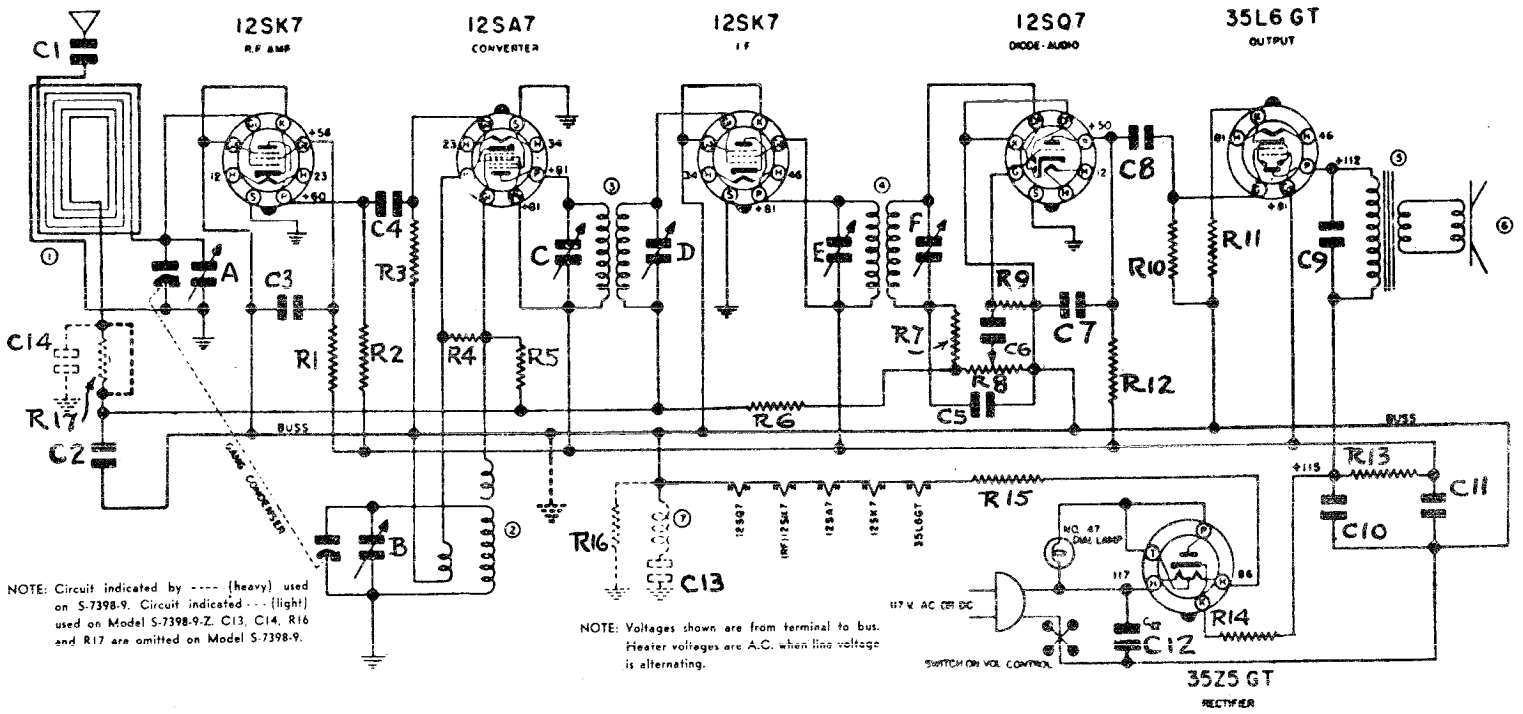


NOTE: Circuit indicated by ---- (heavy) used on S-7398-9. Circuit indicated - - - (light) used on Model S-7398-9-Z. C13, C14, R16 and R17 are omitted on Model S-7398-9.

NOTE: Voltages shown are from terminal to bus. Heater voltages are A.C. when line voltage is alternating.

I.F.—456 K.C.

Diag. No.	Part No.	Description		List Price
C-1	N-1344	.01 mfd. 400 V.	20%	$ 0.35
C-2	N-1345	.05 mfd. 200 V.	20%	.40
C-3	N-1345	.05 mfd. 200 V.	20%	.40
C-4	N-2383	150 mmfd. Mica	20%	.35
C-5	N-1374	100 mmfd. Mica	20%	.35
C-6	N-1344	.01 mfd. 400 V.	20%	.35
C-7	N-1447	.0005 mfd. 400 V.	20%	.40
C-8	N-1344	.01 mfd. 400 V.	20%	$ 0.35
C-9	N-1376	.02 mfd. 400 V.	20%	.35
C-10 } C-11 }	N-3658	{ 40 mfd. 150 W. V. } { 40 mfd. 150 W. V. }	Electrolytic	1.10
C-12	N-1346	.05 mfd. 400 V.	20%	.40
C-13	N-3080	.22 mfd. 200 V.	10%	.70
C-14	N-1345	.05 mfd. 200 V.	20%	.40

Prices subject to change without notice.

DECEMBER 8, 1941

R-1	N-3814	15,000 Ohm	.5 W.	20%	$ 0.20
R-2	N-3964	2,000 Ohm	.5 W.	10%	.20
R-3	N-1260	50,000 Ohm	.5 W.	20%	.20
R-4	N-1627	20,000 Ohm	.5 W.	20%	.20
R-5	N-1263	10 Megohm	.5 W.	20%	.20
R-6	N-1682	3 Megohm	.5 W.	20%	.20
R-7	N-1460	30,000 Ohm	.5 W.	20%	.20
R-8	N-4076	0.5 Megohm Volume Control			2.25
R-9	N-2189	4 Megohm	.5 W.	20%	.20
R-10	N-1264	500,000 Ohm	.5 W.	20%	.20
R-11	N-3663	150 Ohm	.5 W.	10%	.20
R-12	N-1377	200,000 Ohm	.5 W.	20%	.20
R-13	N-3819	1,200 Ohm	1 W.	10%	.30
R-14	N-1742	25 Ohm	.5 W.	20%	.20
R-15	N-3869	30 Ohm	1 W.	10%	.30
R-16	N-1377	200,000 Ohm	.5 W.	20%	.20
R-17	N-1262	1 Megohm	.5 W.	20%	.20

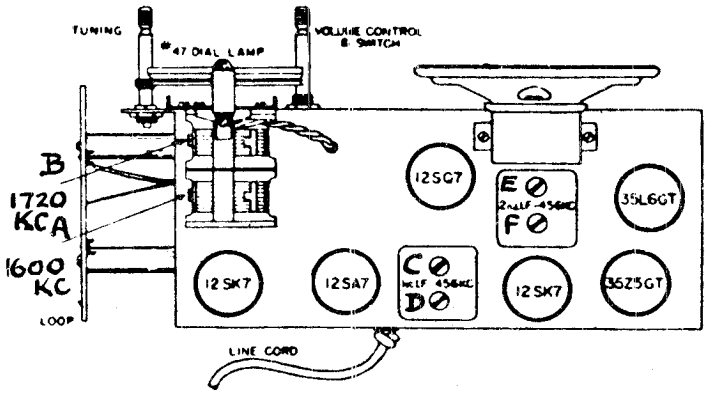
1	N-3784	Antenna Loop Coil	.90
2	N-3298	Oscillator Coil	.70
3	N-3816	1st I.F. Transformer	1.20
4	N-3804	2nd I.F. Transformer	1.20
5	N-3782	Output Transformer	$1.00
6	N-3781	5" P. M. Speaker	3.75
	N-4052	2 Gang Condenser	3.00

MISCELLANEOUS PARTS

Part No.	Description	List Price
N-4054	Dial scale (glass)	$ 0.80
N-4055	Dial background plate	.80
N-4053	Dial pointer	.50
N-3787	Dial drive shaft	.50
N-3238	Dial drive shaft bushing	.40
N-3243	"C" Washer—dial drive shaft retainer	.07
N-2655	Dial drive string	.10
N-3925	Dial drive spring	.10
N-4075	Dial lamp socket	.50
N-1958	Rubber line cord	.45
N-3812	Wood dowel spacers—loop mounting	.10
N-3795	Screw—6-32x2¼" round head	.12
N-3642	Washer—fibre—chassis mounting	.10
N-4687	Cabinet back	.65
N-4688	Knobs	.20
N-4386	Clips—dial scale fastening	.10
N-4696	Speaker baffle	.16
N-4697	Grille cloth	.22

MODELS 7398-9, 7398-9Z, 7403-1

THE FIRESTONE TIRE & RUBBER CO.



TUBE AND TRIMMER LOCATIONS

ALIGNMENT DATA AND SERVICING

Lack of sensitivity and poor tone quality may be due to any one or a combination of causes such as weak or defective tubes or speaker, open or grounded bias resistor, bypass condenser, etc. Never attempt to realign set until all other possible sources of trouble have been first thoroughly investigated and definitely proved not to be the cause.

NOTE: IT IS ABSOLUTELY NECESSARY THAT AN ACCURATELY CALIBRATED TEST OSCILLATOR WITH SOME TYPE OF OUTPUT MEASURING DEVICE BE USED WHEN ALIGNING THE RECEIVER AND THAT THE PROCEDURE BE CAREFULLY FOLLOWED, OTHERWISE THE RECEIVER WILL BE INSENSITIVE AND THE DIAL CALIBRATION WILL BE INCORRECT. THE TRIMMERS WILL BE REFERRED TO BY THEIR FUNCTION AS INDICATED ON THE PARTS DIAGRAM.

ALIGNMENT PROCEDURE

GENERAL DATA

The alignment of this receiver requires the use of a test oscillator that will cover the frequencies of 456, 600, 1400 and 1720 KC and an output meter to be connected across the primary and secondary of the output transformer. If possible, all alignments should be made with the volume control on maximum and the test oscillator output as low as possible to prevent the AVC from operating and giving false readings.

CORRECT ALIGNMENT PROCEDURE

The intermediate frequency (I. F.) stages should be aligned properly as the first step. After the I. F. transformers have been properly adjusted and peaked, the broadcast band should be adjusted.

I. F. ALIGNMENT

With the gang condenser set at minimum, adjust the test oscillator to 456 KC and connect the output to the grid of the first detector tube (12SA7) through a .05 or .1 mfd. condenser. The ground on the test oscillator should be connected to the ground bus, indicated in circuit diagram. Align all four I. F. trimmers to peak or maximum reading on the output meter.

BROADCAST BAND ALIGNMENT

Remove the chassis from the cabinet and set on a bench, taking care that no metal is near the loop. Do not make this setup on a metal bench. Connect the test oscillator to the antenna of the set through a 200 mmfd. (.0002) condenser. With the gang condenser set at minimum capacity, set the test oscillator at 1720 KC, and adjust the oscillator (or 1720 KC trimmer) on gang condenser. Next—set the test oscillator at 1400 KC, and tune in the signal on the gang condenser. Adjust the antenna trimmer (or 1400 KC trimmer) for maximum signal. Next set the test oscillator at 600 KC, and tune in signal on condenser to check alignment of coils.

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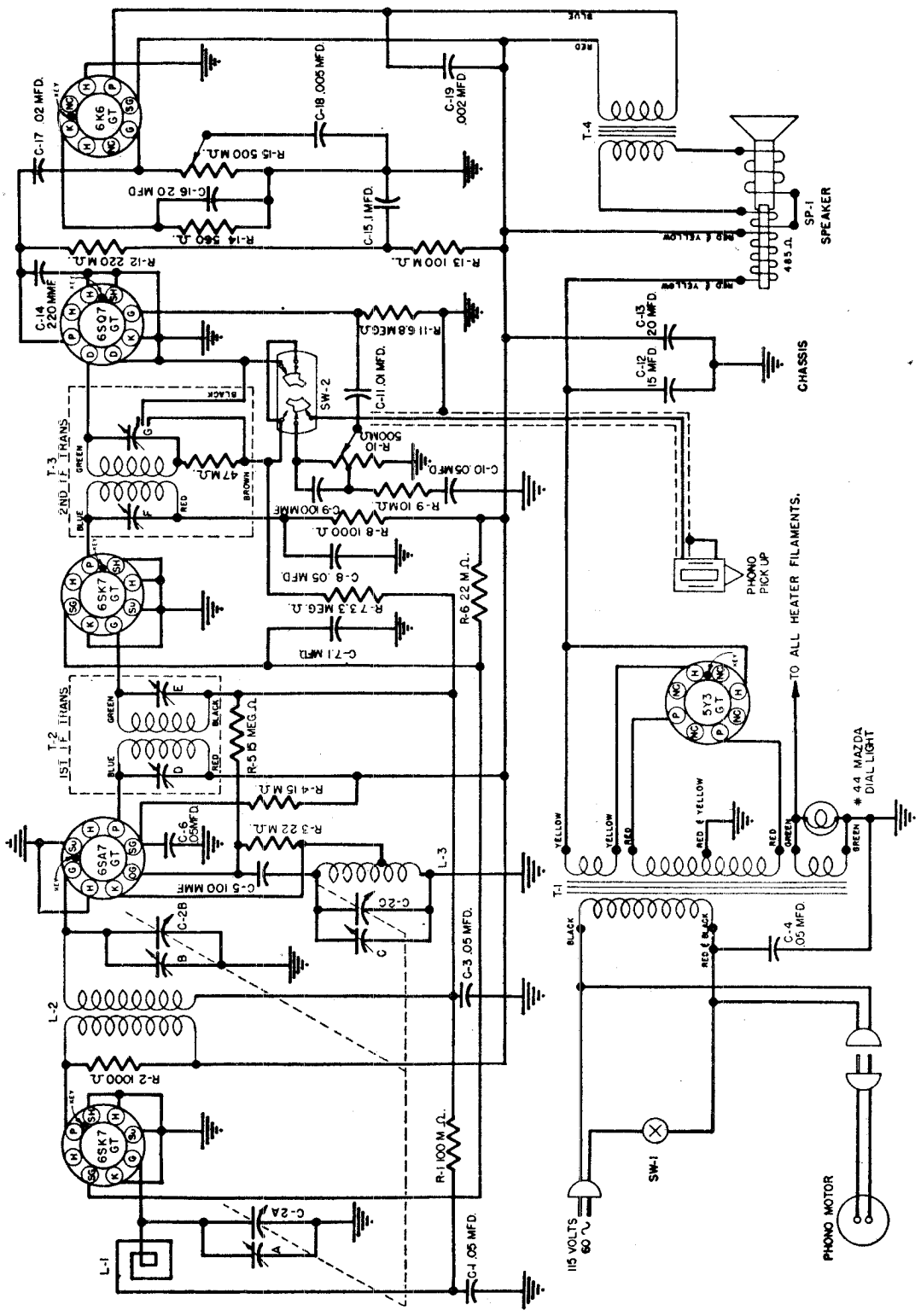

Record Changer: Detrola Model 550

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MODEL 4A43

THE FIRESTONE TIRE & RUBBER CO.

Electrical and Mechanical Specifications

Frequency Range	540-1600 kc.	V.C. Impedance	3.5 ohms at 400 cycles
Intermediate Frequency	455 kc.	Power Output (Undistorted)	1 watt
Power Supply	105-125 volts, 60 cycle A.C.	Power Output (Maximum)	4 watts
Loudspeaker	Electrodynamic	Tuning Drive Ratio	4¾ to 1

TUBE COMPLEMENT

1—6SK7GT	RF Amplifier tube	1—6SQ7GT	Detector—AVC—1st Audio tube
1—6SA7GT	Converter tube	1—6K6GT	Power Output tube
1—6SK7GT	IF Amplifier tube	1—5Y3GT	Rectifier tube

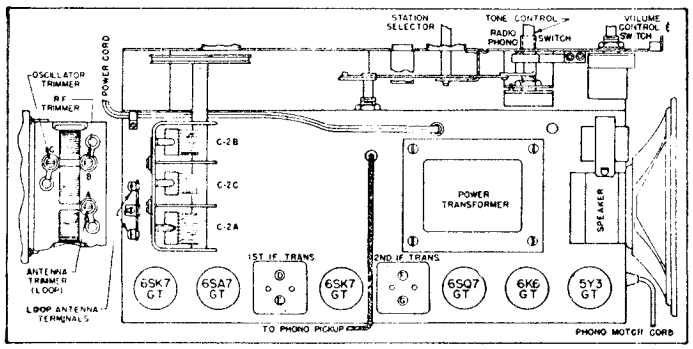
NOTE: The above glass tubes are interchangeable with their metal equivalent.

ALIGNMENT PROCEDURE

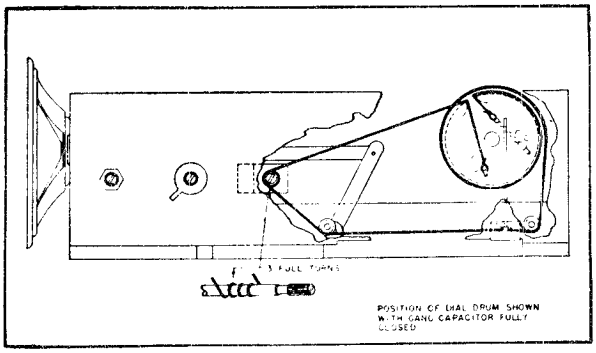
The following equipment is necessary to properly align this chassis:

1. A signal generator which will provide an accurately calibrated signal at the frequencies listed.
2. An output meter.
3. A non-metallic screwdriver.
4. Dummy antenna: — .1 mfd. — RMA loop.

CONNECT GENERATOR TO	DUMMY ANTENNA	INPUT SIGNAL FREQUENCY	BAND	SET DIAL AT	TRIMMERS	PURPOSE
6SA7GT grid	.1 mfd	455 kc.	Broadcast	HF end	D E F G	Align IF
6SK7GT RF grid	.1 mfd	1620 kc.	Broadcast	HF end	C	Set limit of band
6SK7GT RF grid	.1 mfd	1400 kc.	Broadcast	1400 kc.	B	Align RF
RMA loop	Through loop	1400 kc.	Broadcast	1400 kc.	A	Align antenna



Tube Layout



Dial Mechanism

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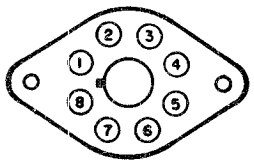
MODEL 4A43

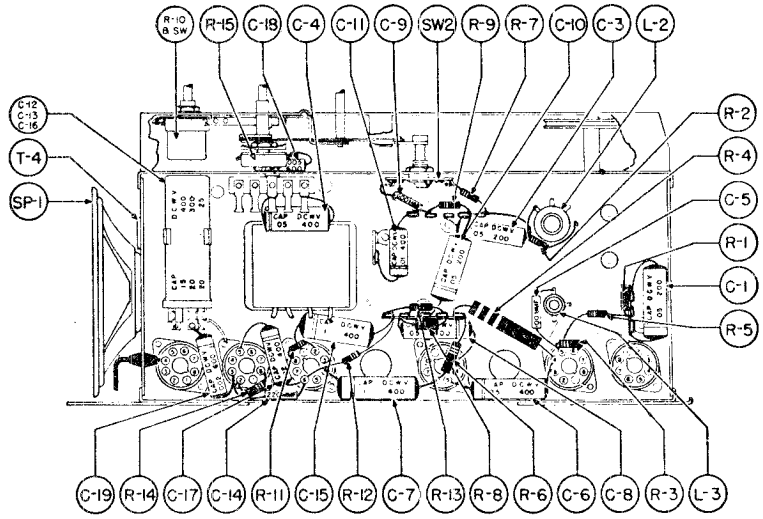
THE FIRESTONE TIRE & RUBBER CO.

SOCKET VOLTAGES

TUBE	POSITION	1	2	3	4	5	6	7	8
6SK7GT	RF Amplifier	0	0	0	0	0	93	6.3 AC	270
6SA7GT	Converter	0	6.3 AC	270	113	-7.5	0	0	0
6SK7GT	IF Amplifier	0	0	0	0	0	93	6.3 AC	260
6SQ7GT	Detector—AVC—1st Audio	0	0	0	0	0	88	6.3 AC	0
6K6GT	Power Output	0	0	250	270	0	0	6.3 AC	19
5Y3GT	Rectifier	0	310	0	290 AC	0	290 AC	0	310



NOTE: All voltages measured from chassis to socket contact indicated.
DC voltages measured with a 1000 ohm-per-volt meter.
All voltages are positive DC unless otherwise marked.
Volume control full on. No signal.
Tone Control in clockwise position.
Line Voltage 117 volts AC.



Parts Layout

SERVICE PARTS LIST

Symbol	Part No.	Description
C-1, 3, 10	BD210503	Cap., Paper, .05 mfd., 200 v.
C-11	BD410103	Cap., Paper, .01 mfd., 400 v.
C-7, 15	BD410104	Cap., Paper, .1 mfd., 400 v.
C-17	BD410203	Cap., Paper, .02 mfd., 400 v.
C-6, 8, 4	BD410503	Cap., Paper, .05 mfd., 400 v.
C-19	BD610202	Cap., Paper, .002 mfd., 600 v.
C-18	BD610502	Cap., Paper, .005 mfd., 600 v.
C-5, 9	BM78A101	Cap., Mica, 100 mmf.
C-14	BM78A221	Cap., Mica, 220 mmf.
R-14	BR16E561	Resistor, 560 ohm, 1 w.
R-2, 8	BR17B102	Resistor, 1000 ohm, ⅓ w.
R-9	BR17B103	Resistor, 10M ohm, ⅓ w.
R-1, 13	BR17B104	Resistor, 100M ohm, ⅓ w.
R-5	BR17B156	Resistor, 15 meg., ⅓ w.
R-3	BR17B223	Resistor, 22M ohm, ⅓ w.
R-12	BR17B224	Resistor, 220M ohm, ⅓ w.
R-7	BR17B335	Resistor, 3.3 meg., ⅓ w.
R-11	BR17B685	Resistor, 6.8 meg., ⅓ w.
R-6	BR17E223	Resistor, 22M ohm, 1 w.
R-4	BR17G153	Resistor, 15M ohm, 2 w.
	A-2163	Cable, Dial
	A-3123	Clamp, Cable
	A-9285	Lamp, Pilot, Mazda No. 44
	A-51160-3	Cord, Power, 6 ft.
	A-51163	Clip, Spring
C-12, 13	A-51356	Cap., Electro., 15-20-20 mfd.
C-2	C-51501-1	Capacitor, Variable, 3-section
T-1	C-51502	Transformer, Power
L-2	B-51511	Coil, Assembly, RF
SP-1	C-51512	Speaker, 5" Dynamic, 485 ohm
L-3	B-51522	Coil Assembly, Osc.
	A-51531	Shaft, Drive
T-2	B-51416-2	Trans. Assembly, 1st IF
T-3	B-51417-2	Trans. Assembly, 2nd IF
	B-51591	Spring, Dial Bracket
	A-51787	Spring, Cable
	A-51801	Rivet, Pronged, 3/32 x 1/8
	B-55300-1	Channel, Rubber
SW-2	B-55500-1	Switch (Radio-Phono)
R-15	B-55550-1	Potentiometer, 500M ohm
R-10	B-55575-1	Potentiometer & Switch, 500M ohm

Order parts not listed by specifying (1) Part Name, (2) Model Number (include number following dash and (3) Run No.

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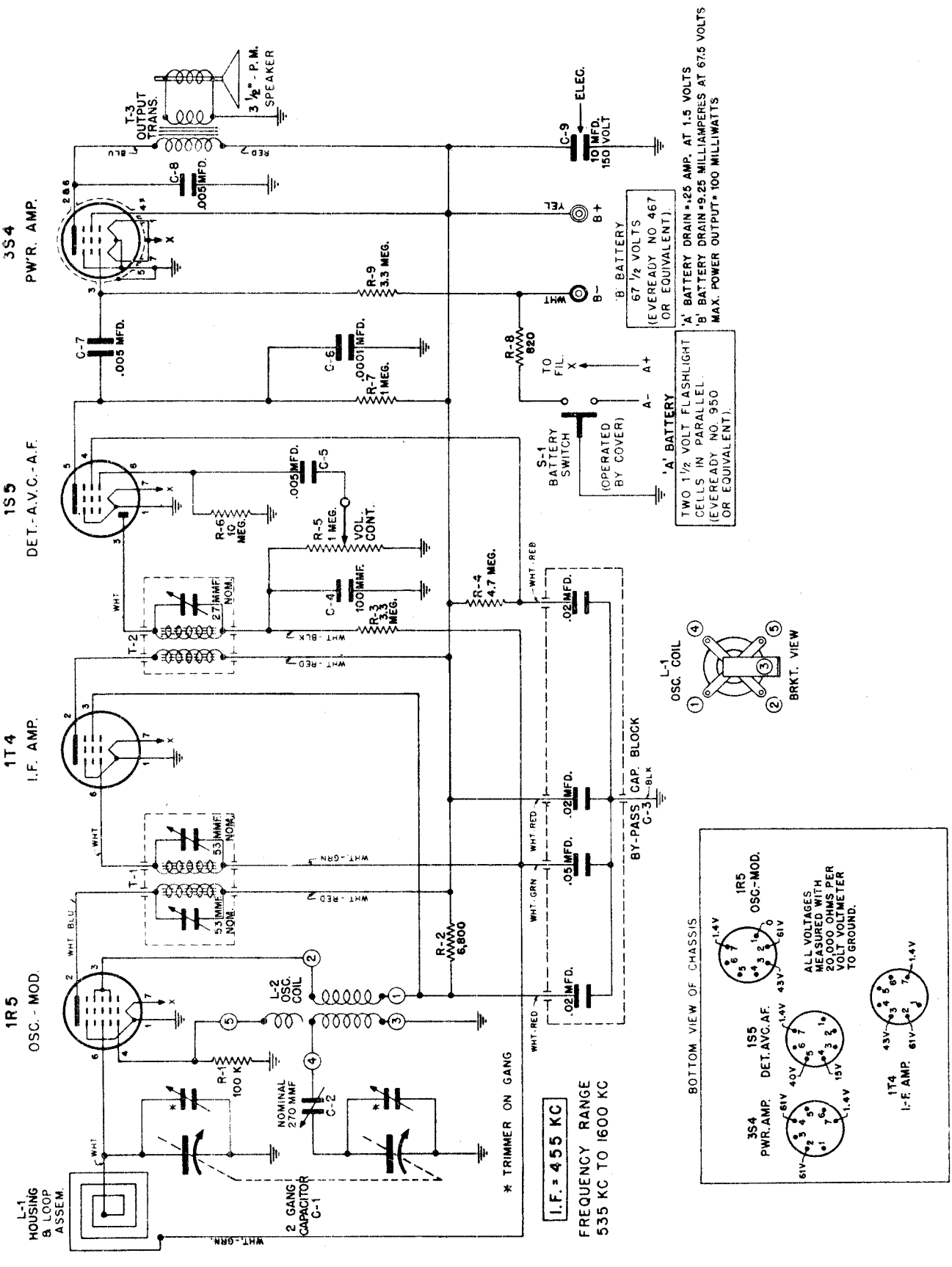
MODEL 5A1,Ch. HS-6

GALVIN MFG. CORP.



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MODEL 5A5, Ch. HS-15

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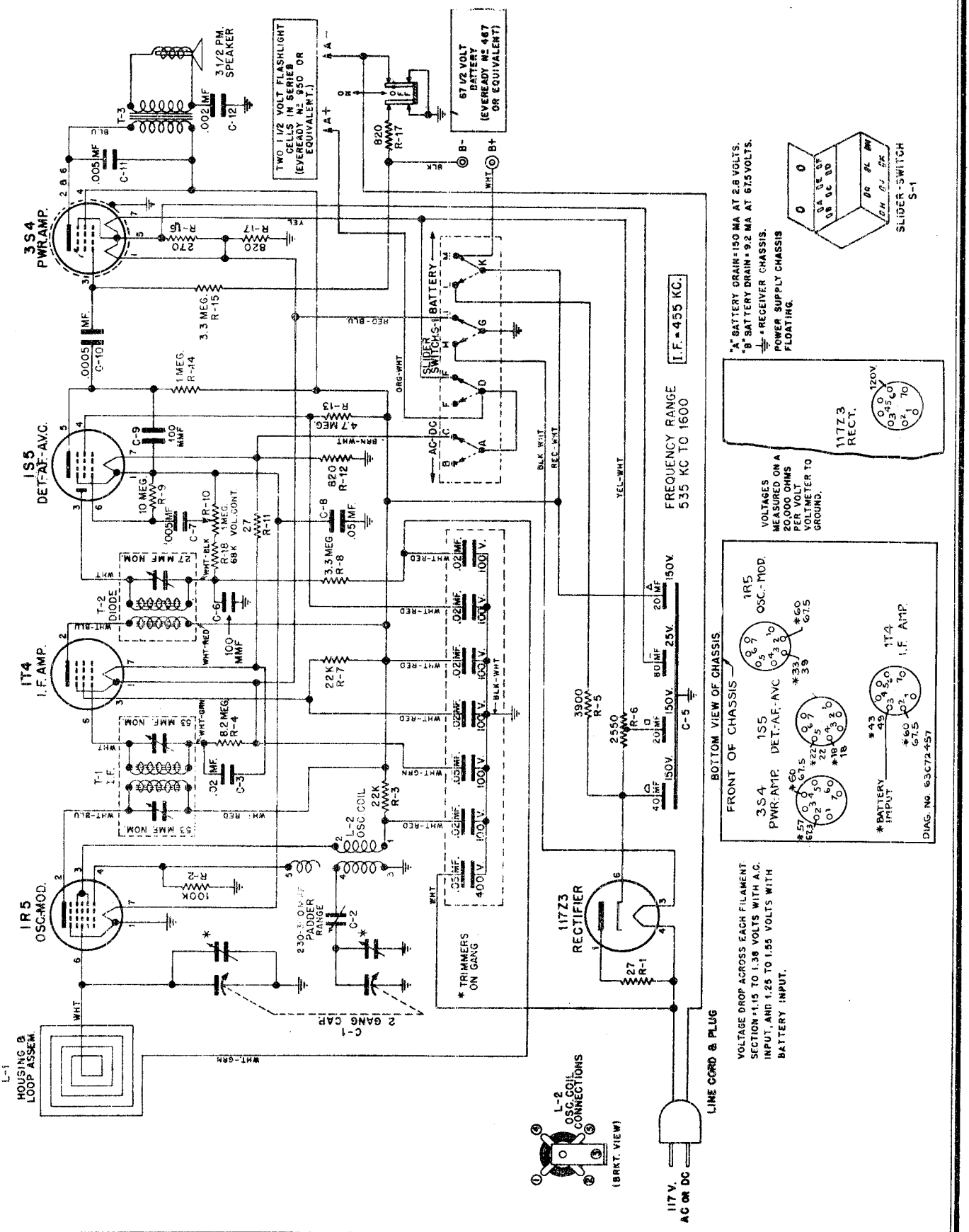
3S4 PWR. AMP.
1S5 DET-AF-AVC.
1T4 I.F. AMP.
1R5 OSC.-MOD.
117Z3 RECTIFIER
3 1/2 PM. SPEAKER
T-3
T-2 DIODE
T-1 I.F.
L-1 HOUSING & LOOP ASSEM.
L-2 OSC. COIL
C-1 2 GANG CAP
TWO 1 1/2 VOLT FLASHLIGHT CELLS IN SERIES (EVEREADY No 950 OR EQUIVALENT.)
67 1/2 VOLT BATTERY (EVEREADY No 467 OR EQUIVALENT)
SLIDER SWITCH S-1
BATTERY
AC-DC
FREQUENCY RANGE 535 KC TO 1600
I.F. = 455 KC.
"A" BATTERY DRAIN = 150 MA AT 2.8 VOLTS.
"B" BATTERY DRAIN = 9.2 MA AT 67.5 VOLTS.
⏚ = RECEIVER CHASSIS.
POWER SUPPLY CHASSIS FLOATING.
VOLTAGES MEASURED ON A 20,000 OHMS PER VOLT VOLTMETER TO GROUND.
BOTTOM VIEW OF CHASSIS
FRONT OF CHASSIS
VOLTAGE DROP ACROSS EACH FILAMENT SECTION 1.15 TO 1.38 VOLTS WITH A.C. INPUT, AND 1.25 TO 1.55 VOLTS WITH BATTERY INPUT.
* TRIMMERS ON GANG
L-2 OSC. COIL CONNECTIONS
(BRKT. VIEW)
117 V. AC OR DC
LINE CORD & PLUG
DIAG. NO. 63C724457

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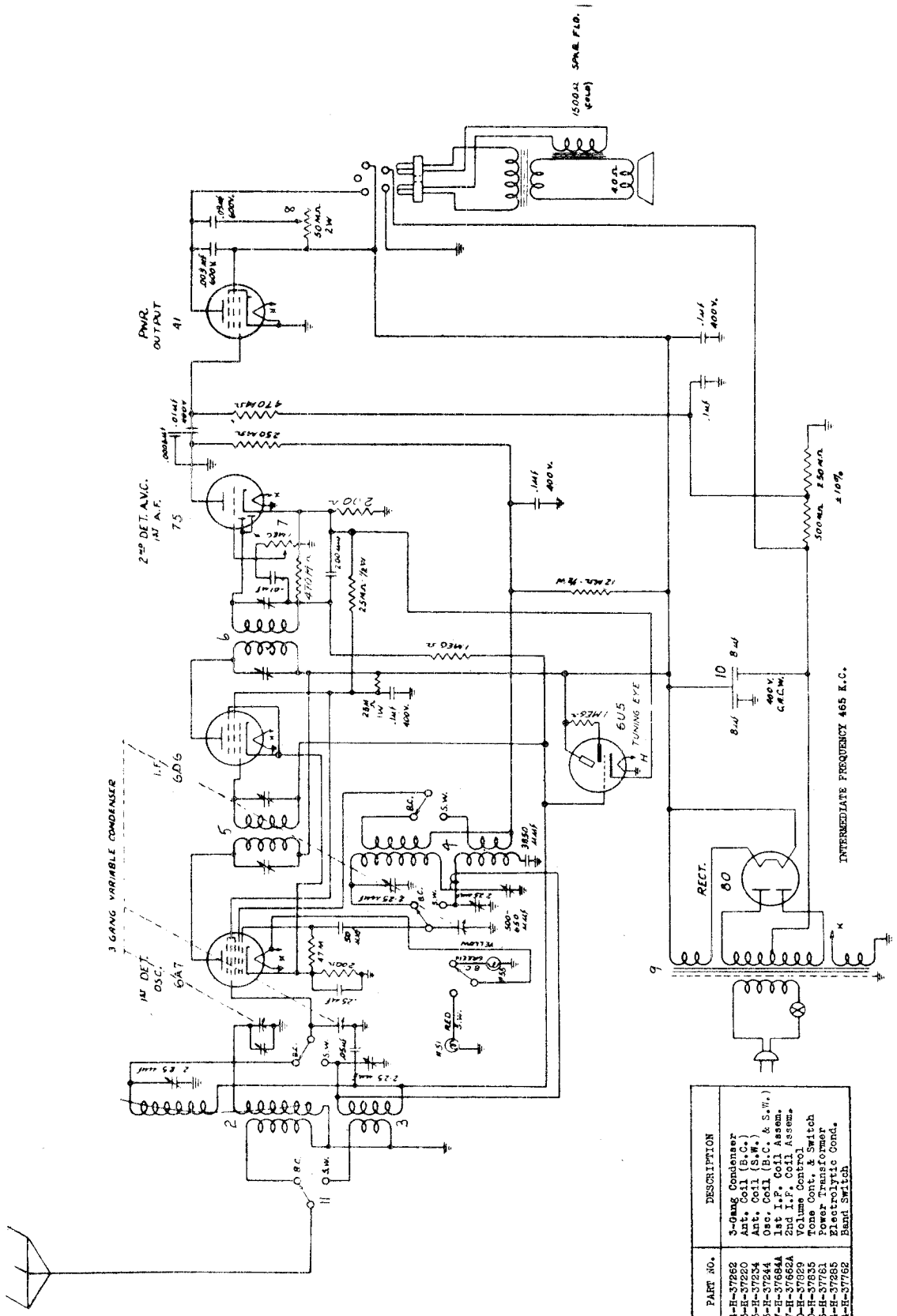
GALVIN MFG. CORP.

MODEL 6A1, Ch. 6-5



DEMO NO.	PART NO.	DESCRIPTION
1	14-H-37262	3-Gang Condenser
2	13-H-37220	Ant. Coil (B.C.)
3	13-H-37234	Ant. Coil (S.W.)
4	13-H-37244	Osc. Coil (B.C. & S.W.)
5	47-H-376844	1st I.F. Coil Assem.
6	47-H-376862A	2nd I.F. Coil Assem.
7	60-H-37829	Volume Control
8	60-H-37835	Tone Cont. & Switch
9	56-H-37781	Power Transformer
10	14-H-37285	Electrolytic Cond.
11	54-H-37762	Band Switch

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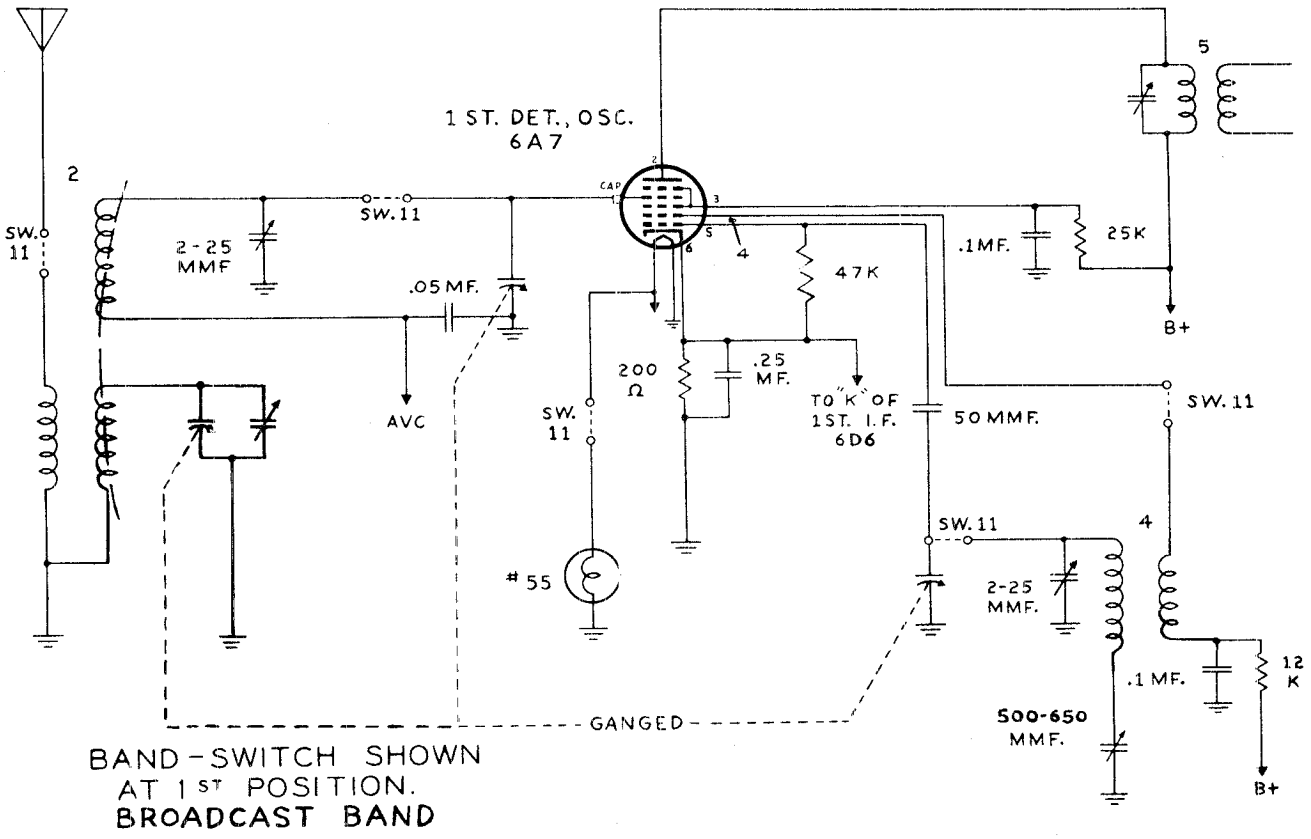
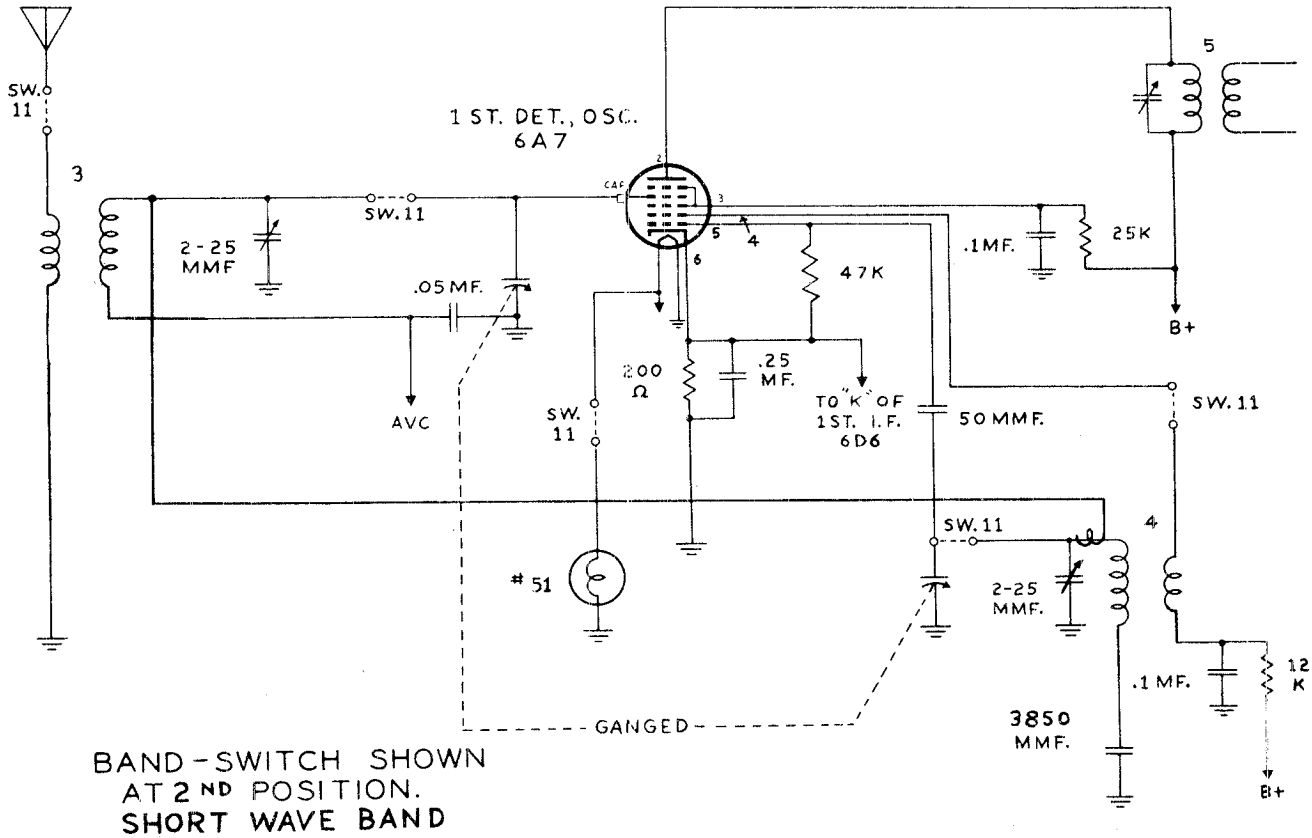
"clarified schematics"

MODEL 6A1, Ch. 6-5

GALVIN MFG. CORP.



BAND-SWITCH SHOWN AT 1ST POSITION.
BROADCAST BAND



BAND-SWITCH SHOWN AT 2ND POSITION.
SHORT WAVE BAND

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GALVIN MFG. CORP.

MODEL 6A1,Ch.6-5
MODELS 52T,52Y,Ch.B5-1
MODELS 56T,56Y,Ch.B5-2

MODEL 6A1 (CHASSIS 6-5)

ALIGNMENT PROCEDURE

CHASSIS 5-1,5-2,5-3,6-1 and 6-5

Connect signal generator to control grid of first detector tube (6A7) through a .05 MF condenser, and to chassis. Do not remove grid cap. Also connect output meter across speaker voice coil. Turn band switch to "American Programs" position. Turn condenser gang completely out of mesh.

Set signal generator at 465 K.C. and carefully adjust the four I.F. trimmers (located in top of I.F. coil cans) to point showing highest reading on output meter.

Leave band switch in "American Programs" position. Connect signal generator to antenna and ground leads using a .0002 MF condenser in antenna lead.

Set signal generator and receiver dial both at 1700 K.C. Adjust B.C. OSC. trimmer until 1700 K.C. signal is heard.

Set signal generator at 1400 K.C. and turn condenser gang to the signal at 1400 K.C. Adjust antenna section and second section of preselector to point showing highest reading on output meter.

Set signal generator at 600 K.C. and rock pointer at 600 K.C. position on dial scale, while adjusting B.C. padder, until combination is found which gives highest output reading. (Note: If there is noise level at 600 K.C., padder can be adjusted to maximum noise without rocking gang and without use of signal generator. Use short wire for pick-up if necessary.)

Turn band switch to "Foreign Programs" position. Replace .0002 MF condenser in signal generator antenna lead with a 400 ohm carbon resistor.

Set signal generator and receiver dial both at 18.0 MC. Adjust SW OSC. trimmer until 18.0 MC signal is heard.

Set signal generator at 16.0 MC and turn condenser gang to the signal at 16.0 M.C. Adjust SW ANT. trimmer to point giving greatest output reading, while slightly rocking condenser gang.

SW padder is fixed (no adjustment necessary.)

NOTE: I.F. Sensitivity at 465 K.C. is 50 microvolts for 50 milliwatts output
Ant. Sensitivity at 600 K.C. is 30 microvolts for 50 milliwatts output (Chassis 5-1)
Ant. Sensitivity at 600 K.C. is 25 microvolts for 50 milliwatts output (Chassis 5-2 and 6-1)

MODELS 52T, 52Y (CHASSIS B5-1)

ALIGNMENT PROCEDURE (CHASSIS B5-1)

1. Connect signal generator to control grid of first detector tube (1C7G) through a .05 MF condenser, and to chassis. Do not remove grid cap. Also connect output meter across speaker voice coil. Turn condenser gang completely out of mesh.
2. Set signal generator to 465 KC and carefully adjust the four I.F. trimmers (located in top of I.F. coil cans) to point showing highest reading on output meter.
3. Connect signal generator to antenna and ground leads using a .0002 MF condenser in antenna lead.
4. Set signal generator and receiver dial both at 1700 KC. Adjust osc. trimmer (on condenser gang) until 1700 KC signal is heard.
5. Set signal generator at 1400 KC and turn condenser gang to the signal at 1400 KC. Adjust antenna trimmer (under side of chassis) to point showing highest reading on output meter.

MODELS 56T, 56Y (CHASSIS B5-2)

NOTES ON SHORT WAVE ALIGNMENT

When aligning short-wave bands of Chassis B5-2, check to make sure you are aligning on a fundamental frequency and not on an image. This can be checked as follows: After aligning, turn signal generator to maximum output and swing it to a point 930 KC (double the IF) above the alignment frequency, leaving the condenser gang set at the alignment frequency. If the alignment was correct, you will pick up an image signal at that point. If no image signal is heard, swing generator back to alignment frequency, decrease the capacity of the trimmers until another signal is heard, and repeat the alignment procedure. For example, after aligning a short-wave band at 5.8 MC, an image should be heard when the generator is swung to 6.73 MC. Likewise, after alignment at 18.7 MC, an image should be heard with the signal generator at 19.63 MC. Remember that while making this test, the condenser gang should not be moved with the signal generator, but should remain at the alignment frequency.

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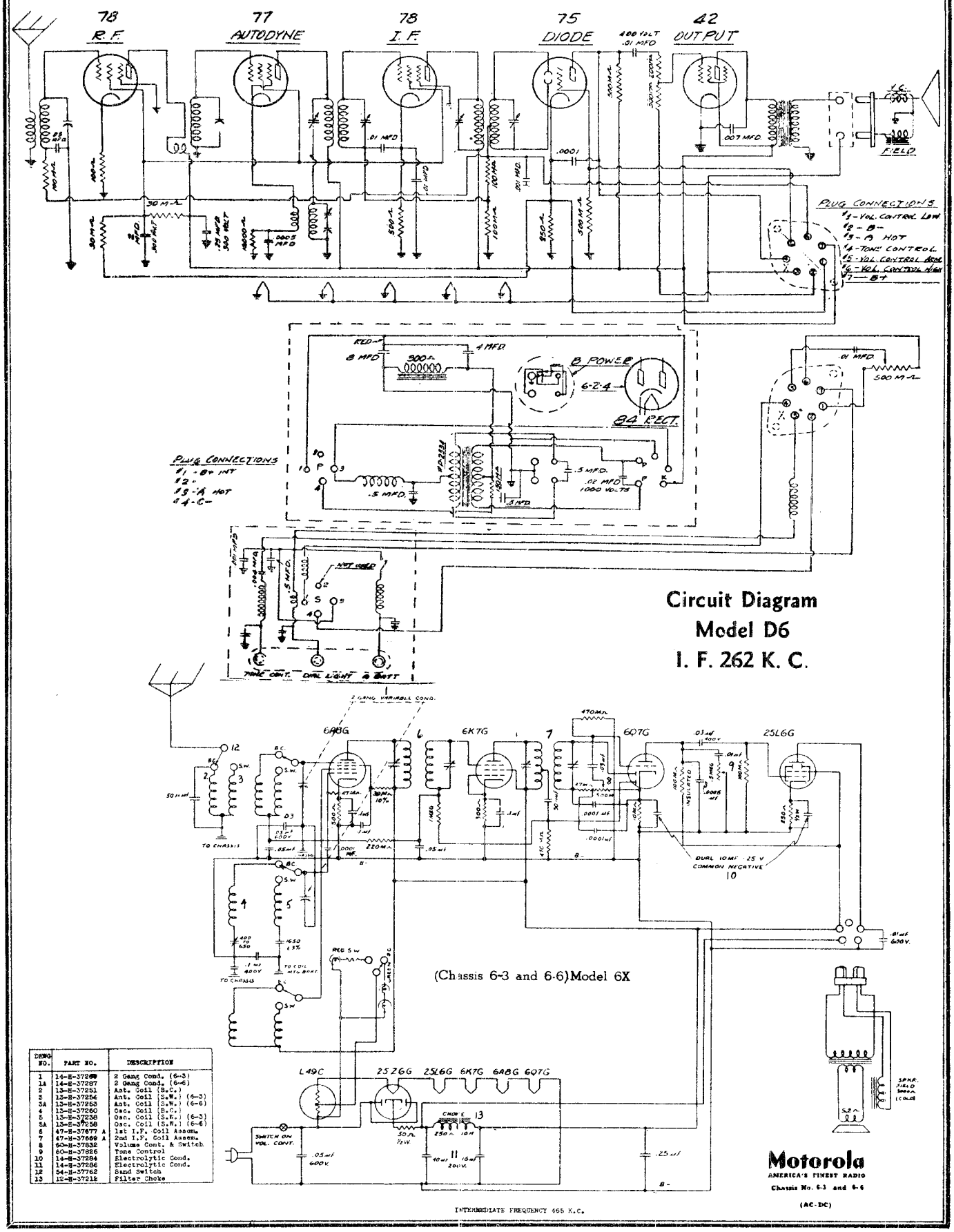
MODEL D6
MODEL 6X, Ch. 6-3, 6-6

GALVIN MFG. CORP.



Circuit Diagram
Model D6
I. F. 262 K. C.

(Chassis 6-3 and 6-6) Model 6X

DESIG NO.	PART NO.	DESCRIPTION
1	14-H-37289	2 Gang Cond. (6-3)
1A	14-H-37287	2 Gang Cond. (6-6)
2	13-H-37251	Ant. Coil (B.C.)
3	13-H-37254	Ant. Coil (S.W.) (6-3)
3A	13-H-37253	Ant. Coil (S.W.) (6-6)
4	13-H-37260	Osc. Coil (B.C.)
5	13-H-37256	Osc. Coil (S.W.) (6-3)
5A	13-H-37258	Osc. Coil (S.W.) (6-6)
6	47-H-37677 A	1st I.F. Coil Assem.
7	47-H-37689 A	2nd I.F. Coil Assem.
8	50-H-37832	Volume Cont. & Switch
9	50-H-37826	Tone Control
10	14-H-37284	Electrolytic Cond.
11	14-H-37286	Electrolytic Cond.
12	54-H-37762	Band Switch
13	12-H-37218	Filter Choke

INTERMEDIATE FREQUENCY 465 K.C.

Motorola
AMERICA'S FINEST RADIO
Chassis No. 6-3 and 6-6
(AC-DC)

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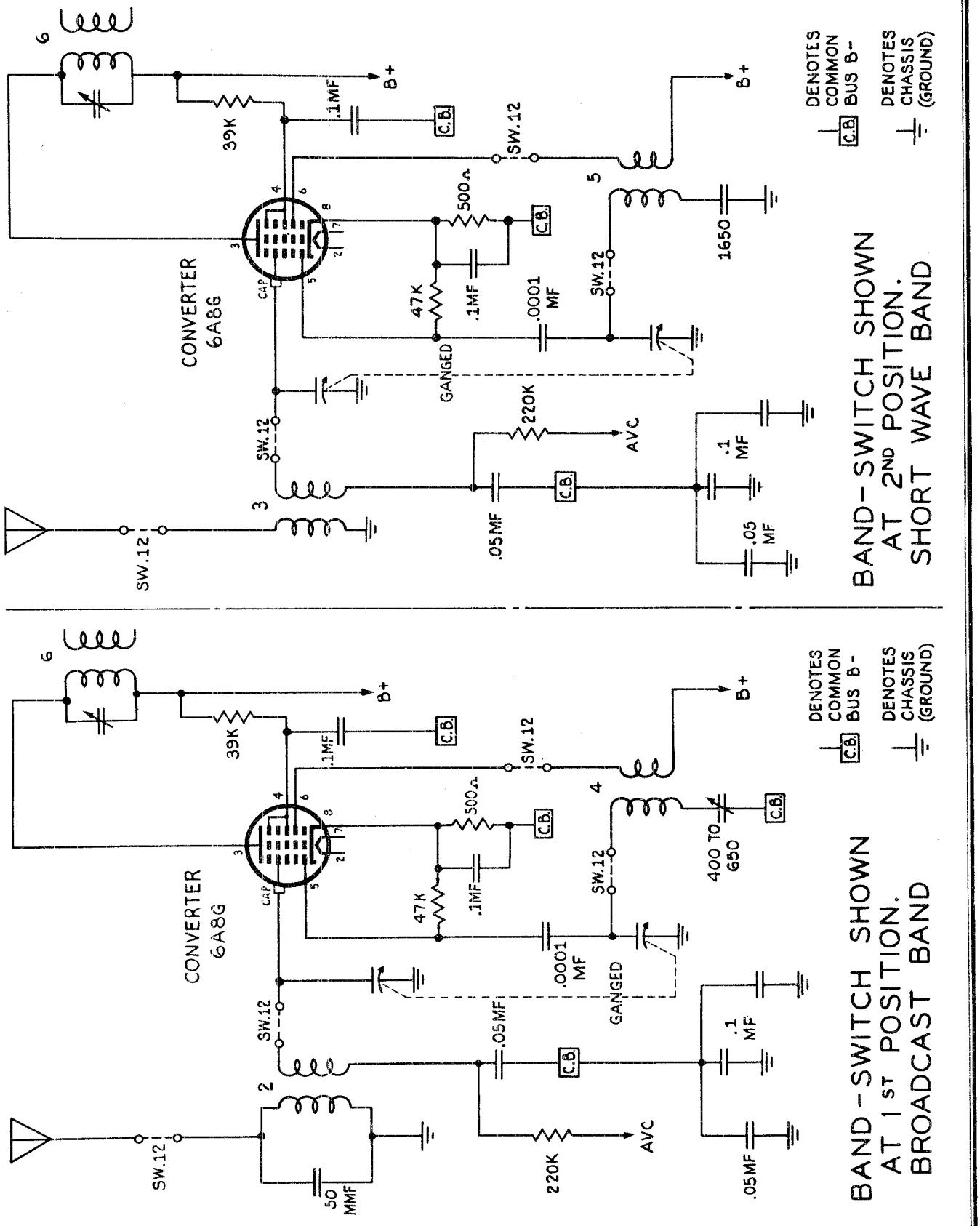
For Alignment, see P. 15-13

MODEL 6X

GALVIN MFG. CORP.



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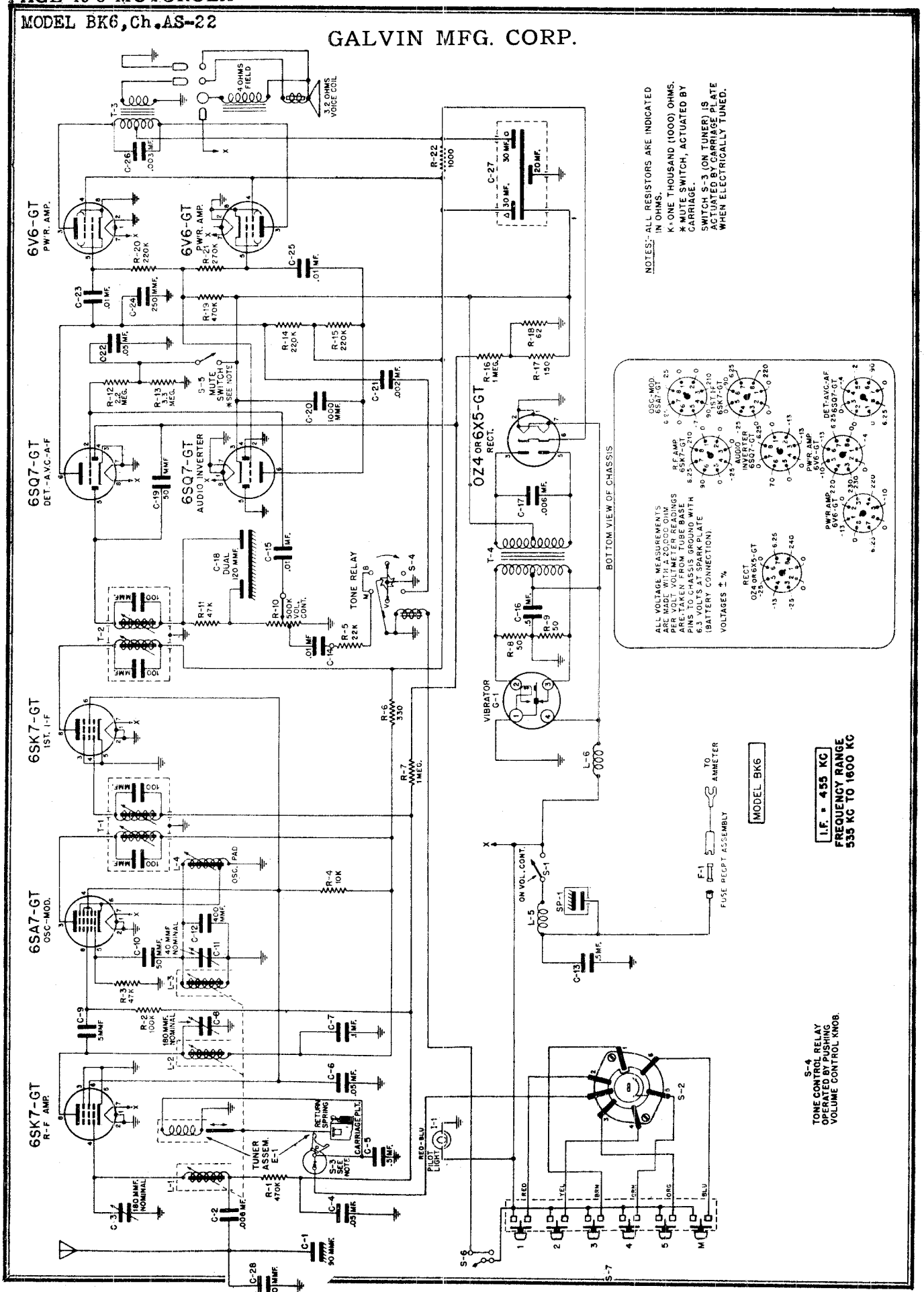
MODEL BK6, Ch. AS-22

GALVIN MFG. CORP.



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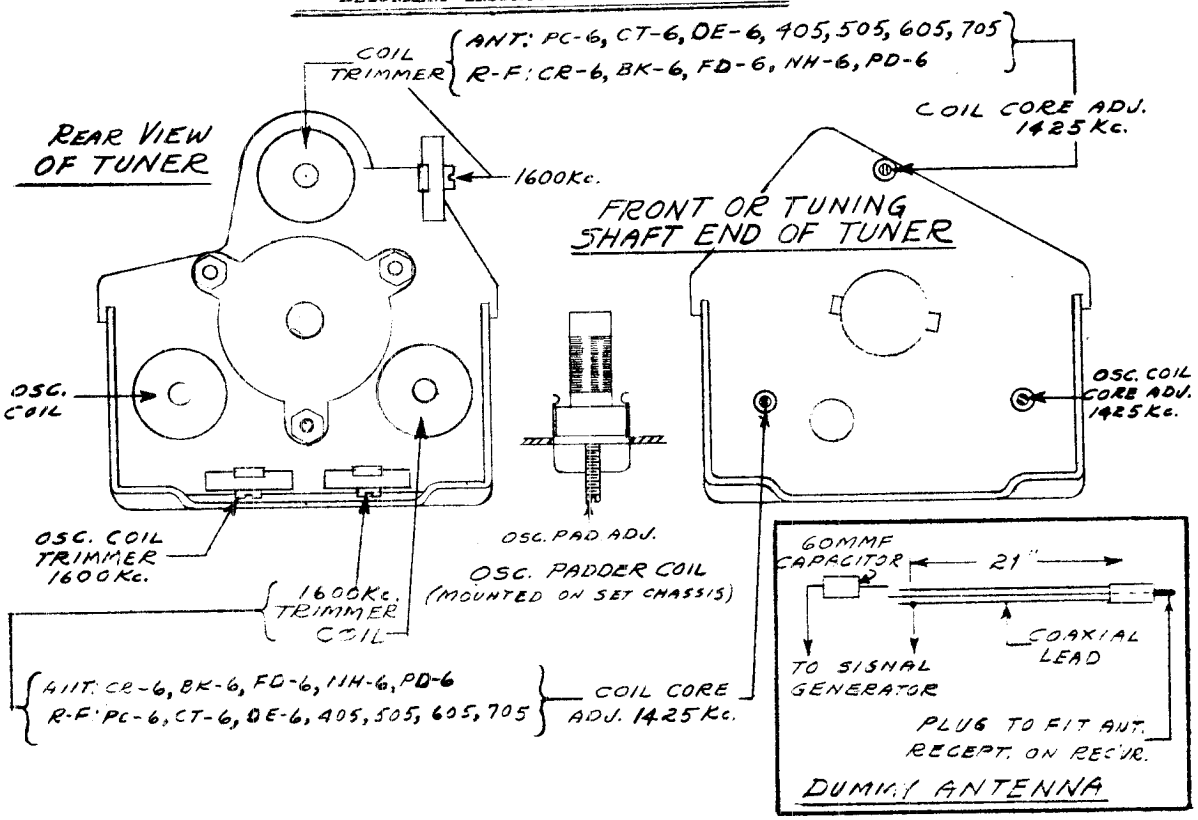
GALVIN MFG. CORP.

MODEL BK-6
MODEL CR-6
MODELS CT-6, OE-6, PC-6
MODELS FD-6, NH-6
MODEL 405
MODEL 505
MODEL 605
MODEL 705

Motorola

ALIGNMENT INSTRUCTIONS FOR 1946 AUTO SETS


COIL TRIMMER
ANT: PC-6, CT-6, OE-6, 405, 505, 605, 705
R-F: CR-6, BK-6, FD-6, NH-6, PD-6
COIL CORE ADJ. 1425 Kc.
REAR VIEW OF TUNER
1600Kc.
FRONT OR TUNING SHAFT END OF TUNER
OSC. COIL
OSC. COIL CORE ADJ. 1425 Kc.
OSC. COIL TRIMMER 1600 Kc.
OSC. PAD ADJ.
OSC. PADDER COIL (MOUNTED ON SET CHASSIS)
1600 Kc. TRIMMER COIL
ANT: CR-6, BK-6, FD-6, NH-6, PD-6
R-F: PC-6, CT-6, OE-6, 405, 505, 605, 705
COIL CORE ADJ. 1425 Kc.
60MMF CAPACITOR
21"
COAXIAL LEAD
TO SIGNAL GENERATOR
PLUG TO FIT ANT. RECEPT. ON REC'VR.
DUMMY ANTENNA

A special tool for adjusting the tuner cores will be required. Use Alignment Tool, Motorola Part Number 66A76278. Keep volume control at maximum throughout alignment. For maximum accuracy, use an output meter connected across the voice coil.

Operations in Order	Tuner Set At	Dummy Antenna	Generator connected to (through dummy)	Adjust following cores or trimmers	Generator Set At
1.	High frequency end.	.1 mf	Osc-Mod grid	Peak: 4 I.F.core screws	455 Kc.
2.	High frequency end(cores are to be projecting 1-1/8" from ends of cans and tuning shaft up against its stop).	60 mmf & 21" coaxial lead. Capacitor to be at generator end.(See Detail)	Antenna Receptacle	Peak: Osc. trimmer R.F. trimmer ANT. trimmer	1600 Kc.
3.	EXACTLY one full turn in from high frequency end, as indicated by marking manual tuning shaft insulated coupling).	"	"	Peak: Osc. core R.F. core ANT. core	1425 Kc.
4.	EXACTLY four more full turns in (as indicated by marking manual tuning shaft insulated coupling)	"	"	Peak: Osc-padder core(mounted on chassis)for maximum noise.	Generator power turned off, but leave generator and dummy antenna connected to antenna receptacle.
5.	1400 Kc.	Install set in car & connect car antenna.	———	Peak: Antenna trimmer for maximum noise.	———

NOTE: If padder core adjustment is too far off, repeat entire procedure (except I.F.). It may be necessary to repeat it more than once if the padder adjustment has been indescriminately tampered with.

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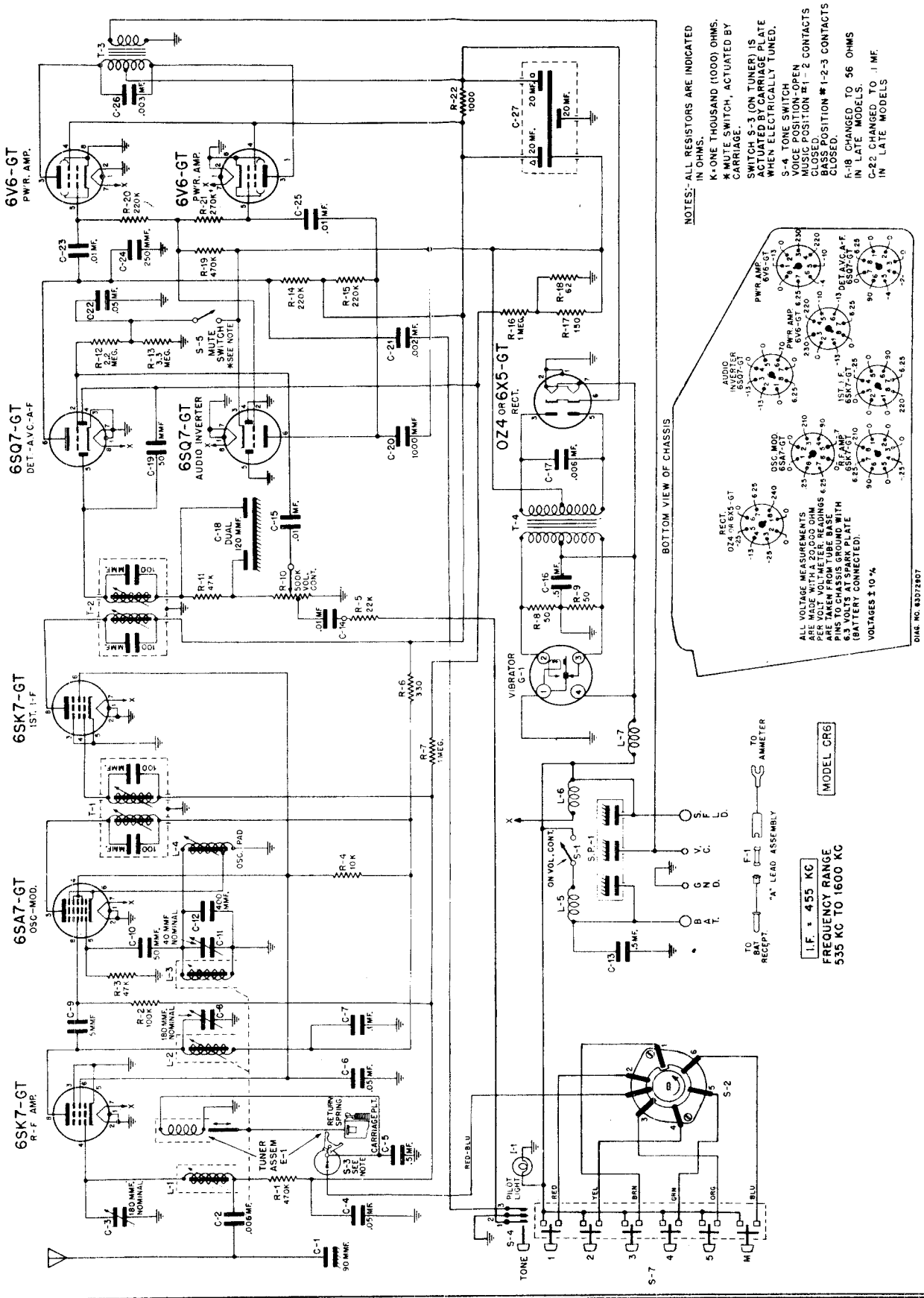
MODEL CR-6, Ch. AS-19

GALVIN MFG. CORP.


6V6-GT PWR. AMP.
6V6-GT PWR. AMP.
6SQ7-GT DET.-AVC-A-F
6SQ7-GT AUDIO INVERTER
6X5-GT RECT.
6SK7-GT 1ST. I-F
6SA7-GT OSC.-MOD.
6SK7-GT R-F AMP.
VIBRATOR G-1
TUNER ASSEM E-1
S-1 ON VOL. CONT.
S-2
S-3 SEE NOTE
S-4 TONE
S-5 MUTE SWITCH *SEE NOTE
S-7
I-1 PILOT LIGHT
F-1 "A" LEAD ASSEMBLY
TO AMMETER
TO BAT. RECEPT.
BOTTOM VIEW OF CHASSIS
NOTES:- ALL RESISTORS ARE INDICATED IN OHMS.
K= ONE THOUSAND (1000) OHMS.
* MUTE SWITCH, ACTUATED BY CARRIAGE.
SWITCH S-3 (ON TUNER) IS ACTUATED BY CARRIAGE PLATE WHEN ELECTRICALLY TUNED.
S-4 TONE SWITCH
VOICE POSITION-OPEN
MUSIC POSITION #1 - 2 CONTACTS CLOSED.
BASS POSITION #1-2-3 CONTACTS CLOSED.
R-18 CHANGED TO 56 OHMS IN LATE MODELS.
C-22 CHANGED TO .1 MF. IN LATE MODELS
ALL VOLTAGE MEASUREMENTS ARE MADE WITH A 20,000 OHM PER VOLT VOLTMETER. READINGS ARE TAKEN FROM TUBE BASE PINS TO CHASSIS GROUND WITH 6.3 VOLTS AT SPARK PLATE (BATTERY CONNECTED).
VOLTAGES ± 10 %
DIAG. NO. 83D72907
I.F. = 455 KC
FREQUENCY RANGE 535 KC TO 1600 KC
MODEL CR6

For Alignment, see P. 15-9

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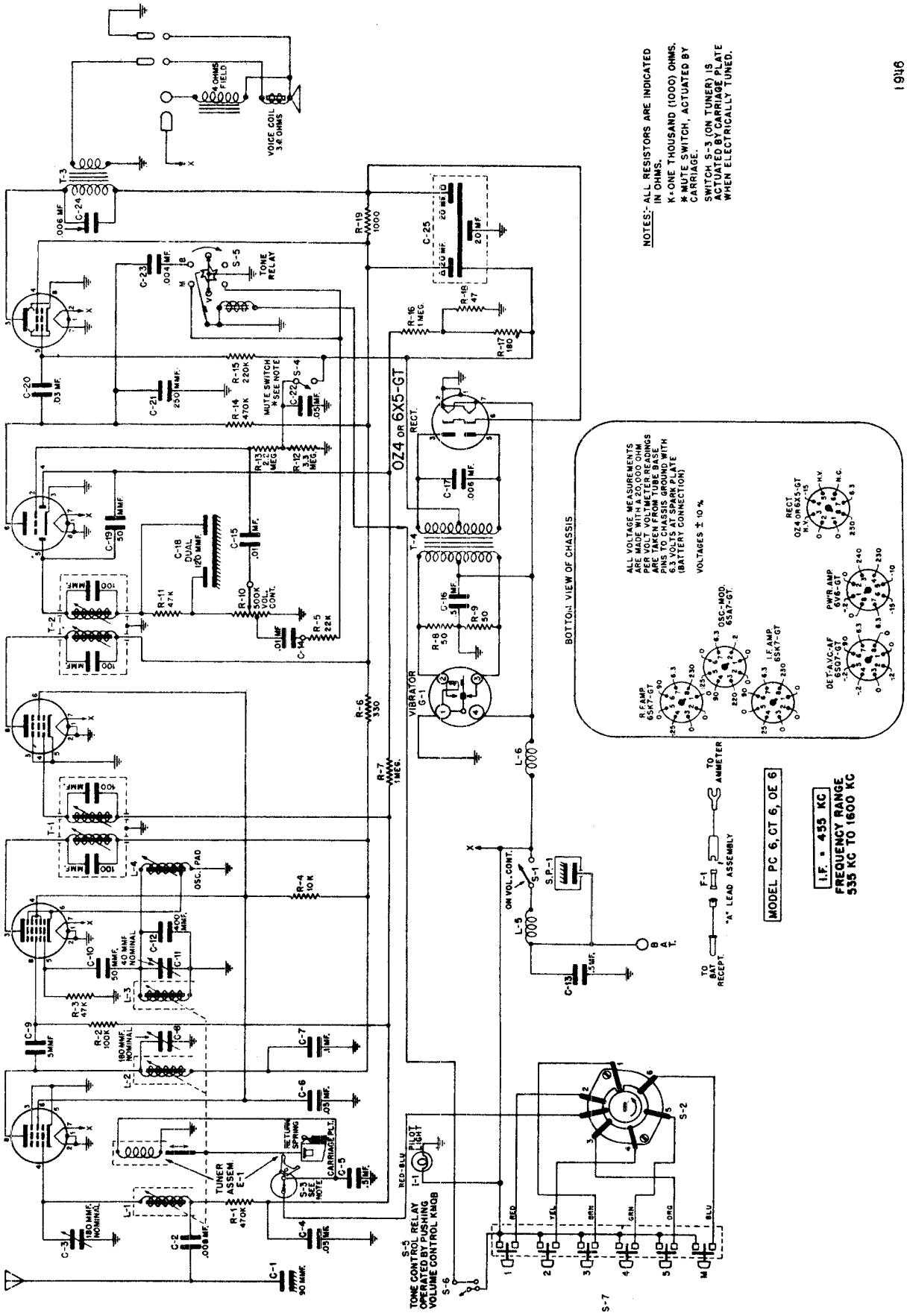
GALVIN MFG. CORP.

MODELS CT-6, OE-6, PC-6,
Ch. AS-24, 18, 23



For Alignment, see P.15-9

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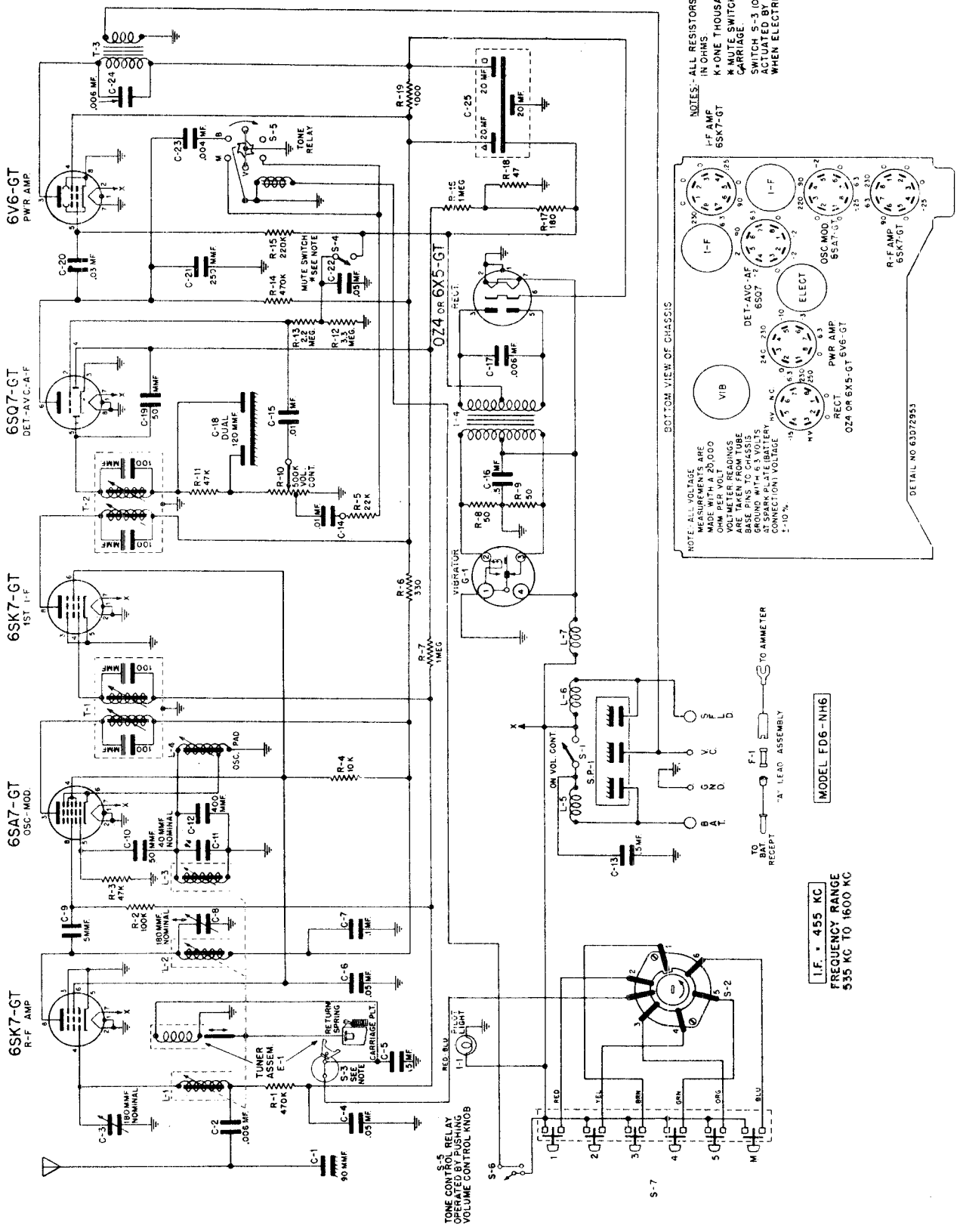
MODELS FD-6,NH-6,
Ch.AS-27,30

GALVIN MFG. CORP.



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For Alignment, see P.15-9

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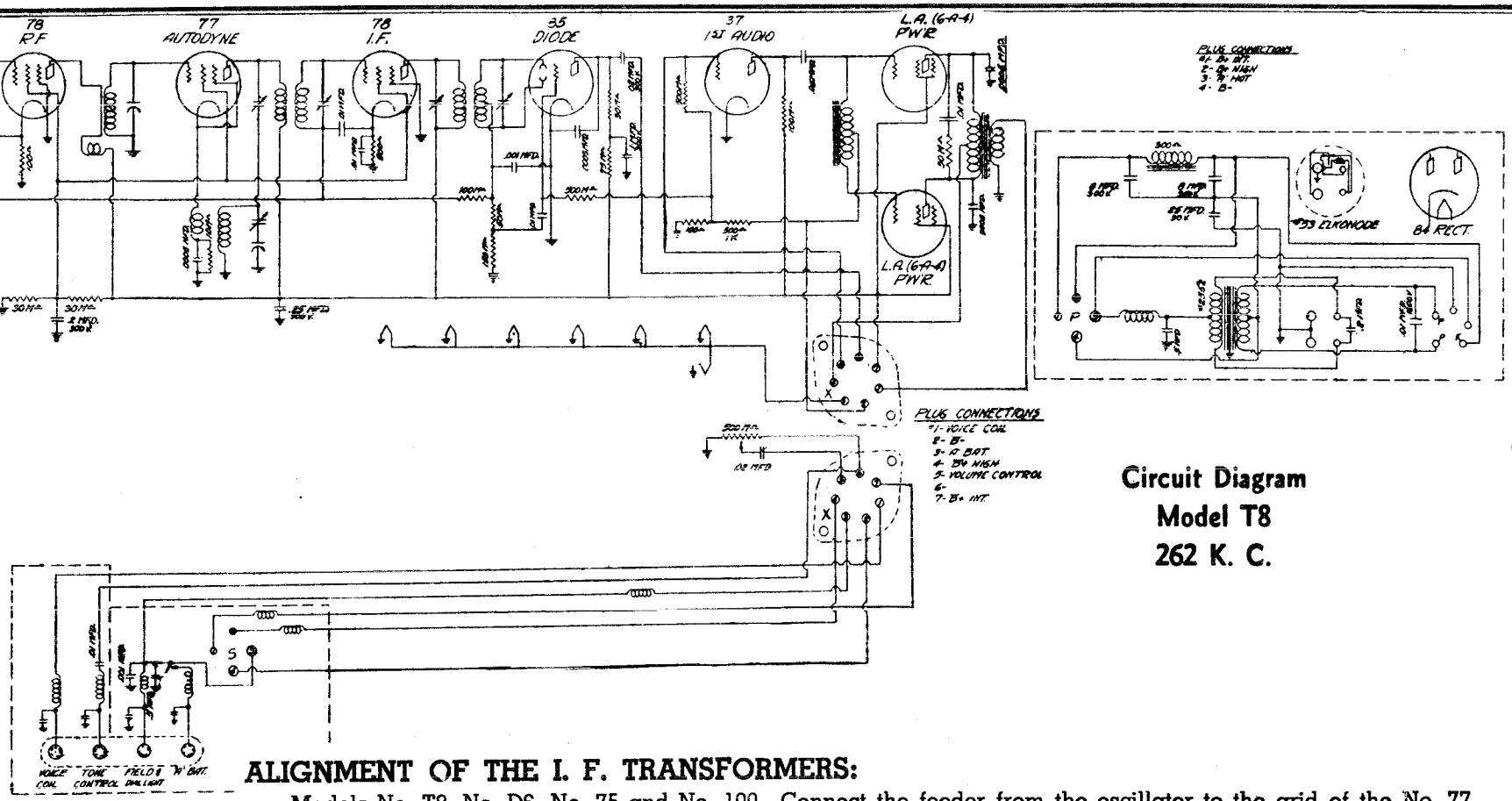


Circuit Diagram
Model T8
262 K. C.

ALIGNMENT OF THE I. F. TRANSFORMERS:

Models No. T8, No. D6, No. 75 and No. 100—Connect the feeder from the oscillator to the grid of the No. 77 autodyne tube. Remove the grid connection and connect a 500 M resistor from grid of the tube to ground.

Rotate the variable condensers to full open position.

Set the oscillator to a frequency of 262 K. C. adjust the I. F. and diode feeder trimmers to obtain maximum reading on the output meter.

ALIGNMENT OF VARIABLE CONDENSERS:

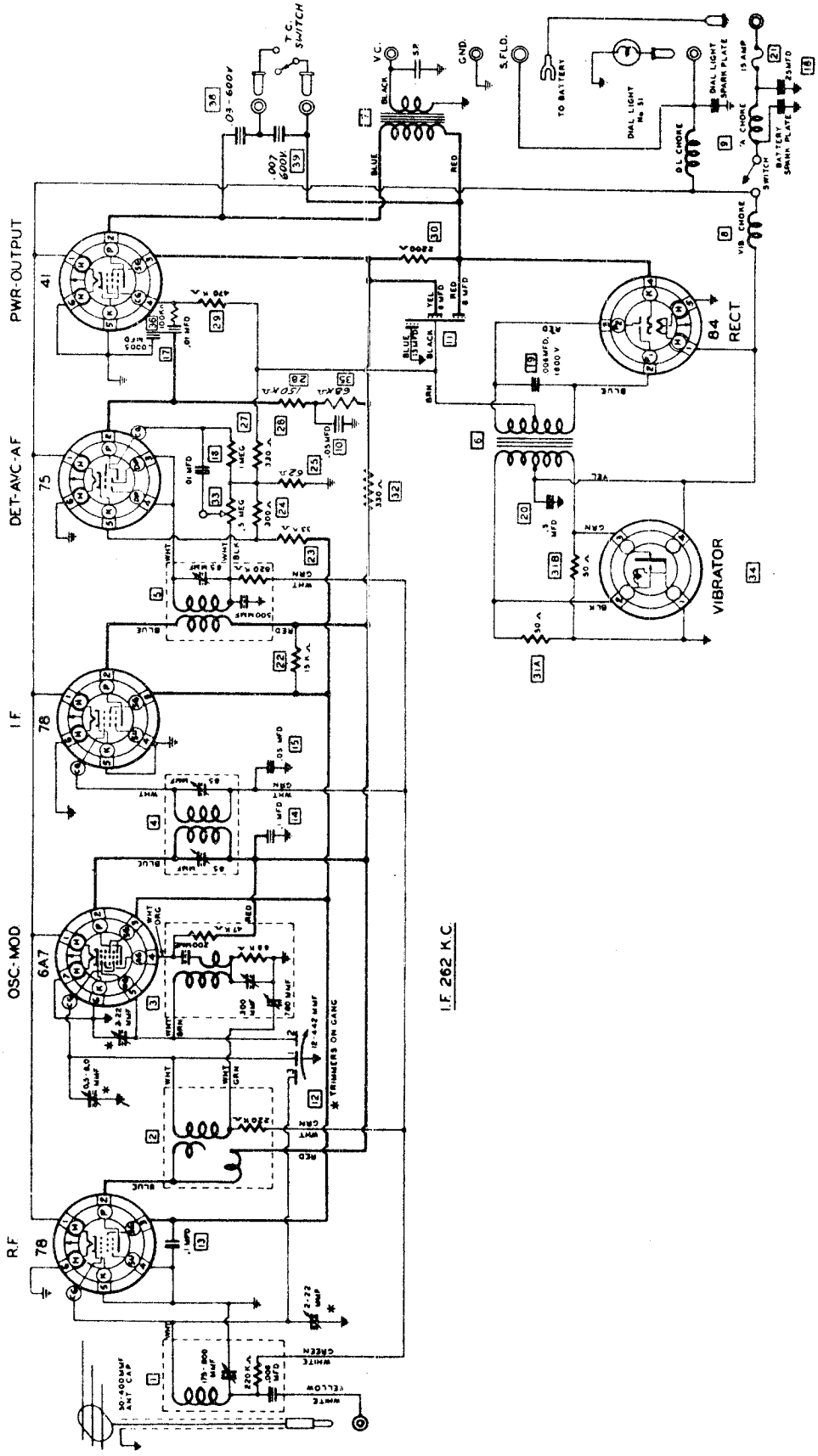
All Models—connect the feeder from a service oscillator to the antenna lead of the set and adjust the oscillator to 1540 K. C. Next, completely open the condenser, going to minimum capacity, and adjust the oscillator trimmer on the condenser gang for greatest reading on the output meter.

Now set the service oscillator to 1400 K. C. and rotate the variable condenser for a peak reading on the output meter of the signal from the oscillator. Then adjust the R. F. and antenna trimmers on the condenser gang for maximum reading of the output meter.

Next set the service oscillator to 600 K. C. Close the condenser gang until the signal is again tuned in and rotate the condensers back and forth while adjusting the oscillator padder condenser for highest reading on the output meter. The variable condensers should now track perfectly and coincide with the dial calibration.

MODEL 9-39

GALVIN MFG. CORP.



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GALVIN MFG. CORP.

MODEL 9-39
MODELS 65BP1A, 65BP2A, 65BP3A, 65BP4A

Model 9-39

VOLTAGE CHART

POSITION	PLATE	SCREEN	CATHODE	OSC. PLATE
RF *	185	85	-	-
Osc.-Mod.*	185	85	-	100
IF *	185	85	-	-
Det.-Avc.	150	-	-2	-
Output **	235	200	-	-
Rect.	AC	-	250	-

* Bias —3 V from B stick

** Bias —17 V from B stick

Current - 6.5 Amps. at 6.3 Volts

Maximum power output - 3.5 Watts

All readings from chassis ground with 1000 ohms per volt meter.

ALIGNMENT CHART MODELS 65BP1A, 2A, 3A and 4A

OPERATIONS IN ORDER	GANG CONDENSER SET AT	DUMMY ANTENNA	GENERATOR CONNECTED TO	ADJUST TRIMMERS NO.	GENERATOR SET AT
1	Minimum 1600 K.C.	.1 Mfd.	Osc.-Mod. Grid	1-2-3-4	455 K.C.
2	Minimum 1600 K.C.	200 Mmf.	External Ant.	5	1600 K.C.
3	1400 K.C.	200 Mmf.	External Ant.	6	1400 K.C.
4	1400 K.C.	200 Mmf.	External Ant.	7	1400 K.C.
5	600 K.C.	200 Mmf.	External Ant.	8	600 K.C.

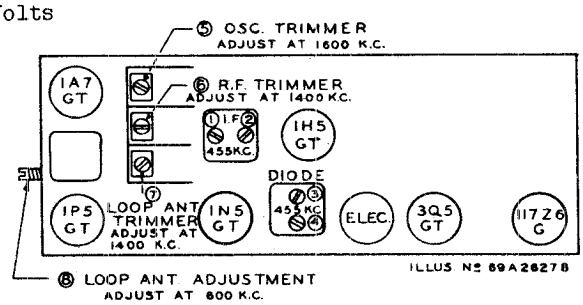
Volume Control Set at Maximum

SENSITIVITY AND STAGE GAIN MEASUREMENTS MODELS 65BP1A, 2A, 3A, and 4A

Average Microvolt Input *	Generator Set At	Generator Feeder Connected to	Dummy Antenna Capacity	Leak Resistance	Output Meter Reading **
7100	455	I.F. Grid	.1 Mfd.	.5 Meg	.38
185	455	Mod. Grid	.1 Mfd.	.5 Meg	.38
200	600	Mod. Grid	.1 Mfd.	.5 Meg	.38
11	600	R.F. Grid	.1 Mfd.	.5 Meg	.38
2	600	Ant. Terminal	200 Mmf.	None	.38

Volume Control Set at Maximum
* .05 Watts = .38 Volts

** Output meter connected across voice coil.



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MODEL 9-39

GALVIN MFG. CORP.

ALIGNMENT PROCEDURE

Place the radio on the service bench with the front cover removed, but with the speaker and battery connected to it.

Turn the volume control to maximum position and leave it there throughout the alignment, reducing the signal generator output if necessary.

NOTE: Do not adjust the trimmer in the oscillator coil can that is covered with Scotch Tape. The original adjustment, made in the factory, should not be tampered with. (Fig. 7 below, shows all trimmer locations.)

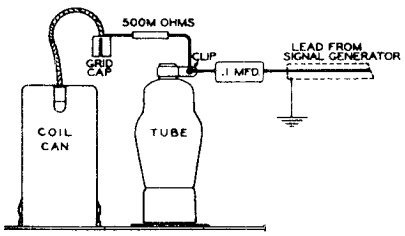
I.F. ALIGNMENT

1. Connect the signal generator to the control grid of the Osc.-Mod. tube (6A7) through a .1 MF condenser, having first removed the grid cap from the top of the tube. Connect a 500,000 ohm leak resistor from the grid of the tube to the grid cap just removed from the tube. (See Fig. 6.) Turn the condenser gang completely out of mesh. Connect an output meter across speaker voice coil.

2. Set the signal generator at 262 K.C. and carefully adjust the single trimmer in the Diode coil can to the point showing the highest reading on the output meter.

3. Adjust the two trimmers in the I.F. coil can to the point showing the highest output reading.

4. Repeat the I.F. and Diode adjustment several times for maximum accuracy.



SETTING THE RANGE

1. Connect the signal generator to the control grid of the R.F. tube (78) using the same .1 MF condenser and the same 500,000 ohm leak resistance.

2. Set the signal generator at 1560 K.C. and with the condenser gang completely out of mesh adjust the trimmer on the oscillator section of the condenser gang to the point showing the highest output reading.

3. Set the signal generator at 535 K.C. Turn the condenser gang completely in mesh and adjust the 600 K.C. trimmer in the Oscillator coil can for the highest output reading.

NOTE: The adjustments above set the range so the receiver will track with the calibrations in the control head.

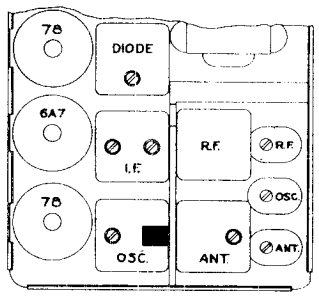
R.F. AND ANTENNA ALIGNMENT

1. Connect the signal generator to the antenna lead through a 40 MMF condenser and to chassis ground. Set the signal generator at 600 K.C. and turn the condenser gang until the signal is heard. Adjust the trimmer on the antenna coil can for the maximum output reading.

2. Set the signal generator at 1400 K.C. Turn the condenser gang until the signal is heard. Adjust the trimmer on the antenna section of the condenser gang for maximum output reading.

3. Adjust the trimmer on the R.F. section of the condenser gang for maximum output reading.

4. Recheck steps 1, 2, and 3, for accuracy.



TRIMMERS

SENSITIVITY AND STAGE GAIN MEASUREMENTS

These stage gain measurements will, if properly used, enable you to localize trouble quickly. They are intended for use with a signal generator that is accurately calibrated in microvolts.

Starting with the second detector - first audio stage, and working back step by step to I.F., Osc.-Mod., R.F. and finally to the antenna terminal, the circuit in which the trouble exists will quickly be determined by evidence of low gain, when signal generator attenuation readings are compared to the normal values as shown in the table.

All stage-gain measurements must be made with the volume control set for full volume. The shielded lead from the signal generator is connected to the top grid terminal of the tube through a .1 MF condenser, with a 500M Ohm resistor connected as a leak resistance between the grid of the tube and the grid cap which has been removed.

When measuring over-all sensitivity at the antenna terminal, use a 40 MMF condenser in place of the .1 MF. It must be remembered that the figures in the table are average and allowance must be made for variations between two sets of the same general type, due to difference of tube characteristics, etc.

Average Microvolt Input *	Generator Set at	Generator Feeder Connected to	Dummy Antenna Capacity	Leak Resistance	Output Meter Reading **
.25 Volts	400 Cycles	75 Grid	.1 MF	.5 Meg	2.2 Volts
25,000	262 K.C.	78 Grid (I.F.)	.1 MF	.5 Meg	2.2 Volts
700	262 K.C.	6A7 Grid	.1 MF	.5 Meg	2.2 Volts
800	600 K.C.	6A7 Grid	.1 MF	.5 Meg	2.2 Volts
45	600 K.C.	78 Grid (R.F.)	.1 MF	.5 Meg	2.2 Volts
3	600 K.C.	Ant. Lead	40 MMF	None	2.2 Volts

* For one watt output. V.C. Resistance - 5 ohms at 400 cycles.

** Meter connected across voice coil. 2.2 Volts equals 1 watt output.

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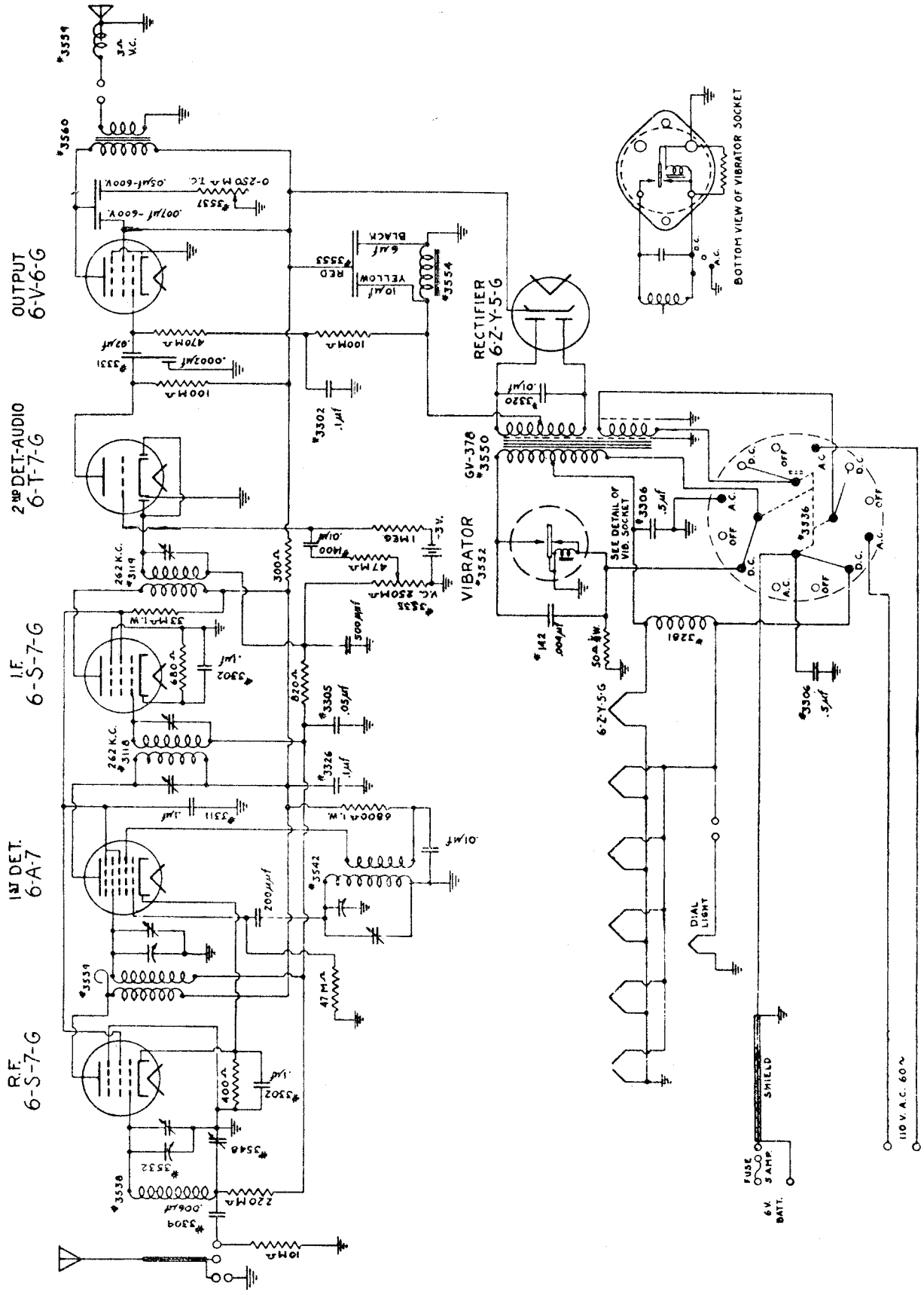
Diag. No.	Part No.	Description	List Price
		MAJOR PARTS	
34	48A3333	Vibrator	$2.50
33	18A4046	Vol. Cont. & Switch (.5 Meg.)	1.00
2	1X4051	R.F. Coil & Shield Assembly	1.50
	1X4070	Spark Plate Assembly	.60
9	1X4080	"A" Choke Assembly	.30
12	19B4110	Variable Condenser (3 Gang)	3.65
8	24A4290	Vibrator Choke	.35
	24X4835	Dial Light Choke (8T-3/8 I.D.)	.15
11	23A5186	Electrolytic Condenser	1.10
	9B6650	Tube Socket (Saddle Type 41)	.15
	9B6651	Tube Socket (Saddle Type 75)	.15
	9B6652	Tube Socket (Saddle Type 78)	.15
	9B6653	Tube Socket (Saddle Type 84)	.15
	9B6654	Tube Socket (Saddle Type 6A7)	.15
	9B6657	Vibrator Socket (Saddle Type)	.15
	15K12552	Rear Housing (Finished)	1.90
	1X12553	Front Housing & Speaker Assembly	7.25
	15C12554	Front Housing Only (Finished)	2.50
10	50B12560	Speaker (5" Dynamic)	3.00
		Speaker Replacement	1.75
7	25A12569	Output Transformer	1.00
6	25B12570	Power Transformer	3.00
5	1X12602	Diode Coil & Shield Assembly	1.50
4	1X12603	I.F. Coil & Shield Assembly	1.50
3	1X12604	Osc. Coil & Shield Assembly	1.75
1	1X12605	Antenna Coil & Shield Assembly	2.00
		ACCESSORIES	
	9A2370	Dial Light Socket & Shell	.10
	14X2423	Fuse Insulator .DOZ.	.20
	6X4141	Distributor Suppressor	.30
	65X4151	Bulb (6-8 V.-1½ W. Rnd. Bay. Base)	.15
	1X4164	Battery Lead Assembly	.30
21	65X4165	Fuse (15 Amp.)	.05
	1X4170	Antenna Lead Assembly	.75
	1X4171	Flexible Shaft & Housing Assem. PAIR.	2.00
	1X4181	Dial Light Assembly	.35
	8A4491	Generator Condenser	.40
	1X12561	Receiver Accessories Assembly (Complete)	3.90
	1X12562	Mtg. & Filter Parts Assembly (Complete)	1.00
	9A13070	Antenna Junction Box (Female)	.10
		CONDENSERS	
16	8A1400	Tubular Condenser (.01-100 V.)	.15
15	8A3305	Tubular Condenser (.05-100 V.)	.15
13	8A3310	Tubular Condenser (.1-200 V.)	.15
17	8A3329	Tubular Condenser (.01-.0005-400 V.)	.20
20	8A4020	Tub. Cond. & Strap (.5-100 V.)	.35
18	8A4089	Tubular Condenser (.25-100 V.)	.20
14	8A4092	Tub. Cond. & Strap (.1-400 V.)	.25
	8A4529	Tubular Condenser (.006-100 V.)	.15
	2136500	Molded Mica Cond. (500 MMF.-20%)	.15
	2136501	Molded Mica Cond. (200 MMF-20%)	.15
19	8A12565	Tub. Cond. & Strap (.006-1600 V.)	.35
		RESISTORS	
	6B6000	Carbon Resistor (820,000-1/3-20) .DOZ.	.60
	6B6001	Carbon Resistor (68,000-1/2-20) .DOZ.	.60
	6B6002	Carbon Resistor (47,000-1/2-20) .DOZ.	.60
	6B6003	Carbon Resistor (220,000-1/3-20) .DOZ.	.60
31	6B6005	Carbon Resistor (50-1/2-20) .DOZ.	.60
30	6B6006	Carbon Resistor (2,200-1-20)	.10
24	6B6008	Carbon Resistor (300-1/2-20) .DOZ.	$0.60
26	6B6009	Carbon Resistor (330-1/2-20) .DOZ.	.60
32	6B6010	Carbon Resistor (330-1/2-20) .DOZ.	.60
29	6B6011	Carbon Resistor (470,000-1/3-20) .DOZ.	.60
23	6B6012	Carbon Resistor (33,000-1/2-20) .DOZ.	.60
22	6B6013	Carbon Resistor (15,000-1-20)	.10
28	6B6015	Carbon Resistor (220,000-1/2-20) .DOZ.	.60
27	6B6071	Carbon Resistor (1 Meg-1/3-20) .DOZ.	.60
25	6B6081	Carbon Resistor (68-1/3-20) .DOZ.	.60
		HARDWARE, BRACKETS, SCREWS, ETC.	
	4A1957	"C" Washer .DOZ.	.15
	21X2194	Small Pin Terminal .DOZ.	.15
	29X2195	Large Pin Terminal .DOZ.	.15
	26B3003	Transformer Shield	.40
	7A3004	Volume Control Mtg. Bracket	.10
	42A3094	Tube Shield Ground Spring	.05
	3A3134	"J" Bolt .DOZ.	.75
	29A3192	Large Pin Terminal & Bushing (Blk) (For Dial Light) .DOZ.	.40
	9A3195	Large Pin Receptacle .DOZ.	.35
	42K3219	Snap-In Cond. Holder (9/16) .DOZ.	.40
	7A4025	Antenna Ferrule Mtg. Bracket .DOZ.	.35
	42X4041	Grid Clip (Large) Collar Grip .DOZ.	.15
	26A4068	Electrolytic Condenser Shield	.15
	26B4074	Tube Shield (Sectional Type)	.30
	42X4098	Grid Cap (Large-Special) .DOZ.	.15
	1A4101	Pinion Bracket & Bearing Assembly	.20
	42A4215	Vibrator Grounding Clip .DOZ.	.75
	9X4435	Fuse Receptacle	.10
	26X4816	Tube Shield (Half)	.05
	29B5350	Spade Lug .DOZ.	.30
	2S7001	Nut (5/16-18x19/32 USS Hex) CP..(Fits "J" bolt) .DOZ.	.25
	3S7100	Set Screw (8-32x3/16 Slab Hd.) .DOZ.	.50
	3S7456	Housing Screw (#8x1/4 AcHd PK A) Cop. Oxd. .PER C.	.65
	4S7653	Lockwasher (1-1/4 OD-5/16 ID) CP..(Fits "J" bolt) .DOZ.	.45
	38X10394	Plug Button (1/8) Cop. Oxd. .DOZ.	.25
	38X10544	Plug Button (1/4") Cop. Oxd .DOZ.	.25
		MISCELLANEOUS	
	14A2371	Ins. Bushing & Contact Eyelet .DOZ.	.15
	41A2372	Backing Coil Spring .DOZ.	.10
	54X3595	Antenna Trimmer Tag .DOZ.	.15
	32K4062	Fibre Spacer Washer .DOZ.	.10
	14X4076	Fuse Backing Washer (Bakelite) .DOZ.	.10
	14X4077	Fuse Ins. Bushing & Cont. Eyelet .DOZ.	.20
	31A4078	Terminal Strip (5 Ins. #4 Mtg.)	.10
	31A4079	Term. Strip (1 Ins. End Mtg.)	.05
	47A4113	Tuning Drive Shaft & Pinion Assembly	.25
	1X4118	Antenna Receptacle Assembly	.10
	37A4163	Rubber Grommet .DOZ.	.30
	37A4187	Condenser Mounting Grommet .DOZ.	.25
	56X4420	Accessories Carton Only	.15
	41A4508	Fuse Backing Coil Spring (Long) .DOZ.	.25
	1X4531	Gang Drive Split Gear Assembly	.30
	41A4532	Split Gear Coil Spring .DOZ.	.10
	39X4817	Shirt Market (Rattle Clip) .DOZ.	.25
	4K4823	Cond. Mtg. Cup Washer (Cop. Pl.) .DOZ.	.10
	10M9405	Copper Rope (259 Str. #36) PER FT.	.05
	11M9513	Saturated Sleeving (#13 Yel.) PER FT.	.05
	64K12557	Speaker Screen & Flocking	.60
	32B12558	Speaker Gasket (Cardboard)	.05
	54X12559	Instruction Sheet & Drilling Template	.05
	1X12563	Receiver Carton Assembly	.20
	13K12684	Medallion (Motoroloa)	.15
	30A13437	Spiral Shield	.05

PRICES SUBJECT TO CHANGE WITHOUT NOTICE.

MODEL 10T

GALVIN MFG. CORP.



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MODELS E15T,E16T,E19T,
E22T,E23T Tuners

GALVIN MFG. CORP.

TUNER	USED ON	VOLUME
E-15-T	103K1	12-53
E-16-T	103F1, 103F2	12-57, 12-58
E-19-T	103CK2	12-54
E-22-T	83K1	12-51
E-23-T	83F1, 93F1	12-49, 12-55

APPROXIMATE VOLTAGE AND RESISTANCE READINGS:

INPUT TO TUNER: 24V (PUSH BUTTON DEPRESSED)
VOLTAGE ACROSS MOTOR: 18V (PUSH BUTTON DEPRESSED)
VOLTAGE ACROSS MAGNET: 6V (PUSH BUTTON DEPRESSED)
D.C. RESISTANCE OF MAGNETS: .78 Ω (COLD)
D.C. RESISTANCE OF MOTOR FIELD COIL: .675 Ω (COLD)
D.C. RESISTANCE OF MUTE WINDING (ON E-22-T & E-23-T ONLY): 23 Ω (COLD)

POINTS OF LUBRICATION:

ALL MOVING PARTS AND BEARINGS (EXCEPT MOTOR BEARINGS AND FIBRE DRIVE GEAR) ARE TO BE LIGHTLY LUBRICATED WITH 11M8930 MILK WHITE GREASE (KEYSTONE #78-6).

USE A LIGHT MOTOR OIL ON MOTOR BEARINGS

CAUTION ..... DO NOT OVER LUBRICATE!

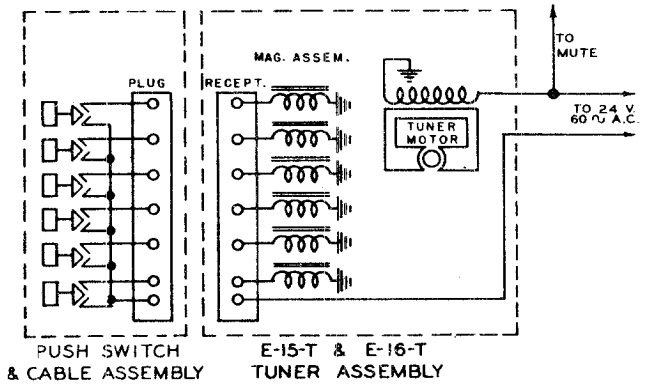

Figure 1

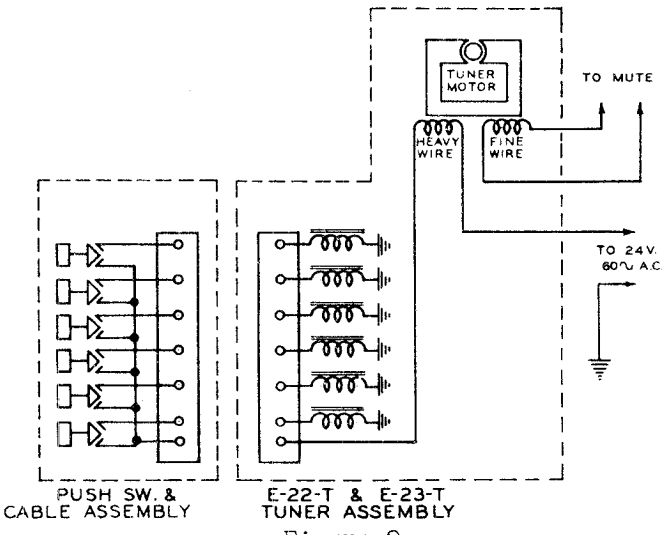

Figure 2

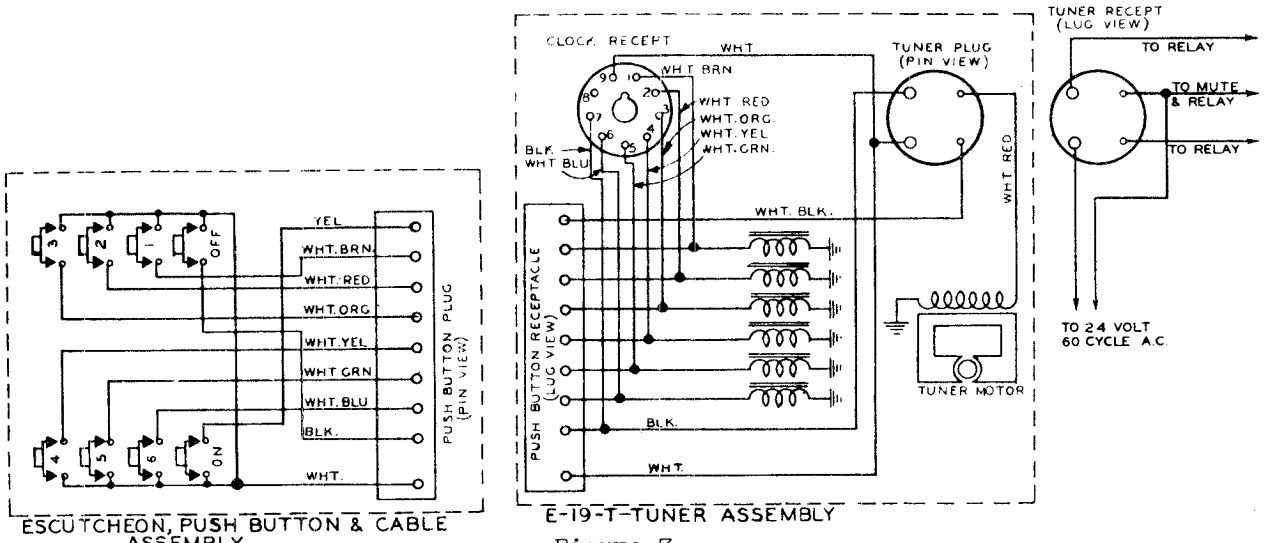

Figure 3

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MODELS E15T,E16T,E19T,
E22T,E23T Tuners

GALVIN MFG. CORP.

PARTS PRICE LIST

MODELS E-15-T,E-16-T,E-19-T,E-22-T,E-23-T

PART NO.	DESCRIPTION		LIST
2S7007	Nut 8-32x1/4 Hex CP (Rods)	.PER C.	$0.50
2S7009	Nut 10-32x3/8 Hex CP (Magnets)	.PER C.	.40
3S7100	Set Screw 8-32x3/16 Slab Hd. (Bush.)	.DOZ.	.50
3S7163	Screw 8-32x1/4 CP (Fibre Gear)	.PER C.	.35
3S7205	Lockscrew 8-32x1/4 CP (Brkt.)	.PER C.	.95
3S7247	Lockscrew 6-32x3/16 CP (Mtr.Mtg.)	.PER C.	1.00
3S7257	Screw 8-32x5/8 CP (Brkt.)	.PER C.	.65
3S7323	Lockscrew 6-32x3/16 PhBh CP (Gang)	.DOZ.	.30
3S7324	Screw 6-32x13/16 CP (Mtr.Mtg.)	.PER C.	.55
3S7326	Lockscrew 8-32x3/16 CP (Magnets)	.PER C.	.95
4S7562	Washer 7/16-.187-.031 CP (Magnets)	.DOZ.	.20
4S7614	Washer 11/16-..171-.037 CP (Brkt.)	.PER C.	.70
4S7651	Lockwasher #8 Int. CP (Rods)	.PER C.	.50
37A13682	Tuner Mtg. Grommet (Brkt.)	.DOZ.	.30
43A13743	Tuner Space Bushing (Brkt.)	.DOZ.	.40
9X14302	9 Prong Recept. & Shell (Cable) E19T		.30
1X20751	E19T Electric Tuner Cpt. - 103 CK		14.50
28K21195	Molded Plug Base (4 prong) E19T		.10
43A21407	Clutch Bushing 1/4 Brass	.DOZ.	.80
4A21408	Clutch Spring Washer 7/16 Bronze	.PER C.	.75
4A21409	Clutch Flat Washer 7/16 CP	.PER C.	.45
2A21416	Tie Rod Nut 8-32x1/4 Spec. CP	.DOZ.	.25
44A21417	Clutch Pinion 3/8 P.D.	.DOZ.	.50
14A21424	Clutch Fibre Washer 7/16	.PER C.	.65
19B21431	Variable Condenser (3 gang) E15,19,22T		2.95
59B21434	Tuner Motor (24V-AC) E15,16,19T		2.80
1X21440	E15T Electric Tuner Cpt. - 103K		13.00
1X21441	E16T Electric Tuner Cpt. - 103F		13.30
1X21550	E22T Electric Tuner Cpt. - 83K		13.50
1X21551	E23T Electric Tuner Cpt. - 83F,93F		14.25
1X21554	Magnet & Channel Assembly - E15,22T		1.35
1B21561	Tuner Magnet Assembly - Black		.15
1X21576	Fibre Gear, Spring & Bush. Assembly		.20
4X21577	"C" Washer 1/8" Notched (Rods)	.PER C.	.65
1X21579	Split Gear & Bushing Assembly		.30
2A21766	Motor Spacer Nut 15/32 Hex	.DOZ.	.50
1X21825	Channel Brkt. & Recept. Assembly E15,16,22,23T		.40
44A21873	Cond. Drive Pinion 7/8 P.D. Brass		.20
19B22050	Variable Condenser (3 gang) E16,23T		2.95
1X22290	Channel Brkt. & Recept. Assembly E19T		.45
1X22292	Magnets & Channel Assembly E16,23T		1.35
59K22419	Tuner Motor (Mute) E22,23T		3.50
41A22471	Cushion Spring (Fibre Gear)	.DOZ.	.50
41A22507	Coil Spring (Armature)	.DOZ.	.35
37A22664	Rubber Grommet (Magnets) E19T	.DOZ.	.25
7A22715	Bracket (Gang Support)		.15
1X23009	Magnets & Channel Assembly E19T		1.95

MODEL E-6-P POWER RELAY
(Used on Model 103-CK2)

2S7048	Nut 10-32x5/16 Hex CP - Magnet	.PER C.	.75
3S7163	Screw 8-32x1/4 SLHHMS CP	.PER C.	.35
3S7326	Lockscrew 8-32x3/16 PlHH CP - Brkt	.PER C.	.95
4S7557	Washer 3/8-.171-.031 CP	.PER C.	.30
41A13262	Armature Spring - Switch Guide	.DOZ.	.30
41A14244	Armature Spring - Latch	.DOZ.	.40
28X15021	Plug Base - Nine Contact		.15
4A22156	Magnet Adjusting Washer	.PER C.	.70
7A22160	Magnet Mounting Bracket		.10
1A22164	Tuner Magnet Switch Assembly - 5 leads		.75
1A22165	Rectifier Switch Assembly - 3 leads		.60
7A22167	Armature Retainer Bracket		.15
1X22319	Housing & Mtg. Bracket Assembly		.55
1K22321	Magnet Assembly		.40
1X22322	Armature & Latch Plate Assembly		.35
1X22323	Armature & Switch Guide Assembly		.40

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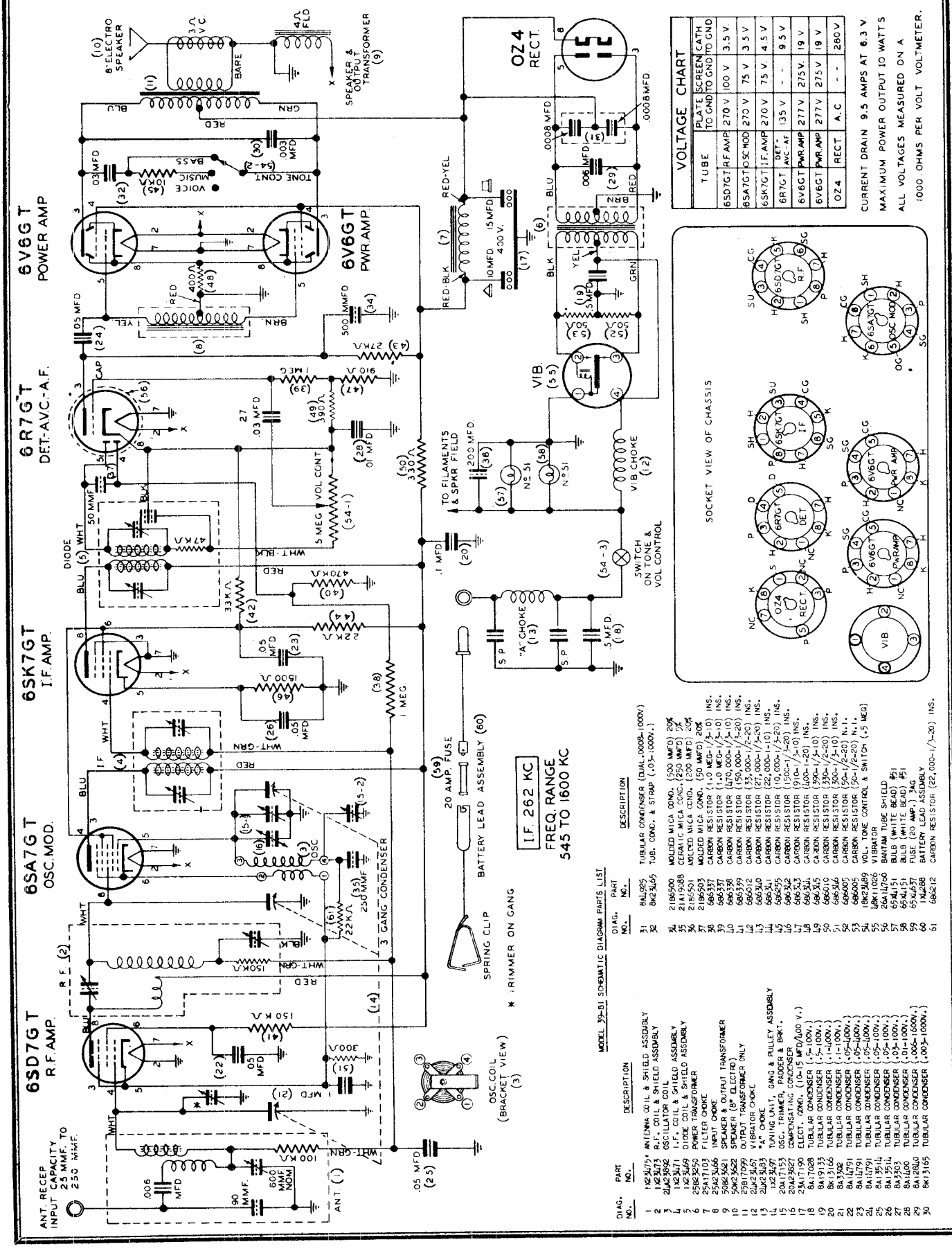
MODEL 39B-1

GALVIN MFG. CORP.



VOLTAGE CHART			
TUBE	PLATE TO GND	SCREEN TO GND	CATH TO GND
6SD7GT R.F. AMP	270 V	100 V	3.5 V
6SA7GT OSC. MOD	270 V	75 V	3.5 V
6SK7GT I.F. AMP	270 V	75 V	4.5 V
6R7GT DET-AVC-AF	135 V	- -	9.5 V
6V6GT PWR. AMP	277 V	275 V	19 V
6V6GT PWR. AMP	277 V	275 V	19 V
OZ4 RECT.	A.C	- -	280 V

CURRENT DRAIN 9.5 AMPS AT 6.3 V
MAXIMUM POWER OUTPUT 10 WATTS
ALL VOLTAGES MEASURED ON A 1000 OHMS PER VOLT VOLTMETER.

MODEL 39-B1 SCHEMATIC DIAGRAM PARTS LIST

DIAG. NO.	PART NO.	DESCRIPTION
1	1X2575, 1X2576	ANTENNA COIL & SHIELD ASSEMBLY
2	1X2573	R.F. COIL & SHIELD ASSEMBLY
3	2U4X3992	OSCILLATOR COIL
4	1X2571	I.F. COIL & SHIELD ASSEMBLY
5	1X2569	DIODE COIL & SHIELD ASSEMBLY
6	2582250	POWER TRANSFORMER
7	25A17103	FILTER CHOKE
8	25A23466	INPUT CHOKE
9	5082621	SPEAKER & OUTPUT TRANSFORMER
10	50K2622	SPEAKER (8" ELECTRO)
11	2581709?	OUTPUT TRANSFORMER ONLY
12	21AK2567	VIBRATOR CHOKE
13	21AK2583	"A" CHOKE
14	1X2597	TUNING UNIT, GANG & PULLEY ASSEMBLY
15	20A17153	OSC. TRIMMER, PADDER & BRKT.
16	20A23827	COMPENSATING CONDENSER
17	23A17190	ELECT., COND. (10-15 MFD/400 V.)
18	8A17028	TUBULAR CONDENSER (.5-100V.)
19	8A19133	TUBULAR CONDENSER (.5-100V.)
20	BK13166	TUBULAR CONDENSER (.1-400V.)
21	8A3302	TUBULAR CONDENSER (.1-100V.)
22	8A11791	TUBULAR CONDENSER (.05-400V.)
23	8A11791	TUBULAR CONDENSER (.05-400V.)
24	8A11791	TUBULAR CONDENSER (.05-400V.)
25	8A13514	TUBULAR CONDENSER (.05-100V.)
26	8A13514	TUBULAR CONDENSER (.05-100V.)
27	8A3303	TUBULAR CONDENSER (.03-100V.)
28	8A11000	TUBULAR CONDENSER (.01-100V.)
29	8A12840	TUBULAR CONDENSER (.006-1600V.)
30	BK13165	TUBULAR CONDENSER (.003-1000V.)
31	8AL925	TUBULAR CONDENSER (DUAL .0008-1000V)
32	BK23465	TUB. COND. & STRAP (.03-1000V.)
34	2186500	MOLDED MICA COND. (500 MMFD) 20%
35	21AK9088	CERAMIC MICA COND. (250 MMFD) 5%
36	2186501	MOLDED MICA COND. (200 MMFD) 20%
37	2186503	MOLDED MICA COND. (50 MMFD) 20%
38	686357	CARBON RESISTOR (1.0 MEG-1/2-10) INS.
39	686357	CARBON RESISTOR (1.0 MEG-1/2-10) INS.
40	686336	CARBON RESISTOR (470,000-1/2-10) INS.
41	686339	CARBON RESISTOR (150,000-1/2-20) INS.
42	686012	CARBON RESISTOR (33,000-1/2-20) INS.
43	686340	CARBON RESISTOR (27,000-1/2-20) INS.
44	686341	CARBON RESISTOR (22,000-1-10) INS.
45	686255	CARBON RESISTOR (10,000-1/2-20) INS.
46	686342	CARBON RESISTOR (1500-1/2-20) N.I.
47	686343	CARBON RESISTOR (910-1/2-10) INS.
48	686341	CARBON RESISTOR (400-1-20) INS.
49	686345	CARBON RESISTOR (390-1/2-10) INS.
50	686010	CARBON RESISTOR (330-1/2-20) INS.
51	686346	CARBON RESISTOR (300-1/2-10) INS.
52	686005	CARBON RESISTOR (150-1/2-20) N.I.
53	686005	CARBON RESISTOR (50-1/2-20) N.I.
54	18K23489	VOL. TONE CONTROL & SWITCH (.5 MEG)
55	18K11026	VIBRATOR
56	26A14706	BANTAM TUBE SHIELD
57	65A4151	BULB (WHITE BEAD) #51
58	65A4151	BULB (WHITE BEAD) #51
59	65A4637	FUSE (20 AMP.) 3AG
60	1X4288	BATTERY LEAD ASSEMBLY
61	686012	CARBON RESISTOR (22,000-1/2-20) INS.

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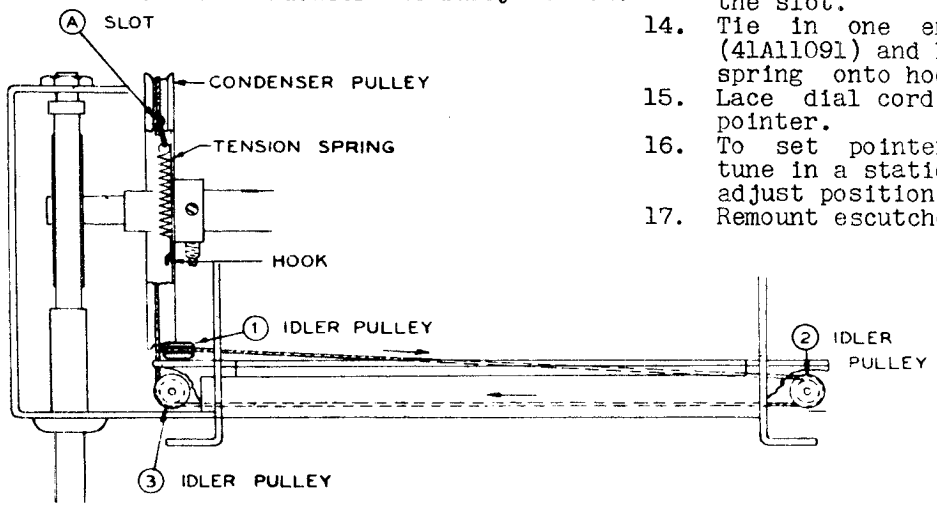
MODEL 39B-1
MODEL 39B-2

GALVIN MFG. CORP.

MODELS 39B-1 and 39B-2 POINTER CORD

1. Remove the chassis from housing.
2. Pull out the five push-buttons.
3. Remove the four screws which hold the escutcheon and remove same from front cover.
4. Remove broken cord.
5. Rotate condenser gang to fully meshed position.
6. Cut 28 inch length of 30 pound silk fish cord.
7. Thread one end of cord through slot (A). This is the slot nearest the front of chassis when condenser is fully meshed.
8. Run cord up and over rear idler pulley No. 1 in clockwise direction.
9. Continue cord across chassis to idler pulley No. 2 and around it in a clockwise direction.
10. Run cord back across chassis to front idler pulley No. 3 and around it in clockwise direction.
11. Run cord under brake shoe and around condenser pulley to slot (A).
12. Thread through slot (A).
13. Knot both ends of cord securely inside the slot.
14. Tie in one end of tension spring (41A11091) and hook other end of tension spring onto hook in condenser pulley.
15. Lace dial cord through hooks in dial pointer.
16. To set pointer to correct frequency, tune in a station of known frequency and adjust position of pointer on string.
17. Remount escutcheon plate.



SENSITIVITY AND STAGE GAIN MEASUREMENTS MODEL 39B-2

Average Microvolt Input *	Generator Set At	Generator Feeder Connected to	Dummy Antenna Capacity	Leak Resistance	Output Meter Reading **
12,000	455 K.C.	I.F. Grid	.1 Mfd.	.5 Meg.	1.74
600	455 K.C.	Mod. Grid	.1 Mfd.	.5 Meg.	1.74
575	600 K.C.	Mod. Grid	.1 Mfd.	.5 Meg.	1.74
30	600 K.C.	R.F. Grid	.1 Mfd.	.5 Meg.	1.74
11	600 K.C.	Antenna	***	None	1.74

Volume Control Set at Maximum — Tone Control Set At Voice.
* 1 Watt = 1.74 Volts — ** Output meter connected across voice coil.
*** Use Special Dummy Part No.1X26767 or Booster Coil 24A26751 in series with a 35Mmf.Cond

SENSITIVITY AND STAGE GAIN MEASUREMENTS MODEL 39B-1

Average Microvolt Input *	Generator Set At	Generator Feeder Connected to	Dummy Antenna Capacity	Leak Resistance	Output Meter Reading **
24,500	262 K.C.	I.F. Grid	.1 Mfd.	.5 Meg.	1.74
1,100	262 K.C.	Mod. Grid	.1 Mfd.	.5 Meg.	1.74
1,200	600 K.C.	Mod. Grid	.1 Mfd.	.5 Meg.	1.74
12	600 K.C.	R.F. Grid	.1 Mfg.	.5 Meg.	1.74
8	600 K.C.	Antenna	***	None	1.74

Volume Control Set at Maximum — Tone Control Set At Voice
* 1 Watt = 1.74 Volts — ** Output meter connected across voice coil.
*** Use Special Dummy Part No.1X26767 or Booster Coil 24A26751 in series with a 35Mmf.Cond

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GALVIN MFG. CORP.

MODEL 39B-1
MODEL 39B-2

MODELS 39B-1 and 39B-2 DIAL CORD INSTRUCTIONS

DIAL DRIVE CORD

Remove the chassis from the housing, and place on service bench with the tubes up.
Remove the broken string.
Turn the condenser gang to fully meshed position.
Cut a length of 30# silk fish cord 26 inches long.
Thread one end of cord through slot in drive pulley and with an ordinary paper clip fasten to tuning shaft bracket so the cord will stay in place.
In a counter clock-wise direction wind cord one full turn around drive pulley and up to tuning shaft.

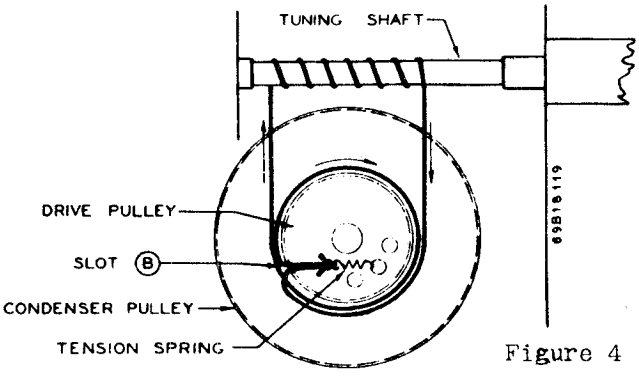


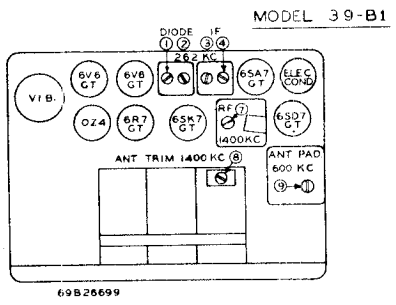
Figure 4

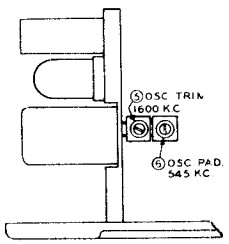
Wind cord in clock-wise direction 7 turns around tuning shaft and down to drive pulley.
In a counter clock-wise direction, wind cord around drive pulley to slot (B).
Knot the two ends of cord together inside of drive pulley and fasten one end of spring (41A14759) to cord and the other end to hole in condenser pulley.

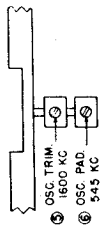
ALIGNMENT CHART MODEL 39B-1

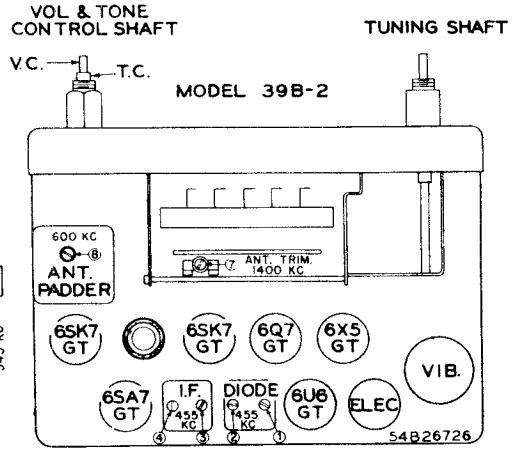
Operations In Order	Gang Condenser Set At	Dummy Antenna	Generator Connected To	Adjust Trimmers No.	Generator Set At
1	Minimum	.1 Mfd.	Osc.-Mod. Grid	1-2-3-4	262 K.C.
2	1600 K.C.	.1 Mfd.	Osc.-Mod. Grid	5	1600 K.C.
3	545 K.C.	.1 Mfd.	Osc.-Mod. Grid	6	545 K.C.
4	1400 K.C.	*	To Special Dummy	7	1400 K.C.
5	1400 K.C.	*	To Special Dummy	8	1400 K.C.
6	600 K.C.	*	To Special Dummy	9	600 K.C.

* Use Special Dummy Part No. 1X26767 or Booster Coil Part No. 24A26751 in series with a 35 Mmf. Condenser.









ALIGNMENT CHART MODEL 39B-2

Operations In Order	Gang Condenser Set At	Dummy Antenna	Generator Connected To	Adjust Trimmers No.	Generator Set At
1	Minimum	.1 Mfd.	Osc.-Mod. Grid	1-2-3-4	455 K.C.
2	1600 K.C.	.1 Mfd.	Osc.-Mod. Grid	5	1600 K.C.
3	545 K.C.	.1 Mfd.	Osc.-Mod. Grid	6	545 K.C.
4	1400 K.C.	*	To Special Dummy	7	1400 K.C.
5	600 K.C.	*	To Special Dummy	8	600 K.C.

* Use Special Dummy Part No. 1X26767 or Booster Coil Part No. 24A26751 in series with a 35 Mmf. Condenser.

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MODEL 39B-1

GALVIN MFG. CORP.

PART NO.	DESCRIPTION	LIST
	MODEL 39B-1	
	MAJOR PARTS	
48K11026	Vibrator - Black.	$2.50
25A17103	Filter Choke.	.75
23A17190	Electrolytic Condenser (FP)	1.00
25B23250	Power Transformer	3.65
16C23259	Housing Shell & Back.	2.75
25A23466	Input Choke	1.70
24K23467	Vibrator Choke.- 6 Pie Wound.	.50
1X23468	Oscillator Coil & Leads Assembly.	.65
1X23469	Diode Coil & Shield Assembly.	1.50
1X23471	I.F. Coil & Shield Assembly	1.40
1X23473	R.F. Coil & Leads Assembly.	1.75
1X23475	Antenna Coil & Shield Assembly.	2.75
24K23483	"A" Choke	.25
1X23487	Front Cover & Bushing Assembly.	1.25
18K23489	Volume & Tone Control	1.50
1X23517	Bottom Housing Assembly	.70
50B23621	Speaker & Output Transformer.	5.50
50B24493	Speaker & Output Transformer.	5.50
50B24929	Speaker & Output Transformer.	5.50
	Speaker Exchange.	3.25
1X24948	Gang, Pulley & Brake Assembly	5.00
	ACCESSORIES	
6X4141	Distributor Suppressor.	.30
1X4288	Battery Lead Assembly	.40
8A4491	Generator Condensor	.40
65X4637	Fuse 20 AMP 3 AG.	.05
1X4894	Fuse Lead Assembly - 20".	.25
1X4895	"A" Lead Assembly - 10"	.25
9B6734	Tube Socket - Saddle 4 Prong.	.15
9B6771	Tube Socket - Saddle Octal.	.15
9A6774	Tube Socket - Saddle Octal.	.15
37A17216	Speaker Gasket.	.15
1X23520	Receiver Accessories Assembly	1.20
38A23693	Call Letters & Instructions	.45
64K23876	Speaker Screen.	.25
	DIAL & DRIVE	
65X4151	Bulb 6-8v. Rnd. Bay. Clr. #51	.15
43X4326	Steel Ball .125 .PER C.	.35
5S7811	Eyelet 5/16 Blk. - Gang Mtg .DOZ.	.20
11M8709	Dial Cord (Blk) 26"-Shaft .YARD	.05
11M8744	Dial Cord (Blk. Wht.) 28"-Pntr. .YARD	.05
41A11091	Tension Coil Spring - Large .DOZ.	.25
37A12691	Rubber Grommet - Gang Mtg .DOZ.	.25
41A14759	Tension Coil Spring - Small .DOZ.	.25
7B17002	Cond. Mtg. Bracket - Left	.10
35A17160	Push Button Strip - Felt. .DOZ.	.20
1B17171	Push Button Plunger Assembly.	.20
35A17224	Knob Washer - Felt - Vol. .PER C.	.40
43X17241	Nut Bearing Assembly. .DOZ.	.35
1A23246	Pointer	.10
34A23248	Dial Scale.	.25
64A23249	Dial Retainer Plate .DOZ.	.25
47K23492	Tuning Drive Shaft.	.35
1X23494	Drive Shaft Brackets Assembly	.30
1X23495	Slider, Plunger & Pulley Assembly	.45
1X23503	Dial Light Assembly - L.H.	.10
1X23504	Dial Light Assembly - R.H.	.10
1X23518	Dial Scale & Esc. Assembly.	1.50
1X23519	Push Button Cpt	.20
1X23521	Dial Brkt. & Background Assembly.	.35
36B24330	Tone Control Lever 1&9/32	.35
36A24331	Tuning Knob 1/4 Hole.	.20
36K24332	Volume Knob 3/16 Hole	.20
	MISCELLANEOUS	
37A4187	Condenser Mounting Grommet. .DOZ.	$ .25
42A4215	Vibrator Grounding Clip .DOZ.	.75
4K4823	Cup Washer Cop. Pl. .DOZ.	.10

PART NO.	DESCRIPTION	LIST
	CONDENSERS	
8A1400	Tubular Condenser .01-100v.	$ .15
8A3302	Tubular Condenser .1-100v	.15
8A3303	Tubular Condenser .03-100v.	.20
8A4925	Dual Tub. Cond. .0008-.0008-1000v	.25
21B6500	Molded Mica Condenser 500mmf-20%.	.15
21B6501	Molded Mica Condenser 200mmf-20%.	.15
21B6503	Molded Mica Condenser 50mmf-20%	.15
8A12840	Tubular Condenser .006-1600v.	.35
8A13014	Condenser-Resistor .006-100v-100K	.25
8K13165	Tubular Condenser .003-1000v.	.15
8K13166	Tubular Condenser .1-400v	.15
8A13514	Tubular Condenser .05-100v.	.15
8A14791	Tubular Condenser .05-400v.	.15
8A17027	Condenser-Resistor .03-100v.-33K.	.20
8A17028	Tubular Condenser .5-100v	.25
20A17153	Double Trimmer & Spec. Brkt	.35
20A17935	Antenna Padder - Single	.35
21A19088	Ceramic Condenser 250mmf-5%	.20
8A19133	Tubular Condenser .5-100v	.30
20A22747	Trimmer Diode - Small	.40
20A22751	Double Trimmer 120mmf-Nom. - I.F.	.30
20A23102	R. F. Trimmer & Padder.	.55
8K23465	Tubular Condenser .03-1000v. & Strap.	.25
20A23827	Compensating Condenser.	.25
	RESISTORS	
6B6005	Carbon Resistor 50-1/2-20 N.I. .DOZ.	.60
6B6010	Carbon Resistor 330-1/2-20 Ins. .DOZ.	.60
6B6012	Carbon Resistor 33,000-1/2-20 .DOZ.	.60
6B6070	Carbon Resistor 150,000-1/3-20 N.I. .DOZ.	.60
6B6212	Carbon Resistor 22,000-1/3-20 Ins .DOZ.	.60
6B6255	Carbon Resistor 10,000-1/3-20 Ins .DOZ.	.60
6B6321	Carbon Resistor 47,000-1/3-20 Ins .DOZ.	.60
6B6337	Carbon Resistor 1 meg-1/3-10 Ins. .DOZ.	.60
6B6338	Carbon Resistor 470,000-1/3-10 Ins. .DOZ.	.60
6B6339	Carbon Resistor 150,000-1/3-20 Ins .DOZ.	.60
6B6340	Carbon Resistor 27,000-1/3-20 Ins .DOZ.	.60
6B6341	Carbon Resistor 22,000-1-10 Ins	.10
6B6342	Carbon Resistor 1,500-1/3-20 Ins. .DOZ.	.60
6B6343	Carbon Resistor 910-1/3-5 Ins .DOZ.	.60
6B6344	Carbon Resistor 400-1-20 Ins.	.10
6B6345	Carbon Resistor 390-1/3-10 Ins. .DOZ.	.60
6B6346	Carbon Resistor 300-1/3-10 Ins. .DOZ.	.60
	SCREWS, WASHERS	
2S7003	Nut 8-32x11-32 CP - Spkr. .PER C.	.50
2S7022	Nut 1-4x20x7/16 CP - Set Mtg. .PER C.	.60
3S7118	Setscrew 8-32x5/16 BO - Knob. .DOZ.	.90
3S7160	Screw 8-32x3/16 CP - Slider Brkt. .PER C.	.35
3S7454	Screw 8x1/4 PK Z PLHH CP. .DOZ.	.20
3S7456	Housing Screw 8x1/4 ACHD PK A CO. .PER C.	.65
3S7457	Screw 8x7/8 CP - Coil Mtg .DOZ.	.25
3S7461	Screw 8x5/16 CO - Esc .DOZ.	.15
3S7499	Screw 8x5/8 CO - Ant. .PER C.	1.00
4S7609	Washer 1&5/16x.218x.050 CP. .DOZ.	.35
4S7635	Washer 7/8 CP - Set Brkt. .DOZ.	.25
4S7657	Lockwasher 8 Ext. BO - Spkr .PER C.	.50
4S7670	Lockwasher 1/4" Blk. Oxd.-Set Brkt. .PER C.	.50
3S8126	Screw 8x1&1/4 CP - Pwr. Trans .DOZ.	.20
3S8131	Screw 8x1&7/8 SS - Choke. .DOZ.	.65
3A13748	Screw 8-32x17/32 CP - Gang Mtg. .DOZ.	.20
3A17181	Thumbscrew 8-32 CO - Bot. Cvr .DOZ.	.25
2K17206.	Mounting Nut - Front. .DOZ.	.75
2K23491	Spacer Nut 1/2-28x5/8 - Vol	.15
3A23753	"J" Bolt - Set Mtg. .DOZ.	.60
4A24333	Tuning Nut Cup Washer .DOZ.	.50
42B5480	Grid Clip - Small - Collar Grip .DOZ.	.15
38X10544	Plug Button 1/4 CO - Ant. .DOZ.	.25
26X14760	Bantam Tube Shield.	.05
56X23774	Packing Carton & Fillers.	.40

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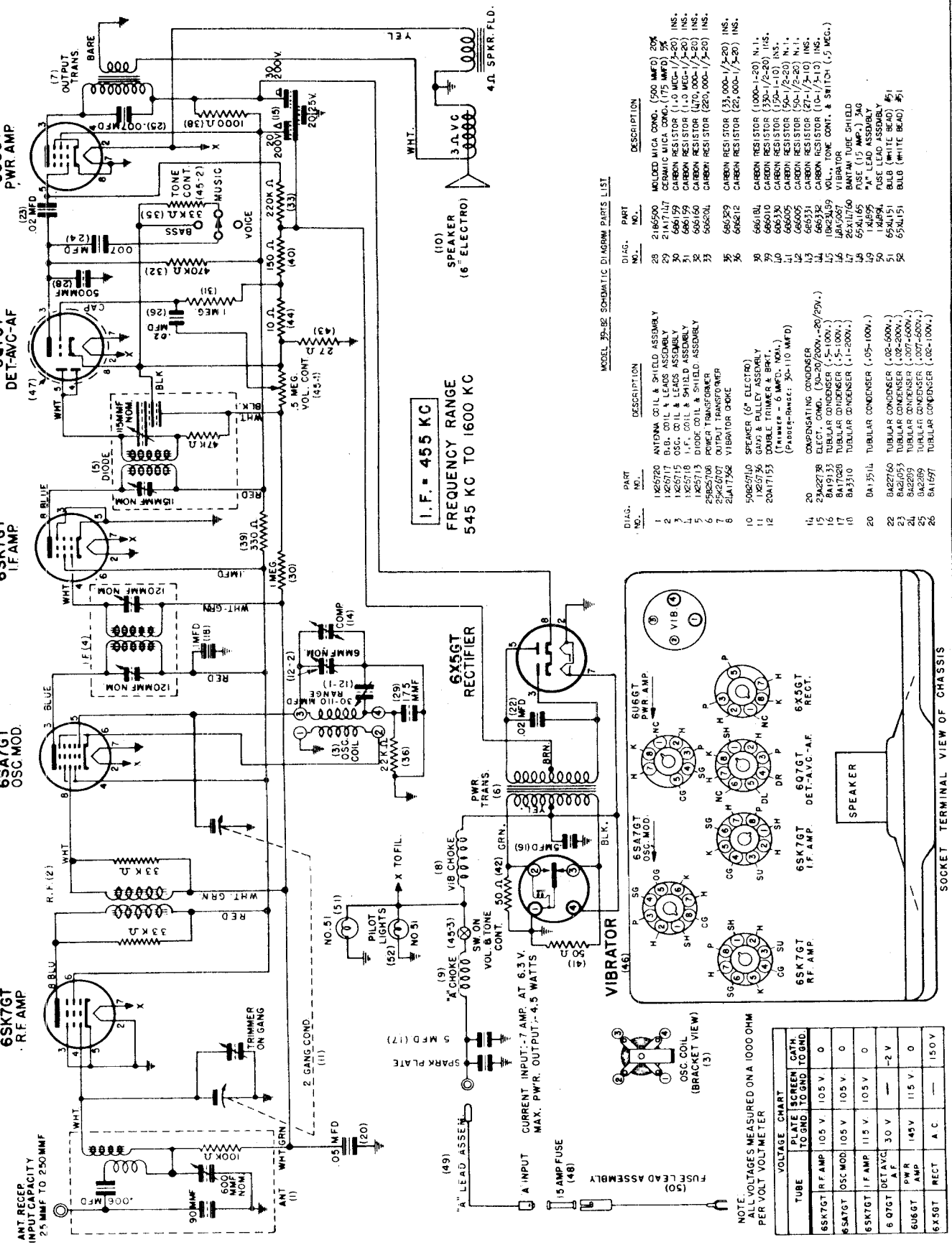
MODEL 39B-2

GALVIN MFG. CORP.



MODEL 39-B2 SCHEMATIC DIAGRAM PARTS LIST

DIAG. NO.	PART NO.	DESCRIPTION
1	1X25720	ANTENNA COIL & SHIELD ASSEMBLY
2	1X26117	R.F. COIL & LEADS ASSEMBLY
3	1X26115	OSC. COIL & LEADS ASSEMBLY
4	1X25118	I.F. COILS & SHIELD ASSEMBLY
5	1X25113	DIODE COIL & SHIELD ASSEMBLY
6	25B25700	POWER TRANSFORMER
7	25K26707	OUTPUT TRANSFORMER
8	21A17362	VIBRATOR CHOKE
10	50B25710	SPEAKER (6" ELECTRO)
11	1X25736	GANG & PULLEY ASSEMBLY
12	20A17153	DOUBLE TRIMMER & BRKT. (Trimmer - 6 MMFD. MAX.) (Padder Range: 30-110 MMFD)
14	20	COMPENSATING CONDENSER
15	23A22738	ELECT. COND. (30-20/200V.-20/25V.)
16	8A19133	TUBULAR CONDENSER (.5-100V.)
17	8A17028	TUBULAR CONDENSER (.5-100V.)
18	8A3310	TUBULAR CONDENSER (.1-200V.)
20	8A13514	TUBULAR CONDENSER (.05-100V.)
22	8A22760	TUBULAR CONDENSER (.02-600V.)
23	8A21053	TUBULAR CONDENSER (.02-200V.)
24	8A22893	TUBULAR CONDENSER (.007-600V.)
25	8A2289	TUBULAR CONDENSER (.007-600V.)
26	8A11697	TUBULAR CONDENSER (.02-100V.)
28	21A65500	MOLDED MICA COND. (500 MMFD) 20%
29	21A17417	CERAMIC MICA COND. (175 MMFD) 5%
30	686159	CARBON RESISTOR (1.0 MEG-1/2-20) INS.
31	686129	CARBON RESISTOR (1.0 MEG-1/2-20) INS.
32	686160	CARBON RESISTOR (470,000-1/2-20) INS.
33	686204	CARBON RESISTOR (220,000-1/2-20) INS.
35	686329	CARBON RESISTOR (33,000-1/2-20) INS.
36	686212	CARBON RESISTOR (22,000-1/2-20) INS.
38	686184	CARBON RESISTOR (1000-1-20) N.I.
39	686010	CARBON RESISTOR (330-1/2-20) INS.
40	686330	CARBON RESISTOR (150-1/2-10) INS.
41	686005	CARBON RESISTOR (50-1/2-20) N.I.
42	686005	CARBON RESISTOR (50-1/2-20) N.I.
43	686331	CARBON RESISTOR (27-1/2-10) INS.
44	686332	CARBON RESISTOR (10-1/2-10) INS.
45	10K23439	VOL., TONE CONT. & SWITCH (.5 MEG.)
46	48A5087	VIBRATOR
47	26X11760	BANTAM TUBE SHIELD
48	65A4165	FUSE (15 AMP.) 3AG
49	1X4895	"A" LEAD ASSEMBLY
50	1X4894	FUSE LEAD ASSEMBLY
51	65A4151	BULB (WHITE BEAD) #51
52	65A4151	BULB (WHITE BEAD) #51

NOTE: ALL VOLTAGES MEASURED ON A 1000 OHM PER VOLT VOLTMETER

VOLTAGE CHART

TUBE		PLATE TO GND.	SCREEN TO GND.	CATH. TO GND.
6SK7GT	R.F AMP.	105 V.	105 V.	0
6SA7GT	OSC MOD.	105 V.	105 V.	0
6SK7GT	I.F AMP.	115 V.	105 V.	0
6 Q7GT	DET.AVC. A.F.	30 V.	—	-2 V.
6U6GT	PWR AMP.	145V.	115 V.	0
6X5GT	RECT.	A.C.	—	150 V.

For Alignment, Gain, Sensitivity, dial data, see Pp. 15-22, 15-23

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MODEL 39B-2

GALVIN MFG. CORP.

PART NO.	DESCRIPTION	LIST
	MODEL 39B-2	
	MAJOR PARTS	
48A5067	Vibrator	2.50
24A17362	Vibrator Choke (8 Pie)	.35
23A22738	Electrolytic Condenser FP	.75
18K23489	Volume & Tone Control	1.50
25K26707	Output Transformer	1.00
25B26708	Power Transformer (Shielded)	2.60
1X26713	Diode Coil & Shield Assembly	1.55
1X26715	Osc. Coil & Leads Assembly	.65
1X26717	B.B. Coil & Leads Assembly	.85
1X26718	I.F. Coil & Shields Assembly	1.40
1X26720	Antenna Coil & Shield Assembly	2.10
1X23729	Front Cover & Bushing Assembly	1.05
50B26740	Speaker 6" Electro	3.25
	Speaker Exchange	1.90
15K26744	Housing Shell, Back & Brkts	3.00
1X26748	Bottom Cover Assembly	.65
1X27101	Gang, Brake & Pulley Assembly	4.65
	ACCESSORIES	
14X2423	Fuse Insulator - "A" Lead .DOZ.	.20
6X4141	Distributor Suppressor	.30
65X4151	Bulb 6-8v. Rnd. Bay. Clr. #51	.15
65X4165	Fuse 15 AMP 3AG	.05
1X4872	Battery Lead Assembly	.50
1X4894	Fuse Lead Assembly - 20"	.25
1X4895	Short "A" Lead Assembly - 10"	.25
9B6734	Tube Socket - Saddle 4 Prong	.15
9B6771	Tube Socket - Saddle Octal	.15
1X12820	Antenna Receptacle Assembly	.15
37A18689	Rubber Gasket 2" - Spkr	.05
1X23503	Dial Light Assembly(Short) - Less Bulb	.10
1X23504	Dial Light Assembly (Long) - Less Bulb	.10
1X26759	Receiver Accessories Assembly	1.20
	DIAL & DRIVE	
5S7811	Eyelet 5/16x.210 Blk. - Gang Mtg. .DOZ.	.20
11M8709	Dial Cord Blk. 26" - Shaft. .YARD	.05
11M8744	Dial Cord Blk.-Wht. 28" - Pntr. .YARD	.05
41A11091	Tension Coil Spring - Large .DOZ.	.25
37A12691	Rubber Grommet - Gang Mtg .DOZ.	.25
41A14759	Tension Coil Spring - Small .DOZ.	.25
7B17002	Gang Mtg. Bracket - Left	.10
38A17093	Call Letters Tab Cover	.05
35A17160	Push Button Pad (Felt) Strip .DOZ.	.20
35A17224	Knob Washer (Felt) 3/64 - Vol .PER C.	.40
13K23244	Dial Escutcheon - Chrome	1.25
1A23246	Dial Pointer Assembly	.10
34A23248	Dial Scale	.25
64A23249	Dial Retainer Plate .DOZ.	.25
47K23492	Tuning Drive Shaft	.35
1X23495	Pointer, Plunger & Pulley Assembly	.45
1X23518	Dial Scale & Esc. Assembly	1.50
1X23519	Push Button Complete	.20
1X23521	Dial Brkt. & Background Assembly	.35
36C24330	Tone Control Lever 1&9/32	.35
36A24331	Tuning Knob 1/4"	.20
36K24332	Volume Knob 3/16"	.20
38K26752	Push Button Number Tabs	.05
	MISCELLANEOUS	
42A4215	Vibrator Grounding Clip .DOZ.	.75
42B5480	Grid Clip - Small - Collar Grip .DOZ.	.15
38X10544	Plug Button 1/4 Cop. Oxd. - Ant .DOZ.	.25
26X14760	Bantam Tube Shield	.05
56X26749	Packing Carton & Fillers	.40

PART NO.	DESCRIPTION	LIST
	CONDENSERS	
8A1697	Tubular Condenser .02-100v	$ .15
8A2289	Tubular Condenser .007-600v	.20
8A3310	Tubular Condenser .1-200v	.15
21B6500	Molded Mica Condenser 500mmf-20%	.15
8A13014	Condenser Res. .006-100v.-100K	.25
8A13514	Tubular Condenser .05-100v	.15
8A17028	Tubular Condenser .5-100v	.25
21A17147	Ceramic Mica Condenser 175mmf	.20
20A17153	Double Trimmer & Spec. Brkt	.35
20A17935	Antenna Padder - Single	.35
8A19133	Tubular Condenser .5-100v	.30
21A20877	Metal Mica Condenser 90mmf-10%	.15
20A22747	Diode Trimmer - Small	.40
20A22751	I.F.Trimmer - Double	.30
8A22760	Tubular Condenser .02-600v	.15
8A24033	Tubular Condenser .02-200v	.10
	RESISTORS	
6B6005	Carbon Resistor 50-1/2-20 N.I .DOZ.	.60
6B6010	Carbon Resistor 330-1/2-20 Ins .DOZ.	.60
6B6037	Carbon Resistor 33,000-1/3-20 N.I .DOZ.	.60
6B6159	Carbon Resistor 1 meg-1/3-20 Ins .DOZ.	.60
6B6130	Carbon Resistor 470,000-1/3-20 N.I. .DOZ.	.60
6B6184	Carbon Resistor 1,000-1-20 N.I	.10
6B6204	Carbon Resistor 220,000-1/3-20 Ins. .DOZ.	.60
6B6212	Carbon Resistor 22,000-1/3-20 Ins .DOZ.	.60
6B6321	Carbon Resistor 47,000-1/3-20 Ins .DOZ.	.60
6B6329	Carbon Resistor 33,000-1/3-20 Ins .DOZ.	.60
6B6330	Carbon Resistor 150-1-10 Ins	.10
6B6331	Carbon Resistor 27-1/3-10 Ins .DOZ.	.60
6B6332	Carbon Resistor 10-1/3-10 Ins .DOZ.	.60
	SCREWS, WASHERS ETC.	
43X4326	Steel Ball .125 .PER C.	.35
2S7003	Nut 8-32x11/32 CP - Spkr. .PER C.	.50
2S7005	Nut 6-32x1/4 CP - B.B. Coil .PER C.	.40
2S7022	Nut 1/4-20x7/16 CP - Set Mtg. .PER C.	.60
3S7118	Setscrew 8-32x5/16 BO - Knob .DOZ.	.90
3S7160	Screw 8-32x3/16 CP - P.P.& P. .PER C.	.35
3S7457	Screw 8x7/8 CP - Can Mtg. .DOZ.	.25
3S7461	Screw 8x5/16 PK A AH CO .DOZ.	.15
3S7499	Screw 8x5/8 Cop. Oxd. - Ant. Recpt. PER C.	1.00
3S7506	Screw 6x1/4 CP - Osc. .PER C.	.50
3S7508	Screw 8x1/4 Blk. - Ant. Coil .PER C.	.65
4S7573	Washer 11/16-.187 Wrt. - Choke .DOZ.	.15
4S7635	Washer 7/8-.281 CP - Set Mtg. .DOZ.	.25
4S7657	Lockwasher #8 Ext. BO - Spkr. .PER C.	.50
4S7670	Lockwasher 1/4 Int.-Set Mtg .PER C.	.50
3S8126	Screw 8x1&1/4 CP - Pwr. Trans .DOZ.	.20
3S8133	Screw 8x1 SS - Choke .DOZ.	.35
3S13748	Screw 8-32x17/32 CP - Gang Mtg. .DOZ.	.20
2K17206	Nut 1/2-28x5/8 Brass - Front Mtg. .DOZ.	.75
43X17241	Nut Bearing Assembly - Tun. Shaft .DOZ.	.35
2K23491	Spacer Nut 1/2-28x5/8 - Vol	.15
3A23753	"J" Bolt - Set Mtg. .DOZ.	.60
4A4333	Tuning Nut Cup Washer .DOZ.	.50

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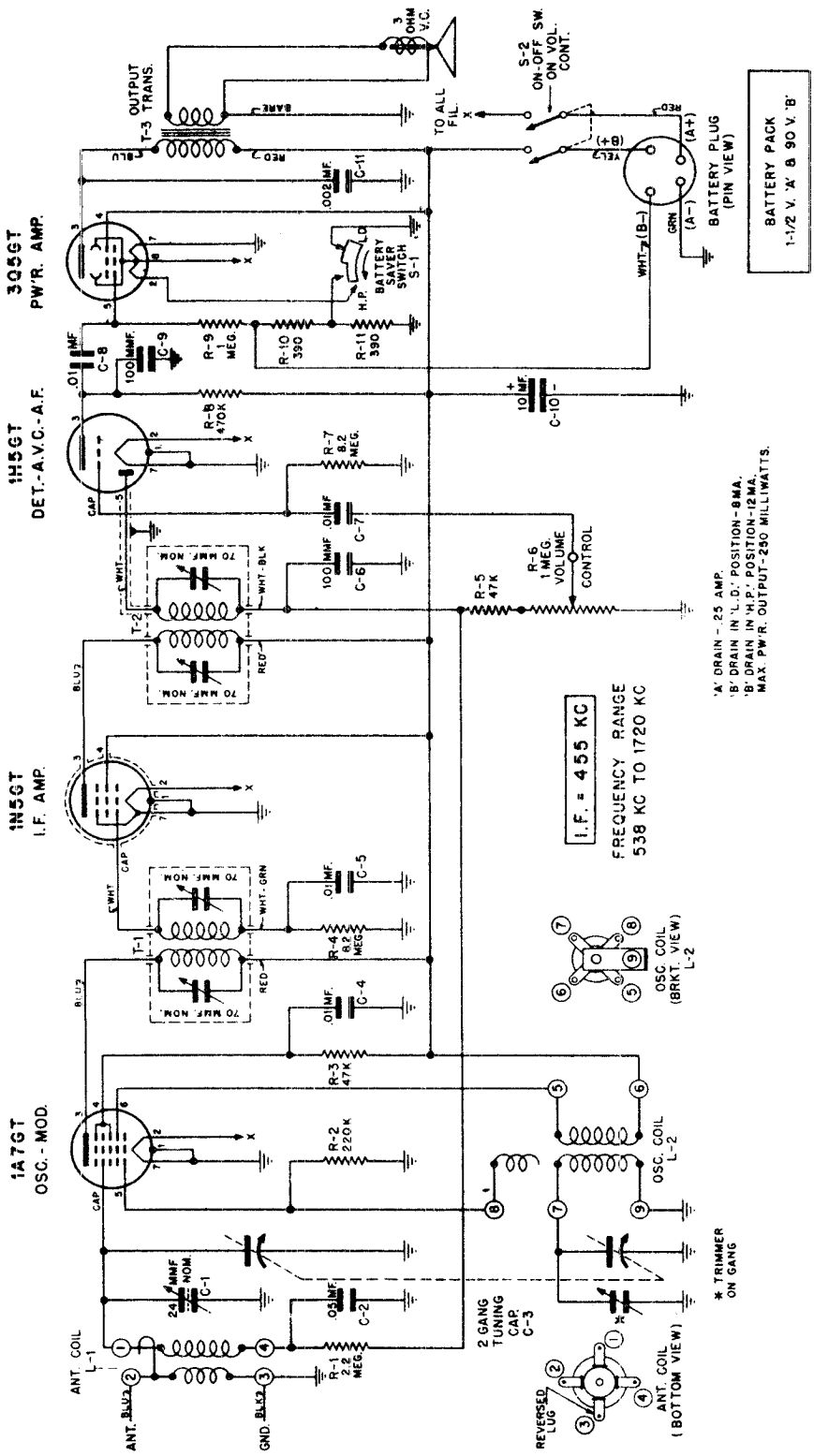
GALVIN MFG. CORP.



This receiver is a 4 tube battery operated superheterodyne, covering the broadcast band from 538 to 1720 kc. The I.F. frequency is 455 kc.

POWER DRAIN:

'A' drain- .25 AMP. at 1.5 V.

'B' drain in 'L.D.' position- 8 MA. at 90 V.

'B' drain in 'H.P.' position- 12 MA. at 90 V.

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MODEL 45B12, Ch. HS-8

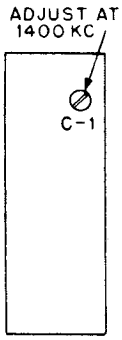
GALVIN MFG. CORP.

Turn Battery Saver Switch to 'H.P.' (high power) position.
Connect output meter across speaker voice coil (.38V = .05 watts).
Volume control set at maximum for all operations.
The adjusting screwdriver or alignment tool should be of the insulated type, such as Motorola Part No. 66A71008.

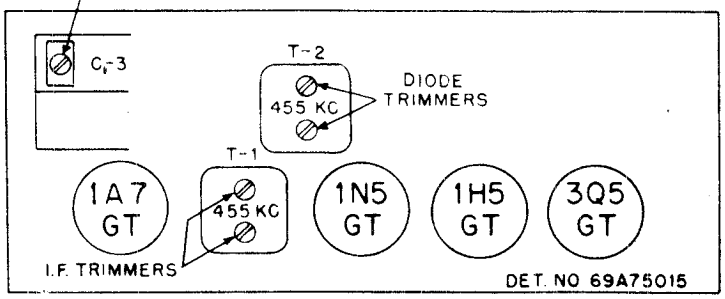
OPERATIONS IN ORDER	GANG CAPACITOR SET AT	DUMMY ANTENNA	GENERATOR CONNECTED TO	ADJUST TRIMMER NO.	GENERATOR SET AT (400~ 30% MODULATED)	AVERAGE INPUT FOR .38V OUTPUT
1. Adjust I.F.'s for maximum	Minimum Capacity	.1 mf	Osc.-Mod. grid	T-1 & T-2 (2 trimmers on each)	455 Kc	3750 microvolts to I.F. grid. 80 microvolts to Osc.-Mod. grid.
2. Set Oscillator trimmer	Minimum Capacity	.1 mf	Osc.-Mod. grid	Trimmer on C-3	1720 KC	100 microvolts
3. Adjust R.F. trimmer for maximum	1400 Kc.	200 mmf	Antenna Lead	C-1	1400 Kc	10 microvolts

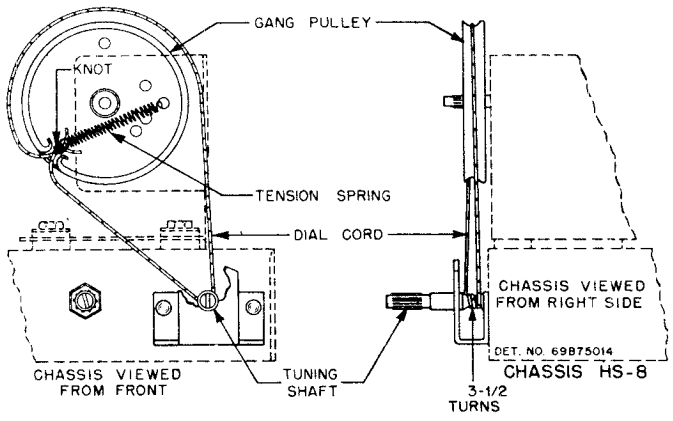
4. Repeat above steps for maximum accuracy.

ANT. COIL TRIMMER
ADJUST AT 1400 KC



OSC. TRIMMER
ADJUST AT 1720 KC





DIAL CORD LAYOUT

TO REPLACE DIAL CORD

1. Remove set from cabinet by pulling the knobs off and unscrewing the three chassis retaining screws from the bottom.
2. Remove the dial crystal by pushing out the four snap-in eyelets. Avoid damaging crystal and dial scale by pushing the eyelets out from the back. Do not remove the dial scale.
3. Remove the dial pointer by carefully pulling it off.
4. Next the dial plate is taken off by removing two screws.
5. Remove the old cord and replace with a new piece of 24 lb. fish line. See Figure 1. 2. 3. 4.
6. Secure the cord knot with a drop of cement.
7. Reassemble dial mechanism by working in reverse order. The pointer should be adjusted so that it is horizontal and pointing to the low frequency end when the gang capacitor is fully closed.

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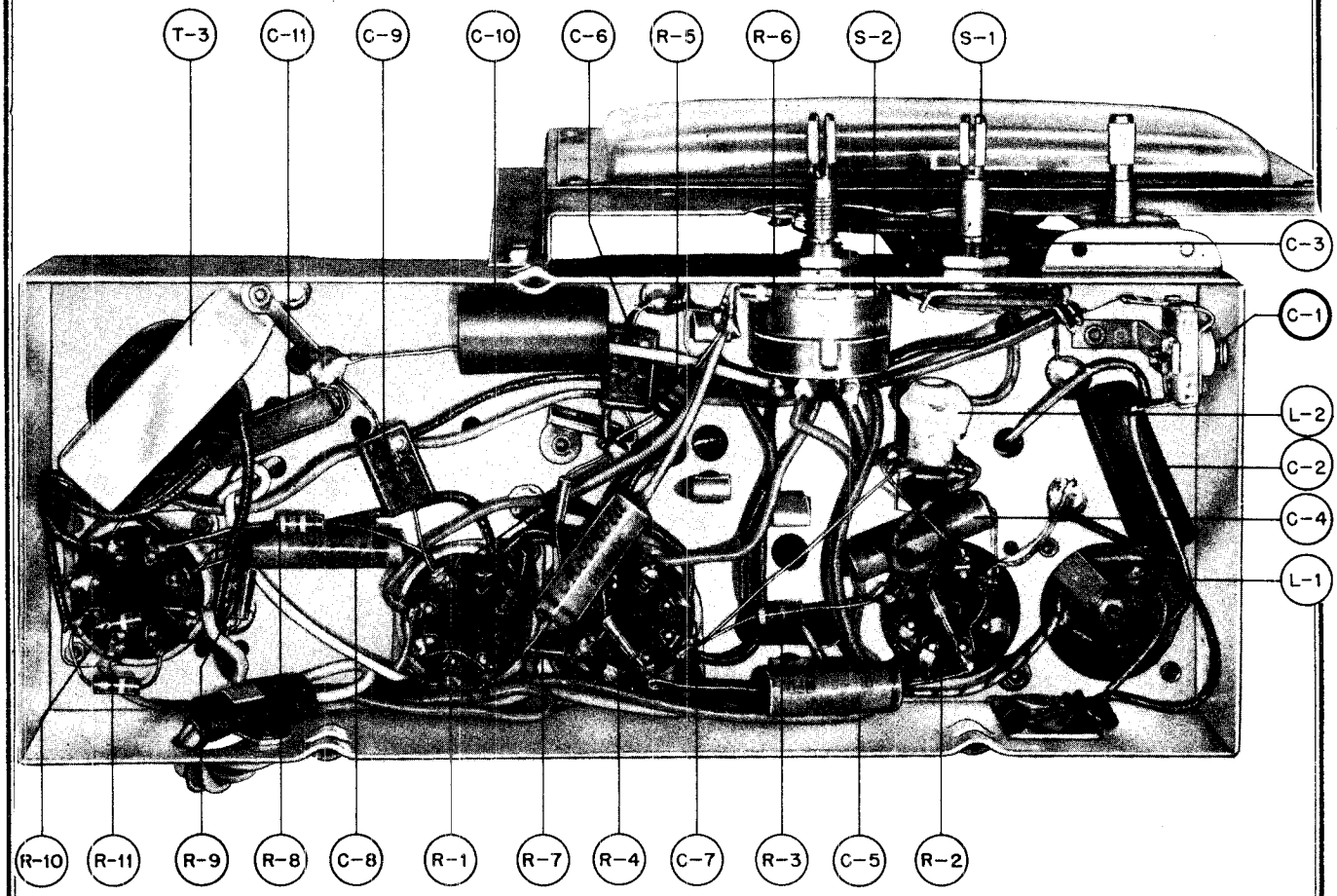
MODEL 45B12,Ch.HS-8

GALVIN MFG. CORP.



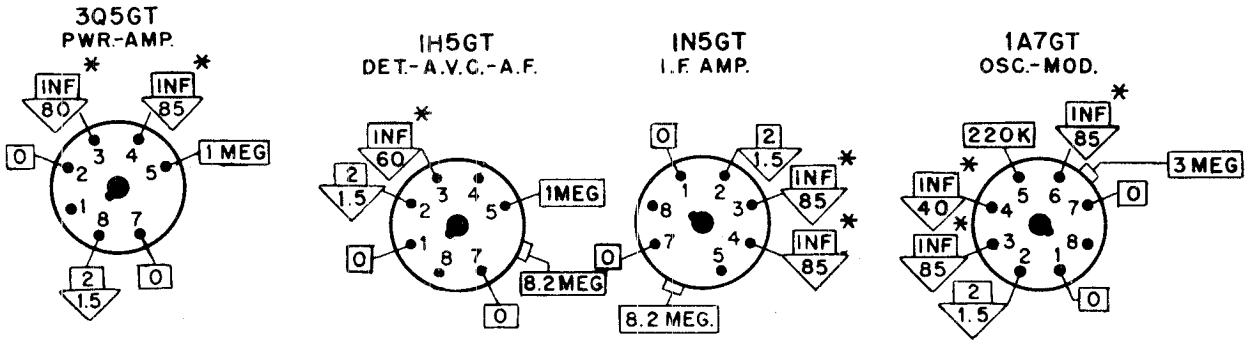
CHASSIS BOTTOM VIEW

VOLTAGES MEASURED ON A 20,000 Ω PER VOLT VOLTMETER TO CHASSIS WITH BATTERY SAVER SWITCH IN H.P. POSITION.

▽ =VOLTAGE MEASUREMENTS.

▭ =RESISTANCE MEASUREMENTS.

* DISCONNECT ONE SIDE OF ELECTROLYTIC CAPACITOR C-10 WHEN MAKING RESISTANCE MEASURMENTS. CHECK ELECTROLYTIC CAPACITOR BY PUTTING POSITIVE OF CAPACITOR TO POSITIVE TERMINAL OF OHM-METER BATTERY. THE RESISTANCE SHOULD BE .5 MEG. OR SO.



BOTTOM VIEW OF CHASSIS

VOLTAGE AND RESISTANCE CHART

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MODEL 45B12,Ch.HS-8

GALVIN MFG. CORP.

REF. NO.	PART NO.	DESCRIPTION	LIST
C-1	20A26941	Capacitor, trimmer: 24 mmf nominal; includes mounting bracket.	.30
C-2	8S9805	Capacitor, fixed: paper;.05 mf 20% 100 VDC.	.20
C-3	1X20506	Capacitor, variable: 2 gang. Cut oscillator plates; (includes pulley).	3.70
C-4	8S9801	Capacitor, fixed: paper;.01 mf 20% 200 VDC.	.15
C-5	8S9801	Capacitor, fixed: paper;.01 mf 20% 200 VDC.	.15
C-6	21R6641	Capacitor, fixed: mica; 100 mmf 20% 500 VDC.	.20
C-7	8S9801	Capacitor, fixed: paper; .01 mf 20% 500 VDC.	.15
C-8	8S9825	Capacitor, fixed: paper; .01 mf 20% 200 VDC.	.15
C-9	21R6641	Capacitor, fixed: mica; 100 mmf 20% 500 VDC.	.20
C-10	23A14727	Capacitor, electrolytic; 10 mf 150 V.	.75
	20A20323	Capacitor, trimmer: dual; 70 mmf nominal (In I.F. & diode cans).	.60
	or 20A72754	Capacitor, trimmer: dual; 70 mmf nominal (In I.F. & diode cans).	
L-1	24A30442	Coil, antenna: iron core type	2.15
L-2	24A27349	Coil, oscillator.	.85
R-1	6R6202	Resistor, fixed: carbon; 2.2 meg 20% 1/3W Ins. doz.	.60
	or 6R3927	Resistor, fixed: carbon; 2.2 meg 20% 1/2W Ins.	
R-2	6R6204	Resistor, fixed: carbon; 220,000 20% 1/3W Ins. doz.	.60
	or 6R6015	Resistor, fixed: carbon; 220,000 20% 1/2W Ins.	
R-3	6R6321	Resistor, fixed: carbon; 47,000 20% 1/3W Ins. doz.	.60
	or 6R6056	Resistor, fixed, carbon; 47,000 20% 1/2W Ins.	
R-4	6R6310	Resistor, fixed, carbon: 8.2 meg 20% 1/3W Ins. doz.	.60
	or 6R3938	Resistor, fixed: carbon; 8.2 meg 20% 1/2W Ins.	
	61B27421	Crystal, dial	.50
	37A14809	Cushion, socket (for 1A7 socket) doz.	.35
	1X27422	Dial Plate & Indicator Assem.	.85
	5S7805	Eyelet, Snap-In: .156 x .141; CP (dial scale mtg). per/c	.70
	5A19658	Eyelet, steel: .296 x .212. Cop. Pl. (gang mtg). doz.	.40
	5S7820	Eyelet, brass: .470 x .129 (spkr. lead tip). per/c	.60
	5S7855	Eyelet, brass: .484 x .156 (spkr. lead tip). doz.	.20
	37A12691	Grommet, rubber (gang cushioning) doz.	.35
	37A14810	Grommet, rubber (1A7 tube socket). doz.	.30
	52A27419	Indicator, ON-OFF.	.20
	36A15813	Knob, control: molded; blank (for tuning and volume shafts).	.10
	36K21243	Knob, control: molded; lined (for battery saver switch).	.15
	4S7666	Lockwasher, steel: #6 external; CP (osc. coil mtg.) per/c	.35
	4S7660	Lockwasher, phosphor bronze: #8 external (spkr. mtg.) per/c	.60
	29R5207	Lug, soldering (gang gnd.) doz.	.20
	29R5209	Lug, soldering: dumb-bell type (chassis gnd). per/c	1.00
	2S7070	Nut: 6/32 x 1/4, Inverted Palnut (ant. coil mtg.) per/c	.50
	2S7000	Nut, brass: 8-32 x 5/16 (speaker mtg.) doz.	.25
	2S7051	Nut: 3/8-32 x 9/16, Palnut; CP (volume control) doz.	.30
	28X11368	Plug, 4 prong (for bat cable)	.10
	52K27662	Pointer, dial	.25
	5S7707	Rivet, steel: 5/32 x .122, Pol. Nkl. (tube socket mtg.) per/c	.45
	5S7701	Rivet, steel: 3/16 x .122; Pol. Nkl. (output trans mtg. etc.) per/c	.45
	5S7703	Rivet, steel: 7/32 x .122; Pol. Nkl. (Ant. & Gnd strip mtg.) per/c	.45
	5S7732	Rivet, steel: 1/2 x .122; Pol. Nkl. (1A7 tube socket mtg.) doz.	.40
R-5	6R6321	Resistor, fixed: carbon; 47,000 20% 1/3W Ins. doz.	.60
	or 6R6056	Resistor, fixed: carbon; 47,000 20% 1/2W Ins.	
R-6	18A19979	Resistor, variable, carbon; 1 meg. With DPST switch.	.85
R-7	6R6310	Resistor, fixed: carbon; 8.2 meg 20% 1/3W Ins. doz.	.60
	or 6R3938	Resistor, fixed: carbon; 8.2 meg 20% 1/2W Ins.	
R-8	6R6160	Resistor, fixed: carbon; 470,000 20% 1/3W Ins. doz.	.60
	or 6R6032	Resistor, fixed: carbon; 470,000 20% 1/2W Ins.	
R-9	6R6159	Resistor, fixed: carbon; 1 meg 20% 1/3W Ins. doz.	.60
	or 6R6004	Resistor, fixed: carbon; 1 meg 20% 1/2W Ins.	
R-10	6R6345	Resistor, fixed: carbon; 390 10% 1/3W Ins. doz.	.60
	or 6R5554	Resistor, fixed: carbon; 390 10% 1/2W Ins.	
R-11	6R6345	Resistor, fixed: carbon; 390 10% 1/3 WIns. doz.	.60
	or 6R5554	Resistor, fixed: carbon; 390 10% 1/2W Ins.	
S-1	40A30444	Switch, battery saver; SPDT.	.75
S-2	Part of R-6	Switch, ON-OFF: DPST.	
T-1	1X28276	Transformer, I.F.; 455 Kc; complete with shield and trimmers.	2.40
T-2	1X28277	Transformer, Diode: 455 Kc; complete with shield and trimmers.	2.35
T-3	25X15786	Transformer, output	1.95
	1X21246	Battery Cable Assembly	.85
	7B18748	Bracket, gang mounting	.25
	7A14610	Bracket, tuning shaft	.10
	16C70088	Cabinet, table model: wood (complete)	13.10
	42K13135	Clamp, cable doz.	.15
	35K70089	Cloth, grille (Olek #421.12)	.20
	1X19897	Coil Shield & Clips Assem. (for I.F. & Diode coils)	.35
	11M8749	Cord, dial: 24 lb., black yd.	.10
	37K20865	Rubber, channel: 9/16 long (for dial plate support bracket) per/c	.80
	3S2683	Screw: #6 x 3/16 PK Z PlHH; CP (osc. coil mtg.) per/c	1.00
	3S7152	Screw: 6-32 x 1/4 SlHHMS; CP (gang & lug mtg.) per/c	.95
	3S7350	Screw (lockscrew): 6-32 x 1/4 SlHHMS; CP (gang mtg.) per/c	.80
	3S7454	Screw: #8 x 1/4 PK Z PlHH; CP (dial plate mtg.) doz.	.20
	3S7248	Screw; 6-32 x 1/8 Pl HHMS; CP (dial plate mtg.) per/c	.50
	3S7512	Screw: #8 x 1/2 PK Z PlHH; CP (gang brkt mtg.) per/c	.70
	3S8117	Screw: #8 x 1 PK Z SlHWH; antique copper pl. (chassis mtg.) doz.	.20
	34B27418	Scale, dial	.30
	47A14635	Shaft, tuning control	.15
	26A14760	Shield, tube: bantam (for 1N5)	.05
	9A6738	Socket, tube: octal, saddle (for 1N5, 1H5 & 3Q5)	.15
	9A6766	Socket, tube: octal, wafer (for 1A7)	.15
	50B71067	Speaker: 6" PM; 3 ohm V.C.	6.75
	41A14244	Spring, tension coil (dial cord). doz.	.60
	41A19997	Spring, indicator (actuates ON-OFF indicator) doz.	.40
	41A72506	Spring, tension (for ON-OFF indicator)	.10
	14A19980	Strip, antenna & ground lead insulating doz.	.30
	4A70015	Washer "C" (used on tuning shaft) per/c	.70
	35K19943	Washer, paper: 11/16 x 17/64 1/32 thick (used under knobs) per/c	.60
	4S7625	Washer, steel: 1/4 x .128 x .018 thick; CP (1A7 tube socket) per/c	.50
	4S7646	Washer, steel: 11/16 x 3/16 x .065 thick; Cop. Pl. (chassis mtg.) per/c	.80

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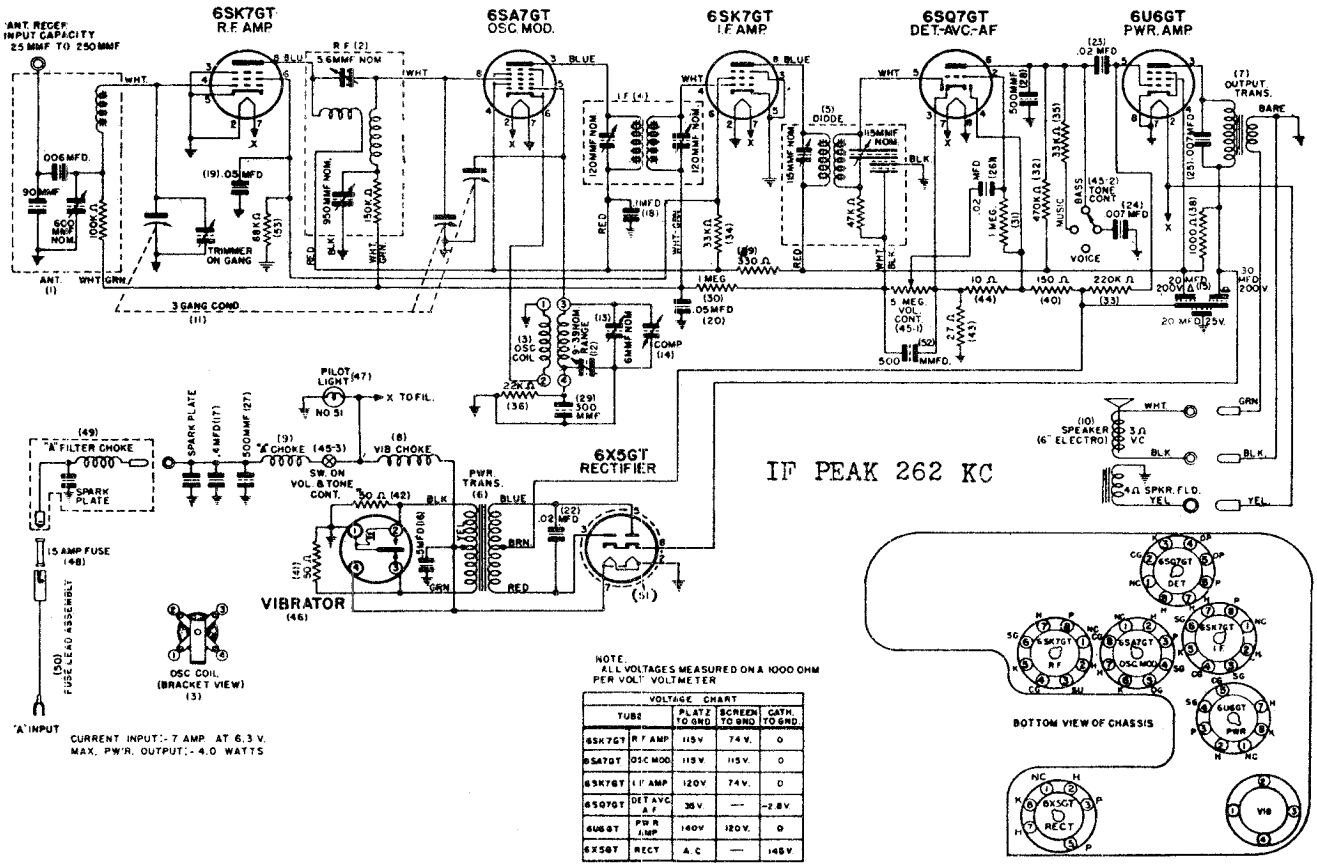
MODEL 46-C,Ch.A06

GALVIN MFG. CORP.



NOTE. ALL VOLTAGES MEASURED ON A 1000 OHM PER VOLT VOLTMETER

VOLTAGE CHART

TUBE		PLATE TO GND	SCREEN TO GND	CATH. TO GND
6SK7GT	R.F. AMP	115 V.	74 V.	0
6SA7GT	OSC. MOD.	115 V.	115 V.	0
6SK7GT	I.F. AMP	120 V.	74 V.	0
6SQ7GT	DET. AVC. A.F.	35 V.	—	-2.8 V.
6U6GT	PWR. AMP.	140 V.	120 V.	0
6X5GT	RECT.	A.C.	—	145 V.

	DIAG. NO.					
48A5067	46	Vibrator	2.50	1H30869		Front Cover & Speaker Assy. 5.10
48A5333		Vibrator	2.50			ACCESSORIES
24A17010	8	Vibrator Choke	.35	41X2157		Backing Coil Spring Fuse Rec. PerC .50
23A22738	15	Electrolytic Condenser FP	.75	14X2423		Fuse Insulator Doz. .20
25A23059	7	Output Transformer Sub. 1H29746	xxxxx	9X4075		Fuse Receptacle Doz. .20
25B23068		Power Transformer	2.35	14X4076		Bakelite Washer Fuse Rec. Doz. .10
24A23092	9	"A" Choke & Bracket	.35	14X4077		Contact Bushing-Fuse Recept. Doz. .20
1X23094	5	Diode Coil & Shield Assy.	1.50	6X4141		Distributor Suppressor .30
1X23096	4	IF Coil & Shield Assy.	1.35	65X4151	47	Bulb 6-8V.25 Amp Bayonet Type .15
1X23098	2	R. F. Coil & Shield Assy.	1.30	65X4165	48	Fuse 15 Amp. 3AG .05
25B23103	6	Power Transformer Sub.25B23068	2.35	9X4168		"A" Lead Male Ferrule Doz. .25
1X23107	1	Antenna Coil & Shield Assy.	2.65	8A4491		Generator Condenser .40
1X24020	11	Tuning Unit Assy. Cpt. w/dial scale	7.60	8K4661		Ammeter Condenser .40
1J24021		Tuning Unit & Pulley Assy. Sub. 1H24020	xxxxx	39X13513		Static Collector .10
24A24045	3	Oscillator Coil & Mtg. Strip	.70	42X15164		Ammeter Bronze Clip .10
18B24046	45	Volume & Tone Control & Switch	1.50	36A17205		Tone Control Lever .40
50B24158	10	Speaker 6" Electro	3.50	39A17479		Grounding Wiper (Curved) .05
		Speaker Exchange	2.05	15B24256		Ash Tray Assembly .45
15K29727		Outer Housing	2.10	7C24336		Receiver Mounting Bracket .20
15K29730		Front Cover Only	1.70	1H29827		"A" Lead Assy (20") .15
1J29746		Output Trans. & Eyelet Assy.	1.15	1H30775		Receiver Accessories Kit Assy. 2.15
1H30746		Rear Cover Assy.	1.75	1H30778	50	Fuse Lead Assy. .20

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ACCESSORIES (Cont'd)

1H30791 49	Filter Lead Assy.		.45

DIAL & DRIVE PARTS

41A2372	Dialite Backing Coil Spring	Doz.	.10
37A4187	Rubber Grommet-Trimmer Eye Bkt.	Doz.	.25
5S7811	Eyelet 5/16 x.210 Blk. Gang Mtg.	Doz.	.20
11M8709	Dial Cord 10" Shaft Drive	Yard	.05
11M8744	Dial Cord 22" Pointer Drive	Yard	.05
41A11091	Tension Coil Spring-Large	Doz.	.25
60A11579	Dial Light Socket & Clip		.05
37A12691	Rubber Grommet- Gang Mtg.	Doz.	.25
41A14759	Tension Coil Spring	Doz.	.25
49A16986	Cord Guide Pulley -.218 Brass	Doz.	.20
37A17013	Brake Shoe Rubber Tubing	Doz.	.20
35A17160	Push Button Pad (Felt)	Doz.	.20
35A17224	Knob Washer (Felt) Vol. Shaft	PerC.	.40
35A17640	Knob Washer (Felt)-Tun. Shaft	Doz.	.15
41A18022	Compression Coil Spring	PerC	.50
49A18288	Cord Guide Pulley 7/32 Wood	Doz.	.20
41A21885	Brake Arm Thorque Spring R.H.	Doz.	.75
41K21886	Brake Arm Torque Spring L. H.	Doz.	.75
1K23996	Pointer & Slider Assy.		.10
7A23997	Tuning Unit Mtg. Brkt.	Doz.	.20
7A23999	Volume Control Mtg. Bracket	Doz.	.40
1X24027	Plunger Pointer & Pulley Assby.		.50
1X24536	Gang Mtg. Brkt Assy.-R.H.		.30
47A24539	Tuning Drive Shaft		.15
36B29593	Control Knob 1/4" Tuning		.35
36K29594	Control Knob 3/16" Volume		.35
1H30833	Dial Escutcheon Assy.		2.15
1H30836	Scale & Background Assy.		.70
1J30867	Light Socket & Lead Assy Less Bulb		.10
1J30883	Push Button & Washer Assy.		.15
1J30889	Dial Scale & Strip Assy.		.35
1J30891	Background & Strip Assy.		.25

CONDENSERS

8A1697 26	Tubular Condenser .02-100V		.15
8A2289 24	Tubular Condenser .007-600V		.20
8A3310 18	Tubular Condenser .1-200V		.15
21R6500 27	Mica Condenser 500MMF.-20%		.15
8A13014	Condenser Resistor .006-100V 100K		.25
8A13514 20	Tubular Condenser .05-100V		.15
8A14095 17	Tubular Condenser .4-100V		.30
20A17227 13	Trimmer & Eye Brkt. 6mmf.		.20

CONDENSERS (Cont'd)

20A17935	Antenna Padder (Single)		.35
21A20877	Metal Mica Condenser 90mmf.10%		.15
20A22747	Diode Trimmer -Small		.40
20A22751	I.F. Trimmer-Double		.30
8A22760 22	Tubular Condenser .02-600V		.15
20A23102	R. F. Trimmer & Padder		.55
21A23110 29	Ceramic Mica Condenser 300mmf 5%		.25
20A23135 12	Osc. Padder & Eye Bracket		.20
8A23146 19	Tubular Condenser .05-200V		.10
20A23827 14	Compensating Condenser		.25
8A24053 23	Tubular Condenser .02-200V		.10
8A28329 16	Tubular Condenser .5-100V		.40

RESISTORS

6B6005 41	Carbon Res. 50-1/2-20 N.I.	Doz.	.60
6B6010 39	Carbon Res. 330-1/2-20 Ins.	Doz.	.60
6B6012 34	Carbon Res. 33,000-1/2-20	Doz.	.60
6B6159 30	Carbon Res. 1 Meg.-1/3-20 ins.	Doz.	.60
6B6160 32	Carbon Res. 470,000-1/3-20 NI	Doz.	.60
6B6184 38	Carbon Res. 1,000-1-20-N.I.		.10
6B6204 33	Carbon Res. 220,000-1/3-20-Ins.	Doz.	.60
6B6212 36	Carbon Res. 22,000-1/3-20-Ins.	Doz.	.60
6B6256 53	Carbon Res. 68,000-1/3-20 Ins.	Doz.	.60
6B6321	Carbon Res. 47,000-1/3-20 Ins.	Doz.	.60
6B6329 35	Carbon Res. 33,000-1/3-20 Ins.	Doz.	.60
6B6330 40	Carbon Res. 150-1-10 Ins.		.10
6B6331 43	Carbon Res. 27-1/3-10 Ins.	Doz.	.60
6B6332 44	Carbon Res. 10-1/3-10 Ins.	Doz.	.60
6B6339	Carbon Res. 150,000-1/3-20 Ins.	Doz.	.60
6B6456	Carbon Res. 150-1-10 Ins		.10

SCREWS, WASHERS, ETC.

4K4823	Cup Washer eye Brkt. Mtg.	Doz.	.10
2S7003	Nut 8-32x5/16 Hex CP-Spkr.	PerC	.50
2S7005	Nut 6-32x1/4 Hex CP Ant. Coil	Per C	.40
2S7022	Nut 1/4-20x7/16 Hex CP Set Mtg.	Per C	.60
2S7070	Nut 6-32x1/4 Inv. Pal CP-Coils	Per C	.50
2S7093	Nut 6-32x1/4 Pal CP-Coils	Per C	.45
3S7160	Screw 8-32x3/16 CP Plunger Assy	Per C	.35
3S7163	Screw 8-32x1/4CP Osc.	Per C-	.35
3S7215	Screw 1/4" PHBHMS CP Eye Brkt.	Doz.	.25
3S7217	Screw 1" Brass Ant. Padder Mtg.	Per C	.90
3S7224	Screw 1/4" Brass Ant. Core Mtg.	Per C	.50
3S7250	Screw 8-32x1" Brs. Choke Mtg.	Per C	1.00
3S7295	Screw 1/4-20x3/4CP Set Mtg.	Doz.	.30

PRICES SUBJECT TO CHANGE WITHOUT NOTICE.

SCREWS, WASHERS, ETC. (Cont'd)

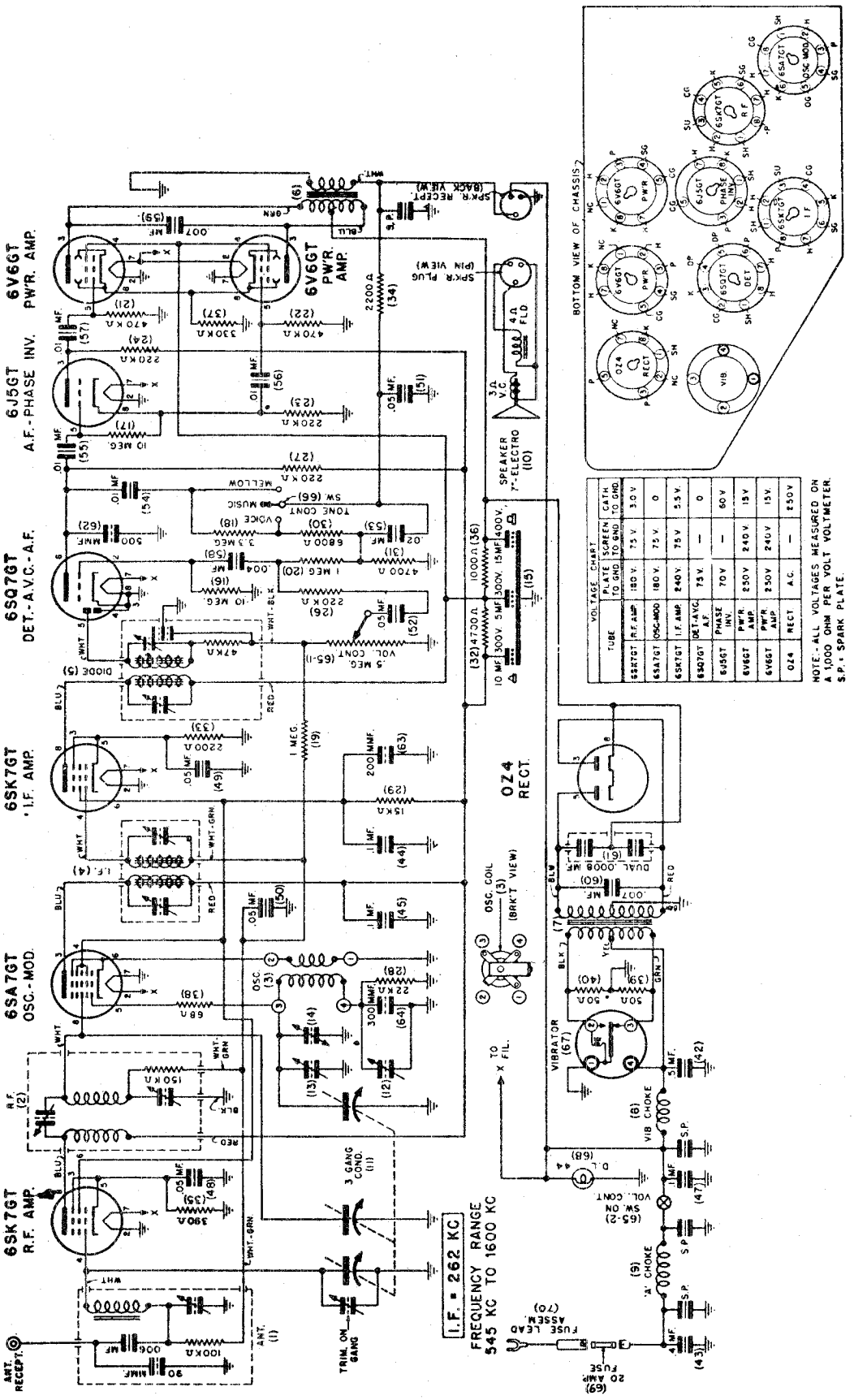
4S7573	Washer 11/16 CP-Choke Mtg.	Doz.	.15
4S7635	Washer 7/8 CP -Set Mtg.	Doz.	.25
4S7653	Lockwasher 5/16 int/ext CP-Set Mtg.	Doz.	.45
4S7657	Lockwasher #8 Ext. CP-Spkr.	Per C	.50
4S7665	Lockwasher #6 Spec. Blk.-Ant. Coil	Per C	.75
4S7666	Lockwasher #6 Ext. Blk. Ant. Coil	Per C	.50
4S7680	Lockwasher #6 Int. PhBr.-Osc.	Per C	.55
4S7688	Lockwasher1/4 Int/ext CP Set Mtg.	Doz.	.20
3A13748	Screw 8-32x17/32 CP-Tuner Mtg.	Doz.	.20
4A16962	Tuning Unit Cup Washer	Doz.	.50
3A16990	Shoulder Screw 6/32 Torque Spring	Doz.	.35
2S17206	Nut 1/2-28x5/8 Brass Hol. Cont.	Doz.	.75
2K18722	Nut 1/2-28x3/4 Cop. Pl.-Vol. Cont.	Doz.	.75
4A19232	Spring Washer 7/16 Tuning Shaft	Doz.	.30
4A21577	"C" Washer-Tuning Shaft	Per C	.65
4A24047	Spacer Washers Set Mtg.	Doz.	.50
4K24124	"C" Washer Push Buttons	Per C	.85
4K24207	Flat Washer Chrome Set Mtg.		.05
3A24808	Upset Screw Coils	Doz.	.35
4A29614	Cup Washer Set Mtg.	Doz.	.45
3S7454	Screw #8x1/4 CP Misc. Mtg'S	Doz.	.20
3S7455	Screw #8x3/8 co. Housing	Doz.	.20
3S7457	Screw #8x7/8 CP Coil Mtg.	Doz.	.25
3S7461	Screw #8x5/16 CO-Housing	Doz.	.15
3S7475	Screw #8x1/4 CP-Esc. Mtg.	Per C	.65
3S7499	Screw #8x5/8 CO -Housing	Per C	1.00

MISCELLANEOUS

42A4215	Vibrator Grounding Clip	Doz.	.75
29B5239	Soldering Lug (Long Tab)	Doz.	.15
9B6734	Tube Socket Saddle 4-Prong		.15
9B6771	Tube Socket Saddle Octal		.15
9A6774	Tube Socket Saddle Octal		.15
5S7820	Eyelet Brass CP Spkr. lead	Per C	.60
5S7824	Eyelet Brass Dial Cord	PerC	.25
38X10544	Plug Button 1/4" Cop Ox.	Doz.	.35
9A12705	Elect Ins.Wafer 1&5/16		.10
31A14655	Terminal Strip 3 ins.#3 Mtg.		.05
9K14906	Elect. Ins. Wafer Armite	Doz.	.15
37A17899	Sponge Rubber Pad-Rear Cover	Doz.	.30
42A18168	Cable Clamp-Filter Lead	PerC	.60
42A18169	Cable Clamp-Filter Lead	PerC	.60
37C24048	Speaker Gasket Rubber		.45
39A24662	Hood Wiper-Spkr. Gndg.	Doz.	.40
26A26283 51	Tube Shield		.05
1H29709	Choke Spark Plate Assy.		.10

GALVIN MFG. CORP.

MODELS 47-D1, Ch. A03, 47-D1A


6V6GT PWR. AMP.
6J5GT A.F.-PHASE INV.
6SQ7GT DET.-A.V.C.-A.F.
6SK7GT I.F. AMP.
6SA7GT OSC.-MOD.
6SK7GT R.F. AMP.
OZ4 RECT.
I.F. = 262 KC
FREQUENCY RANGE 545 KC TO 1600 KC
BOTTOM VIEW OF CHASSIS
VOLTAGE CHART
NOTE:- ALL VOLTAGES MEASURED ON A 1,000 OHM PER VOLT VOLTMETER. S.P. = SPARK PLATE.

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MODELS 47-D1, Ch. A03, 47-D1A

GALVIN MFG. CORP.

PARTS LIST MODEL 47-D1

DIAG. NO.	PART NO.	DESCRIPTION	LIST
		MAJOR PARTS	
67	48K11026	Vibrator - Blk.	$2.50
	1X17346	Choke & Brackets Assembly	.60
65	1K17377	Vol. Control & Shaft Assembly	1.00
6	25A23649	Output Transformer.	1.25
15	23A23651	Electrolytic Condenser.	.85
7	25B23652	Power Transformer	2.80
	19B23653	Tuning Unit & Gang - Subs. 1X24944.	XXXX
5	1X23654	Diode Coil & Shield Assembly.	1.55
4	1X23656	I.F. Coil & Shield Assembly	1.40
2	1X23670	R.F. Coil & Shield Assembly	1.75
1	1X23673	Antenna Coil & Shield Assembly.	2.65
	1X23675	Osc. Coil & Leads Assembly.	.65
	1X23772	Tone Switch Assembly Cpt.	1.30
	1X24944	Gang, Pulley & Brake Assembly.	5.10
		ACCESSORIES	
	7B24365	Receiver Mounting Bracket	.25
	8A4491	Generator Condenser	.40
69	65X4637	Fuse 20 Amp 3 AG.	.05
	39X4817	Shirt Marker - Rattle Clip. .DOZ.	.25
	43A13743	Spacer Bushing - Short (Spkr.). .DOZ.	.40
	6X17117	Dist. Suppressor - Plug-In.	.35
	1X17263	Antenna Brkt. & Recpt. Assembly	.25
	1X17358	Speaker Cable & Plug.	.25
	43A17389	Cover Mtg. Spacer Sleeve - Long	.10
	43A17390	Cover Mtg. Spacer Sleeve - Short.	.05
	39A17391	Housing Wiper .PAIR	.05
	64B17583	Speaker Screen & Gasket	.35
	43A17931	Receiver Mtg. Sleeve.	.10
70	1X18174	Fuse Lead Assembly 7"	.15
	1X18175	"A" Lead Assembly 18"	.15
	1X24313	M333 Fuel Gauge Filter.	.10
		DIAL & DRIVE	
	43X4326	Steel Ball (Tun. Cont.) .PER C.	.35
	5S7811	Eyelet 5/16x.210 Blk (Gang Mtg.). .DOZ.	.20
	11M8709	Dial Cord 30# Blk. 10". .YARD	.05
	11M8744	Dial Cord 18# Blk.-Wht. .YARD	.05
68	65X10867	Bulb 6-8v. Tub. Bay. Clr. #44	.10
	41A11091	Tension Coil Spring (Large) .DOZ.	.25
	14A11212	Insulating Bushing (Gang Brkt.) .DOZ.	.25
	37A12691	Rubber Grommet - Pure Gum (Gang Mtg.) .DOZ.	.25
	41A14759	Tension Coil Spring (Small) .DOZ.	.25
	32A16633	Fibre Spacer Washer (P.B.). .PER C.	.55
	38A16972	Push Button & Stud.	.15
	43X17241	Nut Bearing Assembly (Tun. Shaft) .DOZ.	.35
	62A17367	Dial Crystal.	.10
	1K17373	Tuning Shaft Assembly	.35
	1X17407	Tuning Control Assembly	.40
	38A17410	Call Letters & Instructions	.30
	35A17428	Push Button Cushion (Felt) 6 hole .DOZ.	.35
	38A17573	Tone Button Tab	.05
	38K17574	Tone Tab Cover. .DOZ.	.20
	38A18447	Push Button Jacket.	.05
	60A23728	Dial Background	.15
	1K23766	Dial Pointer.	.10
	1X23770	Pointer, Pulley & Mtg. Assembly.	.30

PART NO.	DESCRIPTION	LIST	DIAG. NO.
	DIAL & DRIVE (Cont'd.)		
1X23782	Dial Light Assembly Less Bulb	$0.10	
34B23882	Dial Scale.	.30	
36A24412	Control Knob.	.20	
	CONDENSERS		
8A1697	Tubular Condenser .02-100v.	.15	53
8A3302	Tubular Condenser .1-100v	.15	47
8A3314	Tubular Condenser .004-120v	.20	58
20A4604	Compensating Trimmer Condenser.	.35	14
8A4925	Dual Tub. Condenser .0008-.0008-1000v	.25	61
21B6500	Molded Mica Condenser 500mmf-20%.	.15	62
21B6501	Molded Mica Condenser 200mmf-20%.	.15	63
8A13014	Condenser Resistor .006-100v.-100K.	.25	
8K13166	Tubular Condenser .1-400v	.15	44
8A13506	Tubular Condenser .007-1000v.	.15	59
8A13514	Tubular Condenser .05-100v.	.15	48
8A14095	Tubular Condenser .4-100v	.30	43
8K15166	Tubular Condenser .007-1600v.	.35	60
20A17237	Trimmer & Eye Brkt. 6 mmf	.20	13
20A17935	Antenna Padder - Single	.35	
8A19133	Tubular Condenser .5-100v	.30	42
21A20877	Metal Mica Condenser 90mmf-10%.	.15	
20A22747	Trimmer Diode - Small	.40	
20A22751	Double Trimmer (120mmf Nom.) I.F.	.30	
21A23110	Ceramic Mica Condenser 300mmf-5%.	.25	64
20A23135	Osc. Padder & Eye Bracket	.20	12
8K23690	Tubular Condenser .01-400v.	.10	54
	RESISTORS		
6B6005	Carbon Resistor 50-1/2-20 .DOZ.	.60	39
6B6013	Carbon Resistor 15,000-1-20 N.I	.10	29
6B6070	Carbon Resistor 150,000-1/3-20 N.I. .DOZ.	.60	
6B6159	Carbon Resistor 1 Meg-1/3-20 Ins. .DOZ.	.60	19
6B6160	Carbon Resistor 470,000-1/3-20 N.I. .DOZ.	.60	22
6B6184	Carbon Resistor 1000-1-20 N.I	.10	36
6B6201	Carbon Resistor 3.3 meg-1/3-20 Ins. .DOZ.	.60	18
6B6204	Carbon Resistor 220,000-1/3-20 Ins. .DOZ.	.60	26
6B6212	Carbon Resistor 22,000-1/3-20 Ins .DOZ.	.60	28
6B6254	Carbon Resistor 330-1-10 Ins.	.10	37
6B6240	Carbon Resistor 2,200-1/3-20 Ins. .DOZ.	.60	34
6B6321	Carbon Resistor 47,000-1/3-20 Ins .DOZ.	.60	
6B6335	Carbon Resistor 1000-1/3-10 Ins .DOZ.	.60	
6B6348	Carbon Resistor 10 meg-1/3-20 Ins .DOZ.	.60	16
6B6349	Carbon Resistor 220,000-1/3-10 Ins. .DOZ.	.60	23
6B6350	Carbon Resistor 6,800-1/3-10 Ins. .DOZ.	.60	30
6B6351	Carbon Resistor 4,700-1/3-10 Ins. .DOZ.	.60	31
6B6352	Carbon Resistor 4,700-1-20 Ins.	.10	32
6B6353	Carbon Resistor 2,200-1/3-10 Ins. .DOZ.	.60	33
6B6367	Carbon Resistor 68-1/3-20 Ins .DOZ.	.60	38
17A24172	Regulating Resistor	.25	
	SCREWS, WASHERS, ETC.		
2S7005	Nut 6-32x1/4 Hex CP - Gang Mtg. .PER C.	.40	
2S7018	Nut 3/8-32x1/2 Hex CP - Vol. Cont .DOZ.	.15	
2S7022	Nut 1/4-20x7/16 Hex CP - Set Brkt .PER C.	.60	
2S7030	Nut 10-24x3/8 Hex Br. - Cvr. Mtg. .PER C.	.75	
2S7035	Nut 5/16-18x5/8 CP - Set Mtg. .DOZ.	.20	
3S7215	Screw 8-32x3/16 CP - Trimmer. .DOZ.	.25	
3S7274	Screw 4-36x3/16 CP - Tone Ratchet .DOZ.	.15	
3S7347	Screw 5-40x1/2 CP - Tone Sw .PER C.	.55	
3S7350	Lockscrew 6-32x1/4 CP - T.C. Mtg. .PER C.	.80	
3S7454	Screw 8x1/4 PK Z PlHH CP. .DOZ.	.20	
3S7455	Screw 8x3/8 PK A SLAH CO - Hsg. .DOZ.	.20	
3S7456	Screw 8x1/4 PK A ACHD Cop. Oxd. .PER C.	.65	
3S7457	Screw 8x7/8 PK A CP - Coil Mtg. .DOZ.	.25	
3S7499	Screw 8x5/8 PK A Cop. Oxd.-Hsg. .PER C.	1.00	

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MODEL 47-D1 Continued

PART NO.	DESCRIPTION	LIST
	SCREWS, WASHERS ETC. (Cont'd.)	
3S7506	Screw 6x1/4 Pk A CP - Osc. Coil . . .PER C.	$0.50
3S7512	Screw 8x1/2 PK Z CP - Gang Mtg. . . .PER C.	.70
3S7516	Screw 8x3/8 PK A Blk. Oxd.-Wiper. . .PER C.	1.00
4S7552	Washer 7/16 CP - Gang Mtg . . . . . .PER C.	.55
4S7613	Washer 3/4 BO - Cover . . . . . .PER C.	1.00
4S7635	Washer 7/8 CP - Set Brkt. . . . . .DOZ.	.25
4S7649	Washer 1 & 5/16 Wrt. CP-Set Mtg . . . .DOZ.	.35
4S7650	Lockwasher #6 Int. CP - Gang Mtg. . .PER C.	.60
4S7655	Lockwasher 3/8 Split Blk. - V.C. Sw .PER C.	.60
4S7657	Lockwasher #8 Ext. BO - Sm.Tone Brkt.PER C.	.50
4S7658	Lockwasher #10 Int. Blk. - Cvr. Mtg .PER C.	.35
4S7670	Lockwasher 1/4 Int. - Set Brkt. . . .PER C.	.50
4S7674	Lockwasher 5/16 Int. CP-Set Mtg . . .PER C.	.55
4S7678	Lockwasher 1/4 Ext. BO - Set Brkt . .PER C.	.60
3S8126	Screw 8x1&1/4 PK A-Pwr. Trans . . . . .DOZ.	.20
4K11722	"C" Washer 11/32 CP - Vol. Cont . . .PER C.	.35
3A17388	Cover Mtg. Screw 10-24 Spec . . . . . .DOZ.	.45
2A17569	Wing Nut 10-24x1&3/8 CO - Cover . . . .DOZ.	.30
1X17921	Screw & Bushing Assembly - Spkr	.05
3A18008	Serrated Cap Screw - Set Mtg. . . . . .DOZ.	.20
2A20464	Speaker Mounting Nut. . . . . .DOZ.	.20
4A23716	Clamping Washer Plate - Tone Drum . .PER C.	.80
2A24411	Mounting Nut. . . . . .DOZ.	.85

PART NO.	DESCRIPTION	LIST	
	MISCELLANEOUS		
37A4187	Rubber Grommet - Trimmer. . . . . .DOZ.	$0.25	
4K4823	Cup Washer Cop. Pl. - Trimmer . . . .DOZ.	.10	
9B6734	Tube Socket Saddle 4 prong.	.15	
9B6771	Tube Socket Saddle Octal.	.15	
9A6774	Tube Socket Saddle Octal.	.15	
38X10544	Plug Button 1/4" Cop. Oxd . . . . . .DOZ.	.25	
14K11244	Insulating Washer - Gang Brkt . . . .PER C.	.50	
7A17349	Vol. Control Mtg. Bracket	.05	
24A17362	Vibrator Choke - 8 pie.	.35	8
24A17363	"A" Choke - 2 pie	.25	9
38X17563	Plug Button (1/2 for 1/16) CO . . . . .DOZ.	.35	
56X23811	Packing Carton & Fillers.	.40	
64A11245	Switch Holding Plate - Tone Sw. . . . .DOZ.	.25	
41A23713	Coil Spring - Large - Tone Button . . .DOZ.	.25	
45A23715	Ratchet Pawl (Tinned) Tone Drum . . . .DOZ.	.30	
7A23720	Indicator Bracket (Small) Center.	.10	
34A23722	Tone Indicator Strip.	.10	
1A23723	Pawl Brkt. & Shaft Assembly	.10	
1A23742	Tone Control Muting Switch.	.50	66
67B23747	Indicator Drum & Cam.	.25	
41A23759	Coil Spring (Small) Tone Drum . . . .PER C.	.70	
45K23760	Ratchet Pawl (Phos.Brz.) Tone Drum. . .DOZ.	.30	
45K23780	Spacer Bushing - T.C. Mtg . . . . . .DOZ.	.25	

4A21408	Clutch Spring Washer 7/16 Brz. Per C.	.75
64A29579	Trim Strip Chrome	.40
38B29608	Push Button & Stud Plain	.15
38K29611	Push Button & Stud Tone	.15
1H29789	Receiver Access. Kit Assy.	1.85
15K29795	Housing Shell	1.45
15K29796	R.H. Bottom Cover	1.30
15K29797	L. H. Top Cover	1.40
50B29974	Speaker 7" Electro	4.75
	Speaker Exchange	2.80
50B29975	Speaker 7" Electro	4.75
62K29976	Front Housing	1.85

CIRCUIT SAME AS 47 D 1

MODEL 47D1A PARTS PRICE LIST MAJOR PARTS

48A5067	Vibrator	2.50
48K11026	Vibrator (Black)	2.50
1X17346	Chokes & Bracket Assy.	.60
24A17362	Vibrator Choke 8 Pie	.35
24A17363	"A" Choke (2pie)	.25
25A23649	Output Transformer	1.25
23A23651	Electrolytic Condenser	.85
25B23652	Power Transformer	2.80
19B23653	Tuning Unit & Gang Sub.1H23676	xxxxxx
1X23654	Diode Coil & Shield Assy.	1.55
1X23656	I.F. Coil & Shield Assy.	1.40
1X23670	R. F. Coil & Shield Assy.	1.75
1X23673	Antenna Coil & Shield Assy.	2.65
1X23675	Oscillator Coil & Leads Assy.	.65
1X23676	Tuning Unit Assy.	6.75
48A27393	Vibrator (Heavy Duty)	2.50
15K29795	Hosung Shell	1.45
50B29974	Speaker 7" Electro	4.75
	Speaker Exchange	2.80
50B29975	Speaker 7" Electro	4.75
	Speaker Exchange	2.80
1J30377	Vol. Control Shaft & Mtg. Assy.	.90
1H30737	Bottom Cover Assy R. H.	1.40
1H30743	Top Cover Assy. L. H.	1.50

MODEL 47D2 PARTS PRICE LIST SAME AS MODEL 47D1A EXCEPT:

8A1400	Tubular Condenser .01-100V	.15
8A2289	Tubular Condenser .007-600V	.20
14X2423	Fuse Insulator Doz.	.20
8A3310	Tubular Condenser .1-200V	.15
14X4077	Contact Bushing Fuse Doz.	.20
65X4165	Fuse 15 Amp 3AG	.05
48A5333	Vibrator	2.50
6B6010	Carbon Resistor 330-1/2-20 In.s Doz.	.60
6B6054	Carbon Resistor 10,000-1/2-20 Ins. Doz.	.60
6B6165	Carbon Resistor 100,000-1/3-20 Ins. Doz.	.60
6B6330	Carbon Resistor 150-1-10-Ins.	.10
6B6332	Carbon Resistor 10-1/3-10 Ins. Doz.	.60
6B66354	Carbon Resistor 8,200-1/3-10 Ins. Doz.	.60
6B6355	Carbon Resistor 39,000-1/3-20 Ins. Doz.	.60
6B6356	Carbon Resistor 22-1/3-10 Ins Doz.	.60
6B6456	Carbon Resistor 150-1-10-Ins.	.10
5S7820	Eyelet Speaker Cable Small Per	.60
5S7855	Eyelet Speaker Cable Large Per	.70
8A12841	Tubular Condenser .05-300V	.15
21A12843	Ceramic Condenser 50 mmf-20-100	.15
31K14509	Terminal Strip 4 ins. #3 Mtg.	.05
9K14906	Elect. Ins. Wafer Armite Doz.	.15
14K15252	Dialite Bushing Contact Doz.	.20
1X17360	Light Socket & Lead Assy.	.20
20A18179	Compensating Condenser	.25
1X20526	Speaker Cable & Tips Assy.	.20
23A22738	Electrolytic Condenser FP	.75
8A22760	Tubular Condenser .02-600V	.15
25A23059	Output Transformer	1.00
25B23068	Power Transformer	2.35
24A23792	Oscillator Coil	.65
19B23793	Tuning Unit & Gang Sub. 1H23825	xxxx
25K23794	Power Transformer Sub. 25B23068	2.35
1X23796	Diode Coil & Shield Assy.	1.55
1X23798	IF Coil & Shield Assy.	1.40
1X23805	Antenna Coil & Shield Assy.	2.00
1X23810	Oscillator Coil & Leads Assy.	.65
1X23825	Tuning Unit Assy.	4.50
21A26226	Tubular Ceramic Condenser 50mmf	.10
39K26814	Grounding Wiper Doz.	.30
40A26969	Tone Control Switch	.45
1H29793	Receiver Accessory Kit Assy.	1.75

PRICES SUBJECT TO CHANGE WITHOUT NOTICE

MODELS 47-D2,Ch.A17;
47-D2A,Ch.A18

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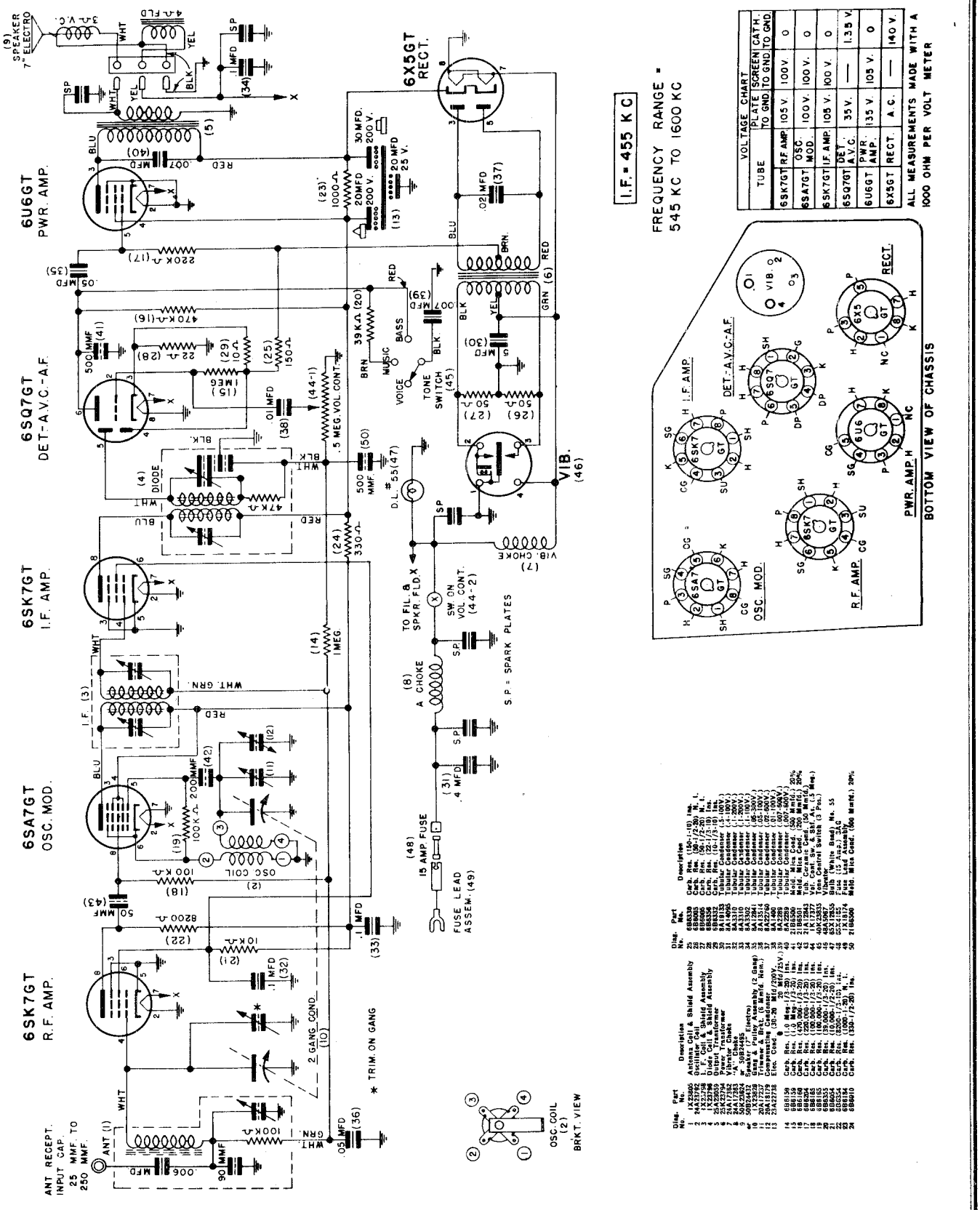

VOLTAGE CHART				
TUBE		PLATE TO GND	SCREEN TO GND	CATH. TO GND
6SK7GT	R.F. AMP.	105 V.	100 V	0
6SA7GT	OSC. MOD.	100 V.	100 V.	0
6SK7GT	I.F. AMP.	105 V.	100 V.	0
6SQ7GT	DET. A.V.C.	35 V.	—	1.35 V.
6U6GT	PWR. AMP.	135 V.	105 V.	0
6X5GT	RECT.	A.C.	—	140 V.

Dia. No.	Part No.	Description
1	1X25805	Antenna Coil & Shield Assembly
2	2AA33782	Oscillator Coil
3	2AA33783	I.F. Coil & Shield Assembly
4	1X32798	Diode Coil & Shield Assembly
5	2SA32805	Output Transformer
6	2SA32804	Power Transformer
7	2AA17382	Vibrator Choke
8	2AA17383	A Choke
*	3B28485	
9	5B25437Z	Speaker (7" Electro)
10	2SA18729	Gang & Pulley Assembly (2 Gang)
11	2AA17229	Trimmer & Brkt. (5 Mmfd. Rem.)
12	2SA32738	Compensating Condenser, Elec. Cond. ● (30-30 Mfd/250V.)
13	6B1139	Carb. Res. (1.0 Meg./1/2-20) Ins.
14	6B1140	Carb. Res. (1.5 Meg./1/2-20) Ins.
15	6B6168	Carb. Res. (40,000/1/2-20) Ins.
16	6B6169	Carb. Res. (50,000/1/2-20) Ins.
17	6B8185	Carb. Res. (100,000/1/2-20) Ins.
18	6B8165	Carb. Res. (150,000/1/2-20) Ins.
19	6B8166	Carb. Res. (220,000/1/2-20) Ins.
20	6B8054	Carb. Res. (10,000/1/2-20) Ins.
21	6B8054	Carb. Res. (8200/1/2-20) Ins.
22	6B8054	Carb. Res. (5000/1/2-20) I. L.
23	6B8010	Carb. Res. (1000/1/2-20) Ins.
24	6B8010	Carb. Res. (330-1/2-20) Ins.
25	6B8539	Carb. Res. (150-1/2-10) Ins.
26	6B8003	Carb. Res. (50-1/2-20) W. L.
27	6B8003	Carb. Res. (50-1/2-20) W. L.
28	6B8356	Carb. Res. (22-1/2-10) Ins.
29	6B8313	Carb. Res. (10-1/2-10) Ins.
30	6B8313	Carb. Res. (10-1/2-10) Ins.
31	2A14005	Tubular Condenser (.4-100V.)
32	6A3310	Tubular Condenser (.1-200V.)
33	6A3310	Tubular Condenser (.1-200V.)
34	6A3302	Tubular Condenser (.1-100V.)
35	6A3294	Tubular Condenser (.05-400V.)
36	2A13514	Tubular Condenser (.05-100V.)
37	6A22760	Tubular Condenser (.02-600V.)
38	6A3294	Tubular Condenser (.01-400V.)
39	6A3288	Tubular Condenser (.007-600V.)
40	2B2259	Tubular Condenser (.007-600V.) Molded Mica Cond. (500 Mmfd.) 20%
41	2B2259	Molded Mica Cond. (500 Mmfd.) 20%
42	21B8561	Molded Mica Cond. (200 Mmfd.) 20%
43	21B8561	Molded Mica Cond. (50 Mmfd.) 20%
44	1K13773	Vol. Cont. Sw. & Bat. Ar. (3 Mes)
45	40X23835	Tone Control Switch (3 Pos.)
46	5B25437	Vibrator
47	8X13855	Bulb (White Base) No. 55
48	5SX1125	Fuse (15 Amp.) 3AG
49	6B8554	Fuse Lead Assembly
50	21B8300	Molded Mica Cond. (600 Mmfd.) 20%

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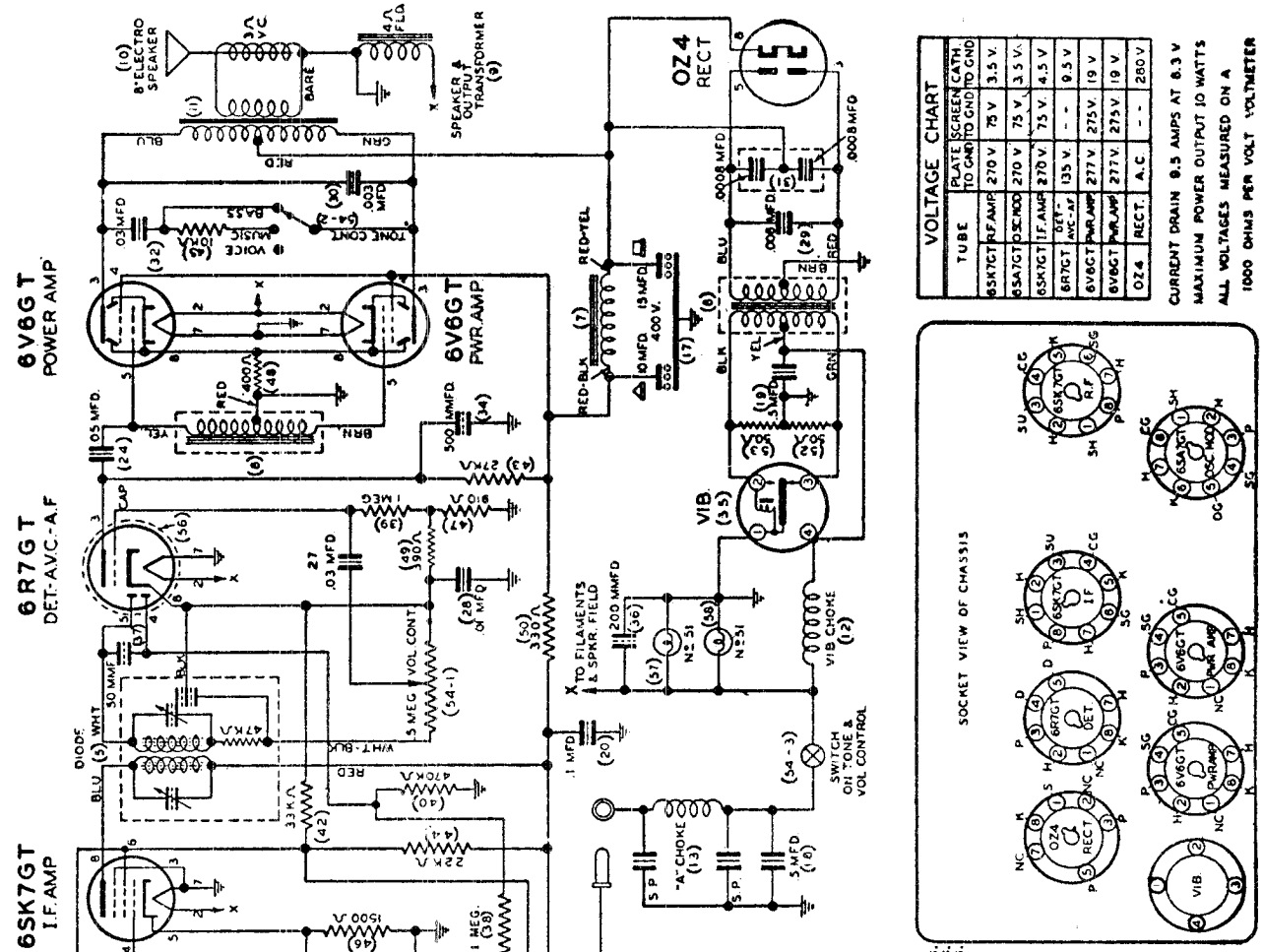
For Parts List, see P.15-35

GALVIN MFG. CORP.

MODELS 49-B, Ch. A04; 49-BU, Ch. All



VOLTAGE CHART

TUBE	PLATE TO GND	SCREEN TO GND	CATH. TO GND
6SK7GT R.F. AMP	270 V	75 V	3.5 V.
6SA7GT OSC.MOD	270 V	75 V	3.5 V.
6SK7GT I.F. AMP	270 V	75 V	4.5 V
6R7GT DET-AVC-AF	135 V.	- -	9.5 V
6V6GT PWR.AMP	277 V	275 V	19 V
6V6GT PWR.AMP	277 V	275 V	19 V
OZ4 RECT.	A.C.	- -	280 V

CURRENT DRAIN 0.5 AMPS AT 6.3 V
MAXIMUM POWER OUTPUT 10 WATTS
ALL VOLTAGES MEASURED ON A 1000 OHMS PER VOLT VOLTMETER

MODEL 49-B SCHEMATIC DIAGRAM PARTS LIST (CHASSIS NO. A04)

DIAG. NO.	PART NO.	DESCRIPTION
1	1X25175	ANTENNA COIL & SHIELD ASSEMBLY
2	1X25173	R.F. COIL & SHIELD ASSEMBLY
3	2U42598	OSCILLATOR COIL
4	1X25174	OSC. COIL & SHIELD ASSEMBLY
5	1X25149	DIODE COIL & SHIELD ASSEMBLY
6	2S62350	POWER TRANSFORMER
7	2S417193	FILTER CHOKE
8	2S42366	INPUT CHOKE
9	5082621	SPEAKER & OUTPUT TRANSFORMER
10	5082622	SPEAKER (8" ELECTRO)
11	2S617099	OUTPUT TRANSFORMER ONLY
12	2U42367	VIBRATOR CHOKE
13	2U42683	"A" CHOKE
14	1X25197	TUNING UNIT, GANG & PULLEY ASSEMBLY
15	20A17153	OSC. TRIMMER, PADDER & RENT.
16	20A29827	COMPENSATING CONDENSER
17	23A17190	ELECT. COND. (10-15 MFD/400 V.)
18	8A17028	TUBULAR CONDENSER (.5-100V.)
19	8A19133	TUBULAR CONDENSER (.5-100V.)
20	8A19136	TUBULAR CONDENSER (.1-100V.)
21	8A1302	TUBULAR CONDENSER (.1-400V.)
23	8A10791	TUBULAR CONDENSER (.05-400V.)
24	8A10791	TUBULAR CONDENSER (.05-400V.)
25	8A19514	TUBULAR CONDENSER (.05-100V.)
26	8A19514	TUBULAR CONDENSER (.05-100V.)
27	8A3303	TUBULAR CONDENSER (.03-100V.)
28	8A1100	TUBULAR CONDENSER (.01-100V.)
29	8A12840	TUBULAR CONDENSER (.006-1600V.)
30	8A13165	TUBULAR CONDENSER (.005-1000V.)
31	8A42925	TUBULAR CONDENSER (DUAL .0006-1000V.)
32	8K23465	TUB. COND. & STRAP (.05-1000V.)
34	8186500	MOLDED MICA COND. (500 MMFD) 20%
35	21A17006	CERAMICA MICA COND. (250 MMFD) 5%
36	2100701	SELECT MICA COND. (200 MMFD) 20%
37	8186903	MOLDED MICA COND. (50 MMFD) 20%
39	686159	CARBON RESISTOR (1.0 MEG-1/2-20) INS.
39	686159	CARBON RESISTOR (1.0 MEG-1/2-20) INS.
40	686338	CARBON RESISTOR (470,000-1/2-10) INS.
42	686012	CARBON RESISTOR (33,000-1/2-20) INS.
43	686340	CARBON RESISTOR (27,000-1/2-20) INS.
44	686361	CARBON RESISTOR (22,000-1-10) INS.
45	686355	CARBON RESISTOR (10,000-1/2-20) INS.
46	686342	CARBON RESISTOR (1500-1/2-20) INS.
47	686343	CARBON RESISTOR (910-1/2-10) INS.
48	686341	CARBON RESISTOR (100-1-2?) INS.
49	686345	CARBON RESISTOR (330-1/2-20) INS.
50	685550	CARBON RESISTOR (220-1/2-10) INS.
52	686005	CARBON RESISTOR (50-1/2-20) N.I.
53	686005	CARBON RESISTOR (50-1/2-20) N.I.
54	18K23089	VOL. TONE CONTROL & SWITCH (.5 MEG)
55	2AM11826	VIBRATOR
56	2S611760	BANTAM TUBE SHIELD
57	6S4A151	BULB (WHITE BEAD) #51
58	6S4A151	BULB (WHITE BEAD) #51
59	6S4A57	FUSE (20 AMP.) 3AG
60	1X2488	BATTERY LEAD ASSEMBLY
61	686212	CARBON RESISTOR (22,000-1/2-20) INS.

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MODEL 49-B,Ch.A04,
49-BU,Ch.All

GALVIN MFG. CORP.

MODEL 49-Bu PARTS PRICE LIST
SAME AS MODEL 49-B EXCEPT:

4S7688	Lockwasher 1/4 Int. Ext. Set Mtg.	Doz.	.20
3S8039	Cap Screw 1/4-20x3/8 CP Set Mtg.	Doz.	.40
11M8709	Dial Cord 30 lb. Blk.	Yard	.05
11M8744	Dial Cord 18 lb. Blk. Wht.	Yard	.05
37A17285	Light Bracket Band	Doz.	.20
1X24844	Fuse Lead Assy.		.10
1H29794	Receiver Accessories Kit Assy.		1.25
60A30048	Dial Scale Background		.15
18B30314	Volume & Tone Swithh		1.70
47K30318	Tuning Drive Shaft		.25
36K30341	Tuning Control Knob 1/4" Hole		.25
36K30342	Volume Control Knob 3/16" Hole		.25
37A30716	Dial Scale Pad	Per C	.80
15K30749	Welded Shell & Back		3.75
7A30754	Receiver Mounting Bracket R. H.		.15
7K30755	Receiver Mounting Brakct L. H.		.15
50B31086	Speaker & Output Transformer		6.35
	Speaker Exchange		3.75
1H31143	Battery Lead Assy.		.25
1J31179	Escutcheon & Pad Assy.		1.60
1J31186	Dial Scale & Pads Assy.		.25
1J31187	Push Button Assy.		.15
1H31192	Background & Strips Assyl		.20
50B31555	Speaker & Output Transformer		6.35
	Speaker Exchange		3.75

MODEL 49-B PARTS PRICE LIST
MAJOR PARTS

48K11026	Vibrator Blk.	2.50
25B17099	Output Transformer	1.50
25A17103	Filter Choke	.75
23A17190	Electrolytic Condenser FP	1.00
25B23250	Power Transformer	3.65
25A23466	Input Choke	1.70
24K23467	Vibrator Choke 6 Pie	.50
1X23468	Oscillator Coil & Leads Assy.	.65
1X23469	Diode Coil & Shield Assy	1.50
1X23471	I.F. Coil & Shield Assy.	1.40
1X23473	R. F. Coil & Shield Assy.	1.75
1X23475	Antenna Coil & Shield Assy.	2.75
24K23483	"A" Choke	.25
1X23487	Front Cover & Bushing Assy.	1.25
50B23621	Speaker & Output Transformer	5.50
	Speaker Exchange	3.25
1X24205	Tuning Unit Assy Cpt. W Dial	6.80
50B24493	Speaker & Output Transformer	5.50
50B24929	Speaker & Output Transformer	5.50
48A27393	Vibrator Heavy Duty	2.50
1H29928	Bottom Cover Assy.	.85
1J30145	Trimmers Brkt. & Grommet Assy.	.40
15K30286	Welded Back & Shell	3.75
18B30643	Volume & Tone Control	1.70

ACCESSORIES

41X2157	Backing Coil Spring Fuse Lead	Per	.50
14X2423	Fuse Insulator Fuse Lead	Doz.	.20
9X4075	Fuse Receptacle Fuse Lead	Doz.	.20
14X4076	Backing Washer Fuse Lead	Doz.	.10
14X4077	Contact Bushing Fuse Lead	Doz.	.20
6X4141	Distributor Suppressor		.30
9X4168	"A" Lead Male Ferrule	Doz.	.25
1X4288	Battery Lead Assy.		.40
8A4491	Generator Condenser		.40
65X4637	Fuse 20 Amp 3AG		.05
1X4894	Fuse Lead Assembly 20"		.25
1X4895	"A" Lead Assembly 10"		.25
65X12712	Fuse 20 Amp SFE		.05
1H29790	Receiver Accessory Kit Assy.		1.20

DIAL & DRIVE PARTS

41A2372	Dialite Backing Coil Spring	Doz.	.10
65X4151	Bulb 6-8VRnd. Bay Clr. #51		.15
41A11091	Tension Coil Spring Pointer Drive	Doz.	.25
41A14759	Tension Coil Spring Shaft Drive	Doz.	.25

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MODEL 49-B,Ch.A04;
49-BU,Ch.All

DIAL & DRIVE PARTS (Cont'd)

14K15252	Dialite Contact Bushing	Doz	.20
38A17093	Call Letter Tab Cover		.05
38A17094	Call Letter Backing		.05
35A17160	Push Button Pad Felt	Doz.	.20
1B17171	Push Button Plunger Assy.		.20
60A17178	Dial Light Socket & Bracket		.05
35A17224	Knob Washer Felt	Per C	.40

CONDENSERS

8K13166	Tubular Condenser .1-400V		.15
8A13514	Tubular Condenser .05-1COV		.15
8A14791	Tubular Condenser .05-400V		.15
8A17028	Tubular Condenser .5-100V		.25
20A17153	Double Trimmer & Spec.Brkt.		.35
20A17935	Antenna Padder Single		.35
21A19088	Ceramic Condenser 250mmf 5%		.20
8A19183	Tubualr Condenser .5-1COV		.30
21A20877	Metal Mica Condenser 90mmf 10%		.15
20A22747	Diode Trimmer		.40
20A22751	I. F. Trimmer-Double		.30
20A23102	R. F. Trimmer & Padder		.55
20A23827	Compensating Condenser		.25
8K23465	Tubular Cond. & Strap .03-1000V		.25

RESISTORS

6B5558	Carbon Resistor 200-1/3-10 Ins.	Doz.	.60
6B6005	Carbon Resistor 50-1/2-20 N.I.	Doz.	.60
6B6010	Carbon Resistor 330-1/2-20 Ins.	Doz.	.60
6B6012	Carbon Resistor 33,000-1/2-20 Ins.	Doz.	.60
6B6159	Carbon Resistor 1 Meg-1/3-20 Ins.	Doz.	.60
6B6212	Carbon Resistor 22,000-1/3-20 Ins.	Doz.	.60
6B6255	Carbon Resistor 10,000-1/3-20 Ins.	Doz.	.60
6B6321	Carbon Resistor 47,000-1/3-20 Ins.	Doz.	.60
6B6338	Carbon Resistor 470,000-1/3-10 Ins.	Doz.	.60
6B6339	Carbon Resistor 150,000-1/3-20 Ins.	Doz.	.60
6B6340	Carbon Resistor 27,000-1/3-10 Ins.	Doz.	.60
6B6341	Carbon Resistor 22,000-1-10 Ins.		.10
6B6342	Carbon Resistor 1.500-1/3-20 Ins.	Doz.	.60
6B6343	Carbon Resistor 910-1/3-5 Ins.	Doz.	.60
6B6344	Carbon Resistor 400-1-20 Ins.		.10
6B6345	Carbon Resistor 390-1/3-10 Ins.	Doz.	.60
6B6457	Carbon Resisotr 22,000-1-10 Ins.		.10

SCREWS, WASHERS, ETC.

4K4823	Cup Washer Cop. Pl Trimmer Mtg.	Doz.	.10
2S7003	Nut 8032x5/16 Hex CP Spkr.	Per. C	.50
2S7005	Nut 6-32x1/4 Hex CP Ant. Coil	Per C	.40
2S7022	Nut 1/4-20x7/16 Hex Set Mtg.	Per C	.60
2S7070	Nut 6-32x1/4 Inv. Pal Coils	Per C	.50
2S7093	Nut 6-32x1/4 Pal Cop. Pl Coils	Per C	.45
3S7160	Screw 3/16" CP Plunger Bkt. Mtg	Per C	.35

SCREWS, WASHERS, ETC. (Cont'd)

3S7217	Screw 1" Brass Ant. Padder Mtg.	Per C	.90
3S7224	Screw 1/4" Brass Coils	Per C	.50
3S7454	Screw #8x1/4 CP Misc. Mtg.	Doz.	.20
3S7456	Screw #8x1/4 Cop. Ox. Housing	Per C	.65
3S7457	Screw 7/8" CP Coil Mtgs.	Doz.	.25
3S7461	Screw 5/16" Cop Ox. Housing	Doz.	.15
3S7499	Screw 5/8" Cop. Ox. Housing	Per C	.00
3S7506	Screw #6x1/4CP Osc. Mtg.	Per C	.50
3S7508	Screw 1/4" Blk Tuning Unit Mtg.	Per C	.65
4S7609	Washer 1-5/16" CP Set Mtg	Doz.	.35
4S7635	Washer 7/8" CP Set Mtg.	Doz.	.25
4S7650	Lockwasher #6 Int. CP Eye Bkt. Mtg.	Per C	.50
4S7657	Lockwahher #8 Ext. Spkr.	Per C	.50
4S7665	Lockwahher #6 Spec. Coils	Per C	.75
4S7666	Lockwasher #6 Ext. Ant. Coil	Per C	.50
4S7670	Lockwasher 1/4" Int. -Set Mtg.	Per C	.50
5S7831	Eyelet 13/16" Long-P.B. Plunger	Doz.	.25
3S8126	Screw 1-1/4" CP -Pwr. Trans.	Doz.	.20
3S8131	Screw 1-7/8" SS -Choke Mtg.	Doz.	.65
3A13748	Screw 17/32" CP-Gang Bkt. Mtg.	Doz.	.20
2K18722	Nut Cop. Pl Hex -Vol.Cont.	Doz.	.75
2K23491	Spacer Nut Hex Vol. Cont.		.15
3A23753	"J" Bolt -Set Mtg.	Doz.	.60
4K24124	"C" Washer -Tuning Shaft	Per C	.85
4A24333	Cup Washer -Chrome Tuning Nut	Doz.	.50

MISCELLANEOUS

31A493	Terminal Strip 2 ins. #2 Mtg.		.05
31A3224	Terminal Strip 3 ins. #3 Mtg.		.10
37A4187	Rubber Grommet-Eye Bkt. Mtg.	Doz.	.25
39X4205	Hood Woper-Power Trans.	Doz.	.25
42A4215	Vibrator Groundgin Clip	Doz.	.75
29B5249	Soldering Lug	Per C	.75
29B5265	Soldering Lug.	Doz.	.20
29B5404	Insl. Pin Terminal Rod "A" Lead		.05
42B5480	Grid Clip Small Collar Grip	Doz.	.15
9B6734	Tube Socket Saddle 4 Prong		.15
9B6771	Tube Socket Saddle Octal		.15
9A6774	Tube Socket Saddle Octal		.15
9A6782	Tube Socket Inverted Octal		.15
38X10544	Plug Button 1/4" Cop. Ox.	Doz.	.25
37A12691	Rubber Grommet Gang Mtg.	Doz.	.25
37X14051	Rubber Sleeve "A" Lead	Doz.	.20
26X14760	Bantam Tube Shield		.05
37A15831	Sponge Rubber Pad- Bottom Cover	Doz.	.45
39A17179	Grounding Wiper-Bottom Cover		.05
37A17216	Speaker Gasket Front Cover		.15
32A18493	Fibre Space Washer Dial Lights	Per C	.35
26A26283	Tube Shield		.05
26C24534	Hash Shield		.05
64K30296	Speaker Screen		.10

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MODEL 50-P,Ch.A05

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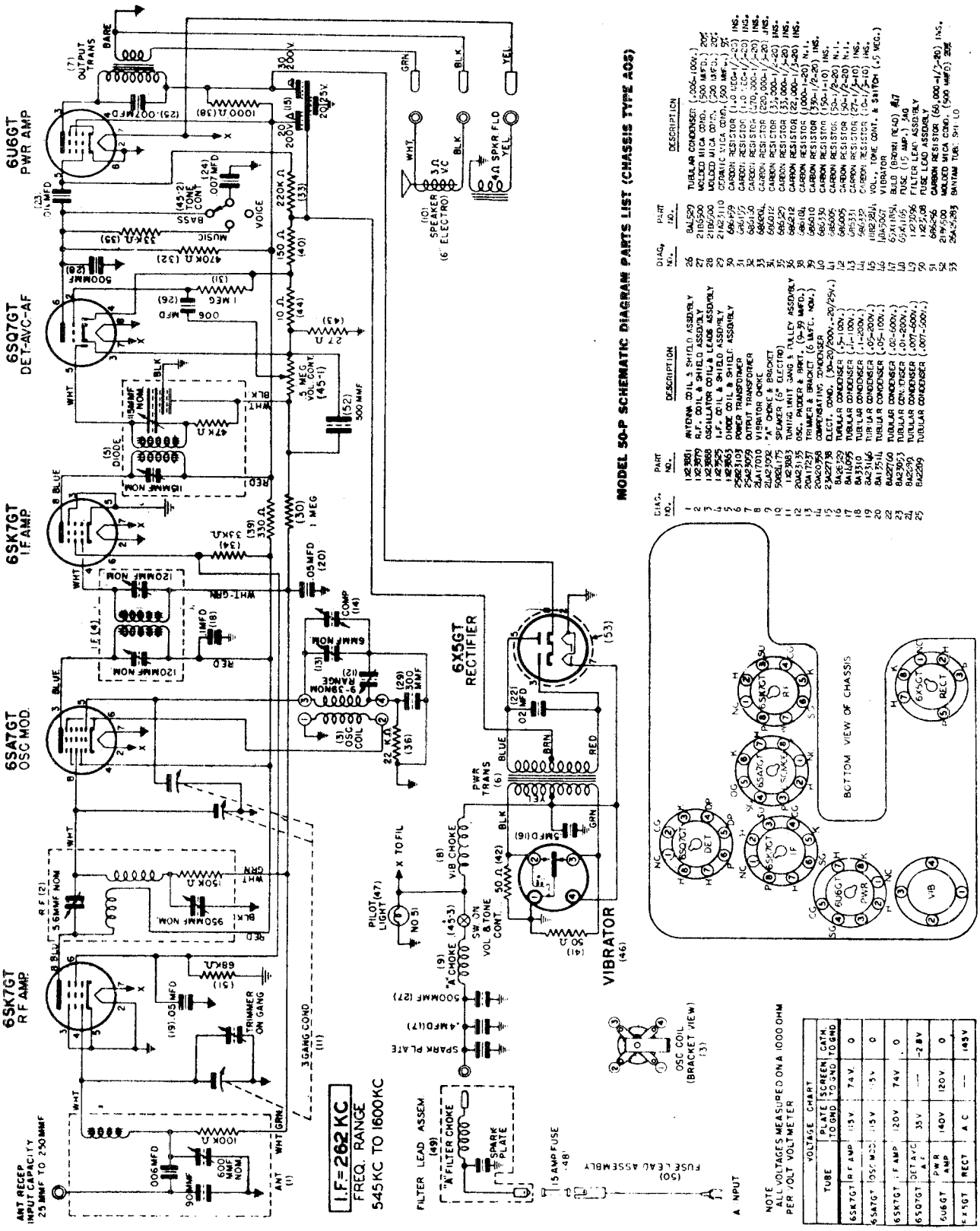

MODEL 50-P SCHEMATIC DIAGRAM PARTS LIST (CHASSIS TYPE A05)

DIAG. NO.	PART NO.	DESCRIPTION
1	1X3861	ANTENNA COIL & SHIELD ASSEMBLY
2	1X3879	R.F. COIL & SHIELD ASSEMBLY
3	1X3888	OSCILLATOR COIL & LEADS ASSEMBLY
4	1X3525	I.F. COIL & SHIELD ASSEMBLY
5	1X3865	DIODE COIL & SHIELD ASSEMBLY
6	25X3109	POWER TRANSFORMER
7	25X3079	OUTPUT TRANSFORMER
8	2AA17010	VIBRATOR CHOKE
9	21A21932	"A" CHOKE & BRACKET
10	50X8L175	SPEAKER (6" ELECTRO)
11	1X3883	TUNING UNIT GANG & PULLEY ASSEMBLY
12	20A21135	OSC., PADDER & BRKT. (.05-.99 MMFD.)
13	20A21237	TRIMMER & BRACKET (6 MMFD. NOM.)
14	20A20758	CONDENSER ASS'Y, DUAL
15	23A22738	ELECT. COND. (30-30-200V.-20/25V.)
16	BA36329	TUBULAR CONDENSER (.1-100V.)
17	BA11095	TUBULAR CONDENSER (.1-200V.)
18	BA13110	TUBULAR CONDENSER (.1-400V.)
19	BA25146	TUBULAR CONDENSER (.05-200V.)
20	BA13514	TUBULAR CONDENSER (.05-100V.)
21	BA22700	TUBULAR CONDENSER (.002-600V.)
22	BA23053	TUBULAR CONDENSER (.01-200V.)
23	BA22099	TUBULAR CONDENSER (.007-600V.)
24	BA22069	TUBULAR CONDENSER (.007-500V.)
25	BA1529	TUBULAR CONDENSER (.006-100V.)
26	2IX5900	MOLDED MICA COND. (500 MMFD.) 20%
27	2IB6500	MOLDED MICA COND. (500 MMFD.) 20%
28	21A21110	CERAMIC MICA COND. (300 MMFD.) 5%
29	686159	CARBON RESISTOR (1.0 MEG-1/2-20) INS.
30	686155	CARBON RESISTOR (470,000-1/2-20) INS.
31	686130	CARBON RESISTOR (270,000-1/2-20) INS.
32	686124	CARBON RESISTOR (220,000-1/2-20) INS.
33	686112	CARBON RESISTOR (33,000-1/2-20) INS.
34	686129	CARBON RESISTOR (33,000-1/2-20) INS.
35	686212	CARBON RESISTOR (22,000-1/2-20) INS.
36	686181	CARBON RESISTOR (1,000-1-20) N.I.
37	686010	CARBON RESISTOR (330-1/2-20) INS.
38	686130	CARBON RESISTOR (150-1-10) INS.
39	686005	CARBON RESISTOR (50-1/2-20) N.I.
40	686005	CARBON RESISTOR (50-1/2-20) N.I.
41	686333	CARBON RESISTOR (27-1/2-10) INS.
42	686181	CARBON RESISTOR (10-1/2-10) INS.
43	1X8284	VOL. & TONE CONT. & SWITCH (.5 MEG.)
44	1A45041	VIBRATOR (6V.)
45	63X1154	BLEEDER (8000 OHM 20-40) ADJ.
46	65X1165	FUSE (15 AMP)
47	1X2096	FILTER LEAD ASSEMBLY
48	1X2508	FUSE LEAD ASSEMBLY
49	686256	CARBON RESISTOR (45,000-1/2-20) INS.
50	21X500	MOLDED MICA COND. (500 MMFD) 20%
51	26A35283	BANTAM TUBE SHIELD

VOLTAGE CHART

TUBE		PLATE TO GND	SCREEN TO GND	CATH. TO GND
6SK7GT	R.F. AMP	115 V.	74 V.	0
6SA7GT	OSC MOD	115 V.	115 V.	0
6SK7GT	I.F. AMP	120 V.	74 V.	0
6SQ7GT	DET AVC A.F.	35 V.	—	-2 V.
6U6GT	PWR AMP	140 V.	120 V.	0
6X5GT	RECT.	A.C.	—	143 V.

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MODEL 50P PARTS PRICE LIST
A05 CHASSIS ASSEMBLY
MAJOR PARTS

48A5067	Vibrator		2.50
24A17010	Vibrator Shake		.35
23A22738	Electrolytic Condenser FP		.75
25A23059	Output Transformer		1.00
25B23068	Power Transformer		2.35
24A23092	"A" Choke & Bracket		.35
1X23096	I.F. Coil & Shield Assy.		1.35
25B23103	Power Transformer Sub.25B23068		XXXX
13X23632	Instrument Panel Overlay Chrome		.95
18B23844	Volume & Tone Control & Switch		1.50
1X23863	Diode Coil & Shield Assy.		1.60
1X23879	R. F. Coil & Shield Assy.		1.75
1X23881	Antenna Coil & Shield Assy.		2.65
1X23888	Osc. Coil & Leads Assy.		.65
50B24175	Speaker 6" Electro		3.65
	Speaker Exchange		2.15
50B24470	Speaker 6x1/2" Electro		3.65
1X24950	Gang Pulley & Brake Assy.		5.25
15K29765	Outer Housing		2.40
15K29768	Front Cover		1.95
1X31242	Front Cover & Speaker Assy.		7.70
1X31244	Rear Cover Assy.		1.90

ACCESSORIES

14X2423	Fuse Insulator "A" Lead	Doz.	.20
6X4141	Distributor Suppressor		.30
65X4165	Fuse 15 Amp 3AG		.05
39X4205	Hood Wiper	Doz.	.25
8A4491	Generator Condenser		.40
8K4661	Ammeter Condenser		.40
39A17479	Grounding Wiper Curved		.06
1X23408	Fuse Lead Assy 16"		.15
37C23631	Speaker Gasket Only		.45
43K23903	Bushing .562-.6259.343 CP Set Mtg.		.10
39A24662	Grounding Wiper Brass Chas.	Doz.	.40
39X28036	Shirt Maker	Per C	.80
1X29791	Receiver Accessories Assby		1.60
1X31241	Filter Lead Assy		.30

DIAL & DRIVE PARTS

41A2372	Dialite Backing Coil Spring	Doz.	.10
5S7811	Eyelet 5/16x.210 Blk Gang Mtg.	Doz.	.20
5S7824	Eyelet 3/16x.100 Brass Dial Cord	Per C	.25
11M8744	Dial Cord Blk Wht Pntr.	Yard	.05
11M8877	Dial Cord Nylon Shaft	Yard	.10
41A11091	Tension Coil Spring Large	Doz.	.25
80A11579	Dialite Socket & Clip		.05
65X11854	Bulb 6/3V.-15A Tub Bay. Clr. #47		.10
37A12891	Rubber Grommet Gang Mtg.	Doz.	.25
3A13748	Locking Screw 8-32x17/32 CP Gang	Doz.	.20
41A14759	Tension Coil Spring Dr. Pul.	Doz.	.25
14K15252	Dialite Bushing Contact	Doz.	.20
49A16986	Cord Guide Pulley .218 Brass	Doz.	.20
37A17013	Brake Shoe Rubber	Doz.	.20
35A17224	Knob Washer Felt Vol.	PerC	.40
35A17640	Knob Washer Felt Tun.	Doz.	.15
41A18022	Compression Coil Spring P.B. Assby.	Per C	.50
49A21741	Cord Pulley 3/8"	Doz.	.20
41A21885	Brake Arm Torque Spring R. H.	Doz.	.75
41K21886	Brake Arm Torque Spring L. H.	Doz.	.75
1K23416	Pointer Assy.		.10
7B23429	Gang Mtg. Bracket Left		.15
7B23430	Gang Mtg. Bracket Right		.15
7A23866	Dialite Mounting Bracket	Doz.	.20
1X23884	Plunger Pointer & Pulley Assy.		.50
1X23886	Dial Background & Brkt. Assy.		.45
1X23897	Dial Escutcheon Assy.		1.70
36B24336	Tone Control Lever 1& 9/32		.35
7A24680	Tuning Unit Mtg. Brkt., Strip	Doz.	.30
47A24862	Tuning Drive Shaft		.15
43A24863	Tuner Shaft Mtg. Bushing		.15
1X24885	Bracket & Pulleys Assby.		.15
36K29567	Control Knob 3/16"		.35
38K29665	Push Button & Stud		.15

CONDENSERS

8A2289	Tubular Condenser .007-600V		.20
8A3310	Tubular Condenser .1-200V		.15
8A4529	Tubular Condenser .006-100V		.15
21B6500	Molded Mica Condenser 500MMf 20%		.15
8A13014	Condenser Resistor .006-100V@100K		.25
8A13514	Tubular Condenser .05-100V		.15
8A14095	Tubular Condenser .4-100V		.30
20A17237	Trimmer & Eye Brkt. 6mmf.		.20
20A17935	Antenna Padder Single		.35
20A20358	Compensating Condenser		.25
20A22747	Trimmer Diode Small		.40
20A22751	Double Trimmer I. F.		.30
8A22760	Tubular Condenser .02-600V		.15
8A23053	Tubular Condenser .01-200V		.10
20A23102	R. F. Trimmer & Paddler		.55
21A23110	Ceramic Mica Condenser 300mmf 5%		.25
20A23135	Osc. Padder & Eye Bracket		.20
8A23146	Tubular Condenser .05-200V		.10
8A28329	Tubular Condenser .5@100V		.40

RESISTORS

6B6005	Carbon Res. 50-1/2-20 N.I.	Doz.	.60
6B6010	Carbon Res. 330-1/2-20 Ins.	Doz.	.60
6B6012	Carbon Res. 33,000-1/2-20	Doz.	.60
6B6159	Carbon Res. 1 Meg-1/3-20 Ins.	Doz.	.60
6B6160	Carbon Res. 470,000-1/3-20 N.I.	Doz.	.60
6B6184	Carbon Res. 1,000-1-20 N.I.		.10
6B6204	Carbon Res. 220,000-1/3-20 Ins.	Doz.	.60
6B6212	Carbon Res. 22,000-1/3-20 Ins.	Doz.	.60
6B6256	Carbon Res. 68,000-1/3-20 Ins.	Doz.	.60
6B6321	Carbon Res. 47,000-1/3-20 Ins.	Doz.	.60
6B6329	Carbon Res. 33,000-1/3-20 Ins.	Doz.	.60
6B6330	Carbon Res. 150-1-10 Ins.		.10
6B6331	Carbon Res. 27-1/3-10 Ins.	Doz.	.60
6B6332	Carbon Res. 10-1/3-10 Ins.	Doz.	.60
6B6339	Carbon Res. 150,000-1/3-20 Ins.	Doz.	.60

SCREWS, WASHERS, ETC.

2S7003	Nut 8-32x5/16 Hex CP Spkr.	Per C	.50
2S7070	Nut 6-32x1/4 Inv. Pal CP Coils	Per C	.50
3S7160	Screw 8-32x3/16 CP P.B.& P Assy.	Per C	.35
3S7215	Screw 8-32x3/16 CP Trim Mtg.	Doz.	.25
3S7250	Screw 8-32x1" Brass Choke	PerC	1.00
3S7295	Screw 1/4-20x3/4CP Set Mtg.	Doz.	.30
3S7454	Screw 8x1/4 PK Z PlHH CP	Doz.	.20
3S7457	Screw 8x7/8 CP Pwr. Trans.	Doz.	.25
3S7461	Screw 8x5/16 CO Housing	Doz.	.15
3S7499	Screw 8x5/8 Cop. Oxd. Ant. Recpt.	Per C	1.00
3S7506	Screw 6x1/4 Pk CP Osc. Mtg.	Per C	.50
4S7573	Washer 11/16.043-.187 CP Choke	Doz.	.15
4S7635	Washer 7/8-.281-.050.CP Set Mtg.	Doz.	.25
4S7657	Lockwasher #8 Ext. BO Sprk	Per C	.50
4S7666	Lockwasher #8 Ext. Blk Osx. Coil	Per C	.50
4S7678	Lockwasher 1/4" Ext. CP Set Mtg.	Per C	.50
4S7692	Lockwasher 1/2 Int. Blk Vol. Cont.	Doz.	.20
3A16990	Shoulder Screw 6-32 Spec.	Doz.	.35
2S17206	Nut 1/2-28x5/8 Hex Brass Vol. Cont.	doz.	.75
4A19232	Spring Washer 7/16 Tun. Shaft	Doz.	.30
4A21577	"C" Washer 1/8" Tun. Shaft	Per C	.65
4A23871	Spacer Washer 3/4" O.D. CP. Frt. Mtg.	Doz.	.35
4K24124	"C" Washer P.B. Shaft	Per C	.85
4S24333	Tuning Nut Cup Washer	Doz.	.50
4K31348	Cup Washer Trim Mtg.	Per C	1.00

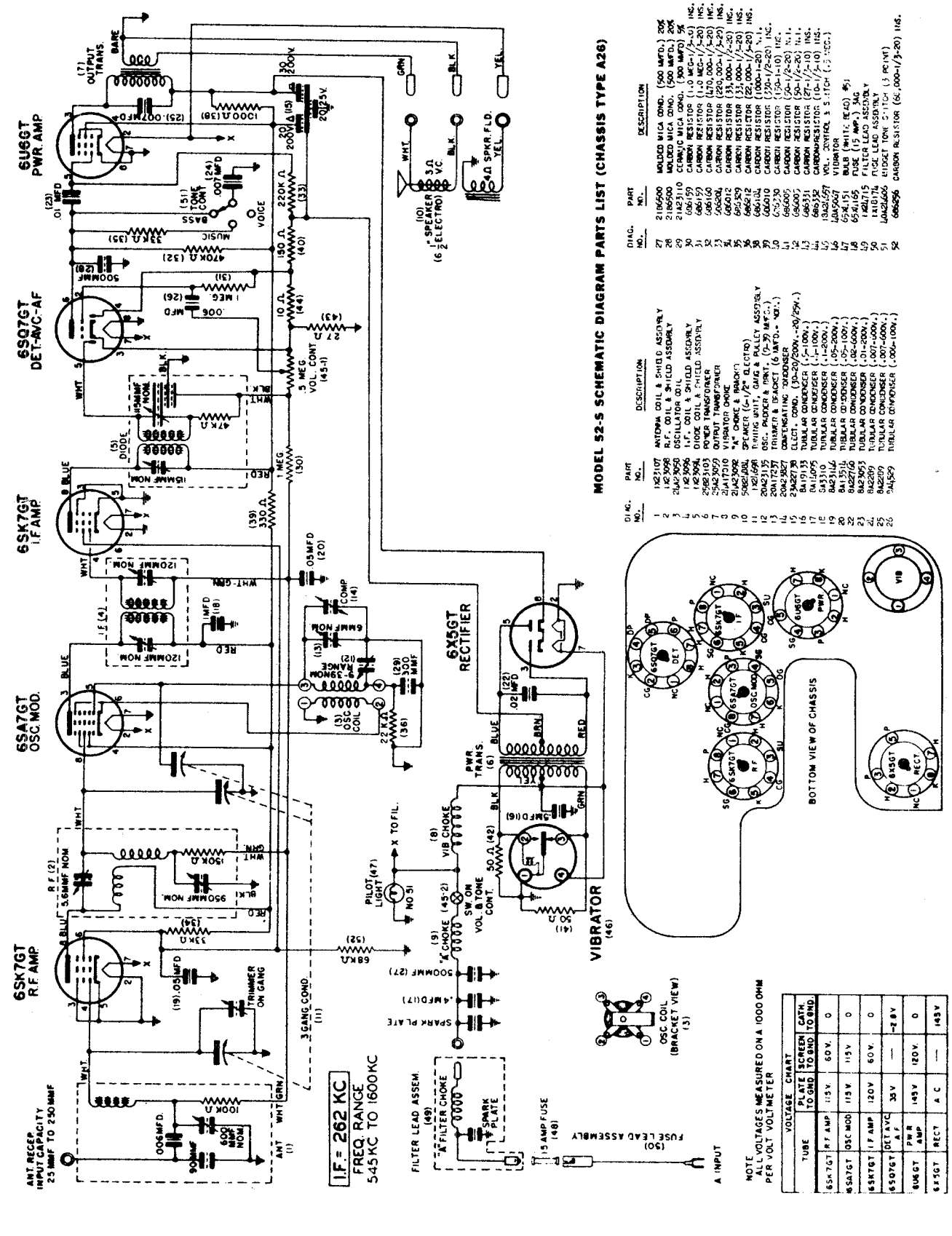
MISCELLANEOUS

37A4187	Rubber Grommet	DOz	.25
29B5239	Soldering Lug Long Tab.	Doz.	.15
9B6734	Tube Socket Saddle 4 Prong		.15
9B6760	Tube Socket Octal 90° Blk		.15
9B6771	Tube Socket Saddle Octal		.15
9A6774	Tube Socket Saddle Octal		.15
9A6782	Tube Socket Inverted Octal		.15
5S7820	Eyelet .470-.129-.230. Brs. CSP	Per C	.60
5S7855	Eyelet 1/2x.156 Brass	Per C	.70
31A10029	Terminal Strip 3 ind. #2 Mtg.		.10
38X10544	Plug Button 1/4" Cop. Oxd.	Doz.	.25

Prices subject to change without notice.

MODEL 52-S

GALVIN MFG. CORP.



MODEL 52-S SCHEMATIC DIAGRAM PARTS LIST (CHASSIS TYPE A26)

DIAG. NO.	PART NO.	DESCRIPTION
1	1X2107	ANTENNA COIL & SHIELD ASSEMBLY
2	1X3098	R.F. COIL & SHIELD ASSEMBLY
3	21A13050	OSCILLATOR COIL
4	1X3096	I.F. COIL & SHIELD ASSEMBLY
5	1X3094	DIODE COIL & SHIELD ASSEMBLY
6	25B23103	POWER TRANSFORMER
7	25A23099	OUTPUT TRANSFORMER
8	21A17310	VIBRATOR CHOKE
9	21A23092	"A" CHOKE & BRACKET
10	50B20284	SPEAKER (6-1/2" ELECTRO)
11	1X21698	TUNING UNIT, GANG & PULLEY ASSEMBLY
12	20A17235	OSCIL. PADDER & TRIM. (.05-.39 MFD.)
13	20A17237	TRIMMER & BRACKET (.6 MFD. - .9 MFD.)
14	20A23827	CONDENSER-SERVICING .01 MFD 600 V.
15	23A27310	ELECTROLYTIC COND. (20-20/200V.-20/25V.)
16	8A19133	TUBULAR CONDENSER (.1-100V.)
17	8A16095	TUBULAR CONDENSER (.1-200V.)
18	9A3310	TUBULAR CONDENSER (.1-400V.)
19	8A23146	TUBULAR CONDENSER (.005-200V.)
20	8A15514	TUBULAR CONDENSER (.005-1000V.)
21	8A22760	TUBULAR CONDENSER (.002-600V.)
22	8A23053	TUBULAR CONDENSER (.01-200V.)
23	8A22269	TUBULAR CONDENSER (.007-400V.)
24	8A22270	TUBULAR CONDENSER (.007-600V.)
25	9A1599	TUBULAR CONDENSER (.004-1000V.)

DIAG. NO.	PART NO.	DESCRIPTION
27	21B6500	MOLDED MICA COND. (500 MMFD.) 20%
28	21B6500	MOLDED MICA COND. (500 MMFD.) 20%
29	21A23110	CERAMIC MICA COND. (300 MMFD) 5%
30	6B6159	CARBON RESISTOR (1.0 MEG-1/2-W)
31	6B6159	CARBON RESISTOR (1.0 MEG-1/2-W) INC.
32	6B6160	CARBON RESISTOR (470,000-1/2-W) INC.
33	6B6804	CARBON RESISTOR (220,000-1/2-W) INC.
34	6B6012	CARBON RESISTOR (33,000-1/2-W) INC.
35	6B6329	CARBON RESISTOR (33,000-1/2-W) INC.
36	6B6212	CARBON RESISTOR (22,000-1/2-W) INC.
37	6B6804	CARBON RESISTOR (1000-1-W) N.I.
38	6B6010	CARBON RESISTOR (330-1/2-W) INC.
39	6B5330	CARBON RESISTOR (330-1-W) INC.
40	6B6005	CARBON RESISTOR (50-1/2-W) N.I.
41	6B6005	CARBON RESISTOR (50-1/2-W) N.I.
42	6B6331	CARBON RESISTOR (27-1/2-W) INS.
43	6B6332	CARBON RESISTOR (10-1/2-W) INS.
44	6B6332	CARBON RESISTOR (10-1/2-W) INS.
45	1X24597	VOL. CONTROL & SWITCH (5 MEG.)
46	1A4A1597	VIBRATOR
47	6S4155	PILOT (WITH RETAINING CLIP)
48	6S4165	FUSE (15 AMP.)
49	12U715	FILTER LEAD ASSEMBLY
50	1A16174	FUSE LEAD ASSEMBLY
51	1A4A2606	BUDGET TONE SWITCH (3 POINT)
52	6B6256	CARBON RESISTOR (6,000-1/2-W) INS.

NOTE
ALL VOLTAGES MEASURED ON A 1000 OHM PER VOLT VOLTMETER

VOLTAGE CHART				
TUBE		PLATE TO GND.	SCREEN TO GND.	CATH. TO GND.
6SK7GT	R.F. AMP	115 V.	60 V.	0
6SA7GT	OSC. MOD.	115 V.	115 V.	0
6SK7GT	I.F. AMP	120 V.	60 V.	0
6SQ7GT	DET. AVC A.F.	35 V.	—	-2 V.
6U6GT	PWR. AMP	145 V.	120 V.	0
6X5GT	RECT.	A. C.	—	145 V.

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MODEL 52-S

GALVIN MFG. CORP.

52-S PARTS PRICE LIST
MAJOR PARTS

		List
48A5067	Vibrator	2.50
48A5333	Vibrator	2.50
24A17010	Vibrator Choke	.35
23A22738	Electrolytic Condenser FP.	.75
24A23058	Oscillator Coil-Ceramic	.40
25A23059	Output Transformer	1.00
25B23068	Power Transformer	2.35
24A23092	"A" Choke & Bracket	.35
1X23094	Diode Coil & Shield Assembly	1.50
1X23094	IF Coil & Shield Assembly	1.35
1X23098	R. F. Coil & Shield Assembly	1.30
1X23107	Antenna Coil & Shield Assembly	2.65
1X23143	Oscillator Coil & Leads Assembly	.40
40A24606	Tone Control Switch-Midget	.40
18A24657	Volume Control & Switch	.80
1X24697	Tuning Unit Assembly	7.25
1X27094	Gang Pulley & Brake Assembly	5.15
15K29715	Outer Shell	2.50
15K29718	Front Covers	1.75
50B30644	Speaker 6½" Electro	3.80
	Speaker Exchange	2.25
1X31263	Back Cover Assembly	1.85

ACCESSORIES

14X2423	Fuse Insulator "A" Lead	Doz.	.20
9X4075	Fuse Receptacle	Doz.	.20
14X4077	Fuse Insulator Bushin G & Contact Eyelet	Doz.	.20
6X4141	Distributor Suppressor	Doz.	.30
6SX4151	Bulb 6-8 Volt 25 Amp Rnd. Bay.		.15
65X4165	Fuse 15 Amp. 3AG		.05
8A4491	Generator Condenser	Doz.	.40
64B4607	Speaker Screen & Flocking		.60
29B5401	Large Pin Terminal .156 x11/16 NP	Doz.	.20
9B6734	Tube Socket Saddle 4 Prong		.15
9B6771	Tube Socket Saddle Octal		.15
1X12820	Antenna Receptacle Assembly		.15
39B17479	Grounding Wiper Curved		.05
1X18174	Fuse Lead Assembly 7"		.15
14A23136	Lead Stabilizer	Doz.	.25
37C24621	Speaker Gasket		.40
1X29792	Receiver Accessories Kit Assembly		1.60
1X31262	Filter Lead Assembly		.55

DIAL & DRIVE PARTS

41A2157	Backing Coil Spring -Fuse	Per C	.50
41A2372	Dialite Backing Coil Spring	Doz.	.10
5S7811	Eyelet 5/16 x.210 Blk	Doz.	.20
5S7820	Eyelet .470-129 .230 Brass CSP	Per C	.60
5S7855	Eyelet 1/2x.156 Brass	Per C	.70
60A11579	Dial Light Socket & Clip Or Brkt.		.05
14K15252	Dialite Bushing Contact	Doz.	.20
37A17013	Brake Shoe Rubber Tubing	Doz.	.20
1B7171	Push Button Plunger Assembly		.20
1X17175	Brake Rod & Arm Assembly		.10
36A17205	Tone Control Lever		.40
7A17282	Dial Light Mounting Bracket		.05
41A21885	Brake Arm Torque Spring R. H.	Doz.	.75
41K21886	Brake Arm Torque Spring L. H.	Doz.	.75
7A23074	Tuning Unit Mounting Bracket Strip	Doz.	.20
35K24149	Felt Washer 7/16x3/16 Blk Vol Knob	Per C	.75
13D24452	Dial Escutcheon-Chrome		.65
35A24602	Push Button Cushion	Doz.	.45
64A24604	Dial Scale Backing Plate		.10
47A24611	Tuning Drive Shaft		.15
7B24617	Gang Mounting Bracket Left		.20
1X24699	Gang Mounting Bracket Right		.35
1X24702	Slider, Plunger & Pulleys Assembly		.50
1X24703	Dial Background & Bracket Assembly		.35
1X24704	Background Assembly		.30
1K24706	Pointer Slider & Extension		.10
1K24707	Pointer Assembly		.15
34K29719	Dail Scale		.30
38K29752	Push Button & Stud		.15
36K29753	Tuning & Control Knob		.20
1X31260	Dial And Escutcheon Assembly		3.10
1X31261	Push Button Assembly(5)		.70

Prices subject to change without notice.

CONDENSERS

8A2289	Tubular Condenser .007 600V	.20
8A3310	Tubular Condenser .1 200V	.15
8A4529	Tubular Condenser .006 100V	.15
21B6500	Molded Mica Condenser 500mmf 20%	.15
8A13014	Condenser Resistro .006 100V 100K	.25
8A13514	Tubular Condenser.05 100V	.15
8A14095	Tubular Condenser.4 100V	.30
20A17237	Trimmer & Eye Bracket 6 MMF	.20
20A17935	Antenna Padder Single	.35
20A22747	Diode Trimmer Small	.40
20A22751	Double Trimmer 120 Mmf Nom.	.30
8A22760	Tubular Condenser .02 600V	.15
8A23053	Tubular Condenser .01 200V	.10
20A23102	R. F. Trimmer & Padder	.55
21A23110	Ceramic Mica Condenser 300 MmF 5%	.25
20A23135	Oscillator Padder & Eye Bracket	.20
8A23146	Tubular Condenser .05 200V	.10
20A23827	Compensating Condenser	.25
8A82329	Tubular Condenser .5 100V	.40

RESISTORS

6B6005	Carbon Resistor 50-1/2-20 N.I.	Doz.	.60
6B6010	Carbon Resistor 330-1/2-20 Ins.	Doz.	.60
6B6012	Carbon Resistor 33,000-1/2-20	Doz.	.60
6B6159	Carbon Resistor 1 Meg 1/3-20 Ins.	Doz.	.60
6B6160	Carbon Resistor 470,000 1/3 20 N.I.	Doz.	.60
6B6184	Carbon Resistor 1,000-1-20 N.I.		.10
6B6204	Carbon Resistor 220,000 1/3 20 Ins.	Doz.	.60
6B6212	Carbon Resistors 22,000 1/3 20 Ins.	Doz.	.60
6B6256	Carbon Resistors 68,000 1/3 20 Ins.	Doz.	.60
6B6321	Carbon Resistor 47,000 1/3 20 Ins.	Doz.	.60
6B6329	Carbon Resistor 33,000 1/3 20 Ins.	Doz.	.60
6B6330	Carbon Resistor 150-1-10 Ins.		.10
6B6331	Carbon Resistor 27-1/3-10 Ins.	Doz.	.60
6B6338	Carbon Resistor 10-1/3-10 Ins.	Doz.	.60
6B6339	Carbon Resistor 150,000 1/3 20 Ins	Doz.	.60
6B6456	Carbon Resistor 150-1-10- Ins.		.10

SCREWS, WASHERS, ETC.

14A1374	Extruded Fibre Washer	Doz.	.95
14X4076	Fuse Backing Washer -Bakelite	Doz.	.10
4K4823	Condenser Mounting Cup Washer Cop. Pl.	Doz.	.10
2S7003	Nut 8/32x5/16 Hex CP.	Per C	.50
2S7018	Nut 3/8 x 1/2 Hex CP Tun Shaft	Doz.	.15
2S7035	Nut 5/16 18x5/8 Sp. Hex CP Fits "J" Bolt	Doz.	.20
2S7087	Speednut .233 x 29/64 Blued	Per C	.75
2S7160	Screw 8-32x 5/16 SlHHMS CP Slider Bkt.	Per C	.35
3S7215	Screw 8-32x 3/16 P H BHMS CP	Doz.	.25
3S7250	Screw 8-32x1" PlHHMS Brass	Per C	1.00
3S7368	Screw 8-32x 1& 25/32 S1OHMS CP	Doz.	.25
3S7454	Screw 8x1/4 PK Z PlHH CP	Doz.	.20
3S7455	Screw 8x3/8 PK A SLAH CO For Cab. Back	Doz.	.20
3S7456	Housing Screw 8x1/4 Cop. Oxd. ACHD PKA	Per C	.65
3S7457	Screw 8x7/8 PK A PLHH CP	Doz.	.25
3S7461	Screw 8x5/16 PK A AH CO	Doz.	.15
3S7475	Screw 8x.1/4 PK Z BLACHO CP	Per C	.65
3S7499	Screw 8x5/8PK A AH Cop. Oxd. Hsg.	Per C.	1.00
3S7506	Screw 6x1/4 PK Z PLHH CP	Per C	.50
4S7555	Washer 1/4 .128 .032 CP	Per C	.85
4S7573	Chassis Mtg. Washer 11/16 -3/16 .046	Doz.	.15
4S7605	Washer 3/4 .328 .031 CP	Doz.	.35
4S7650	Lockwasher #6 Int. CP.	Per C	.50
4S7657	Lockwasher #8 Ext. B.O.	Per C	.50
4S7666	Lockwasher #6 Ext. Blk.	Per C	.50
4S7668	Lockwasher 3/8 Ext. Blk.	Per C.	.50
4S7674	Lockwasher 5/16 Int. CP Set Mtg.	Per C.	.55
3A13748	Locking Screw Automatic 8-32x17/32 HHCP	Doz.	.20
3A16990	Shoulder Screw 6-32 Spec	Doz.	.35
4A21577	"C" Washer 1/8" Notched	Per C	.65
4K24124	"C" Washer .437 for .250	Per C	.85
35K24148	Felt Washer 1/8 Blk. Tun. Knob	Per C	.85
4A24554	Spring Washer 3/8 HT Tun.	Doz.	.40
4A24723	"C" Washer Tone Cont.	Per C	.55
4K24724	Cup Washer 7/8 .171	Doz.	.55

MISCELLANEOUS

37A4187	Rubber Grommet	Doz.	.25
42A4215	Vibrator Grounding G Clip	Doz.	.75
29B5239	Soldering Lug (Long Tab)	Doz.	.15
29B5265	Soldering Lug	Doz.	.20
38X10544	Plug Button 1/4" Cop. Oxd.	Doz.	.25
37A12691	Rubber Grommet-(Gang Mtg.)	Doz.	.25
9A12705	Elect. Ins. Wafer 1-5/16		.10
37X14051	Rubber Sleeve	Doz.	.20
31K14509	Terminal Strip 4 ins. #3 Mt.s		.05
9K14906	Elect. Ins. Wafer Armite	Doz.	.15
39A24524	Tube Base Grounding Wiper	Doz.	.20
39A24662	Hood Wippr	Doz.	.40
39X28036	Shirt Marker	Per C	.80

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MODELS 52T,52Y
Ch.B5-1

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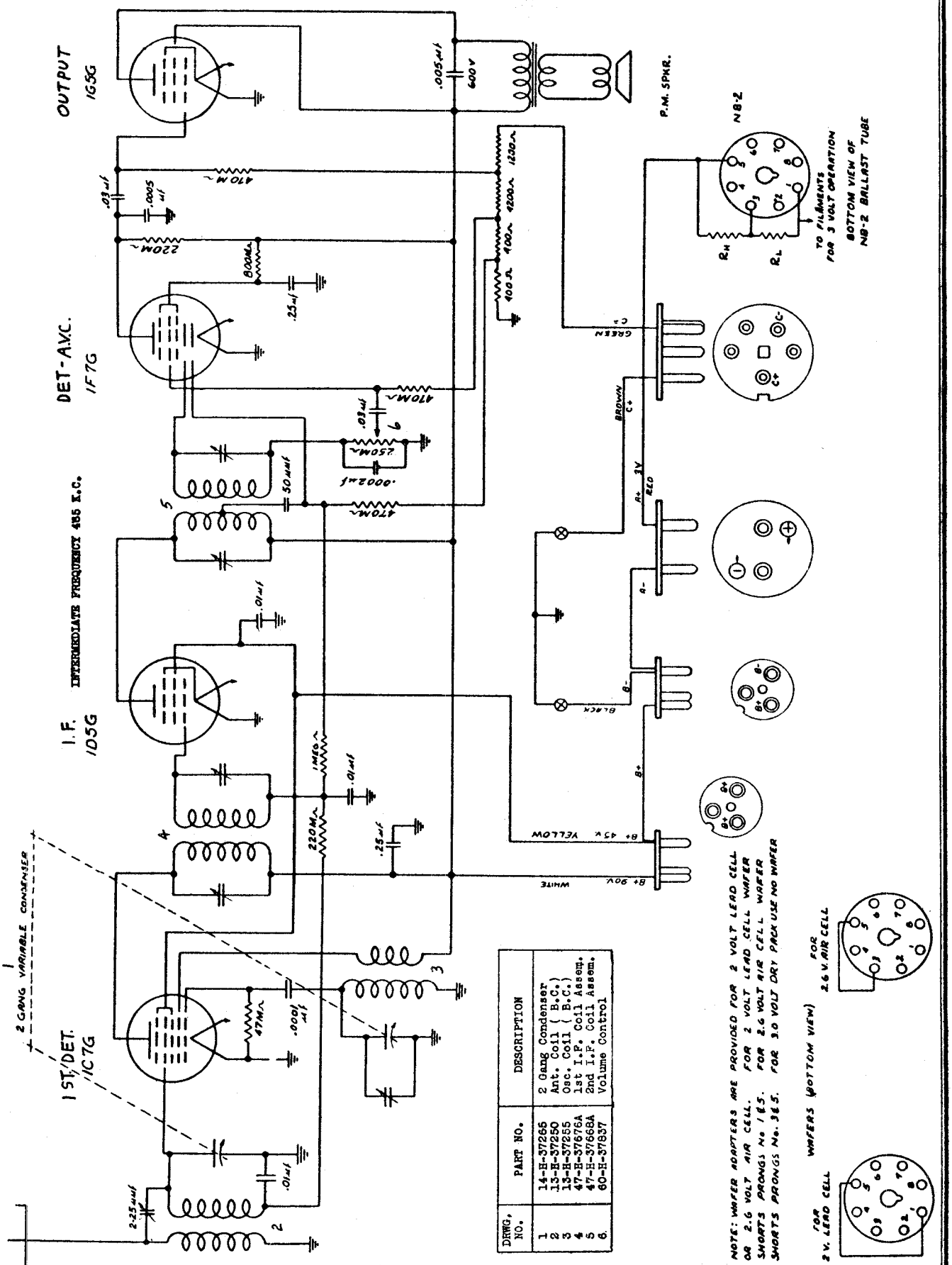

DRWG. NO.	PART NO.	DESCRIPTION
1	14-B-37265	2 Gang Condenser
2	13-B-37250	Ant. Coil (B.C.)
3	13-B-37255	Osc. Coil (B.C.)
4	47-B-37676A	1st I.F. Coil Assem.
5	47-B-37668A	2nd I.F. Coil Assem.
6	60-B-37837	Volume Control

NOTE: WAFER ADAPTERS ARE PROVIDED FOR 2 VOLT LEAD CELL OR 2.6 VOLT AIR CELL. FOR 2 VOLT LEAD CELL WAFER SHORTS PRONGS No. 1&5. FOR 2.6 VOLT AIR CELL WAFER SHORTS PRONGS No. 3&5. FOR 3.0 VOLT DRY PACK USE NO WAFER

For Alignment, see P.15-5

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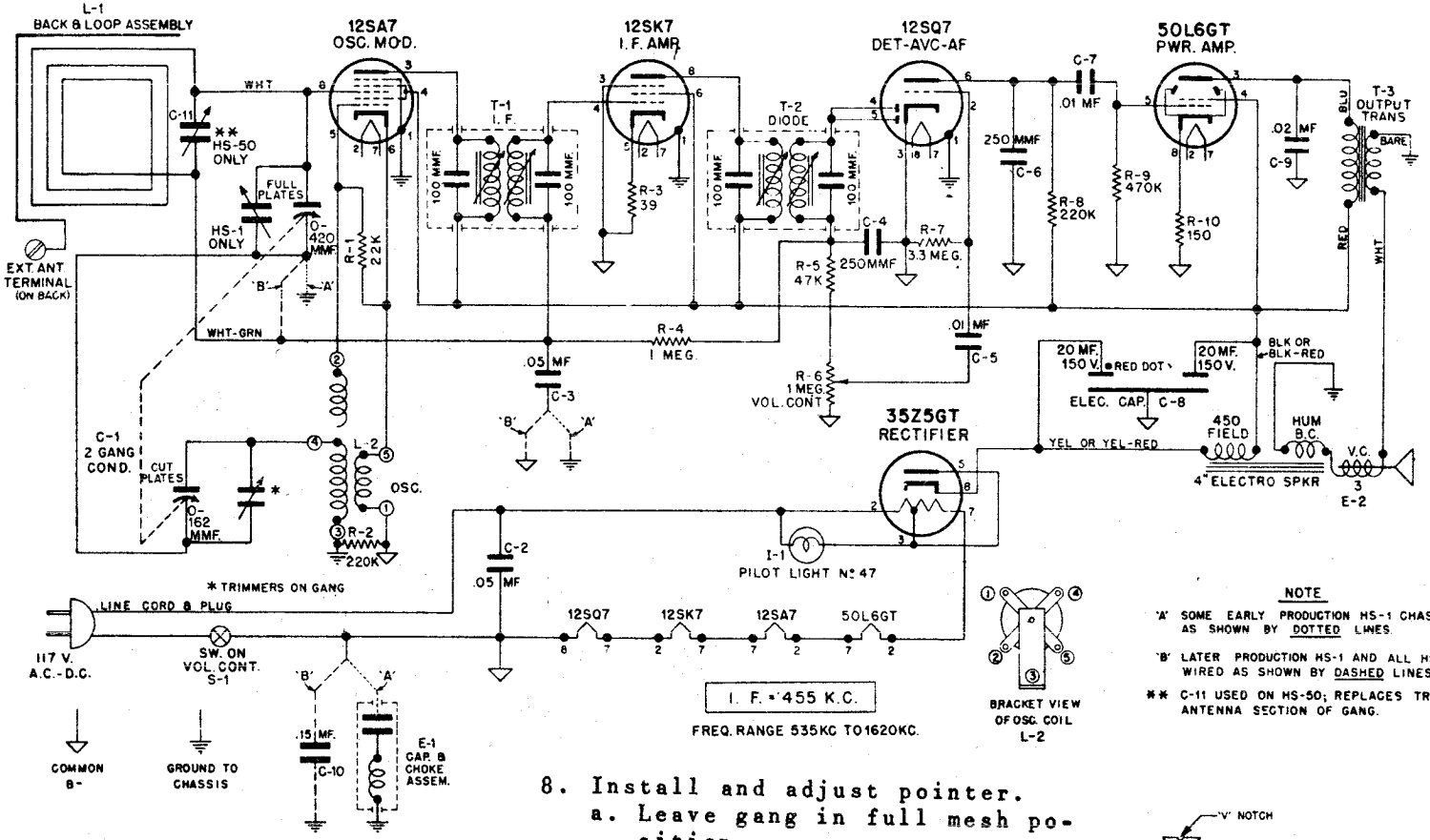

NOTE

'A' SOME EARLY PRODUCTION HS-1 CHASSIS WIRED AS SHOWN BY DOTTED LINES.

'B' LATER PRODUCTION HS-1 AND ALL HS-50 CHASSIS WIRED AS SHOWN BY DASHED LINES.

** C-11 USED ON HS-50; REPLACES TRIMMER ON ANTENNA SECTION OF GANG.

1. Remove the chassis from the cabinet.
2. Remove the broken cord.
3. Turn gang to full mesh position.
4. Cut a 31" length of 18 lb. silk fish cord.
5. Restring by placing cord around dial pulley, over shoulder rivets, and around gang pulley.
6. Tie cord to tension spring and fasten spring as shown in illustration.
7. Place a drop of shellac on cord knot.
8. Install and adjust pointer.
   a. Leave gang in full mesh position.
   b. Set pointer to "V" notch at low end of the dial.
   c. Clamp pointer to cord.
   d. Fix pointer to cord with a drop of shellac.
   e. The cord must not be too tight or bind, as too much tension will prevent the planetary drive (tuning shaft) from pulling the pointer. All elements of the pointer and string system must be free running.

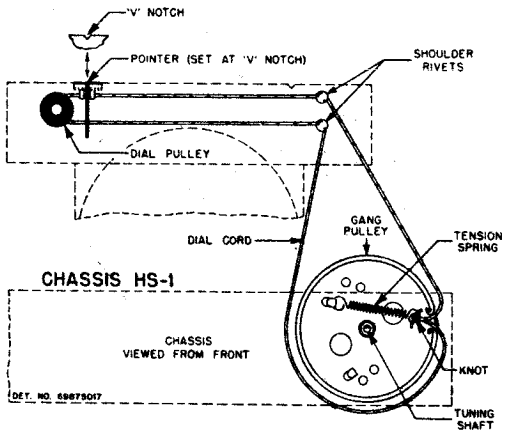

FIGURE 1. DIAL CORD DRIVE (HS.1)

MODELS 55X11,55X12,55X13,
Ch. HS-1

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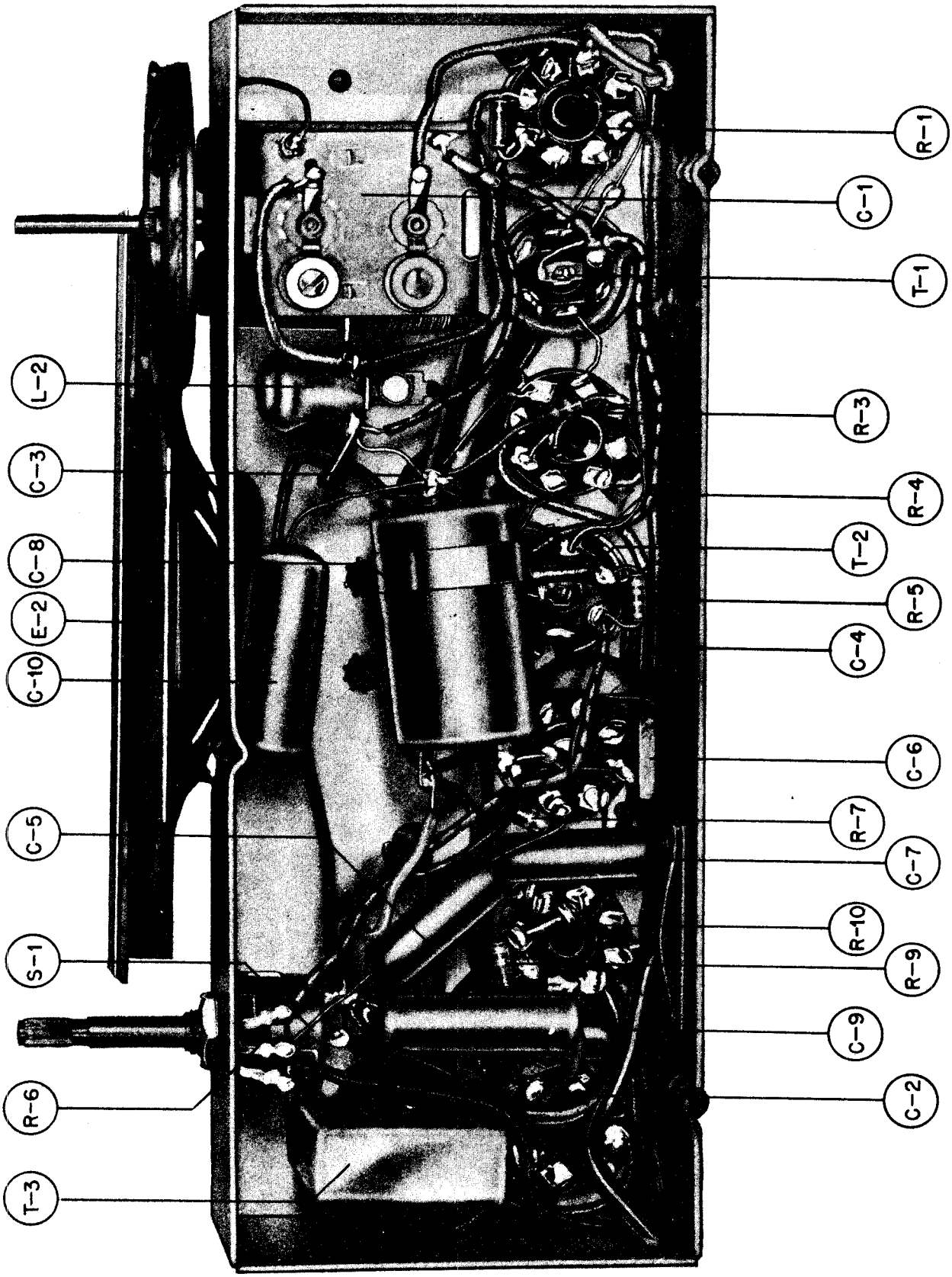

FIGURE 6. BOTTOM VIEW (CHASSIS HS-1)

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MODELS 55X11A,55X12A,
55X13A,Ch.HS-50

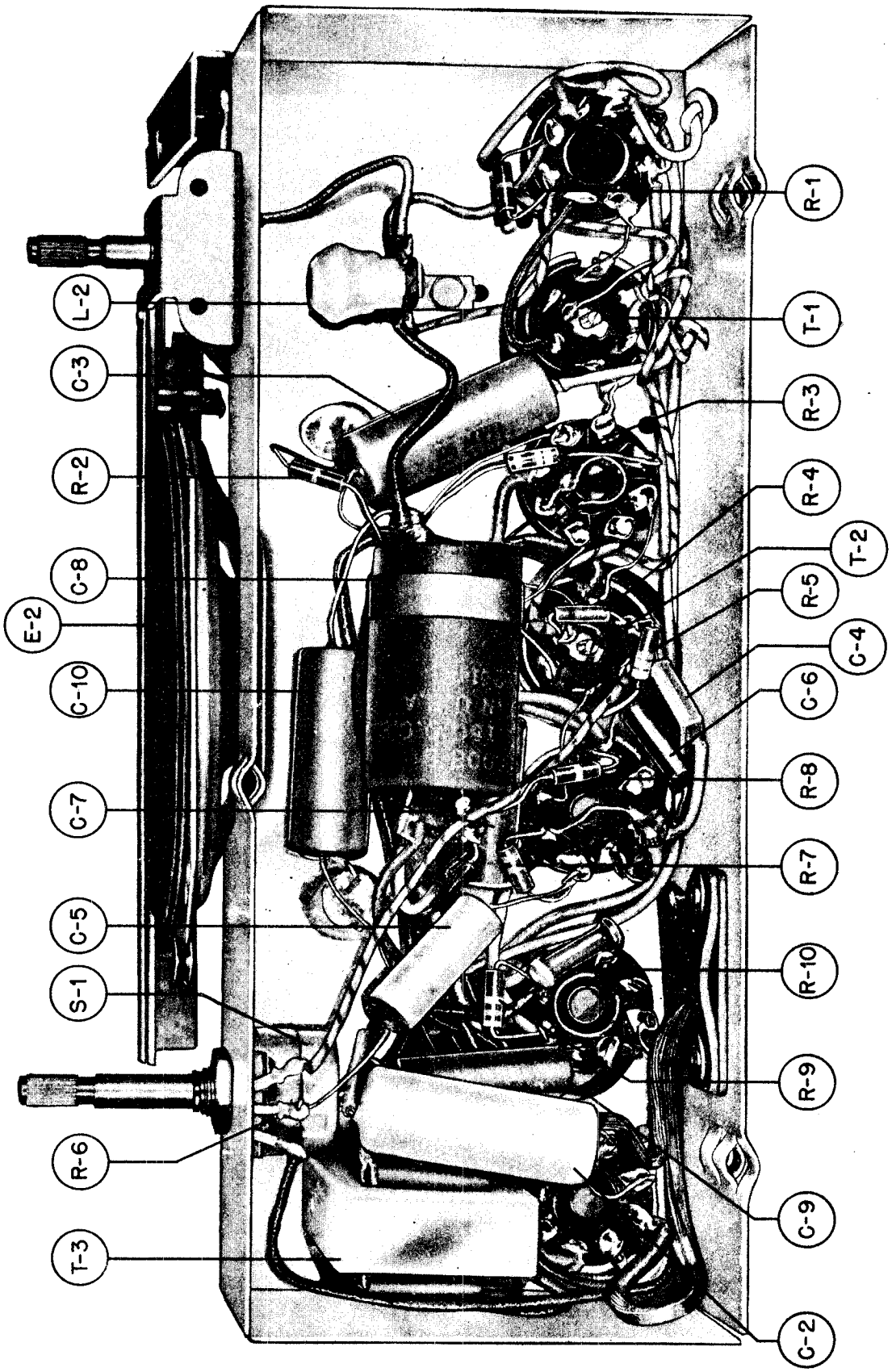

FIGURE 7. BOTTOM VIEW (CHASSIS HS.50)

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MODELS 55X11, 55X12, 55X13, Ch.HS-1; 55X11A, 55X12A, 55X13A, Ch.HS-50

GALVIN MFG. CORP.

ALIGNMENT CHART

Connect output meter across speaker voice coil (.38 V = .05 watt) Volume control set at maximum for all operations The adjusting screwdriver or alignment tool should be of the insulated type, such as Motorola Part No. 66A71008

OPERATIONS IN ORDER	GANG CAPACITOR SET AT	DUMMY ANTENNA	GENERATOR CONNECTED TO	ADJUST TRIMMER TO	GENERATOR SET AT 400~ 30% MODULATED	AVERAGE MICRO. VOLT INPUT FOR .38V OUTPUT
1. Align I.F. and Diode for Maximum	Minimum	.1 mf	Osc.-Mod.* Grid & B-	1-2-3-4	455 Kc	3000 Microvolts to I. F. Grid
2. Set Oscillator to dial scale	1620 Kc	.1 mf	Osc.-Mod.* Grid & B-	5	1620 Kc	
3. Align R.F. for Maximum	1400 Kc	None	**Radiation	6	1400 Kc	45 Microvolts to Osc.Mod Grid thru .1 mf dummy .03 Volts at 400~ to 1st A.F.Grid

4. Repeat above steps for maximum accuracy.

* A convenient point for connection to B-, is the common terminal of the electrolytic capacitor, located in the middle of the chassis (bottom).

** Connect output of signal generator to a 5" diameter, 3 turn loop. With volume on full, and output meter connected across voice coil, bring loop close enough to receiver loop until output of 50 milliwatts is obtained (.38V on output meter) Vary distance between generator and receiver loops to maintain this output during alignment.

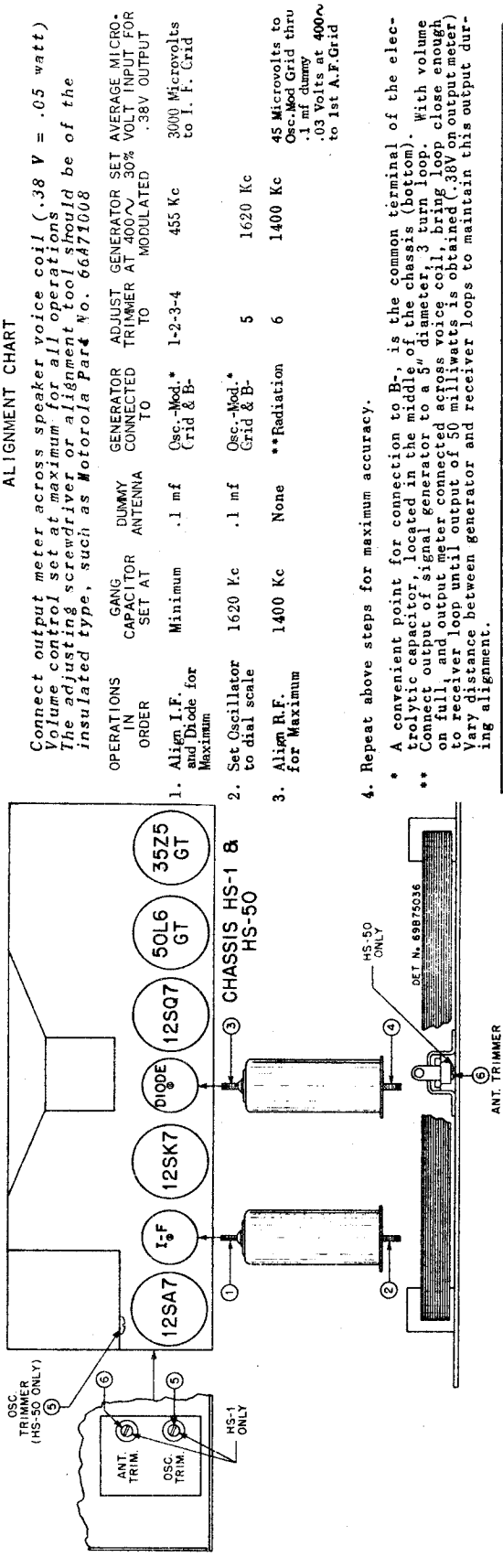

FIGURE 2. TUBE AND TRIMMER LOCATION

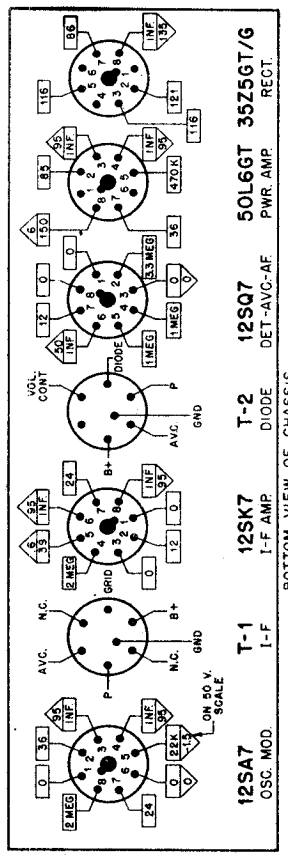
12SA7 OSC. MOD
T-1 I-F
12SK7 I-F AMP.
T-2 DIODE
12SQ7 DET-AVC-AF
50L6GT 35Z5GT/G PWR. AMP RECT.
BOTTOM VIEW OF CHASSIS
NOTE: ALL VOLTAGES MEASURED ON A 20,000 OHM PER VOLT VOLTMETER TO B-.
ALL RESISTANCES ARE MEASURED IN OHMS UNLESS OTHERWISE SPECIFIED TO B-.
K=ONE THOUSAND (1000) OHMS.
B-IS INDICATED BY ⏚ ON SCHEMATIC DIAG.
= RESISTANCE MEASUREMENTS
= VOLTAGE MEASUREMENTS

FIGURE 5. VOLTAGE AND RESISTANCE CHART

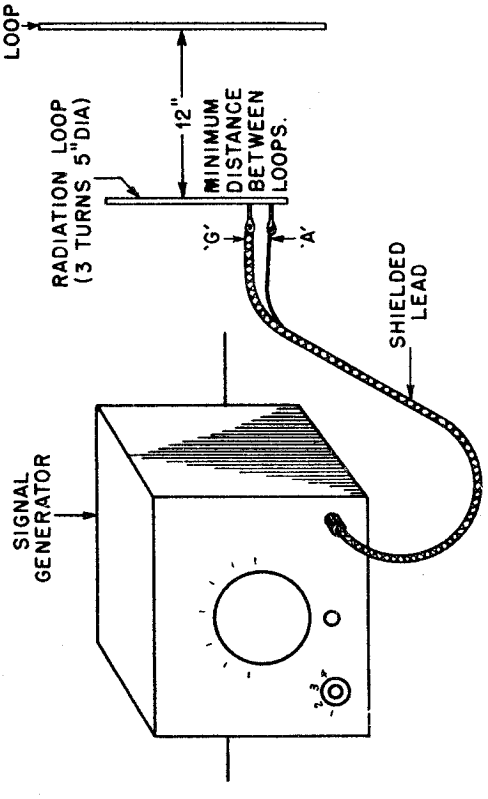

FIGURE 4. METHOD OF RADIATING SIGNAL TO THE RECEIVER

Chassis HS-1 is used in Models 55X11, 55X12 and 55X13. Chassis HS-50 is used in Models 55X11A, 55X12A and 55X13A. Models differ in cabinet and hardware (see parts list.) Chassis differ in circuit

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GALVIN MFG. CORP.

MODELS 55X11,55X12,55X13, 55X11a,55X12A,55X13A

REF. NO.	PART NO.	DESCRIPTION		LIST
	49A12646	Pulley, Cord: 7/32" groove (dial string 55X11A, 12A & 13A)		.05
	49A15045	Pulley, Cord: 11/64" groove (dial string 55X11A, 12A & 13A)	doz.	.20
	49A21552 or 49A71078	Pulley, Cord: 1/2" groove (dial string)	doz.	.20
	5A13896	Rivet, shoulder: .312" Sh; Pol.Nkl. (dial string)	doz.	.40
	5A15045	Rivet, shoulder: .437" Sh; Pol.Nkl. (dial string 55X11A, 12A & 13A)	doz.	.20
	5S7708	Rivet, Steel: 9/32 x .122; Pol. Nkl. (line cord lock)	per/c	.60
	5S7707	Rivet, Steel: 5/32 x .122; Pol. Nkl. (tube socket mtg. & C-8 mtg.)	per/c	.45
	5S7716	Rivet, Steel: 5/32 x .122 Pol. Nkl. (mounting clip - loop and back)	per/c	.45
	5S7718	Rivet, Steel; 3/16 x .122; Ant. Cop. (Terminal strip mtg. loop)	per/c	.45
	34B74430	Scale, dial: glass (55X11A, 12A & 13A)		.60
	34B70435	Scale, dial: glass (55X11, 12 & 13)		.45
	3S7401	Screw, Steel: #2 x 3/8 PhOHWS; Ant. Cop. (55X13 & 55X13A dial brkt. mtg.)		.25
	3S7506	Screw, Steel: #6 x 1/4 PKZ P1 HH; Cad. Pl. (gang cover and L-2 mtg.)	per/c	.50
	3S7331	Screw, Steel: 6-32 x 3/8 S1 FHMS; Cad. Pl. (gang mtg. 55X11, 12 & 13)	per/c	.45
	3S8117	Screw, Steel: #8 x 1 PKZP S1 HMH; Ant. Cop. (Chassis mtg. 55X11, 12, 11A & 12A)	doz.	.20
	3S7119	Screw, Steel: 6/32 x 1/4 S1 ABHD; Cad.Pl. (Replace gang brkt.)	doz.	.35
	3S7526	Screw, Steel: #8 - 1-1/8 PKA S1 HH; Cad. Pl. (Chassis mtg. 55X13 & 13A)	doz.	.30
	29A70422	Screw, terminal (loop and back)	doz.	.35
	47A72659	Shaft, Tuning (55X11A, 12A & 13A)		.25
	1A71049	Shield and Sleeve Assembly (I.F. & Diode Coils)		.50
	41A70705	Spring, Coil (used in T1 & T2)	doz.	.40
	41A73619	Spring, Tension Coil (dial cord 55X11A, 12A & 13A)		.05
	41A22596	Spring, Tension Coil (dial cord 55X11, 12 & 13)	doz.	.35
	42A70423	Strap, ground (loop and back)	doz.	.25
	35A70074	Strip, Dial background		.20
	31K15026	Strip, terminal: 2 Ins. #2 mtg; 3/8" (loop and back 55X11, 12 & 13)		.05
	46A72766	Stud, Trimount; black		
	9A70070	Socket, Pilot Light and Leads		.25
	9A6790 or 9A6787 or 9A6788	Socket, tube; octal; (for 35Z5, 50L6, 12SA7, & 12SQ7)		.15
	9A6792 or 9A70165	Socket, tube: octal; (for 6SK7)		.15
	4S1770	Washer, brass: .365-.234-.025 (gang mtg. 55X11, 12 & 13)		
	4A70015	Washer "C" (Tuning shaft 55X11A, 12A & 13A)	per/c	.70
	4K22505	Washer, paper: 11/16 x 17/64 x 1/32 (under knobs 55X12A)	doz.	.20
	35K70460	Washer, paper: 11/16 x 9/64 x 1/32 (used under tuning knob 55X11, 12 & 13)	per/c	.95
	35K19943	Washer, paper: 11/16 x 17/64 x 1/32 (used under knobs 55X11A 13A and under volume control 55X11, 12 & 13)	per/c	.60
	32A20575	Washer, spacer: 3/8-.171-.062 (Chassis mtg. 55X11 & 12)	per/c	.50
	4S8204	Washer, Steel: 1"-.203-.067; Cop.Pl. Chassis mtg. 55X13 & 13A only)	doz.	.25
	4S1719	Washer, Steel: 3/8-.140-.030; Cad.Pl.(Line cord lock mtg.)	per/c	.55

Prices Subject to Change Without Notice

1. Remove the chassis from the cabinet.
2. Remove the broken cord.
3. Turn gang to full mesh position.
4. Cut a 27" length of 18 lb. silk fish cord.
5. Replace new cord as follows:
   a. Tie one end of cord to tension spring on gang pulley.
   b. Make one complete turn around gang pulley in a counter-clockwise direction.
   c. Route the cord under and over shoulder rivets #1 and #2.
   d. Route the cord the length of dial scale, around the dial pulley, and over shoulder rivet #3.
   e. Make 3-1/2 turns around the tuning shaft in a counter-clockwise direction.
   f. Place cord over the bracket pulley and shoulder rivet #4 to the gang pulley.
   g. Place cord around the gang pulley counter-clockwise to the tension spring and tie.

Place a drop of shellac on the cord knots.

Install and adjust pointer.

a. Leave gang in full mesh position.
b. Set pointer to "V" notch at low end of the dial.
c. Clamp pointer to cord.
d. Fix pointer to cord with a drop of shellac or household cement.

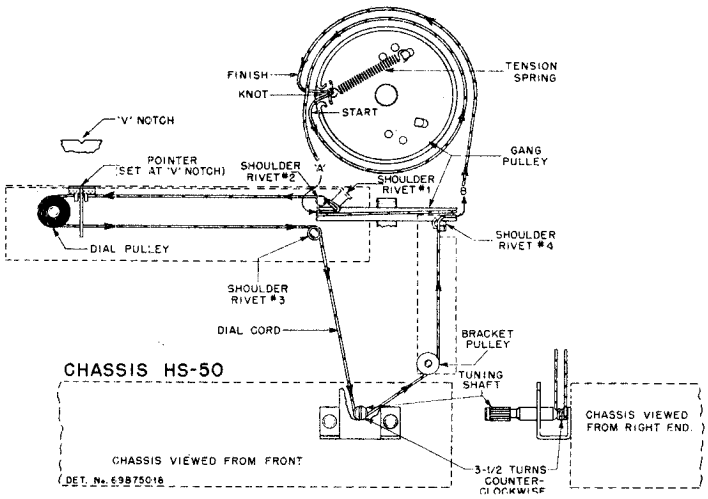

FIGURE 3. DIAL CORD DRIVE (HS-50)

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MODELS 55X11,55X12,55X13, 55X11A,55X12A,55X13A GALVIN MFG. CORP.

PARTS PRICE LIST

REF. NO.	PART NO.	DESCRIPTION		LIST
C-1	19B70080	Capacitor, variable: 2 gang and pulley assembly (55X11,		
	or 1X72550	Capacitor, variable: 2 gang 12&13) and pulley assembly		$3.90
C-1	1X74747	Capacitor, variable: 2 gang and pulley assembly (55X11A, 12A & 13A)		3.50
C-2	8S9816	Capacitor, fixed: paper, .05 mf 20% 400 vdc		.20
C-3	8S9816	Capacitor, fixed: paper; .05 mf 20% 400 vdc		.20
C-4	21R6648	Capacitor, fixed: mica; 250 mmf 20% 500 vdc		.20
C-5	8S9809	Capacitor, fixed: paper; .01 mf 20% 400 vdc		.15
C-6	21R6648	Capacitor, fixed: mica; 250 mmf 20% 500 vdc		.20
C-7	8S9809	Capacitor, fixed: paper; .01 mf 20% 400 vdc		.15
C-8	23A70008	Capacitor, fixed: electrolytic; dual 20 mf 150 vdc		1.35
C-9	8S9802	Capacitor, fixed: paper; .02 mf 20% 400 vdc		.15
C-10	8A72686	Capacitor, fixed: paper; .15 mf 20% 200 vdc		.25
	or 8A75566	Capacitor, fixed: paper; .15 mf 20% 400 vdc		
	20A74404	Capacitor, trimmer; includes "A" brkt (loop back) 55X11A, 12A & 13A		.30
	21B70826	Capacitor, fixed; mica; dual (used in T1 & T2)		.45
E-1	1X70081	Capacitor and choke assembly		.30
E-2	50B70076	Speaker, electrodynamic; 4 inch (HS-1 & HS-50)		5.45
	or 50K76379	Speaker, electrodynamic; 4 inch (HS-50 only)		
I-1	55X11854	Bulb: 6.3V - .15A; tubular bayonet #47		.15
L-1	24C70439	Coil; antenna loop and panel assembly 55X11		1.80
	24K70440	Coil; antenna loop and panel assembly 55X12		2.25
	24K70441	Coil: antenna loop and panel assembly 55X13		2.10
	24C74406	Coil; antenna loop and panel 55X11A		2.20
	24C74407	Coil; antenna loop and panel 55X12A		2.10
L-1	24K74408	Coil: antenna loop and panel (55X13A)		1.00
L-2	24A70424	Coil: oscillator (55X11, 12 & 13)		.85
	24A74616	Coil: oscillator (55X11A, 12A & 13A)		.85
R-1	6R6028	Resistor: fixed; carbon; 22,000 ohms 20% 1/2W Ins.	doz.	.60
R-2	6R6015	Resistor, fixed; carbon; 220,000 ohms 20% 1/2W. Ins.	doz.	.60
R-3	6R2085	Resistor, fixed; carbon; 39 ohms 10% 1/2W Ins.	doz.	.60
R-4	6R6004	Resistor, fixed; carbon; 1 megohm 20% 1/2W. Ins.	doz.	.60
R-5	6R6056	Resistor, fixed; carbon; 47,000 ohms 20% 1/2W. Ins.	doz.	.60
R-6	18A70032	Resistor, variable; carbon; 1 megohm with SPST. switch		1.00
R-7	6R2118	Resistor, fixed; carbon; 3.3 megohms 20% 1/2W. Ins.	doz.	.60
R-8	6R6015	Resistor, fixed; carbon; 220,000 ohms 20% 1/2W. Ins.	doz.	.60
R-9	6R6032	Resistor, fixed; carbon; 470,000 ohms 20% 1/2W Ins.	doz.	.60
R-10	6R6392	Resistor, fixed; carbon; 150 ohms 10% 1/2 W N.I.	doz.	.60
S-1		Switch, SPST: part of R6 (volume control)		

REF. NO.	PART NO.	DESCRIPTION		LIST
T-1	24B70531	Transformer, I.F.; 455 Kc; complete less shield		1.05
T-2	24B70533	Transformer, diode; 455 Kc; complete less shield		1.40
T-3	25B70063	Transformer, output		1.95
	1X72550	Assembly, pulley and bushing (55X11, 12 & 13 replacement)		
	1X74746	Assembly, gang mtg. brkt: less gang (55X11A, 12A, 13A)		.30
	1X74736	Assembly dial background mtg. (55X11A, 12A & 13A)		.45
	1X70084	Bracket, dial brkt. and pulley (55X11, 12 & 13)		.35
	7A72488	Bracket, dial scale retainer; cad. pl (55X13 & 13A)		.05
	7A14684	Bracket, tuning shaft; cad. pl; (55X11A, 12A & 13A)		.10
	38A10544	Button, plug; 1/4" for 1/16"; cop. oxd. (55X11, 12 & 13)		.30
	16E70027	Cabinet, plastic; brown finish (55X11)		3.25
	16K70475	Cabinet, plastic; ivory finish (56X12)		4.55
	51X70401	Cabinet, walnut veneer (55X13)		10.00
	16K72776	Cabinet, plastic; brown finish (55X11A)		3.60
	56K72777	Cabinet, plastic; ivory finish (55X12A)		4.50
	16K72779	Cabinet, walnut veneer (55X13A)		10.50
	42B70721	Clip, coil (used on T1 & T2)	doz.	.30
	42A18764	Clip, mounting (loop and back)	per/c	.95
	35K70445	Cloth, grille (55X13 & 13A)		.10
	11M8944	Cord: dial; 18# black; 27"	yd.	.10
	30A151	Cord. line; 6 ft. and plug		.45
	48A70023	Core, Iron and Screw (used in T1 & T2)		.15
	15A70026	Cover, gang (55X11, 12 & 13)		.10
	5A70078	Eyelet, gang mounting (55X11, 12 & 13)	per/c	1.20
	5S7805	Eyelet, snap-in; .156 x .141; cad. pl. (dial background)	per/c	.70
	37K15641	Foot, rubber; 3/4 dia. (55X13 & 13A)	doz.	.35
	5A72680	Grommet: rubber (gang cushion 55X11, 12 & 13)	doz.	.50
	37A12691	Grommet: rubber (gang cushion 55X11A, 12A & 13A)	doz.	.35
	36K25724	Knob, control; molded; ivory (volume control 55X12, Tuning and volume 55X12A)		.10
	36K70486	Knob, control; molded; ivory with clip (Tuning control 55X12)		.15
	36A21887	Knob, control; molded; brown (volume control 55X11 & 13 Tuning and volume 55X11A & 13A)		.10
	36A70447	Knob, control; molded; brown with clip (tuning control 55X11 & 13)		.15
	32A24815	Lock, line cord	doz.	.30
	3S7205	Lockscrew, steel: 8-32 x 1/4 S1 HH: Cad. Pl. (speaker Mtg)	per/c	.95
	4S7695	Lockwasher; #5 Int. Cad. Pl. (loop and back 55X11, 12 & 13)	doz.	.45
	2S7051	Nut: 3/8-32 x 9/16, Palnut: C.P. (volume control)	doz.	.30
	2B70703	Nut, Special Palnut (used in T1 & T2)	doz.	.25
	2A70775	Nut, Speed: Timmerman #520 (dial brkt. mtg.)	doz.	.25
	2A70434	Nut, Speed: Timmerman #156 (dial scale mtg. 55X11, 12 & 13)	doz.	.25
	38A25507	Plug, split; 5/8": Cop. Ox. (Back and loop)	doz.	.20
	52A71079	Pointer, dial		.20

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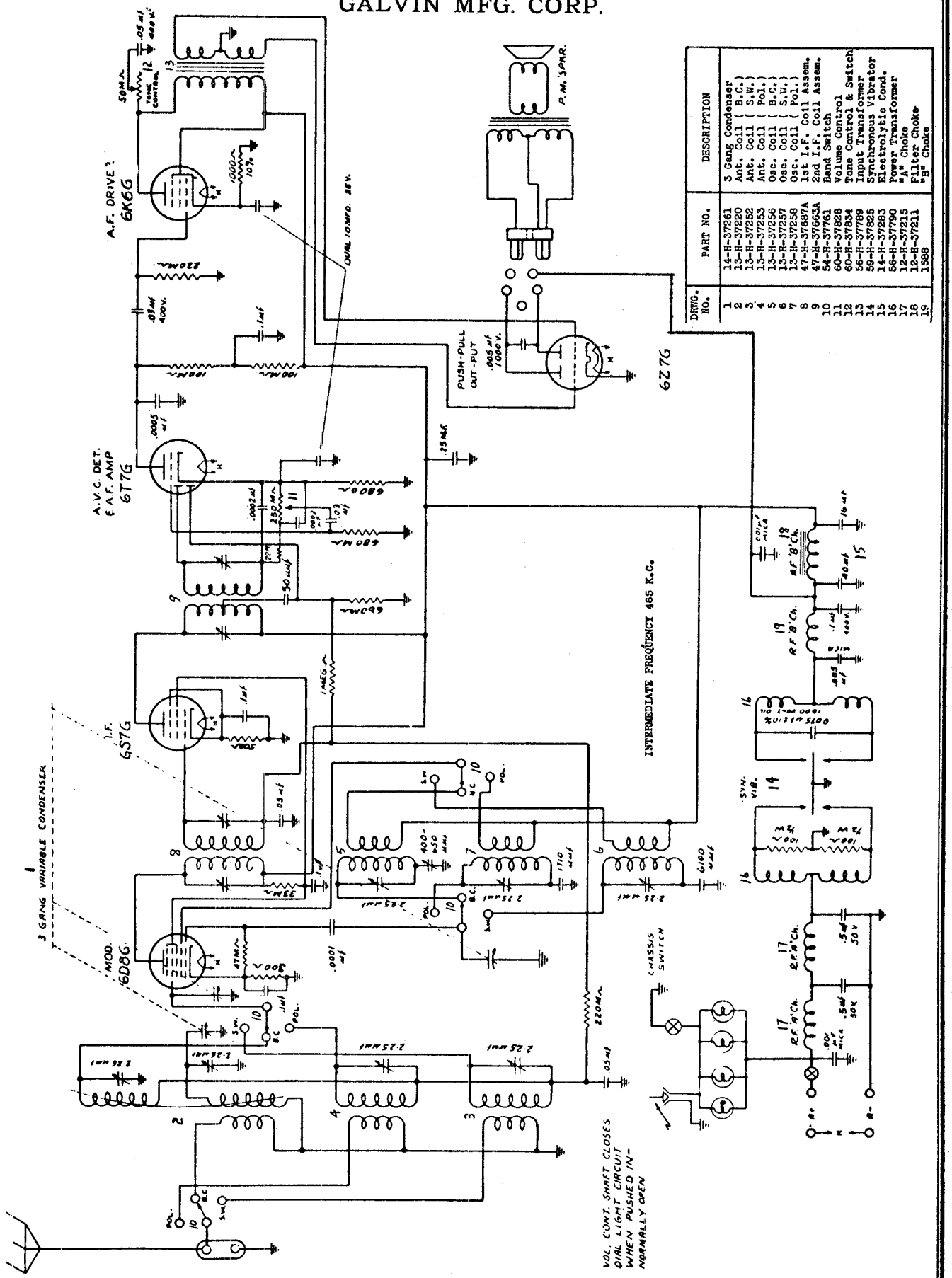
MODEL 56T,56Y,Ch.B5-2

GALVIN MFG. CORP.



DRWG. NO.	PART NO.	DESCRIPTION
1	14-H-37261	3 Gang Condenser
2	13-H-37220	Ant. Coil (B.C.)
3	13-H-37252	Ant. Coil (S.W.)
4	13-H-37253	Ant. Coil (Pol.)
5	13-H-37256	Osc. Coil (B.C.)
6	13-H-37257	Osc. Coil (S.W.)
7	13-H-37258	Osc. Coil (Pol.)
8	47-H-37687A	1st I.F. Coil Assem.
9	47-H-37663A	2nd I.F. Coil Assem.
10	54-H-37761	Band Switch
11	60-H-37828	Volume Control
12	60-H-37834	Tone Control & Switch
13	56-H-37789	Input Transformer
14	59-H-37825	Synchronous Vibrator
15	14-H-37283	Electrolytic Cond.
16	56-H-37790	Power Transformer
17	12-H-37215	"A" Choke
18	12-H-37211	Filter Choke
19	1588	"B" Choke

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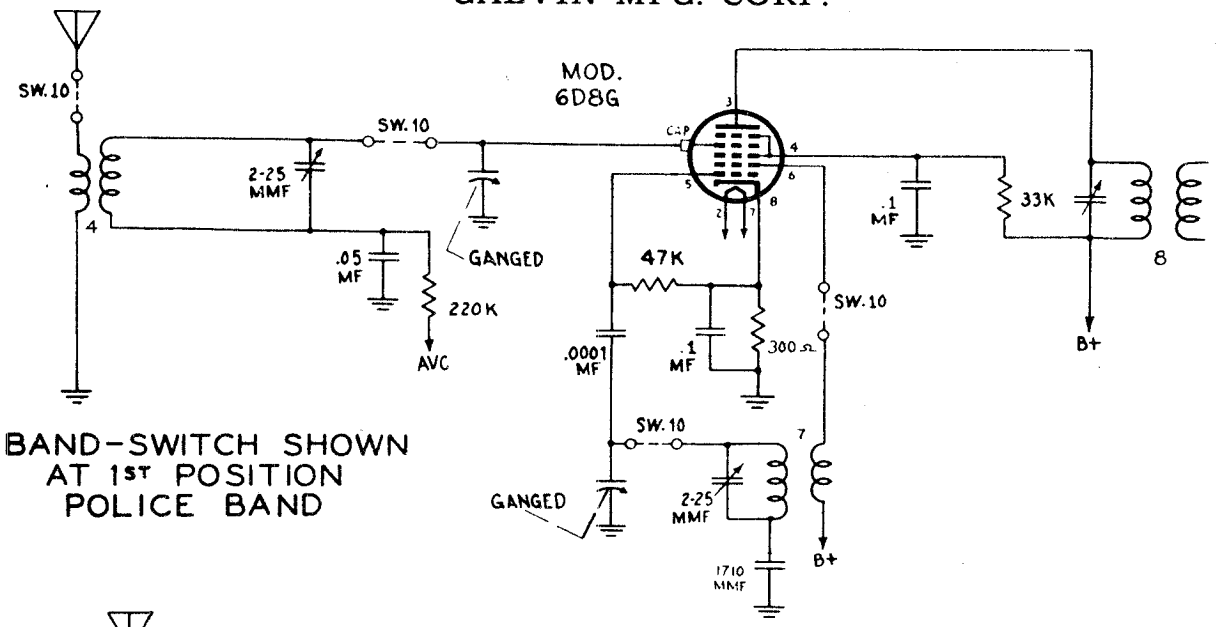
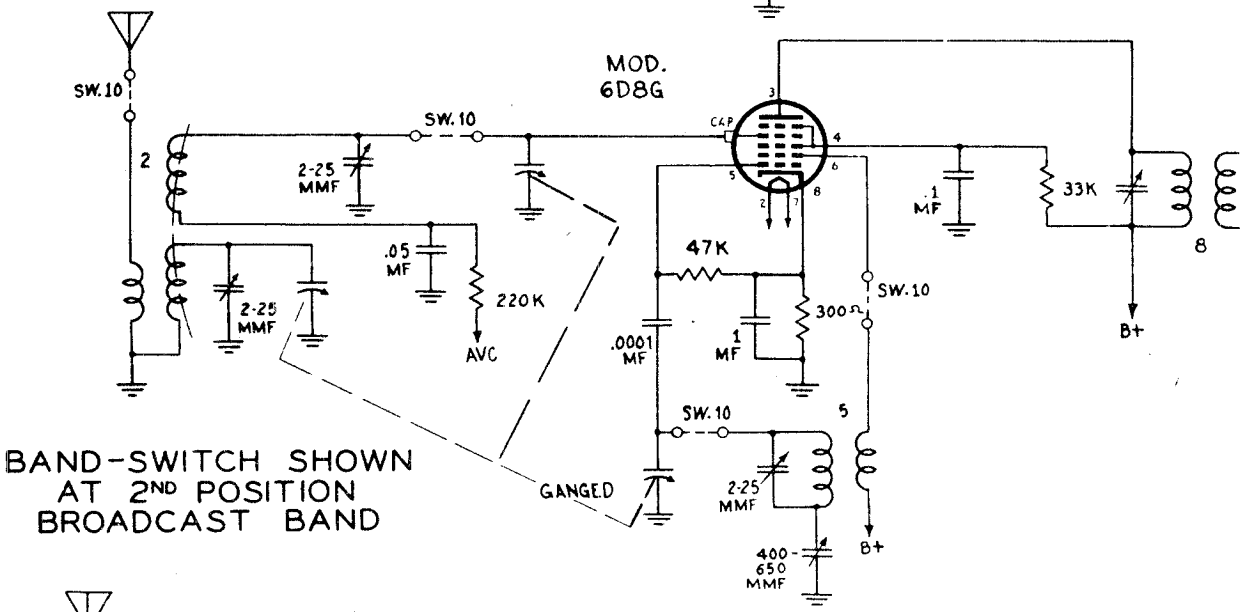
For Alignment, see P.15-5

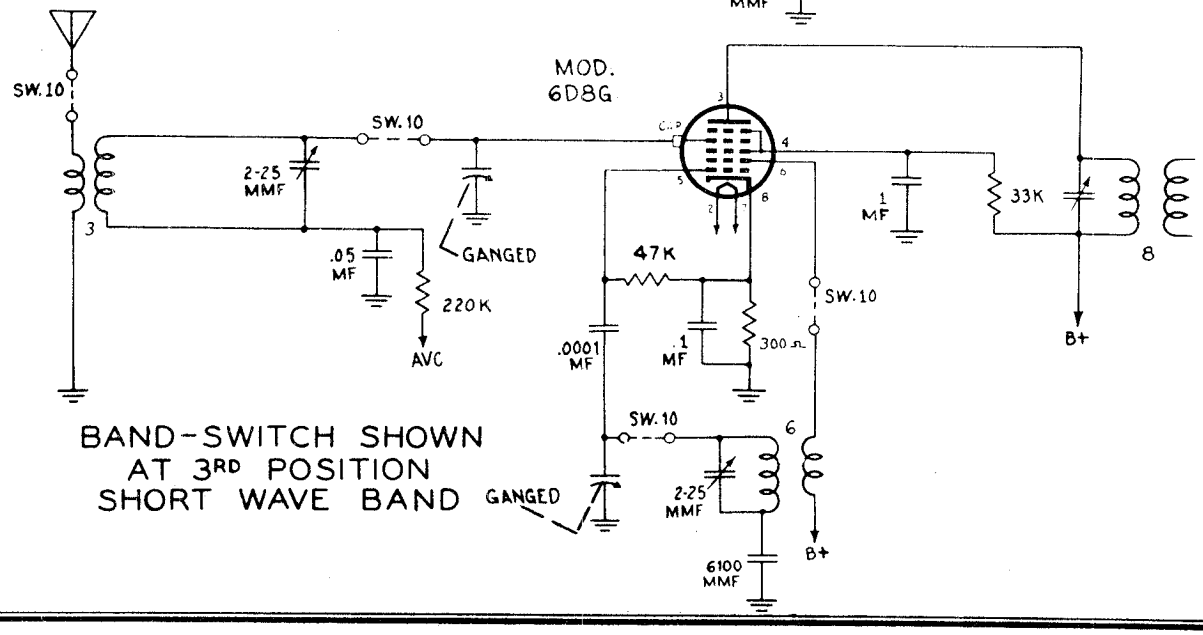
"clarified schematics"

MODELS 56T,56Y

GALVIN MFG. CORP.







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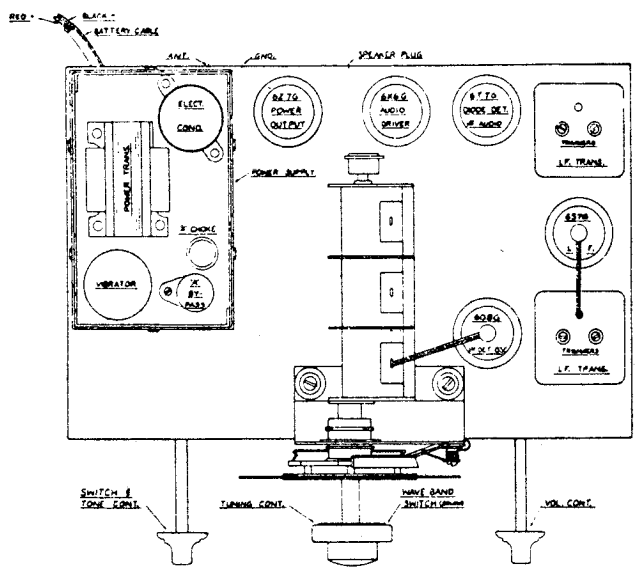
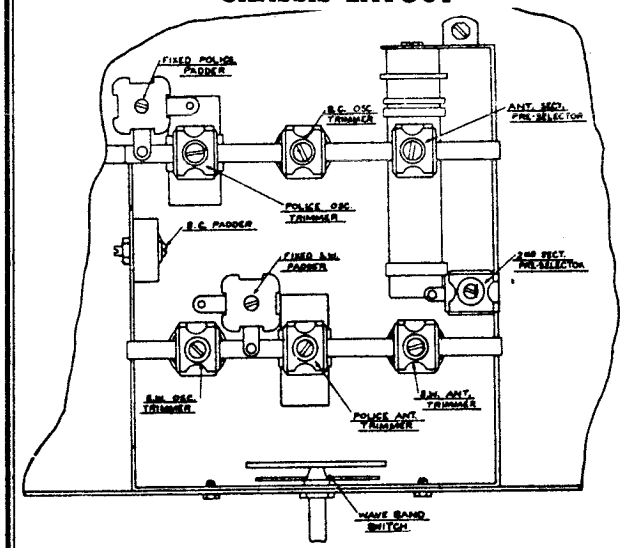
BAND COVERAGE

American Programs 540-1720 KC
Police and Aircraft 2200-7000 KC
Foreign Programs 7,000-22,000 KC



CHASSIS LAYOUT



TRIMMERS

SOCKET VOLTAGES

Tube	Position	1	2	3	4	5	6	7	8	9—Top Grid
6D8G	1st det.-osc.	0	6	150	70	−7.5	150	0	2.0	0
6S7G	I. F.	0	6	150	70	2.6	....	0	2.6	0
6T7G	2nd det.-AVC	X	6	75	0	0	X	0	.8	0
6K6G	A. F.	X	6	145	150	0	....	0	12	.....
6Z7G	Output	X	6	160	0	0	160	0	0	.....

"X" indicates socket terminals used as dummy tie points.

All voltages measured from point indicated to chassis ground, using 1000 ohms per volt meter.

Battery voltage 6.

Battery drain 2.5 amps. at no signal.

Maximum power output 3 watts.

ALIGNMENT PROCEDURE Connect signal generator to control grid of first detector tube (6D8G) through a .05 MF condenser, and to chassis. Do not remove grid cap. Also connect output meter across speaker voice coil. Turn band switch to "American Programs" position. Turn condenser gang completely out of mesh.

Set signal generator at 465 K.C. and carefully adjust the four I.F. trimmers (located in top of I.F. coil cans) to point showing highest reading on output meter.

Leave band switch in "American Programs" position. Connect signal generator to antenna and ground terminals using a .0002 MF condenser in antenna lead.

Set signal generator and receiver dial both at 1700 K.C. Adjust B.C. OSC. trimmer until 1700 K.C. signal is heard.

Set signal generator at 1400 K.C. and turn condenser gang to the signal at 1400 K.C. Adjust antenna section and second section of preselector trimmers to point showing highest reading on output meter.

Set signal generator at 600 K.C. and rock pointer at 600 K.C. position on dial scale, while adjusting B.C. padder, until combination is found which gives highest output reading. (Note: If there is noise level at 600 K.C., padder can be adjusted to maximum noise without rocking gang and without use of signal generator. (Use short wire for pick-up if necessary.)

Turn band switch to "Police and Aircraft" position. Replace .0002 MF condenser in signal generator antenna lead with a 400 ohm carbon resistor.

Set signal generator and receiver dial both at 7.0 MC. Adjust POLICE OSC. trimmer until 7.0 MC signal is heard.

Set signal generator at 5.8 MC and turn condenser gang to signal at 5.8 MC. Adjust POLICE ANT. trimmer to point giving greatest output reading, while slightly rocking condenser gang.

Turn band switch to "Foreign Programs" position, still using 400 ohm carbon resistor in antenna lead to signal generator.

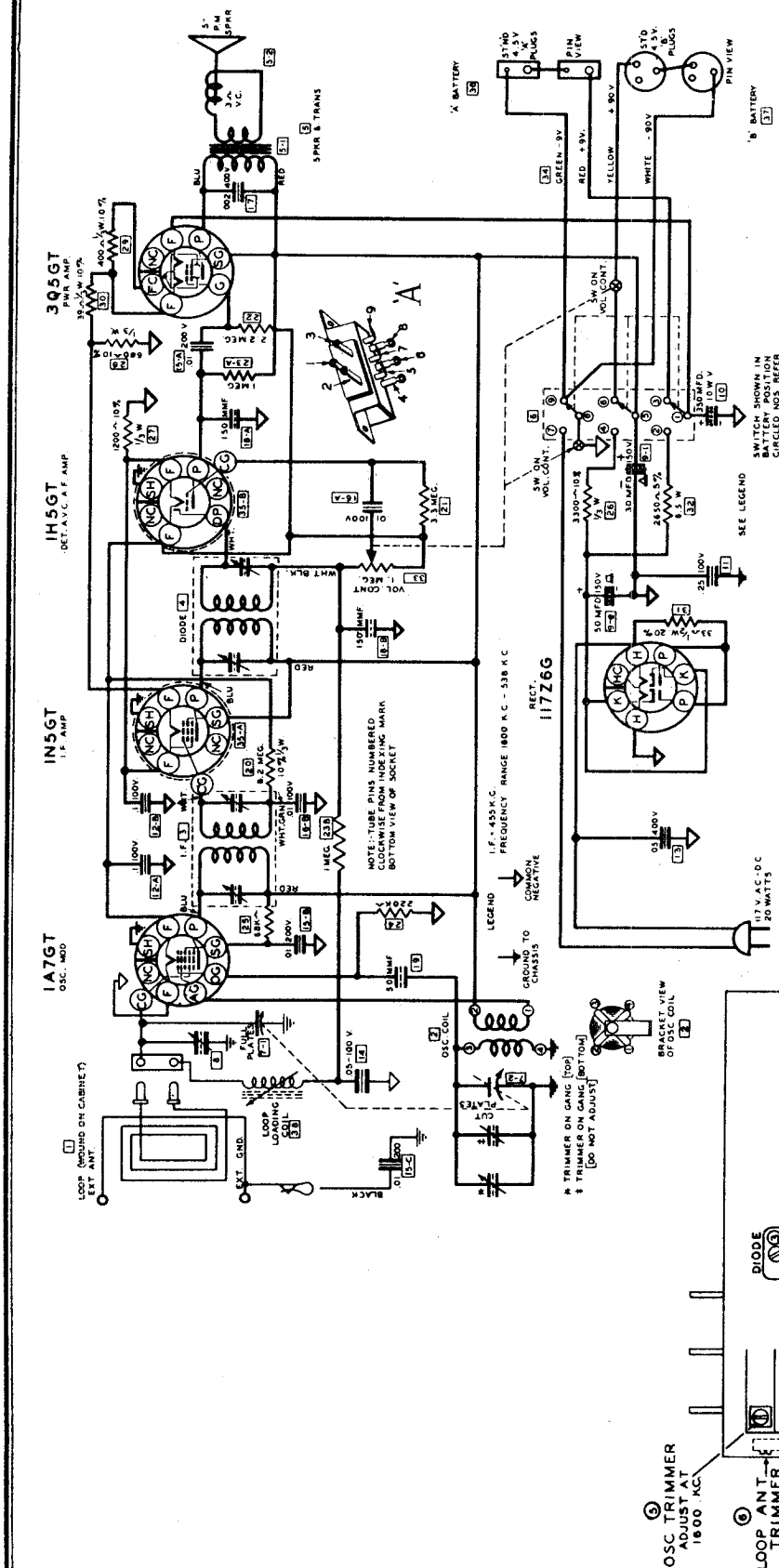
Set signal generator and receiver dial both at 22.0 MC. Adjust SW OSC. trimmer until 22.0 MC signal is heard.

Set signal generator at 18.7 MC. and turn condenser gang to signal at 18.7 MC. Adjust SW ANT. trimmer to point giving greatest output reading, while slightly rocking condenser gang.

Padders on "Police" and "Foreign" bands are fixed (no adjustment necessary).

MODELS 57BP1A, 57BP2A, 57BP3A, 57BP4A

GALVIN MFG. CORP.



ALIGNMENT CHART MODELS 57BP1A, 2A, 3A, and 4A

OPERATIONS IN ORDER	GANG CONDENSER SET AT	DUMMY ANTENNA	GENERATOR CONNECTED TO	ADJUST TRIMMERS NO.	GENERATOR SET AT
1	Minimum 1600 K.C.	.1 Mfd.	Osc.-Mod. Grid	1-2-3-4	455 K.C.
2	Minimum 1600 K.C.	200 Mmf.	External Ant.	5	1600 K.C.
3	1400 K.C.	200 Mmf.	External Ant.	6	1400 K.C.
4	600 K.C.	200 Mmf.	External Ant.	7	600 K.C.

Volume Control Set at Maximum

VOLTAGE CHART

POSITION	PLATE	SCREEN	BIAS
Osc.-Mod.	85	42	1.1
I.F.	85	85	3.7
Det.-AVC.-AF	15	-	2.3
Power	85	87	8.5
Rect.	-	123	-

Line Voltage - 117 Volts A.C.
All voltages measured from socket terminal to common negative using 1000 Ohms per volt meter.

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GALVIN MFG. CORP.

MODELS 57BP1A, 57BP2A, 57BP3A, 57BP4A

SENSITIVITY AND STAGE GAIN MEASUREMENTS MODELS 57BP1A, 2A, 3A, and 4A

Average Microvolt Input *	Generator Set At	Generator Feeder Connected to	Dummy Antenna Capacity	Leak Resistance	Output Meter Reading **
4200	455	I.F. Grid	.1 Mfd.	.5 Meg	.38
85	455	Mod. Grid	.1 Mfd.	.5 Meg	.38
95	600	Mod. Grid	.1 Mfd.	.5 Meg	.38
26	600	Ant. Terminal	200 Mmf.	None	.38

Volume Control Set at Maximum
* .05 Watts = .38 Volts

** Output meter connected across voice coil.

MODELS 57BPA1, 2, 3, 4 PARTS PRICE LIST

DRWG. NO.	PART NO.	DESCRIPTION	LIST
		MAJOR PARTS	
6	1X20289	Slider Switch & Bracket Assembly. . . .	$0.55
10	23A20318	Elect. Cond. & Strap 350-10v.	.50
9	23A20324	Elect. Condenser FP	.80
33	18K20339	Vol. Control & Switch 1 meg	.85
7	1X20506	Gang & Pulley Assembly.	1.85
	19B20507	Variable Condenser - Subs.1X20506 . . .	XXXX
4	1X20586	Diode Coil & Shield Assembly.	1.35
3	1X20588	I.F. Coil & Shield Assembly	1.40
2	24A22746	Osc. Coil (Wht-Brn) Ceramic	.35
38	1X22831	Coil Core & Bracket Assembly - Loop . .	.50
5	50B22836	Speaker & Output Transformer.	4.20
		Speaker Exchange.	2.45
5-1	25K22838	Output Transformer.	.85
		CABINET PARTS	
	7A14345	Zee Bracket - Cab. Back . . . . . .DOZ.	.50
	7A15264	Back Mounting Bracket	.05
	55K15738	Handle Clasp - Cop. Oxd	.20
	55K16551	Female Latch CO - #3,4A	.15
	55K16575	Male Latch - #3,4A.	.20
	37A16614	Rubber Foot . . . . . .DOZ.	.25
	36A20315	Control Knob (Ivory) Plain - #4A. . . .	.10
	7A20375	Battery Retainer Bracket - Long	.05
	32B20581	Speaker Baffle - Card Board . . . .DOZ.	.30
	64B20582	Speaker Screen - Plain.	.15
	36K20609	Control Knob (Ivory) Marked - #4A . . .	.10
	36K20610	Control Knob (Walnut) Marked - #1,2,3A.	.10
	36K20611	Control Knob (Walnut) Plain - #1,2,3A .	.10
	55K20885	Strap Handle - Flat	.25
	35B21021	Grill Cloth	.15
	16D22724	Cabinet (Portable) Cpt. - #3A	9.00
	16K22728	Cabinet (Portable) Cpt. - #4A	9.00
	1X22788	Back & Brackets Assembly - #1,3A. . . .	.55
	1X22792	Back & Brackets Assembly - #2,4A. . . .	.55
	16X22820	Cabinet (Portable) Cpt. - #1A	6.50
	16K22823	Cabinet (Portable) Cpt. - #2A	6.50
	56X22855	Packing Carbon & Fillers - #3,4A. . . .	.40
	56X23002	Packing Carton & Fillers - #1,2A. . . .	.30
		DIAL & DRIVE	
	5S7805	Snap-In Eyelet CP - Dial. . . . .PER C.	.70
	11M8944	Dial Cord 18# Black 18" . . . . . .YARD	.05
	37A12691	Rubber Grommet - Gang Mtg . . . . .DOZ.	.25
	41A14244	Dial Cord Tension Spring. . . . . .DOZ.	.40
	7A14610	Tuning Shaft Bracket.	.05
	49A14641	Cord Pulley 2" Cop. Pl.	.05
	7B18748	Gang Mtg. Bracket	.10
	5A19658	Eyelet Cop. Pl. - Gang Mtg. . . . .DOZ.	.40
	47K20340	Tuning Shaft 1 & 11/64.	.10
	38A20612	"Off" Indicator Button.	.05
	52K20667	Dial Pointer (Double) Molded.	.10
	61K22389	Dial Crystal.	.20
	34B22758	Dial Scale.	.15
	1X22917	Dial Plate & Bracket Assembly	.10
		CONDENSERS	
19	21B6503	Molded Mica Condenser 50mmf-20%	.15
18	21B6506	Molded Mica Condenser 150mmf-20%. . . .	.15
16	8S9801	Tubular Condenser .01-100v.	.10
14	8S9805	Tubular Condenser .05-100v.	.15
11	8S9810	Tubular Condenser .25-100v.	.20
12	8S9814	Tubular Condenser .1-100v	.15
13	8S9816	Tubular Condenser .05-400v.	$0.15
17	8S9824	Tubular Condenser .002-400v	.10
15	8S9825	Tubular Condenser .01-200v.	.10
	20A20321	I.F. Trimmer - Small.	.25
	20A20323	Diode Trimmer - Small	.30
8	20A22796	Trimmer & Bracket - 6 mmf	.15
		RESISTORS	
24	6B6003	Carbon Resistor 220,000-1/3-20 N.I. . . .DOZ.	.60
29	6B6025	Carbon Resistor 400-1/3-10 N.I. . . . .DOZ.	.60
22	6B6049	Carbon Resistor 2.2 meg-1/3-20 N.I. . . .DOZ.	.60
31	6B6067	Carbon Resistor 33-1/2-20 N.I . . . . .DOZ	.60
23	6B6071	Carbon Resistor 1 meg-1/3-20 N.I. . . . .DOZ.	.60
28	6B6073	Carbon Resistor 680-1/3-10 N.I. . . . .DOZ.	.60
25	6B6125	Carbon Resistor 68,000-1/3-20 N.I . . . .DOZ.	.60
21	6B6179	Carbon Resistor 3.3 meg-1/3-20 N.I. . . .DOZ.	.60
27	6B6198	Carbon Resistor 1200-1/3-10 N.I . . . .DOZ.	.60
26	6B6242	Carbon Resistor 3300-1/3-10 N.I . . . .DOZ.	.60
30	6B6283	Carbon Resistor 39-1/3-10 . . . . . .DOZ.	.60
20	6B6297	Carbon Resistor 8.2 meg.-1/3-10 N.I . . .DOZ.	.60
32	17A20578	W.W. Resistor 2650-6.5-5.	.45
		SCREWS, WASHERS etc.	
	4A1957	Cee Washer .093 CP - Tun. Shaft . . . .DOZ.	.15
	2S7003	Nut 8-32x11/32 Hex CP . . . . . .PER C.	.50
	2S7050	Nut 6-32 CP - Switch. . . . . .PER C.	.50
	3S7155	Screw 6-32x3/16 CP - Gang Brkt. . . . .PER C.	.35
	3S7205	Screw 8-32x1/4 CP - Spkr. . . . . .PER C.	.95
	3S7247	Lockscrew 6-32 CP - Gang Brkt . . . . .PER C.	1.00
	3S7248	Screw 8-32 CP - Dial. . . . . .PER C.	.40
	3S7271	Screw 8-32 Brz. - Cab. Back . . . . . .PER C.	.75
	3S7437	Screw 5x3/8 RHWS CO . . . . . .DOZ.	.30
	3S7454	Screw 8x1/4 CP. . . . . .DOZ.	.20
	3S7457	Screw 8x7/8 CP - Chassis Mtg. . . . . .DOZ.	.25
	3S7475	Screw 8x1/4 CP - Cord Guard . . . . .PER C.	.65
	3S7506	Screw 6x1/4 CP - Coil Mtg . . . . . .PER C.	.50
	3S7507	Screw 8x5/8 CP - Gang Mtg . . . . . .PER C.	.70
	3S7528	Screw 8x3/8 CO - Bat. Brkt. . . . . .PER C.	.65
	4S7597	Washer 7/16 CP - Dial . . . . . .PER C.	.35
	3K21134	Speaker Mtg. Screw 8-32x3/4 CP. . . . .PER C.	.85
		MISCELLANEOUS	
	29B5207	Soldering Lug - Gang Mtg. . . . . .PER C.	.85
	29B5209	Dumbell Lug - Cab . . . . . .PER C.	1.00
	29B5248	Soldering Lug - Bent - Cab. . . . . .PER C.	.75
	42B5480	Grid Clip - Small - Collar Grip . . . . .DOZ.	.15
	42B5526	Fahnestock Clip #15 Bronze - Cab. . . .PER C.	.80
	9B6738	Tube Socket - Saddle Octal.	.15
	28X12250	Three Prong Battery Plug.	.05
	42K13135	Cable Clamp . . . . . .DOZ.	.15
35	26X14760	Bantam Tube Shield.	.05
	31A15433	Terminal Strip 1 Ins. #2 Mtg.	.05
	9A15642	Two Prong Receptacle.	.10
	38X15757	Plug Button 19/64x25/64 CO. . . . . .DOZ.	.35
	42A17040	Line Cord Clamp	.05
	7A20317	Switch Mounting Bracket - V.C . . . . .DOZ.	.15
	30B20329	Line Cord & Small Plug - 6 Ft	.35
	28A20361	Two-Pin Plug Base . . . . . .DOZ.	.30
	14A20579	Slider Switch Insulator Strip . . . . .DOZ.	.30
	32B20583	Line Cord Guard - Fibre	.10
34	1X20592	Battery Cable Assembly.	.20
	1X22787	Bottom Cover & Bracket Assembly	.30

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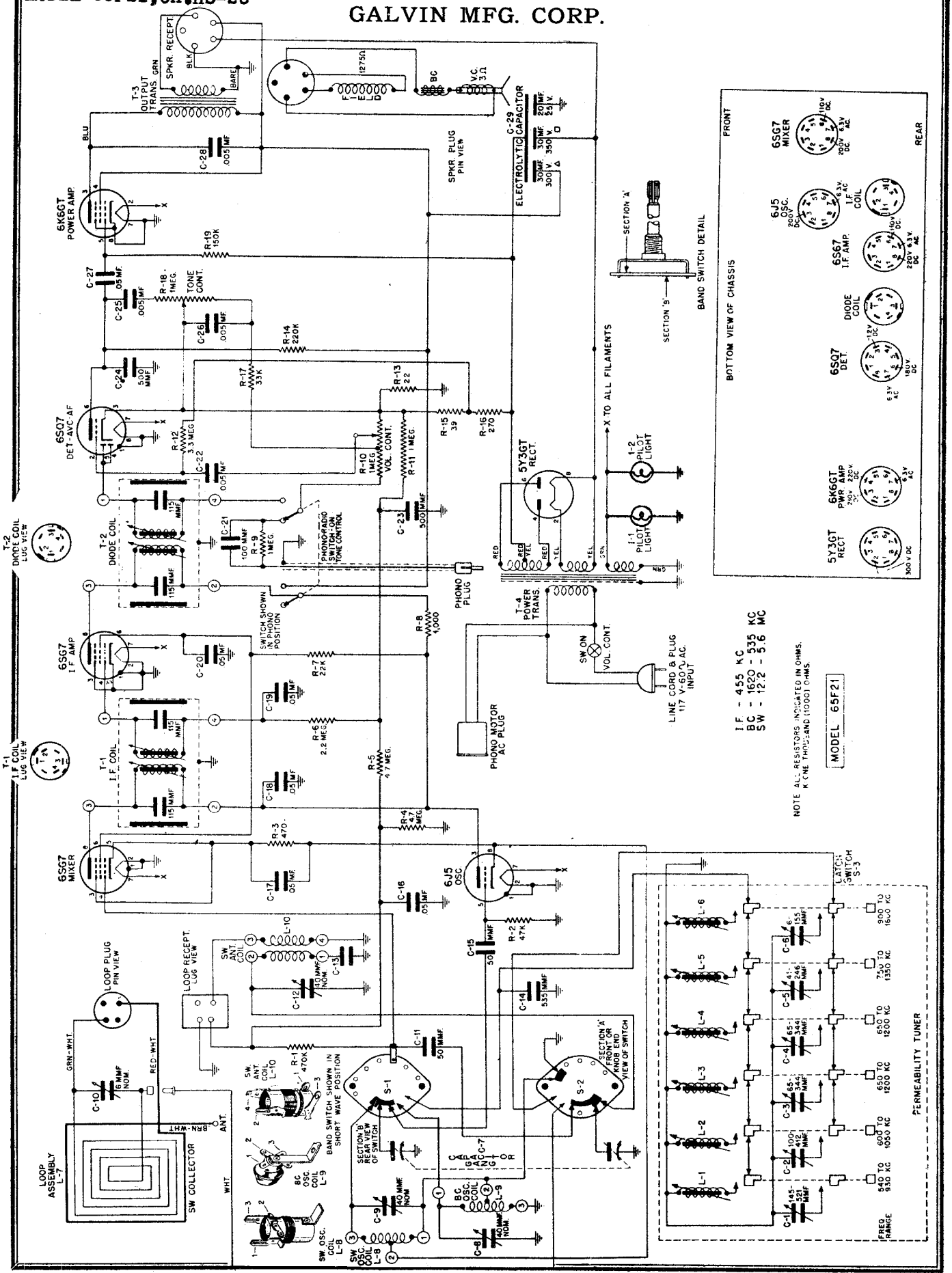
MODEL 65F21, Ch. HS-26

GALVIN MFG. CORP.



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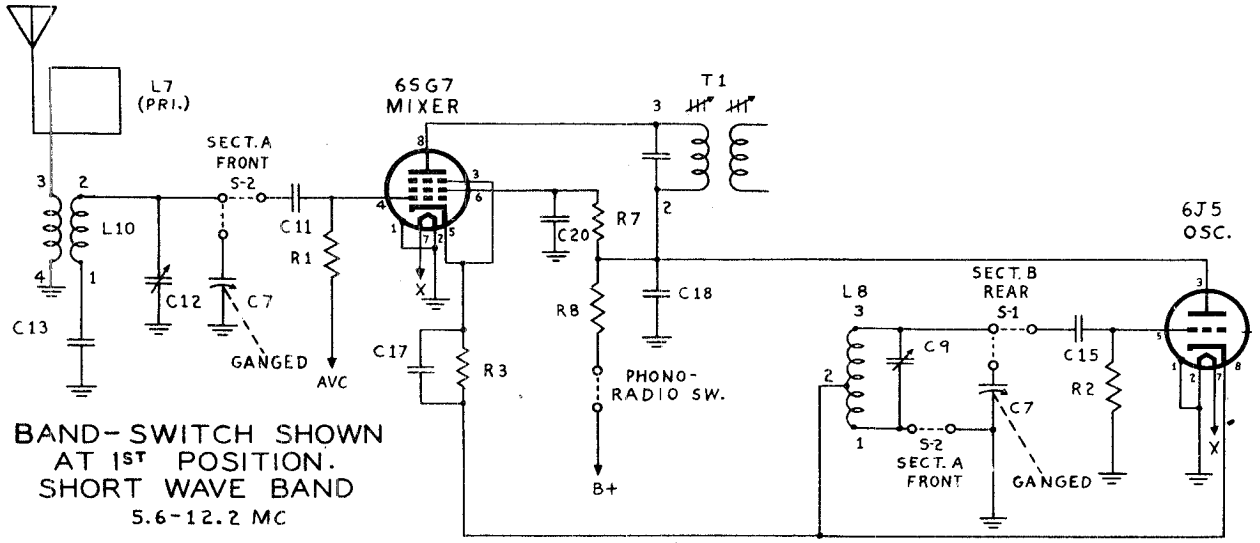
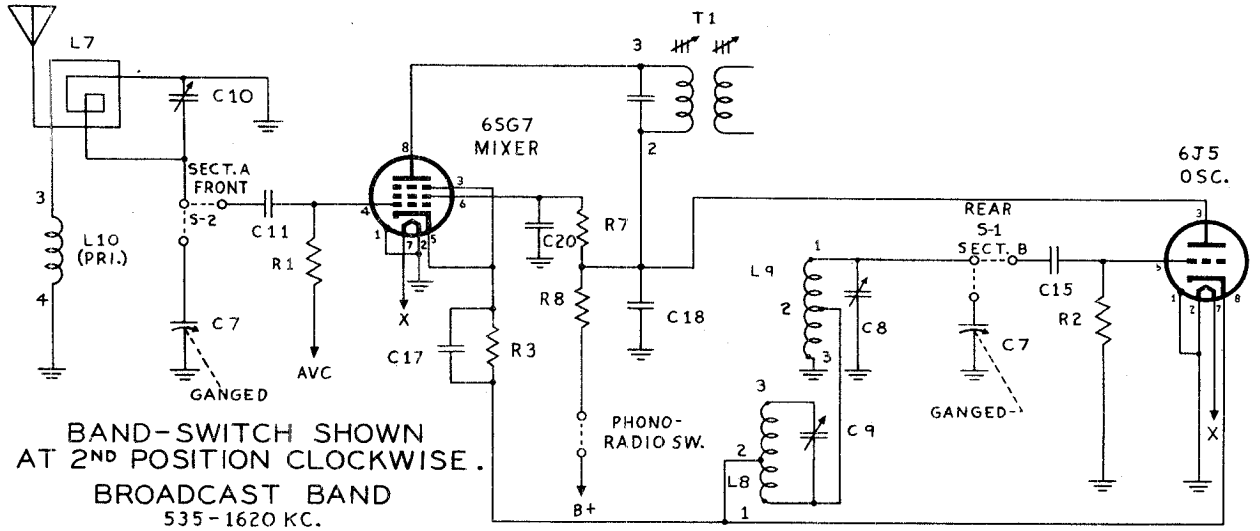
Record Changer: Galvin Model B-24RC

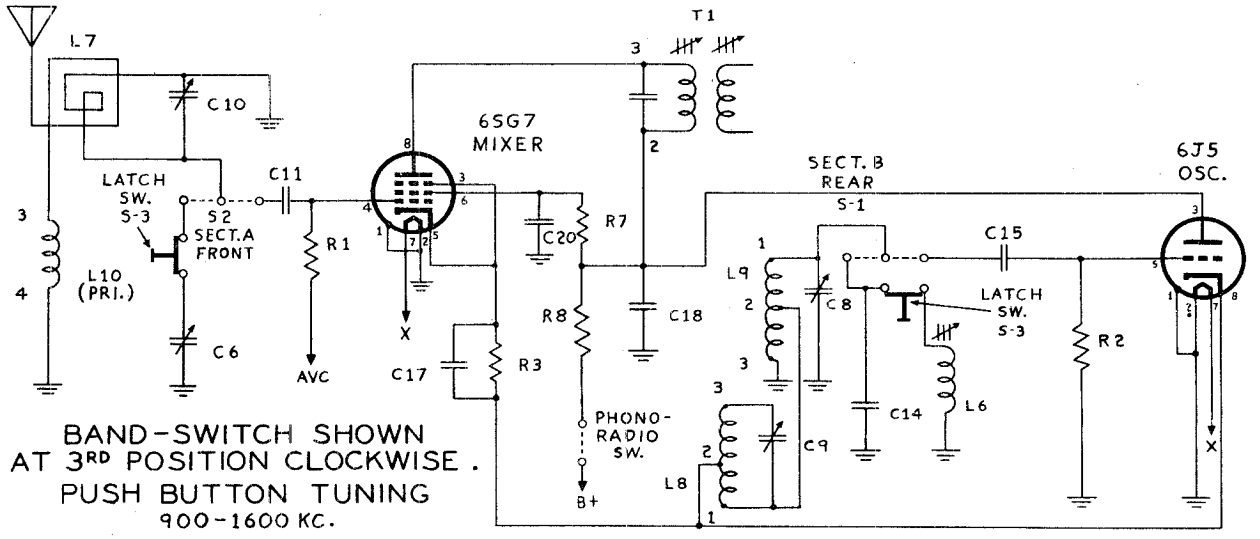
GALVIN MFG. CORP.



BAND-SWITCH SHOWN AT 1ST POSITION. SHORT WAVE BAND 5.6-12.2 MC



BAND-SWITCH SHOWN AT 2ND POSITION CLOCKWISE. BROADCAST BAND 535-1620 KC.



BAND-SWITCH SHOWN AT 3RD POSITION CLOCKWISE. PUSH BUTTON TUNING 900-1600 KC.

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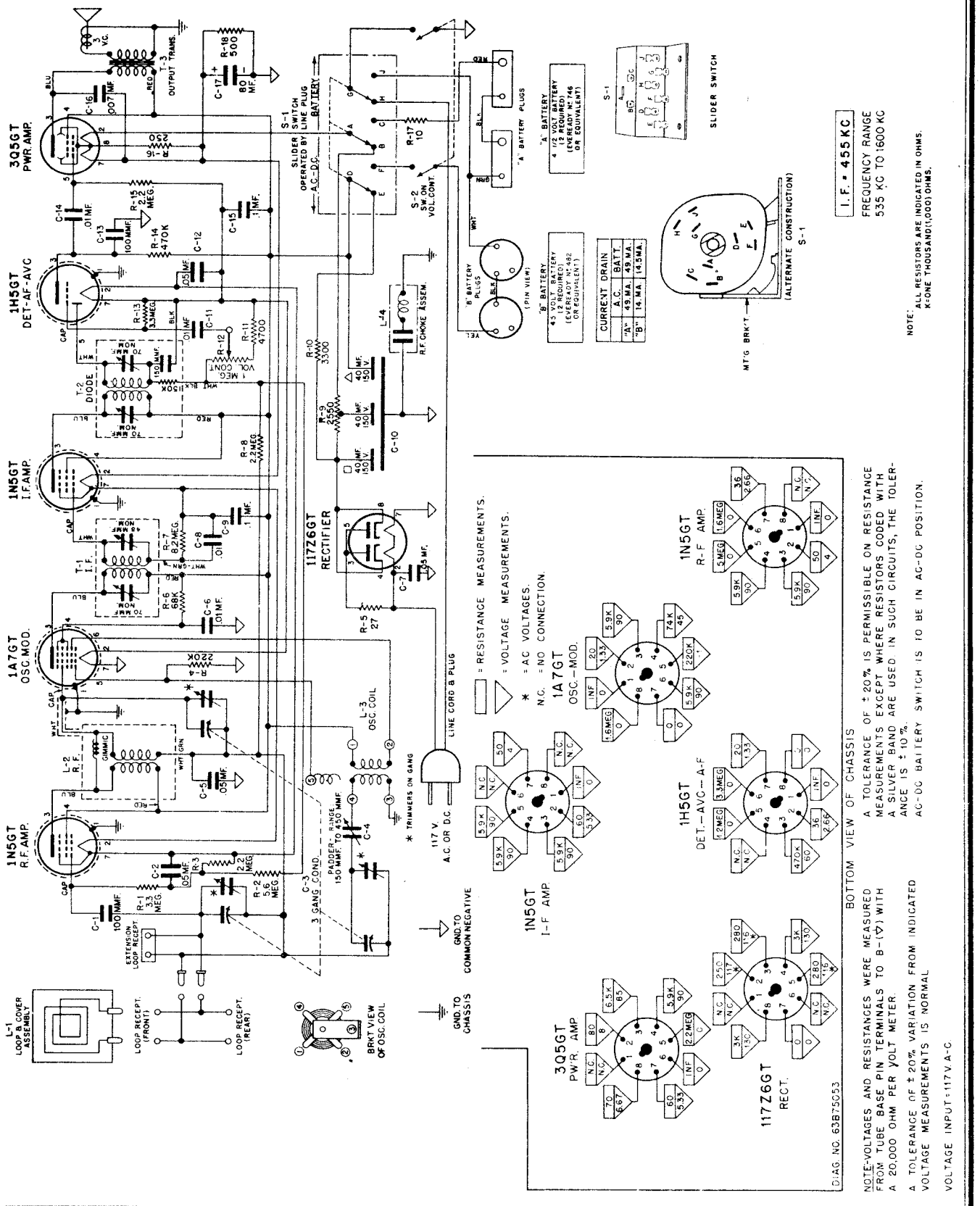
MODELS 65L11, 65L12,
Ch. HS-7

GALVIN MFG. CORP.


3Q5GT PWR. AMP.
1H5GT DET-AF-AVC
1N5GT I.F. AMP.
1A7GT OSC. MOD.
1N5GT R.F. AMP.
1173Z6GT RECTIFIER
L-1 LOOP & COVER ASSEMBLY
EXTENSION LOOP RECEPT.
LOOP RECEPT. (FRONT)
LOOP RECEPT. (REAR)
BRKT VIEW OF OSC. COIL
GND. TO CHASSIS
GND. TO COMMON NEGATIVE
117 V. A.C. OR D.C.
LINE CORD & PLUG
* TRIMMERS ON GANG
PADDER - RANGE 150 MMF. TO 450 MMF.
3 GANG COND.
L-3 OSC. COIL
T-1 I.F.
T-2 DIODE
L-2 R.F.
OUTPUT TRANS.
R.F. CHOKE ASSEM.
VOL. CONT.
S-1 SLIDER SWITCH LINE PLUG BATTERY A.C.-D.C.
S-2 SW. ON VOL. CONT.
"A" BATTERY PLUGS
"B" BATTERY PLUGS
"A" BATTERY 4 1/2 VOLT BATTERY (2 REQUIRED) (EVEREADY NO. 746 OR EQUIVALENT)
"B" BATTERY 45 VOLT BATTERY (2 REQUIRED) (EVEREADY NO. 482 OR EQUIVALENT)
CURRENT DRAIN
A.C. BATT.
"A" 49 MA. 49 MA.
"B" 14 MA. 14.5 MA.
S-1 SLIDER SWITCH
(ALTERNATE CONSTRUCTION) S-1
MTG. BRKT.
I.F. - 455 KC
FREQUENCY RANGE 535 KC TO 1600 KC
NOTE: ALL RESISTORS ARE INDICATED IN OHMS. K=ONE THOUSAND (1,000) OHMS.
= RESISTANCE MEASUREMENTS.
= VOLTAGE MEASUREMENTS.
* = A.C. VOLTAGES.
N.C. = NO CONNECTION.
BOTTOM VIEW OF CHASSIS
DIAG. NO. 63B75053
A TOLERANCE OF ± 20% IS PERMISSIBLE ON RESISTANCE MEASUREMENTS EXCEPT WHERE RESISTORS CODED WITH A SILVER BAND ARE USED IN SUCH CIRCUITS, THE TOLERANCE IS ± 10%.
AC-DC BATTERY SWITCH IS TO BE IN AC-DC POSITION.
NOTE-VOLTAGES AND RESISTANCES WERE MEASURED FROM TUBE BASE PIN TERMINALS TO B-(▽) WITH A 20,000 OHM PER VOLT METER.
A TOLERANCE OF ± 20% VARIATION FROM INDICATED VOLTAGE MEASUREMENTS IS NORMAL.
VOLTAGE INPUT = 117 V A-C.

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INSTRUCTIONS FOR REMOVING CHASSIS FROM CABINET

Remove the line cord plug from 117 Volt outlet.
Remove the batteries.
Remove the dial plate hold-down screw in the upper left hand corner of the cabinet and the chassis retaining nut located beneath the front center of the chassis.
Slide the chassis and shelf out of the cabinet.

ALIGNMENT PROCEDURE

Connect output meter across speaker voice coil (.38 V = .05 watts).
Volume control set at maximum for all operations.
The adjusting screwdriver or alignment tool should be of the insulated type, such as Motorola Part No. 66A71008.
Chassis bottom plate must be in position on bottom of chassis.

OPERATIONS IN ORDER	GANG CAPACITOR SET AT	DUMMY ANTENNA	GENERATOR CONNECTED TO	GENERATOR SET AT (400~ 30% MODULATED)	ADJUST TRIMMER NO.	AVERAGE MICROVOLT INPUT FOR .38V OUTPUT
Align I.F.'s for maximum	Minimum Capacity	.1 mf.	Osc.-Mod. grid	455 Kc	T-1&T-2 (2 trimmers on each)	3700 microvolts to I.F. grid. 120 microvolts to Osc.-Mod. grid.
Set Oscillator trimmer	Minimum Capacity	None	Radiation Loop*	1620 Kc	C-3A	
Adjust R.F. trimmer for maximum	1400 Kc.	None	Radiation Loop*	1400 Kc	C-3B	135 microvolts to Osc.-Mod. Grid through .1 mf dummy.
Adjust Oscillator padder for maximum	600 Kc.	None	Radiation Loop*	600 Kc	C-4 (Rock gang capacitor for greatest output)	
Adjust antenna trimmer for maximum with set in cabinet	Approx. 1400 Kc.	None	Use weak station	---	C-3C	12 microvolts to R.F. grid through .1 mf dummy.

*Connect output of signal generator to a 5" diameter 3 turn loop. See Fig. 1. With volume control on full, bring loop close enough to receiver loop until an output of 50 milliwats is obtained (.38V on output meter). The distance between loops should never be less than 12". Vary distance between generator and receiver loops or adjust generator output to maintain .38V output during alignment.

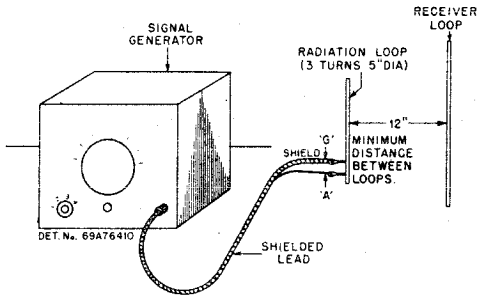
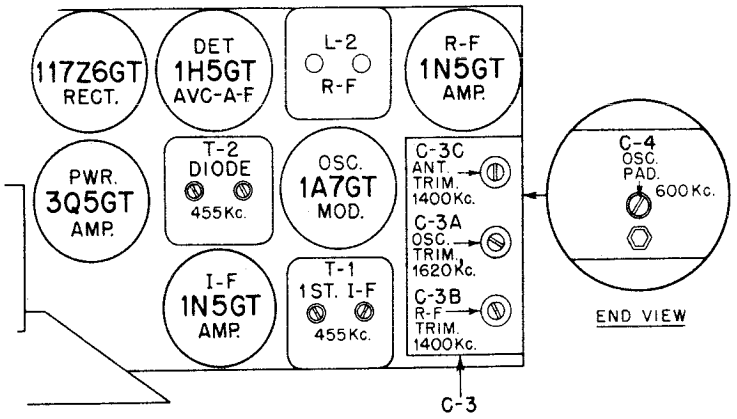


FIGURE 1. METHOD OF RADIATING SIGNAL INTO RECEIVER



MODELS 65L11,65L12,
Ch.HS-7

GALVIN MFG. CORP.

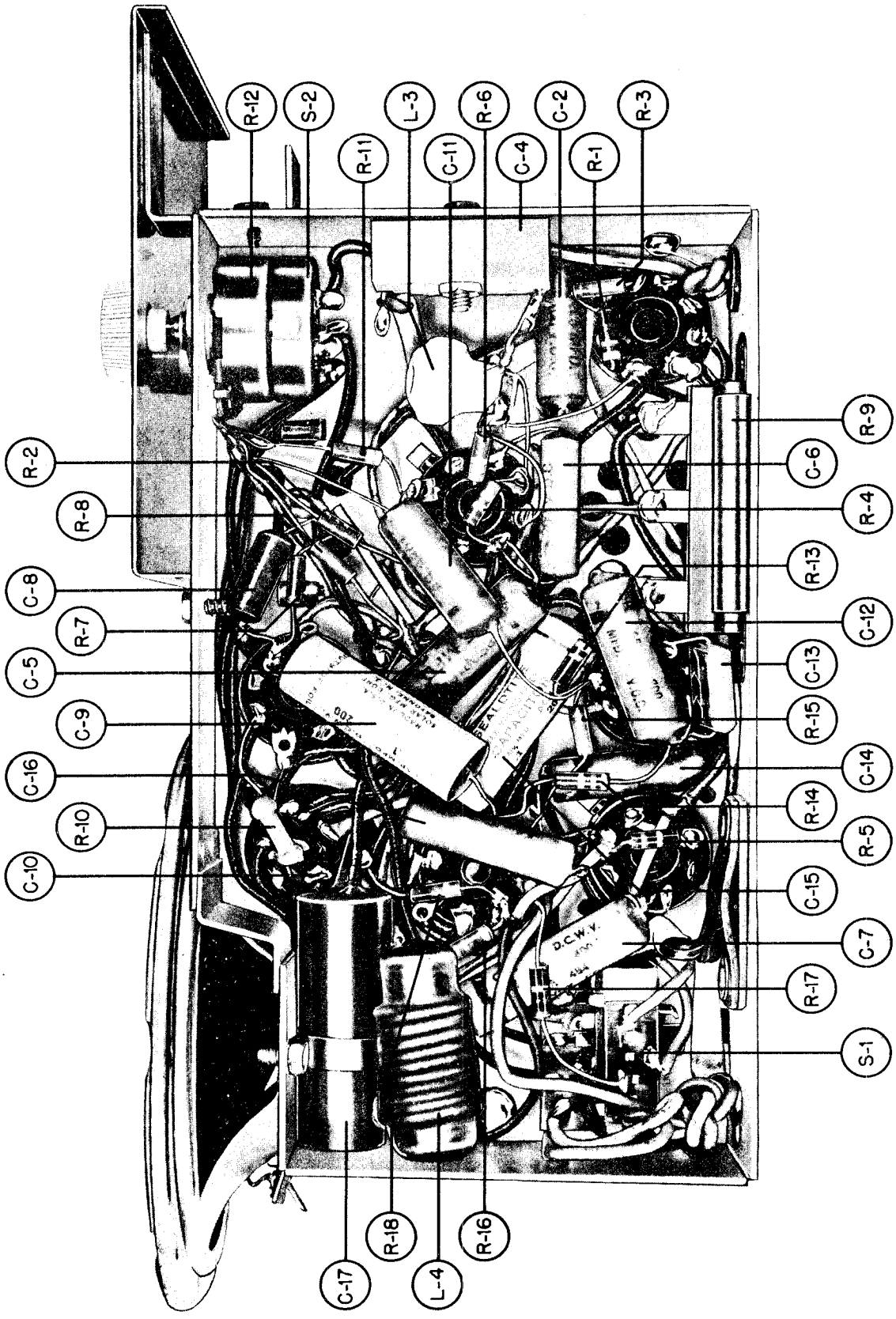


FIGURE 4. CHASSIS BOTTOM VIEW

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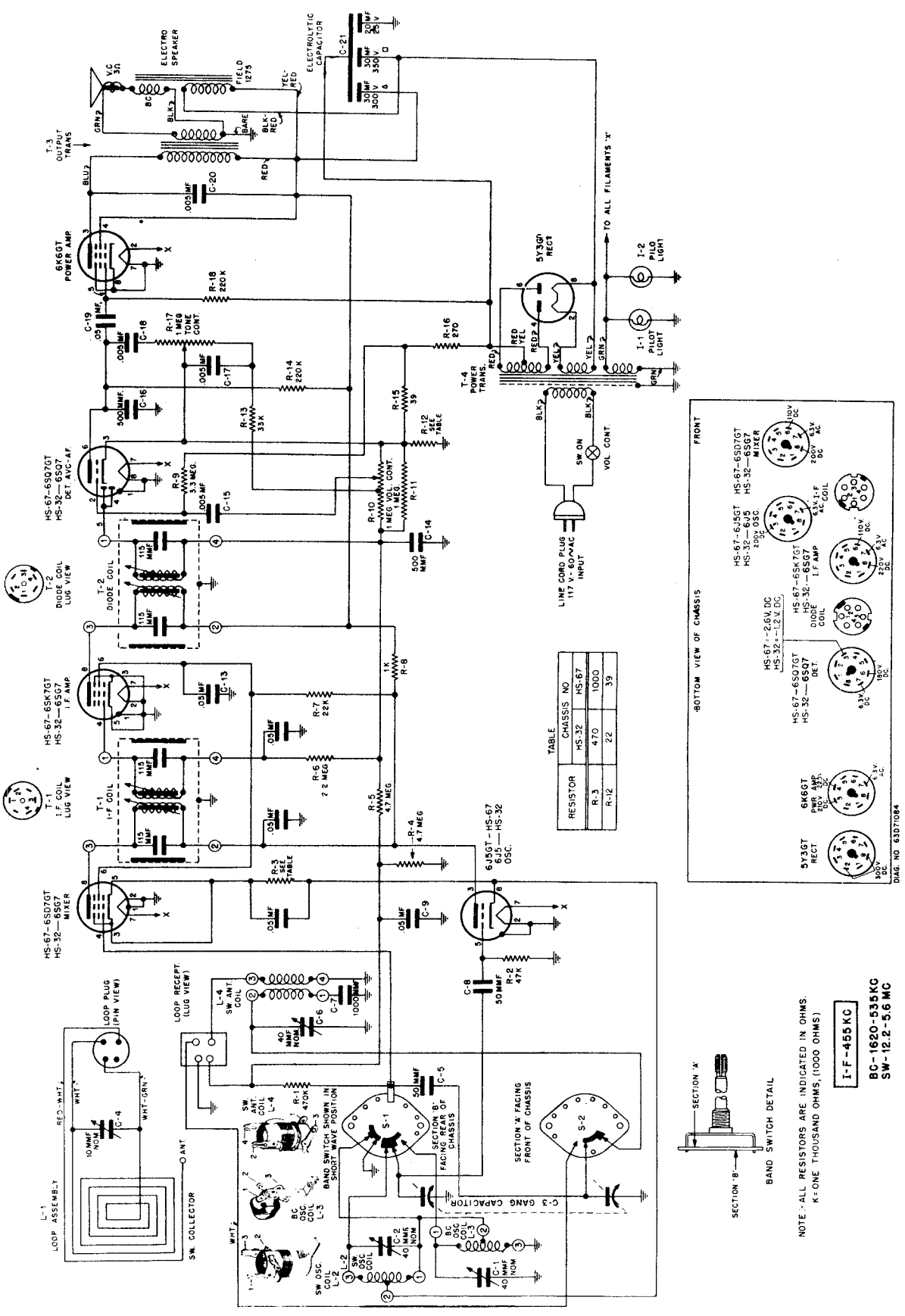
PARTS PRICE LIST
MODELS 65L11 AND 65L12

REF. NO.	PART NO.	DESCRIPTION	LIST
C-1	21R8641	Capacitor, fixed: mica; 100 mmf 20% 500 VDC	.25
C-2	8S9805	Capacitor, fixed: paper; .05 mf 20% 100 VDC	.20
C-3	19B25923	Capacitor, variable: 3 gang; has planetary drive	3.20
C-4	20A25899	Capacitor, padder: 150 to 450 mmf range	.40
C-5	8S9816	Capacitor, fixed: paper; .05 mf 20% 400 VDC	.20
C-6	8S9825	Capacitor, fixed: paper; .01 mf 20% 200 VDC	.15
C-7	8S9816	Capacitor, fixed: paper; .05 mf 20% 400 VDC	.20
C-8	8A25939	Capacitor, fixed: paper; .01 mf 20% 100 VDC	.10
C-9	8S9806	Capacitor, fixed: paper; .1 mf 20% 200 VDC	.15
C-10	23A25889	Capacitor, electrolytic: 40-40-40 mf 150 V	.55
C-11	8S9801	Capacitor, fixed: paper; .01 mf 20% 100 VDC	.15
C-12	8S9805	Capacitor, fixed: paper; .05 mf 20% 100 VDC	.20
C-13	31R8641	Capacitor, fixed: mica; 100 mmf 20% 500 VDC	.25
C-14	8S9801	Capacitor, fixed: paper; .01 mf 20% 100 VDC	.15
C-15	8S9806	Capacitor, fixed: paper; .1 mf 20% 200 VDC	.15
C-16	8A51091	Capacitor, fixed: paper; .007 mf 20% 600 VDC	.20
C-17	3A25888	Capacitor, electrolytic: 80 mf 25 VDC; with mtg. strap	.85
	20A20323 or 20A72754	Capacitor, variable: mica; dual; 70 mmf nom. (diode coil tuning)	.60
	20A20321 or 20A72755	Capacitor, variable: mica; dual; (I. F. coil tuning)	.30
L-1	15C25945	Loop & Front Cover Assembly: complete with hinges and bar knob (65L11)	2.10
	15K27466	Loop & Front Cover Assembly: complete with hinges and bar knob (65L12)	1.85
L-2	1X25906	R. F. Coil & Shield Assembly: complete; also includes extension loop receptacle	2.75
L-3	24A25936	Oscillator coil	.85
L-4	1X75271	R. F. Choke assembly: .15 mf capacitor with 13 turn choke	.45
R-1	6R6201	Resistor, fixed: carbon; 3.3 meg. 20% 1/3 W Ins.	doz. .60
R-2	6R6303	Resistor, fixed: carbon; 5.6 meg. 20% 1/3 W Ins.	doz. .75
R-3	6R6202	Resistor, fixed: carbon; 2.2 meg. 20% 1/3 W Ins.	doz. .60
R-4	6R6349	Resistor, fixed: carbon; 220,000 10% 1/3 W Ins.	doz. .75
R-5	6R5683	Resistor, fixed: carbon; 27 10% 1/2 W Ins.	doz. .60
R-6	6R6256	Resistor, fixed: carbon; 68,000 20% 1/3 W. Ins.	doz. .60
R-7	6R6310	Resistor, fixed: carbon; 8.2 meg. 20% 1/3 W Ins.	doz. .60
R-8	6R6202	Resistor, fixed: carbon; 2.2 meg. 20% 1/3 W Ins.	doz. .60
R-9	17A25877	Resistor, fixed: wire wound; 2550 5% 5 W	.75
R-10	6R6084	Resistor, fixed: carbon; 3300 20% 1/3 W N. I.	doz. .60
R-11	6R6039	Resistor, fixed: carbon; 4700 20% 1/2 W Ins.	doz. .60
R-12	18A25862	Resistor, variable: carbon; 1 meg; with DPDT switch	1.10
R-13	6R6201	Resistor, fixed: carbon; 3.3 meg. 20% 1/3 W Ins.	doz. .60
R-14	6R6160	Resistor, fixed: carbon; 470,000 20% 1/3 W Ins.	doz. .60
R-15	6R6202	Resistor, fixed: carbon; 2.2 meg. 20% 1/3 W Ins.	doz. .60
R-16	6R2068	Resistor, fixed: carbon; 250 10% 1/2 W Ins.	doz. .60
R-17	6R5621	Resistor, fixed: carbon; 10 10% 1/2 W Ins.	doz. .60
R-18	6R6461	Resistor, fixed: carbon; 500 10% 1/3 W Ins.	doz. .75
S-1	40A27114	Switch, slider: triple pole, double throw	.75
	or 40B76395	Switch, rotary: triple pole, double throw	
S-2	Part of R-12	Switch, double pole, single throw (part of R-12)	
T-1	1X25904	I. F. Coil & Shield Assembly: 455 Kc; complete with trimmer	1.65
T-2	1X25902	Diode coil & Shield Assembly: 455 Kc; complete with trimmer	2.20
T-3		Transformer, output (Purch. with 50C70091)	
	32A25884	Baffle, speaker: cardboard, 5-1/2 x 6 x 3/32 thick	.05
	37X10814	Band, rubber (used on tube shields)	oz. .30
	1X25916	Battery Lead Assembly, "A": with 4 two pin plugs	.30
	1X75273	Battery Lead Assembly, "B": with 2 three pin plugs	.45
	7B25715	Bracket, gang mounting	.15
	38X15757	Button, plug: for 3/8 hole; (cdp. oxide finish(cover for antenna trimmer hole)	doz. .25
	1X74392	Cabinet Assembly: complete except for cabinet back and loop & front cover assemblies (65L11)	13.75
	1X74380	Cabinet Assembly: complete except for cabinet back and loop & front cover assemblies (65L12)	13.75
	1X25942	Cabinet Back Assembly: complete with all hardware (65L11)	.65
	1X27464	Cabinet Back Assembly: complete with all hardware (65L12)	.65
	42B5480	Clip, grid: small; collar grip type	doz. .15
	35A27424	Cloth, grille	.10
	30B20329	Cord, line, & small plug: 6 ft. long	.60
	1X25918	Dial scale assembly: includes mounting bracket & crystal	.50
	5A19658	Eyelet, steel: .296 x .212 (gang mtg.)	doz. .40
	37A12691	Grommet, rubber (gang cushions)	doz. .35
	32A25885	Guard, line cord: fibre	.05
	55B71050	Handle: molded	.35
	36A25865	Knob, tuning: white plastic; with spring clip	.10
	36A25864	Knob, volume control: white plastic	.10
	32A24815	Lock, line cord (holds line cord to chassis)	doz. .30
	4S7656	Lockwasher, steel: #6 external; Cad. Pl. (osc. coil mtg.)	per/c .35
	29R5201	Lug, soldering: L shaped (used as washer, to hold top of dial scale to cabinet)	per/c .80
	2S7050	Nut, steel: 8-32 x 5/16 Hex; Palnut (padder mtg.)	per/c .50
	2S7003	Nut, steel: 8-32 x 5/16 Hex; Cad. Pl. (chassis mtg.)	per/c .80
	2S7051	Nut steel: 8/8-32 x 9/16 Hex; Palnut (vol. contr. mtg.)	doz. .30
	1X25940	Plate & Bracket Assembly: chassis bottom plate with retainer bracket	.40
	28A20361	Plug: two pin (fits "A" battery)	doz. .40
	28A12250	Plug: three pin (fits "B" battery)	.05
	52B25875	Pointer, molded: white plastic with spring clip	.10
	1A71295	Receptacle & Eyelet Assembly (receptacle on cabinet for loop terminals)	.10
	9A25924	Receptacle, two prong (extension loop receptacle)	.15
	5S7707	Rivet, steel: .122 x 5/32; Nkl. Pl. (resistor & terminal strip mtg.)	doz. .45
	5S7701	Rivet, steel: .122 x 3/16; Nkl. Pl. (electrolytic capacitor wafer mtg.)	doz. .45
	5S7703	Rivet, steel: .122 x 7/32; Nkl. Pl. (extension loop receptacle mtg.)	per/c .60
	5S7708	Rivet, steel: .122 x 9/32; Nkl. Pl. (line cord lock mtg.)	per/c .45
	64B25721	Screen, speaker	.25
	3S7247	Screw (lockscrew) steel: 6-32 x 3/16 S1 HH MS; Cad. Pl. (mounts gang to gang bracket)	per/c .95
	3S7506	Screw, steel: #6 x 1/4 PKZ Pl HH; Cad. Pl. (change-over switch & osc. coil mtg.)	per/c .55
	3S7233	Screw, steel: 6-32 x 3/4 Pl HH MS; Cad. Pl. (padder mtg.)	per/c .70
	3S7454	Screw, steel: #8 x 1/4 PKZ Pl HH; Cad. Pl. (dial scale & chassis bottom plate mtg.)	doz. .20
	3S7475	Screw, steel: #8 x 1/4 PKZ S1 AH; Cad. Pl. (line cord guard mtg.)	per/c .65
	3S7456	Screw, steel: #8 x 1/4 PKA S1 AH, antique copper fin. (Holds top of dial scale to cabinet)	per/c .65
	3S7205	Screw (lockscrew) steel: 8-32 x 1/4 S1 HH MS; Cad. Pl. (speaker mtg.)	per/c .95
	3S7512	Screw, steel: #8 x 1/2 PKZ Pl HH; Cad. Pl. (gang bracket mtg.)	per/c .70
	26A14760	Shield, tube	.05
	14X17059	Sleeve, insulating (electrolytic cap. insulator)	.05
	9A8787 or 9A678	Socket, tube: molded octal	.15
	9A6788	Socket, tube: replacement (to be used only when mounting lugs on chassis break off)	.15
	50C70091	Speaker & Output Transformer: 5" P.M.	10.00
	31K15026	Strip, terminal: 2 insulated lugs #2 mtg.	.05
	31K25887	Strip, terminals: 2 insulated lugs #2 special mtg. (on top of R. F. coil shield)	.05
	9A12705	Wafer, insulating: bakelite (electrolytic capacitor mtg.)	.10
	9K14906	Wafer, insulating: armite (insulator between electrolytic cap. and its mtg. wafer)	doz. .15
	4S1719	Washer, steel: 3/8 x .140 x .030 thick; Cad. Pl. (line cord lock assembly)	per/c .95

Prices Subject to Change Without Notice

MODELS 65T21,Ch.HS-32;
65T21-B,Ch.HS-67

GALVIN MFG. CORP.



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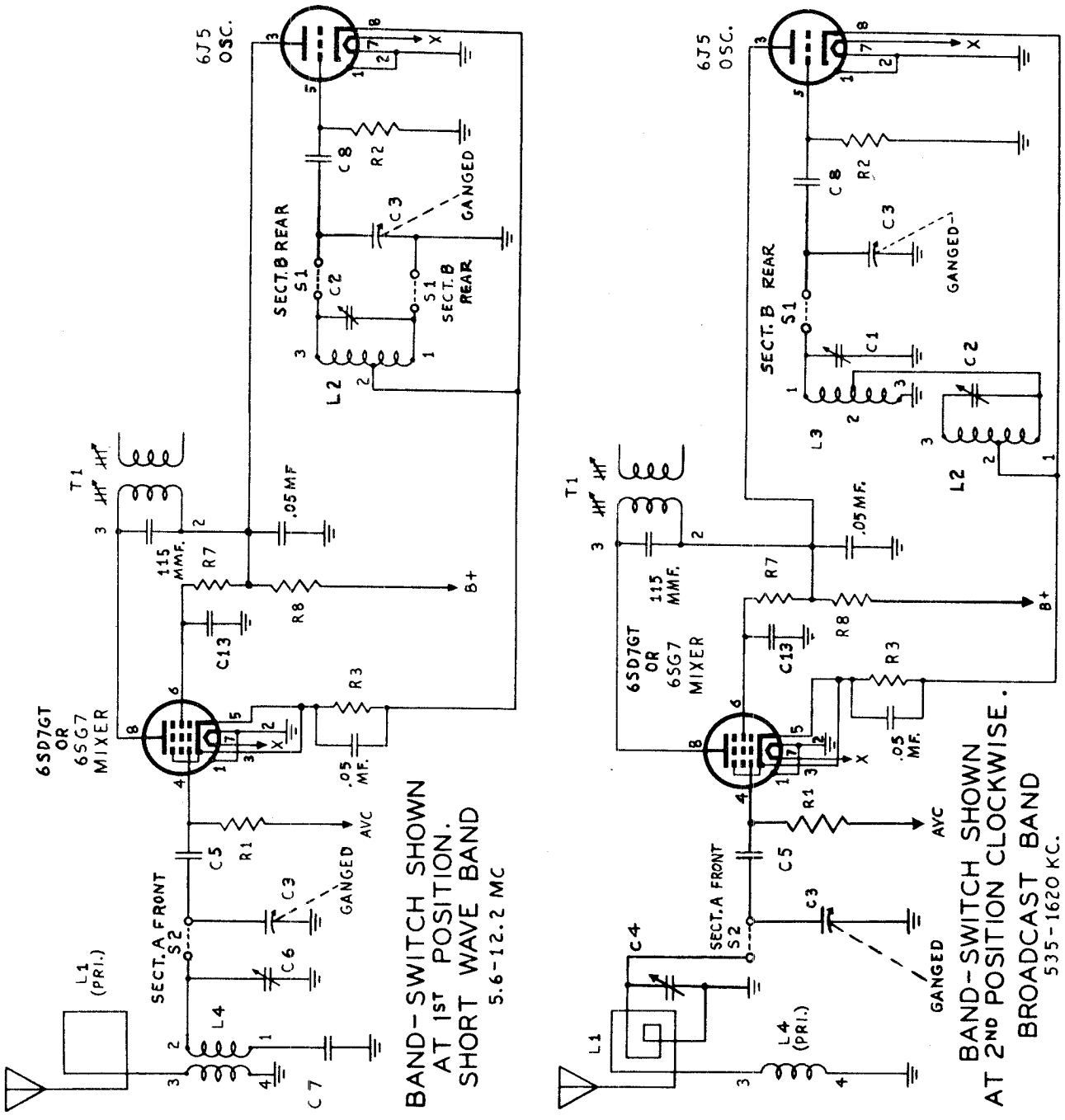

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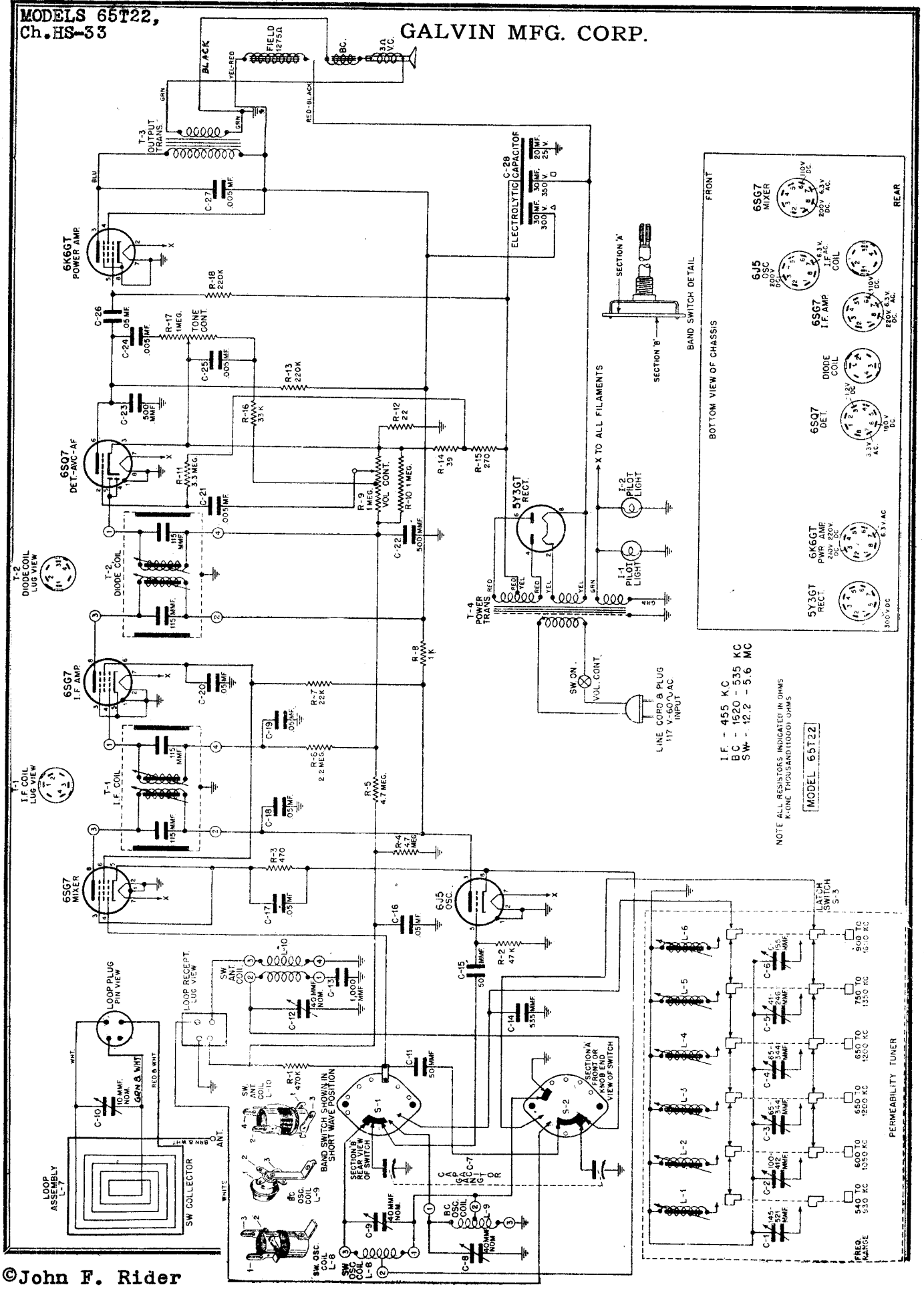
MODELS 65T22,
Ch.HS-33

GALVIN MFG. CORP.



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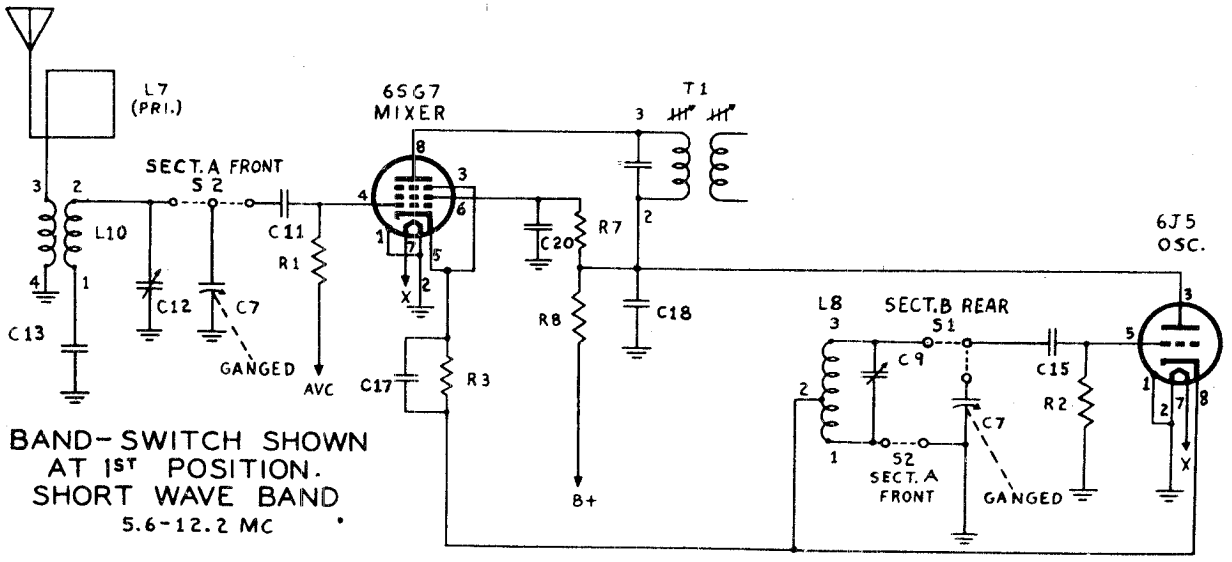
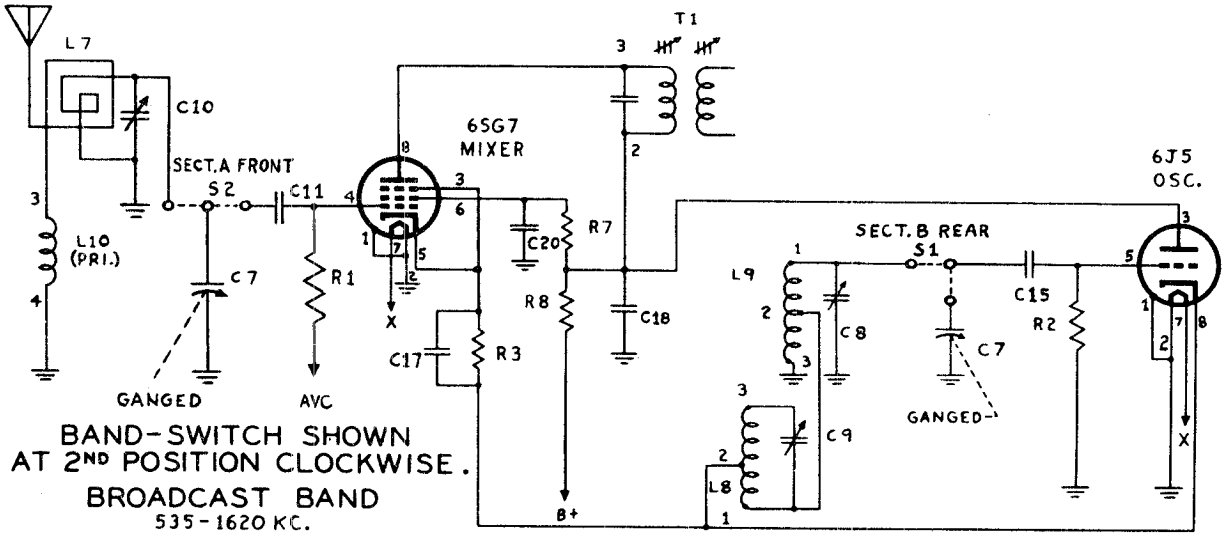
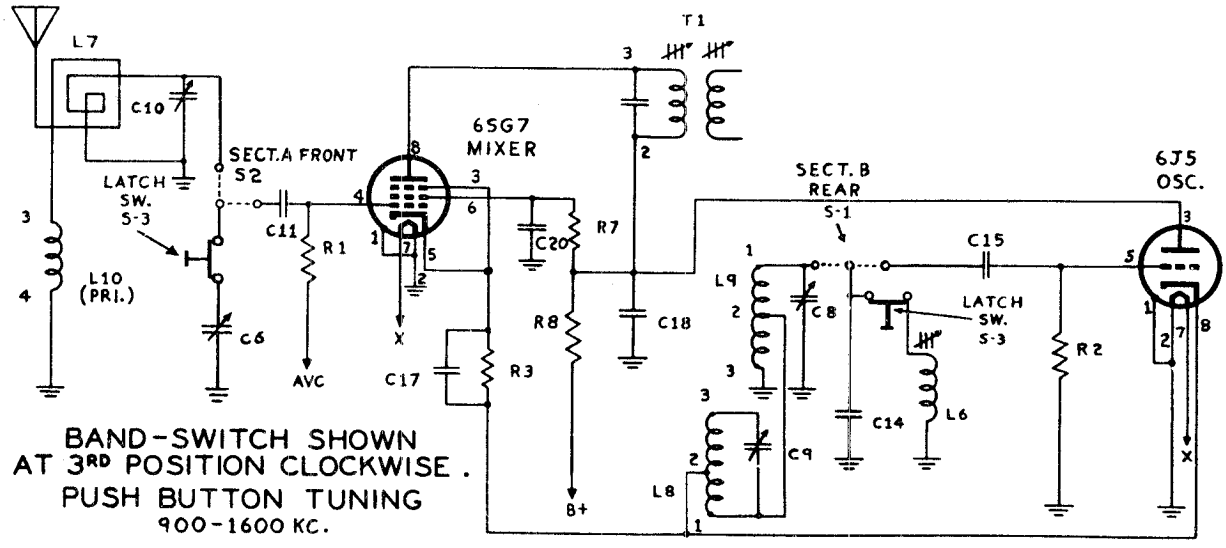
GALVIN MFG. CORP.



BAND-SWITCH SHOWN AT 1ST POSITION. SHORT WAVE BAND 5.6-12.2 MC



BAND-SWITCH SHOWN AT 2ND POSITION CLOCKWISE. BROADCAST BAND 535-1620 KC.



BAND-SWITCH SHOWN AT 3RD POSITION CLOCKWISE. PUSH BUTTON TUNING 900-1600 KC.

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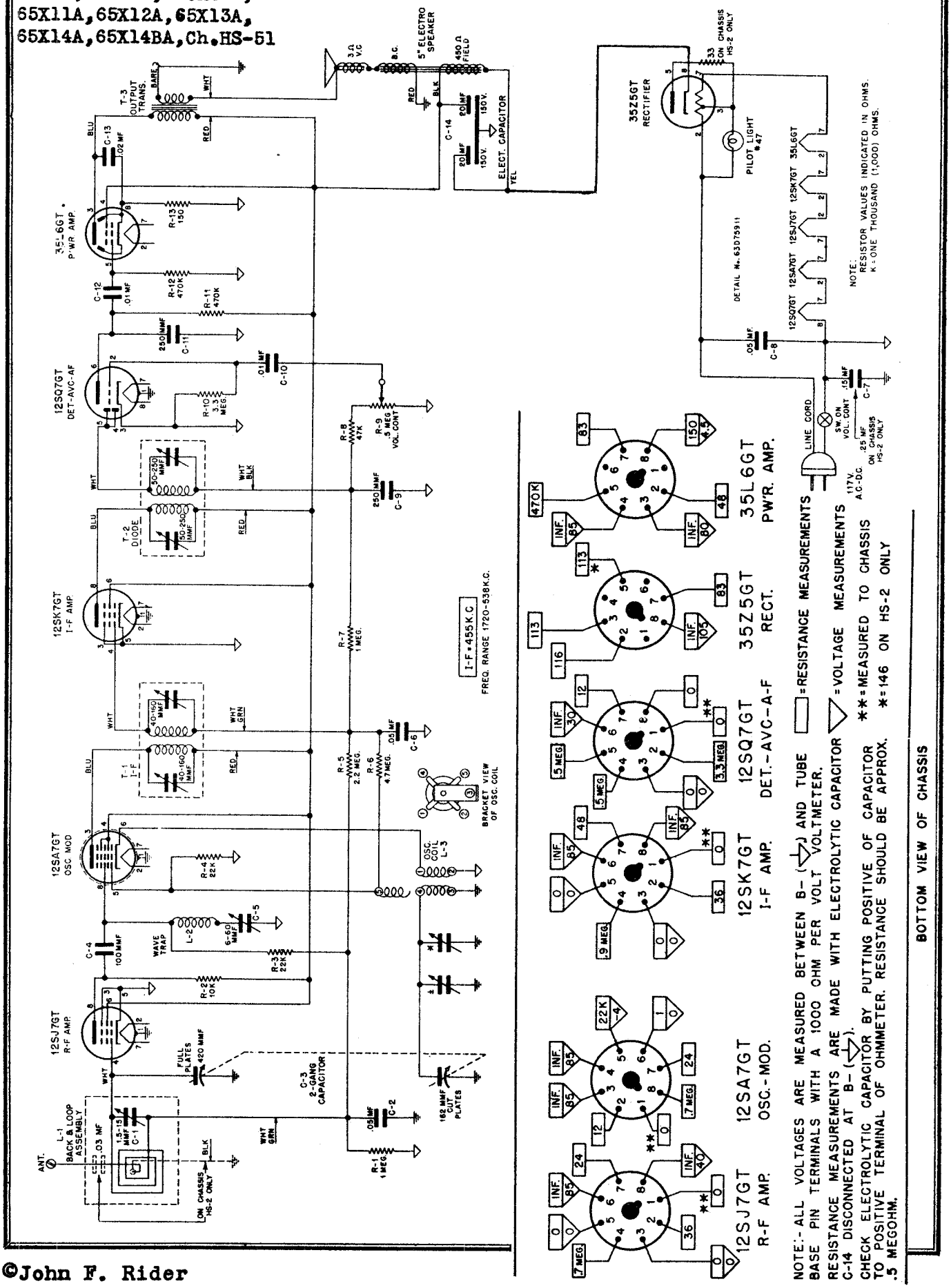
MODELS 65X11,65X12,65X13, 65X14,65X14B,Ch.HS-2; 65X11A,65X12A,65X13A, 65X14A,65X14BA,Ch.HS-51

GALVIN MFG. CORP.



NOTE:- ALL VOLTAGES ARE MEASURED BETWEEN B- (⏚) AND TUBE BASE PIN TERMINALS WITH A 1000 OHM PER VOLT VOLTMETER.
RESISTANCE MEASUREMENTS ARE MADE WITH ELECTROLYTIC CAPACITOR C-14 DISCONNECTED AT B- (⏚).
CHECK ELECTROLYTIC CAPACITOR BY PUTTING POSITIVE OF CAPACITOR TO POSITIVE TERMINAL OF OHMMETER. RESISTANCE SHOULD BE APPROX. .5 MEGOHM.

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GALVIN MFG. CORP.

MODELS 65X11, 65X12, 65X13, 65X14, 65X14B, Ch. HS-2; 65X11A, 65X12A, 65X13A, 65X14A, 65X14BA, Ch. HS-51

ALIGNMENT PROCEDURE

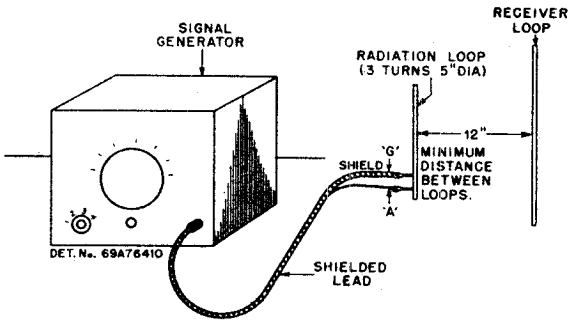
Connect output meter across speaker voice coil (.38V = .05 watt) Volume control set at maximum for all operations. The adjusting screwdriver or alignment tool should be of the insulated type, such as Motorola Part No. 66A71008

OPERATION IN ORDER	GANG CAPACITOR SET AT	DUMMY ANTENNA	GENERATOR CONNECTED TO	ADJUST TRIMMER NO.	GENERATOR SET AT (400 ∿ 30% MODULATED)	AVERAGE MICROVOLT INPUT FOR .38V OUTPUT
1. Align I.F.'s for maximum	Minimum	.1 mf	Osc.-Mod. grid	T-1 & T-2 (2 trimmers on each)	455 Kc	4000 Microvolts to I. F. Grid
2. Adj. wave-trap for minimum response	Minimum	.1 mf	R.F. Grid	C-5	455 Kc	- - - - - - -
3. Set Oscillator to dial scale	Minimum	None	Radiation Loop*	C-3	1720 Kc	- - - - - - -
4. Align R.F. for maximum	1400 Kc	None	Radiation Loop*	C-1 (on loop) Should be adjusted with set in cabinet	1400 Kc	60 microvolts to Osc.-Mod. grid through .1 mf. dummy. 5.5 microvolts to R.F grid through .1 mf dummy
5. Repeat above steps for maximum accuracy.						.31 volt at 400∿ to 1st A.F. grid.

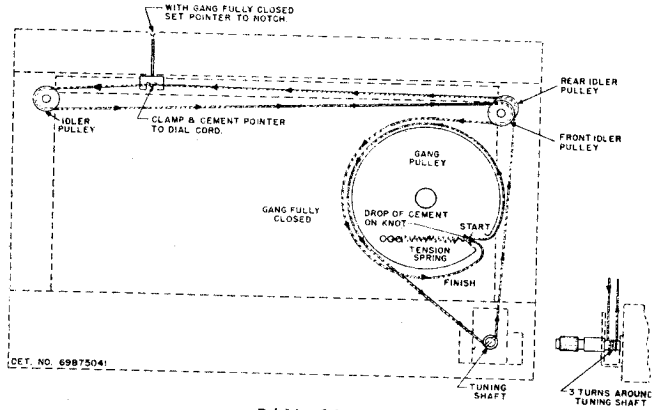
* *Connect output of signal generator to a 5" diameter 3 turn loop. See Fig. 2 . With volume control on full, bring loop close enough to receiver loop until an output of 50 milliwatts is obtained (.38V on output meter). The distance between loops should never be less than 12" Vary distance between generator and receiver loops or adjust generator output to maintain 38V output during alignment.*

TO REPLACE DIAL CORD:

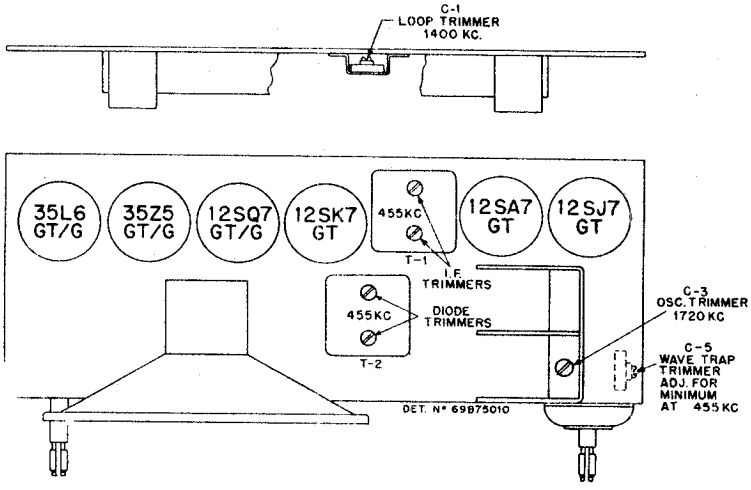
1. Remove loop from cabinet (see instruction on loop back).
2. Remove chassis from cabinet by pulling the knobs off and unscrewing the three chassis retaining screws from the bottom.
3. Remove the old dial cord and replace with a new piece of 18 lb. cord. See Figure 1 for procedure.
4. With the gang fully closed, set pointer to left hand notch of dial background and clamp to cord. In clamping, be careful not to cut the cord.
5. Secure the pointer to cord and dial cord knot with a drop of cement.
6. Reassemble by working in reverse order.



METHOD OF RADIATING SIGNAL TO THE RECEIVER



DIAL CORD RESTRINGING



TUBE AND TRIMMER LOCATION

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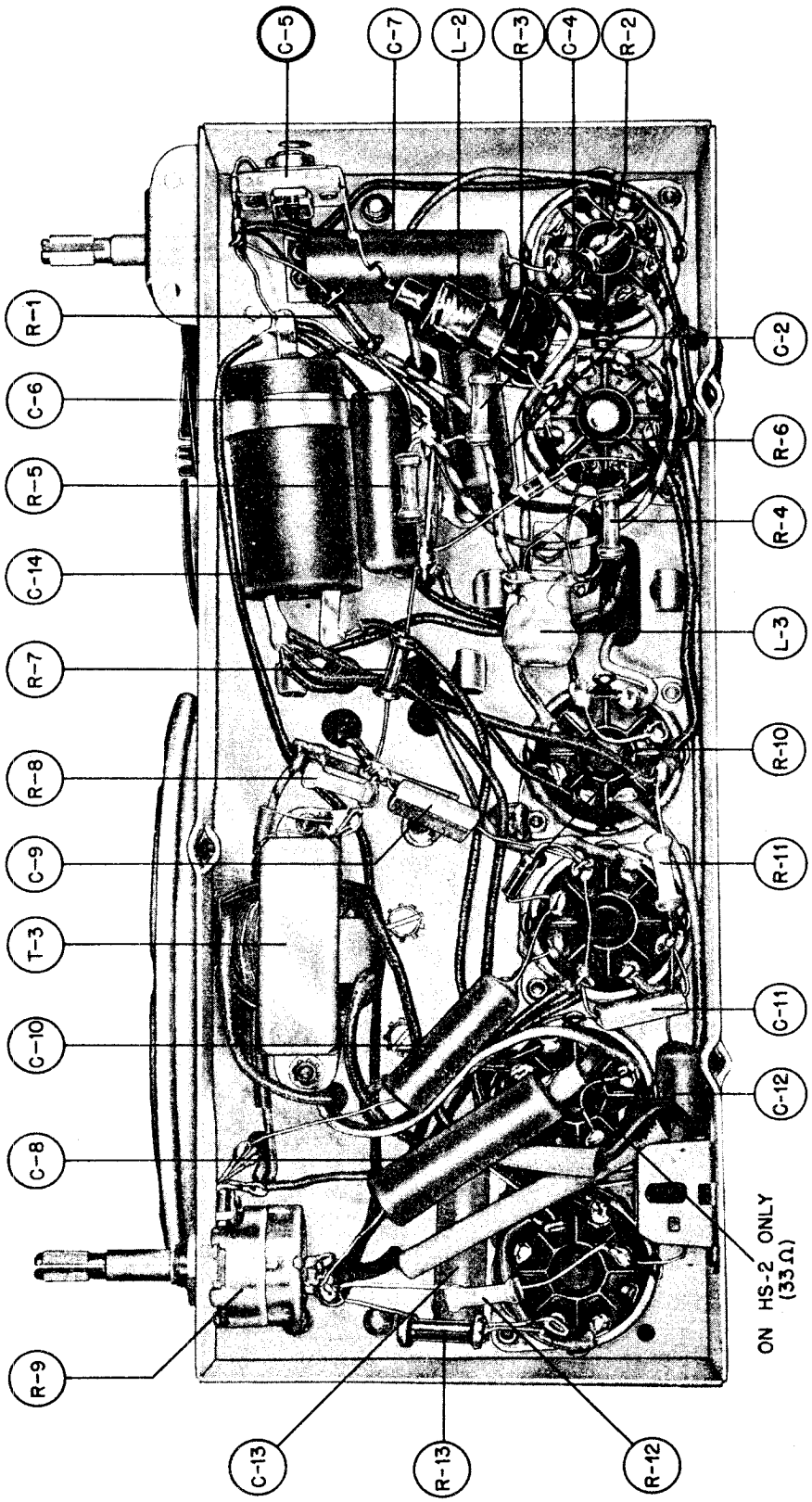
MODELS 65X11,65X12,65X13,
65X14,65X14B,Ch.HS-2;
65X11A,65X12A,65X13A,
65X14A,65X14BA,Ch.HS-51

GALVIN MFG. CORP.



BOTTOM VIEW OF CHASSIS

This receiver is a 6 tube AC-DC superheterodyne, with a self contained loop antenna and a stage of R.F. amplification. The frequency range is 538 to 1720 kc and the I.F. frequency is 455 kc.

POWER INPUT: 117 V. AC-DC, 30 WATTS.

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GALVIN MFG. CORP.

MODELS 65X11,65X12,65X13, 65X14,65X14B,Ch.HS-2; 65X11A,65X12A,65X13A, 65X14A,65X14BA,Ch.HS-51

REF. NO.	PART NO.	DESCRIPTION	LIST
C-1	20A18740	Capacitor, trimmer: 1.5-15 mmf; includes "U" mounting bracket	.30
C-2	8S9805	Capacitor, fixed; paper; .05 mf 20% 100 vdc	.20
C-3	1X26949	Capacitor, variable: 2 gang, cut oscillator plates: includes pulley	3.55
C-4	21R6641	Capacitor, fixed: mica; 100 mmf 20% 500 vdc	.25
C-5	20A26941	Capacitor, trimmer: 6-60 mmf; includes "L" mounting bracket	.30
C-6	8S9805	Capacitor, fixed: paper; .05 mf 20% 100 vdc	.20
C-7	8A72686	Capacitor, fixed: paper; .15 mf 20% 200 vdc (HS-51)	.25
	or 8A75566	Capacitor, fixed: paper; .15 mf 20% 400 vdc (HS-51)	
	or 8S9810	Capacitor, fixed: paper; .25 mf 20% 100 vdc (HS-2)	.25
C-8	8S9816	Capacitor, fixed: paper; .05 mf 20% 400 vdc	.20
C-9	21R6648	Capacitor, fixed; mica: 250 mmf 20% 500 vdc	.20
C-10	8S9801	Capacitor, fixed: paper; .01 mf 20% 100 vdc	.15
C-11	21R6648	Capacitor, fixed: mica; 250 mmf 20% 500 vdc	.20
C-12	8S9825	Capacitor, fixed: paper; .01 mf 20% 200 vdc	.15
C-13	8S9802	Capacitor, fixed: paper; .02 mf 20% 400 vdc	.20
C-14	23A70008	Capacitor, electrolytic; 20-20 mf 150 WV; with mounting strap	1.40
	20A14619	Capacitor, dual trimmer: 40-160 mmf each section (In IF can)	.35
	or 20A72757	Capacitor, dual trimmer: 40-160 mmf each section (In IF can)	.35
	20K20649	Capacitor, dual trimmer: 50-250 mmf each section (In diode can)	.40
	or 20A72756	Capacitor, dual trimmer: 50-250 mmf each section (In diode can)	.40
	5S7707	Rivet, steel: 5/32 x .122, Pol. Nkl. (tube socket mtg.) per/c	.45
	5S7716	Rivet, steel: 5/32 x .122, antique cop. (loop mtg. clip and trimmer mtg.) per/c	.45
	5S7701	Rivet, steel: 3/16 x .122, Pol. Nkl. (tuning shaft brkt.mtg.) per/c	.45
	5K74560	Rivet, shoulder: .312 shoulder; Pol.Nkl.(cord pulley mtg.)	.30
	34B25759	Scale, dial: glass (65X11, 65X11-A, 65X12, 65X12-A, 65X14, 65X14-A, 65X14-B and 65X14-BA)	.45
	34B29469	Scale, dial: glass (65X13 & 65X13-A)	.35
	3S7431	Screw, steel: #2 x 1/4 Ph RH WS; Cop. Ox. (dial scale mtg.)(65X14, 65X14-A, 65X14B & 65X14-BA) doz.	.20
	3S7526	Screw, steel: #8 x 1-1/8 PKZ Sl HH; plain (set mtg.- wood models) doz.	.30
	47A14635	Shaft, tuning control	.15
	26A26283	Shield, tube	.05
	80A25758	Socket, dial light: with mtg. clip and leads.	.20
	9A6738	Socket, tube; octal, saddle type	.15
	50B23173	Speaker, electro: 5 inch	5.20
	or 50B20653	Speaker, electro: 5 inch	5.20
	2S7098	Speednut: for .180 round stud (mounts dial scale to escutcheon in 65X13 & 65X13-A) doz.	.20
	41A14111	Spring, tension coil (dial cord) doz.	.35
	42A70423	Strap, ground (used behind loop screw terminal) doz.	.25
	31A12847	Strip, terminal:.2 ins. lugs, #3 mtg.	.10
	31K15026	Strip, terminal: 2 ins. lugs, #2 mtg.	.05
	29A70422	Terminal, screw (external antenna term. on loop assem.)(Use with ground strap) doz.	.35
	4A70015	Washer, "C" (tuning shaft retainer per/c	.70
	35K19943	Washer, paper: brown (used between knobs and cabinet on dark models) per/c	.60

REF. NO.	PART NO.	DESCRIPTION	LIST
L-1	1X70002	Cabinet back & Loop assembly (65X11)	2.40
	1X70005	Cabinet back & Loop assembly (65X12)	2.75
	1X70014	Cabinet back & Loop assembly (65X13)	2.65
	1X71739	Cabinet back & Loop assembly (65X14)	2.85
	1X71776	Cabinet back & Loop assembly (65X14B)	2.85
	1X74455	Cabinet back & Loop assembly (65X11-A)	2.50
	1X74458	Cabinet back & Loop assembly (65X12-A)	2.50
	1X74461	Cabinet back & Loop assembly (65X13-A)	2.45
	1X74464	Cabinet back & Loop assembly (65X14-A)	2.35
	1X74467	Cabinet back & Loop assembly (65X14-BA)	2.45
L-2	24A21858	Coil, wave trap	.40
L-3	24A26942	Coil, oscillator	.40
R-1	6R6071	Resistor, fixed: carbon; 1 meg. 20% 1/3W N.I. doz.	.60
R-2	6R6113	Resistor, fixed: carbon; 10,000 20% 1/3W N.I. doz.	.60
R-3	6R6050	Resistor, fixed: carbon; 22,000 20% 1/3W N.I. doz.	.60
R-4	6R6050	Resistor, fixed: carbon; 22,000 20% 1/3W N.I. doz.	.60
R-5	6R6049	Resistor, fixed: carbon; 2.2 meg 20% 1/3W N.I. doz.	.60
R-6	6R6446	Resistor, fixed: carbon; 4.7 meg 10% 1/2W Ins. doz.	.60
R-7	6R6071	Resistor, fixed: carbon; 1 meg 20% 1/3W N.I. doz.	.60
R-8	6R6020	Resistor, fixed: carbon; 47,000 20% 1/3W N.I. doz.	.60
R-9	18A14629	Resistor, variable; carbon; .5 meg. with SPST switch	1.00
	or 18A72888	Resistor, variable: carbon; .5 meg. with SPST switch	1.00
R-10	6R2118	Resistor, fixed: carbon; 3.3 meg. 20% 1/2W Ins. doz.	.60
R-11	6R6011	Resistor, fixed: carbon; 470,000 20% 1/3W N.I. doz.	.60
R-12	6R6011	Resistor, fixed: carbon; 470,000 20% 1/3W N.I. doz.	.60
R-13	6R6392	Resistor, fixed: carbon; 150 10% 1/2W N.I. doz.	.60
T-1	1X26946	Transformer, I.F.: 455 Kc; complete with shield and trimmers	1.80
	3S7526	Screw, steel: #8 x 1-1/8 PKZ Sl HH; plain (set mtg.- wood models) doz.	.30
	47A14635	Shaft, tuning control	.15
	26A26283	Shield, tube	.05
	80A25758	Socket, dial light: with mtg. clip and leads.	.20
	9A6738	Socket, tube; octal, saddle type	.15
	50B23173	Speaker, electro: 5 inch	5.20
	or 50B20653	Speaker, electro: 5 inch	5.20
	2S7098	Speednut: for .180 round stud (mounts dial scale to escutcheon in 65X13 & 65X13-A) doz.	.20
	41A14111	Spring, tension coil (dial cord) doz.	.35
	42A70423	Strap, ground (used behind loop screw terminal) doz.	.25
	31A12847	Strip, terminal:.2 ins. lugs, #3 mtg.	.10
	31K15026	Strip, terminal: 2 ins. lugs, #2 mtg.	.05
	29A70422	Terminal, screw (external antenna term. on loop assem.)(Use with ground strap) doz.	.35
	4A70015	Washer, "C" (tuning shaft retainer per/c	.70
	35K19943	Washer, paper: brown (used between knobs and cabinet on dark models) per/c	.60
	35K22505	Washer, paper: ivory (used between knobs and cabinet	
	5S7707	Rivet, steel: 5/32 x .122, Pol. Nkl. (tube socket mtg.) per/c	.45
	5S7716	Rivet, steel: 5/32 x .122, antique cop. (loop mtg. clip and trimmer mtg.) per/c	.45
	5S7701	Rivet, steel: 3/16 x .122, Pol. Nkl. (tuning shaft brkt.mtg.) per/c	.45
	5K74560	Rivet, shoulder: .312 shoulder; Pol.Nkl.(cord pulley mtg.)	.30
	34B25759	Scale, dial: glass (65X11, 65X11-A, 65X12, 65X12-A, 65X14, 65X14-A, 65X14-B and 65X14-BA)	.45
	34B29469	Scale, dial: glass (65X13 & 65X13-A)	.35

Prices Subject To Change Without Notice

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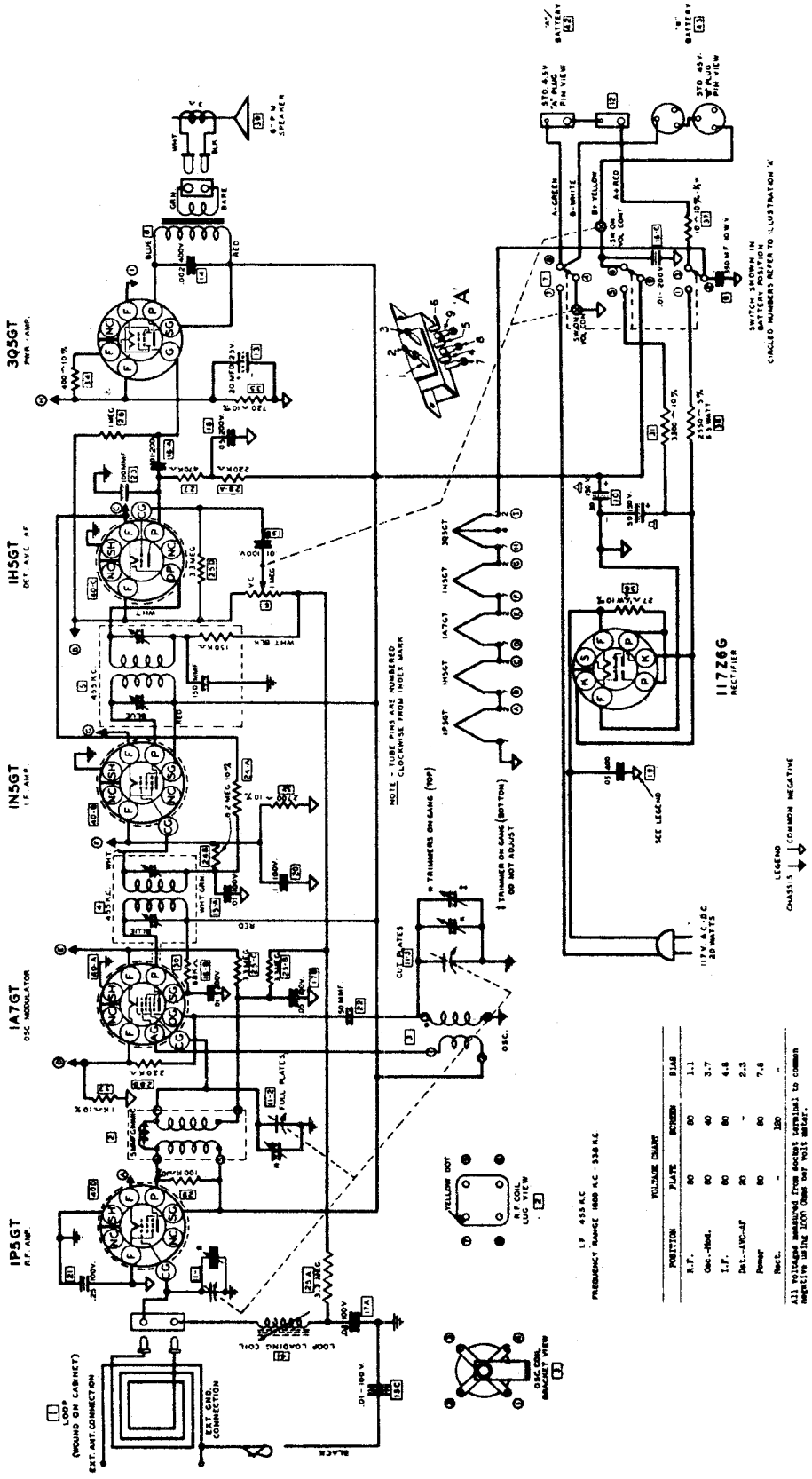
MODELS 65BP1A,65BP2A,
65BP3A,65BP4A

GALVIN MFG. CORP.



POSITION	PLATE	SCREEN	BIAS
R.F.	80	80	1.1
Osc.-Mod.	80	40	3.7
I.F.	80	80	4.8
Det.-AVC-AF	20	-	2.5
Power	80	80	7.8
Rect.	-	120	-

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GALVIN MFG. CORP.

MODELS 65BP1A, 65BP2A, 65BP3A, 65BP4A

MODELS 65BP1, 2, 3, 4A

DRWG. NO.	PART NO.	DESCRIPTION	LIST
		MAJOR PARTS	
8	25A15786	Output Transformer.	$0.80
7	1X20289	Slider Switch & Brkt. Assembly.	.55
9	23A20318	Elect. Cond. & Strap 350-10v.	.50
10	23A20324	Electrolytic Condenser FP	.80
6	18K20339	Volume Control & Switch 1 meg	.85
5	1X20342	Diode Coil & Shield Assembly.	1.55
4	1X20344	I.F. Coil & Shield Assembly	1.40
39	50C20392	Speaker 6" P.M.	3.60
		Speaker Exchange.	2.10
	50C21172	Speaker 6" P.M.	3.60
		Speaker Exchange.	2.10
	19B22734	Variable Condenser - Subs. 1X22749.	XXXX
2	1X22740	R.F. Coil & Shield Assembly	1.40
3	24A22746	Osc. Coil - Wht.-Brn.-Ceramic	.35
11	1X22749	Gang & Pulley Assembly.	2.85
41	1X22831	Coil Core & Brkt. Assembly (Loading Coil)	.50
13	23A22953	Tub. Elect. Cond.-20-25v. EP.	.25
		CABINET PARTS	
	3S7431	Screw 2x1/4 CO - 65BP3,4A .DOZ.	.20
	55K16573	Handle.	.25
	55K16576	Handle Mounting Post.	.20
	37A16614	Rubber Foot .DOZ.	.25
	36A20315	Control Knob - Ivory - Plain.	.10
	64B20372	Speaker Screen - Plain.	.20
	36K20609	Control Knob - Ivory - Marked	.10
	35B21021	Grille Cloth.	.15
	36K21049	Bar Knob & Brkt.-Frt. Cover - 65BP3,4A.	.20
	55A21099	Sliding Hinge- Frt. Cover - 65BP3,4A.	.15
	61K22389	Dial Crystal - 65BP1,2A	.20
	16D22763	Cabinet (Portable) Cpt. - 65BP1A.	7.50
	1X22771	Back & Brackets Assembly - 65BP1A	.55
	16K22774	Cabinet (Portable) Cpt. - 65BP2A.	7.50
	1X22776	Back & Bracket Assembly - 65BP2A.	.55
	61B22798	Escutcheon & Crystal - 65BP3,4A	1.00
	16D22802	Cabinet (Portable) Cpt. - 65BP3A.	12.50
	16K22805	Cabinet (Portable) Cpt. - 65BP4A.	12.50
	1X22814	Back & Bracket Assembly - 65BP3A.	.55
	1X22815	Back & Bracket Assembly - 65BP4A.	.55
	56X22861	Packing Carton & Fillers - 65BP1,2A	.30
	56X22867	Packing Carton & Fillers - 65BP3,4A	.35
		DIAL & DRIVE	
	5S7805	Snap-In Eyelet 1/8x.141 CP. .PER C.	.70
	11M8944	Dial Cord 18# Blk. - 18". .YARD	.05
	37A12691	Rubber Grommet - Gang Mtg .DOZ.	.25
	41A14244	Dial Cord Tension Spring. .DOZ.	.40
	7A14610	Tuning Shaft Bracket.	.05
	7B18748	Gang Mounting Bracket	.10
	5A19658	Eyelet .296 Cop. Pl. - Gang Mtg .DOZ.	.40
	47K20340	Tuning Shaft 1 & 11/64.	.10
	38A20612	"Off" Indicator Button.	.05
	52K20667	Dial Pointer - Double	.10
	1X22755	Dial Plate & Bracket Assembly	.10
	34B22758	Dial Scale.	.15
		CONDENSERS	
22	21B6503	Molded Mica Condenser 50 mmf-20%.	.15
	21B6506	Molded Mica Condenser 150 mmf-20%	.15
23	21B6511	Molded Mica Condenser 100 mmf-20%	.15
15	8S9801	Tubular Condenser .01-100v.	.10
17	8S9805	Tubular Condenser .05-100v.	.15
21	8S9810	Tubular Condenser .25-100v.	.20
20	8S9814	Tubular Condenser .1-100v	$0.15
19	8S9816	Tubular Condenser .05-400v.	.15
18	8S9821	Tubular Condenser .05-200v.	.10
14	8S9824	Tubular Condenser .002-400v	.10
16	8S9825	Tubular Condenser .01-200v.	.10
	20A20321	I.F. Trimmer - Small.	.25
	20A20323	Diode Trimmer - 3 Pl. 70 mmf.	.30
		RESISTORS	
28	6B6003	Carbon Resistor 220,000-1/3-20 N.I. .DOZ.	.60
27	6B6011	Carbon Resistor 470,000-1/3-20 N.I. .DOZ.	.60
34	6B6025	Carbon Resistor 400-1/3-10 N.I. .DOZ.	.60
29	6B6030	Carbon Resistor 100,000-1/3-20 N.I. .DOZ.	.60
	6B6070	Carbon Resistor 150,000-1/3-20 N.I. .DOZ.	.60
26	6B6071	Carbon Resistor 1 meg-1/3-20 N.I. .DOZ.	.60
33	6B6086	Carbon Resistor 1,000-1/3-10 N.I. .DOZ.	.60
30	6B6125	Carbon Resistor 68,000-1/3-20 N.I. .DOZ.	.60
37	6B6132	Carbon Resistor 10-1/2-10 N.I. .DOZ.	.60
25	6B6179	Carbon Resistor 3.3 meg-1/3-20 N.I. .DOZ.	.60
35	6B6192	Carbon Resistor 720-1/3-10 N.I. .DOZ.	.60
36	6B6241	Carbon Resistor 27-1/2-10 N.I. .DOZ.	.60
31	6B6242	Carbon Resistor 3,300-1/3-10 N.I. .DOZ.	.60
32	6B6276	Carbon Resistor 2,700-1/3-20 N.I. .DOZ.	.60
24	6B6297	Carbon Resistor 8.2 meg-1/3-10 N.I. .DOZ.	.60
38	17A20466	W.W. Resistor 2550-6.5-5.	.40
		SCREWS & WASHERS	
	2S7000	Nut 8-32x11/32 Brass - Spkr .PER C.	.70
	2S7003	Nut 8-32x11/32 CP - Bot. Brkt .PER C.	.50
	3S7155	Screw 6-32x3/16 CP - Gang Brkt. .PER C.	.35
	3S7203	Screw 6-32x3/16 CP - Coil Core. .PER C.	.60
	3S7248	Screw 8-32x1/8 CP - Dial. .PER C.	.40
	3S7271	Screw 8-32x7/16 CO - Loop .PER C.	.75
	3S7350	Lockscrew 6-32x1/4 CP - Gang Brkt .PER C.	.80
	3S7454	Screw 8x1/4 PK Z PlHH CP. .DOZ.	.20
	3S7462	Screw 6-32x3/16 CP - Osc. Coil. .PER C.	.90
	3S7475	Screw 8x1/4 CP - Cord Guard .PER C.	.65
	3S7528	Screw 8x3/8 CO - Batt. Brkt .PER C.	.65
	4S7597	Washer 7/16 CP - Bot. Brkt. .PER C.	.35
	3S7512	Screw 8x1/2 CP - Gang Brkt. .PER C.	.70
	4S7660	Lockscrew #8 Ext. Pho. Brz.-Spkr. .PER C.	.60
		MISCELLANEOUS	
	31A504	Terminal Strip 1 Ins. #1 Mtg.	.05
	29B5207	Soldering Lug - Gang Brkt .PER C.	.85
	42B5480	Grid Clip - Small - Collar Grip .DOZ.	.15
	9B6739	Tube Socket - Octal Waferette	.15
	28X12250	Three Prong Battery Plug.	.05
	42K13135	Cable Clamp .DOZ.	.15
40	26X14760	Bantam Tube Shield.	.05
	7A15254	Back Mounting Bracket	.05
	14A15324	Elect. Insulator Tube	.05
	9A15642	Two Prong Receptacle.	.10
	38X15757	Plug Button 3/8x3/16 CO .DOZ.	.35
	42X17040	Line Cord Clamp	.05
	31A20288	Term. Strip - 2 Lrg. Ins. #2 Mtg. .DOZ.	.40
	7A20317	Mounting Bracket - Sw. & Shield .DOZ.	.15
	30B20329	Line Cord & Small Plug - 6 Ft	.35
	32B20332	Line Cord Guard - Fibre	.05
	28A20361	Two-Pin Plug Base .DOZ.	.30
	7A20375	Battery Retainer Brkt. - Long	.05
12	1X20592	Battery Cable Assembly.	.20
	1X22769	Bottom Plate & Brkt. Assembly	.30

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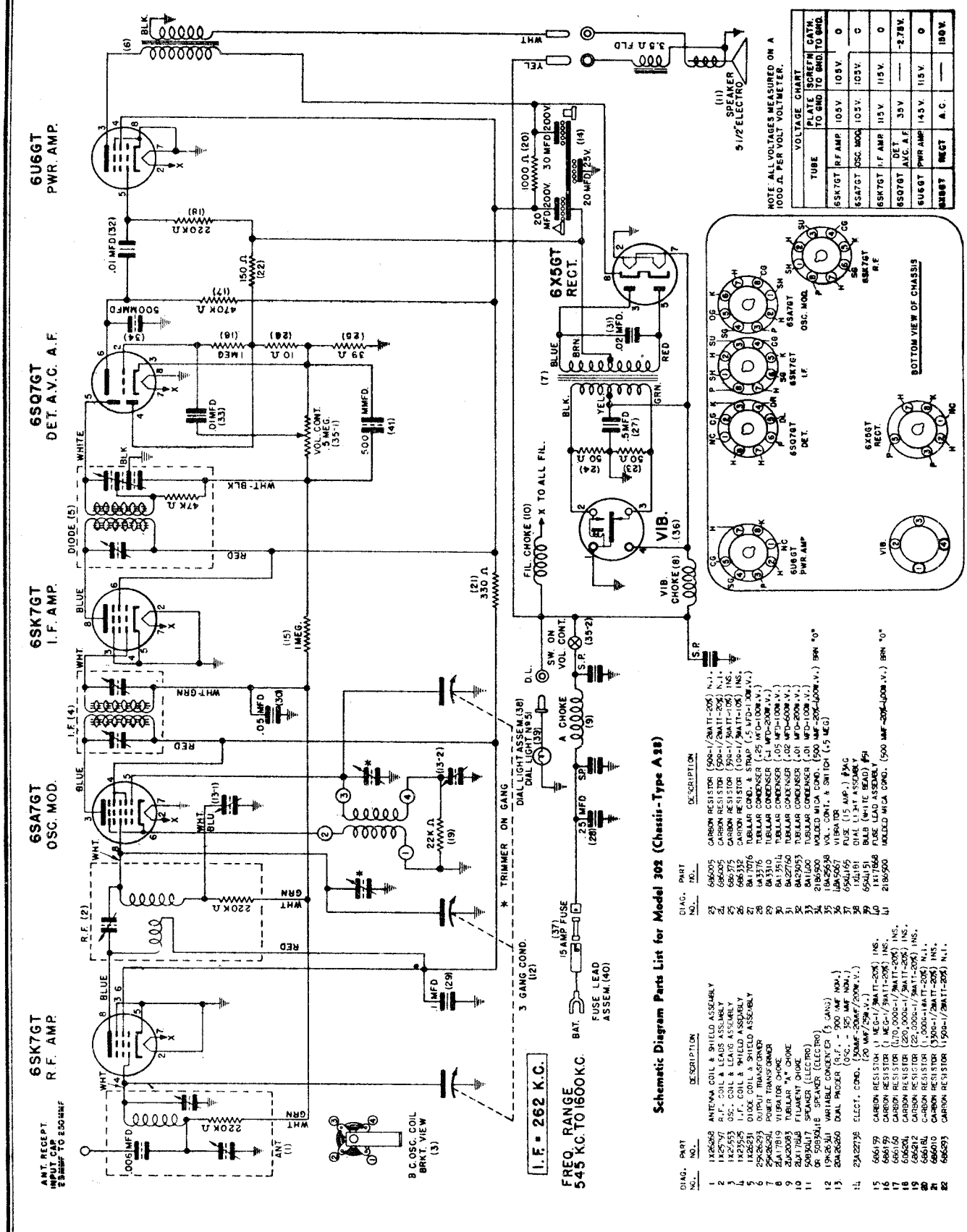
MODEL 302, Ch. A-28

GALVIN MFG. CORP.



NOTE: ALL VOLTAGES MEASURED ON A 1000 Ω PER VOLT VOLTMETER.

VOLTAGE CHART

TUBE		PLATE TO GND.	SCREEN TO GND.	CATH. TO GND.
6SK7GT	R.F. AMP.	105 V.	105 V.	0
6SA7GT	OSC. MOD.	105 V.	105 V.	—
6SK7GT	I.F. AMP.	115 V.	115 V.	0
6SQ7GT	DET. A.V.C. A.F.	35 V.	—	-2.75 V.
6U6GT	PWR AMP.	145 V.	115 V.	0
6X5GT	RECT.	A.C.	—	190 V.

Schematic Diagram Parts List for Model 302 (Chassis-Type A28)

DIAG. NO.	PART NO.	DESCRIPTION
1	1X26268	ANTENNA COIL & SHIELD ASSEMBLY
2	1X25747	R.F. COIL & LEADS ASSEMBLY
3	1X25753	OSC. COIL & LEADS ASSEMBLY
4	1X25525	I.F. COIL & SHIELD ASSEMBLY
5	1X26231	DIODE COIL & SHIELD ASSEMBLY
6	29X26293	OUTPUT TRANSFORMER
7	29X26294	POWER TRANSFORMER
8	21A17819	VIBRATOR CHOKE
9	20X20083	TUBULAR "A" CHOKE
10	21A17848	FILAMENT CHOKE
11	50B39417	SPEAKER (ELECTRO)
	9R 50B39418	SPEAKER (ELECTRO)
12	19X26341	VARIABLE CONDENSER (3 GANG)
13	20A26260	DUAL PADDER (R.F. - 900 MF NOM.) (OSC. - 325 MF NOM.)
14	23A22738	ELECT. COND. (50MF-250MF/250W.V.) (20 MF/25W.V.)
15	6A6159	CARBON RESISTOR (1 MEG-1/2WATT-20%) INS.
16	6A6159	CARBON RESISTOR (470K-1/2WATT-20%) INS.
17	6A6159	CARBON RESISTOR (170,000-1/2WATT-20%) INS.
18	6A6204	CARBON RESISTOR (220,000-1/2WATT-20%) INS.
19	6A6212	CARBON RESISTOR (22,000-1/2WATT-20%) INS.
20	6A6184	CARBON RESISTOR (1,000-1WATT-20%) N.I.
21	6A6010	CARBON RESISTOR (330-1/2WATT-20%) INS.
22	6A6293	CARBON RESISTOR (500-1/2WATT-20%) N.I.
23	6A6005	CARBON RESISTOR (500-1/2WATT-20%) N.I.
24	6A6005	CARBON RESISTOR (500-1/2WATT-20%) N.I.
25	6A6375	CARBON RESISTOR (330-1/2WATT-10%) INS.
26	6A6332	CARBON RESISTOR (100-1/2WATT-10%) INS.
27	8A17076	TUBULAR COND. & STRAP (.5 MFD-400 W.V.)
28	1A33776	TUBULAR CONDENSER (.25 MFD-400 W.V.)
29	8A13310	TUBULAR CONDENSER (.1 MFD-200 W.V.)
30	8A13514	TUBULAR CONDENSER (.05 MFD-400 W.V.)
31	8A27760	TUBULAR CONDENSER (.02 MFD-600 W.V.)
32	8A29053	TUBULAR CONDENSER (.01 MFD-600 W.V.)
33	8A11000	TUBULAR CONDENSER (.01 MFD-1000 W.V.)
34	21A6500	MOLDED MICA COND. (500 MMF-20%-1000 W.V.) BRN "0"
35	19A29598	VOL. CONT. & SWITCH (.5 MEG)
36	19A5067	VIBRATOR
37	6944165	FUSE (15 AMP.) #3AG
38	1A1181	DIAL LIGHT ASSEMBLY
39	6944155	DIAL LIGHT (WHITE BEAD) #51
40	21A6568	FUSE LEAD ASSEMBLY
41	21A6500	MOLDED MICA COND. (500 MMF-20%-1000 W.V.) BRN "0"

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MODEL 302
MODEL 352
MODEL 452

MODEL 302

1X26268	Antenna Coil & Shield Assembly		1.55
1X25797	R. F. Coil & Leads Assembly		.75
1X26553	Osc. Coil & Leads Assembly		.60
1X23525	I. F. Coil & Shield Assembly		1.45
1X26231	Diode Coil & Shield Assembly		1.60
25K26293	Output Transformer		.80
25K26294	Power Transformer		2.35
24A17819	Vibrator Choke		.35
24K20083	Tubular "A" Choke		.20
24X17848	Filament Choke		.05
24X30417	Speaker Electro		3.10
19K26341	Variable Cond 3Gang		3.15
20A26260	Dual Padder(RF 900 MMF Nom) (Osc. 325 MMF Nom)		.55
23A22738	Elect Cond. (30MMF 20MMF/200W.V) (20MMF/25 W.V.)		.75
6B6159	Carbon Res.(1 Meg-1/3 Watt -20% Ins.	Doz.	.60
6B6160	Carbon Res. (470,000-1/3 Watt 20% Ins.	Doz.	.60
6B6204	Carbon Res. (220,000-1/3Watt 20% Ins.	Doz.	.60
6B6212	Carbon Res. (22,000-1/3-20% Ins.	Doz.	.60
6B6184	Carbon Res. (1,000-1 Watt 20% NI		.10
6B6010	Carbon Res. (330-1/2-20% Ins.	Doz.	.60
6B6293	Carbon Res. (150-1/2-Watt -20%) NI	Doz.	.60
6B6005	Carbon Res.(500-1-1/2 Watt 20% NI	Doz.	.60
6B6375	Carbon Res.(300-1/3 Watt 10% Ins.	Doz.	.60
6B6332	Carbon Res. (10-1/3 Watt 10% Ins.	Doz.	.60
8A17076	Tubular Cond. & Strap .5 MFD 100 W. V.		.30
8A3376	Tubular Cond. (.25 MFD 100WV)		.20
8A3310	Tubular Cond. (.1 MFD 200 W. V.)		.15
8A13514	Tubular Cond. (.05-MFD-100W.V.)		.15
8A22760	Tubular Cond. (.02MFD 600 WV)		.15
8A23053	Tubular Cond.(.01 MFD 200 WV)		.10
8A1400	Tubular Cond. (.01 MFD 100WV)		.15
21B6500	Molded Mica Cond.(500 MMF 20%)		.15
18A25638	Vol. Cont. & Switch (.5 Meg)		.80
48A5067	Vibrator		2.50
65X4165	Fuse (15 Amp) 3AG		.05
1X4181	Dial Light Assembly		.35
65X4151	Bulb (White Bead) #51		.15
1X17868	Fuse Lead Assembly		.15

MODEL 352

1X26399	Antenna Coil & Shield Assembly		2.60
1X26379	R. F. Coil & Shield Assembly		1.80
24A23892	Oscillator Coil		.60
1X26385	I. F. Coil & Shield Assembly		1.45
1X26383	Diode Coil & Shield Assembly		1.60
25A26233	Output Transformer		.90
25K26296	Power Transformer		2.45
24A19108	Vibrator Choke		.30
24K19109	"A" Choke		.30
19B26246	Variable Condenser 3 Gang		2.55
20A26238	Single Padder & Brkt.(325 MMFD Nom.)		.30
23A22738	Electrolytic Condenser(30-20/200V-20/25V		.75
8A19133	Tubular Condenser (.05-100V)		.30
8A14095	Tubular Condenser (.4-100V)		.30
8A3310	Tubular Condenser (.1-200V)		.15
8A3302	Tubular Condenser (.1-100V)		.15
8A23146	Tubular Condenser (.5-200V)		.10
8A13514	Tubular Condenser (.05-100V)		.15
8A22760	Tubular Condenser(.02-600V)		.15
8A24053	Tubular Condenser (.02-200V)		.10
8A1697	Tubular Condenser (02-100V)		.15
8A19134	Tubular Condenser (.005-600V)		.20
8A2289	Tubular Condenser (.007-600V)		.20
21B6500	Molded Mica Cond. (500 MMFD 20%)		.15
21B6503	Molded Mica Cond. (50 MMFD 20%)		.15
6B6159	Carbon Resistor (1.0 Meg 1/3-20) Ins.	Doz.	.60
6B6160	Carbon Resistor (470,000-1/3-20 Ins.	Doz.	.60
6B6204	Carbon Resistor (220,000-1/3-20 Ins.	Doz.	.60
6B6012	Carbon Resistor (33,000-1/2-20 Ins.	Doz.	.60
6B6212	Carbon Resistor (22,000-1/3-20 Ins.	Doz.	.60
6B6184	Carbon Resistor (1000-1-20 N.I.		.10
6B6010	Carbon Resistor (330-1/2-20 Ins.	Doz.	.60
6B6330	Carbon Resistor (150-1-10) Ins.		.10
6B6005	Carbon Resistor (50-1/2-20 NI	Doz.	.60
6B6331	Carbon Resistor (27-1/3-10 Ins.	Doz.	.60
6B6332	Carbon Resistor (10-1/3-10 Ins.	Doz.	.60
18K25639	Vol. Cont. & Switch (.5 Meg)		.90
40A26887	Tone Switch		.45
48K12793	Vibrator		2.50
26A14760	Bantam Shield		.05
65X4165	Fuse (15 Amp.)3AG		.05
1X4872	Battery Lead Assembly		.50
1X4181	Dial Light Assembly		.35
65X4151	Bulb White Bead #51		.15
6B6284	Carbon Resistor (.5,000-1/3-20 Ins.	Doz.	.60
21B6500	Molded Mica Cond. (500 MMFD 20%		.15

MODEL 452

1X26583	Antenna Coil & Shield Assembly		2.50
1X26557	R. F. Coil & Shield Assembly		1.75
1X26556	Osc. Coil & Leads Assembly		.65
1X26558	I. F. Coil & Shield Assembly		1.20
1X26586	Diode Coil & Shield Assembly		1.55
25K26487	Power Transformer		2.35
25K26623	Output Transformer		1.00
24A26555	Vibrator Choke		.35
24A26554	"A" Choke & Bracket		.35
19B26622	Variable Condenser (3Gang)		3.95
20A23135	Osc. Padder & Brkt.(9-39 MMF)		.20
20A17237	Osc. Trimmer & Brkt. 6 MMF Nom)		.20
20A23927	Compensating Condenser		.25
23A22738	Elect. Cond. (-30-20/200V-20/25V)		.75
8A19133	Tubular Cond. (.5-100V)		.30
8A3376	Tubular Cond.(.25-100V)		.20
8A3310	Tubular Cond.(.1-200V)		.15
8A14095	Tubular Cond.(.4-100V)		.30
8A23146	Tubular Cond. (.5-200V)		.10
8A13514	Tubular Cond. (.05-100V)		.15
8A22760	Tubular Cond. (.02-600V)		.15
8A1697	Tubular Cond. (.02-100V)		.15
8A2289	Tubular Condenser (.007-600V)		.20
8A4529	Tubular Cond. (.006-100V)		.15
2136525	Molded Mica Cond.(800 MMF) 20%		.20
21B6500	Molded Mica Cond. (500 MMF 20%)		.15
21A23110	Ceramic Mica Cond. (300 MMF 5%		.25
21B20877	Metal Mica Cond.(90MMF 10%		.15
6B6159	Carbon Res. (1 Meg. 1/3-20 Ins.	Doz.	.60
6B6160	Carbon Res. (470,000-1/3-20 Ins.	Doz.	.60
6B6165	Carbon Res. (100,000-1/3-20 Ins.	Doz.	.60
6B6012	Carbon Res. (330,000-1/2-20 Ins.	Doz.	.60
6B6212	Carbon Res.(22,000-1/3-20 Ins.	Doz.	.60
6B6184	Carbon Res. (1,000-1-20 NI		.10
6B6010	Carbon Res. (330-1/2-20 Ins.	Doz.	.60
6B6330	Carbon Res. (150-1-10) Ins.		.10
6B6005	Carbon Res.(50-1/2-20 NI	Doz.	.60
6B6331	Carbon Res.(27--1/3-10 Ins.	Doz.	.60
6B6332	Carbon Res.(10-1/3-10 Ins.	Doz.	.60
18A25638	Vol. Cont. & Switch .5 Meg.		.80
48K12793	Vibrator Short		2.50
65X4151	Bulb White Bead #51		.15
65X12712	Fuse 20 Amp 3AG		.05
1X4288	Battery Lead Assembly		.40
26X14760	Bantam Tube Shield		.05
26A26283	Bantam Tube Shield		.05
1X22875	Model E-24-T Tuner Assembly		9.50
1X26560	MR-6 Tone Control Relay		1.70
6B6256	Carbon Res. (68,000-1/3-20) Ins.	Doz.	.60
21B6500	Molded Mica Cond.(500 MMF) 20%		.15

Prices subject to change without notice.

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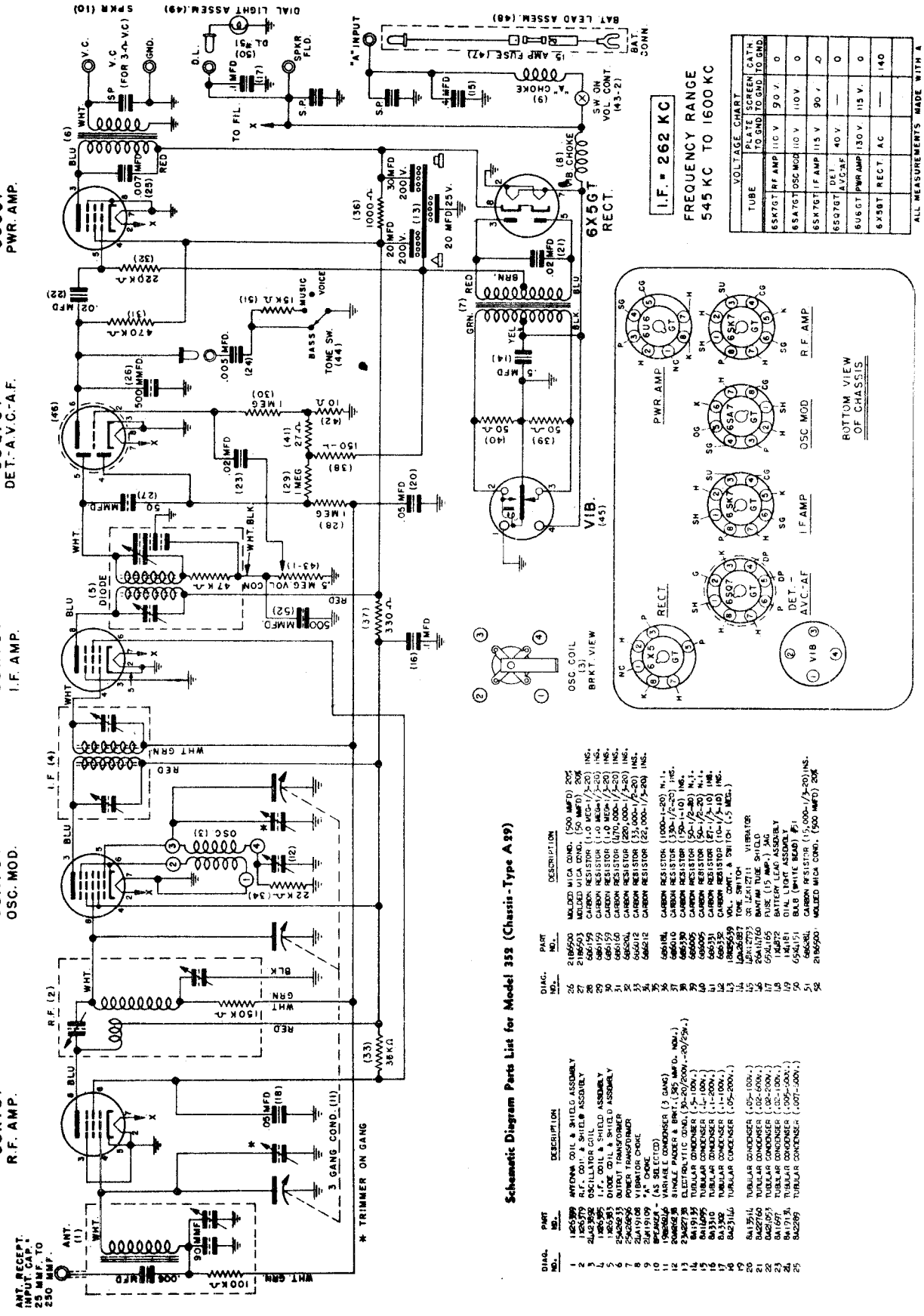
MODEL 352, Ch. A-29

GALVIN MFG. CORP.



Schematic Diagram Parts List for Model 352 (Chassis-Type A29)

DIAG. NO.	PART NO.	DESCRIPTION
1	1R05389	ANTENNA COIL & SHIELD ASSEMBLY
2	1R05379	R.F. COIL & SHIELD ASSEMBLY
3	2U43932	OSCILLATOR COIL
4	1R05395	I.F. COIL & SHIELD ASSEMBLY
5	1R05383	DIODE COIL & SHIELD ASSEMBLY
6	2S43833	OUTPUT TRANSFORMER
7	2S43696	POWER TRANSFORMER
8	2U49108	VIBRATION CHOKE
9	2U49109	"A" CHOKE
10	BPEM29*	* (AS SELECTED)
11	1R05846	VARIABLE CONDENSER (3 GANG)
12	2D46258	SINGLE PADDER & BRKT. (.595 MMFD. NOM.)
13	2S42738	ELECTROLYTIC COND. (30-20/200V.-20/25V.)
14	8A19155	TUBULAR CONDENSER (.5-100V.)
15	8A16095	TUBULAR CONDENSER (.1-100V.)
16	8A3310	TUBULAR CONDENSER (.11-200V.)
17	8A16096	TUBULAR CONDENSER (.05-200V.)
18	8A23146	TUBULAR CONDENSER (.05-200V.)
19	8A13514	TUBULAR CONDENSER (.05-100V.)
20	8A22760	TUBULAR CONDENSER (.02-600V.)
21	8A21055	TUBULAR CONDENSER (.02-1000V.)
22	8A16977	TUBULAR CONDENSER (.02-1000V.)
23	8A17136	TUBULAR CONDENSER (.005-600V.)
24	8A22269	TUBULAR CONDENSER (.007-600V.)
25	8A22269	TUBULAR CONDENSER (.007-600V.)

DIAG. NO.	PART NO.	DESCRIPTION
26	2186500	MOLDED MICA COND. (500 MMFD) 20%
27	2186503	MOLDED MICA COND. (50 MMFD) 20%
28	686199	CARBON RESISTOR (1.0 MEG-1/2-20) INS.
29	686159	CARBON RESISTOR (1.0 MEG-1/2-20) INS.
30	686153	CARBON RESISTOR (1.0 MEG-1/2-20) INS.
31	686168	CARBON RESISTOR (220,000-1/2-20) INS.
32	686156	CARBON RESISTOR (220,000-1/2-20) INS.
33	686144	CARBON RESISTOR (33,000-1/2-20) INS.
34	686212	CARBON RESISTOR (22,000-1/2-20) INS.
35	686184	CARBON RESISTOR (1000-1-20) M.I.
36	686010	CARBON RESISTOR (330-1/2-20) INS.
37	686130	CARBON RESISTOR (150-1-10) INS.
38	686005	CARBON RESISTOR (50-1/2-20) M.I.
39	686095	CARBON RESISTOR (50-1/2-20) M.I.
40	686151	CARBON RESISTOR (27-1/2-10) INS.
41	686132	CARBON RESISTOR (10-1/2-10) INS.
42	1R05659	VOL. CONT. & SWITCH (.5 MEG.)
43	1A26887	TONE SWITCH
44	1A51273*	SR 1A51271* VIBRATOR
45	20A11760	BANTAM TUBE SHIELD
46	6541165	FUSE (15 AMP.) 3AG
47	1A5872	BATTERY LEAD ASSEMBLY
48	1A5181	DIAL LIGHT ASSEMBLY
49	6541151	DIAL LIGHT SOCKET #51
50	686081	CARBON RESISTOR (15,000-1/2-20) INS.
51	2186500	MOLDED MICA COND. (500 MMFD) 20%

VOLTAGE CHART				
TUBE	PLATE TO GND.	SCREEN TO GND.	CATH TO GND.	
6SK7GT	R.F. AMP.	110 V.	90 V.	0
6SA7GT	OSC. MOD.	110 V.	110 V.	0
6SK7GT	I.F. AMP.	115 V.	90 V.	20
6SQ7GT	DET. AVC-AF	40 V.	—	0
6U6GT	PWR. AMP.	130 V.	115 V.	0
6X5GT	RECT.	AC	—	140

For Parts List, see P. 15-73

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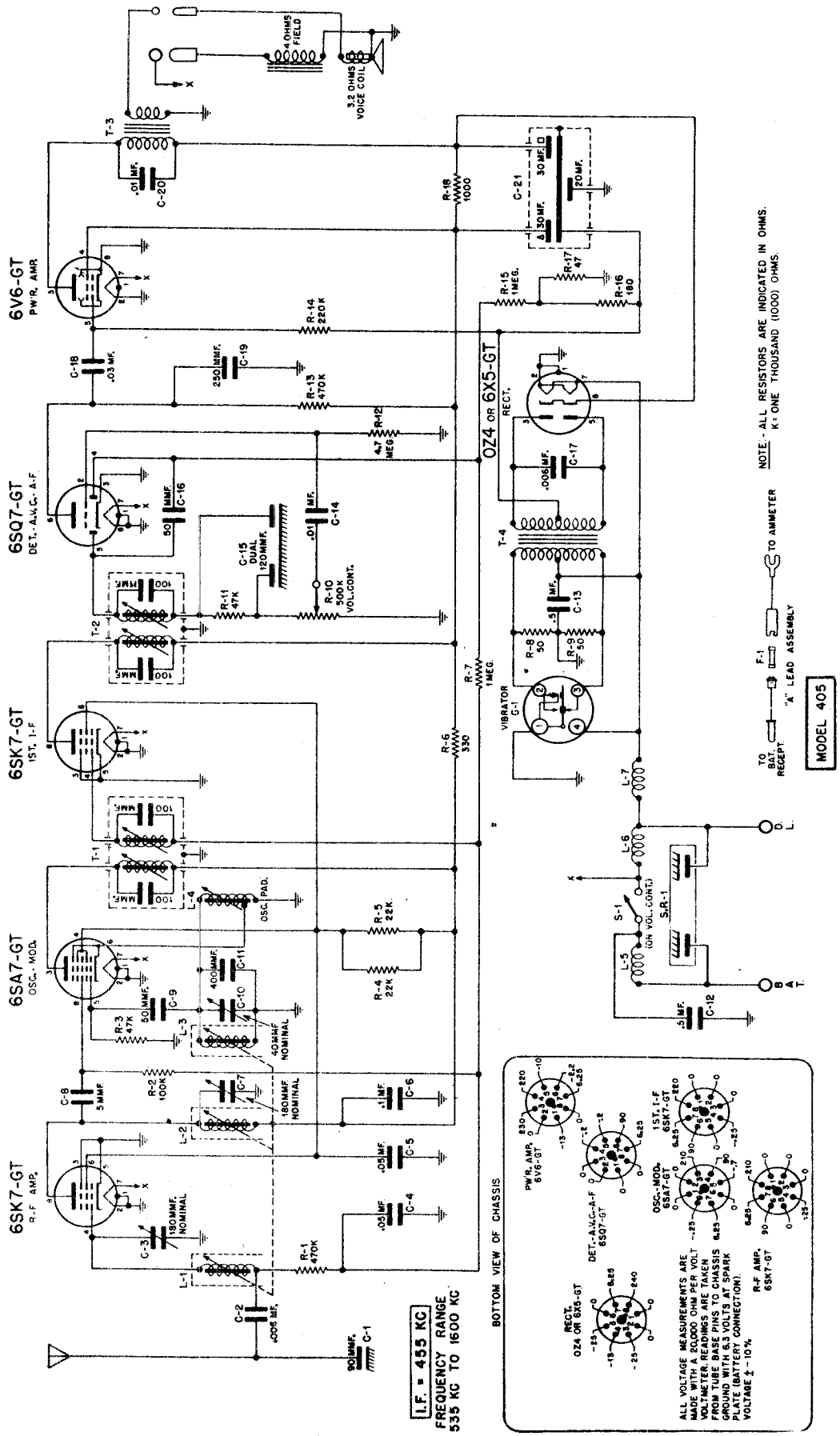
MODEL 405, Ch. AS-13

GALVIN MFG. CORP.



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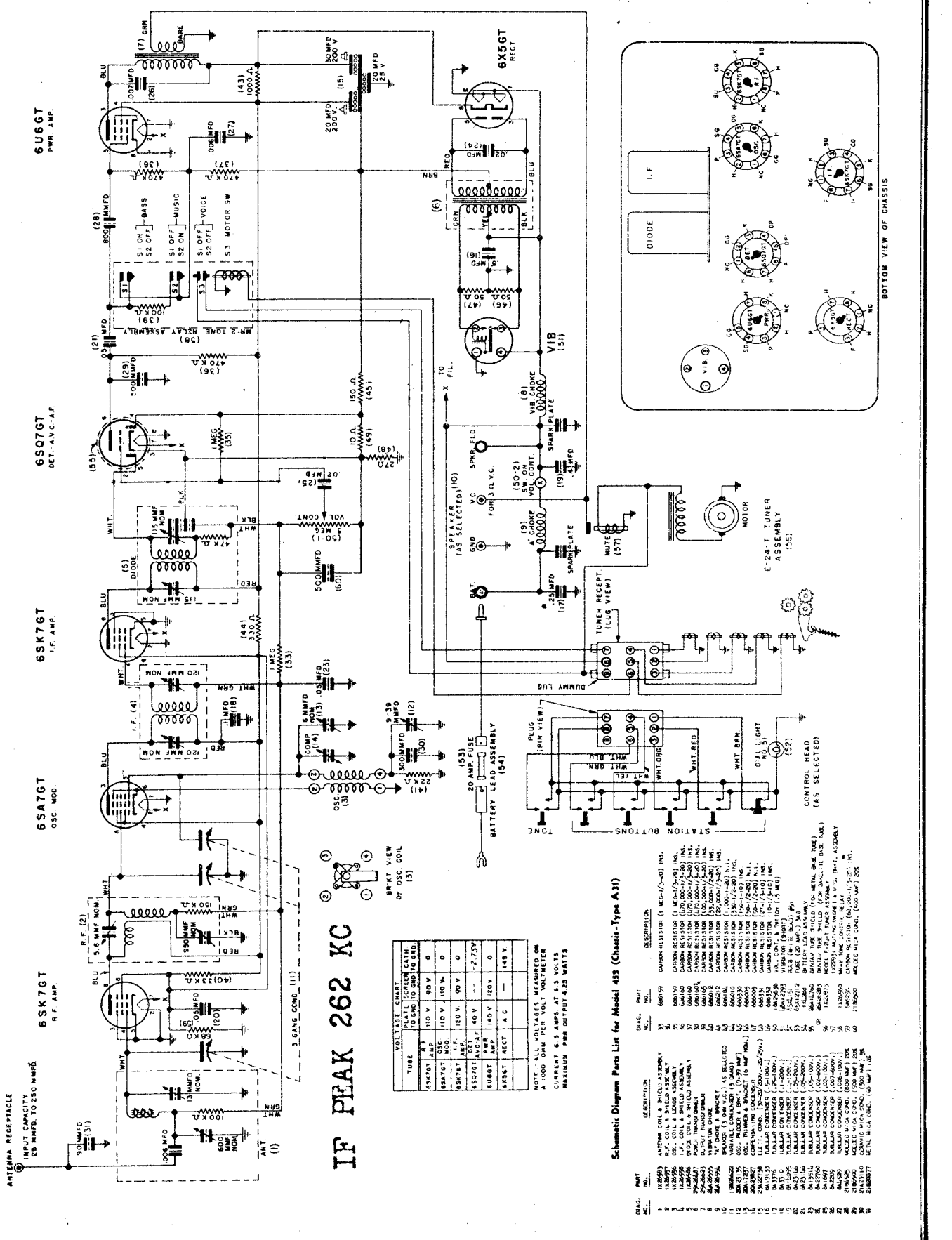
For Alignment, see P.15-9

MODEL 452,Ch.A-31

GALVIN MFG. CORP.



VOLTAGE CHART						
TUBE		PLATE TO CHAS.	SCREEN TO CHAS.	CATH. TO CHAS.	GRID TO CHAS.
6SK7GT	R.F. AMP.	110 V.	90 V.	0	
6SA7GT	OSC MOD	110 V.	110 V.	0	
6SK7GT	I.F. AMP.	120 V.	90 V.	0	
6SQ7GT	DET AVC-AF	40 V.	—	-2.75V.	
6U6GT	PWR AMP.	140 V.	120 V.	0	
6X5GT	RECT.	A.C.	—	145 V.	

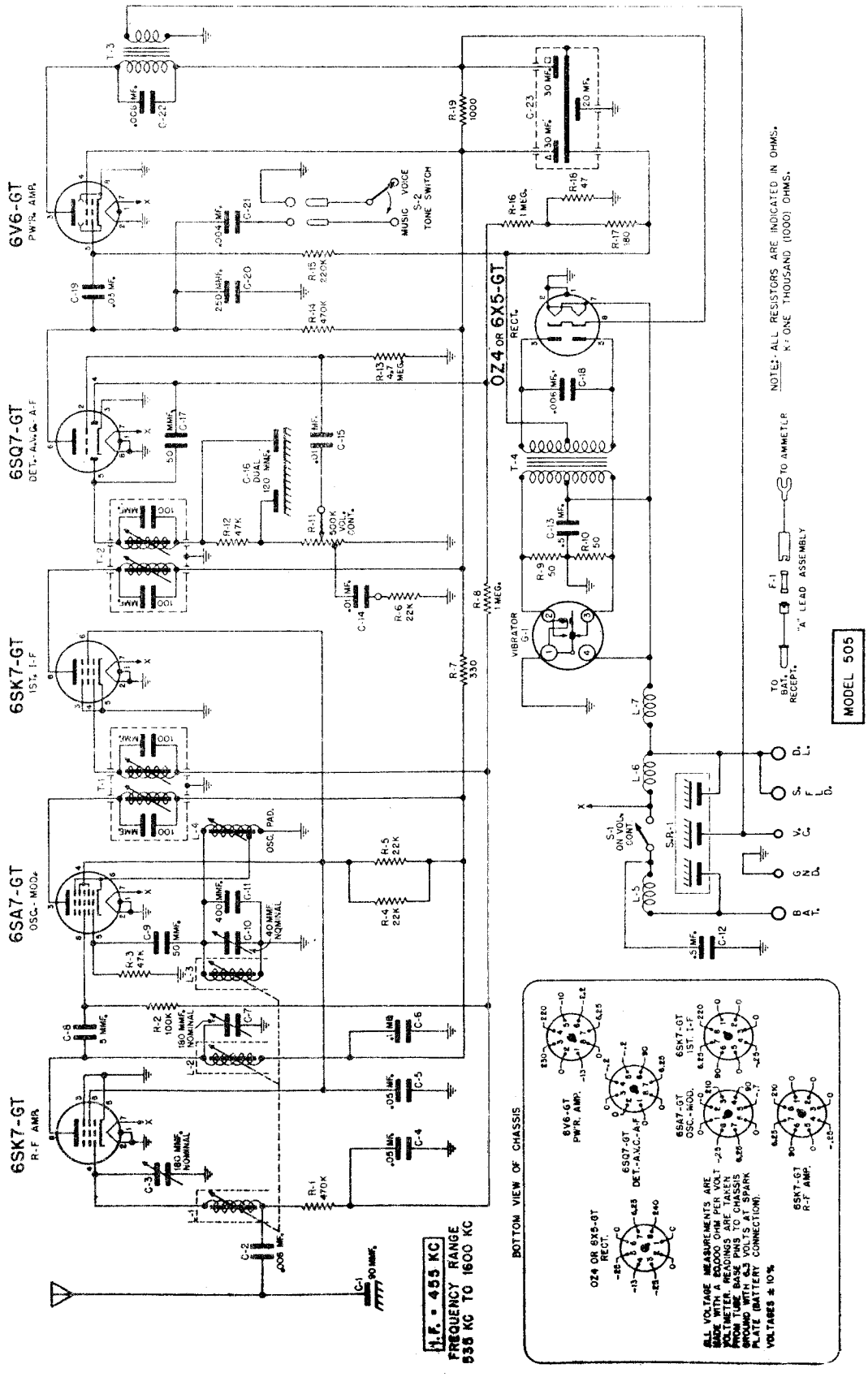
NOTE: ALL VOLTAGES MEASURED ON A 1000 OHM PER VOLT VOLTMETER
CURRENT 6.5 AMPS. AT 6.3 VOLTS
MAXIMUM PWR OUTPUT 4.25 WATTS

Schematic Diagram Parts List for Model 452 (Chassis-Type A-31)

DIAG. NO.	PART NO.	DESCRIPTION
1	1B26563	ANTENNA COIL & SHIELD ASSEMBLY
2	1B26977	R.F. COIL & SHIELD ASSEMBLY
3	1B26956	OSC. COIL & LEADS ASSEMBLY
4	1B26958	I.F. COIL & SHIELD ASSEMBLY
5	1B26959	DIODE COIL & LEADS ASSEMBLY
6	79-26047	POWER TRANSFORMER
7	79-26048	OUTPUT TRANSFORMER
8	3A-26975	VIBRATOR SOCKET
9	3A-26976	VIBRATOR (SPARK PLATE)
10	1B26602	SPEAKER (3 OHM V.C.) AS SELECTED
11	1B26603	VARIABLE CONDENSER (3 GANG)
12	84-21277	TUBULAR CONDENSER (.02 MFD 400 V.)
13	84-21277	OSC. TRIMMER & BRACKET (9-38 MMF NOM.)
14	20A-21277	COMPENSATING CONDENSER
15	20A-26758	ELECT. COND. (20-20-20MFD-450-450-25V.)
16	84-21276	TUBULAR CONDENSER (.02 MFD 400 V.)
17	84-3170	TUBULAR CONDENSER (.25 MFD 400 V.)
18	84-3170	TUBULAR CONDENSER (.1 MFD 400 V.)
19	84-3170	TUBULAR CONDENSER (.25 MFD 400 V.)
20	84-21276	TUBULAR CONDENSER (.05 MFD 400 V.)
21	84-21276	TUBULAR CONDENSER (.05 MFD 400 V.)
22	84-21276	TUBULAR CONDENSER (.05-.005 MFD 400 V.)
23	84-21276	TUBULAR CONDENSER (.05-.005 MFD 400 V.)
24	84-21276	TUBULAR CONDENSER (.02 MFD 400 V.)
25	84-21276	TUBULAR CONDENSER (.05 MFD 400 V.)
26	84-3170	TUBULAR CONDENSER (.001 MFD 400 V.)
27	84-3170	TUBULAR CONDENSER (.005 MFD 400 V.)
28	84-3170	TUBULAR CONDENSER (.005 MFD 400 V.)
29	84-3170	TUBULAR CONDENSER (.005 MFD 400 V.)
30	84-3170	TUBULAR CONDENSER (.005 MFD 400 V.)
31	84-3170	TUBULAR CONDENSER (.005 MFD 400 V.)
32	84-21276	TUBULAR CONDENSER (.05-.005 MFD 400 V.)
33	84-21276	TUBULAR CONDENSER (.05-.005 MFD 400 V.)
34	84-21276	TUBULAR CONDENSER (.05-.005 MFD 400 V.)
35	84-3170	TUBULAR CONDENSER (.005 MFD 400 V.)
36	84-3170	TUBULAR CONDENSER (.005 MFD 400 V.)
37	84-3170	TUBULAR CONDENSER (.005 MFD 400 V.)

MODEL 505,Ch.AS-14

GALVIN MFG. CORP.



For Alignment, see P.15-9

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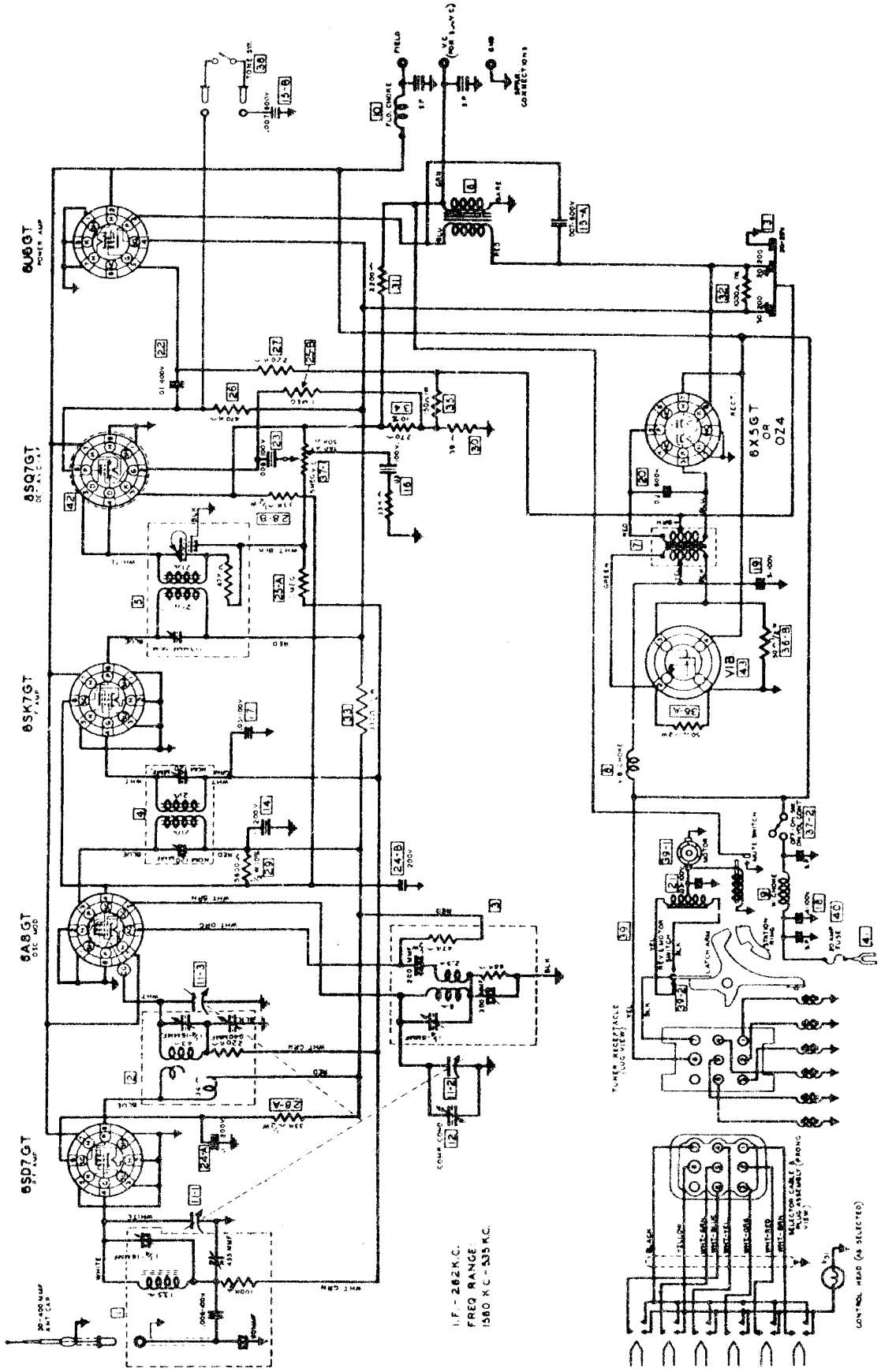
MODEL 550-A

GALVIN MFG. CORP.



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MODEL 550A

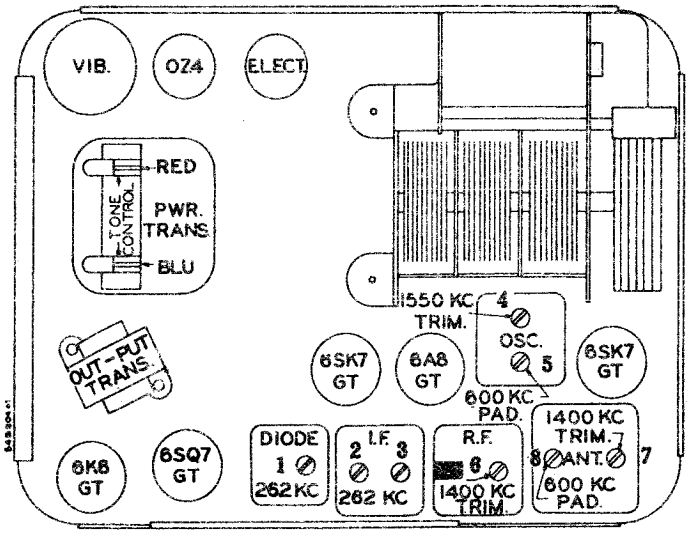
SENSITIVITY AND STAGE GAIN MEASUREMENTS

Average Microvolt Input *	Generator Set At	Generator Feeder Connected To	Dummy Antenna Capacity	Leak Resistance	Output Meter Reading **
12,000	262 K.C.	I.F. Grid	.1 Mfd.	.5 Meg.	1.74
300	262 K.C.	Mod. Grid	.1 Mfd.	.5 Meg.	1.74
350	600 K.C.	Mod. Grid	.1 Mfd.	.5 Meg.	1.74
12	600 K.C.	R.F. Grid	.1 Mfd.	.5 Meg.	1.74
6	600 K.C.	Antenna	***	None	1.74

Volume Control Set At Maximum
Tone Control Set At Music
* 1 Watt = 1.74 Volts
** Output meter connected across voice coil.
*** Use Special Dummy Part No. 1X18018.

ALIGNMENT CHART

Operations In Order	Gang Condenser Set At	Dummy Antenna	Generator Connected To	Adjust Trimmers No.	Generator Set At
1	Minimum	.1 Mfd.	Osc.-Mod. Grid	1-2-3	262 K.C.
2	1550 K.C. (Min.)	.1 Mfd.	Osc.-Mod. Grid	4	1550 K.C.
3	535 K.C. (Max.)	.1 Mfd.	Osc.-Mod. Grid	5	535 K.C.
4	1400 K.C.	*	To Special Dummy	6	1400 K.C.
5	1400 K.C.	*	To Special Dummy	7	1400 K.C.
6	600 K.C.	*	To Special Dummy	8	600 K.C.



* Use Special Dummy Part No. 1X18018.

VOLTAGE CHART

POSITION	PLATE	SCREEN	CATHODE
R.F.	120	85	0
Osc-Mod.	120	75	0
I.F.	125	75	0
Det-AVC-AF	35	.....	1.5
Pwr.	140	125	0
Rect.	AC	.....	145

All measurements from chassis ground to socket terminal using 1000 ohms per volt meter.
Current Consumption—8.5 Amps. Battery Voltage 6.3
Maximum power output 4 Watts

MODEL 550-A

GALVIN MFG. CORP.

MODEL 550A

Same As 550 Except:

	8A2289	Tubular Condenser .007-600v	.20
	20A4308	Trimmer & Padder - Osc.	.55
	20A4399	Antenna Trimmer & Padder.	.45
	6B6029	Carbon Resistor 100,000-1/3-20 N.I. .DOZ.	.60
	6B6154	Carbon Resistor 150-1-20 N.I.	.10
	6B6184	Carbon Resistor 1,000-1-20 N.I.	.10
	6B6200	Carbon Resistor 39-1/2-20 N.I .DOZ.	.60
	6B6321	Carbon Resistor 47,000-1/3-20 Ins .DOZ.	.60
	6B6322	Carbon Resistor 5,600-1/2-10 N.I. .DOZ.	.60
	3S8126	Screw 8 x 1-1/4 CP - Pwr. Trans .DOZ.	.20
	26A13678	Antenna Coil Bottom Shield.	.05
	8K18320	Tub. Cond. & Strap .1-200v.	$0.20
	23A22738	Electrolytic Condenser FP	.75
	25B22739	Power Transformer - Shielded.	2.35
	1X22743	Diode Coil & Shield Assembly.	1.55
	25A22745	Output Transformer.	1.00
	20A22747	Trimmer Diode - Small	.40
	20A22751	Double Trimmer - 120 mmf Nom. (I.F.).	.30
	1X22752	I.F. Coil & Shield Assembly	1.40
	8A22760	Tubular Condenser .02-600v.	.15
	1X22762	Front Housing Assembly.	2.55

MODEL 550

MAJOR PARTS

10	24X4835	Dial Light Choke.	.15
43	48A5067	Vibrator.	2.50
43	48A5333	Vibrator (3333)	2.50
13	23A17738	Electrolytic Condenser FP	1.00
39	1K19819	E14T Tuner Assembly	14.00
7	25B20011	Power Transformer - Shielded.	2.45
38	1X20079	Push Switch Assembly.	.35
9	24K20083	Tubular "A" Choke	.20
6	25K20396	Output Transformer.	.95
3	1X20417	Osc. Coil & Shield Assembly	1.35
2	1X20419	R.F. Coil & Shield Assembly	1.80
1	1X20423	Ant. Coil & Shield Assembly	2.60
5	1X20426	Diode Coil & Shield Assembly.	1.50
4	1X20428	I.F. Coil & Shield Assembly	1.35
37	1A20435	Volume Control & Shaft Assembly	1.00
	18A20439	Volume Control & Switch .5 Meg.	.75
	15K20441	Rear Housing.	.55
	15C20444	Front Housing	.55

ACCESSORIES

	41A2157	Backing Coil Spring - Fuse. .PER C.	.50
	14X2423	"A" Lead Insulator. .DOZ.	.20
	9X4075	Fuse Receptacle .DOZ.	.20
	14X4076	Fuse Backing Washer - Bakelite. .DOZ.	.10
	14X4077	Contact Bushing - Fuse. .DOZ.	.20
	6X4141	Distributor Suppressor.	.30
	9X4168	"A" Lead Male Ferrule .DOZ.	.25
	1X4171	Flexible Shaft & Housing Assembly	1.00
	8A4491	Generator Condenser	.40
40	65X4637	Fuse 20 AMP (3AG)	.05
	9B6734	Tube Socket - Saddle 4 Prong.	.15
	9B6739	Tube Socket - Octal Waferette	.15
	65X12712	Fuse 20 AMP (SFE)	.05
	1X13698	Antenna Receptacle & Bracket Assembly	.10
	1X13699	Antenna Receptacle Assembly	.10
	1X16762	Fuse & Clamp Assembly	.10
41	1X17868	Fuse Lead Assembly 12".	.15
	1X19034	"A" Lead.	.10
	1X20098	Accessories Kit Assembly.	.90
	1X20160	Receiver Accessories Assembly	2.50
	13K20446	Button Medallion.	.20
	1K20476	Spark Plate Assembly.	.80

CONDENSERS

24	8A3310	Tubular Condenser .1-200V	.15
14	8A4092	Tubular Condenser & Strap .1-400V	.25
23	8A4529	Tubular Condenser .006-100V	.15
19	8A4588	Tubular Condenser .5-100V	.30
	21A4807	Molded Mica Condenser 90 MMF 10%.	.20
21	8A4925	Dual Tubular Condenser .0008-.0008-1000V.	.25
	21B6500	Molded Mica Condenser 500 MMF 20%	.15
	21B6501	Molded Mica Condenser 200 MMF 20%	.15
20	8A10432	Tubular Condenser .01-1600V	.35
17	8K13006	Tubular Condenser & Strap .05-100V. LH.	.20
16	8A13134	Condenser Resistor & Strap .03-100V-33K	.30
18	8A14095	Tubular Condenser .4-100V	.30
15	8A17077	Tubular Condenser & Strap .03-600V.	.15
	20A18384	Compensating Condenser.	.30
22	8A18799	Tubular Condenser .01-400V.	.10

RESISTORS

	6B6000	Carbon Resistor 820,000-1/3-20. .DOZ.	.60
	6B6002	Carbon Resistor 47,000-1/2-20. .DOZ.	.60
27	6B6003	Carbon Resistor 220,000-1/3-20 N.I. .DOZ.	.60
36	6B6005	Carbon Resistor 50-1/2-20 .DOZ.	.60
30	6B6006	Carbon Resistor 2,200-1-20.	.10
33	6B6010	Carbon Resistor 330-1/2-20 Ins. .DOZ.	.60
26	6B6011	Carbon Resistor 470,000-1/3-20. .DOZ.	.60
28	6B6012	Carbon Resistor 33,000-1/2-20 .DOZ.	.60
25	6B6071	Carbon Resistor 1 MEG-1/3-20 N.I. .DOZ.	.60
31	6B6072	Carbon Resistor 2,200-1/3-20 N.I. .DOZ.	.60
32	6B6103	Carbon Resistor 330-1-10 N.I.	$0.10
29	6B6106	Carbon Resistor 10,000-1-20 N.I	.10
35	6B6107	Carbon Resistor 68-1/3-10 N.I .DOZ.	.60
34	6B6197	Carbon Resistor 270-1/3-10 N.I. .DOZ.	.60
	6B6204	Carbon Resistor 220,000-1/3-20 Ins. .DOZ.	.60
	6B6256	Carbon Resistor 68,000-1/3-20 Ins .DOZ.	.60

SCREWS, WASHERS, ETC.

	3A3134	"J" Bolt 5/16 X 3" CP .DOZ.	.75
	2S7003	Nut 8-32 X 11/32 HEX. CP. .PER C.	.50
	2S7004	Nut 3/8-32 X 9/16 HEX. CP .PER C.	1.00
	2S7035	Nut 3/16-18 x 5/8 Fits "J" Bolt .DOZ.	.20
	2S7050	Nut 6-32 X 5/16 PAL. CP .PER C.	.50
	3S7224	Screw 6-32 X 1/4 PLHHMS Brass .PER C.	.50
	3S7239	Screw 8-32 X 1" PLHHMS CP .PER C.	.50
	3S7257	Screw 8-32 X 5/8 SLHHMS CP. .PER C.	.65
	3S7454	Screw 8 X 1/4 PK Z PLHH CP. .DOZ.	.20
	3S7456	Housing Screw 8 X 1/4 ACHD PK A .PER C.	.65
	3S7457	Chassis Mounting Screw 8 x 7/8" PK-A-PLHH CP .DOZ.	.25
	3S7461	Screw 8 X 3/4 PK Z SLHH .PER C.	1.00
	3S7509	Screw 6 X 5/8 PK A ACHD CO. .DOZ.	.10
	3S7513	Screw 8 X 3/8 PK A BH BLK. OXD. .PER C.	1.00
	4S7614	Washer 11/16-.171-.037 CP .PER C.	.70
	4S7625	Washer 1/4-.125-.018 Plain. .PER C.	.50
	4S7634	Washer 9/16-.390-.031 CO. .DOZ.	.65
	4S7639	Washer 5/8-.406-.125 CP .DOZ.	.30
	4S7650	Lockwasher No.6 Int. CP .PER C.	.50
	4S7651	Lockwasher No.8 Int. CP .PER C.	.50
	4S7653	Lockwasher 1-1/4 OD-5/16 I.D. CP. .DOZ.	.45
	4S7655	Lockwasher 3/8 Split-Black. .PER C.	.60
	4S7656	Lockwasher No.6 Spec.-Black .PER C.	.60
	4S7657	Lockwasher No.8 Ext. BO .PER C.	.50
	4S7665	Lockwasher-Special-Black No.6 .PER C.	.75
	3S8104	Screw 8 X 1 1/2 PK A SLHH CP. .PER C.	1.00

MISCELLANEOUS

	58A2581	Flexible Shaft Bushing-C.H. End .DOZ.	.30
	58A3180	Flexible Shaft Square Fitting-Set End .DOZ.	.30
	39X4205	Hood Wiper. .DOZ.	.25
	42A4215	Vibrator Grounding Clip .DOZ.	.75
	9K4556	Large Pin Terminal Receptacle .DOZ.	.30
	29B5350	Spade Lug HT. .DOZ.	.30
	42B5480	Grid Clip Small Collar Grip .DOZ.	.15
	5S7820	Eyelet .470-.129-.230 Brs. CSP. .PER C.	.60
	38X10544	Plug Button 1/4" COP. OXD .DOZ.	.25
	9X10844	Electrolytic Ins. Wafer	.10
	31A11114	Terminal Strip 4 Ins. No.2 GND.	.05
	26B13671	Antenna Coil Shield	.35
	7A13680	Choke Support Bracket	.10
	37A13682	Tuner Mtg. Grommet-Small-Rubber .DOZ.	.30
	43A13730	Tuner Spacer Bushing-Long .DOZ.	.50
	43A13743	Tuner Spacer Bushing-Short. .DOZ.	.40
8	24A13775	Vibrator Choke & Mtg. Screw	.50
	42X14564	Cable Clamp .DOZ.	.15
42	26X14760	Bantam Tube Shield.	.05
	37K14841	Tuner Mounting Grommet-Red. .DOZ.	.60
	41A15214	Volume Control Shaft Spring .DOZ.	.25
	1X16764	Hood Wiper & Screw Assembly	.05
	54X17887	Important P.B. Instr. Sheet .DOZ.	.20
	14A19067	Speaker Terminal Insulator. .DOZ.	.20
	7A20008	Volume Control Mtg. Bracket	.05
	31A20397	Tone Control Terminal Strip	.10
	47A20436	Drive Shaft & Coupling.	.15
	47A20438	Volume Control Coupling Shaft	.10
	38K20448	Plug Button & Wiper	.10
	54B20449	Drilling Template .DOZ.	.30
	54X20458	Instruction Booklet	.10
	56X20482	Packing Carton & Fillers.	.30

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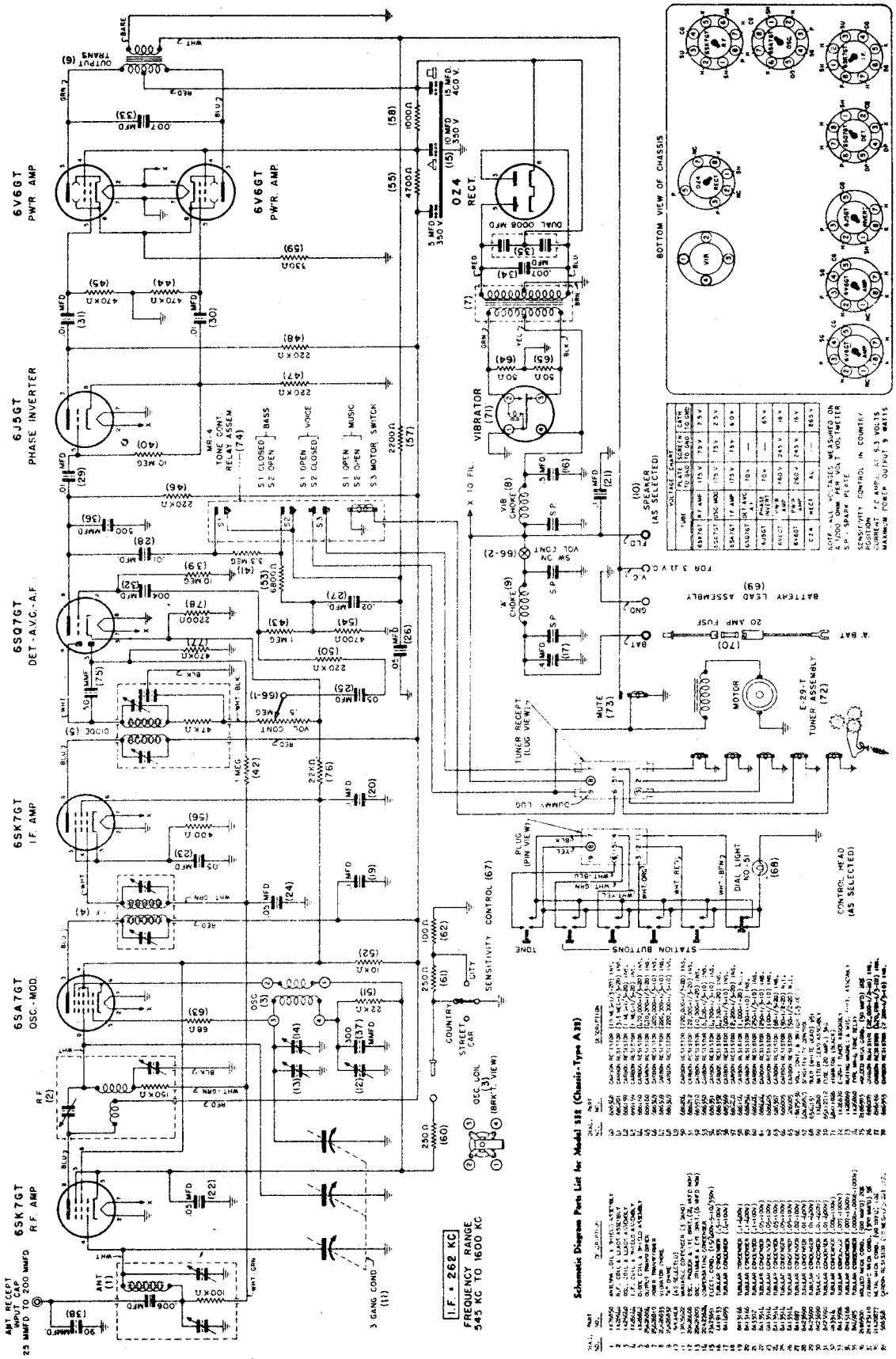

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MODEL 552 PARTS PRICE LIST
MAJOR PARTS

48K11026	Vibrator Blk.	2.50
23A23651	Electrolytic Condenser	.85
1K25619	Volume Control & Switch Assby.	.85
19B26622	Variable Condenser 3 Gang	3.95
25A26804	Output Transformer	1.25
25B26810	Power Transformer	2.90
24K26832	"A" Choke	.30
24K26833	Vibrator Choke	.30
1X26834	Filter Choke & Bracket Assby.	.75
1X26840	Oscillator Coil & Leads Assby.	.70
1X26842	Diode Coil & Shield Assby.	1.60
1X26844	I.F. Coil & Shield Assby.	1.45
1X26848	R. F. Coil & Shield Assby.	1.75
1X26850	Antenna Coil & Shield Assby.	2.50
1X26857	E-29-T Tuner Gang & Leads Assby	13.75
1X26860	Type Mr-4 Tone Relay	1.75
1X26870	E-29-T Electric Tuner Less Gang	9.50
1X27130	Sensitivity Control Assby.	.75
15K30709	Rear Housing	2.05
1X31099	Front Housing Assby.	2.90

ACCESSORIES

14X2423	Fuse Insulator "A" Lead	Doz.	.20
6X4141	Distributor Suppressor		.30
1X4288	Battery Lead Assby.		.40
8A4491	Generator Condenser		.40
1X4894	Fuse Lead Assby. 20"		.25
1X4895	Short "A Lead Assby 10"		.25
65X12712	Fuse 20 AMP SFE		.05
1X12220	Antenna Receptacle Assby.		.15
1X20686	Mounting & Filter Parts Assby.		.80
1B26812	Spark Plate Assby.		.55
39X28036	Shirt Marker	Per C	.80
1K29864	Flexible Shaft & Housing Assby.		1.00
13B30560	Golden Voice Letters		.10
13D30566	Motorola Overlay Molded		.40
36K30675	Tone Control Knob		.10
1X31103	Receiver Accessories Assby.		2.40

CONDENSERS

8A1697	Tubular Condenser .02-100V	.15
8A3302	Tubular Condenser .1-100V	.15
8A3314	Tubular Condenser .004-120V	.20
8A4925	Dual Tubular Cons. .0008-.0008-1000V	.25
21B6500	Molded Mica Condenser 500mmf 20%	.15
21B6503	Molded Mica Condenser 50mmf 20%	.15

CONDENSERS (Cont'd)

8A13014	Condenser Resistor .006-100V.-100K	.25
8K13166	Tubular Condenser .1-400V	.15
8A13506	Tubular Condenser .007-1000V	.15
8A13514	Tubular Condenser .05-100V	.15
8A14095	Tubular Condenser .4-100V	.30
8K15166	Tubular Condesner .007-1600V	.35
8A19133	Tubular Condenser .5-100V	.30
30A19342	Antenna Trimmer & Padder	.50
20A22747	Diode Trimmer Small	.40
20A22751	I.F. Trimmer Double	.30
20A23102	R. F. Trimmer & Padder	.55
21A23110	Ceramic Mica Condenser 300mmf 5%	.25
8K23690	Tubular Condenser .01-400V	.10
20K26808	Osc. Padder & Eye Bracket	.25
20K26809	Osc. Trimmer & Eye Bracket	.25
20A27624	Compensating Condenser	.25

RESISTORS

6B5569	Carbon Res. 400-1/3-10 Ins.	Doz.	.60
6B5570	Carbon Res. 10,000-1020 Ins.		.10
6B6005	Carbon Res. 50-1/2-20 N.I.	Doz.	.60
6B6028	Carbon Res. 22,000-1/2-20 Ins.	Doz.	.60
6B6159	Carbon Res.1 Meg 1/3-20 Ins.	Doz.	.60
6B6160	Carbon Res. 470,000-1/3-20 N. I.	Doz.	.60
6B6184	Carbon Res. 1000-1020 N.I.		.10
6B6201	Carbon Res. 3.3 Meg 1/3-20 Ins.	Doz.	.60
6B6204	Carbon Res. 220,000-1/3-20 Ins.	Doz.	.60
6B6212	Carbon Res. 22,000-1/3-20 Ins.	Doz.	.60
6B6240	Carbon Res. 2,200-1/3-20 Ins.	Doz.	.60
6B6254	Carbon Res. 330-1-10 Ins.		.10
6B6321	Carbon Res. 47,000-1/3-20 Ins.	Doz.	.60
6B6339	Carbon Res. 150,000-1/3-20 Ins.	Doz.	.60
6B6348	Carbon Res. 10 Meg. 1/3-20 Ins.	Doz.	.60
6B6349	Carbon Res. 220,000-1/3-10 Ins.	Doz.	.60
6B6350	Carbon Res. 6,800-1/3-10 Ins.	Doz.	.60
6B6351	Carbon Res. 4,700 1/3-10 Ins.	Doz.	.60
6B6352	Carbon Res. 4,700-1-20 Ins.		.10
6B6353	Carbon Res. 2,200-1/3-10 Ins.	Doz.	.60
6B6367	Carbon Res. 68-1/3-20 Ins.	Doz.	.60
6B6404	Carbon Res. 250-1/3-10 Ins.	Doz.	.60
6B6405	Carbon Res. 100-1/3-10 Ins.	Doz.	.60

SCREWS, WASHERS, ETC.

3A3134	"J" Bolt 5/16x3" CP-Set Mtg.	Doz.	.75
2S7003	Nut 8-32x5/16 Hex C P-Choke	Per C	.50

SCREWS, WASHERS, ETC. (Cont'd)

2S7004	Nut 3/8x9/16 CP -Vol. Cont.	Per C	1.00
2S7007	Nut 8-32x1/4 Hex CP-Gang Mtg.	Per C	.50
2S7035	Nut 5/16-18x5/8 CP-Set Mtg	Doz.	.20
2S7070	Nut 6-32x1/4 Inv. Pal CP-Coils	Per C	.50
2S7084	Speednut 9/16x5/16 Blk. Overlay	Doz.	.25
3S7205	Lockscrew 8-32x1/4 CP Tone Relay	Per C	.95
3S7215	Screw 8-32x3/16 CP -Trim Mtg.	Doz.	.25
3S7236	Screw 8-32x1&3/4 Brass Choke	Doz.	.35
3S7375	Screw 8-32x7/16 CP Gang Mtg.	Doz.	.35
3S7454	Screw 8x1/4 CP. O/P Trans.	Doz.	.20
3S7456	Housing Screw 8x1/4 ACHC Pk A CO	Per C	.65
3S7457	Screw 8x7/8 PK A PlHH CP Misc.	Doz.	.25
3S7467	Screw 8x3/8 PK Z PlHH CP	Per C	.60
3S7506	Screw 6x1/4 CP Osc. Mtg.	Per C	.50
3S7507	Screw 8x5/8 CP Tun. Mtg.	Per C	.70
4S7609	Washer 1-5/16x.218x.050 CP Choke	Doz.	.35
4S7634	Washer 9/16 .390-.031 CO	Doz.	.65
4S7651	Lockwasher #8 Int. CP Gang Mtg.	Per C	.50
4S7653	Lockwasher 5/16 Int. Ext. Set Mtg. CP.	Doz.	.45
4S7655	Lockwasher 3/8 Split Black Sw.	Per C	.60
4S7657	Lockwasher #8 Ext. BO Choke	Per C	.50
4S7666	Lockwaher #6 Ext. Blk. Osc. Coil	Per C	.50

MISCELLANEOUS

37A411	Rubber Grommet-Tuh. Mtg.		.05
37A4187	Rubber Grommet-Trim. Mtg.	Doz.	.25
42A4215	Vibrator Grounding Clip	Doz.	.75
9B6734	Tube Socket -Saddle 4 Prong		.15
9A6774	Tube Socket -Saddle Octal		.15
5S7820	Eyelet .470-.129-.230 Brs. Tone Cont.	Per C	.60
5S7830	Eyelet .406x.240 CP-Tun. Mtg.	Doz.	.20
3A13748	Locking Screw 8-32x17/32 CP Tun. Unit	Doz.	.20
7K26376	Tuner Mounting Bracket Long		.10
43A26594	Spacer Bushing Chamfered	Doz.	.40
1X26599	Receptacle & Brkt. Assby. 9 Prong		.30
7A26741	Tuner Mounting Bracket		.10
31A26803	Terminal Strip 10 Ins.		.10
43A26886	Spacer Sleeve	Doz.	.20
38X26922	Plug Button 1/4"	Doz.	.55
31A27128	Terminal Strip	Doz.	.30
38A30706	Plug Button 3/8"	Doz..	.40

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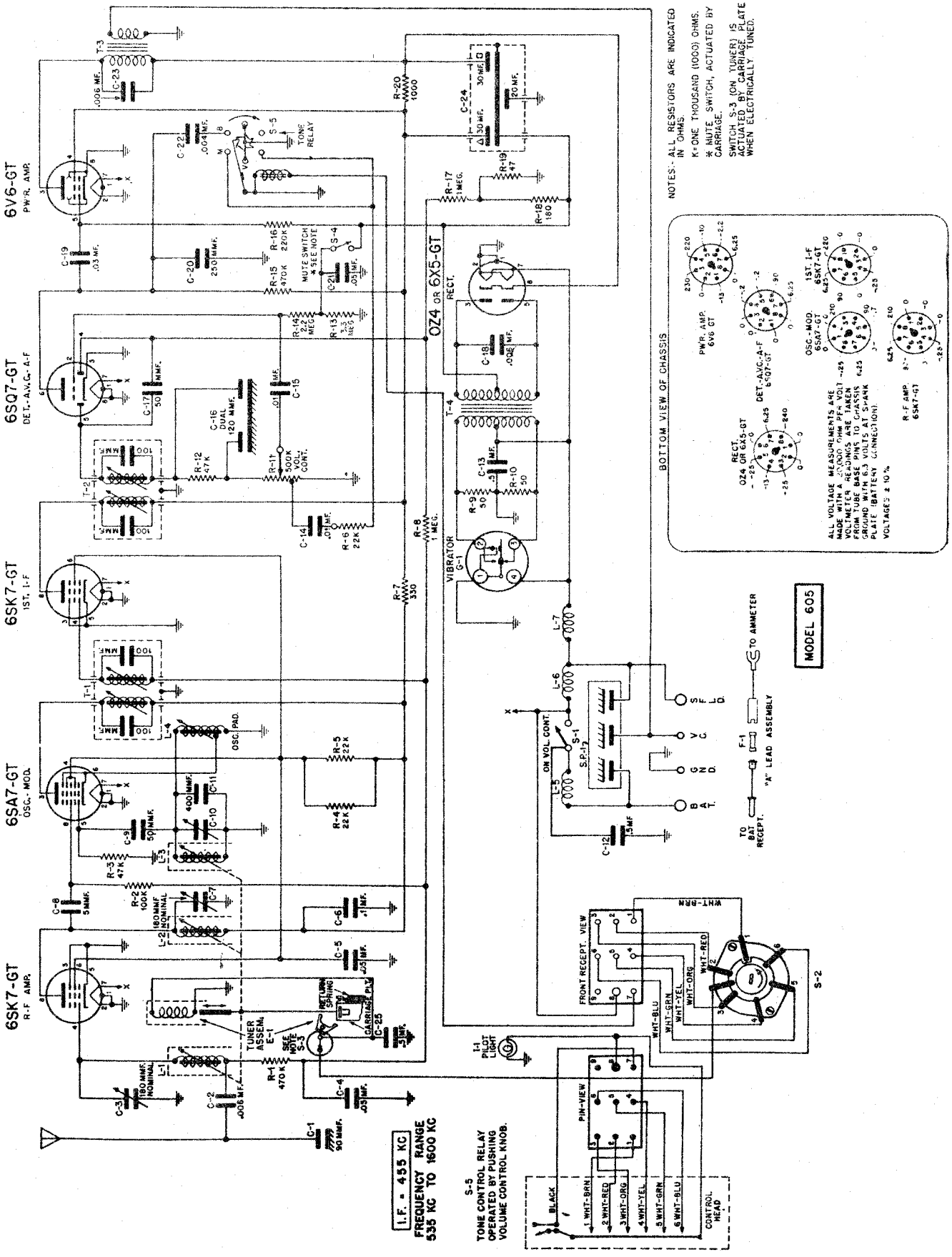
MODEL 605, Ch. AS-15



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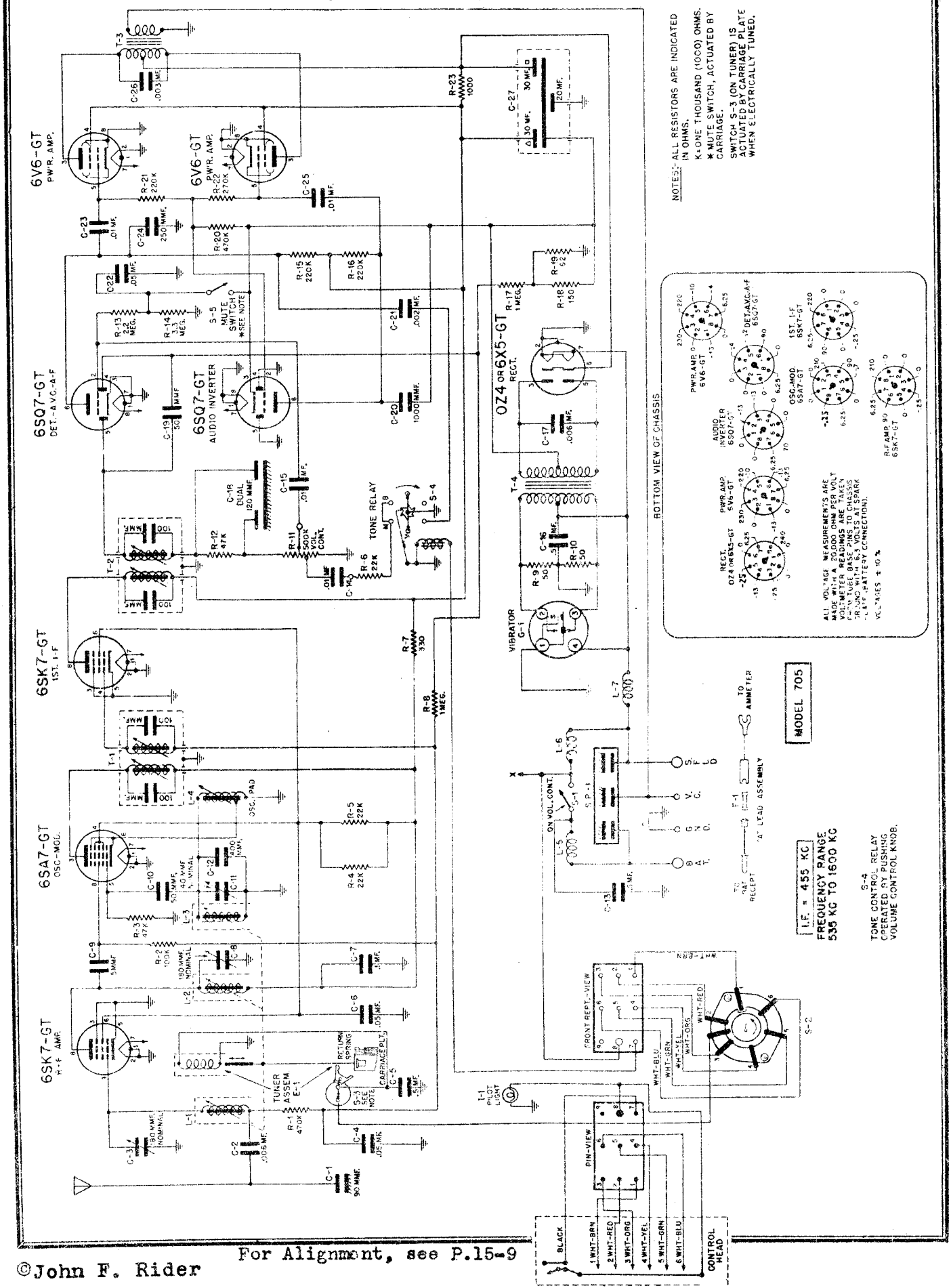
For Alignment, see P.15-9

MODEL 705, Ch. AS-16

GALVIN MFG. CORP.


6V6-GT PWR. AMP.
6V6-GT PWR. AMP.
6SQ7-GT DET.-A.V.C.-A-F
6SQ7-GT AUDIO INVERTER
6SK7-GT 1ST. I-F
6SA7-GT OSC.-MOD.
6SK7-GT R-F AMP.
0Z4 OR 6X5-GT RECT.
VIBRATOR G-1
TONE RELAY
MUTE SWITCH *SEE NOTE
TUNER ASSEM E-1
CARRIAGE PLT.
OSC. PAD
ON VOL. CONT.
TO AMMETER
TO BAT. RECEPT
F-1 LEAD ASSEMBLY
MODEL 705
I.F. = 455 KC
FREQUENCY RANGE 535 KC TO 1600 KC
S-4 TONE CONTROL RELAY OPERATED BY PUSHING VOLUME CONTROL KNOB.
FRONT RECPT.-VIEW
DIN-VIEW
CONTROL HEAD
BOTTOM VIEW OF CHASSIS
NOTES:- ALL RESISTORS ARE INDICATED IN OHMS.
K=ONE THOUSAND (1000) OHMS.
*MUTE SWITCH, ACTUATED BY CARRIAGE.
SWITCH S-3 (ON TUNER) IS ACTUATED BY CARRIAGE PLATE WHEN ELECTRICALLY TUNED.
ALL VOLTAGES MEASUREMENTS ARE MADE WITH A 20,000 OHM PER VOLT VOLUMETER. READINGS ARE TAKEN FROM TUBE BASE PINS TO CHASSIS WITH 6.3 VOLTS AT SPARK - 6 VOLTS BATTERY CONNECTION.
VOLTAGES ± 10%

For Alignment, see P.15-9

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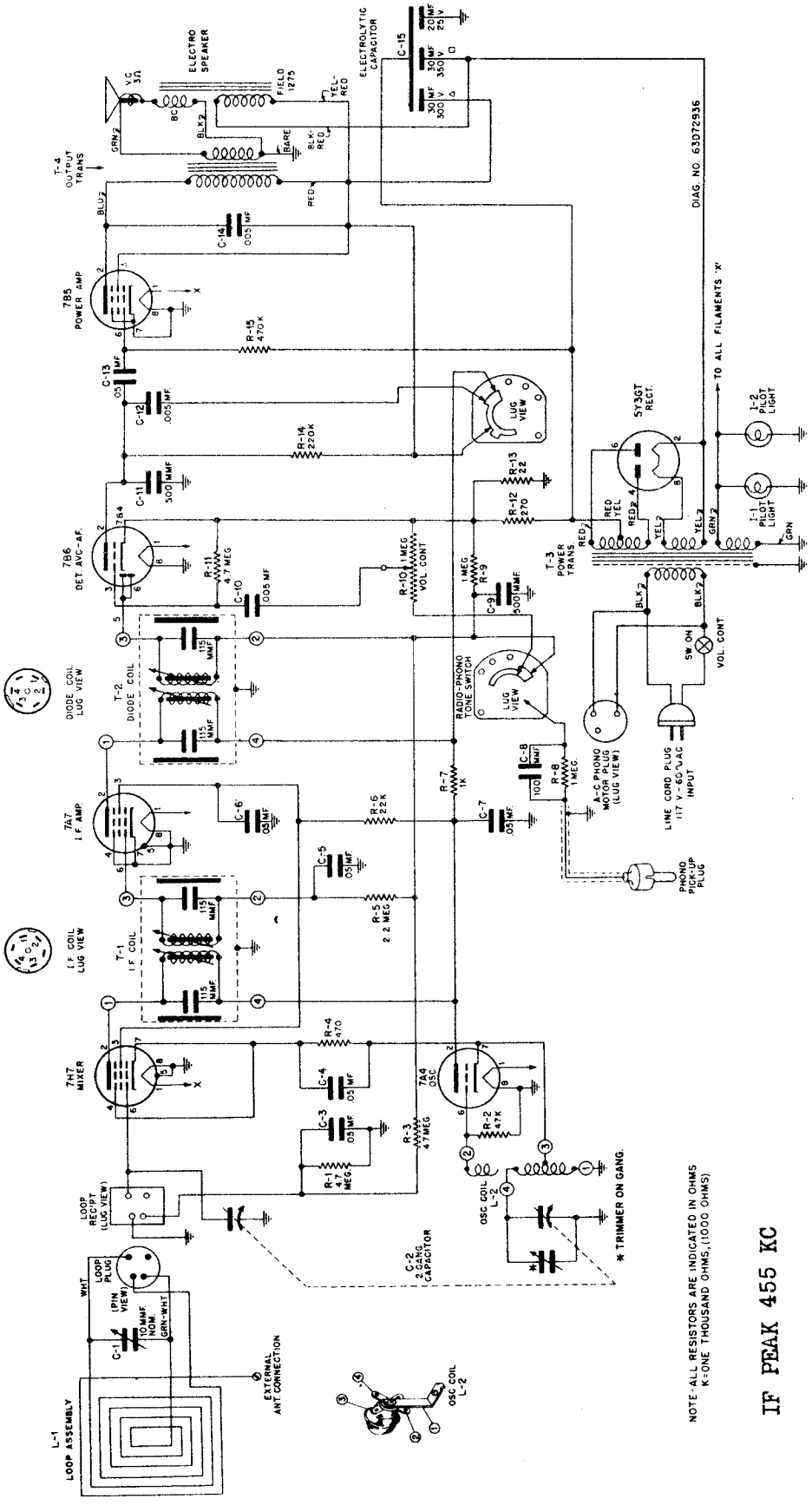
MODELS 65F11, 65F12
Chassis HS-31

GALVIN MFG. CORP.

1946



IF PEAK 455 KC

TO REMOVE CHASSIS FROM CABINET:

1. Remove the 3 control knobs.
2. Remove the 7 wood screws from bottom of cabinet.
3. The bottom board with chassis attached may now be removed from the cabinet.
4. The loop, phono pickup and phono motor cords all terminate in plugs. Do not attempt to unsolder them when freeing chassis from cabinet.
5. To expose bottom of chassis, remove the two screws that hold chassis to bottom board.

Record Changer: Galvin Model B-24RC

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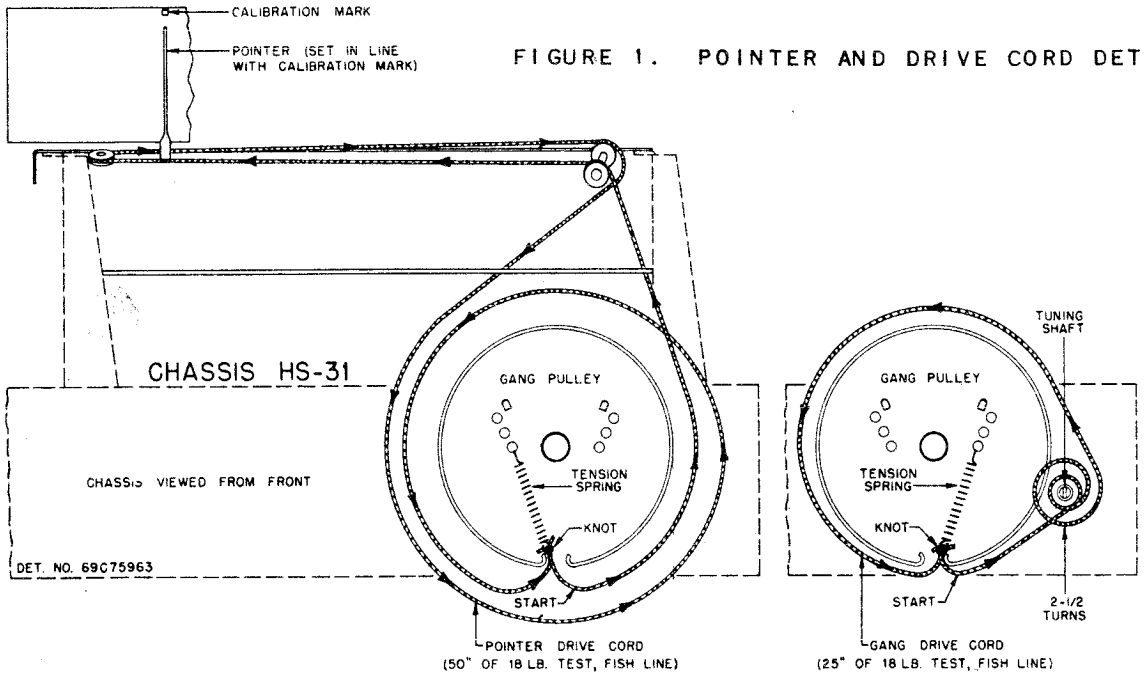


FIGURE 1. POINTER AND DRIVE CORD DETAIL

TO SERVICE POINTER AND DRIVE CORDS:

1. Remove chassis from cabinet as outlined under "TO REMOVE CHASSIS FROM CABINET."
2. All chassis are to be restrung as shown in Figure 1.
3. Secure all cord knots with a drop of household cement.
4. Secure pointer to cord with a drop of household cement.

NOTE:- ALL RESTRINGING IS PERFORMED WITH GANG FULLY CLOSED.

CHASSIS HS-31

NOTE:- A VTVM WAS USED TO MAKE MEASUREMENTS. IF A 20,000 OHM PER VOLT METER IS USED ALL GRID & AVC VOLTAGES WILL READ LOWER.

MEASUREMENTS ARE MADE FROM TUBE BASE PIN TERMINALS TO CHASSIS.

PHONO-RADIO SWITCH IN RADIO POSITION.

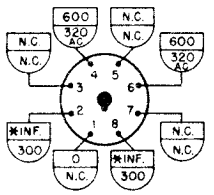
VOLUME CONTROL ON FULL, DIAL SET TO L.F. END AND NO STATION TUNED IN.

VOLTAGE TOLERANCE ± 10%.

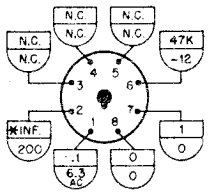
RESISTANCE TOLERANCE ± 20%.

▭ = RESISTANCE MEASUREMENTS.

⬭ = VOLTAGE MEASUREMENTS.

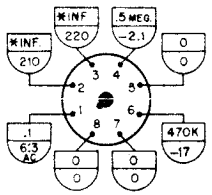


5Y3GT
RECT.

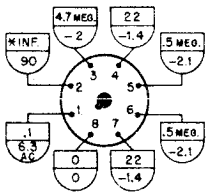


7A4
OSC.

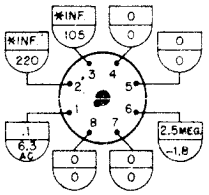
* MAY VARY DUE TO ELECTROLYTIC CAPACITOR C-15 IN CIRCUIT.



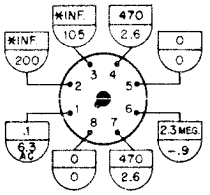
7B5
PW'R. AMP.



7B6
DET.—AVC—A-F



7A7
I-F AMP.



7H7
MIXER

DIAG. NO. 63C75063

BACK VIEW OF CHASSIS

MODELS 65F11, 65F12
Chassis HS-31

GALVIN MFG. CORP.

Refer to Figure 3 for location of adjustment trimmers and cores. Connect output meter across speaker voice coil. (.38V = .05 watt). Volume control set at maximum for all operations. The PHONO-RADIO-TONE switch should be set to RADIO treble position. The adjusting screwdriver or alignment tool should be of the insulated type, such as Motorola Part No. 68A71008.

OPERATIONS IN ORDER	GANG CAPACITOR SET AT	DUMMY ANTENNA	GENERATOR CONNECTED TO	GENERATOR SET AT (400~ 30% MODULATED)	ADJUST TRIMMER OR CORE NO.	AVERAGE MICROVOLT INPUT FOR .38V OUTPUT
1. Align I. F. & diode for maximum	Minimum	.1 mf.	Mixer Grid	455 Kc.	1,2,3 & 4	6 microvolts
2. Set Oscillator trimmer	Minimum	.1 mf.	Mixer Grid	1620 Kc.	5	
3. Peak loop antenna	1400 Kc.	None	Radiation loop*	1400 Kc.	6 (should be repeaked after loop & set are installed in cabinet.)	

* Connect output of signal generator to a 5" diameter 3 turn loop. See Figure 2. With volume control on full, bring loop close enough to receiver loop until an output of 50 milliwatts is obtained. (.38V on output meter). The distance between loops should never be less than 12". Vary distance between generator and receiver loops or adjust generator output to maintain .38V during alignment.

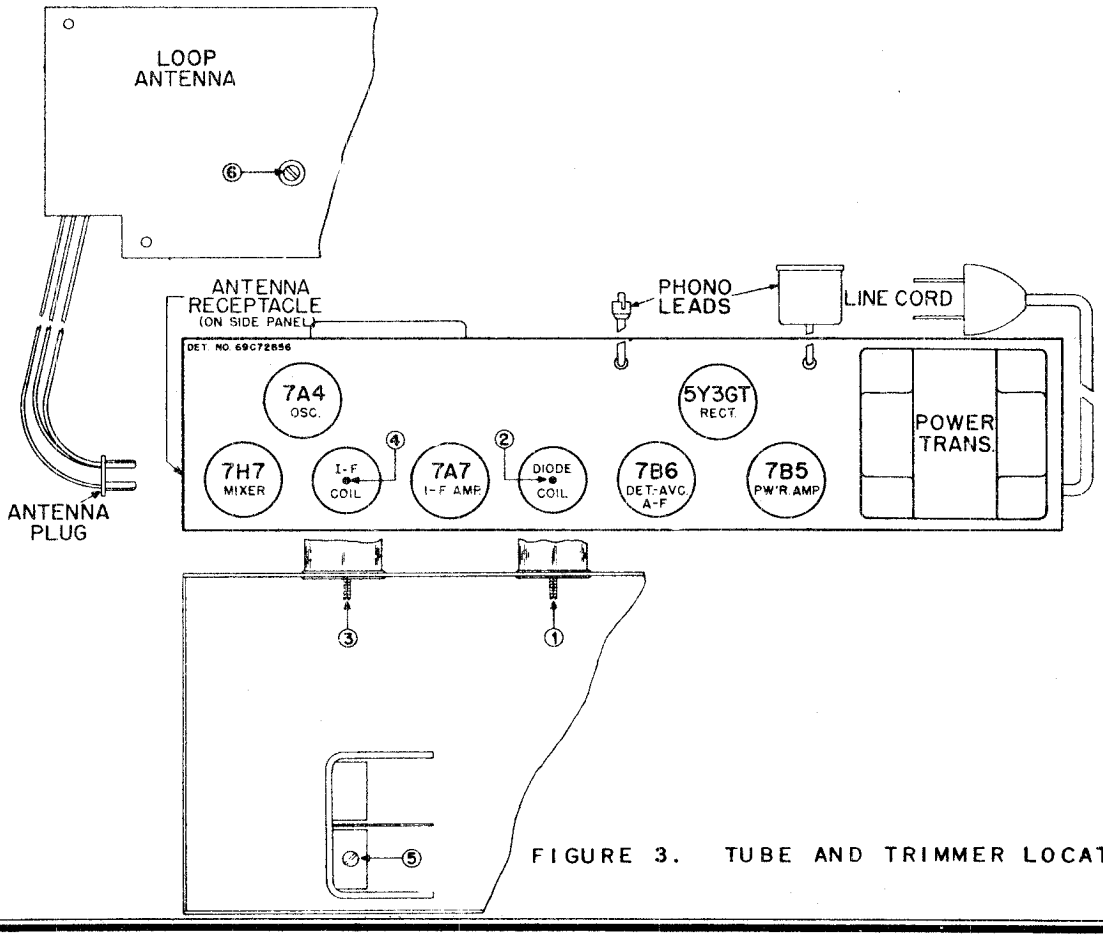


FIGURE 3. TUBE AND TRIMMER LOCATION DETAIL

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MODELS 65F11, 65F12
Chassis HS-31

GALVIN MFG. CORP.

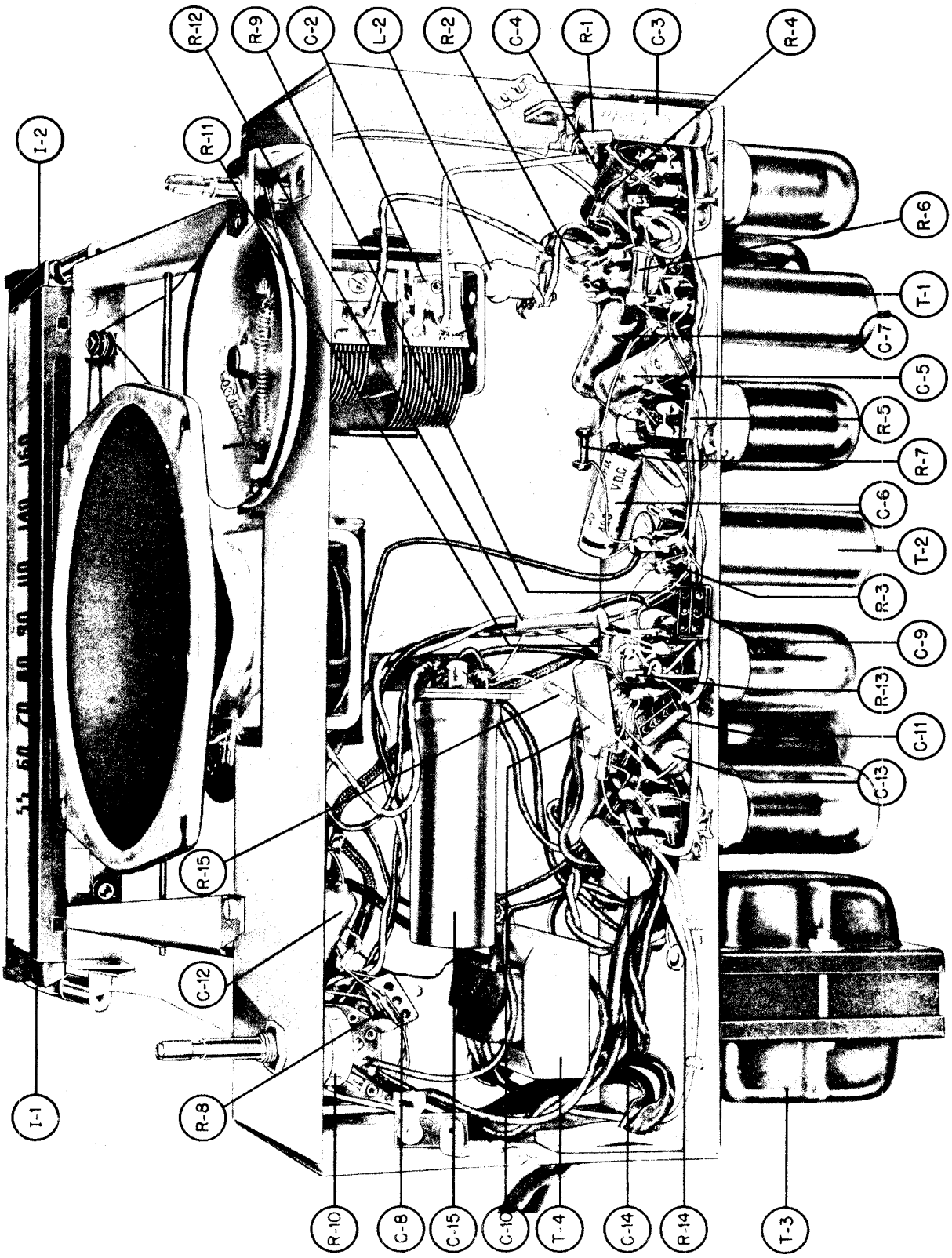

FIGURE 5. CHASSIS BOTTOM VIEW

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MODELS 65F11, 65F12
Chassis HS-31

GALVIN MFG. CORP.

REF. NO.	PART NO.	DESCRIPTION	LIST PRICE
C-1	20A18740	Capacitor, trimmer: 1.5-15 mmf; includes "U" mounting bracket	.35
C-2	1X72533	Capacitor, variable: 2 gang; cut oscillator plates; includes pulley	4.35
C-3	8S9816	Capacitor, fixed: paper; .05 mf. 400V	.20
C-4	8S9816	Capacitor, fixed: paper; .05 mf. 400V	.20
C-5	8S9816	Capacitor, fixed: paper; .05 mf. 400V	.20
C-6	8S9816	Capacitor, fixed: paper; .05 mf. 400V	.20
C-7	8S9816	Capacitor, fixed: paper; .05 mf. 400V	.20
C-8	21R6641	Capacitor, fixed: mica; 100 mmf. 500V	.20
C-9	21R6639	Capacitor, fixed: mica; 500 mmf. 500V	.30
C-10	8S9813	Capacitor, fixed: paper; .005 mf. 600V	.20
C-11	21R6639	Capacitor, fixed: mica; 500 mmf. 500V	.30
C-12	8S9813	Capacitor, fixed: paper; .005 mf. 600V	.20
C-13	8S9816	Capacitor, fixed: paper; .05 mf. 400V	.20
C-14	8S9813	Capacitor, fixed: paper; .005 mf. 600V	.20
C-15	23A27718	Capacitor, electrolytic: 30-30-20 mf/350-300-25V	
or	23X74827	Capacitor, electrolytic: 30-30-20 mf/350-300-25V	2.70
I-1 & I-2	65X10867	Bulb: 6.3V, .25A, tubular bayonet; #44	.15
L-1	24K72585	Loop and Panel Assembly: complete with trimmer, connecting leads and plug (65F11)	3.25
	24K76412	Loop and Panel Assembly: complete with trimmer,, connecting leads and plug. (65F12)	3.25
L-2	24A70547	Coil, B. C. oscillator	1.15
R-1	6R2122	Resistor, fixed: carbon; 4.7 meg 1/2W Ins.	doz. 1.00
R-2	6R6056	Resistor, fixed: carbon; 47,000 1/2W Ins.	doz. 1.00
R-3	6R2122	Resistor, fixed: carbon; 4.7 meg 1/2W Ins.	doz. 1.00
R-4	6R6090	Resistor, fixed: carbon; 470 10% 1/2W Ins.	doz. 1.00
R-5	6R3927	Resistor, fixed: carbon; 2.2 meg 1/2W Ins.	doz. 1.00
R-6	6R6347	Resistor, fixed: carbon; 22,000 10% 1/2W N.I.	doz. 1.20
R-7	6R6053	Resistor, fixed: carbon; 1,000 1/2W N.I.	doz. 1.20
R-8	6R6004	Resistor, fixed: carbon; 1 meg 1/2W Ins.	doz. 1.00
R-9	6R6004	Resistor, fixed: carbon; 1 meg 1/2W Ins.	doz. 1.00
R-10	18A70032	Resistor, variable; 1 meg; with SPST switch	1.10
R-11	6R2122	Resistor, fixed: carbon; 4.7 meg 1/2W Ins.	doz. 1.00
R-12	6R6035	Resistor, fixed: carbon; 270 10% 1W N.I.	each .15 / doz. 1.45
R-13	6R6406	Resistor, fixed: carbon; 22 10% 1/2W Ins.	doz. 1.00
R-14	6R6015	Resistor, fixed: carbon; 220,000 1/2W Ins.	doz. 1.00
R-15	6R6032	Resistor, fixed: carbon; 470,000 1/2W Ins.	doz. 1.00
T-1	24B70545	Transformer, I.F.: 455 kc; complete but less shield and iron core sleeve	2.45
T-2	24B70537	Transformer, diode: 455 kc; complete but less shield and iron core sleeve	2.45
T-3	25C21248	Transformer, power	7.55
T-4	25B21175	Transformer, output	2.85
	1X72531	Bracket & Mounting Plate Assembly: "L" shaped steel bracket and bakelite electrolytic mounting plate	.10
	7371727	Bracket, gang capacitor mounting	.25
	7A14684	Bracket, tuning shaft	.10
	43A76441	Bushing, felt (used on control shafts, between knob and cabinet	.10
	16F71015	Cabinet (65F11)	27.00
	16F76443	Cabinet (65F12)	30.00
	35K72561	Cloth, grille (65F11)	1.00
	35K76444	Cloth, grille (65F12)	1.00
	11M8944	Cord, dial: 18 lb; black	yd. .10
	30K75570	Cord, line: 6 ft. long; with plug	.75
	1X72528	Cord, phono-pick-up; complete with single pin plug	.60
	1X71047	Core & Palnut Assembly (I.F. & diode transformer top tuning iron core and nut)	.20
	1X71048	Core & Clip Assembly (I.F. & diode transformer bottom tuning iron core and clip)	.20
	1X72543	Dial Assembly: complete with 2 mounting brackets, dial plate (painted brown), pointer slider rail, 3 pointer cord pullies and 2 dial light sockets. No glass dial scale or pointer included.	3.30
	13B72476	Escutcheon, dial: brown plastic	1.05
	5A19658	Eyelet: 19/64 x .212 I.D. x 1/2 (gang mounting)	doz. .20
	5A70098	Eyelet: 23/64 x 7/32 I.D. x 1/2 (speaker mounting)	doz. .20
	37K15841	Foot, rubber (cabinet foot)	doz. .25
	13C76344	Grille, cabinet: metal, brass plated (65F12)	2.00
	5A70404	Grommet, rubber (gang capacitor and speaker cushions)	doz. .60

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MODELS 65F11,65F12
Chassis HS-31

GALVIN MFG. CORP.

REF. NO.	PART NO.	DESCRIPTION	LIST PRICE	
	587708	Rivet, steel: .122 x 9/32 nickel plated (line cord lock mounting)	per/c	.50
	5A71246	Rivet, shoulder: .187 long (pointer cord guide pulley mounting)	doz.	.15
	5A13896	Rivet, shoulder: .312 long (pointer cord guide pulley mounting)	doz.	.15
	47A71724	Rod, dial cord guide: steel; 9-3/8 long x 3/32 diameter		.05
	34B71097	Scale, dial: glass		1.10
	3S1317	Screw, steel: #2 x 3/8 Phillips oval head wood screw; bronze finish (dial escutcheon mounting)	doz.	.20
	387506	Screw, steel: #6 x 1/4 PKZ plain hex head; cadmium plated (Osc. coil mounting)	per/c	.50
	387536	Screw, steel: #6 x 3/8 PKA slotted acorn head; antique copper finish (loop mounting)	per/c	.50
	3S2294	Screw, steel: 6-32 x 1/2 plain hex head locking type machine screw; cadmium plated (gang capacitor mounting)	doz.	.15
	387454	Screw, steel: #8 x 1/4 PKZ plain hex head; cadmium plated (gang capacitor bracket mounting)	per/c	.50
	387475	Screw, steel: #8 x 1/4 PKZ slotted acorn head; cadmium plated (power transformer mounting)	per/c	.50
	387512	Screw, steel: #8 x 1/2 PKZ plain hex head; cadmium plated (speaker mounting)	doz.	.15
	387528	Screw, steel: #8 x 1-1/8 PKA slotted hex head; cadmium plated (chassis mounting)	doz.	.15
	387396	Screw, steel: 10-32 x 2" slotted hex head machine screw: copper plated (record changer mounting)	doz.	.25
	47A71722	Shaft, tuning		.15
	55K72558	Hinge, cabinet		.15
	55K72559	Hinge & lid support		.95
	36K74652	Knob, control: bakelite; with white dot (radio-phono-tone knob)		.10
	1K76610 or 1K76611	Knob, control: clear plastic with gold inset (65F11) / Knob, control: brown (65F11) (tuning & volume knobs)		.40
	36K76373	Knob, control (tuning & volume knobs) (65F12)		.40
	32A24815	Lock, line cord: fibre (holds line cord to chassis)	doz.	.25
	487650	Lockwasher: steel; #6 internal; cadmium plated (output transformer mounting)	per/c	.50
	287051	Nut, steel: 3/8-32 x 9/16; Palnut; cadmium plated (phono-radio-tone switch & volume control mounting)	doz.	.15
	9A12705	Plate, electrolytic mounting: bakelite	doz.	.30
	28K71775	Plug, 1 pin (used on phono-pick-up cord)		.10
	28K19871	Plug, 4 pin (loop plug)		.10
	52B71098	Pointer, dial		.20
	49A23980	Pulley, cord: bakelite; 1/4 groove (pointer cord guides)	doz.	.30
	9A30680	Receptacle, 3 prong; less shell (phono-motor power cord receptacle)		.10
	9K28049	Receptacle, 4 prong (loop receptacle)		.10
	587707	Rivet, steel: .122 x 5/32; nickel plated (tube socket mounting; terminal strip mounting; output transformer mounting)	per/c	.50
	587701	Rivet, steel: .122 x 3/16; nickel plated (elect. plate and insulator mounting; tuning shaft bracket mounting)	per/c	.50
	587700	Rivet, steel: .122 x 1/4; nickel plated (loop receptacle mounting)	per/c	.50
	15K74443	Shell, receptacle & plug (used with phono-motor power cord plug and receptacle)		.05
	1A71049	Shield, & Iron Core Sleeve Assembly (I.F. & diode transformer shield with internal iron core sleeve)		.30
	9K72592	Socket, pilot light: with mounting bracket		.25
	9A6771	Socket, tube: octal; saddle type (for rectifier)		.20
	9A72519	Socket, tube: loctal		.20
	50B71731	Speaker: 6" electro; with mounting bracket		8.00
	287087	Speednut: for .093 diameter rods (dial cord guide rod retainer)	per/c	.50
	41A28190	Spring, cushion (top) (record changer mounting)	doz.	.25
	41A21807	Spring, cushion (bottom) (record changer mounting)	per/c	.65
	41A14244	Spring, tension coil (pointer and drive cord tension spring)	doz.	.55
	37K70556	Strip, channel, rubber (dial scale mounting)	doz.	.15
	31K72404	Strip, terminal: 1 small insulated lug (used on loop)	doz.	.50
	31A15433	Strip, terminal: 1 large insulated lug, #2 mounting		.05
	31A71126	Strip, terminal: 3 insulated lugs, #2 ground		.10
	40A71721	Switch, phono-radio & tone		1.15
	4A70015	Washer, "C" (tuning shaft retainer)	per/c	.50
	4S1719	Washer, steel: 3/8 x .140 x .030 thick; cadmium plated (line cord lock mounting)	per/c	.50
	488214	Washer, steel: 7/8 x .203 x .067 thick; cadmium plated (chassis mounting)	doz.	.25
	488204	Washer, steel: 1" x .203 x .067 thick (record changer mounting)	doz.	.25

Prices Subject To Change Without Notice

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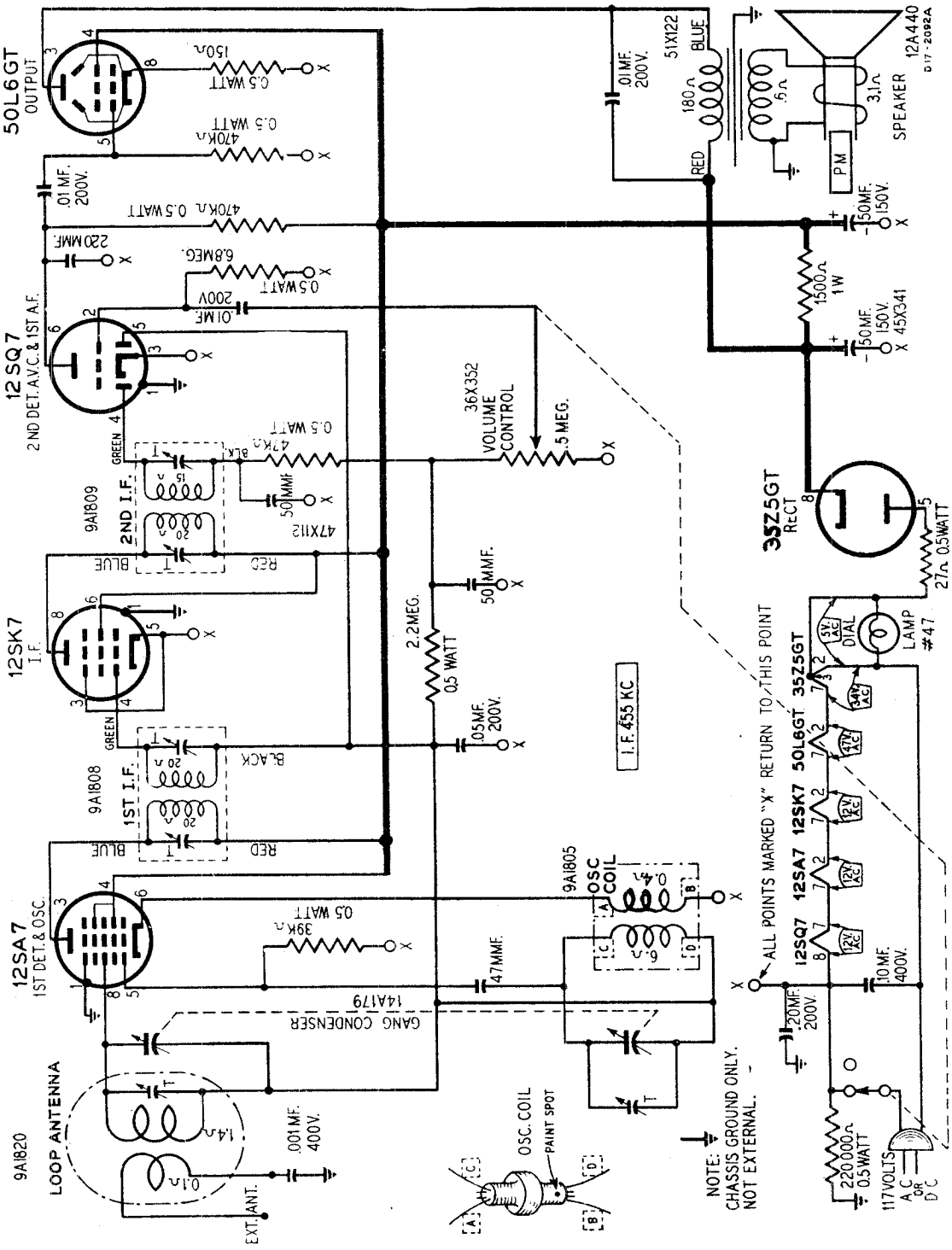

5 Tube Supetheterodyne, including Rectifier Tube
Tuning Frequency Range.....540 to 1600 KC
Power Consumption.....30 watts (At 117 volts AC)
Power Output, 1.5 watt max., .9 watt (10% harmonics)

Selectivity.....55.5 KC Broad at 1000 Times Signal
Intermediate Frequency.....455 KC
Speaker .....5" PM Dynamic
Sensitivity (for .05 watt output with external antenna) .....25 microvolts average

5-46

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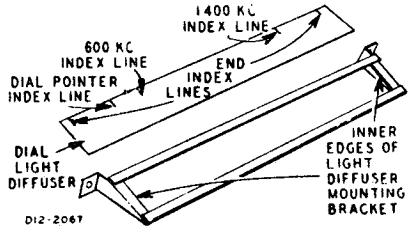
DIAL CALIBRATION

In order to align the receiver, the dial pointer must be positioned on the dial string correctly with reference to the dial. Index lines are provided on the dial light diffuser for this purpose.

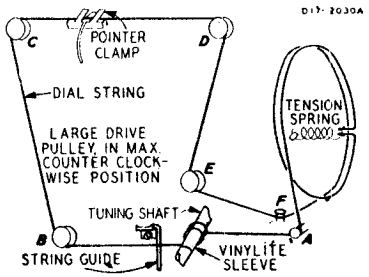
Before aligning the receiver (or when replacing the dial light diffuser) check the position of the diffuser strip, making certain that the two extreme index lines are aligned with the inner edges of the diffuser mounting bracket opening. The bracket should be crimped at one point to prevent movement of the diffuser strip. To position the dial pointer, turn the gang condenser to the fully closed position. The dial pointer should be directly over the dial pointer index line. (See illustration).

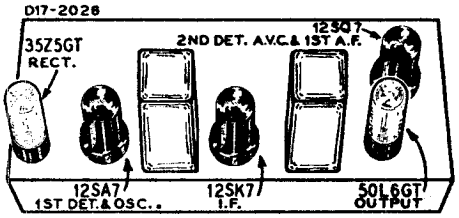
The 600 KC and 1400 KC index lines are for use when aligning the receiver.

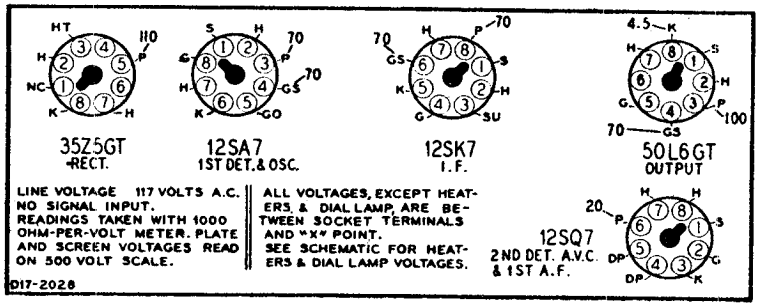


DRIVE CORD REPLACEMENT

Turn gang condenser to fully open position. Use a new drive cord and fasten one end to the tension spring. Fasten the other end of the tension spring to the hook on the drive pulley. Pass the drive cord through the slot in the drive pulley rim and continue over top of pulley (counterclockwise) one-half turn. Pass cord around idler stud A and wind two turns clockwise around tuning shaft, turns must progress away from chassis. Pass cord in front of string guide, around pulley B, over pulleys C, D, E and around idler stud F. Wind cord counterclockwise one and one-half turns around drive pulley in back of previous one-half turn. Pass cord through slot in pulley rim, stretch the tension spring and fasten free end of cord to spring. Refer to the Replacement Parts List for the number of the drive cord assembly for use with this radio.






35Z5GT RECT.
12SA7 1ST DET. & OSC.
12SK7 I.F.
50L6GT OUTPUT
12SQ7 2ND DET. A.V.C. & 1ST A.F.
LINE VOLTAGE 117 VOLTS A.C. NO SIGNAL INPUT. READINGS TAKEN WITH 1000 OHM-PER-VOLT METER. PLATE AND SCREEN VOLTAGES READ ON 500 VOLT SCALE.
ALL VOLTAGES, EXCEPT HEATERS, & DIAL LAMP, ARE BETWEEN SOCKET TERMINALS AND "X" POINT. SEE SCHEMATIC FOR HEATERS & DIAL LAMP VOLTAGES.
D17-2028

ALIGNMENT PROCEDURE

Check dial pointer position, see DIAL CALIBRATION paragraph.

Volume Control—Maximum All Adjustments.

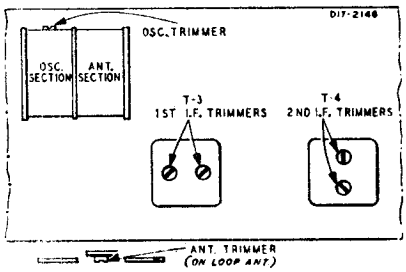
Allow Chassis and Signal Generator to "Heat Up" for several Minutes.

The equipment in column at right is required for aligning:

Signal Generator which will provide an accurately calibrated signal at the test frequencies as listed.

Output Indicating Meter: Non-Metallic Screwdriver.

Dummy Antennas—.1mf., 50 mmf.



NOTE A—Use 1400 KC index line on dial light diffuser. See DIAL CALIBRATION paragraph.

SIGNAL GENERATOR					ADJUST TRIMMERS TO MAXIMUM
FREQUENCY SETTING	ANTENNA CONNECTION	GROUND CONNECTION	DUMMY ANTENNA	CONDENSER SETTING	(See Trimmer Illustration)
455 KC	Control Grid 12SK7—I. F. Prong No. 4	Point "X" 12SK7—I. F. Prong No. 3	.1 mf.	Turn Rotor to full open	2nd I. F. Trimmers
455 KC	Control Grid 12SA7—1st Det. Prong No. 8	Same As Above	.1 mf.	Turn Rotor to full open	1st I. F. Trimmers
1400 KC	Control Grid 12SA7—1st Det. Prong No. 8	Same As Above	.1 mf.	Turn Rotor to 1400 KC See Note A	Oscillator Trimmers
1400 KC	External Antenna Clip On Loop	Chassis	50 mmf.	Turn Rotor to 1400 KC See Note A	Antenna Trimmer

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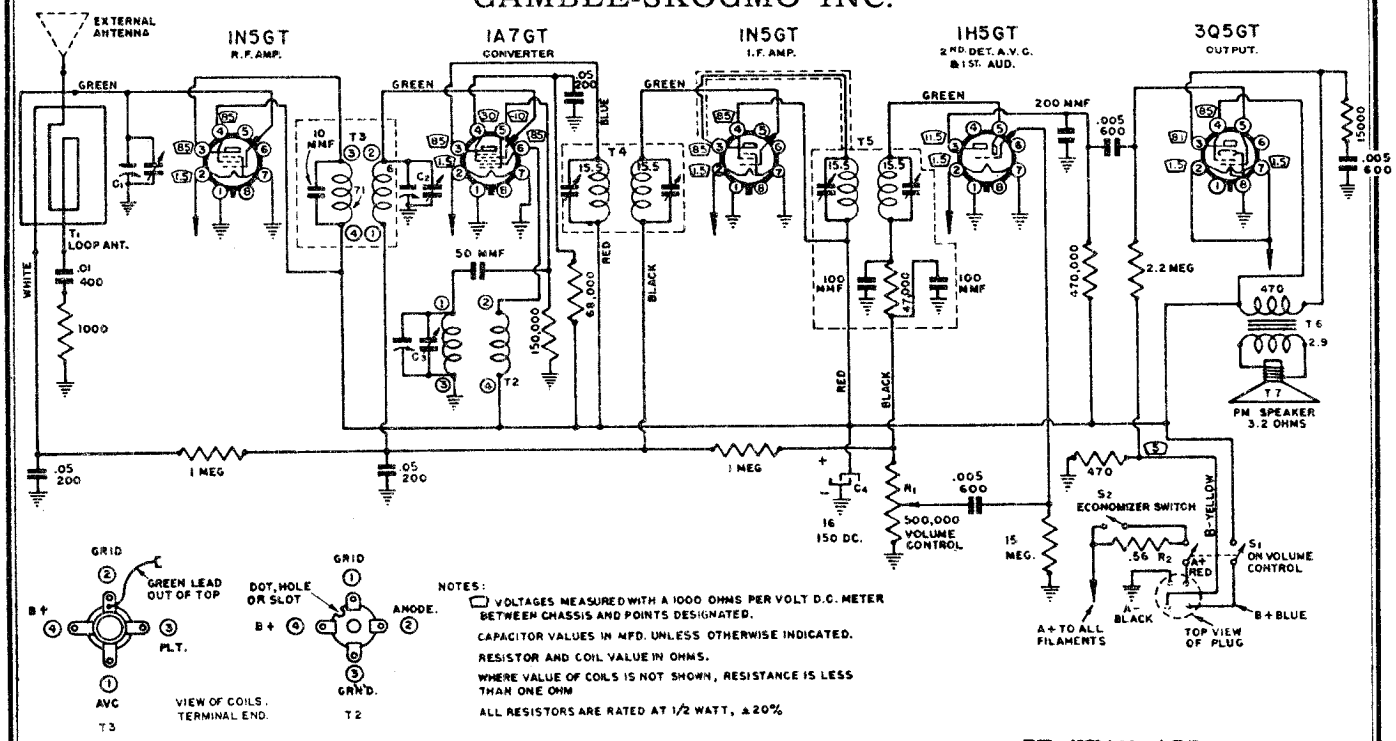
MODEL 43-6451

GAMBLE-SKOGMO INC.



IF PEAK 455 KC

SERVICE PARTS LIST MODEL 43-6451

Order Parts by Model No. and Part No.

Part No.	Name
25296	Adaptor, for use with 2 volt storage battery.
25566	Bearing (for wood pulleys)
25561	Cabinet
25597	Coil, R. F. (T3)
25598	Coil, Oscillator (T2)
25600	Condenser, Electrolytic 16 Mfd, 150 V. (C4)
25592	Condenser—Tuning, 3 Gang, less Tuning Shaft (C1, C2, C3)
25367	Control, Volume, with On-Off Switch (R1)
25811	Cord, Dial, complete with Spring and Pointer Coupling
25696	Knob, Tuning or Volume
25609	Loop (T1)
25612	Plug, Battery Cable 4 Prong
	Pointer, Dial — See "Track-Pointer"
25336	Pulley—Wood
25616	Scale, Dial
25766	Shaft—Tuning with "spool" pulley
25620	Socket—Tube
25593	Speaker 5" P. M. Dynamic (T7) (less Transformer)
25319	Switch, Economizer (S2)
25808	Track, Pointer, complete with Brackets and Pointer
25621	Transformer I. F. Input (T4)
25622	Transformer I. F. Output (T5)
25594	Transformer—Speaker Output (T6)

Reference Numbers such as (C4) are shown on circuit diagram.

Parts not listed above, may be ordered by part number as shown in the picture and by complete description, send a sketch if possible. Order parts from your local Gamble Store.

We cannot supply speaker cones. We can replace or repair a damaged speaker for a nominal price if it is returned to our factory, transportation charges prepaid.

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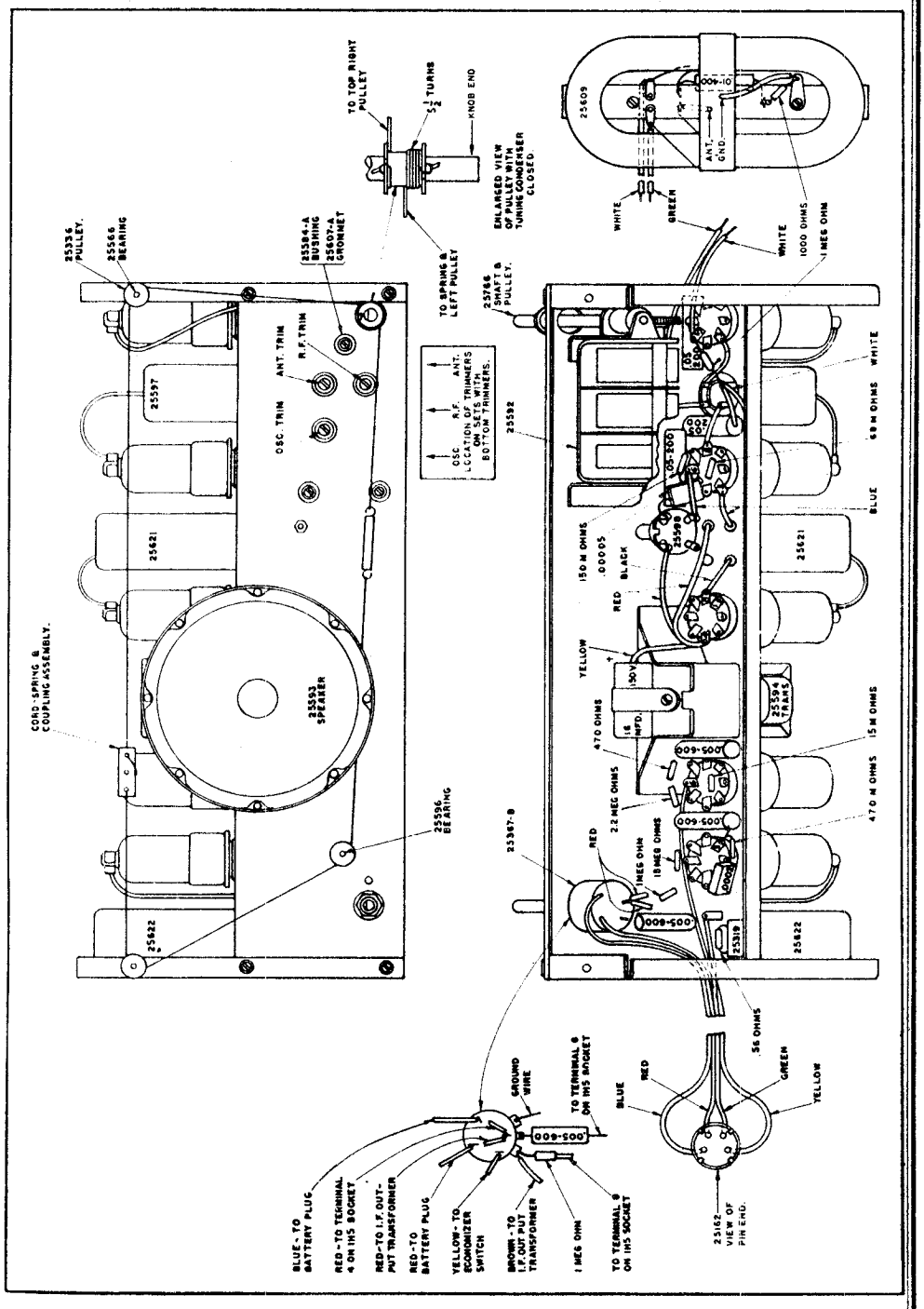
MODEL 43-6451

GAMBLE-SKOGMO INC.

To Properly Align—Remove chassis from cabinet, and align I. F. Transformers in the conventional manner with a test oscillator adjusted to 455 KC, connected to the grid of the 1A7GT through a .1 Mfd condenser, with the tuning condenser set at minimum capacity. To align tuning condenser, connect test oscillator to antenna wire (green) through a .0001 Mfd. condenser. Adjust oscillator trimmer condenser (located on left top) to 1620 KC with tuning condenser at minimum capacity (completely out of mesh). The antenna and R. F. sections are trimmed at 1400 KC. Antenna trimmer is top right; R. F. trimmer is below at right. Dial pointer may be adjusted to scale by slipping bakelite pointer coupling on dial cord.

Battery Unit Voltages—Should be checked with receiver turned on—if B voltage is below 60 Volts, battery unit should be replaced.

Dial Cord Replacement—Is best accomplished by replacing complete cord assembly #25811, which is made up to correct length. In an emergency 30 lb. fish line may be used. See picture of chassis for correct installation.



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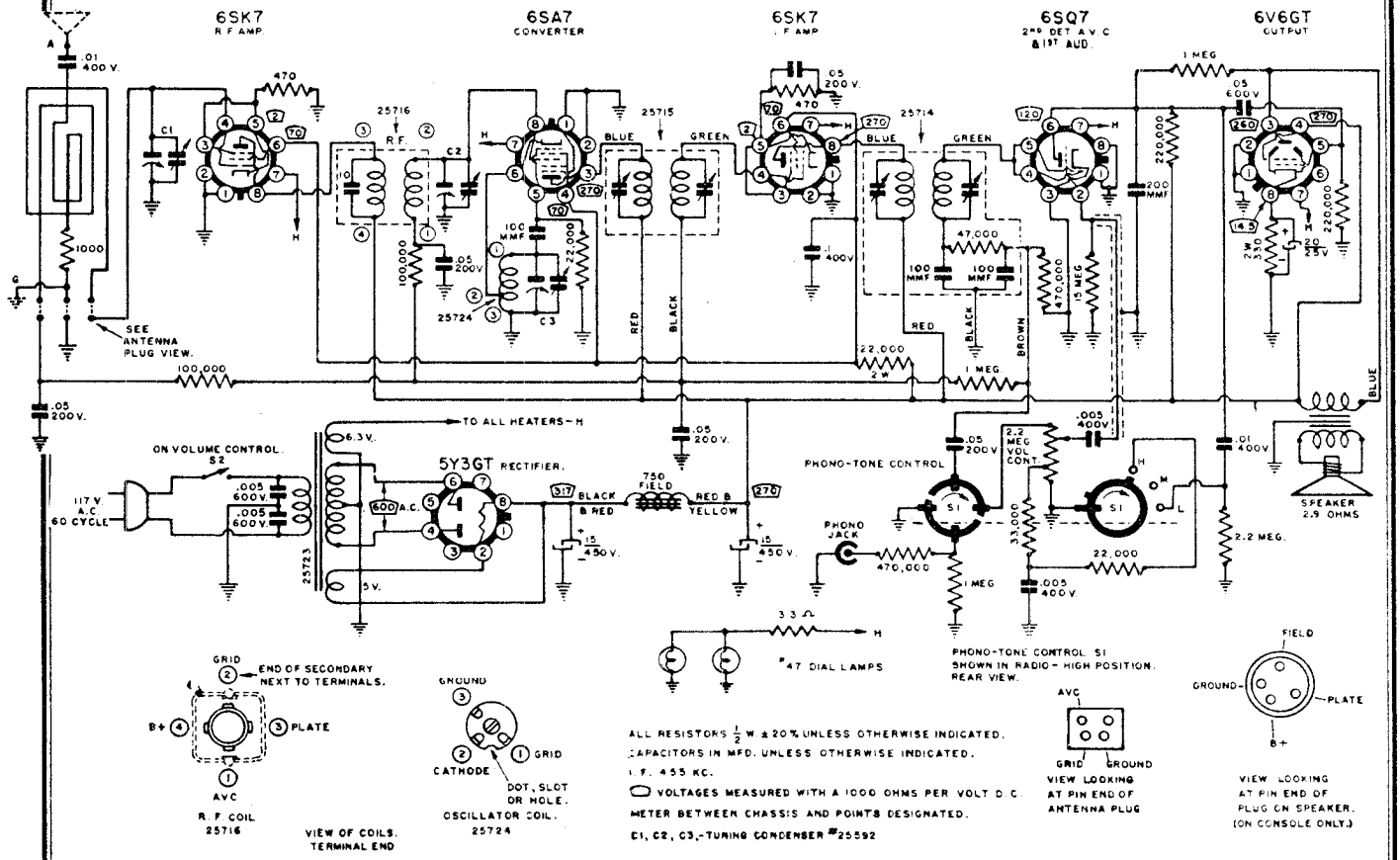
MODEL 43-8685

GAMBLE-SKOGMO INC.


6SK7
R.F. AMP.
6SA7
CONVERTER
6SK7
I.F. AMP
6SQ7
2ND DET. A.V.C. & 1ST AUD.
6V6GT
OUTPUT
5Y3GT RECTIFIER.
TO ALL HEATERS - H
ON VOLUME CONTROL S2
117 V. A.C. 60 CYCLE
PHONO-TONE CONTROL
PHONO JACK
SPEAKER 2.9 OHMS
*47 DIAL LAMPS
PHONO-TONE CONTROL S1 SHOWN IN RADIO - HIGH POSITION. REAR VIEW.
SEE ANTENNA PLUG VIEW.
END OF SECONDARY NEXT TO TERMINALS.
R.F. COIL 25716
VIEW OF COILS. TERMINAL END
OSCILLATOR COIL. 25724
DOT, SLOT OR HOLE.
VIEW LOOKING AT PIN END OF ANTENNA PLUG
VIEW LOOKING AT PIN END OF PLUG ON SPEAKER. (ON CONSOLE ONLY.)
ALL RESISTORS ½ W ± 20% UNLESS OTHERWISE INDICATED.
CAPACITORS IN MFD. UNLESS OTHERWISE INDICATED.
I.F. 455 KC.
VOLTAGES MEASURED WITH A 1000 OHMS PER VOLT D.C. METER BETWEEN CHASSIS AND POINTS DESIGNATED.
C1, C2, C3,-TUNING CONDENSER #25592

REMOVAL OF CHASSIS—Disconnect set from wall plug. Remove knobs by pulling straight out. Remove loop plug on back of chassis. Remove two screws under cabinet, chassis may be withdrawn from rear.

ALIGNMENT—Sets are properly aligned at the factory with precision equipment and the adjustments should not be disturbed unless a coil, tuning condenser or IF transformer has to be replaced or the set has been subject to damage or tampering. Alignment should only be done with the aid of an accurate signal generator and output indicating instrument.

TO PROPERLY ALIGN—Remove chassis from cabinet, and align I. F. Transformers in the conventional manner with a Signal Generator adjusted to 455 KC, connected to the grid of the 6SA7 through a .1 Mfd. condenser, with the tuning condenser set at minimum capacity. To align tuning condenser, carefully place loop in normal relation to chassis, connect Signal Generator to antenna clip through a .0001 Mfd. condenser. Adjust oscillator trimmer condenser (located on left top) to 1620 KC with tuning condenser at minimum capacity (complete out of mesh). The antenna and R. F. sections are trimmed at 1400 KC. Antenna trimmer is top right; R. F. trimmer is below at right. Dial pointer may be adjusted to scale by slipping pointer coupling on dial cord.

DIAL CORD REPLACEMENT—Is best accomplished by replacing complete cord assembly No. 25834 which is made up to correct length. In an emergency 30 lb. fish line may be used. See picture of chassis for correct installation.

DIAL SCALE REPLACEMENT—Remove chassis. Remove pointer track by removing the two wood screws holding it to the cabinet. Dial scale may now be lifted out from front of cabinet. When installing new scale —see that long screws in track bracket engage the notches in the ends of the scale.

DESCRIPTION

This radio is an AC operated superheterodyne set. It is designed for use on the usual home lighting service of 110 - 120 volts 50 - 60 cycles.

The set contains a built-in loop antenna (aerial) and will receive stations on the standard broadcast band, 535 - 1620 kilocycles.

This radio combines many desirable features such as: Oversize eight inch Electro-dynamic speaker for excellent tone; Bass "boost" to give "rich" reproduction at normal volume; Three gang tuning condenser for better selectivity; High efficiency circuit for minimum cost of operation and maintenance.

INSTALLATION

TUBES—All the tubes are properly mounted in their sockets when the set is shipped. There is a possibility, however, that the tubes have worked loose during shipment. Press each tube firmly into its socket.
POWER—Be sure that your home is supplied with current that is within the voltage and frequency ratings given above.

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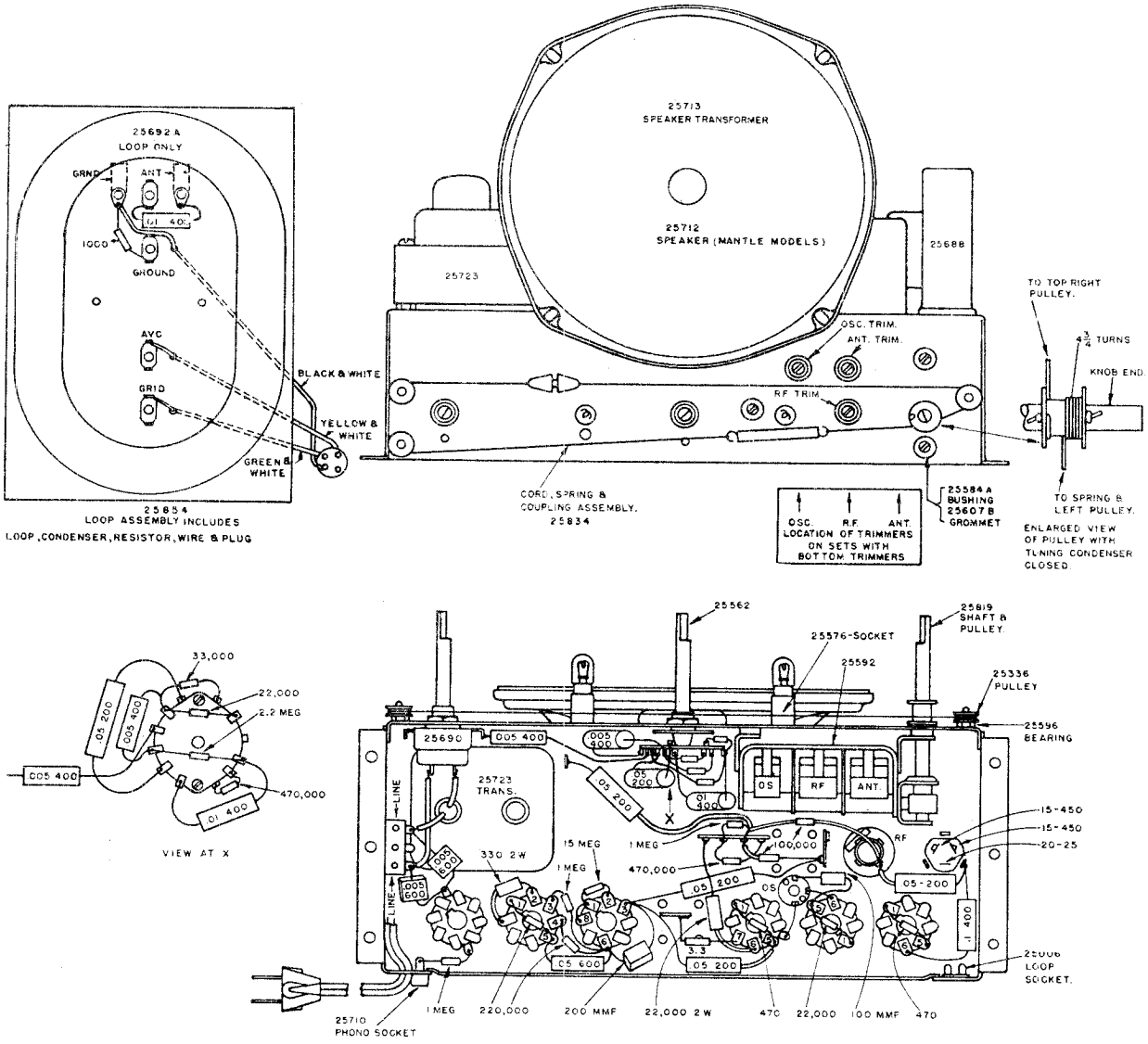
GAMBLE-SKOGMO INC.



SERVICE PARTS LIST

MODEL 43-8685

When ordering parts always mention complete factory model number, series and issue.

Part No.	Description
25692	Antenna—Loop
25596	Bearings—For Wood Pulleys
25572	Bracket—Tuning Condenser—Front
25573	Bracket—Tuning Condenser—Rear
25574	Bracket—Speaker
25765	Bracket—Pointer Track
25660	Cabinet
25597	Coil—R. F.
25724	Coil—Oscillator
25688	Condenser—Filter 15-450, 15-450, 20-25
25592	Condenser—Tuning C-1, C-2, C-3
25690	Control—Volume (with AC Switch S-2)
25068	Cord—AC and Plug
25834	Cord—Dial (includes Spring and Pointer Coupling)
25751	Dial Scale—Glass
25578	Dial Pointer
25829	Knob—Tone
25696	Knob—Volume and Tuning
25710	Phono—Pick-Up Socket
25693	Plug—For Loop

Part No.	Description
25336	Pulley—Wood—Small
25819	Pulley—Manual Drive With Shaft
25607	Rubber—Grommets
25774	Screw—Set For Worm Gear (Tuning Condenser)
25576	Socket—Dial Lamp
25620	Socket—Octal
25006	Socket—For Loop
25712	Speaker—With Transformer
25562	Switch—Tone S-1,
25711	Track—Pointer
25715	Transformer—I. F. Input
25714	Transformer—I. F. Output
25713	Transformer—Output—Speaker
25723	Transformer—Power 60 Cycles

Note: Resistors and condensers not listed will be supplied on order—specify value.
We cannot supply speaker cones. We can replace or repair a damaged speaker for a nominal price if it is returned to our factory, transportation charges prepaid.

In ordering any part not listed give complete description and a sketch, if possible.

Order parts from your local Gamble Store.

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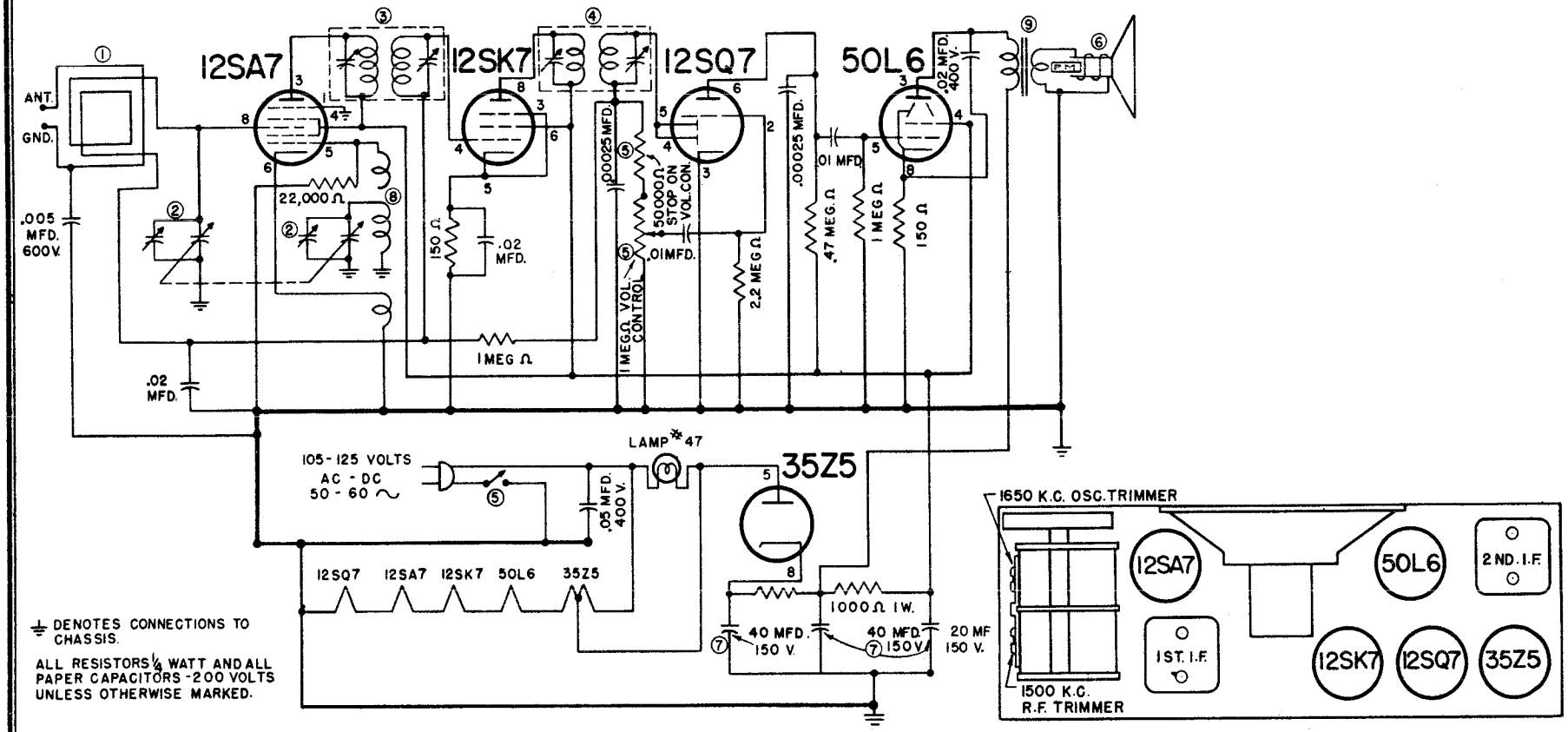

I.F. = 455 K.C.

① 1.403 LOOP ASSEMBLY
② 2.163 2GANG VARIABLE COND.
③ 1.259 1 ST. I.F. TRANSFORMER
④ 1.409 2 ND. I.F. TRANSFORMER
⑤ 8.200-1 VOLUME CONTROL & SWITCH
⑥ 30,300 P.M. 5" SPEAKER
⑦ 5.400-8 ELECTROLYTIC CAP. 40-40-20 MFD.
⑧ 1.402 OSCILLATOR COIL
⑨ 9.200 OUTPUT TRANSFORMER

TRIMMER AND TUBE LOCATION DIAGRAM

POWER CONSUMPTION: 30 Watts.

ALIGNMENT: Should it become necessary at any time to check the alignment of this receiver, proceed as follows:

(1) Set the Signal Generator to 455 KC and connect to the stator lug on the rear section of the Variable Capacitor. Connect the Signal Generator Ground lead to the chassis. Connect a suitable output meter across the Speaker Voice Coil Connections. Turn the Volume Control to the maximum position. Turn the Variable Capacitor to the extreme clockwise position.

(2) Adjust the trimmers located at the top of the first and second I. F. Transformers for maximum output as indicated on the Output Meter.

(3) Loosely couple the Signal Generator lead to the Loop and set to 1650 KC.

(4) With the Variable Capacitor set at the extreme clockwise position, tune in the 1650 KC signal by means of the Oscillator Trimmer on the Variable Capacitor (front section).

(5) Set the Signal Generator to 1500 KC and turn the Tuning Control so that this frequency is indicated on the dial. Adjust the Antenna Trimmer on the Variable Capacitor (rear section) for maximum output. No other adjustments are necessary.

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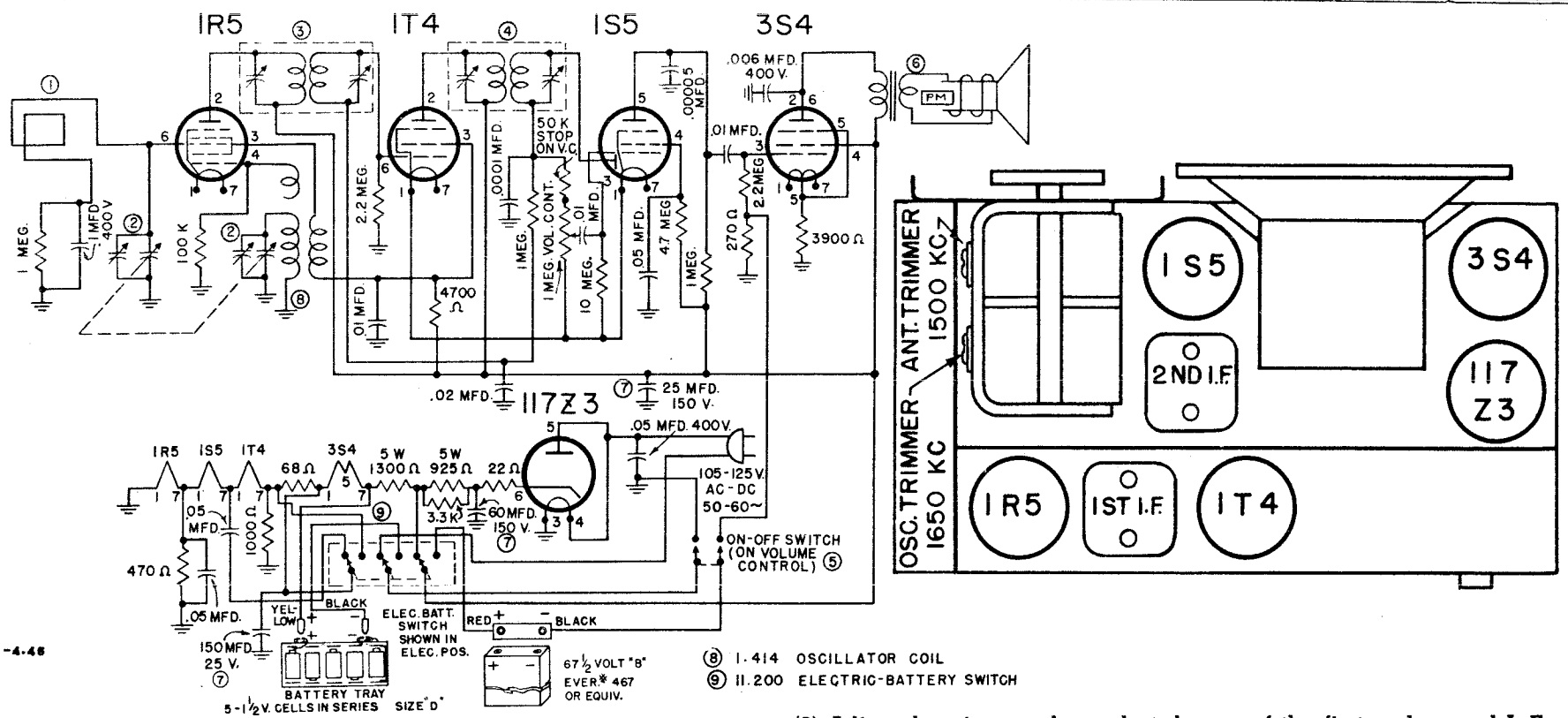

-4-46

ALL RESISTORS ¼ WATT AND ALL PAPER CAPACITORS 200 VOLTS UNLESS OTHERWISE MARKED.

K = KILOHMS

I.F. = 455 K C.

① 1-405 LOOP ANTENNA
② 2-203 2GANG VARIABLE CONDENSER
③ 1-412 1ST I.F. TRANSFORMER
④ 1-413 2ND I.F. TRANSFORMER
⑤ 8.200-2 VOLUME CONTROL & SWITCH
⑥ 30.302 3½" P.M. SPEAKER
⑦ 5.400-3 ELECTROLYTIC CAP. 60-25-150 MFD.
⑧ 1-414 OSCILLATOR COIL
⑨ 11.200 ELECTRIC-BATTERY SWITCH

ALIGNMENT (Electric Operation) Receiver removed from cabinet. Should it become necessary at any time to check the alignment of this receiver, proceed as follows:

(1) Set the Signal Generator to 455 KC and connect to the stator lug (front section) of the Variable Capacitor. Extend Loop leads and connect to Loop contacts inside top of cabinet. Connect the Signal Generator ground lead to the chassis. Connect a suitable output meter across the Speaker Voice Coil Connections. Turn the Volume Control to the maximum position. Turn the Variable Capacitor to the extreme counter-clockwise position (minimum capacity).

(2) Adjust the trimmers located at the top of the first and second I. F. Transformers for maximum output as indicated on the output meter.

(3) Loosely couple the Signal Generator lead to the Loop (open position) and set to 1650 KC.

(4) With the Variable Capacitor set at the extreme counter-clockwise position (minimum capacity), tune in the 1650 KC signal by means of the Oscillator Trimmer on the Variable Capacitor (rear section).

(5) Set the Signal Generator to 1500 KC and turn the Tuning Control so that this frequency is indicated on the dial. Adjust the Antenna Trimmer on the Variable Capacitor (front section) for maximum output.

(6) Install the chassis into the cabinet and check the dial calibration. If further adjustment is required, remove the two plug buttons on the side of the cabinet adjacent to the Variable Capacitor and adjust the Oscillator Trimmer as required for correct dial calibration. Readjust the Antenna Trimmer for maximum output and replace plug buttons.

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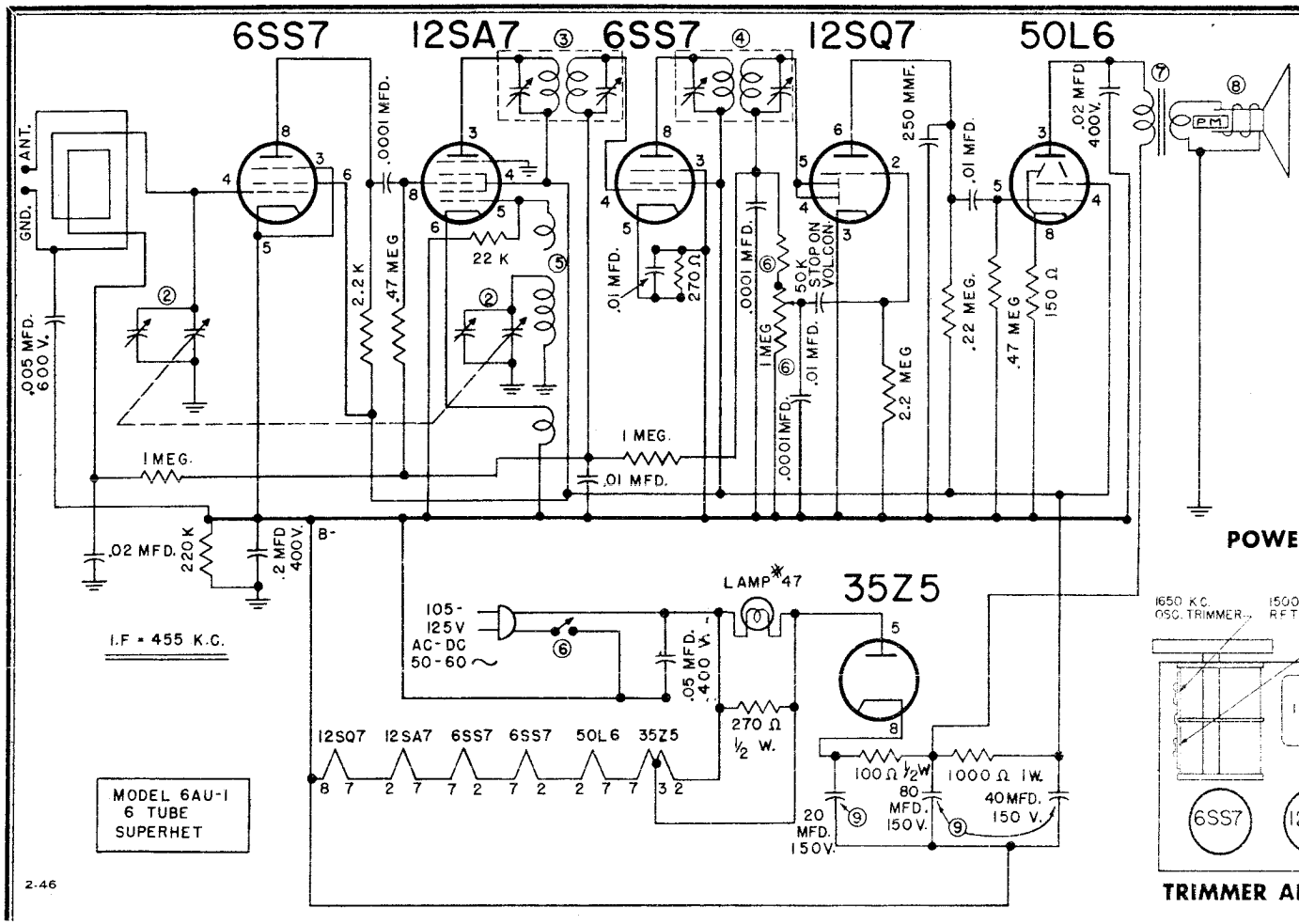
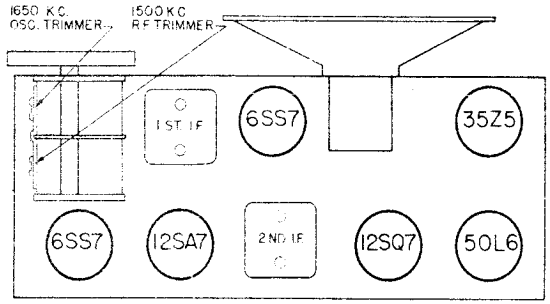


⏚ DENOTES CONNECTIONS TO CHASSIS.

ALL RESISTORS 1/4 WATT AND ALL PAPER CAPACITORS - 200 VOLTS UNLESS OTHERWISE MARKED.
K = KILOHMS

① 1.411 LOOP ASSEMBLY
② 2.163 2 GANG VARIABLE COND.
③ 1.259 1 ST. I.F. TRANSFORMER
④ 1.409 2ND. I.F. TRANSFORMER
⑤ 1.402-1 OSCILLATOR COIL
⑥ 8.200 VOLUME CONT. & SWITCH
⑦ 9.200 OUTPUT TRANSFORMER
⑧ 30.300 5" P.M SPEAKER
⑨ 5.400-7 ELECTROLYTIC CAPACITOR - 80 - 40 - 20 MFD.

POWER CONSUMPTION: 30 Watts.



TRIMMER AND TUBE LOCATION DIAGRAM

ALIGNMENT: Should it become necessary at any time to check the alignment of this receiver, proceed as follows:

Set the Signal Generator to 455 KC and connect to the grid of the 6SS7 R. F. Amplifier, or to the Stator Lug on the rear section of the Variable Capacitor. Connect the Signal Generator Ground Lead to a "—B" point underneath the chassis. Connect a suitable output meter across the Speaker Voice Coil Connections. First turn the Volume Control to the maximum position. Turn the Variable Capacitor to the extreme clockwise position.

Adjust the trimmers located at the top of the first and second I. F. Transformers for maximum output as indicated on the Output Meter.

Loosely couple the Signal Generator lead to the Loop and set to 1650 KC.

With the Variable Capacitor set at the extreme clockwise position, tune in the 1650 KC signal by means of the Oscillator Trimmer on the Variable Capacitor (front section).

Set the Signal Generator to 1500 KC and turn the Tuning Control so that this frequency is indicated on the dial. Adjust the Antenna Trimmer on the Variable Capacitor (rear section) for maximum output. No other adjustments are necessary.

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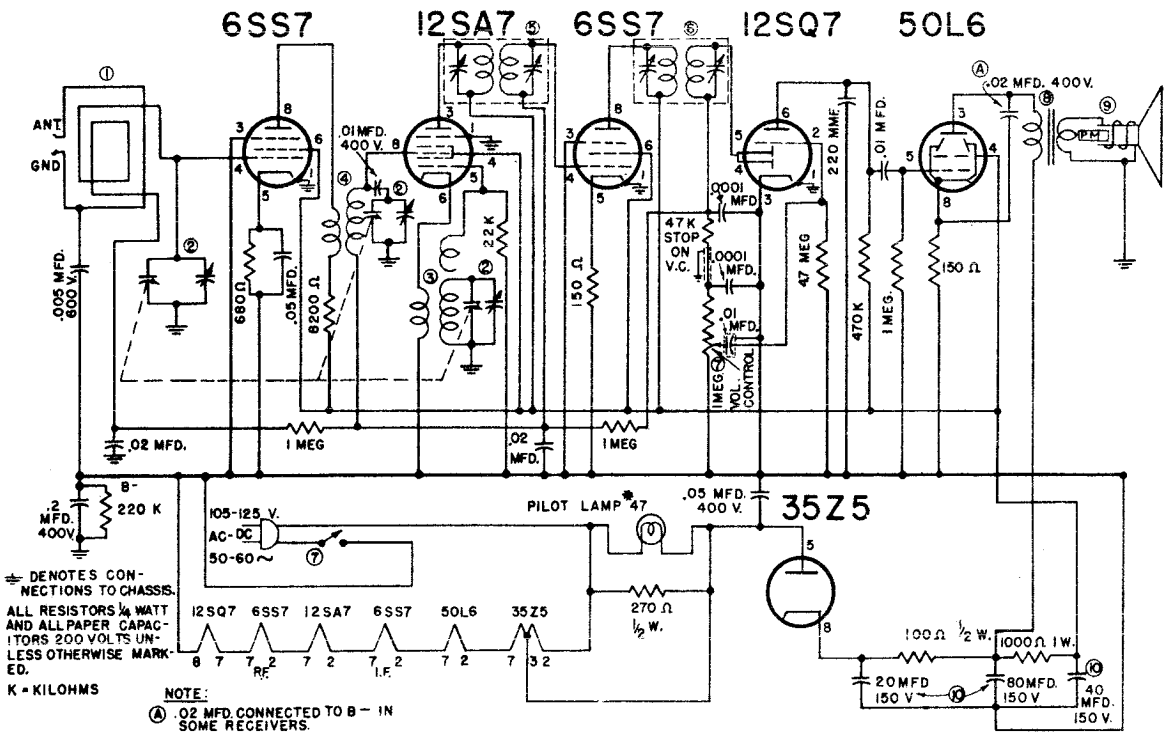


① 1.421 LOOP ANTENNA ASSEMBLY
② 2.201 3 GANG VARIABLE CAPACITOR
③ 1.402-1 OSCILLATOR COIL
④ 1.420 R.F. INTERSTAGE COIL
⑤ 1259 1 ST. I.F. TRANSFORMER
⑥ 1.409 2 ND I.F. TRANSFORMER
⑦ 8.200-4 VOLUME CONTROL & SWITCH
⑧ 9.200 OUTPUT TRANSFORMER
⑨ 30.300 5" P.M. SPEAKER
⑩ 5.400-7 ELECTROLYTIC CAP. 80-40-20 MFD.

(1) Set the Signal Generator to 455 KC and connect to the grid of the 6SS7 R. F. Amplifier, or to the Stator Lug on the rear section of the Variable Capacitor. Connect the Signal Generator Ground Lead to a "−B" point underneath the chassis. Connect a suitable output meter across the Speaker Voice Coil Connections. Turn the Volume Control to the maximum position. Turn the Variable Capacitor to the extreme clockwise position (minimum capacity).

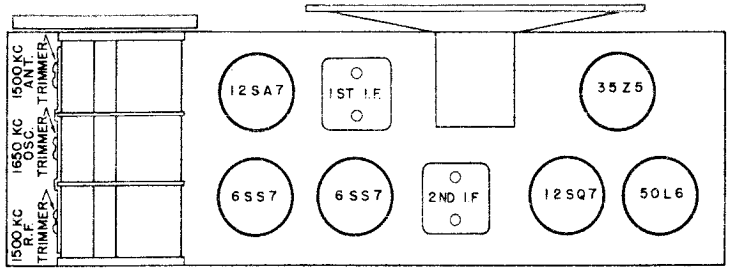
(2) Adjust the trimmers located at the top of the first and second I. F. Transformers for maximum output as indicated on the Output Meter.

(3) Loosely couple the Signal Generator lead to the Loop and set to 1650 KC.

(4) With the Variable Capacitor set at the extreme clockwise position, tune in the 1650 KC signal by means of the Oscillator Trimmer on the Variable Capacitor (middle section).

(5) Adjust the R. F. Trimmer (rear section) and the Antenna Trimmer (front section) on the Variable Capacitor for maximum output. No other adjustments are necessary.

POWER CONSUMPTION: 30 Watts. 8-46



TUNING RANGE: Broadcast: 540 to 1650 Kilocycles (180 to 555 meters).

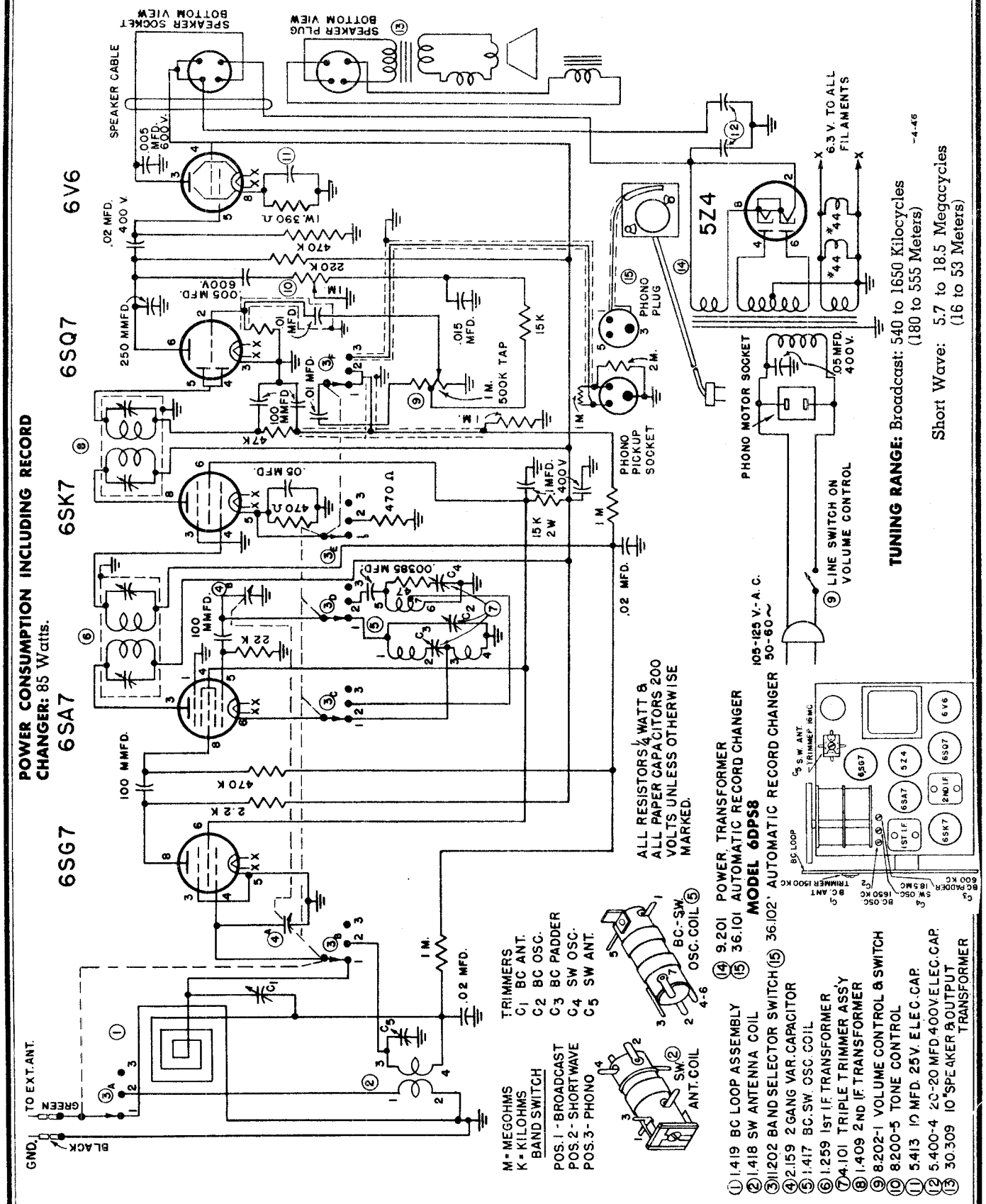
DIAL: The Dial Scale is calibrated in Kilocycles times 10.

TUBES: The tubes used, and their functions, are as follows:

6SS7 R. F. Amplifier	12SQ7 Detector, Avc and Audio Amp.
12SA7 Converter	50L6GT Beam Power Amplifier
6SS7 I. F. Amplifier	35Z5GT Rectifier

MODELS 6DPS, 6DPS8

GAROD ELECTRONICS CORP.



① 1.419 BC LOOP ASSEMBLY
② 1.418 SW ANTENNA COIL
③ 11.202 BAND SELECTOR SWITCH
④ 2.159 2 GANG VAR. CAPACITOR
⑤ 1.417 BC. SW. OSC. COIL
⑥ 1.259 1ST I.F. TRANSFORMER
⑦ 4.101 TRIPLE TRIMMER ASS'Y
⑧ 1.409 2ND I.F. TRANSFORMER
⑨ 8.202-1 VOLUME CONTROL & SWITCH
⑩ 8.200-5 TONE CONTROL
⑪ 5.413 10 MFD. 25 V. ELEC. CAP.
⑫ 5.400-4 20-20 MFD 400 V. ELEC. CAP.
⑬ 30.309 10" SPEAKER & OUTPUT TRANSFORMER
⑭ 9.201 POWER TRANSFORMER
⑮ 36.101 AUTOMATIC RECORD CHANGER

MODEL 6DPS8

36.102 AUTOMATIC RECORD CHANGER

Record Changer: Seeburg Model K

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"clarified schematics"

MODELS 6DPS, 6DPS8

GAROD ELECTRONICS CORP.

Realignment of this receiver should not be attempted unless all other possible causes have been thoroughly investigated. An accurately calibrated signal generator, which will cover the necessary bands, and an output meter for indicating the effect of adjustments are required.

During the alignment procedure, all adjustments should be made under the following conditions (refer to Trimmer and Tube Location Diagram below for trimmer location):

(a) Line voltage as indicated on instruction sheet.
(b) Volume Control at maximum position.
(c) Tone Control at extreme left position (brilliant).
(d) Minimum input from signal generator. This procedure should be adhered to, otherwise adjustments will be broad, due to the action of the automatic volume control.

BROADCAST *(Band Switch in extreme left position)*

I. F. Adjustment:

(1) Set the signal generator to 455 KC and connect to the lower side of the Loop Antenna Trimmer through a .1 MFD capacitor. Connect the signal generator ground lead to the chassis. Connect a suitable output meter across the speaker voice coil connections. Turn the Variable Capacitor to the extreme clockwise position (minimum capacity).

(2) Adjust the trimmers located at the top of the first and second I. F. Transformers for maximum output as indicated on the output meter.

BC. R. F. Adjustment: It is desirable to align this band on the loop.

(1) Couple the signal generator to the receiver loop by means of a two or three turn loop.

(2) With the Variable Capacitor set at the extreme clockwise position (minimum capacity), tune in the 1650 KC signal by means of the broadcast oscillator trimmer (C2).

(3) Set the signal generator to 1500 KC and turn the Tuning Control so that this frequency is indicated on the dial. Adjust the Antenna Trimmer (C1) on the loop for maximum output.

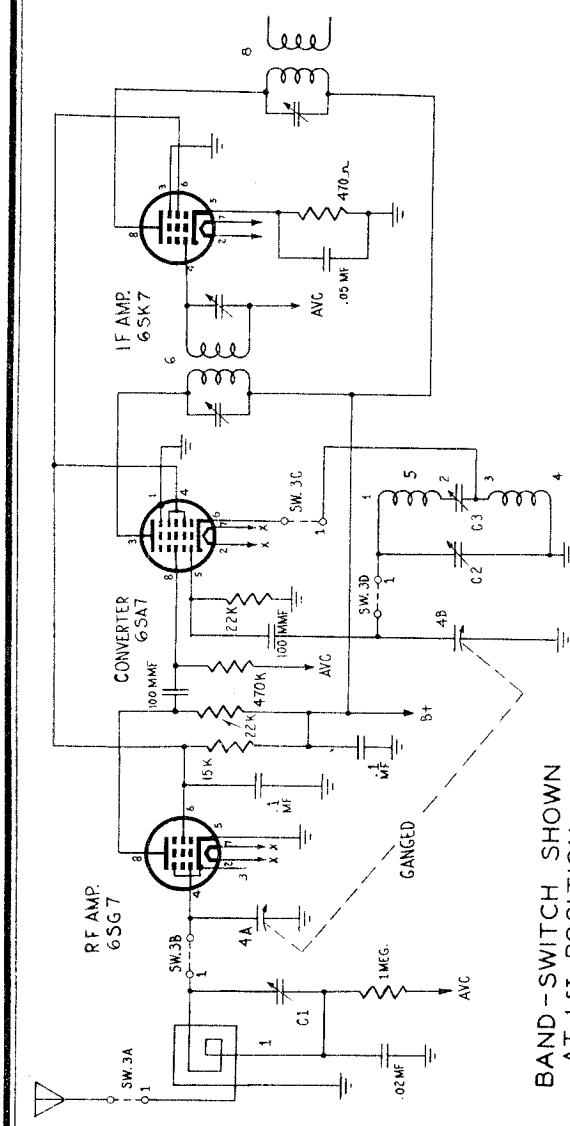
(4) Set the signal generator to 600 KC and turn the Tuning Control so that this frequency is indicated on the dial. Adjust the broadcast oscillator padder capacitor (C3) for maximum response while "rocking" the Variable Capacitor. Recheck the 1500 KC high frequency adjustment trimmer (C1).

SHORT WAVE *(Band Switch in the middle position)*

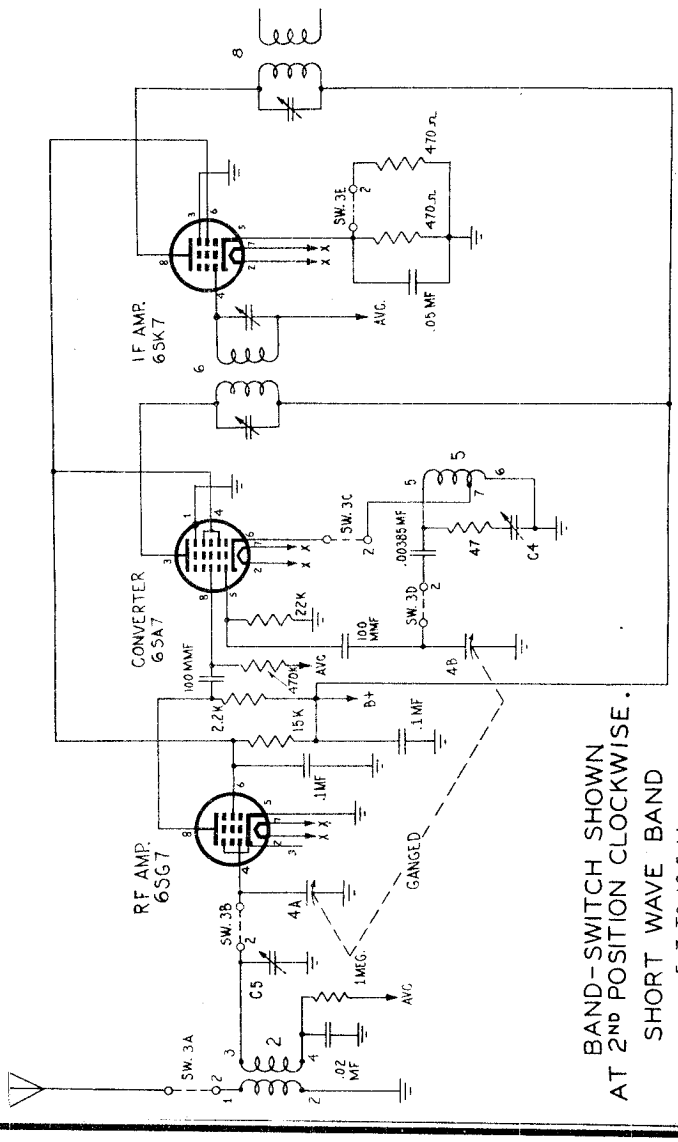
(1) Connect the signal generator through a standard short wave dummy antenna to the antenna (green wire) and the ground lead to the chassis of the receiver. Set the signal generator to 18.5 MC.

(2) With the Variable Capacitor set at the extreme clockwise position (minimum capacity), tune in the 18.5 MC signal by means of the S. W. oscillator trimmer (C4).

(3) Set the signal generator to 16 MC and turn the tuning control so that this frequency is indicated on the dial. Adjust the Antenna Trimmer (C5) on the short wave coil for maximum output while rocking the Variable Capacitor from left to right for maximum output. No other adjustments are necessary.



BAND-SWITCH SHOWN AT 1 ST POSITION. BROADCAST BAND 540 TO 1650 KC



BAND-SWITCH SHOWN AT 2ND POSITION CLOCKWISE. SHORT WAVE BAND 5.7 TO 18.5 Mc.

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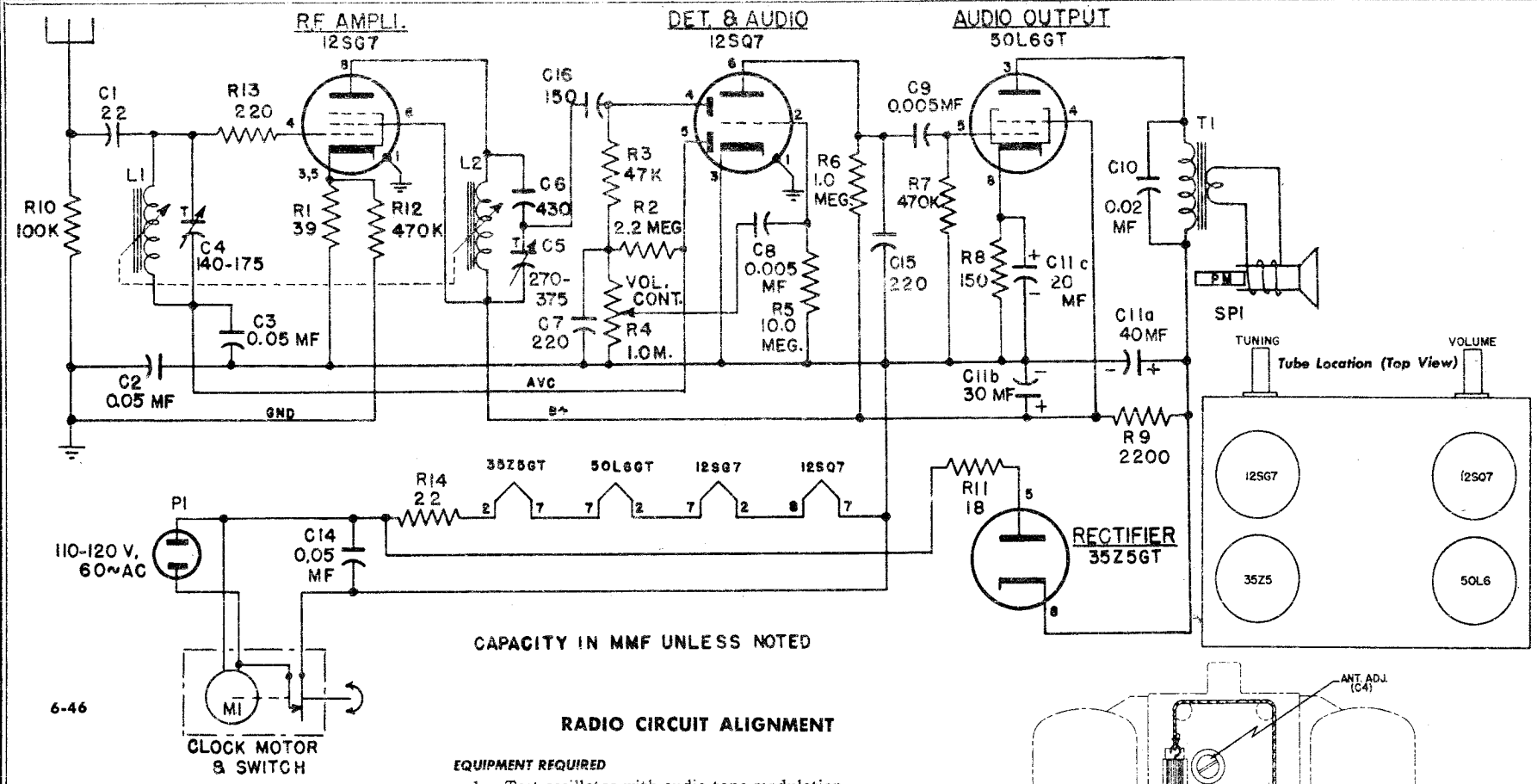

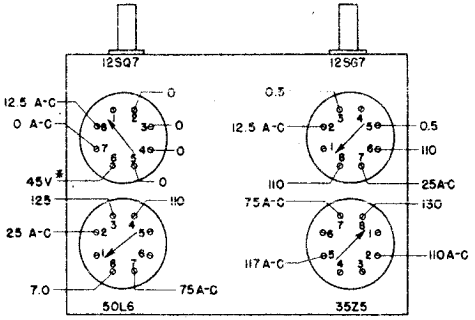

*Measured with 20,000 ohm/volt meter

Fig. 4. Socket Voltages (Bottom View)

RADIO CIRCUIT ALIGNMENT

EQUIPMENT REQUIRED

1. Test oscillator with audio tone modulation.
2. A-C output meter, 1½ volts full scale.
3. 100 mmf. mica capacitor.
4. Insulated screwdriver.

PROCEDURE

1. Connect test oscillator through 100 mmf. to antenna lead; connect output meter across the loudspeaker voice coil leads.
2. Turn dial pointer as far clockwise as it will go.
3. Set test oscillator to 1620 kc with tone modulation. Keeping the radio volume control set for maximum and attenuating test oscillator so that the output meter reading never exceeds 1¼ volts, trim antenna (C4) and RF (C5) trimmers for maximum output.
4. Set test oscillator to 580 kc with tone modulation. While rocking tuning control in vicinity of this dial calibration, adjust tracking adjustment platform up or down to give maximum output meter reading.
5. Recheck 1620 calibration adjustment. If RF (C5) trimmer has to be changed appreciably for maximum output, recheck step 4.

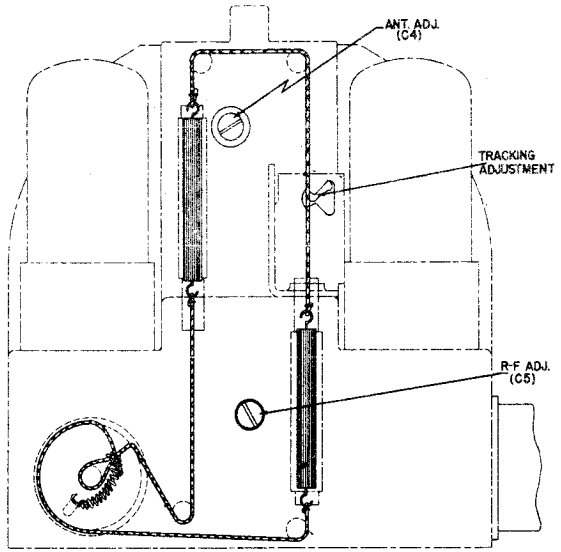

Fig. 1. Drive Stringing and Trimmer Location

GENERAL ELECTRIC CO.

MODEL 50 ----- Mounting Screws.

To meet Underwriters requirements, the Model 50 chassis must be mounted in its cabinet with non-standard screws that cannot be removed with tools that are generally available to non-technical customers. We have been using spanner-head screws to meet this requirement.

Because our stock became exhausted due to the scarcity of these screws, we have temporarily used a standard Phillips-head screw to mount this radio in the cabinet, and then fill the screw head with solder. Radios mounted in this way may be easily removed from their cabinet by heating the screw head with a soldering iron until the solder becomes liquid enough to permit the insertion of a standard Phillips head screwdriver. CAUTION - Care should be exercised not to apply too much heat as it may damage the cabinet.

MODEL 50 ----- Rectifier 35W4 Substitution.

To overcome a shortage of 35Z5GT tubes, for a large portion of the Model 50 production we have had to substitute the miniature 35W4 rectifier tube. This tube has similar characteristics to the 35Z5GT, however it requires a miniature tube socket. This socket is adapted to the regular chassis hole by an adapter plate.

If it is desired to change a 35W4 for a 35Z5GT, it is only necessary to drill out the 35W4 socket adapter plate and substitute an octal base socket.

MODEL 50 ----- Time Set Incorrect.

Customer complaints of alarm set errors are usually brought about by their turning the Time Set shaft counterclockwise. This knob should only be turned clockwise. For alarm adjustment, refer to the Clock Service section

(Schematic Diagram):- The schematic diagram should be corrected to read:

1. Move the series resistor, R14, from its location between the power plug P1 and the 35Z5GT filament pin, to connect in series with the filament string between the 35Z5GT and 50L6GT filament pins.

2. The filament connections (pins 2 and 7) to the 35Z5GT tube are interchanged.

3. Remove R11 in series with the plate side of the 35Z5GT rectifier tube (pin 5) and connect it in series with the cathode side (pin 8) of the rectifier tube.

4. Late production receivers use a tapped primary on the output transformer, T1. The color code of the primary is: red - B+, white - tap; blue - plate. This tapped transformer replaces the early production transformer and is wired as follows:

(a) Break connection to filter resistor, R9, on the rectifier side of the resistor.

(b) Connect this broken side of R9 to the tap of the output transformer, T1.

The above connects the positive (+) side of C11a, the rectifier output and the red lead of the output transformer together; while the tap lead of T1 connects to R9.

5. In late production receivers, a miniature Type 35W4 tube is substituted in place of the 35Z5GT rectifier tube. This requires installation of a miniature socket and adapter plate in place of the octal socket. The corresponding pin connections are as follows:

	35Z5GT	35W4
Plate	Pin 5	Pin 5
Cathode	Pin 8	Pin 7
Filament	Pin 2	Pin 4
Filament	Pin 7	Pin 3

(Radio Replacement Parts List):- Add Part No. RTO-022, symbol T1, Transformer - output transformer. (This part is a direct replacement for late production radios and a replacement with modification for the early production transformer without tap.)

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CLOCK SERVICE

Figure 6 shows clock parts referred to in the following paragraphs and the parts list.

CLOCK MOVEMENT DISASSEMBLY

1. Remove clock movement from case. When removing knobs, note that the Alarm-set knob is a left-hand thread, while Alarm-Radio is a pull-off knob.
2. Remove Bezel Window, Hands and Dial Face.
3. Remove two field screws (A) and break two soldered joints on Field. The Field and Rotor assembly (R) can now be removed. The Rotor is held by friction only to the Field.
4. Remove Switch Assembly (B) by removing two screws from base plate.
5. Remove Switch Shaft Assembly (C) and spacer.
6. Remove Alarm-set Shaft Assembly (D) and spacer.
7. Remove the three front plate assembly screws that are located under the Dial Face and then remove Front Plate.
8. Remove Alarm Gear Sleeve Assembly (E), Hour Gear Sleeve Assembly (F), Minute Gear Sleeve Assembly (G), and Sweep Second Gear Shaft Assembly (H).
9. Remove Alarm Cam Gear Assembly (I) and Spring Washer (J).
10. Remove Alarm-set Gear (K).
11. Remove Time-set Gear and Shaft Assembly (L).
12. Remove Switch Cam Lever (M).

CLOCK MOVEMENT REASSEMBLY

Reassemble in the reverse order of disassembly, observing the following precautions:

1. The spring washer (J) should curve upward when placed on the Alarm Cam Gear (I).
2. The Switch Cam Lever (M) fork must straddle the base plate post as shown in the illustration.
3. After reassembly of front plate, check the Sweep Second Gear (H) through hole in base plate to make sure it is free to turn.
4. Proceed with ALARM AND SWITCH ADJUSTMENTS as described below before installing hands.

ALARM AND SWITCH ADJUSTMENTS

1. Turn Alarm-Radio shaft to ALARM position.
2. Slowly rotate Time Set shaft clockwise until the contacts of the Switch Assembly (B) close.
3. Replace Dial Face, Alarm Dial, the Minute, Hour and Second Hands. Set all Hands and Dial so that they indicate 12 o'clock. Make sure all Hands and Alarm Dial are tight on their respective shafts.
4. With Alarm Set knob pulled out, continue to rotate Time Set shaft clockwise and note that the vibrator arm (N) drops against field core approximately 7-10 minutes later.
5. Set alarm at some other selected position and make sure mechanism actuates within limits (±1 minute).
6. Check alarm tone of vibrator. This can be adjusted by either bending vibrator arm nearer or farther away from field core. Bend arm near anchor point.

CLEANING AND LUBRICATION

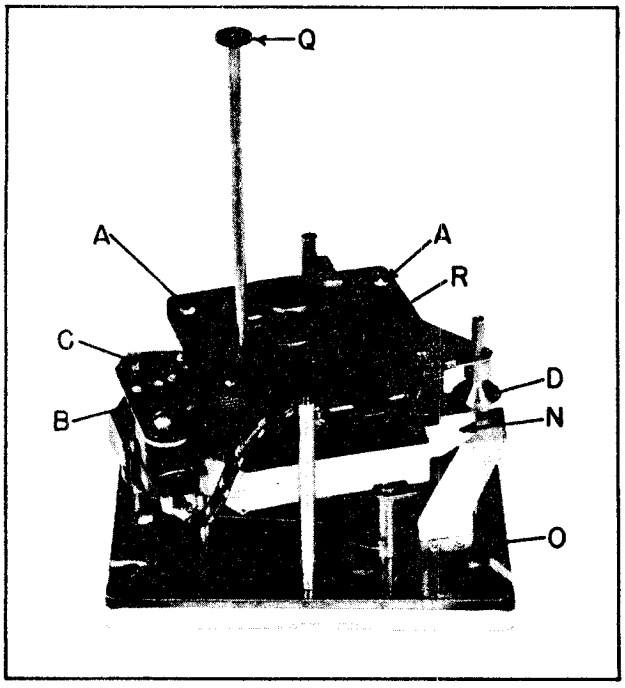
To clean, completely disassemble and clean all moving parts in carbon tetrachloride or some similar cleaner.

The inside of the sleeves and shaft surfaces may be cleaned of oxidized oil by rubbing with a fine grade of steel wool dampened in carbon tetrachloride.

Do not use too much oil and apply by means of a small wire (drop oiler). Too much oil collects dust and later oxidizes. Use only recommended clock oil, such as Nyes Celebrated Oil which may be purchased from Wm. F. Nye Co., Inc., New Bedford, or equivalent.

CLOCK TROUBLES

1. Clock will not operate—Defective field coil, defective rotor, binding of parts.
2. Clock loses time—Binding parts, too little friction on minute hand sleeve assembly, defective rotor. Clock time set shaft bent and rubs against hole in back cover. Radio pushed against wall so that knob (Q) rubs will cause loss of time.
3. Noisy Clock—Rotor defective, alarm armature improperly adjusted, loose parts, or binding of moving parts.



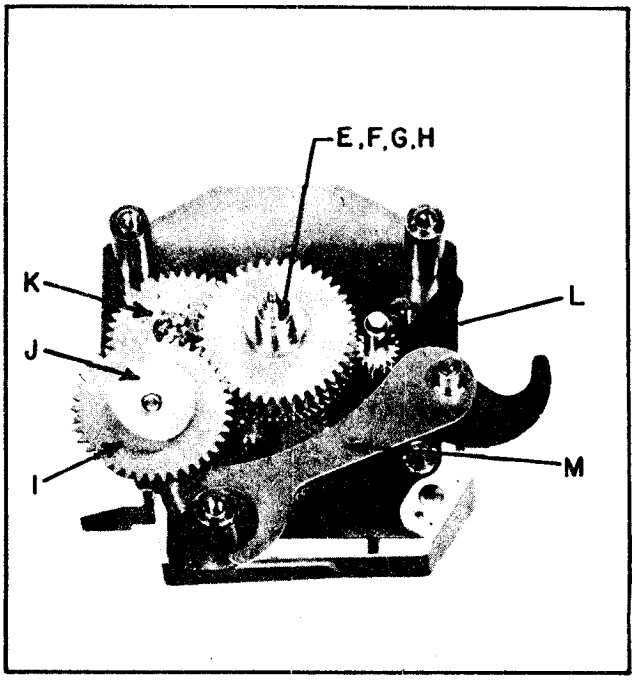


Fig. 6. Clock Part Identification

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ELECTRICAL RATING (INPUT):

Voltage	105-125 volts, a-c
Frequency	60 cycles
Wattage	30 watts

TUNING FREQUENCY (RADIO):

Broadcast Band	540-1600 kc

POWER OUTPUT (117 VOLTS LINE):

Undistorted	1.5 watts
Maximum	2.2 watts

LOUDSPEAKER:

Type	Alnico P.M.
Outside Cone Diameter	4 inch
Voice Coil Impedance (400 Cycles)	3.5 ohms

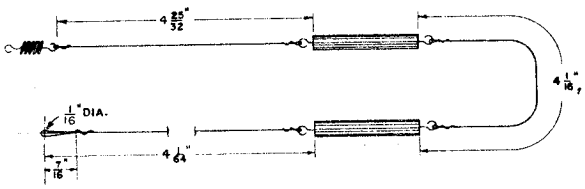

Fig. 2. Drive Cord Assembly

DRIVE CORD REPLACEMENT

When replacing the drive cord, it is essential that the measurements shown in Figure 2 be maintained very accurately, otherwise alignment and dial calibration difficulties will be experienced. Use a 1/32-inch diameter nylon jacketed cord, Part No. RDC-015, for replacement.

RADIO STAGE GAIN AND VOLTAGE CHECKS

Stage gain measurements by vacuum tube voltmeter or similar measuring devices may be used to check circuit performance and isolate trouble. The gain values listed may have tolerances of 20 per cent. Readings are taken with low signal input.

(1) R-F Stage Gains.

Antenna lead to 12SG7 grid	8 at 1000 kc
12SG7 grid to 12SQ7 diode plate	50 at 1000 kc

(2) Audio Gain.

0.06 volts at 400 cycles across volume control (R4) with control set at maximum will give approximately ½-watt output across speaker voice coil.

(3) Socket Pin Voltages.

Figure 4 shows voltages from all points to B —. Voltage readings much lower than those specified may help localize defective components or tubes.

RADIO REPLACEMENT PARTS LIST—MODEL 50

CAT. NO.	SYMBOL	DESCRIPTION
UNIVERSAL G-E RADIO REPLACEMENT PARTS		
UCC-039	C8	CAPACITOR - 0.005 mfd., 600 v., paper
UCC-045	C2, 3	CAPACITOR—0.05 mfd., 600 v., paper
UCG-543	C6	CAPACITOR - 430 mmf., silver mica
UCU-512	C1	CAPACITOR - 22 mmf., mica
UCU-532	C16	CAPACITOR—150 mmf., mica
UCU-536	C7, 15	CAPACITOR - 220 mmf., mica
UIC-001		CEMENT - Speaker cement
UOP-405	SP1	LOUDSPEAKER - 4-inch PM speaker
UOX-009		CONE - Speaker replacement cone
URD-015	R1	RESISTOR - 39 ohms, ½ w., carbon
URD-029	R8	RESISTOR - 150 ohms, ½ w., carbon
URD-033	R13	RESISTOR - 220 ohms, ½ w., carbon
URD-089	R3	RESISTOR - 47,000 ohms, ½ w., carbon
URD-097	R10	RESISTOR - 100,000 ohms, ½ w., carbon
URD-113	R7, 12	RESISTOR - 470,000 ohms, ½ w., carbon
URD-121	R6	RESISTOR - 1.0 megohm, ½ w., carbon
URD-129	R2	RESISTOR - 2.2 megohms, ½ w., carbon
URD-145	R5	RESISTOR - 10.0 megohms, ½ w., carbon
URE-057	R9	RESISTOR - 2,200 ohms, 1 w., carbon
SPECIALIZED G-E REPLACEMENT PARTS		
RAB-016		COVER - Cabinet back cover

CAT. NO.	SYMBOL	DESCRIPTION
SPECIALIZED G-E REPLACEMENT PARTS		
RAU-009		CABINET—Plastic cabinet
RCC-039	C9	CAPACITOR—0.005 mfd., 600 v., paper
RCC-041	C10	CAPACITOR—0.02 mfd., 600 v., paper
RCC-045	C14	CAPACITOR—0.05 mfd., 600 v., paper
RCE-031	C11A, B, C	CAPACITOR—40 mfd., 150 v.; 30 mfd., 150 v.; 20 mfd., 25 v.; electrolytic
RCY-007	C4	TRIMMER—140-175 mmf., antenna trimmer
RCY-008	C5	TRIMMER—270-375 mmf., r-f trimmer
RDC-015		CORD—Tuning drive cord (bulk)
RDK-028		KNOB—Volume or tuning knob
REI-004		CORE—Powdered iron tuning core
RHJ-001		ASSEMBLY - Tuning shaft assembly and spacer
RIT-005		COVER—Electrolytic cardboard cover (inner and outer)
RJS-003		SOCKET—Tube socket
RLA-005	L1, 2	COIL—Antenna or R-F coil
RMB-003		BUSHING - Drive shaft bushing
RMS-034		SPRING - Drive cord tension spring
RMX-006		PULLEY - Drive pulley
RRW-003	R14	RESISTOR—22 ohms, 1 w., wirewound
RRW-008	R11	RESISTOR—18 ohms, 1 w., glassohm W.W.
RWL-009		CORD—Power cord
RZC-001		CLOCK—Clock assembly

CLOCK REPLACEMENT PARTS LIST—MODEL 50

CAT. NO.	SYMBOL	DESCRIPTION
MISCELLANEOUS		
XC34X110	O	Frontplate Assembly
XC11X8	D	Alarm Set Shaft Assembly
XC10X115	L	Time Set Gear and Shaft Assembly
XC40X73	C	Switch Shaft Assembly
XC53X83		Inner Bezel 2⅛ in. Square—Lacquer
XC58X15		Crystal—2⅛ in. Square
XC60X707		Dial
XC32X129		Hands—Gold
XC55X3		Alarm Dial
XC3X49	Q	Time Set Shaft Knob—Bronze
XC4X5		Alarm Set Knob—Ivory
XC40X74		Switch Knob—Ivory
XC31X26		Sweep Second Hand—Gold
CLOCK MOVEMENT		
XC40X260		Spacer—Switch Shaft
XC44X38	R	Rotor Unit - 60 Cycle
XC45X69		Field Coil Assembly—60 Cycle

CAT. NO.	SYMBOL	DESCRIPTION
CLOCK MOVEMENT		
XC64X1-2-3		Frontplate Screw
XC40X202		Spreader Post
XC40X252	J	Cam Gear Spring Washer
XC1X1	A	Field Screws, No. 4-40 x 1⅜ in. R.H.
XC1X2		No. 1204 Lockwasher
XC1X6		Screw No. 4-40 x ⅜ in. R.H.
XC1X43		Hex Nut
XC40X261		Time Set Shaft Spacer
XC40X262		Time Set Shaft Spacer (at front plate)
XC35X39		Baseplate Assembly
XC14X15	G	Minute Gear Sleeve Assembly
XC13X11	F	Hour Gear Sleeve Assembly
XC15X3	E	Alarm Gear Sleeve Assembly
XC40X77	K	Alarm Set Gear Assembly
XC17X8	I	Alarm Gear Shaft Assembly
XC40X78	M	Switch Cam Lever Assembly
XC16X14	H	Sweep Second Gear Shaft Assembly
XC40X13		Rivet—Vibrator
XC40X263		Alarm Shut-off Spacer
XC40X76	B	Switch Assembly
XC40X79		Upper Contact Spring Assembly
XC40X80		Lower Contact Spring and Tip Assembly

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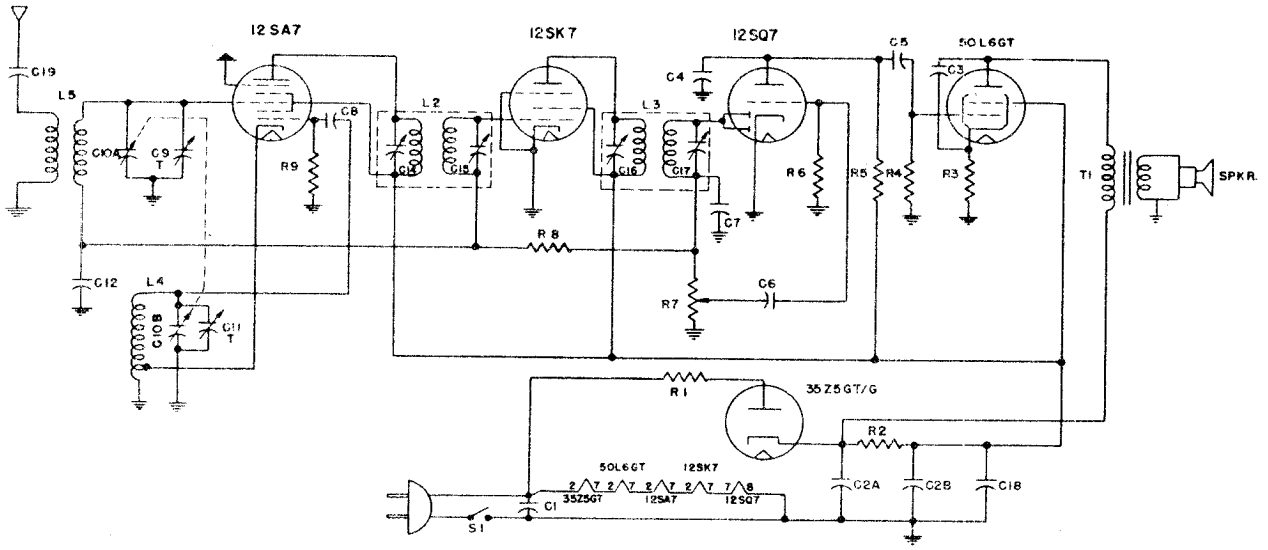
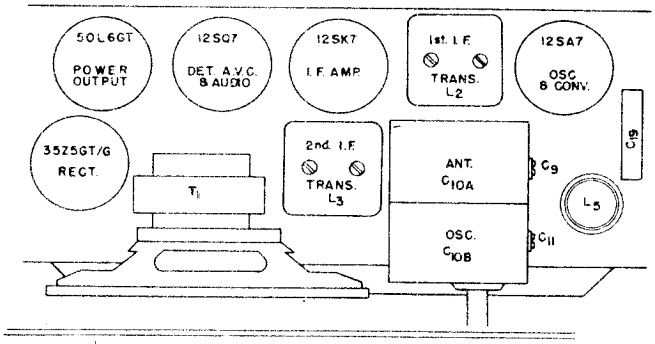
MODELS YRB60-1
YRB60-2





Tuning Frequency Range: ..... 540–1725 kc

Intermediate Frequency: ..... 455 kc

LOUDSPEAKER "ALNICO V" MAGNET DYNAMIC

Outside Cone Diameter ..... 4 in.
Voice Coil Impedance (400 cycles) ..... 3.5 ohm

ALIGNMENT PROCEDURE

ALIGNMENT FREQUENCIES

I.F. ..... 455 kc
R.F. ..... 1725 and 1500 kc
The location of all trimmers is shown in Fig. 1.

I.F. ALIGNMENT

Connect an output meter across the voice coil. Turn the volume control to maximum. Set test oscillator to 455 kc and keep the oscillator output as low as a readable meter reading will permit. Apply signal to the converter grid through a .05 mfd capacitor and align progressively the trimmers in the 2nd and 1st I.F. transformer cans.

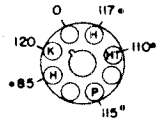
R.F. ALIGNMENT

Apply the R.F. alignment signals through a standard I.R.E. dummy antenna to the receiver antenna post. With the gang condenser wide open, align the oscillator trimmer (C11) to 1725 kc. Change the generator signal to 1500 kc, tune the receiver to the signal and peak antenna trimmer (C9) for maximum output.

PRECAUTION

If the signal generator is a-c operated, use an isolating transformer between the power supply and the radio receiver power input. The use of an isolating capacitor is not recommended, as a-c through the capacitor will introduce hum modulation and/or create the possibility of a burned-out signal generator attenuator.

35Z5GT/G



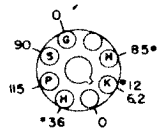
VOLTAGES MEASURED BETWEEN SOCKET TERMINALS AND CHASSIS

● INDICATES A.C. VOLTS
A.C. LINE 117 VOLTS
NO SIGNAL INPUT

ALL VOLTAGES MEASURED WITH 1000 OHM/VOLT METER

✱ MEASURED ON 300 V. SCALE

50L6GT



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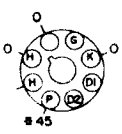

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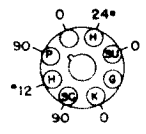

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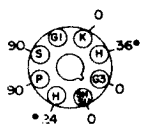

Cat. No.	Symbol	Description

UNIVERSAL G-E REPLACEMENT PARTS

UCC-039	C6, C19	Capacitor—.005 mfd paper
UCC-040	C5, C13	Capacitor—.01 mfd paper
UCC-041	C3	Capacitor—.02 mfd paper
UCC 045	C1, C12, C18	Capacitor—.05 mfd paper
UCU-1020	C8	Capacitor—47 mmfd mica
UCU-1040	C4, C7	Capacitor—330 mmfd mica
URD-029	R3	Resistor—150 ohm ½ watt carbon
URD-041	R11	Resistor—470 ohm ½ watt carbon
URD-081	R9	Resistor—22,000 ohm ½ watt carbon
URD-105	R5	Resistor—220,000 ohm ½ watt carbon
URD-113	R4	Resistor—470,000 ohm ½ watt carbon
URD-129	R8	Resistor—2.2 megohm ½ watt carbon
URD-145	R6	Resistor—10 megohm ½ watt carbon
URE-007	R1	Resistor—18 ohm 1 watt carbon
URF-053	R3	Resistor—1500 ohm 2 watt carbon

SPECIALIZED G-E REPLACEMENT PARTS

SAB-009		Back cover for cabinet
SAU-011		Cabinet, Model YRB 60-1
SAU-012		Cabinet, Model YRB 60-2
SCE-003	C2A, C2B	Capacitor—electrolytic filter, 40-40 mfd 150 volts
SCT-003	C10A, C10B	Capacitor—tuning
SDK-005		Knob—tuning, Model YRB 60-1
SDK-006		Knob—tuning, Model YRB 60-2
SDK-007		Knob—volume control, Model YRB 60-1
SDK-008		Knob—volume control, Model YRB 60-2
SDX-002		Grille and dial, Model YRB 60-1
SDX-003		Grille and dial, Model YRB 60-2
SJS-002		Socket, octal tube
SLA-001		Antenna coil
SLC-002		Oscillator coil
SMC-003		Fasteners, speed clip for fastening grille
SMF-003		Fasteners, for fastening cabinet back cover
SOP-001		Speaker, 4 in. PM dynamic
SRC-004		Volume control, 0.5 megohm, with power switch
STL-003		Transformer, 1st I.F.
STL-004		Transformer, 2nd I.F.
SWL-001		Power cord

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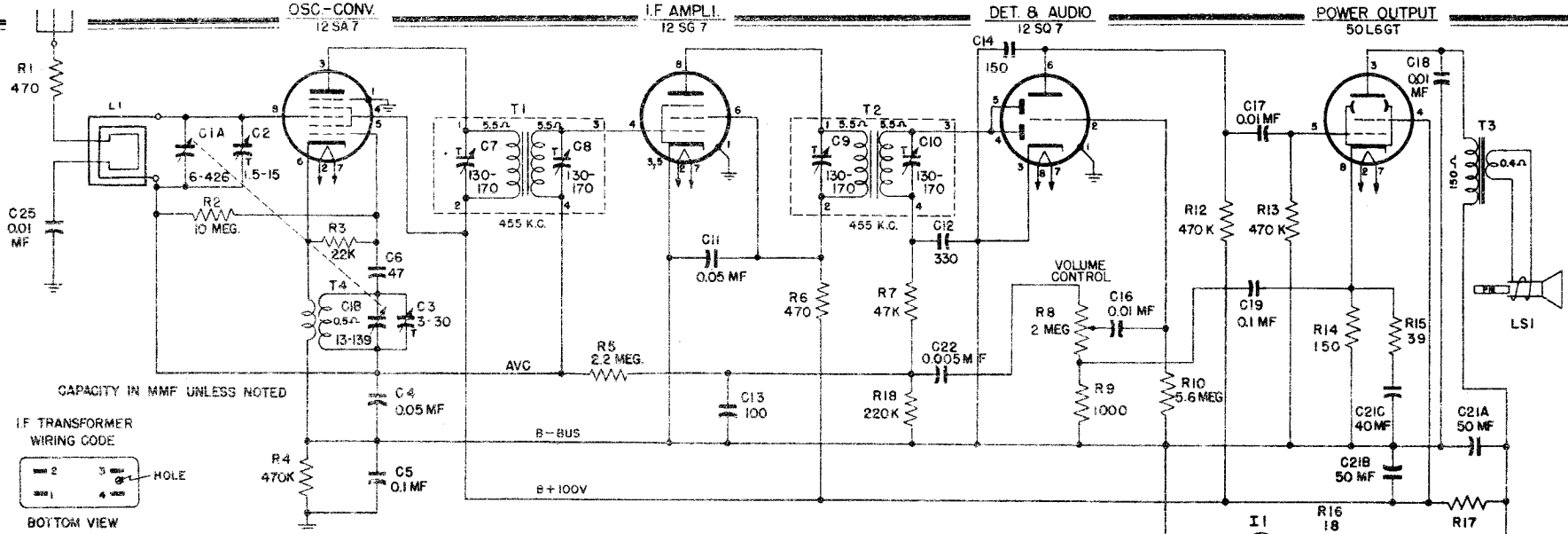
GENERAL ELECTRIC CO.

MODELS 100,101,103,105 Under Serial No.5000



UNIVERSAL G-E REPLACEMENT PARTS

PART NO.	SYMBOL	DESCRIPTION
UCC-013	C19	CAPACITOR—0.1 mfd., 200 v., paper
UCC-039	C22	CAPACITOR—0.005 mfd., 600 v., paper
UCC-040	C25	CAPACITOR—0.01 mfd., 600 v., paper
UCC-045	C4, 11	CAPACITOR—0.05 mfd., 600 v., paper
UCC-048	C5	CAPACITOR—0.1 mfd., 600 v., paper
UDL-018	I1	PILOT LAMP—115 v., 10 watt, candelabra base
URD-015	R15	RESISTOR—39 ohms, ½ w., carbon
URD-029	R14	RESISTOR—150 ohms, ½ w., carbon
URD-041	R6	RESISTOR—470 ohms, ½ w., carbon
URD-049	R9	RESISTOR—1,000 ohms, ½ w., carbon
URD-081	R3	RESISTOR—22,000 ohms, ½ w., carbon
URD-089	R7	RESISTOR—47,000 ohms, ½ w., carbon
URD-105	R18	RESISTOR—220,000 ohms, ½ w., carbon
URD-113	R4, 12, 13	RESISTOR—470,000 ohms, ½ w., carbon
URD-129	R5	RESISTOR—2.2 megohms, ½ w., carbon
URD-139	R10	RESISTOR—5.6 megohms, ½ w., carbon
URD-145	R2	RESISTOR—10 megohms, ½ w., carbon
URE-097	R16	RESISTOR—18 ohms, 1 w., carbon
URF-051	R17	RESISTOR—1200 ohms, 2 w., carbon

SPECIALIZED G-E REPLACEMENT PARTS

RAB-001		BACK—Cabinet Back Cover (Models 103, 105)
RAB-002		BACK—Cabinet Back Cover, white (Model 101)
RAB-003		BACK—Cabinet Back Cover, brown (Model 100)
RAD-001		BRACKET—Antenna Bracket, right rear
RAD-002		BRACKET—Antenna Bracket, left rear
RAU-002		CABINET—Brown Plastic, with grille assembly (Model 100)
RAU-003		CABINET—Ivory Plastic, with grille assembly (Model 101)
RAX-001		ASSEMBLY—Idler pulley assembly
RCC-040	C15, 17, 18	CAPACITOR—0.01 mfd., 600 v., paper
RCC-045	C20	CAPACITOR—0.05 mfd., 600 v., paper
RCE-001	C21A, 21B, 21C	CAPACITOR—50 mf., 150 v., 50 mf., 150 v., 40 mf., 25 v., dry electrolytic
RCT-001	C1A, C1B C2, C3	CAPACITOR—Tuning capacitor assembly
RCU-110	C6	CAPACITOR—47 mmf., 500 v., mica
RCU-112	C13	CAPACITOR—100 mmf., 500 v., mica
RCU-113	C14	CAPACITOR—150 mmf., 500 v., mica
RCU-115	C12	CAPACITOR—330 mmf., 500 v., mica
RDC-001		ASSEMBLY—Dial drive cord
RDD-001		DRUM—Dial drive drum
RDE-001		ESCUTCHEON—Dial scale escutcheon (Models 103, 105)
RDF-001		WASHER—Felt washer for controls (Model 101)
RDF-003		WASHER—Felt washer for controls (Models 100, 103, 105)
RDK-001		KNOB—Control knob (Model 101)
RDK-004		KNOB—Control knob (Models 103, 105)
RDK-006		KNOB—Control knob (Model 100)
RDP-002		POINTER—Dial scale pointer
RDS-001		SCALE—Dial scale (Models 100, 101)
RDS-002		SCALE—Dial scale (Models 103, 105)
RDX-001		ASSEMBLY—Dial scale back plate assembly
RHG-001		GROMMET—Tuning capacitor mounting grommet
RHM-001		RING—Pointer shaft retainer ring
RHM-002		CLIP—Speaker mounting clip
RHM-004		CLIP—Dial scale mounting clip (Models 100, 101)
RHM-005		CLIP—Dial scale mounting clip (Models 103, 105)
RHU-001		SPACER—Scale back plate spacer
RHU-002		SPACER—Tuning capacitor mounting spacer
RLC-001	T4	COIL—Oscillator coil assembly
RLL-001	L1	BEAM-A-SCOPE—Loop antenna assembly
RMM-001		SHIELD—Tube shield
RMS-001		SPRING—Drive cord tension spring
RMU-001		SHAFT—Tuning control shaft
ROP-005	LS1	LOUDSPEAKER—5¼-inch permanent magnet
RRC-002	R8, S1	VOLUME CONTROL—2.0 megohm potentiometer (includes power switch)
RTL-001	T1	TRANSFORMER—1st i-f transformer
RTL-002	T2	TRANSFORMER—2nd i-f transformer
RTO-001	T3	TRANSFORMER—Output transformer
RTS-001		SOCKET—Pilot lamp socket
RTS-003		SOCKET—Octal base tube socket
RTS-004		SOCKET—Electrolytic capacitor mounting socket
RWL-001	P1	CORD—Power cord and plug

SPECIFICATIONS

CABINET:

Model	100	101	103	105
Material	Plastic	Plastic	Wood	Wood
Color	Brown	Ivory	Mahogany	Maple
Height	7 ½"	7 ½"	8 ¼"	8 ¼"
Width	12"	12"	13"	13"
Depth	7 ½"	7 ½"	7 15/16"	7 15/16"

ELECTRICAL RATING (INPUT)

Voltage ..... 105-125 volts a-c or d-c
Frequency on a-c ..... 25 to 60 cycles
Wattage ..... 40 watts

OPERATING FREQUENCIES

Broadcast Band ..... 540-1600 kilocycles
I-F Amplifier ..... 455 kilocycles

POWER OUTPUT (117 VOLTS LINE)

Undistorted ..... 1.25 watts
Maximum ..... 2.0 watts

LOUDSPEAKER

Type ..... Alnico P.M.
Outside Cone Diameter ..... 5 ¼ in.
Voice Coil Impedance (400 cycles) ..... 3.5 ohms

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PRODUCTION CHANGES WERE MADE ON ALL MODELS 100,101,103,AND 105, HAVING SERIAL NUMBERS 5000 AND OVER. THE SERVICING DATA ON THE PRECEDING PAGES APPLY TO THE REVISED MODELS WITH THE FOLLOWING EXCEPTIONS:

(ELECTRICAL CIRCUIT ALIGNMENT)—Under the paragraph *PROCEDURE—GENERAL* the third sentence should read "If it doesn't, remove chassis and slip pointer on shaft until the pointer is under reference mark when chassis is bolted in place."

For receivers equipped with the Beam-A-Scope which forms a part of the back cover(Part Nos.RLL-009 and RLL-010), paragraph 4 should be changed to read, "Chassis must be removed from cabinet during i-f alignment. For r-f alignment,bolt chassis in cabinet securely; r-f and oscillator trimmers are then available through the hole in the back cover assembly".

(SCHEMATIC DIAGRAM)—A corrected schematic is printed below. Changes were made as follows:

(1) C18 connects between the output plate and screen instead of between plate and ground.

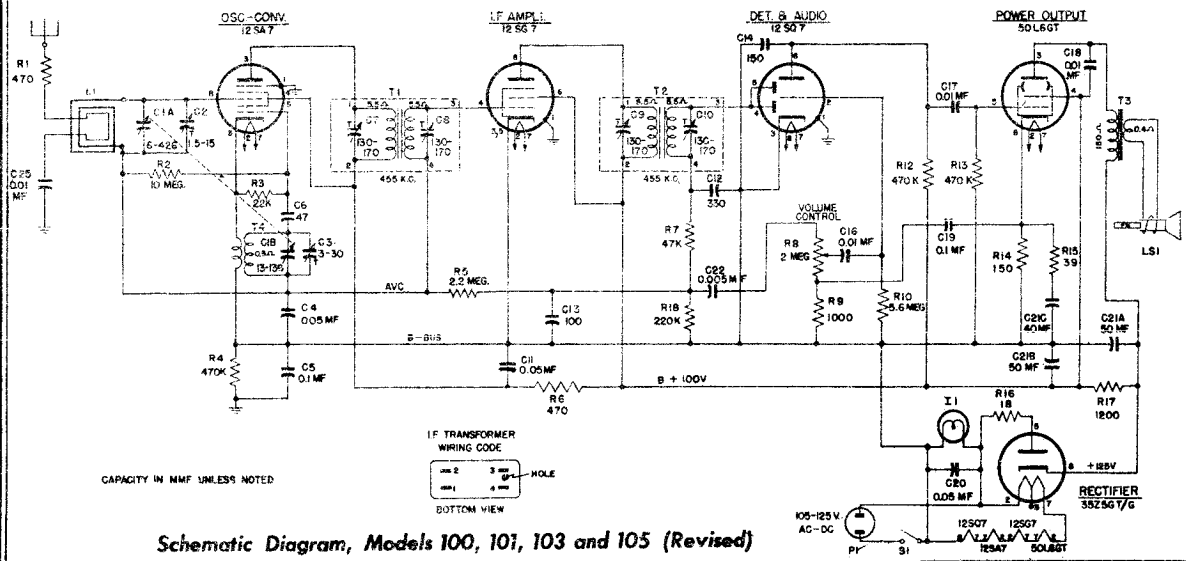
(2) The plate and screen filter (C11, R6) is moved from the IF amplifier circuit to the converter plate and screen circuit.

(3) The filament connections (Pins 2 and 7) to the 12SA7 converter tube are interchanged.

(4) The 10-megohm resistor,R2, is removed.

(Fig.4, Socket Voltages) At 12SA7 socket, pins 3 and 4 should be changed to read +92. At 12SG7 socket,pins 6 and 8 should be changed to read +97 volts.

(REPLACEMENT PARTS LIST)—Part Number UCC-013, Symbol C19, becomes Part Number RCC-013. Stock numbers RTS-001, RTS-003, and RTS-004 should be changed to read: RJS-001, RJS-003, and RJS-004, respectively.



Schematic Diagram, Models 100, 101, 103 and 105 (Revised)

(Parts List). Part No.RCE-001 changed to RCE-027. Delete Part Nos.RDF-001,RDF-003,RDX-001,and RMM-001. Part No.RWL-001 changed to RWL-004.Add Part No.RIT-006, Electrolytic cardboard cover.Add Part No.RLL-009,Beam-A-Scope loop ant. and back cover assembly,Models 103,105. Add Part No.RLL-010,Beam-A-Scope loop ant. and back cover assembly,Models 100, 101.Change Part No.ROP-005 to read Part No.UOP-525.

Beam-A-Scope Change. Two different type loop antenna assemblies were used uri Beam-A-Scope Change.--Two different type loop antenna assemblies were used during production. Part No.RLL-001 is secured to the chassis by two metal brackets and needs a separate cabinet back cover. The other type Beam-A-Scope is identified as it is a part of the back cover assembly. This new assembly is stocked as Part No. RLL-009 for Models 103 and 105,and as Part No.RLL-010 for Models 100 and 101. The Beam-A-Scopes are electrically interchangeable. The loop(RLL-009,RLL-010), which is a part of the back cover can be used without alteration to replace Part No.RLL-001. Part No. RLL-001 may replace Part No.RLL-009 or RLL-010,provided that brackets (Part No.RAD-001 and RAD-002) are added to the chassis to mount the new loop. When connecting the Beam-A-Scopes into the circuit, the inner turn of Part Nos.RLL-009 and RLL-010 must be connected to the converter grid(pin 8);while on Part No.RLL-001 loop, the turn nearest the back cover connects to the converter grid (pin 8).

REMOVAL OF PILOT LIGHT: In some cases, the glyptal cement used between the pilot light base and socket prevents removal of the light. Repeated applications of acetone or nail-polish remover between the lamp and socket will soften cement sufficiently to permit removal.

MODELS 100,101,103,105

GENERAL ELECTRIC CO.

TUBE COMPLEMENT

Oscillator-Converter	Type 12SA7
I. F. Amplifier	Type 12SG7
Detector-Audio	Type 12SQ7
Power Output	Type 50L6GT
Rectifier	Type 35Z5GT/G
Pilot Lamp	G-E, Type C7, 115-volt, 10-watt, clear, candelabra screw base

ELECTRICAL CIRCUIT ALIGNMENT

ALIGNMENT FREQUENCIES

R-F	1500 kilocycles
I-F	455 kilocycles

EQUIPMENT REQUIRED

1. Test oscillator with audio tone modulation
2. A-C output meter, 1 ½ volts full scale
3. 0.05 mf. paper capacitor
4. 50 mmf. mica capacitor
5. Insulated screwdriver

PROCEDURE—GENERAL 1. Turn dial scale pointer as far counter-clockwise as possible. The pointer should coincide with the first marking at the left of the scale. If it doesn't, remove chassis and slip pointer drum on cord until pointer is under reference mark when chassis is bolted in place.

2. For i-f and r-f alignments, the output meter is connected across the loudspeaker voice coil terminals.

3. Keep radio volume control at maximum and attenuate test oscillator signal output so that the output meter reading never exceeds 1 ¼ volts.

4. The chassis must be removed from the cabinet during I-F alignment. For R-F alignment bolt the chassis in the cabinet securely, the rf and osc. trimmers are then available through the hole in the Beam-a-scope assembly when the back cover is removed.

5. Connect the capacitor as listed in column 2, between the output "High Side" of test oscillator and the point of input specified.

ALIGNMENT CHART

Step	Connect test oscillator to	Test osc. setting	Pointer setting on radio	Adjustment for maximum output
1	12SG7 grid in series with 0.05 mf. cap.	455 kc	1,500 kc	2nd I-F Trans. Trimmers
2	12SA7 grid in series with 0.05 mf. cap.	455 kc	1,500 kc	1st and 2nd I-F Trans. Trimmers
3	Ant. Post in series with 50 mmf.	1,500 kc	1,500 kc	C3 (Osc.)
4	Ant. Post in series with 50 mmf.	1,500 kc	1,500 kc	C2 (R-F)

STAGE GAIN AND VOLTAGE CHECKS

Stage gain measurements by vacuum tube voltmeter or similar measuring devices may be used to check circuit performance and isolate trouble. The gain values listed may have tolerances of 20%. Readings taken with low signal input so that AVC is not effective.

(1) R-F Stage Gains.

Antenna post to 12SA7 grid	4 @ 1000 kc
12SA7 grid to 12SG7 grid	30 @ 455 kc
12SG7 grid to 12SQ7 diode plate	150 @ 455 kc

(2) Audio Gain.
0.06 volt at 400 cycles across volume control (R8) with control set at maximum will give approximately ½-watt output across speaker voice coil.

(3) Oscillator Grid Bias.
D-C voltage developed across the oscillator grid leak (R3). Averages 7.7 volts at 1000 kc.

(4) Socket Pin Voltages.
Figure 4 shows voltages from all tube pins to B– unless otherwise specified. Voltage readings much lower than those specified may help localize defective components or tubes

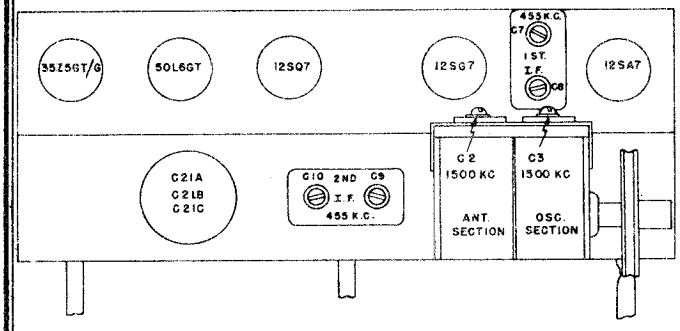


Fig. 1. Tube and Trimmer Location

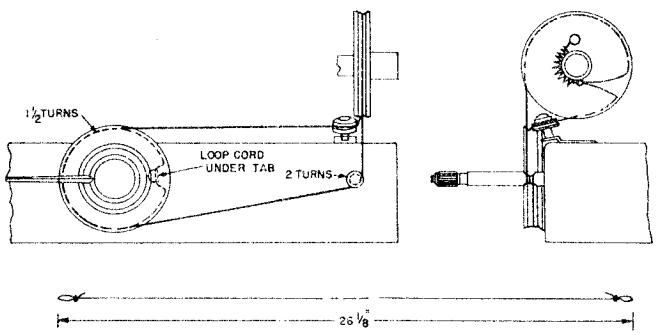


Fig. 2. Dial Stringing Diagram

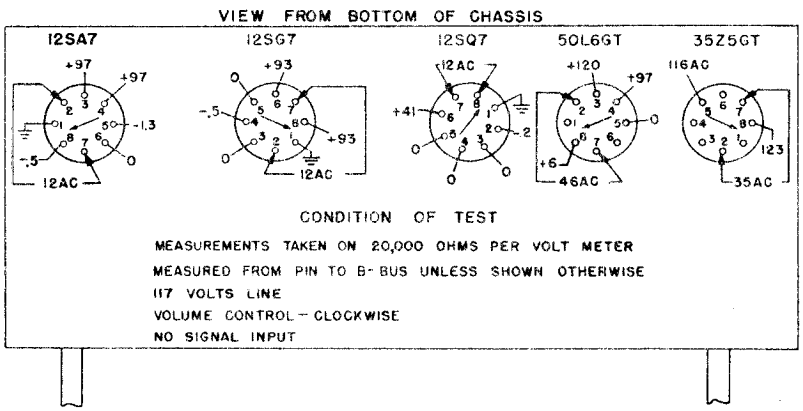


Fig. 4. Socket Voltages

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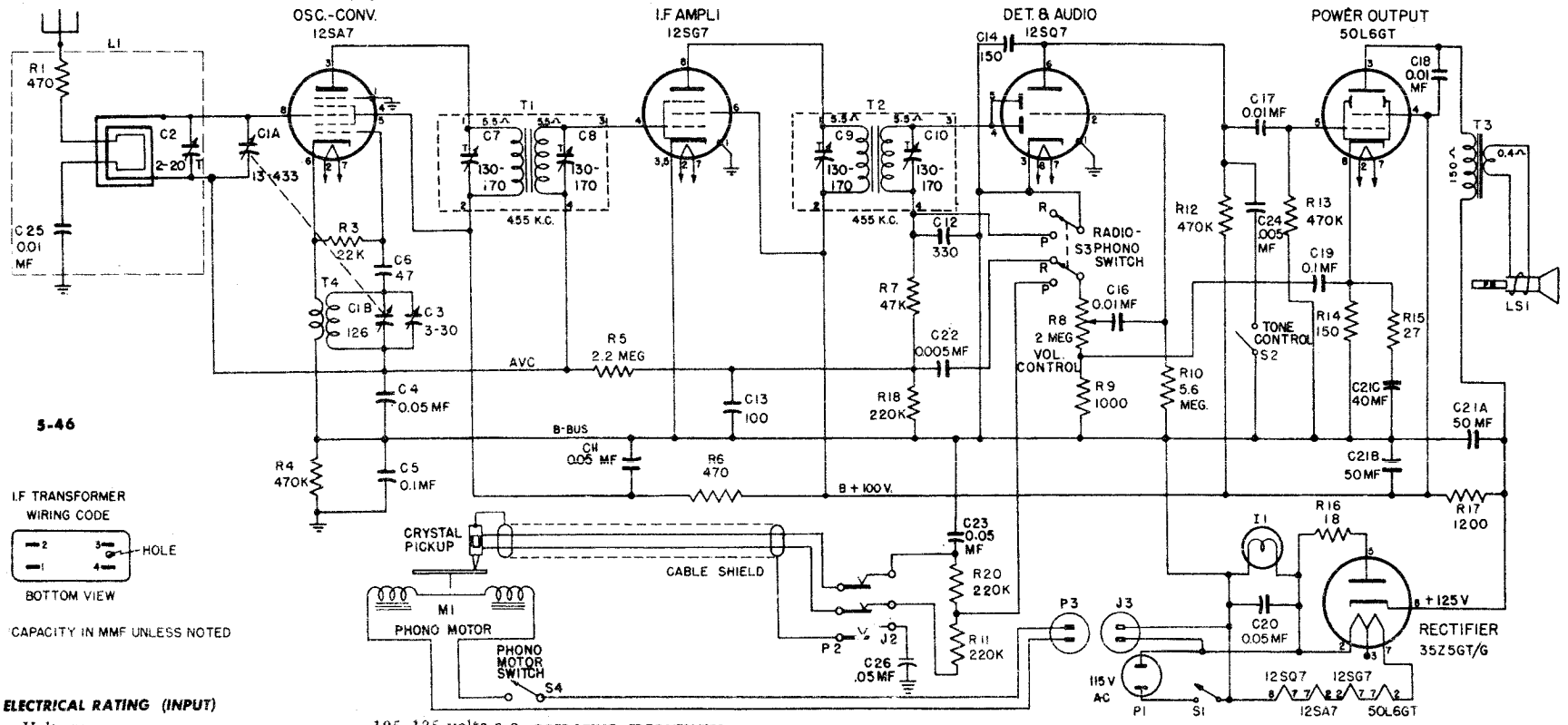


5-46

I.F TRANSFORMER WIRING CODE

CAPACITY IN MMF UNLESS NOTED

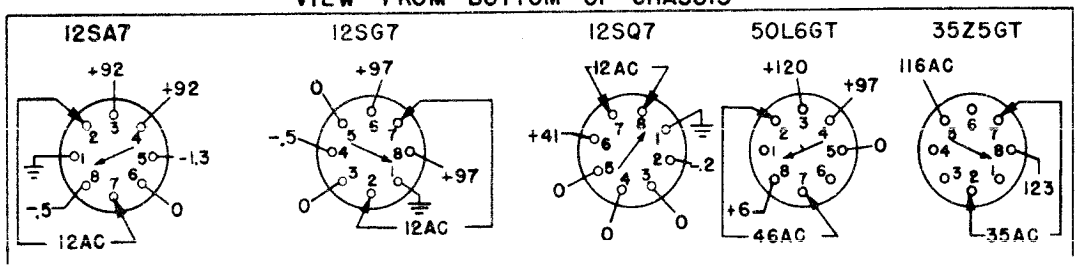
ELECTRICAL RATING (INPUT)

Voltage	105–125 volts a-c
Frequency	60 cycles
Wattage (Including Phonograph)	55 watts

OPERATING FREQUENCIES

Broadcast Band	540–1600 kilocycles
I-F Amplifier	455 kilocycles

VIEW FROM BOTTOM OF CHASSIS



CONDITION OF TEST

MEASUREMENTS TAKEN ON 20,000 OHMS PER VOLT·METER

MEASURED FROM PIN TO B- BUS UNLESS SHOWN OTHERWISE

117 VOLTS LINE

VOLUME CONTROL – CLOCKWISE

NO SIGNAL INPUT

STAGE GAIN AND VOLTAGE CHECKS

Stage gain measurements by vacuum tube voltmeter or similar measuring devices may be used to check circuit performance and isolate trouble. The gain values listed may have tolerances of 20 per cent. Readings taken with low signal input so that AVC is not effective.

(1) R-f Stage Gains.

Antenna post to 12SA7 grid	4 @	1000 kc
12SA7 grid to 12SG7 grid	30 @	455 kc
12SG7 grid to 12SQ7 diode plate	150 @	455 kc

(2) Audio Gain.

0.06 volts at 400 cycles across volume control (R8) with control set at maximum will give approximately ½ watt output across speaker voice coil.

(3) Oscillator Grid Bias.

D-c voltage developed across the oscillator grid leak (R3) averages 7.7 volts at 1000 kc.

(4) Socket Pin Voltages.

Fig. 4 shows voltages from all tube pins to B—unless otherwise specified. Voltage readings much lower than those specified may help localize defective components or tubes.

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PART NO.	SYMBOL	DESCRIPTION
UNIVERSAL G-E REPLACEMENT PARTS		
UCC-039	C22	CAPACITOR—0.005 mfd., 600 v., paper
UCC-040	C25	CAPACITOR—0.01 mfd., 600 v., paper
UCC-045	C4, 11, 23, 26	CAPACITOR—0.05 mfd., 600 v., paper
UCC-048	C5	CAPACITOR—0.1 mfd., 600 v., paper
UDL-018	I1	PILOT LAMP—115 v., 10 watt, candelabra base
UIC-001		CEMENT—Thermoplastic Cement
UOP-625	LS1	LOUDSPEAKER—6½" PM Speaker
URD-011	R15	RESISTOR—27 ohms, ½ w., carbon
URD-029	R14	RESISTOR—150 ohms, ½ w., carbon
URD-041	R1, 6	RESISTOR—470 ohms, ½ w., carbon
URD-049	R9	RESISTOR—1000 ohms, ½ w., carbon
URD-081	R3	RESISTOR—22,000 ohms, ½ w., carbon
URD-089	R7	RESISTOR—47,000 ohms, ½ w., carbon
URD-105	R18, 11, 20	RESISTOR—220,000 ohms, ½ w., carbon
URD-113	R4, 12, 13	RESISTOR—470,000 ohms, ½ w., carbon
URD-129	R5	RESISTOR—2.2 megohms, ½ w., carbon
URD-139	R10	RESISTOR—5.6 megohms, ½ w., carbon
URE-007	R16	RESISTOR—18 ohms, 1 w., carbon
URF-051	R17	RESISTOR—1200 ohms, 2 w., carbon
SPECIALIZED G-E REPLACEMENT PARTS		
RAA-002		ARM—Switch Arm
RAA-003		ARM—Tone Control Switch Arm
RAD-003		BRACKET—Top Bracket Support for Back Plate
RAD-004		BRACKET—Bottom Bracket Support for Back Plate
RAX-002		ASSEMBLY—Idler Pulley Assembly
RAX-003		BRACKET ASSEMBLY—Dial Drum Support
RBH-001	M1	ASSEMBLY—Phono-motor Assembly
RBK-004		ARMATURE—Motor Armature
RBX-001		ASSEMBLY—Phono-motor, Drive Wheel, and Mounting Plate Assembly
RCC-013	C19	CAPACITOR—0.1 mfd., 200 v., paper
RCC-039	C24	CAPACITOR—0.005 mfd., 600 v., paper
RCC-040	C16, 17, 18	CAPACITOR—.01 mfd., 600 v., paper
RCC-045	C20	CAPACITOR—.05 mfd., 600 v., paper
RCE-001	C21A, 21B, 21C	CAPACITOR—50 mfd., 150 v., 50 mfd., 150 v., 40 mfd., 25 v., dry electrolytic
RCT-002	C1A, 1B, 3	CAPACITOR—Tuning Capacitor
RCU-110	C6	CAPACITOR—47 mmf., 500 v., mica
RCU-112	C13	CAPACITOR—100 mmf., 500 v., mica
RCU-113	C14	CAPACITOR—150 mmf., 500 v., mica
RCU-115	C12	CAPACITOR—330 mmf., 500 v., mica
RCY-005	C2	CAPACITOR—2-20 mmf. trimmer
RDC-002		CORD—Dial Drive Cord and Spring
RDD-002		DRUM—Dial Drive Drum
RDE-002		ESCUTCHEON—Dial Scale Escutcheon

PART NO.	SYMBOL	DESCRIPTION
SPECIALIZED G-E REPLACEMENT PARTS (CONT'D)		
RDF-002		WASHER—Felt Washer for Control Knob
RDK-002		KNOB—Radio-phono Knob
RDK-003		KNOB—Volume Control Knob
RDK-005		KNOB—Tone Switch Wafer Knob
RDK-006		KNOB—Tuning Knob
RDP-001		POINTER—Dial Scale Pointer
RDS-003		SCALE—Dial Scale
RDX-025		ASSEMBLY—Back Plate Weld Assembly
RHC-003		PIN—Hairpin Cotter (Fan)
RHC-004		PIN—Hairpin Cotter (Spindle)
RHG-001		GROMMET—Tuning Capacitor Mounting Grommet
RHM-001		RING—Pointer Shaft Retaining Ring
RHM-006		CLIP—Speed Clip (Motor Board)
RHQ-001		TIRE—Rubber Tire (Phono-motor Idler)
RHU-001		SPACER—Scale Back Plate Spacer
RHU-002		SPACER—Tuning Capacitor Mounting Spacer
RIT-001		COVER—Electrolytic Capacitor Cover
RJP-003	P3	PLUG—Phono Power Plug
RJS-002		SOCKET—Pilot Light Socket
RJS-003		SOCKET—Octal Tube Socket
RJS-004		SOCKET—Electrolytic Capacitor Mounting Socket
RJS-049	J3	SOCKET—Phono Power Socket
RJX-005	P2	PLUG AND SOCKET—Phono Plug and Socket
RLC-018	T4	COIL—Oscillator Coil Assembly
RLL-002	L1	BEAM-A-SCOPE—Loop Antenna Assembly
RMM-008		SHIELD—Pilot Lamp Shield
RMS-006		SPRING—Idler Wheel Spring
RMT-001		TURNTABLE—9-inch diameter Turntable
RMU-002		SHAFT—Tuning Shaft
RMU-007		SPINDLE—Turntable Spindle
RMW-005		WHEEL—Phono Idler Wheel (with Rubber Gasket)
ROP-006	LS1	LOUDSPEAKER—6½-inch Permanent Magnet
RPC-014		PICK UP—Crystal Cartridge Pick-up
RPX-012		ARM—Tone Arm Assembly with Pick-up
RRC-001	R8, S1	VOLUME CONTROL—2.0 megohm Potentiometer (includes power switch)
RSS-001	S4	SWITCH—Phono Motor Switch
RSX-001		ASSEMBLY—Phono-motor Switch Assembly
RSX-002		ASSEMBLY—Phono-switch Arm Assembly
RSW-001	S3	SWITCH—Phono radio Switch
RSW-002	S2	SWITCH—Tone Control Switch
RTL-001	T1	TRANSFORMER—1st I-f Transformer
RTL-002	T2	TRANSFORMER—2nd I-f Transformer
RTO-001	T3	TRANSFORMER—Output Transformer
RWL-004		CORD—Power Cord and Plug

Part No. RJX-005 should be changed to read RJX-007. Delete Part No. ROP-006. Add Part No. UOX-001, CONE-Replacement speaker cone.

POWER OUTPUT

Undistorted	1.25 watts
Maximum	2.0 watts

LOUDSPEAKER

Type	Alnico P.M.
Outside Cone Diameter	6½ in.
Voice Coil Impedance (400 cycles)	3.5 ohms

PHONOGRAPH MECHANISM

Type	Manual
Pick-up	Crystal
Needle	Permanent Type
Turntable Speed	78 rpm

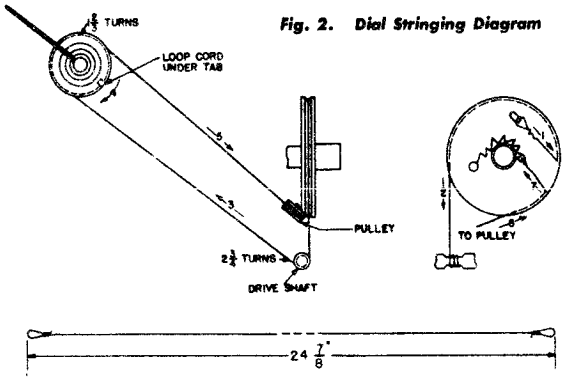

Fig. 2. Dial Stringing Diagram

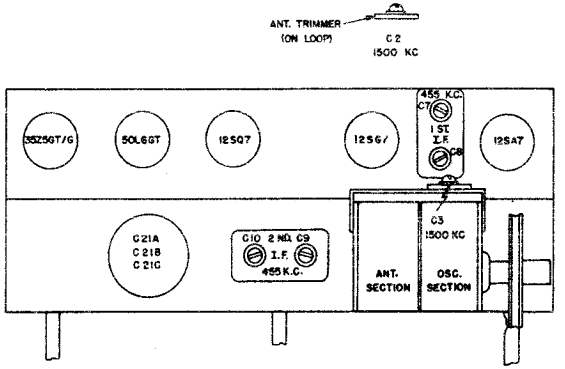

Fig. 1. Tube and Trimmer Location

ELECTRICAL CIRCUIT ALIGNMENT

EQUIPMENT REQUIRED

1. Test oscillator with audio tone modulation
2. A-c output meter, 1½ volts, full scale
3. 0.05 mf paper capacitor
4. 50 mmf mica capacitor
5. Insulated screwdriver

PROCEDURE—GENERAL 1. Turn dial scale pointer as far counterclockwise as possible. The pointer should coincide with the first marking at the left of the scale. If it doesn't, remove chassis and slip pointer on drum until pointer is under reference mark when chassis is bolted in place.

2. For i-f and r-f alignments, the output meter is connected across the loudspeaker voice coil terminals.
3. Keep radio volume control at maximum and attenuate test oscillator signal output so that the output meter reading never exceeds 1¼ volts.
4. The chassis must be removed from the cabinet during i-f alignment. For r-f alignment, bolt the chassis in the cabinet securely. The r-f trimmer is then available through the hole in the Beam-a-Scope assembly (back cover). The Osc. Trimmer can be reached when the back cover is tilted back.
5. Connect the capacitor as listed in column 2 between the output "High Side" of test oscillator and the point of input specified.

ALIGNMENT CHART

Step	Connect test oscillator to	Test osc. setting	Pointer setting on radio	Adjustment for maximum output
1	12SG7 grid in series with 0.05 mf. cap.	455 kc	1500 kc	2nd I-F Trans. Trimmers
2	12SA7 grid in series with 0.05 mf. cap.	455 kc	1500 kc	1st and 2nd I-F Trans. Trimmers
3	Ant. Post in series with 50 mmf.	1500 kc	1500 kc	C3 (Osc.)
4	Ant. Post in series with 50 mmf.	1500 kc	1500 kc	C2 (R-F)

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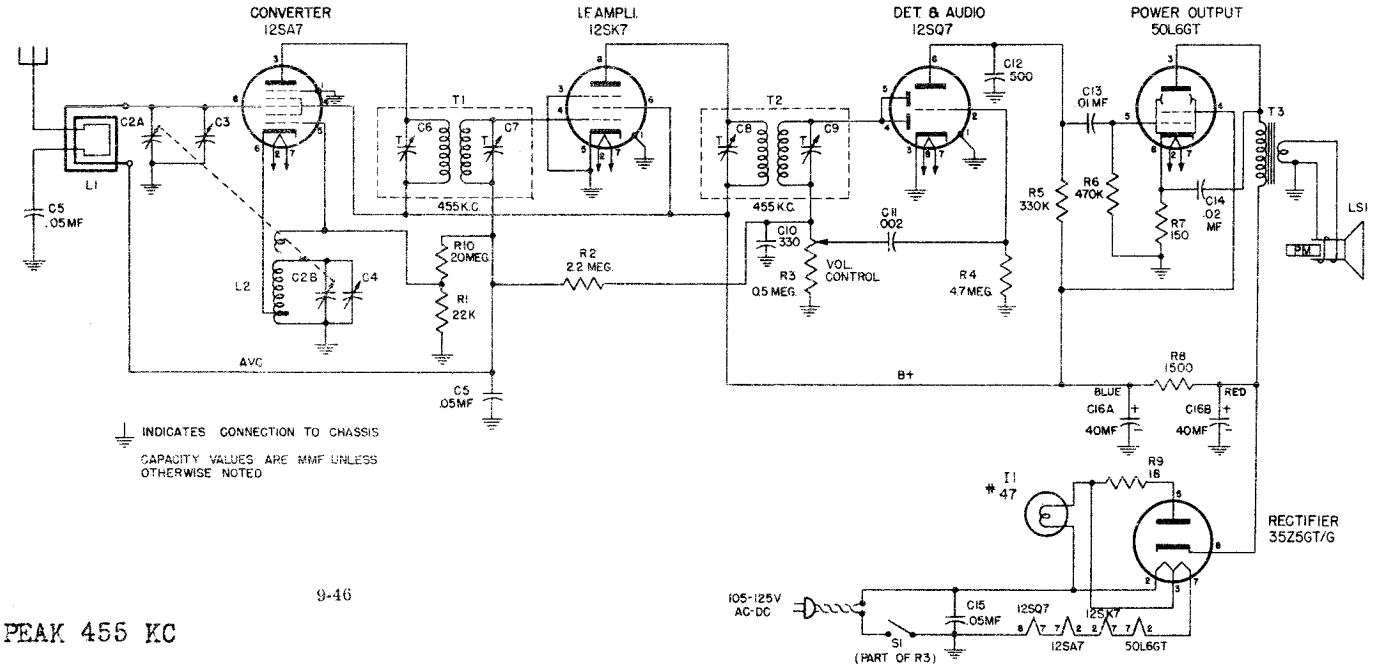

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IF PEAK 455 KC

REPLACEMENT PARTS LIST

CAT. NO.	SYMBOL	DESCRIPTION
UNIVERSAL REPLACEMENT PARTS		
UCC-019	C1, 11	CAPACITOR—0.002 mfd., 400 v., paper
UCC-025	C13	CAPACITOR—0.01 mfd., 400 v., paper
UCC-026	C14	CAPACITOR—0.02 mfd., 400 v., paper
UCC-028	C5, 15	CAPACITOR—0.05 mfd., 400 v., paper
UCU-1040	C10	CAPACITOR—330 mmf., mica
UCU-2045	C12	CAPACITOR—510 mmf., mica
UOP-407	LS1	LOUDSPEAKER—4-in. P.M. speaker
UOX-009		CONE—Replacement speaker cone
URD-029	R7	RESISTOR—150 ohms, ½ w., carbon
URD-081	R1	RESISTOR—22,000 ohms, ½ w., carbon
URD-109	R5	RESISTOR—330,000 ohms, ½ w., carbon
URD-129	R2	RESISTOR—2.2 meg., ½ w., carbon
URD-137	R4	RESISTOR—4.7 meg., ½ w., carbon
URD-153	R10	RESISTOR—20 meg., ½ w., carbon
URE-007	R9	RESISTOR—18 ohms, 1 w., carbon
URF-053	R8	RESISTOR—1500 ohms, 2 w., carbon
SPECIALIZED REPLACEMENT PARTS		
RAB-043	L1	BEAM-A-SCOPE—Back cover and beam-a-scope assembly
RAU-014		CABINET—Walnut cabinet (Model 110)
RAU-015		CABINET—Ivory cabinet (Model 111)
RCE-040	C16a, b	CAPACITOR—40 mfd., 40 mfd., 150 v., electrolytic
RCT-017	C2a, 2b	CONDENSER—Variable tuning condenser
RDC-022		CORD—Drive cord and spring
RDK-015		KNOB—Control knob (ivory)
RDK-077		KNOB—Control knob (walnut)
RDP-024		POINTER—Dial pointer
RDS-035		SCALE—Dial scale assembly
RDW-002		WINDOW—Celluloid dial window
RHX-005		HARDWARE—Tuning condenser mounting hardware
RJF-002		CLIP—Beam a scope and back cover clip
RJS-006		SOCKET—Octal base socket
RJS-061		SOCKET—Pilot lamp socket assembly
RLC-031	L2	COIL—Oscillator coil
RMS-054		SPRING—Drive cord spring
RMX-054		SHAFT—Drive shaft assembly
RRC-037	R3, S1	VOLUME CONTROL—0.5 meg. potentiometer and switch
RTL-035	T1	TRANSFORMER—1st IF transformer
RTL-036	T2	TRANSFORMER—2nd IF transformer
RTO-023	T3	TRANSFORMER—Output transformer
RWL-004		CORD—Power cord assembly

MODELS 110,111

GENERAL ELECTRIC CO.

ELECTRICAL RATING:

Voltage	105-125 v. a-c or d-c
Frequency on a-c	50/60 cycles
Wattage	30 watts

OPERATING FREQUENCIES:

Broadcast Band	540-1600 kc
I-F Amplifier	455 kc

POWER OUTPUT (120 VOLTS LINE):

Undistorted	0.8 watts
Maximum	1.6 watts

LOUDSPEAKER:

Type	Alnico P.M.
Outside Cone Diameter	4 inches
Voice Coil Impedance (400 cycles)	3.5 ohms

TUBE COMPLEMENT:

Oscillator-Converter	Type 12SA7
I-F Amplifier	Type 12SK7
Detector-Audio	Type 12SQ7
Power Output	Type 50L6GT
Rectifier	Type 35Z5GT/G
Pilot Lamp	GE No. 47

ELECTRICAL CIRCUIT ALIGNMENT

ALIGNMENT FREQUENCIES:

R-F	1500 kilocycles
I-F	455 kilocycles

EQUIPMENT REQUIRED:

1. Line isolation transformer.
2. A-c output meter, 1½ volts full scale.
3. Test oscillator with tone modulation.
4. 0.05 mf. paper capacitor.
5. 50 mmf. mica capacitor.
6. Insulated screwdriver.

PROCEDURE—GENERAL. *1.* Remove chassis from cabinet. Turn pointer as far counterclockwise as possible. The pointer should set horizontal. If it doesn't, remove the dial window and slip the pointer on its shaft until it is horizontal.

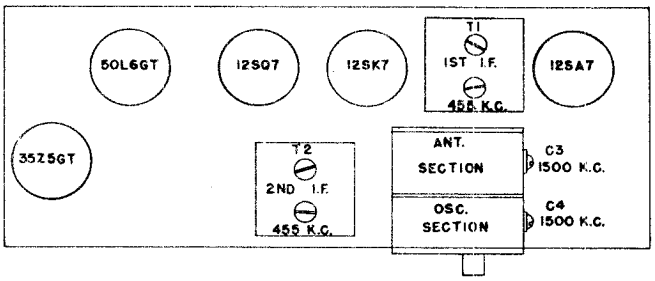

Fig. 2. Tube and Trimmer Location

2. Connect the line cord to the line through an isolation 1:1 ratio transformer.
3. Connect output meter across loudspeaker voice coil terminals.
4. Keep radio volume control at maximum and attenuate the test oscillator signal output so that the output meter reading never exceeds 1 volt.
5. For R-F alignment, the Beam-a-scope assembly should be connected and dressed in exactly the same location it would occupy if installed in the cabinet.
6. Connect the capacitor as listed in column 2, between the output "high side" of the test oscillator and the point of input specified.

ALIGNMENT CHART

Step	Connect Test Oscillator to	Test Oscillator Setting	Pointer Setting on Radio	Adjustment for Maximum Output
1	12SG7 grid in series with 0.05 mf. cap.	455 kc	1500 kc	2nd I-F trans. trimmers
2	12SA7 grid in series with 0.05 mf. cap.	455 kc	1500 kc	1st and 2nd I-F trans. trimmers
3	Ant. post in series with 50 mmf.	1500 kc	1500 kc	C4 (osc.)
4	Ant. post in series with 50 mmf.	1500 kc	1500 kc	C3 (R-F)

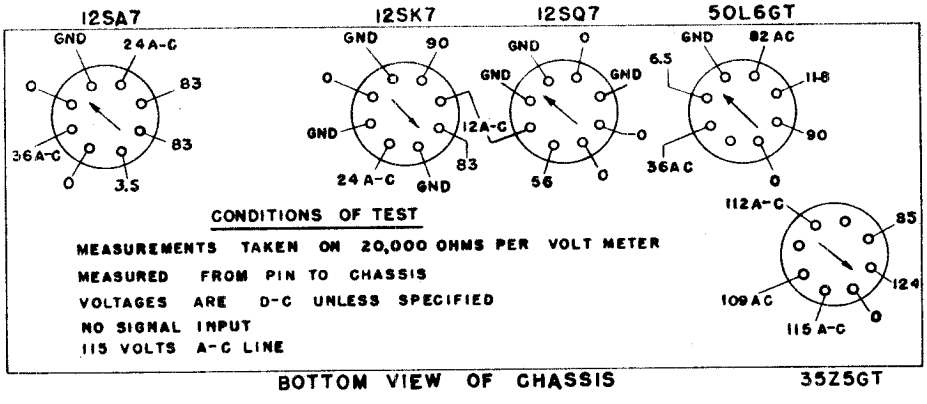

Fig. 1. Socket Voltages

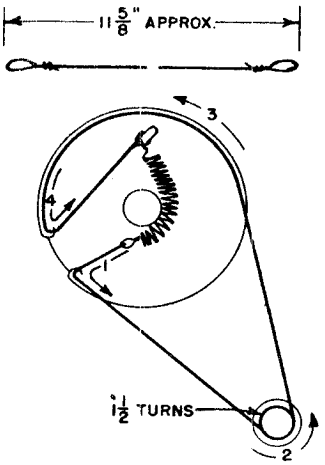

Fig. 3. Drive Stringing

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GENERAL ELECTRIC CO.

MODELS XB-121, XM-121, XR-121, XB-221, XM-221, XR-221

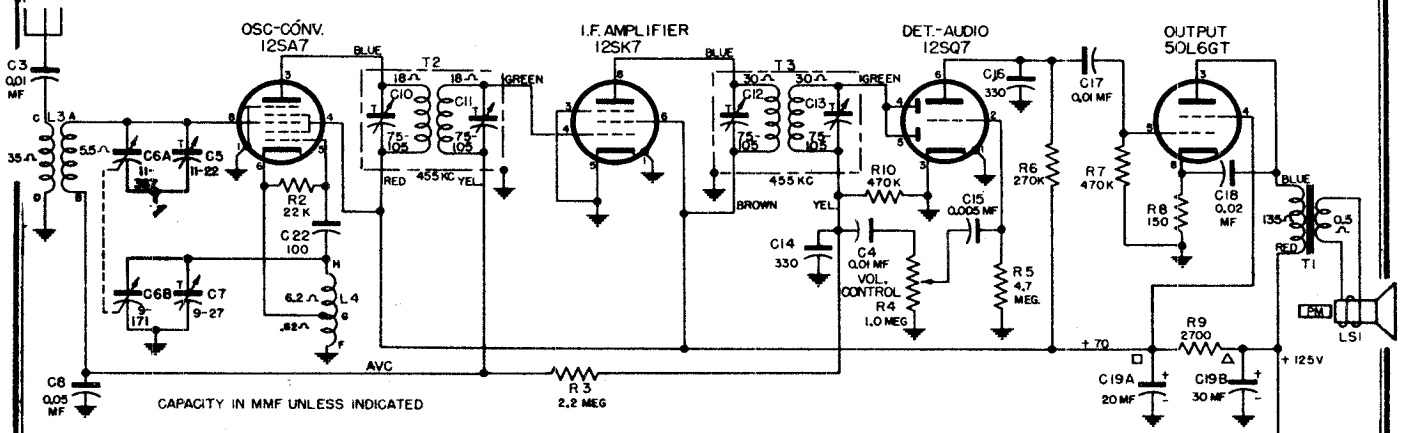


Fig. 2. Schematic Diagram—Model X121 Series

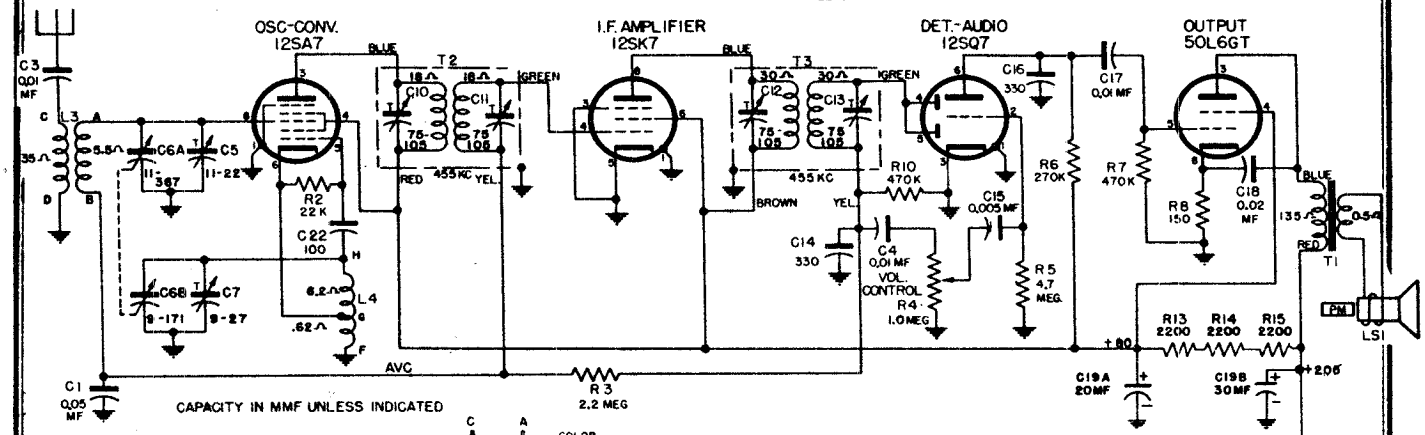


Fig. 3. Schematic Diagram—Model X221 Series

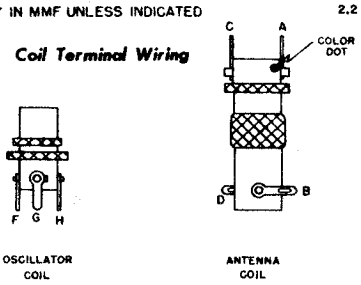
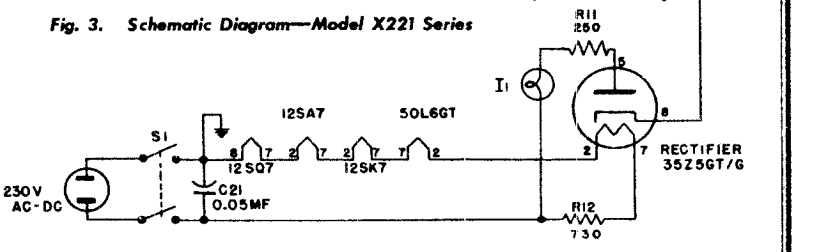


Fig. 4. Coil Terminal Wiring



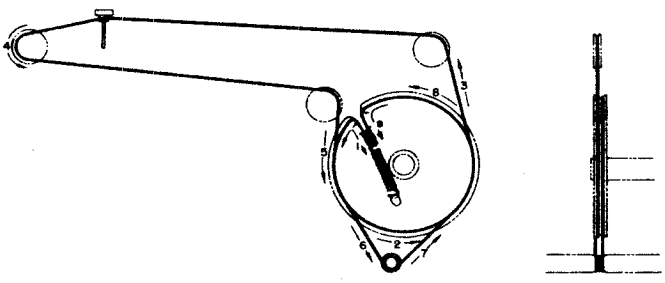


Fig. 5. Dial Stringing Diagram—Model X121 Series (Early Production)

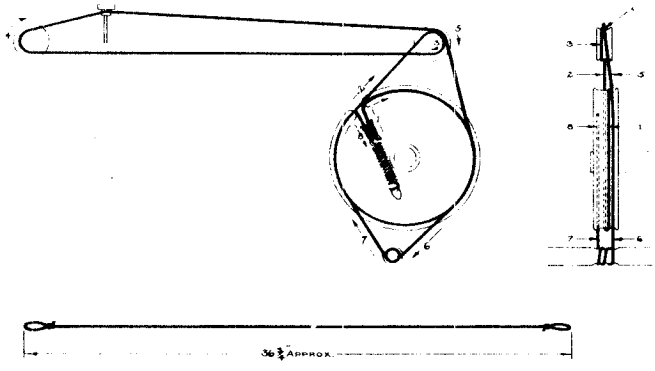


Fig. 6. Dial Stringing Diagram—All Models (Late Production)

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MODELS XB-121,XM-121, XR-121,XB-221,XM-221, XR-221

GENERAL ELECTRIC CO.

SPECIFICATIONS

CABINET:

Model	Material	Color	Height	Width	Depth
XB121	Wood	Walnut	6¾	10⅝	6¾
XM121	Plastic	Mahogany	6	9¼	5 7/16
XR121	Plastic	Maroon	6	9¼	5 7/16
XB221	Wood	Walnut	6¾	10⅝	6¾
XM221	Plastic	Mahogany	6	9¼	5 7/16
XR221	Plastic	Maroon	6	9¼	5 7/16

ELECTRICAL RATING (INPUT):

D1 Voltage Rating (X121 series)..... 105-135 v. a-c or d-c
D2 Voltage Rating (X221 series)..... 210-250 v. a-c or d-c
Frequency on a-c..... 40-60 cycles
Watts (X121 series)..... 30 watts
Watts (X221 series)..... 60 watts

OPERATING FREQUENCIES:

Broadcast Band..... 550-1700 kc
I-F Amplifier..... 455 kc

POWER OUTPUT:

(X121 Series—At 120 Volts Line)
Undistorted..... 0.9 watts
Maximum..... 1.4 watts
(X221 Series—At 230 Volts Line)
Undistorted..... 1.6 watts
Maximum..... 2.5 watts

LOUDSPEAKER:

Type..... Alnico P.M.
Outside Cone Diameter..... 4 inches
Voice Coil Impedance (400 cycles)..... 3.5 ohms

TUBE COMPLEMENT:

Oscillator-Converter..... Type 12SA7
I-F Amplifier..... Type 12SK7
Detector-Audio Amplifier..... Type 12SQ7
Power Output..... Type 50L6GT
Rectifier..... Type 35Z5GT/G
Pilot Lamp..... GE No. 44, 6-8 volt

ELECTRICAL CIRCUIT ALIGNMENT

CAUTION—ONE SIDE OF THE POWER LINE IS CONNECTED TO THE CHASSIS. AVOID ANY GROUND CONNECTIONS TO THE RADIO UNLESS AN ISOLATING TRANSFORMER IS USED IN THE POWER LINE.

ALIGNMENT FREQUENCIES:

R-F..... 1500 kc
I-F..... 455 kc

EQUIPMENT REQUIRED:

1. Test oscillator with audio tone modulation.
2. A-C output meter, 1½ volts full scale.
3. 0.05 mf. paper capacitor.
4. 200 mmf. mica capacitor.
5. Insulated screwdriver.

PROCEDURE—GENERAL: 1. Turn the tuning knob to its extreme counterclockwise position. If the pointer does not coincide with the first marking at the left of the scale, slide it along the dial cord until it does.
2. Remove chassis from cabinet and connect output meter across speaker voice coil terminals. NOTE: For Models XB121 and XB221, use alignment strip in back of dial plate for pointer setting.
3. Keep radio volume control set at maximum and attenuate test oscillator signal output so that the output meter reading never exceeds 1¼ volts.
4. Connect the capacitor, listed in column 2 of Alignment Chart, between the "high side" of the test oscillator and the point of input specified. The ground terminal of the test oscillator may be connected to the chassis, providing an isolating transformer is used between the radio and the line input.

ALIGNMENT CHART

Step	Connect test oscillator to	Test oscillator setting	Pointer setting on radio	Adjustment for maximum output
1.	12SK7 grid (pin 4) in series with 0.05 mf.	455 kc	1500 kc	C12 and C13 (2nd i-f trans. trimmers)
2.	12SA7 grid (pin 8) in series with 0.05 mf.	455 kc	1500 kc	C10 and C11 (1st i-f trans. trimmers)
3.	Ant. post in series with 200 mmf.	1500 kc	1500 kc	C7 (osc.) on gang condenser.
4.	Ant. post in series with 200 mmf.	1500 kc	1500 kc	C5 (ant.) on gang condenser.

STAGE GAIN AND VOLTAGE CHECKS

Stage gain measurements by vacuum tube voltmeter or similar measuring devices may be used to check circuit performance and isolate trouble. The gain values listed may have tolerances of 20%. Readings taken with low signal input so that AVC is not effective.
(1) R-F Stage Gains.
Antenna Post to 12SA7 Grid..... 4.0 @ 1000 kc
12SA7 Grid to 12SK7 Grid..... 55 @ 455 kc
12SA7 Grid to 12SK7 Grid..... 45 @ 1000 kc
12SK7 Grid to 12SQ7 Diode Plate..... 50 @ 455 kc
(2) Audio Gain.
0.12 volts at 400 cycles across volume control (R4) with control set at maximum will give approximately ½-watt output across the speaker voice coil
(3) Oscillator Grid Bias.
D-C voltage developed across the oscillator grid leak (R3) averages 6.0 volts at 1000 kc.
(4) Socket Pin Voltages.
Figures 7 and 8 show voltages from all tube pins to B— unless otherwise specified. Voltage readings much lower than those specified may help localize defective components or tubes.

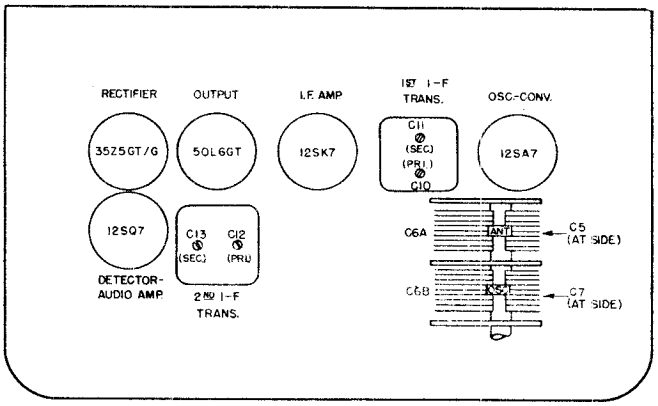

Fig. 1. Tube and Trimmer Location

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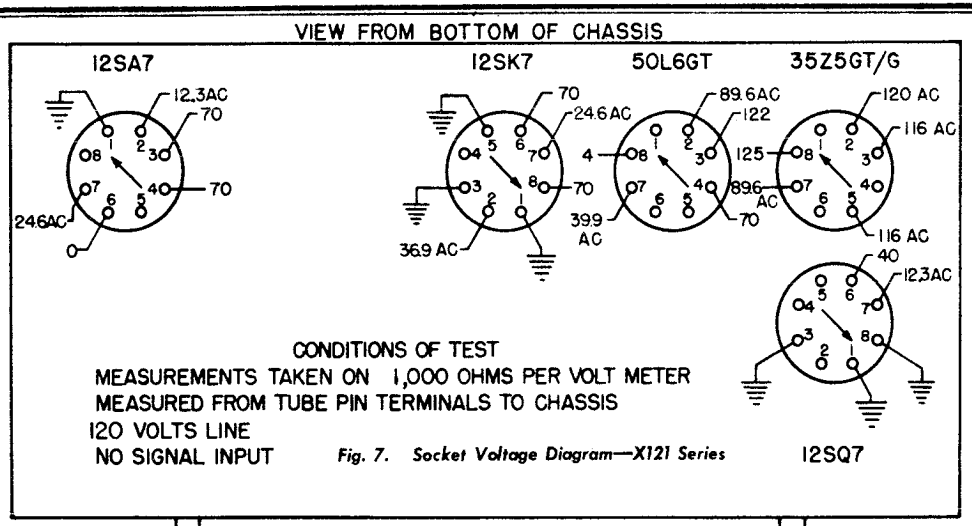


Fig. 7. Socket Voltage Diagram—X121 Series

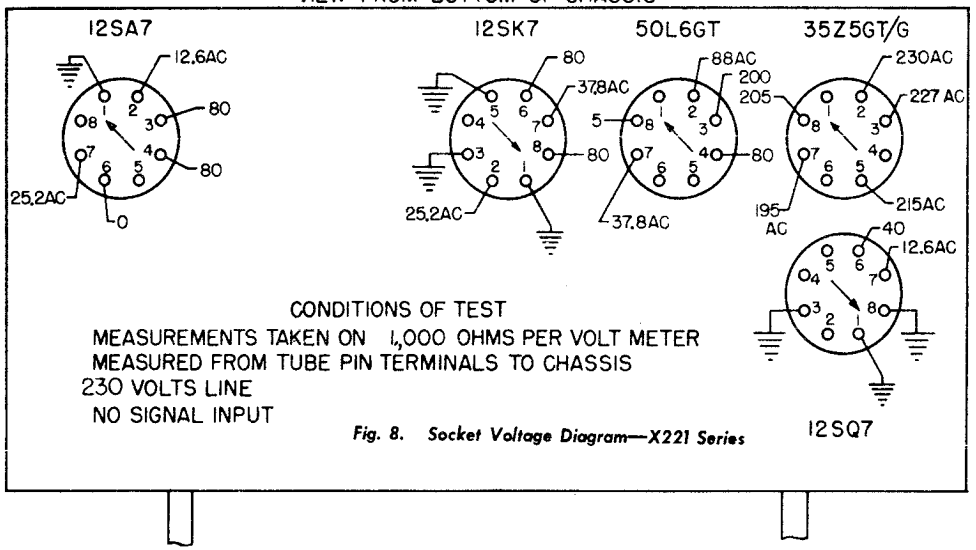


Fig. 8. Socket Voltage Diagram—X221 Series

Note that Part No. UCC-045 and RCC-045 appear to be the same condenser; however, the RCC-type is made with a higher melting-point wax and is used in sections of the receiver where more heat is dissipated. The condensers are identical in size, but the RCC type is marked in red instead of black.

Cat. No.	Symbol	Description
		UNIVERSAL G-E REPLACEMENT PARTS
UCC-039	C15	CAPACITOR—0.005 mfd., 600 v., paper
UCC-045	C8	CAPACITOR—0.05 mfd., 600 v., paper
UCU-028	C22	CAPACITOR—100 mmf., mica
UCU-040	C14, 16	CAPACITOR—330 mmf., mica
UOP-403	LS1	LOUDSPEAKER—4" P.M. speaker
URD-029	R8	RESISTOR—150 ohms, ½ w., carbon
URD-081	R2	RESISTOR—22,000 ohms, ½ w., carbon
URD-107	R6	RESISTOR—270,000 ohms, ½ w., carbon
URD-113	R7, 10	RESISTOR—470,000 ohms, ½ w., carbon
URD-129	R3	RESISTOR—2.2 megohm, ½ w., carbon
URD-137	R5	RESISTOR—4.7 megohm, ½ w., carbon
URE-007	R1	RESISTOR—18 ohms, 1 w., carbon
URF-057	R13, 14	RESISTOR—2,200 ohms, 2 w., carbon (X221 series)
URF-059	R9	RESISTOR—2,700 ohms, 2 w., carbon (X121 series)
		SPECIALIZED G-E REPLACEMENT PARTS
RAB-008		BACK—Cabinet back (XB121)
RAB-009		BACK—Cabinet back (XB221)
RAB-010		BACK—Cabinet back (Plastic X121 series)
RAB-011		BACK—Cabinet back (Plastic X221 series)
RAD-009		BRACKET—Scale mounting bracket
RAU-006		CABINET—Mahogany plastic (XM121, XM221)
RAU-008		CABINET—Maroon plastic (XR121, XR221)
RAV-003		CABINET—Wood (XB121, XB221)
RCC-040	C3, 4, 17	CAPACITOR—0.01 mfd., 600 v., paper
RCC-041	C18	CAPACITOR—0.02 mfd., 600 v., paper
RCC-045	C1, 21	CAPACITOR—0.05 mfd., 600 v., paper
RCE-004	C19a, b	CAPACITOR—20 mfd., 30 mfd., dry electrolytic
RCT-006	C6a, b	CONDENSER—Variable tuning condenser
RDC-005		ASSEMBLY—Drive cord assembly (32⅛"—early production)
RDC-012		ASSEMBLY—Drive cord assembly (36¾" late production)
RDF-005		WASHER—Felt knob washer
RDK-012		KNOB—Control knob (Tomato Red)
RDK-013		KNOB—Control knob (Oak)
RDK-014		KNOB—Control knob (Mahogany)
RDK-016		KNOB—Control knob (Grey)
RDP-006		POINTER—Dial scale pointer
RDS-006		SCALE—Dial scale assembly (XR121, XR221)
RDS-007		SCALE—Dial scale (XB121, XB221)
RDS-009		SCALE—Dial scale (XM121, XM221)
RDW-001		WINDOW—Dial scale window (plastic cabinets)
RDX-010		ASSEMBLY—Scale back plate assembly (XB121, XB221)
RHH-001		FASTENER—Snap fastener (wood cabinets)
RHH-003		FASTENER—Snap fastener (plastic cabinets)
RJS-003		SOCKET—Octal tube socket
RJS-016		SOCKET—Pilot lamp socket
RLA-001	L3	COIL—Antenna coil
RLC-006	L4	COIL—Oscillator coil
RMS-004		SPRING—Drive cord spring
RMU-005		SHAFT—Drive shaft and cotter
RMW-003		PULLEY—Drive cord pulley
RRC-006	R4, S1	VOLUME CONTROL—1.0 megohm control and switch
RRL-001	R12	CORD—Power cord, includes R12 (X221 series)
RRW-001	R11	RESISTOR—250 ohms, 10 w., wirewound
RRW-003	R16	RESISTOR—22 ohms, 1 w., wirewound
RTL-007	T2	TRANSFORMER—1st i-f transformer
RTL-008	T3	TRANSFORMER—2nd i-f transformer
RTO-005	T1	TRANSFORMER—Output transformer
RWL-009		CORD—Power Cord

MODELS X-150,X-150C,
X-150V

GENERAL ELECTRIC CO.

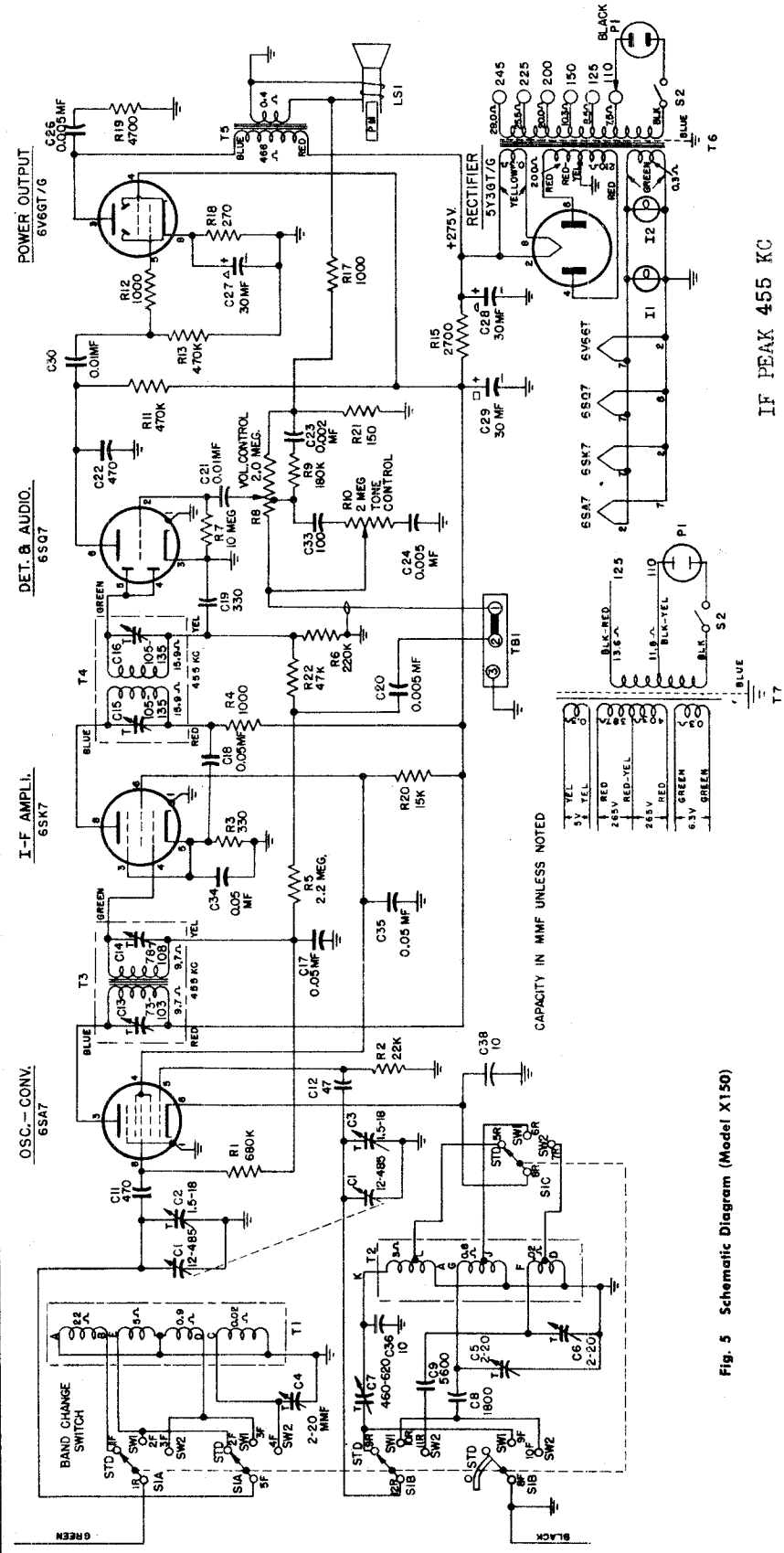


Fig. 5 Schematic Diagram (Model X150)

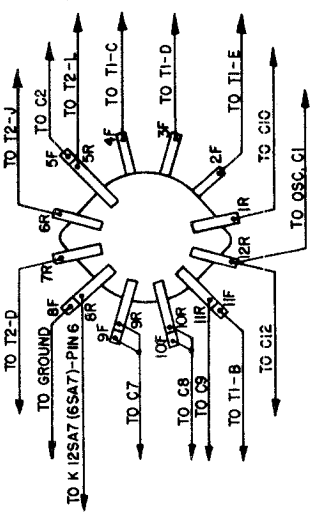


Fig. 7 Switch Terminal Wiring

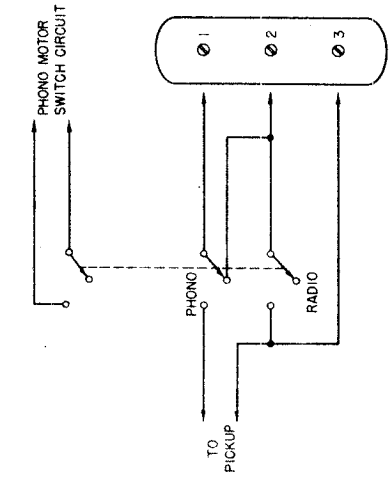


Fig. 4 Phone Connection

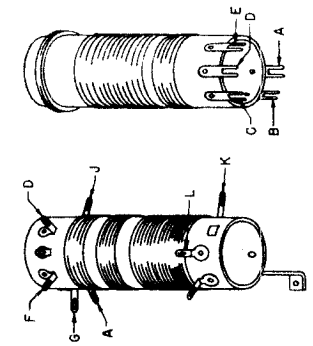
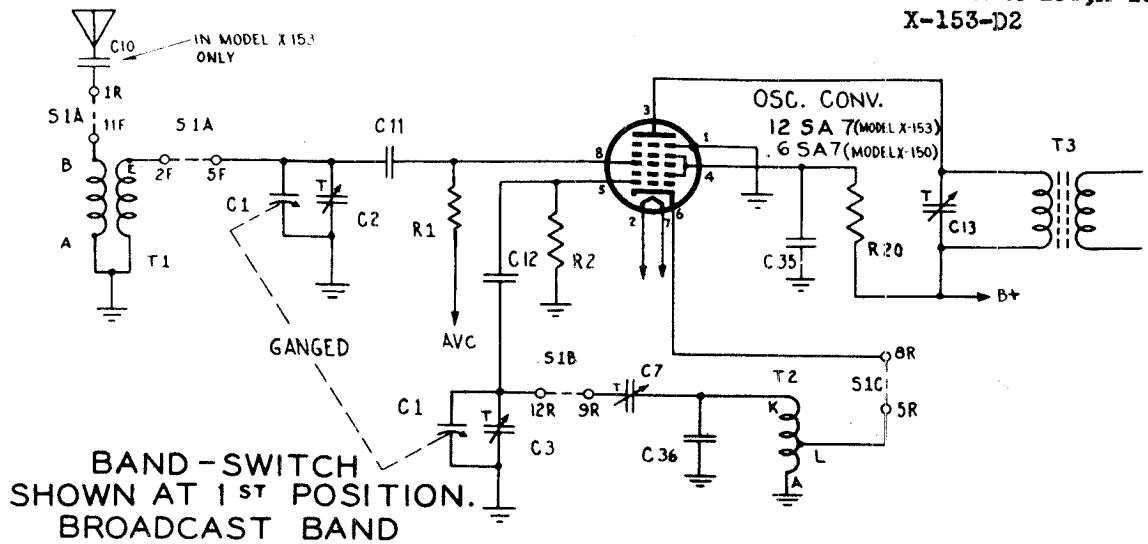


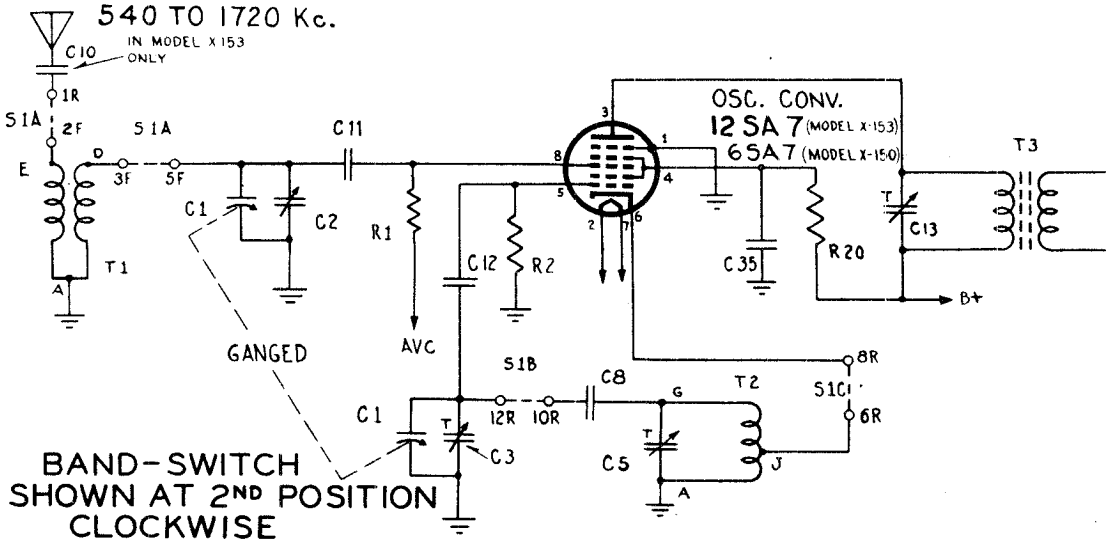
Fig. 6 Coil Terminal Wiring

GENERAL ELECTRIC CO.

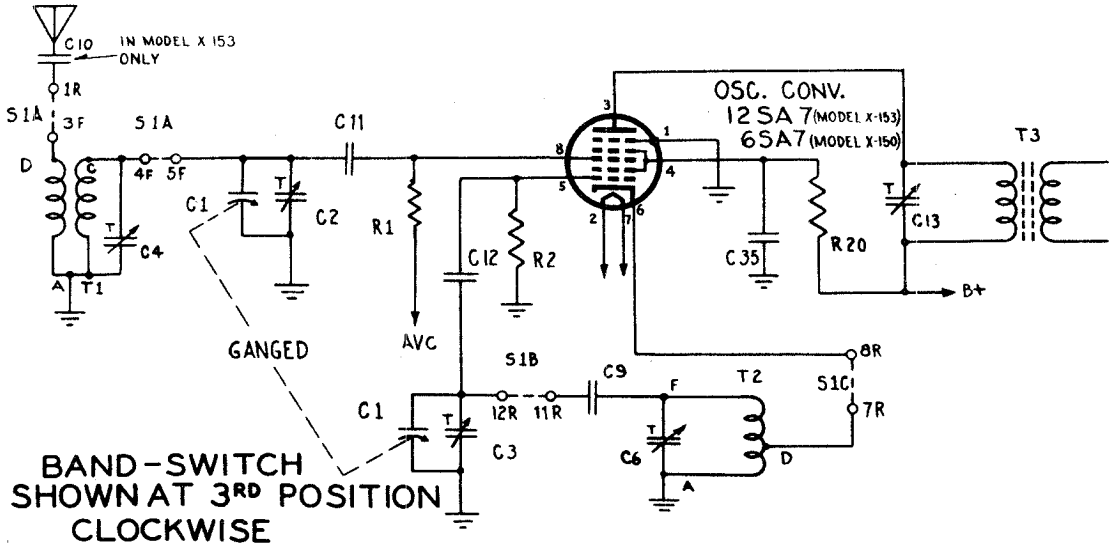
MODELS X-150, X-150C, X-150V
MODELS X-153, X-153-A1, X-153-D2



BAND-SWITCH SHOWN AT 1ST POSITION.
BROADCAST BAND
540 TO 1720 Kc.



BAND-SWITCH SHOWN AT 2ND POSITION CLOCKWISE
SHORT WAVE BAND #1
2.2 - 7.0 Mc.



BAND-SWITCH SHOWN AT 3RD POSITION CLOCKWISE
SHORT WAVE BAND #2
7.0 - 22 Mc.

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MODELS X-153, X-153-A1, X-153-D2

GENERAL ELECTRIC CO.

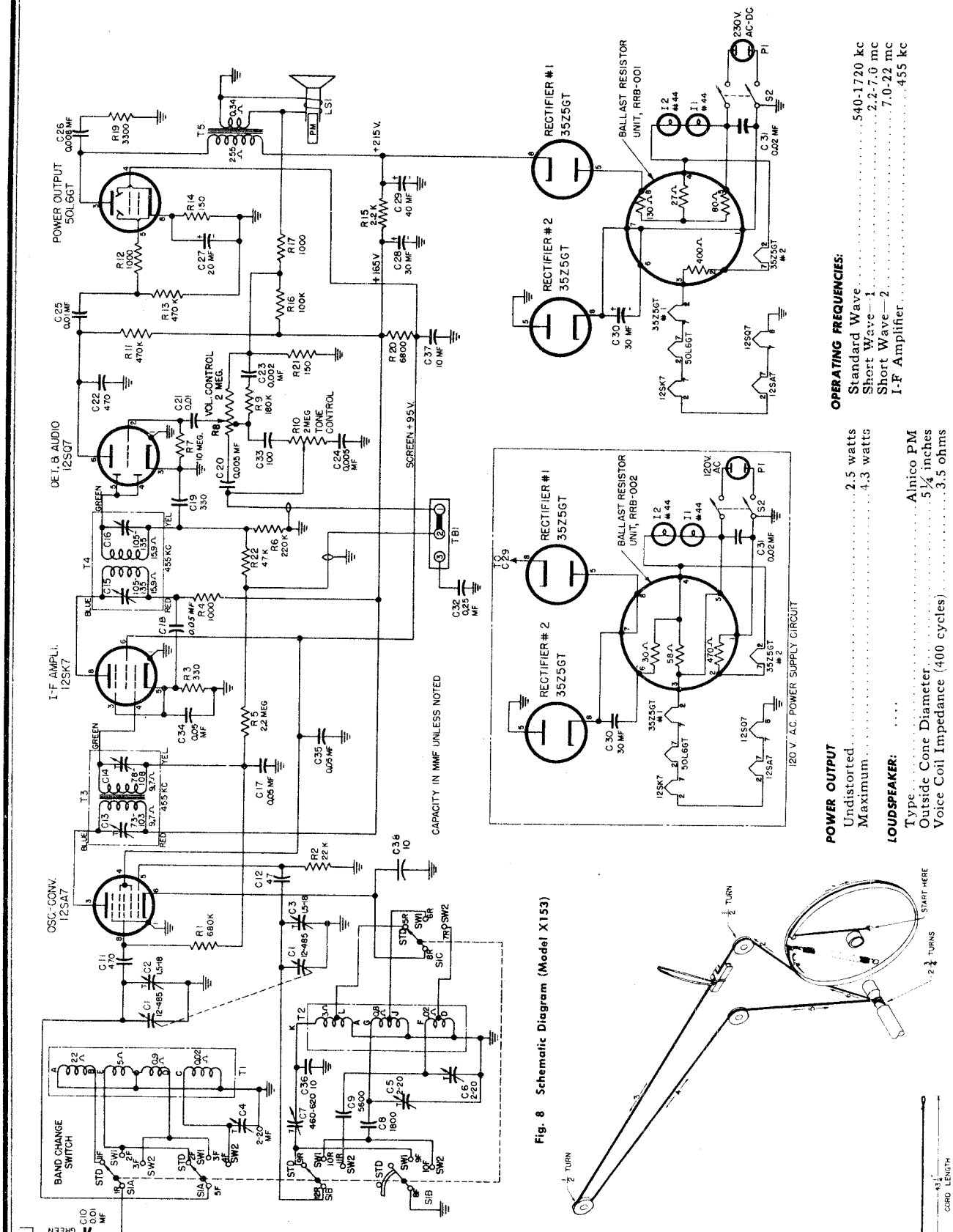

Fig. 8 Schematic Diagram (Model X153)

POWER OUTPUT

Undistorted	2.5 watts
Maximum	4.3 watts

LOUDSPEAKER:

Type	Alnico PM
Outside Cone Diameter	5¼ inches
Voice Coil Impedance (400 cycles)	3.5 ohms

OPERATING FREQUENCIES:

Standard Wave	540-1720 kc
Short Wave—1	2.2-7.0 mc
Short Wave—2	7.0-22 mc
I-F Amplifier	455 kc

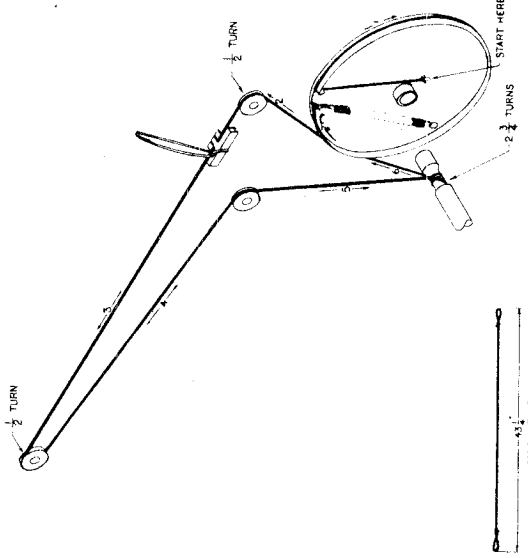

Fig. 9 Drive Stringing

GENERAL ELECTRIC CO.

MODELS X-150,X-150C, X-150V
MODELS X-153,X-153-A1, X-153-D2

ELECTRICAL CIRCUIT ALIGNMENT

ALIGNMENT FREQUENCIES:

R-F (Standard Wave) ..... 580 and 1500 kc
R-F (Short Wave 1) ..... 6 mc
R-F (Short Wave 2) ..... 18 mc
I-F ..... 455 kc

EQUIPMENT REQUIRED:

1. Test oscillator with audio tone modulation.
2. A-C output meter, 1½ volts full-scale.
3. 0.05 mf. paper capacitor.
4. 200 mmf mica capacitor.
5. Insulated screwdriver.

PROCEDURE—GENERAL:

1. The alignment procedure shown in table form should be followed with the chassis removed from the cabinet. Since the dial scale is not a part of the main chassis, it is necessary to use the special alignment scale fastened to the rear of the scale back plate assembly. With the gang condenser fully closed, set the left edge of the pointer to zero on the alignment scale. Then 147 on the alignment scale will correspond to 1500 kc (Standard Wave), approximately 149 to 6 mc (SW 1 band), and 141 to 18 mc (SW 2 band).

2. Connect output meter across speaker voice coil terminals. During alignment keep volume control set at maximum and attenuate test oscillator signal output so that the output meter reading never exceeds 1¼ volts.

3. Connect the capacitor listed in the chart between the "high side" of the test oscillator and the point of input specified. For Model X153, the ground terminal of the test-oscillator may be connected to the chassis, providing an isolating transformer is used between the radio and the line input.

4. After the chassis has been aligned and replaced into the cabinet, it may be necessary to reset the pointer. It should point to zero on the logging scale when the gang condenser is fully closed (pointer at extreme left of scale).

ALIGNMENT CHART

Step	Test-osc. Connection to	Test-osc. Setting	Pointer Setting	Adjust Trimmers for Max. Output
1	12SK7 or 6SK7 IF grid in series with .05 mfd.	455 kc	"STD" Band 550 kc	C15 and C16 (2nd IF trans. capacitors)
2	12SA7 or 6SA7 Conv. grid in series with .05 mfd.	455 kc	"STD" Band 550 kc	C13 and C14 (1st IF trans. capacitors)
3***	Ant. post in series with 200 mmf.	1500 kc	"STD" Band 1500 kc	C3 (osc.); C2 (ant.)
4	Ant. post in series with 200 mmf.	580 kc	"STD" Band 580 kc	C7**
5	Repeat Step No. 3			
6	Ant. post in series with 200 mmf.	6.0 mc	"SW1" Band 6.0 mc	C5 (osc.)**
7	Ant. post in series with 200 mmf.	18.0 mc	"SW2" Band 18 mc	C6 (osc.)* C4 (ant.)**

* Use minimum capacity peak.
** Rock gang condenser for optimum peak.
*** Note: C2 trimmer is not incorporated on some receivers. This requires that C3 be aligned while rocking the gang condenser.

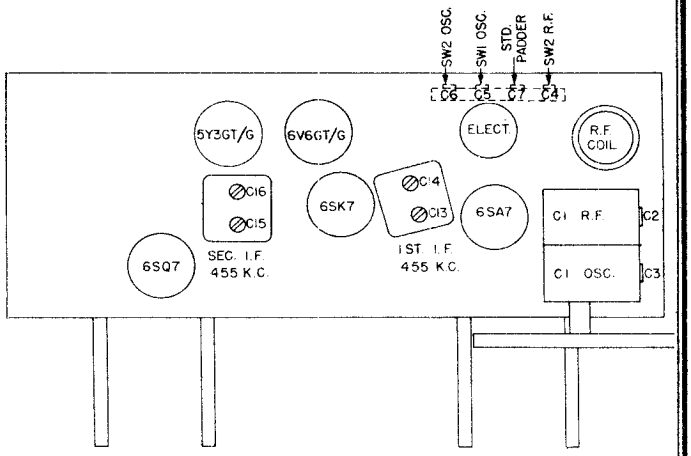

Fig. 1 Tube and Trimmer location (Model X150)

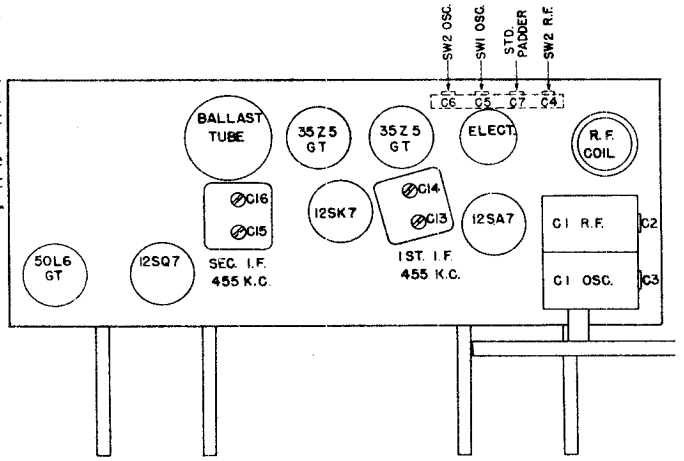

Fig. 2 Tube and Trimmer location (Model X153)

STAGE GAIN AND VOLTAGE CHECKS

Stage gain measurements by vacuum tube voltmeter or similar measuring devices may be used to check circuit performance and isolate trouble. The gain values listed may have tolerances of 20%. Readings taken with low signal input so that AVC is not effective.

(1) R-F Stage Gains.

Antenna Post to 12SA7 Grid ..... 5.5 @ 1000 kc
Antenna Post to 12SA7 Grid ..... 3.3 @ 4000 kc
Antenna Post to 12SA7 Grid ..... 2.0 @ 12000 kc
12SA7 Converter Grid to 12SK7 Grid ..... 65 @ 1000 kc
12SA7 Converter Grid to 12SK7 Grid ..... 81 @ 455 kc
12SK7 Grid to 12SQ7 Diode Plate ..... 62 @ 455 kc

(2) Audio Gain.

0.06 volts for Model X150, or 0.03 volts for Model X153, at 400 cycles across volume control (R10) with control set at maximum will give approximately ½-watt output across the speaker voice coil.

(3) Oscillator Grid Bias.

D-C voltage developed across the oscillator grid leak (R2) averages 7.3 volts at 1000 kc, 9.9 volts at 4000 kc, and 6.8 volts at 12,000 kc.

(4) Socket Pin Voltages.

Figures 9, 10 and 11 show voltages from all tube pins to B— unless otherwise specified. Voltage readings much lower than those specified may help localize defective components or tubes.

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MODELS X-150,X-150C,
X-150V

GENERAL ELECTRIC CO.

MODELS X-153,X-153-A1,
X-153-D?

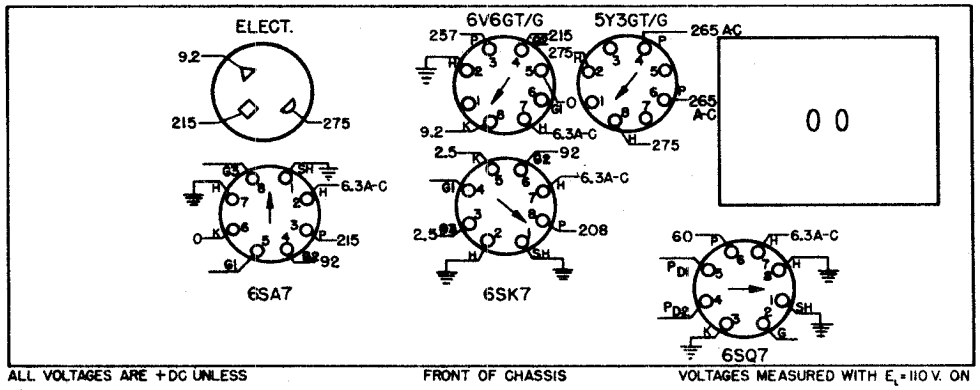

Fig. 9 Socket Voltages (Model X150)

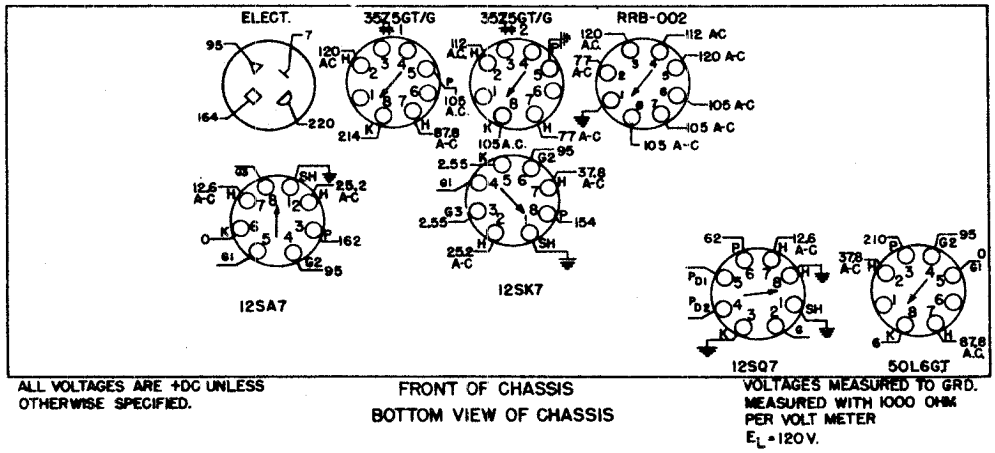

Fig. 10 Socket Voltages (Model X153 A1)

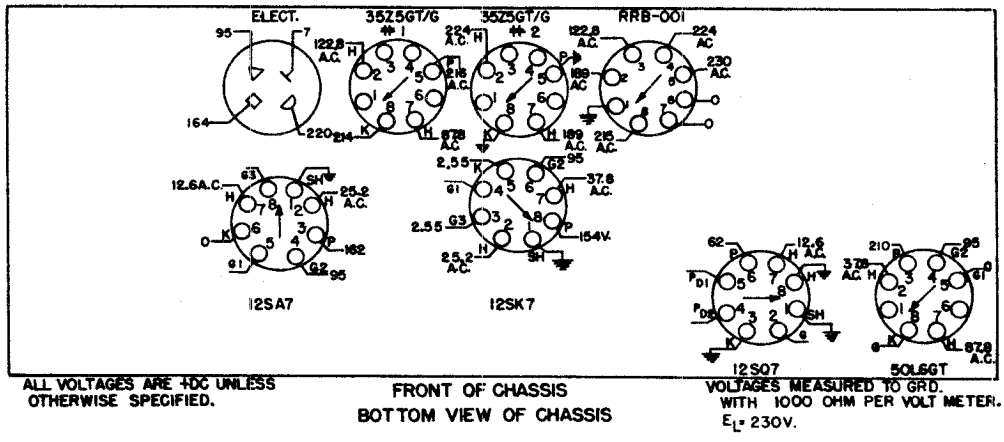

Fig. 11 Socket Voltages (Model X153 D2)

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MODELS X-150, X-150C, X-150V
MODELS X-153, X-153-A1, X-153-D2

ELECTRICAL RATING

Model	Rating	Power Supply			Power Consumption
		Nominal Voltage	Voltage Range	Frequency Cycles A-c	
X150	V	110 125 150 200 225 245	103-117 117-133 140-160 185-213 213-234 234-260	50-60	55
X150	C	110 125	103-117 117-133	25-60	55
X153	D2	230 Ac-Dc	210-250	40-60	60
X153	A1	120 Ac	105-130	40-60	60

CAUTION:

On the Model X153, one side of the power line is connected to the chassis. Use extreme caution when servicing this receiver unless an isolating transformer is used in the power line. Do not place a ground on the chassis unless an isolating transformer is used.

GENERAL INFORMATION

Power Supply Conversion—Model X150:

The Model X150 "V" rating receiver is equipped with a universal power transformer which permits practically instantaneous conversion for operation on any one of the six voltage ranges shown on the label. Merely loosen the set screw on the control at the top of the power transformer and turn the knob until the correct nominal voltage rating appears in the window. Tighten the set screw.

The Model X150 "C" rating makes use of a tapped transformer. To change voltage rating reconnect transformer primary to proper input color coded leads as shown on schematic.

Power Supply Conversion—Model X153:

The X153 Models with "D2" and "A1" ratings are identical except for the ballast tube that is used. The substitution of the appropriate ballast tube takes care of all the wiring changes necessary to convert from one line voltage range to the other. The "A1" rating may be converted for operation on a line of 230 volts a-c or d-c by removing the ballast resistor unit, Part No. RRB-002, and substituting the ballast resistance unit, Part No. RRB-001, in the same socket. When this is done the label should be changed so that it reads "D2" rating. The "D2" rating may be changed to "A1" rating in like manner—by substitution of Part No. RRB-002 ballast resistor for Part No. RRB-001.

Phonograph or FM Sound Connection:

Figure 4 shows a simple method for connecting a crystal or high impedance magnetic phono pick-up into the circuit of the Models X150 and X153. A double-pole, double-throw type phono switch with a phono motor power switch attached is recommended. This should be mounted close to the rear chassis terminal board on the radio. It is important that if the lead from the record player is shielded that the shield braid be connected to terminal 3, ***not to chassis ground. As a precaution when operating the Model X153, add spaghetti insulation to the full length of the shield braid so that the braid cannot accidentally touch the chassis. This will also avoid the possibility of the operator receiving a shock under certain conditions.***

When making this phono connection as a permanent installation, the link between terminals 1 and 2 must be removed.

An FM Translator may be connected in the same manner as for the record player. This permits the FM sound to be reproduced through the radio.

Cat. No.	Symbol	Description
UNIVERSAL G-E REPLACEMENT PARTS		
UCC-036	C23	CAPACITOR—0.002 mf., 600 v., paper
UCC-039	C20, 24	CAPACITOR—0.005 mf., 600 v., paper
UCC-040	C10, 21, 25	CAPACITOR—0.01 mf., 600 v., paper
UCC-045	C17, 18, 34, 35	CAPACITOR—0.05 mf., 600 v., paper
UCC-050	C32	CAPACITOR—0.25 mf., 600 v., paper (Model X153)
UCC-061	C26	CAPACITOR—0.008 mf., 1000 v., paper (Model X153)
UCU-028	C33	CAPACITOR—100 mmf., mica
UCU-044	C11	CAPACITOR—470 mmf., mica
UCU-1004	C36, 38	CAPACITOR—10 mmf., mica
UCU-1040	C19	CAPACITOR—330 mmf., mica
UCU-1044	C22	CAPACITOR—470 mmf., mica
UCU-1520	C12	CAPACITOR—47 mmf., mica
UCU-2557	C8	CAPACITOR—1800 mmf., mica
UCU-2570	C9	CAPACITOR—5600 mmf., mica
UIC-001		CEMENT—Cone cement
UOP-520	LS1	LOUDSPEAKER—5¼ inch PM speaker
UOX-008		CONE—Loudspeaker replacement cone assembly
URD-029	R14, 21	RESISTOR—150 ohms, ½ w., carbon
URD-037	R3	RESISTOR—330 ohms, ½ w., carbon
URD-049	R4, 12, 17	RESISTOR—1000 ohms, ½ w., carbon
URD-061	R19	RESISTOR—3300 ohms, ½ w., carbon (Model X153)
URD-065	R19	RESISTOR—4700 ohms, ½ w., carbon (Model X150)
URD-081	R2	RESISTOR—22,000 ohms, ½ w., carbon
URD-089	R22	RESISTOR—47,000 ohms, ½ w., carbon
URD-097	R16	RESISTOR—100,000 ohms, ½ w., carbon (Model X153)
URD-103	R9	RESISTOR—180,000 ohms, ½ w., carbon
URD-105	R6	RESISTOR—220,000 ohms, ½ w., carbon
URD-113	R11, 13	RESISTOR—470,000 ohms, ½ w., carbon
URD-117	R1	RESISTOR—680,000 ohms, ½ w., carbon
URD-129	R5	RESISTOR—2.2 meg., ½ w., carbon
URD-145	R7	RESISTOR—10 meg., ½ w., carbon
URE-035	R18	RESISTOR—270 ohms, 1 w., carbon (Model X150)
URF-057	R15	RESISTOR—2200 ohms, 2 w., carbon (Model X153)
URF-059	R15	RESISTOR—2700 ohms, 2 w., carbon (Model X150)
URF-069	R20	RESISTOR—6800 ohms, 2 w., carbon (Model X153)
URF-077	R20	RESISTOR—15,000 ohms, 2 w., carbon (Model X150)
SPECIALIZED G-E REPLACEMENT PARTS		
RAB-013		BACK—Cabinet back cover (Model X150)
RAB-014		BACK—Cabinet back cover (Model X153)
RAV-006		CABINET—Wood cabinet
RCC-040	C30	CAPACITOR—0.01 mf., 600 v., paper
RCC-059	C26	CAPACITOR—0.005 mf., 1000 v., paper (Model X150)

Cat. No.	Symbol	Description
SPECIALIZED G-E REPLACEMENT PARTS		
RCE-034	C27, 28, 29	CAPACITOR—30 mf., 350 v.; 30 mf., 350 v.; 30 mf., 25 v., dry electrolytic (Model X150)
RCE-009	C30	CAPACITOR—30 mf., 250 v., dry electrolytic (Model X153)
RCE-035	C27, 28, 29, 37	CAPACITOR—20 mf., 25 v.; 30 mf., 250 v., 40 mf., 250 v.; 10 mf., 250 v., dry electrolytic (Model X153)
RCS-002	C31	CAPACITOR—0.02 mf., 600 v., paper (Model X153)
RCT-009	C1, 2, 3	CONDENSER—Tuning condenser, includes trimmers
RDF-005		WASHER—Felt washer for knobs
RDK-022		KNOB—Control knob with pointer (painted)
RDK-053		KNOB—Control knob with pointer (plain)
RDM-001		CUSHION—Rubber cushions for dial scale
RDP-009		POINTER—Dial scale pointer assembly
RDS-014		SCALE—Dial scale
RDX-012		SCALE PLATE—Scale plate assembly
RDX-014		CORD—Drive cord assembly
RIT-002		Cover—Inner and outer cardboard cover for electrolytic capacitor
RIT-003		
RJS-003		SOCKET—Octal base tube socket
RJS-012		PLATE—Electrolytic mounting plate (4 mtg. lugs)
RJS-022		SOCKET—Pilot light socket (Model X150)
RJS-023		SOCKET—Pilot light socket (Model X153)
RJS-024		PLATE—Electrolytic mounting plate (3 mtg. lugs) (Model X153)
RLA-003	T1	COIL—Antenna coil
RLC-009	T2	COIL—Oscillator coil
RMM-005		SHIELD—Pilot lamp shield
RMS-007		SPRING—Drive cord tension spring
RMU-009		SHAFT—Tuning shaft and cotter
RMW-008		PULLEY—Drive cord idler pulley and stud
RRB-001		BALLAST—230 volt ballast resistance unit (Model X153)
RRB-002		BALLAST—120 volt ballast resistance unit (Model X153)
RRC-009	R8	VOLUME CONTROL—2 meg., potentiometer
RRC-010	R10, S2	TONE CONTROL—2 meg., potentiometer includes power switch (Model X150)
RRC-011	R10, S2	TONE CONTROL—2 meg., potentiometer, includes power switch (Model X153)
RSW-011	S1	SWITCH—Band change switch
RTL-013	T3	TRANSFORMER—1st I-F transformer
RTL-014	T4	TRANSFORMER—2nd I-F transformer
RTO-008	T5	TRANSFORMER—Output transformer (Model X150)
RTO-009	T5	TRANSFORMER—Output transformer (Model X153)
RTP-014	T6	TRANSFORMER—Power transformer, 60 cycle (Model X150)
RTP-015	T6	TRANSFORMER—Power transformer, 25-60 cycles (Model X150)
RWL-004		CORD—Power cord

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MODELS X-181V,XC-181V,
XP-181V,X-182V,X-181C,
XC-181C,Preliminary

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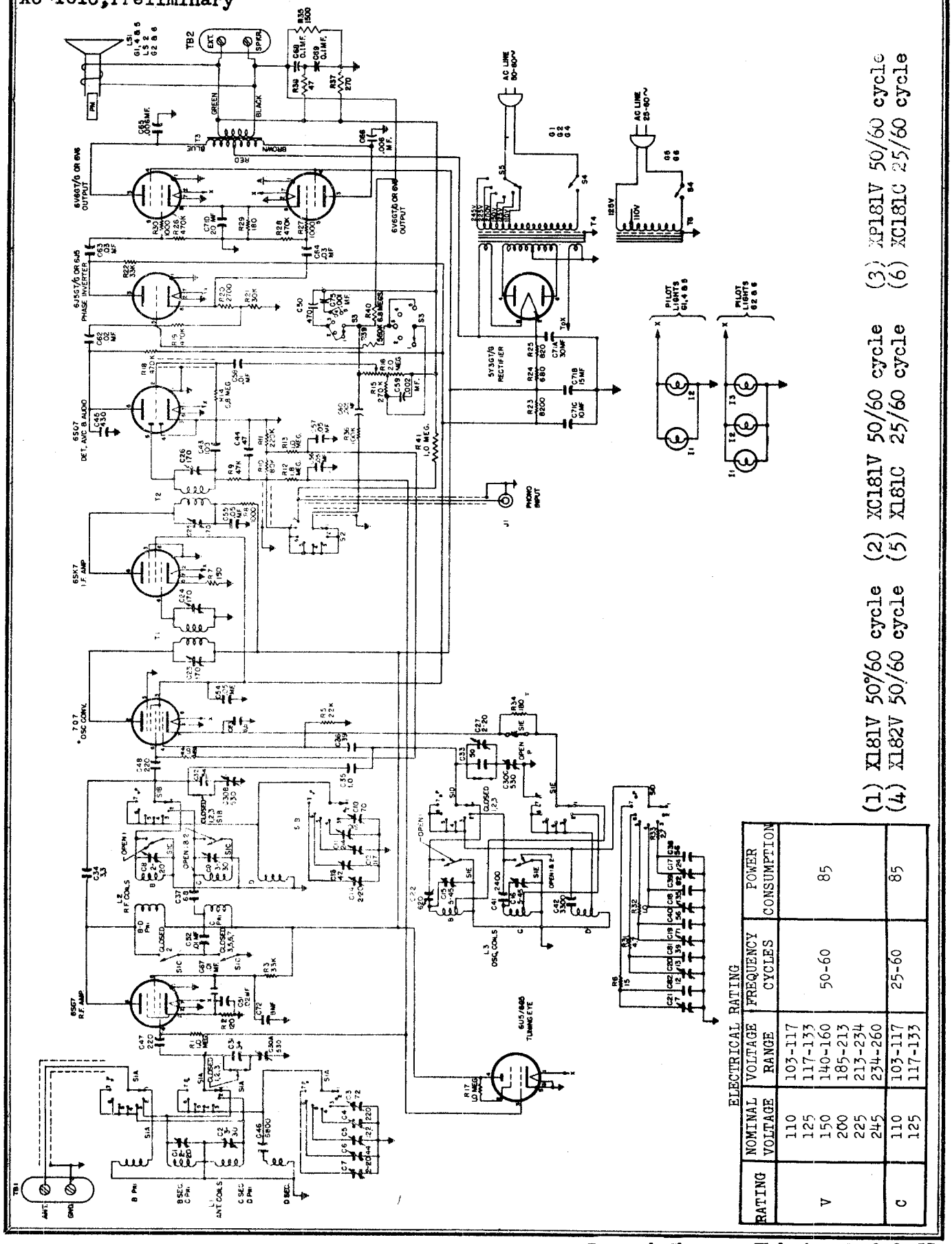

ELECTRICAL RATING

RATING	NOMINAL VOLTAGE	VOLTAGE RANGE	FREQUENCY CYCLES	POWER CONSUMPTION
V	110	103-117	50-60	85
	125	117-133		
	150	140-160		
	200	185-213		
	225	213-234		
	245	234-260		
C	110	103-117	25-60	85
	125	117-133		

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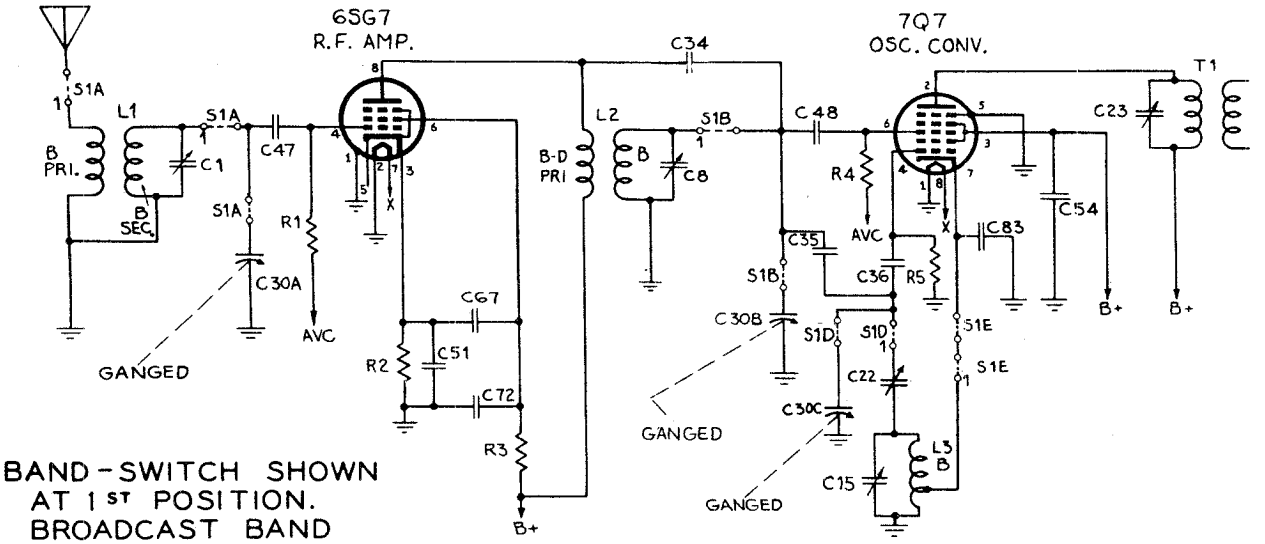
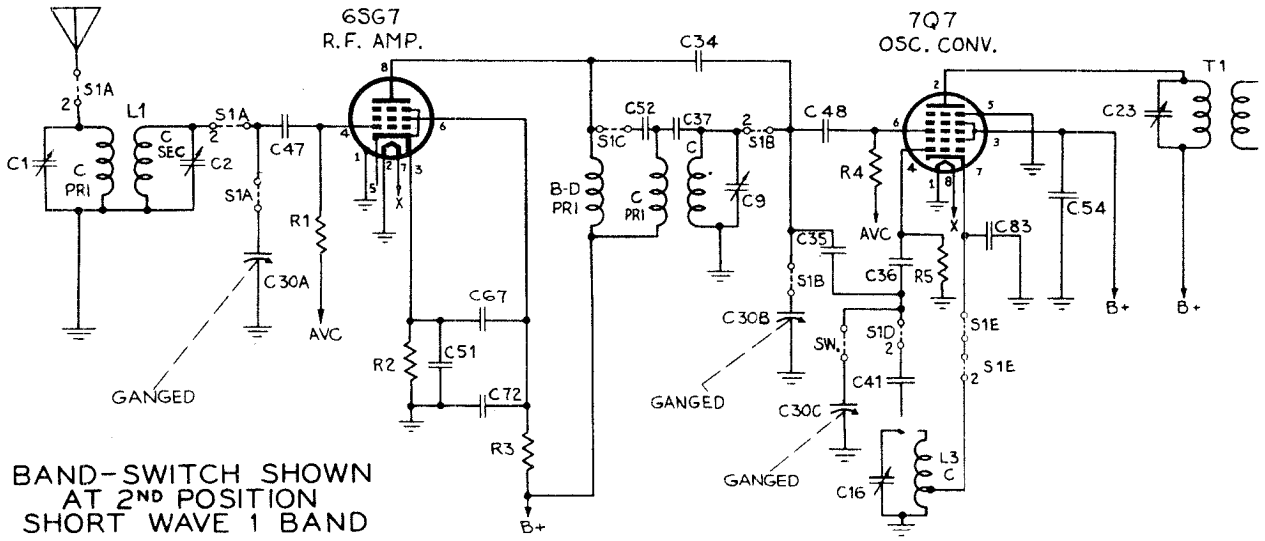
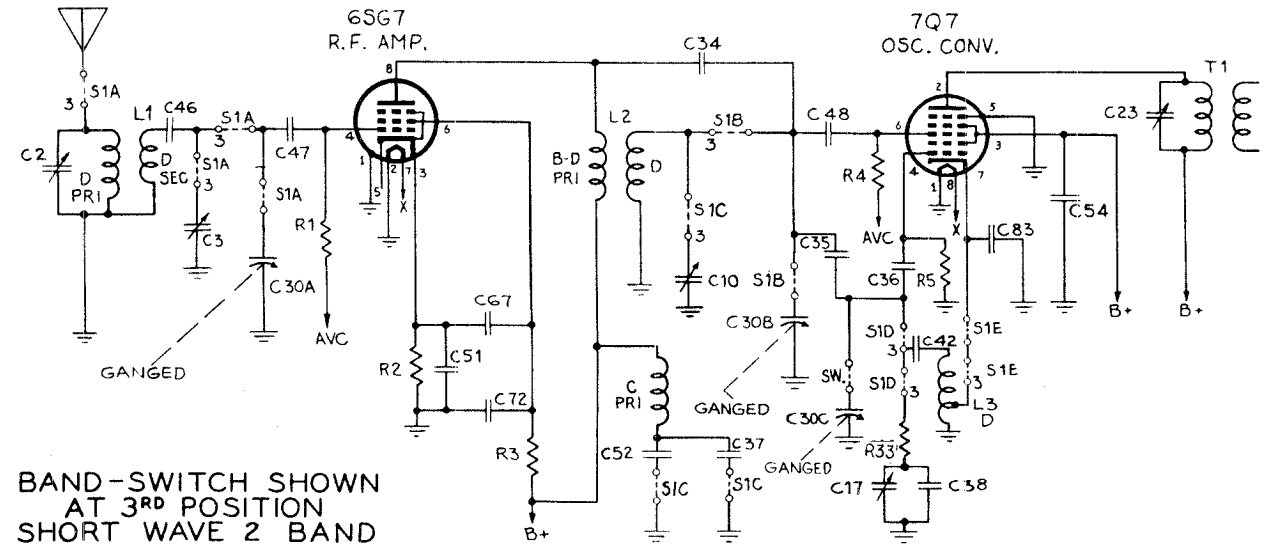
MODELS X-181V, XC-181V, XP-181V, X-181C, XC-181C X-182V, Preliminary



BAND-SWITCH SHOWN AT 1ST POSITION. BROADCAST BAND



BAND-SWITCH SHOWN AT 2ND POSITION SHORT WAVE 1 BAND



BAND-SWITCH SHOWN AT 3RD POSITION SHORT WAVE 2 BAND

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XP-181V, X-181C, XC-181C,
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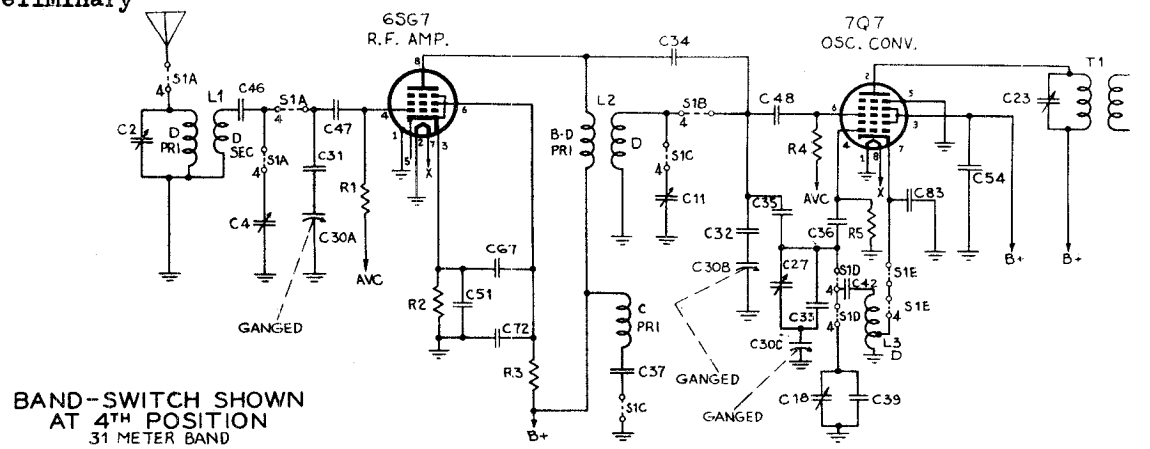
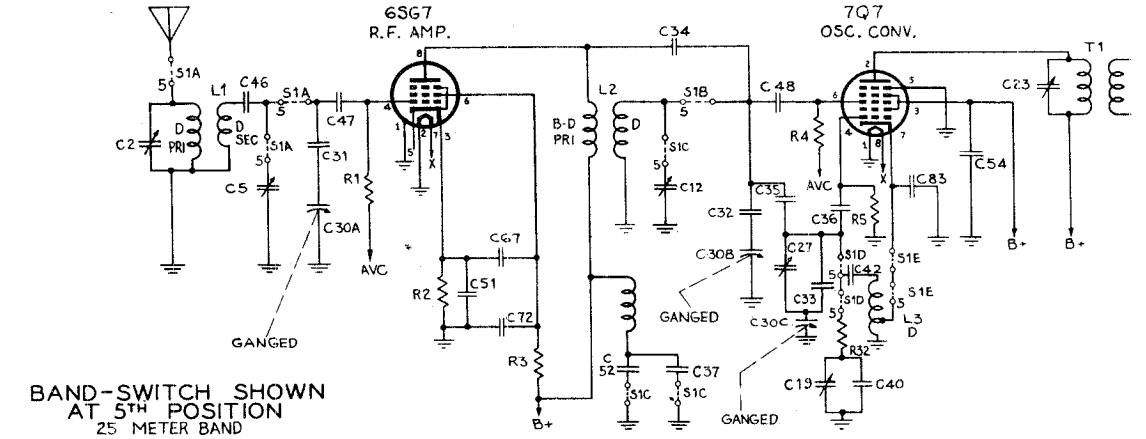
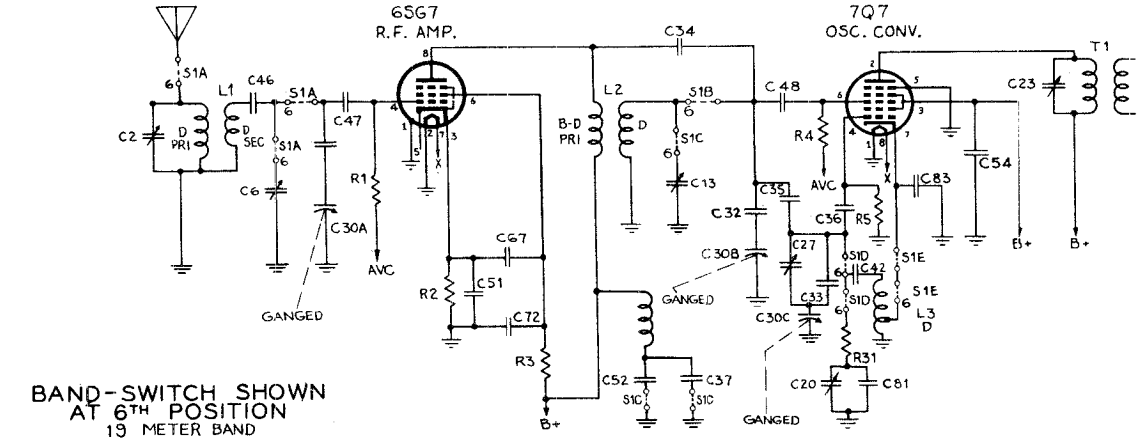


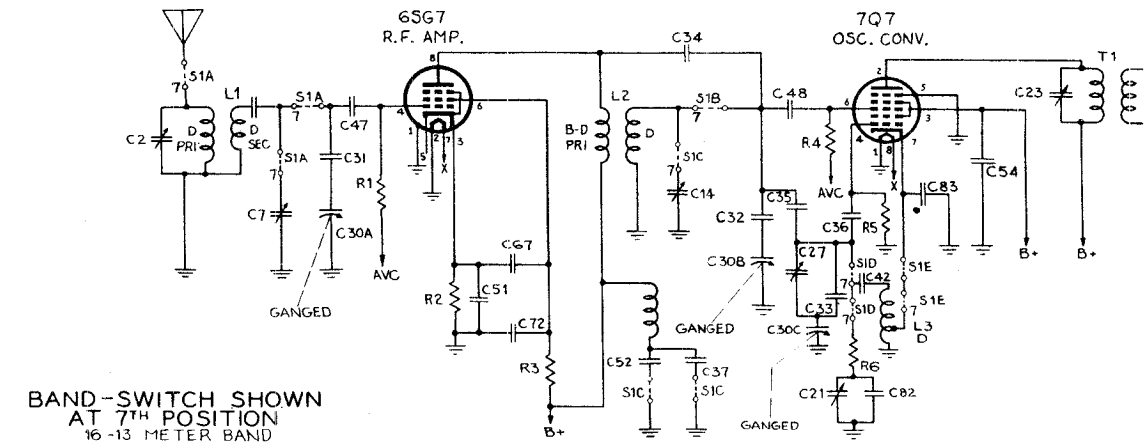
BAND-SWITCH SHOWN
AT 4TH POSITION
31 METER BAND



BAND-SWITCH SHOWN
AT 5TH POSITION
25 METER BAND



BAND-SWITCH SHOWN
AT 6TH POSITION
19 METER BAND



BAND-SWITCH SHOWN
AT 7TH POSITION
16-13 METER BAND

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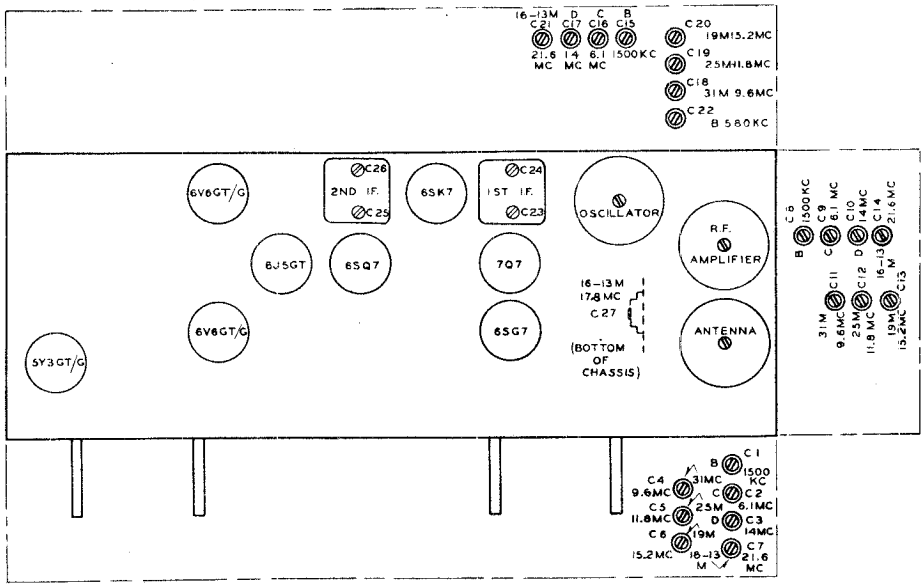
MODELS X-181V,XC-181V, XP-181V,X-181C,XC-181C X-182V,Preliminary



ELECTRICAL CIRCUIT ALIGNMENT

PROCEDURE: (1) Remove chassis during r-f alignment.

(2) Connect output meter across loudspeaker voice coil leads.

(3) Set radio volume control to its maximum position and attenuate the test oscillator signal output so that the output meter reading never exceeds 1 1/4 volts.

(4) Connect capacitor or capacitor and resistor listed in column 2 between the output "High Side" of test oscillator and the point of input specified.

ALIGNMENT CHART

Step	Test Osc. Connected To -	Test Osc. Setting	Band & Pointer Setting	Tune Trimmer for Max. Output
1	6SK7 grid in series with .05 mf.	455 KC	"B" BAND 550KC	C25 & C26
2	7Q7 grid in series with .05 mf.	455 KC	"B" BAND 550KC	C23 & C24 Retrim C25 & C26
3	ANT. POST in series with 200 mmf. and 400 ohms	1500 KC	"B" BAND 1500KC	C15,C1,C8
4	ANT. POST in series with 200 mmf. and 400 ohms	580 KC	"B" BAND 580KC	C22*
5	R E P E A T S T E P 3			
6	ANT. POST in series with 200 mmf. and 400 ohms	6.1 MC	SW1, 6.1MC	C16,C2,C9
7	ANT. POST in series with 200 mmf. and 400 ohms	14 MC	SW2, 14MC	C17,C3,C10
8	ANT. POST in series with 200 mmf. and 400 ohms	17.8 MC	16-13M, 17.8MC	C27*
9	ANT. POST in series with 200 mmf. and 400 ohms	21.6 MC	16-13M, 21.6MC	C21**,C7,C14***
10	R E P E A T S T E P S 8 A N D 9			
11	ANT. POST in series with 200 mmf. and 400 ohms	9.6 MC	31M, 9.6MC	C18**,C4,C11
12	ANT. POST in series with 200 mmf. and 400 ohms	11.8 MC	25M, 11.8MC	C19**,C5,C12
13	ANT. POST in series with 200 mmf. and 400 ohms	15.2 MC	19M, 15.2MC	C20**,C6,C13

*Rock gang condenser for optimum peak. **Use minimum capacity setting if two are obtainable.
***Use maximum capacity peak if two are obtainable.

SOCKET VOLTAGES

CONDITIONS OF TEST: 1000 ohm/volt meter used. All measurements made to chassis. Values are d-c unless noted. Measurements made using tap voltage shown on schematic.

PIN NO.	1	2	3	4	5	6	7	8
6SG7	0	0	1.2	0	1.2	110	6.3 AC	209
7Q7	0	207	95	0	0	0	0	6.3 AC
6SK7	0	6.3 AC	0	0	1.9	95	0	197
6SQ7	0	0	0	0	0	31	6.3 AC	0
6J5GT	0	0	68	-	-2.1	-	6.3 AC	24
6V6GT/G	0	6.3 AC	264	209	0	-	0	11.2
5Y3GT/G	-	270	-	274 AC	-	274 AC	-	270
6U5/6G5	6.3 AC	-	-	209	-	0	-	-

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MODELS X-181V,XC-181V, XP-181V,X-181C,XC-181C, X-182V,Preliminary

GENERAL ELECTRIC CO.

Cat.No.	Description	Model	Qty. Per Set	Symbol
RAB-015	Cabinet back	1-4-5	1	
RAB-026	" "	3	1	
RAG-004	Grille	1-4-5	1	
RAG-007	" (metal)	3	1	
RAV-013	Cabinet	1-5	1	
RAV-014	"	4	1	
RAV-015	"	2-6	1	
RAV-016	"	3	1	
RCC-036	Capacitor (paper) .1 mfd. 600 V.	All	2	C68,69
RCC-060	" " .006 mfd. 1000 V.	"	2	C65,66
RCE-002	" electrolytic - 15-15 - 350 V.	3	1	C88 A & B
RCE-011	" " - 8 mfd. 250 V.	All	1	C72
RCE-012	(" " - 30-350V,			
	(15-300,10-150,20-25	All	1	C71 A,B,C,D
RCT-010	Capacitor (Tuning)	"	1	C30 A,B,C
RCW-010	" (Mica) 56 mmf.	"	1	C38
RCW-011	" (") 56 "	"	1	C40
RCW-012	" (") 39 "	"	1	C81
RCW-058	" (") 54 "	"	2	C31,32
RCW-059	" (") 50 "	"	1	C33
RCX-007	Trimmer strip assembly	"	1	C18,19,20,22
RCX-008	" " "	"	1	C15,16,17,21
RCX-009	" " "	"	2	C1,2,3,7,8,9, 10,14
RCX-010	" " "	"	2	C13,12,11,6, 5,4
RCY-006	Capacitor (trimmer)	"	1	C27
RDC-008	Drive cord assembly (tuning)	1-4-5	1	
RDC-009	" " " "	1-4-5	1	
RDC-010	" " " (Band)	1-4-5	1	
RDD-005	Drum assembly	All	1	
RDE-012	Escutcheon	2-3-6	1	
RDF-005	Knob felt washer	All	4	
RDG-001	Back plate (background)	1-4-5	1	
RDK-026	Knob (plain)	1-4-5	2	
RDK-027	" (pointer)	1-4-5	2	
RDK-034	"	3	2	
RDK-056	"	3	2	
RDP-011	Pointer & slider assembly	1-4-5	1	
RDP-012	" " "	All	1	
RDP-019	" " "	2-3-6	1	
RDS-017	Dial scale	1-4-5	1	
RDS-027	" "	2-3-6	1	
RDX-023	Background plate assembly	2-6	1	
RDX-024	" " "	3	1	
RHG-001	Cushion (capacitor)	All	3	
RHG-005	Grommet (power cord)	"	1	
RHM-023	Stud (pulley)	"	2	
RJP-003	Plug (phono motor)	3	1	
RJP-004	" (phono)	All	1	
RJP-010	Phono jack	"	1	
RJS-012	Mtg.Plate (electrolytic)	"	1	
RJS-016	Socket (dial light)	1-4-5	2	
RJS-017	" (tube)	All	7	
RJS-018	" "	"	1	
RJS-028	Tuning indicator tube connector	"	1	
RJS-037	Mtg.plate (electrolytic)	3	1	
RJS-045	Socket (dial light)	3	1	
RJS-046	" " "	3	1	
RJS-047	" " "	2-3-6	1	
RJS-048	Tuning indicator tube connector	3	1	
RLA-004	Antenna coil	All	1	L-1
RLB-003	R.F.Amplifier coil	"	1	L-2
RLC-010	Oscillator coil	"	1	L-3
RMC-006	Clamp (tuning indicator)	"	1	
RMS-019	Spring (LINK)(Band)	"	1	
RMW-008	Pulley	"	2 or 5	
RMW-013	Flywheel	"	1	
RMW-014	Pulley	2-3-6	3	
RMX-007	Lever & link (Phono Sw.)	All	1	
RPX-010	Phono pick-up	3	1	
RRC-012	Volume control	All	1	

(1) X181V 50/60 cycle
(2) XC181V 50/60 cycle
(3) XP181V 50/60 cycle
(4) X182V 50/60 cycle
(5) X181C 25/60 cycle
(6) XC181C 25/60 cycle

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MODELS X-181V,XC-181V, XP-181V,X-181C,XC-181C, X-182V,Preliminary

Cat.No.	Description	Model	Qty. Per Set	Symbol
RRN-001	Resistor (carbon) 10 ohm. 1/2 W.	"	1	R-32
RRN-002	" " 2.7 ohm. 1/2 W.	"	1	R-33
RRN-003	" " 4.7 " "	"	1	R-31
RRW-006	" " 70 " 25 W.	3	1	R-52
RSW-012	Switch (band)	All	1	S-1
RSW-014	" (radio phono)	"	1	S-2
RSW-015	" (tone & power)	"	1	S-3,4
RTL-015	I.F.Transformer (2nd)	"	1	T-2
RTL-016	" " (1st)	"	1	T-1
RTO-010	Output transformer	"	1	T-3
RTP-016	Power transformer	1-2-4	1	T-4
RTP-017	" "	3	1	T-5
RTP-025	" "	5-6	1	T-6
RWL-004	Power cord	2-3-6	1	
RWL-009	" "	1-4-5	1	
UCC-036	Capacitor (paper) .002 mfd. 600 V.	All	1	C-59
UCC-039	" " .005 " "	"	1	C-60
UCC-040	" " .01 " "	"	3 or 5	C-52,58,67, 89,90
UCC-041	" " .02 " "	"	2 or 3	C-51,62,91
UCC-042	" " .03 " "	"	2	C-63,64
UCC-045	" " .05 " "	"	4 or 5	C-54,55,56, 57,87
UCN-501	Capacitor (Ceramic) 1 mmf.	"	1	C-35
UCN-1052	" (mica) .001 mfd.	"	1	C-75
UCN-1504	" (Ceramic) 3.3 mmf.	"	1	C-34
UCN-1506	" " 6.8 "	"	2	C-37,83
UCU-036	" (mica) 220 mmf.	"	2	C-47,48
UCU-1020	" " 47 "	"	1	C-44
UCU-1044	" " 470 "	"	1	C-50
UCU-1572	" " 6800 "	"	1	C-46
UCU-2043	Capacitor (mica) 430 mmf.	All	1	C-45
UCU-2561	" " 2400 "	"	1	C-41
UCU-2564	" " 3300 "	"	1	C-42
UCW-1018	" (ceramic) 39 mmf.	"	1	C-36
UCW-2006	" " 12 "	"	1	C-82
UCW-2026	" " 82 "	"	1	C-39
UIC-001	Cement for speaker	"		
UOP-302	Speaker 8" PM.	1-4-5	1	LS-1
UOP-1207	" 12" "	2-3-6	1	LS-2
UOX-004	Cone & voice coil assembly 8"	1-4-5	1	
UOX-005	" " " " 12"	2-3-6	1	
URD-005	Resistor (carbon) 150 ohm. 1/2 W.	All	1	R-6
URD-027	" " 120 " "	"	1	R-2
URD-029	" " 150 " "	"	1	R-7
URD-031	" " 180 " "	"	1	R-34
URD-049	" " 1000 " "	"	3	R-8,27,30
URD-053	" " 1500 " "	"	1 & 2	R-35,43
URD-059	" " 2700 " "	"	1	R-20
URD-081	" " 22000 " "	"	1	R-5
URD-083	" " 27000 " "	3	1	R-46
URD-085	" " 33000 " "	All	1	R-22,R-50
URD-089	" " 47000 " "	"	1	R-9
URD-093	" " 68000 " "	3	2	R-48,51
URD-097	" " 100000 " "	All	1 & 2	R-36,49
URD-103	" " 180000 " "	"	1	R-10
URD-105	" " 220000 " "	"	1	R-11
URD-107	" " 270000 " "	"	1	R-15
URD-113	" " 470000 " "	"	4	R-18,19,26,28
URD-115	" " 560000 " "	"	1	R-39
URD-121	" " 1 Meg.1/2 W.	"	5 & 4	R-1,4,13,17,41
URD-127	" " 1.8 Meg. 1/2 W.	"	1	R-12
URD-133	" " 3.3 " "	3	2	R-44,45
URD-141	" " 6.8 " "	All	2	R-14,40
URD-1017	" " 47 ohms. "	"	1	R-38
URD-1035	" " 270 " "	"	1	R-37
URD-1084	" " 30000 " "	"	1	R-21
URD-1104	" " 200000 ohms."	3	1	R-47
URE-085	" " 33000 " 1 W.	All	1	R-3
URF-031	" " 180 " 2 W.	"	1	R-29
URF-045	" " 680 " "	"	1	R-24
URF-047	" " 820 " "	"	1	R-25
URF-071	" " 8200 " "	"	1	R-23

(1) X181V 50/60 cycle
(2) XC181V 50/60 cycle
(3) XP181V 50/60 cycle
(4) X182V 50/60 cycle
(5) X181C 25/60 cycle
(6) XC181C 25/60 cycle

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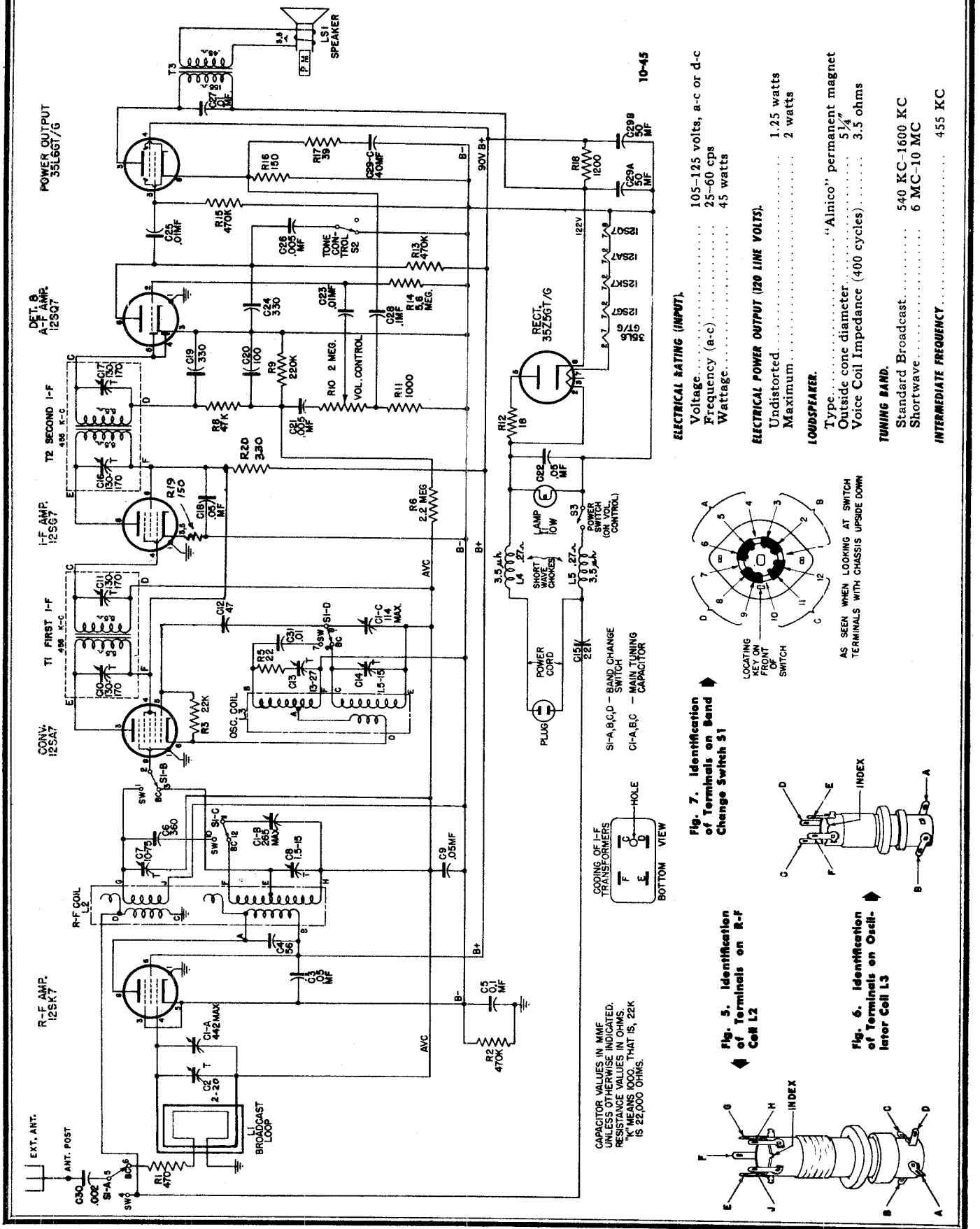
MODELS 219,220,221

GENERAL ELECTRIC CO.



ELECTRICAL RATING (INPUT).

Voltage	105–125 volts, a-c or d-c
Frequency (a-c)	25–60 cps
Wattage	45 watts

ELECTRICAL POWER OUTPUT (120 LINE VOLTS).

Undistorted	1.25 watts
Maximum	2 watts

LOUDSPEAKER.

Type	"Alnico" permanent magnet
Outside cone diameter	5¼"
Voice Coil Impedance (400 cycles)	3.5 ohms

TUNING BAND.

Standard Broadcast	540 KC–1600 KC
Shortwave	6 MC–10 MC

INTERMEDIATE FREQUENCY 455 KC

Fig. 7. Identification of Terminals on Band Change Switch S1

Fig. 5. Identification of Terminals on R-F Coil L2

Fig. 6. Identification of Terminals on Oscillator Coil L3

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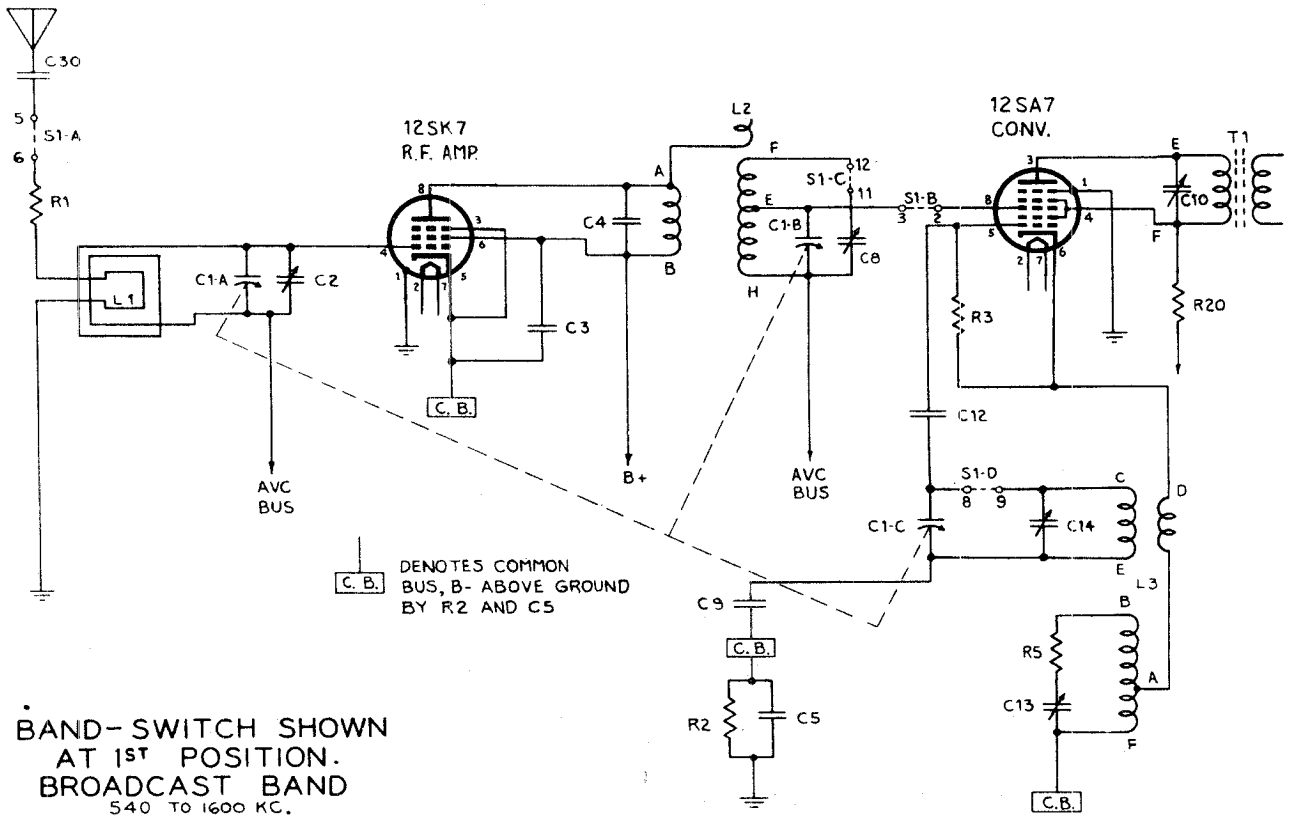
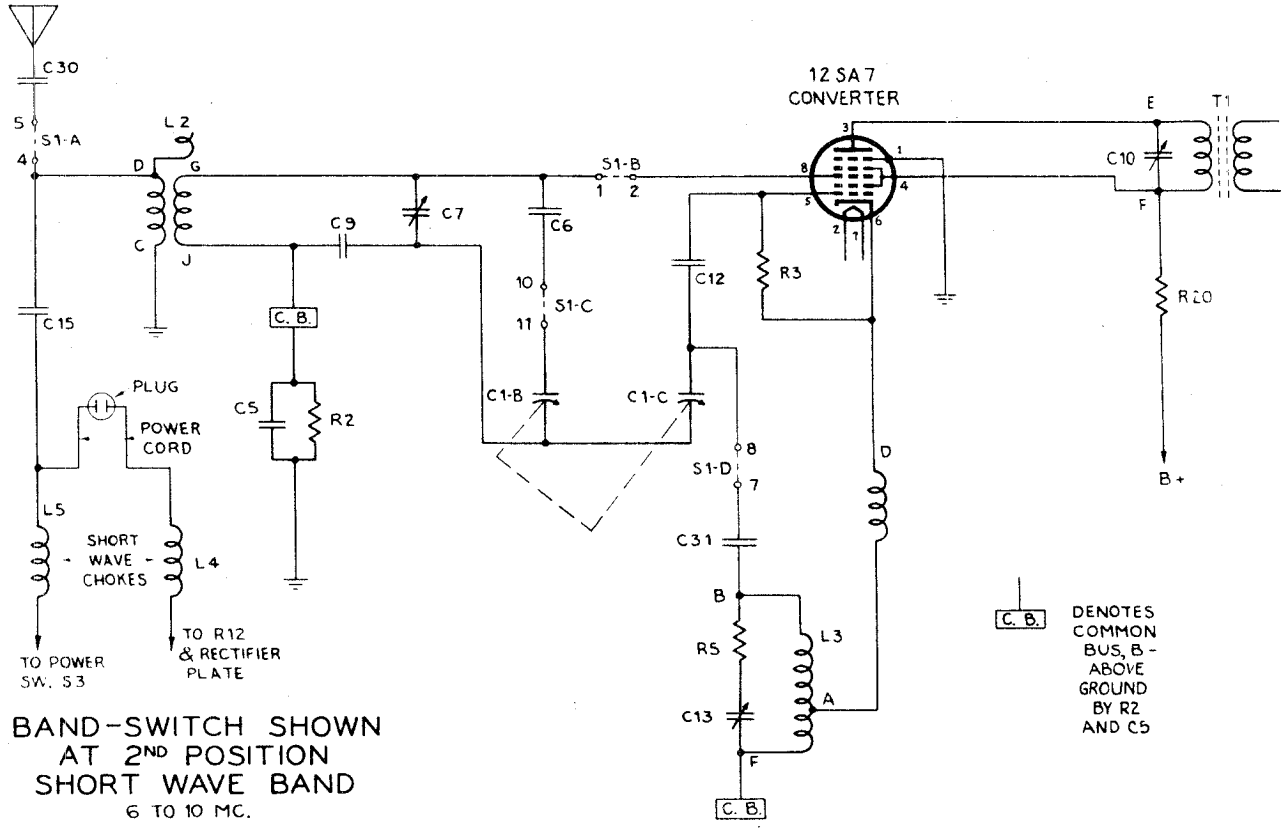


BAND-SWITCH SHOWN AT 1ST POSITION. BROADCAST BAND
540 TO 1600 KC.



BAND-SWITCH SHOWN AT 2ND POSITION SHORT WAVE BAND
6 TO 10 MC.

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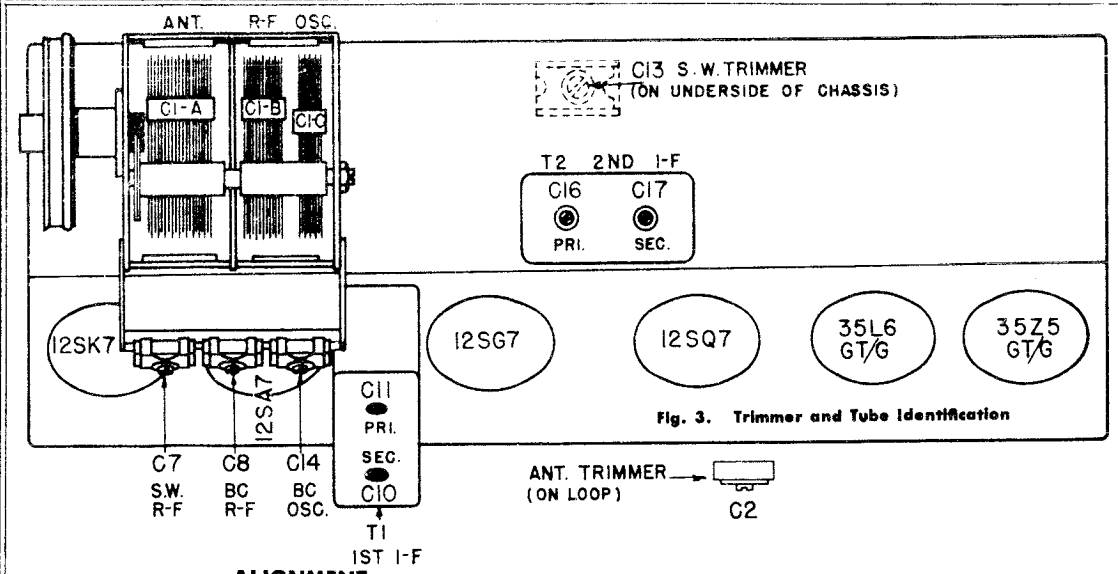


Fig. 3. Trimmer and Tube Identification

ALIGNMENT

Equipment Needed.

Signal Generator, modulated 30% with 400 cycles.
One—60 mmf. capacitor
One—.05 mf. capacitor
One—400-ohm resistor
One—output meter
One—insulated screw driver.

General.

For a complete alignment, the i-f should be aligned before the r-f.

The i-f sections may be aligned with the chassis removed from the cabinet, but for the final r-f alignment the chassis should be in place, in the cabinet.

Fig. 3 identifies and locates all trimmers.

Be sure the radio has been "on" for at least 10 minutes before making any alignment adjustments.

In order to be sure of frequency stability in the signal generator, follow the manufacturer's recommended procedure for use.

When making connections to the signal generator, avoid any ground connections to the radio unless an isolation transformer is used in the power line.

I-F Alignment.

1. Remove chassis from cabinet.
2. Connect output meter across the speaker voice coil.
3. Set volume control for maximum.
4. Connect output terminal of signal generator through a .05 mf. capacitor to pin 4 of the 12SG7 (i-f amplifier) tube.
5. Set signal generator frequency to 455 kc.
6. Set dial pointer on radio to approximately 1500 kc.
7. Peak second i-f trimmers, C16 and C17, for maximum output.
8. It is important to keep the output reading under 1¼ volts by reducing the input or gain control so as to avoid spurious results due to a.v.c. action.
9. Disconnect signal generator from 12SG7 and connect (through .05 mf. capacitor) to pin eight of the 12SA7 converter.
10. Keeping output below 1¼ volts as before, peak the first i-f trimmers, C10 and C11, for maximum output.
11. Check second and first i-f trimmer adjustments.

Broadcast R-F Alignment.

When making the following alignment, the Beam-a-Scope (loop antenna) must be mounted to the chassis, and the chassis must be installed in the cabinet. All trimmer adjusting screws are available through the hole in the loop antenna frame.

1. Connect the output of the signal generator through a 60 mmf. capacitor, to the radio antenna post.
2. Set the signal generator and dial pointer to 1500 kc.
3. Adjust C14, C8, and C2 for maximum output. If two peaks are obtained when adjusting C14, the correct point is the one with the trimmer plates the furthest apart.

Shortwave R-F Alignment.

1. Set Band Change switch to SW position.
2. Set dial pointer and signal generator to 9.5 mc.
3. Remove chassis carefully, so as not to disturb the setting of the dial pointer.
4. Connect the output of the signal generator through a .05 mf. capacitor to pin eight of the 12SA7 converter tube.
5. Adjust C13 (under the chassis) for maximum output. Two points of maximum output may be obtained. The correct point is the one with the trimmer plates closest together.
6. Remove the signal generator connection, and connect its output through a 400-ohm resistor to the radio antenna post. Peak C7 for maximum output while rocking-in the main tuning condenser.
7. Replace the chassis in the cabinet, and check the setting of C7.

ANTENNA.

Broadcast Reception—Built in "Beam-a-Scope" loop antenna.

Shortwave Reception—Power cord used as antenna. An external antenna is recommended for improvement of long-distance reception.

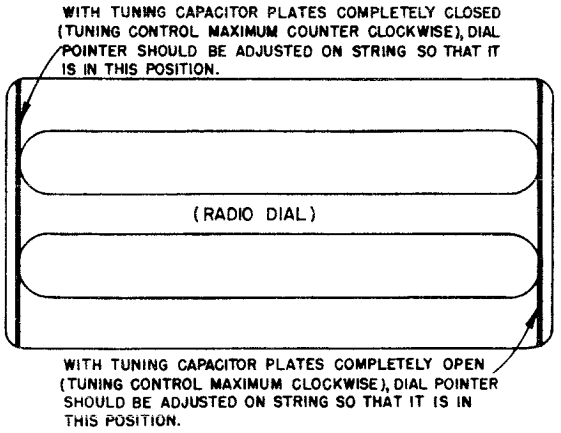
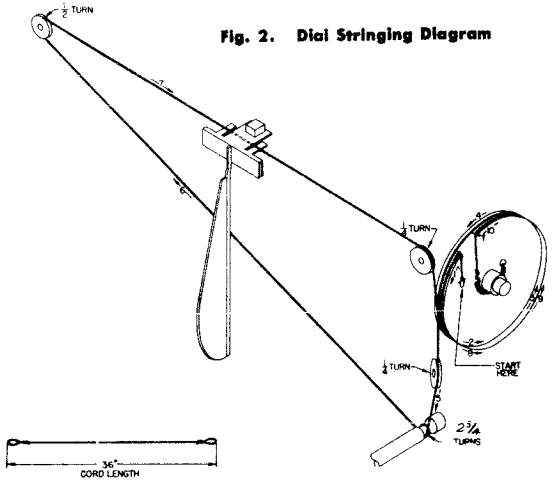

WITH TUNING CAPACITOR PLATES COMPLETELY CLOSED (TUNING CONTROL MAXIMUM COUNTER CLOCKWISE), DIAL POINTER SHOULD BE ADJUSTED ON STRING SO THAT IT IS IN THIS POSITION.
(RADIO DIAL)
WITH TUNING CAPACITOR PLATES COMPLETELY OPEN (TUNING CONTROL MAXIMUM CLOCKWISE), DIAL POINTER SHOULD BE ADJUSTED ON STRING SO THAT IT IS IN THIS POSITION.

Fig. 1. Alignment of Dial Pointer on String

Alignment of Dial Pointer and String.

The extreme left and right positions of the dial pointer should be in accordance with Fig. 1. This adjustment should be checked before proceeding with the r-f alignment.

Fig. 2. Dial Stringing Diagram



GENERAL ELECTRIC CO.

STAGE GAINS AND VOLTAGE CHECKS

The following information will be useful to servicemen equipped with vacuum tube voltmeters or similar voltage measuring instruments. The stage gain values listed may have a tolerance of 20%.

Stage Gains.

(1) Antenna terminal* to pin 4 of 12SK7 . . 4 @ 1000 kc
(2) Pin 4 of 12SK7† to pin 8 of 12SA7. . . . . 10 @ 1000 kc
(3) Pin 8 of 12SA7† to pin 4 of 12SG7. . . . . 35 @ 455 kc
(4) Pin 4 of 12SG7† to pins 4 or 5 of 12SQ7. . . . . 100 @ 455 kc

* Connect to signal generator output through a 60 mmf. capacitor.
† Connect to signal generator output through a .05 mf. capacitor.

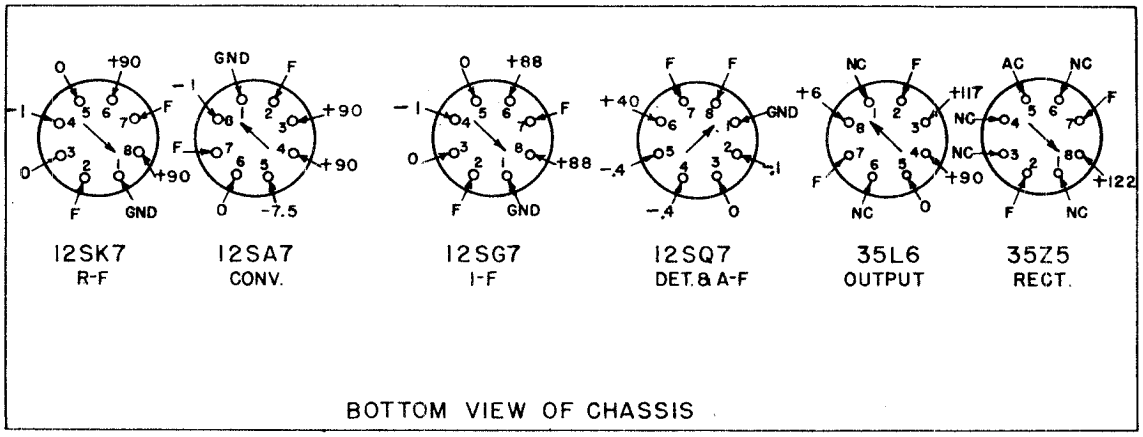
In all measurements, the readings should be kept as low as possible by reducing the signal generator gain control so as to avoid a.v.c. action.

Audio Gain.

0.06 volt at 400 cycles across the volume control (R10), with the control set at maximum, will give approximately 0.5 watt output (1.32 volts) across the speaker voice coil.

Oscillator Grid Voltage.

The d-c voltage developed across the grid leak R3 (22,000 ohms) averages 7.7 volts at 1000 kc. This should be measured with a vacuum tube voltmeter. (The grid current, measured with an ammeter in series with pin 6 of the 12SA7 tube, should be in the order of 350 microamps.)



BOTTOM VIEW OF CHASSIS

CONDITIONS OF TEST

ALL MEASUREMENTS D-C
MEASUREMENTS MADE TO B- BUS
MEASUREMENTS MADE WITH 20,000 OHM/VOLT METER

LINE VOLTAGE 117 VOLTS
VOL. CONTROL MAX. CLOCKWISE
NC - NOT CONNECTED
F - FILAMENT

PART NO.	SYMBOL	DESCRIPTION
UNIVERSAL G-E REPLACEMENT PARTS		
UCC-036	C30	Capacitor—.002 mf, 600 V., paper
UCC-039	C21	Capacitor—.005 mf, 600 V., paper
UCC-040	C23, C25, C27, C31	Capacitor—.01 mf, 600 V., paper
UCC-045	C3, C9, C18, C22	Capacitor—.05 mf, 600 V., paper
UDL-018	I1	Lamp—110-125 V., 10 W.
URD-009	R5	Resistor—22 ohm, ½ watt, carbon
URD-015	R17	Resistor—39 ohm, ½ watt, carbon
URD-029	R16, R19	Resistor—150 ohm, ½ watt, carbon
URD-041	R1, R7	Resistor—470 ohm, ½ watt, carbon
URD-049	R11	Resistor—1000 ohm, ½ watt, carbon
URD-081	R3	Resistor—22,000 ohm, ½ watt, carbon
URD-089	R8	Resistor—47,000 ohm, ½ watt, carbon
URD-105	R9	Resistor—220,000 ohm, ½ watt, carbon
URD-113	R2, R13, R15	Resistor—470,000 ohm, ½ watt, carbon
URD-129	R6	Resistor—2.2 meg., ½ watt, carbon
URD-139	R14	Resistor—5.6 meg., ½ watt, carbon
URE-007	R12	Resistor—18 ohm, 1 watt, carbon
URF-051	R18	Resistor—1200 ohm, 2 watt, carbon
SPECIALIZED G-E REPLACEMENT PARTS		
RAA-003	—	Switch arm, with set screw, for Band Change and Tone Control switches—switch half
RAA-004	—	Switch arm, with set screw, for Band Change and Tone Control switches—flipper half
RAB-005	—	Cabinet back, for Model 220
RAB-006	—	Cabinet back, for Model 221
RAB-007	—	Cabinet back, for Model 219
RAD-006	—	Antenna bracket, left side
RAD-007	—	Antenna bracket, right side
RAD-008	—	Baffle bracket—models 219, 220
RAE-001	—	Baffle shield
RAG-001	—	Grille—models 219, 220
RAU-004	—	Cabinet—model 219
RAU-005	—	Cabinet—model 220
RAV-002	—	Cabinet—model 221
RCC-004	C26	Capacitor—.005 mf, 600 V., paper
RCC-040	C23, C25, C27	Capacitor—.01 mf, 600 V., paper
RCC-045	C22	Capacitor—.05 mf, 600 V., paper
RCC-046	C5, C28	Capacitor—0.1 mf, 600 V., paper
RCE-001	C29-A, -B, -C	Capacitor—50-50-40 mf, 150-150-25 V., electrolytic
RCT-004	C1, C7, C8, C14	Capacitor—main tuning capacitor assembly

PART NO.	SYMBOL	DESCRIPTION
SPECIALIZED G-E REPLACEMENT PARTS (Cont'd)		
RCU-053	C4	Capacitor—56 mmf, mica
RCU-108	C15	Capacitor—22 mmf, mica
RCU-110	C12	Capacitor—47 mmf, mica
RCU-112	C20	Capacitor—100 mmf, mica
RCU-115	C19, C24	Capacitor—330 mmf, mica
RCU-164	C6	Capacitor—360 mmf, mica
RCY-002	C2	Capacitor—trimmer—1.5-15 mmf
RCY-003	C13	Capacitor—trimmer—13-27 mmf
RDE-004	—	Escutcheon—model 221
RDF-002	—	Felt washer, smaller, under round knobs—models 220, 221
RDF-004	—	Felt washer, larger, under flipper knobs—models 220, 221
RDK-003	—	Knob, round—model 220
RDK-005	—	Knob, flipper—model 220
RDK-008	—	Knob, round—model 219
RDK-009	—	Knob, round—model 221
RDK-010	—	Knob, flipper—model 221
RDK-011	—	Knob, flipper—model 219
RDP-004	—	Pointer assembly
RDS-005	—	Dial scale assembly
RDX-005	—	Dial parts—back plate and bracket assembly
RDX-006	—	Shaft, hair pin cotter, and drive shaft bracket
RDX-007	—	Cord—for dial pointer
RHG-001	—	Grommet—cushion used for mounting tuning capacitor
RHU-002	—	Spacer—for RHG-001
RHX-001	—	Chassis mounting bolt and washer
RIT-001	—	Cover for electrolytic capacitor
RJS-003	—	Tube socket—octal
RJS-004	—	Socket for electrolytic capacitor
RJS-010	—	Socket—dial light
RLB-001	L2	Coil—RF
RLC-003	L3	Coil—oscillator
RLI-001	L4, L5	Coil—power cord choke
RLL-003	L1	Loop Assembly
RMS-001	—	Spring—on dial string drum
ROP-005	LS1	Speaker—5¼ in. PM
RRC-004	R10	Volume Control—2 meg.
RSW-004	S2	Switch—Tone Control
RSW-005	S1	Switch—Band Change
RTL-001	T1	I-F Transformer assembly
RTL-002	T2	I-F Transformer assembly
RTO-003	T3	Transformer—output
RWL-003	—	Power cord

URD-037 R20 RESISTOR--330 ohms 1/2 w., carbon

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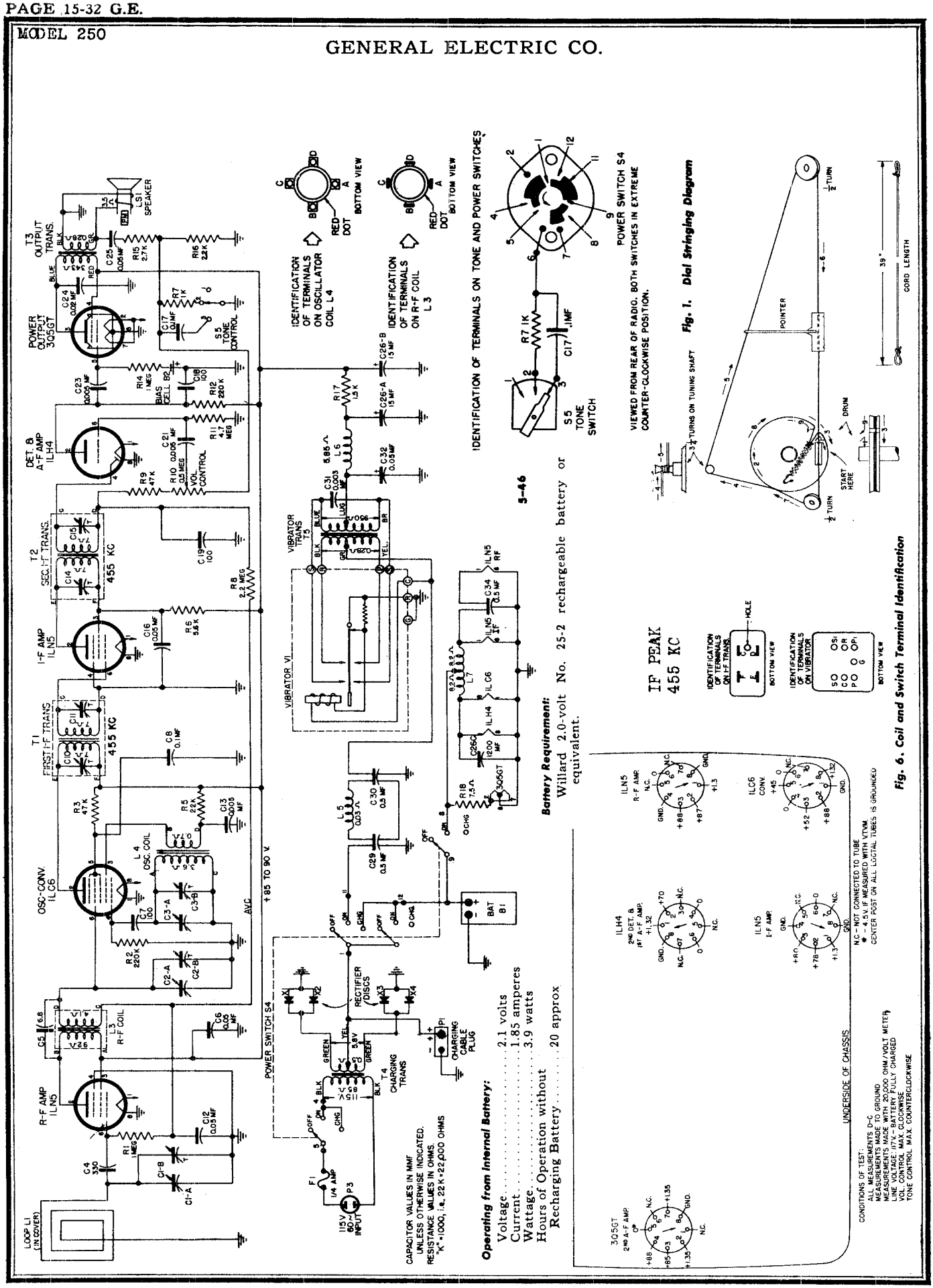
MODEL 250

GENERAL ELECTRIC CO.


IDENTIFICATION OF TERMINALS ON TONE AND POWER SWITCHES
S5 TONE SWITCH
POWER SWITCH S4
VIEWED FROM REAR OF RADIO. BOTH SWITCHES IN EXTREME COUNTER-CLOCKWISE POSITION.
IDENTIFICATION OF TERMINALS ON OSCILLATOR COIL L4
IDENTIFICATION OF TERMINALS ON R-F COIL L3
BOTTOM VIEW
RED DOT
IF PEAK 455 KC
IDENTIFICATION OF TERMINALS ON I-F TRANS.
IDENTIFICATION OF TERMINALS ON VIBRATOR
HOLE
POINTER
DRUM
START HERE
CORD LENGTH
3½ TURNS ON TUNING SHAFT
½ TURN
1 TURN
39"
Fig. 1. Dial Stringing Diagram
Fig. 6. Coil and Switch Terminal Identification
Operating from Internal Battery:
Voltage ..... 2.1 volts
Current ..... 1.85 amperes
Wattage ..... 3.9 watts
Hours of Operation without Recharging Battery ..... 20 approx
Battery Requirement:
Willard 2.0-volt No. 25-2 rechargeable battery or equivalent.
CAPACITOR VALUES IN MMF UNLESS OTHERWISE INDICATED.
RESISTANCE VALUES IN OHMS. "K"=1000, i.e., 22K=22,000 OHMS
CONDITIONS OF TEST:
ALL MEASUREMENTS D-C
ALL VOLTAGES MEASURED TO GROUND
MEASUREMENTS MADE WITH 20,000 OHM/VOLT METER
LINE VOLTAGE: 117V - BATTERY FULLY CHARGED
VOL. CONTROL MAX. CLOCKWISE
TONE CONTROL MAX. COUNTERCLOCKWISE
N.C. - NOT CONNECTED TO TUBE
* - 4.5 V. IF MEASURED WITH VTVM.
CENTER POST ON ALL LOCTAL TUBES IS GROUNDED
UNDERSIDE OF CHASSIS
5-46

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GENERAL ELECTRIC CO.

MODEL 250 ----- Battery Filler Cap.

It is important that the battery filler cap be sufficiently tight so that the washer is compressed, otherwise battery acid will leak out and damage the radio. Make sure the washer is replaced when the cap is removed and that possible thread burrs do not prevent the cap from being tightened completely. Use a screwdriver to tighten the cap.

A quantity of Model 250 radios was shipped with the oscillator adjustment plug not locked after alignment. This causes the low frequency calibration to be considerably in error and reduces sensitivity at this end of the band.

Realign the oscillator adjustment (adjacent to 1st IF transformer), L4, then tighten down the lock nut.

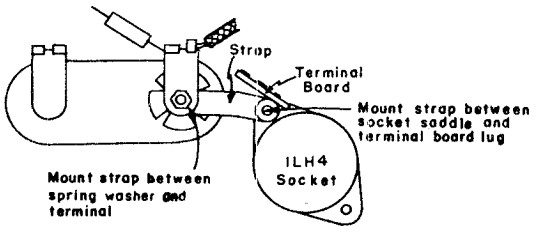
Failure of the vibrator unit REU-001 may be treated in the following manner:

1. The vibrator should be removed from the receiver and a resistance check made with an ohmmeter across terminals C and R.
2. If the resistance checks approximately six ohms and the vibrator will not start, it should be replaced with a new one.
3. If the resistance checks an infinite or high value, the vibrator should be opened up by unsoldering the base from the can. A resistance check should then be made across the terminals of the operating coil, and across the 220 ohm resistor. The operating coil should check approximately six ohms. If the coil is open, the vibrator must be replaced with a new one. If the resistor is open, the resistor should be replaced.
4. If the resistance across terminals C and R checks approximately 220 ohms, the starting contacts that short out the 220 ohm resistor do not make contact. This condition may be corrected by opening the vibrator and turning the small adjustment screw on the resistor side of the vibrator very slowly in the clockwise direction until the resistance across terminals C and R reads approximately six ohms. Care should be taken to see that this adjustment screw is not turned beyond the point where contact is made, and the 220 ohm resistor is shorted out.

A few radios were shipped that did not have the IF transformers peaked for maximum sensitivity. For sets with low sensitivity, realign the IF amplifier

When hum is experienced, the following checks should be made in the order of their listing:

1. Check the battery electrolyte level. It should be maintained at the recommended level.
2. A battery which is nearly discharged caused an excessive hum level.
3. A dirty or loose negative battery terminal contact causes excessive hum. Remove the battery and clean the terminals. Also, clean the negative prong located in the battery compartment, with fine emery; spread the battery spring contacts; and install a rubber insert, V61J551, up through the center of the split spring contacts. Early production radios did not have the rubber insert so that the normal handling causes these spring contacts to be compressed resulting in a high resistance connection. For those receivers not equipped, write your requirements to the Technical Service Section in Bridgeport and they will be forwarded immediately. When reinstalling the battery, spread a thin layer of petroleum jelly on the contacts.
4. Where the previous checks do not remedy the trouble, check the spring washer on the opposite end of the negative prong for a good chassis bond. This requires that the front part of receiver case be removed and then install a bonding strap as shown in the illustration. The factory is now installing an auxiliary copper strap made of 3/8" x .010" soft copper strip, fastened between the spring washer and the 1LH4 socket saddle hole as shown in the illustration. Drill out the rivet at the socket saddle and install a bolt and nut to hold it and the socket and terminal board.


Strap
Terminal Board
Mount strap between socket saddle and terminal board lug
1LH4 Socket
Mount strap between spring washer and terminal

In a few remote cases it has been found that the storage battery (25-2) terminals have loosened internally where they are swedged to the plate holder of the battery. This causes low voltage when under load and results in a "dead" or intermittent set. To remedy replace the battery.

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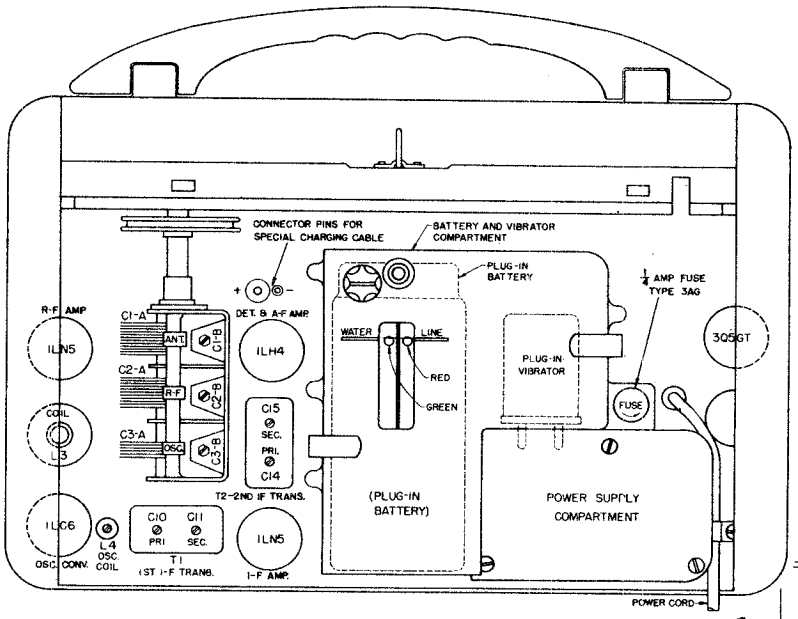

Fig. 3. Tube and Trimmer Location

ELECTRICAL RATING:

Charging from A-c Line:

Voltage . . . . . 105–125 volts, a-c only
Frequency . . . . . 50/60 cps
Wattage . . . . . 10 watts

Fuse:

G-E No. 2548, ¼-ampere rating.

OPERATING FREQUENCIES:

Broadcast Band . . . . . 540–1600 kc
I-F Amplifier . . . . . 455 kc

POWER OUTPUT:

Undistorted . . . . . 248 milliwatts
Maximum . . . . . 365 milliwatts

LOUDSPEAKER:

Type . . . . . Alnico PM
Outside Cone Diameter . . . . . 5¼ inches
Voice Coil Impedance (400 cps) . . 3.2 ohms

ALIGNMENT CHART

Turn Tone Control CCW (Treble)
Turn Volume Control CW (Maximum)

Step	Connect Signal Generator to	Signal Generator Setting	Dial Setting	Adjust
1	Stator of C2-A in series with 0.05 mf.	455 kc	Reference Point Below 550 kc (Gang Closed)	2nd i-f (T-2) Trimmers for Max.
2	Stator of C2-A in series with 0.05 mf.	455 kc	Reference Point Below 550 kc (Gang Closed)	1st i-f (T-1) Trimmers for Max.
3	†Inductively Coupled	580 kc	580 kc	*L3 and L4 for Maximum.
4	†Inductively Coupled	1500 kc	1500 kc	**C3-B, C2-B, and C1-B for maximum in sequence given.

† Use loop on output of signal generator.
* Adjust L3 and L4 alternately several times to obtain peak.
** Make all adjustments of C1B, C2B, and C3B with rear cover closed, through the three ports provided on cover. Remove snap buttons for access.

ELECTRICAL CIRCUIT ALIGNMENT

1. EQUIPMENT REQUIRED.

1. Signal generator with audio tone modulation.
2. A-c output meter, 1 or 1½ volts full scale, 1000 ohms - volt.
3. Insulated screwdriver.

2. ALIGNMENT PROCEDURE.

1. *General.*—The alignment procedure is given in table form for convenience. Reference is made to Fig. 3 for the trimmer locations. The low side of the signal generator should be connected to the chassis of the receiver for i-f alignment; the high side should be connected as indicated in the Alignment Chart. A meter or some other suitable indicating device must be connected to the output of the receiver. Two methods for connecting an output meter are given in later paragraphs.

When aligning the receiver, the Volume Control on the receiver should be turned to its maximum position (clockwise), and the Tone Control should be turned to the position of maximum treble (extreme counterclockwise). The output signal of the signal generator should be kept as low as possible at all times; the reading of a meter connected across the voice coil leads of the receiver should be kept below ½ volt by changing the signal generator output. If the signal level is too high, the AVC becomes effective and alignment errors may result.

The following paragraphs give greater details regarding the connection of the output meter and the signal generator to the receiver during alignment.

2. *Connecting the Output Meter.*—In aligning the receiver, some means for indicating differences in the output voltage will be required. Either of the following methods is satisfactory. The first requires more disassembly of the receiver case than the second, but the second requires additional test equipment.

Method 1.—A satisfactory method for indicating differences in output is to connect a rectifier-type a-c meter of 1 or 1½ volts full scale deflection across the speaker voice coil terminals. To gain access to the speaker, remove the front panel from the radio as previously described. A short green lead will be found connected to one terminal of the speaker. This may be pushed through one of the holes in the chassis so that it will be accessible from the back of the radio. The front panel is reinstalled in place so that the stray capacities in the set will be the same as when the set is operating normally. Connect the meter between this lead and ground. A convenient ground connection is to remove the tone control knob and use a clip lead to the shaft.

Method 2.—The following is an alternate method which eliminates the necessity of removing the front panel of the set, but which requires additional test equipment. Make an indicating device by connecting a 4- to 6-inch diameter magnetic speaker or the high-impedance leads from the output transformer of a good p m dynamic speaker to the terminals of a rectifier-type microammeter with a full scale deflection of 100 microamperes or less. For convenience, the meter and speaker may be mounted in a small box in such a way that the meter will be visible when the speaker is placed in front of the speaker on the receiver being aligned.

To use this device, place its speaker in front of and about an inch away from the speaker of the receiver being aligned. The meter will then deflect in proportion to the intensity of the sound produced by the speaker, and therefore may be used as an output meter. The meter must not be moved during alignment.

3. *Connecting the Signal Generator.*—For aligning the i-f transformers, the output of the signal generator should be coupled through a 0.05 mf. capacitor to the grid (pin 6) of the 1LC6 oscillator-converter tube. This may be accomplished easily by connecting the capacitor to the stator of C2-A, the middle section of the tuning gang, as this stator is connected directly to the converter grid. The low side of the signal generator output should be connected to the chassis ground to complete the circuit.

For aligning the oscillator and r-f coils, the r-f signal should be inductively coupled by connecting a three- or four-turn, 6-inch diameter, loop of bell wire across the signal generator output terminals and then locate the loop about one foot from the radio cover, with cover open. To prevent possible errors in peak readings, the position of the loop with respect to the receiver should not be changed during any one set of adjustments.

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1. POWER SUPPLY

All power necessary for the operation of the receiver is supplied by the 2-volt built-in rechargeable battery. Power to the 1.4-volt tube filaments is supplied by the battery through suitable voltage dropping resistors. The high voltage for the screens and plates of the tubes is furnished by a synchronous vibrator used in conjunction with a step-up power transformer and its associated filter circuit. The synchronous vibrator operates directly from the battery voltage.

The receiver power is obtained from the battery at all times in the manner just described, whether the power cord is connected to a power source or not. When the power cord is connected to a receptacle supplying from 105 to 125 volts, 50 or 60 cps, a-c, and the power selector is in either the CHARGE or ON position, the power supplied from the line will be used to charge the battery. The CHARGE position on the three-position power selector switch allows the battery to be charged from the house current when the receiver is not operating. The ON position of the switch permits the radio to be operated at the same time that the battery is being charged. Under this condition, the battery floats in the circuit to keep the voltage at its proper voltage and, with high line voltage, the battery may be charged slowly while the radio is operating.

The battery-charging unit consists of a step-down transformer which converts the house current to approximately 5.8 volts center-tapped at 117 volts line, and a full-wave copper-oxide rectifier circuit which supplies the battery with d-c charging current.

A charging cable is available, which provides a convenient means of charging the radio battery from an automobile or 6-volt storage battery. The cable plug is inserted over the two pins provided, see Fig. 3, and the plug and socket on the other end of the cable are connected to a 6-volt supply. Complete installation instructions are provided with each cable.

2. CHARGER CHARACTERISTICS

Testing the operation of the rectifier unit.—A ¼-ampere fuse is used in series with the primary of the charger transformer. If the battery does not show any signs of becoming charged after a reasonable length of time, check the fuse. If it is necessary to replace the fuse, use a ¼-ampere, Type 3AG fuse.

If one or more of the copper-oxide discs of the rectifier unit are defective, the charger will not operate properly. To test the rectifier unit operation, remove the battery from the unit and reconnect it in series with a d-c ammeter capable of reading at least two amperes. Plug the power cord into a 105–125 volt, 50 or 60 cps, a-c supply, and turn the power selector switch to the CHARGE position. With the a-c line voltage at 117 volts, the average charging current should read about 1.8 amperes at 2.1 volts battery. Care must be exercised in making this test as the charging circuit is of extremely low resistance. *Very heavy* leads must be used, and the use of an ammeter having only 0.05 ohms resistance will introduce considerable error. If the line voltage is greater than 117, or the battery voltage is lower than 2.1 volts, the charging current will be greater. If the current is much less than 1.8 amperes at the rated line voltage of 117 volts, one or more of the copper-oxide discs may be defective.

Testing the individual rectifier discs.—Two rectifier assemblies are used in the receiver, each assembly consisting of two rectifier discs held together by an eyelet. A cross section of a rectifier assembly is shown in Fig. 2. The center plate of the assembly is positive and is provided with a soldering tab. A copper-oxide rectifier disc is located on each side of the center plate. The rectifier disc conducts when the positive potential is applied to the copper-oxide surface. The copper oxide is a dark purple coating which has been plated with nickel to afford a good surface contact to the copper oxide. If either or both of the rectifier discs in an assembly become defective, the entire assembly should be replaced.

To check the rectifier assembly, the following tests are recommended. In the conducting direction, the rectifier assembly should pass 0.5 ampere or more when ½ volt is impressed across it. If a d-c ammeter is not available for measuring currents as high as 0.65 ampere, the circuit shown in Fig. 2 can be used for this check. The 2.00-ohm resistance should be fairly accurate. The voltage across the rectifier assembly should read 0.7 volt or less; if this voltage exceeds 0.7 volt, the assembly is defective and should be replaced.

The reverse current flow is as important as the above test and is made as follows: Reverse the battery polarity in the test circuit described for current check, disconnect the voltmeter, and place a milliammeter that will read 10 ma. in series with a lead to one of the battery terminals. A suitable meter fuse should be used in series with the milliammeter to prevent damage to the meter in case the assembly under test

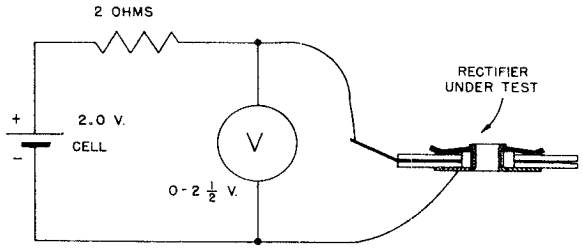

Fig. 2. Rectifier Test Circuit

is shorted. The reverse current should not exceed 10 ma. If the current is considerably above this value, the rectifier assembly should be discarded.

If a milliammeter is not available, a rough check may be made by measuring the resistance of the assembly in the nonconducting direction on the low-resistance range of an ohmmeter. The resistance should measure at least 300 ohms.

3. DISASSEMBLY OF THE RECEIVER

The following outlines should be of assistance in gaining access to the various compartments of the receiver and in dismantling it for replacement of panels.

To Gain Access to Power Supply Compartment.

1. Open the back cover and unsnap the battery compartment cover. Remove the cover by prying gently with a screwdriver.
2. Remove the three flat-head screws on the power supply compartment cover (see Fig. 3).
3. Pry the lid from the power supply compartment and lift it straight outward. All of the power supply components are attached to the lid and will come out with it as far as the connecting leads will permit. In replacing this cover, be careful not to short circuit the B + lead.

To Gain Access to Underside of Radio Chassis.

1. Open the top cover and remove the four Phillips-head screws from the front edge of the escutcheon.
2. Unscrew the three flat-head screws from the bottom of the case, and remove the single sheet of metal which forms the front and bottom of the case. Disconnect the speaker plugs from the speaker to free the front panel from the chassis.

To Remove the Right End Panel.

1. Open the top cover and pull off the four knobs.
2. Remove the two cover stay-arms by unscrewing the screw which holds each to the cover. This allows the loop to fall to its extreme position. Care should be taken to see that the loop connection springs are not broken while the stay-arms are off.
3. Remove the eight Phillips-head screws which hold the escutcheon in place.
4. Bend the ends of the escutcheon inward slightly to free them from the end panels, and remove the escutcheon and dial assembly.
5. Remove the three speed-nuts which hold the end in place. Two of these are located in the top part of the case; the third one is in the bottom rear.
6. Pull off the end panel.

To Remove the Left End Panel.

1. Remove the escutcheon and dial assembly as outlined in steps one through four in the preceding paragraph.
2. Unscrew the three flat-head screws from the bottom of the case, and remove the single sheet of metal which forms the front and bottom of the case. Disconnect the speaker plugs from the speaker to free the front panel from the chassis.
3. Remove the three speed-nuts which hold the end in place. Two of these are located in the top part of the case; the third is in the bottom front.

To Remove Top and Rear Cover Assembly.

1. Open the back cover and unsolder the two antenna loop leads. To facilitate replacement, mark each of the metal strips with the color code of the wire which was unsoldered from it.
2. Remove the escutcheon and dial assembly as outlined in steps one through four of the preceding paragraph, "To Remove the Right End Panel."
3. Unscrew the three flat-head screws located near the ends of the hinge on the top of the chassis, and remove the entire top and rear cover assembly.
4. Pull out the hinge pin to separate the top and rear covers.

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MODEL 250

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STAGE GAIN AND VOLTAGE CHECKS

Stage gain measurements may be made with a vacuum-tube voltmeter to check circuit performance and to locate stages which are not operating properly. The gain values listed may have a tolerance of 20%.

1. R-F Stage Gains.
   R-F Amplifier grid (1LN5, pin 6) to Osc.-Conv. grid (1LC6, pin 6) ..... 25.0 at 1000 kc
   Osc.-Conv. grid (1LC6, pin 6) to I-F Amp. grid (1LN5, pin 6) ..... .33 at 1000 kc
2. Audio Gain.
   The power output across the speaker voice coil should be approximately 50 milliwatts with a 400 cps signal of 0.07 volts applied across C19 (Volume Control max.—Tone Control CCW).
3. Oscillator Grid Bias.
   The d-c voltage developed across the oscillator grid leak (R2) averages 8.1 volts at 1000 kc.
4. Socket Pin Voltages.
   Fig. 4 shows typical tube pin voltages. All readings should be made from the pins to ground unless otherwise indicated.

BATTERY INFORMATION

The receiver uses a 2-volt Willard Radio Battery No. 25-2 or equivalent. It has a 25 ampere-hour capacity and should be cared for in the same manner as any other storage battery.

Charge Indicator

The degree of charge of the battery can be determined by raising the back cover of the radio and referring to the charge ball indicators visible through the hole in the metal battery case.

If the battery is fully charged, two indicator balls will be visible at the surface of the liquid in the battery. When the battery discharges, these ball indicators will sink and disappear in the following order:

1. Green indicator sinks when approximately 20 per cent of battery capacity has been discharged.
2. The red ball sinks when battery is 80 per cent discharged.

On charge, the balls rise or float in the reverse order and the charge is complete and may be stopped when both balls appear in the opening.

To Charge Battery

The battery is charged by merely plugging the receiver power cord in the rated a-c power outlet and turning the selector switch to CHARGE. Frequent check should be taken of the charge indicator and when both indicator balls are visible, the battery is fully charged. Charging the battery after all indicator balls are visible will not harm the battery except that it will evaporate the water faster. A completely discharged battery will be restored usually within 20 to 30 hours.

When operating the receiver from the a-c house current, the battery floats or is being charged at a slow rate. Thus, if you wish to operate the receiver at the same time that you are charging even a fully discharged battery, plug the power cord in the a-c receptacle and turn the power selector switch to the ON position. Prolonged and repeated operation on this position will assure that the battery is always maintained in a nearly fully charged condition.

Battery Operating Instructions

1. Add distilled or tap water in the filler cap at sufficiently frequent intervals to keep liquid level at indicator mark as viewed through opening in battery case. DO NOT OVER-FILL as this impairs nonspill feature.

2. A fully charged battery will operate the radio in the ON position without being connected to a-c outlet for about 20 hours before recharging is required. Whenever possible, it is best not to allow the battery to become discharged to the extent that both indicators disappear.

However, if both indicators have sunk, the battery should be recharged immediately or within 24 hours.

3. A battery will continually discharge at a slow rate even when not in use. For this reason, monthly checks should be made of the charge condition and the battery placed on charge when necessary. This will prevent damage to the battery such as freezing during cold weather.

BATTERY INSTALLATION

The following instructions should be carefully followed in installing a battery:

1. Remove battery from packing carton.

2. If needed, add water to bring liquid level to indicator mark on battery container. *Do not overfill.*

3. Raise back cover on radio, remove battery case cover. The latter is removed by unclipping the two catches. Pry off cover.

4. Unplug battery and replace with new battery.

5. Place battery on charge, if necessary, as described in a previous paragraph, until both indicators are showing in the opening in the case cover.

UNIVERSAL G-E REPLACEMENT PARTS LIST

CAT. NO.	SYMBOL	DESCRIPTION
UCC-030	C8, 17	CAPACITOR—0.1 mf., 400 v., paper
UCC-039	C13, 21, 23	CAPACITOR—0.005 mf., 600 v., paper
UCC-041	C24	CAPACITOR—0.02 mf., 600 v., paper
UCN-506	C5	CAPACITOR—6.8 mmf., ceramic
UCU-028	C7, 18, 19	CAPACITOR—100 mmf., mica
UCU-040	C4	CAPACITOR—330 mmf., mica
UOP-009	LS1	LOUDSPEAKER—5¼-inch PM speaker
URD-049	R7	RESISTOR—1,000 ohms, ½ w., carbon
URD-057	R16	RESISTOR—2,200 ohms, ½ w., carbon
URD-059	R15	RESISTOR—2,700 ohms, ½ w., carbon
URD-067	R6	RESISTOR—5,600 ohms, ½ w., carbon
URD-081	R5	RESISTOR—22,000 ohms, ½ w., carbon
URD-089	R3, 9	RESISTOR—47,000 ohms, ½ w., carbon
URD-105	R2, 12	RESISTOR—220,000 ohms, ½ w., carbon
URD-121	R1, 14	RESISTOR—1 meg., ½ w., carbon
URD-129	R8	RESISTOR—2.2 meg., ½ w., carbon
URD-137	R11	RESISTOR—4.7 meg., ½ w., carbon
URE-053	R17	RESISTOR—1,500 ohms, 1 w., carbon

SPECIALIZED G-E REPLACEMENT PARTS

CAT. NO.	SYMBOL	DESCRIPTION
RAC-002		COVER—Battery compartment cover
RAC-003		COVER—Power supply compartment cover
RAC-006		COVER—Case back cover (brown)
RAC-007		COVER—Case back cover (gray)
RAC-010		COVER—Case left end cover (brown)
RAC-011		COVER—Case left end cover (gray)
RAC-012		COVER—Case right end cover (brown)
RAC-013		COVER—Case right end cover (gray)
RAG-002		COVER—Case front and grille (brown)
RAG-003		COVER—Case front and grille (gray)
RAI-001		BRACE—Case cover brace assembly (brown)
RAI-002		BRACE—Case cover brace assembly (gray)
RAX-004		COVER—Case cover assembly (brown)
RAX-005		ASSEMBLY—Cover stay arm assembly
RAX-006		COVER—Case cover assembly (gray)
RBC-001	B2	CELL—Bias cell
RCC-028	C6, 12, 16, 25, 32	CAPACITOR—0.05 mf., 400 v., paper
RCC-069	C34	CAPACITOR—0.5 mf., 120 v., paper
RCC-070	C29, 30	CAPACITOR—0.5 mf., 120 v., paper
RCC-073	C31	CAPACITOR—0.003 mf., 1500 v., paper
RCE-007	C26A, B, C	CAPACITOR—15 mf., 150 v.; 15 mf., 150 v.; 1200 mf., 1.5 v. electrolytic
RCT-008	C1A, B, 2A, B, 3A, B	CONDENSER—Tuning condenser and trimmers
RDC-007		CORD—Drive cord and tension spring
RDE-006		ESCUTCHEON—Dial scale escutcheon
RDK-020		KNOB—Control knob (plain)
RDK-021		KNOB—Control knob (pointer)
RDP-008		POINTER—Dial pointer assembly
RDS-013		SCALE—Dial scale
REF-001	F1	FUSE—¼-amp. fuse, Type 3AG
REU-001	V1	VIBRATOR—Vibrator unit
REX-001	X1, 2, 3, 4	RECTIFIER—Copper-oxide rectifier assembly
RHF-001		FOOT—Cabinet foot
RHK-001		KNOB—Cover lock knob
RHQ-002		TUBE—Battery vent tube
RHX-003		HARDWARE—Tuning condenser mtg. hardware
RIG-001		GASKET—Dial scale gasket
RJS-019		SOCKET—Vibrator socket
RJS-020		SOCKET—Loktal tube socket
RJS-021		PLATE—Electrolytic capacitor mounting plate
RJS-026		SOCKET—Octal base tube socket
RJW-001		HOLDER—Fuse holder
RLB-002	L3	COIL—R-f coil
RLC-008	L4	COIL—Oscillator coil
RLF-001	L5, 6	CHOKE—Vibrator and B+ choke
RLF-002	L7	CHOKE—Filament choke
RLL-008	L1	BEAM-A-SCOPE—Loop antenna assembly (in cover)
RMC-008		CAM—Cover lock mechanism cam
RMC-009		CATCH—Cover lock mechanism catch
RMU-010		SHAFT—Tuning shaft
RMW-004		PULLEY—Pulley and stud (small pulley)
RMW-009		PULLEY—Pulley and stud (large pulley)
RMX-013		CATCH—Battery case catch
RRC-008	R10	VOLUME CONTROL—0.5 meg., potentiometer
RRG-001	R18	RESISTOR—7.5 ohms, ½ w., carbon
RSW-009	S4	SWITCH—Power selector switch
RSW-010	S5	SWITCH—Tone selector switch
RTC-001	T4	TRANSFORMER—Rectifier transformer
RTL-011	T1	TRANSFORMER—1st i-f transformer
RTL-012	T2	TRANSFORMER—2nd i-f transformer
RTO-007	T3	TRANSFORMER—Output transformer
RTV-001	T5	TRANSFORMER—Vibrator transformer
RWL-005	P3	PLUG—Power cord and plug

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MODEL 305

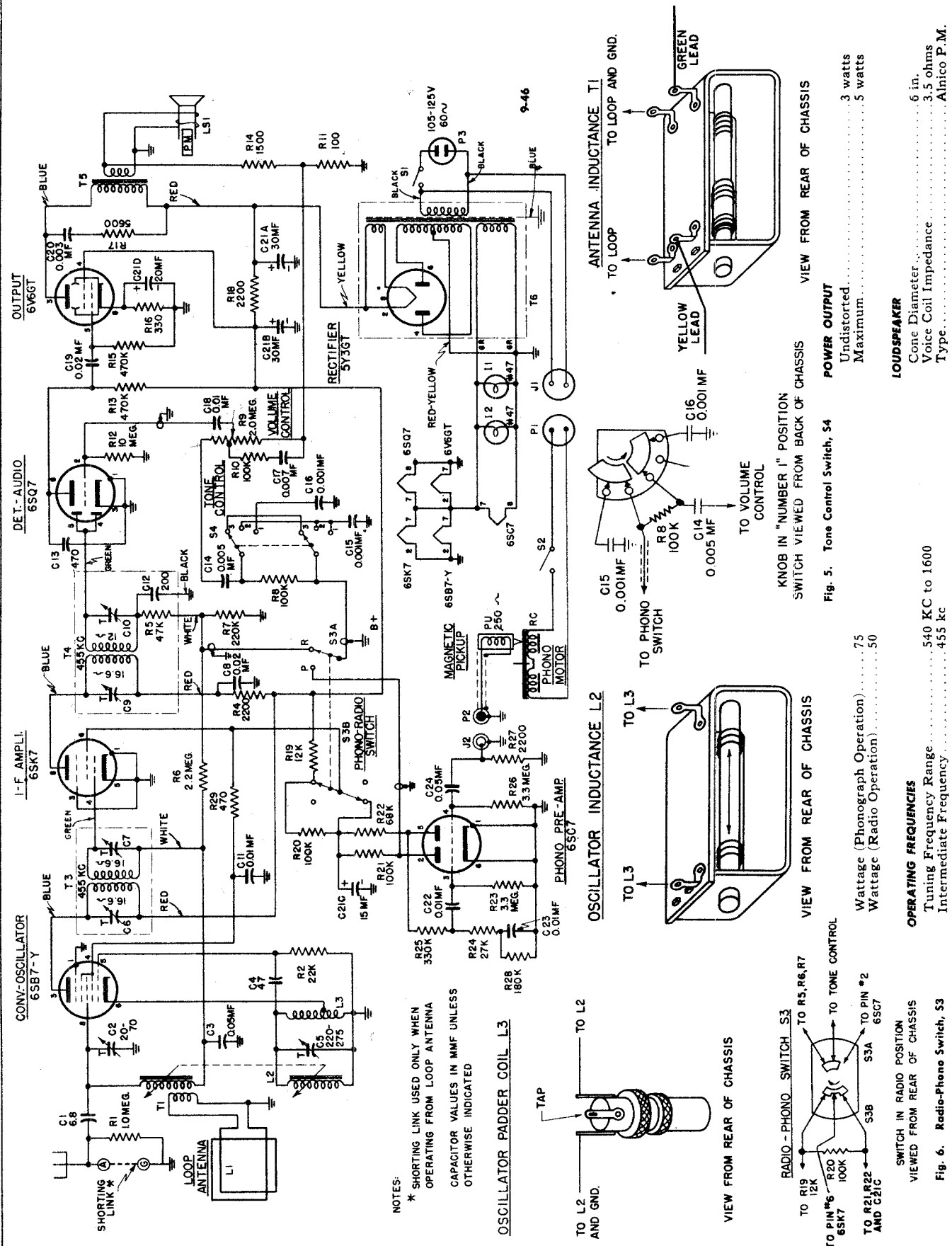

Fig. 5. Tone Control Switch, S4

POWER OUTPUT

Undistorted	3 watts
Maximum	5 watts

LOUDSPEAKER

Cone Diameter	6 in.
Voice Coil Impedance	3.5 ohms
Type	Alnico P.M.

Wattage (Phonograph Operation) 75
Wattage (Radio Operation) 50

OPERATING FREQUENCIES

Tuning Frequency Range	540 KC to 1600
Intermediate Frequency	455 kc

Fig. 6. Radio-Phone Switch, S3

GENERAL ELECTRIC CO.

ELECTRICAL CIRCUIT ALIGNMENT

ALIGNMENT FREQUENCIES

R-F—1620, 1500, 1000 KC
I-F—455 KC

EQUIPMENT REQUIRED

1. Test Oscillator with Tone Modulation.
2. A-C Output Meter, 1½ volts full scale.
3. .05 Paper Condenser.
4. Insulated Screwdriver.
5. 200 $\mu\mu$f. Mica Condenser.

ALIGNMENT PROCEDURE—GENERAL

The alignment procedure is given in table form. All i-f and r-f alignments may be made with the chassis removed from the cabinet. All i-f and r-f adjustments are accessible from the bottom of the cabinet when the chassis is installed. The location of the i-f and r-f adjustments is shown in Figure 4. Adjustment of inductances L_2 and T_1 is accomplished by loosening the adjustment screws and sliding the inductance to the correct position using the chassis hole as a fulcrum. Retighten the adjustment screw after alignment.

For accurate calibration, the position of the pointer should be established prior to r-f alignment as follows. If no dial scale is available or if the chassis is removed from the cabinet, turn the tuning control knob fully counterclockwise (slugs fully in the coils) and secure the pointer to the dial string at some arbitrary position near the left end of the dial scale or pointer travel. Mark the pointer position on the backplate or note its position with reference to the number scale stamped on the backplate. Proceed with the alignment as indicated in the alignment chart and mark the pointer position for 1500 kc. The distance between the original reference mark and the 1500 kc mark should be 5.25 inches for accurate dial calibration. After installation of the chassis in the cabinet, the tuning control is turned extreme counterclockwise and the pointer slid and secured to the string at the extreme left rectangular dial calibration mark on the scale. The pointer is accessible through the hole in the backplate.

The output meter should be connected across the loudspeaker voice coil terminal. A voice coil terminal is accessible at an insulated rivet in the bottom of the chassis. The low side of the test oscillator output should be connected to the chassis ground; the high side of the test oscillator output should be connected as indicated in the alignment chart. During the entire alignment procedure, the volume control should be at its maximum position. The test oscillator output should be attenuated so that the output meter reading doesn't exceed 1¼ volts.

ALIGNMENT CHART

Step	Connect Test-Osc. To:	Test-Osc. Setting	Pointer Setting on Radio	Adj. for Max. Output
1	6SK7 pin No. 4 in series with .05 mf. paper capacitor	455 kc	1600 kc	2nd I-F Trans Trimmers C9-C10
2	6SB7Y pin No. 8 in series with .05 mf. paper capacitor	455 kc	1600 kc	1st and 2nd I-F Trans. C6, C7, C9, and C10
3	Antenna post in series with 200 mmf. capacitor. Shorting link removed.	1620 kc	Extreme Right	Osc. Trimmer C5
4	Antenna post in series with 200 mmf. capacitor. Shorting link removed.	1620 kc	Extreme Right	Ant. Trimmer C2
5	Antenna post in series with 200 mmf. capacitor. Shorting link removed.	1500 kc	*1500 kc	Oscillator Inductance L2
6	Antenna post in series with 200 mmf. capacitor. Shorting link removed.	1000 kc	1000 kc	Antenna Inductance T1
7	Recheck Steps 3, 4, 5, and 6.			
8	Replace shorting link unless installing for antenna operation.			

*1500 kc is 5.25 inches from extreme low frequency pointer position. (See alignment procedure.)

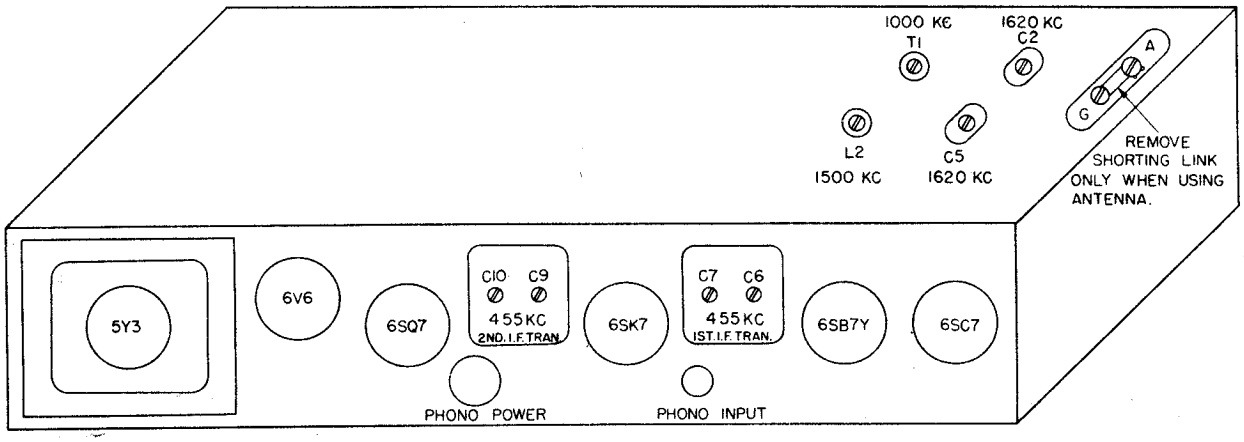

Fig. 4. Tube and Trimmer Location

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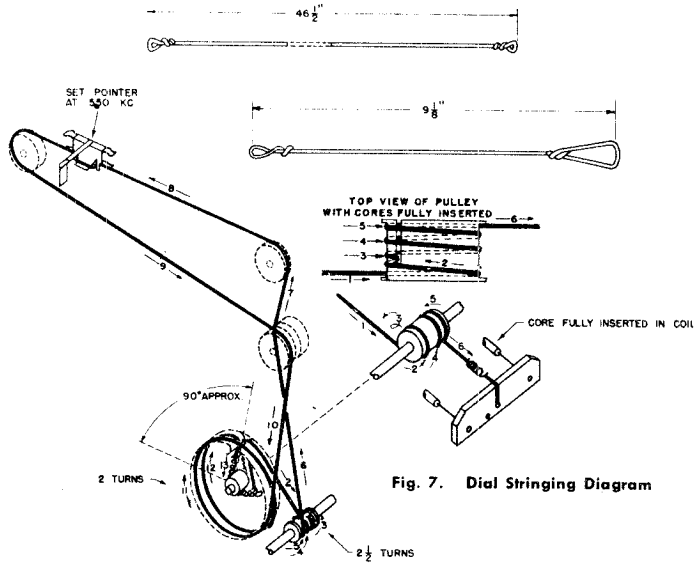

Fig. 7. Dial Stringing Diagram

STAGE GAIN AND VOLTAGE CHECKS

Stage gain measurements may be made with a vacuum tube voltmeter to check circuit performance and to locate stages which are not operating properly. The gain values listed may have a tolerance of 20%.

1. R-F Stage Gain.

Antenna post to 6SB7Y grid . . . . . 3 at 1000 kc
6SB7Y grid to 6SK7 grid . . . . . 70 at 455 kc
6SK7 grid to 6SQ7 diode plate . . . . . 70 at 455 kc

2. Audio Gain.

The power output across the speaker voice coil should be approximately ½ watt with .05 volts at 400 cps applied between the high side of the volume control and ground. Approximately .008 volts at 400 cps should be applied to the phonograph input for ½ watt output across the speaker voice coil.

3. Oscillator Grid Bias.

The d-c voltage developed across the oscillator grid leak R2 should be approximately 6.6 volts at 1000 kc.

4. Socket Pin Voltages.

Socket pin voltages greatly different than those shown in Figure 1 indicate defective components or tubes. It should be noted that a considerable difference in voltage exists at some voltage check points depending on the position of the radio-phono switch. (See Fig. 1).

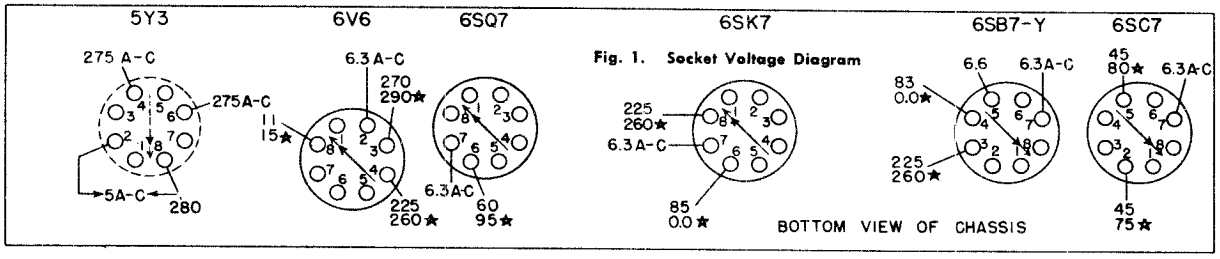

Fig. 1. Socket Voltage Diagram

CONDITIONS OF TEST
VALUES OBTAINED WITH 20000 OHMS PER VOLT METER
READINGS ARE BETWEEN PIN AND CHASSIS WITH A LINE VOLTAGE OF 117 VOLTS
VOLUME CONTROL MINIMUM
NO SIGNAL INPUT
★ VALUES OBTAINED WITH RADIO-PHONO SWITCH IN PHONO POSITION
ALL READINGS TAKEN WITH RADIO-PHONO SWITCH IN RADIO POSITION UNLESS OTHERWISE INDICATED

PART NO	SYMBOL	DESCRIPTION
UNIVERSAL G-E REPLACEMENT PARTS		
UCC-035	C15, 16	CAPACITOR .001 mfd., 600 v., paper
UCC-039	C14	CAPACITOR .005 mfd., 600 v., paper
UCC-040	C11, 18, 22, 23	CAPACITOR .01 mfd., 600 v., paper
UCC-041	C8, 19	CAPACITOR .02 mfd., 600 v., paper
UCC-045	C3, 24	CAPACITOR .05 mfd., 600 v., paper
UCC-057	C20	CAPACITOR .003 mfd., 1000 v., paper
UCN-506	C1	CAPACITOR 6.8 mmf., v., ceramic
UCU-020	C4	CAPACITOR 47 mmf., 500 v., mica
UCU-044	C13	CAPACITOR 470 mmf., 500 v., mica
UIC-001		CEMENT—Speaker cone replacement cement
UOP-628	SPKR	SPEAKER—6 inch permanent magnet
UOX-001		CONE—Speaker cone and dust cap
URD-025	R11	RESISTOR 100 ohms, ½ w., carbon
URD-041	R28	RESISTOR 180,000 ohms, ½ w., carbon
URD-053	R14	RESISTOR 1500 ohms, ½ w., carbon
URD-057	R4, 27	RESISTOR 2200 ohms, ½ w., carbon
URD-067	R17	RESISTOR 5600 ohms, ½ w., carbon
URD-081	R2	RESISTOR 22,000 ohms, ½ w., carbon
URD-083	R24	RESISTOR 27,000 ohms, ½ w., carbon
URD-093	R22	RESISTOR 68,000 ohms, ½ w., carbon
URD-097	R8, 20, 21, 10	RESISTOR 100,000 ohms, ½ w., carbon
URD-103	R26	RESISTOR 180,000 ohms, ½ w., carbon
URD-105	R7	RESISTOR 220,000 ohms, ½ w., carbon
URD-109	R25	RESISTOR 330,000 ohms, ½ w., carbon
URD-113	R13, 15	RESISTOR 470,000 ohms, ½ w., carbon
URD-121	R1	RESISTOR 1.0 meg., ½ w., carbon
URD-129	R6	RESISTOR 2.2 meg., ½ w., carbon
URD-133	R23, 26	RESISTOR 3.3 meg., ½ w., carbon
URD-145	R12	RESISTOR 10.0 meg., ½ w., carbon
URE-037	R16	RESISTOR 330 ohms, 1 w., carbon
URF-057	R18	RESISTOR 2200 ohms, 2 w., carbon
URF-075	R19	RESISTOR 12,000 ohms, 2 w., carbon
SPECIALIZED G-E REPLACEMENT PARTS		
RAC-015		COVER—Cabinet bottom
RAD-016		BRACKET—For pilot light
RCC-001	C17	CAPACITOR .007 mf., 600 v., paper
RCD-001		SHAFT—Tuner assembly consisting of slide shaft and bracket (less iron cores)

PART NO.	SYMBOL	DESCRIPTION
SPECIALIZED G-E REPLACEMENT PARTS (Cont'd)		
RCE-033	C21A	CAPACITOR—30 mf., 350 v., dry electrolytic
	C21B	CAPACITOR—30 mf., 350 v., dry electrolytic
	C21C	CAPACITOR—15 mf., 250 v., dry electrolytic
	C21D	CAPACITOR—20 mf., 25 v., dry electrolytic
RCY-013	C2	CAPACITOR—Antenna trimmer, 20-75 mmf.
RCY-014	C5	CAPACITOR—Oscillator trimmer, 220-275 mmf.
RDC-013		CORD—Dial drive cord 46½ in.
RDC-014		CORD—Tuning mechanism drive cord 9⅛ in.
RDF-005		WASHER—Felt washers for control knobs
RDK-002		KNOB—Phono-radio and tone control (pointer)
RDK-006		KNOB—Tuning and volume control (plain)
RDP-014		POINTER—Dial pointer and slide
RDS-020		SCALE—Dial scale and cushion
REI-005		CORE—Iron core for tuning antenna and oscillator coils
RHG-003		GROMMET—Mounting grommet for 6SC7 socket
RHH-004		FASTENER—Holds bottom plate on
RJA-001		ADAPTER—Connects control knobs to control shaft
RJC-001		PLUG—Connects to speaker
RJP-010	J2	SOCKET—Phono input socket on chassis
RJS-003		SOCKET—6SB7-Y socket
RJS-006		SOCKET—Octal socket
RJS-031		SOCKET—6SC7 socket
RJS-033		SOCKET—Pilot light socket
RJS-049	J1	SOCKET—Phono power socket
RLA-010	T1	COIL—Antenna coil assembly (less iron core)
RLC-019	L2	COIL—Oscillator coil assembly (less iron core)
RLC-020	L3	COIL—Oscillator padder
RLL-011	L1	BEAM-A-SCOPE—Loop antenna assembly
RMS-004		SPRING—Tuning Drive Cord Tension Spring
RMS-055		SPRING—Main Drive Cord Tension Spring
RMW-003		PULLEY—Idler pulley for dial string
RMX-013		SHAFT—Shaft assembly for driving tuning mechanism
RMX-014		SHAFT—Tuning control shaft assembly
RPX-010	PU	PICK-UP—Magnetic pick-up cartridge
RRC-029	R9	VOLUME CONTROL AND POWER SWITCH—2 meg. tapped at 1 meg.
RSW-018	S3	SWITCH—Radio phono
RSW-019	61	SWITCH—Tone control
RTL-020	T4	TRANSFORMER—2nd IF Transformer
RTL-021	T3	TRANSFORMER—1st IF Transformer
RTO-013	T5	TRANSFORMER—Output transformer
RTP-021	T6	TRANSFORMER—Power transformer
RWL-009		CORD—Power cord and plug

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XH-713D2,Preliminary

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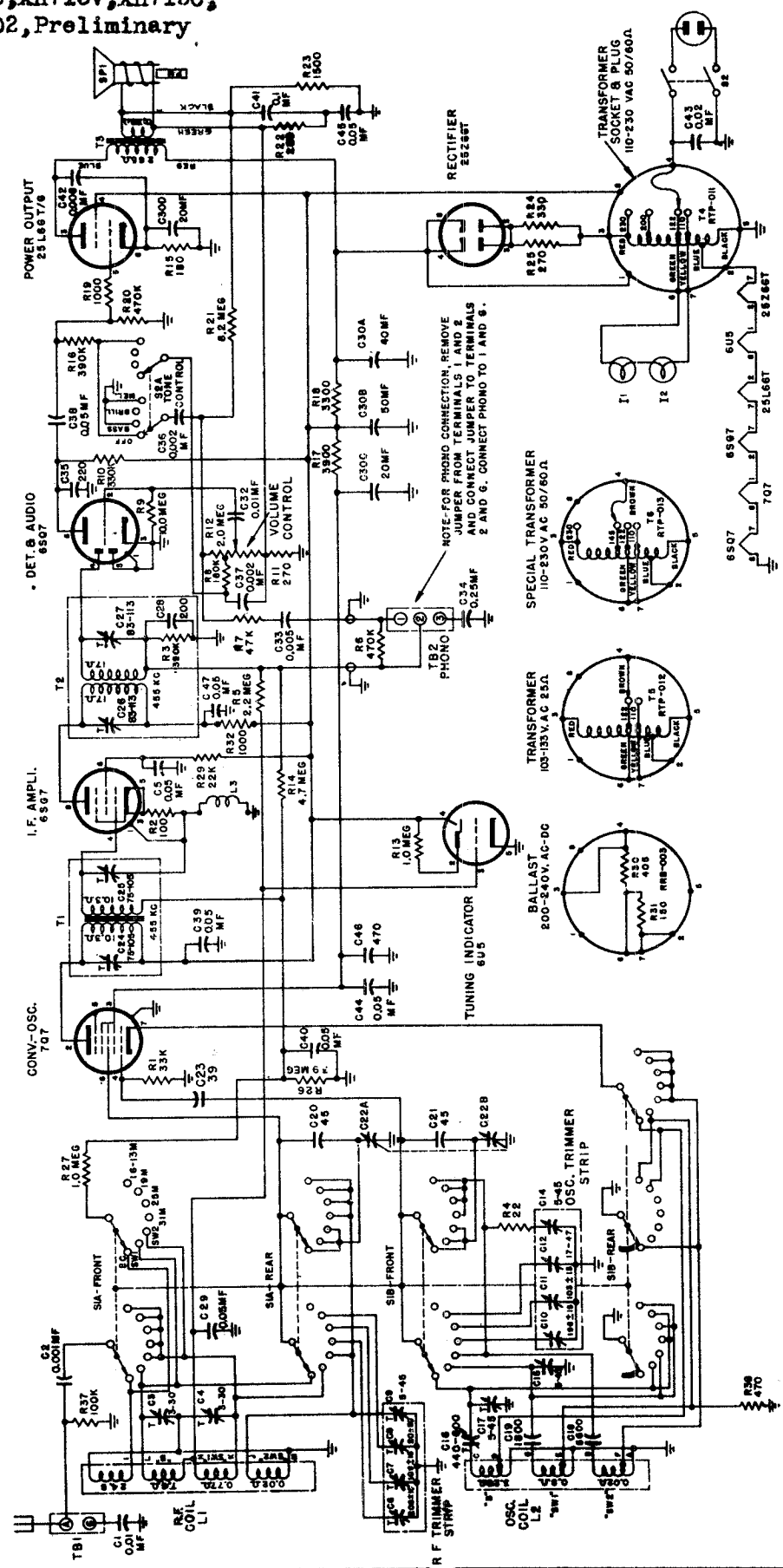
IF PEAK 455 KC
(1) X317V Univ.
(4) XH713V "
(2) X317C 25 cycle
(5) XH713C 25 cycle
(3) X317D2 230 V. AC-DC
(6) XH713D2 230 V. AC-DC
RECTIFIER 25Z6GT
TRANSFORMER SOCKET & PLUG 110-230 VAC 50/60Ω
SPECIAL TRANSFORMER 110-230V AC 50/60Ω
TRANSFORMER 103-133V.AC 25Ω
BALLAST 200-240V. AC-DC
TUNING INDICATOR 6U5
POWER OUTPUT 25L6GT/G
DET.& AUDIO 6SQ7
I.F. AMPLI. 6SG7
CONV.-OSC. 7Q7
VOLUME CONTROL
TONE CONTROL
NOTE-FOR PHONO CONNECTION, REMOVE JUMPER FROM TERMINALS 1 AND 2 AND CONNECT JUMPER TO TERMINALS 2 AND 6. CONNECT PHONO TO 1 AND 6.
TB2 PHONO
TB1
R.F. COIL L1
OSC. COIL L2
R.F. TRIMMER STRIP
OSC. TRIMMER STRIP

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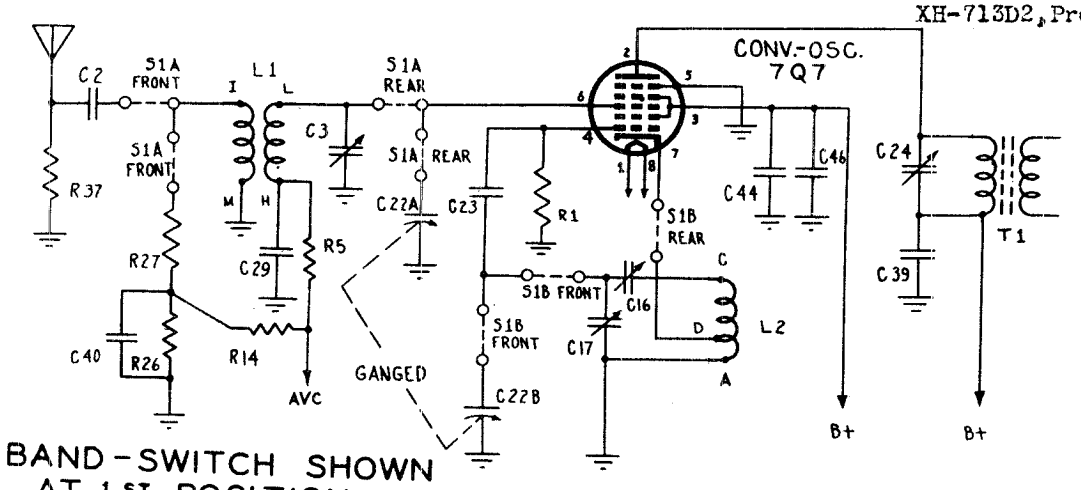
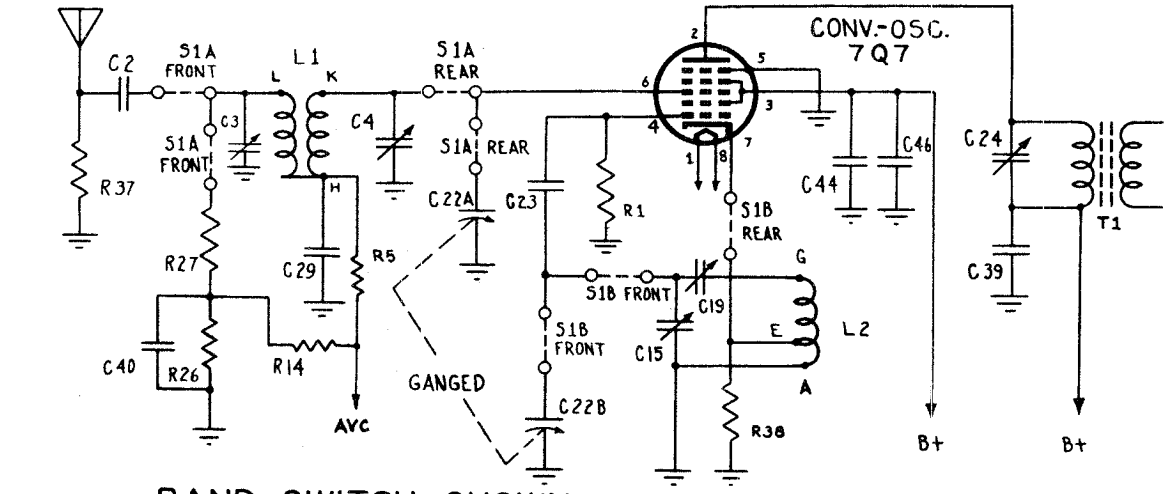
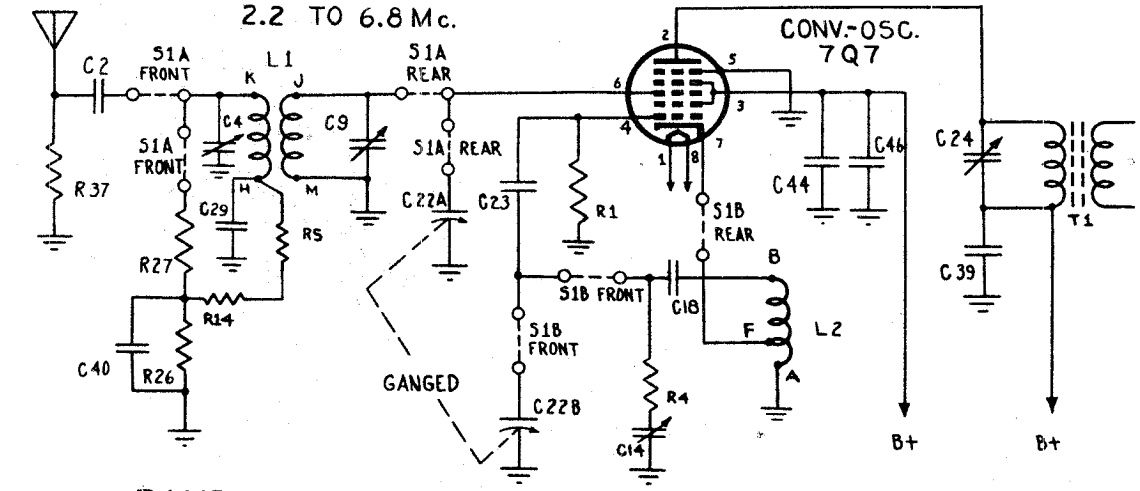
MODELS X-317V, X317C, X-317D2, XH-713V, XH-713C, XH-713D2, Preliminary



BAND-SWITCH SHOWN AT 1ST POSITION. BROADCAST BAND 540 TO 1700 KC.



BAND-SWITCH SHOWN AT 2ND POSITION COUNTERCLOCKWISE SHORT WAVE 1 BAND 2.2 TO 6.8 Mc.



BAND-SWITCH SHOWN AT 3RD POSITION COUNTERCLOCKWISE SHORT WAVE 2 BAND 6.8 TO 21.0 Mc.

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MODELS X-317V, X-317C,
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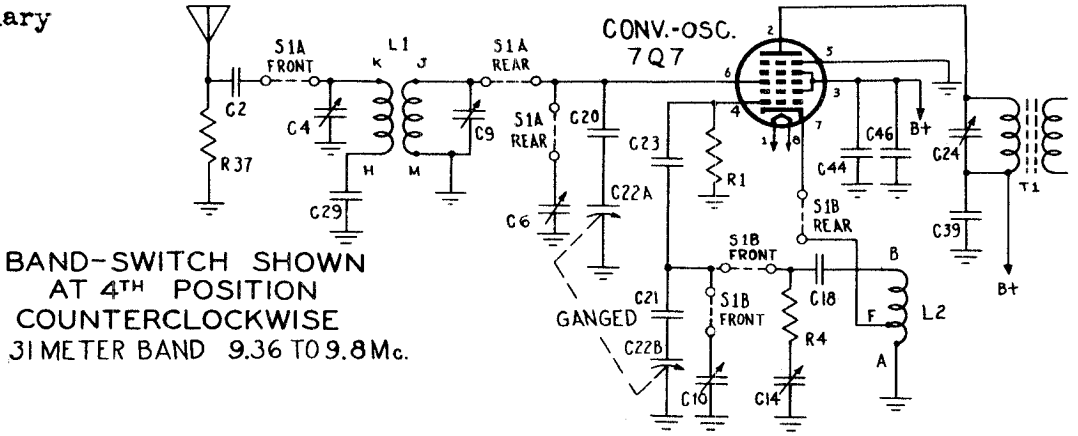
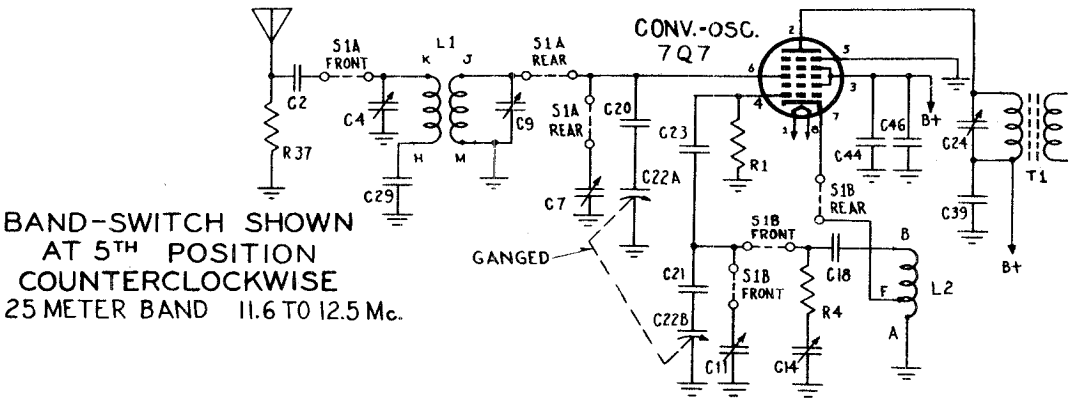
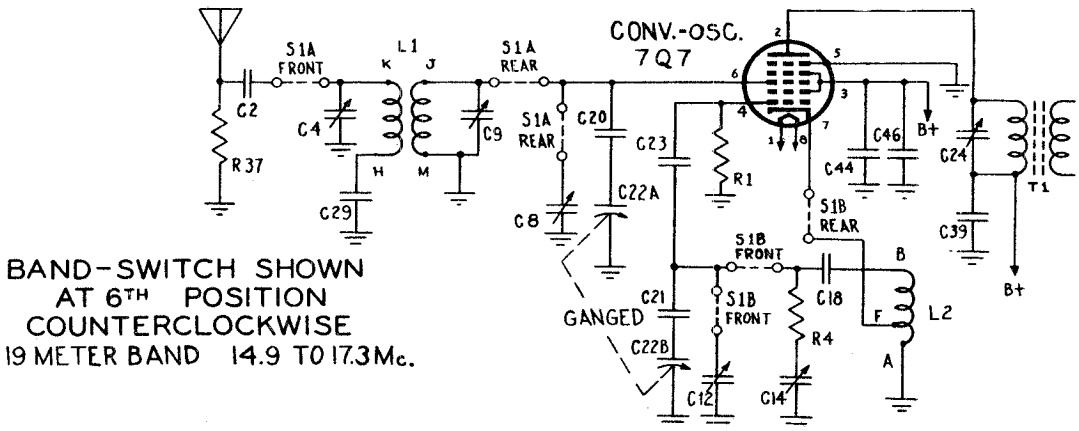


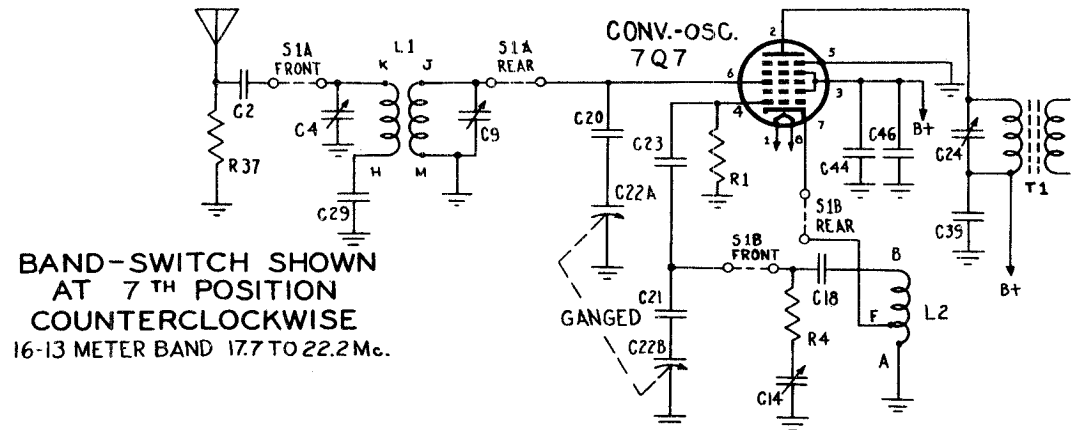
BAND-SWITCH SHOWN
AT 4TH POSITION
COUNTERCLOCKWISE
31 METER BAND 9.36 TO 9.8 Mc.



BAND-SWITCH SHOWN
AT 5TH POSITION
COUNTERCLOCKWISE
25 METER BAND 11.6 TO 12.5 Mc.



BAND-SWITCH SHOWN
AT 6TH POSITION
COUNTERCLOCKWISE
19 METER BAND 14.9 TO 17.3 Mc.



BAND-SWITCH SHOWN
AT 7TH POSITION
COUNTERCLOCKWISE
16-13 METER BAND 17.7 TO 22.2 Mc.

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XH-713C,XH-713D2,
Preliminary

CAUTION

ONE SIDE OF THE POWER LINE IS CONNECTED TO THE CHASSIS. AVOID ANY GROUND CONNECTIONS TO THE RADIO UNLESS AN ISOLATING TRANSFORMER IS USED IN THE POWER LINE.

ELECTRICAL CIRCUIT ALIGNMENT

The following equipment is required: (1) test oscillator with tone modulation, (2) a-c output meter, 1 1/2 volts full scale, (3) 0.05 mf. paper capacitor, (4) 200 mmf. mica capacitor, (5) insulated screwdriver.

PROCEDURE:

(1) For i-f alignment, the chassis must be removed from the cabinet. For r-f alignment, the chassis should be firmly bolted in place in the cabinet.

(2) Connect output meter across loudspeaker voice coil leads.

(3) Set radio volume control to its maximum position and attenuate test oscillator signal output so that the output meter reading never exceeds 1 1/4 volts.

(4) Connect the capacitor as listed in column 2, between the output "High Side" of test oscillator and the point of input specified.

TUBE COMPLEMENT:

Converter-Oscillator	Type 7Q7
I-F Amplifier	Type 6SG7
Detector-Audio	Type 6SQ7
Power Output	Type 25L6GT/G
Rectifier	Type 25Z6GT
Tuning Indicator	Type 6U5
Pilot Lamp	(2) GE #44

ELECTRICAL RATING:

"C" Voltage Rating (Transformer RTP-012)	103-133 v., 25-60 cycles
"D2" Voltage Rating (Ballast RRB-003)	210-240 v., a-c or d-c
"V" Voltage Rating (Transformer RTP-011)	103-250 v., 50-60 cycles
Wattage ("C" and "V" Ratings)	60 watts
Wattage (D2 Rating)	100 watts

OPERATING FREQUENCIES:

Broadcast	540-1700 kc
Shortwave 1	2.2-6.8 mc
Shortwave 2	6.8-21.0 mc
31 Meters	9.36-9.8 mc
25 Meters	11.6-12.5 mc
19 Meters	14.9-17.3 mc
16-13 Meters	17.7-22.2 mc
I-F Amplifier	455 kc

ALIGNMENT CHART

Step	Test Osc. Connected to	Test-Osc. Setting	Band & Pointer Setting	Tune Trimmer for Max. Output
1	6SG7 I-F grid in series with .05 mfd. cap.	455 KC	"BC" BAND 550KC	C26 and C27
2	7Q7 CONV. grid in series with .05 mfd. cap.	455 KC	"BC" BAND 550KC	C24 and C25
3	ANT. POST in series with 200 mmf.	580 KC	"BC" BAND 580KC	C16**
4	ANT. POST in series with 200 mmf.	1500 KC	"BC" BAND 1500KC	C17 (osc.) C3 (ant.)
5	R E P E A T S T E P 3			
6	ANT. POST in series with 200 mmf.	6.1 MC	"SW-1" BAND 6.1 MC	C15 (osc.) C4 (ant.)
7	ANT. POST in series with 200 mmf.	17.8 MC	16 METER 17.8MC	C14* (osc.)
8	ANT. POST in series with 200 mmf.	21.6 MC	16 METER 21.6MC	C9*** (ant.)
9	ANT. POST in series with 200 mmf.	15.22 MC	19 METER 15.22MC	C12* (osc.) C8*** (ant.)
10	ANT. POST in series with 200 mmf.	11.8 MC	25 METER 11.8MC	C11* (osc.) C7*** (ant.)
11	ANT. POST in series with 200 mmf.	9.6 MC	31 METER 9.6MC	C10* (osc.) C6*** (ant.)

*Use minimum capacity peak if two are obtainable. ***Use maximum capacity peak if two are obtainable.
**Rock gang condenser for optimum peak.

SOCKET VOLTAGES

CONDITIONS OF TEST: 100 ohm/volt meter used. All measurements made to chassis. Values are +d-c unless otherwise noted.
"C" and "V" Rating - 110 volts on 110 v. tap. "D2" Rating - 220 volts a-c.

Pin Number	1	2	3	4	5	6	7	8
7Q7	12.6 AC	131	98	...	GND	...	0	6.3 AC
6SG7	0	12.6 AC	1.0	...	1.0	82	18.9 AC	131
6SQ7	0	.....	0	0	.....	60	6.3 AC	0
25L6GT/G	.....	43.9 AC	201	131	.....	...	18.9 AC	10
25Z6GT	.....	.....	210 AC	216	210 AC	...	.....	216

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MODELS X-317V, X-317C,
X-317D2, XH-713V,
XH-713C, XH-713D2,
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Cat. No.	Description	Model	Quan. Used Per Set	Symbol	Cat. No.	Description	Model	Quan. Used Per Set	Symbol
RAB-012	Cabinet back	All	1		RTP-012	Power transformer	2-5	1	T-5
RAV-004	Cabinet	1-2-3	1		RWL-009	Power cord	All	1	
RAV-005	"	4-5-6	1		RWX-001	Cable (tuning eye)	"	1	R-13
RCB-026	Dry Electrolytic 40-300, 50-20-250 20-25	All	1	C-30 a-b-c-d.	UCC-036	Capacitor (paper) .002 mfd. 600 V.	"	2	C-36, 37
					UCC-039	" .005 " "	"	1	C-33
					UCC-040	" .01 " "	"	2	C-1, 32
RCS-001	Line capacitor .02 mfd. 600 V.	All	1	C-43	UCC-045	" .05 " "	"	7	C-5, 29, 38, 39, 40, 44, 45
RCT-007	Tuning capacitor	"	1	C-22 a & b					
RCW-030	Compensating capacitor 45 mmf.	"	2	C-20,21	UCC-048	" " .1 " "	"	1	C-41
RCX-004	Trimmer Strip (spread antenna)	"	1	C-6,7,8,9	UCC-049	" " .001 " "	"	1	C-2
RCX-005	" " (B-C ant.)	"	1	C-3,4	UCC-050	" " .25 " "	"	1	C-34
RCX-006	" " (oscillator)	"	1	C-10,11,12, 14,15,16,17	UCC-061	" " .008 " 1000 V.	"	1	C-42
					UCU-036	Capacitor (mica) 220 mfd.	"	1	C-35
RDC-006	Drive cord assembly	"	1		UCU-044	" " 470 "	"	1	C-46
RDF-005	Felt washer	"	4		UCU-2557	" " 1800 "	"	1	C-19
RDK-017	Knob & spring	4-5-6	2		UCU-2570	" " 5600 "	"	1	C-18
RDK-018	" "	4-5-6	2		UCW-1018	" (ceramic) 39 mfd.	"	1	C-23
RDK-019	" "	1-2-3	2		UIC-001	Cement for speaker	"		
RDK-024	" "	1-2-3	2		UOP-802	Speaker 8" PM	"		
RDP-007	Pointer assembly	All	1		UCX-004	Cone and voice coil assembly	"	1	
RDS-010	Scale	1-2-3	1		URD-009	Resistor (carbon) 22 ohm. 1/2 W.	"	1	R-4
RDS-011	"	4-5-6	1		URD-025	" " 100 " . "	"	1	R-2
RDX-011	Pilot light socket assembly	All	1		URD-033	" " 220 " "	"	1	R-22
RDX-016	Drum assembly	"	1		URD-035	" " 270 " "	"	1	R-11
RHC-001	Hairpin cotter	"	2		URD-041	" " 470 " "	"	1	R-38
RHJ-002	Tuning shaft spacer	"	1		URD-049	" " 1000 " "	"	1	R-19
RHM-019	Tuning eye thumb screw	"	1		URD-053	" " 1500 " "	"	1	R-23
RHX-004	Mounting plate & bearing assembly	"	1		URD-081	" " 22000 " "	"	1	R-29
RJC-003	Contact (female)	"	5		URD-085	" " 33000 " "	"	1	R-1
RJS-012	Mtg.plate	"	1		URD-089	" " 42000 " "	"	1	R-7
RJS-017	Tube socket	"	5		URD-097	" " 100000 " "	"	1	R-37
RJS-018	" "	"	1		URD-103	" " 180000 " "	"	1	R-8
RLA-002	Antenna coil	"	1	L-1	URD-109	" " 330000 " "	"	1	R-10
RLC-007	Oscillator coil	"	1	L-2	URD-111	" " 390000 " "	"	2	R-3, 16
RLN-002	I.F.Neutralizing coil	"	1	L-3	URD-113	" " 470000 " "	"	2	R-6, 20
RMC-005	Clamp (scale)	"	2		URD-121	" " 1 meg.	"	1	R-27
RMC-006	Clamp (tuning eye)	"	1		URD-129	" " 2.2 " "	"	1	R-5
RMM-006	Pilot light shield	"	2		URD-135	" " 3.9 " "	"	1	R-26
RMS-005	Spring (dial cord)	"	1		URD-137	" " 4.7 " "	"	1	R-14
RMU-006	Tuning shaft	"	1		URD-143	" " 8.2 " "	"	1	R-21
RMW-006	Pulley and pin	"	2		URD-145	" " 10 " "	"	1	R-9
RRB-003	Ballast tube	3-6	1	R-12	URE-031	"180 ohm. 1 W.	"	1	R-15
RRC-007	Volume control	All	1		URE-063	"3900 " "	"	1	R-17
RSW-008	Band change switch	"	1	S-1	URF-035	" 270 " 2 W.	"	1	R-25
RSX-004	Tone control and AC switch	"	1	S-2 a & b	URF-037	" 330 " "	"	1	R-24
RTL-009	1st I.F.transformer	"	1	T-1	URF-061	"3300 " "	"	1	R-18
RTL-010	2nd " "	"	1	T-2					
RTO-006	Output "	"	1	T-3	(1) X317V Univ.	(2) X317C 25 cycle	(3) X317D2 230 V. AC-DC		
RTP-011	Power transformer	1-4	1	T-4	(4) XH713V "	(5) XH713C 25 cycle	(6) XH713D2 230 V. AC-DC		

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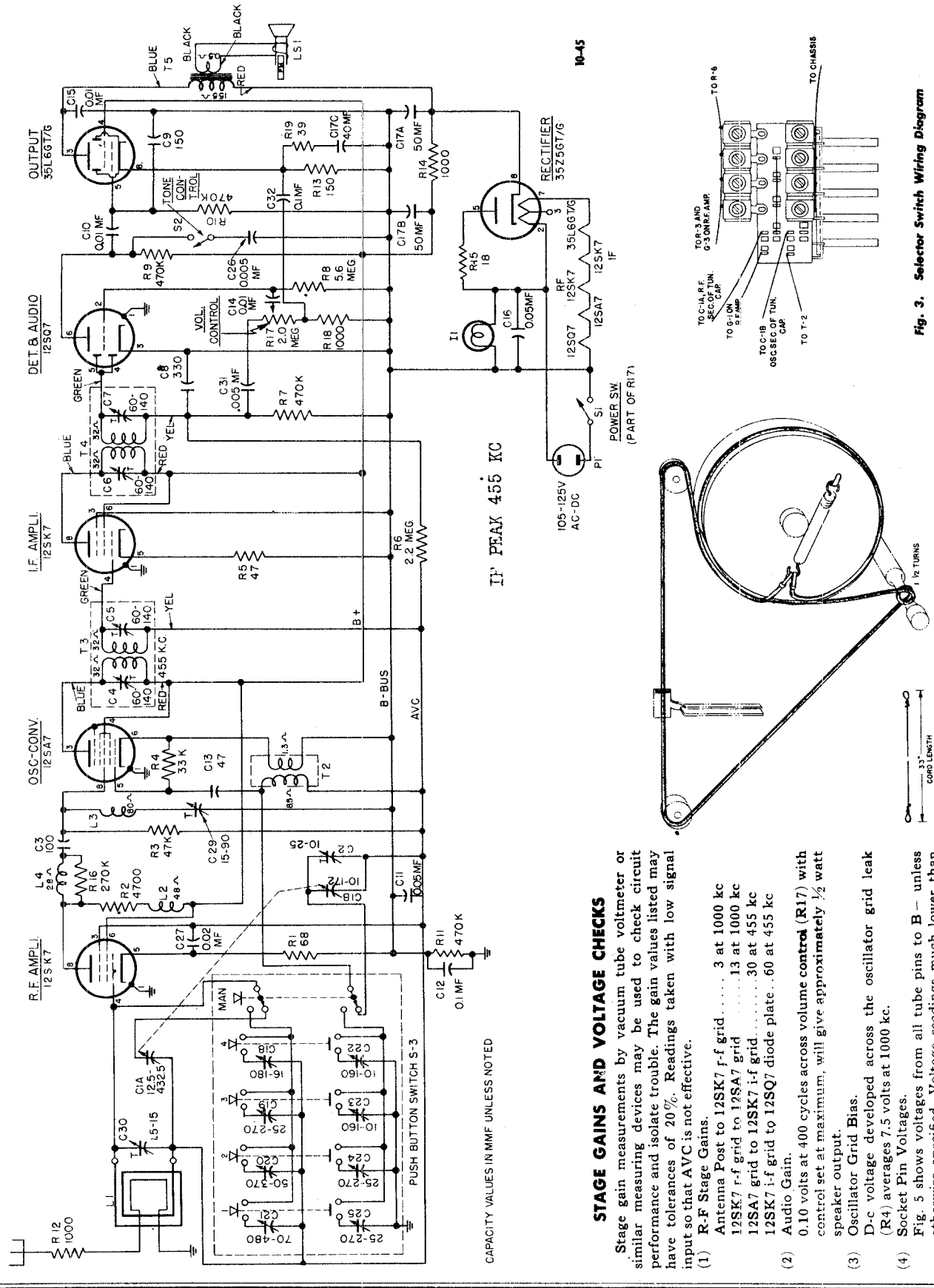

Fig. 1. Dial Cord Stringing

Fig. 3. Selector Switch Wiring Diagram

STAGE GAINS AND VOLTAGE CHECKS

Stage gain measurements by vacuum tube voltmeter or similar measuring devices may be used to check circuit performance and isolate trouble. The gain values listed may have tolerances of 20%. Readings taken with low signal input so that AVC is not effective.

(1) R-F Stage Gains.
Antenna Post to 12SK7 r-f grid . . . . . 3 at 1000 kc
12SK7 r-f grid to 12SA7 grid . . . . . 13 at 1000 kc
12SA7 grid to 12SK7 i-f grid . . . . . 30 at 455 kc
12SK7 i-f grid to 12SQ7 diode plate . . 60 at 455 kc

(2) Audio Gain.
0.10 volts at 400 cycles across volume control (R17) with control set at maximum, will give approximately ½ watt speaker output.

(3) Oscillator Grid Bias.
D-c voltage developed across the oscillator grid leak (R4) averages 7.5 volts at 1000 kc.

(4) Socket Pin Voltages.
Fig. 5 shows voltages from all tube pins to B − unless otherwise specified. Voltage readings much lower than those specified may help localize defective components or tubes.

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For Parts List, see P.15-48

MODEL 321 Late

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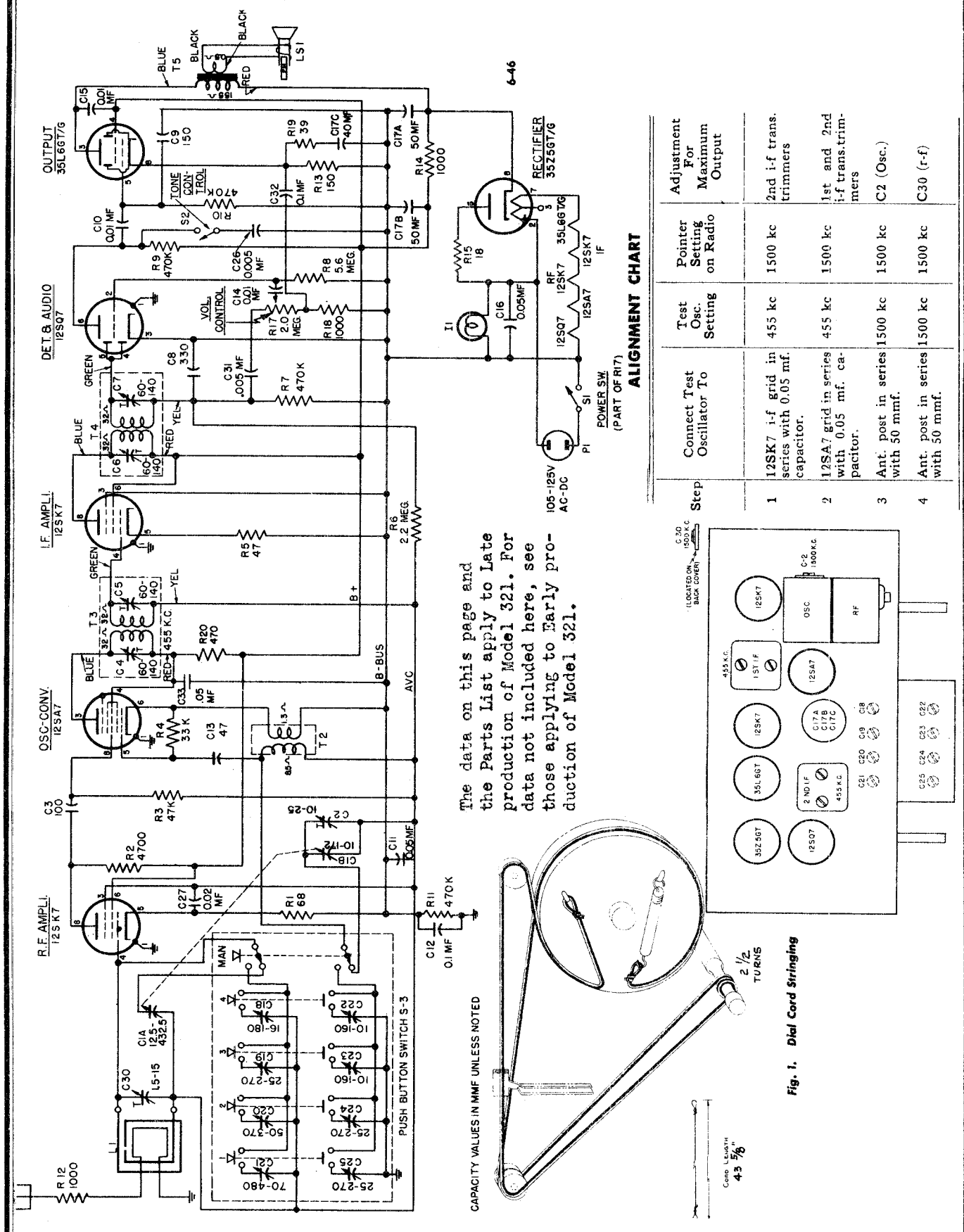

The data on this page and the Parts List apply to Late production of Model 321. For data not included here, see those applying to Early production of Model 321.

ALIGNMENT CHART

Step	Connect Test Oscillator To	Test Osc. Setting	Pointer Setting on Radio	Adjustment For Maximum Output
1	12SK7 i-f grid in series with 0.05 mf. capacitor.	455 kc	1500 kc	2nd i-f trans. trimmers
2	12SA7 grid in series with 0.05 mf. capacitor.	455 kc	1500 kc	1st and 2nd i-f trans. trimmers
3	Ant. post in series with 50 mmf.	1500 kc	1500 kc	C2 (Osc.)
4	Ant. post in series with 50 mmf.	1500 kc	1500 kc	C30 (r-f)

Fig. 1. Dial Cord Stringing

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For Parts List, see P. 15-52

ALIGNMENT PROCEDURE

ALIGNMENT FREQUENCIES

R-F . . . . . 1500 kilocycles
I-F . . . . . 455 kilocycles

EQUIPMENT REQUIRED

1. Test oscillator with audio tone modulation
2. A-C output meter, 1½ volts full scale
3. 0.05 mf. paper capacitor
4. 50 mmf. mica capacitor
5. Insulated screwdriver

PROCEDURE—GENERAL

1. Turn dial control until pointer is as far to the left as it will go. The pointer should coincide with the first marking at the left of the scale. If it doesn't, remove chassis and slip pointer along drive cord until pointer is under reference mark when chassis is bolted in place.

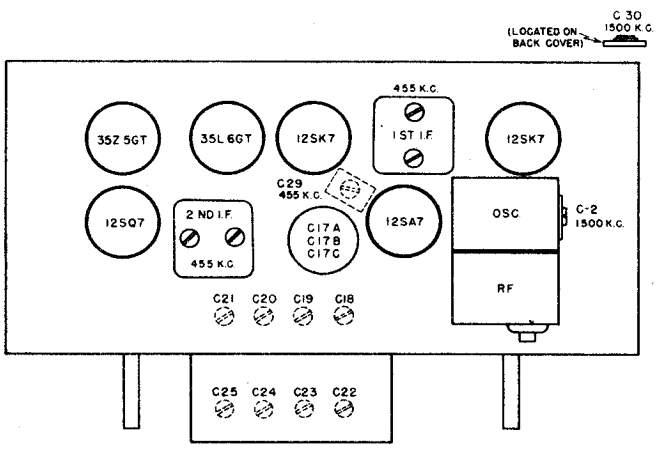

Fig. 4. Tube and Trimmer Location

ALIGNMENT CHART

Step	Connect Test Oscillator To	Test Osc. Setting	Pointer Setting on Radio	Adjustment For Maximum Output
*1	12SK7 i-f grid in series with 0.05 mf. capacitor.	455 kc	1500 kc	2nd i-f trans. trimmers
*2	12SA7 grid in series with 0.05 mf. capacitor.	455 kc	1500 kc	1st and 2nd i-f trans. trimmers
3	Ant. post in series with 50 mmf.	455 kc	1500 kc	C-29 (wavetrap) adjust for minimum output
4	Ant. post in series with 50 mmf.	1500 kc	1500 kc	C2 (Osc.)
5	Ant. post in series with 50 mmf.	1500 kc	1500 kc	C30 (r-f)

*Disconnect wavetrap (L3, C29) from circuit before making these alignments.

2. For i-f and r-f alignments, the output meter is connected across the loudspeaker voice coil terminals.
3. Keep radio volume control set at maximum and attenuate test oscillator signal output so that the output meter reading never exceeds 1¼ volts.
4. For i-f alignment, remove chassis from cabinet. For r-f alignment, the chassis should be bolted in the cabinet. Since the oscillator trimmer (C-2) is not accessible when the chassis is bolted in the cabinet, before C-2 adjustment, set pointer and test oscillator to 1500 kc and then remove chassis carefully from cabinet, so as not to disturb the setting of the dial pointer. Adjust oscillator trimmer (C-2) for maximum output and replace chassis in cabinet, then proceed with r-f trimmer (C-30) alignment.
5. Connect the capacitor as listed in column 2 between the "high side" of the test oscillator and the point of input specified. The ground terminal of the test oscillator may be connected to B — in the chassis providing an isolating transformer is used between the radio and the line input, otherwise use a suitable capacitor.

ELECTRICAL RATING (INPUT)

Voltage . . . . . 105-125 volts a-c or d-c
Frequency (on a-c) . . . . . 25 to 60 cycles
Wattage . . . . . 40 watts

OPERATING FREQUENCIES:

Broadcast Band . . . . . 540-1600 kilocycles
I-F Amplifier . . . . . 455 kilocycles

POWER OUTPUT (117 volts line)

Undistorted . . . . . 1.2 watts
Maximum . . . . . 1.5 watts

LOUDSPEAKER:

Type . . . . . Alnico P.M.
Outside Cone Diameter . . . . . 5¼ inches
Voice Coil Impedance (400 cycles) . . . 3.5 ohms

STATION KEY ADJUSTMENTS—The station key adjustments are located on the bottom of the cabinet through the slots designated as "Osc." and "R-F." The extreme left trimmers in rows "Osc." and "R-F" are corresponding adjustments for the first or extreme left station key. The second set of adjustment trimmers is for the No. 2 or second key from the left; correspondingly the remaining sets of trimmers are for the station keys No. 3 and No. 4. Turn power ON and allow radio to operate 15 minutes before making the following adjustments.

1. List the desired station on key, then depress the "Manual" key. Tune in the station desired for the key.
2. Push in station key to be set up, to its depressed position.
3. Adjust its corresponding "Osc." adjustment for the station signal which you tuned in step 1 and which is listed for the key. Peak the adjustment for the clearest program reception.
4. Adjust corresponding "R-F" adjustment for maximum signal strength.
5. Proceed in like manner for adjustment of the remaining keys.

Note: Clockwise rotation of adjustment screws lowers the frequency.

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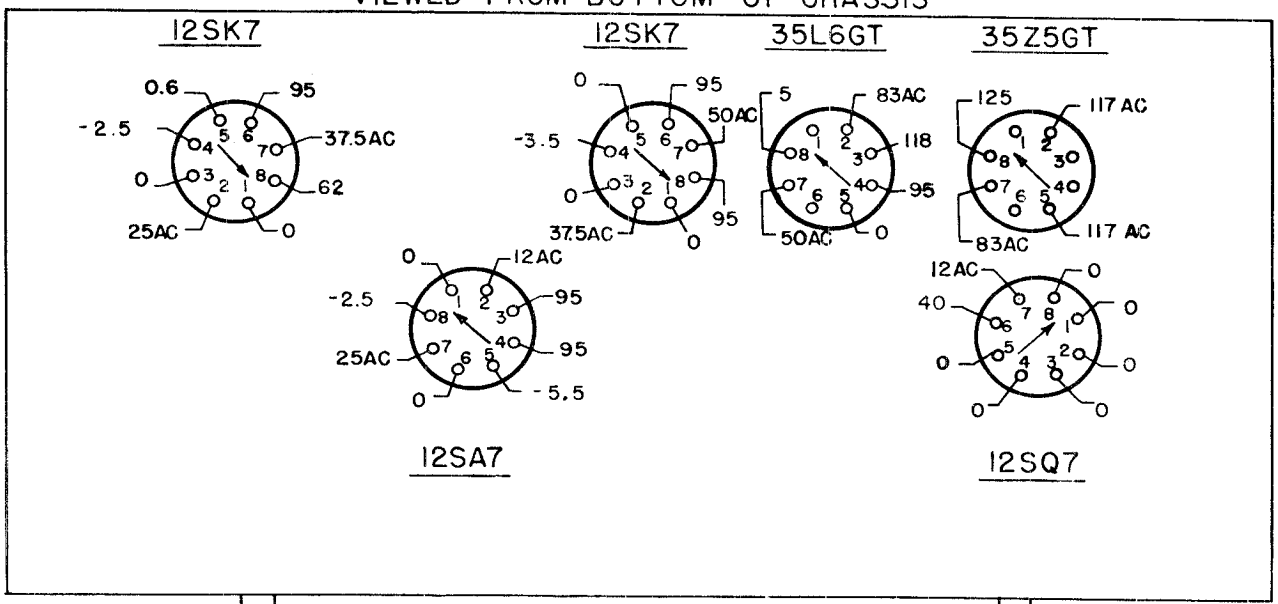
MODEL 321 Early

GENERAL ELECTRIC CO.

VIEWED FROM BOTTOM OF CHASSIS



CONDITIONS OF TEST

MEASURED AT 117 VOLTS LINE ON A 20,000 OHMS PER VOLT METER
READINGS TAKEN BETWEEN TUBE PIN TERMINALS AND B-BUS.
NO SIGNAL INPUT

UNIVERSAL G-E REPLACEMENT PARTS

Cat. No.	Symbol	Description
UCC-009	C27	Capacitor—0.02 mfd., 200 V., paper
UCC-013	C32	Capacitor—0.1 mfd., 200 V., paper
UCC-025	C10, 14	Capacitor—0.01 mfd., 400 V., paper
UCC-030	C12	Capacitor—0.1 mfd., 400 V., paper
UCC-039	C26, 31	Capacitor—0.005 mfd., 600 V., paper
UCC-040	C15	Capacitor—0.01 mfd., 600 V., paper
UCC-045	C11, 16	Capacitor—0.05 mfd., 600 V., paper
UDL-018	I1	Pilot Lamp—115 V., 10 watt candelabra base
URD-015	R19	Resistor—39 ohms, ½ W., carbon
URD-017	R5	Resistor—47 ohms, ½ W., carbon
URD-021	R1	Resistor—68 ohms, ½ W., carbon
URD-029	R13	Resistor—150 ohms, ½ W., carbon
URD-049	R12, 18	Resistor—1000 ohms, ½ W., carbon
URD-065	R2	Resistor—4700 ohms, ½ W., carbon
URD-085	R4	Resistor—33,000 ohms, ½ W., carbon
URD-089	R3	Resistor—47,000 ohms, ½ W., carbon
URD-113	R7, 9, 10, 11	Resistor—470,000 ohms, ½ W., carbon
URD-129	R6	Resistor—2.2 megohms, ½ W., carbon
URD-139	R8	Resistor—5.6 megohms, ½ W., carbon
URE-007	R15	Resistor—18 ohms, 1 W., carbon
URF-049	R14	Resistor—1000 ohms, 2 W., carbon

SPECIALIZED G-E REPLACEMENT PARTS

RAV-001		Cabinet—Cabinet, less escutcheon and back
RCE-001	C17A, 17B, 17C	Capacitor—50 mfd., 150 V., 50 mfd., 150 V., 40 mfd., 25 V., dry electrolytic
RCT-003	C1A, 1B, 2	Capacitor—Tuning capacitor assembly
RCU-110	C13	Capacitor—47 mmf., 500 V., mica
RCU-112	C3	Capacitor—100 mmf., 500 V., mica
RCU-113	C9	Capacitor—150 mmf., 500 V., mica
RCU-115	C8	Capacitor—330 mmf., 500 V., mica
RCX-001	C18, 19, 20, 21	Trimmer Strip—Station selector adjustments (r-f)
RCX-002	C22, 23, 24, 25	Trimmer Strip—Station selector adjustments (osc.)
RCY-001	C29	Capacitor—Wave trap trimmer
RCY-002	C30	Capacitor—1.5-15 mmf. antenna trimmer
RDF-002		Washer—Felt washer, ½ in. O.D.
RDF-003		Washer—Felt washer, ⅝ in. O.D.
RDF-004		Washer—Felt washer, 1 1/16 in. O.D.
RDK-004		Knob—Control knob (tuning)

SPECIALIZED G-E REPLACEMENT PARTS (Cont'd)

RDK-007		Key—Station selector key
RDK-009		Knob—Control knob (volume)
RDK-010		Knob—Tone control wafer knob
RDP-003		Pointer—Dial scale pointer
RDS-004		Scale—Dial scale
RDX-003		Assembly—Dial scale back plate assembly
RDX-004		Assembly—Drive cord assembly
RHC-001		Cotter—Hairpin shaft retaining cotter
RHG-001		Grommet—Tuning capacitor mtg. grommet
RHM-007		Stud—Idler pulley stud
RHM-008		Cam—Tone switch cam
RHM-009		Link—Tone switch cam link
RHM-010		Clip—Tone control shaft clip
RHM-011		Bushing—Tuning shaft bushing
RHX-001		Assembly—Chassis mounting assembly
RIT-001		Cover—Electrolytic capacitor cardboard cover
RJC-003		Terminal—Loudspeaker lead terminals
RJS-007		Socket—Pilot lamp socket
RJS-008		Socket—Octal base tube socket
RJS-009		Socket—Mtg. socket for electrolytic capacitor
RLC-002	T2	Coil—Oscillator coil
RLL-004	L1	Beam-a-scope—Cabinet back and antenna assembly
RLP-001	L2	Coil—Plate choke
RLP-002	L4, R16	Coil—Series peaking coil and resistor assembly
RLW-001	L3	Coil—Wavetrap coil
RMM-001		Shield—Tube shield and clip
RMM-002		Shield—Light shield
RMS-001		Spring—Drive cord spring
RMS-003		Spring—Station selector button spring
RMU-003		Shaft—Tuning shaft and cotter pin
RMW-001		Pulley—Drive cord idler pulley
ROP-005	LS1	Speaker—5¼ in. permanent magnet loudspeaker
RRC-003	R17	Volume Control—2 meg. potentiometer
RSP-001	S3	Switch—Station selector push button switch
RSW-003	S2	Switch—Tone control switch
RTL-003	T3	Transformer—1st I-F transformer
RTL-004	T4	Transformer—2nd I-F transformer
RTO-002	T5	Transformer—Output transformer
RWL-002	P1	Cord—Power cord and plug
RYC-001		Card—Station letter cards

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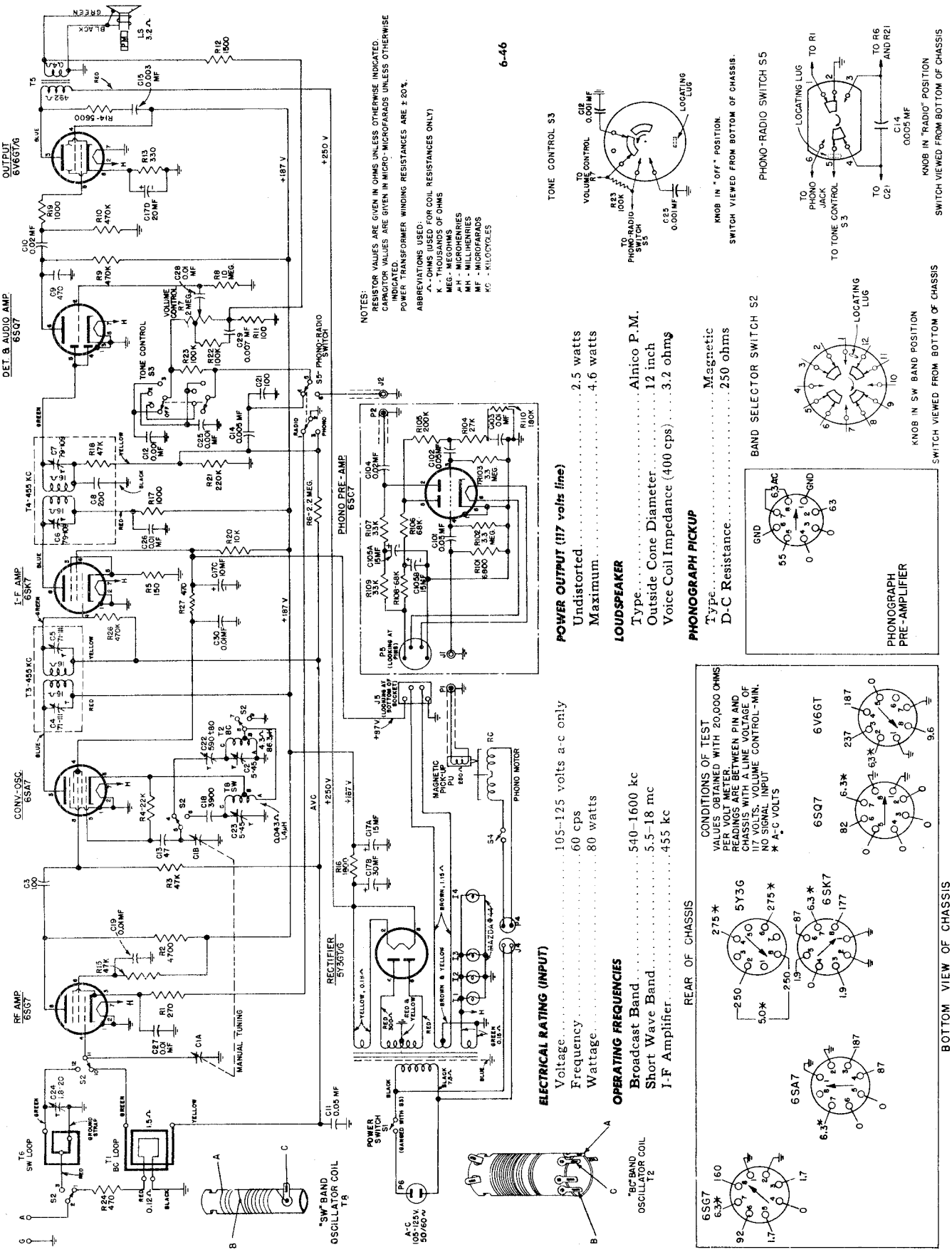

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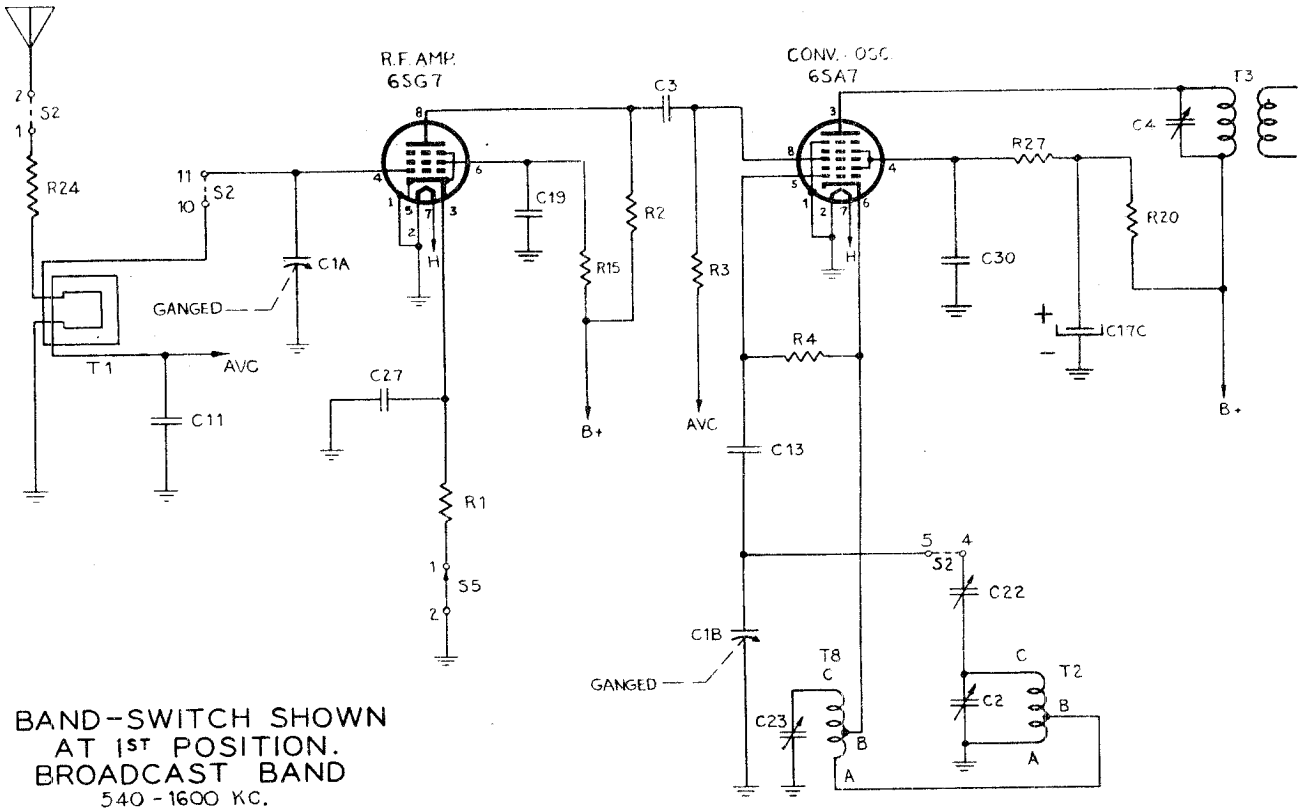
Record Changer: Single-post, General Instrument Model 204
Two-post, Seeburg Model K

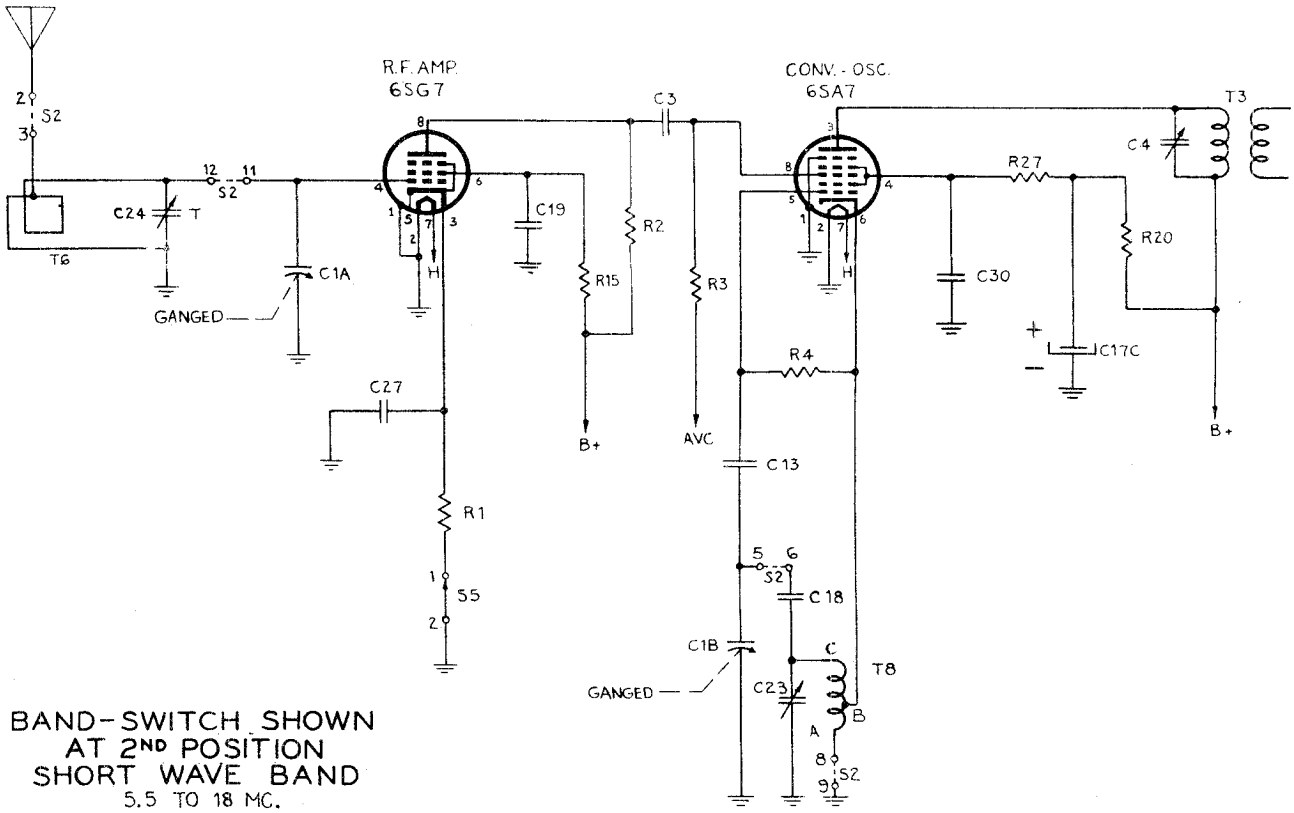
"clarified schematics"

MODELS 326,327

GENERAL ELECTRIC CO.



BAND-SWITCH SHOWN AT 1ST POSITION. BROADCAST BAND 540 - 1600 KC.



BAND-SWITCH SHOWN AT 2ND POSITION SHORT WAVE BAND 5.5 TO 18 MC.

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GENERAL ELECTRIC CO.

ELECTRICAL CIRCUIT ALIGNMENT

EQUIPMENT REQUIRED

1. Test oscillator with audio tone modulation.
2. A-C output meter, 1½ volts full scale.
3. Insulated screwdriver.

ALIGNMENT PROCEDURE

The alignment procedure is given in table form. All i-f alignments may be made with the chassis removed from the cabinet. However, the r-f alignments should be made with the chassis and loop antennas securely fastened in the cabinet, as the relative position of the loop antenna with respect to the chassis materially affects the alignment. All oscillator and r-f trimmers are accessible from the rear of the cabinet when the chassis is installed; the location of these trimmers is shown in Fig. 1.

The r-f signal should be capacity coupled by placing a two-foot wire on the output post (high side) of the test oscillator to act as an antenna. This antenna should be kept two feet or more away from the receiver loop to insure freedom from too much coupling. Metal objects such as meters and tools should not be placed on top of the receiver cabinet.

The output meter should be connected across the loudspeaker voice coil terminals. The low side of the test oscillator output should be connected to the chassis ground; the high side of the test oscillator output should be connected as indicated in the alignment chart. During the entire alignment procedure, the radio volume control should be in its maximum position. The test oscillator output signal should be attenuated so that the output meter reading never exceeds 1¼ volts.

ALIGNMENT CHART

Step	Connect Test Oscillator to	Test Oscillator Setting	Dial Settings	Adjust Trimmers
1	6SK7, pin 4, in series with 0.05 mf	455 kc	"BC" Band 550 kc	C6 and C7 for maximum
2	6SA7, pin 8, in series with 0.05 mf	455 kc	"BC" Band 550 kc	C4 and C5 for maximum
3	‡Capacity Coupled	1500 kc	"BC" Band 1500 kc	*C2 (Osc.) for maximum
4	‡Capacity Coupled	580 kc	"BC" Band 580 kc	*C22 (Osc) for maximum
5	‡Capacity Coupled	1500 kc	"BC" Band 1500 kc	*C2 (Osc) for maximum
6	‡Capacity Coupled	18 mc	"SW" Band 18 mc	**C23 (Osc.) to signal
7	‡Capacity Coupled	18 mc	"SW" Band 18 mc	*C24(Ant.) for maximum

‡ Use two-foot antenna on output of test oscillator.
* Rock gang condenser when making alignment.
** Use minimum capacity peak.

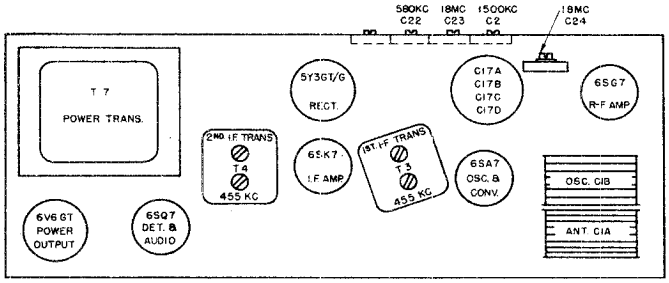

Fig. 1—Tube and Trimmer Location

STAGE GAIN AND VOLTAGE CHECKS

Stage gain measurements may be made with a vacuum tube voltmeter to check circuit performance and to locate stages which are not operating properly. The gain values listed may have a tolerance of 20%. Readings should be taken with the AVC shorted out. This may be done conveniently by connecting the yellow Beam-a-Scope lead to ground.

1. R-F Stage Gains.
   Antenna to 6SG7 grid..... 4 at 1000 kc
   6SG7 grid to 6SA7 grid.....14 at 1000 kc
   6SA7 grid to 6SK7 grid.....74 at 455 kc

   Audio Gain.
   The power output across the speaker voice coil should be approximately ½ watt with 0.06 volts at 400 cps applied between the high side of the volume control and ground.

3. Oscillator Grid Bias.
   The d-c voltage developed across the oscillator grid leak (R4) averages 5.7 volts at 1000 kc.

4. Socket Pin Voltages.
   Fig. 4 shows typical tube pin voltages. All readings should be made from the pins to ground unless otherwise indicated.

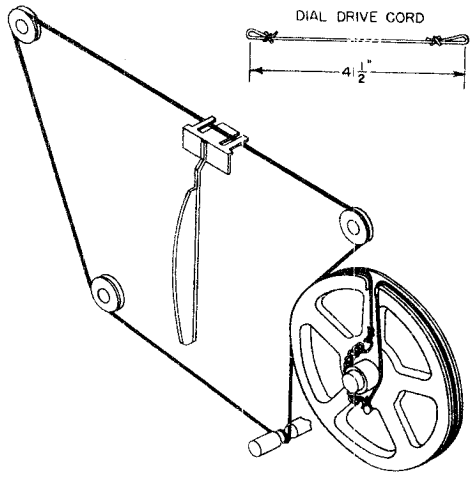

Fig. 3—Dial Stringing Diagram

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MODEL 321 Late
MODELS 326,327

GENERAL ELECTRIC CO.

MODEL 321 (LATE)

UNIVERSAL G-E REPLACEMENT PARTS

Cat. No.	Symbol	Description
UCC-009	C27	Capacitor—0.02 mfd., 200 V., paper
UCC-013	C32	Capacitor—0.1 mfd., 200 V., paper
UCC-025	C10,14	Capacitor—0.01 mfd., 400 V., paper
UCC-030	C12	Capacitor—0.1 mfd., 400 V., paper
UCC-039	C26, 31	Capacitor—0.005 mfd., 600 V., paper
UCC-040	C15	Capacitor—0.01 mfd., 600 V., paper
UCC-045	C11, 16, 33	Capacitor—0.05 mfd., 600 V., paper
UDL-018	I1	Pilot Lamp—115 V., 10 watt candelabra base
UOP-525	LS1	Speaker—5¼ in. permanent magnet loudspeaker
URD-015	R19	Resistor—39 ohms, ½ W., carbon
URD-017	R5	Resistor—47 ohms, ½ W., carbon
URD-021	R1	Resistor—68 ohms, ½ W., carbon
URD-029	R13	Resistor—150 ohms, ½ W., carbon
URD-041	R20	Resistor—470 ohms, ½ W., carbon
URD-049	R12, 18	Resistor—1000 ohms, ½ W., carbon
URD-065	R2	Resistor—4700 ohms, ½ W., carbon
URD-085	R4	Resistor—33,000 ohms, ½ W., carbon
URD-089	R3	Resistor—47,000 ohms, ½ W., carbon
URD-113	R7, 9, 10, 11	Resistor—470,000 ohms, ½ W., carbon
URD-129	R6	Resistor—2.2 megohms, ½ W., carbon
URD-139	R8	Resistor—5.6 megohms, ½ W., carbon
URE-007	R15	Resistor—18 ohms, 1 W., carbon
URF-049	R14	Resistor—1000 ohms, 2 W., carbon

SPECIALIZED G-E REPLACEMENT PARTS

RAV-001		Cabinet—Cabinet, less escutcheon and back
RCE-001	C17A, 17B, 17C	Capacitor—50 mfd., 150 V., 50 mfd., 150 V., 40 mfd., 25 V., dry electrolytic
RCT-003	C1A, 1B, 2	Capacitor—Tuning capacitor assembly
RCU-110	C13	Capacitor—47 mmf., 500 V., mica
RCU-112	C3	Capacitor—100 mmf., 500 V., mica
RCU-113	C9	Capacitor—150 mmf., 500 V., mica
RCU-115	C8	Capacitor—330 mmf., 500 V., mica
RCX-001	C18, 19, 20, 21	Trimmer Strip—Station selector adjustments (r-f)
RCX-002	C22, 23, 24, 25	Trimmer Strip—Station selector adjustments (osc.)
RCY-002	C30	Capacitor—1.5-15 mmf. antenna trimmer
RDK-004		Knob—Control Knob (tuning)
RDK-007		Key—Station selector key
RDK-009		Knob—Control knob (volume)
RDK-023		Knob—Tone control wafer knob
RDP-003		Pointer—Dial scale pointer
RDS-004		Scale—Dial scale
RDX-003		Assembly—Dial scale back plate assembly
RDX-004		Assembly—Drive cord assembly
RHC-001		Cotter—Hairpin shaft retaining cotter
RHG-001		Grommet—Tuning capacitor mtg. grommet
RHM-007		Stud—Idler pulley stud
RHM-008		Cam—Tone switch cam
RHM-009		Link—Tone switch cam link
RHM-010		Clip—Tone control shaft clip
RHM-011		Bushing—Tuning shaft bushing
RHX-001		Assembly—Chassis mounting assembly
RIT-006		Cover—Electrolytic capacitor cardboard cover
RJC-001		Terminal—Loudspeaker lead terminals
RJS-007		Socket—Pilot lamp socket
RJS-008		Socket—Octal base tube socket
RJS-004		Socket—Mtg. socket for electrolytic capacitor
RLC-002	T2	Coil—Oscillator coil
RLL-004	L1	Beam-a-scope—Cabinet back and antenna assembly
RLP-001	L2	Coil—Plate choke
RLP-002	L4, R16	Coil—Series peaking coil and resistor assembly
RLW-001	L3	Coil—Wavetrap coil
RMM-001		Shield—Tube shield and clip
RMM-002		Shield—Light shield
RMS-001		Spring—Drive cord spring
RMS-003		Spring—Station selector button spring
RMU-003		Shaft—Tuning shaft and cotter pin
RMW-001		Pulley—Drive cord idler pulley
RRC-003	R17	Volume Control—2 meg. potentiometer
RSP-001	S3	Switch—Station selector push button switch
RSW-003	S2	Switch—Tone control switch
RTL-003	T3	Transformer—1st I-F transformer
RTL-004	T4	Transformer—2nd I-F transformer
RTO-002	T5	Transformer—Output transformer
RWL-009	P1	Cord—Power cord and plug
RYC-001		Card—Station letter cards

MODELS 326, 327

UNIVERSAL G-E REPLACEMENT PARTS

UCC-037	C15	CAPACITOR—0.003 mf., 600 v., paper
UCC-039	C14	CAPACITOR—0.005 mf., 600 v., paper
UCC-040	C19, 26, 27, 28, 30, 103	CAPACITOR—0.01 mf., 600 v., paper
UCC-041	C10, 104	CAPACITOR—0.02 mf., 600 v., paper
UCC-045	C11, 101, 102	CAPACITOR—0.05 mf., 600 v., paper
UDL-005	I1, 2, 3, 4	PILOT LAMP—G.E. No. 44, 6-8 v., 0.25 amp.
UIC-001		CEMENT—Speaker cone replacement cement
UOP-1206	LS	SPEAKER—12 inch PM speaker
UOX-005		CONE—Replacement speaker cone kit
URD-025	R11	RESISTOR—100 ohms, ½ w., carbon
URD-029	R5	RESISTOR—150 ohms, ½ w., carbon
URD-035	R1	RESISTOR—270 ohms, ½ w., carbon
URD-037	R13	RESISTOR—330 ohms, ½ w., carbon
URD-041	R24, 27	RESISTOR—470 ohms, ½ w., carbon
URD-049	R17, 19	RESISTOR—1000 ohms, ½ w., carbon
URD-053	R12	RESISTOR—1500 ohms, ½ w., carbon
URD-065	R2	RESISTOR—4700 ohms, ½ w., carbon
URD-067	R14	RESISTOR—5600 ohms, ½ w., carbon
URD-077	R101	RESISTOR—6800 ohms, ½ w., carbon
URD-081	R4	RESISTOR—22,000 ohms, ½ w., carbon
URD-083	R104	RESISTOR—27,000 ohms, ½ w., carbon
URD-085	R107, 109	RESISTOR—33,000 ohms, ½ w., carbon
URD-089	R3, 15	RESISTOR—47,000 ohms, ½ w., carbon
URD-093	R106, 108	RESISTOR—68,000 ohms, ½ w., carbon
URD-097	R22, 23	RESISTOR—100,000 ohms, ½ w., carbon
URD-105	R21	RESISTOR—220,000 ohms, ½ w., carbon
URD-113	R9, 10, 26	RESISTOR—470,000 ohms, ½ w., carbon
URD-129	R6	RESISTOR—2.2 meg., ½ w., carbon
URD-133	R102, 103	RESISTOR—3.3 meg., ½ w., carbon
URD-145	R8	RESISTOR—10 meg., ½ w., carbon
URF-055	R16	RESISTOR—1800 ohms, 2 w., carbon
URF-073	R20	RESISTOR—10,000 ohms, 2 w., carbon

SPECIALIZED G-E REPLACEMENT PARTS

RAC-001		COVER—Beam-a-scope Cover
RAL-001		JEWEL—Pilot light jewel
RCC-001	C29	CAPACITOR—0.007 mfd., 600 v., paper
RCC-035	C12, 25	CAPACITOR—0.001 mf., 600 v., paper
RCE-002	C105A	CAPACITOR—15 mf., 350 v., dry electrolytic
	C105B	CAPACITOR—15 mf., 350 v., dry electrolytic
	C17A	CAPACITOR—15 mf., 350 v., dry electrolytic
RCE-003	C17B	CAPACITOR—30 mf., 350 v., dry electrolytic
	C17C	CAPACITOR—10 mf., 250 v., dry electrolytic
	C17D	CAPACITOR—20 mf., 25 v., dry electrolytic
RCT-005	C1A, 1B	CAPACITOR—2 gang tuning capacitor
RCU-064	C9	CAPACITOR—470 mmf., mica
RCU-110	C13	CAPACITOR—47 mmf., mica
RCU-112	C3, 21	CAPACITOR—100 mmf., mica
RCU-189	C18	CAPACITOR—3900 mmf., mica
	C2	CAPACITOR—Trimmer, 5-45 mmf.
RCX-020	C16	CAPACITOR—Trimmer, 15-90 mmf.
	C22	CAPACITOR—Trimmer, 590 ± 80 mmf.
	C23	CAPACITOR—Trimmer, 5-45 mmf.
RCY-004	C24	CAPACITOR—Trimmer, 1.8-20 mmf.
RDC-004		CORD—Dial drive cord, 41½ in. long
RDD-003		DRUM—Dial drum assembly
RDE-005		ESCUTCHEON—Dial escutcheon
RDF-005		WASHER—Felt washer for knobs
RDK-036		KNOB—Mahogany knob (plain)
RDK-038		KNOB—Oak knob (plain)
RDK-039		KNOB—Mahogany knob (pointer)
RDK-041		KNOB—Oak knob (pointer)
RDP-005		POINTER—Dial scale pointer
RDS-016		SCALE—Dial scale
RDX-008		BACKPLATE—Dial backplate assembly
RHG-001		GROMMET—Tuning capacitor mounting grommet
RHG-003		GROMMET—Rubber grommet, ⅛ in. I.D. for ⅞ in. hole
RHG-004		GROMMET—Rubber grommet, ⅛ in. I.D. for ⅜-in. hole
RHM-012		CUSHIONS—Rubber dial scale cushions
RHM-014		STUD—Shaft for upper pulleys on backplate
RHM-015		BUSHING—Tuning shaft bushing, washer, and nut
RHU-002		SPACER—Tuning capacitor mounting spacer
RJB-001		RECEPTACLE—Two-pin speaker receptacle
RJB-002		TERMINAL STRIP—Terminal strip for phono pre-amplifier, 2 terminals
RJC-001		PLUG—Tip plug for speaker leads
RJC-002		CONNECTOR—Clip for antenna loop connections
RJP-002	P5	PLUG—4-prong plug for pre-amplifier
RJP-004	P2	PLUG—Phono pre-amplifier output plug
RJS-003		SOCKET—Octal socket for receiver chassis
RJS-011		SOCKET—Pilot light socket for cabinet jewel
RJS-012		PLATE—Mounting plate for capacitor C17A, B, C, D
RJS-013		SOCKET—Pilot light socket for chassis lights
RJS-014	J5	RECEPTACLE—Four prong receptacle (Power to pre-amp.)
RJS-015		SOCKET—Octal socket for pre-amplifier (shock mounted)
RJX-001	J2	RECEPTACLE—Phono input receptacle on receiver chassis
RJS-049	J4	RECEPTACLE—Phono motor connector (female)
RJX-003	J1	RECEPTACLE—Phono input receptacle on pre-amplifier
RLC-004	T2	COIL—BC Band oscillator coil
RLC-005	T8	COIL—SW Band oscillator coil
RLL-005	T6	LOOP—SW Band antenna loop
RLL-006	T1	LOOP—Beam-a-scope BC Band loop
RMC-001		CLAMP—Mounts BC Band oscillator coil
RMC-002		CLAMP—Mounts SW Band oscillator coil
RMM-003		SHIELD—Bottom shield for 2nd I-F transformer
RMS-001		SPRING—Drive cord tension spring
RMU-004		SHAFT—Tuning shaft with cotter pin and "C" clip
RMW-001		PULLEY—Upper back plate pulley
RMW-002		PULLEY—Chassis idler pulley
ROC-001		CONE—Speaker cone and dust cap
RPX-010	PU	PICKUP—Magnetic pickup cartridge
RRC-005	R7	POTENTIOMETER—Volume control, 2 meg. tapped at 1 meg.
RRD-089	R18	RESISTOR—47,000 ohms, ½ w., carbon
RRD-104	R105	RESISTOR—200,000 ohms, ½ w., carbon
RSW-006	S5	SWITCH—Phono-Radio switch
RSW-007	S2	SWITCH—Band switch
RSX-003	S1	SWITCH—Power switch
	S3	SWITCH—Tone control switch
RTL-005	T3	TRANSFORMER—1st I-F transformer
RTL-006	T4	TRANSFORMER—2nd I-F transformer
RTO-004	T5	TRANSFORMER—Output transformer
RTP-010	T7	TRANSFORMER—Power transformer
RWL-004	P6	CORD—Power cord and plug

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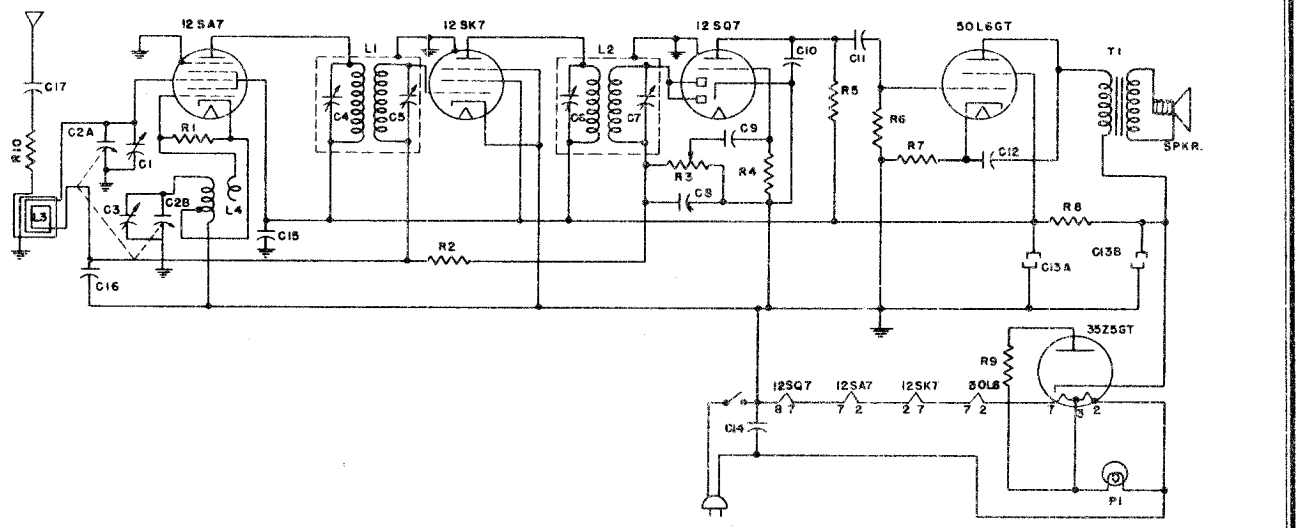
MODELS YRB67-1, YRB67-2, YRB82-1

GENERAL ELECTRIC CO.



ALIGNMENT PROCEDURE

ALIGNMENT FREQUENCIES

I.F. ..... 455 KC
R.F. ..... 1720 and 1500 KC

The location of all trimmers is shown in Fig. 1.

I. F. ALIGNMENT

Connect an output meter across the voice coil. Turn the volume control to maximum. Set test oscillator to 455 KC and keep the oscillator output as low as a readable meter reading will permit. Apply signal to the converter grid through a .05 mfd capacitor and align progressively the trimmers in the 2nd and 1st I.F. transformer cans.

R. F. ALIGNMENT

Apply the R.F. alignment signals through a standard I.R.E. dummy antenna to the receiver antenna post. With the gang condenser wide open, align the oscillator trimmer (C17B) to 1720 KC. Change the generator signal to 1500 KC, tune the receiver to the signal and peak the antenna trimmer (C17A) for maximum output.

PRECAUTION

If the signal generator is A-C operated, use an isolating transformer between the power supply and the radio receiver power input. The use of an isolating capacitor is not recommended, as A-C through the capacitor will introduce hum modulation and/or create the possibility of a burned-out signal generator attenuator.

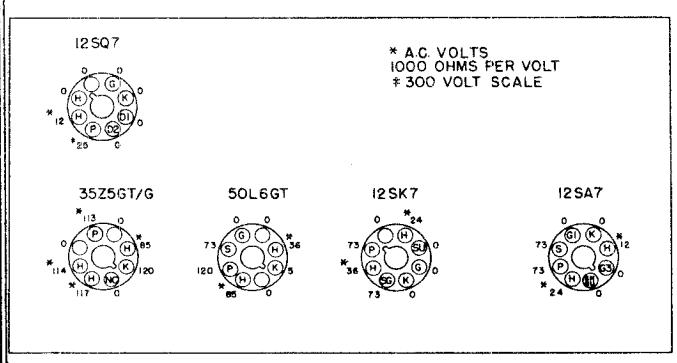


Fig. 2. Socket Voltage Diagram

OVERALL DIMENSIONS—

	YRB 82-1	YRB 67-1, 2
Height	8⅛"	8½"
Width	12½"	13"
Depth	7"	6⅞"

Rating: 105-125 volts DC
105-125 volts 40-60 cycles AC
28 watts at 117 volts

Tuning Frequency Range: ..... 540–1720 KC

Intermediate Frequency: ..... 455 KC

LOUDSPEAKER "ALNICO V" MAGNET DYNAMIC

Outside Cone Diameter ..... 5¼"
Voice Coil Impedance (400 cyc) ..... 3.2 ohms

TUBES

Converter and Oscillator 12SA7
I.F. Amplifier 12SK7
Det. Audio, AVC 12SQ7
Power Output 50L6GT
Rectifier 35Z5GT
Pilot Lamp ..... GE 51

GENERAL INFORMATION

Models YRB 67-1 and 67-2 are 5 tube (including rectifier) superheterodyne receivers in distinctively styled wood cabinets; Model YRB 82-1 is a rich brown plastic cabinet. These receivers incorporate built-in antenna, automatic volume control, oversize permanent magnet speaker and beam power output.

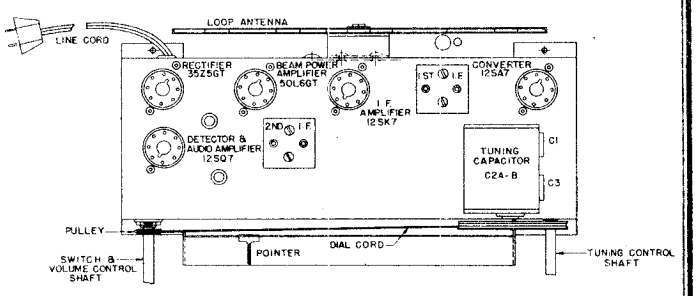


Fig. 1. Tube and Trimmer Location

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MODELS YRB67-1, YRB67-2,
YRB82-1
MODELS 200, 203, 205

GENERAL ELECTRIC CO.
PARTS DESCRIPTION LIST
MODELS YRB 82-1, YRB 67-1, YRB 67-2

Symbol	Description	Symbol	Description	Symbol	Description
C1	Ant. trimmer condenser	C14	.05 mfd paper capacitor	R2	2.2 megohm carbon resistor
C2A	Tuning condenser, ant. section	C15	.05 mfd paper capacitor	R3	Volume control .5 megohm
C2B	Tuning condenser, osc. section	C16	.05 mfd paper capacitor	R4	4.7 megohm carbon resistor
C3	Osc. trimmer condenser	C17	.01 mfd paper capacitor	R5	470,000 ohm carbon resistor
C8	220 mmfd mica capacitor	L1	1st I.F. transformer	R6	470,000 ohm carbon resistor
C9	.005 mfd paper capacitor	L2	2nd I.F. transformer	R7	150 ohm carbon resistor
C10	220 mmfd mica capacitor	L3	Loop assembly	R8	2700 ohm carbon resistor
C11	.01 mfd paper capacitor	L4	Oscillator coil	R9	18 ohm carbon resistor
C12	.02 mfd paper capacitor	P1	Pilot lamp	R10	470 ohm carbon resistor
C13A	30 mfd electrolytic capacitor	T1	Output transformer		
C13B	30 mfd electrolytic capacitor	R1	22,000 ohm carbon resistor		

REPLACEMENT PARTS LIST
MODELS YRB 82-1, YRB 67-1, YRB 67-2

Stock No.	Description
	SPECIALIZED G-E REPLACEMENT PARTS
SAB 004	Back cover, Models YRB 67-1 and 67-2
SAB 006	Back cover, Model YRB 82-1
SAU 001	Cabinet, Model YRB 82-1
SAV 003	Cabinet, Model YRB 67-1
SAV 015	Cabinet, Model YRB 67-2
SCE 002	Capacitor, filter electrolytic, 30-30 mfd 150 volt, C13A, C13B
SCT 002	Capacitor, tuning, C2A, C2B
SDC 001	Cord, dial drive cord
SDK 002	Knob, Models YRB 67-1 and 67-2
SDK 010	Knob, Model YRB 82-1
SDP 001	Pointer, dial scale
SDS 004	Dial scale, Models YRB 67-1 and 67-2
SDS 006	Dial scale, Model YRB 82-1
SHC 001	Hair pin cotter for dial drive
SJP 002	Connector, female to speaker
SJS 001	Pilot lamp socket
SJS 003	Socket, octal tube
SLC 001	Coil, oscillator
SLL 001	Loop, antenna
SMF 002	Snap button
SMF 003	Fastener, back cover to cabinet
SMS 001	Spring, dial drive drum
SMU 001	Shaft, dial drive
SMW 001	Pulley, dial drive
SRC 003	Volume control, 0.5 megohm with power switch

Stock No.	Description
	SPECIALIZED G-E REPLACEMENT PARTS (Cont.)
STL 001	Transformer, 1st I.F.
STL 002	Transformer, 2nd I.F.
STO 001	Transformer, output
SWL 001	Power cord
	UNIVERSAL G-E REPLACEMENT PARTS
UCC 039	Capacitor, .005 mfd paper, C9
UCC 040	Capacitor, .01 mfd paper, C17
UCC 041	Capacitor, .02 mfd paper, C12
UCC 045	Capacitor, .05 mfd paper, C14, C15, C16
UCU 1036	Capacitor, 220 mmfd mica, C8, C10
UDL 013	Pilot lamp, Mazda 51
UOP 526	Speaker, 5¼ inch PM dynamic
URD 007	Resistor, 18 ohm ½ watt carbon, R9
URD 029	Resistor, 150 ohm ½ watt carbon, R7
URD 041	Resistor, 470 ohm ½ watt carbon, R10
URD 081	Resistor, 22,000 ohm ½ watt carbon, R1
URD 113	Resistor, 470,000 ohm ½ watt carbon, R5, R6
URD 129	Resistor, 2.2 megohm ½ watt carbon, R2
URD 137	Resistor, 4.7 megohm ½ watt carbon, R4
URE 059	Resistor, 2700 ohm 1 watt carbon, R8

REPLACEMENT PARTS LIST—MODELS 200, 203, & 205

PART NO.	SYMBOL	DESCRIPTION
		UNIVERSAL REPLACEMENT PARTS
UCC-039	C22	CAPACITOR—.005 mfd, 600 v, paper
UCC-040	C25	CAPACITOR—.01 mfd, 600 v, paper
UCC-048	C5	CAPACITOR—0.1 mfd, 600 v, paper
UCU-020	C6	CAPACITOR—47 mmf, 500 v, mica
UCU-028	C13, 15	CAPACITOR—100 mmf, 500 v, mica
UCU-032	C14	CAPACITOR—150 mmf, 500 v, mica
UCU-040	C12	CAPACITOR—330 mmf, 500 v, mica
UIC-001		CEMENT—Loudspeaker cone cement
UIC-002		THINNER—Cone cement thinner
UOP-528	LS1	SPEAKER—5¼ in. PM
UOX-001		CONE—Replacement cone kit
URD-029	R14, 22	RESISTOR—150 ohms, ½ w, carbon
URD-041	R1, 11	RESISTOR—470 ohms, ½ w, carbon
URD-057	R9, 15	RESISTOR—1000 ohms, ½ w, carbon
URD-067	R2	RESISTOR—5600 ohms, ½ w, carbon
URD-081	R3	RESISTOR—22,000 ohms, ½ w, carbon
URD-089	R6, 7, 21	RESISTOR—47,000 ohms, ½ w, carbon
URD-105	R18	RESISTOR—220,000 ohms, ½ w, carbon
URD-113	R4, 12, 13	RESISTOR—470,000 ohms, ½ w, carbon
URD-129	R5	RESISTOR—2.2 meg, ½ w, carbon
URD-139	R10	RESISTOR—5.6 meg, ½ w, carbon
URF-049	R17	RESISTOR—1000 ohms, 2 w, carbon
		SPECIALIZED REPLACEMENT PARTS
RAB-001		LEAM-A-SCOPE—Cabinet back and loop assembly (Models 203, 205)
RAB-003		LEAM-A-SCOPE—Cabinet back and loop assembly (Model 200)
RAU-002		CABINET—Brown plastic (Model 200)
RAV-025		CABINET—Walnut wood (Model 203)
RAV-026		CABINET—Blonde wood (Model 205)
RAV-027		CABINET—Maple wood (Model 205)

PART NO.	SYMBOL	DESCRIPTION
		SPECIALIZED REPLACEMENT PARTS (Cont'd)
RAX-001		PULLEY—Idler pulley assembly
RCC-013	C19	CAPACITOR—0.1 mfd, 200 v, paper
RCC-040	C16, 17, 18	CAPACITOR—.01 mfd, 600 v, paper
RCC-045	C4, 11, 20	CAPACITOR—.05 mfd, 600 v, paper
RCE-037	C21A, 21B	CAPACITOR—50-50 mfd, 150 v, dry electrolytic
RCT-015	C1A, 1B	CONDENSER—Tuning condenser (includes C2 and C3)
RDC-001		CORD—Drive cord assembly
RDD-001		DRUM—Drive drum and shaft assembly
RDE-001		ESCUTCHEON—Dial escutcheon (Models 203, 205)
RDG-002		PLATE—Dial back plate assembly
RDK-006		KNOB—Control knob
RDS-030		SCALE—Dial scale (Models 203, 205)
RDS-031		SCALE—Dial scale (Models 200, 201)
RHM-004		CLIP—Speed clip for dial scale (Model 200)
RHM-005		CLIP—Speed clip for dial scale (Models 203, 205)
RHM-016		CLIP—Osc. coil mtg. clip
RJS-003		TUBE SOCKET—Octal base tube socket (12SA7)
RJS-006		TUBE SOCKET—Octal base tube socket
RJS-053		SOCKET—Pilot lamp socket
RLC-021	T4	COIL—Oscillator coil
RRC-002	R8, S1	VOLUME CONTROL—2.0 meg potentiometer includes power switch
RRW-008	R16	RESISTOR—18 ohms, 1 w, wirewound
RTL-061	T1	TRANSFORMER—1st I.F. transformer
RTL-029	T2	TRANSFORMER—2nd I.F. transformer
RTC-003	T3	TRANSFORMER—Output transformer
RWL-009	P3	CORD—Power cord and plug

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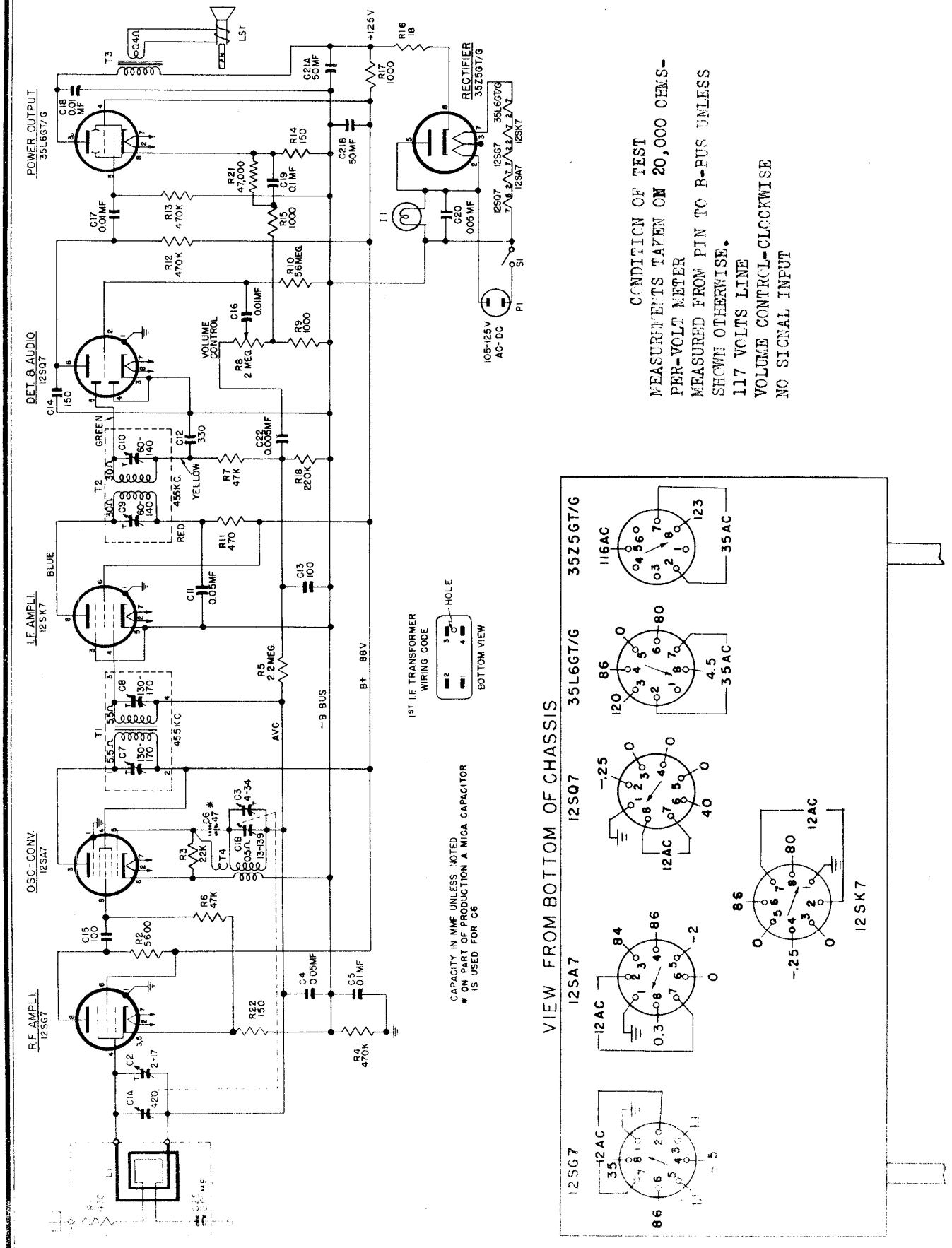
MODELS 200, 203, 205

GENERAL ELECTRIC CO.



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MODELS 200, 203, 205

GENERAL ELECTRIC CO.

SPECIFICATIONS

CABINET:

Model	200	203	205
Material	Plastic	Wood	Wood
Color	Brown	Mahogany	Maple
Height	7 1/2 in.	8 1/4 in.	8 1/4 in.
Width	12 in.	13 in.	13 in.
Depth	7 1/2 in.	7 15/16 in.	7 15/16 in.

ELECTRICAL RATING (INPUT)

Voltage ..... 105-125 volts a-c or d-c
Frequency on a-c ..... 25 to 60 cycles
Wattage ..... 45 watts

OPERATING FREQUENCIES

Broadcast Band ..... 540-1600 kilocycles
I-F Amplifier ..... 455 kilocycles

POWER OUTPUT (117 VOLTS LINE)

Undistorted ..... 1.2 watts
Maximum ..... 1.5 watts

LOUDSPEAKER

Type ..... Alnico P.M.
Outside Cone Diameter ..... 5 1/4 in.
Voice Coil Impedance (400 cycles) ..... 3.5 ohms

TUBE COMPLEMENT

R.F. Amplifier ..... Type 12SG7
Oscillator-Converter ..... Type 12SA7
I.F. Amplifier ..... Type 12SK7
Detector-Audio ..... Type 12SQ7
Power Output ..... Type 35L6GT
Rectifier ..... Type 35Z5GT/G
Pilot Lamp ..... G-E, Type C7, 115-volt, 10-watt, clear, candelabra screw base

ELECTRICAL CIRCUIT ALIGNMENT

ALIGNMENT FREQUENCIES

R-F ..... 1500 kilocycles
I-F ..... 455 kilocycles

EQUIPMENT REQUIRED

1. Test oscillator with audio tone modulation
2. A.C. output meter, 1 1/2 volts full scale
3. 0.05 mf paper capacitor
4. 50 mmf mica capacitor
5. Insulated screwdriver

PROCEDURE—GENERAL

1. Turn dial scale pointer as far counterclockwise as possible. The pointer should coincide with the first marking at the left of the scale. If it doesn't, remove chassis and slip pointer on shaft until the pointer is under reference mark when chassis is bolted in place.
2. For i-f and r-f alignments, the output meter is connected across the loudspeaker voice coil terminals.
3. Keep radio volume control at maximum and attenuate test oscillator signal output so that the output meter reading never exceeds 1 1/4 volts.
4. The chassis must be removed from the cabinet during I-F alignment. For R-F alignment bolt the chassis in the cabinet securely.
5. Connect the capacitor as listed in column 2, between the output "High Side" of test oscillator and the point of input specified.

ALIGNMENT CHART

Step	Connect Test Oscillator to	Test Osc. Setting	Pointer Setting on Radio	Adjustment for Maximum Output
1	12SK7 grid in series with 0.05 mf cap.	455 kc	1500 kc	2nd I-F Trans. Trimmers
2	12SA7 grid in series with 0.05 mf cap.	455 kc	1500 kc	1st and 2nd I-F Trans. Trimmers
3	Ant. Post in series with 50 mmf	1500 kc	1500 kc	C3 (Osc.)
4	Ant. Post in series with 50 mmf	1500 kc	1500 kc	C2 (R-F)

STAGE GAIN AND VOLTAGE CHECKS

Stage gain measurements by vacuum tube voltmeter or similar measuring devices may be used to check circuit performance and isolate trouble. The gain values listed may have tolerances of 20 per cent. Readings taken with low signal input so that AVC is not effective.

(1) R-F Stage Gains.

Antenna post to 12SG7 grid	4 at 1000 kc
12SG7 grid to 12SA7 grid	8 at 1000 kc
12SA7 grid to 12SK7 grid	30 at 455 kc
12SK7 grid to 12SQ7 diode plate	57 at 455 kc

(2) Audio Gain.
0.12 volt at 400 cycles across volume control (R8) with control set at maximum will give approximately 1/2-watt output across speaker voice coil.

(3) Oscillator Grid Bias.
D-C voltage developed across the oscillator grid leak (R3). Averages 7.7 volts at 1000 kc.

(4) Socket Pin Voltages.
Figure 4 shows voltages from all tube pins to B- unless otherwise specified. Voltage readings much lower than those specified may help localize defective components or tubes.

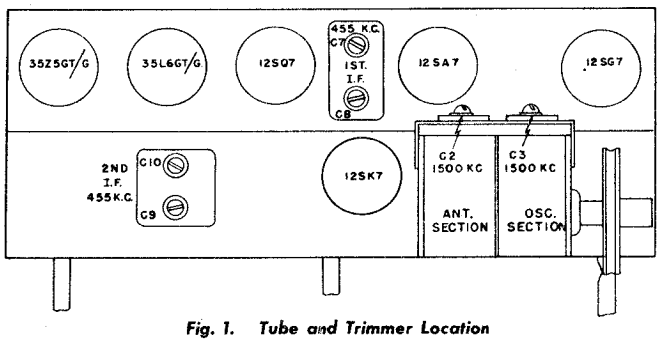

Fig. 1. Tube and Trimmer Location

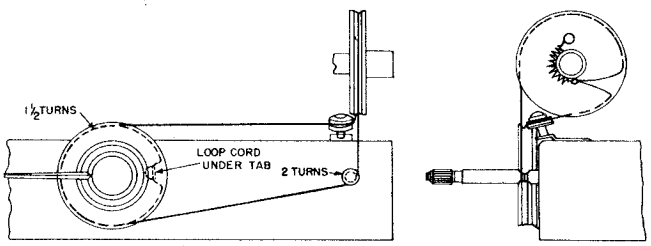

Fig. 2. Dial Stringing Diagram

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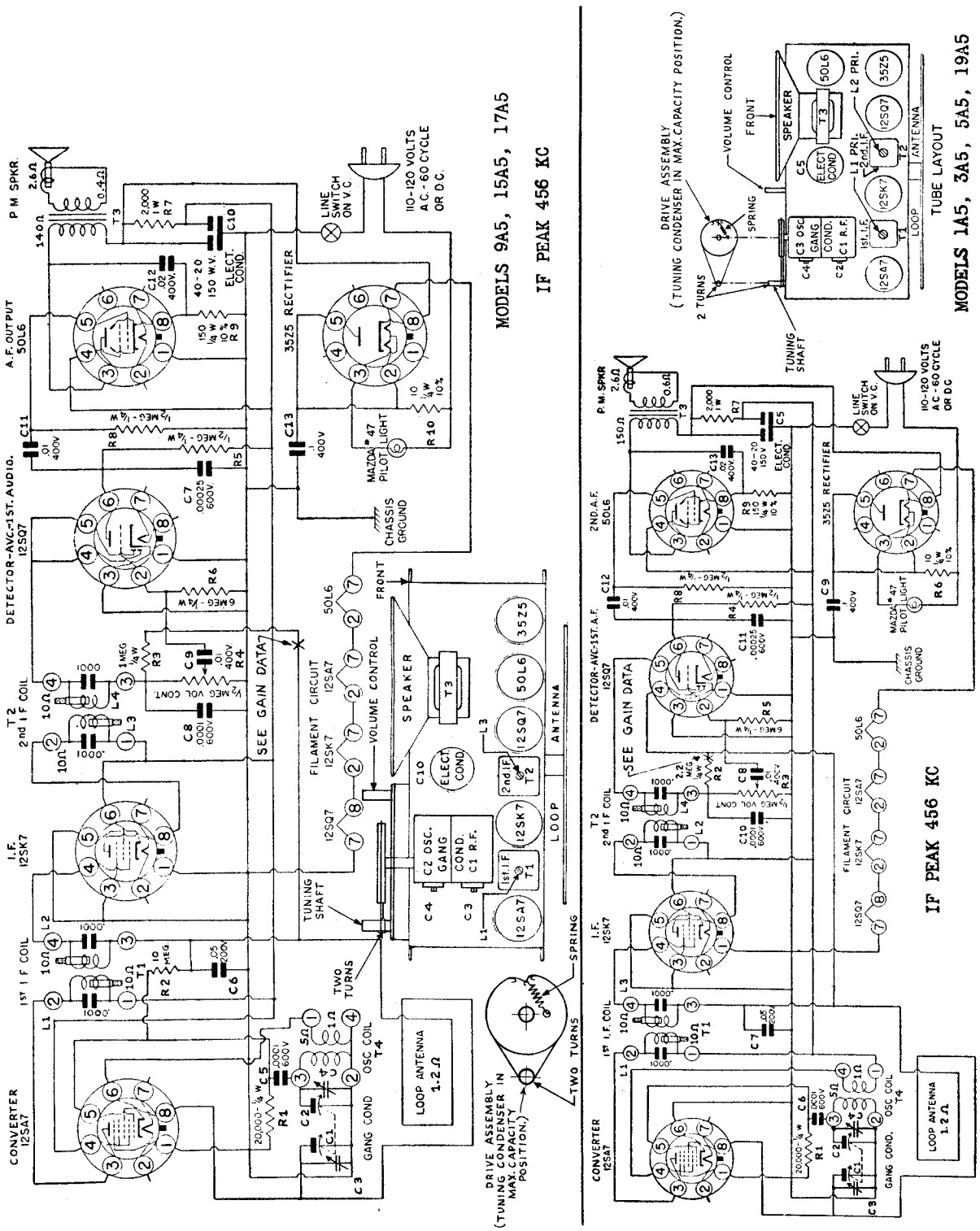
GENERAL TELEV. & RADIO CORP.

MODELS 1A5,3A5,5A5
19A5
MODELS 9A5,15A5,17A5



For alignment see p. 15-7. For Model 17A5 chassis view, see P. 15-4

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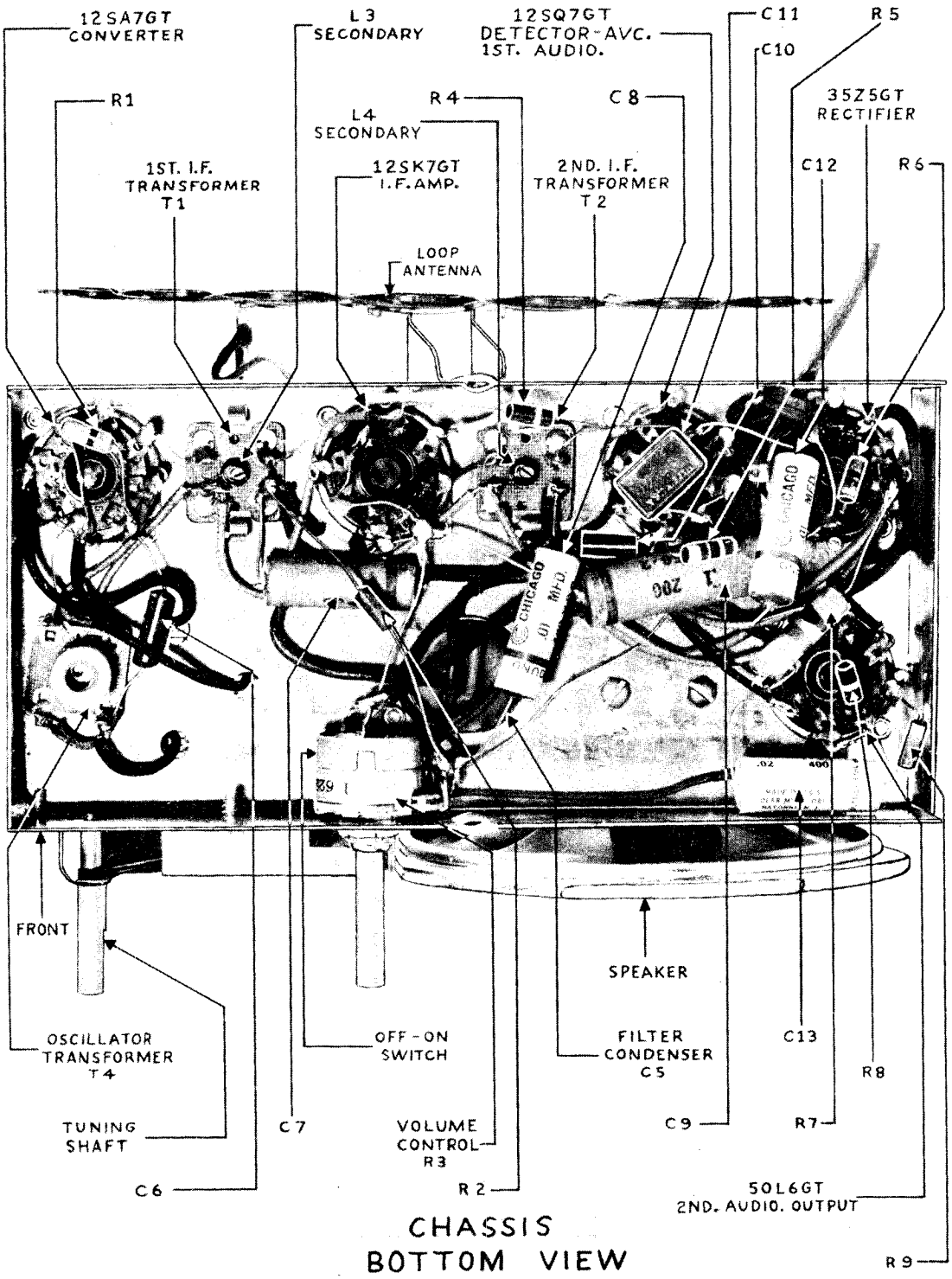
MODEL 5A5

GENERAL TELEV. & RADIO CORP.



CHASSIS
BOTTOM VIEW

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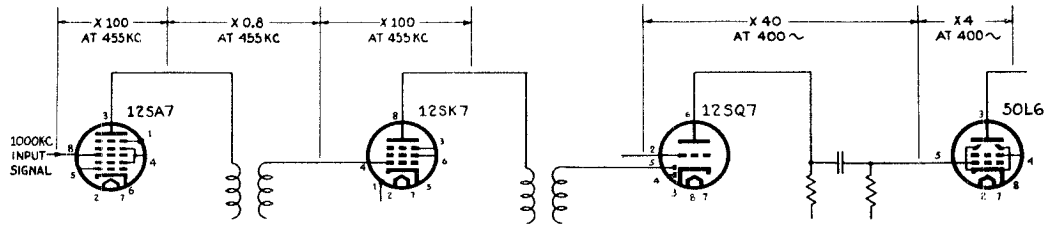
MODELS 9A5,15A5,17A5 MODEL 14A4F GENERAL TELEV. & RADIO CORP. MODELS 1A5,3A5,5A5, 19A5

MODELS 1A5, 3A5, 5A5, 19A5

TUBE	PIN	VTVM	D-C VOLTAGE 20,000 OHMS PER VOLT	D-C VOLTAGE 1000 OHMS PER VOLT	RESISTANCE
12SA7	1	0	0	0	0
	2	0	0	0	26
	3	+80	+80	+80	5,000,000
	4	+80	+80	+80	5,000,000
	5	-6	-5.6	-2.6	19,000
	6	0	0	0	0
	7	0	0	0	40
	8	-1	-0.4	-0.4	5,000,000
12SK7	1	0	0	0	0
	2	0	0	0	16
	3	0	0	0	0
	4	-1	-0.4	-0.4	5,000,000
	5	0	0	0	0
	6	+80	+80	+78	5,000,000
	7	0	0	0	26
	8	+80	+80	+78	5,000,000
12SQ7	1	0	0	0	0
	2	-1.2	-0.8	-0.5	10,000,000
	3	0	0	0	0
	4	-1	-0.45	-0.4	5,000,000
	5	-0.7	-0.5	-0.2	500,000
	6	+54	+48	+42	5,000,000
	7	0	0	0	15
	8	0	0	0	0
50L6	1	0	0	0	0
	2	0	0	0	40
	3	+125	+120	+120	5,000,000
	4	+80	+80	+80	5,000,000
	5	0	0	0	450,000
	6	0	0	0	INFINITE
	7	0	0	0	90
	8	+5.2	+5	+5	140
35Z5	1	0	0	0	INFINITE
	2	0	0	0	120
	3	0	0	0	120
	4	0	0	0	INFINITE
	5	0	0	0	120
	6	0	0	0	120
	7	0	0	0	90
	8	130	125	125	5,000,000

MODELS 9A5, 15A5, 17A5

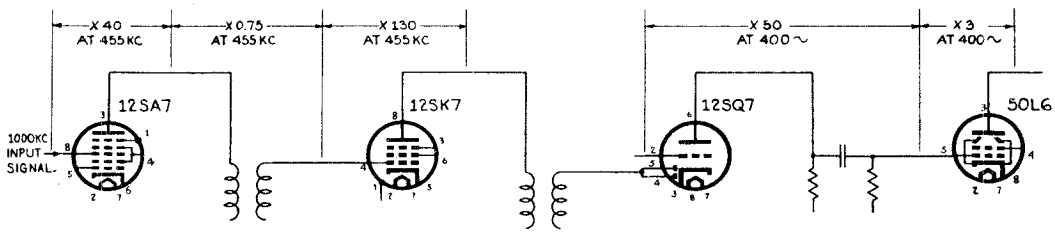
TUBE	PIN	VTVM	D-C VOLTAGE 20,000 OHMS PER VOLT	D-C VOLTAGE 1000 OHMS PER VOLT	RESISTANCE
12SA7	1	0	0	0	0
	2	0	0	0	24
	3	+80	+80	+78	INFINITE
	4	+80	+80	+78	INFINITE
	5	-9.5	-9.5	-4.8	20,000
	6	0	0	0	1
	7	0	0	0	40
	8	-1.5	-0.8	-0.2	1,200,000
12SK7	1	0	0	0	0
	2	0	0	0	12
	3	0	0	0	0
	4	-1.5	-0.6	-0.2	1,200,000
	5	0	0	0	0
	6	+80	+80	+78	INFINITE
	7	0	0	0	26
	8	+80	+80	+78	INFINITE
12SQ7	1	0	0	0	0
	2	-0.5	-0.4	-0.2	6,000,000
	3	0	0	0	0
	4	-0.5	-0.4	-0.2	400,000
	5	-0.5	-0.4	-0.2	400,000
	6	+46	+42	+40	INFINITE
	7	0	0	0	14
	8	0	0	0	0
50L6	1	0	0	0	0
	2	0	0	0	40
	3	+120	+120	+120	INFINITE
	4	+80	+80	+78	INFINITE
	5	0	0	0	460,000
	6	0	0	0	INFINITE
	7	0	0	0	90
	8	+4.5	+4.5	+4.5	150
35Z5	1	0	0	0	INFINITE
	2	0	0	0	120
	3	0	0	0	120
	4	0	0	0	INFINITE
	5	0	0	0	120
	6	0	0	0	120
	7	0	0	0	90
	8	+120	+120	+120	INFINITE



MODELS 1A5,3A5, 5A5,19A5

APPROXIMATE GAIN PER STAGE DATA

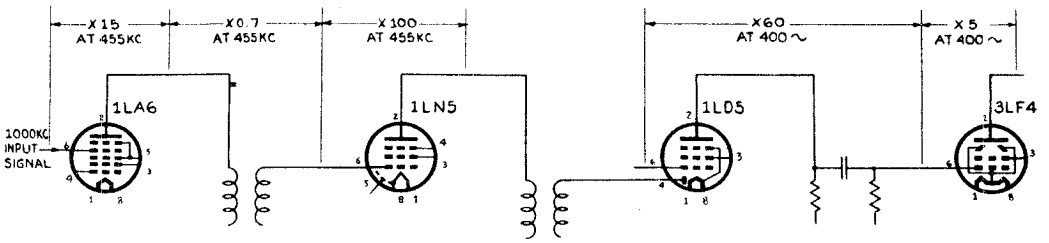
IN MAKING GAIN PER STAGE MEASUREMENTS, CIRCUIT WAS OPENED AT POINT X TO STOP AVC ACTION, AND A 3-VOLT BATTERY CONNECTED BETWEEN THIS POINT AND GROUND.



MODELS 9A5,15A5, 17A5

APPROXIMATE GAIN PER STAGE DATA

IN MAKING GAIN PER STAGE MEASUREMENTS, CIRCUIT WAS OPENED AT POINT X TO STOP AVC ACTION, AND A 3-VOLT BATTERY CONNECTED BETWEEN THIS POINT AND GROUND



MODEL 14A4F

APPROXIMATE GAIN PER STAGE DATA

IN MAKING GAIN PER STAGE MEASUREMENTS, CIRCUIT WAS OPENED AT POINT X TO STOP AVC ACTION, AND A 1-1/2 VOLT BATTERY CONNECTED BETWEEN THIS POINT AND GROUND.

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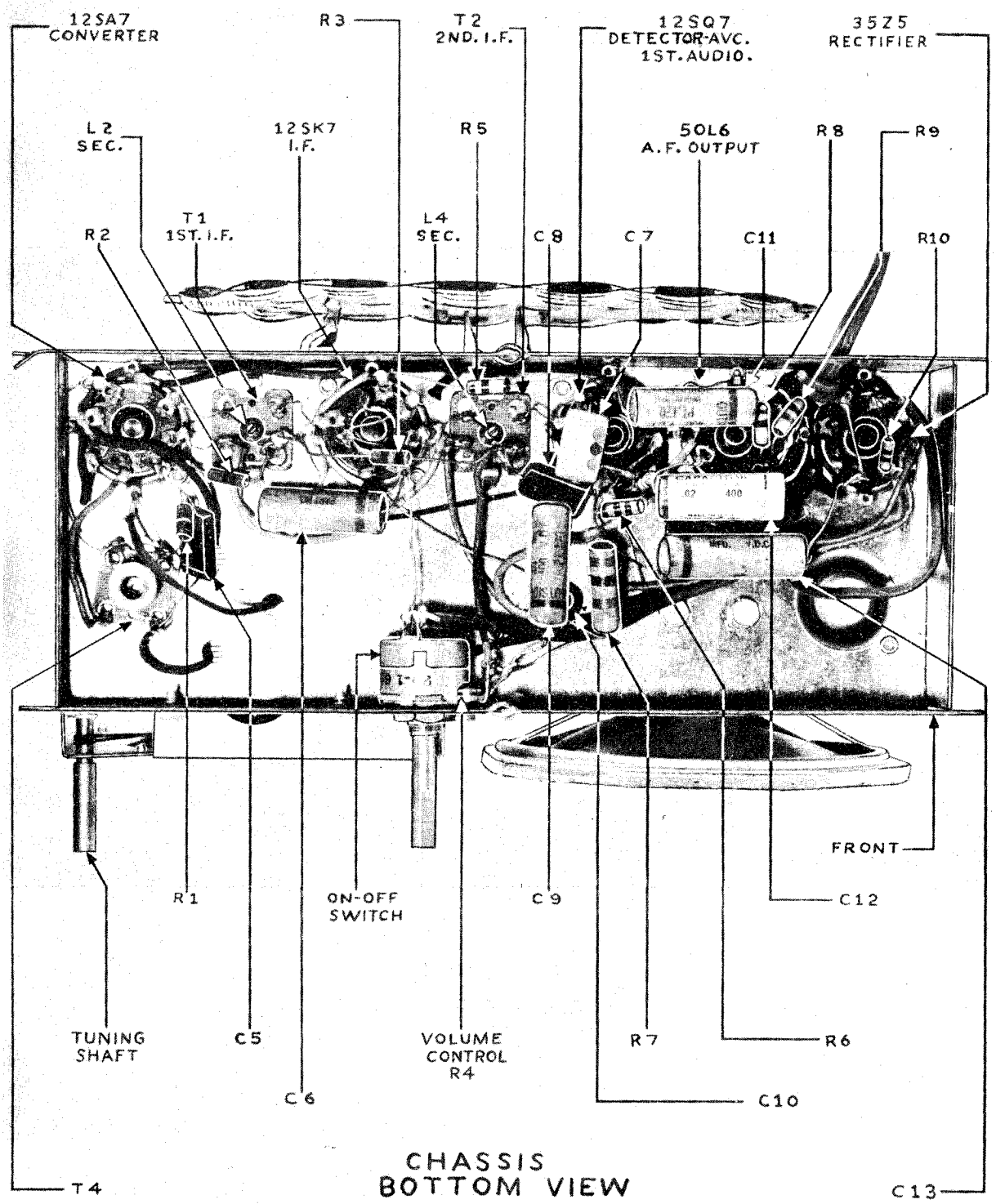
MODEL 17A5

GENERAL TELEV. & RADIO CORP.



CHASSIS
BOTTOM VIEW

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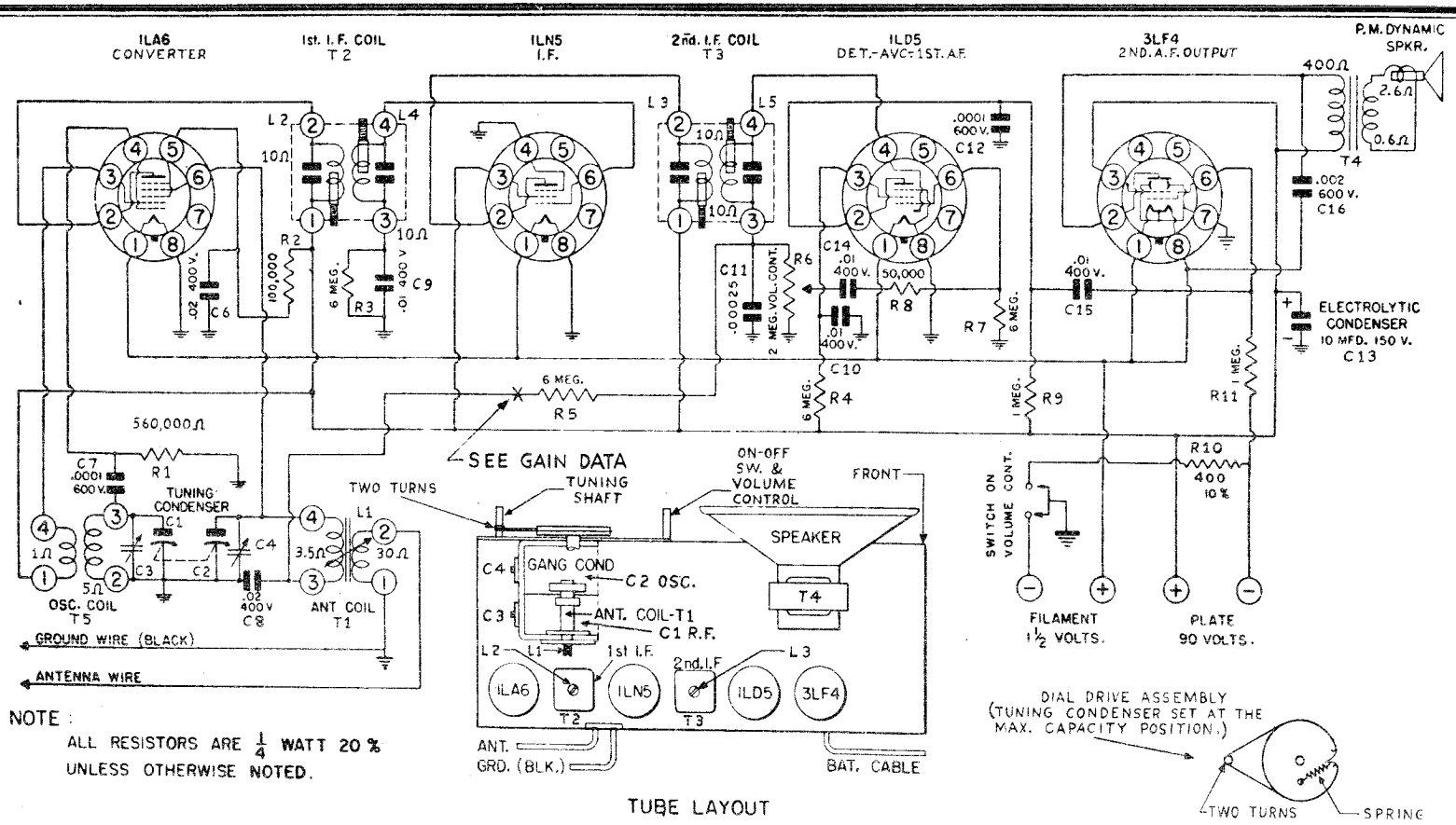


NOTE :
ALL RESISTORS ARE ¼ WATT 20 % UNLESS OTHERWISE NOTED.

TUBE LAYOUT

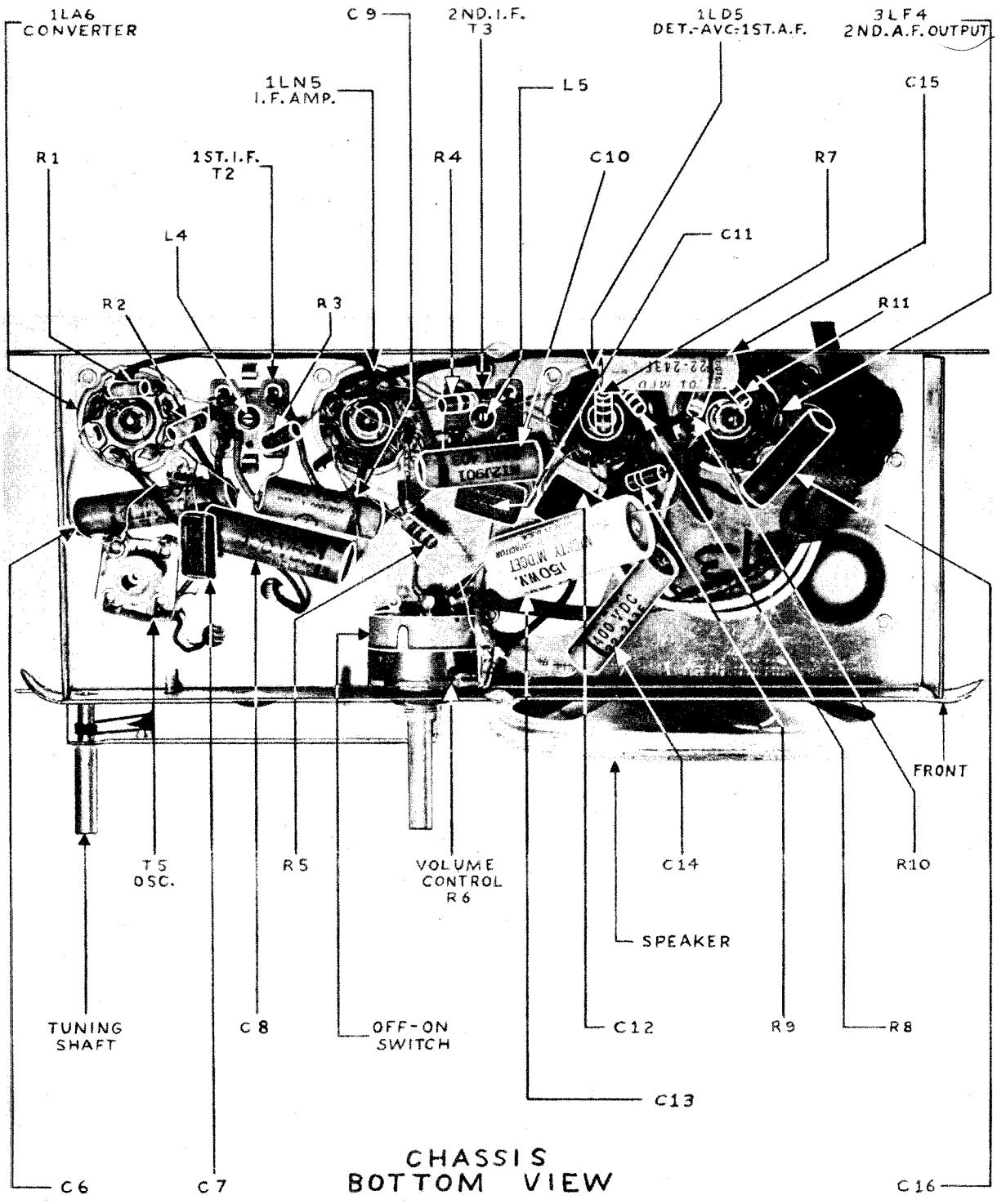
IF PEAK 456 KC

TUBE	PIN	VTVM	D-C VOLTAGE 20,000 OHMS PER VOLT	D-C VOLTAGE 1000 OHMS PER VOLT	RESISTANCE	TUBE	PIN	VTVM	D-C VOLTAGE 20,000 OHMS PER VOLT	D-C VOLTAGE 1000 OHMS PER VOLT	RESISTANCE
1LA6	1	+1.5	+1.4	+1.4	4	1LD5	1	+1.5	+1.4	+1.4	4
	2	+90	+90	+88	INFINITE		2	+26	+20	+20	INFINITE
	3	+90	+90	+88	INFINITE		3	+21	+16	+10	INFINITE
	4	-3.5	-0.5	0	600,000		4	-0.4	-0.2	0	2,000,000
	5	+34	+33	+26	INFINITE		5	0	0	0	INFINITE
	6	-0.3	-0.1	0	7,000,000		6	-0.2	0	0	7,500,000
	7	0	0	0	INFINITE		7	-0.2	0	0	7,700,000
	8	0	0	0	0		8	0	0	0	0
1LN5	1	+1.5	+1.4	+1.4	4	3LF4	1	+1.5	+1.4	+1.4	4
	2	+90	+90	+88	INFINITE		2	+86	+86	+84	INFINITE
	3	+90	+90	+88	INFINITE		3	+90	+90	+88	INFINITE
	4	0	0	0	0		4	0	0	0	0
	5	0	0	0	INFINITE		5	-5.4	-5	-5	450
	6	-0.3	-0.1	0	INFINITE		6	-5	-1	0	1,700,000
	7	-0.3	-0.1	0	7,000,000		7	0	0	0	0
	8	0	0	0	0		8	+1.5	+1.4	+1.4	4

For alignment see p. 15-7. For Gain data, see P.15-3

MODEL 14A4F

GENERAL TELEV. & RADIO CORP.



CHASSIS
BOTTOM VIEW

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GENERAL TELEV. & RADIO CORP.

MODELS 1A5, 3A5, 5A5,19A5
MODELS 9A5, 15A5, 17A5
MODEL 14A4F

ALIGNMENT

MODELS 1A5, 3A5, 5A5, 19A5

The chassis must be removed from the cabinet in order to align this receiver. Connect the output meter across the voice coil. Connect the signal generator to the Standard Hazeltine Model 1150 loop, and couple loosely to the receiver loop. Set the receiver volume control at maximum. The tuning condenser plates should be fully meshed when the dial pointer is at the index mark at the low frequency end of the dial. The signal generator output should at all times be just sufficient to obtain a minimum deflection on the output meter. Set the signal generator to 456 Kc. Adjust the i-f trimmers for maximum meter deflection in the following sequence: L4, L2, L3, L1. Set the generator and receiver to 1600 Kc and adjust oscillator trimmer C4 for maximum output. Set the generator and receiver to 1400 Kc and adjust loop trimmer C3 for maximum output.

MODELS 9A5, 15A5, 17A5

The chassis must be removed from the cabinet in order to align this receiver. Connect the output meter across the voice coil. Connect the signal generator to the standard Hazeltine Loop Model 1150, and couple loosely to the receiver loop. Set the receiver volume control at maximum. The tuning condenser plates should be fully meshed when the dial pointer is at the index mark at the low frequency end of the dial. The signal generator output should at all times be just sufficient to obtain a minimum deflection on the output meter. Set the signal generator to 456 Kc and adjust the i-f trimmers for maximum meter deflection in the following sequence: L4, L3, L2, L1. Set the generator and receiver to 1600 Kc and adjust the oscillator trimmer C4 for maximum output. Set the generator and receiver to 1400 Kc and adjust the loop trimmer C3 for maximum output.

MODEL 14A4F

Alignment may be accomplished with the chassis in the cabinet if a small alignment screwdriver is used. Connect the output meter across the voice coil. Connect the high side of the signal generator to the antenna lead through a .01 mf condenser and the low side to the black ground wire. Set the receiver volume control at maximum. The tuning condenser plates should be fully meshed when the dial pointer is at the index mark at the low frequency end of the dial. The signal generator output should at all times be just sufficient to obtain a minimum deflection on the output meter. Set the signal generator to 455 Kc and adjust the i-f trimmers for maximum output in the following sequence: L5, L3, L4, L2. Set the generator and receiver to 1500 Kc and adjust the oscillator shunt trimmer C4 for maximum output. Set the generator and receiver to 1400 Kc and adjust the antenna trimmer C3 for maximum output. Set the generator and receiver to 600 Kc and adjust the antenna coil tuning slug L1 for maximum output. Repeat the high frequency adjustment of the antenna trimmer C3 at 1400 Kc.

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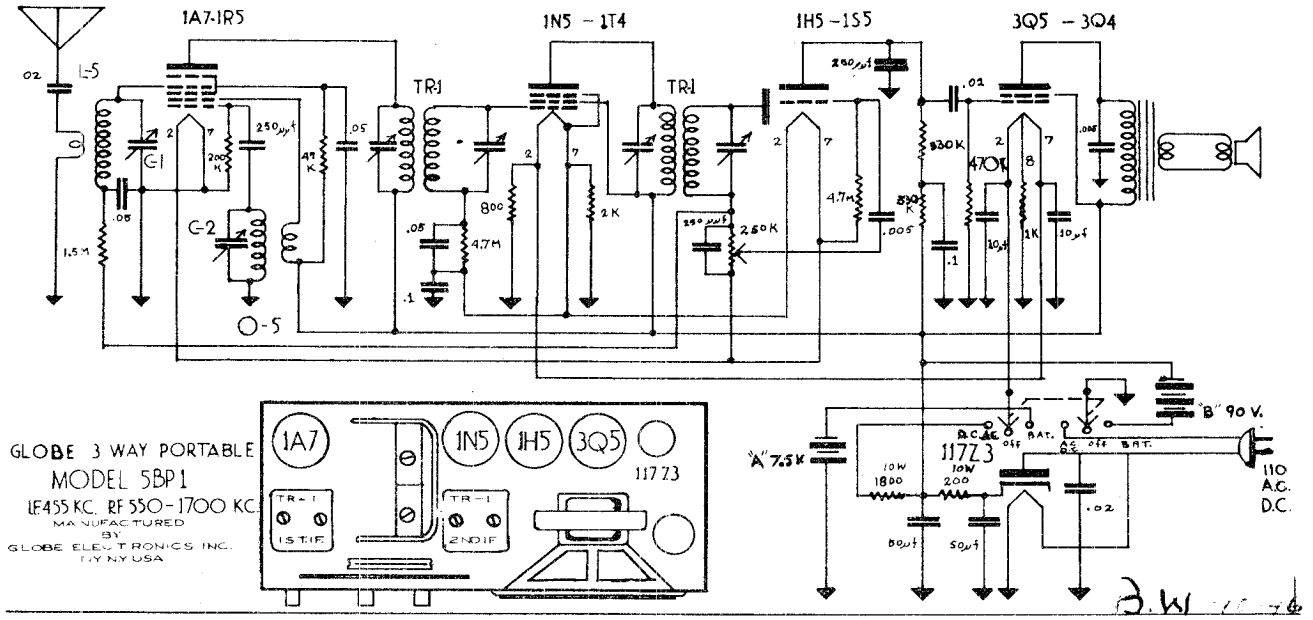
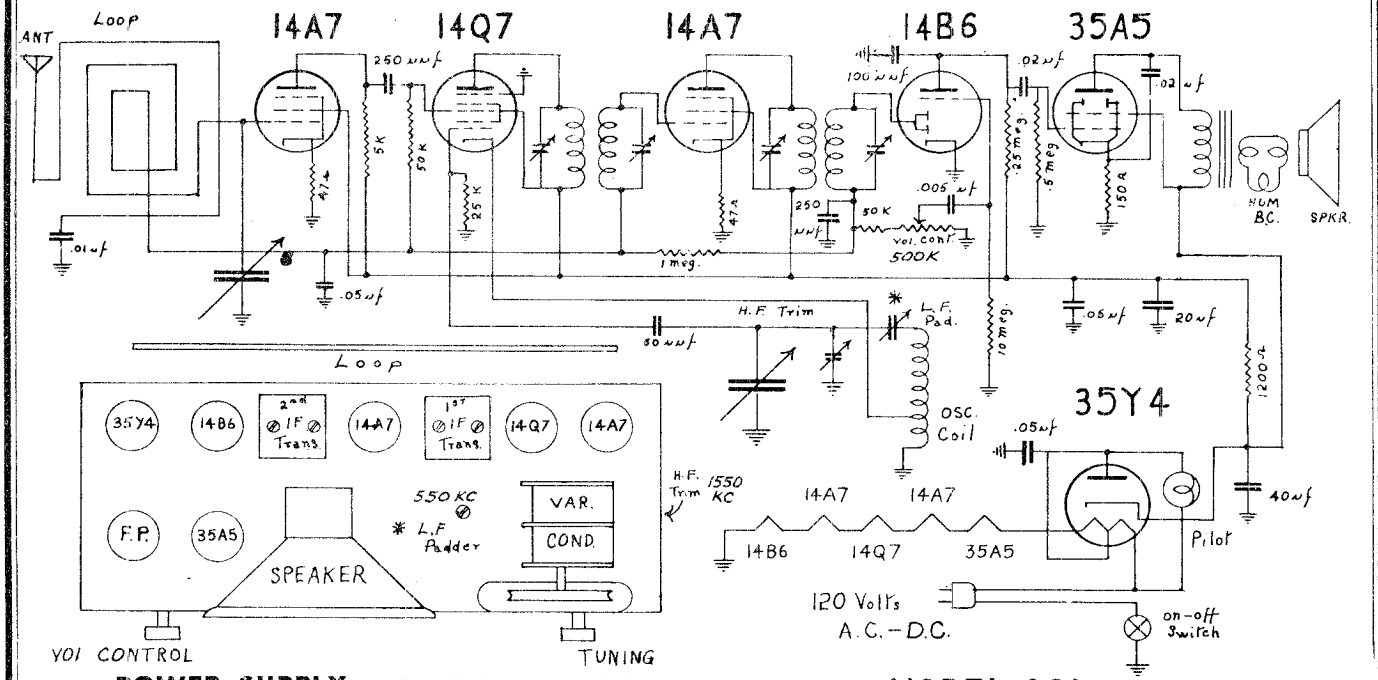
GLOBE ELECTRONICS, INC.

MODEL 5BP1
MODELS 601, 6U1





POWER SUPPLY: A.C.-D.C. (105-125 volts).

RANGE: 540-1620 Kilocycles.

MODEL 601

USE NO GROUND CONNECTIONS.

IF PEAK 455 KC

B.W. 9-25 46

NOTE: MODEL 6U1 is the same as MODEL 601 except that the frequency range is from 550 to 1700 KC and a cut-plate variable condenser replaces the L.F. padder.

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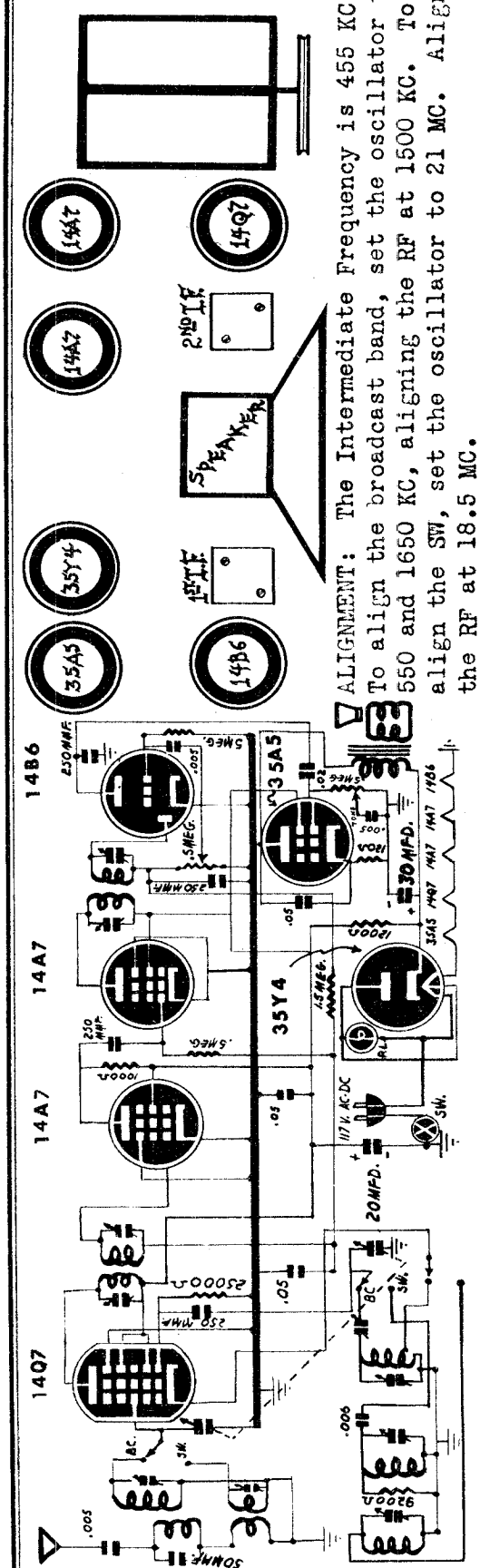
MODEL 62

GLOBE ELECTRONICS, INC.


14A7
14Q7
14A7
2ND I.F.
SPEAKER
35Y4
1ST I.F.
35A5
14B6
14B6
35A5
35Y4
14A7
14A7
14Q7
.005
.02
.05
.01
.006
.005
.05
.05
.005
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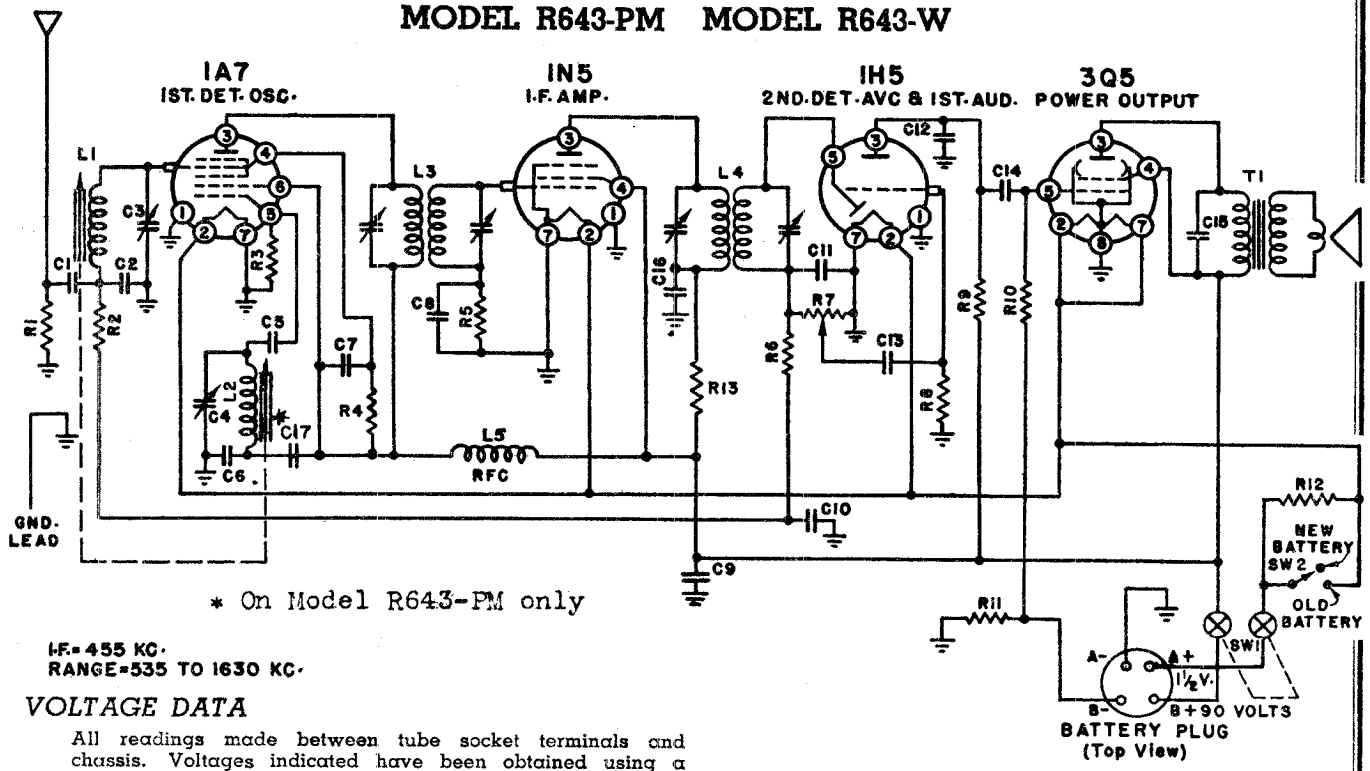
B. F. GOODRICH CO. MODELS R643-PM, R643-W

MODEL R643-PM MODEL R643-W



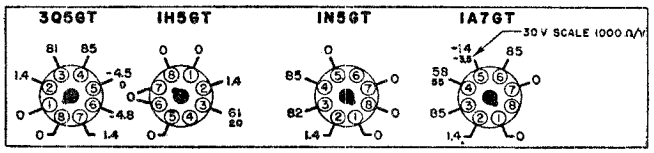
* On Model R643-PM only

I.F. = 455 KC.
RANGE = 535 TO 1630 KC.

VOLTAGE DATA

All readings made between tube socket terminals and chassis. Voltages indicated have been obtained using a Vacuum Tube Voltmeter. A second voltage reading is shown made with a 1000 ohm-per-volt meter, when use of this instrument would result in appreciably lower readings. The voltages were measured using a fresh battery, volume control full on, dial at the high frequency end, and no signal.

VOLTAGE CHART BOTTOM VIEW



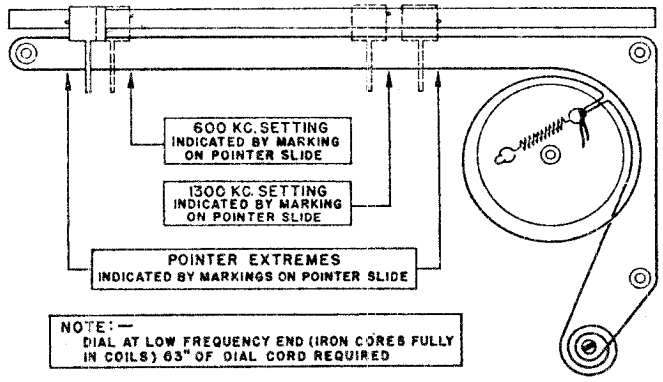
COILS

8-46

Symbol No.	Description
L1	Antenna Coil (3 ohms)
L2	Oscillator Coil (3 ohms)
L3	1st I.F. Transformer
L4	2nd I.F. Transformer
L5	R.F. Choke (14.5 ohms)
T1	Output Transformer

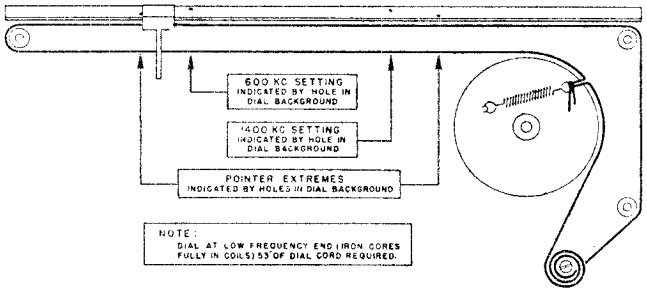
MODEL R643-PM

POINTER SETTINGS AND DIAL CORD STRINGING


600 KC. SETTING INDICATED BY MARKING ON POINTER SLIDE
1300 KC. SETTING INDICATED BY MARKING ON POINTER SLIDE
POINTER EXTREMES INDICATED BY MARKINGS ON POINTER SLIDE
NOTE:—
DIAL AT LOW FREQUENCY END (IRON CORES FULLY IN COILS) 63" OF DIAL CORD REQUIRED

MODEL R643-W

POINTER SETTINGS AND DIAL CORD STRINGING


600 KC. SETTING INDICATED BY HOLE IN DIAL BACKGROUND
1400 KC. SETTING INDICATED BY HOLE IN DIAL BACKGROUND
POINTER EXTREMES INDICATED BY HOLES IN DIAL BACKGROUND
NOTE:
DIAL AT LOW FREQUENCY END (IRON CORES FULLY IN COILS) 55" OF DIAL CORD REQUIRED.

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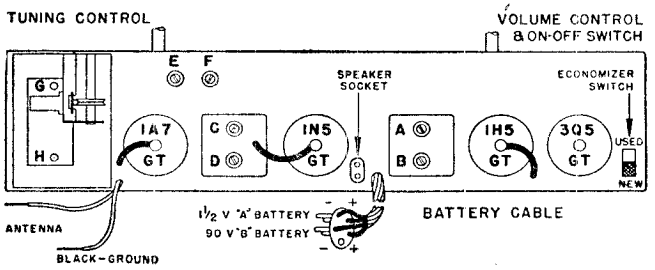
MODEL R643-PM

B. F. GOODRICH CO.

MODEL R643-PM

ALIGNMENT PROCEDURE

- IMPORTANT—Check to see that dial pointer reaches each end of dial scale when Station Selector Control is turned from one end to the other.
- Volume control—Maximum for all adjustments.
- Connect radio chassis to ground post of signal generator with a short heavy lead.
- Connect dummy antenna value in series with generator output lead, when needed (see below).
- Connect output meter across voice coil of speaker.
- Allow chassis and signal generator to warm up for several minutes.



- Use lowest Output setting of Signal Generator capable of producing adequate Output Meter indication and then proceed as indicated in the chart below.

Band	Signal Generator Frequency	Dummy Antenna	Connection to Radio	Receiver Dial Setting	Trimmers Adjusted (In Order Shown)	Trimmer Function	Type of Adjustment
I. F.	455 KC.	.1 MFD.	Grid of 1A7 (Cap)	High frequency end of dial	C-D—2nd I.F.	Output I.F.	Adjust to maximum output
	455 KC.	.1 MFD.	Grid of 1A7 (Cap)	High frequency end of dial	A-B—1st I.F.	Input I.F.	Adjust to maximum output
BROAD-CAST	1630 KC.	.0002 MFD.	Antenna Lead	High frequency end of dial	E—(See note below) F—(See note below)	Oscillator Antenna	Adjust to maximum output
	1300 KC.	.0002 MFD.	Antenna Lead	1300 KC.	G H	Oscillator Antenna	Adjust to maximum output

NOTE: Before adjusting trimmers "E" and "F", make sure that each iron core is 1⅜" or more outside of its coil form. If necessary, turn adjustments "G" and "H" to accomplish this.

CONDENSERS

Symbol	Description	Part No.
C1	Paper, .01 mfd., 400 V.	64B1-25
C2	Mica, .0008 mfd. ±10%	65B5-31
C3	Trimmer, Antenna	66A21-1
C4	Trimmer, Oscillator	
C5	Mica, .0001 mfd. ±20%	65B7-17
C6	Mica, .0008 mfd. ±10%	65B5-31
C7	Paper, .01 mfd., 400 V.	64B1-25
C8	Paper, .002 mfd., 600 V.	64B1-14
C9	Elect., 4 mfd., 150 V.	67A4-2
C10	Paper, .05 mfd., 200 V.	64B1-32
C11	Mica, .00025 mfd. ±20%	65B7-22
C12	Mica, .00025 mfd. ±20%	65B7-22
C13	Paper, .01 mfd., 400 V.	64B1-25
C14	Paper, .01 mfd., 400 V.	64B1-25
C15	Paper, .005 mfd., 600 V.	64B1-12
C16	Paper, .01 mfd., 400 V.	64B1-25
C17	Paper, .01 mfd., 400 V.	64B1-25

RESISTORS

R1	15,000 ohm ±10%, ½W.	60B8-153
R2	470,000 ohm ±10%, ¼W.	60B2-474
R3	220,000 ohm ±10%, ½W.	60B8-224
R4	33,000 ohm ±10%, ½W.	60B8-333
R5	4,700,000 ohm ±10%, ¼W.	60B2-475
R6	2,200,000 ohm ±10%, ¼W.	60B2-225
R7	1 megohm Volume Control & Switch	75B1-1
R8	4,700,000 ohm ±10%, ¼W.	60B2-475
R9	1,000,000 ohm ±10%, ¼W.	60B2-105
R10	1,000,000 ohm ±10%, ¼W.	60B2-105
R11	390 ohm ±10%, ¼W.	60B2-391
R12	0.75 ohm ±10%, ¼W. (Wire)	61A2-1
R13	2200 ohm ±10%, ¼W.	60B2-222

TRANSFORMERS AND COILS

L1	Antenna Coil	AC105-1
L2	Oscillator Coil	A1020
L3	1st I.F. Transformer	72B5
L4	2nd I.F. Transformer	72B6
L5	Choke Coil (RF)	AB103-1
T1	Output Transformer	98A5

MISCELLANEOUS

Description	Part No.
Background, Dial	X22C5-1
Cabinet, R643-PM (Plastic)	34D10
Cable, Battery (complete with plug)	A1026
Cap, Grid	90A1-2
Clip, Dial Glass	18A2
Cord, Dial (5" on tuner and 63" on dial drive)	50A1-3
Dial Scale, glass	21B25
Drum and Hub, Tuning	A1035
Grille Cloth	36B3-1
Iron Slug, with wire (Oscillator)	71B1-3
Iron Slug, with wire (Antenna)	71B1-4
Knob	33A7-2
Plug, Battery, 5 Prong	88A4-4
Pointer, Dial	25A9-1
Pulley, Fibre Dial	17A1-3
Screw Studs (for iron cores)	27A4
Shaft, Tuning	28A1-1
Shaft and Pulley (Tuner)	A1040
Shield, Tube	87A8
Socket, Octal Tube	87A5-1
Socket, Speaker	87A4-3
Speaker and Output Transformer	78B15-2
Speaker Guard	36A5-2
Spring, Dial Drum Cord Tension	19B1-10
Spring, Hairpin (To hold Ant. or Osc. coil)	19A3-1
Spring, Tuner Slide Cord Tension	19A1-4
Spring, Tuner, back bearing takeup	19A6
Spring, Tuner, front bearing takeup	19A5
Spring, Tuner Slide Pressure	18A9
Switch, SPST (Economizer) SW2	77B1-6
Washer, C	4A4-1
Washer, spring (coils)	4A6-12-0
Washer, spring (shaft)	4A6-3-0

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B. F. GOODRICH CO.

MODEL R643-W

MODEL R643-W

ALIGNMENT PROCEDURE

Be sure Radio Receiver and Signal Generator are thoroughly warmed up before starting alignment procedure.

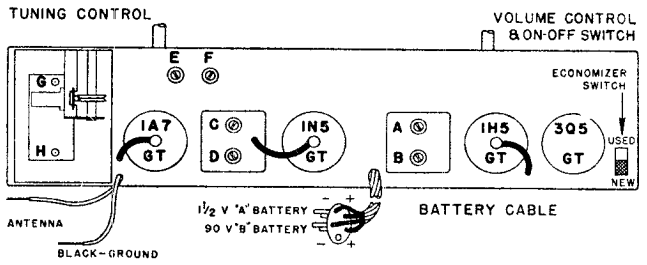
Check setting of Pointer Extremes and note correct 600 K.C. and 1400 K.C. positions on Dial Background. (See Dial Diagram on reverse side.)

Connect Output Meter across Voice Coil.

Turn Receiver Volume Control—full on.

Use lowest Output setting of Signal Generator capable of producing adequate Output Meter indication and then proceed in the following sequence.

Repeat adjustments to insure final overall maximum results.



Connect Signal Generator to—	Dummy Antenna Between Radio and Generator	Set Generator Frequency to—	Set Receiver Dial Frequency to—	Adjust Following Trimmers or Slugs	Type of Adjustment
Grid of 1A7 (Cap)	.1 mfd. Condenser	455 Kc.	High frequency End of dial	A-B—1st I.F. C-D—2nd I.F.	Adjust to maximum Output
Antenna Lead	.0002 mfd. Condenser	1630 Kc.	High frequency End of dial	E—Osc. (Trimmer) F—Ant. (Trimmer)	Adjust to maximum Output
Antenna Lead	.0002 mfd. Condenser	1400 Kc.	Tune in Generator Signal	G—Osc. (iron core) H—Ant. (iron core)	Adjust to maximum Output

PAPER CONDENSERS

Part No.	Symbol No.	Description
64B1-14	C8	.002 mfd. 600 Volt
64B1-12	C15	.005 mfd. 600 Volt
64B1-25	C1, C7, C13, C14, C16	.01 mfd. 400 Volt
64B1-32	C10	.05 mfd. 200 Volt

MICA CONDENSERS

Part No.	Symbol	Description
65B7-17	C5	.0001 mfd.
65B7-22	C11, C12	.00025 mfd.
64B5-31	C2, C6	.0008 mfd.

ELECTROLYTIC CONDENSER

67A4-2	C9	4. mfd. 150 Volt

TRIMMER CONDENSERS

Part No.	Symbol No.	Description
66A9-1	C3, C4	Dual trimmer

RESISTORS

Part No.	Symbol		Description
61A2-1	R12	.75	ohm ¼ w (wire)
60B2-391	R11	390.	ohm ¼ w
60B2-222	R13	2200	ohm ¼ w
60B8-153	R1	15,000	ohm ½ w
60B8-333	R4	33,000	ohm ½ w
60B8-224	R3	220,000	ohm ½ w
60B2-474	R2	470,000	ohm ¼ w
60B2-105	R9, R10	1,000,000	ohm ¼ w
60B2-225	R6	2,200,000	ohm ¼ w
60B2-475	R5, R8	4,700,000	ohm ¼ w

VOLUME CONTROL

Part No.	Symbol No.	Description
75B1-1	R7	1 megohm Vol. Control and switch

TRANSFORMERS AND COILS

Part No.	Symbol No.	Description
AC105-1	L1	Antenna coil
AB104-4	L2	Oscillator coil
72B5	L3	1st I.F. Transformer
72B6	L4	2nd I.F. Transformer
AB103-1	L5	Choke coil (RF)
	T1	Output Transformer (specify full speaker part no. including mfg. code when ordering)

MISCELLANEOUS

22C5-1	Background, Dial
35C25	Cabinet, R643-W
A1026	Cable, Battery (complete with plug)
90A1-4	Cap, Grid
50A1-1	Cord, Dial (5" on tuner) (53" on dial drive)
A1035	Drum and Hub, Tuning
23A8-1	Escutcheon
71B1-3	Iron Core, with wire (Osc.)
71B1-4	Iron Core, with wire (Ant.)
33A7-2	Knob
A1028	Permeability Tuner Assembly, complete
88A4-4	Plug, Battery 5 Prong
25A9-1	Pointer, Dial
17A1-3	Pulley, Fibre Dial
21B13	Scale, Glass Dial
27A4	Screw studs (for iron cores)
87A8	Shield, Tube
28A11-1	Shaft, Tuning
A1040	Shaft and pulley (Tuner)
87A10-2	Socket, octal tube
78B5	Speaker and output Transformer (specify complete part number including mfg. code, when ordering)
19A1-3	Spring, Dial Drum Cord Tension
19A1-4	Spring, Tuner slide cord tension
18A1	Spring, Tuner slide pressure
19A5	Spring, Tuner, front bearing takeup
19A6	Spring, Tuner, back bearing takeup
19A3-1	Spring, Hairpin (To hold Ant.-Osc. coils)
95A9-1	Spirashield (3")
77A1-6	Switch, SPST (Economizer)
9A8-1	Terminal, Tuner slide cord
4A4-1	Washer, C
4A6-3-0	Washer, spring (shaft)
4A6-5-0	Washer, spring (coils)

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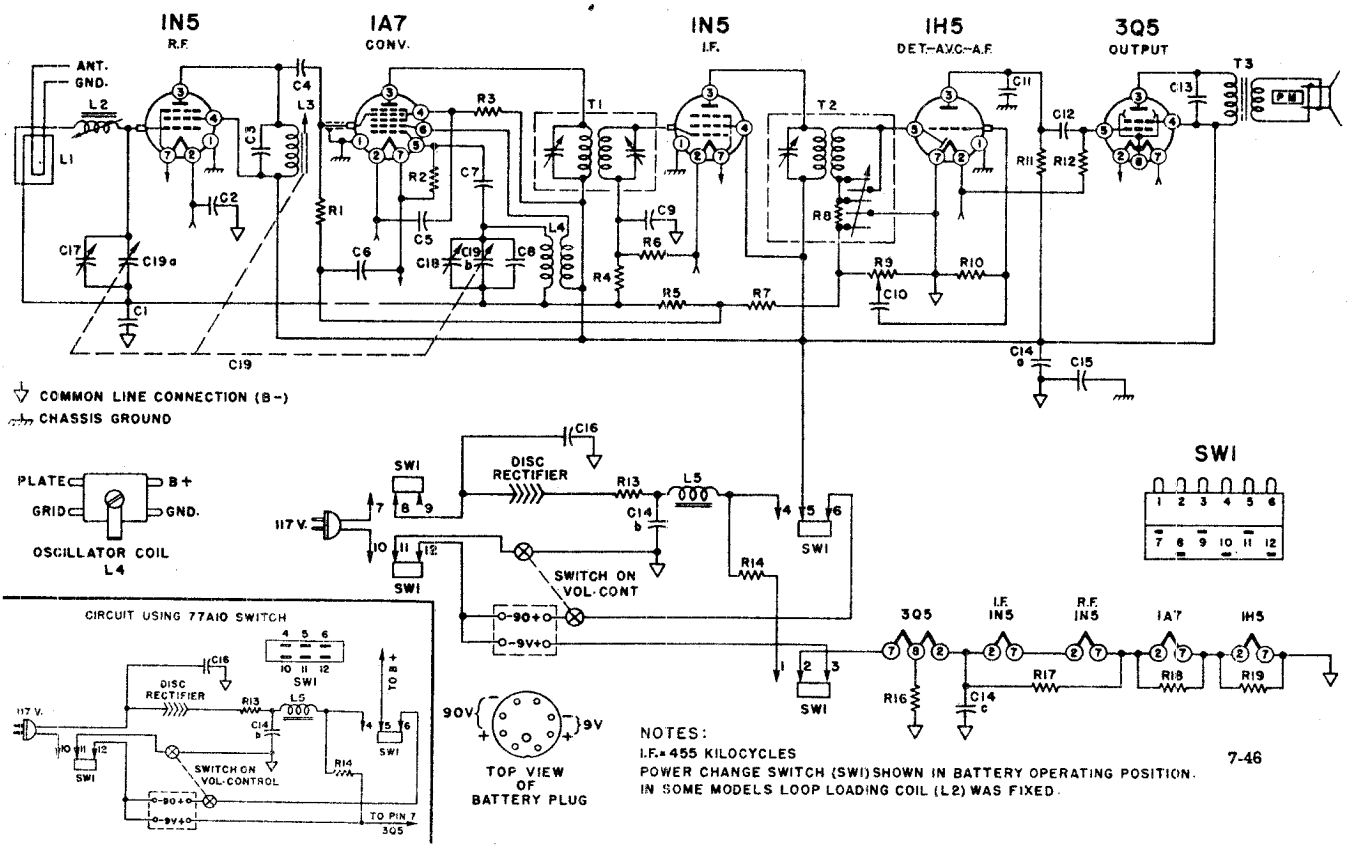
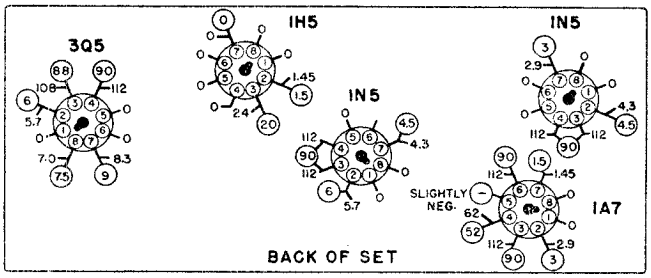
MODELS R652, R652-N

B. F. GOODRICH CO.



VOLTAGE CHART



VOLTAGE DATA

1. Voltage readings circled (O) are for Battery Operation.
2. All readings made between Tube Socket Terminals and Pin No. 7 on the 1H5.
3. A.C. Voltages measured on a 117 Volt A.C. line.
4. Battery Voltages measured with a fresh battery.
5. Dial turned to low frequency end, no signal.
6. All Voltages measured with a 1000 ohm-per-volt meter.

CONDENSERS

Symbol	Description	Part No.
C1	.05 Mfd., 200 Volt, Paper	64B1-32
C2	.25 Mfd., 200 Volt, Paper	64B1-28
C3	.00042 Mfd., Mica	65B1-13
C4, C11	.00025 Mfd., Mica	65B5-22
C5, C6, C9, C10, C12	.01 Mfd., 400 Volt, Paper	64B1-25
C7	.00005 Mfd., Mica	65B5-11
C8	.000015 Mfd., Mica	65B5-3
C13	.002 Mfd., 600 Volt, Paper	64B1-14
C14a	50 Mfd., 150 Volt Elect.	67C7-42
C14b	30 Mfd., 150 Volt Cond.	
C14c	100 Mfd., 25 Volt	
C15	.2 Mfd., 400 Volt, Paper	64A2-1
C16	.05 Mfd., 400 Volt, Paper	64B1-22
C17	Antenna Trimmer	66A12-5
C18	Oscillator Trimmer (Part of Gang)	
C19 (C19a, C19b)	Condenser, Gang	68B4

RESISTORS

R1	100,000 Ohms, ½ Watt, Carbon	60B8-104
R2	220,000 Ohms, ½ Watt, Carbon	60B8-224
R3	47,000 Ohms, ½ Watt, Carbon	60B8-473
R4, R5	4.7 Megohms, ¼ Watt, Carbon	60B2-475

RESISTORS

Symbol	Description	Part No.
R6	4.7 Megohms, ¼ Watt, Carbon	60B2-475
R7	3.3 Megohms, ¼ Watt, Carbon	60B2-335
R8	47,000 Ohms, ½ Watt. Carbon	60B8-473
R9	1 Megohm Volume Control	75B1-10C
R10	15 Megohms, ¼ Watt, Carbon	60B2-156
R11	1 Megohm, ¼ Watt, Carbon	60B2-105
R12	2.2 Megohms, ¼ Watt, Carbon	60B2-225
R13	68 Ohms, Wire Wound, 1 Watt	60B28-4
R14	2,275 Ohms, Wire Wound, 5 Watt	61A3-6
R16	1,500 Ohms, ½ Watt, Carbon	60B8-152
R17	560 Ohms, ½ Watt, Carbon	60B8-561
R18	220 Ohms, ½ Watt, Carbon	60B8-221
R19	120 Ohms, ½ Watt, Carbon	60B8-121

COILS & TRANSFORMERS

L2	Coil, Loop Loading, (fixed)	AA114
	Coil, Loop Loading, (variable)	AA115
L3	Iron Slug for plate coil	71B1-3
	Coil, Plate	AB100-5
L4	Oscillator Coil	69A7
L5	Choke Filter	74A5
T1	1st I.F. Transformer	72B9-2

COILS & TRANSFORMERS

Symbol	Description	Part No.
T2	2nd I.F. Transformer	72B10-2
T3	Transformer, Output	*
	* When ordering, specify all numbers on the speaker and transformer.	
SW1	Switch, Power Change (R652)	77A6
	Switch, Power Change (R652N)	77A10

MISCELLANEOUS

Description	Part No.
Dial Background	21A18-2
Dial Cord, 12"	50A1-3
Dial Cord Tension Spring	19A1-2
Escutcheon and Dial Scale	23C14
Knob, Tuning	33A14-6
Knob, Volume	33A14-5
Plug, Battery (9 prong)	88A3-3
Pointer, Cream Tenite	25A15-1
Rectifier, Selenium	93A1-2
Speaker & Output Transformer	78B8
Tube Shields	87A8

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MODELS R652, R652-N

ALIGNMENT PROCEDURE

1. Be sure both set and signal generator are thoroughly warmed up before starting alignment.
2. Make alignment, using a battery whenever possible.
3. Disconnect Loop Antenna leads from clips on set and remove chassis from cabinet.
4. Connect a 50,000 ohm carbon resistor across the two clips from which the Loop Antenna was removed.
5. Connect Output Meter across the Voice Coil.
6. Connect a fresh battery to the set.
7. Turn receiver Volume Control full on.

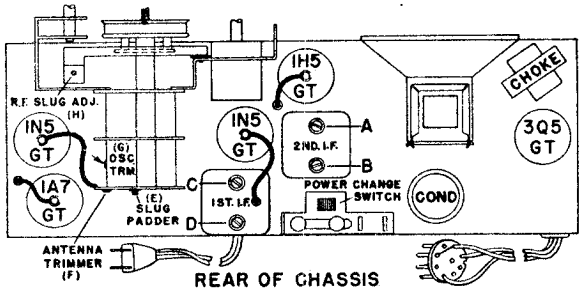
Step	*Dummy Antenna Used in Series with Signal Generator*	*Connect High Side Signal Generator to*	*Signal Generator Frequency*	*Gang Condenser Setting*	*Trimmer Description and Designation*	*Type of Adjustment*
1	.00025 Mfd. when using A.C. .1 Mfd. when using Battery	Grid Cap 1A7	455 K.C.	Any point where it does not affect Signal	2nd I.F. (A), (B). 1st I.F. (C), (D).	Maximum Deflection. Then repeat
2	.00025 Mfd. when using A.C. .1 Mfd. when using Battery	Grid Cap 1N5	1620 K.C.	Rotor full open (Plates out of mesh)	Oscillator Trimmer (G)	Maximum Deflection
3	.00025 Mfd. when using A.C. .1 Mfd. when using Battery	Grid Cap 1N5	1400 K.C.	Tune in Generator Signal	R.F. Slug (H)	Maximum Deflection
4	Replace Set in Cabinet					
5	.00025 Mfd.	Antenna and Ground Leads	1400 K.C.	Tune in Generator Signal	Antenna Trimmer (F)	Maximum Deflection
6	Disregard the next two steps if the set being aligned is a model with a fixed loop loading coil (L2).					
7	.00025 Mfd.	Antenna and Ground Leads	600 K.C.	Tune in Generator Signal	Loop Loading Coil Slug (E)	Maximum Deflection
8	.00025 Mfd.	Antenna and Ground Leads	1400 K.C.	Tune in Generator Signal	Reset Antenna Trimmer (F)	Maximum Deflection

Seal adjusting screw on the loop loading coil with any quick drying cement.

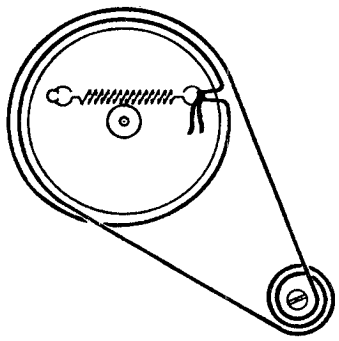
REPLACING R.F. TUNING SLUG

If the R.F. Tuning Slug has to be changed, use the following procedure. Set the gang condenser to the point where the plates are fully meshed. Screw the slug adjusting screw about halfway down. Place the slug in the coil in such a position that the top of the slug is flush with the top of the coil. Solder the slug wire to the adjusting screw. Be sure that the position of the slug does not change during the soldering and that the slug wire is straight. Proceed to re-align the set as shown in the chart.

TUBE AND TRIMMER LAYOUT



DIAL CORD STRINGING



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MODELS R654-PM, R654-PV

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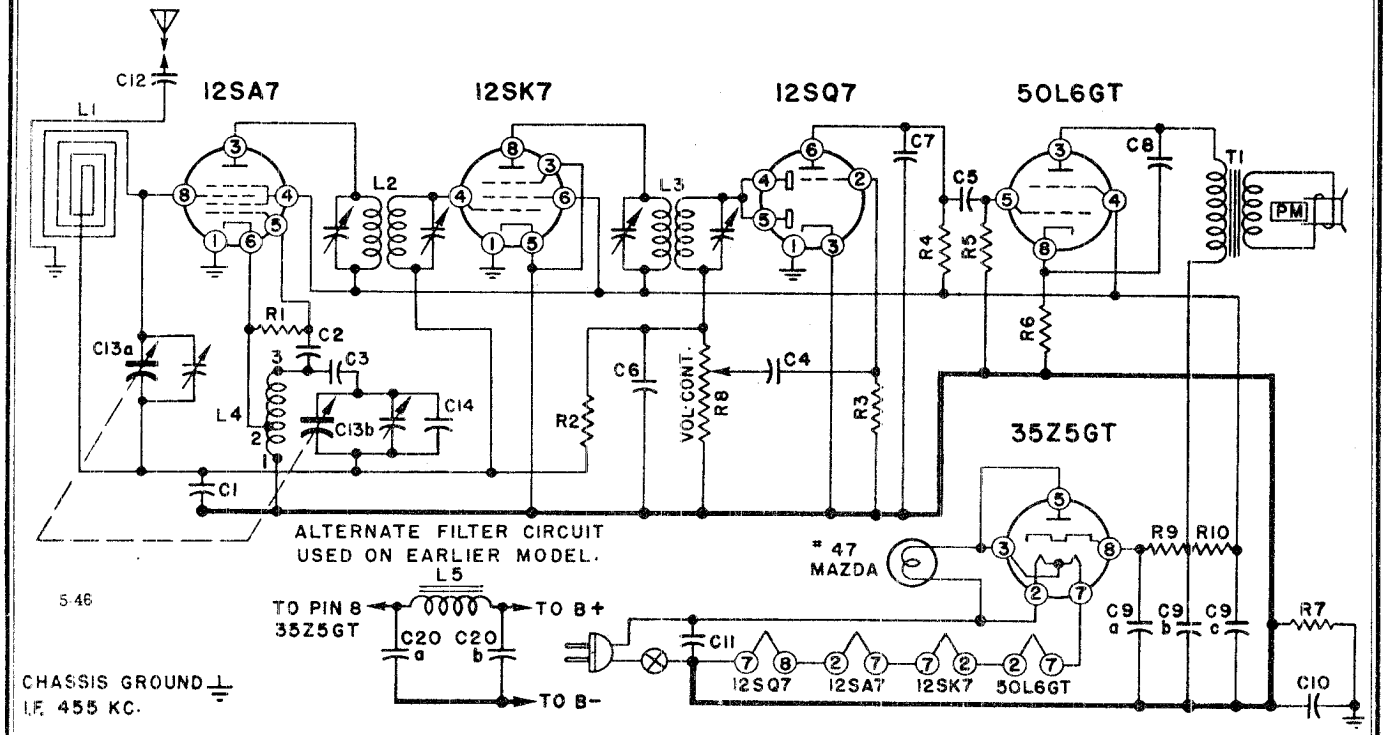


NOTE: 1. In later production R9 and C9a are disconnected from pin No. 8 of the 35Z5 and a 33-ohm 1-watt resistor (R11) is connected between pin No. 8 and the junction of R9 and C9a.

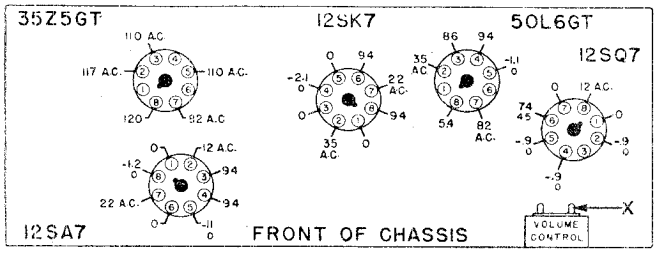
2. The jumper between pins 4 and 5 on the 12SQ7 is removed and one pin is connected to the secondary of the second I.F. (L3) and the other pin is connected directly to the junction point of R2 and the secondary of the 1st I.F. (2).

VOLTAGE DATA

All readings made between Tube Socket Terminals and Switch Lug on volume control (Point "X" on drawing).

Voltages indicated obtained on Vacuum Tube voltmeter.

A second voltage reading is shown made with a 1000 ohm-per-volt meter when use of this instrument would result in appreciably lower readings.



Bottom View

Measured on a 117 Volt A.C. line; volume control full on; dial tuned to low frequency end, no signal.

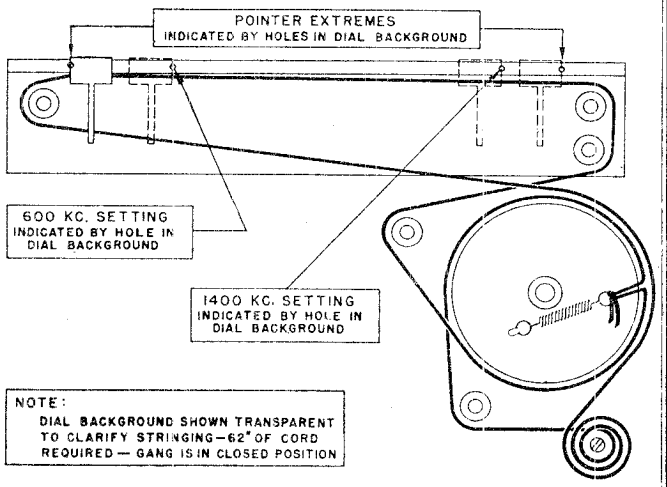
Frequency Range 540-1630 Kc.

POWER SUPPLY

This receiver is designed to operate from any AC (Alternating Current) power supply main of 110-120 volts, 50-60 cycles or DC (Direct Current) power supply main of 110-120 volts. If the receiver fails to operate on DC (Direct Current), reverse the power main plug.

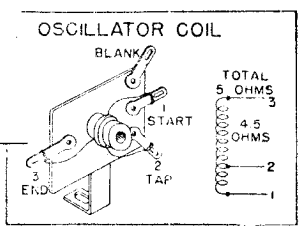
On AC only the line plug should be tried both ways and left in the position that gives minimum hum.

DIAL STRINGING AND POINTER SETTINGS


POINTER EXTREMES INDICATED BY HOLES IN DIAL BACKGROUND
600 KC. SETTING INDICATED BY HOLE IN DIAL BACKGROUND
1400 KC. SETTING INDICATED BY HOLE IN DIAL BACKGROUND
NOTE:
DIAL BACKGROUND SHOWN TRANSPARENT TO CLARIFY STRINGING—62° OF CORD REQUIRED — GANG IS IN CLOSED POSITION

COILS

Symbol	Description
L1 (Sec. 2.3 ohms)	Loop
L2	1st I.F. Trans.
L3	2nd I.F. Trans.
L4	Osc. Coil
L5 (325 ohms)	Choke, Filter



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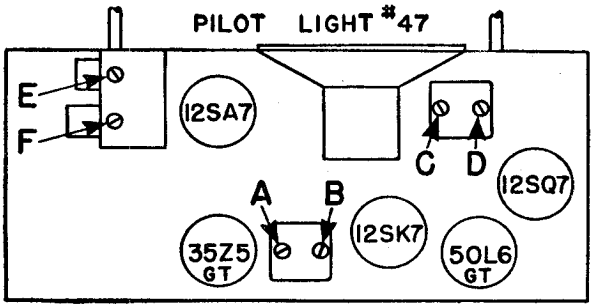
MODELS R654-PM, R654-PV
MODEL R655-W

ALIGNMENT PROCEDURE

- Be sure Radio Receiver and Signal Generator are thoroughly warmed up before starting alignment procedure.
- Check setting of Pointer Extremes and note correct 600 K.C. and 1400 K.C. positions on Dial Background. (See Dial Diagram on reverse side.)
- Connect radio chassis to ground post of signal generator with a short heavy lead.
- Connect Output Meter across Voice Coil of Speaker.
- Turn Receiver Volume Control full on.
- Use lowest Output setting of Signal Generator capable of producing adequate Output Meter indication and then proceed as outlined in chart below.
- Repeat adjustments to insure final overall maximum results.

TOP VIEW — TUBE & TRIMMER LOCATION



BACK OF CHASSIS

Step	Dummy Antenna between Radio and Signal Generator	Connect Signal Generator to	Signal Generator Frequency	Gang Condenser Setting	Trimmers Adjusted for Maximum Output
1	250 mmfd. Condenser	Gang Condenser Antenna Stator	455 KC.	Rotor full open (Plates out of mesh)	C and D—2nd. I.F.
2	250 mmfd. Condenser	Gang Condenser Antenna Stator	455 KC.	Rotor full open (Plates out of mesh)	A and B—1st I.F.
3	250 mmfd. Condenser	Gang Condenser Antenna Stator	1630 KC.	Rotor full open (Plates out of mesh)	E—Oscillator
4	No actual connection between set and generator.	Loop radiator (or place pickup lead from generator close to loop of set to obtain adequate signal).	1400 KC.	Set Gang to tune in Generator Signal	F—Antenna (See Note)

NOTE: Antenna trimmer "F" must be aligned after chassis and loop are mounted in the cabinet. This adjustment can be made by lifting up the top cover and removing the plug button which is directly above trimmer "F".

MODEL R655-W REPLACEMENT PARTS

CONDENSERS

Symbol	Description	Part No.
C1	.1 mfd., 200 Volts, Paper	64B1-30
C2	50 mmfd., Mica	65B7-11
C3	.02 mfd., 400 Volts, Paper	64B1-24
C4	.01 mfd., 400 Volts, Paper	65A3-10
C5	.01 mfd., 400 Volts, Paper	65A3-10
C6	250 mmfd., Mica	65B7-22
C7	500 mmfd. Mica	65B7-27
C8	.02 mfd., 400 Volts, Paper	64B1-24
C9a	30 mfd., 150 V. }	
C9b	30 mfd., 150 V. } Electrolytic	67A8
C9c	20 mfd., 150 V. }	
C10	.1 mfd., 400 Volts, Paper	64B1-20
C11	.05 mfd., 400 Volts, Paper	64B1-22
C12	.005 mfd., 600 Volts, Paper	64B1-12
C13a	.00042 mfd., Gang }	
C13b	.00018 mfd., Gang }	68A2
C14	15 mmfd., Mica	65B5-3
C15	.01 mfd., 400 Volts, Paper	65A3-10
C16	.01 mfd., 400 Volts, Paper	65A3-10
C17	.05 mfd., 400 Volts, Paper	64B1-22
C20a	30 mfd., 150 V. }	
C20b	50 mfd., 150 V. } Electrolytic	67A3

RESISTORS

R1	22,000 ohms, ½ Watt	60B8-223
R2	1 megohm, ½ Watt	60B8-105
R3	10 megohms, ½ Watt	60B8-106
R4	220,000 ohms, ½ Watt	60B8-224
R5	470,000 ohms, ½ Watt	60B8-474
R6	150 ohms, ½ Watt	60B8-151
R7	150,000 ohms, ½ Watt	60B8-154

RESISTORS

Symbol	Description	Part No.
R8	½ megohm, Volume Control and Switch. Tapped at approx. 100,000 and 200,000 ohms from start.	75B3-2
R9	47,000 ohms, ½ Watt	60B8-473
R10	27,000 ohms, ½ Watt	60B8-273
R11	150 ohms, 1 Watt	60B28-1
R12	1,000 ohms, 1 Watt	60B28-2
R13	33 ohms, 1 Watt	60B28-3
R14	10 megohms, ½ Watt	60B9-106

TRANSFORMERS and COILS

L1	Antenna, Loop	69B6
L2	Transformer, 1st I. F.	72B3
L3	Transformer, 2nd I. F.	72B4
L4	Oscillator Coil	69A5
L5	Choke Coil (Filter)	74A1
T1	Transformer, Output	98A4

PHONOGRAPH PARTS

Description	Part No.
Centerpost	G400A12-1
Crystal Cartridge	409A1
Idler Wheel (407B3 Motor)	G400A23
Idler Wheel (407B2 Motor)	G400A59
Idler Wheel (407B1 Motor)	G400A57
Motor, 60 cycle 115 volt, A. C. (Types 407B1 & 407B2 also used)	407B3

MISCELLANEOUS

Description	Part No.
Background, Dial	X22C3-1
Dial Scale, Glass	21B27-2
Drum and Hub Assembly	A1012
Grommet, Rubber Insulating	12A1-1
Grommet, Rubber for Drum	12A1-2
Knob, Tuning or Volume Control	33A16-2
Knob, Radio-Phono Switch	33A11-5
Pilot Light, Mazda No. 47	81A1-8
Pilot Light Socket and Leads	82A2-3
Plug, Button	13A2-1-57
Plug, Alden (Motor Leads)	88A8-1
Pointer	25A4-1
Pulley, Fibre Dial	17A1-3
Shaft, Tuning	28A1-1
Socket and Leads (Alden)	89A6-2
Socket, Octal Tube	87A5-1
Speaker (5" PM) & Output Transformer	78B13-1
Spring, Dial Cord Tension	19B1-7
Switch, Rotary Radio-Phono	{ 77A8 or { 77A11
Washer, Flat Insulating	5A1-6
Washer, Offset Insulating	5A2-5
Washer, C	4A4-1
Washer, Spring	4A6-3-0

PARTS FOR MODELS R654-PM, R654-PV THE SAME AS ABOVE EXCEPT FOR THE PHONOGRAPH PARTS AND THE FOLLOWING EXCEPTIONS:

Part No.	Symbol	Description
64B1-25	C4. C5	.01 mfd. 400 V.
64A2-1	C10	.2 mfd. 900 V.

MICA CONDENSERS

65B5-5	C14	Mica 20 mmf. ±10%
60B28-3	R11	33 ohm 1 W. ±10%
60B28-1	R9	150 ohm 1 W. ±10%
60B28-2	R10	1,000 ohm 1 W. ±10%
75B1-6	R8	1 meg Control and Switch

MISCELLANEOUS

Part No.	Description
22C3-1	Background, Dial
15A14	Bracket, Loop Retainer
34D5-1	Cabinet (Ivory)
34D5-2	Cabinet (Mahogany)
43B9	Cover, Back
18A2	Clip, Dial Glass Mtg.
89A1	Cord, Line
50A1-3	Cord, Dial (62")
A1012	Drum and Hub Assy., Dial
12A1-2	Grommets, Rubber
33A7-1	Knob, Ivory
33A7-2	Knob, Mahogany
1A67-27-2	Mounting Bolts, 8-32 x ½" lg.
81A1-8	Pilot Light No. 47
82A2-3	Pilot Light Socket and Leads
25A4-1	Pointer, Metal Dial
17A1-3	Pulley, Fibre Dial
21B8-1	Scale, Glass Dial
28A1-1	Shaft, Tuning
13A1-4-47	Snap Buttons (for Cabinet Back)
87A1C-2	Socket, Laminated Octal Tube
78B4-1	Speaker, 5" PM and Output Trans.
19A1-3	Spring, Dial Cord Tension
5A1-6	Washer, Fibre Flat
5A2-5	Washer, Fibre Offset
4A4-1	Washer, C
4A6-3-0	Washer, Spring
4B1-55-2	Washer, Flat Mounting 7/16" OD
3B1-26-2	Washer, Mounting Lock (No. 8)

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MODEL R655-W

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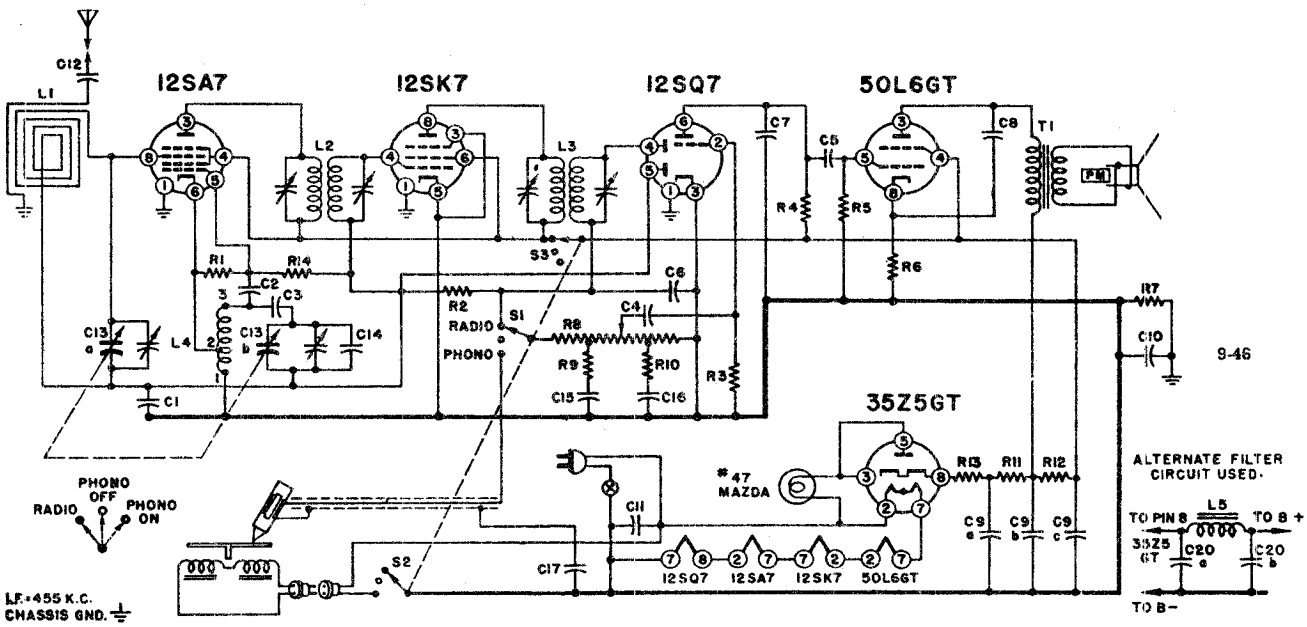
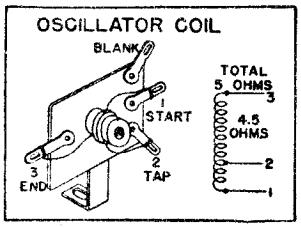
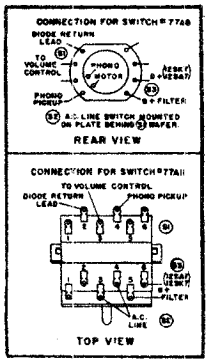


9-46

TUBES USED

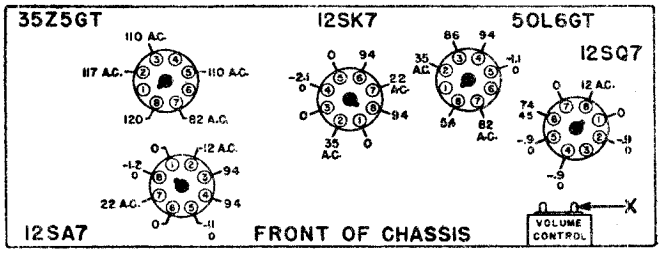
12SA7—1st Det. Osc. 50L6GT—Beam Power Output
12SK7—I. F. Amplifier 35Z5GT—Rectifier
12SQ7—2nd Det.—A. V. C.—1st Audio





Frequency Range 540-1630 Kilocycles

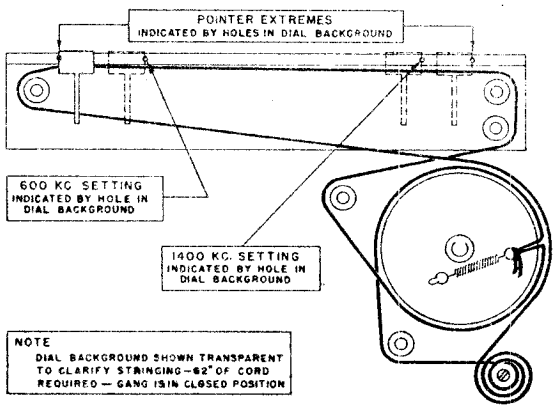
VOLTAGE DATA



Bottom View of Chassis, Showing Voltages

—All readings made between Tube Socket Terminals and Switch Lug on Volume Control (Point "X" on drawing).
—Measured on a 117 Volt A.C. line.
—Volume control full on.
—Dial tuned to low frequency end, no signal.
—Voltages obtained on Vacuum Tube voltmeter.
—A second voltage reading is shown made with a 1000 ohm-per-volt meter when use of this instrument would result in appreciably lower readings.

DIAL STRINGING AND POINTER SETTINGS


POINTER EXTREMES INDICATED BY HOLES IN DIAL BACKGROUND
600 KC SETTING INDICATED BY HOLE IN DIAL BACKGROUND
1400 KC. SETTING INDICATED BY HOLE IN DIAL BACKGROUND
NOTE
DIAL BACKGROUND SHOWN TRANSPARENT TO CLARIFY STRINGING—82" OF CORD REQUIRED—GANG IS IN CLOSED POSITION

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For Alignment and Parts List, see P.15-7

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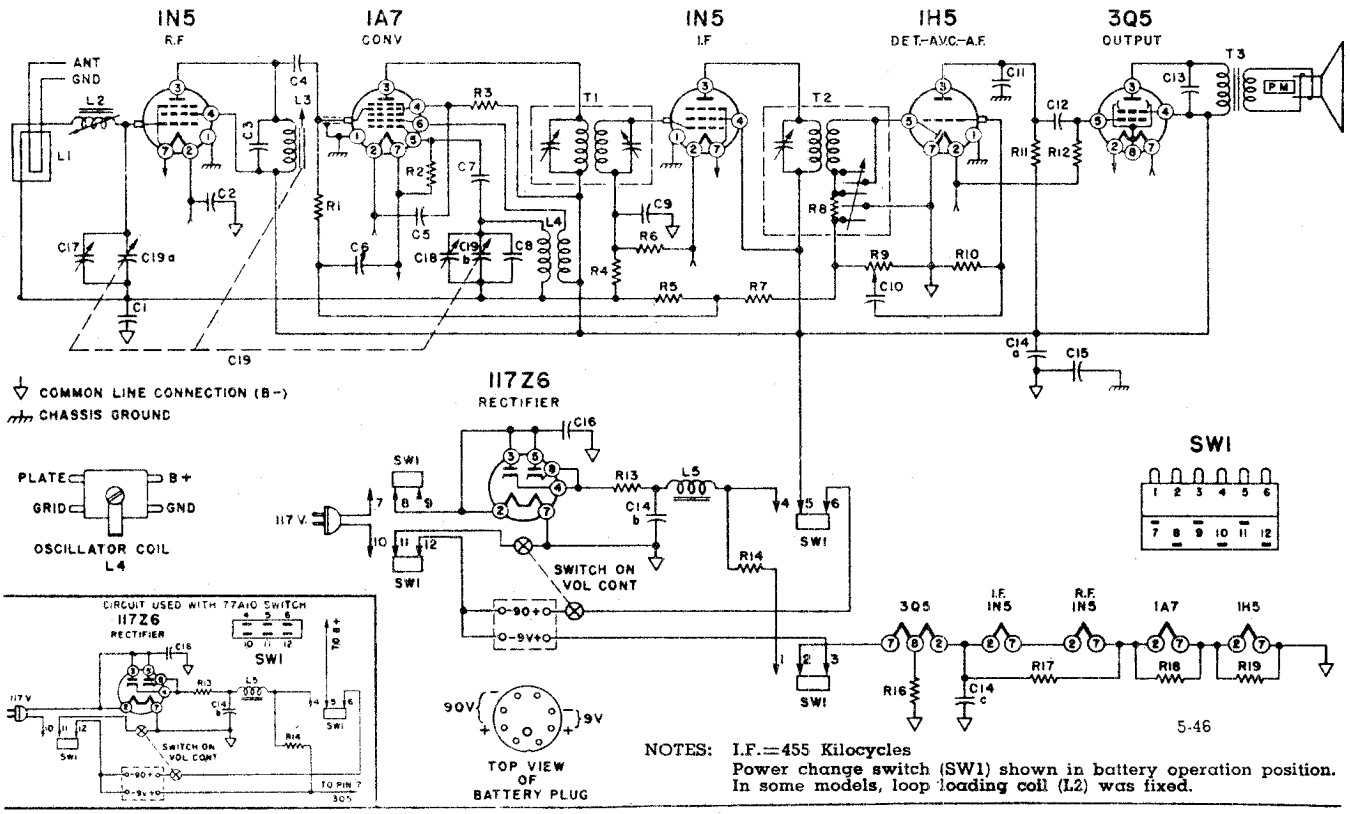
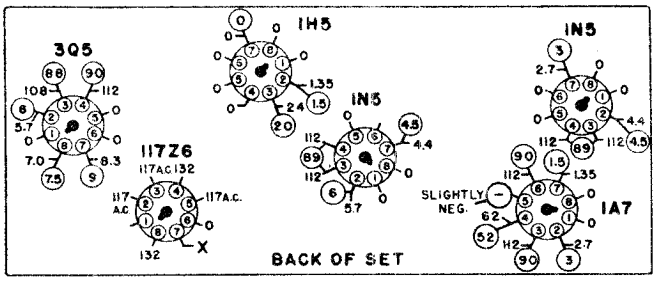
MODELS R662,R662-N



NOTES: I.F.=455 Kilocycles
Power change switch (SW1) shown in battery operation position.
In some models, loop loading coil (L2) was fixed.

Frequency Range—535 to 1620 Kilocycles



VOLTAGE DATA

1. Voltage readings circled (O) are for Battery Operation.
2. All readings made between Tube Socket Terminals and Terminal No. 7 on the 117Z6 (Point "X" on Voltage Chart).
3. A.C. Voltages measured on a 117 Volt A.C. line.
4. Battery Voltages measured with a fresh battery.
5. Dial turned to low frequency end, no signal.
6. All Voltages measured with a 1000 ohm-per-volt meter.

CONDENSERS

Symbol	Description	Part No.
C1	.05 Mfd., 200 Volt, Paper	64B1-32
C2	.25 Mfd., 200 Volt, Paper	64B1-28
C3	.00042 Mfd., Mica	65B1-9
C4, C11	.00025 Mfd., Mica	65B5-22
C5, C6, C9, C10, C12	.01 Mfd., 400 Volt, Paper	64B1-25
C7	.00005 Mfd., Mica	65B5-11
C8	.000015 Mfd., Mica	65B5-3
C13	.002 Mfd., 600 Volt, Paper	64B1-14
C14a	50 Mfd., 150 Volt	Elect. Cond. 67C7-42
C14b	30 Mfd., 150 Volt	
C14c	100 Mfd., 25 Volt	
C15	.2 Mfd., 400 Volt, Paper	64A2-1
C16	.05 Mfd., 400 Volt, Paper	64B1-22
C17	Antenna Trimmer	66A12-5
C18	Oscillator Trimmer (Part of Gang)	
C19 (C19a, C19b)	Condenser, Gang	68B4

RESISTORS

Symbol	Description	Part No.
R1	100,000 Ohms, ½ Watt, Carbon	60B8-104
R2	220,000 Ohms, ½ Watt, Carbon	60B8-224
R3	47,000 Ohms, ½ Watt, Carbon	60B8-473
R4, R5	4.7 Megohms, ½ Watt, Carbon	60B2-475

RESISTORS

Symbol	Description	Part No.
R6	4.7 Megohms, ½ Watt, Carbon	60B2-475
R7	3.3 Megohms, ½ Watt, Carbon	60B2-335
R8	50,000 Ohms, ½ Watt, Carbon	60B8-503
R9	1 Megohm Volume Control	75B1-100
R10	15 Megohms, ½ Watt, Carbon	60B2-156
R11	1 Megohm, ½ Watt, Carbon	60B2-105
R12	2.2 Megohms, ½ Watt, Carbon	60B2-225
R13	22 Ohms, Wire Wound, ½ Watt	61A2-2
R14	2,450 Ohms, Wire Wound, 5 Watt	61A3-5
R16	1,500 Ohms, ½ Watt, Carbon	60B8-152
R17	560 Ohms, ½ Watt, Carbon	60B8-561
R18	220 Ohms, ½ Watt, Carbon	60B8-221
R19	120 Ohms, ½ Watt, Carbon	60B8-121

COILS & TRANSFORMERS

Symbol	Description	Part No.
L2	Coil, Loop Loading, (fixed)	AA114
	Coil, Loop Loading, (variable)	AA115
L3	Iron Slug for plate coil	71B1-3
	Coil, Plate	70A1-30
L4	Oscillator Coil	69A7
L5	Choke Filter	74A5
T1	1st I.F. Transformer	72B9-2

COILS & TRANSFORMERS

Symbol	Description	Part No.
T2	2nd I.F. Transformer	72B10-2
T3	Transformer, Output	*
	*When ordering, specify all numbers on the speaker and transformer.	
SW1	Switch, Power Change (R662)	77A6
	Switch, Power Change (R662N)	77A10

MISCELLANEOUS

Description	Part No.
Dial Background	21A18-2
Dial Cord, 12"	50A1-3
Dial Cord Tension Spring	19A1-2
Escutcheon and Dial Scale	23C14
Knob, Tuning	33A14-6
Knob, Volume	33A14-5
Plug, Battery (9 prong)	88A3-3
Pointer, Cream Tenite	25A15-1
Speaker & Output Transformer	78B8
Tube Shields	87A8

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MODELS R662, R662-N

B. F. GOODRICH CO.

ALIGNMENT PROCEDURE

1. Be sure both set and signal generator are thoroughly warmed up before starting alignment.
2. Make alignment, using a battery whenever possible.
3. Disconnect Loop Antenna leads from clips on set and remove chassis from cabinet.
4. Connect a 50,000 ohm carbon resistor across the two clips from which the Loop Antenna was removed.
5. Connect Output Meter across the Voice Coil.
6. Connect a fresh battery to the set.
7. Turn receiver Volume Control full on.

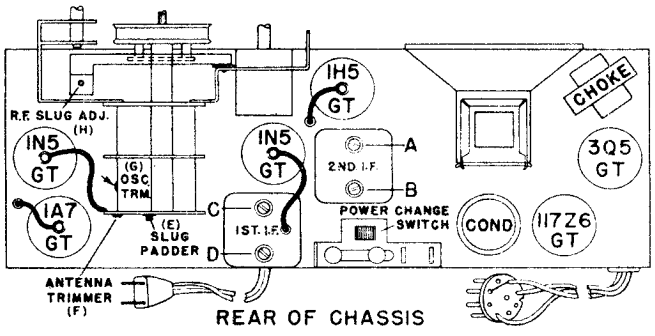
Step	*Dummy Antenna Used in Series with Signal Generator*	*Connect High Side Signal Generator to*	*Signal Generator Frequency*	*Gang Condenser Setting*	*Trimmer Description and Designation*	*Type of Adjustment*
1	.00025 Mfd. when using A.C. .1 Mfd. when using Battery	Grid Cap 1A7	455 K.C.	Any point where it does not affect Signal	2nd I.F. (A), (B). 1st I.F. (C), (D).	Maximum Deflection. Then repeat
2	.00025 Mfd. when using A.C. .1 Mfd. when using Battery	Grid Cap 1N5	1620 K.C.	Rotor full open (Plates out of mesh)	Oscillator Trimmer (G)	Maximum Deflection
3	.00025 Mfd. when using A.C. .1 Mfd. when using Battery	Grid Cap 1N5	1400 K.C.	Tune in Generator Signal	R.F. Slug (H)	Maximum Deflection
4	Replace Set in Cabinet					
5	.00025 Mfd.	Antenna and Ground Leads	1400 K.C.	Tune in Generator Signal	Antenna Trimmer (F)	Maximum Deflection
6	Disregard the next two steps if the set being aligned is a model with a fixed loop loading coil (L2).					
7	.00025 Mfd.	Antenna and Ground Leads	600 K.C.	Tune in Generator Signal	Loop Loading Coil Slug (E)	Maximum Deflection
8	.00025 Mfd.	Antenna and Ground Leads	1400 K.C.	Tune in Generator Signal	Reset Antenna Trimmer (F)	Maximum Deflection

Seal adjusting screw on the loop loading coil with any quick drying cement.

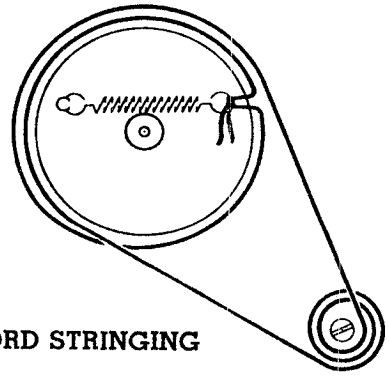
REPLACING R.F. TUNING SLUG

If the R.F. Tuning Slug has to be changed, use the following procedure. Set the gang condenser to the point where the plates are fully meshed. Screw the slug adjusting screw about halfway down. Place the slug in the coil in such a position that the top of the slug is flush with the top of the coil. Solder the slug wire to the adjusting screw. Be sure that the position of the slug does not change during the soldering and that the slug wire is straight. Proceed to re-align the set as shown in the chart.

TUBE AND TRIMMER LAYOUT



REAR OF CHASSIS



DIAL CORD STRINGING

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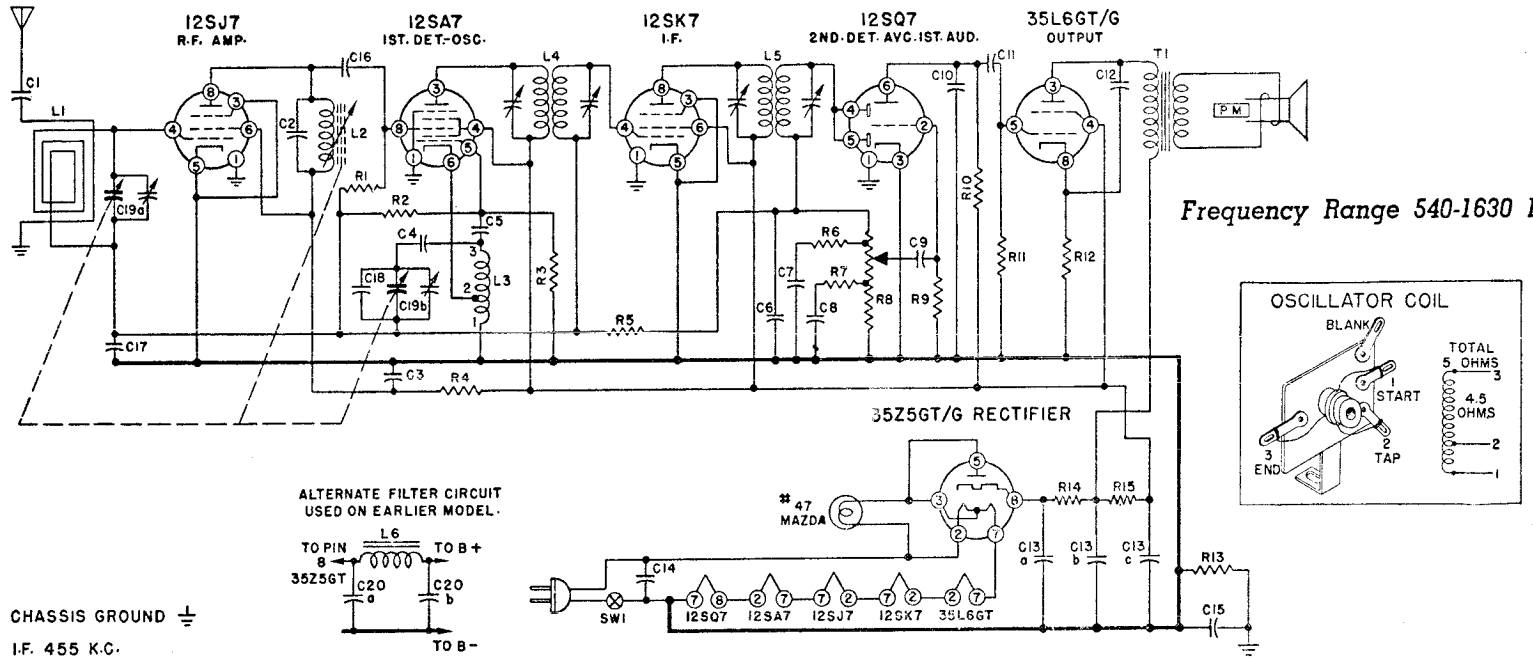


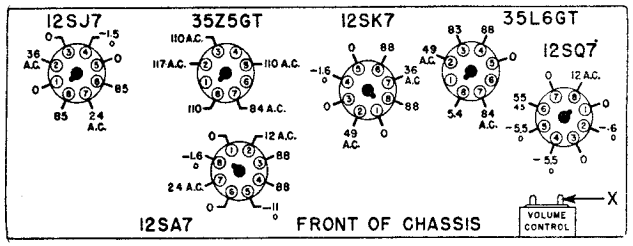
Frequency Range 540-1630 Kc.

NOTE: 1. In later production R14 and C13a are disconnected from pin #8 of the 35Z5 and a 33-ohm 1W resistor (R16) is connected from pin #8 to the junction of R14 and C13a.

2. The jumper between pins 4 and 5 on the 12SQ7 is removed and one pin is connected to the secondary of the second I.F. (L5) and the other pin is connected directly to the junction point of R5 and the secondary of the 1st I.F. (L4).

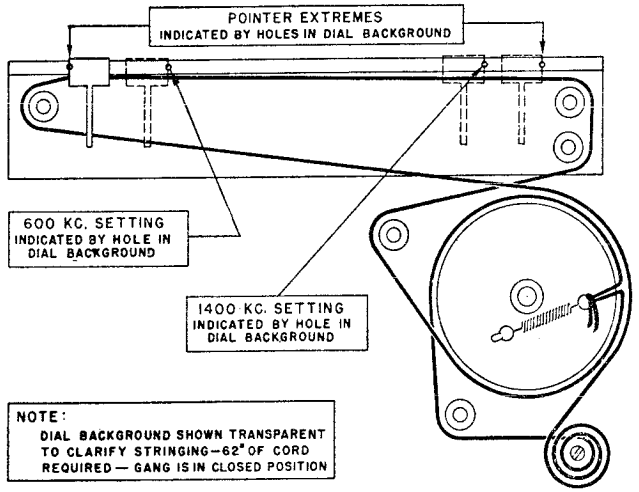
VOLTAGE DATA

All readings made between Tube Socket Terminals and Switch Lug on volume control (Point "X" on drawing). Voltages indicated were obtained with a vacuum tube voltmeter. However, when use of a 1000 ohm-per-volt meter results in an appreciably different reading, this reading is shown below that of the vacuum tube voltmeter reading. Voltages are measured using a 117 volt A.C. line with the volume control full on, the dial tuned to the low-frequency end and no signal.



Bottom View

DIAL STRINGING AND POINTER SETTINGS



NOTE:
DIAL BACKGROUND SHOWN TRANSPARENT TO CLARIFY STRINGING—62° OF CORD REQUIRED—GANG IS IN CLOSED POSITION

COILS

Symbol	Description
L1 (Sec. 2.3 ohms)	Loop
L2 (2.5 ohms)	R. F. Coil
L3	Osc. Coil
L4	1st I. F. Trans.
L5	2nd I. F. Trans.
L6 (325 ohms)	Choke, Filter

MODELS R664-PM, R664-PV, R664-W

B. F. GOODRICH CO.

DIAL DRUM POSITION

If the dial drum position is disturbed, it should be carefully re-positioned to insure correct tuning of the permeability tuned coil. With the gang fully meshed, the drum will be properly positioned if the center of the condenser shaft and the dial cable hole on the drum are in a straight line parallel to the chassis base. Note that the dial cable hole should be on the right side (looking at front) of the chassis.

TUNED SLUG POSITION.

If the tuned coil slug needs replacing or re-positioning, first see that the dial drum is in its proper position. Then with the gang condenser fully meshed and the threaded stud half-way through the bakelite, note that the top of the slug is flush with the top of coil form. Then re-align.

ALIGNMENT PROCEDURE

Be sure Radio Receiver and Signal Generator are thoroughly warmed up before starting alignment procedure.

Check setting of Pointer Extremes and note correct 600 K.C. and 1400 K.C. positions on Dial Background. (See Dial Diagram on reverse side.)

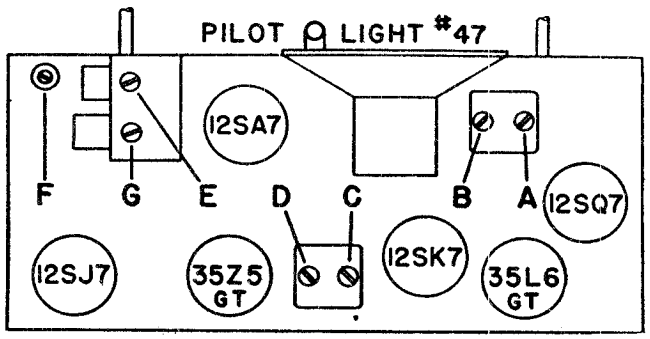
Connect Output Meter across Voice Coil.

Turn Receiver Volume Control full on.

Use lowest Output setting of Signal Generator capable of producing adequate Output Meter indication and then proceed as outlined in chart below.

Repeat adjustments to insure final overall maximum results.

TOP VIEW — TUBE & TRIMMER LOCATION



BACK OF CHASSIS

Connect Signal Generator To—	Dummy Antenna Between Radio and Generator	Set Generator Frequency To—	Set Receiver Dial Frequency To—	Adjust Following Trimmers	Type of Adjustment
12SA7 Control Grid	250 mmfd. Mica Condenser	455 KC.	High frequency end of Dial	A and B 2nd I. F. C and D 1st I. F.	Adjust to maximum Output
External Antenna Wire on Loop	250 mmfd. Mica Condenser	1630 KC.	High frequency end of Dial	E—Osc.	Adjust to maximum Output
External Antenna Wire on Loop	250 mmfd. Mica Condenser	1400 KC.	* Tune in Generator signal	F—R. F. (Iron Core)	See Note Below
Loop radiator or place pickup lead from gen. close to set loop to obtain adequate signal.	No actual connection between set and generator.	1400 KC.	Tune in Generator signal	G—Ant.	Adjust to maximum Output

NOTE: Adjustment F is the threaded stud at the top end of the slug wire. Screw stud up or down in the bakelite for maximum output. Alignment is correct if the output is reduced when the position of the lever arm is changed slightly in either direction (up or down).

PAPER CONDENSERS

Part No.	Symbol	Description
64B1-12	C-1	.005 mfd 600 V.
64B1-22	C-3, C-14	.05 mfd 400 V.
64B1-24	C-4, C-12	.02 mfd 400 V.
64B1-25	C-7, C-8, C-9, C-11	.01 mfd 400 V.
64B1-30	C-17	.1 mfd 200 V.
64A2-1	C-15	.2 mfd. 400 V.

CERAMIC or MICA CONDENSERS

65B5-5	C-18	20 mmfd. ±10%
65B7-11	C-5	50 mmfd. ± 20%
65B7-22	C-6, C-16	250 mmfd. ±20%
65B7-27	C-10	500 mmfd ±20%
65B1-8	C-2	785 mmfd. ±5% (silver)

VARIABLE RESISTORS

75B3-2	R-8	Volume Control (½ meg ohm) and Switch (Tapped)

TRANSFORMERS and COILS

69B4	L1	Aeroscope (Loop)
A1052	L2	R. F. Coil and Mounting
69A5	L3	Oscillator Coil
72B3	L4	1st I. F. Transformer
72B4	L5	2nd I. F. Transformer
74A1	L6	Choke, Filter
*	T1	Transformer, Output

*When ordering, specify all numbers on speaker and transformer.

ELECTROLYTIC CONDENSERS

Part No.	Symbol	Description
67A3	C20a	30 mfd. 150 V.
	C20b	50 mfd. 150 V.
or	C13a	30 mfd 150 V.
67A8	C13b	30 mfd 150 V.
	C13c	20 mfd 150 V.

VARIABLE CONDENSERS

68A2	C19a, b	Condenser, Gang

RESISTORS

60B28-3	R-16	33 ohm 1 W. ±10%
60B8-101	R-4	100 ohm ½ W. ±10%
60B8-151	R-12	150 ohm ½ W. ±10%
60B14-151	R-14	150 ohm 1 W. ±10%
60B14-102	R-15	1,000 ohm 1 W. ±10%
60B8-103	R-1	10,000 ohm ½ W. ±10%
60B8-223	R-3	22,000 ohm ½ W. ±10%
60B8-273	R-7	27,000 ohm ½ W. ±10%
60B8-473	R-6	47,000 ohm ½ W. ±10%
60B8-154	R-13	150,000 ohm ½ W. ±10%
60B8-274	R-10	270,000 ohm ½ W. ±10%
60B8-474	R-11	470,000 ohm ½ W. ±10%
60B8-105	R-5	1 meg ohm ½ W. ±10%
60B8-475	R-9	4.7 meg ohm ½ W. ±10%
60B8-106	R-2	10 meg ohm ½ W. ±10%

MISCELLANEOUS

Part No.	Description
22C3-1	Background, Dial (specify blue for plastic, brown for wood cabinets)
15A69	Bracket, Dial glass mtg. (wood Cab.)
13A1-4-47	Buttons, Snap (For cabinet back and R. F. Coil)
15A14	Bracket Plate, Loop Retainer
34D8-1	Cabinet, Plastic Ivory
34D8-2	Cabinet, Plastic Mahogany
18A2	Clip, Dial glass (Plastic Cab.)
43B10	Cover, Chipboard back (Plastic Cab.)
43B18	Cover, Chipboard back (wood Cab.)
50A1-3	Cord, Dial (62")
A1049	Drum and Cam Assembly
12A1-2	Grommet, Rubber
33A7-1	Knob (For Ivory Plastic only)
33A7-2	Knob (For Mahog. Plastic only)
33A7-5	Knob (For wood cabinet)
A1050	Lever arm assembly (R.F.)
81A1-8	Pilot light, No. 47
82A2-3	Pilot light socket and leads
25A13-1	Pointer
17A1-3	Pulley, Fibre ⅛ x ½ OD
21B10-1	Scale, Glass dial
1A5-14	Screw, Set 8-32x⅛ (Dial Drum)
1A67-27-2	Screw, Mtg., 8-32x½" lg. (For Plastic only)
1A67-29-2	Screw, Mtg., 8-32x¾" lg. (For Wood only)
28A1-1	Shaft, Tuning
78B4-2	Speaker and Trans. 5" PM
19A1-3	Spring, Tension (Dial)
19A4	Spring, Lever Arm (R.F.)
29A2-3-21	Spacer, T (R.F.)
71B1-2	Slug, R. F. Iron Core (with wire)
87A10-2	Socket, Octal Tube
27A4	Stud, slug adj. (R.F.)
4A4-1	Washer, C (Tuning shaft)
4A6-3-C	Washer, Spring (Tuning Shaft)

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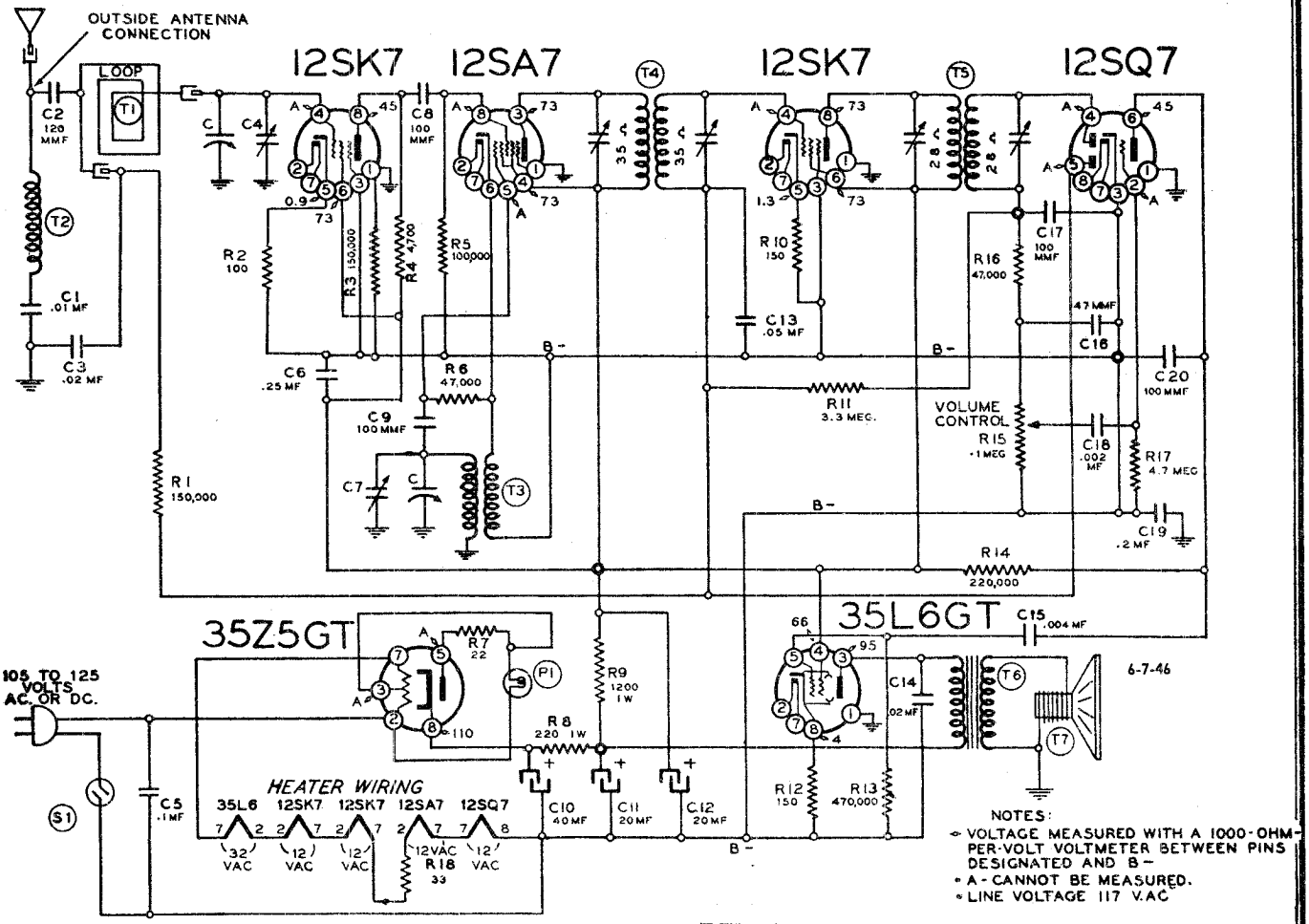
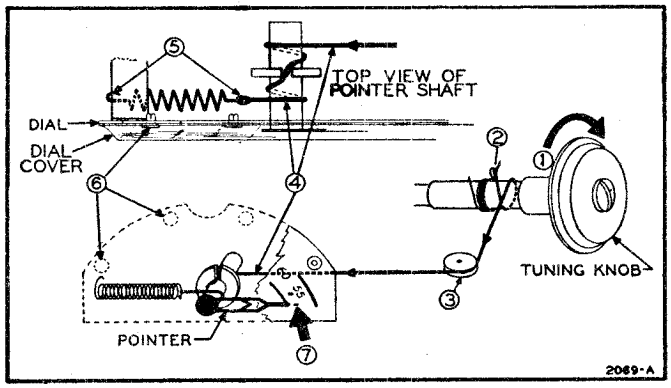
MODELS 605, 606
Series A





REPLACING DIAL POINTER DRIVE CORD

Six inches of cord are required. Numbers below correspond to circled numbers in diagram.

1. Rotate tuning knob to extreme clockwise position.
2. Tie cord to loop in spring as shown.
3. Pass cord over idler pulley.
4. Pass cord OVER pointer shaft; wind it one turn around shaft; pass it through key washer, then once more around shaft.
5. Hook spring over end of dial support. Tie cord to spring. IMPORTANT: Full contraction of spring must rotate pointer shaft at least one half turn.
6. Remove dial crystal by removing snap-in rivets.
7. Make sure tuning knob is in extreme clockwise position. Then rotate pointer clockwise, against friction of shaft, until it is in a horizontal position, as shown.

POWER SUPPLY.....105 to 125 volts, DC or 50-60 cycle AC, 35 watts. Also made for 25 cycles.

FREQUENCY RANGE.....530 to 1650 kc.

INTERMEDIATE FREQ....455 kc.

TUNING.....Two-gang capacitor.

ANTENNA.....Built-in loop. Also provisions for external antenna. No ground required.

SPEAKER.....5-inch; P.M.; voice coil impedance 3.2 ohms.

POWER OUTPUT.....1 watt undistorted. 1.5 watts maximum.

SENSITIVITY.....10 microvolts average for 50-milliwatt output.

SELECTIVITY.....55 kc. broad at 1000 times signal at 1000 kc.

TUBE COMPLEMENT.....12SK7, R. F. amplifier
12SA7, converter
12SK7, I. F. amplifier
12SQ7, 2nd detector, AVC, 1st audio
35L6GT, output amplifier
35Z5GT, rectifier

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MODELS 605,606
Series A

W. T. GRANT CO.

DIAL LIGHT—If the dial lamp burns out the set should not be operated until a new lamp has been installed. Failure to heed this caution may result in a burned-out 35Z5GT tube. To replace the lamp, first remove the four buttons which hold the back to the cabinet. On the inside of the back unclip the green, black, and white wires clipped to the back. The Chassis View illustration shows the location of the dial lamp. *Pull* the lamp bracket toward the rear of the radio. The lamp can now be removed and replaced. Use a 6- to 8-volt lamp, type T-47. When replacing the back on the cabinet, connect the green wire to the green-painted clip, the black wire to the black-painted clip, and the white wire to the unpainted clip.

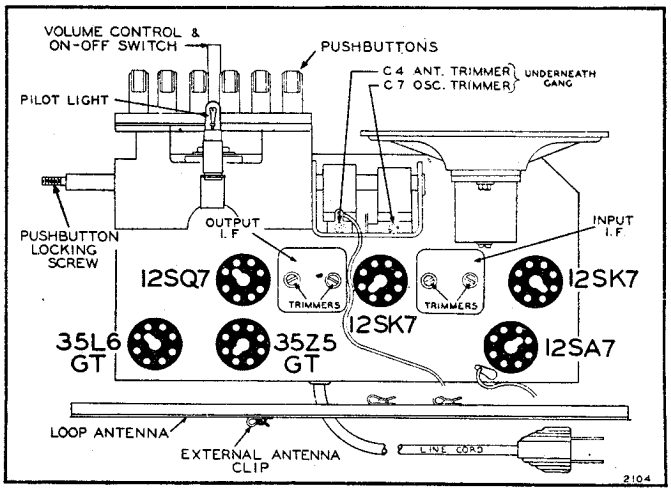
REMOVAL OF CHASSIS—If for any reason you wish to remove the radio chassis from the cabinet, proceed as follows: First be sure the line cord is disconnected from the house power receptacle. Then take off the back as described under "Dial Light" above. *Pull* the volume control knob off its shaft. Unscrew the locking screw in the center of the tuning knob and pull the knob off its shaft. Remove the four chassis mounting screws from the bottom of the cabinet. The chassis can now be slipped out.

After the chassis is replaced the automatic pushbuttons will probably have to be reset.

SETTING THE PUSHBUTTONS—The pushbuttons may be used, after proper adjustment, for the automatic tuning of any six stations on the standard broadcast band. They can be set up in any order.

1. Turn on the radio.

2. Push out the call letters of the six stations from the call-letter sheets supplied with this manual.



3. Insert one call-letter tab in the rectangular opening in the front of each pushbutton, in any order. Press an acetate tab (supplied in small envelope) into each of the pushbuttons.

4. With the screwdriver supplied, check to see that the locking screw in the center of the tuning knob (see front view) is loose. If it is not, turn it several turns to the left (counterclockwise).

5. Press the first pushbutton down *all the way*. With one hand hold the button down firmly and with the other carefully tune in the desired station. Release the pushbutton.

6. Follow this procedure for each of the five other buttons, setting each one for a different station.

7. Rotate the tuning knob on the side of the cabinet as far to the right as it will go. Tighten the locking screw in the center of the knob. IT IS IMPORTANT THAT THIS SCREW BE TIGHTENED VERY FIRMLY.

8. The pushbuttons are now properly set for automatic tuning.

Any of the six stations may be tuned in simply by pressing the proper button down as far as it will go. If you wish to reset any of the buttons for a new station, loosen the locking screw, set the pushbutton as described above, and re-tighten the locking screw.

ALIGNMENT PROCEDURE

(Refer to Chassis View for location of trimmers)

Output meter across 3.2-ohm output load.
Align for maximum output. Reduce input as needed to keep output near 0.4 volts.
Volume control at maximum for all adjustments.
Connect ground post of signal generator to B— of radio.

- Chassis must be removed from cabinet for proper alignment. Slight adjustments of the oscillator and antenna circuits can be made, without removing the chassis, through two holes provided on the bottom of the cabinet. The screws can be reached with a long screwdriver.

SIGNAL GENERATOR			*TUNER SETTING*	*ADJUST FOR MAXIMUM OUTPUT (in order shown)*
Frequency	*Dummy Antenna*	*Connection to Radio*		
455 kc	.1 mf	Grid (pin 8) of 12SA7	Plates out of mesh	Trimmers on output and input I.F. cans
1650 kc	.1 mf	Grid (pin 8) of 12SA7	Plates out of mesh	Oscillator trimmer C7 on bottom of gang
1400 kc	200 mmf	See note below	Set dial at 1400 kc	Antenna trimmer C4 on bottom of gang

Lay output lead of generator in back of loop antenna. Turn up generator output. Loop will pick up energy.

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Ref. No.	Part. No.	Description
		CAPACITORS*
C,C4,C7	B-8A-10211	Two-gang, including antenna and oscillator trimmers
C1	C-8D-10761	.01 mf, 400 volts, 20%
C2	C-8F3-114	120 mmf, 500 volts, 10%, mica
C3,C14	C-8D-10774	.02 mf, 400 volts, 20%
C5	C-8D-10760	.1 mf, 400 volts, +20%—10%
C6	C-8D-10775	.25 mf, 200 volts, +20%—10%
C8,C9 C17,C20	C-8F3-8	100 mmf, 500 volts, 20%, mica
C10,C11, C12	11994 or	Electrolytic for 60 cycles; 40 mf, 20 mf, 20 mf x 150 volts
	11995	Electrolytic for 25 cycles; 60 mf, 40 mf, 40 mf x 150 volts
C13	C-8D-10770	.05 mf, 200 volts, 20%
C15	C-8D-10788	.004 mf, 600 volts, 20%
C16	C-8F3-6	47 mmf, 500 volts, 20%, mica
C18	C-8D-10778	.002 mf, 600 volts, +40%—15%
C19	C-8D-10942	.2 mf, 400 volts, +30%—10%
		RESISTORS*
R1,R3	C-9B1-26	150,000 ohms, ½ watt, 20%
R2	C-9B1-50	100 ohms, ½ watt, 10%
R4	C-9B1-70	4700 ohms, ½ watt, 10%
R5	C-9B1-25	100,000 ohms, ½ watt, 20%
R6	C-9B1-82	47,000 ohms, ½ watt, 10%
R7	C-9B1-42	22 ohms, ½ watt, 10%
R8	C-9B2-54	220 ohms, 1 watt, 10%
R9	C-9B2-63	1200 ohms, 1 watt, 10%
R10,R12	C-9B1-52	150 ohms, ½ watt, 10%
R11	C-9B1-34	3.3 megohms, ½ watt, 20%
R13	C-9B1-29	470,000 ohms, ½ watt, 20%
R14	C-9B1-27	220,000 ohms, ½ watt, 20%
R15,S1	101193	Volume control (1 megohm) and on-off switch
R16	C-9B1-23	47,000 ohms, ½ watt, 20%
R17	C-9B1-35	4.7 megohms, ½ watt, 20%
R18	C-9B2-44	33 ohms, 1 watt, 10%
		COILS AND TRANSFORMERS
T1,T2	B-212-11062	Loop antenna assembly, including capacitors C1 and C2, coil T2, and cardboard back. Specify brown or ivory back.
T3	A-13D-10215	Oscillator coil
T4	108140G	Input I.F. coil complete in can. Range of trimmers: 56-104 mmf
T5	108145C	Output I.F. coil complete in can. Range of trimmers: 56-104 mmf
T6	10595B	Output transformer

*The values of the resistors and mica capacitors listed above are based on RMA standards. Due to conditions beyond our control, some receivers have been shipped with components of pre-standardized values. This receiver will operate equally well with components of either group. An illustration of the differences follows:

Pre-standardized value—200,000 ohms, 20%, 1/3 watt
RMA value—220,000 ohms, 20%, 1/2 watt
Pre-standardized value—50 mmf, 500 volts, 20%
RMA value—47 mmf, 500 volts, 20%

NOTE ON TUBE REPLACEMENT

Replace a defective metal 12SK7 tube with another metal tube. Replace a glass 12SK7 tube with a metal tube or with an exact duplicate of the tube now in the set.

Ref. No.	Part. No.	Description
		TUNER MECHANICAL PARTS
	115146	Cams (6 used on cam shaft)
	115143	Key washers (12 used)
	117528	Spacer (1 used on shaft)
	117602	Spacer (4 used on shaft)
	117604	Locking collar
	131181	Spring washer for collar
	A-3N-11086	Spacer on shaft for drive cord
	A-49A-11087	Spring on shaft for drive cord
	115361	Cam lever with roller
	120283	Return spring for lever
	112785	Pointer
	A-53A-10989	Drive cord (6 inches)
	120143	Tension spring for drive cord
	B-6D-10241	Dial scale
	112659	Crystal for dial scale
	B-2M-7758	Snap-in rivets (4) for crystal
		MISCELLANEOUS
T7	114191B	Speaker, 5-inch, P.M.
	121171	Socket for tube (6 used)
	10798D	Line cord and plug
P1	107249	Dial lamp, 6-8 volts, T-47
	107271	Socket assembly for dial lamp
	A-2H-11271	Tube shield for bakelite-base 12SA7GT
	A-2H-10715	Tube shield for metal-base 12SA7GT
	128334B-18	Cabinet, walnut
	128334B-9	Cabinet, ivory
	A-5B-11249-17	Knob, volume, walnut
	A-5B-11249-8	Knob, volume, ivory
	B-5B-10994-18	Knob, tuning, walnut
	B-5B-10994-9	Knob, tuning, ivory
	120388	Locking spring for tuning knob
	A-3F-10995	Locking screw in tuning knob
	128292B-17	Pushbutton, walnut
	128292B-8	Pushbutton, ivory
	134123	Rubber bumper for bottom of cabinet
	131193	Snap-in rivets (4) for mounting back
	112784	Station call letters, 1 set
	112606	Acetate tabs for call letters

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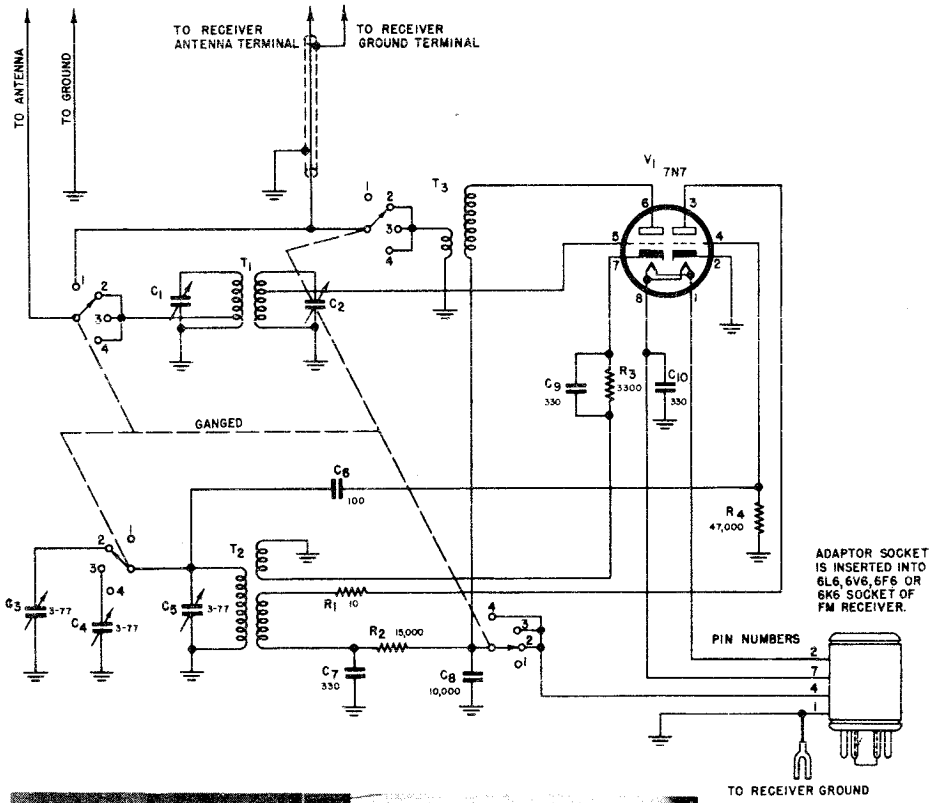
THE HALLICRAFTERS CO.

MODEL CN-1
Converter

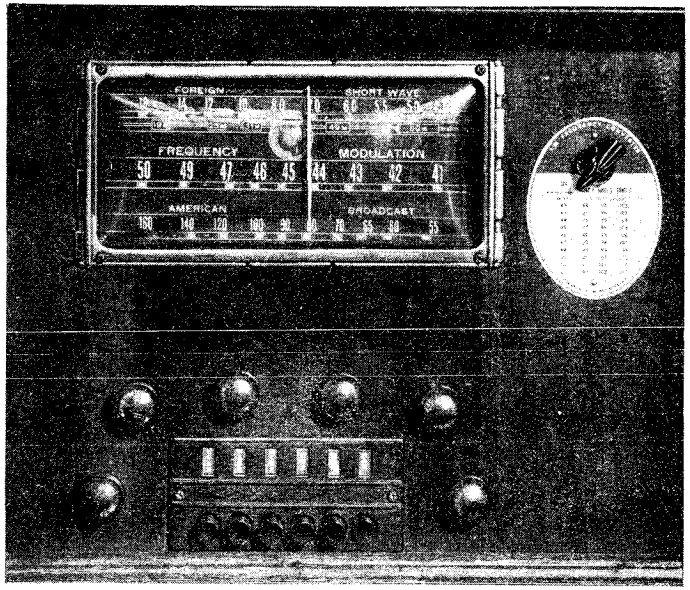


89C200

ALL RESISTOR VALUES IN OHMS.
ALL CAPACITOR VALUES IN MICROMICROFARADS

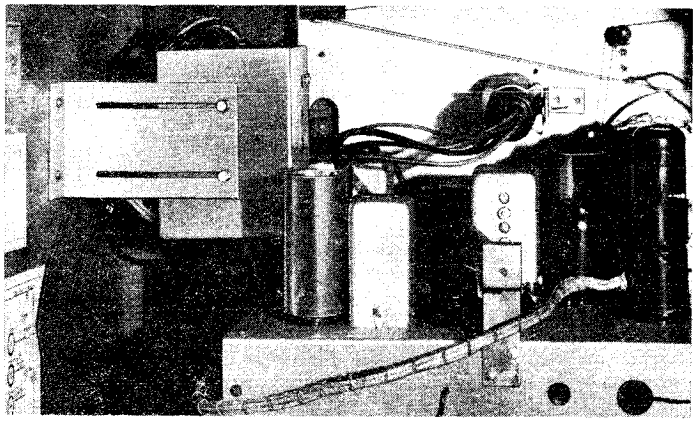
SWITCH POSITIONS

1—OFF——NORMAL OPERATION OF FM RECEIVER
2—RANGE——84 TO 93 MC.
3—RANGE——93 TO 102 MC.
4—RANGE——102 TO 111 MC.

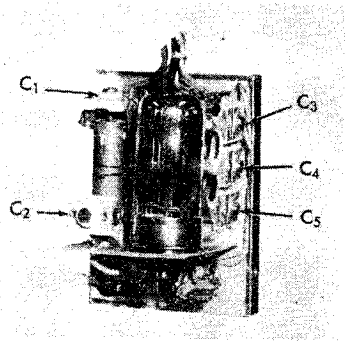


Front view of typical installation.

Can be used with f-m tuner
Can be used with f-m ac/dc tuner, in which case converter is isolated from tuner through condenser



Rear view of typical installation.



CONVERTER OSCILLATOR ADJUSTMENT

NOTE - A signal generator with a range of 84 MC to 111 MC will be necessary for oscillator and r-f adjustments.

HOW TO CONNECT SIGNAL GENERATOR TO CONVERTER

1. Connect signal generator "hot" lead to converter aerial. (green wire)
2. Connect signal generator ground lead to converter ground lead. (black wire)

WHERE TO SET RECEIVER TUNING DIAL

Set receiver tuning dial at 45 MC on FM dial scale for all of the three oscillator adjustments and use the following:

ADJUSTMENT PROCEDURE

NOTE - Always begin adjustments with converter range selector set at position 3.

Set converter frequency selector at position	Set sig. gen. at	Adjust following trimmer until signal is heard
3	105 MC	C - 5
2	96 MC	C - 4
1	87 MC	C - 3
Refer to photograph on schematic diagram for location of trimmers.		

CONVERTER R-F ADJUSTMENTS

NOTE - Signal generator remains connected the same as for oscillator adjustments. Use audio output meter for proper r-f alignment. The r-f alignment of the converter is performed only with the frequency range selector in positions 1 and 3.

With the frequency range selector in position 1-

1. Set the receiver at 48 MC on the FM dial scale.
2. Set the signal generator at 90 MC (Signal should be heard.
3. Peak secondary trimmer C-2 for maximum output on output meter.

With the converter frequency range selector at position 3-

1. Set the receiver at 42 MC on FM dial scale.
2. Set signal generator at 102 MC. (Signal should be heard.)
3. Peak aerial trimmer C-1 for maximum output on output meter.

NOTE - It may be necessary to readjust the converter on position 1 to insure maximum output.

A switch is provided on the converter for selecting three frequency ranges (84mc to 93mc, 93mc to 102mc, and 102mc to 111mc) and also for turning off the power to the converter and restoring the receiver for normal operation.

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HOW TO INSTALL THE CONVERTER

The converter should be mounted inside of the receiver in such a way that the range selector switch will be easily accessible.

1. Determine suitable location for the converter inside of receiver cabinet on either side of receiver chassis.
2. Remove knob from converter shaft.
3. Place converter in a position such that the switch shaft will rest against inside front of cabinet in such a way as will permit the short side of mounting bracket to rest against inside surface of cabinet.
4. Mark spot on inside front of cabinet where hole is to be drilled and then remove the converter.
5. Drill small pilot hole and enlarge it from the front of the cabinet using a 3/8 inch carpenters drill.
6. Put extension shaft on converter switch shaft and tighten coupling.
7. Replace converter so that shaft extends out through front of cabinet and converter is located where desired.
8. Mark shaft, so when cut, it will extend at least 3/8 inches from front of cabinet and then remove converter from cabinet.
9. Saw off shaft where marked and file off any rough edges on end of shaft.
10. Replace converter in cabinet at desired position and fasten short end of bracket to mounting surface by means of the two wood screws supplied with kit.
11. Fasten frequency conversion chart label to front of receiver cabinet, put knob on shaft and fasten securely by tightening set screw.
12. Remove audio output tube from the receiver. (This will be either a 6V6, 6F6, 6K6 or 6L6 type tube.) In cases where there are two of the type, remove only one.
13. Insert the adapter plug into the audio output tube socket and insert the audio output tube, previously removed, into the adapter socket.
14. Disconnect the aerial from the receiver and connect it to the converter aerial lead. (green wire)
15. Connect inner conductor of shielded lead from the converter output to the aerial terminal on the receiver.
16. Connect shield of converter output lead from the converter to the ground terminal on the receiver.
17. Connect black lead of converter to a ground. (Water or radiator pipe or an external ground)

HOW TO USE THE CONVERTER

Consult frequency label chart for frequency conversions.

Turn converter frequency range switch to position 2. The range of reception on the receiver will now be 84 to 93 MC (megacycles).

Turn converter frequency range switch to position 3. The range of reception will now be 93 to 102 MC. (megacycles). Or

Turn converter frequency range switch to position 4. The range of reception on the receiver will now be 102 to 111 MC. (megacycles).

Turn converter frequency range switch to position 1 to restore receiver for normal operation.

A universal bracket is included for mounting the converter. Power is supplied to the converter tube through an adapter cable from the receiver with which the converter is to be used.

The converter will in no way interfere with the normal operation of the receiver. All tuning is accomplished by the main tuning dial on the receiver.

MODEL Skyrider 5-10
S21

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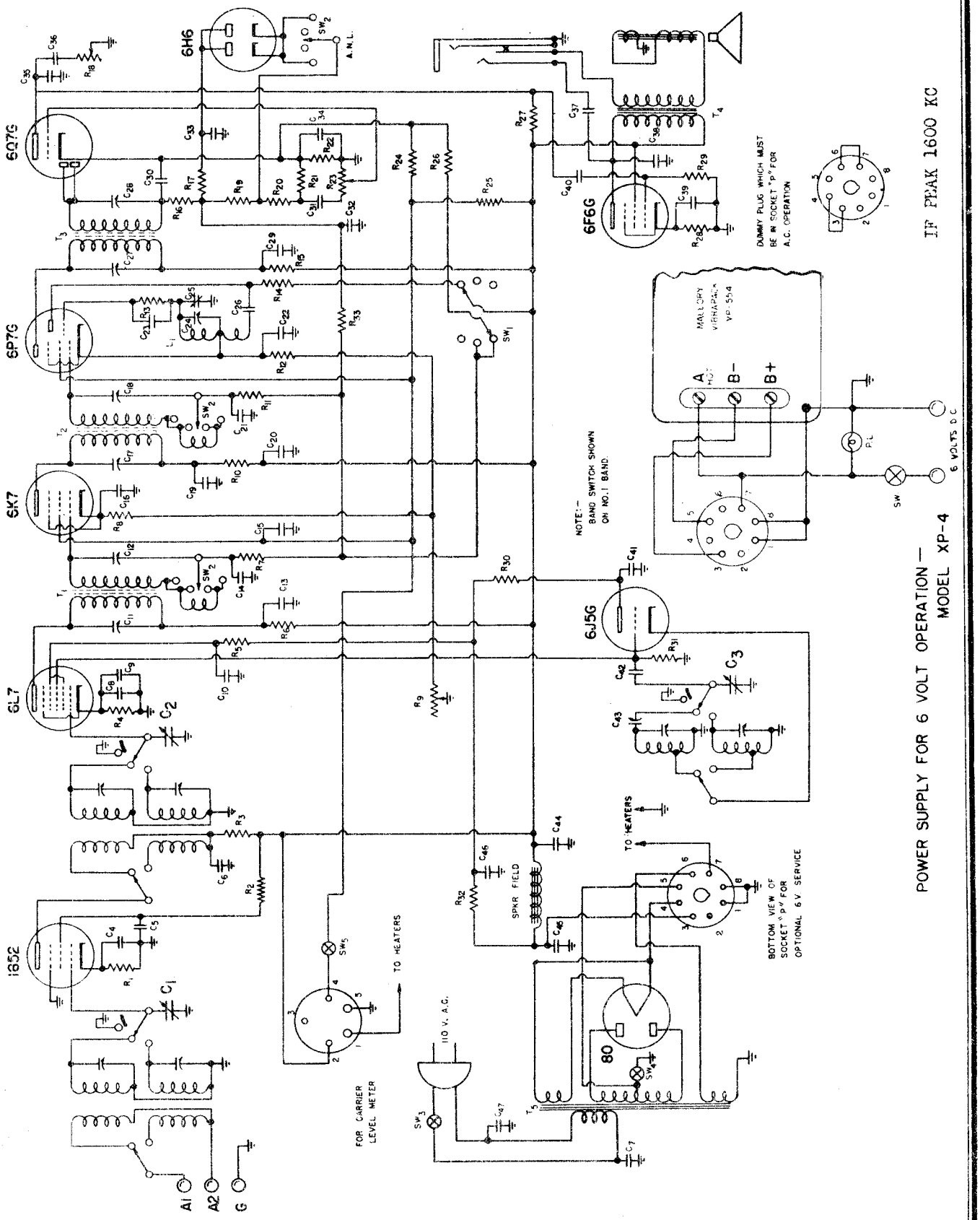

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For Parts List, see P.15-58

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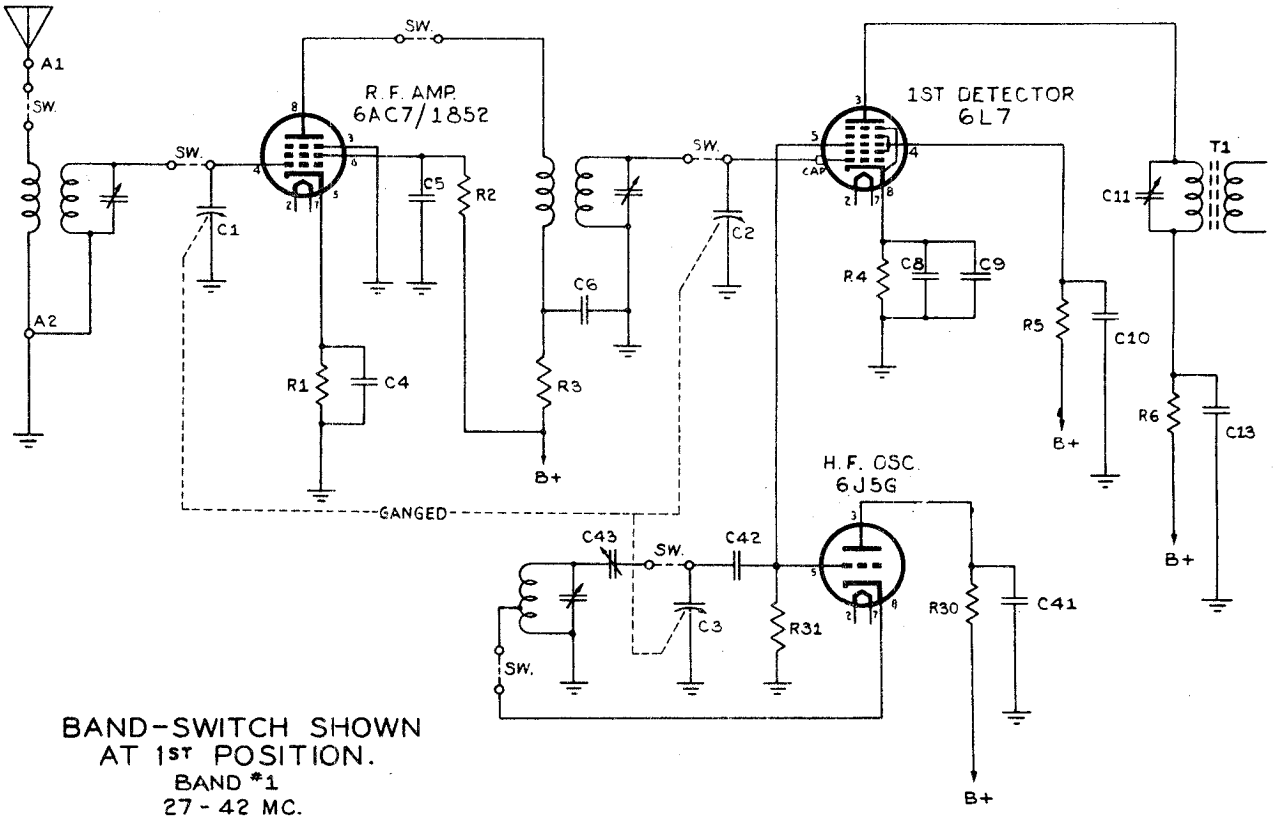
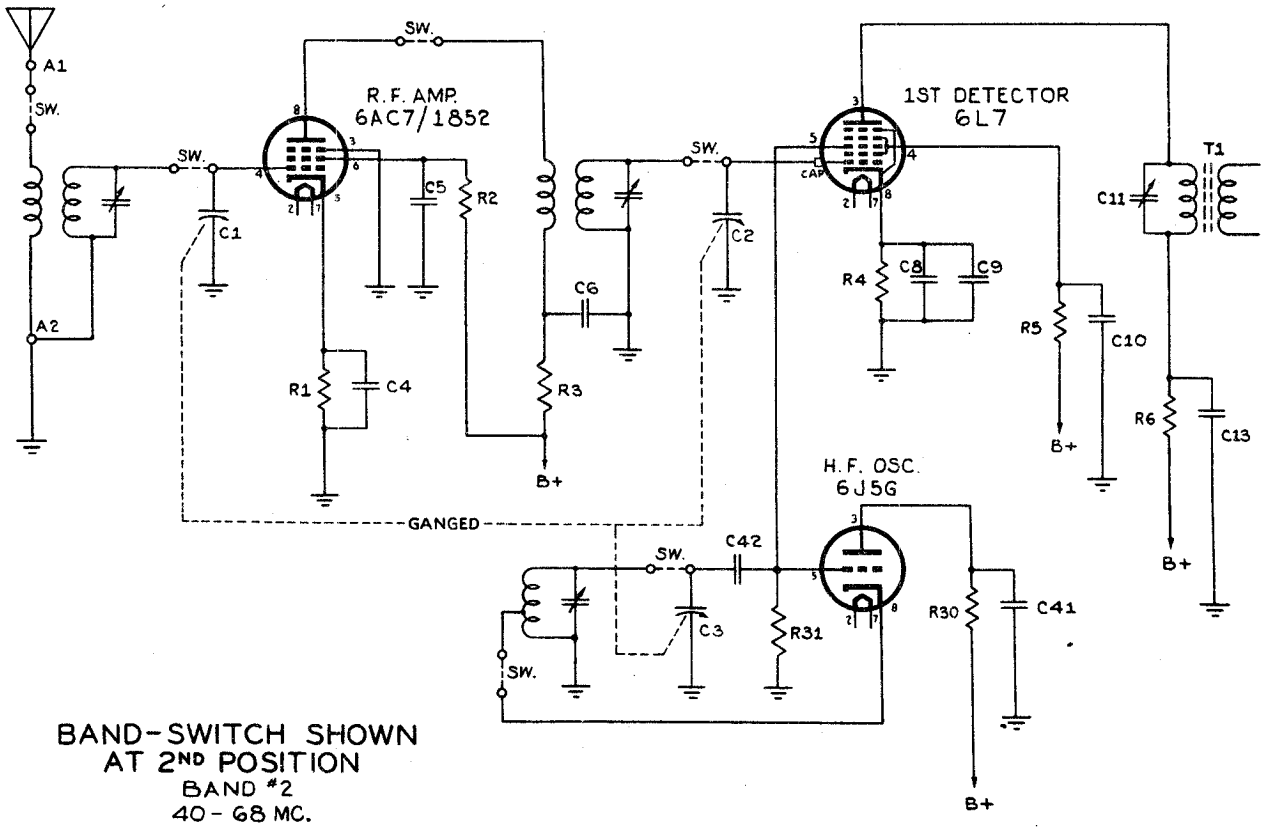
MODEL Skyrider 5-10
S21



BAND-SWITCH SHOWN
AT 1ST POSITION.
BAND #1
27 - 42 MC.



BAND-SWITCH SHOWN
AT 2ND POSITION
BAND #2
40 - 68 MC.

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ALIGNMENT PROCEDURE FOR SKYRIDER "5-10" Model S21

Intermediate Frequency Alignment

Have the controls set as follows:

Broad-sharp switch to sharp position.
A.V.C. - B.F.O. switch in "OFF" position.
Set R. F. and A. F. gain controls at maximum.
Set band switch on Band #1.
Adjust main dial to minimum capacity or #24 on the Vernier scale.
Remove the 6L7 grid cap - connect the signal generator to this tube, through an .01 mfd condenser.
Now set the signal generator for 1600 KC output.
Adjust trimmers on T1, T2, T3 transformer for exact resonance which will be indicated by maximum output.

For adjustment of the Beat Frequency Oscillator turn the knob on the "pitch control" unit until the dot is straight up. Remove modulation from the 1600 KC signal being fed into the I. F. amplifier and then adjust T4 for zero beat.

R. F. Alignment

Replace the 0.1 mfd condenser in series with the generator to the receiver with a 400 ohm resistor. Connect the generator to the A1 terminal on the antenna terminal strip to be found on the rear apron of the chassis. Leave the jumper connected between A2 and G. There is only one pad adjustment on the "5-10" receiver and that is for the low frequency end of Band #1. This pad is adjusted from the top of the chassis.

Band #1

Place the band switch on Band #1. Set the generator and tuning dial to 28 mc and adjust pad C43 for maximum signal. Reset tuning dial and generator to 40 mc and set oscillator trimmer CA. Now recheck pad C43 and trimmer CA until no change in frequency calibration is noted. When this is accomplished adjust trimmers CB, CC for maximum gain. When making these latter adjustments it is advisable to "rock" the tuning control slightly until the point of exact resonance and maximum output is obtained.

Band #2

Set signal generator and tuning dial to 60 mc and adjust oscillator trimmer CD to signal. Then adjust CE, CF for maximum gain, slightly rocking the tuning gang while making the adjustment.

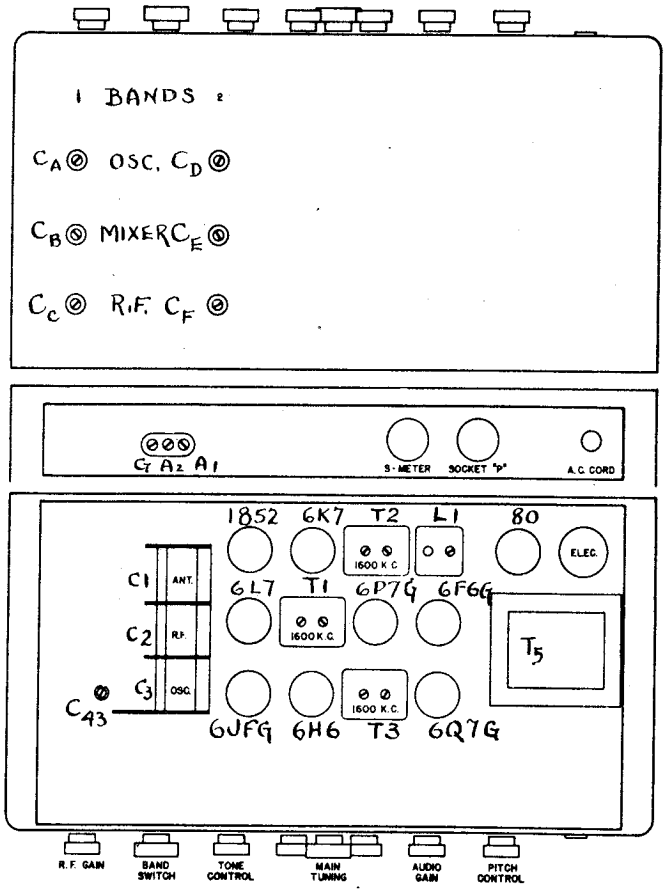
There is no pad on Band #2.

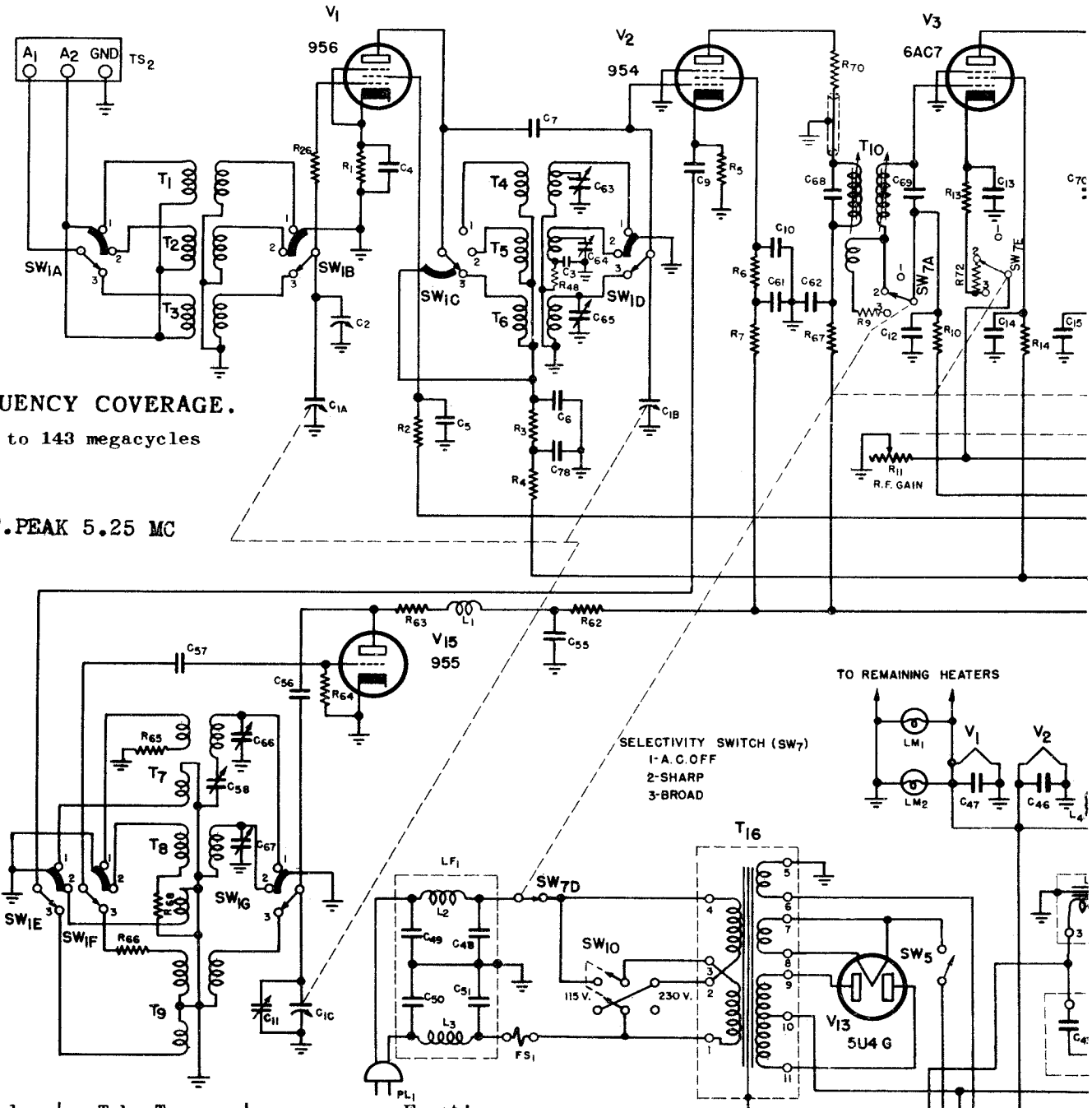
NOTE: Should the noise picked up by the receiver interfere seriously with the alignment, increase the signal generator output and reduce the R. F. gain. The noise limiter may also be left on during alignment.

The SKYRIDER "5-10" draws 74 watts at 117 volts 60 cycle A.C.

Band 1 - 27 MC to 42 MC
Band 2 - 40 MC to 68 MC

1852 - R. F. Amplifier
6L7 - First Detector
6J5 - High Frequency Oscillator
6K7 - 1st I. F. Amplifier
6P7G - 2nd I. F. Amplifier, B.F.O.
6Q7G - 2nd Detector, A.V.C., 1st Stage of Audio
6F6G - Audio Output tube
80 - Rectifier





Symbol	Tube Type	Function
V-1	956	R-F amplifier
V-2	954	Mixer
V-3	6AC7	1st i-f amplifier
V-4	6AB7	2nd i-f amplifier
V-5	6SK7	3rd i-f amplifier
V-6	6H6	A-M detector and noise limiter
V-7	6AC7	F-M limiter
V-8	6H6	F-M discriminator
V-9	6SL7GT	Audio voltage phase inverter
V-10	OD3/VR-150	Voltage regulator
V-11	6V6GT/G	Audio power amplifier
V-12	6V6GT/G	Audio power amplifier
V-13	5U4G	Rectifier
V-14	6J5	Beat-frequency oscillator
V-15	955	High-frequency oscillator

Figu

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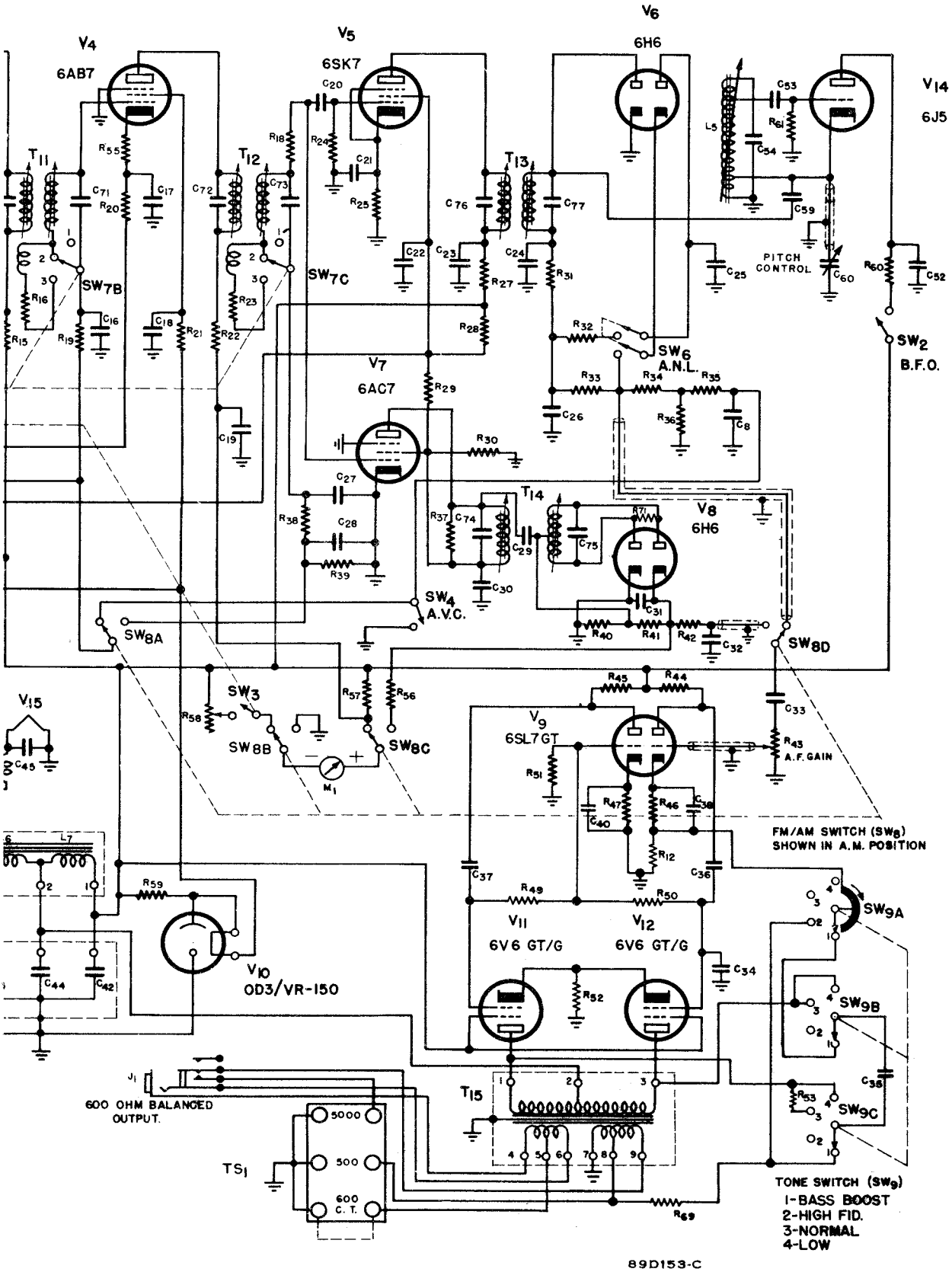
MODEL S-36A



re 7-7. Radio Receiver Model S-36A, schematic wiring diagram.

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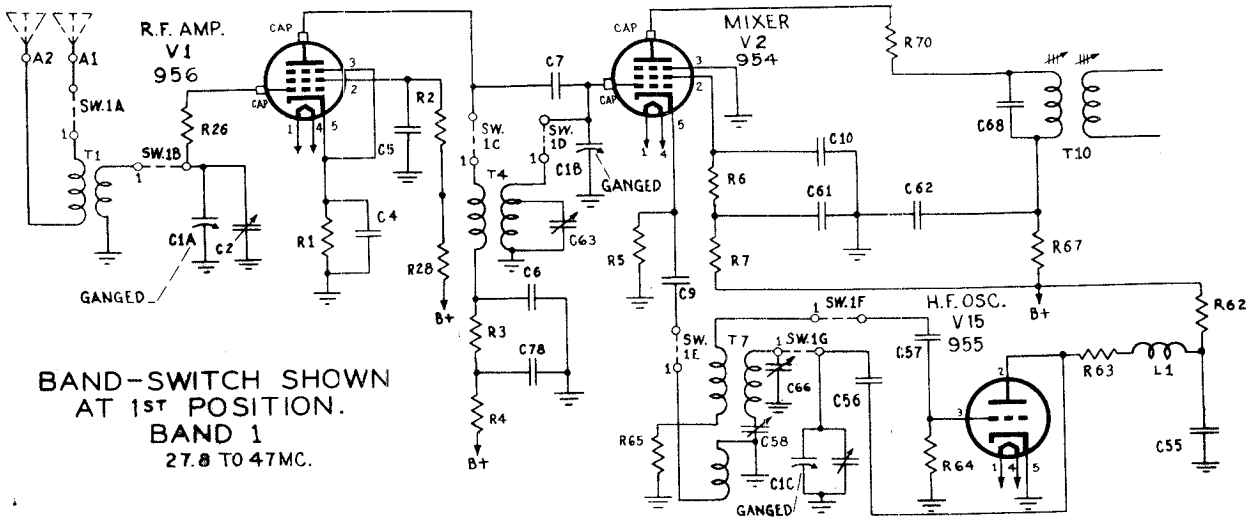
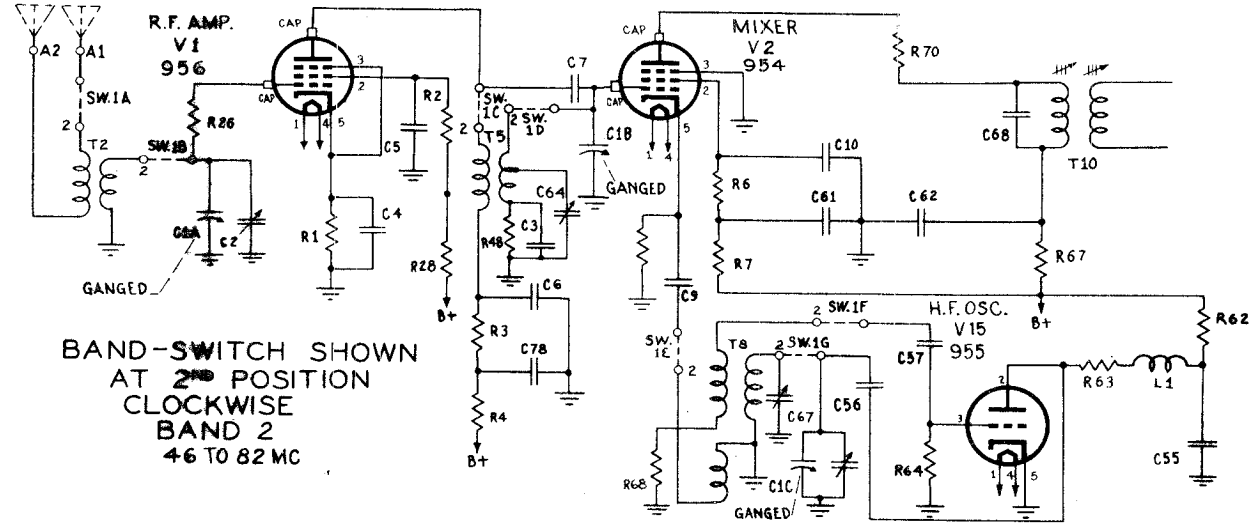
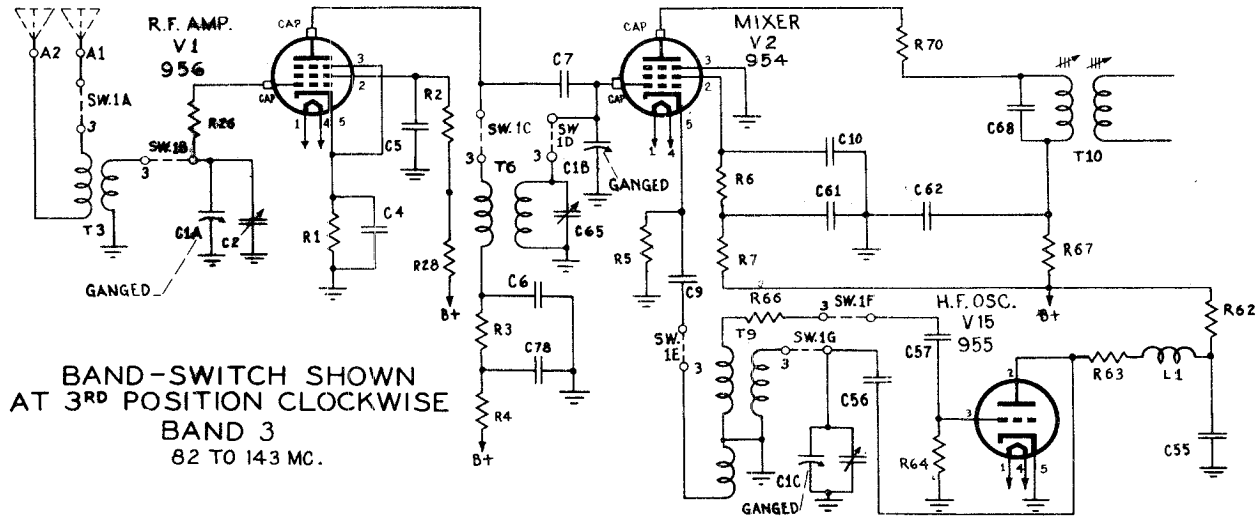
MODEL S-36A



BAND-SWITCH SHOWN AT 1ST POSITION.
BAND 1
27.8 TO 47MC.



BAND-SWITCH SHOWN AT 2ND POSITION CLOCKWISE
BAND 2
46 TO 82 MC



BAND-SWITCH SHOWN AT 3RD POSITION CLOCKWISE
BAND 3
82 TO 143 MC.

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POWER REQUIREMENTS.

The receiver is designed to operate from either a 115-volt or 230-volt 50/60 cycle, single phase, a-c source or from a 6-volt storage battery and 270-volt "B" battery. The "B" batteries may be replaced by a suitable vibrator type power supply if it meets the following current requirements.

A-C Operation	* D-C Operation
Line voltage . . .115 volts, 230 volts	Filament voltage . . . . . 6.3 volts
Line current . . .1.0 amp., 0.5 amp.	Filament current . . . . . 4.5 amps.
Power consumption. . . . . 115 watts	"B" voltage. . . . . 270 volts
	"B" current . . . . . 145 ma.

* The 6-volt battery drain using a vibrator type supply for "B" voltage will run approximately 20 to 22 amperes.

Audio Output Connections.-A headset or loudspeaker may be used with the receiver.

(1) The headset jack marked PHONES, located on the front panel, provides a 600-ohm balanced output for headset reception. The center tap of the 600-ohm headset winding is grounded externally at the speaker output terminal board TS-1 by a jumper wire across the terminals marked 600 C.T. If it is desirable to operate with one side of the headset line grounded, disconnect the jumper on terminal board TS-1.

(2) The two sets of speaker terminals located on the rear chassis apron provide output impedances of 500 and 5000 ohms for loudspeaker reception. One side of each of the 500 and 5000-ohm output connections is grounded. This should be kept in mind if this receiver is to work in conjunction with other equipment. A speaker capable of handling 5 watts of audio power should be used with this equipment.

Remote Operation Facilities. - The receiver may be disabled remotely by disconnecting the jumper wire between pins #3 and #4 in the shorting plug PL-2, which is normally plugged into socket SO-1 during a-c operation, and connecting a remote switch or relay across these pins. The stand-by switch is connected in the "B" lead, hence, the remote stand-by switch must be insulated for approximately 270 volts to protect the operator. When using the remote control disabling switch, the SEND/REC switch on the receiver must be set at SEND.

> CAUTION - The external stand-by switch and its connections will be approximately 270 volts above ground hence must be well insulated throughout.

PREPARATION FOR USE.

A-C Operation. - The receiver may be operated from either a 115-volt or 230-volt, 50/60 cycle, single phase, a-c source of power. To change over from one line voltage to the other, it is merely necessary to throw the line voltage switch (SW-10) located on the top of the chassis near the power transformer. See Fig. 7-1. for location of the line voltage switch.

> CAUTION - Check the line voltage and position of the line voltage switch before connecting the receiver to a source of power. A receiver set for 230-volt operation will not be damaged when connected to a 115-volt line, but a receiver set for 115-volt operation will, in most cases, be damaged when plugged into a 230-volt outlet. When in doubt, set the line voltage switch for 230-volt operation. If the dial lamps light up dimly, indicating a 115-volt line voltage, switch over to the 115-volt position.

D-C Operation. - The receiver may be operated from a 6-volt d-c source, generally a storage battery, and a 270-volt d-c supply in the form of dry batteries or vibrator type power pack. Consult the chart on power requirements for d-c operation in Section I. and provide battery facilities capable of supplying these demands. The receiver is connected to the d-c supply as follows:

(1) Remove the octal "jumper plug" (PL-2) used for a-c operation from socket SO-1. Use No. 18 (AWG) wire leads for the 270-volt "B" supply connections to pins #3 and #5 and No. 12 (AWG) wire leads for the 6-volt "A" battery connections to pins #1, #8 and #7.

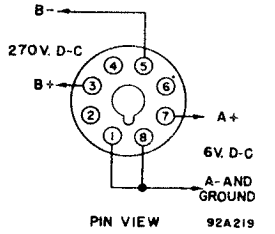

Fig. 2-1. Radio Receiver Model S-36A, wiring diagram for d-c power plug.

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R.F. GAIN Control. - The radio frequency gain control regulates the sensitivity of the receiver. Turning the control to the right increases the sensitivity of the receiver. Ganged to this control is the "S" meter switch which connects the tuning meter into the circuit when the control is advanced all the way to the right.

SELECTIVITY Switch.-The selectivity switch serves a dual purpose. In position #1 it turns the receiver off when operating from an a-c source of power. (When operating from a d-c supply the power switch is part of the external supply, hence, the SELECTIVITY switch does not function in position #1). In positions #2 and #3 the selectivity switch controls the bandwidth of the i-f amplifier thereby affecting the selectivity of the receiver. In general, the switch is set at SHARP for amplitude modulated signals and at BROAD for frequency modulated signals.

"S" Meter or Tuning Meter.- The tuning meter serves two functions in the receiver depending on the type of reception as follows:

(1) A.M. Reception. - When the receiver is adjusted to receive amplitude modulated signals, the tuning meter indicates the relative carrier strength of the received signal. To put the meter in operation, turn the R.F. GAIN control to the right until the switch connected to its shaft clicks, and set the A.V.C. switch at ON.

(2) F.M. Reception. - When the receiver is adjusted to receive frequency modulated signals, the tuning meter is used to indicate resonance with the station carrier. As the receiver is tuned through the f-m carrier the indicator will deflect to one side of zero, return to zero and deflect an equal distance to the opposite side of zero, and finally return to zero as the carrier is completely passed. The zero center position in the middle of the swing represents the correct setting of the receiver tuning dial and indicates resonance with the station carrier.

2. OPERATION.

Listed below are the receiver controls and their settings for the three types of reception provided by this receiver, namely, amplitude and frequency modulated telephone and c-w code reception.

a. A.M. (Amplitude Modulation) Telephone Reception - To receive amplitude modulated telephone signals set the front panel controls as follows:

SELECTIVITY switch	-	Set at A.C. OFF when the receiver is not in use. Set at SHARP for reception of amplitude modulated phone signals.
SEND/REC. switch	-	Set at REC. (Set at SEND to disable receiver for short stand-by periods.)
BAND SWITCH	-	Set at range number corresponding to band covering desired frequency.
A.M./F.M. switch	-	Set at A.M.
A.V.C.	-	Set at ON.
R.F. GAIN control	-	Turn to the right until tuning meter switch ganged to the control snaps on.
B.F.O. switch	-	Set at OFF.
PITCH CONTROL	-	Not used.
TUNING wheel	-	Set calibrated dial to frequency of desired signal, adjust for maximum tuning meter deflection.
ANTENNA trimmer	-	Adjust for maximum tuning meter deflection.
A.F. GAIN control	-	Adjust for desired volume at headset or loudspeaker.
TONE control	-	Set to please the listener. Generally set at HIGH FID. or BASS BOOST when signal to noise ratio is high or at NORMAL or LOW when signal to noise ratio is low.
A.N.L. switch	-	Normally set at OFF except when background noise is excessive.

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MODEL S-36-A

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b. **F.M. (Frequency Modulation) Telephone Reception.** - To receive frequency modulated telephone signals set the front panel controls as follows:

SELECTIVITY switch	-	Set at A.C. OFF when the receiver is not in use. Set at BROAD for reception of frequency modulated phone signals.
SEND/REC. switch	-	Set at REC. (Set at SEND to disable receiver for short stand-by periods.)
BAND SWITCH	-	Set at range number corresponding to band covering desired frequency.
A.M./F.M. switch	-	Set at F.M.
R.F. GAIN control	-	Turn all the way to the right. (The switch ganged to this control does not operate during f-m reception).
A.V.C. switch	-	Set at OFF.
B.F.O. switch	-	Set at OFF.
PITCH CONTROL	-	Not used.
A.N.L. switch	-	Set at OFF
TUNING wheel	-	Set calibrated dial to frequency of desired signal, adjust for "0" position of tuning meter marked for F-M tuning.
ANTENNA trimmer	-	Adjust for minimum background noise (Control will only be effective on very weak signals.)
A.F. GAIN control	-	Adjust for desired volume at headset or loudspeaker.
TONE control	-	Set at BASS BOOST or HIGH FID.

c. **C-W Code Reception.** - To receive continuous wave (c-w) code signals set the front panel controls as follows:

SELECTIVITY switch	-	Set at A.C. OFF when the receiver is not in use. Set at SHARP for reception of c-w code signals.
SEND/REC. switch	-	Set at REC. (Set at SEND to disable receiver for short stand-by periods.)
BAND SWITCH	-	Set at range number corresponding to band covering desired frequency.
A.M./F.M. switch	-	Set at A.M.
A.V.C. switch	-	Set at OFF.
B.F.O. switch	-	Set at ON.
PITCH CONTROL	-	Adjust to produce a 500 to 1000 cycle code signal.
TUNING wheel	-	Set calibrated dial to frequency of desired signal. Tune for maximum signal level at headset or loudspeaker.
R.F. GAIN control	-	Turn up as high as the signal strength of the code signal will allow. Too much gain will result in distortion of the signal.
ANTENNA trimmer	-	Adjust for maximum signal level at the headset or loudspeaker.
TONE control	-	Set at LOW or NORMAL.
A.N.L. switch	-	Set at OFF.
A.F. GAIN control	-	Adjust for desired volume at headset or speaker.

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FUNCTIONING OF PARTS

1. GENERAL.

Figure 4-1. shows, in a very simple block form, the plan of the circuit of the Model S-36A receiver. Note that the circuit is that of the conventional superheterodyne receiver up to the second i-f amplifier stage. The output of the 2nd i-f amplifier is fed to two channels, namely, the F-M signal channel and the A-M signal channel. The F-M channel consists of the f-m limiter and discriminator and the A-M channel consists of an additional i-f amplifier stage and second detector stage. The demodulated signal from both channels then feeds the same audio amplifier, being selected by the A.M./F.M. switch.

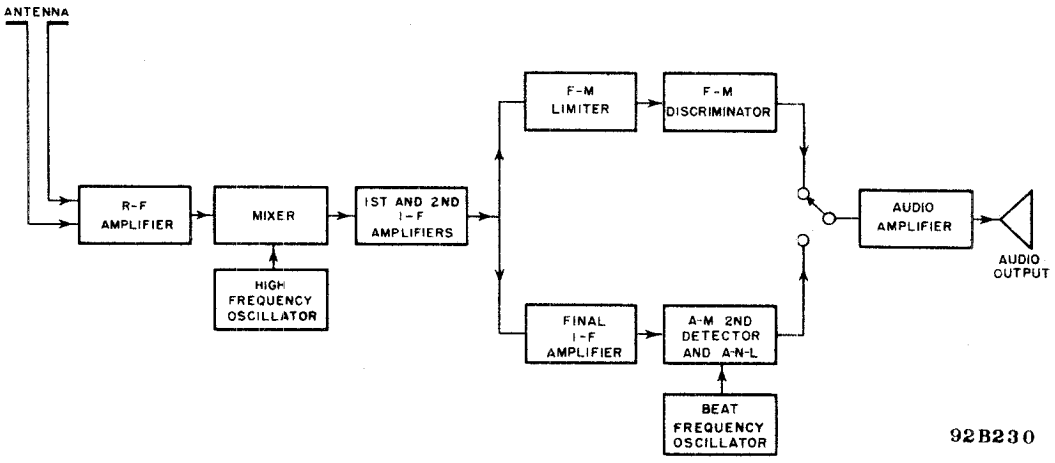

Fig. 4-1. Radio Receiver Model S-36A, block diagram.

2. DETAILED FUNCTIONING BY STAGES. (Refer to Fig. 7-7.)

Since the circuit functions of bands 1, 2 and 3 are essentially identical, this discussion will describe the circuit with BAND SWITCH (SW_{1A} to SW_{1G}) set at band 3 as shown in the schematic diagram.

a. R-F Amplifier. - The r-f amplifier stage employs a type 956 acorn type pentode tube in a conventional class A amplifier circuit. Signals present at the antenna are fed to the primary of transformer T-3 through terminals A_1 and A_2 of the antenna terminal strip TS-2. The secondary is tuned by the ganged tuning capacitor section C-1A and trimmer C-2. Trimmer capacitor C-2 is controlled from the front panel by the control marked ANTENNA to provide accurate alignment of the r-f stage with varying antenna load impedances. R-F signals selected by the parallel resonant circuit are applied to the grid of tube V-1 and appear in greater amplitude across the primary of transformer T-6. Parasitic resistor R-26 prevents unwanted oscillations in this stage and tends to stabilize the amplifier. Resistor R-1 by-passed by capacitor C-4 provides self-bias for the stage. Resistor R-2 and capacitor C-5 act as decoupling network for the screen of tube V-1 and resistor R-3 and R-4 and capacitors C-6 and C-78 act as decoupling networks for the plate circuit. The signal across the primary of transformer T-6 is coupled to the grid of tube V-2 inductively by transformer T-6 and capacitively by capacitor C-7. Capacitor C-7 provides a small amount of coupling to improve the response at the high frequency end of the band, thus equalizing the r-f signal amplitude over the tunable frequency range. The signal developed at the grid of tube V-2 then feeds the mixer stage of the receiver.

b. Mixer. - The mixer stage employs a type 954 acorn type pentode in a cathode coupled mixer circuit. The secondary of transformer T-6 is tuned by section C-1B of the ganged tuning capacitor and trimmer C-65. R-F signals selected by the parallel resonant circuit are applied to the grid of the mixer tube, V-2. A signal from the local oscillator 5.25 mc higher in frequency than the received signal on band #1 and 5.25 mc. lower in frequency than the received signal on bands #2 and #3 is fed to the mixer tube through the cathode and provides the difference frequency of 5.25 mc for the i-f amplifier stages.

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c. Oscillator. - The oscillator circuit consists of a type 955 acorn type triode in a tuned-plate untuned grid type of oscillator circuit. The frequency of oscillation is determined by a resonant circuit consisting of the secondary of transformer T-9 and section C-1C of the main tuning capacitor connected in parallel. Capacitor C-11 is used to trim transformer T-9 (Band #3) only, although it remains in the circuit on bands #1 and #2. The r-f energy is fed from the plate of tube V-15 to the tuned circuit by the d-c blocking capacitor C-56. The decoupling network in the plate circuit of the oscillator tube consists of R-63, L-1, C-55 and R-62. Resistor R-66 (in band #3 only) and capacitor C-57 (in all bands) in series with the feed-back winding of transformer T-9 provide grid voltage across resistor R-64 for the oscillator tube. The oscillator voltage is supplied for the mixer stage by a third winding on transformer T-9 which is fed to the mixer tube (V-2) through capacitor C-9.

d. First and 2nd I-F Amplifier. - The 1st and 2nd i-f amplifier stages employ type 6AC7 and 6AB7 pentodes respectively. The i-f amplifier coupling transformers T-10, T-11, and T-12 for these two stages are tuned to 5.25 mc. by adjusting the powdered iron core slugs in both primary and secondary windings. The gain of the 1st and 2nd i-f amplifier stages is varied by the R.F. GAIN control (R-11), connected in series with the cathodes of both tubes, to provide sensitivity control for the receiver instead of the usual practice of varying the gain of the r-f amplifier stages. This method of control permits the r-f amplifier stages to operate at maximum gain, thereby providing a high signal to noise ratio at all sensitivity settings. The a-v-c grid voltage is applied to this section of the receiver through the decoupling networks C-12, R-10, C-16, and R-19. The a-v-c voltage is supplied by the 2nd detector tube (V-6) during a-m reception and a small amount of voltage is also supplied for a similar purpose, from the limiter tube (V-7) during f-m reception. Since the 1st and 2nd i-f amplifier stages are used for both a-m and f-m reception, the band width of the i-f amplifier channel is varied to provide a relatively sharp frequency response for a-m reception (SELECTIVITY switch set at SHARP) and a relatively broad frequency response for f-m reception. (SELECTIVITY switch set at BROAD). The selectivity of the i-f amplifier is controlled by switching in a third winding which varies the coupling between the primary and secondary windings. In SHARP position, the coupling winding is disconnected and only the coupling between primary and secondary windings determines the band width of the i-f amplifier. In BROAD position, the coupling winding is introduced to increase the coefficient of coupling between primary and secondary winding. The increase in coupling broadens the i-f amplifier frequency response to accept f-m signals. The signal voltage supplied by the 2nd i-f amplifier is fed to the limiter and discriminator for f-m reception and to the 3rd i-f amplifier stage and 2nd detector for a-m reception.

e. Final I-F Amplifier. - The last i-f amplifier stage, used for a-m reception, employs a type 6SK7 pentode connected in a conventional class A amplifier circuit. The stage is coupled by transformers T-12 and T-13 which are tuned by adjustable powdered iron core slugs. Resistor R-25 by-passed by capacitor C-21 provides self-bias for the stage. The gain of this stage is not varied as was the case for the 1st and 2nd i-f amplifier stages. The amplified signal voltage developed across the secondary of transformer T-13 is then fed to the 2nd detector for demodulation of a-m signals.

f. A-M 2nd Detector and A-N-L. - Both the second detector and automatic noise limiter stages employ a single type 6H6 duo-diode. One diode section of tube V-6 serves as detector for amplitude modulated signals by rectifying the modulated carrier. The r-f filter for this type of detection consists of resistor R-31 and capacitors C-24 and C-26 connected in a pi-section. Automatic volume control voltage and audio frequency voltage is obtained from the load and voltage divider resistors R-33, R-34, and R-36. Resistor R-35 and capacitor C-8 serve as a-v-c decoupling. The remaining diode section of tube V-6 serves as automatic noise limiter as follows: Capacitor C-25 becomes charged by the rectified carrier voltage and the time constant of this capacitor and the filter network associated with it is such that the audio frequency voltage variations do not alter this charge. During a severe noise pulse, however, the cathode of the diode plate connected to capacitor C-25 becomes more negatively charged than the charge held by capacitor C-25, hence, current flows shorting the audio voltage to ground through capacitor C-25 until the cathode voltage of the a-n-l diode again reaches a less negative potential than its plate and capacitor C-25 acquires its normal charge again. By shorting the audio voltage to ground during a noise pulse, the a-n-l circuit prevents the objectional noise pulses from reaching the audio amplifier stages.

g. Beat Frequency Oscillator. - The beat frequency oscillator employs a type 6J5 triode tube in a modified Hartley oscillator circuit. The oscillator frequency is adjusted by a moveable powdered iron core within the field of coil L-5. This iron core adjustment sets the oscillator's frequency at 5.25 mc. and is adjusted by a screw driver during alignment. The fine adjustment of the oscillator frequency re-

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quired to provide control of the beat note frequency is controlled by variable capacitor C-60 (PITCH CONTROL) which tunes a small portion of the total oscillator coil (L-5). The B.F.O. switch controls the use of the oscillator by breaking the plate voltage lead to the tube. The decoupling network R-60 and C-52 prevents the oscillator signal from reaching the other stages through the "B" voltage supply.

h. **F-M Limiter and Discriminator.** - The frequency modulation detector consists of a limiter stage and a discriminator stage. The 6AC7 limiter tube (V-7) is fed by the second i-f transformer secondary winding along with the third i-f amplifier tube V-5 for a-m reception. The limiter stage operates as a saturated amplifier in which the output voltage remains constant over a large range of input voltage levels, thus eliminating variations in the amplitude of the carrier signal to be demodulated by the discriminator. When operating as an f-m receiver, automatic volume control action is obtained by applying a part of the voltage developed across resistor R-39 in the grid return of the limiter tube (V-7), to the control grids of the 1st and 2nd i-f amplifier tubes (V-3 and V-4) through section SW-8A of the A.M./F.M. switch. The constant level signal voltage from the limiter tube (V-7) is fed to the type 6H6 discriminator tube (V-8) through the discriminator transformer (T-14) and coupling capacitor C-29. The discriminator circuit, consisting of transformer T-14, tube V-9 and load resistors R-40 and R-41, converts the frequency variations of the f-m signal into amplitude variations or the audio signal. The de-emphasis network, consisting of resistor R-42 and capacitor C-32, attentuates the high frequency end of the audio range since these frequencies are emphasized as the f-m transmitter. From the de-emphasis network the audio signal is fed to the A.F. GAIN control (R-43) in the same way as the audio signal from the amplitude modulation detector tube (V-6).

i. **Audio Amplifier.** - The audio amplifier stages consists of a class A phase inverter amplifier employing a type 6SL7GT twin-triode driving a pair of 6V6GT/G pentodes in push-pull class A. The audio signal from either the a-m detector or the f-m discriminator is fed to the grid of the first triode section of the phase inverter tube (V-9) through the A.F. GAIN control (R-43). The amplified audio signal voltage from the first triode section of tube V-9 is fed to the grid of power amplifier tube V-12 and to the grid of the second triode section of tube V-9 through the voltage divider network consisting of resistors R-50 and R-51 which also serve as grid return for the power amplifier tube (V-12). The audio signal voltage developed across the plate load resistor (R-45) of the second triode section of tube V-9, which is now 180 degrees out of phase, is then fed to the remaining power amplifier tube (V-11) grid. The output of the power amplifier tubes is coupled to the load through transformer T-15, the secondary of which provides output impedances of 500 ohms and 5000 ohms to ground and 600 ohms balanced to ground. The network consisting of R-69, R-53 and C-35 supplies inverse feedback in various amounts to provide tone control ranging from bass boost to high frequency cutoff. The TONE switch SW-9 selects the required network combination.

j. **Tuning Meter.** - The tuning meter serves two circuits in the receiver depending upon the type of signals being received. It is switched from one circuit to the other by the A.M./F.M. switch (SW-8 sections B and C).

(1) **A-M Reception.** - When metering the reception of a-m signals, the tuning meter measures the plate current of the 2nd i-f amplifier tube (V-4) which varies with the strength of the signal carrier. Resistor R-58 sets the zero (no signal) position of the tuning meter by controlling that part of the plate current of tube V-4 flowing through the meter. The intermediate frequency signal voltage then drives the plate current of tube V-4 to a lower value depending upon the signal strength. The screen grid voltage of tube V-4 is regulated by the voltage regulator tube (V-10) to provide an accurate control over the zero signal plate current so that the meter adjustment resistor (R-58) need not be continually re-set for variations of the a-c line voltage.

(2) **F-M Reception.** - When metering reception of f-m signals the tuning meter measures the unbalanced current in resistors R-40 and R-41 obtained when the receiver is tuned to one side of the f-m carrier. When the receiver is tuned to the exact center of the f-m carrier the meter rests at zero indicating that the currents in the discriminator load resistors are equal. Resistor R-56 functions to limit the maximum current in the meter circuit to a safe value.

k. **Power Supply.** - The receiver has provisions for operation from either an a-c or d-c source.

(1) **A-C Operation.** - The receiver's power supply provides for operation from 115 or 230-volt a-c mains. The a-c current is fed through the line filter which is a low pass pi-section network connected in each side of the line. The network consists

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of inductances L-2 and L-3 and capacitors C-48, C-49, C-50 and C-51. The line filter attenuates all the objectionable noise components coming into the receiver circuit through the a-c power source. The line voltage at which the receiver will operate is determined by the setting of the line voltage switch SW-10. This switch simply connects the two 115-volt primary windings of transformer T-16 in parallel for 115-volt operation or series for 230-volt operation. A type 5U4G (tube V-13) full wave rectifier is employed in a conventional full wave rectifier circuit. The high voltage from this rectifier is fed to the filter network through the "Shorting Plug" on the rear apron of the receiver chassis as is the filament current for the heaters of the tubes. The SEND/REC. switch is connected in series with the high voltage lead from the rectifier filament to the shorting plug socket to break the high voltage circuit to the receiver's filter sections, thereby, disabling the receiver but at the same time keeping the tube heaters hot, ready for instant use. The filter circuit consists of two low pass pi-section networks made up of inductances L-6 and L-7 and capacitors C-42, C-43, and C-44. In order to provide a constant "B" voltage for the oscillator, mixer, and screen grid of the 2nd i-f amplifier stages a voltage regulator tube type OD3/VR-150 is used. The voltage supplied to the screen of tube V-4 is regulated to provide accurate current control for the tuning meter connected in the plate circuit of this tube.

(2) **D-C Operation.** - External 6-volt storage battery and 270-volts of "B" batteries or storage battery and vibrator type supply provide for d-c operation. When operating from an external d-c supply the "Shorting Plug" on the rear apron of the receiver chassis is removed and a similar plug is wired to supply filament and plate current to the receiver circuits. The "B" voltage is fed to the input side of the filter sections used for a-c operation thereby insuring adequate filtering for vibrator type power supplies.

MAINTENANCE

CAUTION - Voltages at various points in this equipment are of sufficiently high potential to produce a severe shock. Locate the high-potential points on the VOLTAGE CHART before attempting to service circuits that are "hot". IT IS A GOOD RULE TO DISCONNECT THE POWER SOURCE BEFORE MAKING ADJUSTMENTS WHEN POSSIBLE. BE CAREFUL.

1. PREVENTIVE MAINTENANCE.

All components of the receiver should be given a thorough inspection at regular intervals. The time interval between inspections will be determined by the operating conditions of the individual installation. In general, keep the components clean and dry. Moisture, even in a completely tropicalized set may cause serious deterioration and produce general unsatisfactory operation. Dust and dirt materially effect both electrical and mechanical operation. Keep the various parts clean especially the tuning capacitors and associated gear drive. Dust should be blown out with dry air or brushed out carefully. Do not oil the gear teeth or the condenser wipers, as noisy reception will result from intermittant electrical contact at these points. Noisy reception may also be caused by dirty condenser wipers, faulty gain controls and switches, frayed cable connections, faulty tubes, etc. in the installation. Check accessible connections, switch contacts, etc. regularly, making sure that all are clean and tight and the tubes and cable connectors are held securely in their sockets.

2. REPLACING TUBES, LAMPS, and FUSES.

a. Replacing Tubes. - All tubes with exception of the three acorn types are accessible at the top of the chassis through the hinged cover of the cabinet. The three acorn type tubes are made accessible by removing the top cover of the r-f section which is held down by anchor clips. The acorn type tubes are inserted with the short end of the body in the socket. Acorn tubes are more fragile than the rest and must be handled accordingly. If the grid and plate clips on the connections to these tubes become loose replace or bend them to fit firmly. DO NOT ATTEMPT TO SOLDER DIRECTLY TO THE TUBE PIN as the heat generated by the soldering iron will crack the glass envelope. When replacing tubes, check the tube type carefully and replace with the correct tube type. Refer to the top view of the chassis to determine the location of the tubes and to the PARTS LIST for the type number and description of each.

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b. Replacing Lamps. The receiver employs two lamps with bayonet type sockets to illuminate the calibrated tuning dial and the vernier dial. The lamps are to be replaced with a 6/8-volt, 250 ma. (blue bead) G.E. #44 or equivwlent. The color code referred to is the color of the glass bead above the glass stem inside the envelope of the lamp.

3. PERIODIC ADJUSTMENTS.

a. Tuning Meter Adjustment. -

(1) The tuning meter zero setting control is located behind its front panel button type cover, marked METER ADJ. Remove the button with a knife or screw driver blade.

(2) Disconnect the antenna and connect a jumper across terminals A_1, A_2, and GND. on terminal board TS-2.

(3) Set the front panel controls for amplitude modulation reception as follows:

(a) Set A.M./F.M. switch at A.M.

(b) Set A.V.C. switch at ON.

(c) Turn R.F. GAIN control to right until the switch on the control clicks.

(d) Set A.F. GAIN control for minimum gain. (All the way to the left.)

(e) Set A.N.L. switch at OFF.

(f) Set B.F.O. switch at OFF.

(g) Set SEND/REC. switch at REC.

(h) Set SELECTIVITY switch at SHARP.

(4) With a screw driver set the METER ADJ. control for the zero reading on the S-meter scale of the tuning meter.

(5) Remove the antenna terminal jumper and replace antenna leads and meter adjustment cover button, the adjustment is completed.

b. Receiver Alignment. - The receiver has been carefully aligned at the factory and should not require realignment until the receiver requires new tubes in the r-f and i-f amplifier stages, or shows signs of loss of sensitivity, off frequency calibration or requires service work on one or more of its r-f and i-f amplifier stages. Alignment should not be attempted by inexperienced personnel as maximum performance is obtained only by careful and intelligent alignment.

(1) Aligning Tools. -

(a) Signal generator capable of providing a 400-cycle modulated signal at 5.25 mc. and 27 to 145 mc. range. Recommended generators are the Ferris Instrument Corp. Model 18D or 18FS and the Measurements Corp. Model 75.

(b) A 50-ohm non-inductive dummy antenna resistor.

(c) Non-metallic screw driver. A bakelite screw driver with a short metal blade is very good.

(d) Audio output meter capable of handling 10 watts of audio power for either 500 or 5000-ohm loads.

(2) I-F Amplifier Alignment. -

(a) Disconnect the grid lead of the type 954 mixer tube (V-2) and connect the "hot" lead of the signal generator to the grid of the mixer tube using a small clip or flexible piece of wire to make the connection. Connect the ground wire of the generator to the receiver chassis.

> CAUTION - Do not attempt to solder to the tube terminal as the heat of the soldering iron is certain to crack the glass envelope.

(b) Connect the output meter across the speaker terminals. Set the range of the output meter for its highest range to prevent overloading the meter accidentally.

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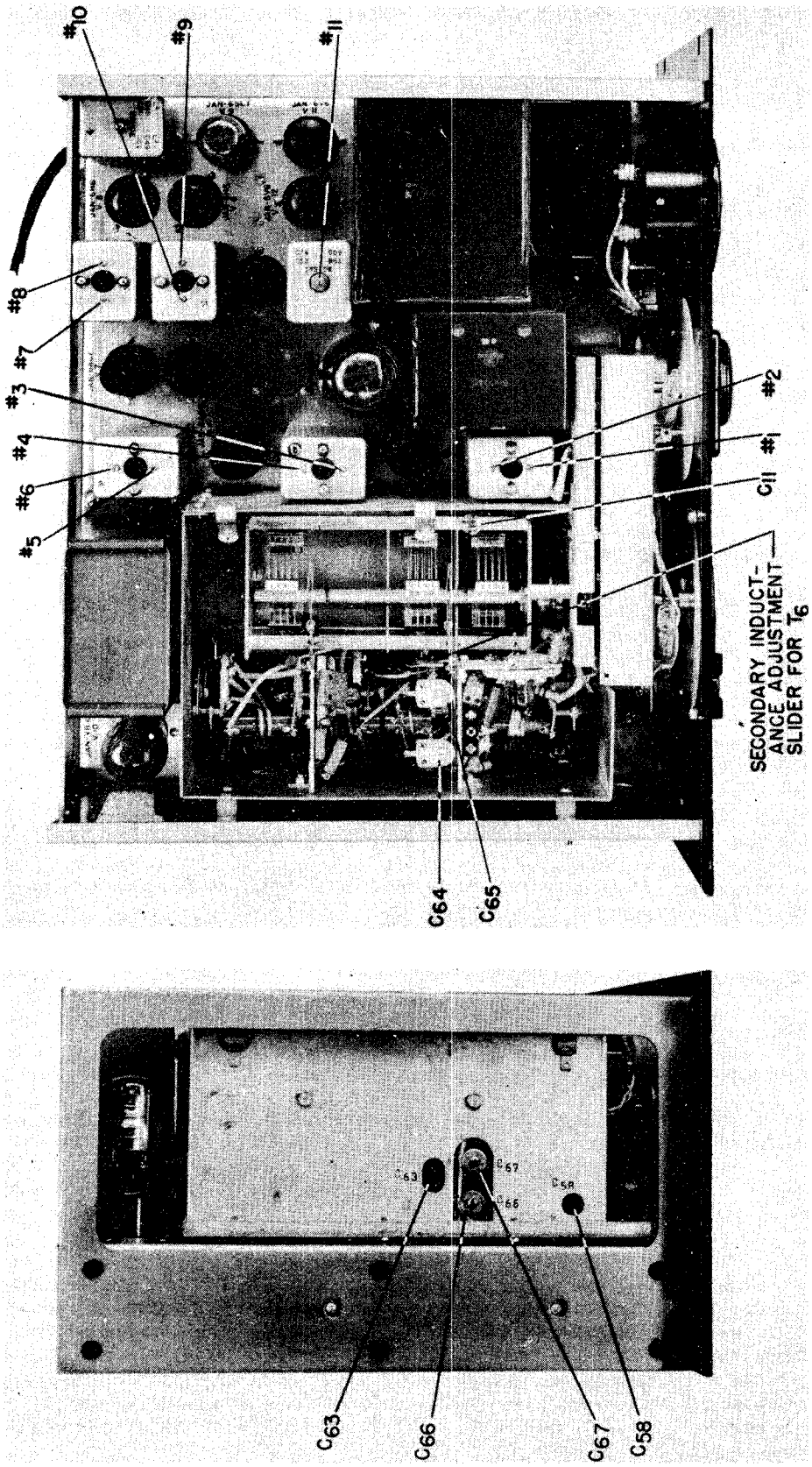

Figure 5-1. Radio Receiver Model S-36A, view showing alignment points.

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(c) Let the receiver warm up for approximately half an hour, then set the receiver controls as follows:

R.F. GAIN control at maximum gain.

A.F. GAIN control at maximum gain. Work in a shielded room if possible.

SELECTIVITY switch at SHARP.

A.M./F.M. switch at A.M.
BAND SWITCH at band #2.

A.V.C. switch at OFF.

SEND/REC. switch at REC.

A.N.L. switch at OFF.

B.F.O. switch at OFF.

TONE control at HIGH FID.

(d) Set the signal generator frequency at 5.25 mc. and turn on the 400-cycle modulation.

(d) Adjust transformers T-10, T-11, T-12 and T-13 for maximum output meter reading using just enough signal generator output to provide a good resonant swing on the output meter. The signal level at the generator should not be more than 70 microvolts for a 500 milliwatt audio output level. Repeat the alignment procedure until assured of accurate alignment. Refer to figure 5-1. for the location of i-f transformer adjustment screws #1 through #8 inclusive on i-f transformers T-10, T-11, T-12, and T-13.

(3) Discriminator Transformer Alignment. -

(a) Set the A.M./F.M. switch at F.M. and the SELECTIVITY switch at BROAD.

(b) Leave the signal generator set at 5.25 mc. with 400-cycle modulation.

(c) Adjust the secondary slug (#10) of the discriminator transformer (T-14) for zero signal level at the output meter. Note that this adjustment is critical, therefore turn the adjustment screw slowly. Use sufficient signal generator output to provide a good null indication.

(d) Detune the adjustment made in par. (c) slightly so that the output meter gives a readable indication.

(e) Adjust the primary slug adjustment (#9) of the discriminator transformer for maximum response.

(f) Retune the secondary (slug #10) of the discriminator transformer for the null point as in par. (c).

(g) Detune the signal generator to a frequency lower than the i-f frequency until the maximum output point is reached. Note the output meter reading and the frequency deviation from the i-f frequency (5.25 mc.).

(h) Repeat the procedure for the frequency above the i-f frequency. The frequency deviation and maximum output should be the same for good balance. If they are not, then tune the signal generator to the lower of the two peaks and adjust the primary slug adjustment (#9) until the output rises an amount equal to about half the difference of the two peaks previously noted.

(i) Retest for balance as above readjusting the primary slug adjustment until both maximum readings are alike when the signal generator is detuned approximately the same amount on either side of resonance (5.25 mc.). If a balance cannot be obtained, it is an indication that the discriminator transformer secondary slug adjustment (#10) has been misadjusted and will require a very slight correction in either direction. The direction of adjustment that will cause the off-tune peaks to assume the same values is the correct one. Care must be taken in adjusting the discriminator secondary control as even a very slight misadjustment will result in distortion of frequency modulated signals.

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(4) **B.F.O. Adjustment.** - Set up the receiver and signal generator as for i-f amplifier alignment and proceed as follows:

(a) Shut off the 400-cycle modulation of the signal generator.

(b) Set the PITCH CONTROL at "0" and set the B.F.O. switch at ON.

(c) Back off the A.F. GAIN control slightly and use just enough signal generator output to provide a clean beat note.

(d) Plug a headset into the PHONES jack.

(e) Adjust the slug screw (#11) of coil L-5 for zero beat.

(f) Check the adjustment by turning the PITCH CONTROL to the right and left of "0". A change in the pitch of the beat note should result. The frequency of the beat note will vary from zero at the "0" setting to a very high pitch at the #5 setting of the control.

(g) Disconnect the signal generator and reconnect the grid lead to the mixer tube, the alignment of the i-f amplifier stages is completed.

(5) **R-F Amplifier Alignment.** - The following sequence must be followed to properly align the r-f amplifier stages. Band 3 is aligned first since the adjustment of trimmer C-11 is made for band 3 alignment only and will slightly effect the alignment of bands 1 and 2 if band 3 is not aligned first.

(a) Connect the "hot" lead of the signal generator to terminal "A_1" of the antenna terminal board through a 50-ohm non-inductive resistor (carbon). Connect the ground lead of the generator to the receiver chassis. Leave the jumper connected between terminals "A_2" and "GND". Turn on the 400-cycle modulation.

(b) Let the receiver warm up for approximately half an hour, then set the receiver controls as follows:

R.F. GAIN control at maximum gain.

A.F. GAIN control at maximum gain.

SELECTIVITY switch at SHARP during alignment of band 1. and at BROAD during alignment of bands 2 and 3.

A.M./F.M. switch at A.M.

A.V.C. switch at OFF.

SEND/REC. switch at REC.

A.N.L. switch at OFF.

B.F.O. switch at OFF.

TONE control at HIGH FID.

NOTE For all alignment adjustments the signal generator output attentuator must be adjusted to provide a 500 milliwatt audio signal output at the speaker terminals of the receiver.

NOTE - During each of the following adjustments the ANTENNA control should be touched up to keep the antenna stage in alignment.

(c) Band 3. Alignment. - (BAND SWITCH at 3.)

1. Set the signal generator at 135 mc. and tune in its signal on the receiver. If the receiver's calibrated dial reads 135 mc. no adjustment of capacitor C-11 is necessary if not, adjust C-11 for maximum output with the receiver dial set at 135 mc.

2. Set the signal generator at 90 mc. and tune in its signal on the receiver. If the receiver dial reads 90 mc. no adjustment of the plate winding inductance of transformer T-9 is necessary - if not, loosen the setscrew at the frame of the main tuning condenser (C-1), holding the end of the plate coil, and adjust the inductance. Increase the inductance if the generator signal falls lower than the 90 mc. calibration point on the receiver dial and reduce the inductance if the signal

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falls above the 90 mc. calibration point. Tighten down the set screw each time before checking the adjustment.

NOTE - If the plate coil inductance was altered it will be necessary to repeat step 1. again. Several adjustments of capacitor C-11 in step 1. and the plate coil inductance in step 2. may be required in cases of where a new transformer (T-9) had to be installed.

3. Set the signal generator and receiver at 135 mc. and adjust trimmer capacitor C-65 for maximum output. Rock the tuning control back and forth slightly to determine the best adjustment.

4. Ordinarily no adjustment of the secondary winding inductance of transformers T-3 and T-6 is necessary at 90 mc., however, if the sensitivity of the receiver falls off at this end of the range or if new transformers have just been installed it will be necessary to adjust the secondary winding inductance for maximum response at 90 mc. Transformer T-6 is provided with a soldered slider adjustment at the gang condenser frame, however, the ground side of the secondary of transformer T-3 must be unsoldered to be adjusted. The value of inductance that provides maximum audio signal at the output meter is the correct adjustment.

NOTE - If the secondary inductance was altered it will be necessary to repeat step 3. again. Several adjustments of capacitor C-65 in step 3. and inductance in step 4. may be necessary depending upon the condition of the coils.

(d) **Band 2. Alignment. - (BAND SWITCH at 2.)**

1. Set the signal generator at 80 mc. and tune in its signal on the receiver. If the receiver's calibrated dial reads 80 mc. no adjustment of capacitor C-67 is necessary - if not, adjust capacitor C-67 for maximum output with the receiver dial set at 80 mc.

2. Set the signal generator at 50 mc. and tune in its signal on the receiver. If the receiver dial reads 50 mc. no adjustment of the plate winding inductance of transformer T-8 is necessary - if not, it will be necessary to loosen the winding from the form with lacquer thinner and shift the individual turns until the signal peaks with the receiver dial set at 50 mc. Repeat step 1. above and recheck step 2. again before cementing the coil in place with Amphenol 912 cement.

NOTE - The presence of lacquer thinner may effect the winding inductance, hence, it is well to allow a few minutes for the lacquer thinner to evaporate before making inductance adjustments.

3. Set the signal generator and receiver at 80 mc. and adjust trimmer capacitor C-64 for maximum output. Rock the tuning control back and forth slightly to determine the best adjustment.

4. Ordinarily no adjustment of the secondary winding inductance of transformers T-2 and T-5 is necessary at 50 mc., however, if the sensitivity of the receiver falls off at this end of the range or if new transformers have just been installed it will be necessary to adjust the secondary winding inductance for maximum response at 50 mc. To adjust the secondary inductance it will be necessary to use lacquer thinner as in step 2. to loosen and shift turns until the signal peaks with the receiver dial set at 50 mc. Repeat step 3. above and recheck step 4. again before cementing the coils in place with Amphenol 912 cement.

(e) **Band 1. Alignment. - (BAND SWITCH at 1.)**

1. Set the signal generator at 45 mc. and tune in its signal on the receiver. If the receiver's calibrated dial reads 45 mc. no adjustment of capacitor C-66 is necessary - if not, adjust capacitor C-66 for maximum response with the receiver dial set at 45 mc.

2. Set the signal ganerator at 30 mc. and tune in its signal on the receiver. If the receiver dial reads 30 mc. no adjustment of the padder capacitor C-58 is necessary - if not, adjust capacitor C-58 for maximum output with the receiver dial set at 30 mc.

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3. Set the signal generator and receiver at 45 mc. and adjust trimmer capacitor C-63 for maximum response. Rock the tuning control back and forth slightly to obtain the best adjustment.

4. Ordinarily no adjustment of the secondary winding inductance of transformers T-1 and T-4 is necessary at 30 mc., however, if the sensitivity of the receiver falls off at this end of the range or if new transformers have just been installed it will be necessary to adjust the secondary winding inductance for maximum response at 30 mc. To adjust the secondary inductance it will be necessary to use lacquer thinner as before to loosen and shift turns until the signal peaks with the receiver dial set at 30 mc. Repeat step 3. above and recheck step 4. again before cementing the coils in place with Amphenol 912 cement.

NOTE - After completing the above alignment procedure check the image frequency to determine whether the oscillator frequency is higher than the signal frequency on band 1. and lower than the signal frequency on bands 2 and 3. For example: Set the receiver dial at 100 mc., set the signal generator frequency at twice the i-f frequency lower than 100 mc. or 89.5 mc. and turn up the signal generator output to about 5000 times the normal alignment output. An image signal should be heard. If not, tune the signal generator to twice the i-f frequency higher than the signal frequency or 110.5 mc. and look for the image there. If the image shows up at 110.5 mc., the receiver's oscillator is operating above the signal frequency on this band and must be readjusted so that it falls below the signal frequency. Due to the construction of this receiver it is considered impossible to adjust the oscillator frequency so that it will fall on the wrong side of the signal frequency on any of the three bands, however, it is always well to check for the image after making any extensive alignment adjustments.

(f) When completely aligned the overall receiver sensitivity will usually run from 2 microvolts at 30 mc. to 10 microvolts at 130 mc. for 50 milliwatts audio output. If your receiver falls reasonably close to this sensitivity, consider your job finished.

4. LOCATING FAULTS WITH A VOLT-OHM METER.

a. Voltage Chart. - Refer to Fig. 5-2. for the tube socket terminal voltages. Voltages shown are those between the terminal and ground (chassis) unless otherwise specified. To identify the tube socket connections, refer to Fig. 7-6. The readings were taken with an RCA Volt-Ohymist Junior analyzer using 20,000 ohm per volt sensitivity. To prepare the receiver for measurement, disconnect the antenna, connect a jumper between the antenna termipals A_1, A_2 and GND, disconnect the speaker and replace with a 5000-ohm 10-watt resistor across the 5000-ohm output terminals or a 500-ohm 10-watt resistor across the 500-ohm terminals, and set the controls as follows:

SELECTIVITY switch at SHARP

SEND/REC. switch at REC.

A.M./F.M. switch at A.M.

A.V.C., A.N.L., and B.F.O. switches at ON.

R.F. GAIN and A.F. GAIN controls at maximum gain position.

ANTENNA, TONE, TUNING, and PITCH CONTROL adjustments do not effect the readings.

b. Resistance Chart. - Refer to Fig. 5-3. for the tube socket terminal to ground (chassis) resistance measurements.

The readings were taken with an RCA Volt Ohmyst Junior analyzer. To prepare the receiver for measurement, disconnect the a-c line cord and set the controls as follows:

SELECTIVITY switch at SHARP.

SEND/REC. switch at REC.

A.M./F.M. switch at A.M.

A.V.C., A.N.L., and B.F.O. switches at ON.

R.F. GAIN and A.F. GAIN controls at maximum gain position.

TONE control set at BASS BOOST.

ANTENNA, TUNING and PITCH CONTROL adjustments do not effect the readings.

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THE HALLICRAFTERS CO. MODEL S-36-A

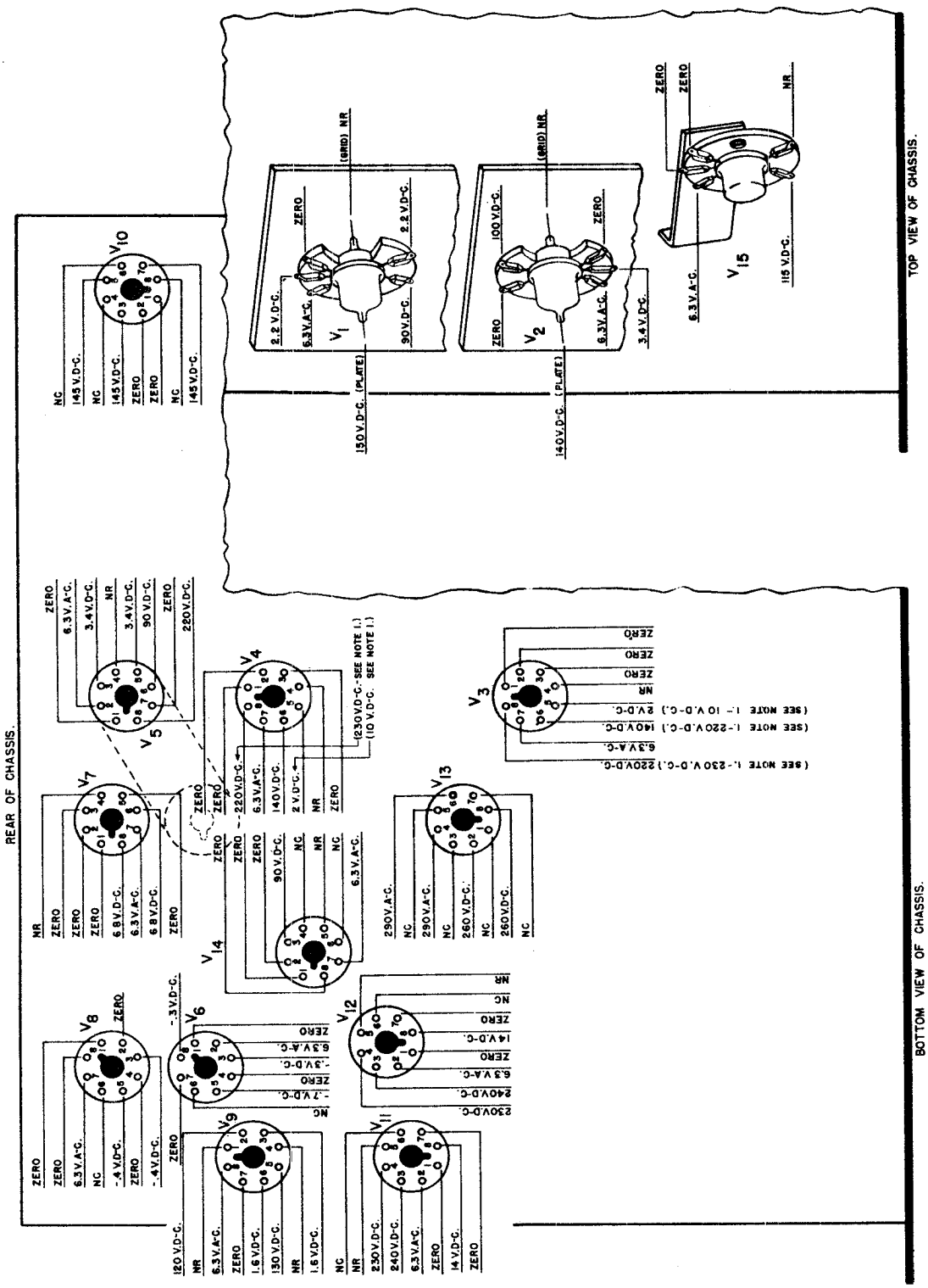

Figure 5-2. Radio Receiver Model S-36A, voltage chart.

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MODEL S-36-A

THE HALLICRAFTERS CO.

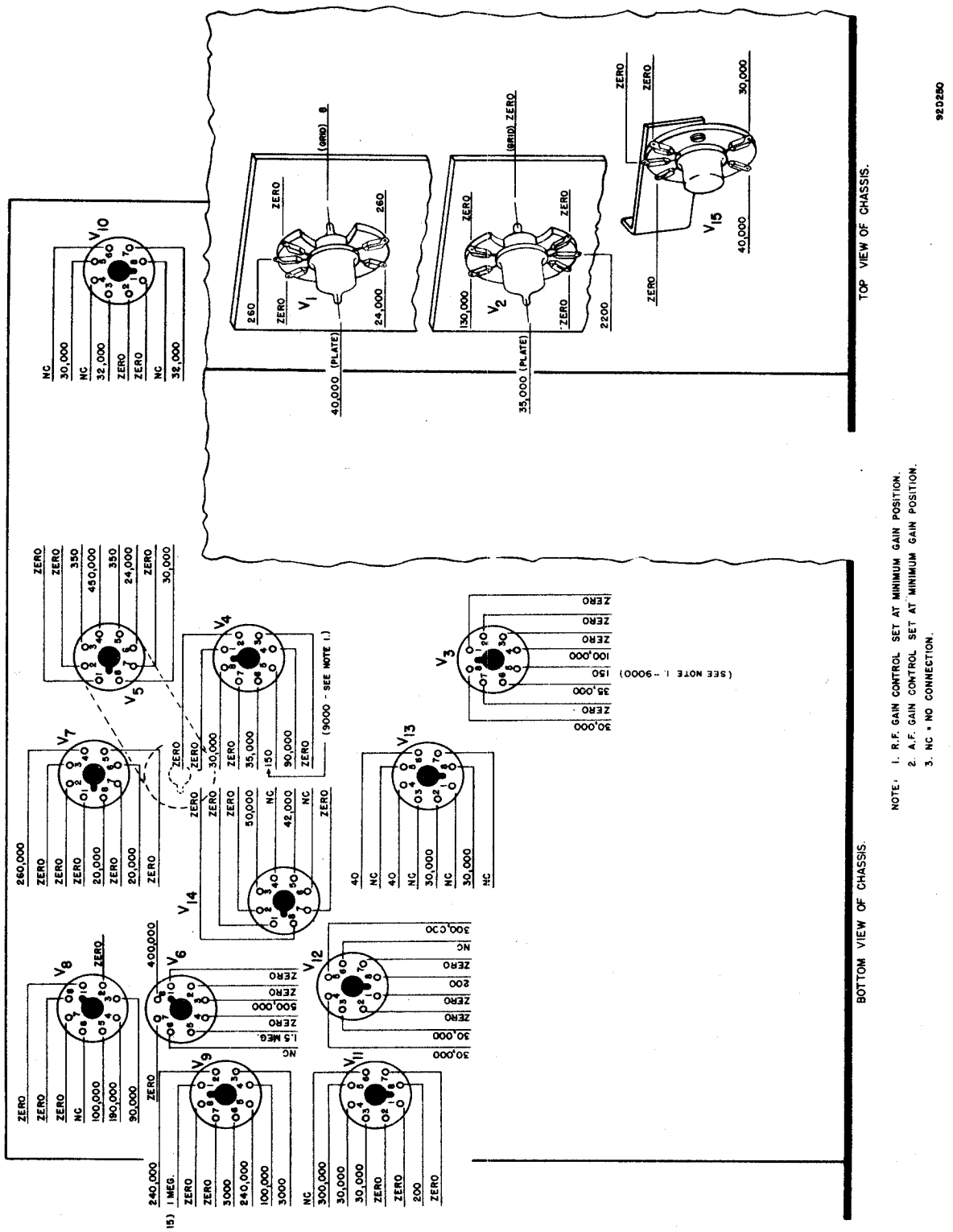
TOP VIEW OF CHASSIS.
BOTTOM VIEW OF CHASSIS.
REAR OF CHASSIS.
NOTE: 1. R.F. GAIN CONTROL SET AT MINIMUM GAIN POSITION.
2. A.F. GAIN CONTROL SET AT MINIMUM GAIN POSITION.
3. NC = NO CONNECTION.
920280

Figure 5-3. Radio Receiver Model S-36A, resistance chart.

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c. Checking Transformer and Inductor Windings With an Ohm-meter. -

NOTE - One terminal of each winding measured must be disconnected from the circuit to avoid measuring circuit resistance instead of winding resistance alone as indicated in the chart.

Circuit Symbol	Name of Part	Winding	Winding Terminals	D-C Resistance (ohms)
T-15	TRANSFORMER, audio.	Primary	1 to 3	560
		½ primary	1 to 2/2 to 3	280
		600-ohm secondary	4 to 6	25
		½ 600-ohm secondary	4 to 5/5 to 6	12.5
		5000-ohm secondary	7 to 9	33
		500-ohm secondary	7 to 8	3
T-16	TRANSFORMER, power.	Primary #1	1 to 3	3.5
		Primary #2	2 to 4	3.5
		H.V. secondary	9 to 11	90
		½ H.V. secondary	8 to 10/10 to 11	45
		5.0-volt secondary	7 to 8	Zero
		6.3-volt secondary	5 to 6	Zero
L-6/L-7	Reactor, filter.	12-henry coil	1 to 2	215
		3-henry coil	2 to 3	85

SUPPLEMENTARY DATA

FREQUENCY RANGE.

27.8 mc. - 143 mc. (Covered in three bands).

AUDIO POWER OUTPUT.

Speaker operation - 3 watts with less than 5% distortion (500 or 5000 ohms).
Headset operation - 3 watts with less than 5% distortion (600 ohms).

SENSITIVITY.

At 30 mc. - 2.0 microvolts (For 50 milliwatt audio output).
At 135 mc. - 10.0 microvolts (For 50 milliwatt audio output).
(Signal generator modulated 30% at 400 cycles.)

AUDIO FIDELITY.

Audio response is flat within ± 3 db. from 40 to 10,000 cycles per second.

IMAGE RATIO.

Image ratio exceed 1000:1 at 30 mc., 300:1 at 58 mc.; 100:1 at 80 mc. and 60:1 at 100 mc.

SELECTIVITY.

I-F selectivity measured at the grid of the mixer tube is not less than 10kc. or more than 25 kc. with the SELECTIVITY switch at SHARP and not less than 65 kc. or more than 80 kc. with the SELECTIVITY switch at BROAD. at 6 db. down from resonance.

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MODEL S-36-A

THE HALLICRAFTERS CO.

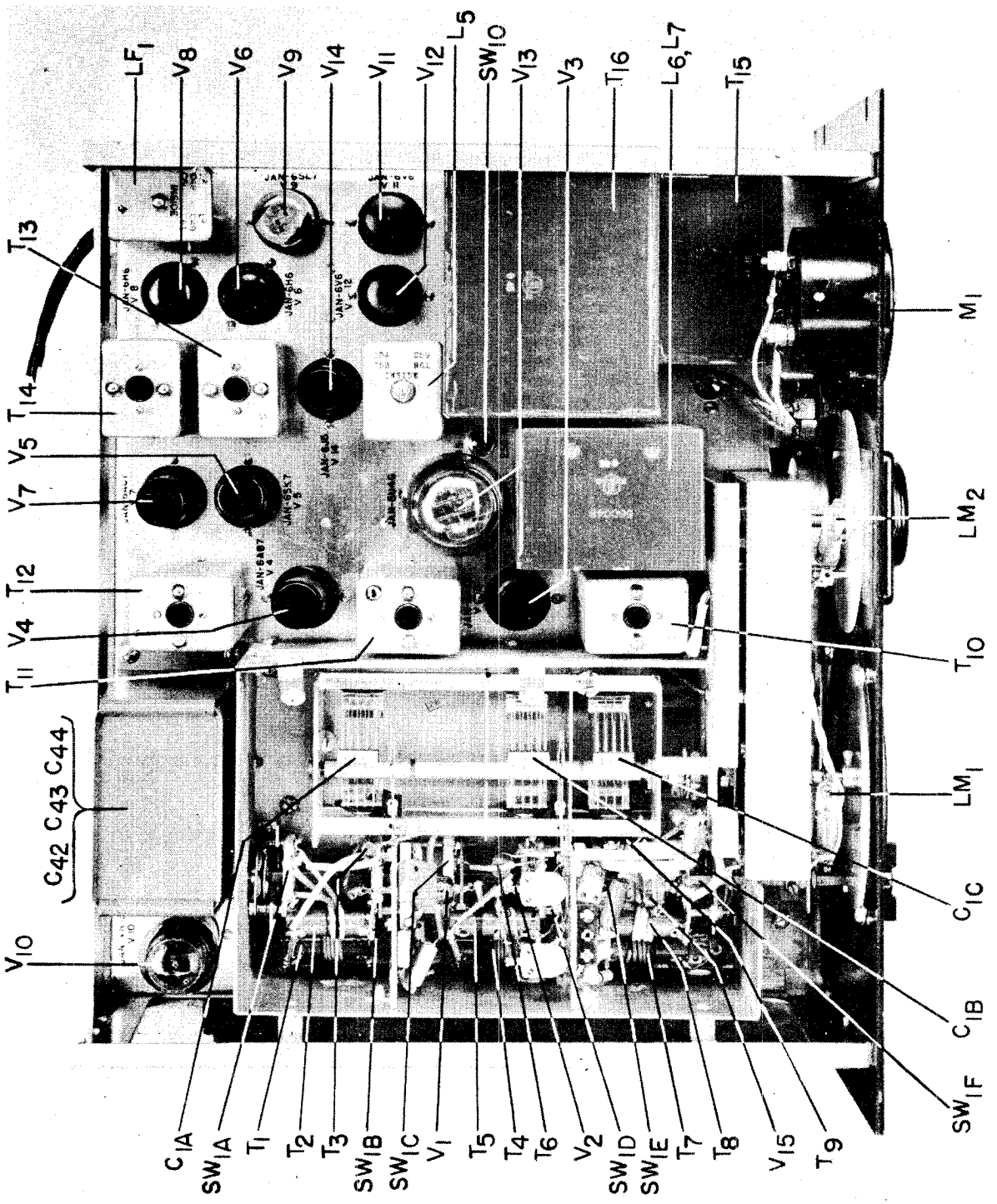

Figure 7-1. Radio Receiver Model S-36A, top view.

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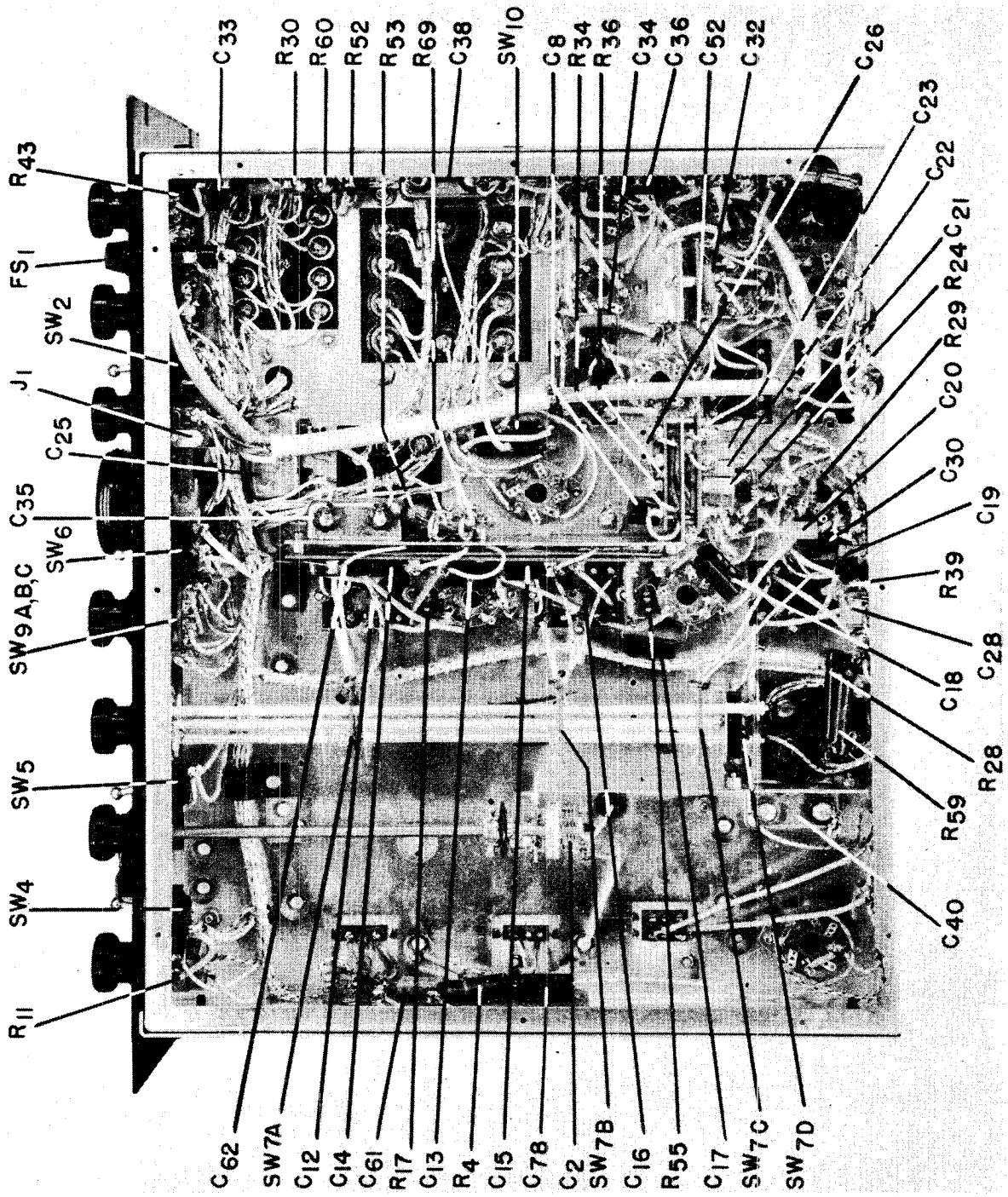

Figure 7-2. Radio Receiver Model S-36A, bottom view.

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MODEL S-36-A

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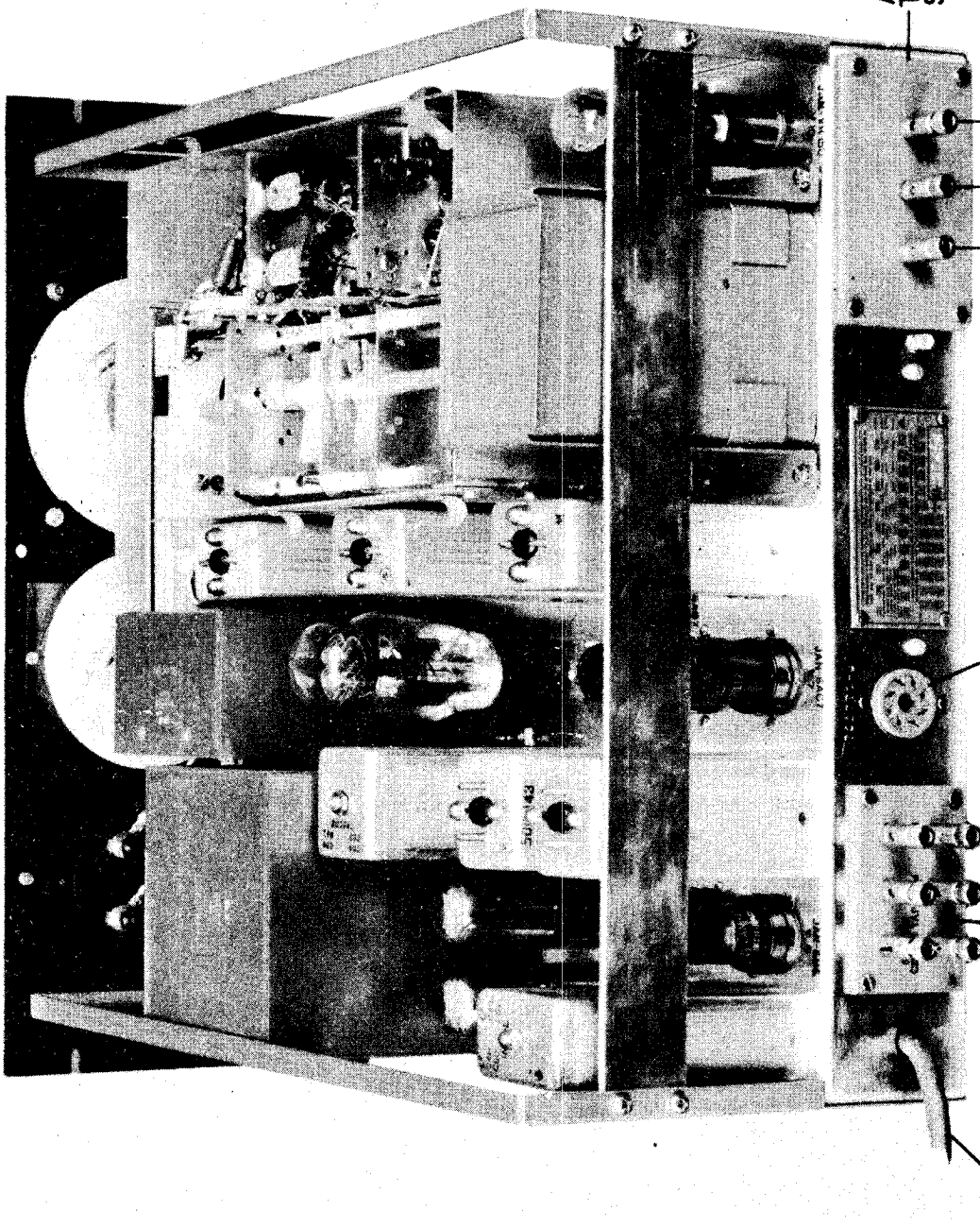

Figure 7-3. Radio Receiver Model S-36A, rear view.

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Ref. Symbol	Name of Part and Description	Mfr Code and Type No.	Hallicrafter's Part No.
	CAPACITORS		
C_1	Capacitor, variable: air dielectric; 3 section; 9 plates with double spacing between plates; min. cap, 6 mmfd., max. cap. 54.7 mmfd.; plates are aluminum; shaft silver plated brass 5" long x 0.375" dia., with x 2B insulation on stators; front rotor section grounded to frame, other two sections insulated from frame; spade lug mtg.; solder lug terminals.	OM special	48C147
C_2	Capacitor, variable: air dielectric; single section; 7 plates; min. cap. 3 mmfd., max. cap. 25 mmfd.; aluminum plates; ceramic insulation; brass shaft 3/4" long x ¼" dia., mtg. base ¼" thick x 1-7/32" dia., mtg. centers 21/32"; total depth of unit 7/8"; solder lug terminals	HC type 22-7	48A039
C_3	Capacitor, fixed: mica dielectric; 330 mmfd. ± 10%; 500 V. D-C working; case 51/61" lg x 15/32" wd x 7/32" thk; same as C_5, C_9, C_{10}, C_{45}, C_{46}, C_{47}, C_{55}.	ASA	CM20A331K
C_4	Capacitor, fixed: mica dielectric; 2200 mmfd. ± 10%; 500 V D-C working; case 53/64" long x 53/64" wide x 9/32" thick; same as C_6, C_{52}, C_{61}.	ASA	CM30A222K
C_5	Same as C_3	-	-
C_6	Same as C_4	-	-
C_7	Capacitor, fixed: ceramic dielectric: 10 mmfd. ± 10%; 500 V. D-C working; temp. coeff. -0.00055 mmfd/ mmfd/ deg. Cent.; case 0.625" long x 0.225" dia.	CRL type 811-077	47A006
C_8	Capacitor, fixed: mica dielectric; 8200 mmfd. ± 10%; 500 V. D-C working; case 1-1/32" long x 41/64" wide x 11/32" thick; same as C_{13}, C_{14}, C_{15}, C_{17}, C_{18}, C_{19}, C_{21}, C_{22}, C_{23}, C_{30}, C_{33}, C_{36}, C_{37}, C_{62}, C_{78}.	ASA	CM40A822K
C_9	Same as C_3	-	-
C_{10}	Same as C_3	-	-
C_{11}	Capacitor, variable: air dielectric; small variable capacity formed between a 6-32 metal screw and a CRS plate 5/8" wd x 13/16" lg, rolled to 3/16" ID, at one end, with a 7/32" dia mtg hole 3/16" center from other end x 7/32" center from top side; cadmium plated plate.	B 48A140	48A140
C_{12}	Capacitor, fixed: paper dielectric; 1000 mmfd. + 100-20%; 600 V. D-C working; case 3/4" lg x ¼" wd x 7/32" thk.	CE	47A121
C_{13}	Same as C_8	-	-
C_{14}	Same as C_8	-	-
C_{15}	Same as C_8	-	-
C_{16}	Same as C_{12}	-	-
C_{17}	Same as C_8	-	-
C_{18}	Same as C_8	-	-
C_{19}	Same as C_8	-	-
C_{20}	Capacitor, fixed: mica dielectric; 47 mmfd. ± 10%; 500 V. D-C working; case 51/64" long x 15/32" wide x 7/32" thick; same as C_{31}.	ASA	CM20A470K
C_{21}	Same as C_8	-	-
C_{22}	Same as C_8	-	-
C_{23}	Same as C_8	-	-
C_{24}	Capacitor, fixed: mica dielectric; 56 mmfd. ± 10%; 500 V. D-C working; case 51/64" long x 15/32" wide x 7/32"; thk same as C_{26}	ASA	CM20A560K
C_{25}	Capacitor, fixed: paper dielectric; 0.05 mfd. - 6 + 14%; 600 V. D-C working; metal case 1-25/32" long x 1-1/32" deep x 13/16" high, with 2 mtg. feet with 2-1/8" mtg. centers; 2 solder lug terminals insulated from case by neoprene seals and phenolic washers; same as C_{35}	IC type 7678	46A005
C_{26}	Same as C_{24}	-	-
C_{27}	Capacitor, fixed: mica dielectric; 100 mmfd. ± 10%; 500 V. D-C working; case 51/64" lg x 15/32" wd x 7/32" thick.	ASA	CM20A101K
C_{28}	Capacitor, fixed: mica dielectric; 560 mmfd. ± 10%; 500 V. D-C working; case 53/64" long x 53/64" wide x 9/32" thick.	ASA	CM30A561K
C_{29}	Capacitor, fixed: ceramic dielectric; 25 mmfd. ± 10%; 500 V. D-C working; negative 0 temp. coeff; body 5/8" lg x 3/16" dia.	IRC special	47A142
C_{30}	Same as C_8	-	-
C_{31}	Same as C_{20}	-	-
C_{32}	Capacitor, fixed; mica dielectric; 560 mmfd. ± 10%; 500 V. D-C working; case 1-1/16" long x 15/32" wide x 7/32" thick.	ASA	CM25A561K
C_{33}	Same as C_8	-	-
C_{34}	Capacitor, fixed: mica dielectric; 1000 mmfd ± 10%; 500 V. D-C working; case 53/64" square x 9/32 thk.	ASA	CM30A102K
C_{35}	Same as C_{25}	-	-
C_{36}	Same as C_8	-	-
C_{37}	Same as C_8	-	-
C_{38}	Capacitor, fixed: paper dielectric; 20 mfd. - 10 + 75%; 25 V. D-C working; case hermetically sealed metal 2-1/8" long x 1" deep x 13/16" high; 2 mtg. feet with 2-1/8" mtg. centers; 2 solder lug terminals insulated from the case; same as C_{40}	IC type 18113	46A011
C_{39}	Capacitor, fixed: mica dielectric; 150 mmfd. ± 10%; 500 V. D-C working; case 51/64" lg x 15/32" wd x 7/32" thk	ASA	CM20A151K
C_{40}	Same as C_{38}	-	-
C_{41}	Not used		
C_{42}, C_{43}, C_{44}	Capacitor, fixed: paper dielectric; triple unit; unit #1 is 4 mfd. 650 V. D-C working (C_{42}), unit #2 is 8 mfd. 650 V. D-C working (C_{43}), unit #3 is 8 mfd. 650 V. D-C working (C_{44}); hermetically sealed metal case 4-¼" long x 2-½" deep x 5-7/16" high; 2 mtg. feet with 4-3/4" x 2" mtg. centers; 4 solder lug terminals (one common to all units) insulated from the case by bakelite and neoprene washers; terminals marked "8", "4", "8".	IC type 7392E	42B043
C_{45}	Same as C_3	-	-
C_{46}	Same as C_3	-	-
C_{47}	Same as C_3	-	-

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Ref. Symbol	Name of Part and Description	Mfr Code and Type No.	Hallicrafter's Part No.
C_{48}	Capacitor, fixed: mica dielectric; 8200 mmfd ± 20%; 500 V. D-C working; case 53/64" square x 11/32" thk; same as C_{49}, C_{50}, C_{51}.	ASA	CM35A822M
C_{49}	Same as C_{48}	-	-
C_{50}	Same as C_{48}	-	-
C_{51}	Same as C_{48}	-	-
C_{52}	Same as C_4	-	-
C_{53}	Capacitor, fixed: mica dielectric; 100 mmfd ± 20%; 500 V. D-C working; case 51/64" lg x 15/32" wd x 7/32" thk.	ASA	CM20A101K
C_{54}	Capacitor, fixed: ceramic dielectric; 200 mmfd ± 10%; 500 V. D-C working; zero temp. coeff; body 1.875" lg x 0.265" dia.	ER	47A026
C_{55}	Same as C_3	-	-
C_{56}	Capacitor, fixed: ceramic dielectric; 50 mmfd ± 2.5 mmfd; 500 V. D-C working; neg. 0.00075 mmfd/mmfd/deg. Cent.; body 7/16" lg x 7/32" dia.	ER type N750K	47A109
C_{57}	Capacitor, fixed: ceramic dielectric; 1000 mmfd ± 20%; 500 V. D-C working; body 11/16" lg x 3/16" dia.	MT type 20K1200	47A132
C_{58}	Capacitor, adjustable: mica dielectric; 450 mmfd ± 10%; bakelite mtg. insulation; 2 solder lug terminals to which are attached #18AWG tinned copper leads 1" long, both leads insulated from the frame; special L shaped mtg. frame 1"x 7/8" x 1"; octagon condenser frame 3/4" diam.	UE type S81A	44A050
C_{59}	Capacitor, fixed: twisted pair of leads to form 1 mmfd capacity.		
C_{60}	Capacitor, variable: air dielectric; min. cap. 3.5 mmfd, max. cap. 23 mmfd; ceramic insulation: 2 mtg. holes with 21/32" mtg. centers; one solder lug terminal (rotor plates); wire slot on stator plates mtg. posts: shaft 29/32" long x ¼" dia.; base 1-7/32" long x 15/16" wide; overall depth 2-3/8".	RC type 22-7	48A064
C_{61}	Same as C_4	-	-
C_{62}	Same as C_8	-	-
C_{63}	Capacitor, adjustable: mica dielectric; min. cap. 3 mmfd, max. cap. 50 mmfd; ceramic insulation; compression type adjustment; unit is 3/4" long x 5/8" wide x 11/16" deep including 2 solder lug terminals.	UE Special	44A049
C_{64}	Capacitor, adjustable: ceramic dielectric; 4 to 20 mmfd; 300 V. D-C working; screw driver adjustment; vertically mounted by a CRS special mtg bracket; same as C_{65}.	H Special	44A101
C_{65}	Same as C_{64}	-	-
C_{66}	Capacitor, adjustable: air dielectric; 1 to 12 mmfd; bakelite insulation; screw driver adjustment; 1-11/64" lg x 0.555" dia. overall excluding solder lug terminals; same as C_{67}.	MN type 22-5230 modified	44A140
C_{67}	Same as C_{66}	-	-
C_{68}	Capacitor, fixed: ceramic dielectric; 100 mmfd ± 3%; 500 V. D-C working; neg. 0.00005 mmfd temp. coeff.; body 3/4" lg x ¼" dia.; same as C_{69}, C_{70}, C_{71}, C_{72}, C_{73}, C_{76}, C_{77}.	ER Special	47A117
C_{69}	Same as C_{68}	-	-
C_{70}	Same as C_{68}	-	-
C_{71}	Same as C_{68}	-	-
C_{72}	Same as C_{68}	-	-
C_{73}	Same as C_{68}	-	-
C_{74}	Capacitor, fixed: ceramic dielectric; 50 mmfd ±10%; 500 V. D-C working; zero temp. coeff; body 3/4" lg x 1/4" dia.; same as C_{75}.	ER Special	47A091
C_{75}	Same as C_{74}	-	-
C_{76}	Same as C_{74}	-	-
C_{77}	Same as C_{74}	-	-
C_{78}	Same as C_8	-	-
	FUSES		
FS_1	Fuse: 3 amperes @250 V.; 4AG; glass enclosed; 1-¼" long x 9/32" dia.; caps nickle plated copper alloy; carries 110% of rated current; vibration factor is 200.	LF type 1093	39A018
	JACKS		
J_1	Jack, phone: switching-one make, one break; steel frame; silver contacts; rubber and bakelite insulation; mounted by 3/8-32 brass bushing ¼" long; frame dimensions 1-19/32" x 27/32" x 3/4": solder lug contacts; 1" from front of bushing to tip contact.	U type ST-687 modified	36U008
	INDUCTORS		
L_1	Inductor, R-F: 75 turns of #38SCE single layer winding; inductance 15.5 microhenries ± 10%; d-c resistance 4.10 ohms ± 3%; wound on molded bakelite coil form 15/16" long x 5/32" dia., coated with Chinese red lacquer; air core.	SWI type 661	53A008
L_2	Inductor, line filter: 57 turns of #22SCE universal winding; 46 microhenries inductance; winding ¼" ID x 1-1/16" OD x 9/32" lg; air core; coil form 1" lg x ¼" dia., tapped 6-32 at each end for mtg.	H 53A082	53A082
L_3	Same as L_2		
L_4	Inductor, R-F: 42 turns of #28SCE single layer winding; inductance 4.20 microhenries ± 10%; d-c resistance 0.25 ohms ± 70%; wound on molded bakelite coil form 7/8" long x 9/32" dia., coated with Chinese blue lacquer; air core.	SWI type 662	53A009
L_5	Inductor, beat frequency oscillator; 15-7/8 turns of #15/44 D cel. litz single layer winding tapped 3-1/8" turns and 10-7/8 turns from start of winding; coil wound on xx bakelite tube 1-5/8" long x ¼" O.D. x 0.409" I.D.; tuned by adjustable iron core; unit shielded; assembly includes resistor R_{61} and capacitors C_{53}, C_{54}, and C_{59}.	SWI type 3491	54C024

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Ref. Symbol	Name of Part and Description	Mfr Code and Type No.	Hallicrafter's Part No.
L_6 L_7	Inductor assembly, filter: 2 section unit; section #1 inductance 3 henries - 10 + 30% @ 150 milliamperes; d-c resistance 85 ohms ± 10%; connected to solder lug terminals #2 and #3 (L_6); section #2 inductance 12 henries - 10 + 20%, @ 90 milliamperes; d-c resistance 215 ohms ± 10%; connected to solder lug terminals #1 and #2 (L_7); each section has a separate iron core; coils and cores located so no mutual coupling exists; hermetically sealed case 3-½" long x 2-9/16" deep x 5-½" high; unit mounts by 4 threaded lugs with 2-5/8" x 1-9/16" mtg. centers; breakdown between core and windings 2000 V. RMS; heat rise under rated load 40 deg. Cent. or less	ST type 10CU23	56C048
	LINE FILTERS		
LF_1	Line filter assembly: consists of inductors L_2 and L_3, and capacitors C_{48}, C_{49}, C_{50} and C_{51}, mounted in drawn aluminum can 4-15/32" high, x 1-3/8" wide x 1-13/16" deep with solder lug terminals and mounted by 4 spade lugs.	SWI type 3492	53A056
	LAMPS		
LM_1	Lamp: bayonet base 6 to 8 volts @ 250 milliamperes; glass bulb; same as LM_2	GE type 44	39A003
LM_2	Same as LM_1	-	-
	METERS		
M_1	Meter, "S" meter: calibrated in "S" units; 160-0-40 microamperes movement; body 2.82" dia. x 1.56" deep; round flush type mtg. plate 3.5 O.D., with 3 mtg. holes 120 degrees apart; includes 2 terminals #-28-NF2 which project 0.69" from rear of meter.	H Special	82A097
	PLUGS		
PL_1	Plug and line cord assembly: 2 conductor #18 type S-J all rubber covered cord 6 feet long with a spring type (Allied type 371) molded on plug at one end and stripped and tinned for 5/8" at the other end.	H type 1750	87A125
PL_2	Plug, octal: male, bakelite body 1-½" O.D. x 7/16" thick; metal contact prongs 7/16" long; supplied with insulated jumpers between contacts 3 and 4, and contacts 6 and 7.	AP type CP-8	35A003
	RESISTORS		
R_1	Resistor, fixed: 270 ohms ± 10%; ½ watt; carbon; insulated; 0.249" O.D. x 0.655" long.	ASA	RC21AE271K
R_2	Resistor, fixed: 1000 ohms ± 10%; ½ watt; carbon; insulated; 0.249" O.D. x 0.655" long; same as R_3, R_6, R_{21}, R_{27}, R_{67}.	ASA	RC21AE102K
R_3	Same as R_2	-	
R_4	Resistor, fixed: 10,000 ohms ± 20%; 2 watt; carbon; insulated; 0.342" O.D. x 1.76" long.	ASA	RC41AE103M
R_5	Resistor, fixed: 2200 ohms ± 10%; ½ watt; carbon; insulated; 0.249" O.D. x 0.655" long; same as R_{29}, R_{72}.	ASA	RC21AE222K
R_6	Same as R_2	-	-
R_7	Resistor, fixed: 100,000 ohms ± 10%; ½ watt; carbon; insulated; 0.249" O.D. x 0.655" long; same as R_{33}, R_{40}, R_{41}, R_{51}.	ASA	RC21AE104K
R_8	Not used		
R_9	Resistor, fixed: 10 ohms ± 10%; ½ watt; carbon; insulated; 0.249" O.D. x 0.655" long; same as R_{16}, R_{23}, R_{26}.	ASA	RC21AE100K
R_{10}	Resistor, fixed: 100,000 ohms ± 10%; ½ watt; carbon; insulated; 0.170" diam x 0.406" long.	ASA	RC10AE104K
R_{11}	Resistor, variable: 10,000 ohm ± 20%; #8 reversed taper; shaft 1" long x ¼" dia.; 3 solder lug terminals with the variable contact located in the center and the fixed contacts 1-7/16" apart; no taps; includes a toggle action switch (SW_3) on rear which closes the circuit when the control is turned to the extreme right (clockwise).	CT type 135	25C058G
R_{12}	Resistor, fixed: 120 ohms ± 10%; ½ watt; carbon; insulated; 0.249" O.D. x 0.466" long.	ASA	RC20AE121K
R_{13}	Resistor, fixed: 120 ohms ± 10%; ½ watt; carbon; insulated; 0.249" O.D. x 0.655" long; same as R_{20}.	ASA	RC21AE121K
R_{14}	Resistor, fixed: 39,000 ohms ± 10%; ½ watt, carbon; insulated; 0.249" O.D. x 0.655" long.	ASA	RC21AE393K
R_{15}	Resistor, fixed: 330 ohms ± 10%; ½ watt; carbon; insulated; 0.249" O.D. x 0.655" long; same as R_{22}, R_{25}, R_{62}.	ASA	RC21AE331K
R_{16}	Same as R_9	-	-
R_{17}	Not used.		
R_{18}	Resistor, fixed: 33 ohms ± 10%; ½ watt; carbon; insulated; 0.249" O.D. x 0.655" long; same as R_{55}, R_{57}, R_{65}.	ASA	RC21AE330K
R_{19}	Same as R_{10}	-	-
R_{20}	Same as R_{13}	-	-
R_{21}	Same as R_2	-	-
R_{22}	Same as R_{15}	-	-
R_{23}	Same as R_9	-	-
R_{24}	Resistor, fixed: 470,000 ohms ± 10%; ½ watt; carbon; insulated; 0.249" O.D. x 0.655" long; same as R_{35}, R_{56}.	ASA	RC21AE474K
R_{25}	Same as R_{15}	-	-
R_{26}	Same as R_9	-	-
R_{27}	Same as R_2	-	-
R_{28}	Resistor, fixed: 7500 ohms ± 5%; 10 watt; wire wound; coated with baked vitreous enamel; 3 3/8" O.D. x 1-3/4" long.	IRC type AB	24BG752D
R_{29}	Same as R_5	-	-
R_{30}	Resistor, fixed: 22,000 ohms ± 10%; 2 watt; carbon; insulated; 0.342" O.D. x 1.76" long; same as R_{60}.	ASA	RC41AE223K
R_{31}	Resistor, fixed: 47,000 ohms ± 10%; ½ watt; carbon; insulated; 0.249" O.D. x 0.655" long.	ASA	RC21AE473K

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Ref. SymBol	Name of Part and Description	Mfr Code and Type No.	Hallicrafter's Part No.
R_{32}	Resistor, fixed: 1 megohm ± 10%; ½ watt; carbon; insulated; 0.249" O.D. x 0.655" long.	ASA	RC21AE105K
R_{33}	Same as R_7	-	-
R_{34}	Resistor, fixed: 220,000 ohms ± 10%; ½ watt; carbon; insulated; 0.249" O.D. x 0.655" long; same as R_{36}, R_{39}, R_{42}, R_{44}, R_{45}, R_{49}, R_{50}.	ASA	RC21AE224K
R_{35}	Same as R_{24}	-	-
R_{36}	Same as R_{34}	-	-
R_{37}	Resistor, fixed: 15,000 ohms ± 10%; ½ watt; carbon; insulated; 0.249" O.D. x 0.655" long; same as R_{71}.	ASA	RC21AE153K
R_{38}	Resistor, fixed: 56,000 ohms ± 10%; ½ watt; carbon, insulated; 0.249" O.D. x 0.655" long.	ASA	RC21AE563K
R_{39}	Same as R_{34}	-	-
R_{40}	Same as R_7	-	-
R_{41}	Same as R_7	-	-
R_{42}	Same as R_{34}	-	-
R_{43}	Resistor, variable: 1 megohm ± 20%; carbon; #6 taper; shaft 1" long x ¼" dia.; 3 solder lug terminals with the variable contact located in the center and the fixed contacts 1-7/16" apart; no taps.	CT type 125	25C059
R_{44}	Same as R_{34}	-	-
R_{45}	Same as R_{34}	-	-
R_{46}	Resistor, fixed: 3300 ohms ± 10%; ½ watt; carbon; insulated; 0.249" O.D. x 0.655" long; same as R_{47}.	ASA	RC21AE332K
R_{47}	Same as R_{46}	-	-
R_{48}	Resistor, fixed: 100,000 ohms ± 20%; ½ watt; carbon; insulated; 0.249" diam x 0.655" long.	ASA	RC21AE104M
R_{49}	Same as R_{34}	-	-
R_{50}	Same as R_{34}	-	-
R_{51}	Same as R_7	-	-
R_{52}	Resistor, fixed: 220 ohms ± 10%; 2 watt; carbon; insulated; 0.342" O.D. x 1.76" long.	ASA	RC41AE221K
R_{53}	Resistor, fixed: 3900 ohms ± 10%; 2 watt; carbon; insulated; 0.405" diam x 1.41" long.	ASA	RC40AF392K
R_{54}	Not used		
R_{55}	Same as R_{17}	-	-
R_{56}	Same as R_{24}	-	-
R_{57}	Same as R_{17}	-	-
R_{58}	Resistor, variable: 1500 ohms ± 20%; wire wound; st. line taper; shaft 3/8" long x ¼" dia. slotted 1/16" x 1/16"; 3 solder lug terminals with the variable contact located in the center and the fixed contacts 1-7/16" apart; no taps.	CT type 125	25C060
R_{59}	Resistor, fixed: 3300 ohms ± 5%; 10 watt; wire wound; coated with baked vitreous enamel; 3/8" O.D. x 1-3/4" long.	IRC type AB	24BG332D
R_{60}	Same as R_{30}	-	-
R_{61}	Resistor, fixed: 47,000 ohms ± 10%; ½ watt; carbon; insulated; 0.249" diam x 0.468" long.	ASA	RC20AE473K
R_{62}	Same as R_{15}	-	-
R_{63}	Resistor, fixed: 4700 ohms ± 10% ½ watt; carbon; insulated: 0.249" diam x 0.655" long.	ASA	RC21AE472K
R_{64}	Resistor, fixed: 22,000 ohms ± 10%; ½ watt; carbon; insulated: 0.249" O.D. x 0.655" long.	ASA	RC21AE223K
R_{65}	Same as R_{17}	-	-
R_{66}	Resistor, fixed: 6 ohms ± 10%; ½ watt; carbon; insulated; 0.215" O.D. x 7/16" long.	ER type 504	23A011
R_{67}	Same as R_2	-	-
R_{68}	Resistor, fixed: 8 ohms ± 10%; ½ watt; carbon; insulated; 0.215" O.D. x 7/16" long.	ER type 504	23A019
R_{69}	Resistor, fixed: 15,000 ohms ± 20%; ½ watt; insulated; 0.249" diam x 0.406" long.	ASA	RC20AE153M
R_{70}	Same as R_{52}.	-	-
R_{71}	Same as R_{37}.	-	-
R_{72}	Same as R_5.	-	-
	SOCKETS		
SO_1	Socket, octal: female; high dielectric mica filled bakelite body 1-7/64" dia. x 31/64" thick; silver plated phosphor bronze solder lugs; molded on steel mtg. plate 1-9/32" wide x 0.031 thick having 2 mtg. holes of 5/32" dia. x 1-⅜" mtg. centers; pins are numbered on back of socket clockwise from locating pin.	AP type MIP6TM	6A200
	SWITCHES		
SW_1	Switch, rotary selector: 3 position single pole, 7 section; non-shorting type contacts; ceramic wafers oval shaped 1-7/8" x 1-5/8" x 5/32" thick; 2 holes 0.144" dia. x 1-9/16" mtg. centers mount wafers individually; entire shaft 11-3/4" long x 0.249" dia. squared on opposite sides to 0.185" dia., with index plate 1-7/8" x 1-3/8" x 0.038" thick and having two 0.1875" stainless steel balls; 3 stops, each 60 degrees apart and position 1 symetrical to mtg. holes; minimum torque not less than 70 inch ounces.	OM type HC	60B181
SW_2	Switch, toggle: SPST; rated 3 amperes @ 250 V.; case 1" long threaded 15/32-32; solder lug contacts; same as SW_4, SW_5.	CH type 8280	60A175
SW_3	Switch, toggle action; SPST; part of resistor R_{58}	-	-
SW_4	Same as SW_2	-	-
SW_5	Same as SW_2	-	-
SW_6	Switch, toggle: DPST; rated 3 amperes @ 250 V.; case 1-3/32" long x 17/32" wide x 9/16" deep; mounted by bushing 15/32" long threaded 15/32-32; solder lug contact	CH type 8360 MZ	60A123

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Ref. Symbol	Name of Part and Description	Mfr Code and Type No.	Hallicrafter's Part No.
SW_{7A}, SW_{7B}, SW_{7C}, SW_{7D}, SW_{7E}	Switch, rotary selector: 3 section 3 position; 2 shields separate section #1 from rest of the assembly; a single pole A-C power switch is included at rear and is open at position #1, and closed in positions #2 and #3; all metal parts silver plated brass except for stainless steel index spring and ball; vacuum wax impregnated phenolic wafers; shorting type rotor contacts; frame 11" long including special mtg. bracket at rear of assembly; front of assembly mounts by 3/8-32 bushing $\frac{1}{2}$" long, shaft 1" long x $\frac{1}{4}$" dia.	OM type H	60B178
SW_{8A}, SW_{8B}, SW_{8C}, SW_{8D}	Switch, rotary selector: single section 2 position; all metal parts silver plated brass except for stainless steel index spring and ball; vacuum wax impregnated phenolic wafer; non shorting teeth at contacts 5 and 8; frame 5/16" long, mounts by 3/8-32 bushing $\frac{1}{2}$" long; shaft 1" long x $\frac{1}{4}$" dia.	OM type QH	60A177
SW_9	Switch, rotary selector; 3 circuit; single section 4 position; metal parts brass, fungacide treated bakelite wafer; shorting type contacts; 1-3/8" lg x 1-7/16" wd x 1-5/8" h overall; shaft $\frac{1}{4}$" lg x $\frac{1}{4}$" dia.; mtg by 3/8-32 x $\frac{1}{2}$" lg brass bushing.	OM Special	60B212
SW_{10}	Switch, toggle, DPDT, rated 3 amperes @ 250 V., 1-3/4" long x 21/32" wide x 5/8" deep, mounted by bushing 13/32" long threaded 15/32-32, solder lug contacts.	HH	60A090
	TRANSFORMERS		
T_1	Transformer, R-F: 27.8 to 47 megacycles; one primary and one secondary winding; primary 1-$\frac{1}{2}$ turns of #30SCE single layer winding with a Q of 85 at 44 megacycles with 96.8 micro-microfarads; secondary 5 turns of #22 D cel. single layer winding with a Q of 163 at 26 megacycles with 93.5 micro-microfarads; air cores; coils wound on a xx bakelite tube 1-5/8" long x $\frac{1}{4}$" O.D. x 3/8" I.D.; solder lug terminals.	SWI type 651	51A265
T_2	Transformer, R-F: 46 to 82 megacycles; one primary and one secondary winding; primary 1-$\frac{1}{2}$ turns of #30SCE single layer winding with a Q of 67 at 45 megacycles with 105 micro-microfarads; secondary 1-7/8 turns of #18 D cel. braid single layer winding with a Q of 158 at 45 megacycles with 99 micro-microfarads; air cores; coils wound on a bakelite tube 1-5/8" long x $\frac{1}{4}$" O.D. x 3/8" I.D., solder lug terminals.	SWI type 654	51A268
T_3	Transformer, R-F: 82 to 143 megacycles; one primary and one secondary winding; primary 3-$\frac{1}{2}$ turns of #28 braided cel. single layer winding; secondary 1-$\frac{1}{4}$ turns of #14 solid copper single layer winding; air cores; coils wound on a solid form 3 4" long x $\frac{1}{4}$" dia.; extended coil winding leads for terminals.	SWI type 657	51A792
T_4	Transformer, R-F: 27.8 to 47 megacycles; one primary and one secondary winding; primary 25-$\frac{1}{2}$ turns of #34SCE single layer winding; secondary 6 turns of #22 D cel. braid; air cores; coils wound on a bakelite tube 1-5/8" long x $\frac{1}{4}$" O.D. x 3/8" I.D.; solder lug terminals.	SWI type 652	51B793

Ref. Symbol	Name of Part and Description	Mfr Code and Type No.	Hallicrafter's Part No.
T_5	Transformer, R-F: 46 to 82 megacycles; one primary and one secondary winding; primary 11-$\frac{1}{2}$ turns of #34SCE single layer winding (wound counter-clockwise), secondary 2-$\frac{1}{2}$ turns of #22 D cel. braid single layer winding (wound clockwise); air cores; coils wound on a bakelite tube 1-5/8" long x $\frac{1}{4}$" O.D. x 3/8" I.D.; solder lug terminals.	SWI type 655	51B794
T_6	Transformer, R-F: 82 to 143 megacycles; one secondary winding; primary 2-3/4 turns of #36SCE single layer winding; secondary 3/4 turns of #14 solid copper single layer winding; air cores; coils are wound on a solid bakelite from 7/8" long x $\frac{1}{4}$" dia.; extended coil winding leads for terminals.	SWI type 658	51A776
T_7	Transformer, R-F: 27.8 to 47 megacycles; one primary and two secondary windings; primary 1-3/4 turns of #34SCE; first secondary 4-1/8 turns of #22 D cel. braid; second secondary 2-$\frac{1}{2}$ turns of #30DCE; air cores; coils are wound on a bakelite tube 1-5/8" long x $\frac{1}{4}$" O.D.; solder lug terminals.	SWI type 653	51A267
T_8	Transformer, R-F: 46 to 82 megacycles; one primary and two secondary windings; primary 3/4 turn of #30S cel. braid; first secondary 2-$\frac{1}{2}$ turns of #18D cel. braid; second secondary $\frac{1}{2}$ turn of #22D cel. braid; air cores; coils are wound on a bakelite tube 1-5/8" long x $\frac{1}{4}$" O.D.; solder lug terminals.	SWI type 656	51A270
T_9	Transformer, R-F: 82 to 143 megacycles; one primary and two secondary windings; primary $\frac{1}{2}$ turn of #26 plain enamel; first secondary 1 turn of #14 bare copper wire; second secondary 1-$\frac{1}{2}$ turns of #28S cel. braid; air core; coils are wound on xx bakelite tube 1-5/8" long x 3/8" dia.; one solder lug and extended coil winding leads provide terminals.	SWI type 659	51B778
T_{10}	Transformer, intermediate-frequency: 5.25 megacycles; one primary and three secondary windings; primary 16$\frac{1}{2}$ turns single layer winding on adjustable polyiron core assembly; first secondary 1$\frac{1}{2}$ turns single layer winding on same form as primary; second secondary 21$\frac{1}{2}$ turns single layer winding on adjustable polyiron core assembly; third secondary 2$\frac{1}{2}$ turns wound on same form as second secondary; fixed trimmer capacitors (C_{68}) and (C_{69}), a fixed resistor (R_{10}) and a fixed capacitor (C_{12}) complete the assembly; aluminum shield can 4" high x 1-7 8" long x 1-7 16" wide with 4 spade lugs centered one on each side of shield; solder lug terminals at base numbered 1 thru 8 and a 7$\frac{1}{2}$" insulated stranded wire lead brought out through a hole in the side of the shield provide connections.	EW Special	50C140
T_{11}	Transformer, intermediate-frequency: 5.25 megacycles; one primary and three secondary windings; primary 16$\frac{1}{2}$ turns single layer winding on adjustable polyiron core assembly; first secondary 1$\frac{1}{2}$ turn winding on same form as primary; second secondary 20 turns single layer winding on adjustable polyiron core assembly; third secondary 2$\frac{1}{2}$ turn winding on same form as second secondary; fixed trimmer capacitors (C_{70}) and (C_{71}), a fixed resistor (R_{19}) and a fixed capacitor (C_{16}) complete the assembly; aluminum shield can 4" high x 1-7 8" long x 1-7 16" wide with 4 spade lugs centered one on each side of shield mounted 9 32" from base; solder lug terminals at the base numbered 1 thru 8 provide connections.	EW Special	50C141

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Ref. Symbol	Name of Part and Description	Mfr Code and Type No.	Hallicrafter's Part No.
T_{12}	Transformer, intermediate-frequency: 5.25 megacycles; one primary and three secondary windings; primary 16½ turns single layer winding on adjustable polyiron core assembly; first secondary 1½ turn winding on same form as primary; second secondary 20½ turns single layer winding on adjustable polyiron core assembly; third secondary 2½ turn winding on same form as second secondary; fixed trimmer capacitors (C_{72}) and (C_{73}), complete the assembly; aluminum shield can 4" high x 1-7 8" long x 1-7 16" wide with 4 spade lugs centered one on each side of shield mounted 9 32" from base; solder lug terminals at base numbered 1 thru 8 provide connections.	EW Special	50C142
T_{13}	Transformer, intermediate-frequency: 5.25 megacycles; one primary and one secondary winding; primary 31½ turns single layer winding on adjustable polyiron core assembly; secondary 31½ turns single layer winding on adjustable polyiron core assembly; fixed trimmer capacitors (C_{76} and C_{77}) complete the assembly; aluminum shield can 4" high x 1-7 8" long x 1-7 16" wide with 4 spade lugs centered one on each side of shield mounted 9 32" from base; solder lug terminals at base numbered 1 thru 8 provide connections.	EW Special	50C143
T_{14}	Transformer, discriminator: 5.25 megacycles; one primary and one secondary winding; primary 33 turns single layer winding on adjustable polyiron core assembly; secondary 35 turns center tapped single layer winding on polyiron core assembly; fixed trimmer capacitors (C_{74} and C_{75}), and a fixed coupling capacitor (C_{29}) complete the assembly; aluminum shield can 4" high x 1-7/8" long x 1-7/16" wide with 4 spade lugs centered one on each side of shield mounted 9/32" from base; solder lug terminals at base numbered 1 thru 8 provide connections.	EW Special	50C144
T_{15}	Transformer, A-F: one primary and 2 secondary windings; primary to match a 12,000-ohm push-pull load @ 35 ma. for each tube; first secondary to match a load of 600 ohms, center tapped; second secondary to match a load of 5000 ohms; iron core; case hermetically sealed; vacuum impregnated; coil and core assemblies bolted to brackets spot welded to case, solder lugs terminals marked 1 through 9 at base of transformer, 4 mtg. lugs at base with 3-1 16" x 1-11 16" mtg. centers; breakdown between windings and core 1000 R.M.S. volts.	ST type 10A40	55C062
T_{16}	Transformer, power: primary, 2 section winding connected in parallel for 115 V. A-C, and connected in series for 230 V. A-C operation, 50/60 cycles, single phase; first secondary center tapped to provide 270 V. D-C @ 150 milliamperes across 10 mfd. capacitor and a 2 henry 85 ohm choke with a 5Y3G rectifier tube; second secondary 6.4 V. A-C @ 4 amperes; third secondary 5 V. A-C @ 3 amperes; hermetically sealed case 4-15/16" long x 3-3/4" deep x 5-5/16" high spot welded at all joints; coil and core assemblies bolted to brackets spot welded to case; vacuum impregnated; mounted by 4 lugs at base with 3-5/8" x 2-3 8" mtg. centers; 4 terminals threaded 8-32 NC-2 connected to primary as follows: 1 and 3 to one section of primary, 2 and 4 to other section of primary; 7 solder lug terminals connected as follows; 5 and 6 connect to secondary #2 (6.4 V. A-C), 7 and 8 connect to secondary #3 (5 V. A-C), 9 and 11 connect to secondary #1 (540 V. A-C), 10 is center tap for secondary #1 and ground for transformer case and core, iron core; breakdown voltages as follows between windings and core and case; primary - 1500 V. RMS, secondary #1-2500 V. RMS, secondary #2-1500 V. RMS, secondary #3-2500 V. RMS.	ST type 10P51	52C084

Ref. Symbol	Name of Part and Description	Mfr Code and Type No.	Hallicrafter's Part No.
	TERMINAL BOARDS		
TS_1	Board, terminal: output; consists of vacuum impregnated natural linen bakelite mtg. board 3½" long x 2" wide x 1/8" thick with 4 mtg. holes 0.144" dia. and having 2-7/8" x 1-5/8" mtg. centers, marked "600 OHM CENTER TAP - GND. and 500 OHM, 5000 OHM-GND", six brass knurled thumb screw binding posts provide electrical connection.	H Special	41X5306
TS_2	Board, terminal: antenna input; consists of natural paper bakelite mtg. board 4-5/16" long x 2-½" wide x 3/16" thick with 4 mtg holes 0.144" dia. and having 3-13/16" x 2" mtg. centers; marked A_1, A_2, GND; 3 brass knurled thumb screw binding posts provide electrical connections.	H Special	41X5308

INDEX TO PARTS MANUFACTURERS

Symbol	Manufacturer	Symbol	Manufacturer
AP	American Phenolic Corp. Chicago, Illinois	IC	Industrial Condenser Chicago, Illinois
ASA	Any manufacturer meeting the applicable American Standards Association specifications.	IRC	International Resistance Co. Philadelphia, Pa.
B	Belden Mfg. Co. Chicago, Illinois	LF	Littlefuse, Inc. Chicago, Illinois
BC	Brenner Chemical Co. Chicago, Illinois	MCM	McClintock Meter Co. Minneapolis, Minn.
CE	Coronet Electric Co. Chicago, Illinois	MN	Meissner Manufacturing Co. Mt. Carmel, Illinois
CH	Cutler-Hammer Milwaukee, Wis.	MT	The Muter Co. Chicago, Illinois
CRL	Centralab Milwaukee, Wis.	OM	Oak Manufacturing Co. Chicago, Illinois
CT	Chicago Telephone & Supply Co. Elkhart, Indiana	RC	Radio Condenser Corp. Chicago, Illinois
ER	Erie Resistor Erie, Pa.	RCA	RCA Manufacturing Co., Inc., Camden, N. J.
EW	Electronic Winding Corp. Chicago, Illinois	ST	Standard Transformer Corp. Chicago, Illinois
GE	General Electric Co. Schenectady, N. Y.	SWI	S.W. Inductor Co. Chicago, Illinois
H	The Hallicrafters Co. Chicago, Illinois	U	Utah Products Company Chicago, Illinois
HH	Hart & Hegeman Electric Co. Hartford, Conn.	UE	Underwood Electric Co. Chicago, Illinois

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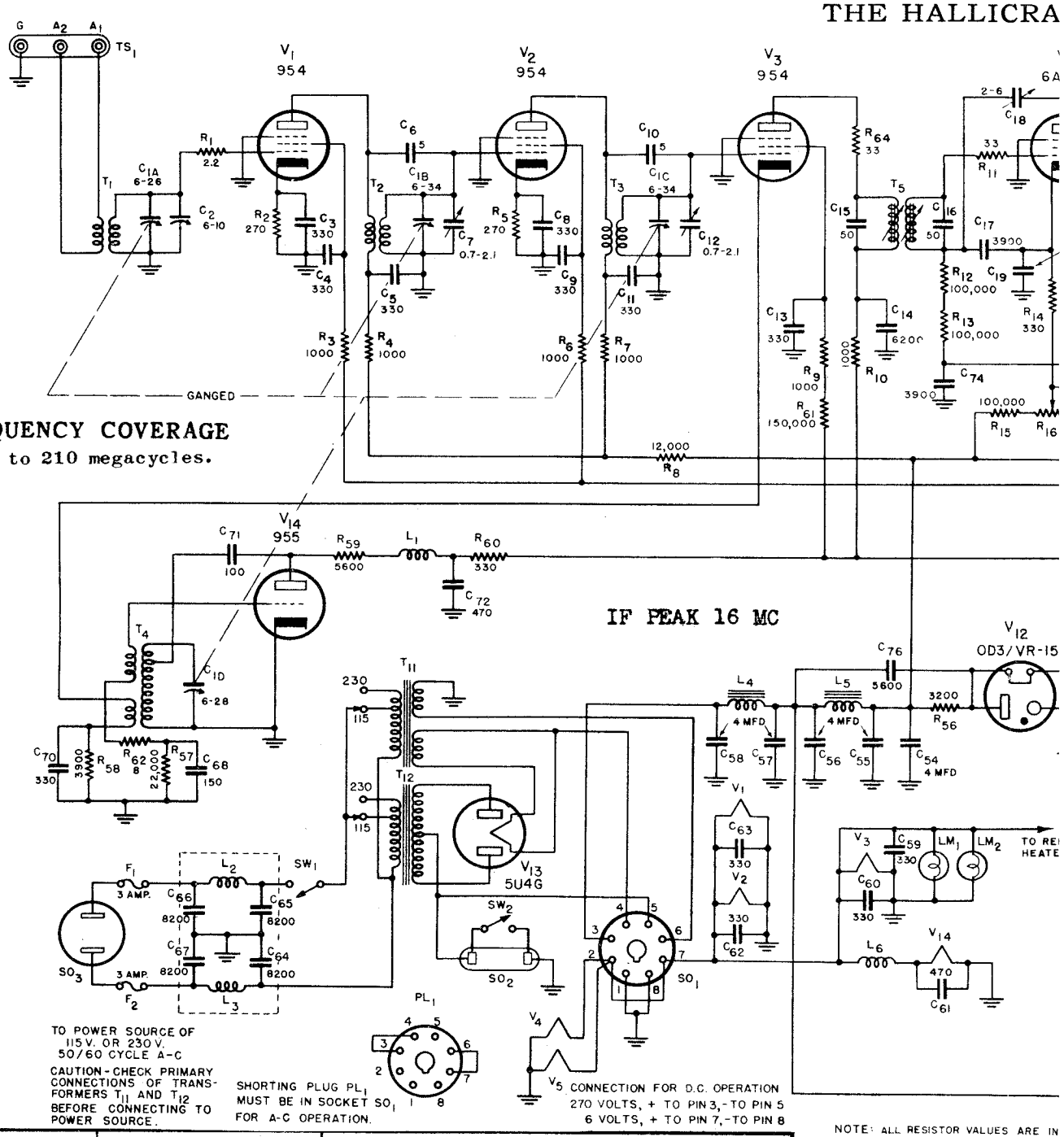
FREQUENCY COVERAGE
130 to 210 megacycles.
GANGED
IF PEAK 16 MC
TO POWER SOURCE OF 115 V. OR 230 V. 50/60 CYCLE A-C
CAUTION - CHECK PRIMARY CONNECTIONS OF TRANSFORMERS T11 AND T12 BEFORE CONNECTING TO POWER SOURCE.
SHORTING PLUG PL1 MUST BE IN SOCKET SO1 FOR A-C OPERATION.
V5 CONNECTION FOR D.C. OPERATION
270 VOLTS, + TO PIN 3, - TO PIN 5
6 VOLTS, + TO PIN 7, - TO PIN 8
NOTE: ALL RESISTOR VALUES ARE IN
ALL CAPACITOR VALUES ARE
UNLESS OTHERWISE SPECIFIED

Symbol	Tube Type	Function
V-1	954	1st r-f amplifier
V-2	954	2nd r-f amplifier
V-3	954	Mixer
V-4	6AC7	1st i-f amplifier
V-5	6AB7	2nd i-f amplifier
V-6	6SK7	3rd i-f amplifier
V-7	6H6	A-M detector and noise limiter
V-8	6AC7	F-M limiter
V-9	6H6	F-M discriminator
V-10	6SL7GT	Audio voltage amplifier
V-11	6V6GT/G	Audio power amplifier
V-12	OD3/VR-150	Voltage regulator
V-13	5U4G	Rectifier
V-14	955	High-frequency oscillator

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FTERS CO.

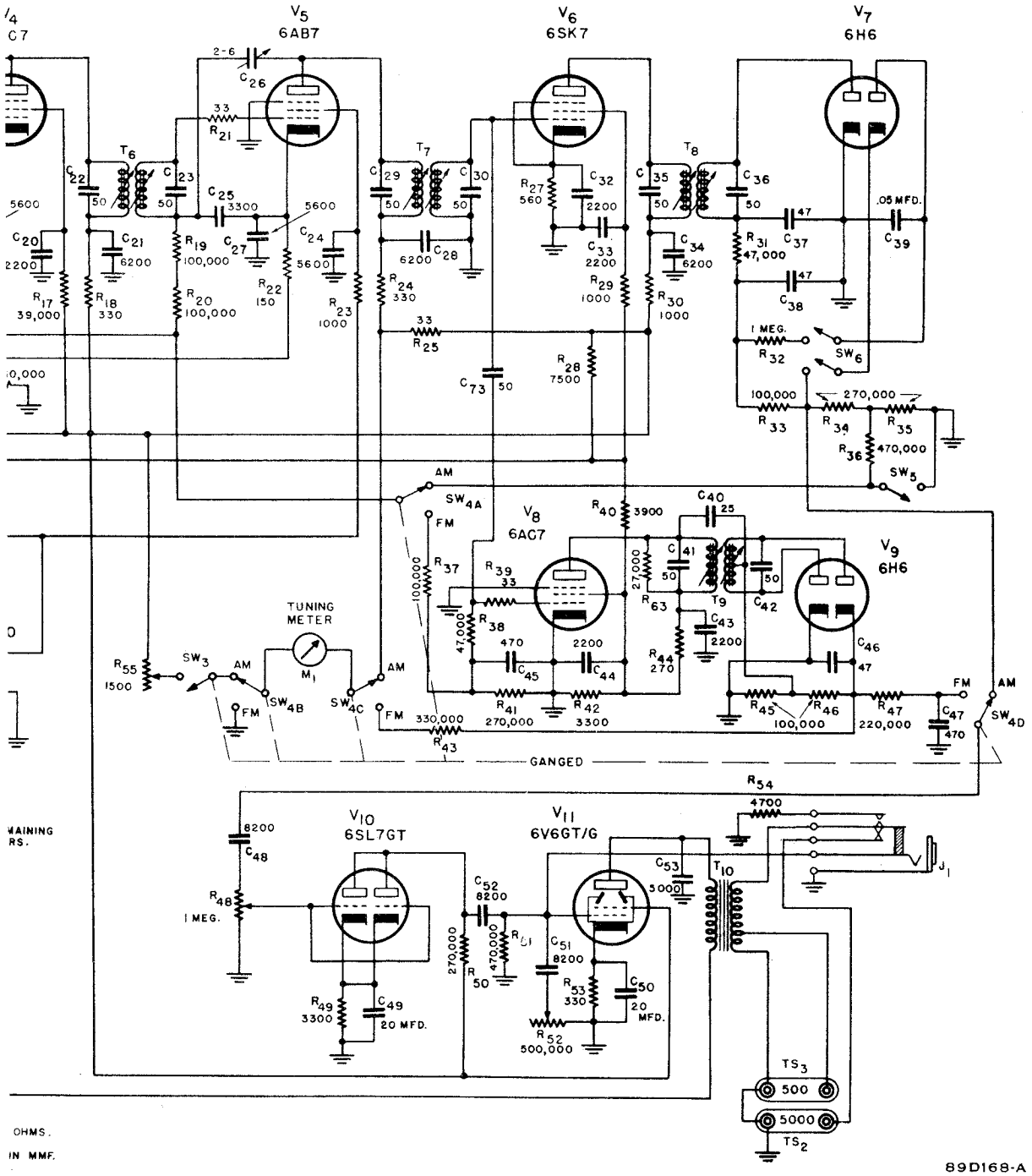

Figure 7-7. Radio Receiver Model S-37, schematic wiring diagram.

A-C Operation	* D-C Operation
Voltage.....117 volts, 230 volts. Current.....1.0 amp, 0.5 amp. Consumption..110 watts.	Filament voltage..... 6.3 volts. Filament current..... 3.6 amps. "B" voltage..... 270 volts. "B" current..... 125 ma.

* The 6-volt battery drain using a vibrator type supply for "B" voltage will run approximately 18-20 amperes.

1. GENERAL

Figure 4-1. shows, in very simple block form, the plan of the circuit of the Model S-37 receiver. Note that the circuit is that of the conventional superheterodyne receiver up to the second-i-f amplifier stage. The output of the 2nd i-f amplifier is fed to two channels, namely, the F-M signal channel and the A-M signal channel. The F-M channel consists of the f-m limiter and discriminator and the A-M channel consists of an additional i-f amplifier stage and second detector stage. The demodulated signal from both channels then feeds the same audio amplifier being selected by the AM/FM switch.

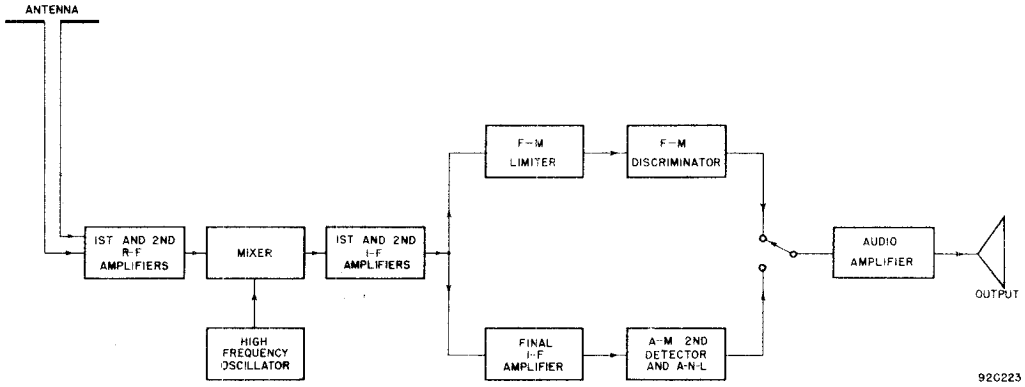

Fig. 4-1. Radio Receiver Model S-37, block diagram

2. DETAILED FUNCTIONING BY STAGES. (Refer to Fig. 7-7.)

a. R-F Amplifier. - The two r-f amplifier stages employ type 954 acorn pentode tubes in a conventional two stage amplifier circuit. Signals present at the antenna are fed to the primary of transformer T-1 through terminals A_1 and A_2 of antenna terminal strip TS-1. The secondary is tuned by the ganged tuning capacitor section C-1A and trimmer C-2. Trimmer capacitor C-2 is controlled from the front panel by the control marked ANTENNA to provide accurate alignment of the r-f stage with varying antenna load impedances. R-F signals selected by the parallel resonant circuit are applied to the grid of tube V-1 and appear in greater amplitude across the primary of transformer T-2. Parasitic resistor R-1 prevents unwanted oscillations in this stage and tends to stabilize the amplifier. Resistor R-2 by-passed by capacitor C-3, provides self-bias for the stage. Resistors R-3 and R-4 and capacitors C-4 and C-5 act as decoupling networks for the screen and plate circuit of tube V-1. The signal across the primary of transformer T-2 is coupled to the grid of tube V-2 inductively by transformer T-2 and capacitively by capacitor C-6. Capacitor C-6 provides a small amount of coupling to improve response at the high-frequency end of the band, thus equalizing the r-f signal amplitude over the tunable frequency range. The secondary of transformer T-2 is tuned by section C-1B of the ganged tuning capacitor and trimmer C-7. R-F signals applied to the grid of tube V-2 by the secondary winding of transformer T-2, appear at the primary of transformer T-3 in greater amplitude as a result of the amplifying action of tube V-2. Resistor R-5 by-passed by capacitor C-8 provides self-bias for the stage. Resistors R-6 and R-7 and capacitors C-9 and C-11 act as decoupling networks for the screen and plate circuit of tube V-2. The signal developed at the primary winding of transformer T-3 then feeds the mixer stage of the receiver.

b. Mixer. - The mixer stage employs a type 954 acorn pentode in a cathode coupled mixer circuit. The signal across the primary of transformer T-3 is coupled to the grid of tube V-3 inductively by trasnformer T-3 and capacitively by capacitor C-10. Capacitor C-10 provides a small amount of coupling to improve response at the high-frequency end of the band, thus equalizing the r-f signal amplitude over the tunable frequency range. The secondary of transformer T-3 is tuned by section T-10 of the ganged tuning capacitor and trimmer C-12. R-F signals selected by the parallel resonant circuit are applied to the grid of the mixer tube V-3. A signal from the local oscillator 16 megacycles lower in frequency than the receiver tuning frequency, is fed to the mixer tube through the cathode and provides the difference frequency of 16 mc. for the i-f stages.

c. Oscillator. - The oscillator circuit consists of a type 955 acorn triode in a tuned-plate untuned-grid type of oscillator circuit. The frequency of oscillation is determined by a resonant circuit which consists of the secondary of transformer T-4 and section C-1D of the main tuning gang connected in parallel. The r-f energy is

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fed from the plate of tube V-14 to the tuned circuit by the d-c blocking capacitor C-71. The decoupling network in the plate circuit of the oscillator tube consists of R-59, L-1, C-72, and R-60. Resistor R-62 and R-57 by-passed by capacitor C-68 are connected in series with the feedback winding of transformer T-4 to provide equal oscillator voltage to the mixer stage over the entire tuning range. The mixer voltage is further compensated by the network R-58 and C-70, connected in series with the winding feeding the cathode of the mixer tube.

d. First and 2nd I-F Amplifier. - The 1st and 2nd i-f amplifier stages employ type 6AC7 and 6AB7 pentodes respectively. The i-f amplifier coupling transformers T-5, T-6 and T-7 for these two stages are tuned to 16 mc. by adjusting the powdered iron core slugs in both primary and secondary windings. Each stage is neutralized by capacitors C-18 for tube V-4 and C-26 for tube V-5, to provide stable amplification at this relatively high intermediate frequency. The gain of the 1st and 2nd i-f amplifier stages is varied by the R.F. GAIN control (R-16), connected in series with the cathodes of both tubes, to provide sensitivity control for the receiver instead of the usual practice of varying the gain of the r-f amplifier stages. This method of control permits the r-f amplifier stages to operate at maximum gain, thereby providing a high signal to noise ratio at all sensitivity settings. The a-v-c grid voltage is applied to this section of the receiver through the decoupling networks C-17, R-12, R-13, C-74, and R-19, R-20 and C-25. The a-v-c- voltage is supplied by the 2nd detector during a-m reception and a small amount of voltage is also supplied, for a similar purpose, from the limiter tube (V-8) during f-m reception.

e. Final I-F Amplifier. - The last i-f amplifier, used for a-m reception, employs a type 6SK7 pentode connected in a conventional circuit. The stage is coupled by transformers T-7 and T-8 which are tuned by adjustable iron core slugs. Resistor R-27 by-passed by capacitor C-32 provides self-bias for the stage. The gain of this stage is not varied as was the case for the 1st and 2nd i-f amplifier stages. The amplified voltage developed across the secondary of transformer T-8 is then fed to the 2nd detector for demodulation of a-m signals.

f. A-M 2nd. Detector and A-N-L. - Both the second detector and automatic noise limiter stages employ a single type 6H6 duo-diode. One diode section of tube V-7 serves as detector for amplitude modulated signals by rectifying the modulated carrier. The r-f filter for this type of detection consists of resistor R-31, and capacitors C-37 and C-38 connected in a pi-section. Automatic volume control voltage and audio frequency voltage is obtained from the load and voltage divider resistors R-33, R-34, R-35. Resistor R-36 serves as a-v-c decoupling. The remaining diode section of tube V-7 serves as automatic noise limiter as follows: Capacitor C-39 becomes charged by the rectified carrier voltage and the time constant of this capacitor and the filter network associated with it is such, that the audio frequency voltage variations do not alter this charge. During a severe noise pulse, however, the cathode of the diode plate connected to capacitor C-39 becomes more negative than the charge held by C-39, hence, current flows shorting the audio voltage to ground through capacitor C-39 until the cathode voltage of the a-n-l diode again reaches a less negative potential than its plate and capacitor C-39 acquires its normal charge again. By shorting the audio voltage to ground during a noise pulse, the a-n-l circuit prevents the objectional noise pulses from reaching the audio amplifier stages.

g. F-M Limiter and Discriminator. - The frequency modulation detector consists of a limiter stage and a discriminator stage. The type 6AC7 limiter tube (V-8) is fed by the second i-f transformer secondary winding along with the third i-f amplifier tube V-6 for a-m reception. The limiter stage operates as a saturated amplifier in which the output remains constant over a large range of input voltage levels, thus eliminating variations in the amplitude of the carrier signal to be demodulated by the discriminator. When operating as an f-m receiver, automatic volume control action is obtained by applying a part of the voltage developed across resistor R-41 in the grid return of the limiter tube (V-8), to the control grids of the 1st and 2nd i-f amplifier tubes (V-4 and V-5) through section SW-4A of the F.M./A.M. switch. The constant level signal out of the limiter tube (V-8) is fed to the discriminator tube (V-9) through the discriminator transformer (T-14) and coupling capacitor C-40. The discriminator circuit, consisting of transformer T-9, tube V-9 and load resistors R-45 and R-46, converts the frequency variations of the f-m signal into amplitude variations or the audio signals. The de-emphasis network, consisting of resistor R-47 and capacitor C-47, attentuates the high frequency end of the audio range since these frequencies are emphasized at the f-m transmitter. From the de-emphasis network the audio signal is fed to the A.F. GAIN control (R-48) in the same way as the signal from the amplitude modulation detector tube (V-7).

h. Audio Amplifier. - The audio amplifier consists of a conventional high-mu triode class A voltage amplifier driving a single beam power amplifier also operating class A.

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(1) Voltage Amplifier. - The voltage amplifier stage employs a type 6SL7GT twin-triode tube with its elements connected in parallel. Self bias voltage obtained from resistor R-49 by-passed by capacitor C-49 provides grid bias voltage for class A operation. The stage operates into its plate load resistor R-50 from which grid voltage for the beam power stage is obtained as well as audio voltage for headset operation. Capacitor C-52 isolates the d-c plate voltage from the headset and beam power amplifier grid.

(2) Power Amplifier. - The power amplifier employs a type 6V6GT/G beam-power amplifier in a resistance capacity coupled single ended class A amplifier circuit. Grid bias is obtained from cathode resistor R-53 which is by-passed by capacitor C-50. The output of tube V-11 is coupled to the speaker load by transformer T-10 which provides proper matching for 5000 and 500 ohm loads. When the headset is plugged into the circuit, resistor R-54 is automatically connected across the 5000 - ohm winding to maintain proper load impedance for the beam power stage. If a speaker is connected to the 5000 ohm outlet, it will be automatically disabled when the headset is plugged in. The frequency response of the power amplifier stage is controlled by variable resistor R-52 and capacitor C-51 connected in series from the grid of tube V-11 to ground. As the resistance of R-52 is lowered, the higher audio frequencies are attenuated producing a bass boost effect in the output.

i. Tuning Meter. - The tuning meter is switched between two circuits depending upon the type of reception:

(1) A-M Reception. - When metering reception of a-m signals the tuning meter measures the plate current of the 2nd i-f amplifier stage which varies as the strength of the signal carrier. Resistor R-55 sets the zero (no signal) position by adjusting the plate current of tube V-5. A carrier then drives the plate current of tube V-5 to a lower value depending upon the signal strength. The screen grid voltage of tube V-5 is regulated by the voltage regulator tube to provide accurate control over the plate current.

(2) F-M Reception. - When metering reception of f-m signals the tuning meter measures the unbalanced current in resistors R-45 and R-46 obtained when the receiver is tuned to one side of the f-m carrier. When the receiver is tuned to the exact center of the f-m carrier the meter rests at zero indicating that the currents in the discriminator load resistors are equal. Resistor R-43 functions to limit the maximum current in the meter circuit to a safe value.

j. Power Supply. - The receiver has provisions for operation from either an a-c or d-c source.

(1) A-C Operation. - The internal power supply provides for operation from 115 or 230-volt a-c mains. The a-c current is fed through a line filter which is a low pass pi-section network connected in each side of the line. The networks consist of inductances L-2 and L-3 and capacitors C-64, C-65, C-66 and C-67. The line filter attentuates all the objectionable noise components coming into the receiver circuit through the a-c power source. The filament and high voltage supply transformers are separate units, each provided with a tapped primary for 115- or 230-volts operation. The taps must be wired accordingly each time the line potential is changed. A type 5U4G (tube V-13) full-wave rectifier is employed in a conventional rectifier circuit. The high voltage from this rectifier is fed to the filter network through the "Shorting Plug" on the rear apron of the receiver chassis as is the filament current for the heaters of the tubes. The SEND-REC. switch is connected in series with the center tap of the high voltage secondary of transformer T-12 and ground to break the high voltage circuit in order to disable the receiver and yet keep the tube heaters hot ready for instant use. The filter circuit consists of two low pass pi-section networks made up of inductances L-4 and L-5 and capacitors C-58, C-57, C-56, C-55 and C-54. In order to provide a constant plate voltage to the oscillator, mixer and screen of the second i-f stages a voltage regulator tube type OD3/VR-150 is used. The voltage supplied to the screen of tube V-5 is regulated to provide accurate current control for the tuning meter connected in the plate circuit of this tube.

(2) D-C Operation. - External storage battery and "B" batteries or storage battery and vibrator type supply provide for d-c operation. When operating from an external d-c supply the "Shorting Plug" on the rear apron of the receiver chassis is removed and a similar plug is wired to supply filament and plate current to the receiver circuits. The "B" voltage is supplied to the input side of the filter section used for a-c operation there by insuring adequate filtering for vibrator type supplies when used.

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ANTENNA Control. - This control is used to compensate for misalignment of the receiver's antenna stage due to antenna impedance variations. Once set for a given antenna, its setting will hold for a wide range of frequencies.

R. F. GAIN Control. - The radio frequency gain control regulates the sensitivity of the receiver. Turning the control to the right increases the sensitivity of the receiver. Ganged to this control is the "S" meter switch which connects the tuning meter into the circuit when the control is advanced all the way to the right during automatic volume control operation.

S-METER ADJ. - This adjustment sets the signal level meter to its zero signal level position when the receiver is set for A.M. (amplitude modulation) reception. The adjustment is made with a screw driver and once set, it is seldom necessary to make further adjustments.

POWER Switch. - The power switch connects the a-c power to the receiver when operating from a-c mains only. When operating the receiver from a battery supply this control function must be handled by a power switch in the battery supply circuit.

CAUTION - When operating the receiver from a d-c supply set the receiver's POWER switch at OFF and do not plug the a-c line cord into an a-c outlet.

"S" Meter or Tuning Meter. - The tuning meter serves two functions in the receiver depending on the type of reception as follows:

A.M. Reception. - When the receiver is adjusted to receive amplitude modulated signals, the tuning meter indicates the relative carrier strength of the received signal. To put the meter in operation, turn the R.F. GAIN control to the right until the switch connected to its shaft clicks, and set the A.V.C. switch at ON.

F.M. Reception. - When the receiver is adjusted to receive frequency modulated signals, the tuning meter is used to indicate resonance with the station carrier. As the receiver is tuned through the f-m carrier the meter pointer will first deflect to one side of zero, return to zero and deflect an equal distance on the opposite side of zero, and finally return to zero as the carrier is completely passed. The zero center position in the middle of the swing represents the current setting of the receiver tuning dial and indicates resonance with the station carrier.

OPERATION.

Listed below are the receiver controls and their settings for the two types of reception provided by this receiver, namely, amplitude modulation reception and frequency modulation reception.

a. A.M. (Amplitude Modulation) Reception. - To receive an amplitude modulated signal, set the panel controls as follows:

POWER switch	-	Set at ON when operating receiver on alternating current. To turn off receiver set switch at off.
		CAUTION - Leave switch set at OFF when operating receiver from external batteries.
SEND/REC. switch	-	Set at REC. (Set at SEND to disable receiver when desired.)
A.M./F.M. switch	-	Set at A.M.
A.V.C. switch	-	Set at ON.
R.F. GAIN control	-	Turn to right until switch on control clicks.
TUNING control	-	Set dial that is calibrated in megacycles to frequency of signal: adjust for maximum tuning meter reading.
ANTENNA control	-	Adjust for maximum tuning meter reading.
A.F. GAIN control	-	Adjust for desired signal level at headset or speaker.
TONE control	-	Set to please the listener.
A.N.L. switch	-	Normally set at OFF. Use only when background noise is excessive.

NOTE - The control settings listed above are those necessary for reception using automatic volume control and meter tuning. Should the operator wish to use manual control of the receiver's sensitivity set the A.V.C. switch at OFF and adjust the R.F. GAIN control for maximum required sensitivity. The tuning meter will not function when manual control of the receiver's sensitivity is employed.

F.M. (Frequency Modulation) Reception. - To receive a frequency modulated signal, set the panel controls as follows:

POWER switch	-	Set at ON when operating receiver on alternating current. To turn off receiver set switch at OFF.
		CAUTION - Leave switch set at OFF when operating receiver from external batteries.
SEND/REC. switch	-	Set at REC. (Set at SEND to disable receiver when desired.)
A.M./F.M. switch	-	Set at F.M.
A.V.C. switch	-	Set at OFF.
R.F. GAIN control	-	Turn all the way to the right. (It is not necessary to actuate the switch.)
TUNING control	-	Set dial that is calibrated in megacycles to frequency of signal; adjust for zero setting of tuning meter.
ANTENNA control	-	Adjust for maximum signal level in headset or speaker if control is effective. (Adjustment is generally needed only on very weak signals.)
A.F. GAIN control	-	Adjust for desired signal level at headset or speaker.
TONE control	-	Set to please the listener.
A.N.L. switch	-	Set at OFF. (not used)

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CAUTION - Voltages at various points in this equipment are of sufficiently high potential to produce a severe shock. Locate the high potential points on the VOLTAGE-RESISTANCE DIAGRAM before attempting to service circuits that are "hot". IT'S A GOOD RULE TO DISCONNECT THE POWER SOURCE BEFORE MAKING ADJUSTMENTS WHEN POSSIBLE. BE CAREFUL.

1. PREVENTIVE MAINTENANCE

All components of the receiver should be given a thorough inspection at regular intervals. Keep the components clean and dry. Moisture, even in a completely tropicalized set may cause serious deterioration and produce general unsatisfactory operation. Dust and dirt materially effect both electrical and mechanical operation. Keep the various parts clean especially the tuning capacitor and associated gear drive. Dust should be blown out with dry air or brushed out carefully. Do not oil the gear teeth or the condenser wipers as noisy reception will result from intermittant electrical contact at these points. Noisy reception may also be caused by dirty condenser wipers, faulty gain controls, and switches, frayed cable connections, faulty tubes, etc. in the installation. Check accessible connections, switch contacts, etc. regularly making sure that all are clean and tight and the tubes and cable connectors are held securely in their sockets.

2. REPLACING TUBES, LAMPS, AND FUSES

a. Replacing Tubes. - All tubes with the exception of the four acorn types are accessible at the top of the chassis through the hinged cover of the cabinet. The four acorn type tubes are made accessible by removing the top cover of the r-f section which is held down by thumb screws. The acorn tubes should be inserted with the short end of the body in the socket. Acorn tubes are more fragile than the rest and should be handled accordingly. If the grid and plate clips on the connections to these tubes become loose replace or bend to fit. DO NOT ATTEMPT TO SOLDER DIRECTLY TO THE TUBE PIN as the heat generated by the soldering iron will crack the glass envelope. When replacing tubes, check the tube type carefully and replace with the correct tube type. Refer to the top view of the chassis to determine the location of the tubes and to the PARTS LIST for the type number and description of each.

b. Replacing Lamps. - The receiver employs two lamps with bayonet type sockets to illuminate the vernier dial and the tuning meter. The lamps illuminating the vernier dial scale and tuning meter are to be replaced by a 6/8-volt, 150 ma. (Brown bead) G.E. 47 or equivalent. The color code referred to, is the color of the glass bead above the glass stem inside the envelope of the lamp. The lamp illuminating the meter scale is removed by pulling the lamp socket from the rubber grommet in the meter case. When reinserting the lamp, do not push the socket assembly too far into the meter case as a hot spot of light will appear on the meter scale instead of even area of illumination.

c. Replacing Fuses. - Two fuses are used, one in each side of the a-c line. The fuse holders are located on the rear apron of the chassis and require a screw driver to remove the fuse. Replace burned out fuses with 3-ampere 250-volt, Little Fuse type 3AG or equivalent.

CAUTION - The fuses protect your equipment, don't take chances using fuses rated for a heavier current drain than 3 amperes.

3. PERIODIC ADJUSTMENTS

a. Tuning Meter Adjustment.

(1) The tuning meter zero setting control is located behind its front panel button type cover marked S-METER ADJ. Remove the button with a knife or screw driver blade.

(2) Disconnect the antenna and connect a jumper across terminals A_1, A_2, and GND.

(3) Set the front panel controls for amplitude modulation reception as follows:

(a) Set A.M./F.M. switch at A.M.

(b) Set A.V.C. switch at ON.

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(c) Turn R.F. GAIN control to right until the switch on the control clicks.

(d) Set A.F. GAIN control for minimum gain. (All the way to the left).

(e) Set A.N.L. switch at OFF.

(f) Set SEND-REC. switch at REC.

(4) With a screw driver set the S-METER ADJ. control for the zero reading on the S-meter scale of the tuning meter.

(5) Remove the antenna terminal jumper and replace antenna leads and meter adjustment cover button, the adjustment is completed.

b. Receiver Alignment. - The receiver has been carefully aligned at the factory and should not require realignment until the receiver requires new tubes in the r-f and i-f stages or shows signs of loss of sensitivity, off frequency calibration or requires service work on one or more of its r-f and i-f stages. Alignment should not be attempted by inexperienced personnel as maximum performance is obtained only by careful and intelligent alignment.

(1) Aligning Tools. -

(a) Signal generator capable of providing a 400-cycle modulated signal at 16 mc. and 130 to 210 mc. range. Recommended generators are the Ferris Instrument Corp. Model 18D or 18FS and the Measurements Corp. Model 75.

(b) A 50-ohm non-inductive dummy antenna resistor.

(c) Non-metallic screw driver. A bakelite screw driver with a short metal blade is very good.

(d) Audio output meter capable of handling 5 watts of audio power for either 500 or 5000-ohm loads.

(2) I-F Amplifier Alignment.

(a) Disconnect the grid lead of the type 954 mixer tube (V-3) and connect the signal generator to the grid of the mixer tube, using a small clip or flexible piece of wire to make the connection. Connect the ground wire of the generator to the receiver chassis.

CAUTION - Do not attempt to solder to the tube terminal as the heat of the soldering iron is certain to crack the glass envelope.

(b) Connect the output meter across the speaker terminals. Set the range of the output meter for its highest range to prevent overloading the meter accidently.

(c) Let the receiver warm up for approximately half an hour then set the receiver controls as follows:

R.F. GAIN control at maximum gain.

A.F. GAIN control at maximum gain permitted by local noise level. Work in a shielded room if possible.

A.M./F.M. switch at A.M.

A.V.C. switch at OFF.

A.N.L. switch at OFF.

SEND/REC. switch at REC.

(d) Set the signal generator frequency at 16 megacycles and turn on the 400-cycle modulation.

(e) Adjust i-f transformers T-5, T-6, T-7, and T-8 for maximum response by tuning for maximum signal level at the output meter using just enough signal generator output to provide a good resonant swing on the output meter. The signal level at the generator should run not more than 70 microvolts for a 500 milliwatt audio output level. Repeat the alignment procedure until assured of accurate alignment. Refer to

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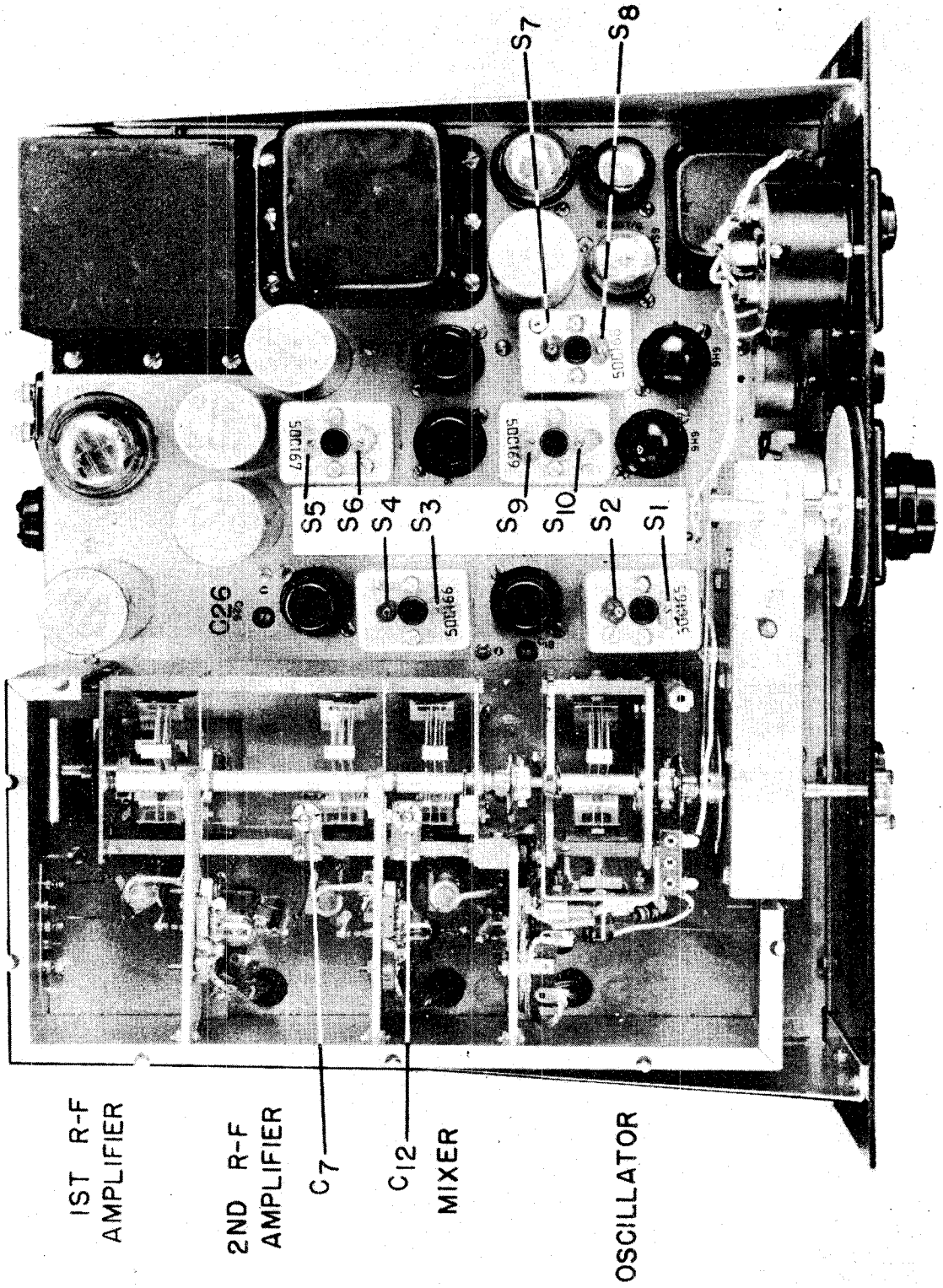

Figure 5-1. Radio Receiver Model S-37, top view showing alignment points.

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figure 5-1 for the location of i-f transformer adjustment screws S_1 through S_8 inclusive on i-f transformers T-5, T-6, T-7, and T-8.

(f) Disconnect the filament lead of the 1st i-f amplifier tube (V-4) at pin #2 of the d-c power input socket (SO-1) on the rear apron of the chassis. Refer to Fig. 7-7. Allow the filament of tube V-4 about one minute to cool off before proceding.

(g) Increase the output of the signal generator until a readable signal level is indicated by the output meter and adjust neutralizing capacitor C-18 for minimum output. While adjusting capacitor C-18, adjust slug adjustment S_3 on transformer T-6 for maximum output to compensate for detuning caused by adjusting C-18. Repeat the procedure until satisfied that the best possible settings have been obtained.

(h) Reconnect the filament lead of tube V-4 and disconnect the filament lead of the 2nd i-f amplifier tube V-5 at the d-c power input socket. Allow a minute for the tube to cool as before.

(i) Adjust neutralizing capacitor C-26 and slug adjustment S_5 on transformer T-7 for their optimmum settings as for the 1st i-f amplifier stage. Reconnect the filament lead again before proceeding.

(j) Detune transformers T-6 (Slugs S_3 and S_4) and T-8 (Slugs S_7 and S_8) until a fairly high signal generator output is required to produce a readable output meter reading. First adjust transformers T-5 and T-7 for maximum output, then adjust transformer T-8 and finally transformer T-6. Do not readjust transformers T-5 and T-7 when adjusting T-8 and T-6. Reduce the signal generator output as required while bringing these last two i-f transformers into alignment.

(3) Discrimator Transformer Alignment. -

(a) Set the A.M./F.M. switch at F.M.

(b) Leave the signal generator set at 16 mc. with 400 cycle modulation.

(c) Adjust the secondary slug (S_{10}) of the discriminator transformer (T_9) for zero signal level at the output meter. Note that this adjustment is critical, therefore turn the screw slowly.

(d) Detune the signal generator from the 16 mc i-f frequency until a readable indication is obtained at the output meter and adjust the primary slug (S-9) for maximum output meter reading.

(e) Balance up the discriminator stage as follows:

1. Detune the signal generator to either side of the 16 mc resonant point and note the maximum output meter readings obtained. If they are equal, the discriminator stage is functioning properly, if not, proceed with the balancing adjustment that follows.

2. To balance up an unbalanced condition, tune the signal generator to the resonant point of the weaker peak and tune the primary slug (S_9) until the output rises about one-half the difference of the unbalanced readings obtained in step 1. Recheck for balance and repeat the balancing procedure if necessary.

> NOTE - If a balance cannot be obtained by adjusting the primary slug (S_9), the discriminator's secondary slug (S_{10}) has been misadjusted slightly and will require a very slight readjustment in either direction. The direction of adjustment that will cause the off-tune peaks to assume the same values is the correct one. Note that the quality of the f-m signal will depend materially upon the degree of balance obtained, hence, a little care will be well repaid in performance.

(f) Disconnect the signal generator and reconnect the grid lead to the mixer tube, the alignment of the i-f amplifier stages is completed.

(4) R-F Amplifier Alignment. -

(a) Connect the signal generator to the "A_1" antenna terminal through a 50-ohm resistor and connect the ground wire of the signal generator to terminal "A_2". Disconnect the jumper wire between "A_2" and "GND" as the generator should not be grounded to the receiver's chassis for the following adjustments.

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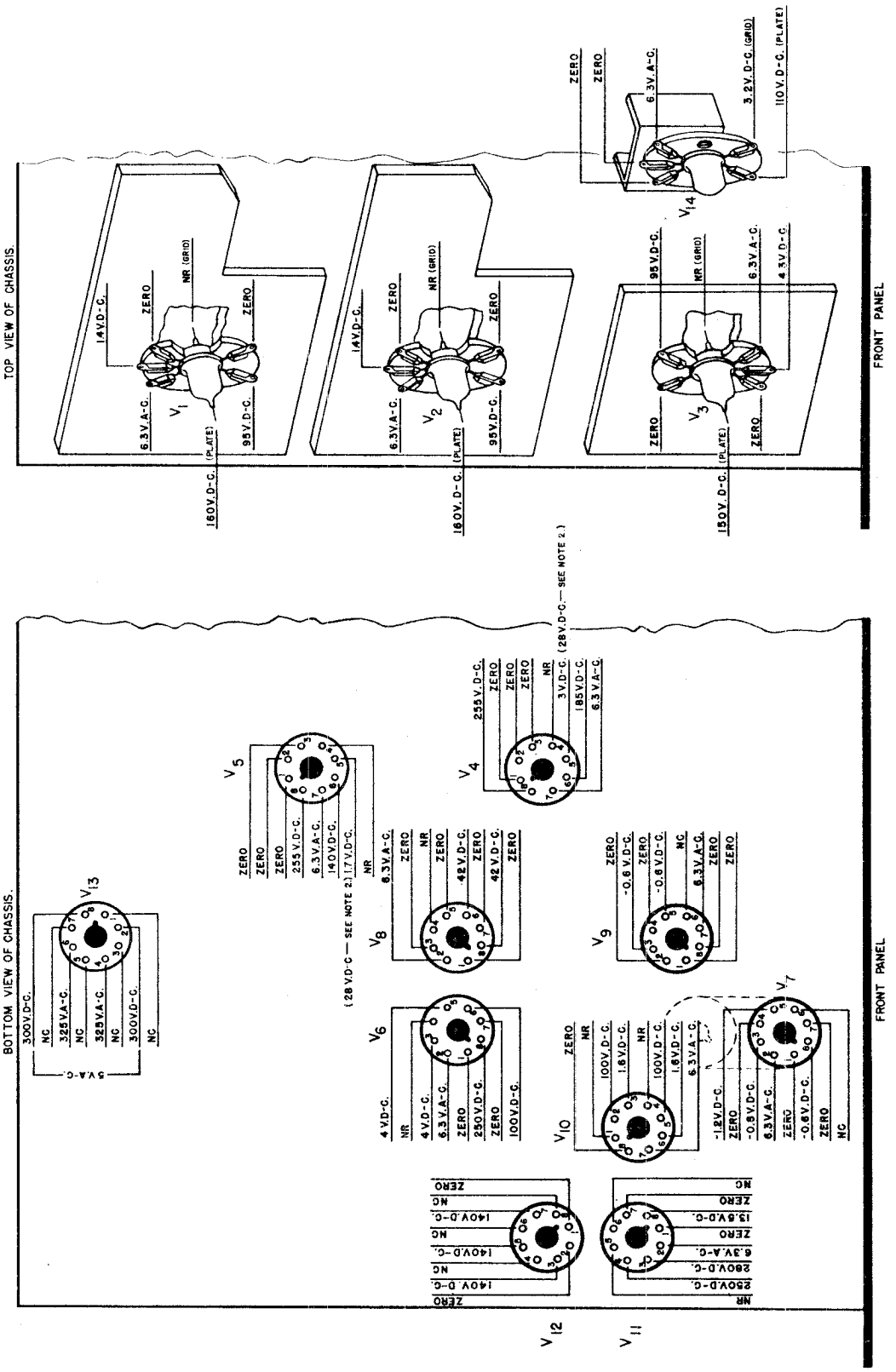

Figure 5-2. Radio Receiver Model S-37, voltage chart.

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(b) Set the receiver controls as for i-f amplifier alignment. Refer to paragraph 3. b. (2) (c) this section.

(c) Set the signal generator at 210 mc. and turn on 400 cycle modulation.

Note - if your signal generator will not reach 210 mc. use the harmonic of the generator signal.

(d) Set the receiver's TUNING dial at 210 mc. and set the ANTENNA control for maximum output, then adjust capacitors C-7 and C-12 for maximum output while "rocking" the TUNING dial control back and forth across the generator signal. Use just enough signal generator output to provide a readable resonance point at the output meter.

NOTE - Should it be necessary to adjust the frequency of the oscillator to make the receiver's dial reading fall on 210 mc exactly, loosen and shift the heavy wire primary winding (oscillator transformer T-4 primary) nearest to the front panel and the heavy wire coupling loop on the opposite side of the heavy tubing secondary winding. Take care that the coupling between the primary winding and the secondary is not reduced below that necessary to maintain adequate feed back for the oscillator over the entire band. Having obtained proper adjustment recement the winding in place with Amphenol "912" or an equivalent low loss cement. After adjusting the oscillator frequency realign capacitors C-7 and C-12 as described above.

(e) Set the signal generator at 130 mc, tune in the signal on the receiver and check to see that the receiver's main tuning dial reads 130 mc. If not, the secondary (heavy tubular winding) inductance of transformers T-1, T-2, T-3, and T-4 must be adjusted by loosening the clamps and set screws which hold them in place and sliding the transformers back and forth. Tighten all set screws after adjustment.

NOTE - If it is necessary to adjust the inductance of the windings at 130 mc. the adjustments in paragraph (d) must be repeated at 210 mc to bring the high frequency end of the range into alignment again.

(f) Repeat steps (d) and (e) until the receiver alignment and calibration are satisfactory then make the following check to see that the oscillator frequency falls below the signal frequency as it should. For example: Set the receiver dial at 165 mc., turn up the signal generator output to about 5000 times normal, and set the signal generator frequency at twice the i-f frequency lower than 165 mc. or 133 mc. An image signal should be heard. If not, tune the signal generator to twice the i-f frequency higher than the signal frequency or 197 mc. and look for the image there. If the image shows up at the 197 mc. the receiver's oscillator is operating above the signal frequency and must be readjusted so that it falls below the signal frequency. Due to the construction of this receiver it is considered impossible to adjust the oscillator frequency so that it will fall above the signal frequency, however, it is always well to check for the image after making any extensive alignment adjustments.

(g) When completely aligned the overall receiver sensitivity will usually run between 10 to 15 microvolts for 500 milliwatts audio output. If your receiver falls reasonably close to this sensitivity, consider your alignment adjustments satisfactory.

4. LOCATING FAULTS WITH A VOLT-OHM METER

a. Voltage Chart. - Refer to Fig. 5-2. for the tube socket terminal voltages. Voltages shown are those between the terminal and ground (chassis) unless otherwise specified. To identify the tube socket connections, refer to Fig. 7-6. The readings were taken with an RCA Volt Ohmyst Junior analyzer using 20,000 ohm per volt sensitivity. To prepare the receiver for measurement, disconnect the antenna, connect a jumper between the antenna terminals A_1, A_2, and GND., disconnect the speaker and replace with a 5000-ohm 10-watt resistor across the 5000-ohm output terminals or a 500-ohm 10-watt resistor across the 500-ohm terminals, and set the controls as follows:

POWER, A.V.C. and A.N.L. switches at ON.

SEND/REC. switch at REC.

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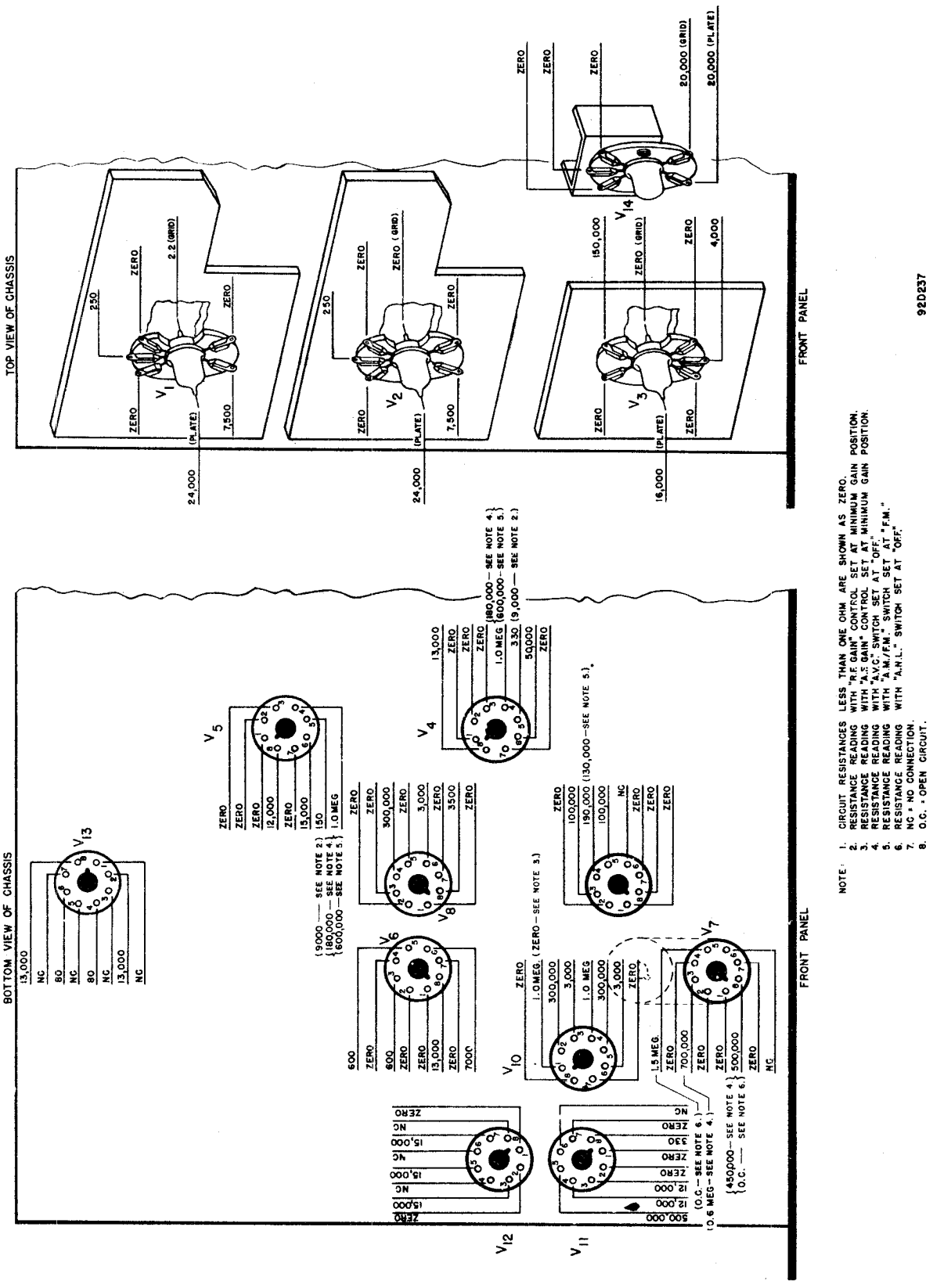
THE HALLICRAFTERS CO. MODEL S-37



NOTE:
1. CIRCUIT RESISTANCES LESS THAN ONE OHM ARE SHOWN AS ZERO.
2. RESISTANCE READING WITH "R.F. GAIN" CONTROL SET AT MINIMUM GAIN POSITION.
3. RESISTANCE READING WITH "A.F. GAIN" CONTROL SET AT MINIMUM GAIN POSITION.
4. RESISTANCE READING WITH "A.V.C." SWITCH SET AT "OFF." "F.M."
5. RESISTANCE READING WITH "A.M./F.M." SWITCH SET AT "F.M."
6. RESISTANCE READING WITH "A.N.L." SWITCH SET AT "OFF."
7. NC = NO CONNECTION.
8. O.C. = OPEN CIRCUIT.

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Figure 5-3. Radio Receiver Model S-37, resistance chart.

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A.M./F.M. switch at A.M.

R.F. GAIN and A.F. GAIN controls at maximum gain position.

ANTENNA TUNING and TONE controls do not effect readings.

b. Resistance Chart. - Refer to Fig. 5-3. for the tube socket terminal to ground (chassis) resistance measurements. To identify tube socket connections, refer to Fig. 7-6. The readings were taken with an RCA Volt Ohmyst Junior analyzer. To prepare the receiver for measurement, disconnect the a-c line cord and set the controls as follows:

POWER, A.V.C. and A.N.L. switches at ON.

SEND/REC. switch at REC.

A.M./F.M. switch at A.M.

R.F. GAIN and A.F. GAIN controls at maximum gain position.

TONE control at maximum clock-wise position.

ANTENNA and TUNING controls do not effect readings.

CAUTION - The receiver's line cord, if operating from an a-c outlet, or the battery supply cord, if operating from a d-c supply, must be disconnected before making resistance measurements.

c. Checking Transformer and Inductor Windings With an Ohm-meter. -

NOTE - One terminal of each winding measured must be disconnected from the circuit to avoid measuring circuit resistances instead of winding resistance alone as indicated in the chart.

Circuit symbol	Name of part	Winding	Winding terminals	D-C resistance (ohms)
T-10	TRANSFORMER, audio.	Primary.	1 to 2	300
		5000-ohm secondary.	3 to 6	250
		500-ohm secondary.	3 to 5	22
T-11	TRANSFORMER, filament power.	115-volt primary.	± to 115 V.	12
		230-volt primary.	± to 230 V.	40
		6.3-volt secondary.	-	Less than one ohm.
		5.0-volt secondary.	-	Less than one ohm.
T-12	TRANSFORMER, plate power	115-volt primary.	± to 115 V.	7
		230-volt primary.	± to 230 V.	20
		½ secondary.	CT to 288 V.	75
		Secondary	288 V. to 288 V.	150
L-4	REACTOR, filter.	-	1 to 2	85
L-5	REACTOR, filter.	-	-	300

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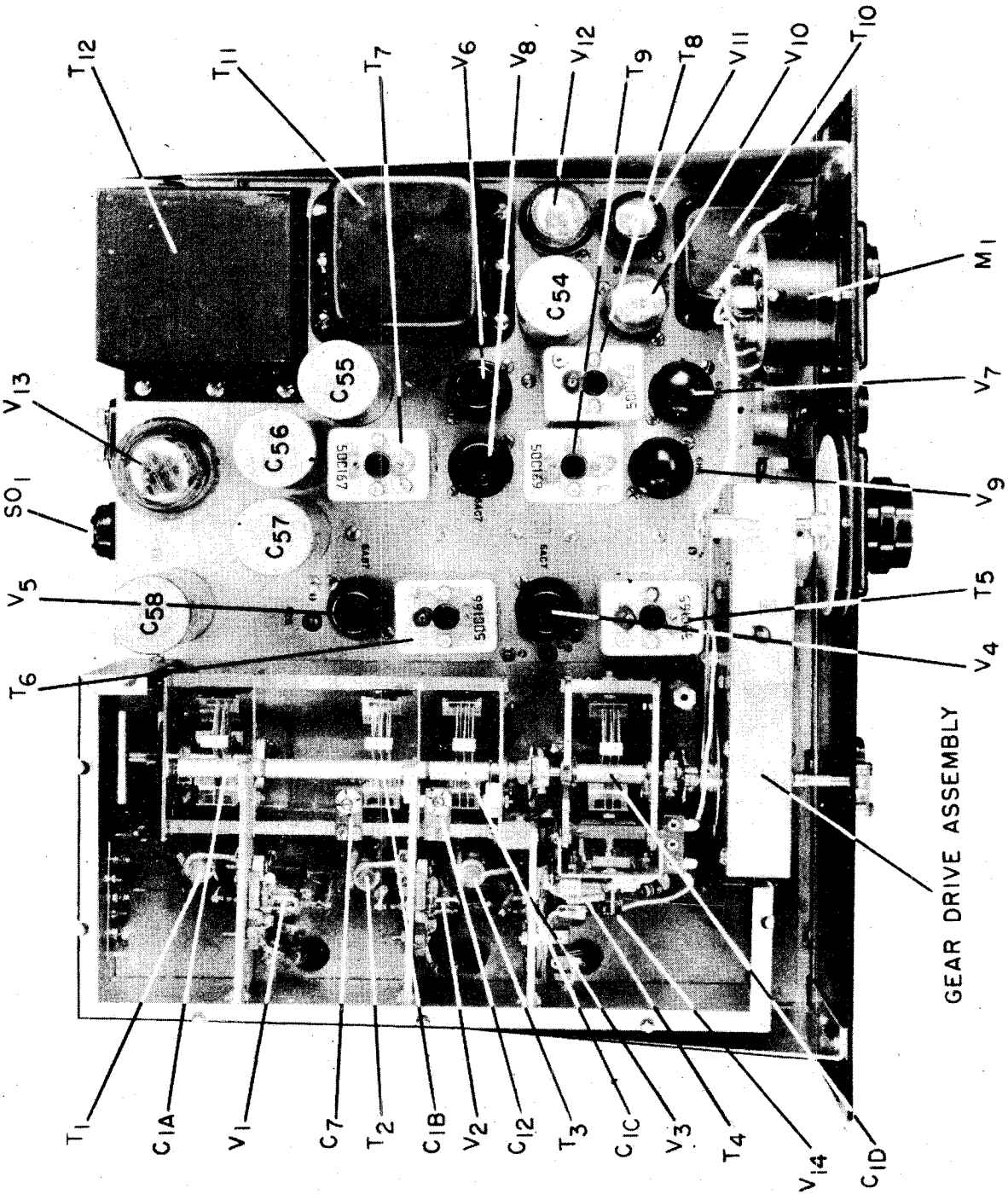

Figure 7-1. Radio Receiver Model S-37, top view.

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MODEL S-37 THE HALLICRAFTERS CO.

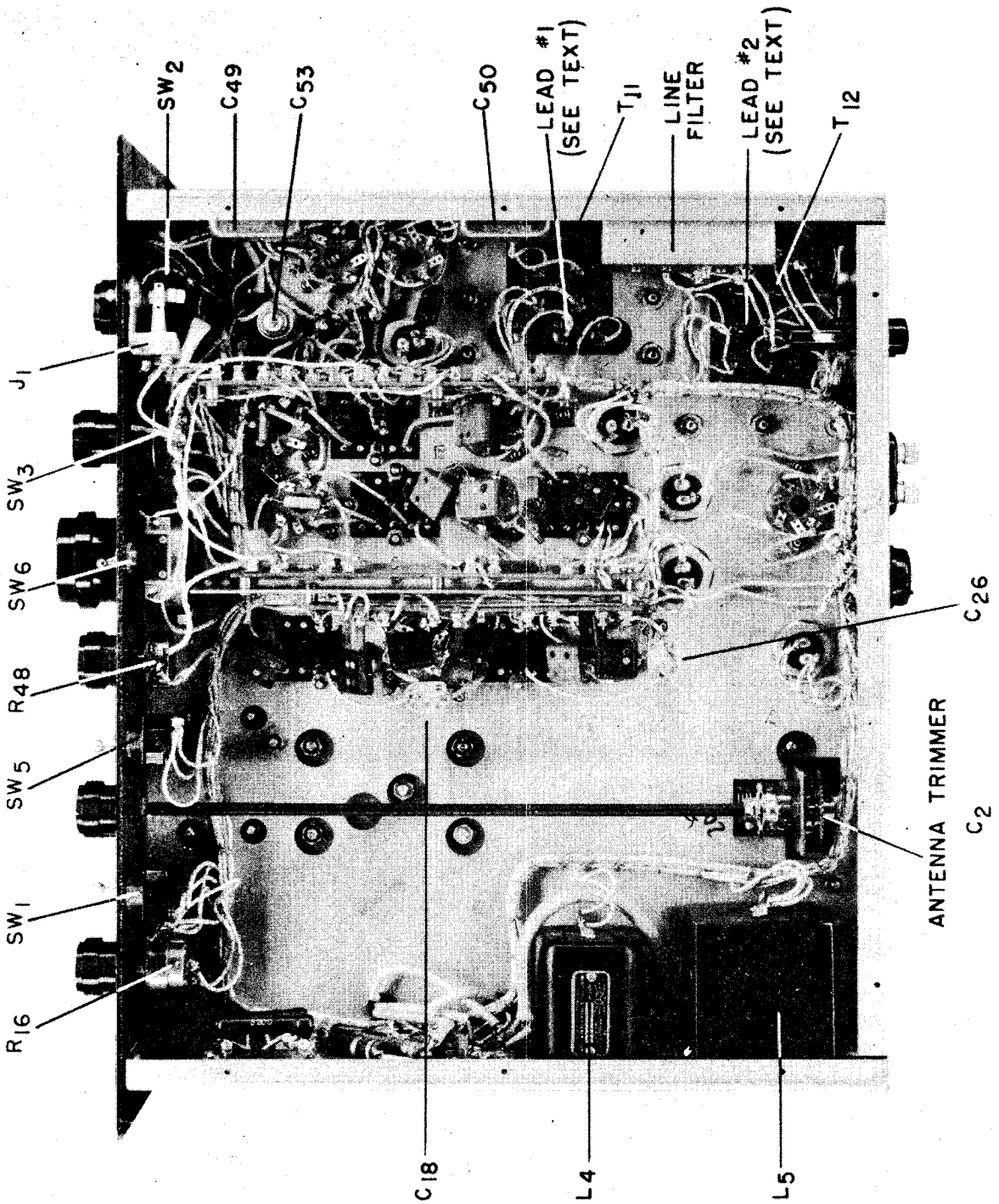

Figure 7-2. Radio Receiver Model S-37, bottom view.

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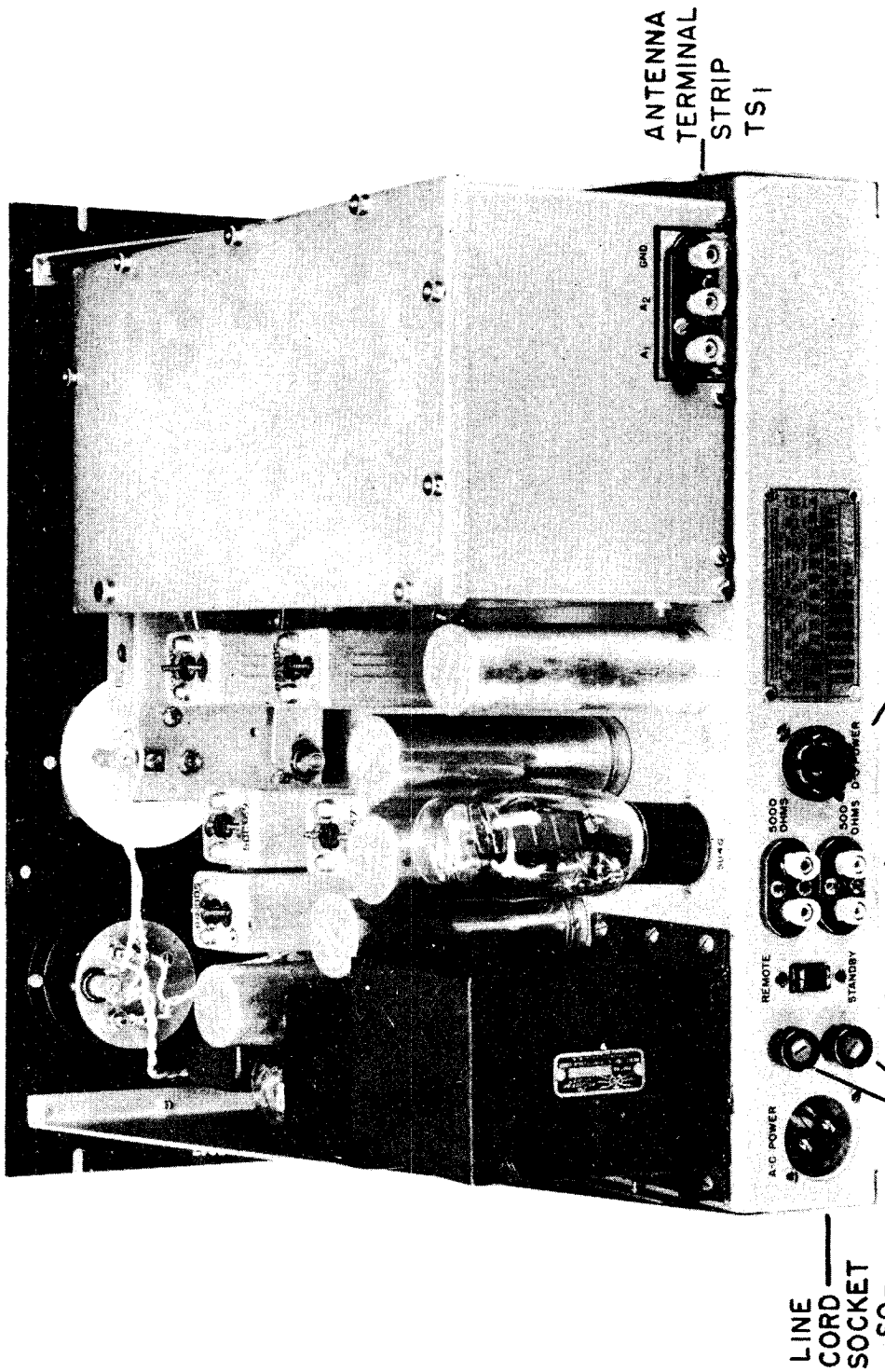

Figure 7-3. Radio Receiver Model S-37, rear view.

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Ref. Symbol	Name of Part and Description	Mfr Code and Type No.	Hallicrafter's Part No.
C_{1A}, C_{1B}, C_{1C}	Capacitor, variable: air dielectric; 4 sections, section 1 (C_{1A}), approx. 6 mmf min to 26 mmf max. sections 2 & 3 (C_{1B} and C_{1C}) capacity approx. 6 mmf min to 34 mmf max. section 4 (C_2) capacity; approx. 6 mmf min. to 10.5 mmf max; 6-$\frac{1}{2}$" lg excluding shaft, shaft $\frac{1}{2}$" lg x 0.376/0.373" diam. for sections 1, 2 and 3, shaft for section 4 is 21/32" lg x $\frac{1}{4}$" diam; section 1 has 4 plates, sections 2 & 3 have 5 plates each, section 4 has 6 plates, common stator plates for sections 1 and 4; X2B bakelite insulation; spade lug mtg bolts not supplied with unit; each section has rotor shaft insulated from other sections; section 4 is separate rotor assembly bolted to main unit so that the plates mesh with section 1 stator plates and has its own drive shaft assembly consisting of a 1 to 1 ratio brass and fibre gear drive assembly.	OM Special	48C067
C_{1D}	Capacitor, variable, single section, effective capacity 28 mmf., air dielectric, unit is ganged to C_1.	H Special	48B066
C_2	Section 4 of Hallicrafters variable capacitor assembly 48C067; refer to description of C_{1A}, C_{1B}, C_{1C} for details.	-	-
C_3	Capacitor, fixed; mica dielectric; 330 mmf. $\pm$ 20%; 500 v dcw; case 51/64" lg x 15/32" wd x 7/32" thk; two #20 AWG wire leads 1-1/8" lg; humidity resistant; same as C_4, C_5, C_8, C_9, C_{11}, C_{13}, C_{59}, C_{61}, C_{62}, C_{63}, C_{70}, C_{72}.	ASA	CM20A331M
C_4	Same as C_3.	-	-
C_5	Same as C_3.	-	-
C_6	Capacitor, fixed: ceramic dielectric; 5-6$\frac{1}{2}$ mmf: 500 vdcw; TC-0.00075 mmf/mmf/°C; case 0.625" lg x 0.225" dia; two #22 AWG tinned copper or brass wire leads 1-$\frac{1}{2}$" lg; same as C_{10}.	CRL type 807004 NTC	47A005
C_7	Capacitor, variable; polystyrene dielectric; 2 mmf; same as C_{12}.	H Special	44A081
C_8	Same as C_3.	-	-
C_9	Same as C_3.	-	-
C_{10}	Same as C_6.	-	-
C_{11}	Same as C_3.	-	-
C_{12}	Same as C_7.	-	-
C_{13}	Same as C_3.	-	-
C_{14}	Capacitor, fixed: mica dielectric; 6200 mmf. $\pm$ 10%; 500 vdcw; case body 53/64" square x 11/32" thk; humidify resistant; two #18 AWG wire leads 1-1/8" lg; same as C_{21}, C_{28}.	ASA	CM35A622J
C_{15}	Capacitor, fixed: ceramic dielectric; 50 mmf. $\pm$ 10%; 500 vdcw; T. C. 0.00075 max negative; body 7/16" lg x 7/32" diam; two #22 AWG wire leads 1-$\frac{1}{2}$" lg; part of transformer T_5.	ER type K	47A091
C_{16}	Same as C_{15}; part of transformer T_5.	-	-
C_{17}	Capacitor, fixed. mica dielectric; 3900 mmf $\pm$ 10%; 500 vdcw; case 53/64" x 53/64" x 11/32"; humidity resistant: two #18 AWG wire leads 1-1/8" lg; same as C_{74}.	ASA	CM35A392K
C_{18}	Capacitor, variable: ceramic dielectric; 2-6 mmf.; solder lug terminals; same as C_{26}.	CRL type 820-A	44A079
C_{19}	Capacitor, fixed: mica dielectric; 5600 mmf. $\pm$ 10%, 500 vdcw; case body 53/64" x 53/64" x 11/32"; humidity resistant; two #18 AWG wire leads 1-1/8" lg; same as C_{24}, C_{27}, C_{76}.	ASA	CM35A562K
C_{20}	Capacitor, fixed: mica dielectric; 2200 mmf $\pm$ 20%; 500 vdcw; case 53/64" x 53/64" x 9/32"; humidity resistant, two #18 AWG wire leads 1-1/8" lg.	ASA	CM20A222M
C_{21}	Same as C_{14}.	-	-
C_{22}	Same as C_{15}; part of transformer T_6.	-	-
C_{23}	Same as C_{15}; part of transformer T_6.	-	-
C_{24}	Same as C_{19}.	-	-
C_{25}	Capacitor, fixed: mica dielectric; 3300 mmf $\pm$ 10%; 500 vdcw; case 53/64" x 53/64" x 9/32"; humidity resistant; two #18 AWG wire leads 1-1/8" lg.	ASA	CM30A332K
C_{26}	Same as C_{18}.	-	-
C_{27}	Same as C_{19}.	-	-
C_{28}	Same as C_{14}.	-	-
C_{29}	Same as C_{15}; part of transformer T_7.	-	-
C_{30}	Same as C_{15}; part of transformer T_7.	-	-
C_{31}	Not used.		
C_{32}	Capacitor, fixed: mica dielectric; 2200 mmf $\pm$ 10%; 500 vdcw; case 53/64" x 53/64" x 9/32"; humidity resistant; two #18 AWG wire leads 1-1/8" lg; same as C_{33}, C_{43}, C_{44}.	ASA	CM30A222K
C_{33}	Same as C_{32}.	-	-
C_{34}	Capacitor, fixed: mica dielectric; 6200 mmf $\pm$ 5%; 500 vdcw; case body 53/64" square x 11/32" thk; humidity resistant; two #18 AWG wire leads 1-1/8 lg.	ASA	CM35A622J
C_{35}	Same as C_{15}; part of transformer T_8.	-	-
C_{36}	Same as C_{15}; part of transformer T_8.	-	-
C_{37}	Capacitor, fixed: mica dielectric; 47 mmf $\pm$ 10%; 500 vdcw; case 51/64" x 51/64" x 9/32"; humidity resistant; two #20 AWG wire leads 1-1/8" lg; same as C_{38}, C_{46}.	ASA	CM20A470K
C_{38}	Same as C_{37}.	-	-
C_{39}	Capacitor, fixed: paper dielectric; 0.05 mfd $\pm$ 20%; 400 vdcw; molded bakelite case 1-7/16" lg x 3/4" wd x 3/8" thk; two #20 AWG wire leads 1-$\frac{1}{2}$" lg.	MIC type 345	46A1503H
C_{40}	Capacitor, fixed: ceramic dielectric; 25 mmf $\pm$ 10%; 500 vdcw; T.C. negative 0.00075 mmf/mmf/degree C; body 0.625" lg x 0.225" diam; two #22 AWG wire leads 1-$\frac{1}{2}$" lg; part of discriminator transformer T_9.	ER type K	47A103

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Ref. Symbol	Name of Part and Description	Mfr Code and Type No.	Hallicrafter's Part No.
C_{41}	Same as C_{15}; part of discriminator transformer T_9.	-	-
C_{42}	Same as C_{15}; part of discriminator transformer T_9.	-	-
C_{43}	Same as C_{32}.	-	-
C_{44}	Same as C_{32}.	-	-
C_{45}	Capacitor, fixed: mica dielectric; 470 mmf ± 10%; 500 vdcw; case 51/64" x 15/32" wd x 7/32" thk; humidity resistant; two #20 AWG wire leads 1-1/8" lg; same as C_{47}.	ASA	CM20A471K
C_{46}	Same as C_{37}.	-	-
C_{47}	Same as C_{45}.	-	-
C_{48}	Capacitor, fixed: mica dielectric; 8200 mmf ± 10%; 500 vdcw; case 53/64" x 53/64" x 11/32"; humidity resistant; two #18 AWG wire leads 1-1/8" lg; same as C_{51}, C_{52}, C_{64}, C_{65}, C_{66}, C_{67}.	ASA	CM35A822K
C_{49}	Capacitor, fixed: electrolytic; 20 mfd -20 + 50%; 100 vdcw; bathtub metal case 1-3/4" lg x 1" wd x 13/16" h, exeluding lugs; two mtg lugs with 2-1/8" mtg/c; two solder lug terminals; same as C_{50}.	IC type 100BE20	45B033
C_{50}	Same as C_{49}.	-	-
C_{51}	Same as C_{48}.	-	-
C_{52}	Same as C_{48}.	-	-
C_{53}	Capacitor, fixed: paper dielectric; 0.005 mfd ± 20%; 1000 vdcw; round metal case 2-½" h x 11/16" diam; oil filled; one mtg hole 9/16" from center of unit on mtg base; mtg hole .178/.188" diam.; base is one terminal, solder lug on top is other terminal.	IC	46A007
C_{54}	Capacitor, fixed: paper dielectric; 4 mfd. ± 10%, 600 vdcw; tubular metal case 4-1/2" lg x 1-1/2" diam. overall; mtd by bushing having 3/4-16 NF-2 thd, nut and lock washer included; solder lug is one terminal, can is other terminal; same as C_{55}, C_{56}, C_{57}, C_{58}.	CD type TL6040	46A018
C_{55}	Same as C_{54}.	-	-
C_{56}	Same as C_{54}.	-	-
C_{57}	Same as C_{54}.	-	-
C_{58}	Same as C_{54}.	-	-
C_{59}	Same as C_3.	-	-
C_{60}	Capacitor, fixed: mica dielectric; 330 mmf ± 10%; 500 vdcw; case 51/64 lg x 15/32" wd x 7/32" thk; humidity resistant; two #20 AWG wire leads 1-1/8" lg.	ASA	CM20A331K
C_{61}	Same as C_{45}.	-	-
C_{62}	Same as C_3.	-	-
C_{63}	Same as C_3.	-	-
C_{64}	Same as C_{48}.	-	-
C_{65}	Same as C_{48}.	-	-
C_{66}	Same as C_{48}.	-	-
C_{67}	Same as C_{48}.	-	-
C_{68}	Capacitor, fixed: silver mica dielectric; 150 mmf ± 20%; 500 vdcw; button type; 13/32" x 29/64" diam; 2 solder lug terminals; mtg hole tapped #3-48 x 11/64" d.	ER type 370-A	47A135
C_{69}	Not used.		
C_{70}	Same as C_3.	-	-
C_{71}	Capacitor, fixed: ceramic dielectric; 100 mmf ± 5 mmf; 500 vdcw; T.C. positive 0.0007 mmf/mmf/degree C; body 11/16" lg x 7/32" diam; vacuum wax impreganted; two #20 AWG wire leads 1-½" lg; part of oscillator transformer T_4.	ER type N-750L	47A108
C_{72}	Same as C_{45}.	-	-
C_{73}	Same as C_{15}; part of transformer T_7.	-	-
C_{74}	Same as C_{17}.	-	-
C_{75}	Not used.		
C_{76}	Same as C_{19}.	-	-
F_1	Fuse, cartridge: 3 amp 250-volt; 3 AG; glass enclosed; ferrule caps; same as F_2.	LF type 1043	39A301
F_2	Same as F_1.	-	-
J_1	Jack, telephone: headphone; short; takes standard tip and sleeve; mounts by bushing 3/8"-32x3/8"; furnished with one brass hex nut and one brass ni pl 5/8" OD washer; solder lug terminals.	U type ST-627	36B011
L_1	Coil, r-f: 15.5 uh ± 10%; distributed capacity 1 mmf ± 20%; d-c resistance 4.10 ohms ± 3%; "Q" with 100 mmf capacity 65 ± 15%; 75 turns #38 SCC wire on molded natural bakelite rod 15/16" lg x 5/32" diam; two wire leads 1-½" lg; Chinese red laquer coating.	SWI Special	53A008
L_2	Coil, filter: line; 46 uh; 57 turns #22 SCE wire, universal winding; wound on glazed ceramic form 1" lg x ½" diam, tapped #6-32 x 7/16 d; winding is 1" lg x 1-1/16" diam; two extended leads with spaghetti covering; tape over spaghetti and leads to prevent leads breaking; same as L_3.	SWI Special	53A095
L_3	Same as L_2.	-	-
L_4	Coil, filter: input; 2 henries ± 15%; rated d-c current 150 ma; d-c resistance 85 ohms ± 10%; iron core; 1850 turns of #31 enameled copper wire; metal case 2-5/8" h x 2-3/16" wd x 2-11/16" lg; mtg flange has six mtg holes, 3 on each side, of 3/16" diam, spaced 3/4" apart; on 2-3/8" mtg centers; two lug terminals on top of case, each terminal 3/16" diam, spaced 5/8" apart; coil is vacuum wax impregnated; voltage breakdown 2400 volts A.M.S. between coil and core or coil and case.	CTC type 7488	56B011
L_5	Coil, filter: output; 12 henries; rated d-c current 90 ma; d-c resistance 298 ohms at 75°C; test voltage 2400 volt r.m.s. between coil and core or coil and case; hermetically sealed in metal case 3-1/16" h x 2-3/8" wd x 2-½" lg; four #8-32 NC thread mtg studs on 1-½" x 1-3/4" mtg centers; hardware included; two lug terminals on top spaced 23-32" apart.	CTC type 7845	56B012

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Ref. Symbol	Name of Part and Description	Mfr Code and Type No.	Hallicrafter's Part No.
L_6	Coil, r-f: 4.2 uh ± 10%; distributed capacity 1 mmf ± 20%; d-c resistance 0.25 ohms ± 10%; "Q" with 100 mmf capacitor 100 ± 20%; 42 turns #28 ESCC copper wire on molded natural bakelite form 7/8" lg x 9/32" diam; Chinese blue lacquer coated; two copper wire leads 1-½" lg.	SWI Special	53A009
LM_1	Lamp, incandescent: pilot; 6-8 volt, 0.15 amp; bayonet type base.	GE type 47	39A004
LM_2	Same as LM_1.	-	
PL_1	Connector, male contact: octal; molded bakelite body, 1" lg x 1-½" diam overall; prongs are numbered from 1 to 8 on both sides; includes insulated jumper between 3 and 4 and one between 6 and 7.	AP type CP-8	35A003
M_1	Meter, micro ammeter: range 160-0-40 microamperes; accuracy ± 20% of full scale length 1.65" covered in 90° of pointer swing; approx resistance 1250 ohms d-c; damping factor 8 (full scale length); metal case 1-3/16 d x 2-½" diam; mtd by metal flange 3-½" diam having 3 mtg holes 1/8" diam spaced 120° apart on 1-3/16" radius; two stud terminals at rear ¾" long x #10-32 thread; flange is part of case.	B Special	82A036
R_1	Resistor, fixed: 2.2 ohm ± 10%; ½ watt; composition; insulated; 7/16" lg x 0.215" diam; two #18 AWG leads 1-½" lg; part of transformer T_1.	ER type 504	23A016
R_2	Resistor, fixed: 270 ohm ± 10%; ½ watt; composition; humidity resistant; insulated; 0.655" lg x 0.249 diam; two #21 AWG wire leads 1-½" lg; same as R_5, R_{44}.	ASA	RC21AE271K
R_3	Resistor, fixed: 1000 ohm ± 20%; ½ watt; composition; humidity resistant; insulated; 0.655" lg x 0.249" diam; two #21 AWG wire leads 1-½" lg; same as R_4, R_6, R_7, R_9, R_{10}, R_{23}, R_{29}.	ASA	RC21AE102M
R_4	Same as R_3.	-	-
R_5	Same as R_2.	-	-
R_6	Same as R_3.	-	-
R_7	Same as R_3.	-	-
R_8	Resistor, fixed: 12,000 ohms ± 10%; 2 watt; composition; insulated; humidity resistant; 1.78" lg x 0.342" diam; two #19 AWG wire leads 1-1/2" lg.	ASA	RC41AE123K
R_9	Same as R_3.	-	-
R_{10}	Same as R_3.	-	-
R_{11}	Resistor, fixed: 33 ohm ± 10%; ½ watt; composition; insulated; humidity resistant; 0.655" lg x 0.249" diam; two #21 AWG wire leads 1-½" lg; same as R_{21}, R_{25}, R_{39}, R_{64}.	ASA	RC21AE330K
R_{12}	Resistor, fixed: 100,000 ohm ± 10%; ½ watt; composition; insulated; humidity resistant; 0.468" lg x 0.249" diam; two #21 AWG wire leads 1-½" lg; part of transformer T_5. Same as R_{19}, R_{45}, R_{46}.	ASA	RC20AE104K

Ref. Symbol	Name of Part and Description	Mfr Code and Type No.	Hallicrafter's Part No.
R_{13}	Resistor, fixed: 100,000 ohm ± 10%; ½ watt; composition; insulated; humidity resistant; 0.655" lg x 0.249" diam; two #21 AWG wire leads 1-½" lg; same as R_{15}, R_{33}.	ASA	RC21AE104K
R_{14}	Resistor, fixed: 330 ohm ± 10%; ½ watt; composition; insulated; humidity resistant; 0.655" lg x 0.249" diam; two #21 AWG wire leads 1-½" lg; same as R_{24}, R_{53}, R_{60}.	ASA	RC21AE331K
R_{15}	Same as R_{13}.	-	-
R_{16}	Resistor, variable: 10,000 ohm ± 20%; carbon; #8 reversed taper; shaft 1" long x ¼" diam; 3 solder lug terminals; center lug is variable contact; includes switch SW_3.	CT type 135	25C058
R_{17}	Resistor, fixed: 39,000 ohm ± 10%; ½ watt; composition; insulated; humidity resistant; 0.655" lg x 0.249" diam; two #21 AWG wire leads 1-½" lg.	ASA	RC21AE393K
R_{18}	Resistor, variable: 330 ohm ± 20%; ½ watt; composition; insulated; humidity resistant; 0.655" lg x 0.249" diam; two #21 AWG wire leads 1-½" lg.	ASA	RC21AE331M
R_{19}	Same as R_{12}; part of transformer T_6.	-	-
R_{20}	Resistor, fixed: 100,000 ohm ± 20%; ½ watt; composition; insulated; humidity resistant; 0.655" lg x 0.249" diam; two #21 AWG wire leads 1-½" lg; same as R_{37}, R_{45}, R_{46}.	ASA	RC21AE104M
R_{21}	Same as R_{11}.	-	-
R_{22}	Resistor, fixed: 150 ohm ± 10%; ½ watt; composition; insulated; humidity resistant; 0.655" lg x 0.249" diam; two #21 AWG wire leads 1-½" lg.	ASA	RC21AE151K
R_{23}	Same as R_3.	-	-
R_{24}	Same as R_{14}.	-	-
R_{25}	Same as R_{11}.	-	-
R_{26}	Not used		
R_{27}	Resistor, fixed: 560 ohm ± 10%; ½ watt; composition; insulated; humidity resistant; 0.655" lg x 0.249" diam; two #21 AWG wire leads 1-½" lg.	ASA	RC21AE561K
R_{28}	Resistor, fixed: 7500 ohm ± 10%; 10 watt; wire wound; vitreous baked enameled coated; 1-3 4" lg x 3 8" max diam; two #18 AWG wire leads 1-3 8" lg.	U type CC	24BG752E
R_{29}	Same as R_3.	-	-
R_{30}	Resistor, fixed: 1000 ohm ± 10%; ½ watt; composition; insulated, humidity resistant; 0.655" lg x 0.249" diam; two #21 AWG wire leads 1-½" lg.	ASA	RC21AE102K
R_{31}	Resistor, fixed: 47,000 ohm ± 10%; ½ watt; composition; insulated; humidity resistant; 0.655" lg x 0.249" diam; two #21 AWG wire leads 1-½" lg; same as R_{38}.	ASA	RC21AE473K
R_{32}	Resistor, fixed: 1 megohm ± 20%; ½ watt; composition; insulated; humidity resistant; 0.655" lg x 0.249" diam; two #21 AWG wire leads 1-½" lg.	ASA	RC21AE105M
R_{33}	Same as R_{13}.		

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Ref. Symbol	Name of Part and Description	Mfr Code and Type No.	Hallicrafter's Part No.
R_{34}	Resistor, fixed: 270,000 ohm ± 10%; ½ watt; composition; insulated; humidity resistant; 0.655" lg x 0.249" diam; two #21 AWG wire leads 1-½" lg; same as R_{35}, R_{41}, R_{50}.	ASA	RC21AE274K
R_{35}	Same as R_{34}.	-	-
R_{36}	Resistor, fixed: 470,000 ohm ± 20%; ½ watt; composition; insulated; humidity resistant; 0.655" lg x 0.249" diam; two #21 AWG wire leads 1-½" lg.	ASA	RC21AE474M
R_{37}	Same as R_{20}.	-	-
R_{38}	Same as R_{31}.	-	-
R_{39}	Same as R_{11}.	-	-
R_{40}	Resistor, fixed: 3,900 ohm ± 10%; 2 watt; composition; insulated; humidity resistant; 1.78" lg x 0.242" diam; two #19 AWG wire leads 1-½" lg.	ASA	RC41AE392K
R_{41}	Same as R_{34}.	-	-
R_{42}	Resistor, fixed: 3300 ohm ± 10%; 1 watt; composition; insulated; humidity resistant; 1.28" lg x 0.310" diam; two #20 AWG wire leads 1-½" lg.	ASA	RC31AE332K
R_{43}	Resistor, fixed: 330,000 ohm ± 10%; ½ watt; composition; insulated; humidity resistant; 0.655" lg x 0.249" diam; two #21 AWG wire leads.	ASA	RC21AE334K
R_{44}	Same as R_{2}.	-	-
R_{45}	Same as R_{12}; part of transformer T_9.	-	-
R_{46}	Same as R_{12}; part of transformer T_9.	-	-
R_{47}	Resistor, fixed: 220,000 ohm ± 20%; ½ watt; composition; insulated; humidity resistant; 0.655" lg x 0.249" diam; two #21 AWG wire leads 1-½" lg.	ASA	RC21AE224M
R_{48}	Resistor, variable: 1 megohm ± 20%; carbon; #6 taper; shaft 1" long x ¼" diam; 3 solder lug terminals with variable contact located in the center and fixed contacts 1-7/16" apart; no taps.	CRL type 1-010	25C059
R_{49}	Resistor, fixed: 3300 ohm ± 10%; ½ watt; composition; insulated; humidity resistant; 0.655" lg x 0.249" diam; two #21 AWG wire leads 1-½" long.	ASA	RC21AE332K
R_{50}	Same as R_{34}.	-	-
R_{51}	Resistor, fixed: 470,000 ohm ± 10%; ½ watt; composition; insulated; humidity resistant; 0.655" lg x 0.249" diam; two #21 AWG wire leads 1-½" lg.	ASA	RC21AE474K
R_{52}	Resistor, variable: 500,000 ohm ± 20%; carbon; #6 taper; shaft 1" lg x ¼" diam; 3 solder lug terminals with variable contact between the outer lug terminals; terminals 1-7/16" apart; no taps.	CT type 31	25C065
R_{53}	Same as R_{14}.	-	-
R_{54}	Resistor, fixed; 4700 ohm ± 20%; 1 watt; composition; insulated; humidity resistant; 1.28" lg x 0.310" diam; two #20 AWG wire leads 1-½" lg.	ASA	RC31AE472W

Ref. Symbol	Name of Part and Description	Mfr Code and Type No.	Hallicrafter's Part No.
R_{55}	Resistor, variable: 1500 ohm ± 20%; wire wound; st line taper; shaft 3/8" long x ¼" diam, slotted 1/16" x 1/16"; 3 solder lug terminals with variable contact located in the center and fixed contacts 1-7/16" apart; no taps.	CT type 125	25C060
R_{56}	Resistor, fixed: 3,200 ohm ± 10%; 10 watt; wire wound; vitreous enamel coated; 1-3/4" lg x 3/8" max diam; two #18 AWG wire leads 1-3/8" long.	U type CC	24BG322E
R_{57}	Resistor, fixed: 22,000 ohm ± 20%; ½ watt; composition; insulated; humidity resistant; 0.655" lg x 0.249" diam; two #21 AWG wire leads 1-½" lg.	ASA	RC21AE223M
R_{58}	Resistor, fixed: 3900 ohm ± 10%; ½ watt; composition; insulated; humidity resistant; 0.655" lg x 0.249" diam; two #21 AWG wire leads 1-½" lg.	ASA	RC21AE392K
R_{59}	Resistor, fixed: 5,600 ohm ± 10%; ½ watt; composition; insulated; humidity resistant; 0.655" lg x 0.249" diam; two #21 AWG wire leads 1-½" lg.	ASA	RC21AE562K
R_{60}	Same as R_{14}.	-	-
R_{61}	Resistor, fixed: 150,000 ohm ± 20%; ½ watt; composition; insulated; humidity resistant; 0.655" lg x 0.249" diam; two #21 AWG wire leads 1-½" lg.	ASA	RC21AE154M
R_{62}	Resistor, fixed: 8 ohm ± 10%; ½ watt; composition; insulated; humidity resistant; 7/16" lg x 0.215" diam; two #21 AWG wire leads.	ER type 504	23A019
R_{63}	Resistor, fixed: 27,000 ohm ± 10%; ½ watt; composition; insulated; humidity resistant; 0.468" lg x 0.249" diam; two #21 AWG leads 1-½" lg. Part of transformer T_9.	ASA	RC20AE273K
R_{64}	Same as R_{11}.	-	-
SO_1	Connector, female contact: octal; high dielectric mica filled bakelite body, 1-7/64" diam x 31/64" thick; silver plated phosphor bronze solder lugs; molded on steel mtg plate 1-9/32" wd x 0.031" thk having 2 mtg holes of 5/32" diam x 1-½" mtg centers; pins are numbered on back of socket clockwise from locating pin.	AP type MIPSTM	6A200
SO_2	Connector, female contact: two terminal; bakelite body, 11/16" wd x 3/8" h x 23/32" d + thickness of mtg plate; mounted by cad plated steel plate having 2 mtg holes with 1-1/8" mtg centers; 2 solder lug terminals 5/16" lg x ½" wd, rated 10 amp at 250 volts, 15 amp at 125 volts.	AL type 4002-T	10A015
SO_3	Connector, male contact: recessed; two brass prongs; screw type terminals; 1-3/4" x 1-5/8" x 1-½" overall; molded bakelite body recessed in metal cup 1-3/8" diam with flange type mtg having 1-3/4" mtg centers, mtg holes 0.144" diam.	AP type 60M-10	10A047
SW_1	Switch, toggle; SPST; power; rated 3 amp at 250-volt; black enamel steel case 13/16" h x 15/32" d x ½" wd; 2 solder lug terminals; mounts by brass bushing 15/32" - 32 to fit a 3/8" hole; mechanism is brass; lugs separated by fibre piece; same as SW_2, SW_5.	HH type 20994	60A116
SW_2	Same as SW_1.	-	-

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Ref. Symbol	Name of Part and Description	Mfr Code and Type No.	Hallicrafter's Part No.
SW_3	Switch, toggle: SPST; mounts on back of R.F. GAIN control and closes when the R.F. GAIN control is turned all the way to the right (clockwise); part of R.F. GAIN control.	-	-
SW_{4A} SW_{4B} SW_{4C} SW_{4D}	Switch, rotary: single section; 2 position; all metal parts silver plated brass except for stainless steel index spring and ball; vacuum wax impregnated phenolic wafer; non shorting teeth of contacts 5 and 8; frame 5/16" lg; mts by 3/8-32 bushing ½" lg, shaft 1" lg x ¼" diam.	OM type OH	60A177
SW_5	Same as SW_1.	-	-
SW_6	Switch, toggle: DPST; rated 1 amp at 250-volts, 3 amp at 125-volts; metal case, 1-9/16" x 19/32" overall diam; includes fibre separators in assembly; 4 brass lug terminals; mts by brass bushing 15/32-32 x 13/32".	HH	60A117
T_1	Transformer, r-f: sec, 2 turns of 1/8" O.D. x 1/16" I.D. copper tubing, silver plated; pri, 1-½ turns of #28 tinned & single braided celanese wire strung thru hollow sec; grid lead, stranded voice coil wire 3/4" lg; spacing between sec turns not less than 1/32"; coil wound on polystyrene form 1-13/16" lg x 3/8" diam; includes resistor R_1, mounted thru center of form ½" from top end; one lead of resistor soldered to sec about 1-3/4 turns from winding start; the other lead is cut short and the grid lead with acorn tube clip is attached; the start end of the sec extends 27/32" from the center of the coil form and is flatted 3/16" from the end; the finish end of the secondary extends 15/16" from the center of the coil form; the primary terminal are two solder lug terminals which are mounted on a ceramic terminal 5/8" wd x 3/4" h x 5/32" thk which is mtd near the bottom of the coil form by a ½" nickel plated brass screw; start and finish leads of sec extend from coil at a 90 degree angle.	EW Special	51A350
T_2	Transformer, r-f: pri, 2-½ turns of #32 enameled single silk covered wire; spaced one wire diam; sec, 2 turns of silver plated copper tubing 1/8" O.D. x 1/16" I.D.; grid lead is voice coil wire 1-½" lg with acorn tube clip and soldered on sec 2 turns from winding start; spacing between sec turns not less than 1/32"; the start end of the sec extends 3/4" from center of coil form and flatted 3/16" from end; the finish end extends 15/16" from center of coil form; coils are wound on polystyrene from 1-7/16" lg x 3/8" diam at one end and 5/16" diam at other end; secondary leads terminate as two solder lug terminals which are mtd on a ceramic terminal 5/8" wd x 3/4" h x 5/32" thk which mounts to coil form by a ½" nickel plated brass screw; grid lead insulated by 2 Amphenol "912" beads #73-1; start and finish leads of sec extend from coil at a 90 degree angle.	EW Special	51A351
T_3	Transformer, r-f: pri, 3-3/4" turns of #32 enameled single silk covered wire spaced not less than 1/32" between turns; sec, 1-½ turns of silver plated copper tubing, 1/8" O.D. x 1/16" I.D.; grid lead is voice coil wire 1-3/4" lg with acorn tube clip at one end, other end soldered to sec 1 turn from start end; start end of sec extends 1-1/32" from center of coil and is flatted 3/16" from end; finish end of sec extends 13/16" from center of coil; start and finish end of coil extend at a 90 degree angle; pri leads terminate at two solder lug terminals which are mounted on a ceramic terminal 5/8" wd x 3/4" h x 5/32" thk mounted on coil form by a 1/2" nickel plated brass screw; grid lead is insulated by 3 amphenol "912" beads #73-1.	EW Special	51A352
T_4	Transformer, r-f: pri, 1-½ turns of #16 tinned copper wire; sec, 1-¼ turns of silver plated copper tubing 1/8" O.D. x 1/16" I.D.; sec winding spaced 1/32"; sec leads are 1-½" and 1-3/32" lg respectively; pri leads are 1-3/4" wd 1-½" lg respectively and extending from the coil at a 90 degree angle; capacitor C_{71} is soldered 1 turn from longest lead of sec; coils are wound on polystyrene from 1-½" lg x 3/8" diam; pri is slightly sealed to coil form for shipping, seal may easily be broken for adjustment.	EW Special	51A353
T_5	Transformer, IF: 16 megacycles; input stage; shielded; shield can 1-7/8" lg x 1-7/16" wd x 4" h; powdered iron core; tuned primary and secondary; adjustable iron core tuning; spade lug mtg on 1-7/8" x 1-7/16" mtg centers; 8 solder lug terminals at base; includes capacitors C_{15} and C_{16} and resistor R_{12}.	EW Special	50C165
T_6	Transformer, IF: 16 megacycles; interstage; shielded; shield can 1-7/8" lg x 1-7/16" wd x 4" h; powdered iron core; tuned primary and secondary; adjustable iron core tuning; spade lug mtg on 1-7/8" x 1-7/16" mtg centers; 8 solder lug terminals at base; includes capacitors C_{22} and C_{23}, and resistor R_{19}.	EW Special	50C166
T_7	Transformer, IF: 16 megacycles; interstage; shielded; shield can 1-7/8" lg x 1-7/16" wd x 4" h; powdered iron core; tuned primary and secondary; adjustable iron core tuning; spade lug mtg on 1-7/8" x 1-7/16" mtg centers; 8 solder lug terminals at base; includes capacitors C_{29}, C_{30}, and C_{73}.	EW Special	50C167
T_8	Transformer, IF: 16 megacycles; diode; shielded; shield can 1-7/8" lg x 1-7/16" wd x 4" h; powdered iron core; tuned primary and secondary; adjustable iron core tuning; spade lug mtg on 1-7/8" x 1-7/16" mtg centers; 8 solder lug terminals at base; includes capacitors C_{35} and C_{36}.	EW Special	50C168
T_9	Transformer, IF: 16 megacycles; discriminator; shielded; shield can 1-7/8" lg x 1-7/16" wd x 4" h; powdered iron core; tuned primary and secondary; adjustable iron core tuning spade lug mtg on 1-7/8" x 1-7/16" mtg centers; 8 solder lug terminals at base; includes capacitors C_{40}, C_{41} and C_{42}, and resistors R_{45}, R_{46} and R_{83}.	EW Special	50C169
T_{10}	Transformer, AF: audio output; two windings; primary to match output of tube V_{11} (6V6GT), secondary to match 5000 ohm load; tapped to match 500 ohm load; enclosed in metal case.	H Special	55B012
T_{11}	Transformer, power: filament; primary for 230 volts, 50 cycles with tap for 115-volts; #1 secondary 3 amp 5 volts; #2 secondary 4 amp 6.3 volts; coil and core potted and sealed in metal case 3-15/16" x 3-1/4" x 4" overall, 2 mtg flanges each having 3 mtg holes 7/32" diam spaced 1-1/8" apart, 2 sets of mtg holes have 3-½" x 2-½" mtg centers.	H Special	52A044

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Ref. Symbol	Name of Part and Description	Mfr Code and Type No.	Hallicrafter's Part No.
T_{12}	Transformer, power: plate; primary 230 volts, 50 cycles with tap for 115 volts; secondary 280 volts each side of center tap, 150 ma using 5U4G full wave rectifier and 10 mfd filter capacity; coil and core potted and sealed in metal case, 4-3/8" h x 3-21/32" wd x 3-21/32" d; 2 mtg flanges each having 3 mtg holes 7/32" diam spaced 1-3/8" apart, mtg centers 3-7/8" x 2-3/4".	H Special	52A043
TS_1	Board, terminal: mounts three brass, cadmium plated binding posts and nuts, and has two brass cadmium plated mtg inserts; base of black BM120 or 262 high impact bakelite; base 2-3/8" lg x 7/8" wd x 3/16" thk; mtg inserts centered on 3/4" x ± mtg centers, have 0.144" clearance ID.	H Special	11B163
TS_2	Board, terminal: mounts two brass, cadmium plated binding posts and nuts, and has two brass cadmium plated mtg inserts; base of black BM120 or 262 high impact bakelite; base 1-5/8" lg x 7/8" wd x 3/16" thk: mtg inserts centered on ½" mtg centers have 0.144" clearance ID, same as TS_3.	H Special	11B162
TS_3	Same as TS_2.	-	-
V_1	Tube, detector amplifier pentode (acorn type); same as V_2, V_3.	RCA type 954	90X954
V_2	Same as V_1.	-	-
V_3	Same as V_1.	-	-
V_4	Tube, television amplifier pentode, same as V_8.	RCA type 6AC7	90X6AC7
V_5	Tube, television amplifier pentode.	RCA type 6AB7	90X6AB7
V_6	Tube, triple-grid super-control amplifier.	RCA type 6SK7	90X6SK7
V_7	Tube, twin diode; same as V_9.	RCA type 6H6	90X6H6
V_8	Same as V_4.	-	-
V_9	Same as V_7.	-	-
V_{10}	Tube, twin-triode amplifier.	RCA type 6SL7GT	90X6SL7GT
V_{11}	Tube, beam power amplifier.	RCA type 6V6 GT/G	90X6V6GT/G
V_{12}	Tube, voltage regulator (Glow discharge type).	RCA type OD3/VR-150	90XVR150
V_{13}	Tube, full-wave high-vacuum rectifier.	RCA type 5U4G	90X5U4G
V_{14}	Tube, detector, amplifier, oscillator (acorn type).	RCA type 955	90X955

SUPPLEMENTARY DATA

AUDIO POWER OUTPUT.

Speaker operation - 2 watts with less than 5% distortion
Headset operation - High impedance.

SENSITIVITY.

At 130 mc. - 15 microvolts. (For 500 milliwatt audio output.)
At 200 mc. - 7 microvolts, (For 500 milliwatt audio output.)

SIGNAL TO NOISE RATIO.

Not less than 5 to 1 when measured with a 3.5 microvolt, 400-cycle 30% modulated signal.

AUDIO FIDELITY.

Audio response is flat within ± 4 db. from 100 to 10,000 cycles per second.

IMAGE RATIO.

Not less than 60 db. between 130 mc. and 210 mc.

SELECTIVITY.

I-F selectivity measured at the grid of the mixer tube is not less than 140 kc. or more than 180 kc. at 6 db down from resonance. The receiver will be more selective when measured from the antenna terminals.

INDEX TO PARTS MANUFACTURERS

Symbol	Manufacturer	Symbol	Manufacturer
AL	Alden Manufacturing Co. Brookton, Mass.	IC	Industrial Condenser Corp. Chicago, Illinois
AP	American Phenolic Corp. Chicago, Illinois	IRC	International Resistance Co. Philadelphia, Pennsylvania
CD	Cornell-Dubilier Corp. South Plainfield, N.J.	LF	Littlefuse Inc. Chicago, Illinois
CRL	Centralab Milwaukee, Wis.	O	Ohmite Manufacturing Co. Chicago, Illinois
CT	Chicago Telephone Supply Elkhart, Indiana	OM	Oak Manufacturing Co. Chicago, Illinois
ER	Erie Resistor Co. Erie, Pennsylvania	RCA	RCA Mfg. Co. Chicago, Illinois
GE	General Electric Co. Schenactady, N.Y.	SI	F. W. Sickles Co. Springfield, Mass.
H	The Hallicrafters Co. Chicago, Illinois	U	Utah Products Co. Chicago, Illinois
HH	Hart & Hegeman Hartford, Conn.		

NO.	OHMS	WATTAGE	PARTS NO.
R1	160	1/3	22-011
2	100,000	1/3	20-093
3	1,000	1/3	20-033
4	600	1/3	22-125
5	30,000	1	22-075
6	2,500	1/3	22-044
7	100,000	1/3	20-093
8	500	1/3	22-026
9	10,000	R.F. Gain Control	25-029
10	2,500	1/3	22-044
11	100,000	1/3	20-093
12	500	1/3	24-040
13	50,000	1/3	20-084
14	50,000	1/2	22-082
15	1,000	1/3	20-033
16	20,000	1/3	22-071
17	1,000,000	1/3	20-018
18	500,000	Tone Control	25-018
19	100,000	1/3	20-093
20	100,000	1/3	20-093
21	250,000	1/3	20-099
22	300	1/3	20-021
23	500,000	A.F. Gain Control	25-031
24	25,000	1	20-073
25	20,000	1	20-070
26	150	1/3	22-011
27	100,000	1/3	20-093
28	500	1/3	24-040
29	500,000	1/3	22-101
30	10,000	1	20-061
31	50,000	1/3	20-084
32	5,000	2	

CONDENSER PARTS LIST - SKYRIDER 5-10 Model S21

NO.	CAPACITY	TYPE	VOLTAGE	PARTS NO.
C1		main		
2	80 mmfd per section	tuning		48-033
3		gang		
4	.005 mfd.	mica		
5	.002 "	"		40-013
6	.01 "		400	41-001
7	.01 "		600	45-002
C8	.002 mfd.	mica		40-013
9	.05 "		200	41-004
10	.05 "		400	41-005
11	Tuning Condenser in I.F. Transformer			
12	" " " " "			
13	.01 mfd.		400	41-001
14	.01 "		200	41-000
15	.05 "		400	41-005
16	.01 "		400	41-001
17	Tuning Condenser in I.F. Transformer			
18	" " " " "			
19	.01 mfd.		400	41-001
20	.25 "		400	
21	.01 "		200	41-000
22	.01 "		400	41-001
23	.00025 "	mica		40-024
24	Pad			
25	.00025 "	air		48-021
26	.01 "		400	41-001
27	Tuning Condenser in I.F. Transformer			
28	" " " " "			
29	.02 mfd.		400	41-002
30	.0001 "	mica		40-003
31	.02 "		400	41-002
32	.0001 "	mica		40-003
33	.05 "		200	41-004
34	.1 "		200	41-006
35	.0001 "	mica		40-003
36	.01 "		400	41-001
37	.01 "		600	45-002
38	.01 "		600	45-002
39	20. "		25	42-025
40	.05 "		400	41-005
41	.002 "	mica		40-013
42	.0001 "	"		40-003
43	.400 mmfd.	Pad		44-037
44	10. mfd.		450	
45	10. "		450	42-024
46	10. "		450	
47	.01 "		600	45-002
S1	A.V.C. - B.F.O. On-Off Switch			
S2	Automatic Noise Limitor and I.F. Expander Switch			
S3	A.C. On-Off Switch on Tone Control			
S4	Stand By SPST			
S5	Meter Switch on R.F Gain Control			

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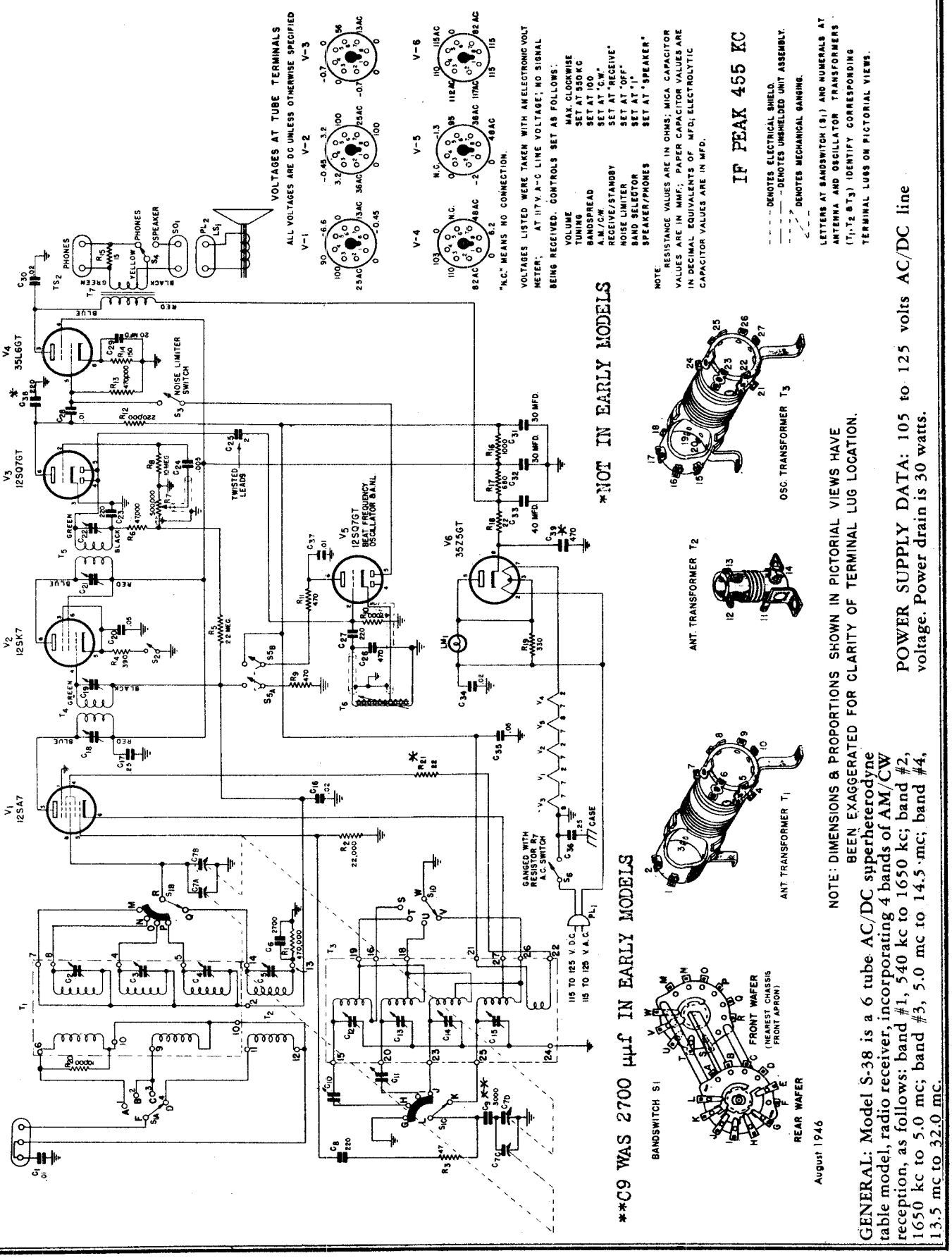
MODEL S-38, Early and Revised


VOLTAGES AT TUBE TERMINALS
ALL VOLTAGES ARE DC UNLESS OTHERWISE SPECIFIED
V-1
V-2
V-3
V-4
V-5
V-6
"N.C." MEANS NO CONNECTION.
VOLTAGES LISTED WERE TAKEN WITH AN ELECTRONIC VOLT METER; AT 117 V. A-C LINE VOLTAGE; NO SIGNAL BEING RECEIVED. CONTROLS SET AS FOLLOWS:
VOLUME — MAX. CLOCKWISE
TUNING — SET AT 550 KC
BANDSPREAD — SET AT 100
A.M./C.W. — SET AT "C.W."
RECEIVE/STANDBY — SET AT "RECEIVE"
NOISE LIMITER — SET AT "OFF"
BAND SELECTOR — SET AT "1"
SPEAKER/PHONES — SET AT "SPEAKER"
NOTE: RESISTANCE VALUES ARE IN OHMS; MICA CAPACITOR VALUES ARE IN MMF.; PAPER CAPACITOR VALUES ARE IN DECIMAL EQUIVALENTS OF MFD; ELECTROLYTIC CAPACITOR VALUES ARE IN MFD.
IF PEAK 455 KC
- - - - DENOTES ELECTRICAL SHIELD.
——— DENOTES UNSHIELDED UNIT ASSEMBLY.
DENOTES MECHANICAL GANGING.
LETTERS AT BANDSWITCH (S1) AND NUMERALS AT ANTENNA AND OSCILLATOR TRANSFORMERS (T1, T2 & T3) IDENTIFY CORRESPONDING TERMINAL LUGS ON PICTORIAL VIEWS.
*NOT IN EARLY MODELS
**C9 WAS 2700 μμf IN EARLY MODELS
ANT. TRANSFORMER T2
OSC. TRANSFORMER T3
ANT. TRANSFORMER T1
BANDSWITCH S1
FRONT WAFER
REAR WAFER
NOTE: DIMENSIONS & PROPORTIONS SHOWN IN PICTORIAL VIEWS HAVE BEEN EXAGGERATED FOR CLARITY OF TERMINAL LUG LOCATION.
August 1946

GENERAL: Model S-38 is a 6 tube AC/DC superheterodyne table model, radio receiver, incorporating 4 bands of AM/CW reception, as follows: band #1, 540 kc to 1650 kc; band #2, 1650 kc to 5.0 mc; band #3, 5.0 mc to 14.5 mc; band #4, 13.5 mc to 32.0 mc.

POWER SUPPLY DATA: 105 to 125 volts AC/DC line voltage. Power drain is 30 watts.

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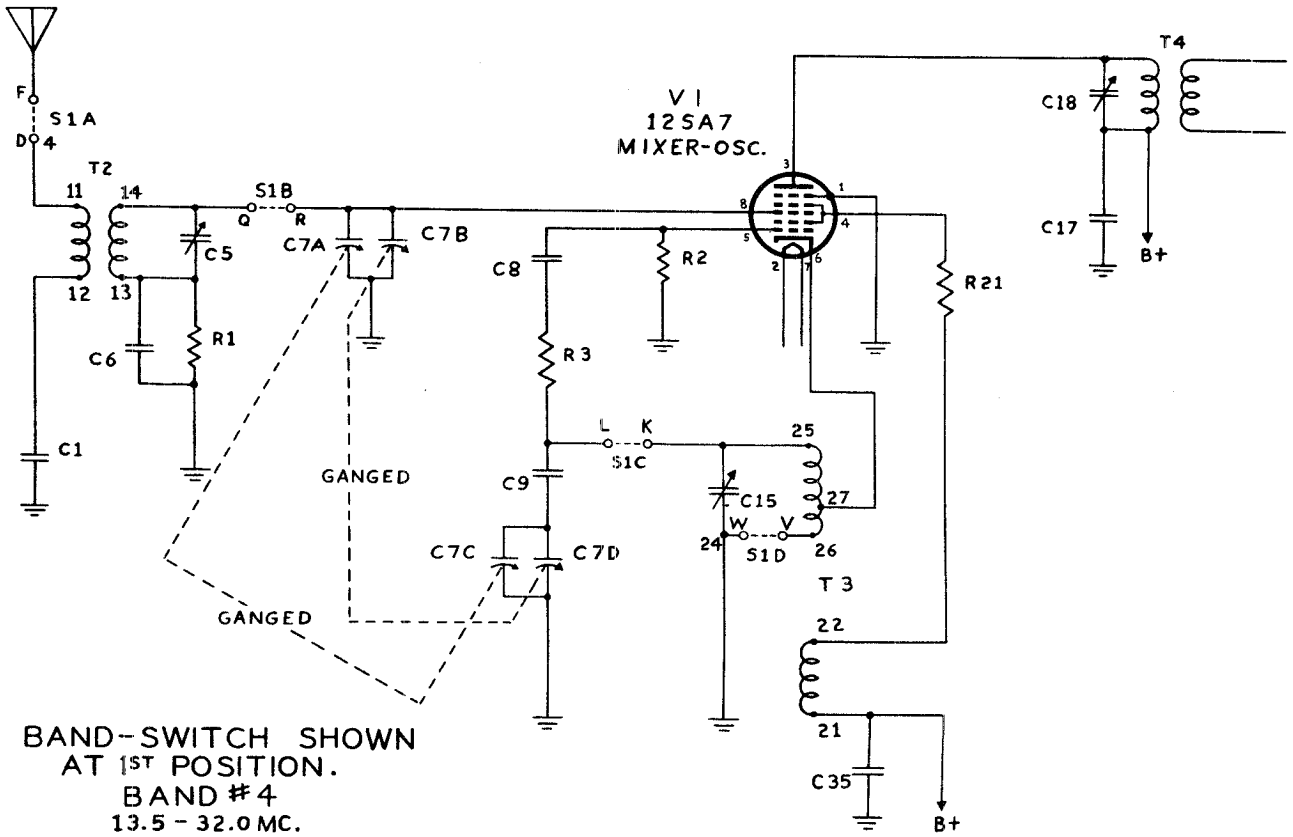
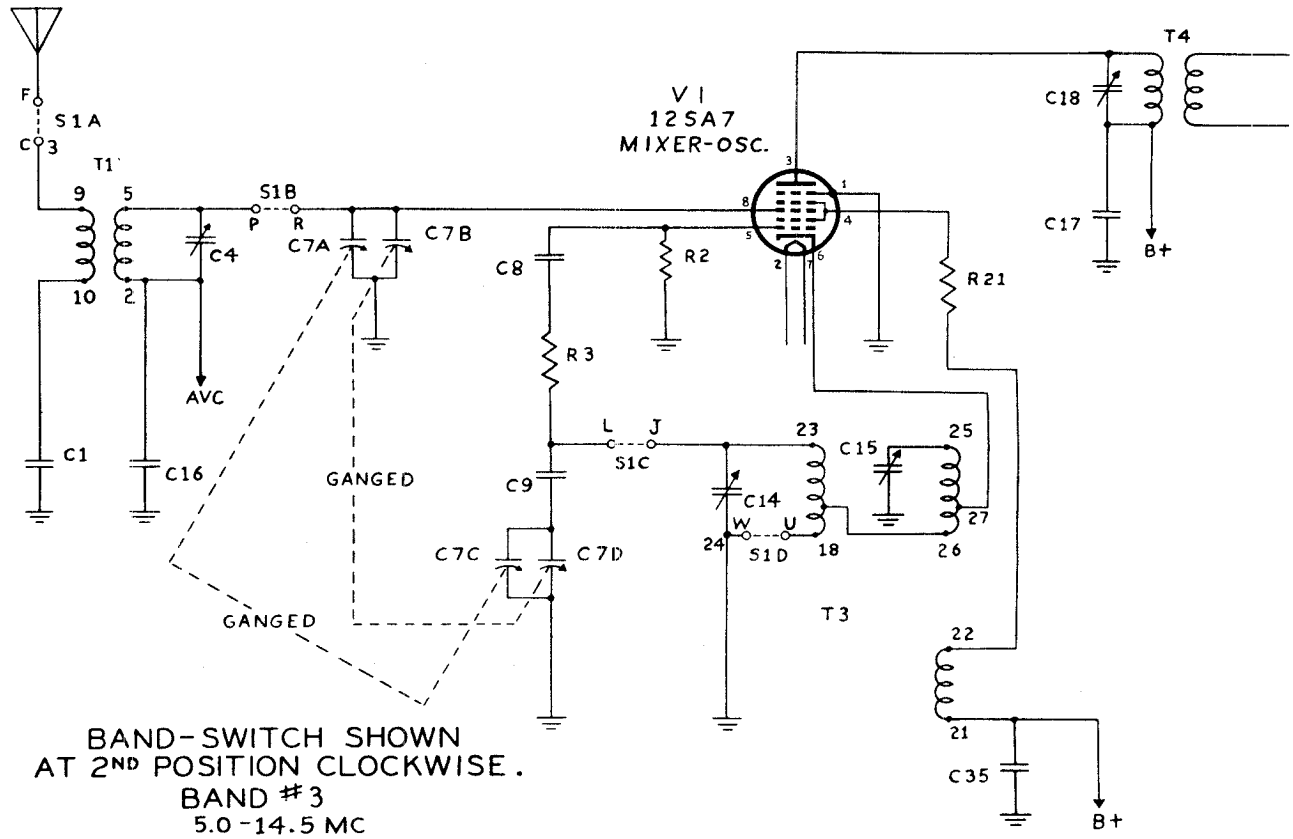
MODEL S-38, Early and Revised

THE HALLICRAFTERS CO.



BAND-SWITCH SHOWN AT 1ST POSITION.
BAND #4
13.5 - 32.0 MC.



BAND-SWITCH SHOWN AT 2ND POSITION CLOCKWISE.
BAND #3
5.0 - 14.5 MC

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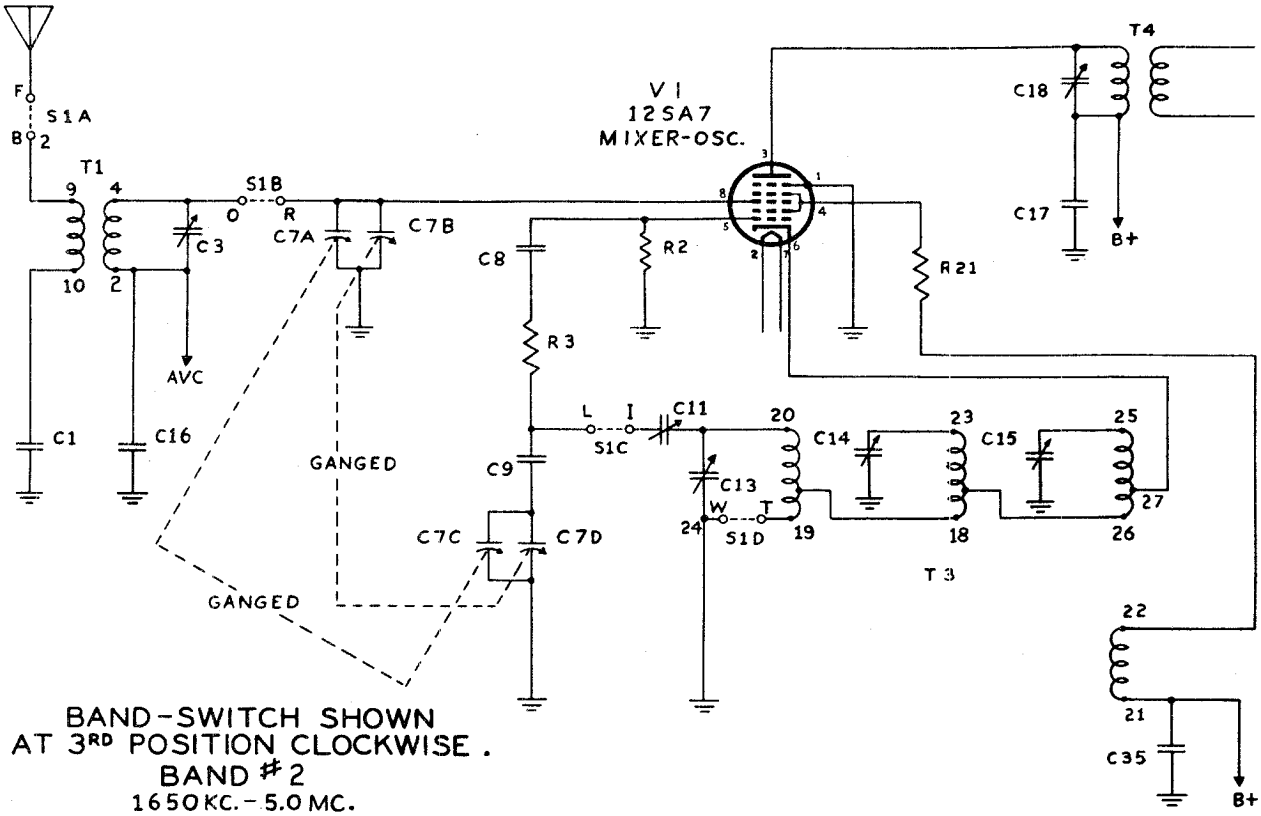
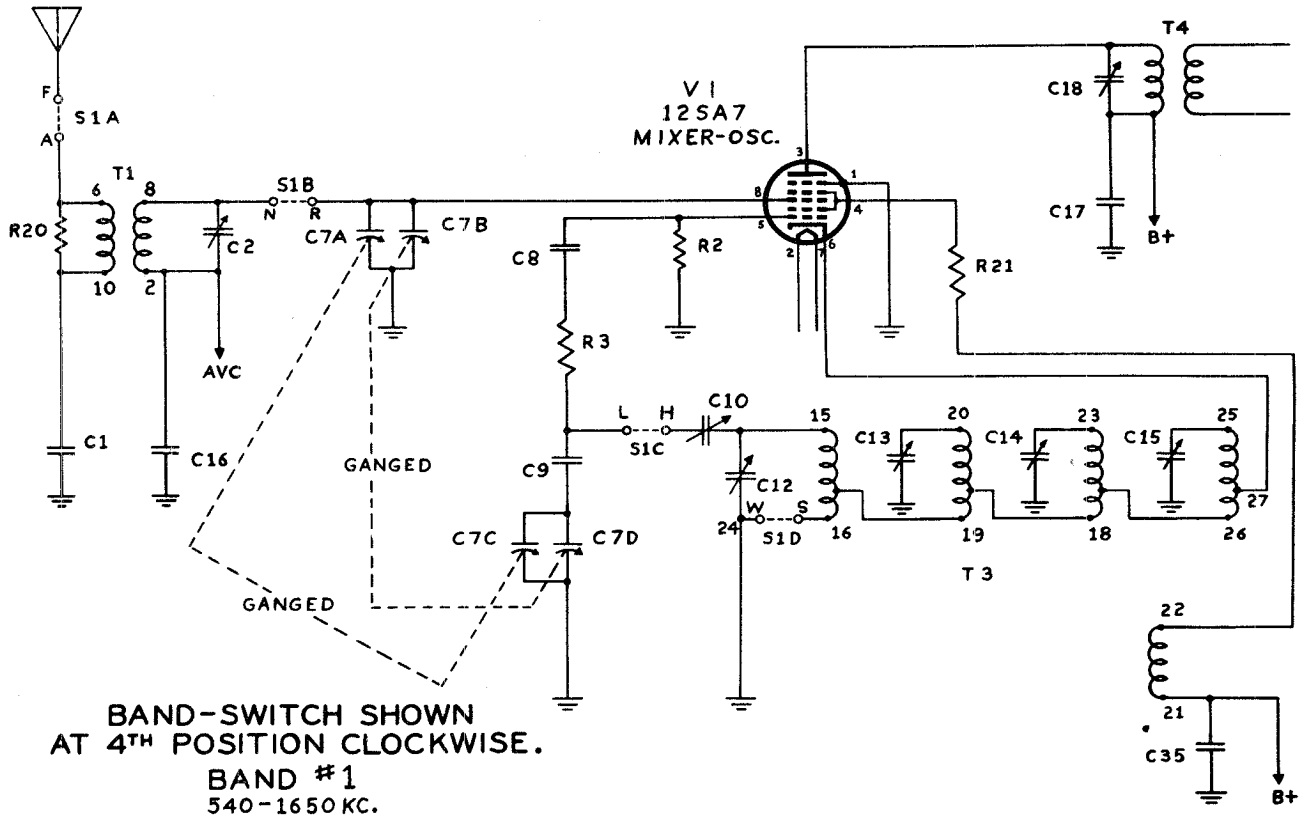
MODEL S-38, Early and Revised



BAND-SWITCH SHOWN AT 3RD POSITION CLOCKWISE.
BAND #2
1650 KC. - 5.0 MC.



BAND-SWITCH SHOWN AT 4TH POSITION CLOCKWISE.
BAND #1
540 - 1650 KC.

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IF FREQUENCY	IF SELECTIVITY	IMAGE RATIO	SENSITIVITY	AUDIO OUTPUT
455 kc	7 kc wide at 6 db down 65 kc wide at 60 db down (for 50 milliwatt output)	2.7:1 at 30 mc 6:1 at 14 mc 10:1 at 5 mc 35:1 at 1500 kc	12 microvolt at 600 kc 12 microvolt at 5 mc 11 microvolt at 14 mc 23 microvolt at 30 mc (for 50 milliwatt output)	675 milliwatt with less than 10% distortion at 400 cycles

EQUIPMENT:

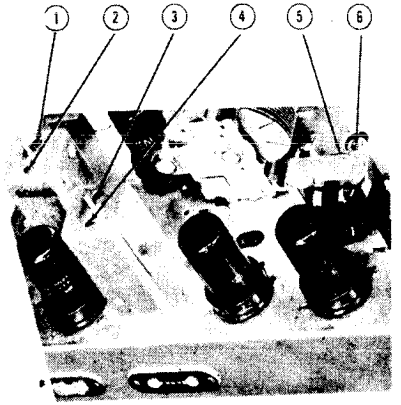
1. Signal Generator capable of the ranges indicated in the Alignment Chart, including a 400 cycle audio modulator.
2. Output meter capable of handling 1 watt of audio power.
3. Standard RMA dummy consisting of a 200 mmf condenser in series with a 20uh r-f choke which is shunted by a 400 mmf condenser in series with a 400 ohm carbon resistor.
4. Non-metallic screw driver.

CONNECTIONS: Connect the Sig. Gen. "cold" lead to "G" on the antenna strip; the "hot" lead is connected as indicated in the Chart.

Connect the output meter across the terminals of socket SO-1 and remove the speaker plug from the socket and adjust the meter for 3 ohms impedance.
Caution: Set the meter at a sufficiently high range to prevent possible damage from overload.

CONTROL SETTINGS: After allowing about a ten minute warm up period, set the receiver's control as follows:

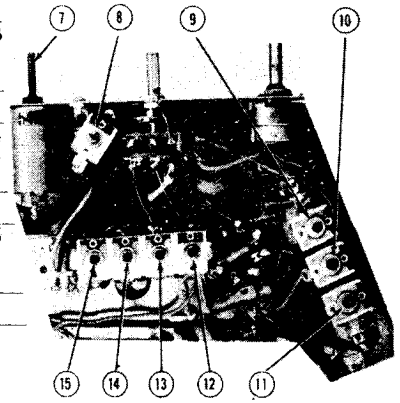
SPEAKER/PHONES switch at "SPEAKER."
VOLUME control at full clockwise (maximum).
CW/AM switch at "AM" (except for BFO adjustment).
NOISE LIMITER switch at "OFF."
BANDSPREAD TUNING control at "0," (min. cap.).
STANDBY/RECEIVE switch at "RECEIVE."



TOP VIEW OF CHASSIS

Fig. 5, Top and bottom views of the receiver locating slugs, padders and trimmers for alignment purposes.

DUMMY ANT. IN SERIES WITH SIG. GENERATOR	CONNECTION OF SIG. GENERATOR OUTPUT TO RECEIVER	SIG. GEN. FREQUENCY SETTING	BAND SWITCH SETTING	RECEIVER DIAL SETTING	ADJUST SLUG, PADDER, OR TRIMMER NO.	DESCRIPTION	TYPE OF ADJUSTMENT —MAKE ADJUSTMENT FOR:	STEP NO.
				*IF ADJUSTMENT				
None	Stator plates of rear sect. of tuning gang	455 kc	"1"	1000 kc	3 and 4 1 and 2	2nd IF 1st IF	Maximum output Maximum output Repeat steps 1 and 2	1 2
BFO ADJUSTMENT—NOTE: Turn off Sig. Gen. 400 cycle modulation; set CW/AM switch at "CW"; remove Pitch Control knob and adjust slotted screw shaft.								
None	Stator plates of rear sect. of tuning gang	455 kc	"1"	1000 kc	7	BFO slug	Zero beat	3
BAND #4 ADJUSTMENT—NOTE: Make sure 400 cycle audio modulator is turned on; AM/CW switch should be at "AM."								
STANDARD RMA Dummy	"A1" on antenna strip	30 mc 30 mc	"4"	30 mc 30 mc	12 † 8	Osc. Trimmer Mix. Trimmer	Maximum output Maximum output	4 5
				BAND #3 ADJUSTMENT				
STANDARD RMA Dummy	"A1" on antenna strip	14 mc 14 mc	"3"	14 mc 14 mc	13 † 9	Osc. Trimmer Mix. Trimmer	Maximum output Maximum output	6 7
				*BAND #2 ADJUSTMENT				
STANDARD RMA Dummy	"A1" on antenna strip	5 mc 1.8 mc	"2"	5 mc 1.8 mc	14 6	Osc. Trimmer Osc. Padder	Maximum output Maximum output and repeat step 8	8 9
		5 mc		5 mc	†10	Mix. Trimmer	Maximum output	10
				*BAND #1 ADJUSTMENT				
STANDARD RMA Dummy	"A1" on antenna strip	1500 kc 600 kc	"1"	1500 kc 600 kc	15 5	Osc. Trimmer Osc. Padder	Maximum output Maximum output and repeat step 11	11 12
		1500 kc		1500 kc	11	Mix. Trimmer	Maximum output	13



BOTTOM VIEW OF CHASSIS

*It may be necessary to repeat the indicated adjustments several times.
†Rock the main tuning capacitor slightly (turn back and forth) when making these adjustments.

THE HALLICRAFTERS CO.

MODEL S-38, Early and Revised

Fig. 4. Bottom view of the receiver showing components location.

CONTROL SETTINGS FOR PRELIMINARY TEST OPERATION (Broadcast Band)

NAME	FUNCTION	SETTING
STANDBY/ RECEIVE	Receiver temporary standby	At "RECEIVE"
VOLUME	Audio gain control and receiver on/off switch	Half clockwise; adj. as necessary
BAND SELECTOR	Operating band selector	Clockwise to "1"
PITCH CONTROL	CW beat note pitch selector	Any position (not in use)

NAME	FUNCTION	SETTING
SPEAKER/ PHONES	Output selector switch	At "SPEAKER"
CW/AM	BFO on/off switch AVC on/off switch	At "AM" (AVC on)
NOISE LIMITER	Noise peak limiting	At "OFF"
TUNING	Main tuning control	To local station freq. on main dial scale
BAND SPREAD	Short wave band spreading	To "0" on small dial scale

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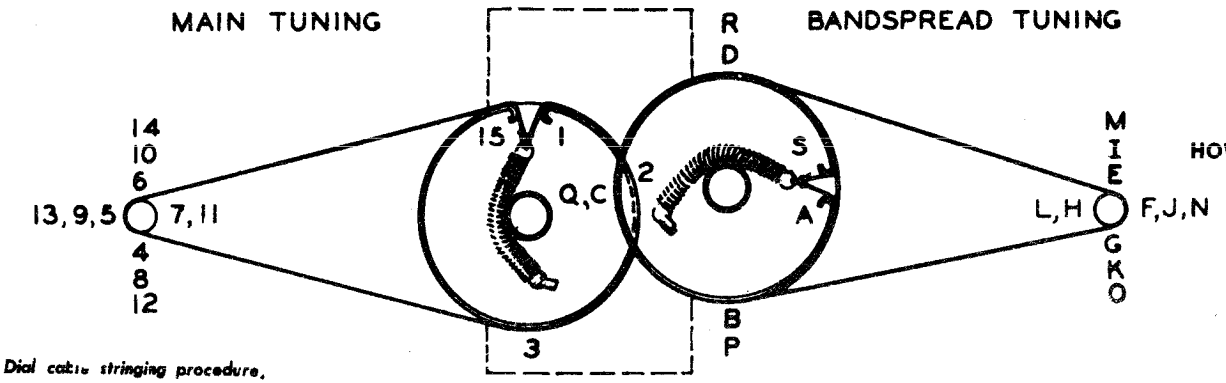

Fig. 2. Dial cable stringing procedure.

TUNING CAPACITOR FULLY CLOSED (BOTH SECTIONS).

FRONT VIEW

REF. NO.	DESCRIPTION	HALLICRAFTER'S PART NUMBER	LIST PRICE PER COMPONENT
	CAPACITORS		
C-1	0.01 mfd; 600 vdcw; paper	46AY103J	$ .10
C-2, 3 & 4	Trimmer Unit for antenna transformer T-1	44B129	.40
C-5	Trimmer for antenna transformer T-2	44A039	.10
C-6	2700 mmf; ±5%; 500 vdcw; mica	CM30A272J	.30
C-7	Tuning capacitor; air; 2 sections ganged	48C162	2.90
C-8, 23, 27 & 38	220 mmf; 500 vdcw; mica	CM20A221K	.15
C-9	3000 mmf; 5%; 500 vdcw; mica	CM30A302J	
C-10 & 11	Dual padder for oscillator transformer T-3	44A152	.65
C-12, 13, 14 & 15	Trimmer Unit for oscillator transformer T-3	44B159	.50
C-16 & 34	0.02 mfd; 400 vdcw; paper	46AW203J	.10
C-17 & 36	0.25 mfd; 200 vdcw; paper	46AT254J	.15
C-18, 19, 21 & 22	Trimmers for IF transformers T-4 and T-5	44A097	.25
C-20 & 35	0.05 mfd; 200 vdcw; paper	46AU503J	.10
C-24	0.005 mfd; 400 vdcw; paper	46AW502J	.10
C-25	2 mmf; twisted insulated wire leads; NOT AVAILABLE AS A SPARE PART.		
C-26 & 39	470 mmf; 500 vdcw; mica	CM20A471K	.20
C-28 & 37	0.01 mfd; 400 vdcw; paper	46AW102J	.10
C-29, 31, 32 & 33	Electrolytic; four section unit; color coded leads; sect. 1(C-29) 20 mfd, 25 vdcw; sect. 2 & 3(C-31 & 32) 30 mfd, 150 vdcw; sect. 4(C-33) 40 mfd, 150 vdcw.	45B091	.80
C-30	0.02 mfd; 600 vdcw; paper	46AY203J	.10
	PILOT LAMP		
LM-1	6/8 v @ 150ma; brown bead; G. E. type 47	39A004	.10
	LOUDSPEAKER		
LS-1	5" P.M. speaker; 3.2 ohm voice coil	85C035	2.50
	PLUGS		
PL-1	AC line cord with two prong plug at one end	87A078	.35
PL-2	Speaker voice coil connector plug	88A072	.10
	RESISTORS		
R-1 & 13	470,000 ohm; ½ watt; carbon	RC20AE474M	.10
R-2	22,000 ohm; ½ watt; carbon	RC20AE223M	.10
R-3	47 ohm; ½ watt; carbon	RC20AE470M	.10
R-4	390 ohm; ±10%; ½ watt; carbon	RC20AE391K	.10
R-5	2.2 megohm; ½ watt; carbon	RC20AE225M	.10
R-6 & 10	47,000 ohm; ½ watt; carbon	RC20AE473M	.10
R-7 & S-6	Volume Control; ½ megohm; includes SPST toggle action switch assembly on rear	25B094	.50
R-8	10 megohm; ½ watt; carbon	RC20AE106M	.10
R-9 & 11	470 ohm; ±10%; ½ watt; carbon	RC20AE471K	.10
R-12	220,000 ohm; ½ watt; carbon	RC20AE224M	.10
R-14	150 ohm; ±10%; ½ watt; carbon	RC20AE151K	.10
R-15	15 ohm; ½ watt; carbon	RC20AE150M	.10
R-16	1,000 ohm; ½ watt; carbon	RC20AE102M	.10
R-17	680 ohm; 1 watt; carbon	RC30AE681M	.10
R-18 & 21	22 ohm; ½ watt; carbon	RC20AE220M	.10
R-19	330 ohm; ½ watt; carbon	RC20AE331M	.10
R-20	10,000 ohm; ½ watt; carbon	RC20AE103M	.10

REF. NO.	DESCRIPTION	HALLICRAFTER'S PART NUMBER	LIST PRICE PER COMPONENT
	SWITCHES		
S-1a, b, c & d	Bandswitch; two sections ganged; rotary four position	60A240	$ .95
S-2 & 3	"RECEIVE-STANDBY" and "NOISE LIMITER" switches; slide action; SPST	60A244	.20
S-4	"SPEAKER-PHONES" switch; slide action; SPDT	60A243	.20
S-5	"A.M.-C.W." switch; slide action; DPST	60A245	.25
	TRANSFORMERS		
T-1	Antenna coil for bands 1, 2 and 3	51C821	2.35
T-2	Antenna coil for band 4	51C818	.65
T-3	Oscillator coil for bands 1, 2, 3 and 4	51C822	2.45
T-4	Input IF transformer; 455 kc	50C183	1.20
T-5	Diode IF transformer; 455 kc	50B184	1.20
T-6	Beat frequency oscillator coil; 455 kc	54B031	1.25
T-7	Audio output transformer; 3,000 ohm primary —15 ohm secondary tapped at 3 ohms	55A075	.95
	TERMINAL STRIPS		
TS-1	Antenna and ground connector strip	88A032	.10
TS-2	Headset plug connector strip; bakelite	88A071	.10

MISCELLANEOUS MECHANICAL COMPONENTS

QUANT. IN EQUIPMENT	DESCRIPTION	HALLICRAFTER'S PART NUMBER	LIST PRICE PER COMPONENT
2	Knob; for Volume Control and Band Selector switches	15A049	.15
1	Knob; for C. W. PITCH Control	15A058	.15
2	Knob; for main TUNING and BANDSPREAD tuning Controls	15A047	.25
1	Pointer; for main tuning dial	82A102	.15
1	Pointer; for bandspread tuning dial	82A103	.15
1	Calibrated dial assembly, complete	83B257	.15
1	Dial window; glass	22B157	.30
6	Octal tube sockets; Amphenol type MIP-8	6A035	.10
1	Dial lamp socket; bayonet	86A011	.15
2	Tuning capacitor dial drive pulley	28A002	.10
1	Tuning capacitor rear mounting bracket	67A568	.10
1	Tuning capacitor front mounting bracket	67A559	.15
1	Left hand switch mounting bracket	67B560	.10
1	Right hand switch mounting bracket	67B561	.10
4	Rubber mounting feet for cabinet	16A007	.10
2	Spring washers for grounding tuning capacitor drive shafts	4A043	.10
4	"C" washers; (hair-pin type)	75A062	.10
1	Rear cover plate; cardboard	32C331	.10
1	Bottom cover plate; painted steel	63C220	.45

NOTE: ALL PRICES ARE SUBJECT TO CHANGE WITHOUT NOTICE.

HOW TO RESTRING DIAL CORDS

To restring the main tuning dial cord, cut a 14" length of 30 lb. test dial cord and tie one end to the tension spring of the main tuning capacitor drive pulley at position "1" on the diagram. Following the numbers 1 through 15, wind the cord on the pulley and knob drive shaft. At position "15", stretch the tension spring and tie the cord securely. Cut off the excess cord. Note that two complete turns are wound on the knob drive shaft.

To restring the bandspread tuning dial cord, cut a 16" length of dial cord and follow the procedure as explained above, except start at position "A" on the diagram and proceed through position "S". Note that the knob drive shaft has two complete turns.

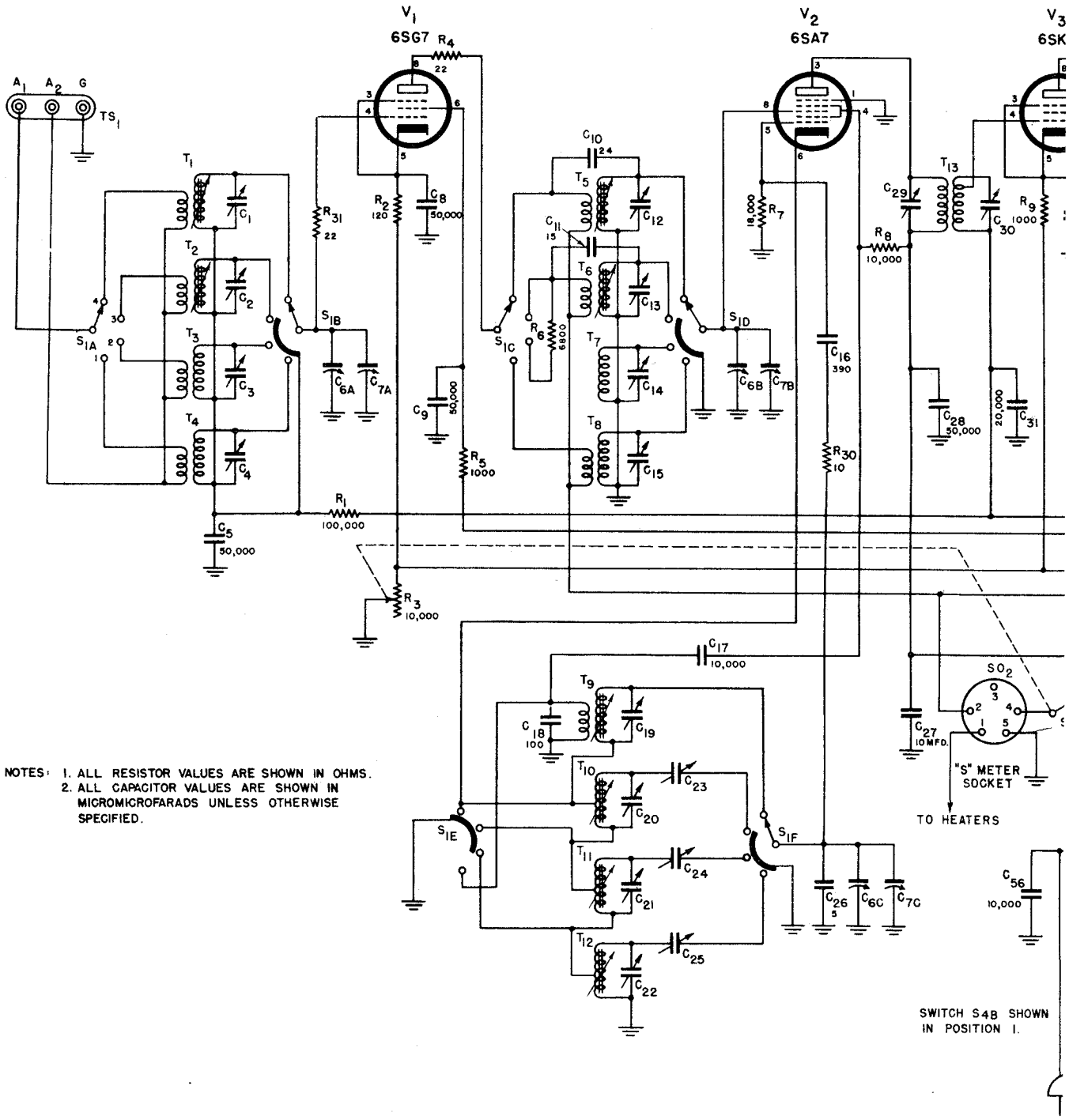

Figure 7-7.

FREQUENCY COVERAGE.

The Model S-40 Radio Receiver provides continuous coverage over the frequency range from 550 kilocycles (kc) to 44 megacycles (mc) in four bands. Each band is provided with sufficient overlap to insure continuity of coverage over the entire tuning range. The frequencies covered per band are as follows:

Band	Coverage
1	550 kc. to 1700 kc.
2	1680 kc. to 5.4 mc.
3	5.3 mc. to 15.8 mc.
4	15.3 mc. to 44 mc.

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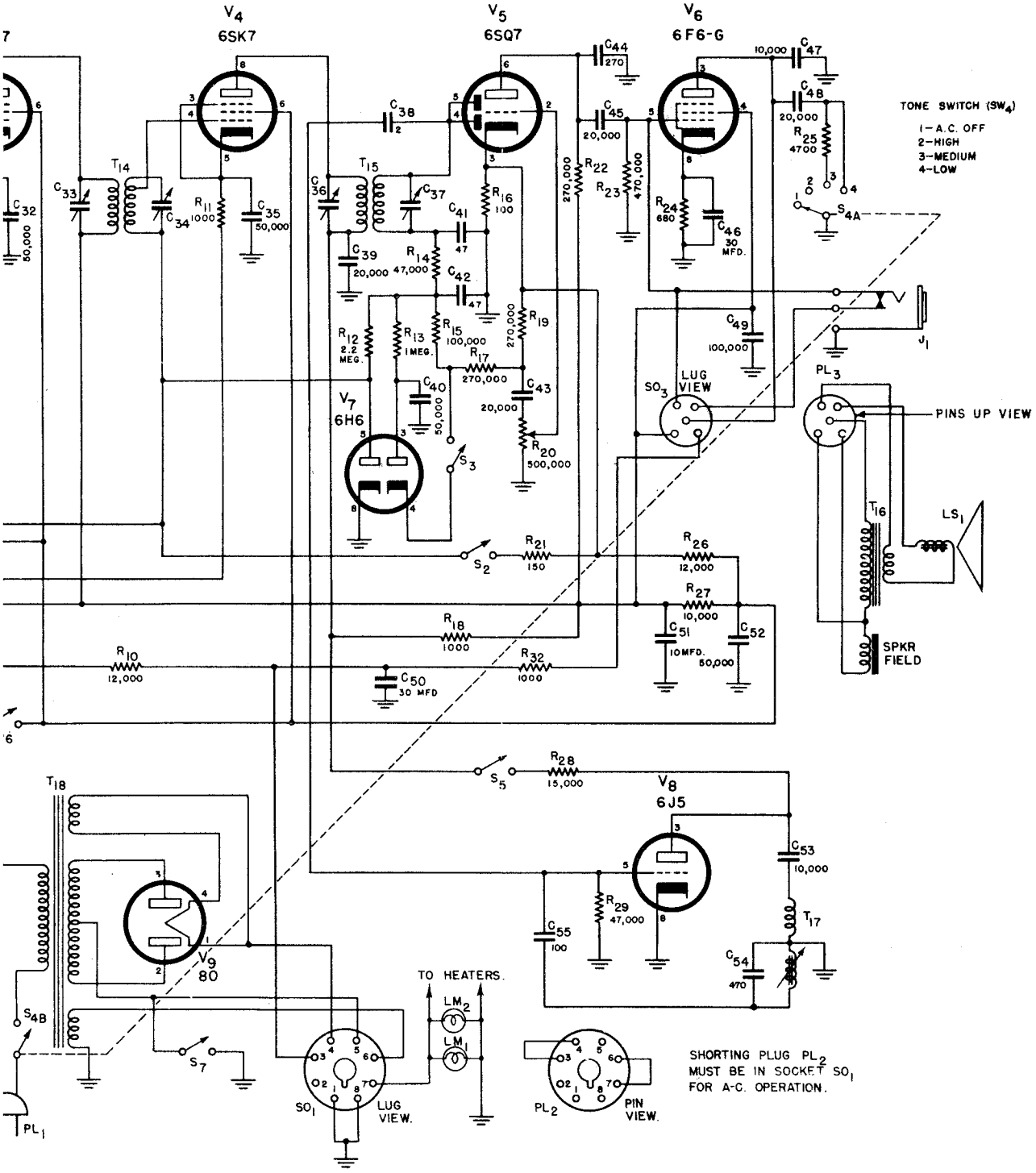

Radio Receiver Model S-40, schematic wiring diagram.

MODEL S-40, 1st and 2nd Revisions

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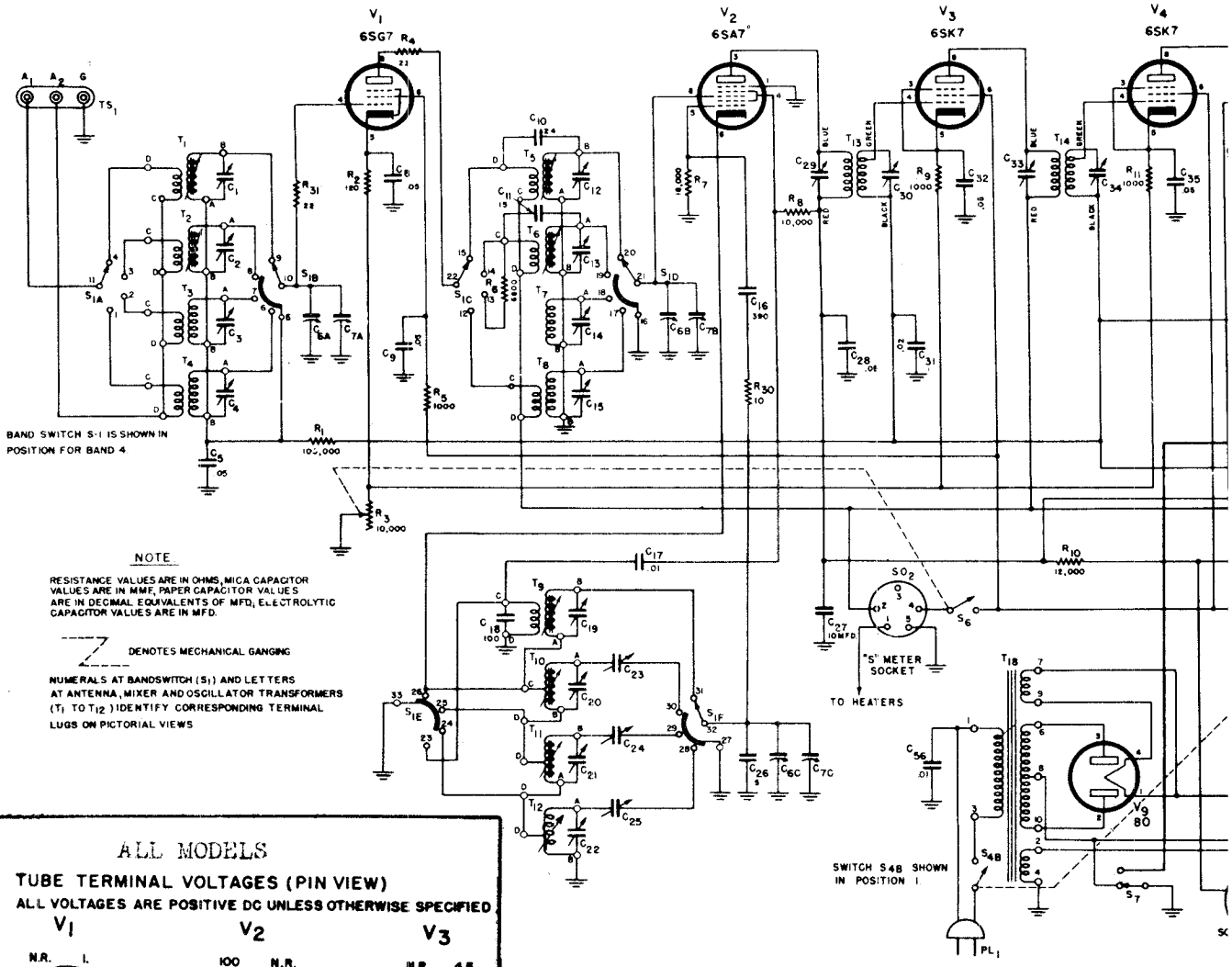
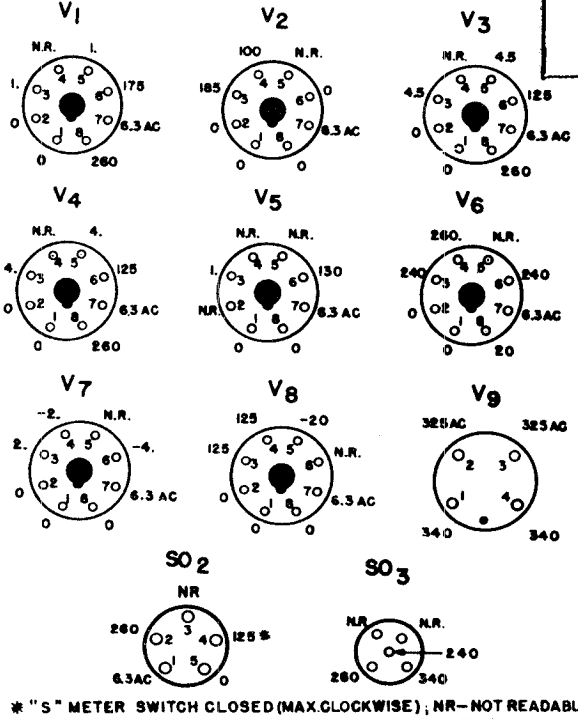

V1 6SG7
V2 6SA7
V3 6SK7
V4 6SK7
BAND SWITCH S-1 IS SHOWN IN POSITION FOR BAND 4
NOTE
RESISTANCE VALUES ARE IN OHMS, MICA CAPACITOR VALUES ARE IN MMF, PAPER CAPACITOR VALUES ARE IN DECIMAL EQUIVALENTS OF MFD, ELECTROLYTIC CAPACITOR VALUES ARE IN MFD.
DENOTES MECHANICAL GANGING
NUMERALS AT BANDSWITCH (S1) AND LETTERS AT ANTENNA, MIXER AND OSCILLATOR TRANSFORMERS (T1 TO T12) IDENTIFY CORRESPONDING TERMINAL LUGS ON PICTORIAL VIEWS
"S" METER SOCKET
TO HEATERS
SWITCH S4B SHOWN IN POSITION 1
V9 80
PL1

ALL MODELS

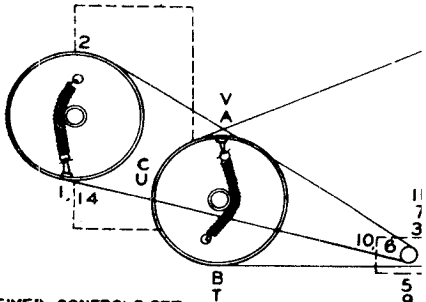
TUBE TERMINAL VOLTAGES (PIN VIEW)

ALL VOLTAGES ARE POSITIVE DC UNLESS OTHERWISE SPECIFIED



To restring the main tuning dial cord, cut a 25" length of 18 lb. test dial cord and tie one end to the tension spring of the main tuning capacitor drive pulley at position "1" on the diagram. Following the numbers 1 through 14, wind the cord on the pulley and knob drive shaft. At position "14," stretch the tension spring and tie the cord securely. Cut off the excess cord. Note that three turns are wound on the knob drive shaft.

To restring the bandspread tuning dial cord, cut a 35" length of dial cord and follow the procedure as explained above, except start at position "A" on the diagram and proceed through position "V." Note that the knob drive shaft has three turns and the dial drive pulley has one turn.



* "S" METER SWITCH CLOSED (MAX. CLOCKWISE); NR—NOT READABLE WITH METER USED.
ALL READINGS TAKEN AT 117 V. AC LINE VOLTAGE; WITH 20,000 OHM/VOLT METER; NO SIGNAL BEING RECEIVED; CONTROLS SET AS FOLLOWS: STANDBY/RECEIVE SWITCH AT "RECEIVE"; AVC, NOISE LIMITER AT "ON"; AM/CW SWITCH AT "CW"; SENSITIVITY AND VOLUME CONTROLS FULL CLOCKWISE; TUNING, PITCH CONTROL AND TONE CONTROLS IN ANY POSITION AS THEY DO NOT AFFECT READINGS.

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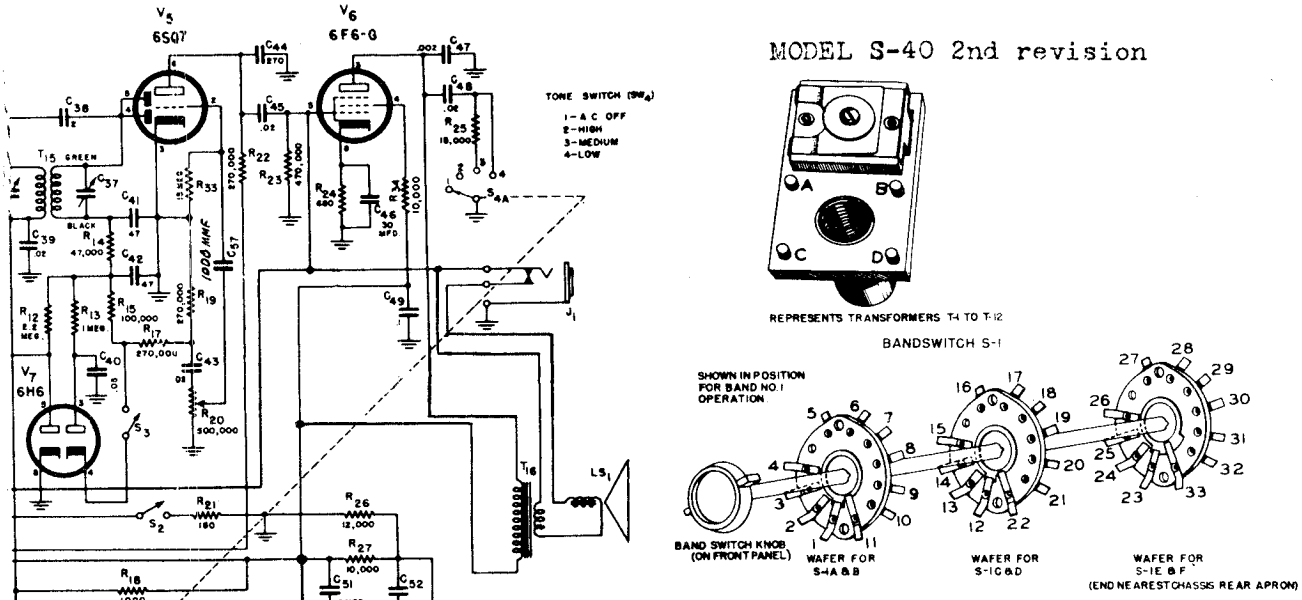
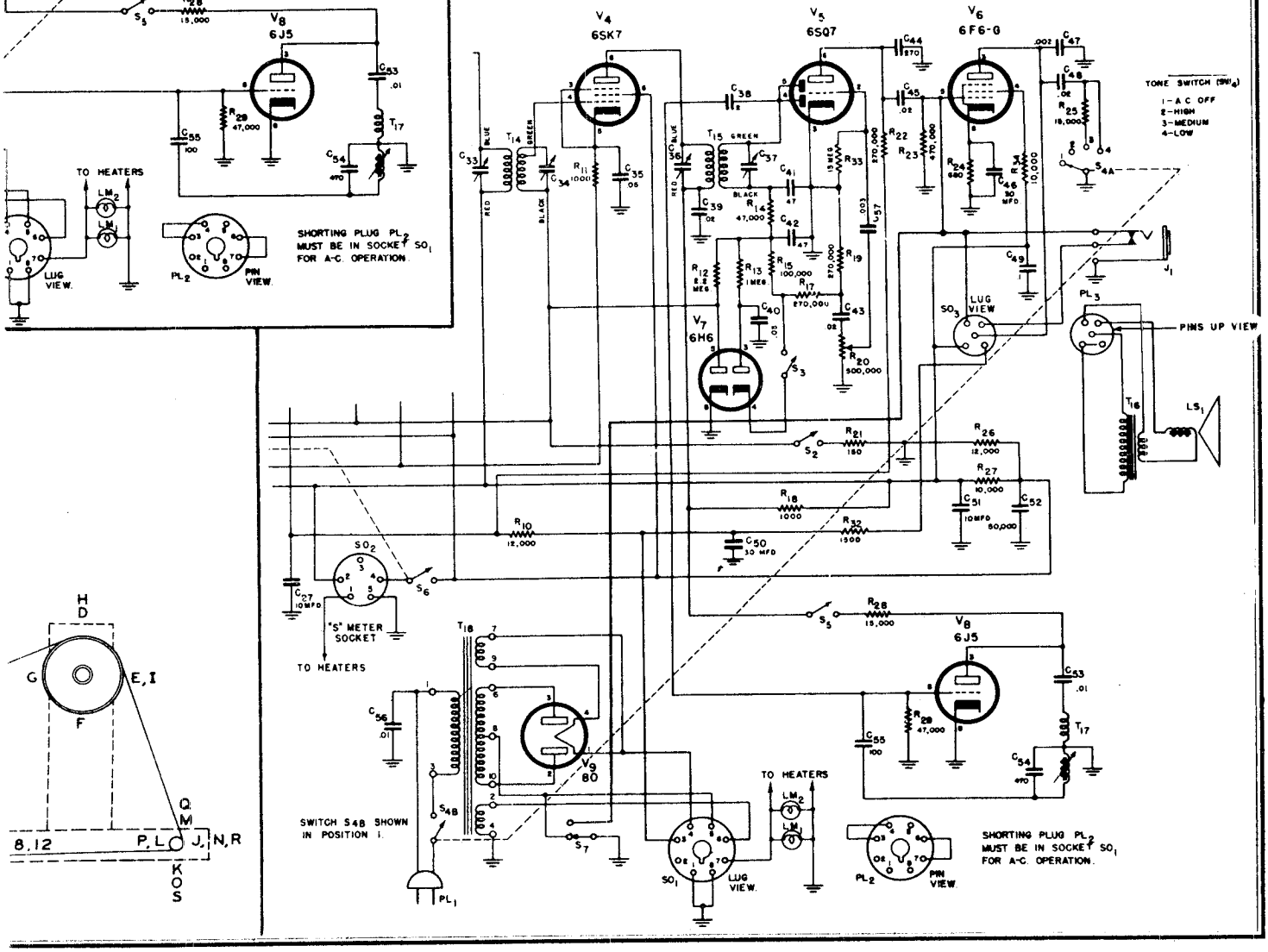
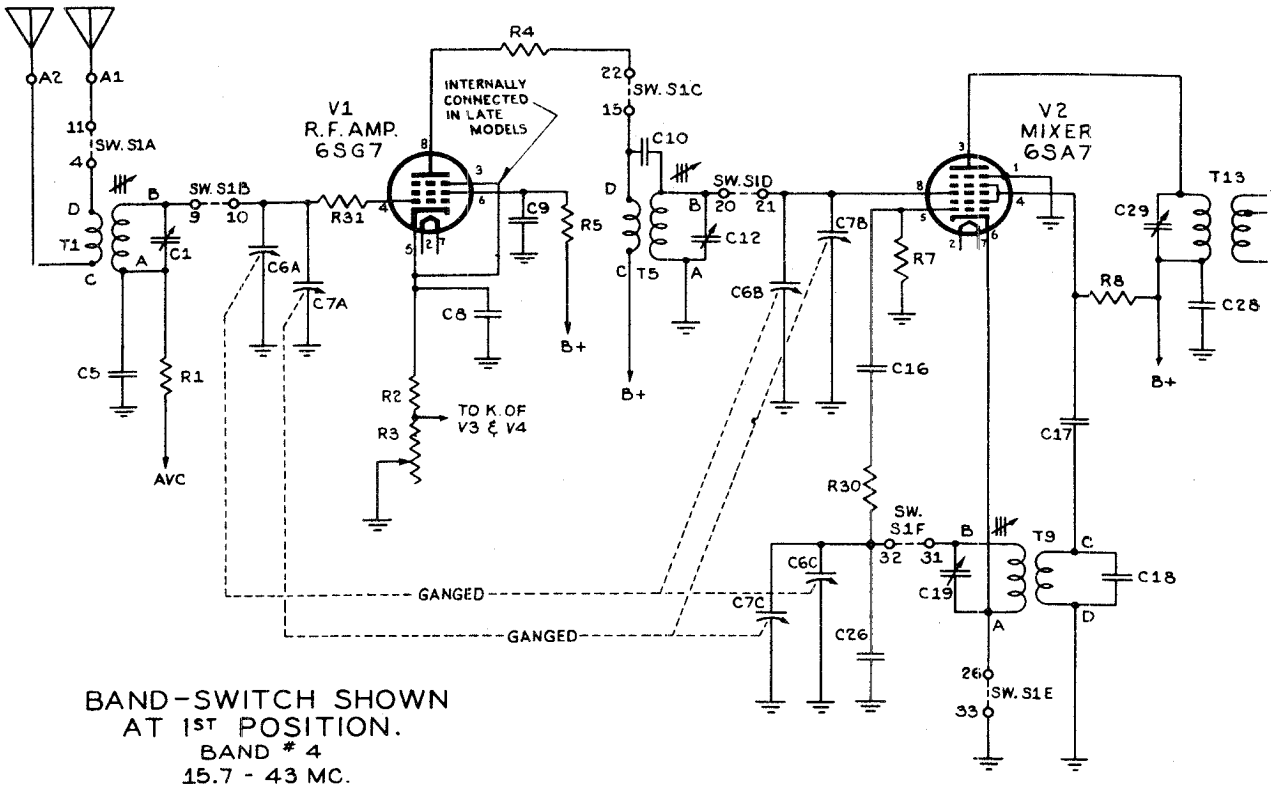
MODEL S-40 2nd revision



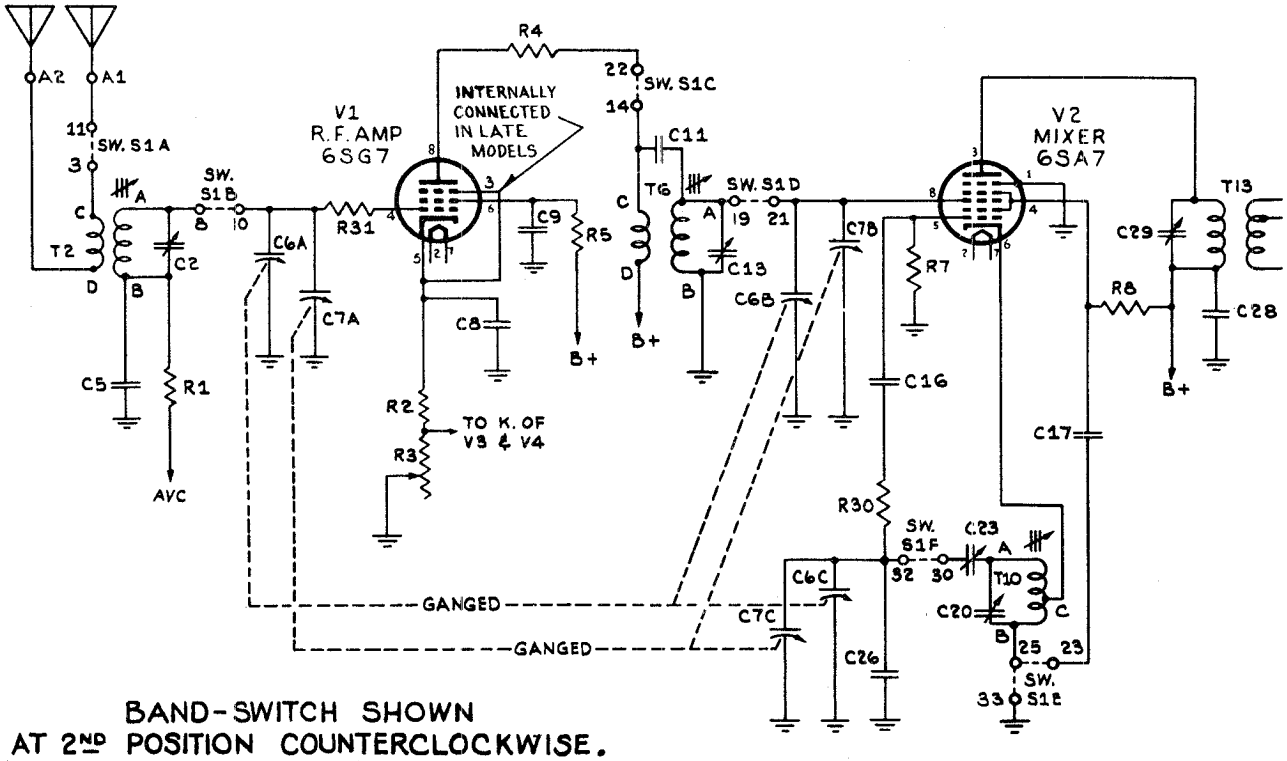
MODEL S-40 1st revision



THE HALLICRAFTERS CO. MODEL S-40



BAND-SWITCH SHOWN
AT 1ST POSITION.
BAND # 4
15.7 - 43 MC.



BAND-SWITCH SHOWN
AT 2ND POSITION COUNTERCLOCKWISE.
BAND #3
5.35 - 15.7 MC

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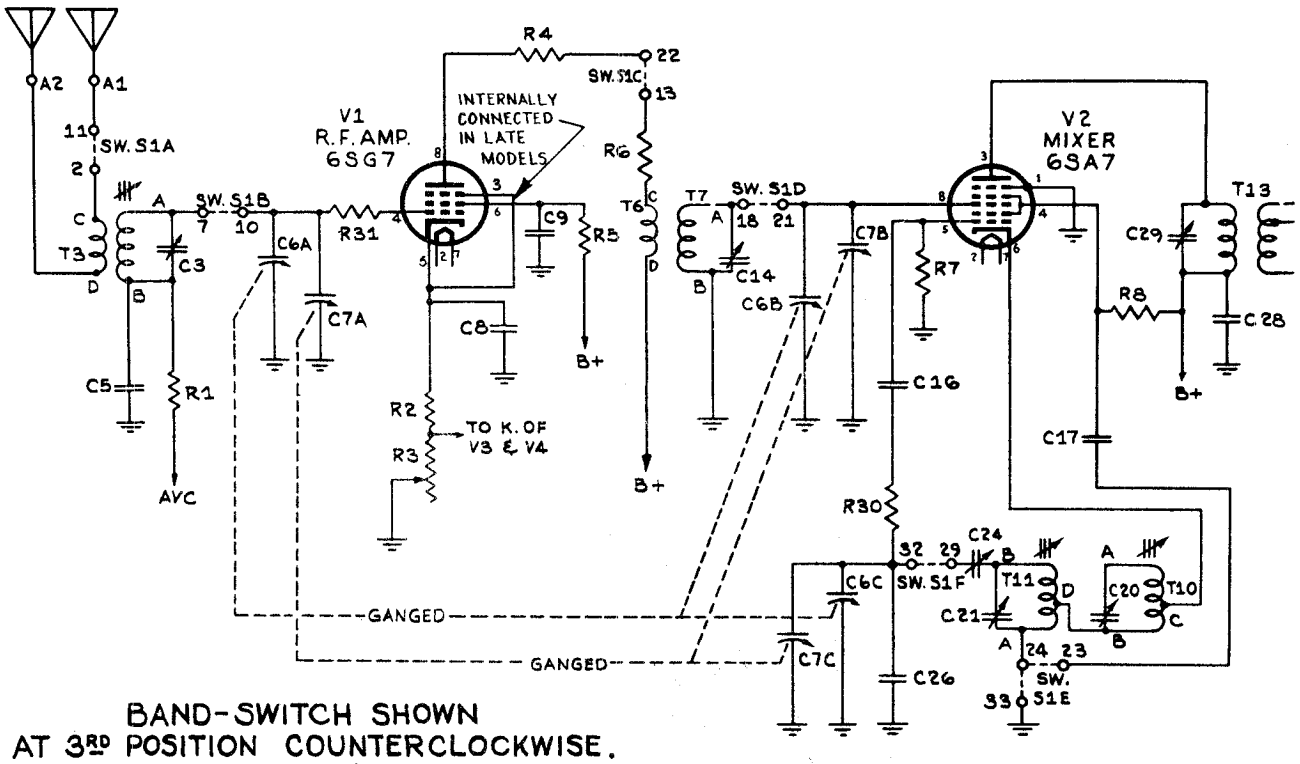
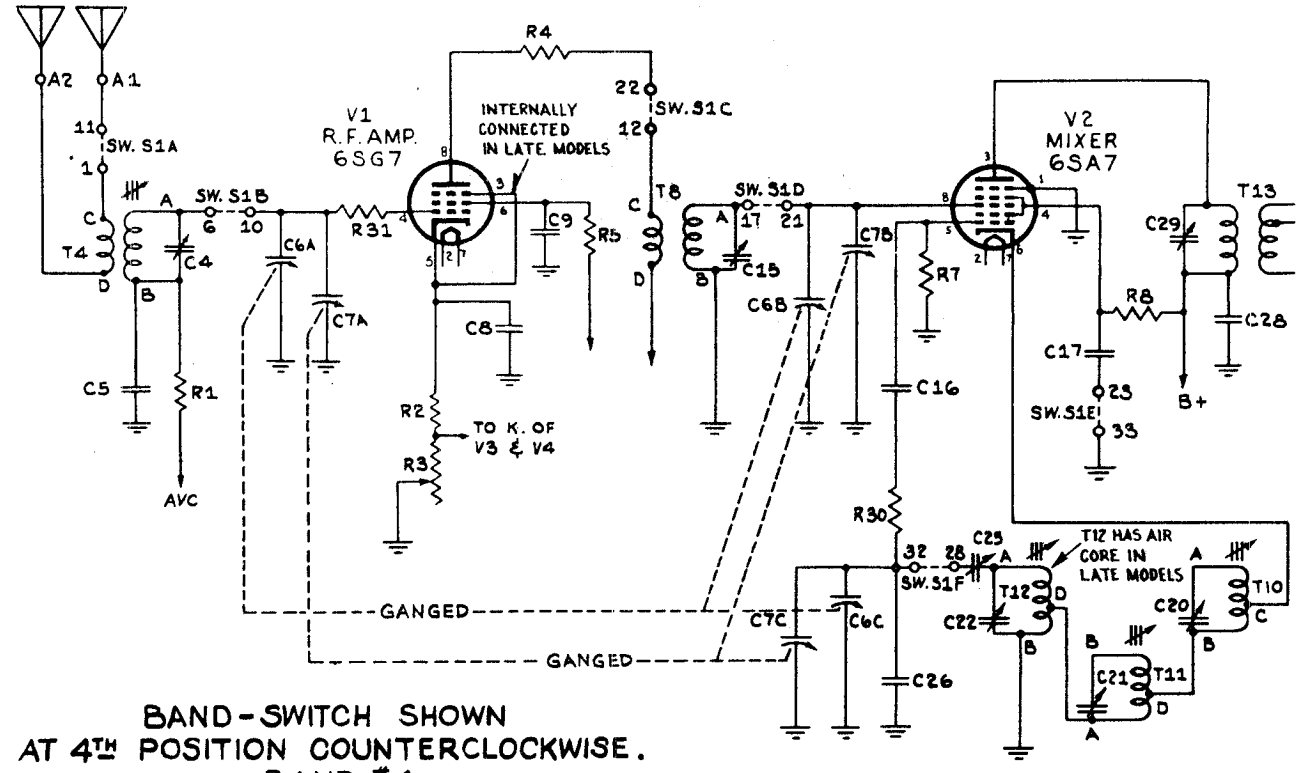
MODEL S-40 THE HALLICRAFTERS CO.



BAND-SWITCH SHOWN
AT 3RD POSITION COUNTERCLOCKWISE.
BAND #2
1.7 - 5.35 MC.



BAND-SWITCH SHOWN
AT 4TH POSITION COUNTERCLOCKWISE.
BAND #1
540 - 1700 KC.

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POWER REQUIREMENTS.

The receiver is designed to operate from a 117-volt, 50/60 cycle single phase, (25/60 cycle if receiver has universal power transformer) a-c source or from a 6-volt storage battery and 260-volts of "B" battery. The "B" batteries may be replaced by a suitable vibrator type power supply if it meets the following current requirements:

A-C Operation	* D-C Operation
Line voltage . . . . . 117 volts	Filament voltage. . . . . 6.3 volts
Line current . . . . . 0.76 amp.	Filament current. . . . . 5 amps.
Power consumption. . . . . 75 watts	"B" voltage . . . . . 260 volts
	"B" current . . . . . 70 ma.

* The 6-volt battery drain using a vibrator type supply for "B" voltage will run approximately 10 amperes.

Audio Output Connections. - The headset jack marked PHONES, located on the front panel, provides output for headset reception. The circuit is such, that the speaker circuit is opened when the headset cord plug is inserted into the PHONE jack. The output of the first audio stage is then capacitively coupled to the PHONE jack.

Remote Operation Facilities. - The receiver may be disabled remotely by disconnecting the jumper wire between pins #3 and #4 on the shorting plug (PL-2), which is normally plugged into socket SO-1 during a-c operation, and connecting a remote switch or relay across these pins. The stand-by switch is connected in the "B" lead. When using the remote control disabling switch, the STANDBY/RECEIVE switch on the receiver must be set at STANDBY.

PREPARATION FOR USE.

A-C Operation. - The receiver may be operated from a 117-volt, 50/60 cycle, (25/60 cycle if universal power transformer is used) single phase a-c source of power. In the event that the receiver has a universal power transformer, check the line voltage and set the line voltage switch, located on top of the transformer, before connecting the receiver to a source of power. If the receiver power transformer is set for a higher line voltage than the source, it will not be damaged when connected to a line of lower voltage, but a receiver set for a lower line voltage will, in most cases, be damaged when plugged into an outlet having a higher line voltage.

D-C Operation. - The receiver may be operated from a 6-volt d-c source, generally a storage battery, and a 260-volt d-c supply in the form of dry batteries or vibrator type power pack. Consult the chart on power requirements for d-c operation in Section I, and provide battery facilities capable of supplying these demands. The receiver is connected to the d-c supply as follows:

(1) Remove the octal "jumper plug" (PL-2) used for a-c operation from socket SO-1. Use #18 (AWG) wire leads for the 260-volt "B" supply connections to pins #3 and #5, and #12 (AWG) wire leads for the 6-volt "A" battery connections to pins #1, #8 and #7.

> CAUTION - Check your wiring carefully before connecting up to the battery supply.

OPERATION.

Listed below are the receiver controls and their settings for the two types of reception provided by this receiver, namely, phone and c-w code reception. Refer to Figure 1-1 or the front panel of the receiver.

a. PHONE RECEPTION. - To receive phone signals set the front panel controls as follows:

STANDBY/RECEIVE switch	- Set at RECEIVE. (Set at STANDBY to disable receiver for short standby periods.
BAND SELECTOR switch	- Set at range number corresponding to band covering desired frequency.
AM-CW switch	- Set at AM.
A.V.C. switch	- Set at ON.
NOISE LIMITER switch	- Normally set at OFF.

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SENSITIVITY control	- Turn the control all the way clockwise to maximum.
VOLUME control	- Adjust for desired volume at headset or loudspeaker.
PITCH CONTROL	- Not used.
TONE control	- Set to please listener. Set at HIGH for normal reception. Generally set at LOW or MED. when noise level is high.
TUNING control	- Set calibrated dial to frequency of desired signal and adjust for maximum tuning meter deflection (if a tuning meter is used.) Dial frequency calibrations are true only with BANDSPREAD tuning dial set at zero.
BANDSPREAD Tuning control	- Use this control in conjunction with the TUNING control as described in the paragraph on bandspread tuning in this section. This control is used for finer tuning.

b. C-W Code Reception. - To receive continuous wave (c-w) code signals, set the front panel controls as follows:

BAND SELECTOR switch	- Set at range number corresponding to band covering desired frequency.
A.V.C. switch	- Set at OFF.
AM-CW switch	- Set at CW.
NOISE LIMITER switch	- Set at OFF.
TUNING control	- Set calibrated dial at frequency of desired signal. Tune for maximum signal level at headset or loudspeaker. Dial frequency calibrations are true only with the BANDSPREAD tuning dial set at zero.
SENSITIVITY control	- Turn up as high as the signal strength of the code signal will permit. Too much gain will result in distortion of the signal.
TONE control	- Set at LOW or MED.
VOLUME control	- Turn up to full clockwise.
BANDSPREAD tuning control	- Use this control in conjunction with the MAIN tuning control as described in the paragraph in bandspread tuning in this section. This control is used for finer tuning.
PITCH CONTROL	- Set at desired pitch of code signal by turning to the right or left.
STANDBY-RECEIVE	- Set at RECEIVE (Set at STANDBY to disable receiver for short standby periods.

GENERAL: Model S-40 is a 9 tube commercial superheterodyne table model, radio receiver, incorporating 4 bands of AM/CW reception, as follows: band #1, 540 kc to 1700 kc; band #2, 1.7 mc to 5.35 mc; band #3, 5.35 mc to 15.7 mc; band #4, 15.7 mc to 43 mc. Provision for variable sensitivity control; optional AVC, noise limiting, BFO pitch, tone, headset reception, and use of an external "S" meter; standby operation; and bandspreading are provided.

REAR PANEL CONNECTIONS: Consist of AC line cord with plug, antenna and ground connector strip, dc power input socket and external "S" meter connector socket.

POWER SUPPLY DATA: AC operation—117 volt, 50/60 single phase source. (Also, 110/130/150/220/250 volt, 25 cycles single phase source with special power transformer available, Hallicrafter's part #52CO27.) Power drain is 75 watts.

DC operation—filament 6.3 volt @ 3.5 amp; "B" supply 260 volt @ 70 ma. (The 6 volt battery drain for vibrator type supply for "B" voltage will run about 10 amp.)

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FUNCTIONING OF PARTS

1. GENERAL.

Figure 4-1. shows, in a very simple block form, the plan of the circuit of the Model S-40 radio receiver. Note that the circuit is that of the conventional superheterodyne receiver. A signal received at the antenna is fed through an r-f amplifier stage to a combined mixer-oscillator stage where a local signal is generated and mixed with the incoming signal. An intermediate frequency signal selected at the output of the mixer stage is fed through two i-f amplifier stages to a combined detector audio amplifier stage where it is demodulated, amplified and fed through an audio power amplifier stage to a loud speaker. Provision is made for headset reception. A combined a-v-c and a-n-l stage is also included to provide improved reception. A beat frequency oscillator is incorporated for the reception of continuous wave (c-w) signals. Provision is also made for bandspread operation. An external tuning meter may be used with the receiver, provision being made at the rear of the receiver for connections.

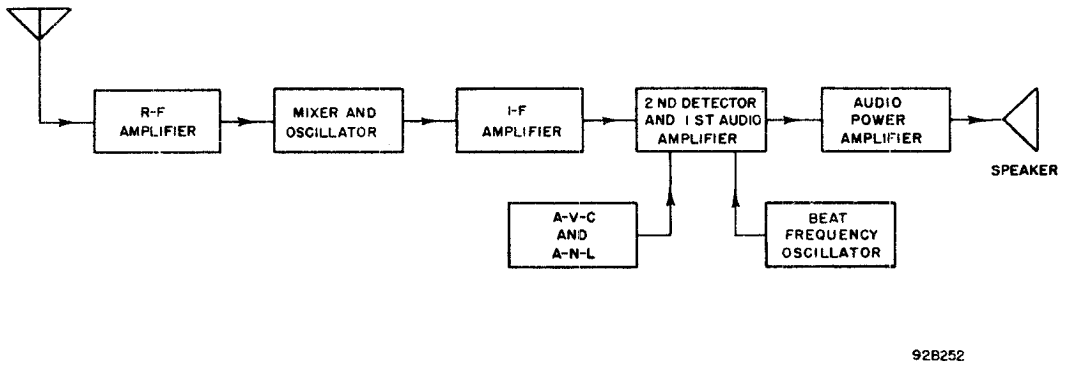

Figure 4-1. Radio Receiver Model S-40, block diagram.

2. DETAILED FUNCTIONING BY STAGES. (Refer to Fig. 7-7.)

Since the circuit functions of bands 1, 2, 3 and 4 are essentially identical, this discussion will describe the circuit with BAND SELECTOR switch (S-1A through S-1F) set at band 4 as shown in the schematic diagram.

a. **R.F. Amplifier.** - The r-f amplifier stage employs a type 6SG7 pentode tube in a conventional class A amplifier circuit. Signals present at the antenna are fed to the primary of transformer T-1 through terminals A-1 and A-2 of the antenna terminal strip TS-1. The secondary of transformer T-1 is tuned by the ganged tuning capacitor section C-6A and trimmer C-1. Ganged tuning capacitor section C-7A acts as a bandspread for the secondary of transformer T-1. R-f signals selected by the parallel resonant circuit are applied to the grid of tube V-1 and appear in greater amplitude across the primary of transformer T-5. Resistor R-1 and capacitor C-5 provide decoupling for the a-v-c voltage applied to the control grid. Parasitic resistors R-4 and R-31 prevents unwanted oscillations in this stage and tends to stabilize the amplifier. Resistor R-2, by-passed by capacitor C-8, provides self-bias for the stage. Resistor R-3 (SENSITIVITY control) regulates the bias to the grid. Resistor R-5 and capacitor C-9 act as a decoupling network for the screen of tube V-1. The signal voltage developed across the primary of transformer T-5 is then coupled to the grid of tube V-2 inductively through transformer T-5 and capacitively through capacitor C-10. Capacitor C-10 provides a small amount of coupling to improve the response at the high frequency end of the band, thus equalizing the r-f signal amplitude over the tunable frequency range.

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b. Mixer-Oscillator. - The mixer-oscillator stage employs a type 6SA7 converter tube. The tube functions both as oscillator and mixer. The secondary of r-f transformer T-5 is tuned by section C-6B of the ganged tuning capacitor and trimmer C-12. Ganged tuning capacitor section C-7B acts as bandspread tuning for the secondary of transformer T-5. Ganged tuning capacitor section C-6C, trimmed by capacitor C-19, tunes the secondary of transformer T-9 which is part of the oscillator circuit. Ganged tuning capacitor section C-7C acts as bandspread tuning for the secondary of transformer T-9. A signal generated by the local oscillator, 455 kc. higher in frequency than the received signal on bands #1, #2, #3 and 455 kc. lower in frequency than the received signal on band #4, is mixed electronically in the mixer tube since the oscillator tube elements are included as part of the mixer tube V-2 in the same tube envelope. The frequency of oscillation is determined by a resonant circuit consisting of the secondary of transformer T-9 and section C-6C of the main tuning capacitor and trimmer capacitor C-19 connected in parallel. Section C-7C of the variable ganged bandspread capacitor is connected in parallel with section 6-6C of the main tuning capacitor for the purpose of effectively spreading or broadening the frequency range. Capacitor C-26 is an additional fixed trimmer across the resonant circuit. Capacitor C-18 provides increased gain for the oscillator on this band. Variable capacitors C-23, C-24, and C-25 are padders for bands #3, #2, and #1 respectively. Resistor R-7 is a grid return for the oscillator grid in tube V-2. Capacitor C-16 is the oscillator grid coupling capacitor while capacitor C-17 provides coupling and d-c blocking for the oscillator plate circuit. Resistor R-30 suppresses parasitic oscillations. Plate voltage for the screen grid of tube V-2, which also acts as oscillator plate, is applied through resistor R-8. The difference frequency of the oscillator and incoming signal frequencies is applied to the first i-f transformer T-13 primary which is tuned by capacitor C-29. Capacitor C-29 is a by-pass for the mixer plate.

c. First and 2nd I-F Amplifier. - The first and 2nd i-f amplifier stages employ type 6SK7 pentode tubes. I-f amplifier coupling transformer T-13, T-14, and T-15 for these two stages are tuned to 455 kc by adjusting the trimmer capacitors across each transformer primary and secondary. The gain of the 1st and 2nd i-f amplifier stages is varied by the SENSITIVITY control (R-3), connected in series with the cathodes of both tubes, to provide sensitivity control for the receiver. The a-v-c grid voltage is applied to this section of the receiver through resistor R-12 when A.V.C. switch S-2 is at OFFor in the open position. C-31 is an a-v-c by-pass for the control grid of 1st i-f amplifier tube V-3. Resistor R-9, by-passed by capacitor C-32, provides fixed bias for tube V-3. Resistor R-11 by-passed by capacitor C-35 provides fixed bias for 2nd i-f amplifier tube V-4. Capacitor C-39 is a plate by-pass for tube V-4. The signal voltage developed across the transformer T-15 primary is fed inductively to the 2nd detector.

d. 2nd Detector and 1st Audio. - Both the second detector and first audio amplifier stages employ a single type 6SQ7 duo diode-triode. The diode section of tube V-5 serves as a detector by rectifying the modulated carrier. The r-f filter for this type of detection consists of resistor R-14 and capacitors C-41 and C-42 connected in a pi-section. Automatic volume control and audio frequency voltage is obtained from a voltage divider consisting of resistors R-19, R-17 and R-15. Capacitor C-43 couples the 2nd detector to the VOLUME control, resistor (R-20). Resistor R-16 is bias for the first audio stage, part of tube V-5. Resistor R-22 is the plate load for the triode part of tube V-5. Capacitor C-44 acts as r-f filter at the plate. The audio frequency voltage is then fed through coupling capacitor C-45 to the grid of the output audio amplifier tube V-6.

e. Power Audio Amplifier. - The power audio amplifier stage is a class A amplifier employing a type 6F6-G pentode. Resistor R-23 is a grid return for the control grid of tube V-6. Resistor R-24, by-passed by capacitor C-46, supplies bias to the control grid. Resistor R-25 and capacitors C-47 and C-48 serve as a tone control circuit. Capacitor C-49 serves as by-pass for the screen grid. The audio signal is then fed through socket SO-3 and plug PL-3 to the primary of output transformer T-16 whence it is coupled inductively to the secondary and fed to the speaker LS-1 voice coil. An audio frequency signal is also fed from the grid of tube V-6 to PHONE jack J-1. Voltage is fed to the plate of tube V-6 through the primary of transformer T-16.

f. A.V.C. and NOISE LIMITER. - Both the automatic volume control and automatic noise limiter stages employ a single type 6H6 duo-diode. One diode of tube V-7 serves as the automatic volume control rectifier. The remaining diode section of tube V-7 serves as an automatic limiter as follows: Capacitor C-40 becomes charged by the rectified carrier voltage and the time constant of this capacitor and filter network associated with it is such that the audio frequency voltage variations do not alter this charge. During a severe noise pulse, however, the cathode of the diode plate connected to capacitor C-40 becomes more negatively charged than the charge held by capacitor

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C-40 until the cathode voltage of the a-n-l diode again reaches a less negative potential than its plate and capacitor C-40 acquires its normal charge. By shorting the audio voltage to ground during a noise pulse, the a-n-l circuit prevents the objectionable noise pulses from reaching the audio amplifier stages.

g. Beat Frequency Oscillator. - The beat frequency oscillator employs a type 6J5 triode tube in a tuned-grid, untuned plate oscillator circuit. The oscillator frequency is adjusted by a moveable powdered iron core in the field of transformer T-17. This iron core adjustment sets the oscillator frequency at 455 kc. and is adjusted by a screw driver during alignment. The fine adjustment of the oscillator frequency required to provide control of the beat note frequency is controlled by a knob (PITCH CONTROL) from the front panel. The AM-CW switch controls the use of the oscillator by opening or closing the plate voltage lead to the tube. Resistor R-28 provides a load for the plate of tube V-8. Resistor R-29 is the oscillator tube V-8 grid return while capacitor C-55 provides grid coupling from the oscillator tank circuit. Capacitor C-54, across part of transformer T-17, resonates the tank circuit. Capacitor C-53 forms part of a series impedance circuit with part of transformer T-17. The beat frequency signal is coupled to the 2nd detector through capacitor C-38.

h. Power Supply. - The receiver has provisions for operation from either an a-c or d-c source.

(1) A-C Operation. - The receiver's power supply provides for operation from a 117-volt source. The a-c current is fed to the primary of power transformer T-18 through the line cord. A type 80 (tube V-9) full wave rectifier is employed in a conventional full wave rectifier circuit. The high voltage from this rectifier is fed to a filter network through the "Shorting Plug" on the rear apron of the receiver chassis as is the filament current for the heaters of the tubes. The STANDBY/RECEIVE switch is connected in series with the transformer T-18 center tap lead to ground (chassis), thereby disabling the receiver but at the same time keeping the tube heaters hot and ready for instant use. The filter circuit consists of a pi network made up of the speaker field coil and capacitors C-50 and C-51. Resistors R-26 and R-27 are part of a voltage divider and capacitor C-52 is a by-pass.

(2) D-C Operation. - External 6-volt storage battery and 260-volts of "B" batteries or storage battery and vibrator type supply provide for d-c operation. When operating from an external d-c supply the "Shorting Plug" on the rear apron of the receiver chassis is removed and a similar plug is wired to supply filament and plate current to the receiver circuits. The "B" voltage is fed to the input side of the filter sections used for a-c operation thereby insuring adequate filtering for vibrator type power supplies.

i. Tuning Meter. - The tuning meter "S METER" is not supplied with the receiver, but can be purchased on request from the company. Provision has been made on the rear apron of the receiver for the external connection of the "S" meter. A five prong plug is wired to the meter as indicated in figure 4-2 and should be plugged into socket SO-2. When metering reception, the meter measures a voltage drop across resistor R-27 e.i. a change in screen current of first and second i-f amplifier tubes V-4 and V-3.

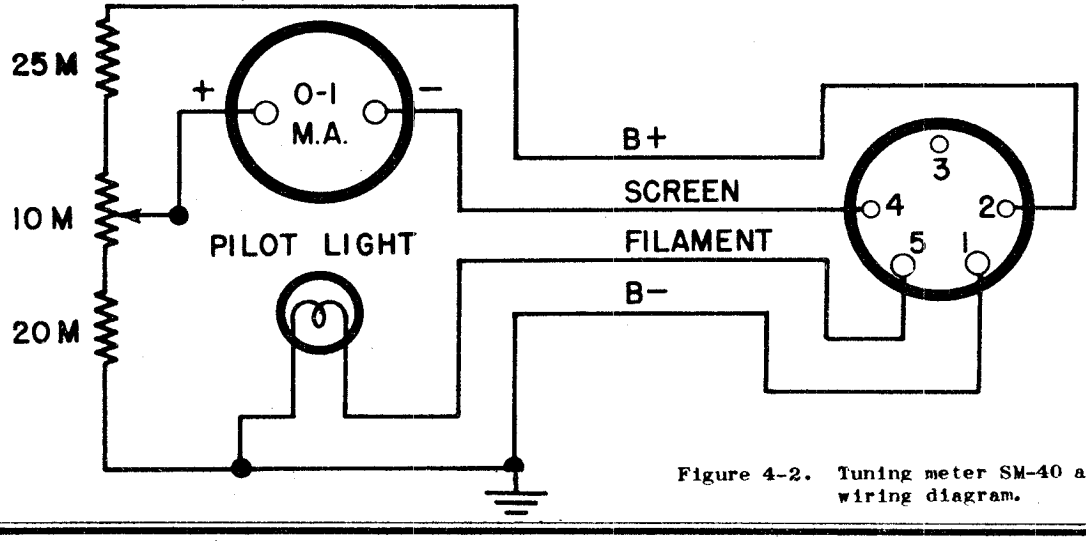

Figure 4-2. Tuning meter SM-40 and schematic wiring diagram.

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MAINTENANCE

CAUTION. - Voltages at various points in this equipment are of sufficiently high potential to produce a severe shock. Locate the high - potential points on the VOLTAGE CHART before attempting to service circuits that are "hot". IT IS A GOOD RULE TO DISCONNECT THE POWER SOURCE BEFORE MAKING ADJUSTMENTS WHEN POSSIBLE. BE CAREFUL.

1. PREVENTIVE MAINTENANCE.

All components of the receiver should be given a thorough inspection at regular intervals. The time interval between inspections will be determined by the operating conditions of the individual installation. In general, keep the components clean and dry. Moisture, even in a completely tropicalized set may cause serious deterioration and produce general unsatisfactory operation. Dust and dirt materially effect both electrical and mechanical operation. Keep the various parts clean, especially the tuning capacitors. Dust should be blown out with dry air or brushed out carefully without bending the gang plates in the slightest. Noisey reception may also be caused by dirty condenser wipers, faulty gain controls and switches, frayed cable connections, faulty tubes, etc. in the installation. Check accessible connections, switch contacts, etc. regularly, making sure that all are clean and tight and the tubes and cable connectors are held securely in their sockets.

2. REPLACING TUBES, LAMPS, and FUSES.

a. Replacing Tubes. - All tubes are accessible at the top of the chassis through the hinged cover of the cabinet. When replacing tubes, check the tube type carefully and replace with the correct type. Refer to the top view of the chassis to determine the location of the tubes and to the PARTS LIST for the type number and description of each.

b. Replacing Lamps. - The receiver employes two lamps with bayonet type sockets to illuminate the calibrated tuning dial and the bandspread tuning dial. The lamps are to be replaced with a 6/8-volt, 250 ma. (blue bead) G.E. #44 or equivalent. The color code referred to, is the color of the glass bead above the glass stem inside the envelope of the lamps.

3. PERIODIC ADJUSTMENTS.

a. Receiver Alignment. - The receiver has been carefully aligned at the factory and should not require realignment until the receiver requires new tubes in the r-f and i-f amplifier stages, or shows signs of loss of sensitivity, off frequency calibration or requires service work on one or more of its r-f and i-f amplifier stages. Alignment should not be attempted by inexperienced persons as maximum performance is obtained only by careful and intelligent alignment.

(1) Aligning Tools. -

(a) Signal generator capable of providing a 400 cycle modulated signal at 455 kc, and 550 kc. to 44 mc. range.

(b) A 390 ± 20% ohm non-inductive carbon dummy antenna resistor.

(c) Non-metallic screw driver. A bakelite screw driver with a short metal blade is very good.

(d) Audio output meter capable of handling 1.5 watts of audio power for speaker load.

(2) I-F Amplifier Alignment. - (See Fig. 5-1)

(a) Connect the "hot" lead of the generator directly to the stator plates of the center section of the main tuning capacitor gang (the solder lug on top of that section). Connect the ground wire of the generator to the receiver chassis. Set main tuning capacitor at minimum capacity (open).

(b) Connect the output meter across the speaker voice coil and set the meter range switch for its highest range to prevent overloading the meter accidentally.

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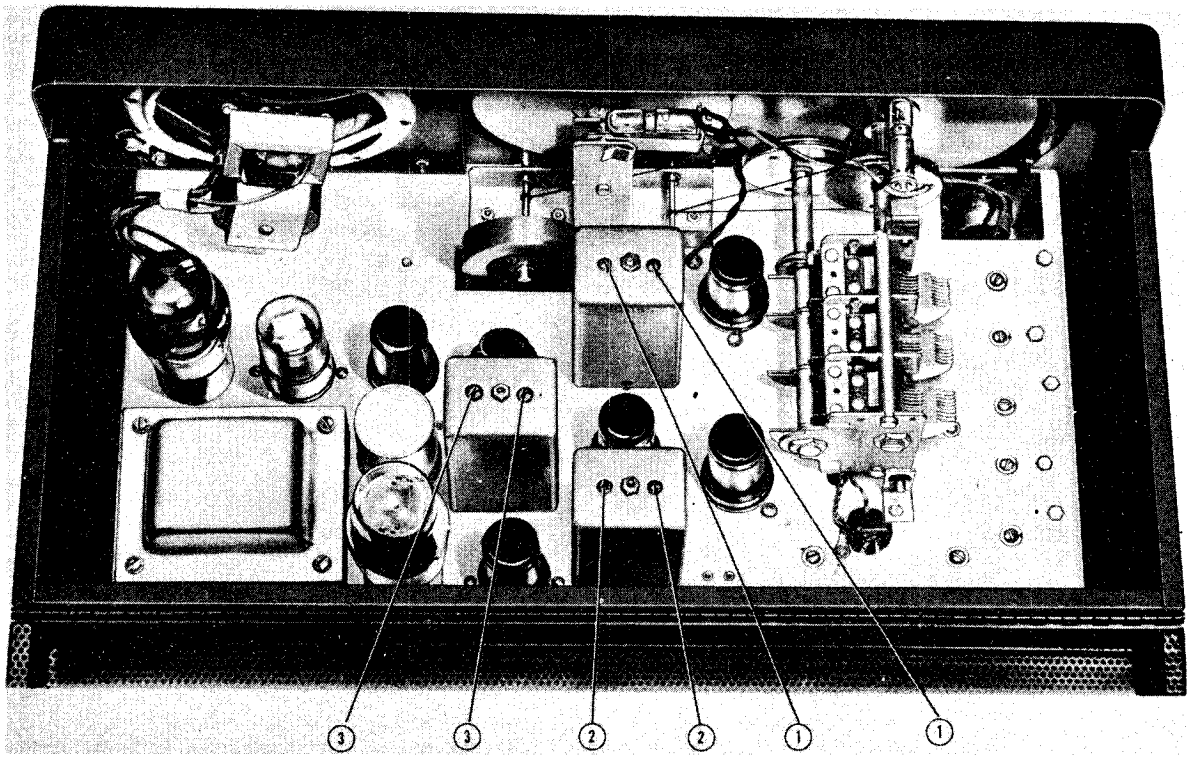
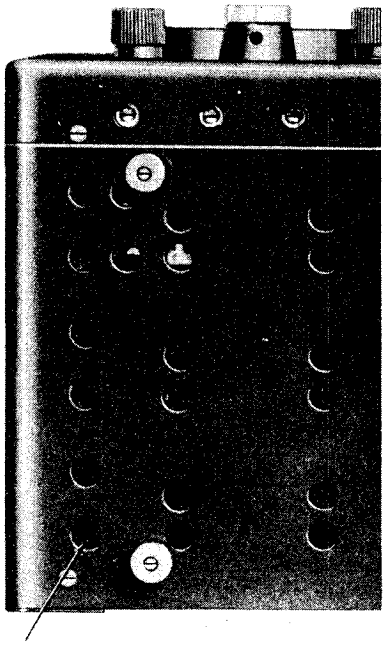


① I-F Adjustments for 1st I-F Transformer T-13
② I-F Adjustments for 2nd I-F Transformer T-14
③ I-F Adjustments for 3rd I-F Transformer T-15



R-F and oscillator adjustment holes

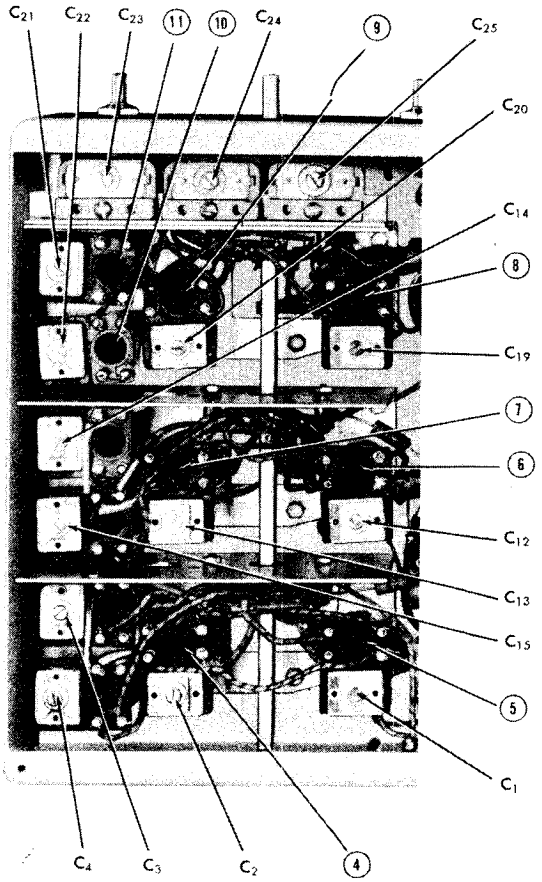


Figure 5-1. Radio Receiver Model S-40, view showing aligning points.

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(c) Let the receiver warm up for approximately ten minutes, then set the receiver controls as follows:

SENSITIVITY control at maximum sensitivity (full clockwise).
VOLUME control at maximum volume (full clockwise).
A.V.C. switch at OFF.
NOISE LIMITER switch at OFF.
CW-AM switch at AM.
TONE control at HIGH.
STANDBY/RECEIVE switch at RECEIVE.

(d) Set the signal generator frequency at 455 kc, and turn on the 400-cycle modulation.

(e) Adjust transformers T-13, T-14, and T-15 for maximum output meter reading using just enough signal generator output to provide a good resonant swing on the output meter. The signal level at the generator should be approximately 52 microvolts for a 500 milliwatt audio output level. Repeat the alignment procedure until assured of accurate alignment. Refer to figure 5-1 for the location of i-f transformer adjustment screws #1 through #3 inclusive on transformers T-13, T-14, and T-15.

(3) Beat Frequency Oscillator Adjustment. -

Connect signal generator as in paragraph (2). Turn 400-cycle modulation off. Remove PITCH CONTROL knob with an Allen wrench and adjust the slotted screw shaft for zero beat. Replace knob so that red mark is on top.

(4) R-F Amplifier Alignment. -

†See note at end of this section.

(a) Connect the "hot" lead of the signal generator to terminal "A1" of the antenna terminal board through a 390 ± 20% ohm non-inductive carbon resistor. Connect the ground lead of the generator to the receiver chassis. Leave the jumper connected between terminals "A2" and "GND". Turn on the 400-cycle modulation.

(b) Let the receiver warm up for approximately ten minutes, then set the receiver controls as follows:

SENSITIVITY control at maximum sensitivity (full clockwise).
VOLUME control at maximum volume (full clockwise).
A.V.C. switch at OFF.
NOISE LIMITER switch at OFF.
CW-AM switch at AM.
TONE control at HIGH.
STANDBY/RECEIVE switch at RECEIVE.

NOTE - For all alignment adjustments, the signal generator output attenuator must be adjusted to provide a 500 milliwatt audio signal output at the speaker socket of the receiver on the output meter.

NOTE - Refer to figure 5-1 for all r-f alignment points.

(c) Band 4. Alignment. -

(1) Set the signal generator at 36 mc. and tune in its signal on the receiver. If the receiver's calibrated dial reads 36 mc. no adjustment is necessary - if not, adjust oscillator trimmer capacitor C-19 for maximum output with the receiver dial set at 36 mc.

(2) Set the signal generator at 18 mc. and tune in its signal on the receiver. If the receiver's calibrated dial reads 18 mc. no adjustment is necessary - if not, adjust slug #8 on transformer T-9 for maximum output with the receiver dial set at 18 mc.

NOTE - If slug #8 has been adjusted it will be necessary to repeat step (1) again. Several adjustments of capacitor C-19 in step (1) and slug #8 in step (2) may be required in cases where the transformer has been greatly detuned or a new transformer has been installed.

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(3) Set signal generator and receiver at 36 mc. and adjust trimmers C-1 and C-12 for maximum output.

(4) Set signal generator and receiver at 18 mc. and adjust slugs #5 and #6 for maximum output.

NOTE - If slugs #5 and #6 have been adjusted, it will be necessary to repeat step (3) again. Several adjustments of capacitors C-1 and C-12 and slugs #5 and #6 may be required in cases where the transformer has been greatly detuned or a new transformer has been installed.

(d) Band 3. Alignment. -

(1) Set the signal generator at 14 mc. and tune in its signal on the receiver. If the receiver's calibrated dial reads 14 mc. no adjustment is necessary - if not, adjust oscillator trimmer capacitor C-20 for maximum output with the receiver dial set at 14 mc.

(2) Set the signal generator at 7 mc. and tune in its signal on the receiver. If the receiver's calibrated dial reads 7 mc. no adjustment is necessary - if not, adjust oscillator padder capacitor C-23 for maximum output with the receiver dial set at 7 mc.

NOTE - If capacitor C-20 has been adjusted it will be necessary to repeat step (1) again. Several adjustments of capacitor C-20 in step (1) and capacitor C-23 in step (2) may be required in cases where the transformer has been greatly detuned or a new transformer has been installed.

(3) Set the signal generator at 10 mc. and tune in its signal on the receiver. If the receiver's calibrated dial reads 10 mc. no adjustment is necessary - if not, adjust slug #9 on transformer T-10 for maximum output with the receiver dial set at 10 mc.

(4). If slug #9 has been adjusted, repeat steps (1) and (2).

(5) Set the signal generator and receiver at 14 mc. and adjust trimmers C-2 and C-13 for maximum output.

(6) Set signal generator and receiver at 7 mc. and adjust slugs #4 and #7 for maximum output.

NOTE - If slugs #4 and #7 have been adjusted, it will be necessary to repeat step (3) again. Several adjustments of capacitors C-2 and C-13 and slugs #4 and #7 may be required in cases where the transformer has been greatly detuned or a new transformer has been installed.

(e) Band 2. Alignment. -

(1) Set the signal generator at 5 mc. and tune in its signal on the receiver. If the receiver's calibrated dial reads 5 mc. no adjustment is necessary - if not, adjust oscillator trimmer capacitor C-21 for maximum output.

(2) Set the signal generator at 1.8 mc. and tune in its signal on the receiver. If the receiver's calibrated dial reads 1.8 mc. no adjustment is necessary - if not, adjust oscillator padder capacitor C-24 for maximum output with the receiver dial set at 1.8 mc.

NOTE - If capacitor C-21 has been adjusted it will be necessary to repeat step (1) again. Several adjustments of capacitor C-21 in step (1) and capacitor C-24 in step (2) may be required in cases where the transformer has been greatly detuned or a new transformer has been installed.

(3) Set the signal generator at 3 mc. and tune in its signal on the receiver. If the receiver's calibrated dial reads 3 mc. no adjustment is necessary - if not, adjust slug #11 on transformer T-11 for maximum output with the receiver dial set at 3 mc.

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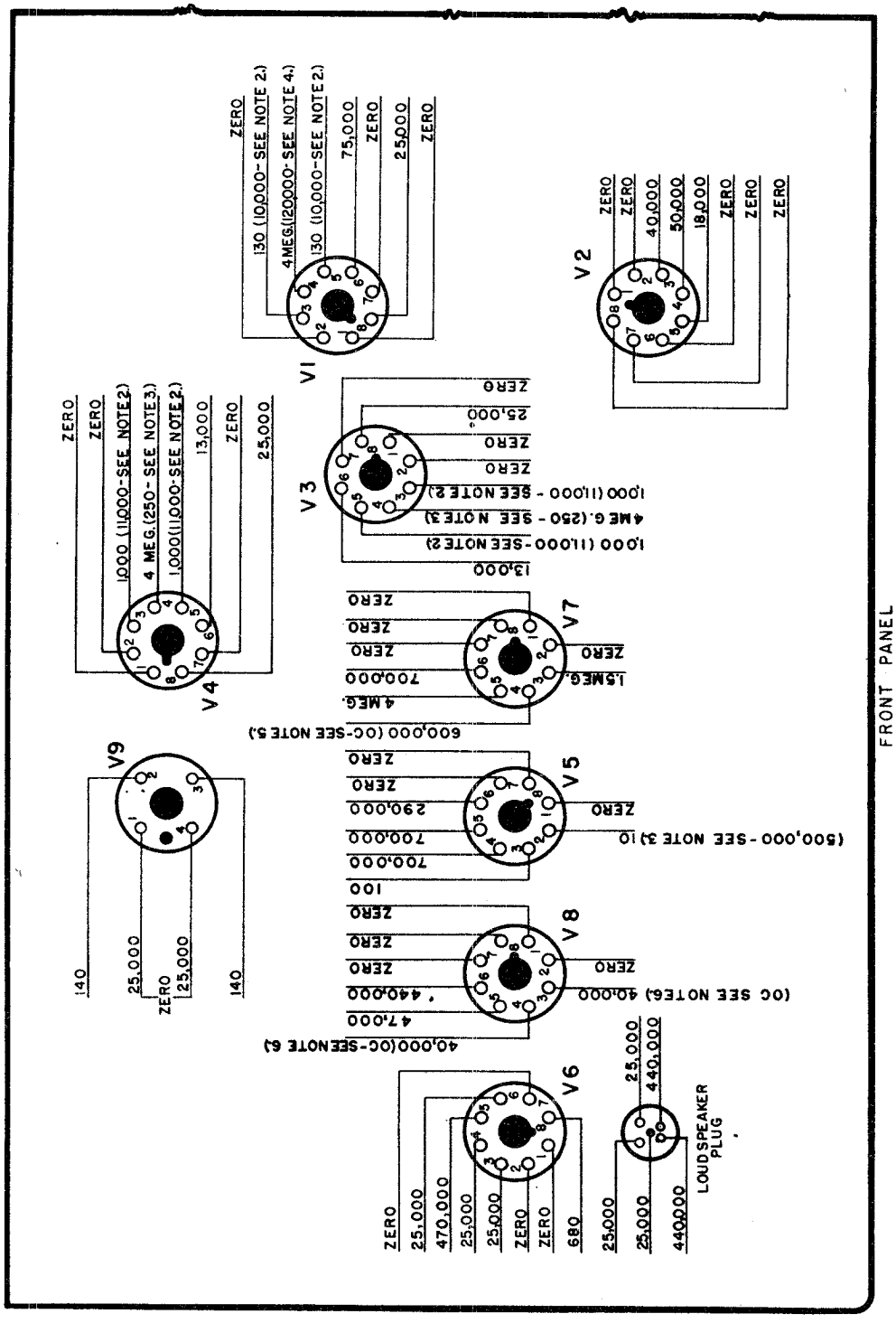

NOTES:
1. CIRCUIT RESISTANCES LESS THAN ONE OHM ARE SHOWN AS "ZERO".
2. RESISTANCE READING WITH "SENSITIVITY" CONTROL SET AT MINIMUM SENSITIVITY.
3. RESISTANCE READING WITH "VOLUME" CONTROL SET AT MINIMUM VOLUME.
4. RESISTANCE READING WITH "A.V.C." SWITCH SET AT "OFF."
5. RESISTANCE READING WITH "NOISE LIMITER" SWITCH SET AT "OFF."
6. RESISTANCE READING WITH "C.W.-A.M." SWITCH SET AT "A.M."
7. O.C. = OPEN CIRCUIT.

Figure 5-3. Radio Receiver Model S-40, resistance chart.

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(4) If slug #11 has been adjusted repeat steps (1) and (2).

(5) Set the signal generator and receiver at 5 mc. and adjust trimmers C-3 and C-14 for maximum output.

(f) Band 1. Alignment. -

(1) Set the signal generator at 1500 mc. and tune in its signal on the receiver. If the receiver's calibrated dial reads 1500 kc. no adjustment is necessary - if not, adjust oscillator trimmer capacitor C-22 for maximum output with the receiver dial set at 1500 kc.

(2) Set the signal generator at 600 kc. and tune in its signal on the receiver. If the receiver's calibrated dial reads 600 kc. no adjustment is necessary - if not, adjust oscillator padder capacitor C-25 for maximum output with the receiver dial set at 600 kc.

NOTE - If capacitor C-22 has been adjusted it will be necessary to repeat step (1) again. Several adjustments of capacitor C-22 in step (1) and capacitor C-25 in step (2) may be required in cases where the transformer has been greatly detuned or a new transformer has been installed.

(3) Set the signal generator and receiver at 1000 kc. and tune in its signal on the receiver. If the receiver's calibrated dial reads 1000 kc. no adjustment is necessary - if not, adjust slug #10 on transformer T-12 for maximum output with the receiver dial set at 1000 kc.

(4) If slug #10 has been adjusted repeat steps (1) and (2).

(5) Set the signal generator and receiver at 1500 kc. and adjust trimmers C-4 and C-15 for maximum output.

NOTE - After completing the above r-f alignment procedure check the image frequency to determine whether the oscillator frequency is higher than the signal frequency on bands 1, 2 and 3, and lower than the signal frequency on band 4.

(g) When completely aligned the overall receiver sensitivity will usually run from 7.2 microvolts at 600 kc. to 5 microvolts at 36 mc. for 500 milliwatts audio output. If your receiver falls reasonably close to this sensitivity, consider your job finished.

4. LOCATING FAULTS WITH A VOLT-OHM METER.

a. Voltage Chart. Refer to schematic for the tube socket terminal voltages. Voltages shown are those between the terminal and ground (chassis) unless otherwise specified. The readings were taken with a Weston Model 772 Analyzer using 20,000 ohm per volt sensitivity. To prepare the receiver for measurement, disconnect the antenna, connect a jumper between the antenna terminals A1, A2, and G, and set the controls as follows:

STANDBY/RECEIVE switch at RECEIVE.
A.V.C., NOISE LIMITER at ON and AM-CW switch at CW.
SENSITIVITY and VOLUME controls full clockwise.
TUNING, and PITCH CONTROL adjustments do not effect the reading.
TONE control at any one of the three tone positions.

b. Resistance Chart. - Refer to Fig. 5-3. for the tube socket terminal to ground (chassis) resistance measurements. To identify tube socket connections, refer to Fig. 7-6. The readings were taken with a Weston Model 772 Analyzer. To prepare the receiver for measurement, disconnect the a-c line cord and set the controls as follows:

STANDBY/RECEIVE switch at RECEIVE.
A.V.C., NOISE LIMITER at ON and AM-CW switch at CW.
SENSITIVITY and VOLUME controls full clockwise position.
TONE control at any one of the three tone positions.
TUNING and PITCH control adjustments do not effect the readings.

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c. Checking Transformer and Inductor Windings With an Ohm-meter. -

NOTE - One terminal of each winding measured must be disconnected from the circuit to avoid measuring circuit resistance instead of winding resistance alone as indicated in the chart.

Circuit Symbol	Name of Part	Winding	Winding Terminals	D-C Resistance (Ohms)
T-16	TRANSFORMER, audio	Primary	Primary	400
		Secondary	Secondary	* 5
SPKR FIELD	Speaker field	-	-	1500
T-18	TRANSFORMER, power	Primary	1 to 3	6
		H.V. secondary	6 to 10	280
		½ H.V. second-	6 to 8	140
		ary	8 to 10	140
		6.3-volt sec-	2 to 4	ZERO
		ondary		
		5.0-volt sec-	7 to 9	ZERO
		ondary		

* With speaker plug in socket.

†Note Rock main tuning gang capacitor when making r-f adjustments on bands 3 and 4.

TUBE COMPLEMENT.

Symbol	Tube Type	Function
V-1	6SG7	R-F amplifier
V-2	6SA7	Mixer and local oscillator.
V-3	6SK7	1st i-f amplifier
V-4	6SK7	2nd i-f amplifier
V-5	6SQ7	Detector, 1st audio amplifier
V-6	6F6-G	Audio power amplifier
V-7	6H6	A-V-C and noise limiter
V-8	6J5	Beat frequency oscillator
V-9	80	Rectifier

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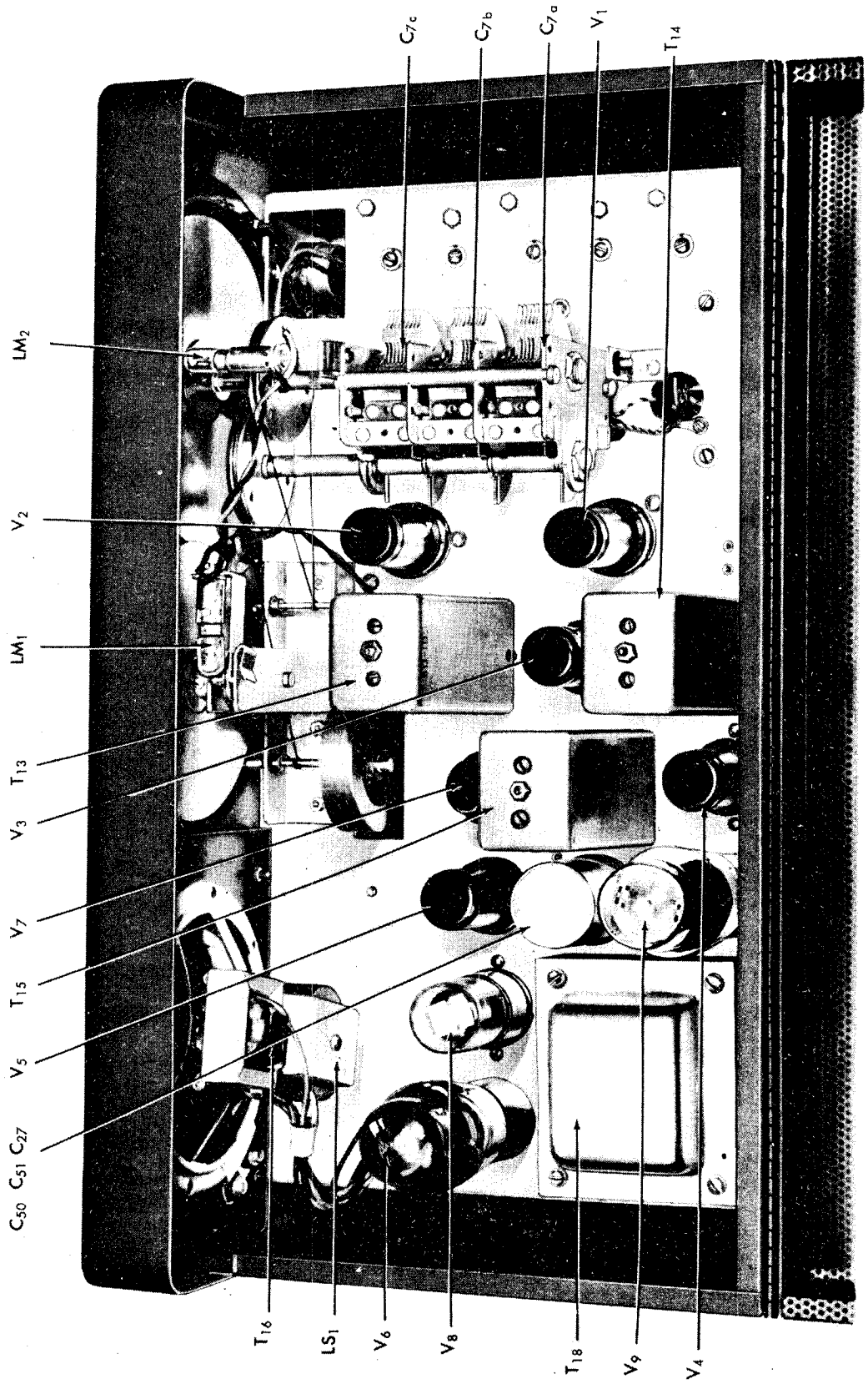

Figure 7-1. Radio Receiver Model S-40, top view.

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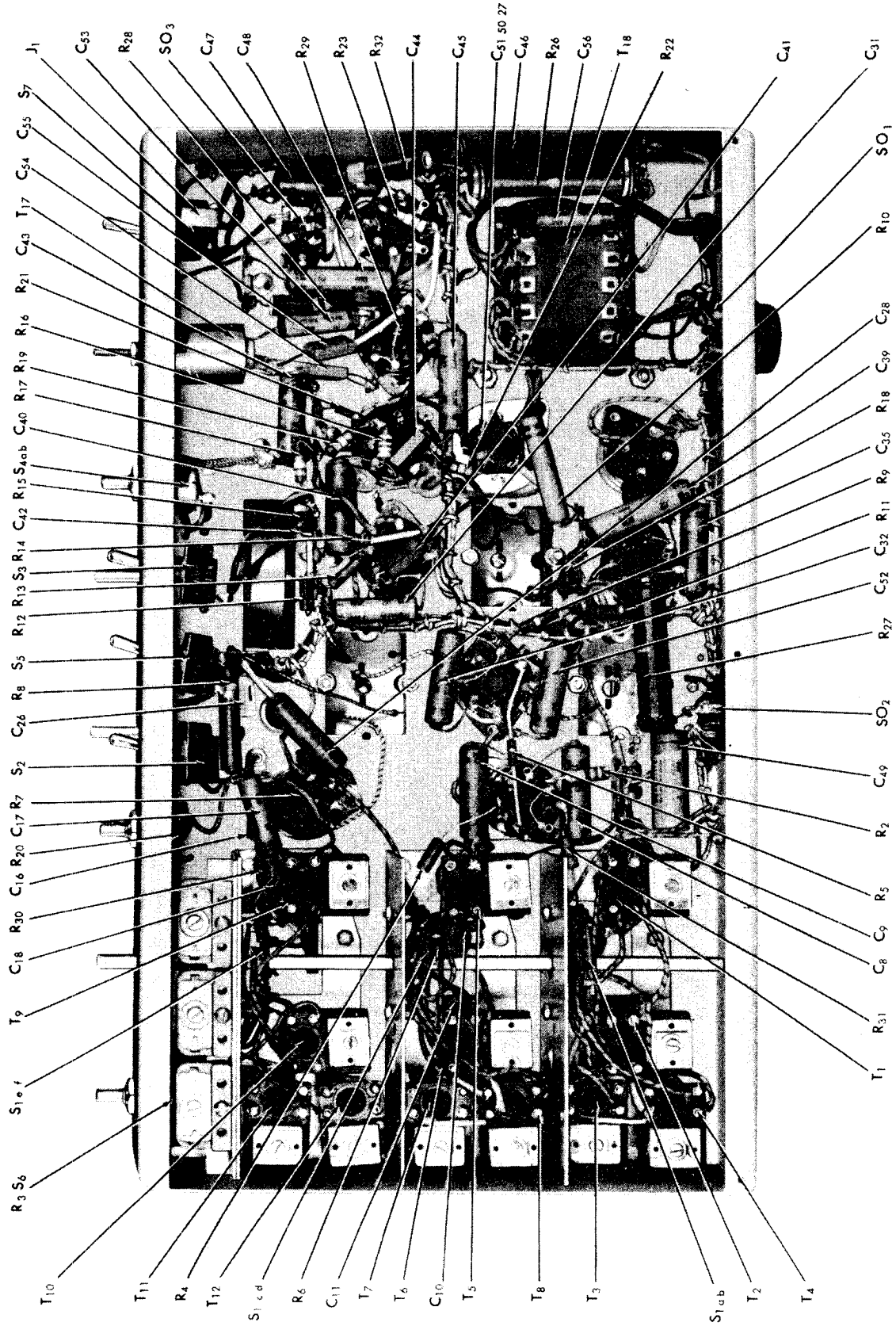

Figure 7-2. Radio Receiver Model S-40, bottom view.

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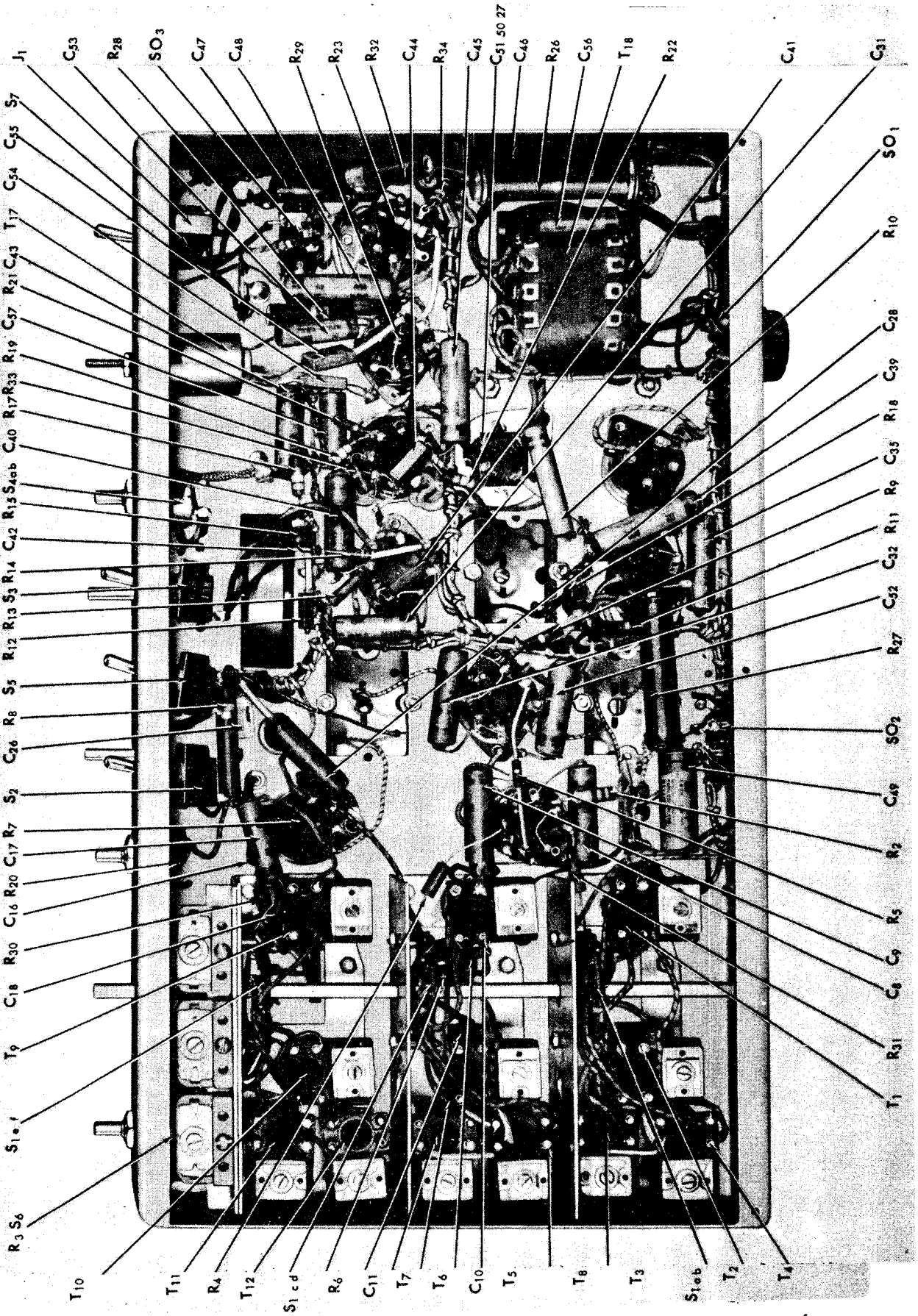

Fig. 3. Bottom view of the receiver showing components location.

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IF FREQUENCY	IF SELECTIVITY	IMAGE RATIO	SENSITIVITY	AUDIO OUTPUT
455 kc	6.8 kc wide at 6 db down 40.7 kc wide at 60 db down (for 500 milliwatt output)	6:1 at 30 mc 15:1 at 14 mc 37:1 at 5 mc 1000:1 at 1500 kc	15 microvolt for 500 milliwatt output at 550 kc 8 microvolt for 500 milliwatt output at 40 mc	1 watt with less than 10% distortion

CONTROL SETTINGS FOR PRELIMINARY TEST OPERATION (Broadcast Band)

REF. NO. (in Fig 1)	NAME	FUNCTION	SETTING
1	SENSITIVITY	RF gain control	Maximum clockwise
2	BAND SELECTOR	Operating band selector	Counter clockwise to "1"
3	VOLUME	Audio gain control	Half clockwise; adj. as necessary
4	AVC	Automatic volume control	AT "ON"
5	TUNING	Main tuning control	To local station freq. on main dial scale
6	CW/AM	BFO on/off switch	At "AM"
7	NOISE LIMITER	Noise peak limiting	At "OFF"
8	BAND SPREAD	Short wave band spreading	To "0" on small dial scale
9	TONE	Receiver on/off switch and tone control	Clockwise to "MED"
10	PITCH CONTROL	CW beat note pitch selector	Any position (not in use)
11	PHONES jack	Headset connection	Not used
12	STANDBY RECEIVE	Receiver temporary standby	At "RECEIVE"

REF. NO.	DESCRIPTION	HALLICRAFTER'S PART NUMBER	COMPONENT LIST PRICE
	CAPACITORS		
C-1, 2, 12, 13 and 19	4 to 80 mmf trimmer for transformers T-1, T-2, T-5, T-6 and T-9.	44A149	$ .10
C-3, 4, 14, 15, 20 21 and 22	1.5 to 15 mmf trimmer for transformers T-3, T-4, T-7, T-8, T-10, T-11 and T-12	44A147	.10
C-5	0.05 mfd; +60−20%; 300 vdcw; paper.	46A091	.20
C-6 and 7	Tuning capacitor; 3 sections ganged.	48C138	3.75
C-8, 32, 35 and 40	0.05 mfd; +40−10%; 200 vdcw; paper.	46AU503J	.10
C-9, 28 and 52	0.05 mfd; +40−10%; 400 vdcw; paper	46AW503J	.10
C-10	24 mmf; ± 20%; 500 vdcw; neg. temp. coeff. 750 mmf mmf deg. C.; ceramic.	CC21UK240M	.15
C-11	15 mmf; +20%; 500 vdcw; neg. temp. coeff. 750 mmf mmf deg. C.; ceramic.	CC21UK150M	.15
C-16	390 mmf; ± 20%; 500 vdcw; mica	CM20A391K	.15
C-17, 53 and 56	0.01 mfd; +40−10%; 400 vdcw; paper	46AW103J	.10
C-18	100 mmf; ± 10%; 500 vdcw; neg. temp. coeff. 0.00075 mmf mmf deg. C.; ceramic.	CC25UK101K	.15
C-23	2645 mmf nominal; padder for transformer T-10	44B141	.50
C-24	1300 mmf nominal; padder for transformer T-11	44A024	.35
C-25	490 mmf nominal; padder for transformer T-12	44A142	.25
C-26	3 mmf ± 0.2 mmf at 25 deg. C.; temp. compensating for oscillator stage	44A158	
C-27, C-50 and C-51	Electrolytic; 3 section unit; coded lug terminals; sect. 1 (C-50) 30 mfd, +40−10%; sect. 2 (C-27) and sect. 3 (C-51) each 10 mfd, +40−10%; all sections 450 vdcw.	45A062	1.60
C-29 and 30, 33 and 34	Dual trimmer unit for IF transformers T-13 and T-14	44A095	.25
C-31 and 43	0.02 mfd; +40−10%; 200 vdcw; paper	46AU203J	.10
C-36 and 37	Dual trimmer unit for IF transformer T-15	44A098	.25
C-38	2 mmf gimmick; formed by twisting two insulated wire leads: NOT AVAILABLE AS A REPLACEMENT PART, SHOWN FOR REFERENCE ONLY		
C-39, 45 and 46	0.02 mfd; +40−10%; 600 vdcw; paper	46AY203J	$ .10
C-41 and 42	47 mmf; ± 20%; 500 vdcw; mica	CM20A470M	.10
C-44	270 mmf; ± 10%; 500 vdcw; mica	CM20A271K	.15
C-46	Electrolytic; 30 mfd; +250−10%; 25 vdcw; axial stranded wire leads	45A034	.35
C-47	0.002 mfd; +40−15%; 800 vdcw; paper	46A104	.10
C-49	0.1 mfd; +40−10%; 400 vdcw; paper	46AV104J	.10
C-54	560 mmf; ± 5%; 500 vdcw; mica	CM25A[illegible]J	.15
C-55	100 mmf; ± 20%; 500 vdcw; mica	CM20A101M	.10
C-57	~~0.001 mfd~~ 1000 mmf; +40−10%; 600 vdcw; paper	46AZ302J	.10
	JACKS		
J-1	PHONES jack; closed circuit; short body; accepts standard headset plug	36A002	.30
	LAMPS		
LM-1 and 2	6.8 v@ 250 ma; blue bead; G.E. type 44	39A003	.10
	LOUDSPEAKER		
LS-1	5" P.M. speaker; 3.2 ohm voice coil		
	PLUGS		
PL-1	AC line cord and standard 2 prong plug	87A078	.35
PL-2	AC operating shorting plug; Amphenol octal, male, type CP-8; includes jumpers wired between pins 3,4,4 and 6,4,7	35A003	.10
PL-3	Speaker connecting plug; Cinch type 2749; part of speaker LS-1 assembly	10A197	.10
	RESISTORS		
R-1 and 15	100,000 ohm; ± 20%; ½ watt; carbon	RC20AE104M	$ .10
R-2	120 ohm; ± 10%; ½ watt; carbon	RC20AE121K	.10
R-3 and S-6	SENSITIVITY control; 10,000 ohm; includes SPST toggle action switch (S-6) on rear	25A533	.50
R-4	22 ohm; ± 20%; ½ watt; carbon	RC20AE220M	.10
R-5, 18 and 32	1,000 ohm; ± 20%; ½ watt; carbon	RC20AE102M	.10
R-6	6,800 ohm; ± 10%; 1 watt; carbon	RC20AE682K	.10
R-7	10,000 ohm; ± 10%; ½ watt; carbon	RC20AE183K	.10
R-8	10,000 ohm; ± 10%; 2 watt; carbon	RC41AE103K	.10
R-9 and 11	1,000 ohm; ± 10%; ½ watt; carbon	RC20AE102K	.10
R-10	12,000 ohm; ± 10%; 4 watt; carbon	RC65CE123K	.10
R-12	2.2 megohm ± 20%; ½ watt; carbon	RC20AE225M	.10
R-13	1 megohm; ± 20%; ½ watt; carbon	RC20AE105M	.10
R-14 and 29	47,000 ohm; ± 20%; ½ watt; carbon	RC20AE473M	.10
R-17, 19 and 22	270,000 ohm; ± 10%; ½ watt; carbon	RC20AE473M	.10
R-20	AUDIO GAIN control; 500,000 ohm	25A534	.35
R-21	150 ohm; ± 20%; ½ watt; carbon	RC20AE151M	.10
R-23	470,000 ohm; ± 20%; ½ watt; carbon	RC20AE474M	.10
R-24	680 ohm; ± 10%; 1 watt; carbon	RC31AE681K	.10
R-25	15,000 ohm; ± 20%; 1 watt; carbon	RC31AE153M	.10
R-26	12,000 ohm; ± 10%; 2 watt; carbon	RC41AE123K	.10
R-27	10,000 ohm; ± 10%; 4 watt; carbon	RC65CE103K	.10
R-28	15,000 ohm; ± 20%; 2 watt; carbon	RC41AE153M	.10
R-30	10 ohm; ± 20%; ½ watt; carbon	RC20AE100M	.10
R-32	1,500 ohm; ± 10%; 10 watt; wire wound	24BG152E	.30
R-33	15 megohm; ± 20%; ¼ watt; carbon	RC10AE156M	.10
R-34	10,000 ohm; ± 20%; ½ watt; carbon	RC20AE103M	.10

REF. NO.	DESCRIPTION	HALLICRAFTER'S PART NUMBER	LIST PRICE PER COMPONENT
	SWITCHES		
S-1	BAND SELECTOR; 3 sections ganged; 4 position; each wafer is individually mounted in chassis, ganged by indexing shaft.		
	2 bakelite wafers (S-1A through D)	62B039	$ .25
	1 bakelite wafer (S-1E and F)	62B044	.25
	Shaft and index assembly	74C172	.65
S-2, 3, 5 and 7	A.V.C. ON/OFF; SPST; toggle; 3 amp @ 250 volts	60A138	.25
S-4	TONE and AC line switch; 2 sections ganged; 1 sect. (S-4A) Single Pole 4 Position; 2 sect. (S-4B) SPST; rotary action; sect. 2 rated 3 amp @ 125 volts or 1 amp @ 250 volts, AC; bushing mtg.	60A225	.45
S-6	"S" meter; SPST; refer to R-3; NOT AVAILABLE AS A SEPARATE REPLACEMENT PART.		
	SOCKETS		
SO-1	DC power source input socket; octal, female, Amphenol type MIP-8	6A035	.10
SO-2	Connection for external "S" meter; 5 contacts, female, Amphenol type MIP-5	6A186	.10
SO-3	Speaker plug connection; 5 contacts, female, Cinch type 2649-B	6A246	.10
	TRANSFORMERS		
T-1	Antenna coil for Band 4; variable iron core	51B783	
T-2	Antenna coil for Band 3; variable iron core	51B782	
T-3	Antenna coil for Band 2; air core	51B781	
T-4	Antenna coil for Band 1; air core	51B780	
T-5	Mixer coil for Band 4; variable iron core	51B787	
T-6	Mixer coil for Band 3; variable iron core	51B786	
T-7	Mixer coil for Band 2; air core	51B785	
T-8	Mixer coil for Band 1; air core	51B784	
T-9	Oscillator coil for Band 4; variable iron core	51B791	
T-10	Oscillator coil for Band 3; variable iron core	51B790	
T-11	Oscillator coil for Band 2; variable iron core	51B789	
T-12	Oscillator coil for Band 1; variable iron core	51B788	
T-13	1st IF transformer; 455 kc; shielded	50C185	
T-14	2nd IF transformer; 455 kc; shielded	50C186	
T-15	Diode IF transformer; 455 kc; shielded	50C192	
T-16	Audio output transformer; part of loudspeaker LS-1 assembly but is available as a separate replacement part.		
T-17	BFO coil; 455 kc; shielded	54B028	
T-18	Power transformer; primary—117 volt AC, 50/60 cycle; high voltage secondary 342 volts each side of center tap (no load); filament secondary 6.3 volts @ 3.5 amp; rectifier filament secondary 5 volt @ 2 amp; solder lug terminals at base	52C026	3.30
T-18*	Power transformer; same as T-18 above, except primary—110/130/150/220/250 volt AC, 25 cycles.	52C027	8.35
	*This transformer is available on special order only, and is not standard equipment for this model		
	TERMINAL STRIPS		
TS-1	Antenna and ground connector strip; marked "A1", "A2" and "G" on face; Cinch type 1738	88A032	.10
QUANTITY IN EQUIP.	**MISCELLANEOUS MECHANICAL COMPONENTS**		
9	Octal tube sockets	6A035	.10
1	4 prong tube socket; for rectifier	6A025	.10
1	Pilot lamp socket; main tuning dial; bayonet base	86A033	.10
1	Pilot lamp socket; bandspread dial light; bayonet base	86A034	.10
1	Bandspread knob drive shaft	74A170	.10
1	Main tuning knob drive shaft	74A171	.10
1	Bandspread dial drive shaft	74A169	.10
1	Bandspread dial drive pulley	28A012	.40
1	Bracket; main tuning and bandspread dial drive	67B503	.30
1	Flywheel; bandspread tuning	71A169	.50
1	Pulley; 2" O.D.; capacitor drive; main tuning	28A002	.10
1	Pulley; 2" O.D.; capacitor drive; bandspread tuning	28A019	.10
1	Calibrated scale; main tuning	83C240	.85
1	Calibrated scale; bandspread tuning	83B254	.75
1	Escutcheon; main tuning dial; includes window	7B017	.75
1	Escutcheon; bandspread tuning dial; includes window	7C034	1.85
2	Tension springs; dial cabling	75A012	.10
4	Cabinet mounting feet; rubber	16A007	.10
2	Knobs; main tuning and bandspread controls	15A047	.25
3	Knobs; SENSITIVITY, VOLUME and TONE controls	15A049	.10
1	Knob; BANDSWITCH control; aluminum	15B053	.40
1	Knob; PITCH CONTROL	15A058	.10
1	Top cover for receiver cabinet	66D285	2.60
1	Receiver cabinet	66E284	2.85

Note: All prices are subject to change without notice.

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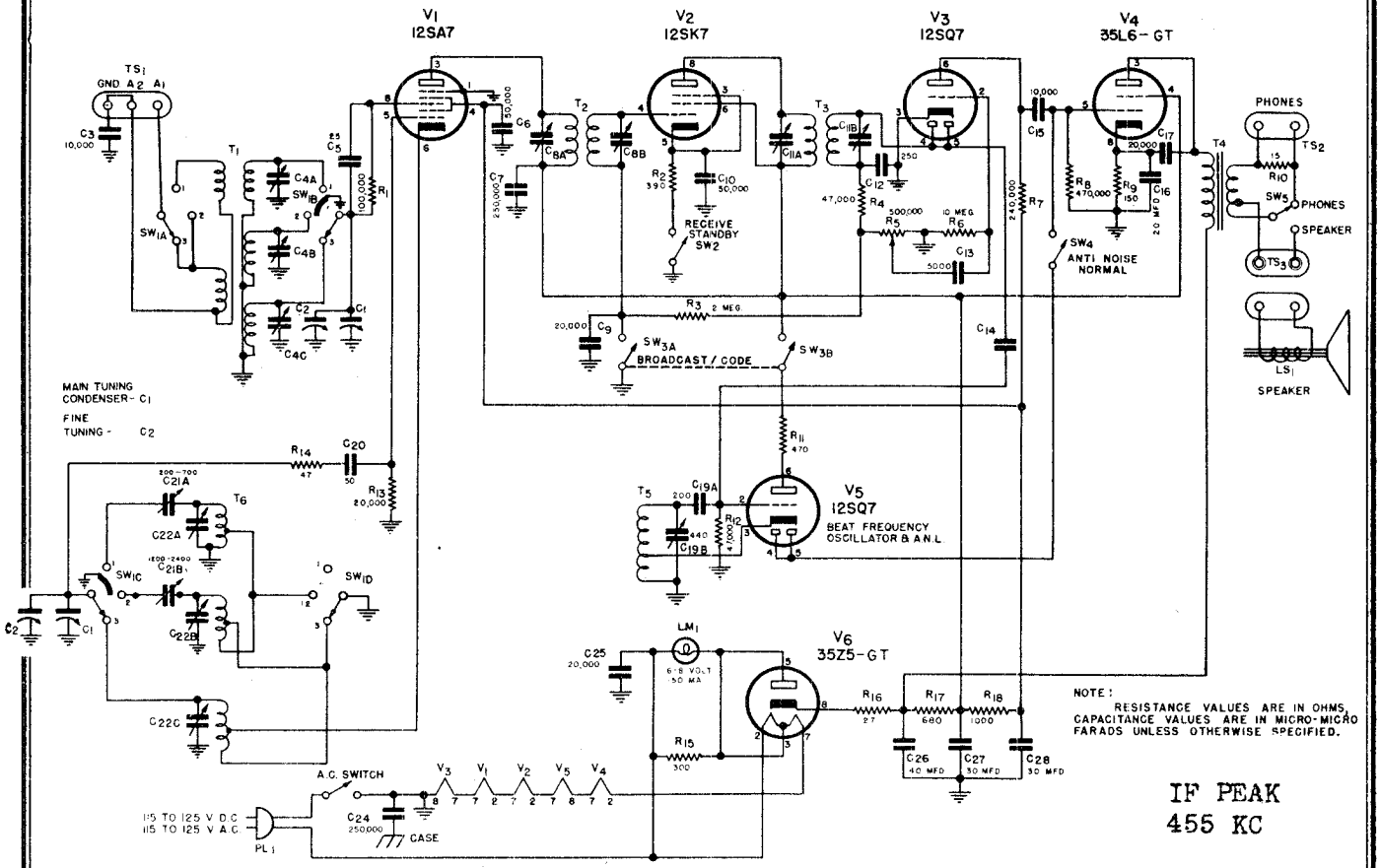
THE HALLICRAFTERS CO.

MODELS S-41G, S-41W



December 1945

Foreign and Domestic Broadcast Reception. - To receive broadcast stations set the controls as follows:

VOLUME control	- Set at OFF when the receiver is not in use. Turn to the right until desired volume is obtained after tuning in the station.
BAND SELECTOR switch	- Set at band number corresponding to the range covering desired frequency of reception.
BROADCAST-CODE switch	- Set at Broadcast. This switch may be set at CODE to help tune in weak phone signals by tuning for zero beat and then switching back to BROADCAST.
PHONES/SPEAKER switch	- Set at PHONES for headset reception; set at SPEAKER for loudspeaker reception.
RECEIVE-STANDBY switch	- Set at RECEIVE when listening, set at STANDBY during short standby periods.
FINE TUNING control	- Set at zero when tuning in stations with the MAIN TUNING control. Tuning dial calibrations are true only when the FINE TUNING pointer is set at zero. Use the FINE TUNING control for amateur band reception or for vernier tuning in the short wave bands.
MAIN TUNING control	- Set main tuning pointer at frequency of desired station. FINE TUNING pointer must be set at zero for true calibration.
ANTI NOISE-NORMAL switch	- Set at NORMAL unless background noise is excessive.

Foreign and Domestic Code Reception. - To receive code stations set the BROADCAST-CODE switch at CODE. All other controls are to be handled as for foreign and domestic broadcast.

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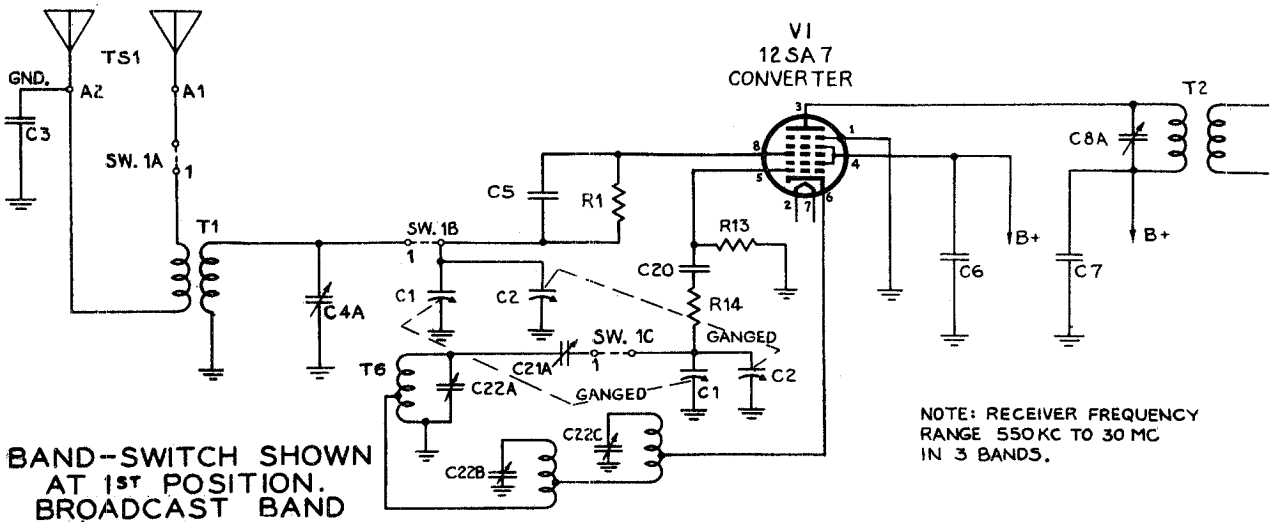
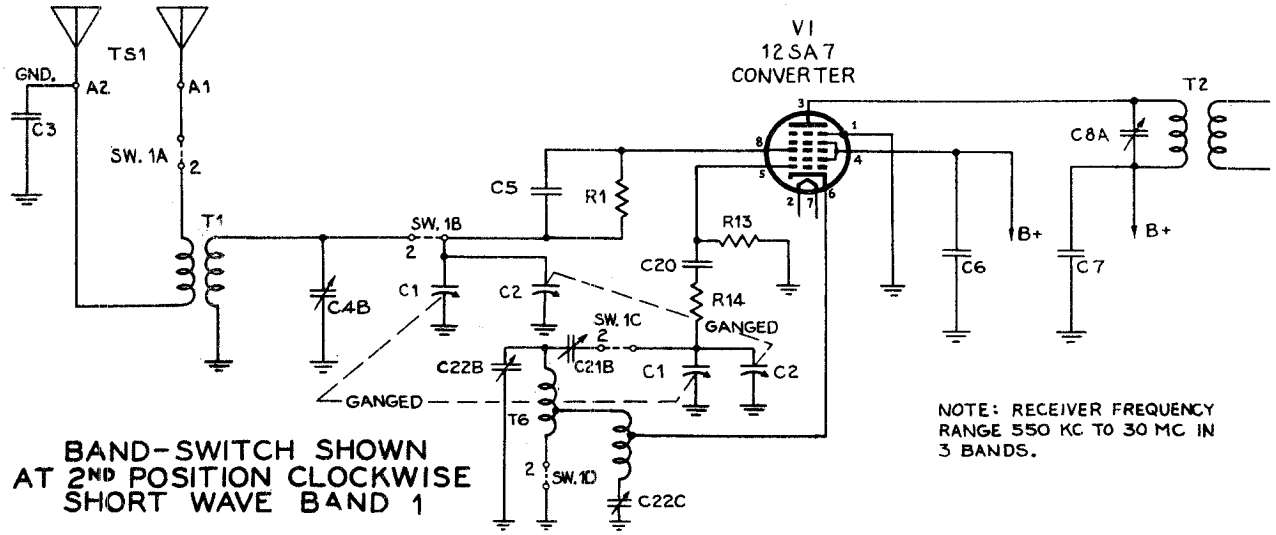
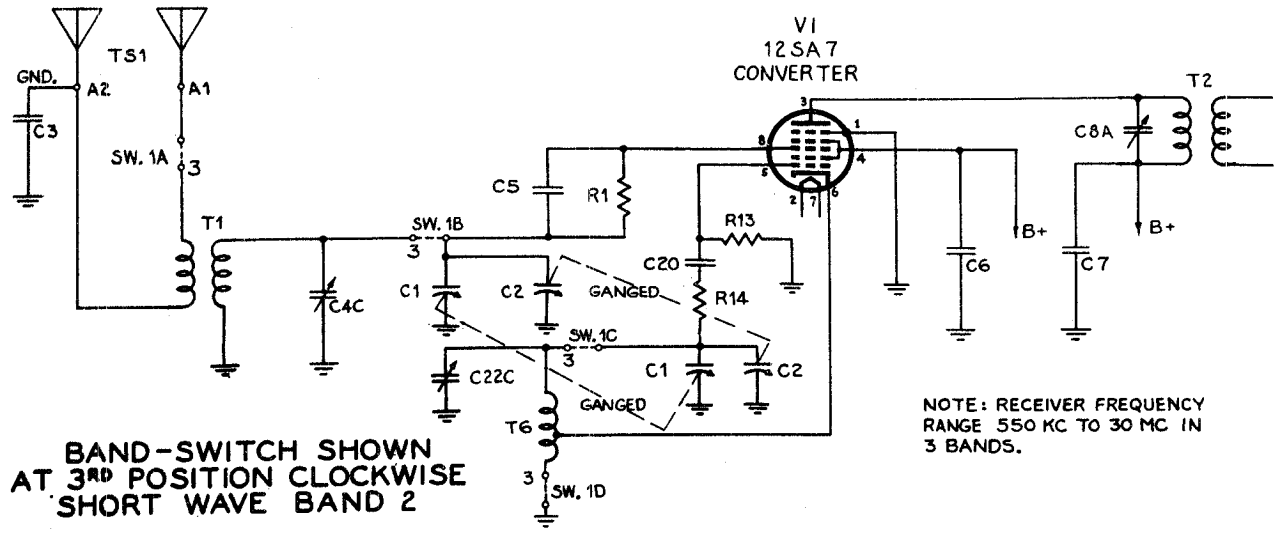
MODELS S-41G, S-41W THE HALLICRAFTERS CO.







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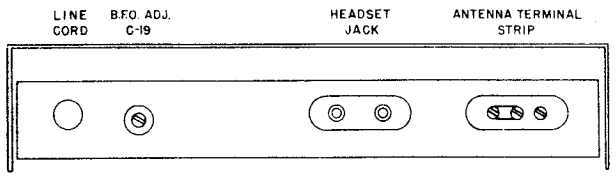
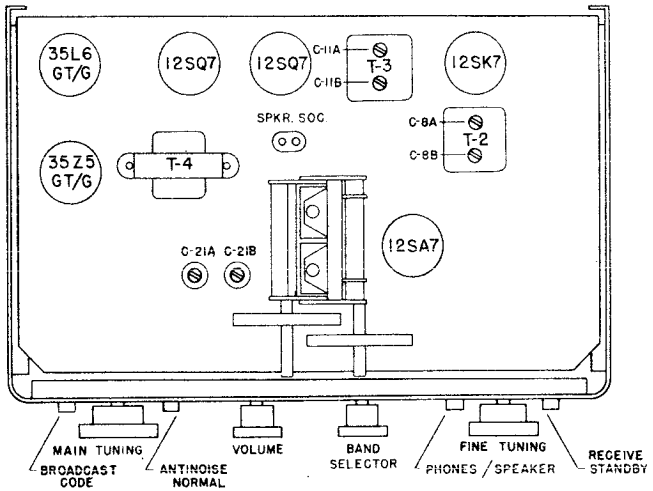
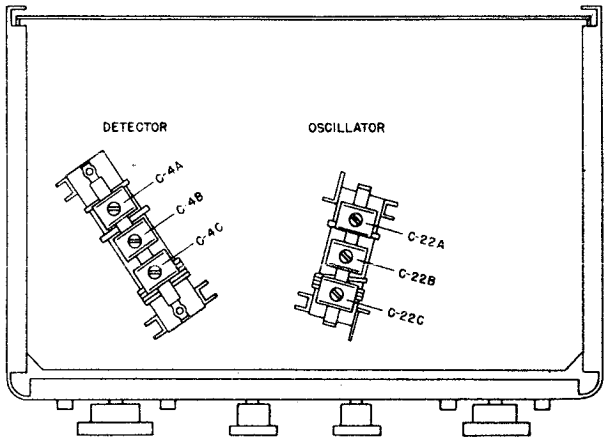


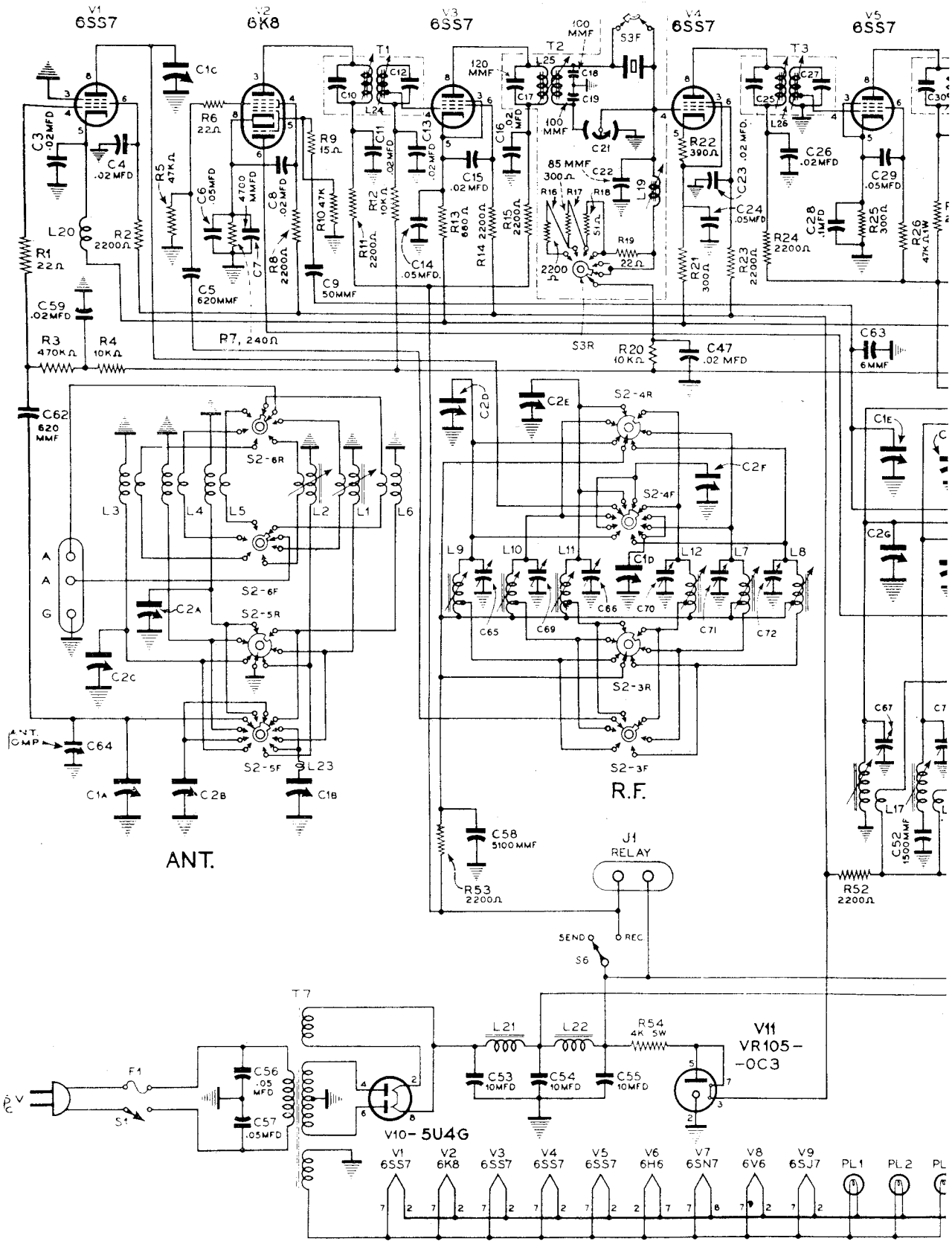




Listed below in table form, are the alignment frequencies and adjustments necessary to align the receiver. CAUTION - Do not connect signal generator ground directly to the chassis, connect it to the "G" terminal of the antenna terminal strip.

ALIGNMENT DATA

Band	Signal Generator Frequency	Dummy Antenna	Adjust Pads	Adjust Trimmers
I-F	455 kc.	None	None	C-8A, C-8B, C-11A, C-11B
BFO	455 kc.	None	Adjust capacitor C-19 for zero beat.	
1	600 kc. 1800 kc.	330 ohm 330 ohm	C-21A None	None C-22A
2	2.4 mc. 7.0 mc.	330 ohm 330 ohm	C-21B None	None C-22B
3	No low frequency adjustment on this band. 28 mc.	330 ohm	None	C-22C


V1 6SS7
V2 6K8
V3 6SS7
V4 6SS7
V5 6SS7
T1
T2
T3
S3F
S3R
R7, 240Ω
S2-6R
S2-6F
S2-5R
S2-5F
S2-4R
S2-4F
S2-3R
S2-3F
ANT.
R.F.
J1 RELAY
SEND
REC
S6
T7
V10- 5U4G
V11 VR105--0C3
F1
S1
V1 6SS7
V2 6K8
V3 6SS7
V4 6SS7
V5 6SS7
V6 6H6
V7 6SN7
V8 6V6
V9 6SJ7
PL1
PL2

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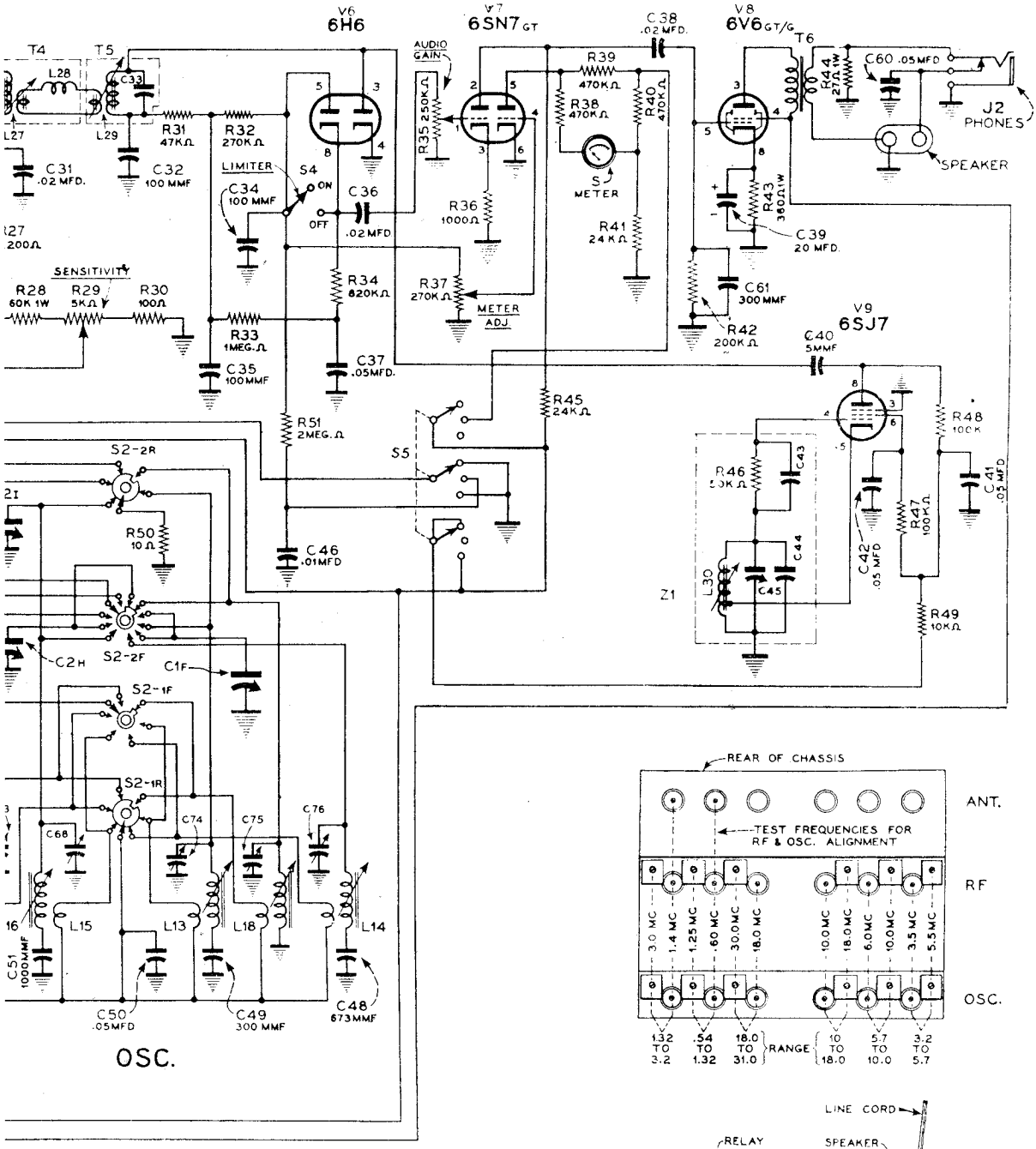

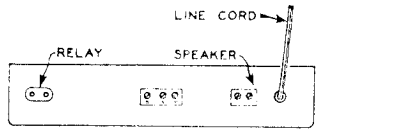

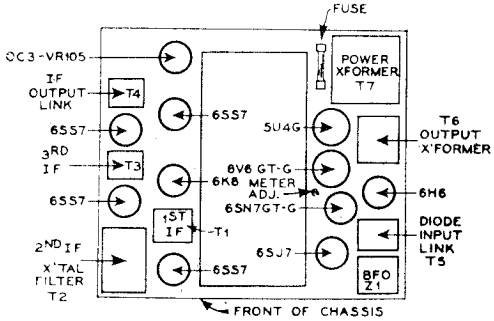

NOTE:—
"S2" RANGE SWITCH SHOWN IN 18 TO 31 MC. POSITION. WAFERS NUMBERED FROM 1 TO 6 - No.1 BEING CLOSEST TO KNOB.

ALL OTHER WAFER SWITCHES SHOWN IN EXTREME COUNTERCLOCKWISE POSITION OF KNOBS ON PANEL EXCEPT LIMITER "S4"

Fig. 8—Circuit diagram.

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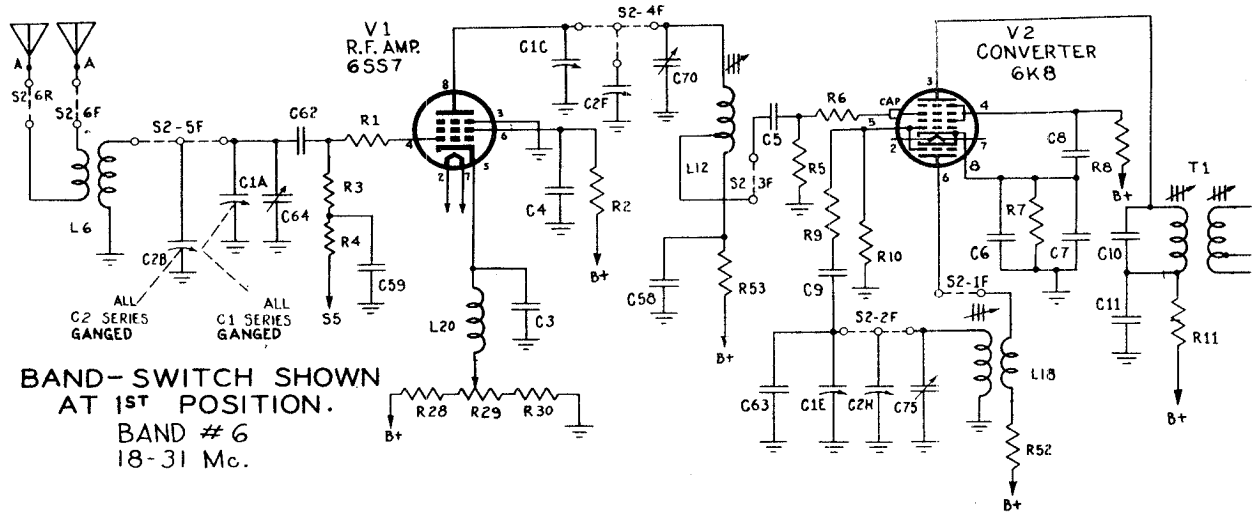
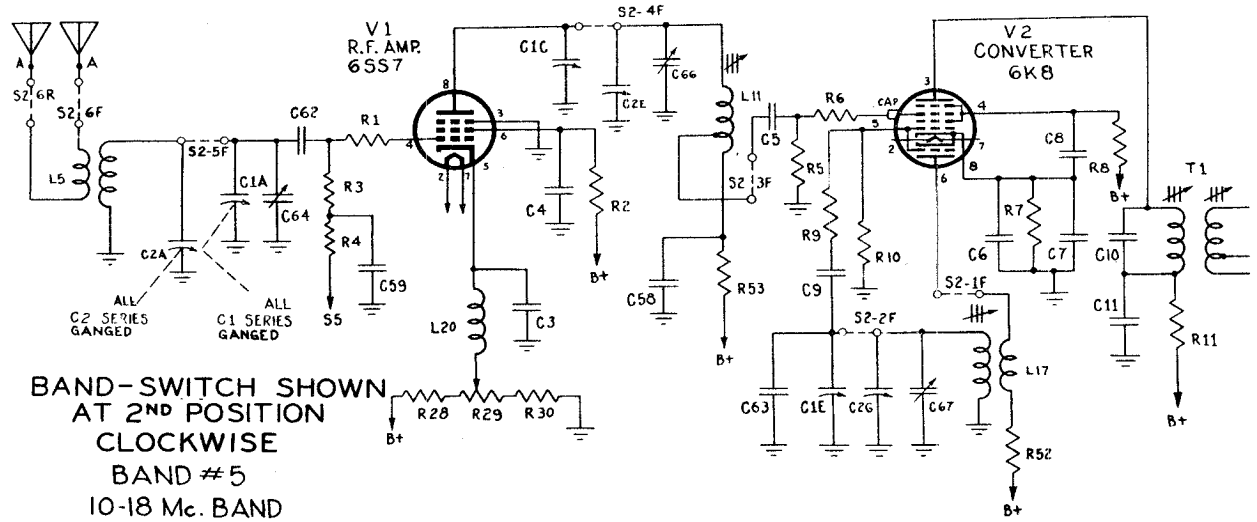
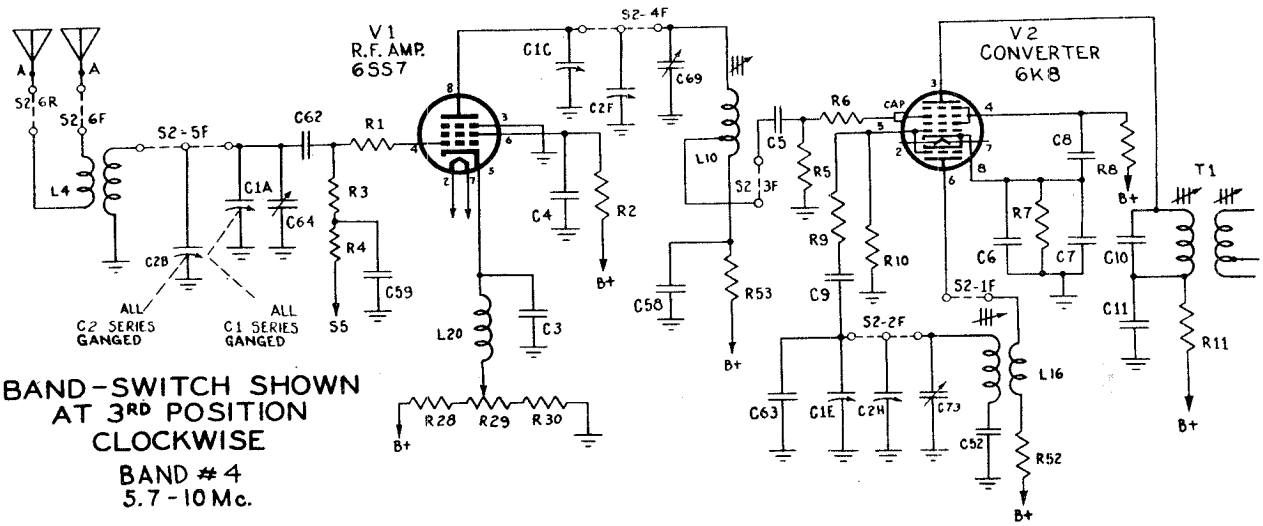


BAND-SWITCH SHOWN AT 1ST POSITION.
BAND #6
18-31 Mc.



BAND-SWITCH SHOWN AT 2ND POSITION CLOCKWISE
BAND #5
10-18 Mc. BAND



BAND-SWITCH SHOWN AT 3RD POSITION CLOCKWISE
BAND #4
5.7 - 10 Mc.

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MODEL HQ-129-X

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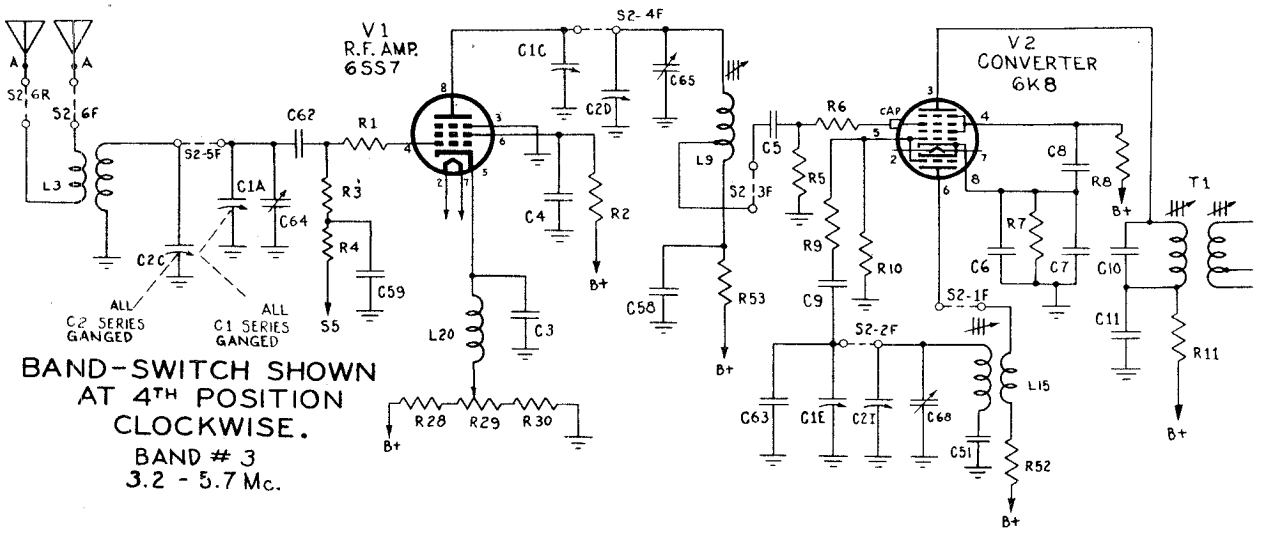
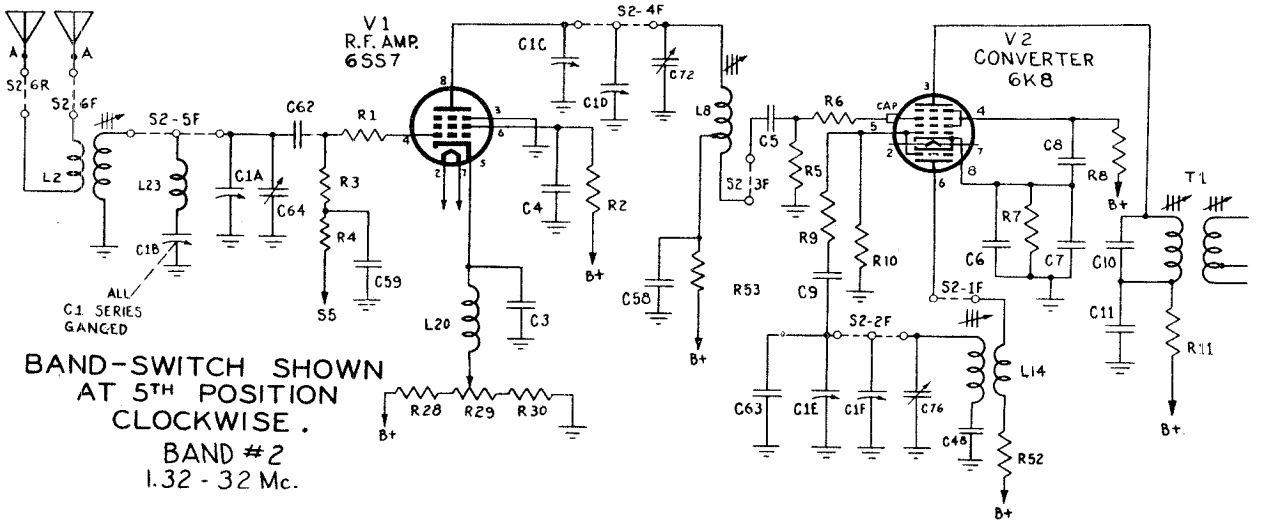
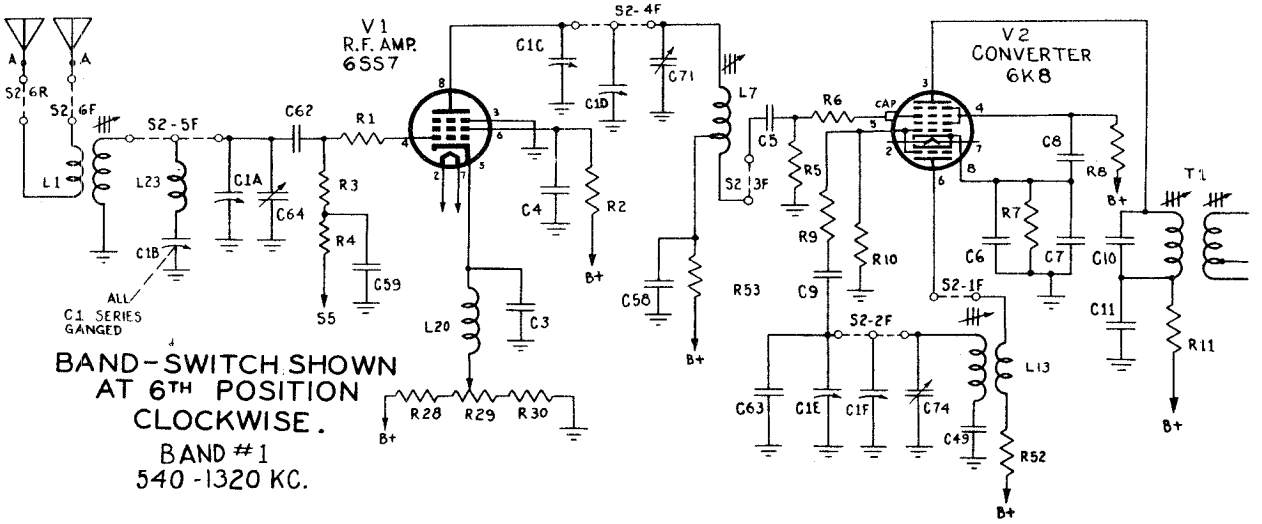


BAND-SWITCH SHOWN AT 4TH POSITION CLOCKWISE.
BAND # 3
3.2 - 5.7 Mc.



BAND-SWITCH SHOWN AT 5TH POSITION CLOCKWISE.
BAND #2
1.32 - 32 Mc.



BAND-SWITCH SHOWN AT 6TH POSITION CLOCKWISE.
BAND #1
540 -1320 KC.

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TECHNICAL DESCRIPTION

This receiver is sensitive enough to pick up extremely weak signals and has the selectivity to separate signals in the more crowded bands. It covers a continuous range of frequencies from 540 KC. to 31 MC, or from 555 meters to 9.7 meters, in six bands. Band spread tuning is supplied on the four higher frequency bands, with actual calibration in the 80, 40, 20 and 10 meter amateur bands.

DESIGN

PRE-SELECTION

The pre-selection or tuned R.F. stage for each band of this receiver is designed for high performance. Entirely individual tuning coils are used for each band. These along with the multi-section variable condenser permit the proper LC ratio for best performance to be used with each band. Both grid and plate circuits are tuned. A compensating condenser, adjustable from the front of the panel, provides perfectly aligned input circuits with any given antenna system.

These features of design provide high selectivity and high gain and afford maximum signal-to-noise ratio and maximum image signal rejection.

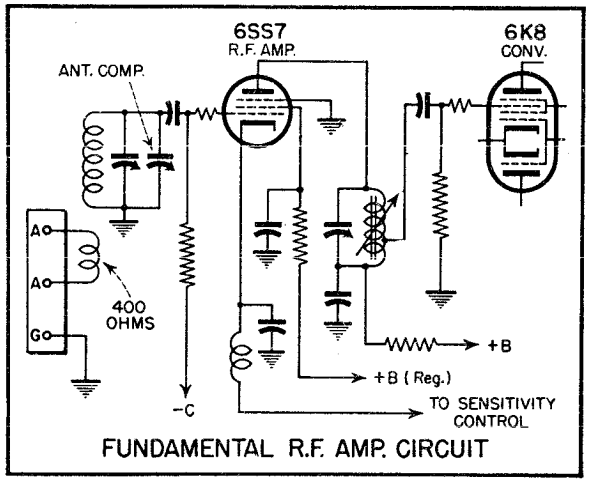

Fig. 2—Tuned R.F. amplifier and converter. Careful circuit design improves signal-to-noise ratio.

TUNING RANGES

Band	*Frequency*	*Meters Wave Length*
1	540 —1320 KC	555 —227
2	1.32—3.2 MC	227 —93.7
3	3.2 —5.7 MC	93.7—52.6
4	5.7 —10 MC	52.6—30.0
5	10 —18 MC	30 —16.7
6	18 —31 MC	16.7—9.7

TUBE LINE-UP

Symbol		*Type*	*Function*
V-1	6SS7	Triple-Grid Super Control Amplifier, Single Ended	R.F. Amplifier
V-2	6K8	Triode-Hexode Converter	Converter or 1st Detector and Oscillator
V-3	6SS7	See Above	1st I.F. Amplifier
V-4	6SS7	See Above	2nd I.F. Amplifier
V-5	6SS7	See Above	3rd I.F. Amplifier
V-6	6H6	Twin Diode	Detector and Noise Limiter
V-7	6SN7GT/G	Twin Triode Amplifier	1st Audio Amplifier and "S" Meter Tube
V-8	6V6GT/G	Beam Power Amplifier	Audio Power Amplifier and output Tube
V-9	6SJ7	Triple Grid Tube	Beat Frequency Oscillator
V-10	5U4G	Full Wave Rectifier	Rectifier
V11	0C3/VR105	Voltage Regulator	Voltage Regulator

BAND SPREAD

An exceptionally wide band spread of 310 degrees supplied by a special 9 section condenser, is provided on the 4 higher frequency ranges. The band spread dial has 5 scales. Four of these are directly calibrated for the 80, 40, 20 and 10 meter amateur bands. The fifth

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scale is an arbitrary 0-200 division scale, provided for making up calibration charts for other bands, such as the short wave international broadcast bands. It is also of use in logging stations.

The following table shows the approximate frequency range that can be covered by the band spread dial at different points on each of the 4 higher frequency bands.

Band	*Low End*	*Middle*	*High End*
3.2 MC— 5.7 MC	.4 MC	.7 MC	1.25 MC
5.7 MC— 10 MC	.2 MC	.5 MC	.9 MC
10 MC— 18 MC	.2 MC	.5 MC	.9 MC
18 MC— 31 MC	.6 MC	1.2 MC	2.2 MC

It should be noted that the Main Tuning dial has been calibrated with the Band Spread dial set at 200 which corresponds to minimum band spread capacity included in the circuit. To use band spread tuning, the Main Tuning dial should be set at the high frequency end of the desired band with the Band Spread dial set at 200. Lower frequencies such as those in the above table will then be obtained as the Band Spread dial setting is decreased.

CONVERTER STAGE

This converter stage uses the triode-hexode 6K8 tube which becomes more efficient as the frequency increases. The design of this converter stage is such that the over-all RF gain is relatively constant and uniform over the whole range of the receiver. This provides uniform operation and provides a true indication of signal strength, as shown on the "S" meter, over all the bands.

The stability of the oscillator is insured by a drift compensator, by low loss tube sockets, and by a ceramic oscillator switch section. It is further insured by its operation from a controlled voltage circuit which uses the OC3/VR-105 Voltage Regulator tube to keep the voltages constant regardless of line voltage fluctuation.

All these factors aid in maintaining the accuracy of the calibration of the receiver.

CRYSTAL FILTER AND PHASING CIRCUIT

The patented crystal filter included in the HQ-129-X Receiver is an outstanding Hammarlund development. Five degrees of selectivity, selected by a six-position panel control, are provided for reducing interference. Steps 1, 2, and 3, varying from broad to fairly sharp, may normally be used for phone reception, depending upon the degree of fidelity desired. Steps 4 and 5, giving sharper selectivity, may be used for CW code reception. The "OFF" position of the control cuts out the crystal filter when broadest selectivity or highest fidelity is desired. The curves of Fig. 5, indicate the degrees of broadness or sharpness that may be obtained.

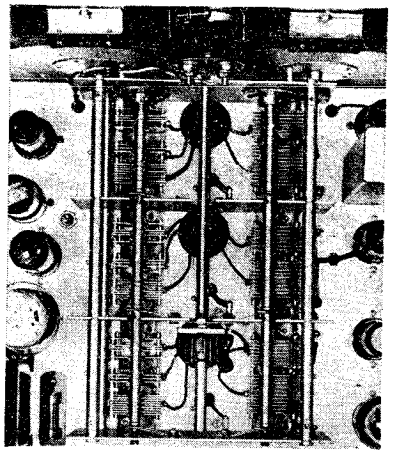

Fig. 3—Precision H.F. tuning assembly.

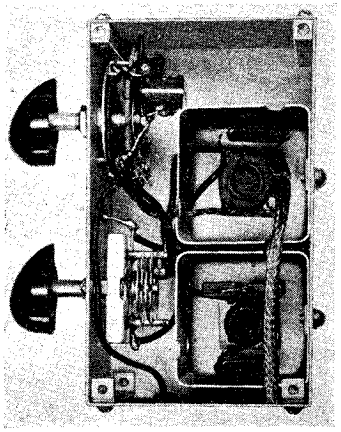

Fig. 4—Crystal Filter unit.

Along with the crystal filter, a phasing control is provided to eliminate interfering heterodynes, within limits. Fig. 5, is a schematic diagram of the filter and phasing circuit. The complete unit is shown in Fig. 4.

The over-all gain of the receiver is not noticeably affected by the changes in selectivity of the filter nor is the reading of the "S" Meter appreciably affected.

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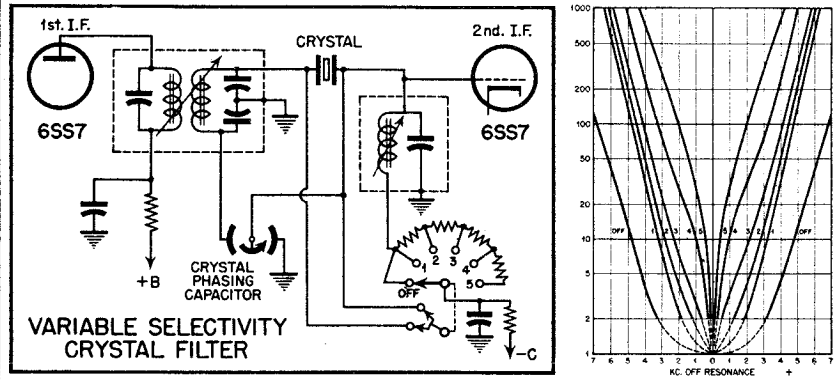

Fig. 5—Selectivity curve and crystal filter circuit.

I. F. AMPLIFIER

Three stages of I.F. amplification are provided. The gain per stage is purposely made low, in order to maintain stability. Iron core permeability-tuned transformers are used for improved performance and for ease of adjusting. Silvered mica condensers are used in each transformer circuit to improve its stability. The intermediate frequency is 455 KC—the R.M.A. standard frequency.

Over-all selectivity curves for this amplifier and the crystal filter are shown in Fig. 5.

A.V.C. SYSTEM

The automatic volume control system in the HQ-129-X gives remarkably smooth operation. The RF stage and the first two I.F. stages are automatically controlled. A switch is provided for shifting from AVC to manual control, when so desired.

SECOND DETECTOR

One section of a 6H6 tube is used for the second detector and for the A.V.C. system. This system is well designed and produces a minimum of distortion.

NOISE LIMITER

The other section of the 6H6 tube is employed as a noise limiter. It is designed to reduce automobile ignition interferences and other similar disturbances to a negligible amount. Its operation does not affect the intelligibility of the received signals, and it may be switched off when so desired.

"S" METER

The signal strength "S" meter which is operated from one section of the 6SN7 Tube shows the relative signal strength of the received signal. The dial is calibrated in units of 1 to 9. Each division represents a doubled signal strength over the previous division. For example, if division 6 corresponds to approximately 6.25 microvolts at the antenna terminals, division 7 represents approximately 12.5 microvolts, 8 represents 25 microvolts, and 9 represents 50. Each division therefore represents a 6 DB step. This relative sensitivity of the meter can be adjusted. In production it is arbitrarily adjusted to a reading of 9 for an input of approximately 50 microvolts. Should this not correspond with your previous experience with a strength 9 signal, readjust the slotted shaft, located near the 6V6 and the 6SN7 tubes, as shown on the chart in Fig. 8.

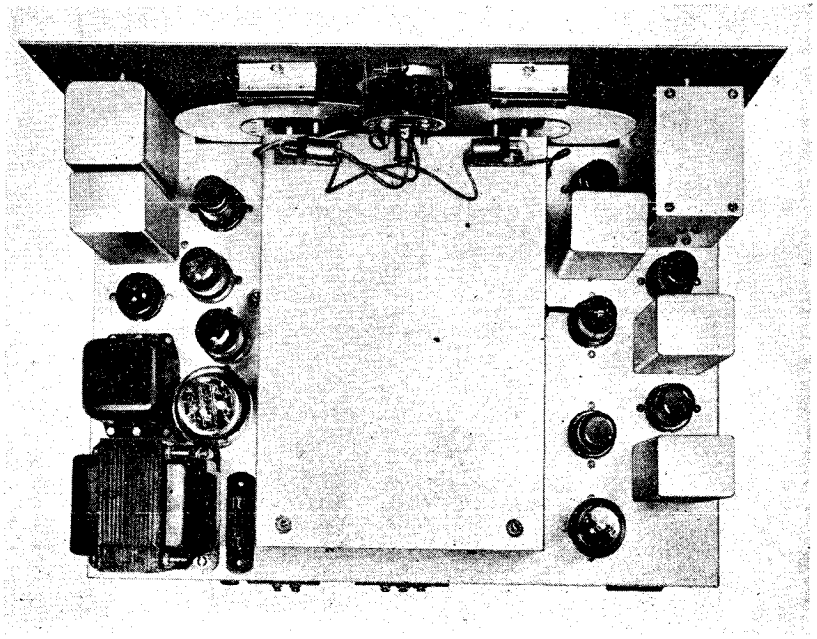

Fig. 6—Top view showing chassis layout.

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BEAT FREQUENCY OSCILLATOR

The Beat Frequency Oscillator is designed for the reception of CW or unmodulated code signals. The control on the front panel provides a wide selection of beat frequencies for the best tone to cut through any interfering signals. The oscillator is of the electron coupled type, has excellent stability, and is designed to have no material affect on the operation of the I.F. Amplifier. A switch is provided for turning this oscillator on or off at will.

AUDIO AMPLIFIER

The first stage of the audio amplifier is a resistance coupled triode voltage amplifier using one section of the twin triode 6SN7 tube. The final stage uses a 6V6 Beam Power amplifier Tube and supplies an undistorted power output of approximately 3 watts. An output transformer with an output impedance of 6 ohms is used to connect directly to the voice coil of a suitable permanent magnet type dynamic speaker. A phone jack is connected across the same output and disconnects the speaker when headphones are plugged in. A manual gain control is provided.

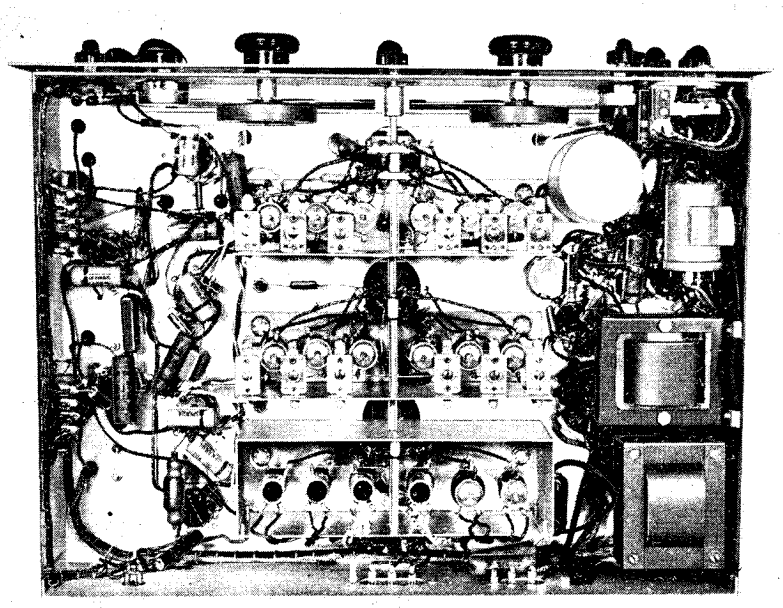

Fig. 7—Bottom view showing placement of parts.

POWER SUPPLY

All components of the power supply have a very large safety factor in order to insure satisfactory operation over a long period of time. A two-section filter is employed with a total inductance of 40 henries and a total capacitance of 30 microfarads. This heavy duty filter provides humless operation.

ANTENNA SUGGESTIONS

Because of the high sensitivity of the HQ-129-X receiver, the antenna is usually not critical. Often an indoor wire 20 to 50 feet long, strung along the base board or along the ceiling molding of a room will give surprisingly good reception. A long single wire outdoor antenna, such as shown in Fig. 9, will generally give entirely satisfactory reception. This wire may be 50 to 75 feet long. The more isolated this antenna is from neighboring objects the better the reception will be.

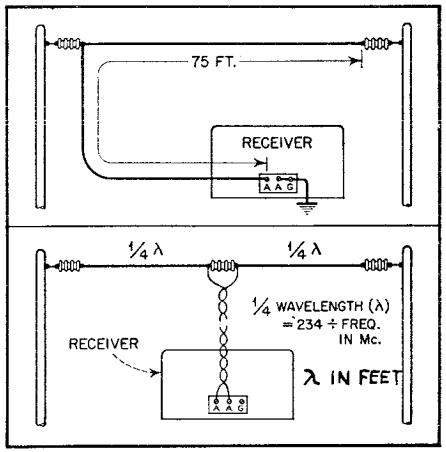

Fig. 9—Antenna suggestions.

REALIGNMENT PROCEDURE—I.F. AMPLIFIER

Tuning of the intermediate-frequency transformers is accomplished by the use of iron-core permeability-tuned coils together with fixed silvered-mica capacitors, resulting in a very high degree of stability. This, together with the mechanical arrangement provided, precludes the possibility of any appreciable drift or change of setting. Therefore, re-alignment should not be necessary, except when parts are re-

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placed which would affect tuning of the I.F. circuits (like I.F. transformer or crystal).

Alignment of the I.F. channel should not be attempted unless suitable equipment is on hand. Proper alignment is accomplished by the visual method employing a cathode-ray oscilloscope used in conjunction with a frequency-modulated (swept) signal generator, having a fairly constant output. The oscilloscope should be externally synchronized by the signal generator.

The transformers must be tuned for symmetry and proper coincidence of the visible curves, as well as for amplitude. This requires a stage-by-stage alignment, starting with the Diode Input Link Transformer (T5) and continuing back through the First I.F. Transformer (T1). The procedure is as follows:

1) Set the Main Tuning capacitor to .54 M.C. and the band-switch to .54-1.32 M.C., the Send-Receive switch to Receive, the Limiter "off", the MAN-AVC-BFO switch to MAN position and the Crystal Selectivity switch to "off" position.

2) Now, with the generator set at 455 K.C. and applying the signal to the grid (pin #4) of the Third I.F. tube (V5), adjust the plate inductor (L27) of the I.F. Output Link (T4) and the Diode Input inductor (L29) of the Diode Input Link (T5), alternately, to obtain maximum amplitude, symmetry and pattern coincidence on the oscilloscope.

3) Apply the signal input lead to the grid (pin #4) of the 2nd I.F. tube (V4). Turn the two adjustment screws of the 3rd I.F. Transformer to obtain symmetrical, coinciding curve with as much amplitude as possible without disturbing the pattern.

4) Switch the signal input lead to the grid (pin #4) of the 1st I.F. tube (V3), and adjust the lower (plate) inductor (L25) of the Crystal Filter (T2) for maximum amplitude at center of curve.

5) Apply the signal input to the grid cap of 6K8 mixer tube (V2). Adjust screws of 1st I.F. Transformer (T1) as in (3). This should result in a tall selectivity curve with a slightly flattened peak.

6) Turn Crystal Selectivity switch to position #1, set Crystal Phasing pointer on arrow, and adjust the upper (grid) inductor (L19) of the Crystal Filter (T2) for maximum amplitude and symmetry. Adjust signal input or receiver Sensitivity control to prevent overloading.

7) Switch Crystal Selectivity to position #2 and adjust Phasing control slightly from the arrow position, if necessary, to obtain identical images.

Adjust the signal generator frequency to obtain coincidence of the images, and if complete coincidence is not obtained, alternately make slight adjustments of the phasing control and the signal generator frequency, until images coincide.

These last steps have determined the exact frequency of the quartz crystal and the frequency setting of the signal generator should be left undisturbed.

8) Repeat carefully the complete I.F. alignment procedure (steps 1 through 7) for the crystal frequency.

R.F. AND H.F: OSCILLATOR

As in the case of the I.F. amplifier, the R.F. stage and the H.F oscillator were accurately aligned at the factory with the aid of calibrated oscillators that are frequencly compared with standard frequency crystals. These circuits are designed to insure permanence of adjustment and should not be disturbed unless it is positive that readjustment is necessary.

The front row of adjustments, shown on the chart (Fig. 8), control the H.F. Oscillator circuits and consequently the dial calibration. To check these adjustments the band spread dial must be at 200, since that is the setting at which the main dial was calibrated. An accurate test oscillator is necessary. Connect the test oscillator to the antenna terminals and set it and the MAIN TUNING dial at the frequency indicated on the chart. The inductance is adjusted at a low frequency and the trimmer at a high frequency in each band, each being adjusted for maximum response. Generally a small fraction of a turn will suffice. These adjustments mutually affect each other. Therefore, if much damage is made at one end of a band, the other end of the same band must be readjusted. This procedure must be repeated until further readjustment at either end is unnecessary.

The adjustments in the middle row control the mixer input cir-

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cuits. To adjust these, set the oscillator to the frequency indicated on the chart and tune it in on the receiver. Employing an output meter, make the adjustments for peak meter readings. At 30 mc. there is a certain amount of interlocking between the detector and H.F. oscillator making it necessary to rock the tuning capacitor back and forth while adjusting the trimmer capacitor, in order to avoid a false setting.

The chart below, Fig. 10, gives the values of the voltages between the tube socket terminals and ground or B- negative side of the circuit. The meter scale that should be used for making the check is shown in parenthesis below the voltage. A meter having a resistance of 1000 ohms per volt should be used. Small variations in voltages do not indicate trouble. With the aid of this chart and the circuit diagram (Fig. 8) the ailing capacitor or resistor can be found.

LINE VOLTAGE 115V. A.C. SENSITIVITY MAX. SWITCH ON MAN. NO SIGNAL Limiter-off Audio Gain Max. Send Receive on Receive										SWITCH ON AVC	BFO
TUBE	RF 6SS7	Conv. 6K8	1-1F 6SS7	2-1F 6SS7	3-1F 6SS7	Detector Limiter 6H6	Output 6V6	Rectifier 5U4G	Reg. VR-105		1st Audio 6SN7-GT/G	BFO 6SJ7
Pin 1 to ground	...	...	...	...	...	...	...	Tie Point 212 (300)	Tie Point 93 (150)	...	...	...
Pin 2 to ground	...	...	...	...	...	6.2 A.C.	...	300 (750)	...	...	113 (150)	...
Pin 3 to ground	...	210 (300)	6.3 (15)	4.3 (15)	3.5 (15)	—0.4 (15)	254 (300)	Tie Point 212 (300)	Tie Point 108 (150)	...	3.6 (15)	...
Pin 4 to ground	...	91 (150)	...	...	...	...	268 (300)	280 A.C.	Tie Point 108 (150)	...	—0.3 (15)	—2.3 (15)
Pin 5 to ground	3.2 (15)	...	6.3 (15)	6.3 (15)	3.5 (15)	—0.2 (15)	...	...	108 (150)	...	5.6 (15)	...
Pin 6 to ground	102 (150)	98 (150)	105 (150)	105 (150)	97 (150)	Tie Point	Tie Point 210 (300)	280 A.C.	2.8 (15)	...	...	58 (150)
Pin 7 to ground	6.2 A.C.	6.2 A.C.	6.2 A.C.	6.2 A.C.	6.2 A.C.	...	6.2 A.C.	Tie Point 212 (300)	Tie Point 108 (150)	...	6.2 A.C.	6.2 A.C.
Pin 8 to ground	196 (300)	3.2 (15)	206 (300)	204 (300)	193 (300)	—0.2 (15)	14 (30)	300 (750)	Tie Point 108 (150)	...	...	34.5 (150)

Fig. 10

PARTS LIST HQ-129X

SCHEMATIC DESIGNATION	DESCRIPTION	HML'D. PART No.
	CAPACITORS	
C1, A-F	Main tuning, variable (Part of SA-610)	
C2, A-I	Band-spread, variable (Part of SA-610)	
C3, 4	Paper tubular, .02 uf 500 W.V.D.C.	23912-1
C5	Mica, 620 uuf 500 W.V.D.C.	23005-86B
C6	Paper tubular, .05 uf 500 W.V.D.C.	23912-2
C7	Mica, 4700 uuf 500 W.V.D.C.	23015-5B
C8	Paper tubular, .02 uf 500 W.V.D.C.	23912-1
C9	Silver mica, 50 uuf 500 W.V.D.C.	23002-11D
C10	Silver mica (Part of T1, I.F. Transformer #6335)	
C11	Paper tubular, .02 uf 500 W.V.D.C.	23912-1
C12	Silver mica (Part of T1, I.F. Transformer #6335)	
C13	Paper tubular, .02 uf 500 W.V.D.C.	23912-1
C14	Paper tubular, .05 uf 500 W.V.D.C.	23912-2
C15, 16	Paper tubular, .02 uf 500 W.V.D.C.	23912-1
C17	Silver mica, 120 uuf 500 W.V.D.C.	23003-96D
C18, 19	Mica, 100 uuf 500 W.V.D.C.	23001-48B
C21	Crystal phasing, variable	SA-604
C22	Silver mica, 85 uuf 500 W.V.D.C.	6180
C23	Paper tubular, .02 uf 500 W.V.D.C.	23912-1
C24	Paper tubular, .05 uf 500 W.V.D.C.	23912-2
C25	Silver mica (Part of T3, I.F. Transformer #6335)	
C26	Paper tubular, .02 uf 500 W.V.D.C.	23912-1
C27	Silver mica (Part of T3, I.F. Transformer #6335)	
C28	Paper tubular, 0.1 uf 500 W.V.D.C.	23912-3
C29	Paper tubular, .05 uf 500 W.V.D.C.	23912-2
C30	Silver mica, 95 uuf 500 W.V.D.C.	6195
C31	Paper tubular, .02 uf 500 W.V.D.C.	23912-1
C32	Mica, 100 uuf 500 W.V.D.C.	23001-48B
C33	Silver mica, 95 uuf 500 W.V.D.C.	6195
C34, 35	Mica, 100 uuf 500 W.V.D.C.	23001-48B
C36	Paper tubular, .02 uf 500 W.V.D.C.	23912-1
C37	Paper tubular, .05 uf 500 W.V.D.C.	23912-2
C38	Paper tubular, .02 uf 500 W.V.D.C.	23912-1
C39	Electrolytic, 20 uf 25 W.V.D.C. (Part of 23840-1)	
C40	Silver mica, 5 uuf 500 W.V.D.C.	23002-1D
C41, 42	Paper tubular, .05 uf 500 W.V.D.C.	23912-2
C43	Silver mica (Part of Z1, B.F.O. Assy. #26021-G1)	
C44	Silver mica (Part of Z1, B.F.O. Assy. #26021-G1)	
C45	B.F.O., variable (Part of Z1, B.F.O. Assy. #26021-G1)	SA-681
C46	Paper tubular, .01 uf 200 W.V.D.C.	23912-4
C47	Paper tubular, .02 uf 500 W.V.D.C.	23912-1
C48	Silver mica 673 uuf 500 W.V.D.C.	6061
C49	Silver mica 300 uuf 500 W.V.D.C.	23003-105D
C50	Paper tubular, .05 uf 500 W.V.D.C.	23912-2
C51	Mica, 1000 uuf 500 W.V.D.C.	23015-40B
C52	Mica, 1500 uuf 500 W.V.D.C.	23015-20B
C53,54.55	Electrolytic 10/10/10 uf 450 W.V.D.C. (Part of 23840-1)	
C56, 57	Paper tubular, .05 uf 500 W.V.D.C.	23912-2
C58	Mica, 5100 uuf 500 W.V.D.C.	23015-16B
C59	Paper tubular, .02 uf 500 W.V.D.C.	23912-1
C60	Paper tubular, .05 uf 500 W.V.D.C.	23912-2

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PARTS LIST HQ-129X—Cont.

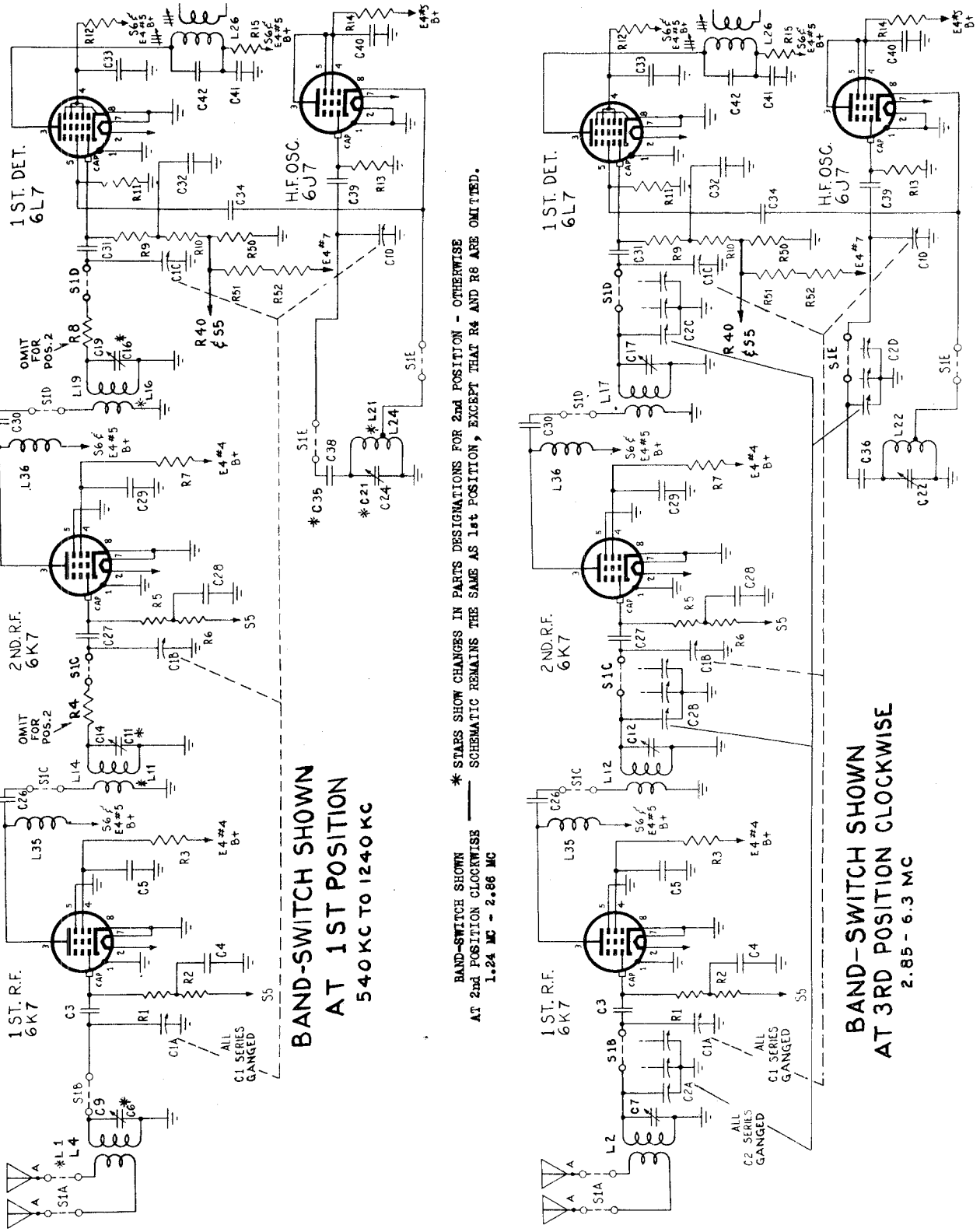
Schematic Designation	Description	HML'D. Part No.
	CAPACITORS—Continued	
C61	Mica 300 uuf 500 W.V.D.C.	23001-75B
C62	Mica 620 uuf 500 W.V.D.C.	23005-86B
C63	Ceramic N750K 6uuf 500 W.V.D.C.	23023-34
C64	Antenna Comp., variable (Part of SA-610)	SA-617
C65-68	Trimmer, mica, 1.5 - 9 uuf	6189-G2
C-69-76	Trimmer, mica, 3-35 uuf	6055-G1
F1	Fuse, 2 amp. type 3AG	15928-7
J1	Relay jack	6142
J2	Phone jack	6087
	INDUCTORS	
L1	Antenna coil assembly .54-1.32 mc range	26051-G1
L2	Antenna coil assembly 1.32-3.2 mc range	26051-G2
L3	Antenna coil 3.2-5.7 mc range	6013
L4	Antenna coil 5.7-10 mc range	6016
L5	Antenna coil 10-18 mc range	6019
L6	Antenna coil 18-31 mc range	6022
L7	R.F. coil assembly .54-1.32 mc range	26047-G2
L8	R.F. coil assembly 1.32-3.2 mc range	26047-G1
L9	R.F. coil assembly 3.2-5.7 mc range	26047-G6
L10	R.F. coil assembly 5.7-10 mc range	26047-G5
L11	R.F. coil assembly 10-18 mc range	26047-G4
L12	R.F. coil assembly 18-31 mc range	26047-G3
L13	H.F. osc. coil assembly .54-1.32 mc range	26030-G2
L14	H.F. osc. coil assembly 1.32-3.2 mc range	26030-G1
L15	H.F. osc. coil assembly 3.2-5.7 mc range	26030-G6
L16	H.F. osc. coil assembly 5.7-10 mc range	26030-G5
L17	H.F. osc. coil assembly 10-18 mc range	26030-G4
L18	H.F. osc. coil assembly 18-31 mc range	26030-G3
L19	Crystal filter grid coil (Part of Assy. #SA788)	
L20	R.F. choke (CHX)	6181
L21	Filter choke	6083
L22	Filter choke	6084
L23	R.F. choke	26054-1
L24	1st I.F. coil (Part of T1, #6335)	
L25	Crystal filter plate coil (Part of Assy. #SA787)	
L26	3rd I.F. coil (Part of T3, #6335)	
L27	I.F. output coil (Part of T4, #SA797)	
L28	Series coupling coil (Part of T4, #SA797)	
L29	Diode input coil (Part of T5, #SA799)	
L30	B.F.O. coil (Part of Z1, #26021-G1)	
M1	"S" meter	4903
PL1, 2, 3	Pilot lamp #47 6.3 V., .15 amp.	16004
	RESISTORS	
R1	22 ohms, ½ W.	19302-9
R2	2200 ohms, ½ W.	19301-40
R3	470,000 ohms, ½ W.	19301-96
R4	10,000 ohms, ½ W.	19301-56
R5	47,000 ohms, ½ W.	19301-72
R6	22 ohms, ½ W.	19302-9
R7	240 ohms, ½ W.	19302-34
R8	2200 ohms, ½ W.	19301-40
R9	15 ohms, ½ W.	19302-5
R10	47,000 ohms, ½ W.	19301-72
R11	2200 ohms, ½ W.	19301-40
R12	10,000 ohms, ½ W.	19301-56
R13	680 ohms, ½ W.	19301-28

PARTS LIST HQ-129X—Cont.

Schematic Designation	Description	HML'D. Part No.
	RESISTORS—Continued	
R14,15,16	2200 ohms, ½ W.	19301-40
R17	300 ohms, ½ W.	19301-196
R18	51 ohms, ½ W.	19301-187
R19	22 ohms, ½ W.	19302-9
R20	10,000 ohms, ½ W.	19301-56
R21	300 ohms, ½ W.	19301-196
R22	390 ohms, ½ W.	19301-22
R23, 24	2200 ohms, ½ W.	19301-40
R25	300 ohms, ½ W.	19301-196
R26	47,000 ohms, 1 W.	19303-61
R27	2200 ohms, ½ W.	19301-40
R28	60,000 ohms, 1 W.	19310-231
R29	Potentiometer, 5,000 ohms	15305-4
R30	100 ohms, ½W.	19301-8
R31	47,000 ohms, ½ W.	19301-72
R32	270,000 ohms, ½ W.	19301-90
R33	1 Meg ohms, ½ W.	19301-104
R34	820,000 ohms, ½ W.	19301-102
R35	Potentiometer, 250,000 ohms (Switch Attached)	15356-1
R36	1,000 ohms, ½ W.	19301-32
R37	Potentiometer, 270,000 ohms	15357-1
R38,39,40	470,000 ohms, ½ W.	19301-96
R41	24,000 ohms, ½ W.	19301-213
R42	200,000 ohms, ½ W.	19301-220
R43	360 ohms, 1 W.	19305-38
R44	27 ohms, 1 W.	19305-11
R45	24,000 ohms, 1 W.	19310-187
R46	50,000 ohms (Part of Z1, B.F.O. Assy. #26021-G1)	
R47, 48	100,000 ohms, ½ W.	19301-80
R49	10,000 ohms, ½ W.	19301-56
R50	10 ohms, ½ W.	19302-1
R51	2 meg. ohms, ½ W.	19301-169
R52, 53	2200 ohms, ½ W.	19301-40
R54	4,000 ohms, 5 W., wire wound	19380-47
	SWITCHES	
S1	(Part of R29, potentiometer #15305-4)	
S2-1 F,R	H.F. Osc. Plate	6331
S2-2 F,R	H.F. Osc. Grid	6332
S2-3 F,R	Det. Grid Tap	6064
S2-4 F,R	R.F. Plate	6063
S2-5 F,R	R.F. Grid	6063
S2-6 F,R	Antenna	6062
S3 F,R	Crystal filter assy.	26035-G1
S4	Limiter	6333
S5	MAN-AVC-BFO	6097
S6	Send-Rec.	6333
	TRANSFORMERS	
T1	1st I.F.	6335
T2	Crystal filter assy. (2nd I.F.)	SA785
T3	3rd I.F.	6335
T4	I.F. output coil assy. (Link)	SA797
T5	Diode input coil assy. (Link)	SA799
T6	Audio output transformer	6086
T7	Power transformer	26012
X1	Quartz crystal	6338
Z1	B.F.O. assembly	26021-G1

MODEL SP-400-X

HAMMARLUND MFG. CO. INC.


1ST. DET. 6L7
H.F. OSC. 6J7
2ND. R.F. 6K7
1ST. R.F. 6K7
OMIT FOR POS. 2
ALL C1 SERIES GANGED
BAND-SWITCH SHOWN AT 1ST POSITION 540 KC TO 1240 KC
BAND-SWITCH SHOWN AT 3RD POSITION CLOCKWISE 2.85 - 6.3 MC
ALL C2 SERIES GANGED

BAND-SWITCH SHOWN AT 2nd POSITION CLOCKWISE 1.24 MC - 2.86 MC

* STARS SHOW CHANGES IN PARTS DESIGNATIONS FOR 2nd POSITION - OTHERWISE SCHEMATIC REMAINS THE SAME AS 1st POSITION, EXCEPT THAT R4 AND R8 ARE OMITTED.

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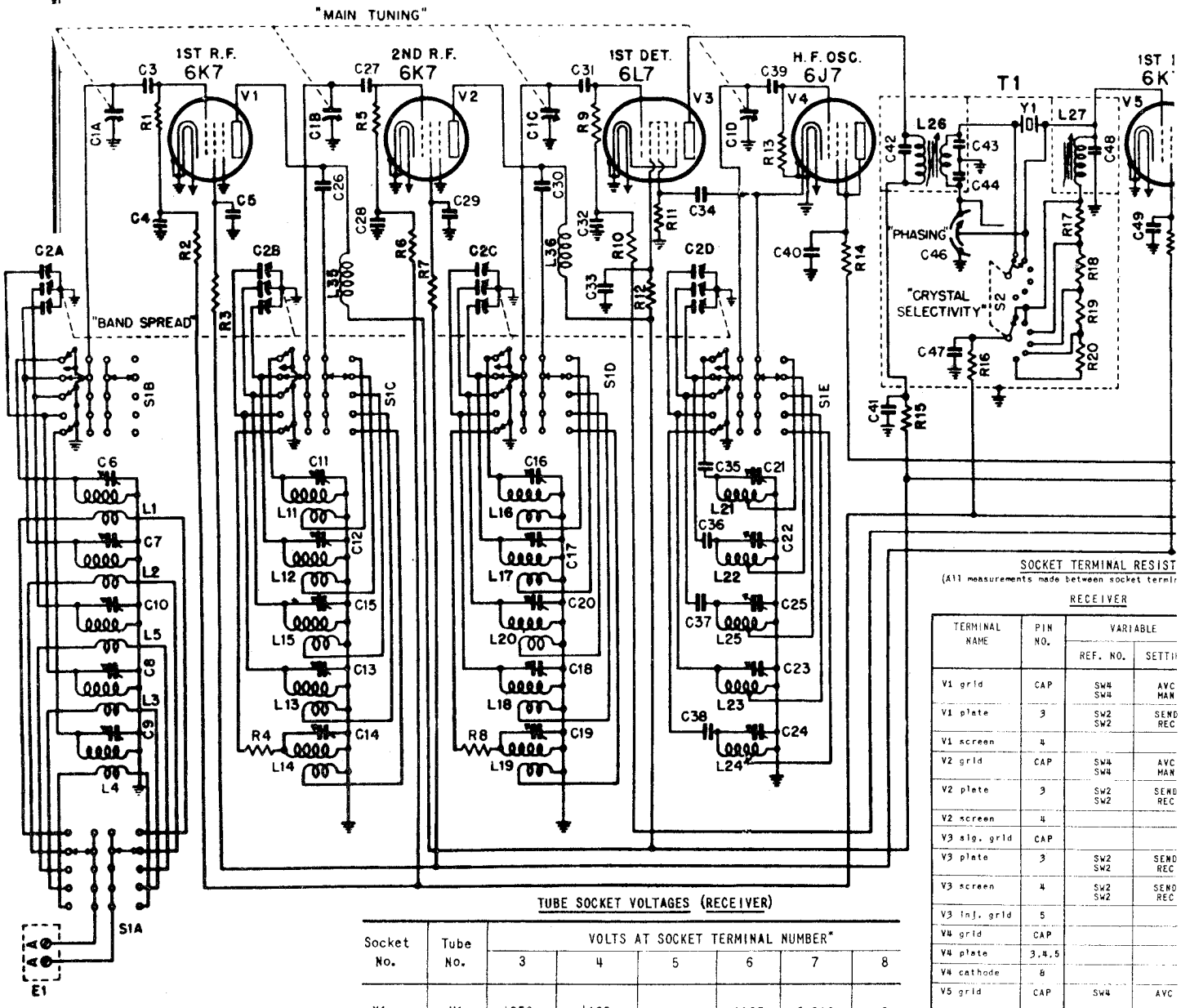

SENSITIVITY and AUDIO GAIN should be set at a 0

SIGNAL-MOD-CW switch should be on CW.

AVC-MANUAL switch should be on MANUAL.

SEND-REC switch should be on REC.

LIMITER switch should be ON.

TUBE SOCKET VOLTAGES (RECEIVER)

Socket No.	Tube No.	VOLTS AT SOCKET TERMINAL NUMBER*					
		3	4	5	6	7	8
X1	V1	+250	+135		+135	6.3AC	0
X2	V2	+250	+135		+135	6.3AC	0
X3	V3	+250	+115			6.3AC	0
X4	V4	+150**	+150**	+150**		6.3AC	
X5	V5	+250	+135	0		6.3AC	0
X6	V6	0	-43	0	+135	6.3AC	+250
X7	V7	0	-1.5	0	+100	6.3AC	+240
X8	V8	-.2	+.4	-.2		6.3AC	+.4
X9	V9	+.4	0	0	+.4	4.0AC	-.2
X10	V10	0		0	+40	6.3AC	+155
X11	V11	0	-1.5	0	+110	6.3AC	+240
X12	V12	-3.2	0	-3.2		6.3AC	0
X13	V13	+110			-3.2	6.3AC	0
X14	V14	+240	+240		-20	6.3AC	0
X15	V15	+380	+380	0		6.3AC	+38
X16	V16	+380	+380	0		6.3AC	+38

*Terminals 1 and 2 of all sockets are at zero potential with respect to chassis.

**Varies widely with different tubes; also with dial setting.

SOCKET TERMINAL RESIST

(All measurements made between socket termi

RECEIVER

TERMINAL NAME	PIN NO.	VARIABLE	
		REF. NO.	SETTI
V1 grid	CAP	SW4 SW4	AVC MAN
V1 plate	3	SW2 SW2	SEND REC
V1 screen	4		
V2 grid	CAP	SW4 SW4	AVC MAN
V2 plate	3	SW2 SW2	SEND REC
V2 screen	4		
V3 sig. grid	CAP		
V3 plate	3	SW2 SW2	SEND REC
V3 screen	4	SW2 SW2	SEND REC
V3 inj. grid	5		
V4 grid	CAP		
V4 plate	3,4,5		
V4 cathode	8		
V5 grid	CAP	SW4	AVC
		SW4 R56	MAN 0
		SW4 R56	MAN 10
V5 plate	3		
V5 screen	4		
V6 grid	4	SW4	AVC
		SW4 R56	MAN 0
		SW4 R56	MAN 10

*Varies with BAND SWITCH setting

V6 screen	6		
V6 plate	8		
V7 grid	4		
V7 screen	6		
V7 plate	8		
V8 plates	3,5		
V8 cathodes	4,8		
V9 plates	3,6		
V9 grids	4,5		
V9 heater	7		
V9 cathode	8	SW3 SW5	ON OFF
V10 grid	4		

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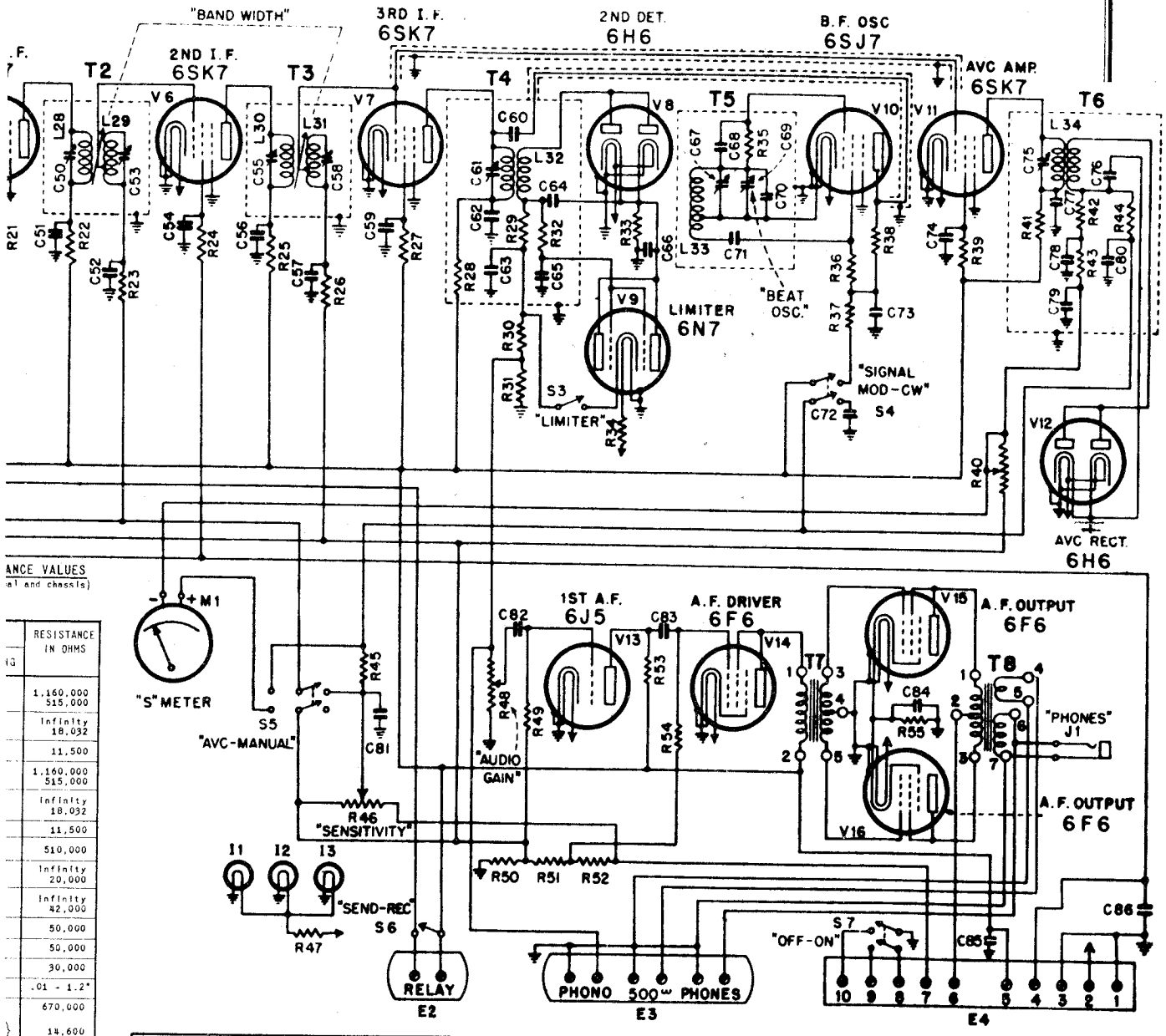
IFG. CO. INC.

MODEL SP-400-X



ANCE VALUES
(al and chassis)

	RESISTANCE IN OHMS
	1,160,000
	515,000
	Infinity
	18,032
	11,500
	1,160,000
	515,000
	Infinity
	18,032
	11,500
	510,000
	Infinity
	20,000
	Infinity
	42,000
	50,000
	50,000
	30,000
	.01 - 1.2*
	670,000
	14,600
	10,300
	20,000
	11,500
	670,000
	14,600
	10,300
	11,500
	20,000
	10,300
	68,000
	20,000
	217,000
	250,000
	250,000
	1,220,000
	4**
	117,000
	Infinity
	100,000

TERMINAL NAME	PIN NO.	VARIABLE		RESISTANCE IN OHMS
		REF. NO.	SETTING	
V10 screen	6	SW3 SW3	CW MOD	523,000 Infinity
V10 plate	8	SW3 SW3	CW MOD	73,000 Infinity
V11 grid	4			10,300
V11 screen	6			68,000
V11 plate	8			20,000
V12 plates	3,5			34,300
V13 plate	3			69,000
V13 grid	5			510,000
V14 plate	3,4			18,600
V14 grid	5			510,000
V15 plate	3,4			19,400
V15 grid	5			320
V15 cathode	8			750
V16 plate	3,4			19,400
V16 grid	5			320
V16 cathode	8			750

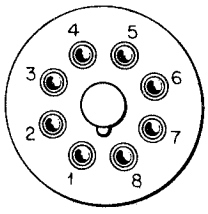
**with V9 removed from socket

SOCKET TERMINAL RESISTANCE VALUES

(All measurements made between socket terminal and chassis)

POWER SUPPLY

TERMINAL NAME	PIN NO.	RESISTANCE IN OHMS
V1 plate	4	40
V1 plate	6	40
V1 filament	2, 8	19,500
V2 plates	4, 6	28,500
V2 filament	2, 8	22



OCTAL BASE

(BOTTOM VIEW)

Tube socket terminals.

voltage readings are based on an a-c line voltage exactly equal to the primary tap on the power transformer - higher or lower line voltage should result in corresponding variations in these readings.

All d-c readings are based on the use of a meter having a resistance of 1000 ohms per volt, and are taken between socket terminals and chassis.

MODEL SP-400-X

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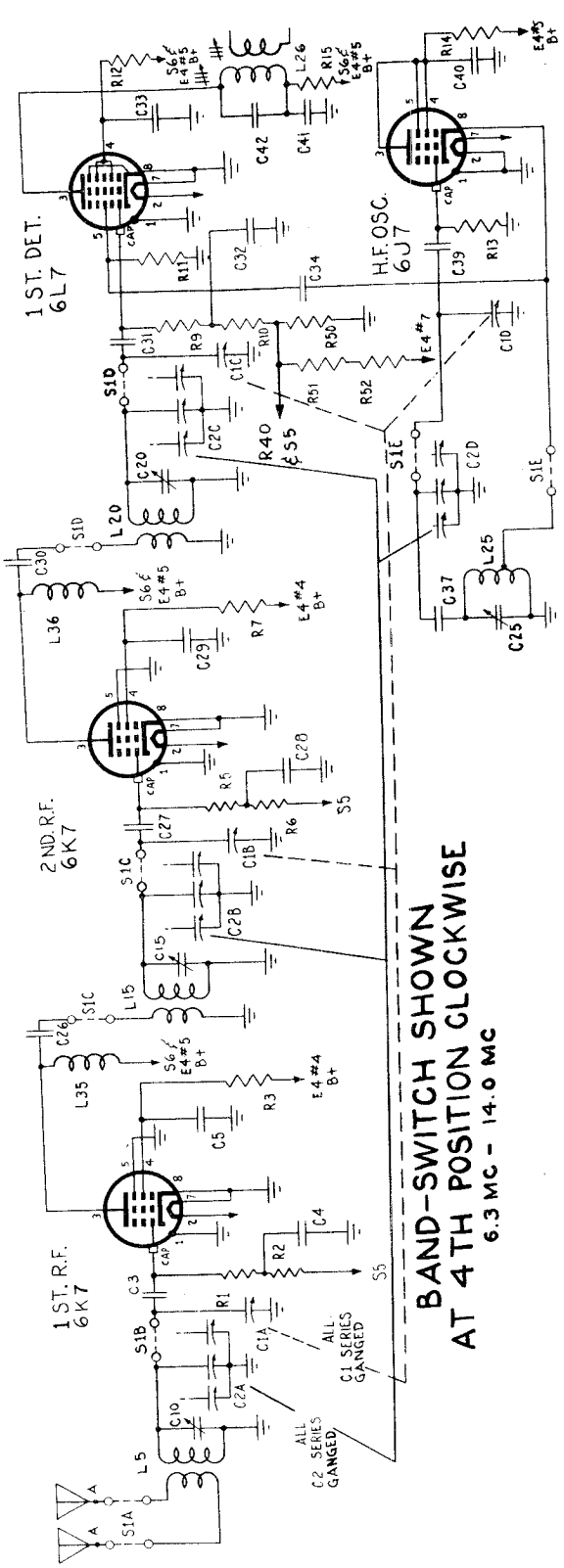

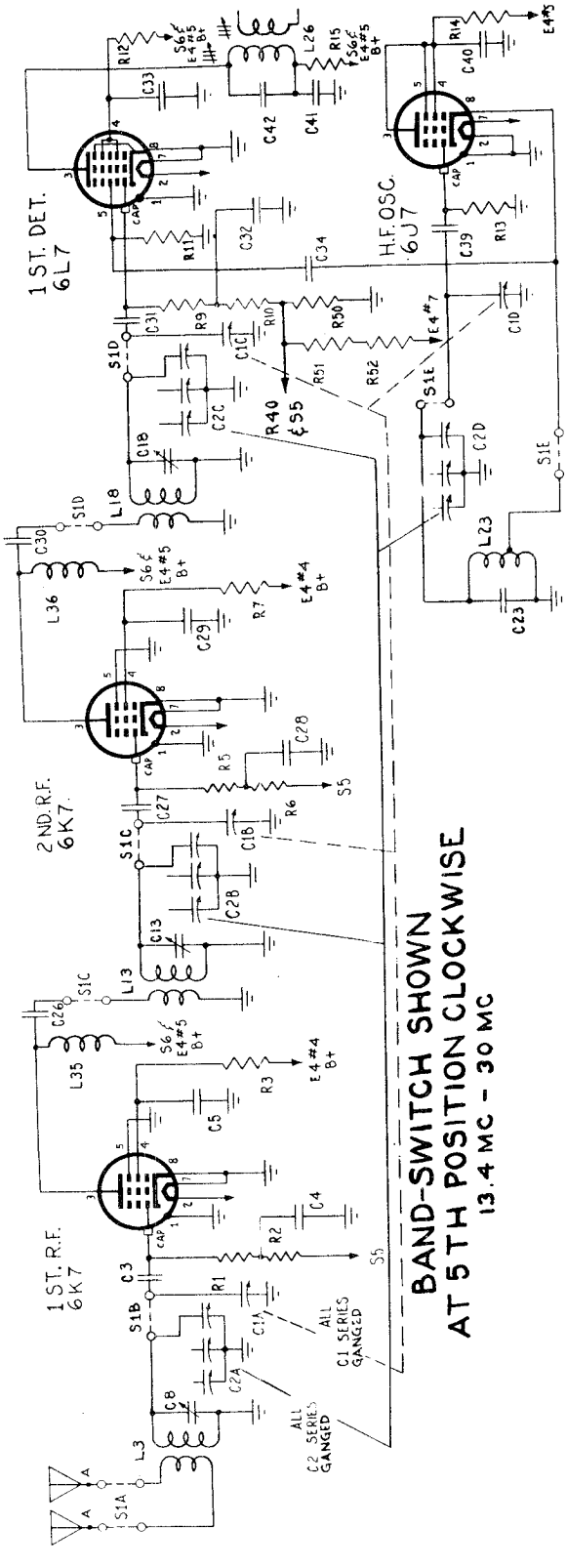

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INSTALLATION

Connection to Power Supply—Connect Receiver to Power Supply as follows:

(1) Remove the sheet-metal covers from terminal strip (E4, FIG. 3) on rear of Receiver and from terminal strip (E1, FIG. 3) on Power Supply. See that all ten screws on each strip are unscrewed at least three turns. Then attach one end of the connector cable to each terminal strip *exactly* as shown in FIG. 3 and tighten all screws securely. Make certain that each slotted spade lug on the cable strips makes contact with its respective screw terminal *only*, since a lug jammed between *two* screws could cause considerable trouble. Immediately replace both metal covers and do not remove them while the Power Supply is connected to the a-c power line.

(2) The spacing of spade lugs on cable terminal strips is exactly the same as the spacing of screws on Receiver and Power Supply. If the two fail to go together easily, DON'T USE FORCE. Be sure *all* screws are unscrewed far enough. If a spade lug has been bent or pushed out of place by rough handling, straighten it and try again. Spade lugs should slip under screws from the top.

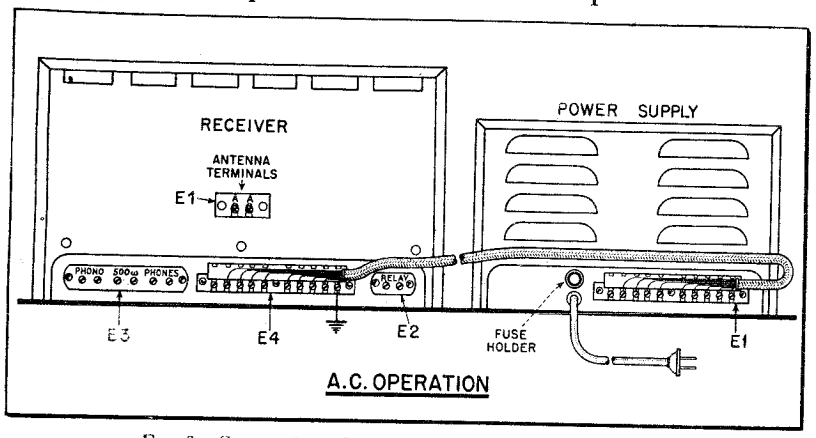

FIG. 3—Connections for power cable—A.C. operation.

Connection for Battery Operation—A cable for use in battery operation is available on special order. This cable (W2 in Parts List) has only one terminal strip. The other end of the cable is made up of eight loose wires. Connect this cable according to FIG. 4 (note the color code for the eight loose wires), or make up connections to serve the purpose. Connect the battery cable to the Receiver *first* and replace the terminal cover *before* making connections to the batteries. When discontinuing battery operation, disconnect the battery cable from the receiver. All operations of the Receiver are the same with either the Power Supply or the battery set-up.

Chassis Ground: It is not usually necessary to ground the Receiver chassis, but this can be done by connecting the ground lead to the left-hand PHONO or to the left-hand PHONES terminal (located on terminal strip E3, FIG. 3). These two terminals are grounded to the inside of the chassis.

Earphones: Plug a headset into the PHONES jack (J1, FIG. 2), or connect it to screw terminals marked PHONES on rear of chassis. No matching transformer is necessary

Loudspeaker: The permanent magnet dynamic loudspeaker supplied with the Receiver has a transformer mounted on its housing. This transformer matches the voice coil of the loudspeaker to the 500-ohm output terminals (on terminal strip E3, FIG. 3) located at the rear of the chassis (marked 500 ohms). For loudspeaker operation, connect the two-wire lead attached to the terminals of the loudspeaker transformer to the 500-ohm terminals on the Receiver. Disconnecting the loudspeaker will not impair the operation of the Receiver.

Power Transformer Primary Tap: Before plugging the power cord into the a-c line, remove bottom plate from Power Supply to see that power cord is properly connected for the a-c voltage of the power line being used. One wire of the power cord is permanently connected to the fuse-holder (E3, FIG. 5); the other wire is connected at the factory to one of the screw terminals on terminal strip E2 (FIG. 5). These screw terminals are marked 105, 115 and 125, and are connected to primary taps on the power transformer. See that the power cord wire is connected to the screw terminal most closely agreeing with the available a-c line voltage and replace the bottom cover plate.

POWER SOURCES

A-C Operation . . .
105-125 Volts, 50-60 cps
180 watts average power consumption

Battery Operation . . .
6-volt storage battery, drain
6.25 amperes for heaters.
Five 45-volt "B" batteries, drain
117 milliamperes at 225 volts:
4.5 milliamperes at 90 volts.
One 45-volt "C" battery, drain
10 milliamperes.

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OPERATION

a. *Radiophone Reception:* Set the front panel controls (FIG. 2) as follows:

CONTROL	POSITION
CRYSTAL SELECTIVITY	OFF
PHASING	on arrow
BAND WIDTH	3
LIMITER	Off
AVC-MANUAL	AVC
SENSITIVITY	10
BAND SPREAD	100
SIGNAL-MOD-CW	MOD
AUDIO GAIN	6
SEND-REC	REC
BEAT OSCILLATOR	0

(1) Throw OFF-ON power switch in center of panel to ON. This puts Receiver in operation.

(2) Adjust band switch (S1, FIG. 2) to a band which is likely to be very active. This will facilitate the process of getting familiar with the various adjustments. If interference is not serious, BAND WIDTH control can be adjusted to a wider band width (higher number), depending upon the degree of fidelity desired. In general, adjust this control to band width giving best tone with least interference.

(3) Do all tuning, with or without the meter with BAND WIDTH control set at 3. Other settings give wider bands, making exact tuning difficult. Make band width adjustments *after* signal is tuned properly.

(4) LIMITER-OFF-ON control turns noise limiter on and off. The noise limiter will be most valuable on the higher frequencies, where interference from automobile ignition system is most bothersome.

b. *Code Reception:* Flip AVC-MANUAL switch to MANUAL and turn down SENSITIVITY control to provide proper sensitivity.

(1) On strong signals, do not turn SENSITIVITY control all the way on, because it will cause overloading. If the AUDIO GAIN control is set at about 7, it is possible to regulate volume by using only the sensitivity control.

(2) To turn on the beat oscillator, set SIGNAL-MOD-CW switch at CW. The BEAT OSCILLATOR control varies the pitch of the beat between oscillator and incoming signal. Use beat oscillator for code reception and for locating weak modulated signals.

(3) Fading signals can be improved by returning AVC-MANUAL switch to AVC.

c. *Crystal Filter:* First three positions of CRYSTAL SELECTIVITY control are generally used for radiophone reception and will serve for code reception where interference is not serious. Last two positions are intended for code reception *only* since they provide so narrow a band that "phone" signals are usually unintelligible. After adjusting CRYSTAL SELECTIVITY control for desired degree of selectivity, use PHASING control to eliminate or reduce any heterodyne interference or "whistle" which may be present.

d. *Receiver Silencing:* Receiver can be silenced by flipping the SEND-REC switch (S6, FIG. 2) to SEND. This operation opens the "B" supply to the R-F and 1st detector tubes (V1, V2 and V3). The Receiver then remains ready for instant service during transmission periods. Note also that instead of using the SEND-REC switch, a relay may be connected to the RELAY terminals (E2, FIG. 3) at rear of Receiver and silencing controlled by relay action, actuated, for example, by the associated transmitter. When using a relay for silencing, flip SEND-REC switch to SEND (open) and *leave* it there. While the transmitter is operating, the relay should remain *open;* when the transmitter is "off the air," the relay contacts should *close* to restore Receiver operation.

e. *Phono Operation:* Leads from a phonograph pickup may be connected to the PHONO terminals (on terminal strip E3, FIG. 3) at the rear of the Receiver. (Note that the left-hand terminal of this pair is grounded to chassis.) Use the SEND-REC switch (S6) as a "phono-radio" switch by flipping it to the SEND position, thus eliminating radio intereference and making it unnecessary to hunt for a "dead spot" on the tuning dial.

f. *Tuning:* All tuning *can* be done with the MAIN TUNING control. In this case, leave the band spread dial at 100. BAND SPREAD control spreads out a narrow band of frequencies *below* the frequency to which the main dial is set. This control operates continuously throughout the entire tuning range of the Receiver, and signals can be spread out in any one of the five bands.

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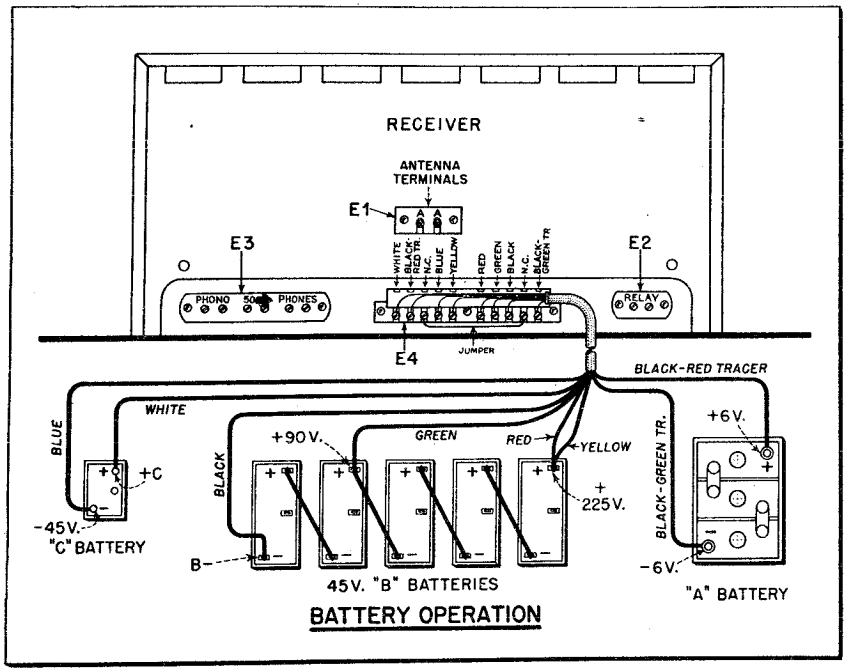

FIG. 4—Connections for power cable—battery operation.

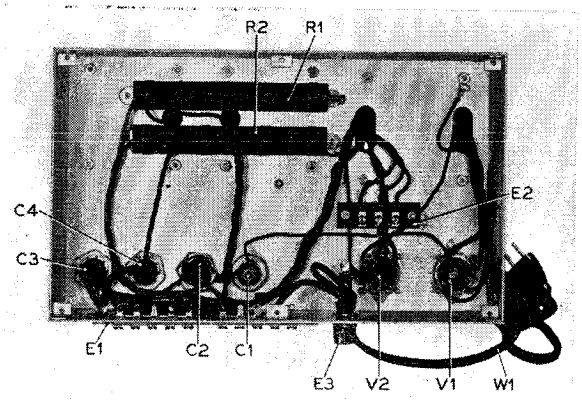

FIG. 5—Bottom view of power supply.

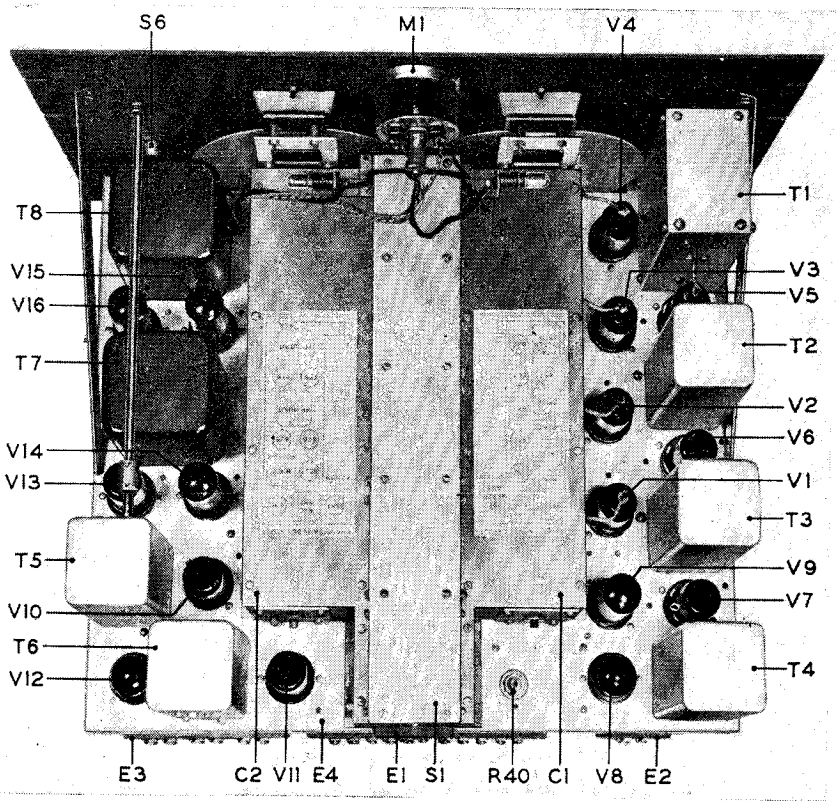

FIG. 7—Top chassis view showing arrangement of components.

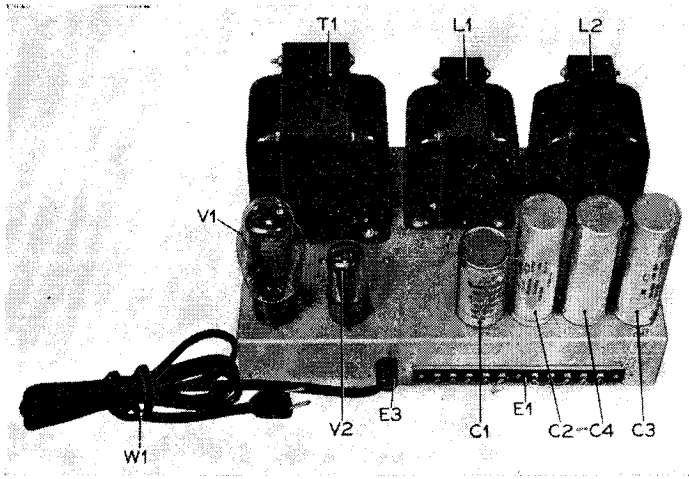

FIG. 6—Top view of power supply.

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g. *Earphone Operation:* For earphone operation, plug earphones into the PHONES jack (J1, FIG. 2) provided for them on the front panel, or connect them to the PHONES terminals on the rear of the Receiver chassis. These terminals are connected in parallel with the jack on the front panel.

h. *S-Meter Tuning:* The S-meter (M1, FIG. 2), a tuning guide, operates only when the Receiver is set for AVC. Its reading increases as the Receiver approaches resonance with the incoming signal. Exact resonance is shown by the greatest reading of the meter. BAND WIDTH control must be set at 3 for accurate tuning by means of the meter. A screwdriver adjustment (R40, FIG. 7) at the rear of the chassis varies the resistance in shunt with the meter. By means of this adjustment, an "S9" reading may be obtained on any input between approximately 10 and 10,000 microvolts. The normal factory adjustment is made on an input of 50 microvolts, and when so adjusted each "S" number represents a change in signal input of approximately 6 decibels, or a ratio of two-to-one.

CIRCUIT ARRANGEMENT

RF AMPLIFIER

a. *Antenna Circuit:* The antenna is coupled to the grid of the 1st RF amplifier (V1) through an input transformer having an untuned primary and tuned secondary. The terminals of the primary coils are ungrounded, and are connected through a double-pole section (S1A) of the band switch to the "A," "A" terminals (E1) on the rear of the tuning unit. This symmetrical arrangement of the antenna primary coils permits full advantage to to be taken of the noise-reducing properties of a balanced transmission line lead-in. The impedance of the input circuit averages approximately 100 ohms throughout the tuning range of the Receiver.

b. *Amplifier Stages:* There are two stages of RF amplification preceding the first detector or mixer. These stages are coupled by means of RF transformers having tuned secondaries and low inductance untuned primaries. The plates of the two RF amplifier tubes (V1, V2) are shunt fed through RF chokes L35, L36 and are coupled to their respective tuned circuits through fixed capacitors C26, C30. This shunt feed keeps plate voltage off the tuned RF amplifier circuits. Two stages of RF amplification, in the frequency range covered by the 540-1240 kc band, normally provide more selectivity than is desirable for the reception of high-fidelity programs. To prevent loss of audio quality resulting from RF side-band cutting, resistors (R4, R8) have been placed in series with the secondaries of RF transformers L14, L19, to broaden their pass band.

CRYSTAL FILTER

a. *Controls:* The Quartz Crystal Filter (T1) couples the 1st detector (V3) to the 1st IF amplifier (V5). Its selectivity can be varied in definite steps by the CRYSTAL SELECTIVITY switch (S2) controlled from the front panel by knob and pointer. In addition, its selectivity characteristic can be greatly sharpened *on one side* or the other (to avoid heterodyne "whistle") by adjusting the PHASING capacitor (C46), also controlled by a knob on the front panel.

b. *Variable Selectivity:* Curves A and B, FIG. 8, show Receiver selectivity curves which indicate certain effects of the Crystal Filter. When the CRYSTAL SELECTIVITY switch is set at OFF, the quartz crystal is short-circuited and signal voltages present in the secondary of the 1st detector plate coil (L26) are impressed directly on the control grid of the first IF amplifier tube (V5). At any other setting (1 to 5), the quartz crystal is in use and acts as an extremely high "Q," high impedance, series tuned circuit interposed between the secondary of plate coil L26 and the 1st IF grid circuit (L27, C48), which constitutes the load into which the crystal works. Selectivity is varied by altering the impedance of this parallel tuned circuit (L27, C48), which is accomplished by adding resistance. (R17, R18, R19, R20) in series with coil L27 and capacitor C48.

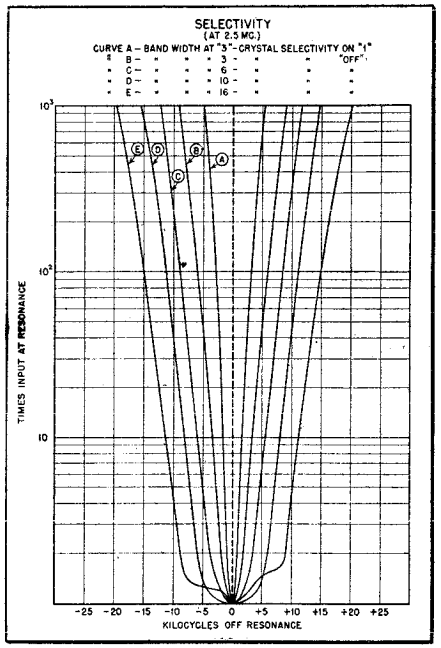
SELECTIVITY
(AT 2.5 MC.)
CURVE A – BAND WIDTH AT "3" – CRYSTAL SELECTIVITY ON "1"
B – " " " 3 – " " "OFF"
C – " " " 6 – " " "
D – " " " 10 – " " "
E – " " " 16 – " " "
TIMES INPUT AT RESONANCE
KILOCYCLES OFF RESONANCE

FIG. 8—Selectivity curves.

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HF OSCILLATOR

The HF oscillator operates at a frequency 455 kc. (the frequency for which the IF amplifier is adjusted) *higher* than that of the incoming signal. The oscillator section of the variable tuning capacitor (C1D) has the same capacitance and plate shape as the RF sections (C1A, C1B, C1C). The constant 455 kc. frequency difference is maintained by means of a padding capacitor in series with the variable, together with appropriate values of oscillator inductance and parallel trimmer capacitance.

FIRST DETECTOR

The 1st detector employs a 6L7 pentagrid mixer (V3). Its injection grid (grid No. 3) is coupled to the HF oscillator cathode, and its signal grid (grid cap) is coupled to the plate of the second RF amplifier tube (V2) by means of the second RF transformer.

I-F AMPLIFIER

The intermediate-frequency amplifier has three stages consisting of three coupling transformers (T2, T3 and T4) and three pentode amplifier tubes (V5, V6 and V7) of the remote cutoff or super-control type. The first two transformers (T2, T3) are identical, and have tuned primaries as well as tuned secondaries. The secondary coils are fixed in position, while the primary coils are mounted on slide rods permitting them to move back and forth with respect to the secondaries, thus changing the degree of inductive coupling between them. When the coils are farthest apart the coupling is at its lowest value and the transformers exhibit their maximum selectivity or minimum band width. Conversely, when the coils are pushed close together the coupling is greatly increased and minimum selectivity or maximum band width results. At any adjustment between these two extremes, an intermediate degree of selectivity is obtained.

SECOND DETECTOR

The 2nd detector (V8) is a twin diode operated with both plates and both cathodes connected in parallel. Its IF input is obtained from the untuned secondary of coil L32 in transformer T4 in the plate circuit of the 3rd IF amplifier (V7). To facilitate operation of the limiter tube (V9) the diode load resistance is divided into two approximately equal parts. One part, R33, is placed between the paralleled cathodes and ground and is by-passed (for IF) by a small capacitor (C66). The other part is between the low-potential end of the secondary and ground, and is made up of R29, R30 and R31. Resistor R29 and two small capacitors (C64, C63) constitute a filter to prevent IF voltages from reaching resistor R31 and the AUDIO GAIN control (R48).

NOISE LIMITER

The noise limiter tube (V9) is a 6N7 class B twin triode with its two grids and its two plates connected in parallel in order to secure the lowest possible impedance. The circuit is designed to limit interferences of very short pulse duration such as caused by auto ignition and other similar disturbances. It is designed to work with or without the AVC system and will automatically follow widely different signal levels. Some distortion results at higher modulation percentages but this is unavoidable if effective noise limiting is to be obtained. An "on-off" switch is provided.

"S" METER

The "S" or Signal Strength Meter (M1) is connected for use when the AVC-MANUAL switch (S5) is thrown to AV. This meter shows the relative strength of the received signal. The centrally located dial is calibrated in units of 1 to 9. A variable control (R40) on the rear of the chassis allows the meter to be adjusted to read "S-9" on any signal from 10 to 10,000 microvolts. The normal factory adjustment for "S-9" is approximately 50 microvolts. Each division represents a ratio of approximately 2 to 1 over the previous division. Thus each division represents a 6db step. The sensitivity control (R46) must be set at maximum (position 10) for maximum "S" meter accuracy. This "S" meter can also be used as a tuning meter since it will show maximum reading at resonance. In this case, to obtain a relatively sharp resonance indication, the BAND WIDTH control should be set at position 3.

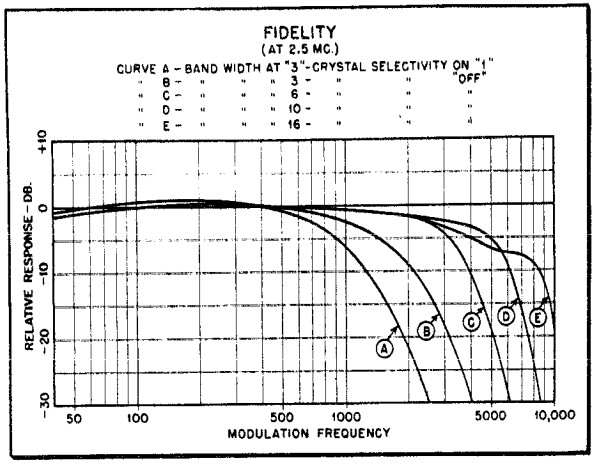

FIG. 9—Audio fidelity curves.

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AVC AMPLIFIER AND RECTIFIER

Special amplifier and rectifier stages are employed in order to give most satisfactory AVC action. AVC voltages are applied to the two RF stages and to the first two IF stages and compensate for variations in signal strength due to fading. A different rate of compensation is required for voice modulated signals than for code signals. This is automatically adjusted when the beat frequency oscillator is turned on or off.

BEAT OSCILLATOR

The beat oscillator tube (V10) and associated oscillator circuit (T5) provide a voltage at approximately the intermediate frequency. This voltage, when introduced into the input circuit of the 2nd detector (V8) by means of a small coupling capacitor (C60), mixes with the I-F signal being delivered to the detector by the 3rd I-F amplifier (V7). The mixture of these two similar frequencies results in a "beat" or difference frequency in the output of the 2nd detector. The beat oscillator frequency is adjusted so that the pitch of this difference frequency falls within the audio-frequency range. Fine adjustment of the beat frequency pitch is accomplished by means of the BEAT OSCILLATOR control on the front panel which turns a small variable capacitor (C69) in transformer T5. The beat oscillator is turned on by throwing the SIGNAL-MOD-CW switch (S4) to CW. In addition to being necessary for proper reception of CW signals, the beat oscillator is useful for locating weak signals of any kind.

AF AMPLIFIER

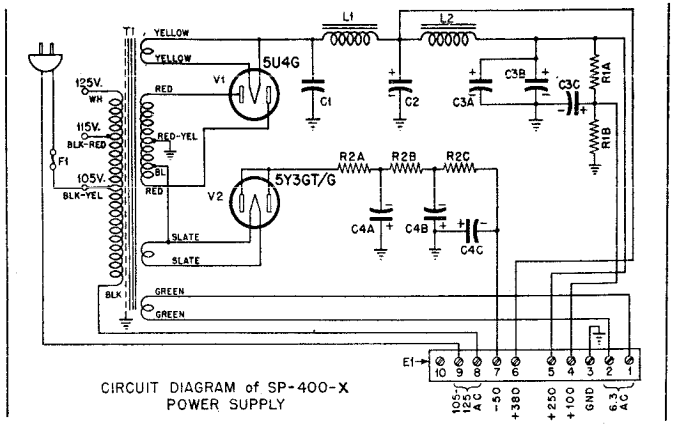
a. *Circuits:* The AF amplifier has three stages, using one 6J5 triode (V13) and three 6F6 pentodes (V14, V15, V16). The grid of the first tube (V13) is connected to the moving arm of the AUDIO GAIN control (R48) through a blocking capacitor (C82). Its plate is coupled to the grid of the second AF amplifier by means of capacitor C83, plate resistor R53 and grid leak R54. The second amplifier tube (V14), while a pentode, is operated as a triode by connecting its plate and screen together. It drives the output tubes (V15, V16) through a push-pull input transformer (T7). The output tubes (V15, V16) are also triode-connected pentodes and are operated as class AB_2 amplifiers.

b. *Output Transformer:* The output transformer (T8) has two secondary windings; a 500-ohm secondary (4-5) for power output, and a secondary for earphones (6-7) designed to deliver about 3% of the output power into an 8000-ohm resistive load when the 500-ohm secondary is connected to a matching load such as the loudspeaker

The turns ratio and resistance of the earphone winding are such that the power delivered to any load between 8000 ohms and 80 ohms varies less than 6 db, and the power input to a 250-ohm load is but 2 db greater than that to a 4000-ohm load. FIG. 16 shows curves of overall audio fidelity with different settings of the CRYSTAL SELECTIVITY and BAND WIDTH controls.

POWER SUPPLY

The Power Supply furnishes "A," "B" and "C" voltages for the Receiver. The "A," or heater voltage, is 6.3 volts AC obtained from a separate secondary winding (1-2) on the power transformer (T1, FIG. 10). "B" voltage is obtained from the center-tapped high-voltage secondary (7-8-10) connected to the plates of the "B" rectifier tube (V1). After this voltage is rectified, it is filtered by the combined action of the first filter choke (L1) and the two filter capacitors C1 and C2. This provides 380 volts DC for the plates of the power output tubes in the Receiver. Further filtering by the second filter choke (L2) and the first two sections of capacitor C3 provides 250 volts DC for the plates of the remaining tubes in the Receiver. Approximately 100 volts DC for the screen grids of the Receiver tubes is obtained from the tap on the bleeder resistor (R1), which is by-passed by the remaining section of capacitor C3. Negative "C" voltage is obtained from a tap (9) on the high-voltage secondary connected to the filament of the "C" rectifier tube (V2). The rectified output from the plates of tube V2 is filtered by the three sections of resistor R2 and the three sections of filter capacitor C4. When connected to the Receiver, the voltage at the end of this filter is approximately minus 50.



CIRCUIT DIAGRAM of SP-400-X POWER SUPPLY

FIG. 10—Power supply diagram.

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CONTINUITY TESTS

If the Receiver is inoperative, it may have a shorted filter or by-pass capacitor or an open resistor. Remove the cabinet or bottom cover plate to get at all parts. Measure socket voltages and compare them with TABLE 2. (Consult FIG. 11 and TABLE 1 for key to tube base pin connections.) If this measurement does not reveal the trouble, start checking socket terminal resistance values against TABLE 3 (Receiver) or TABLE 4 (Power Supply). Obtain values of resistors and capacitors by locating the reference number on the proper circuit diagram and looking it up in the Table of Parts, Section V. In checking these resistance values be sure to set the "variable" controls to the positions specified in the table.

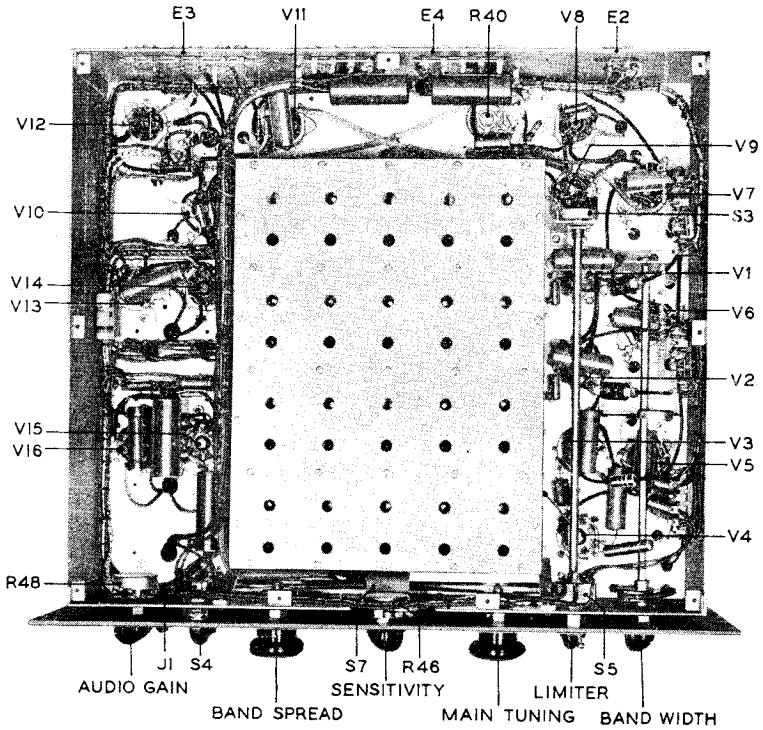

FIG. 12—Bottom view of chassis.

ALIGNMENT—GENERAL

When either selectivity or sensitivity or both appear to be below normal and *all tubes have been tested,* check the alignment. Remove the dust cover or cabinet and bottom cover plate of the Receiver to get at all parts for making adjustments. CAUTION: ANY CHANGES FROM ORIGINAL SETTINGS WILL BE SMALL SO USE GREAT CARE WHEN CHECKNG ADJUSTMENTS. This is especially true of the HF oscillator circuits, which should NOT be disturbed unless the MAIN TUNING dial is definitely known to be off calibration.

a. *Signal Generator:* This should be an accurately calibrated instrument producing amplitude-modulated radio-frequency signals. In addition to 455 kc. (the IF), the frequency range required of the signal generator depends on the tuning range of the receiver to be aligned. The RF alignment frequencies required for the Series 400-X Super-Pro are shown in FIG. 13. The second harmonic can generally be used when the fundamental frequency is not available. For example, a signal generator covering all frequencies from 455 kc to 15 mc could be used to check the highest frequency band by using the second harmonic of 15 mc to provide the 30 mc called for in FIG. 13. The signal generator should have an output of approximately 100 microvolts and an output impedance of approximately 100 ohms for best results when aligning the RF and HF Oscillator circuits. For IF alignment these values are not critical. The frequency calibration of the signal generator is extremely important *if* the Receiver dial calibration is to be correct.

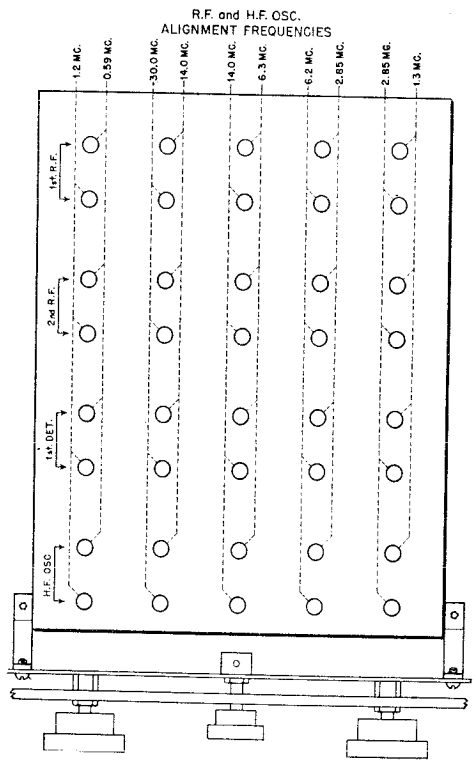

FIG. 13—R.F. and H.F. osc. alignment frequencies and location of adjustments.

b. *Output Meter:* The output meter should respond to the modulation frequency of the signal generator, preferably 400 cps, and should provide at least half-scale deflection for 10 volts. Its resistance should be greater than 500 ohms.

c. *Tools:* An insulated screwdriver 9/64" wide and .025" thick at the bit, is required for alignment of the Receiver.

d. *Preliminary Procedure:* Throw the OFF-ON switch to ON and permit the Receiver to warm up for about an hour before beginning adjustments. Connect the output meter to the 500-ohm terminals located at the rear of the Receiver chassis

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ALIGNMENT PROCEDURE

a. *Preliminary Setup:* Adjust the signal generator to approximately 455 kc and connect its output to the control grid cap of the 1st detector tube (V3) through a fixed capacitor (anything larger than 100 mmf will do). Set the front panel controls as follows:

SENSITIVITY	0
AVC-MANUAL	MANUAL
SIGNAL-MOD-CW	MOD
SEND-REC	REC
BAND SWITCH	2.85-6.3 mc
AUDIO GAIN	10
CRYSTAL SELECTIVITY	OFF
PHASING	on arrow
BAND WIDTH	3
BAND SPREAD DIAL	100

b. *IF Alignment Check:*

(1) Set the MAIN TUNING dial near 2.85 mc, but be careful not to tune in a powerful local signal. Set the CRYSTAL SELECTIVITY switch on 3, the AVC-MANUAL switch on AVC, and advance the SENSITIVITY to 10. Turn off the modulation of the signal generator and adjust its frequency slightly to produce maximum deflection of the "S" meter. The adjustment of the signal generator in this manner is necessary in order to get exact agreement with the natural period of the particular quartz crystal in the Receiver being checked. After reducing SENSITIVITY to 0, the modulation may be switched on, but the tuning adjustment of the signal generator must not be altered until the alignment check has been completed. Return the CRYSTAL SELECTIVITY and AVC-MANUAL controls to their original settings of OFF and MANUAL and advance the SENSITIVITY control until a suitable output meter reading is obtained. A half-scale reading in the region of 5 to 10 volts will be satisfactory.

(2) Now check the alignment of both upper (grid) and lower (plate) air trimmer capacitors in IF transformers T2 and T3 and the single trimmer in T4 for peak reading of the output meter. If one or more of these adjustments results in a sizeable increase in output, reduce the SENSITIVITY control enough to bring the meter reading back to half-scale. Alignment of the plate circuit of the crystal filter (T1) can be tested in the same way by means of the lower adjusting screw on the side of the unit. This screw varies the position of the powdered iron core in coil L26. Do not change the setting of the upper adjusting screw which tunes grid coil L27, as this circuit cannot be adjusted properly with the output meter. It can, however, be aligned by the "visual" method using a frequency-modulated signal generator and cathode-ray oscilloscope. If this equipment is available, proceed as follows:

(3) Connect the input of the vertical amplifier of the oscilloscope to the PHONO connections on Terminal strip E3 (FIG. 7) on the rear skirt of the Receiver chassis. The "high" terminal is the second one from the edge of the strip; the first screw is connected to the chassis. Set the frequency-modulated signal generator to approximately 455 kc and connect its output to the control grid cap of the 1st detector (V3) through a fixed capacitor (100 mmf or larger). With the CRYSTAL SELECTIVITY switch at OFF, readjust the signal generator frequency to produce the conventional single-peaked resonance curve on the screen of the oscilloscope. Then turn the CRYSTAL SELECTIVITY switch to position 1. If the grid coil (L27) is correctly tuned the image on the oscilloscope screen will remain symmetrical but will be only about two-thirds as wide as before, indicating an increase in selectivity. The oscilloscope image is also affected by the PHASING control, maximum symmetry occurring at or very near the arrow on its scale. Therefore, when tuning L27, rock the PHASING control back and forth at the same time to secure the best adjustment.

c. *AVC Alignment Check:* Leaving all other controls as in PAR. 26a, and without changing the signal generator frequency, reduce AUDIO GAIN to 0, switch to AVC and increase SENSITIVITY to 10. Increase AUDIO GAIN to restore half-scale reading on the output meter and adjust the single trimmer capacitor in T6 for *minimum* output meter reading. The "S" meter reading should "peak" at the same time the output meter reading "dips."

d. *Beat Oscillator Alignment Check:* Continuing with controls as above switch off the output meter and plug in a pair of earphones, or replace the meter with a suitable loudspeaker. Turn the SIGNAL-MOD-CW switch to CW and see that the BEAT OSCILLATOR control is exactly on 0 (zero). If tone in earphones or speaker is not very low in pitch, readjust the trimmer capacitor near the bottom of T5 until it is. If the beat oscillator is in perfect alignment when this test is made, no sound will be heard since the signal generator and the beat oscillator will be oscillating at the same frequency and there will be no audible difference or "beat." Check this by turning the BEAT OSCILLATOR control knob slightly off 0 (zero) toward one side or the other. If this results in a tone rising in pitch as the pointer is turned away from 0 (zero) to either side, the beat frequency oscillator is perfectly aligned. If no audible tone can be obtained within the range of the BEAT OSCILLATOR control, adjust the trimmer capacitor near the bottom of T5 until an approximate "zero beat" occurs at 0 (zero) setting of the BEAT OSCILLATOR control.

e. *HF Oscillator Calibration Check:* The accuracy of the MAIN DIAL calibration depends solely on the HF oscillator frequency, which in this Receiver is 455 kc. (the IF) *higher* than the signal frequency. Although the frequency of the HF oscillator can be measured directly if accurate frequency-measuring equipment is on hand, it is far simpler to check it by tuning in signals of known frequency and noting the MAIN DIAL readings. CAUTION: BE SURE THE BAND SPREAD DIAL IS SET AT 100 WHEN MAKING THIS TEST.

(1) To correct dial calibration, refer to alignment chart (FIG. 13) for location of HF oscillator adjustments as well as signal frequencies at which settings should be made. The output of the signal generator should be unmodulated and SIGNAL-MOD-CW switch on Receiver turned to CW. Set BEAT OSCILLATOR at 0, AUDIO GAIN at 10, AVC-MANUAL on MANUAL, BAND WIDTH at 16. Disconnect output meter and use carphones or loudspeaker to make necessary adjustments by "zero beat" method. Connect signal generator to antenna terminals for this test.

(2) If the 2.85-6.3 mc band is to be corrected, tune signal generator accurately to 6.3 mc. Tune in signal generator signal at 6.3 mc end of Receiver dial to zero beat. Notice approximate dial error. Turn main dial slightly toward 6.3 mc calibration line until beat note rises to a high pitch. Do not turn dial far enough to raise beat so high it cannot be heard. With alignment screwdriver adjust trimmer capacitor marked HF OSC 6.3 mc (FIG. 13) until beat is again zero. Turn main dial still farther toward 6.3 mc line and make a further adjustment of trimmer capacitor to return to zero beat. Repeat this process as often as necessary to bring dial to exactly 6.3 mc. (The main dial could be set at once on exactly 6.3 mc and trimmer turned enough at one time to produce zero beat, but the step-by-step method is recommended.) Now retune signal generator to exactly 2.85 mc and tune in signal-generator signal at low-frequency end of main dial and correct the calibration step-by-step as before, using inductance trimming adjustment HF OSC 2.85 mc (FIG. 13). When 6.3 mc signal from signal generator is again tuned in at other end of dial, it will be found that inductance adjustment at 2.85 mc has changed correction previously made at 6.3 mc. This is normal. Go back and forth several times from 2.85 to 6.3 mc in order to bring both ends of dial scale into exact agreement with the signal frequency. CAUTION: DURING THIS ADJUSTMENT BE VERY CAREFUL TO ADJUST THE SENSITIVITY CONTROL TO AVOID OVERLOADING.

f. *RF and 1st Detector Alignment Check:* Although alignment of these three circuits (1st and 2nd RF and 1st Det) can be checked at the same time as the HF oscillator, it is simpler to consider each check as a separate operation. Efficient weak-signal reception, with low receiver noise level and high image rejection ratios, depends on the relative alignment of these three circuits with respect to the HF oscillator and without regard to calibration accuracy.

(1) Accurate calibration of the signal generator is not required to check these adjustments. Modulation of the signal generator, while convenient, is not strictly necessary. Input to antenna terminals should be through 100 ohms (approximate) including output resistance of signal generator. If signal generator is modulated, Receiver controls should be set as for IF alignment; if unmodulated, set BEAT OSCILLATOR to 2 (either side) and SIGNAL-MOD-CW to CW. Adjust SENSITIVITY for half-scale reading on output meter when signals are exactly in tune.

(2) Starting with 2.85-6.3 mc band, set main dial at 6.3 mc (BAND SPREAD at 100) and adjust frequency of signal generator for peak deflection of output meter. Then check setting of trimmer marked 1st DET 6.3 mc (FIG. 13). Repeat this procedure on trimmers designated as 2nd RF and 1st RF in same row. If readjustments on one of these settings greatly increases output meter reading, alter SENSITIVITY slightly to reduce reading to half-scale. After each adjustment check tuning of Receiver to make sure test signal is still accurately tuned. BAND SPREAD may be used as a vernier for this purpose.

CAUTION: THIS TUNING CHECK IS EXTREMELY IMPORTANT AT HIGH END OF 6.3-14.0 MC AND 13.4-30.0 MC BANDS WHERE THERE IS SOME SLIGHT INTERACTION BETWEEN 1ST DET AND HF OSC CIRCUITS. After checking the three trimmers at high end of this band, turn main dial to 2.85 mc and retune signal generator to suit. Then check the three inductance adjuster settings marked 2.85 mc (FIG. 13) in the same row. Since adjustments at one end of a band also affect the other end of the band (as described under HF OSC alignment), repeat above procedure until no further improvement can be secured. The number of repetitions necessary depends on how much mistuning existed initially. Other bands may be checked in the same manner.

(3) For best possible efficiency with a particular antenna arrangement, the 1st RF circuits may be adjusted with the antenna connected. This can be done by loosely coupling output of signal generator to antenna system instead of directly to antenna terminals through a 100-ohm resistor. Make sure that signal from signal generator actually reaches Receiver by way of antenna rather than by some form of direct coupling.

(4) In all the foregoing tests using output meter readings for circuit adjustment it is recommended that earphones (or speaker) be used to monitor the signal. This will avoid false adjustments caused by overloading or freakish responses.

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TABLE OF PARTS

Circuit Ref. No.	Description	Part No.
	CAPACITORS	
C1	Main Tuning	
C2	Band Spread	
C3	620 mmf, Mica	23005-86
C4	.02 mf, Paper	23912-1
C5	.05 mf, Paper	23912-2
C6	Trimmer, Mica, 3-30 mmf	Part of 29529-G1
C7	Trimmer, Mica, 3-30 mmf	Part of 29532-G1
C8	Trimmer, Mica, 3-30 mmf	Part of 29538-G1
C9	Trimmer, Mica, 3-30 mmf	Part of 29520-G1
C10	Trimmer, Mica, 3-30 mmf	Part of 29535-G1
C11	Trimmer, Mica, 3-30 mmf	Part of 29530-G1
C12	Trimmer, Mica, 3-30 mmf	Part of 29533-G1
C13	Trimmer, Mica, 3-30 mmf	Part of 29539-G1
C14	Trimmer, Mica, 3-30 mmf	Part of 29521-G1
C15	Trimmer, Mica, 3-30 mmf	Part of 29536-G1
C16	Trimmer, Mica, 3-30 mmf	Part of 29530-G1
C17	Trimmer, Mica, 3-30 mmf	Part of 29533-G1
C18	Trimmer, Mica, 3-30 mmf	Part of 29539-G1
C19	Trimmer, Mica, 3-30 mmf	Part of 29521-G1
C20	Trimmer, Mica, 3-30 mmf	Part of 29536-G1
C21	Trimmer, Air, 4-25 mmf	Part of 29531-G1
C22	Trimmer, Air, 4-25 mmf	Part of 29534-G1
C23	Trimmer, Air, 4-25 mmf	Part of 29540-G1
C24	Trimmer, Air, 4-25 mmf	Part of 29528-G1
C25	Trimmer, Air, 4-25 mmf	Part of 29537-G1
C26	300 mmf, Silver Mica	23003-105D
C27	620 mmf, Mica	23005-86
C28	.02 mf, Paper	23912-1
C29	.05 mf, Paper	23912-2
C30	300 mmf, Silvered Mica	23003-105D
C31	620 mmf, Mica	23005-86
C32	.02 mf, Paper	23912-1
C33	.05 mf, Paper	23912-2
C34	95 mmf, Silvered Mica	6195
C35	673 mmf, Silvered Mica	Part of 29531-G1
C36	1500 mmf, Silvered Mica	Part of 29534-G1
C37	3300 mmf, Silvered Mica	Part of 29537-G1
C38	300 mmf, Silvered Mica	Part of 29528-G1
C39	51 mmf, Silvered Mica	23003-50
C40	.05 mf, Paper	23912-2
C41	.05 mf, Paper	23912-2
C42	120 mmf, Silvered Mica	23003-96
C43	100 mmf, Mica	23001-48
C44	100 mmf, Mica	23001-48
C45	NOT USED	
C46	Phasing, Air, 2-6 mmf (ea.)	SA-179
C47	.02 mf, Paper	23912-1
C48	85 mmf, Silvered Mica, 2%	6180
C49	.05 mf, Paper	23912-2
C50	Variable, Air, 100 mmf	SA-1
C51	.05 mf, Paper	23912-2
C52	.05 mf, Paper	23912-2
C53	Variable, Air, 100 mmf	SA-1
C54	.05 mf, Paper	23912-2
C55	Variable, Air, 100 mmf	SA-1
C56	.05 mf, Paper	23912-2
C57	.05 mf, Paper	23912-2
C58	Variable, Air, 100 mmf	SA-1

TABLE OF PARTS—*Cont.*

Circuit Ref. No.	Description	Part No.
	CAPACITORS—Continued	
C59	.05 mf, Paper	23912-2
C60	5 mmf, Silvered Mica	23003-75
C61	Variable, Air, 100 mmf	SA-1
C62	.05 mf, Paper	23912-2
C63	51 mmf, Mica	23001-59
C64	51 mmf, Mica	23001-59
C65	.05 mf, Paper	23912-2
C66	51 mmf, Mica	23001-59
C67	Variable, Air, 100 mmf	SA-197
C68	100 mmf. Mica	23001-48
C69	Variable, Air, 9 mmf	SA-170
C70	95 mmf, Silvered Mica	6195
C71	620 mmf, Mica	23005-86
C72	.25 mf, Paper	23912-38
C73	.05 mf, Paper	23912-2
C74	.05 mf, Paper	23912-2
C75	Variable, Air, 100 mmf	SA-1
C76	5100 mmf, Mica	23015-16
C77	.05 mf, Paper	23912-2
C78	.05 mf, Paper	23912-2
C79	.05 mf, Paper	23912-2
C80	.05 mf, Paper	23912-2
C81	.05 mf, Paper	23912-2
C82	.02 mf, Paper	23912-1
C83	.05 mf, Paper	23912-2
C84	40 mf, Electrolytic, Dry	6171
C85	.25 mf, Paper	23912-38
C86	.25 mf, Paper	23912-38
	COILS	
L1	Assembly, Antenna transformer 1.24-2.86 mc	29529-G1
L2	Assembly, Antenna transformer, 2.85-6.3 mc	29532-G1
L3	Assembly, Antenna transformer, 13.4-30.0 mc	29538-G1
L4	Assembly, Antenna transformer, 540-1240 kc	29520-G1
L5	Assembly, Antenna transformer, 6.3-14.0 mc	29535-G1
L6	Not Used	
L7	Not Used	
L8	Not Used	
L9	Not Used	
L10	Not Used	
L11	Assembly, R.F. transformer, 1.24-2.86 mc	29530-G1
L12	Assembly, R.F. transformer, 2.85-6.3 mc	29533-G1
L13	Assembly, R.F. transformer, 13.4-30.0 mc	29539-G1
L14	Assembly, R.F. transformer, 540-1240 kc	29521-G1
L15	Assembly, R.F. transformer, 6.3-14.0 mc	29536-G1
L16	Assembly, Same as L11	29530-G1
L17	Assembly, Same as L12	29533-G1
L18	Assembly, Same as L13	29539-G1
L19	Assembly, Same as L14	29521-G1
L20	Assembly, Same as L15	29536-G1
L21	Assembly, Oscillator Coil, 1.24-2.86 mc	29531-G1
L22	Assembly, Oscillator Coil, 2.85-6.3 mc	29534-G1
L23	Assembly, Oscillator Coil, 13.4-30.0 mc	29540-G1
L24	Assembly, Oscillator Coil, 540-1240 kc	29528-G1
L25	Assembly, Oscillator Coil, 6.3-14.0 mc	29537-G1
L26	Universal, 7/41 Litz., iron dust core	6146
L27	Universal, 7/41 Litz., iron dust core	6147
L28	3 pie universal 7/41 Litz., ceramic core	2903-A

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TABLE OF PARTS—*Cont.*

Circuit Ref. No.	Description	Part No.
	COILS—Continued	
L29	3 pie universal, 7/41 Litz., ceramic coil	3990
L30	Same as L28	2903-A
L31	Same as L29	3990
L32	Universal, 7/41 Litz., ceramic core	4907
L33	3 pie universal, 7/41 Litz., ceramic core	2931
L34	Universal, 7/41 Litz., ceramic core	4906
L35	Choke Coil, 5 pie universal R.F. choke, ceramic core, wire leads	609-1
L36	Choke Coil, Same as L35	609-1
J1	JACK, JK-34-A, Phone Jack (headset)	5066
M1	Meter, 0-200 micro-ampere movement	4903
	RESISTORS	
R1	500,000 ohms, ⅓ W	4959
R2	10,000 ohms, ½ W	19309-73
R3	2,000 ohms, ½ W	19301-206
R4	20 ohms, ½ W	19301-183
R5	500,000 ohms, ⅓ W	4959
R6	10,000 ohms, ½ W	19309-73
R7	2,000 ohms, ½ W	19301-206
R8	20 ohms, ½ W	19301-183
R9	500,000 ohms, ⅓ W	4959
R10	10,000 ohms, ½ W	19309-73
R11	50,000 ohms, ⅓ W	4960
R12	24,000 ohms, 2 W	19304-202
R13	50,000 ohms, ⅓ W	4960
R14	12,000 ohms, 2 W	19304-44
R15	2,000 ohms, ½ W	19301-206
R16	10,000 ohms, ½ W	19309-73
R17	24 ohms, ½ W	19301-178
R18	51 ohms, ½ W	19301-187
R19	300 ohms, ½ W	19301-196
R20	2,000 ohms, ½ W	19301-206
R21	2,000 ohms, ½ W	19301-206
R22	2,000 ohms, ½ W	19301-206
R23	10,000 ohms, ½ W	19309-73
R24	2,000 ohms, ½ W	19301-206
R25	2,000 ohms, ½ W	19301-206
R26	10,000 ohms, ½ W	19309-73
R27	51,000 ohms, 1 W	19303-182
R28	2,000 ohms, ½ W	19301-206
R29	100,000 ohms, ½ W	19301-80
R30	75,000 ohms, ½ W	19301-215
R31	51,000 ohms, ½ W	19301-171
R32	1 Megohm, ½ W	19301-104
R33	240,000 ohms, ½ W	19301-155
R34	4 ohms, 5 W	19431-1
R35	100,000 ohms, ½ W	19301-80
R36	510,000 ohms, ½ W	19309-159
R37	5,100 ohms, ½ W	19301-210
R38	51,000 ohms, ½ W	19301-171
R39	51,000 ohms, 1 W	19303-182
R40	1,000 ohms, Potentiometer	4932
R41	2,000 ohms, ½ W	19301-206
R42	24,000 ohms, ½ W	19301-213
R43	10,000 ohms, ½ W	19309-73
R44	1 Megohm, ½ W	19301-104
R45	2 Megohm, ½ W	19301-169
R46	50,000 ohms, Potentiometer	5023
R47	4 ohms, 5 W	19431-1
R48	250,000 ohms, Potentiometer	4919
R49	510,000 ohms, ½ W	19309-159
R50	300 ohms, ½ W	19301-196
R51	1,800 ohms, ½ W	19301-38
R52	3,000 ohms, 1 W	19303-169
R53	51,000 ohms, 1 W	19303-182
R54	510,000 ohms, ½ W	19309-159
R55	750 ohms, 10 W	19430-30
	SWITCHES	
S1	10 pole, 5 position, 5 section	
S2	Wafer type, 6 position	4911
S3	SPST rotary snap	4916
S4	DPST rotary snap	5733
S5	DPST toggle	2990
S6	SPST rotary snap	5729
S7	DPST toggle	2983-1
	TRANSFORMERS	
T1	Filter Assembly, Variable selectivity quartz crystal filter	29555-G1
T2	Variable selectivity I.F. transformer	SA-166A
T3	Same as T2	SA-166A
T4	Fixed selectivity, I.F. transformer	SA-167A
T5	455 kc oscillator assembly	SA-169A
T6	Fixed selectivity, I.F. transformer	SA-168A
T7	A.F. transformer, push-pull input	4887
T8	A.F. transformer, push-pull output	4888
W1	Connector Cable, Nine wire, with two 10 terminal connector strips	SA-35
W2	Connector Cable, Eight wire, with one 10 terminal connector strip (special order only)	SA-67
X1-X4	Tube Socket, Molded octal, low-loss bakelite	16082-1
X5 X16	Tube Socket, Molded octal, black bakelite	16083-1
Y1	Quartz Crystal, Resonator type, ground for 455 kc	6338

POWER SUPPLY

Circuit Ref. No.	Description	Part No.
	CAPACITORS	
C1	Paper 1 mf, 1000 VDCW	23843-4
C2	16 mf, 600 VDCW Dry Electrolytic	23842-13
C3-A-B-C	8-8-8 mf, 450 VDCW Dry Electrolytic	23842-28
C4-A-B-C	8-8-8 mf, 450 VDCW Dry Electrolytic	23842-28
E3	Fuse Holder	15923-1
F1	Fuse, 2 amp. 250V, glass enclosed	15928-7
L1	Filter Choke, 160 ohms, 25h at 160 ma.	2981
L2	Filter Choke, 1150 ohms, 50h at 110 ma.	4819
	RESISTORS	
R1	18,000 ohms tapped at 9500, 10 watt	4946
R1A	8500 ohms Part of R1	
R1B	9500 ohms Part of R1	
R2	18,000 ohms tapped at 6500, 6500, 10 watt	3997
R2A	5000 ohms Part of R2	
R2B	6500 ohms Part of R2	
R2C	6500 ohms Part of R2	
	TRANSFORMER	
T1	50-60 cycle, primary tapped at 105, 115, 125V	4801

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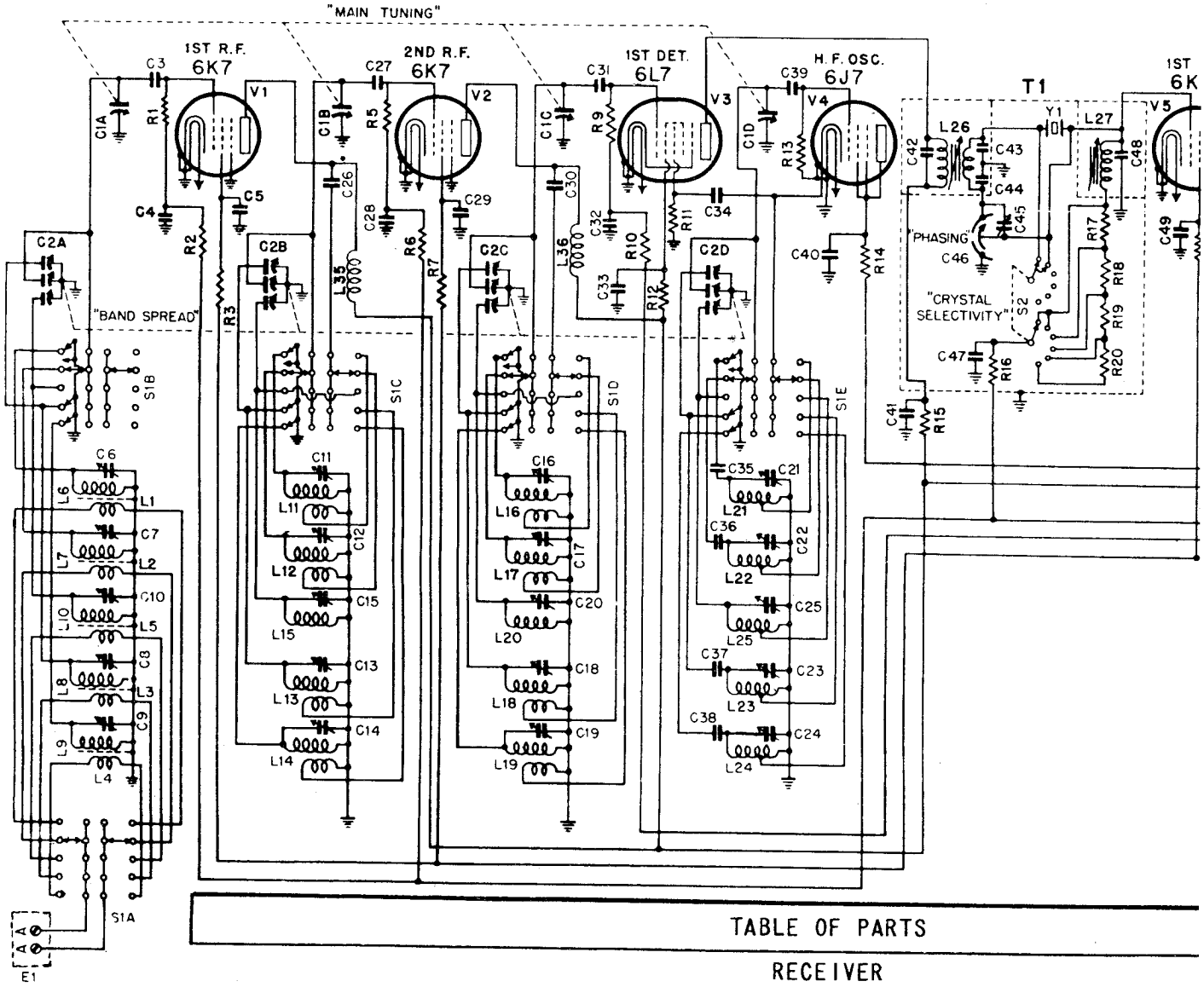

TABLE OF PARTS

RECEIVER

CIRCUIT REF.NO.	DESCRIPTION	PART NO.
	CAPACITORS	
C1	Main Tuning	
C2	Band Spread	
C3	620 mmf,Mica	23005-86
C4	.02 mf, Paper	23912-1
C5	.05 mf, Paper	23912-2
C6	Trimmer,Mica,3-30 mmf	Part of SA-110
C7	Trimmer,Mica,3-30 mmf	Part of SA-113
C8	Trimmer,Mica,3-30 mmf	Part of SA-116
C9	Trimmer,Mica,3-30 mmf	Part of SA-136
C10	Trimmer,Air,4-36 mmf	Part of SA-130
C11	Trimmer,Mica,3-30 mmf	Part of SA-111
C12	Trimmer,Mica,3-30 mmf	Part of SA-114
C13	Trimmer,Mica,3-30 mmf	Part of SA-117
C14	Trimmer,Mica,3-30 mmf	Part of SA-137
C15	Trimmer,Air,4-16 mmf	Part of SA-131
C16	Trimmer,Mica,3-30 mmf	Part of SA-111
C17	Trimmer,Mica,3-30 mmf	Part of SA-114
C18	Trimmer,Mica,3-30 mmf	Part of SA-117
C19	Trimmer,Mica,3-30 mmf	Part of SA-137
C20	Trimmer,Air,4-16 mmf	Part of SA-131
C21	Trimmer,Air,4-28 mmf	Part of SA-112
C22	Trimmer,Air,4-28 mmf	Part of SA-115
C23	Trimmer,Air,4-28 mmf	Part of SA-118
C24	Trimmer,Air,4-28 mmf	Part of SA-138
C25	Trimmer,Air,4-25 mmf	Part of SA-132
C26	300 mmf, Silver Mica	23003-105D
C27	620 mmf, Mica	23005-86
C28	.02 mf, Paper	23912-1
C29	.05 mf, Paper	23912-2
C30	300 mmf, Silver Mica	23003-105D
C31	620 mmf, Mica	23005-86
C32	.02 mf, Paper	23912-1
C33	.05 mf, Paper	23912-2
C34	95 mmf, Silver Mica	6195
C35	4800 mmf, "Toothpick"	Part of SA 112
C36	2400 mmf, "Toothpick"	Part of SA 115

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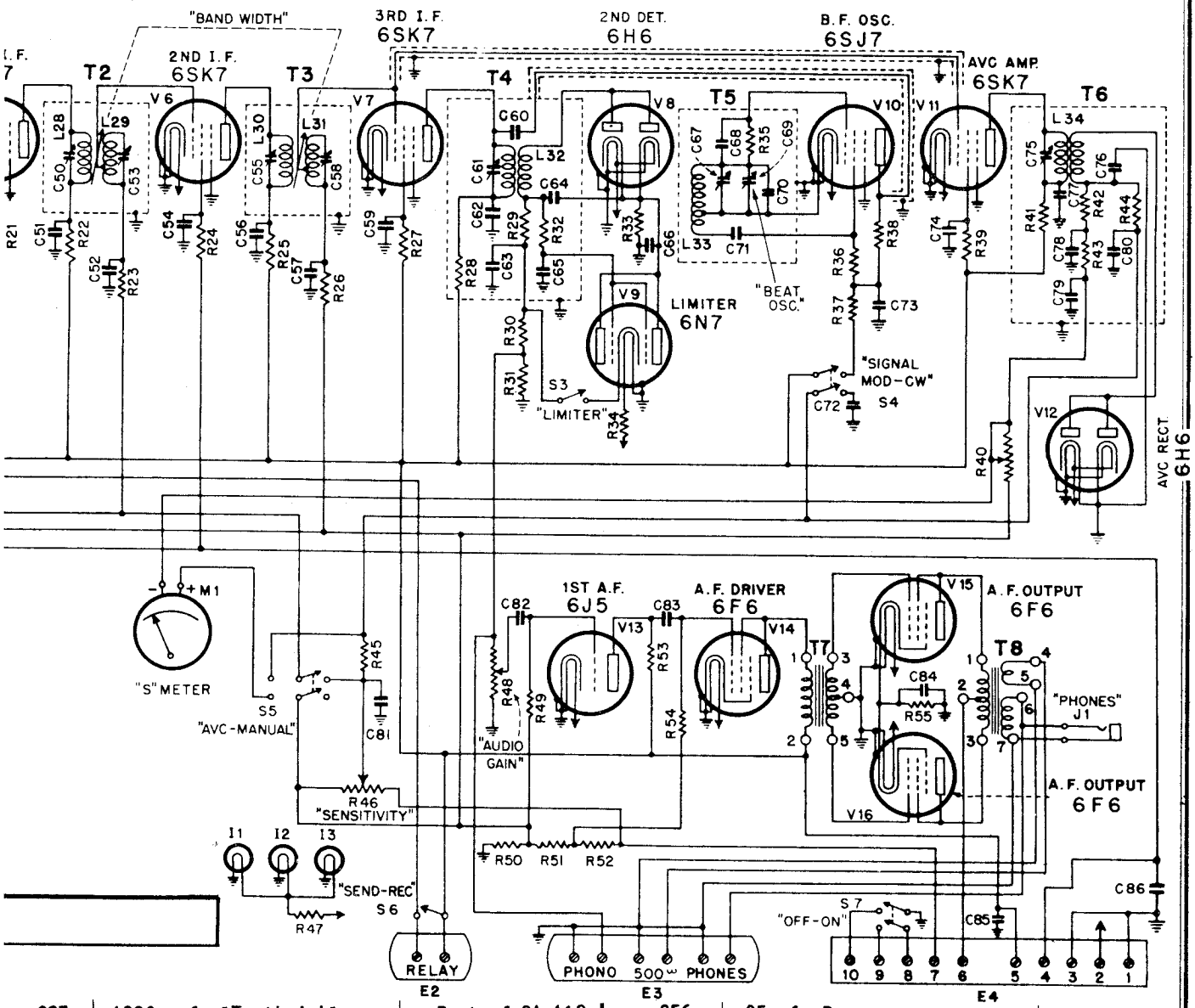
MODEL SP-400-SX



C37	1220 mmf, "Toothpick"	Part of SA 118
C38	522 mmf, Silver Mica	Part of SA 138
C39	51 mmf, Silver Mica	23003-50
C40	.05 mf, Paper	23912-2
C41	.05 mf, Paper	23912-2
C42	120 mmf, Silver Mica	23003-96
C43	100 mmf, Mica	23001-48
C44	100 mmf, Mica	23001-48
C45	Trimmer,Mica,1.5-5 mmf	6189
C46	Phasing,Air,2-6 mmf (ea.)	SA-179
C47	.02 mf, Paper	23912-1
C48	85 mmf,Silver Mica ±2%	6180
C49	.05 mf, Paper	23912-2
C50	Variable,Air,100 mmf	SA-1
C51	.05 mf, Paper	23912-2
C52	.05 mf, Paper	23912-2
C53	Variable,Air,100 mmf	SA-1
C54	.05 mf, Paper	23912-2
C55	Variable,Air,100 mmf	SA-1
C56	.05 mf, Paper	23912-2
C57	.05 mf, Paper	23912-2
C58	Variable,Air,100 mmf	SA-1
C59	.05 mf, Paper	23912-2
C60	5 mmf, Silver Mica	23003-75
C61	Variable,Air,100 mmf	SA-1
C62	.05 mf, Paper	23912-2
C63	51 mmf, Mica	23001-59
C64	51 mmf, Mica	23001-59
C65	.05 mf, Paper	23912-2
C66	51 mmf, Mica	23001-59
C67	Variable,Air,100 mmf	SA-197
C68	100 mmf, Mica	23001-48
C69	Variable,Air,9 mmf	SA-170
C70	95 mmf, Silver Mica	6195
C71	620 mmf, Mica	23005-86
C72	.25 mf, Paper	23912-38
C73	.05 mf, Paper	23912-2
C74	.05 mf, Paper	23912-2
C75	Variable,Air,100 mmf	SA-1

For Circuit description, installation, and other notes, see Pp.15-16 to 15-21

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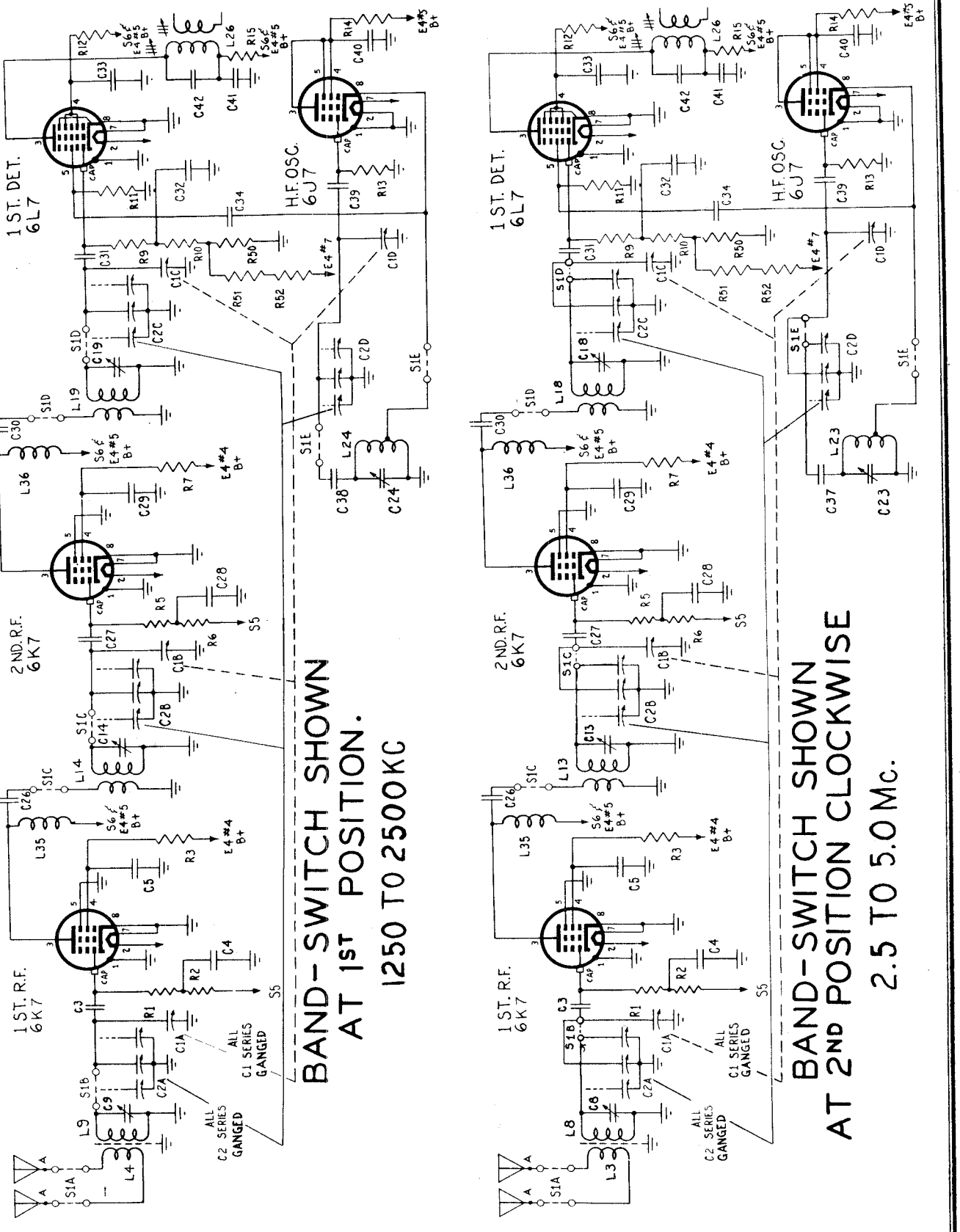
1ST. R.F. 6K7
2ND. R.F. 6K7
1ST. DET. 6L7
H.F. OSC. 6J7
ALL C1 SERIES GANGED
ALL C2 SERIES GANGED
BAND-SWITCH SHOWN AT 1ST POSITION. 1250 TO 2500 KC
BAND-SWITCH SHOWN AT 2ND POSITION CLOCKWISE 2.5 TO 5.0 Mc.

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MODEL SP-400-SX

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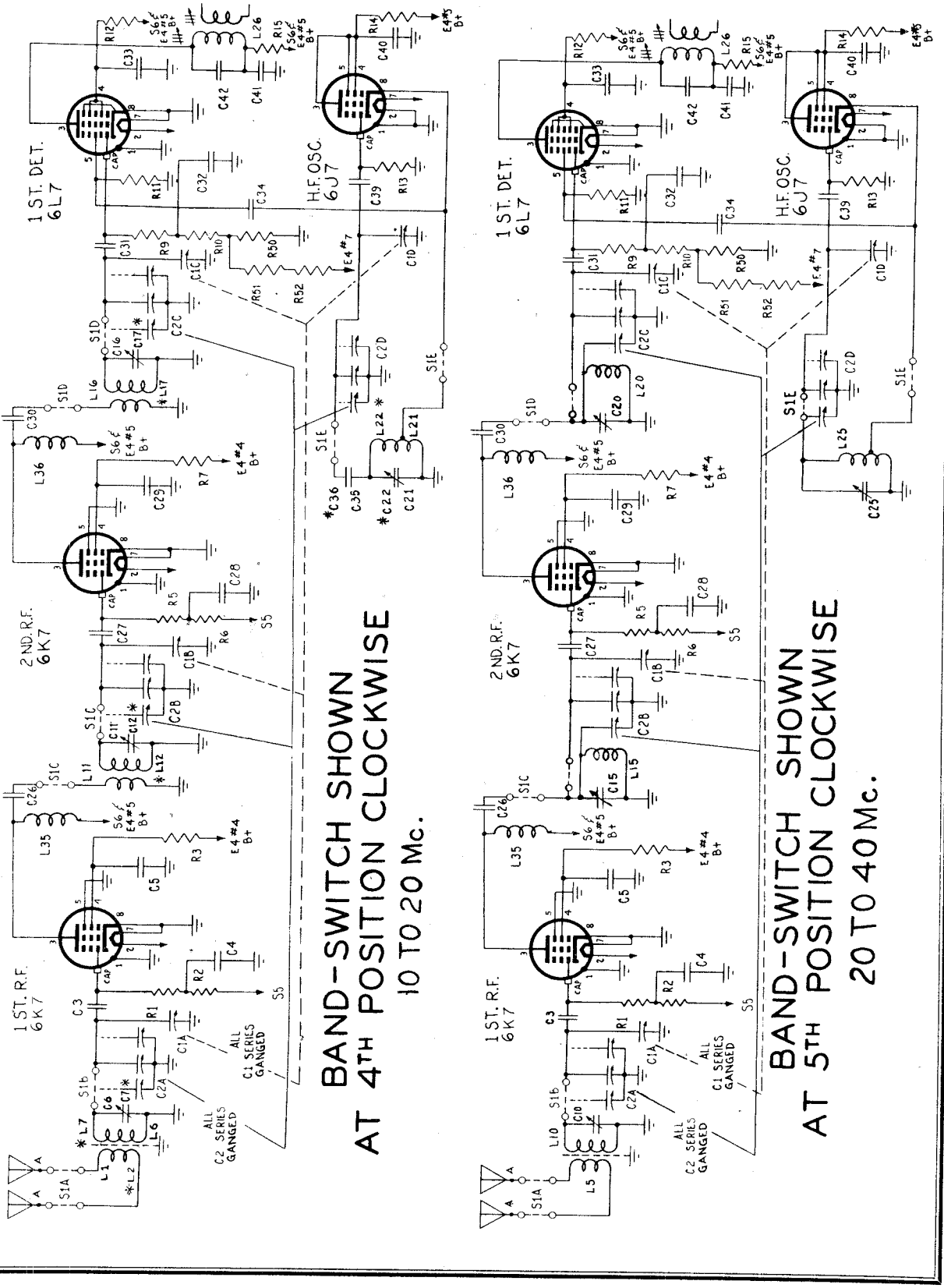
BAND-SWITCH SHOWN
AT 4TH POSITION CLOCKWISE
10 TO 20 Mc.
BAND-SWITCH SHOWN
AT 5TH POSITION CLOCKWISE
20 TO 40 Mc.
1 ST. R.F. 6K7
2 ND. R.F. 6K7
1 ST. DET. 6L7
H.F. OSC. 6J7
ALL C1 SERIES GANGED
ALL C2 SERIES GANGED
BAND-SWITCH SHOWN
AT 3rd POSITION CLOCKWISE
5 to 10 MC
* STARS SHOW CHANGES IN PARTS DESIGNATIONS FOR 3rd POSITION - OTHERWISE
SCHEMATIC REMAINS THE SAME AS 4th POSITION.

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ALIGNMENT - GENERAL

When either selectivity or sensitivity or both appear to be below normal and *all tubes have been tested,* check the alignment. Remove the cabinet or dust cover and bottom cover plate of the Receiver to get at all parts for making adjustments. CAUTION: ANY CHANGES FROM ORIGINAL SETTINGS WILL BE SMALL SO USE GREAT CARE WHEN CHECKING ADJUSTMENTS. This is especially true of the H-F oscillator circuits, which should NOT be disturbed unless the MAIN TUNING dial is definitely known to be off calibration.

a. *Signal Generator* - This should be an accuretely calibrated instrument producing amplitude-modulated radio-frequency signals. In addition to 465 kc (the I.F.), the frequency range required of the signal generator depends on the tuning range of the receiver to be aligned. The R-F alignment frequencies required for the Series 400-SX Super-Pro are shown in Fig. 13. The second harmonic can generally be used when the fundamental frequency is not available. For example: a signal generator covering all frequencies from 465 kc to 20 mc could be used to check the highest frequency band by using the second harmonic of 20 mc to provide the 40 mc called for in Fig. 13. The signal generator should have an output of approximately 100 microvolts and an output impedance of approximately 100 ohms for best results when aligning the R-F and H-F-Oscillator circuits. For I-F alignment these values are not critical. The frequency calibration of the signal generator is extremely important *if* the Receiver dial calibration is to be correct.

b. *Output Meter* - The output meter should respond to the modulation frequency of the signal generator, preferably 400 cps, and should provide at least half-scale deflection for 10 volts. Its resistance should be greater than 500 ohms.

c. *Tools* - An insulated screwdriver 9/64" wide and .025" thick at the bit, is required for alignment of the Receiver.

d. *Preliminary Procedure* - Throw the OFF-ON switch to ON and let the Receiver warm up for about an hour before beginning adjustments. Connect the output meter to the 500-ohm terminals located at the rear of the Receiver chassis.

ALIGNMENT PROCEDURE

a. *Preliminary Setup* - Adjust the signal generator to approximately 465 kc and connect its output to the control grid cap of the 1st detector tube (V3) through a fixed capacitor (anything larger than 100 mmf will do). Set the front panel controls as follows:

SENSITIVITY	0
AVC-MANUAL	MANUAL
SIGNAL-MOD-CW	MOD
SEND-REC	REC
BAND SWITCH	2.5-5.0 mc
AUDIO GAIN	10
CRYSTAL SELECTIVITY	OFF
PHASING	on arrow
BAND WIDTH	3
BAND SPREAD DIAL	100

b. *I-F Alignment Check* -

(1) Set the MAIN TUNING dial near 2.5 mc, but be careful not to tune in a powerful local signal. Set the CRYSTAL SELECTIVITY switch on 3, the AVC-MANUAL switch on AVC, and advance the SENSITIVITY to 10. Turn off the modulation of the signal generator and adjust its frequency slightly to produce maximum deflection of the "S" meter. The adjustment of the signal generator in this manner is necessary in order to get exact agreement with the natural period of the particular quartz crystal in the Receiver being checked. After reducing SENSITIVITY to 0, the modulation may be switched on, but the tuning adjustment of the signal generator must not be altered until the alignment check has been completed. Return the CRYSTAL SELECTIVITY and AVC-MANUAL controls to their original settings of OFF and advance the SENSITIVITY control until a suitable output meter reading is obtained. A half-scale reading in the region of 5 to 10 volts will be satisfactory.

(2) Now check the alignment of both upper (grid) and lower (plate) air trimmer capacitors in I-F transformers T2 and T3 and the single trimmer in T4 for peak reading of the output meter. If one or more of these adjustments results in a sizeable increase in output, reduce the SENSITIVITY control enough to bring the meter reading back to half-scale. Alignment of the plate circuit of the crystal filter (T1) can be tested in the same way by means of the lower adjusting screw on the side of the unit. This screw varies the position of the powdered iron core in coil L26. Do not change the setting of the upper adjusting screw which tunes grid coil L27, as this circuit cannot be adjusted properly with the output meter. It can, however, be aligned by the "visual" method using a frequency-modulated signal generator and cathode-ray oscilloscope. If this equipment is available, proceed as follows:

(3) Connect the input of the vertical amplifier of the oscilloscope to the PHONO connections on terminal strip E3 (Fig. 6) on the rear skirt of the Receiver chassis. The "high" terminal is the second one from the edge of the strip; the first screw is connected to the chassis. Set the frequency-modulated signal generator to approximately 465 kc and connect its output to the control grid cap of the 1st detector (V3) through a fixed capacitor (100 mmf or larger). With the CRYSTAL SELECTIVITY switch at OFF, readjust the signal generator frequency to produce the conventional single-peaked resonance curve on the screen of the oscilloscope. Then turn the CRYSTAL SELECTIVITY switch to position 1. If the grid coil (L27) is correctly tuned the image on the oscilloscope screen will remain symmetrical but will be only about two-thirds as wide as before, indicating an increase in selectivity. The oscilloscope image is also affected by the PHASING control, maximum symmetry occurring at or very near the arrow on its scale. Therefore, when tuning L27, rock the PHASING control back and forth at the same time to secure the best adjustment.

c. *AVC Alignment Check* - Leaving all other controls as in PAR. 26a, and without changing the signal generator frequency, reduce AUDIO GAIN to 0, switch to AVC and increase SENSITIVITY to 10. Increase AUDIO GAIN to restore half-scale reading on the output meter and adjust the single trimmer capacitor in T6 for *minimum* output meter reading. The "S" meter reading should "peak" at the same time the output meter reading "dips".

d. *Beat Oscillator Alignment Check* - Continuing with controls as above (PAR. 26c), switch off the output meter and plug in a pair of earphones, or replace the meter with a suitable loudspeaker. Turn the SIGNAL-MOD-CW switch to CW and see that the BEAT OSCILLATOR control is exactly on 0 (zero). If tone in earphones or speaker is not very low in pitch, readjust the trimmer capacitor near the bottom of T5 until it is. If the beat oscillator is in perfect alignment when this test is made, no sound will be heard since the signal generator and the beat oscillator will be oscillating at the same frequency and there will be no audible difference of "beat". Check this by turning the BEAT OSCILLATOR control knob slightly off 0 (zero) toward one side or the other. If this results in a tone rising in pitch as the pointer is turned away from 0 (zero) to either side, the beat frequency oscillator is perfectly aligned. If no audible tone can be obtained within the range of the BEAT OSCILLATOR control, adjust the trimmer capacitor near the bottom of T5 until an approximate "zero beat" occurs at 0 (zero) setting of the BEAT OSCILLATOR control.

e. *H-F Oscillator Calibration Check* - The accuracy of the MAIN DIAL calibration depends solely on the H-F oscillator frequency, which in this Receiver is 465 kc (the IF) *higher* than the signal frequency except in the 20-40 mc band, where the H-F oscillator is 465 kc lower than the signal frequency. Although the frequency of the H-F oscillator can be measured directly if accurate frequency-measuring equipment is on hand, it is far simpler to check it by tuning in signals of known frequency and noting the MAIN DIAL readings. CAUTION: BE SURE THE BAND SPREAD DIAL IS SET AT 100 WHEN MAKING THIS TEST.

(1) To correct dial calibration, refer to alignment chart (Fig. 13) for location of H-F oscillator adjustments as well as signal frequencies at which settings should be made. If the 2.5-5.0 mc band is to be corrected, the signal generator may be set accurately to 2.5 mc and its second harmonic (if strong enough) used for the 5.0 mc end of the band. The output of the signal generator should be unmodulated and SIGNAL-MOD-CW switch on Receiver turned to CW. Set BEAT OSCILLATOR at 0, AUDIO GAIN at 10, AVC-MANUAL on MANUAL, BAND WIDTH at 16. Disconnect output meter and use earphones or loudspeaker to make necessary adjustments by "zero beat" method. Connect signal generator to antenna terminals for this test.

(2) Tune in second harmonic at 5.0 mc end of dial to zero beat. Notice approximate dial error. Turn main dial slightly toward 5.0 mc calibration line until beat note rises to a high pitch. Do not turn dial far enough to

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raise beat so high it cannot be heard. With alignment screwdriver adjust trimmer capacitor marked HF OSC 5.0 mc (Fig. 13) until beat is again zero. Turn main dial still farther toward 5.0 mc line and make a further adjustment of trimmer capacitor to return to zero beat. Repeat this process as often as necessary to bring dial to exactly 5.0 mc. (The main dial could be set at once on exactly 5.0 mc and trimmer turned enough at one time to produce zero beat, but the step-by-step method is recommended.) Now tune in 2.5 mc fundamental at low-frequency end of main dial and correct the calibration step-by-step as before, using inductance trimming adjustment HF OSC 2.5 mc (Fig. 13). When second harmonic is again tuned in at other end of dial, it will be found that inductance adjustment at 2.5 mc has changed correction previously made at 5.0 mc. This is normal. Go back and forth several times from 2.5 to 5.0 mc in order to bring both ends of dial scale into exact agreement with the signal frequency. CAUTION: DURING THIS ADJUSTMENT BE VERY CAREFUL TO ADJUST THE SENSITIVITY CONTROL TO AVOID OVERLOADING.

f. *R-F and 1st Detector Alignment Check* - Although alignment of these three circuits (1st and 2nd RF and 1st Det) can be checked at the same time as the H-F oscillator, it is simpler to consider each check as a separate operation. Efficient weak-signal reception, with low receiver noise level and high image rejection ratios, depends on the relative alignment of these three circuits with respect to the H-F oscillator and without regard to calibration accuracy.

(1) Accurate calibration of the signal generator is not required to check these adjustments. Modulation of the signal generator, while convenient, is not strictly necessary. Input to antenna terminals should be through 100 ohms (approximate) including output resistance of signal generator. If signal generator is modulated, Receiver controls should be set as for I-F alignment; if unmodulated, set BEAT OSCILLATOR to 2 (either side) and SIGNAL-MOD-CW to CW. Adjust SENSITIVITY for half-scale reading on output meter when signals are exactly in tune.

(2) Starting with 2.5-5.0 mc band, set main dial at 5.0 mc (BAND SPREAD at 100) and adjust frequency of signal generator for peak deflection of output meter. Then check setting of trimmer marked 1st DET 5.0 mc (Fig. 13). Repeat this procedure on trimmers designated as 2nd RF and 1st RF in same row. If readjustments on one of these settings greatly increases output meter reading, alter SENSITIVITY slightly to reduce reading to half-scale. After each adjustment check tuning of Receiver to make sure test signal is still accurately tuned. BAND SPREAD may be used as a vernier for this purpose. CAUTION: THIS TUNING CHECK IS EXTREMELY IMPORTANT AT HIGH END OF 10-20 MC AND 20-40 MC BANDS WHERE THERE IS SOME SLIGHT INTERACTION BETWEEN 1ST DET AND H-F OSC CIRCUITS. After checking the three trimmers at high end of this band, turn main dial to 2.5 mc and retune signal generator to suit. Then check the three inductance adjuster settings marked 2.5 mc (Fig. 13) in the same row. Since adjustments at one end of a band also affect the other end of the band (as described under H-F OSC alignment), repeat above procedure until no further improvement can be secured. The number of repetitions necessary depends on how much mistuning existed initially. Other bands may be checked in the same manner.

(3) For best possible efficiency with a particular antenna arrangement, the 1st RF circuits may be adjusted with the antenna connected. This can be done by loosely coupling output of signal generator to antenna system instead of directly to antenna terminals through a 100-ohm resistor. Make sure that signal from signal generator actually reaches Receiver by way of antenna rather than by some form of direct coupling.

(4) In all the foregoing tests using output meter readings for circuit adjustment it is recommended that earphones (or speaker) be used to monitor the signal. This will avoid false adjustments caused by overloading or freakish responses.

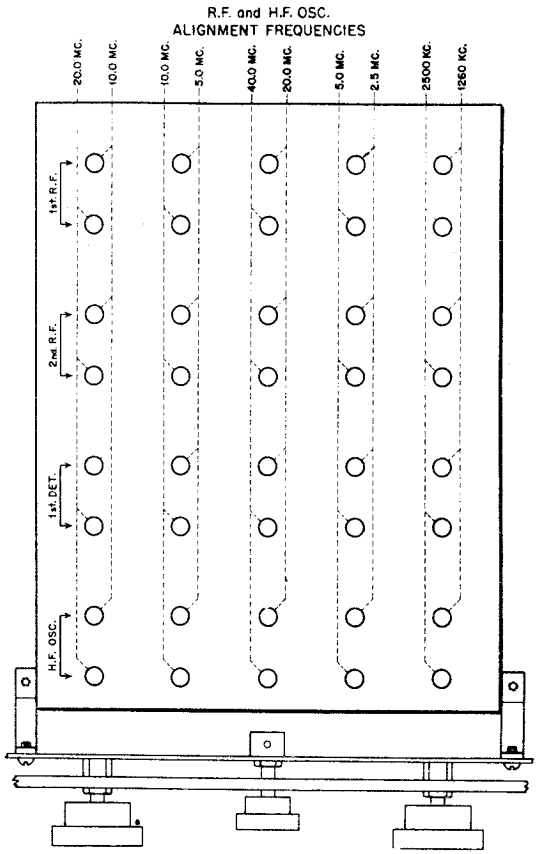

Fig. 13. ALIGNMENT CHART. Shows location of screwdriver adjustments and corresponding test frequencies.

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CIRCUIT REF NO.	DESCRIPTION	PART NO.
C76	5100 mmf, Mica	23015-16
C77	.05 mf, Paper	23912-2
C78	.05 mf, Paper	23912-2
C79	.05 mf, Paper	23912-2
C80	.05 mf, Paper	23912-2
C81	.05 mf, Paper	23912-2
C82	.02 mf, Paper	23912-1
C83	.05 mf, Paper	23912-2
C84	40 mf,Electrolytic,Dry	6171
C85	.25 mf, Paper	23912-38
C86	.25 mf, Paper	23912-38
	JACK	
J1	JK-34-A,Phone Jack (Headset)	5066
	COILS	
L1	Coil Assem.,Antenna Primary, 10-20 mc	SA-46
L2	Coil Assem.,Antenna Primary, 5-10 mc	SA-47
L3	Coil Assem.,Antenna Primary, 2.5-5 mc	SA-48
L4	Coil Assem.,Antenna Primary, 1250-2500 kc	SA-49
L5	Coil Assem.,Antenna Primary, 20-40 mc	SA-46
L6	Coil Assem.,Grid Coil, 10-20 mc	SA-110
L7	Coil Assem.,Grid Coil 5-10 mc	SA-113
L8	Coil Assem.,Grid Coil, 2.5-5 mc	SA-116
L9	Coil Assem.,Grid Coil, 1250-2500 kc	SA-136
L10	Coil Assem.,Grid Coil, 20-40 mc	SA-130
L11	Coil Assem.,R.F. Transformer, 10-20 mc	SA-111
L12	Coil Assem.,R.F. Transformer, 5-10 mc	SA-114
L13	Coil Assem.,R.F. Transformer, 2.5-5 mc	SA-117
L14	Coil Assem.,R.F. Transformer, 1250-2500 kc	SA-137
L15	Coil Assem.,R.F. Transformer, 20-40 mc	SA-131
L16	Coil Assem., Same as L11	SA-111
L17	Coil Assem., Same as L12	SA-114
L18	Coil Assem., Same as L13	SA-117
L19	Coil Assem., Same as L14	SA-137
L20	Coil Assem., Same as L15	SA-131
L21	Coil Assem.,Oscillator Coil, 10-20 mc	SA-112
L22	Coil Assem.,Oscillator Coil, 5-10 mc	SA-115
L23	Coil Assem.,Oscillator Coil, 2.5-5 mc	SA-118
L24	Coil Assem.,Oscillator Coil, 1250-2500 kc	SA-138
L25	Coil Assem.,Oscillator Coil, 20-40 mc	SA-132
L26	Coil,Universal,7/41 Litz., Iron dust core	4146
L27	Coil,Universal,7/41 Litz., Iron dust core	6147
L28	Coil,3 pie universal,7/41 Litz.,ceramic core	2903-A
L29	Coil,3 pie universal,7/41 Litz.,ceramic core	3990
L30	Coil, Same as L28	2903-A
L31	Coil, Same as L29	3990
L32	Coil,Universal,7/41 Litz., ceramic core	4907
L33	Coil,3 pie universal,7/41 Litz.,ceramic core	2931
L34	Coil,Universal,7/41 Litz., ceramic core	4906
L35	Choke coil,5 pie universal R.F. Choke,ceramic core, wire leads	609-1
L36	Choke Coil, Same as L35	609-1

CIRCUIT REF.NO.	DESCRIPTION	PART NO.
	METERS	
M1	Meter,0-200 micro-ampere movement	4903
	RESISTORS	
R1	500,000 ohms, 1/3 W	4959
R2	10,000 ohms, 1/2 W	19309-73
R3	2,000 ohms, 1/2 W	19301-206
R4	Not used	
R5	500,000 ohms, 1/3 W	4959
R6	10,000 ohms, 1/2 W	19309-73
R7	2,000 ohms, 1/2 W	19301-206
R8	Not used	
R9	500,000 ohms, 1/3 W	4959
R10	10,000 ohms, 1/2 W	19309-73
R11	50,000 ohms, 1/3 W	4960
R12	25,000 ohms, 2 W	19304-202
R13	50,000 ohms, 1/3 W	4960
R14	12,000 ohms, 2 W	19304-44
R15	2,000 ohms, 1/2 W	19301-206
R16	10,000 ohms, 1/2 W	19309-73
R17	25 ohms, 1/2 W	19301-178
R18	51 ohms, 1/2 W	19301-187
R19	300 ohms, 1/2 W	19301-196
R20	2,000 ohms, 1/2 W	19301-206
R21	2,000 ohms, 1/2 W	19301-206
R22	2,000 ohms, 1/2 W	19301-206
R23	10,000 ohms, 1/2 W	19309-73
R24	2,000 ohms, 1/2 W	19301-206
R25	2,000 ohms, 1/2 W	19301-206
R26	10,000 ohms, 1/2 W	19309-73
R27	51,000 ohms, 1 W	19303-182
R28	2,000 ohms, 1/2 W	19301-206
R29	100,000 ohms, 1/2 W	19301-80
R30	75,000 ohms, 1/2 W	19301-215
R31	51,000 ohms, 1/2 W	19301-171
R32	1 megohm, 1/2 W	19301-104
R33	240,000 ohms, 1/2 W	19301-155
R34	4 ohms, 5 W	19431-1
R35	100,000 ohms, 1/2 W	19301-80
R36	510,000 ohms, 1/2 W	19309-159
R37	5,100 ohms, 1/2 W	19301-210
R38	51,000 ohms, 1/2 W	19301-171
R39	51,000 ohms, 1 W	19303-182
R40	1,000 ohms,Potentiometer	4932
R41	2,000 ohms, 1/2 W	19301-206
R42	25,000 ohms, 1/2 W	19301-213
R43	10,000 ohms, 1/2 W	19309-73
R44	1 megohm, 1/2 W	19301-104
R45	2 megohms, 1/2 W	19301-169
R46	50,000 ohms,Potentiometer	5023
R47	4 ohms, 5 W	19431-1
R48	250,000 ohms,Potentiometer	4919
R49	510,000 ohms, 1/2 W	19309-159
R50	300 ohms, 1/2 W	19301-196
R51	1,800 ohms, 1/2 W	19301-38
R52	3,000 ohms, 1 W	19303-169
R53	51,000 ohms, 1W	19303-182
R54	510,000 ohms, 1/2 W	19309-159
R55	750 ohms, 10 W	19430-30
	SWITCHES	
S1	10 pole,5 position,5 section	
S2	Wafer type,six position	4911
S3	SPST Rotary Snap	4916
S4	SPST Rotary Snap	5733
S5	DPDT Toggle	2990
S6	SPST Rotary Snap	5729
S7	DPST Toggle	2983-1
	FILTER	
T1	Assem.,Variable selectivity quartz crystal filter	SA-178A
	TRANSFORMERS	
T2	Variable selectivity,I.F.	SA-166A
T3	Same as T2	SA-166A
T4	Fixed selectivity,I.F.	SA-167A
T5	455 kc oscillator assem.	SA-169A
T6	Fixed selectivity,I.F.	SA-168A
T7	A.F. push-pull input	4887
T8	A.F. push-pull output	4888

CIRCUIT REF.NO.	DESCRIPTION	PART NO.
	TUBES	
V1,V2,V5	6K7	16244-1
V3	6L7	16212-1
V4	6J7	16220-1
V6,V7,V11	6SK7	16245-1
V8,V12	6H6	16202-1
V9	6N7	16246-1
V10	6SJ7	16236-1
V13	6J5	16209-1
V14,V15,V16	6F6	16239-1
	CABLES	
W1	Connector,nine wire, with two 10 terminal connector strips.	SA-35
W2	Connector,eight wire, with one 10 terminal connector strip (special order only)	SA-67
	SOCKETS	
X1-X4	Tube socket,molded octal,low loss bakelite.	16082-1
X5-X16	Molded octal,black bakelite	16083-1
	QUARTZ CRYSTAL	
Y1	Resonator type, ground for 465 kc	4944
	POWER SUPPLY	
	CAPACITORS	
C1	Paper 1 mf, 1000 VDCW	23843-4
C2	16 mf,600 VDCW, Dry Electrolytic	23842-13
C3-A-B-C	8-8-8 mf, 450 VDCW Dry Electrolytic	23842-28
C4-A-B-C	8-8-8 mf, 450 VDCW Dry Electrolytic	23842-28
E3	FUSE HOLDER	15923-1
F1	FUSE 2 amp 250V, glass enclosed	15928-7
	CHOKES	
L1	Filter,350 ohms,25h at 160 ma	2981
L2	Filter,1150 ohms,50h at 100 ma	4819
	RESISTORS	
R1	18,000 ohms tapped at 9500, 10 W	4946
R1A	8500 ohms	Part of R1
R1B	9500 ohms	Part of R1
R2	18,000 ohms tapped at 6500, 6500, 10 W	3997
R2A	5000 ohms	Part of R2
R2B	6500 ohms	Part of R2
R2C	6500 ohms	Part of R2
T1	TRANSFORMER, 50-60 cycle, primary tapped at 105, 115, 125 V	4801
	TUBES	
V1	5U4G	16215-1
V2	5Y3GT/G	16252-1
W1	CABLE, Power	6143
X1,X2	TUBE SOCKET, Molded octal, black bakelite	16083-1

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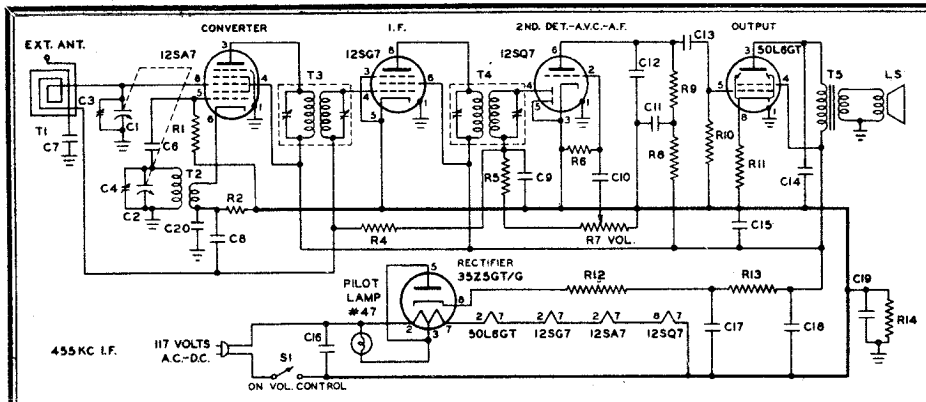

SYMBOL	DESCRIPTION	HOFFMAN NO.
C1-C2	Two-Section Variable (388-180 Mmf.)	4401
C3, C4	Trimmers; Part of Variable Cond.	
C6	100 Mmf. ±20%, Mica	4000
C7, C10, C13	.005 Mfd., 600 Volt, Tubular Paper	4102
C8, C11, C15	.05 Mfd., 200 Volt, Tubular Paper	4100
C9, C12	270 Mmf. ±20%, Mica	4001
C14	.02 Mfd., 400 Volt, Tubular Paper	4106
C16	.01 Mfd., 600 Volt, Tubular Paper	4103
C17-C18	Dry Electrolytic (30-50 Mfd/150V)	4201
C19, C20	.1 Mfd, 200 Volt, Tubular Paper	4111
LS	5" PM Loudspeaker	9003
R1	22,000 Ohm ±20%, ½ Watt	4501
R2	68 Ohm ±20%, ½ Watt	4524
R4	2.2 Megohm ±20%, ½ Watt	4502
R5	47,000 Ohm ±20%, ½ Watt	4504
R6	10 Megohm ±20%, ½ Watt	4505
R7	.5 Megohm Pot. with Switch (Volume)	4802
R8	.1 Megohm ±20%, ½ Watt	4511
R9	.22 Megohm ±20%, ½ Watt	4500
R10, R14	.47 Megohm ±20%, ½ Watt	4506
R11	150 Ohm ±20%, ½ Watt	4510
R12	47 Ohm, ±20%, ½ Watt	4508
R13	500 Ohm ±10%, 5 Watt, W.W.	4700
S1	On-Off Switch (On Volume Control)	
T1	Antenna Loop	5207
T2	Oscillator Coil	5208
T3	Input I.F. Transformer (455 K.C.)	5205
T4	Output I.F. Transformer (455 K.C.)	5206
T5	Audio Output Transformer	5101

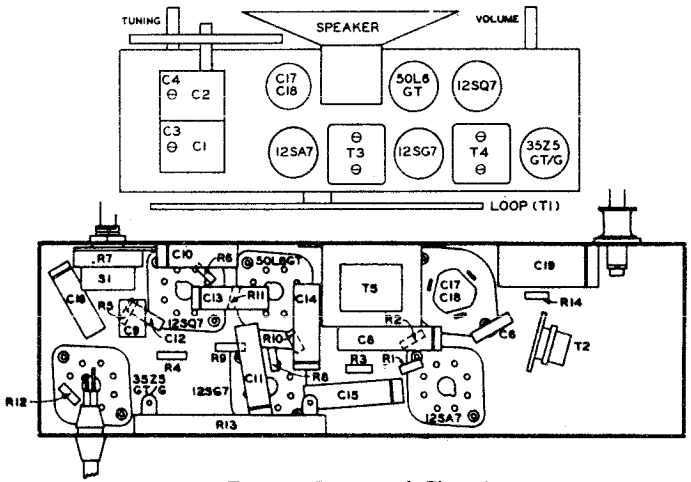

Fig. 2 Bottom of Chassis

NORMAL OPERATING CURRENTS

35Z5	Cathode Current	57 Ma.
50L6	Cathode Current	33 Ma.

NORMAL OPERATING VOLTAGES

The following table lists the normal operating voltages to be expected at the various tube socket terminals.

PIN NO.	1	2	3	4	5	6	7	8
12SA7		24.5AC	+87	+87	−7	0	12AC	−.9
12SG7		36AC	0	−.9	0	+87	24AC	+87
12SQ7		−.5	0	0	0	+62	0	12AC
50L6GT/G		87AC	+85	+87	0	+77 *	36AC	+5.3
35Z5GT/G		117AC	112AC	—	112AC	—	87AC	+117

D.C. voltages measured with 20,000 ohm/volt meter
A.C. voltages measured with 1,000 ohm/volt meter
All voltages measured with reference to B-
Line voltage 117.5

* Means tie point

NOTE: The above readings are obtained with no signal input to receiver.

No alignment adjustments should be attempted without first thoroughly checking over all other possible causes of trouble such as defective tubes, resistors, and condensers. In order to align the receiver properly, remove the chassis from the cabinet and proceed as follows.

EQUIPMENT REQUIRED:

1. Signal Generator.
2. Output Meter with 2.5 Volt Scale.
3. .1 Mfd. Condenser.

I.F. ALIGNMENT:

1. Connect output meter across speaker voice coil; set meter on 2.5 volt scale.
2. Connect output of signal generator directly to antenna post on loop; connect ground side of generator to chassis of receiver through .1 Mfd. condenser. Set signal generator on 455 Kc (modulated).
3. Adjust I.F. trimmers (first T4 and then T3) for maximum reading on output meter.

Note: Keep signal level low, just enough to keep maximum reading on lower half of meter scale. Tuning condenser plates should be all the way out; volume control should be on full.

R.F. ALIGNMENT:

1. Set tuning condenser with plates completely out.
2. Set signal generator at 1650 Kc (modulated) and feed its output into a loop of wire about 6" in diameter. Place this loop about one foot away from and parallel to the receiver loop antenna.
3. Tune in signal by adjusting oscillator trimmer (C4).
4. Adjust output of signal generator to obtain deflection on lower half of meter scale.
5. Adjust oscillator trimmer for maximum output.
6. Set signal generator at 1400 Kc and tune in signal with tuning condenser.
7. Adjust antenna trimmer (C3) while rocking gang condenser for maximum reading on output meter. Feed only enough signal from generator to keep maximum reading on lower half of meter scale.

DIAL ADJUSTMENT:

To set the dial on calibration, pick up a station of known frequency near the center of the dial and move the pointer by hand as required.

Power Consumption .....26 Watts
Undistorted Audio Output.....1.0 Watt
Maximum Audio Output .....1.5 Watts
Loudspeaker .....5-inch round P.M.

MAY, 1946

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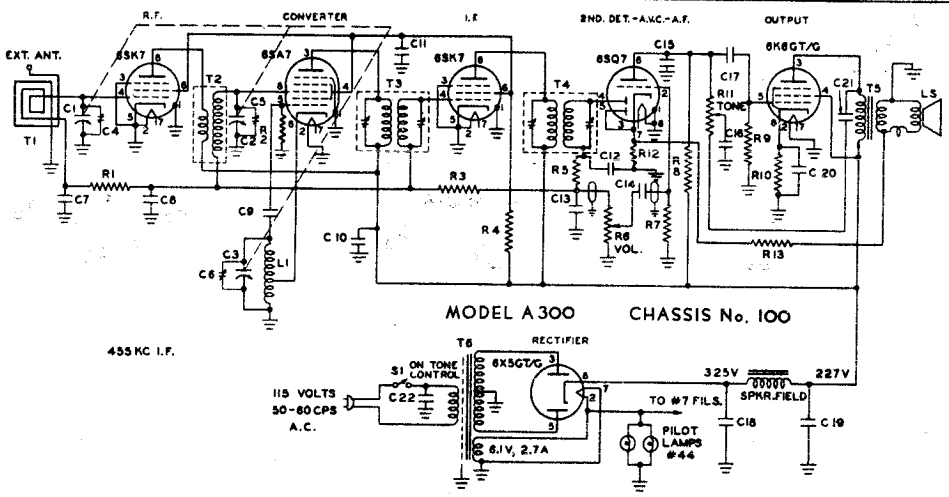


Hoffman Model A300 with Chassis number 100S is electrically identical with Chassis number 100 except for the following:

1. Five-inch P.M. speaker, part number 9003, has been substituted for 4 x 6 inch oval dynamic speaker, part number 9000.
2. A 1500-ohm resistor, part number 4701, has been connected in the filter circuit in place of the 1500-ohm speaker field.

These changes have been incorporated in the schematic diagram shown below.

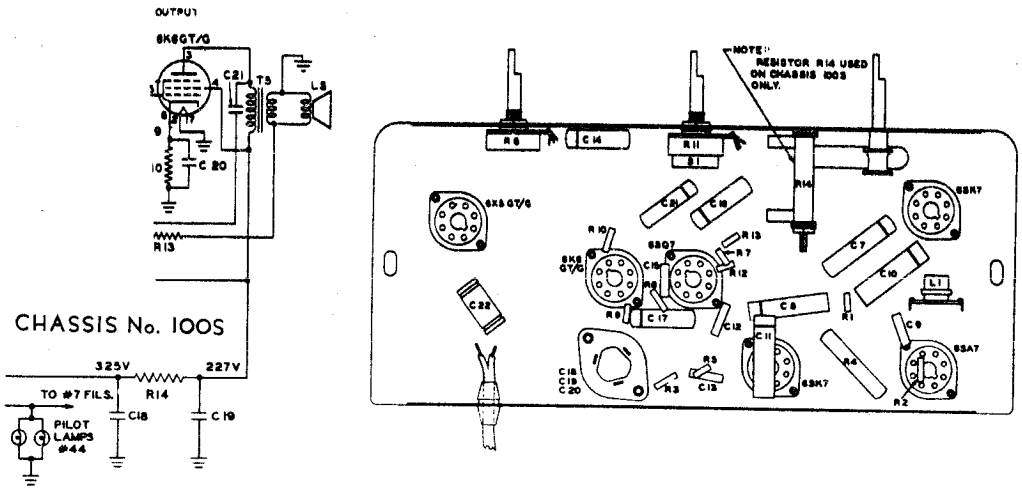


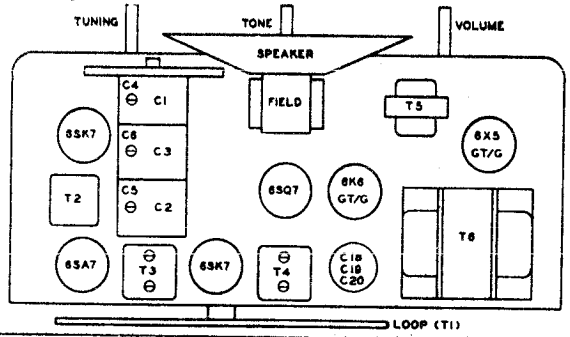
Fig. 3. Bottom of Chassis

SYMBOL	DESCRIPTION	HOFFMAN No.
C1-C2-C3	Three-Section Variable (388-388-180 Mmf.)	4400
C4, C5, C6	Trimmers; Part of Variable Condenser	
C7, C8	.05 Mfd, 200 Volt, Tubular Paper	4100
C9, C12, C13, C15	100 Mmf ±20%, Mica	4000
C10, C11	.05 Mfd, 400 Volt, Tubular Paper	4101
C14, C16	.005 Mfd, 600 Volt, Tubular Paper	4102
C17	.01 Mfd, 600 Volt, Tubular Paper	4103
C18-C19-C20	Dry Electrolytic Condenser (20-20-20 Mfd 450-450-25 Volt)	4200
C21	.001 Mfd, 600 Volt, Tubular Paper	4104
C22	.01 Mfd, 600 Volt, Tubular Paper (Metal Can)	4105
L1	Oscillator Coil	5200
L5	5" PM Loudspeaker	9003
R1, R8	.22 Megohm ±20%, ½ Watt	4500
R2	22,000 Ohm ±20%, ½ Watt	4501
R3	2.2 Megohm ±20%, ½ Watt	4502
R4	10,000 Ohm ±10%, 2 Watt	4503
R5	47,000 Ohm ±20%, ½ Watt	4504
R6	.5 Megohm Potentiometer (Volume)	4800
R7	10 Megohm ±20%, ½ Watt	4505
R9	.47 Megohm ±20%, ½ Watt	4506
R10	560 Ohm ±10%, ½ Watt	4507
R11	.25 Megohm Potentiometer With Switch (Tone)	4801
R12	47 Ohm ±20%, ½ Watt	4508
R13	330 Ohm ±20%, ½ Watt	4509
R14	1500 Ohm ±10%, 10 Watt, W.W.	4702
S1	On-Off Switch (On Tone Control)	
T1	Antenna Loop	5201
T2	R.F. Coil (Shielded)	5202
T3	Input I.F. Transformer (455 K.C.)	5203
T4	Output I.F. Transformer (455 K.C.)	5204
T5	Audio Output Transformer	5100
T6	Power Transformer	5000

Hoffman Model A300 is a 6-tube broadcast band AC operated superheterodyne table model receiver incorporating such features as built-in loop antenna, a stage of r-f amplification preceding the converter tube, and a variable tone control. An additional feature, usually not found in receivers of this type, is an inverse feedback network to reduce audio distortion.

SPECIFICATIONS

Tuning Range	535 Kc to 1640 Kc
Intermediate Frequency	455 Kc
Power Supply	115 V A.C., 50-60 C.P.S.
Power Consumption	55 Watts
Audio Output	1.25 Watts

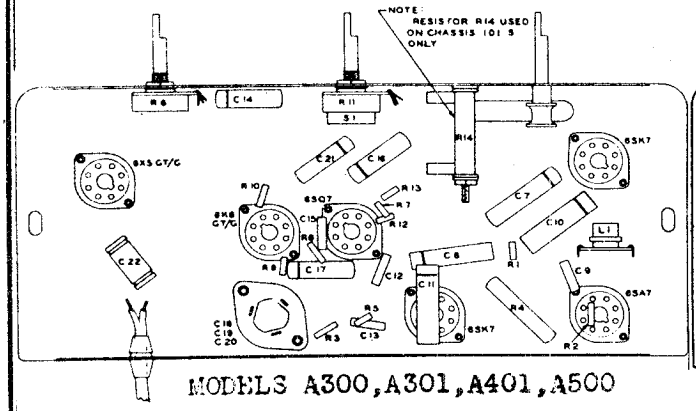


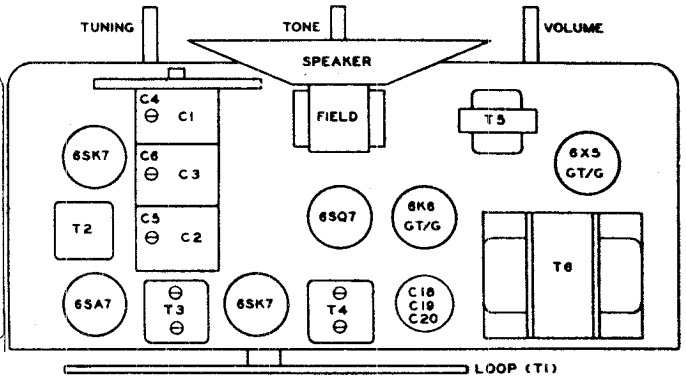
HOFFMAN RADIO CORP.

MODEL A300
MODEL A301
MODEL A401
MODEL A500

MODEL A300,Chassis 100,100S
MODEL A301,Chassis 101,101S

DIAL ADJUSTMENTS:
To set the dial on calibration, tune in a station of known frequency near the center of the dial and move the pointer by hand as required.





MODELS A300,A301,A401,A500

Fig. 1 Top of Chassis

NORMAL OPERATING VOLTAGES

The following table lists the normal operating voltages to be expected at the various tube socket terminals.

PIN NO.	1	2	3	4	5	6	7	8
6SK7 (R.F.)	0	0	0	—.5	0	+85	6.1A.C.	+227
6SA7	0	0	+227	+85	—7	0	6.1A.C.	—.7
6SK7 (I.F.)	0	0	0	—.7	0	+85	6.1A.C.	+227
6SQ7	0	—.5	0	—.25	0	+95	6.1A.C.	0
6K6GT/G	0	0	+217	+227	0	+325 *	6.1A.C.	+15
6X5GT/G	0	6.1A.C.	290A.C.	—	290A.C.	—	0	+325

D.C. voltages measured with 20,000 ohm/volt meter.
A.C. voltages measured with 1,000 ohm/volt meter.
All voltages measured with reference to chassis.
Line voltage 117.5.

* Means tie point.

NOTE: The above readings are obtained with no signal input to the receiver.

MODELS A300,A301,A401,A500

NORMAL OPERATING CURRENTS

6X5GT/G	Cathode Current	65 Ma
6K6GT/G	Cathode Current	24.5 Ma

ALIGNMENT PROCEDURE

CAUTION:

No alignment adjustments should be attempted without first thoroughly checking over all other possible causes of trouble such as defective tubes, resistors, and condensers. In order to align the receiver properly, remove the chassis from the cabinet and proceed as follows:

EQUIPMENT REQUIRED:

1. Signal Generator
2. Output Meter with 2.5 Volt Scale.
3. .1 Mfd. Condenser

I.F. ALIGNMENT:

1. Connect output meter across speaker voice coil; set meter on 2.5 Volt Scale.
2. Connect output of signal generator to stator of C2 (see schematic) through a .1 Mfd. condenser; connect ground side of generator directly to chassis of receiver. Set signal generator on 455 Kc (modulated).
3. Adjust I.F. trimmers (first T4 and then T3) for maximum reading on output meter. (Note: Keep signal level low, just enough to keep maximum reading on lower half of meter scale.) The tuning condenser plates should be all the way out; volume and tone controls should be in extreme clockwise position.

R.F. ALIGNMENT:

1. Set tuning condenser with plates completely out.
2. Set signal generator at 1650 Kc (modulated) and feed its output into a loop of wire about 6 inches in diameter. Place this loop about one foot away from and parallel to the receiver loop antenna.
3. Tune in signal by adjusting oscillator trimmer (C6).
4. Adjust output of signal generator to obtain deflection on lower half of meter scale.
5. Adjust oscillator trimmer for maximum output.
6. Set signal generator at 1400 Kc and tune in signal with tuning condenser.
7. Adjust antenna and RF trimmers (C4 and C5) while rocking gang condenser for maximum reading on output meter. Feed only enough signal from generator to keep maximum reading on lower half of meter scale.

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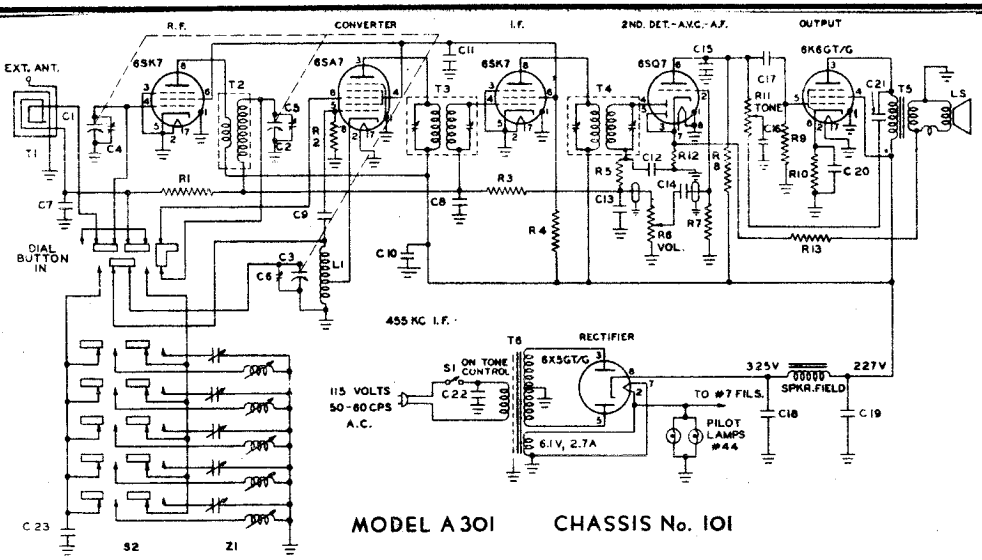
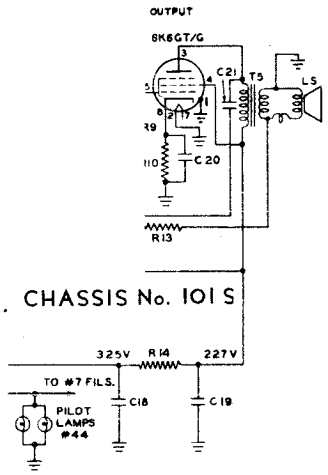


MODEL A301 CHASSIS No. 101

Hoffman Model A301 with Chassis 101S is electrically identical with Chassis 101 except for the following:

1. Five-inch P.M. speaker, part number 9003, has been substituted for 4 x 6-inch oval dynamic speaker, part number 9000.
2. A 1500-ohm resistor, part number 4701, has been connected in the filter circuit in place of the 1500-ohm speaker field.

These changes have been incorporated in the schematic diagram shown below.



SPECIFICATIONS

Tuning Range	535 Kc to 1640 Kc
Intermediate Frequency	455 Kc
Power Supply	115 V A.C., 50-60 C.P.S.
Power Consumption	55 Watts
Audio Output	1.25 Watts

MODELS A301, A500, A501 MAY, 1946

SYMBOL	DESCRIPTION	HOFFMAN No.
C1-C2-C3	Three-Section Variable (388-388-180 Mmf.)	4400
C4, C5, C6	Trimmers; Part of Variable Condenser	
C7, C8	.05 Mfd, 200 Volt, Tubular Paper	4100
C9, C12, C13, C15	100 Mmf ±20%, Mica	4000
C10-C11	.05 Mfd, 400 Volt, Tubular Paper	4101
C14, C16	.005 Mfd, 600 Volt, Tubular Paper	4102
C17	.01 Mfd, 600 Volt, Tubular Paper	4103
C18-C19-C20	Dry Electrolytic Condenser (20-20-20 Mfd 450-450-25 Volt)	4200
C21	.001 Mfd, 600 Volt, Tubular Paper	4104
C22	.01 Mfd, 600 Volt, Tubular Paper (Metal Can)	4105
C23	500 Mmf ±5%, Silver Mica	4004
L1	Oscillator Coil	5200
LS	Loudspeaker, 5" P.M.	9003
R1, R8	.22 Megohm ±20%, ½ Watt	4500
R2	22,000 Ohm ±20%, ½ Watt	4501
R3	2.2 Megohm ±20%, ½ Watt	4502
R4	10,000 Ohm ±10%, 2 Watt	4503
R5	47,000 Ohm ±20%, ½ Watt	4504
R6	.5 Megohm Potentiometer (Volume)	4804
R7	10 Megohm ±20%, ½ Watt	4505
R9	.47 Megohm ±20%, ½ Watt	4506
R10	560 Ohm ±10%, ½ Watt	4507
R11	.25 Megohm Potentiometer With Switch (Tone)	4805
R12	47 Ohm ±20%, ½ Watt	4508
R13	330 Ohm ±20%, ½ Watt	4509
R14	1500 Ohm ±5%, 6½ Watt	4701
S1	On-Off Switch (On Tone Control)	
S2	Pushbutton Switch Assembly	6000
T1	Antenna Loop	5201
T2	R.F. Coil (Shielded)	5212
T3	Input I.F. Transformer (455 K.C.)	5203
T4	Output I.F. Transformer (455 K.C.)	5204
T5	Audio Output Transformer	5100
T6	Power Transformer	5000
Z1	Pushbutton Tuning Assembly	55200

PUSHBUTTON ADJUSTMENTS

The frequency ranges for the pushbuttons are given in figure 3. A layout of the pushbutton adjustments is shown in figure 4. Note that in this figure pushbutton number 1 is now to the extreme right, since the pushbutton assembly is being viewed from the rear. To make pushbutton adjustments, proceed as follows:

1. Turn the receiver on and let it warm up for fifteen minutes or longer in order to minimize drift effects.
2. Depress the DIAL pushbutton and tune in the station which is to be set on pushbutton number 1.
3. Now depress pushbutton number 1 and adjust tuning slug 1a and trimmer 1b (figure 4) until the station is accurately tuned in again.
4. Repeat the above procedure for the remaining pushbuttons.

NOTE: When making oscillator coil pushbutton adjustments, it is desirable that this adjustment be made from the high-frequency end (slug all the way out). The proper oscillator coil slug setting will then be reached before there is any possibility of tuning the oscillator to the low-frequency side of the carrier.

PUSHBUTTON NO.	1	2	3	4	5
FREQUENCY RANGE IN KILOCYCLES	550-800	550-800	720-1200	720-1200	900-1500

Fig. 3 Pushbuttons

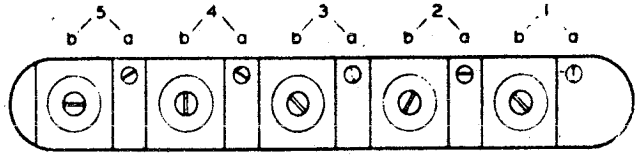


Fig. 4 Adjustment Screws

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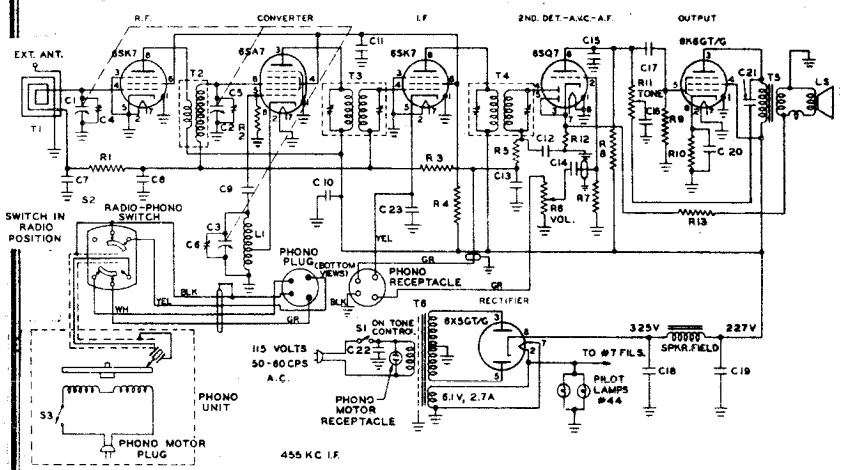
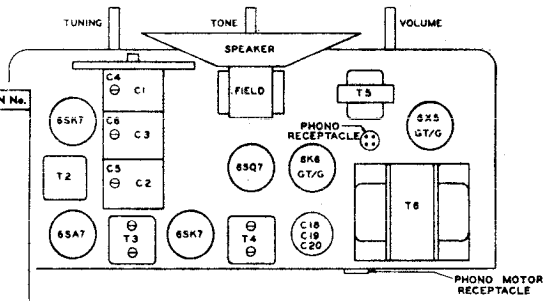


AUTOMATIC RECORD CHANGER MODEL A401 CHASSIS No. 102

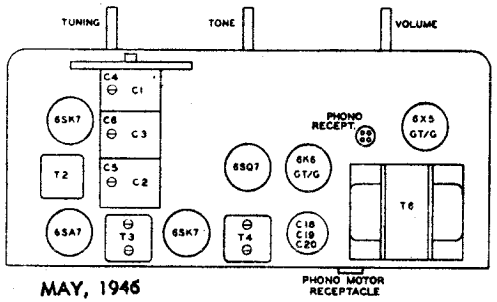
The automatic record changer used with this receiver is a General Instrument, Model 205.



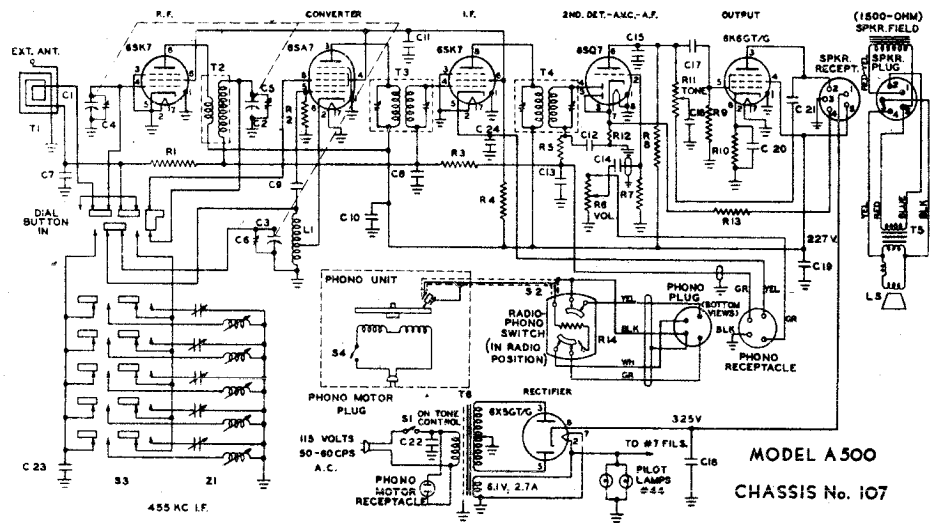
SYMBOL	DESCRIPTION	HOFFMAN No.
C1-C2-C3	Three-Section Variable (388-388-180 Mmf.)	4400
C4, C5, C6	Trimmers; Part of Variable Condenser	
C7, C8	.05 Mfd, 200 Volt, Tubular Paper	4100
C9, C12, C13, C15	100 Mmf ±20%, Mica	4000
C10, C11, C23	.05 Mfd, 400 Volt, Tubular Paper	4101
C14, C16	.005 Mfd, 600 Volt, Tubular Paper	4102
C17	.01 Mfd, 600 Volt, Tubular Paper	4103
C18-C19-C20	Dry Electrolytic Condenser (20-20-20 Mfd 450-450-25 Volt)	4200
C21	.001 Mfd, 600 Volt, Tubular Paper	4104
C22	.01 Mfd, 600 Volt, Tubular Paper (Metal Can)	4105
L1	Oscillator Coil	5200
LS	Loudspeaker, 4" x 6" (1500-Ohm Field)	9000
R1, R8	.22 Megohm ±20%, ½ Watt	4500
R2	22,000 Ohm ±20%, ½ Watt	4501
R3	2.2 Megohm ±20%, ½ Watt	4502
R4	10,000 Ohm ±10%, 2 Watt	4503
R5	47,000 Ohm ±20%, ½ Watt	4504
R6	.5 Megohm Potentiometer (Volume)	4804
R7	10 Megohm ±20%, ½ Watt	4505
R9	.47 Megohm ±20%, ½ Watt	4506
R10	560 Ohm ±10%, ½ Watt	4507
R11	.25 Megohm Potentiometer With Switch (Tone)	4805
R12	47 Ohm ±20%, ½ Watt	4508
R13	330 Ohm ±20%, ½ Watt	4509
S1	On-Off Switch (On Tone Control)	
S2	Radio-Phono Switch	6001
S3	Phono Motor Switch (Part of Phono Unit)	
T1	Antenna Loop	5223
T2	R.F. Coil (Shielded)	5202
T3	Input I.F. Transformer (455 K.C.)	5203
T4	Output I.F. Transformer (455 K.C.)	5204
T5	Audio Output Transformer	5100
T6	Power Transformer	5000
	Phono Unit—Automatic Record Player	9011

AUTOMATIC RECORD CHANGER

The automatic record changer used with this receiver is a Seeburg Model "K"



MAY, 1946



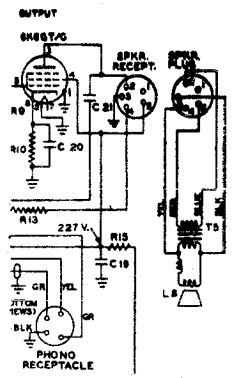
MODEL A500 CHASSIS No. 107

Hoffman Model A500 with Chassis 107S is electrically identical with Chassis 107 except for the following:

1. Ten-inch P.M. speaker, part number 9010, has been substituted for ten-inch electrodynamic speaker, part number 9012.
2. A 1500-ohm resistor, part number 4701, has been connected in the filter circuit in place of the 1500-ohm speaker field.

These changes have been incorporated in the schematic diagram shown below.

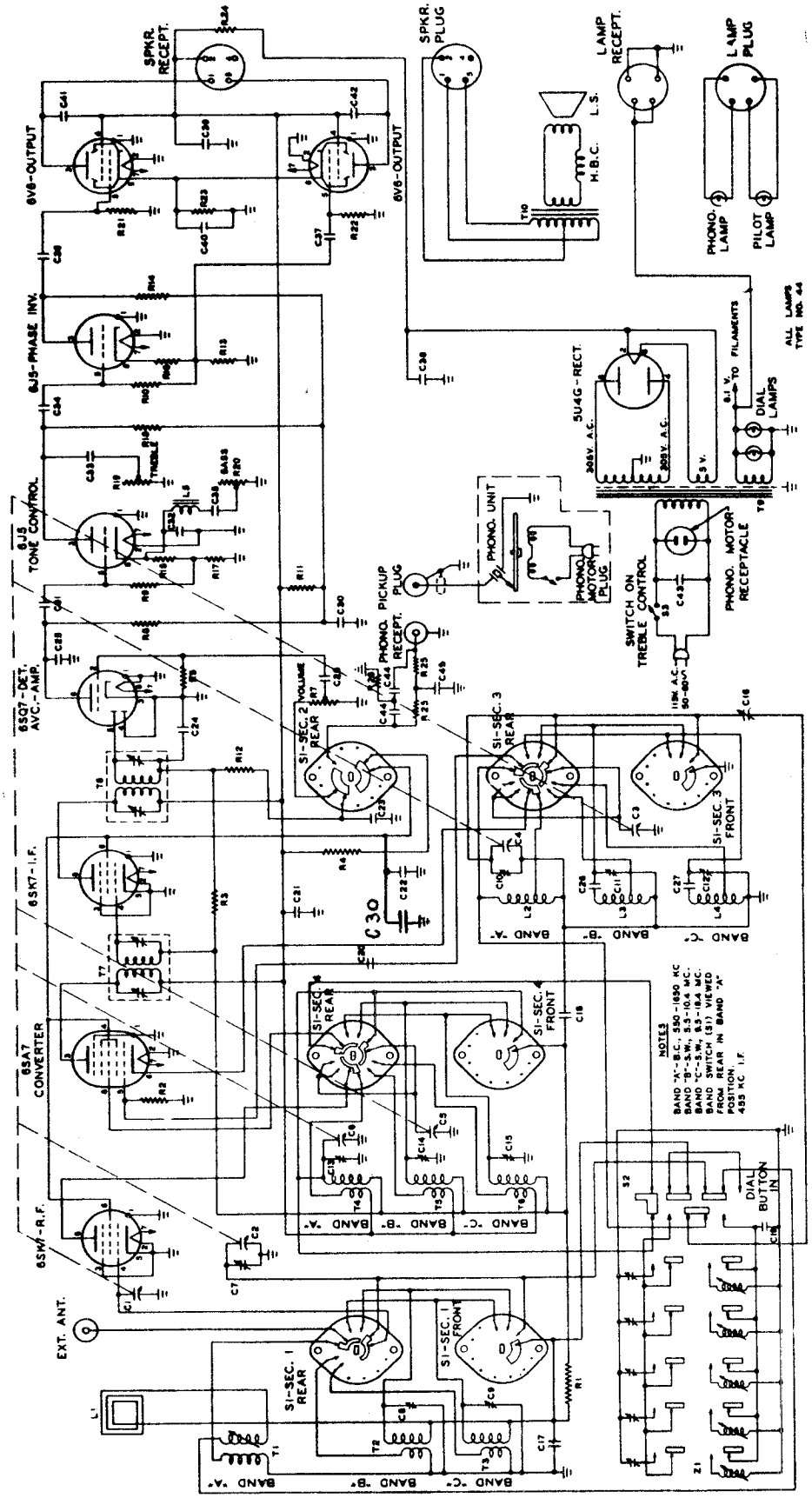
SYMBOL	DESCRIPTION	HOFFMAN No.
C1-C2-C3	Three-Section Variable (388-388-180 Mmf.)	4400
C4, C5, C6	Trimmers; Part of Variable Condenser	
C7, C8	.05 Mfd, 200 Volt, Tubular Paper	4100
C9, C12, C13, C15	100 Mmf ±20%, Mica	4000
C10-C11-C24	.05 Mfd, 400 Volt, Tubular Paper	4101
C14, C16	.005 Mfd, 600 Volt, Tubular Paper	4102
C17	.01 Mfd, 600 Volt, Tubular Paper	4103
C18-C19-C20	Dry Electrolytic Condenser (20-20-20 Mfd/450-450-25 Volt)	4200
C21	.001 Mfd, 600 Volt, Tubular Paper	4104
C22	.01 Mfd, 600 Volt, Tubular Paper (Metal Can)	4105
C23	500 Mfd ±5%, Silver Mica	4004
L1	Oscillator Coil	5200
LS	10" Loudspeaker, Permanent Magnet	9010
R1, R8, R14	.22 Megohm ±20%, ½ Watt	4500
R2	22,000 Ohm ±20%, ½ Watt	4501
R3	2.2 Megohm ±20%, ½ Watt	4502
R4	10,000 Ohm ±10%, 2 Watt	4503
R5	47,000 Ohm ±20%, ½ Watt	4504
R6	.5 Megohm Potentiometer (Volume)	4804
R7	10 Megohm ±20%, ½ Watt	4505
R9	.47 Megohm ±20%, ½ Watt	4506
R10	560 Ohm ±10%, ½ Watt	4507
R11	.25 Megohm Potentiometer With Switch (Tone)	4805
R12	47 Ohm ±20%, ½ Watt	4508
R13	330 Ohm ±20%, ½ Watt	4509
R15	1500 Ohm ±5%, 6½ Watt	4701
S1	On-Off Switch (On Tone Control)	
S2	Radio-Phono Switch	6001
S3	Pushbutton Switch Assembly	6000
S4	Phono Motor Switch (Part of Record Player Unit)	
T1	Antenna Loop	5224
T2	R.F. Coil (Shielded)	5212
T3	Input I.F. Transformer (455 K.C.)	5203
T4	Output I.F. Transformer (455 K.C.)	5204
T5	Audio Output Transformer (on Speaker)	5107
T6	Power Transformer	5000
Z1	Pushbutton Tuning Assembly	55208
	Automatic Record Player	9011S



©John F. Rider A401 -Record Changer:Gen.Inst.Model 205; for Alignment,Volt,see P.15-3
A500 -Record Changer:Seeburg Model K;for Alignment,Voltage,see P.15-3

MODEL A501, Ch. 108S, 108ST

HOFFMAN RADIO CORP.



Record Changer: Webster Model 56; for push button data, see P. 15-4

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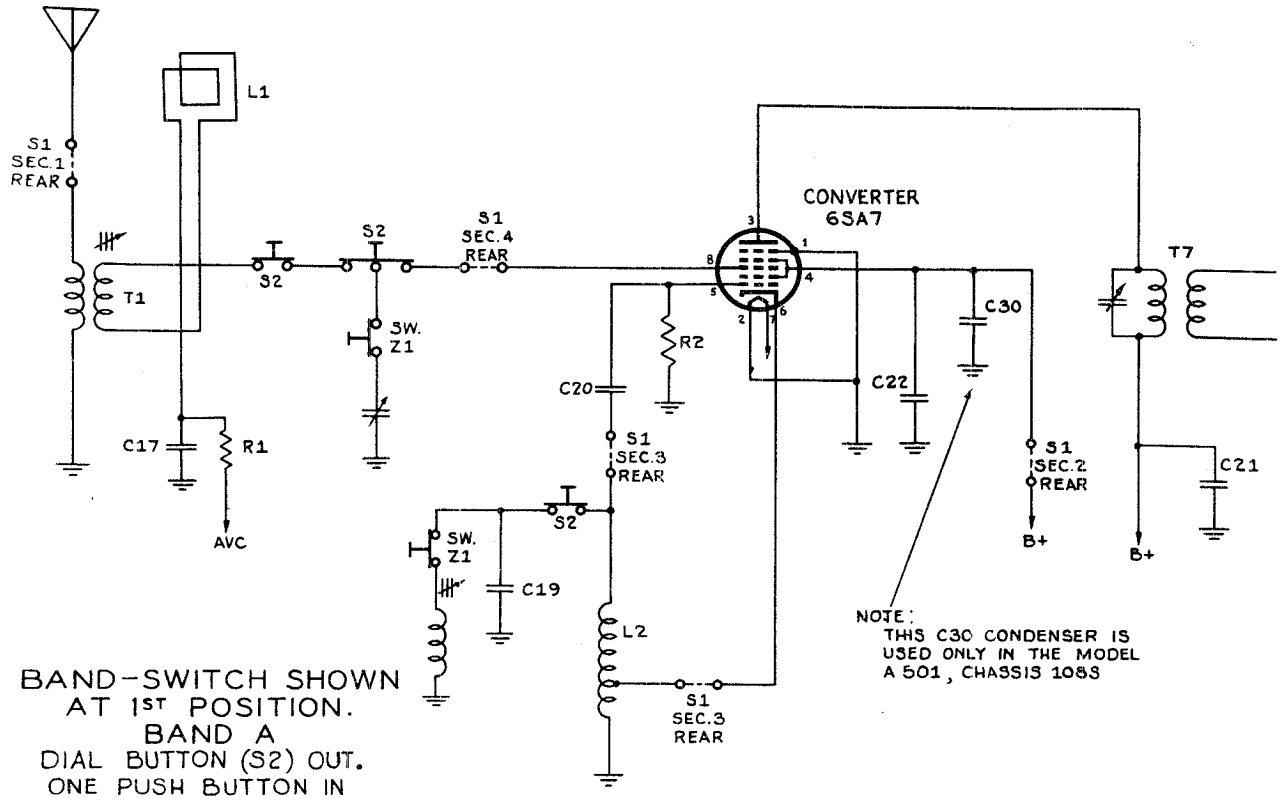
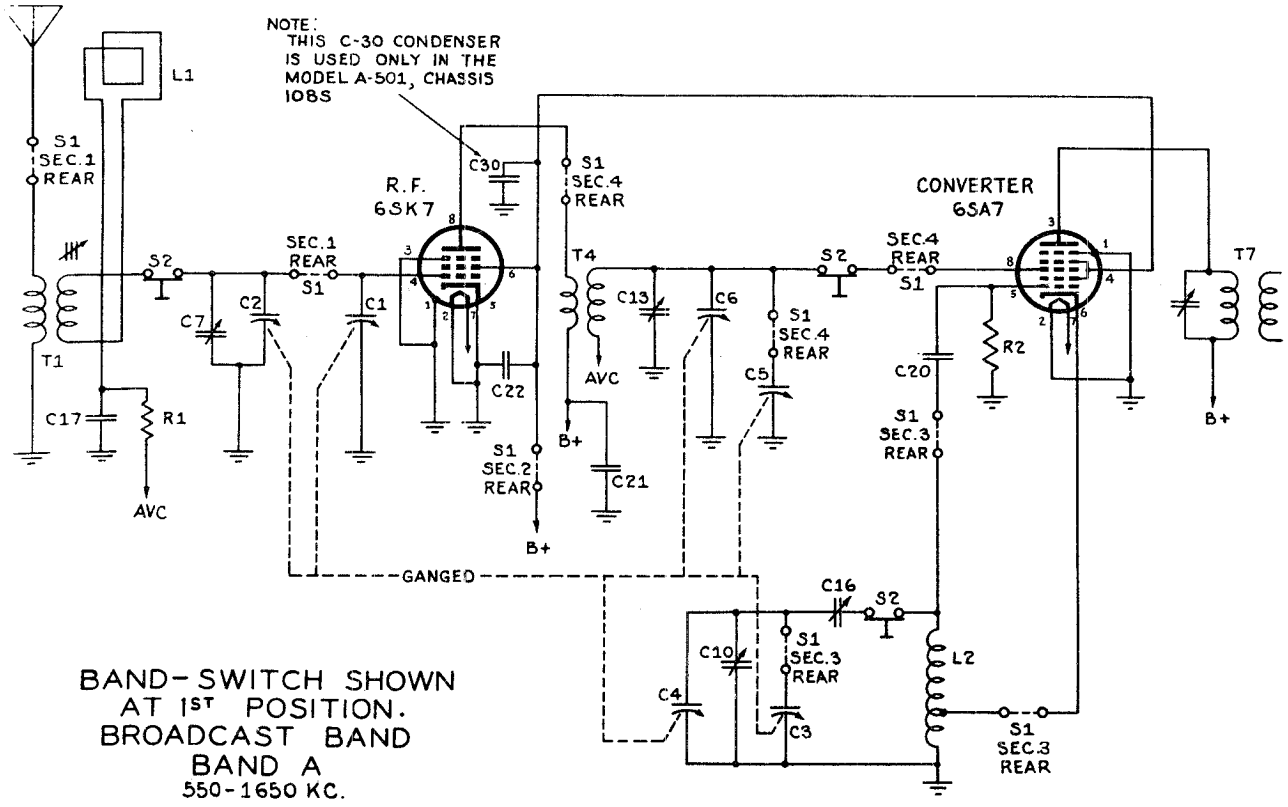
MODEL A501, Ch. 108S, 108ST

HOFFMAN RADIO CORP.



BAND-SWITCH SHOWN AT 1ST POSITION.
BAND A
DIAL BUTTON (S2) OUT.
ONE PUSH BUTTON IN



BAND-SWITCH SHOWN AT 1ST POSITION.
BROADCAST BAND
BAND A
550-1650 KC.

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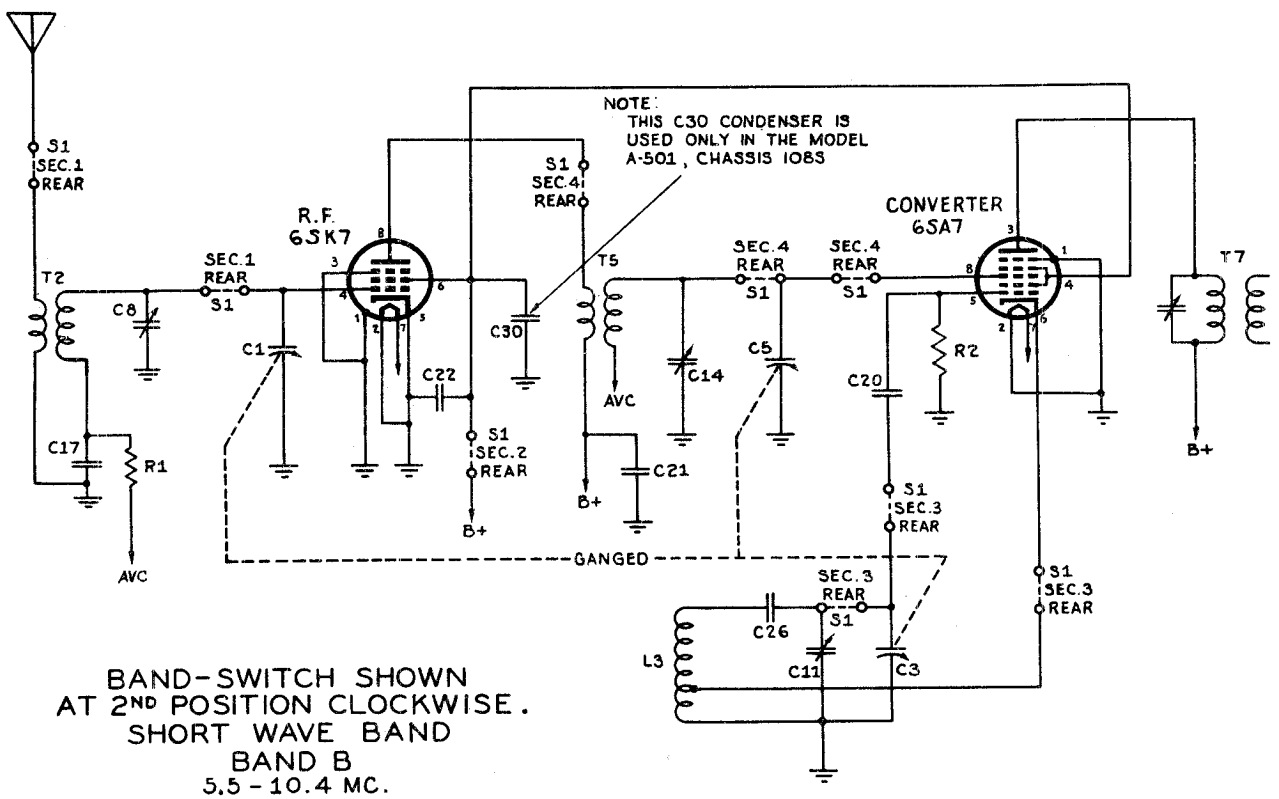
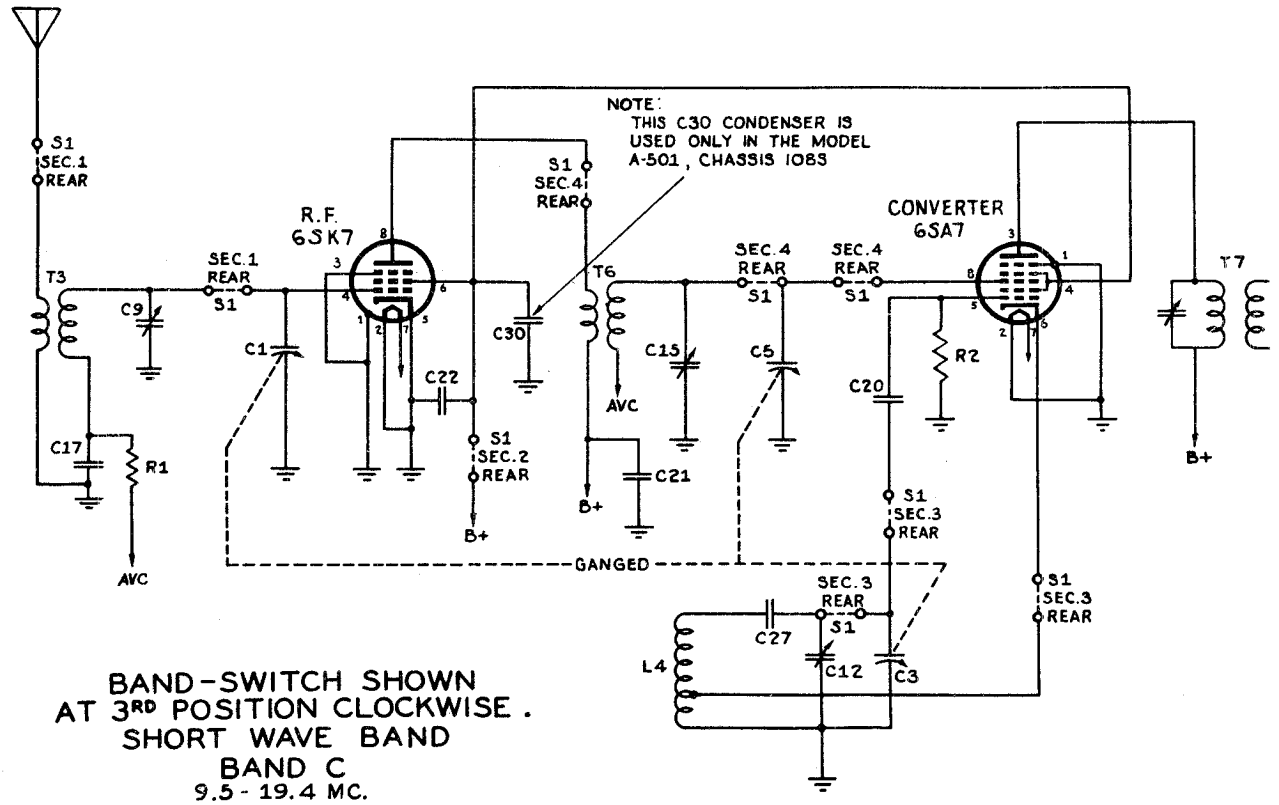
MODEL A501, Ch. 108S, 108ST

HOFFMAN RADIO CORP.



BAND-SWITCH SHOWN AT 2ND POSITION CLOCKWISE.
SHORT WAVE BAND
BAND B
5.5 - 10.4 MC.



BAND-SWITCH SHOWN AT 3RD POSITION CLOCKWISE.
SHORT WAVE BAND
BAND C
9.5 - 19.4 MC.

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HOFFMAN RADIO CORP.

MODEL A501, Ch. 108S
108ST

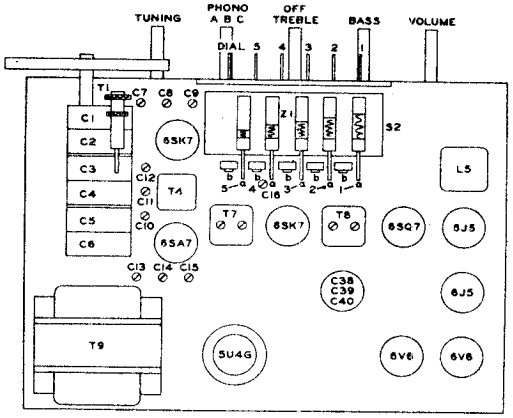
OPERATIONS IN ORDER	SIGNAL GENERATOR		RECEIVER		TRIMMER ADJ. IN ORDER
	CONNECTIONS TO REC.	FREQUENCY	CONTROL SETTINGS	DIAL SETTING	
1	To stator of C-6 through .1 mfd. cond.	455 Kc	Vol. Max. Range Sw. on "A" Band	Minimum Capacity	T-8 and T-7
2	To Ant. Term. through a 400-ohm resistor.	18 Mc	Vol. Max. Range Sw. on "C" Band	18 Mc	C-12, C-15, C-9
3	To Ant. Term. through a 400-ohm resistor	10 Mc	Vol. Max. Range Sw. on "B" Band	10 Mc	C-11, C-13, C-8
4	To Ant. Term. through 200 mmf. condenser	1400 Kc	Vol. Max. Range Sw. on "A" Band	1400 Kc	C-10, C-13, C-7
5	To Ant. Term. through 200 mmf. condenser	600 Kc	Vol. Max. Range Sw. on "A" Band	600 Kc	C-16, T-1 tuning slug
6	To Ant. Term. through 200 mmf. condenser	1400 Kc	Vol. Max. Range Sw. on "A" Band	1400 Kc	C-10, C-13, C-7

NOTE: Rocking the condenser gang on the higher frequencies (bands "B" and "C") is necessary in order to avoid a false point of alignment due to "pulling action" between r-f and oscillator circuits.

NOTE: Be sure that the image frequency is not picked up during this adjustment. Note that the signal may be readily heard at two points as C-11 is adjusted. The correct setting for C-11 is with the trimmer in its looser position (adjusting screw further out).

NOTE: It is necessary to align the "C" band first so that "B" band and broadcast band alignment will not be adversely affected by subsequent "C" band adjustment.

Alignment of "C" Band:



NORMAL OPERATING VOLTAGES

The following table lists the normal operating voltages to be expected at the various tube socket terminals.

PIN NO.	1	2	3	4	5	6	7	8
6SK7 (R.F.)	0	0	0	−.1	0	+95	6.2 AC	+290
6SA7 (Conv.)	0	0	+290	+95	−5 to −10	0	6.2 AC	−.15
6SK7 (I.F.)	0	0	0	−.15	0	+95	6.2 AC	+290
6SQ7	0	−.2	0	−.25	0	+75	6.2 AC	0
6J5 (Tone)	0	0	+130	0	+20 □	0	6.2 AC	+22
6J5 (Inverter)	0	0	+105	0	+50 #	0	6.2 AC	+43
6V6	0	0	+290	+290	0	0	6.2 AC	+17
6V6	0	0	+290	+290	0	0	6.2 AC	+17
5U4G	0	+350 5.2 AC*	0	335 AC	0	335 AC	0	+350 5.2 AC *

D.C. voltages measured with 20,000 ohm/volt meter.
A.C. voltages measured with 1,000 ohm/volt meter.
Line voltage 117.
measured at junction of R13 and R16.
□ measured at junction of R15 and R17.

All voltages measured with reference to chassis except as follows:
* measured between pins 2 and 8; not to chassis.

NOTE The above readings are obtained with no signal input to receiver and band switch in position "A".

NORMAL OPERATING CURRENTS

5U4G	Cathode Current	115 Ma.
6V6	Cathode Current (both tubes)	70 Ma.

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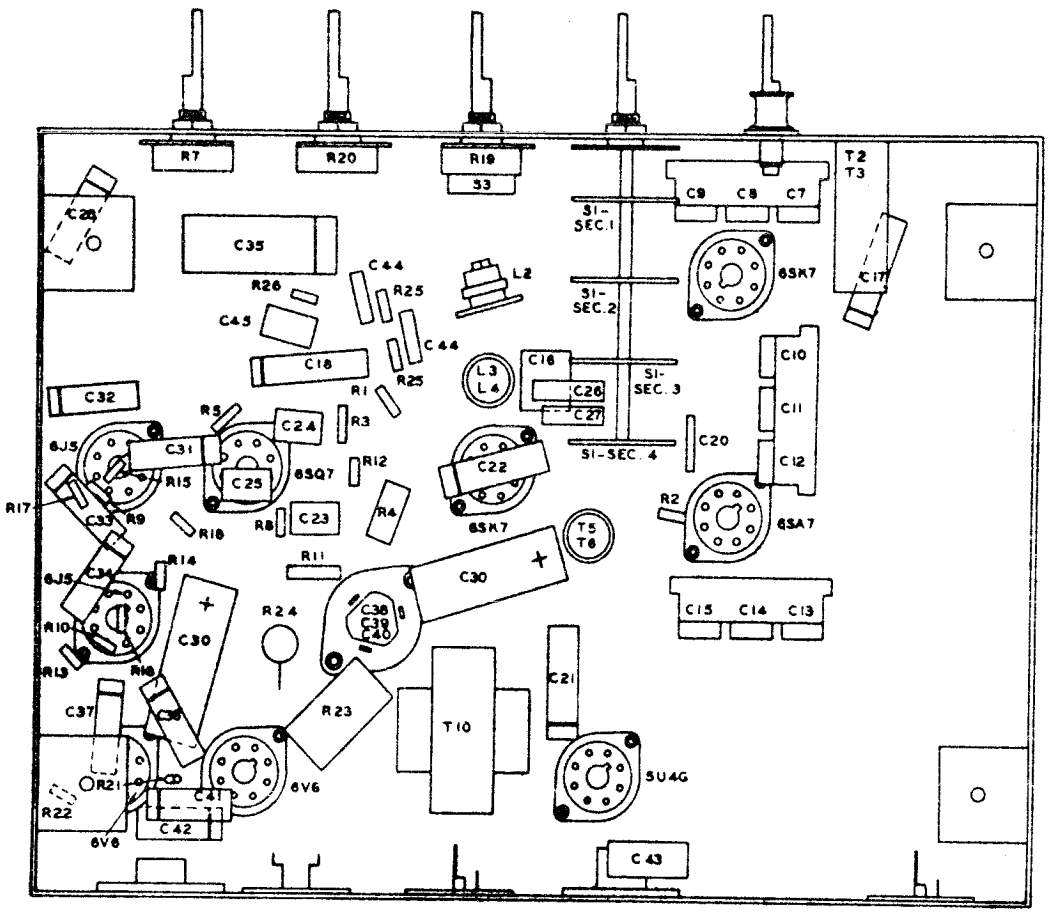


TUNING RANGES:

Band "A"	540 Kc to 1600 Kc.
Band "B"	5.6 Mc to 10.4 Mc
Band "C"	9.4 Mc to 19.4 Mc
Intermediate Frequency	455 Kc
Power Supply	115V A.C., 50-60 C.P.S.
Power Consumption (incl. phono)	125 Watts
Undistorted Audio Output	12 Watts

Model A501 with Chassis 108S is electrically identical with Chassis 108ST, except for: Output transformer, Part No.5110 substituted for Part No.5107.

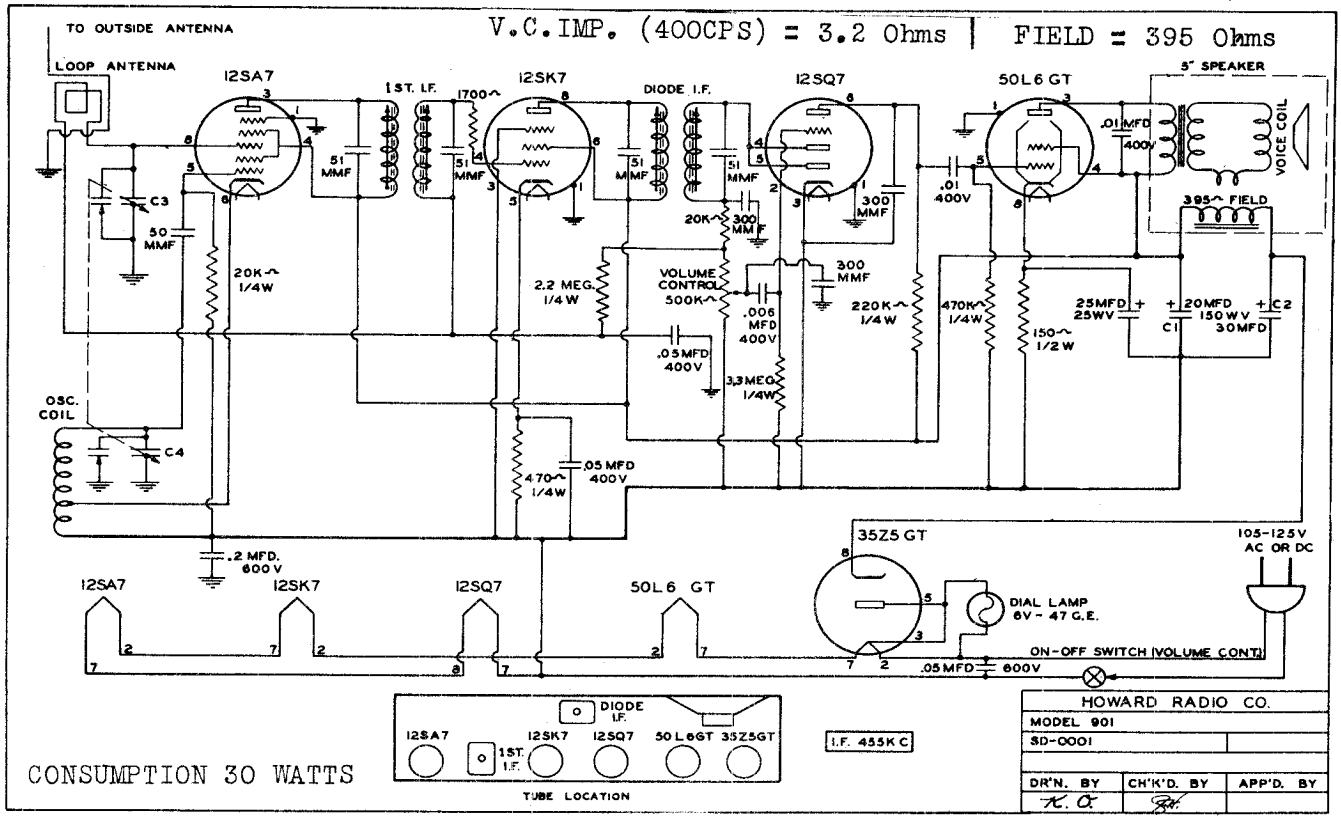
These are electrically identical.

A 10-mf, 450-volt electrolytic condenser, Part No.4203, has been added from screen to ground on the 6SK7 r-f and i-f tubes to eliminate a hum modulation. It is suggested that this condenser be added on all Model A501 receivers not having it.

SYMBOL	DESCRIPTION	Hoffman No.
C1-C2, C3-C4, C5-C6	Three-section Variable with Split Stator, (160-260, 160-260, 160-260 Mmf.)	4403
C7, C8, C9	Three-section Trimmer Assembly	4300
C10, C11, C12	Three-section Trimmer Assembly	4300
C13, C14, C15	Three-section Trimmer Assembly	4300
C16	110-560 Mmf. Padder, Band "A"	4301
C17, C18	.05 Mfd., 200 Volt, Tubular Paper	4100
C19	500 Mmf. ±5%, Silver Mica	4004
C20	47 Mmf. ±10%, Mica	4007
C21, C22	.05 Mfd., 400 Volt, Tubular Paper	4101
C23, C24, C25	100 Mmf. ±20%, Mica	4000
C26	1050 Mmf. ±5%, Mica	4005
C27	2300 Mmf. ±5%, Mica	4006
C28, C29	.005 Mfd., 600 Volt, Tubular Paper	4102
C30	10 Mfd., 450 Volt, Tubular Electrolytic	4203
C31, C32, C33, C34	.01 Mfd., 400 Volt, Tubular Paper	4112
C35	.5 Mfd., 200 Volt, Tubular Paper	4110
C36, C37	.02 Mfd., 400 Volt, Tubular Paper	4106
C38-C39-C40	20-20-20 Mfd./450-450-25 V. Electrolytic	4200
C41, C42	.01 Mfd., 600 Volt, Tubular Paper	4103
C43	.01 Mfd., 600 Volt, Tubular Paper (Metal Can)	4105
C44	330 Mmfd., 5%, Mica	4010
C45	650 Mmfd., 5%, Mica	4011
L1	Loop Antenna	5221
L2	Oscillator Coil (Band "A")	5215
L3-L4	Oscillator Coil (Bands "B" and "C")	5218
L5	5 Hy Choke (Bass Boost)	5103
LS	12-inch Loudspeaker, Permanent Magnet	9020
R1	.1 Megohm ±20%, ½ Watt	4511
R2	22,000 Ohm ±20%, ½ Watt	4501
R3	2.2 Megohm ±20%, ½ Watt	4502
R4	10,000 Ohm ±20%, 3 Watt	4520
R5	10 Megohm ±20%, ½ Watt	4505
R6	15,000 Ohm ±20%, ½ Watt	4521
R7	.5 Megohm Potentiometer (Volume Control)	4804
R8	.22 Megohm ±20%, ½ Watt	4500
R9, R10	1 Megohm ±20%, ½ Watt	4513
R11	47,000 Ohm ±20%, 1 Watt	4516
R12, R13, R14	47,000 Ohm ±20%, ½ Watt	4504
R15, R16	2200 Ohm ±20%, ½ Watt	4512
R17, R18	10,000 Ohm ±20%, ½ Watt	4515
R19	.25 Meg. Pot. with Switch (Treble Control)	4805
R20	50,000 Ohm Potentiometer (Bass Control)	4806
R21, R22	.47 Megohm ±20%, ½ Watt	4506
R23	220 Ohm ±20%, 3 Watt	4519
R24	500 Ohm ±10%, 20 Watt	4702
R25	47,000 Ohm ±10%, ½ Watt	4537
R26	22,000 Ohm ±10%, ½ Watt	4538
S1	Band Change Switch	6005
S2	Pushbutton Switch Assembly	6004
S3	On-Off Switch (On Treble Control)	
T1	Antenna Coil (Band "A")	5220
T2-T3	Antenna Coil (Bands "B" and "C")	5217
T4	R.F. Coil, Shielded (Band "A")	5216
T5-T6	R.F. Coil (Bands "B" and "C")	5219
T7	Input I.F. Transformer	5213
T8	Output I.F. Transformer	5214
T9	Power Transformer	5001
T10	Audio Output Transformer (On Speaker)	5107
Z1	Pushbutton Tuning Assembly	55200

HOWARD RADIO CO.

MODELS 901, 901AE, 901AH, 901AI, 901AM, 901AW



POWER OUTPUT - (MAX.) 1.25W UPO .5 W. TUNING RANGE = 540-1600 KC

SOCKET VOLTAGE READINGS:

All voltages taken from the back of the AC switch to the socket contacts with a 20,000 ohm per volt D.C. meter and the line voltage fixed at 117 volts A.C.

TUBE	FUNCTION	CATH-ODE	SCR. GRID	PLATE	OSC. PLATE
12SA7	Mixer		92	92	92
12SK7	I.F.Amp.	3	92	92	
12SQ7	Det.			44	
50L6GT	Output	5.8	92	85	

ALIGNMENT INFORMATION

Each 455 KC I. F. coil has an Iron Core adjustment protruding from the top and the bottom of the I. F. can. Look beneath the chassis to reach the lower I. F. adjustments. Repeat the I. F. alignment operation several times to insure accuracy of adjustment.

Add or remove resistance in the cathode circuit of the 12SK7 tube as the I. F. gain indicates.

The wire lead running from the loop aerial between the I. F. coils and the condenser gang is important in its placement. Dress this wire tightly to the chassis.

Set dial at 1400 KC. and adjust oscillator trimmer which is located on back section of variable condenser, then peak antenna stage trimmer on front section of variable condenser to 1400 KC. No adjustment is required at the low frequency end of the dial.

The filter condenser has a common negative, but note it does not return to ground and is insulated from the chassis.

For Parts list, see P.15-4

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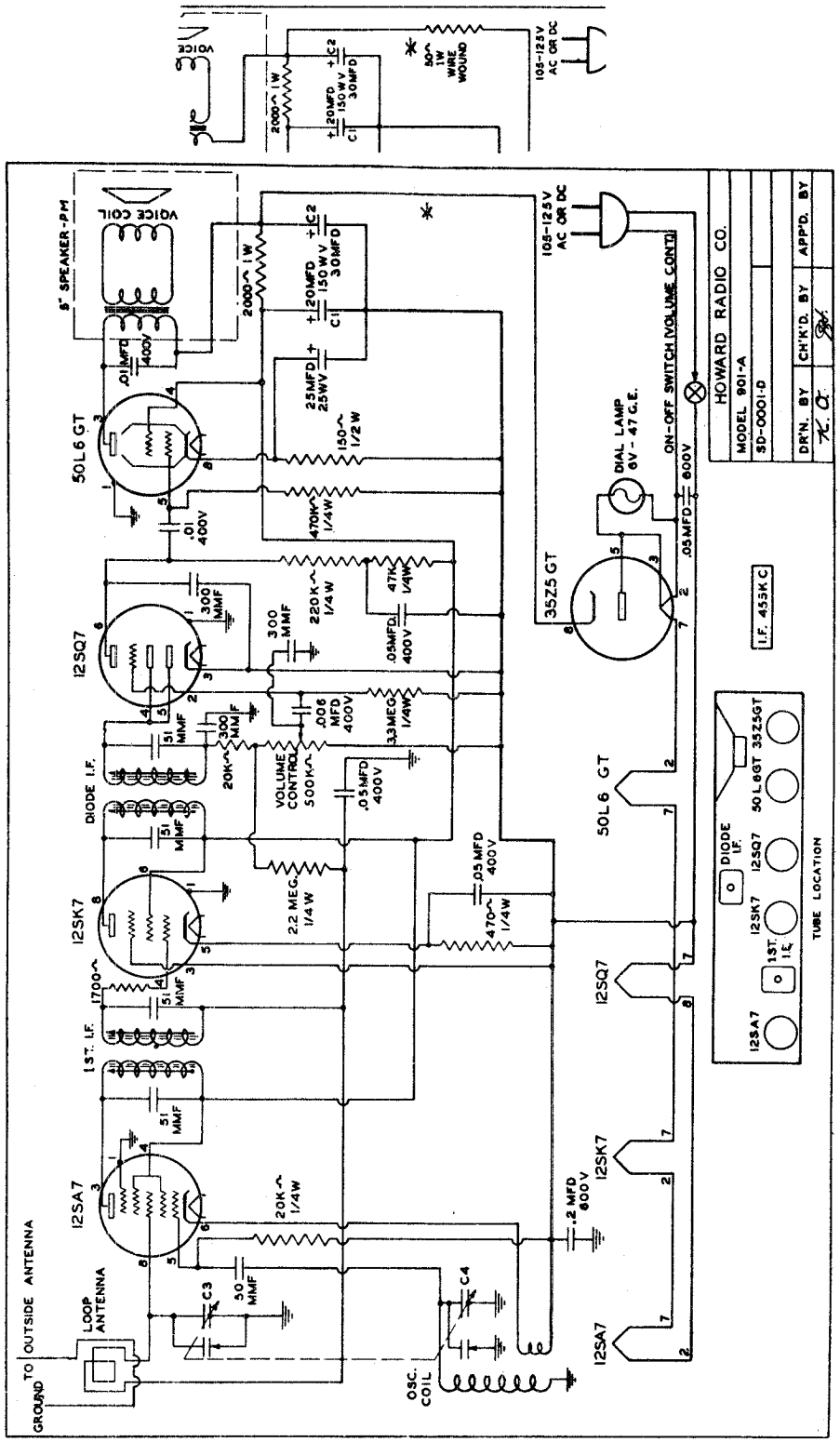
MODEL 901A

HOWARD RADIO CO.



CONSUMPTION -- 30 Watts ---- See label on back of chassis.

ANTENNA SYSTEM = Built-in Loop. Available connections for aerial and ground.

TUNING RANGE = 540-1600 KC -- String Drive -- Full Vision Airplane Dial.

SPEAKER = Permo Mag. Dynamic -- SIZE = 5" -- V.C.IMP. (400CPS) 3.2 Ohms.

POWER OUTPUT = (MAX.) 1.5 W. -- UPO 1.W.

* Circuit change for plastic cabinets Serial Nos. 31, 321 to 50,000 and

I.F. = 455KC - 26 Ohms Resistance Primary and Secondary. Wood cabinets above Serial No. 70,380

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For Alignment, see P.15-1;for Parts list,see P.15-4

MODEL 901AP

HOWARD RADIO CO.

Tube	Function	Cath.	Scr. Grid	Plate
12SA7	Mixer	0	88	86
12SK7	I.F. Amp.	2.4	88	86
12SQ7	Det.	0	-	53
50L6	Output	5.8	88	115

901A - AE - AP

*Circuit Change above Serial No. 4200

CONSUMPTION = 55 Watts ---- See label on back of chassis.

TUNING RANGE = 540-1600 KC -- String Drive

ANTENNA SYSTEM = Built in low impedence loop. Ant. connection only.

SPEAKER = Permo Mag. Dynamic -- SIZE 5" -- V.C.IMP. (400CPS) 3.2 Ohms.

POWER OUTPUT = (MAX.) 1.5 W.--UPO 1. W.

I.F. = 455 KC -- 26 Ohms Resistance Primary and Secondary.

VOLTAGES + OR - 20% ARE MEASURED TO B MINUS AT REAR OF AC SWITCH.

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Record Changer: Webster Model 50
For Alignment, see P.15-1; for Parts list, see P.15-4

MODEL 901 SERIES

Part No.		DESCRIPTION
		CONTROLS
VC-0001		Volume and on-off switch
		CONDENSERS
CV-0008		Tuning
CE-0001		Filter, 30-30-30-MFD, 200 Volt
CE-0003	or	Filter, 30-20-MFD, 150 Volt
CE-0004	or	Filter, 30-30-MFD, 150 Volt
CE-0005		Filter, 25-MFD, 25 Volt this used with CE-0003 or CE-0004
		COIL ASSEMBLIES
AN-0002		Ant. Loop (for Plastic Cabinet)
LA-0001		Ant. Loop (for Wood Cabinet)
LO-0014		Osc. coil
LI-0006		1st I.F. Assembly complete
LI-0007		Diode I.F. Assembly complete
		CABINETS
CB-0001		Plastic, Ivory
CB-0003		Plastic, Walnut
CW-0003		Wood, Phono Model
CW-0004		Wood, Wraparound Model
		DIAL AND CONTROL PARTS
AR-0002		Calibrated Dial Plate (Plastic)
AR-0003		Calibrated Dial Plate (Wood)
DC-0001		Dial Drive Cord
LS-0001		Dial Lamp-Bayonet Type #47
WG-0001		Dial Window (for Plastic Cabinet)
WG-0002		Dial Window (for Wood Cabinets)
SP-0005		Tension Spring for Dial Drive Cord
HD-0001		Dial Indicator Hand (Plastic Cabinet)
HD-0002		Dial Indicator Hand (Wood Cabinet)
SM-0074		Shaft-Tuning
GR-0006		Grommet-Dial Drive Cord-Ser. #0 to #6500.
		KNOBS
KB-0003		Moulded, Ivory (Plastic Cabinet)
KB-0004		Moulded, Walnut (Plastic Cabinet)
KB-0005		Moulded, Brown (Wood Cabinet)
		LINE CORDS
CA-0038		Standard 110 Volt
		SOCKETS
SO-0009		Tube Sockets (Octal Wafer)
SL-0001		Dial Lamp Socket-Bayonet Type
		SPEAKERS
SK-0001		5" Dynamic (Serial #1 to 7250)
TO-0001		Transformer for Above
SK-0002		5" Dynamic (Above Serial #7250)
TO-0002		Transformer for Above

MODEL - 901-A*

Part No.	DESCRIPTION
SK-0003	Speaker P.M. with trans.
LI-0008	1st I.F. Assembly Complete
AN-0004	Loop Antenna Wood Cabinet
LO-0017	Oscillator Coil
LI-0009	Diode I.F. Assembly Complete
KB-0009	Knob with set screw

*REMAINDER OF PARTS LIST SAME AS MODEL 901

MODEL - 901-AP*

Part No.	DESCRIPTION
SK-0005	Speaker P.M. with trans.
LI-0010	1st I.F. Assembly Complete
LA-0004	Antenna Loading Coil
AN-0003	Loop Antenna works only with models having antenna load coil
LO-0017	Oscillator Coil
LI-0011	Diode I.F. Assembly Complete
SW-0005	Radio Phono Switch

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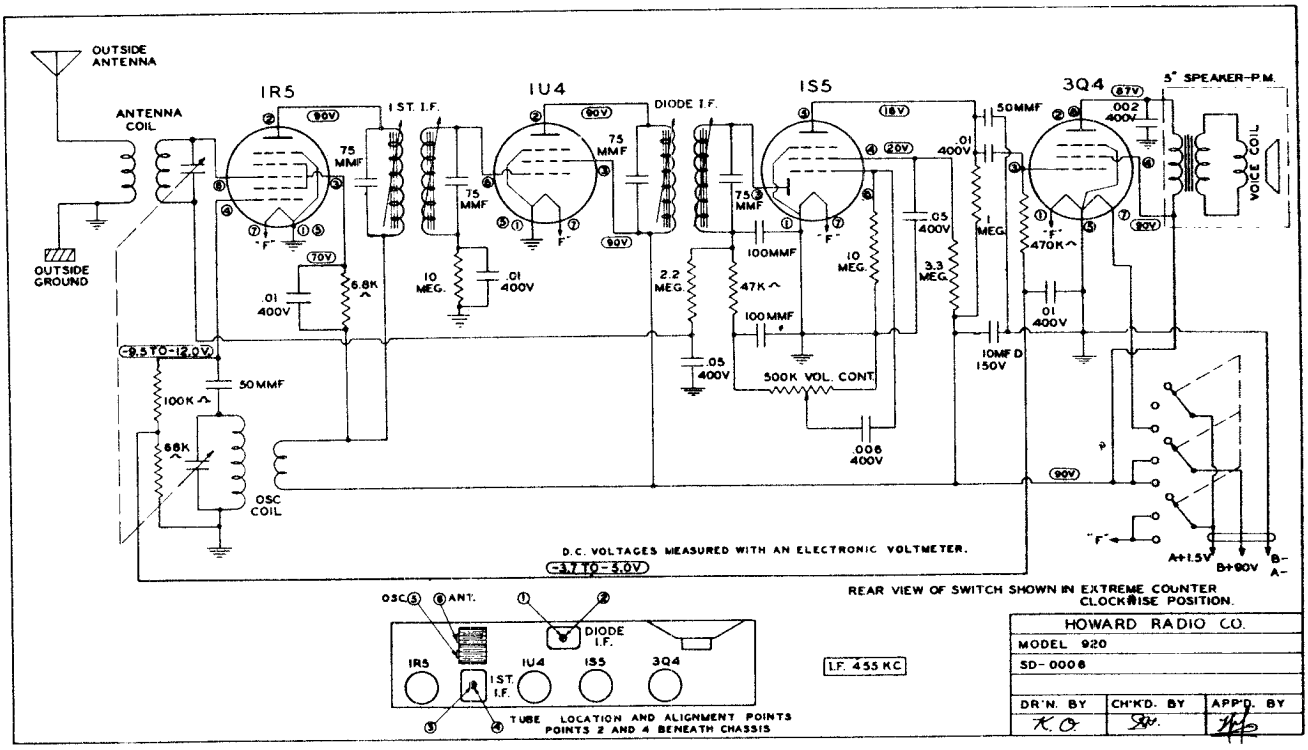

ANTENNA SYSTEM - Iron core high impedence antenna coil.
TUNING RANGE - 540 - 1600 K.C.
SPEAKER - Permo. Mag. Dynamic -- Size 5" -- V.C. IMP. (400CPS) 3.2 Ohms.
POWER OUTPUT - Max. 250MW U.P.O. 100MW.
I.F. - 455 KC - Iron core tuned.

Part No.	Description	Part No.	Description
	CONTROLS	DC-0001	Dial Drive Cord
VC-0003	Volume 1/2 Meg. R Taper	SP-0005	Tension Spring - Dial Drive Cord
SW-0008	Switch - On-Off - Batt. Saver	WG-0001	Dial Window (Plastic)
	CONDENSERS	HD-0001	Dial Indicator Hand
CV-0008	Tuning - 2 Gang cut Osc. Sec.	SM-0092	Drive Shaft Tuning
CE-0008	Filter - 10 MFD-150 V. Tubular		KNOB
	COIL ASSEMBLIES	KB-0009	Moulded, Walnut (with set screw)
LO-0017	Osc. Coil		CABLE
LA-0003	Ant. Coil	CA-0040	Battery Cable - 3 ft.
LI-0012	1st I.F. Assem. Complete		SOCKETS
LI-0013	Diode I.F. Assem. Complete	SO-0013	Miniature Tube Socket. 7 Pin.
	CABINET		SPEAKERS
CB-0004	Plastic Mottled	SK-0006	P.M. Dynamic Speaker 5"
AR-0011	Back Panel & Clip Assem.	TO-0004	Transformer (speaker)
	DIAL AND CONTROL PARTS	GR-0004	Grommet - Mounting Spk. & Gang
AR-0002	Calibrated Dial Plate (Plastic)	WD-0001	Wood Spacer Spk. Mounting
MP-0179	Battery Saver Red Flag	RB-0001	Sponge Rubber Spk. Support

The following batteries are some well known makes that can be used with this instrument;

Burgess No.17GD60
Eveready No.758
General No.60DL-11L
Ray-O-Vac No.AB-82

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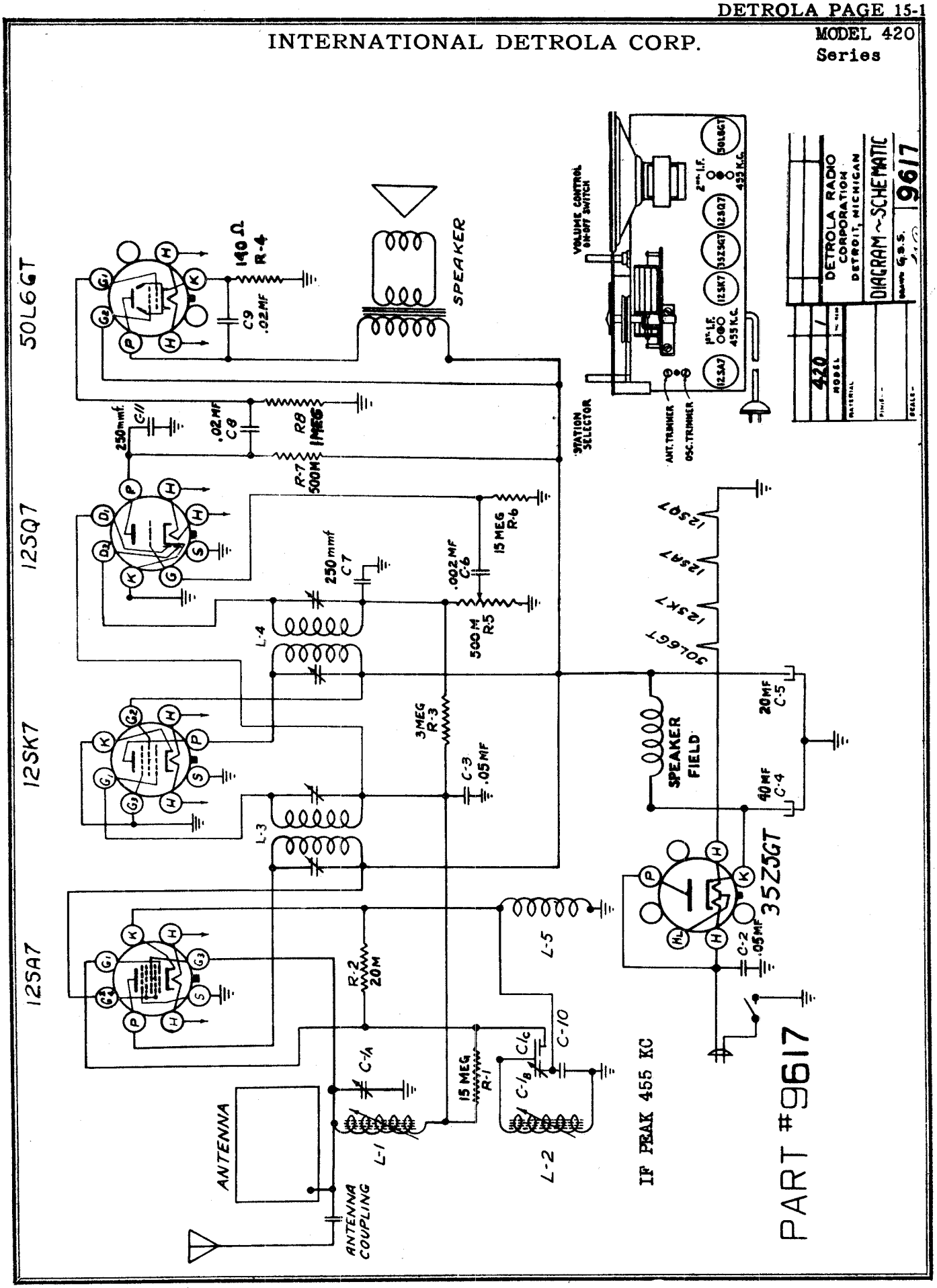
INTERNATIONAL DETROLA CORP.

MODEL 420
Series



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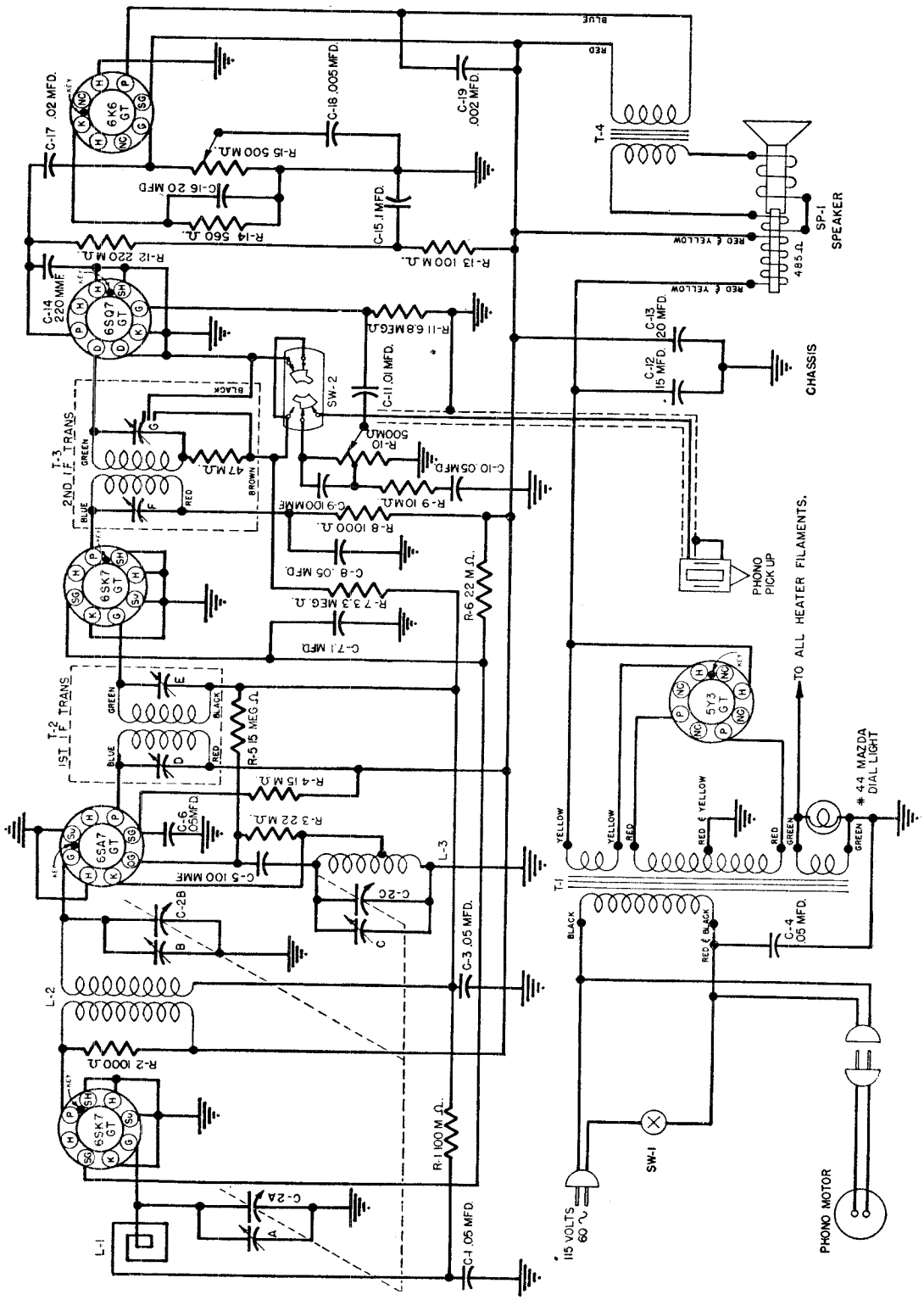
MODEL 554

INTERNATIONAL DETROLA CORP.



455 KC IF

ALL TUBE SOCKETS SHOWN FROM PIN END VIEW.

ALL SWITCHES SHOWN IN COUNTERCLOCKWISE POSITION, SHAFT END VIEW

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INTERNATIONAL DETROLA CORP

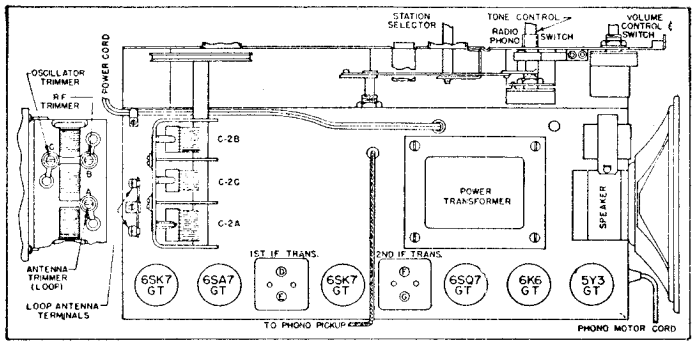
MODEL 554

ALIGNMENT PROCEDURE

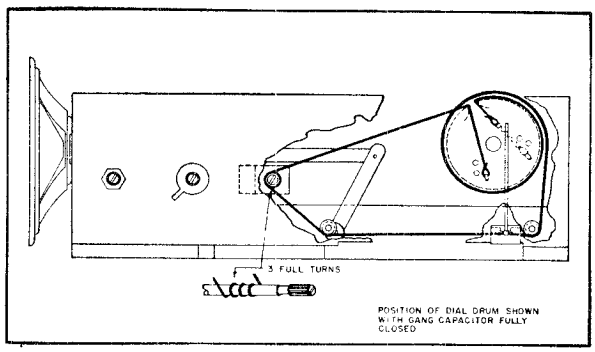
The following equipment is necessary to properly align this chassis:

1. A signal generator which will provide an accurately calibrated signal at the frequencies listed.
2. An output meter.
3. A non-metallic screwdriver.
4. Dummy antenna: — .1 mfd. — RMA loop.

CONNECT GENERATOR TO	DUMMY ANTENNA	INPUT SIGNAL FREQUENCY	BAND	SET DIAL AT	TRIMMERS	PURPOSE
6SA7GT grid	.1 mfd	455 kc.	Broadcast	HF end	D E F G	Align IF
6SK7GT RF grid	.1 mfd	1620 kc.	Broadcast	HF end	C	Set limit of band
6SK7GT RF grid	.1 mfd	1400 kc.	Broadcast	1400 kc.	B	Align RF
RMA loop	Through loop	1400 kc.	Broadcast	1400 kc.	A	Align antenna



Tube Layout



Dial Mechanism

TUBE COMPLEMENT

1—6SK7GT.....RF Amplifier tube
1—6SA7GT.....Converter tube
1—6SK7GT.....IF Amplifier tube
1—6SQ7GT.....Detector—AVC—1st Audio tube
1—6K6GT.....Power Output tube
1—5Y3GT.....Rectifier tube

NOTE: The above glass tubes are interchangeable with their metal equivalent.

Electrical and Mechanical Specifications

Frequency Range.....540-1600 kc.
Intermediate Frequency.....455 kc.
Power Supply.....105-125 volts, 60 cycle A.C.
Loudspeaker.....Electrodynamic
V.C. Impedance.....3.5 ohms at 400 cycles
Power Output (Undistorted).....1 watt
Power Output (Maximum).....4 watts
Tuning Drive Ratio.....4¾ to 1

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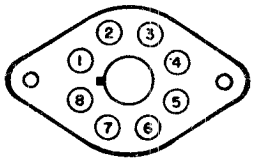
MODEL 554

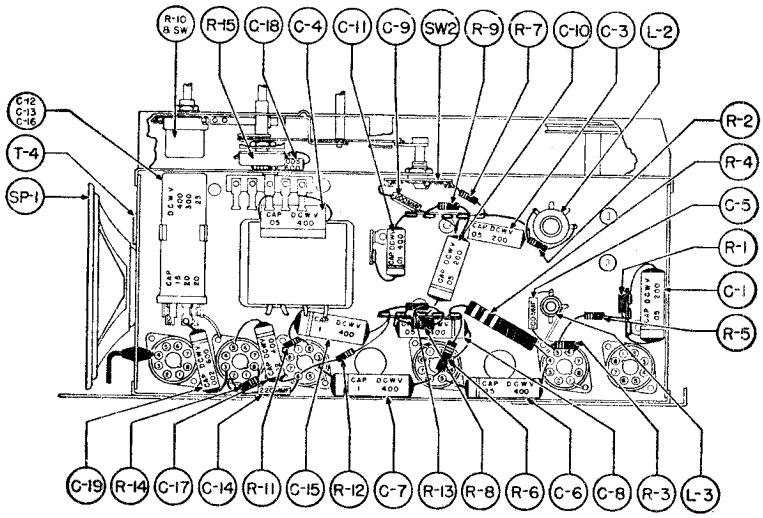
INTERNATIONAL DETROLA CORP.

SOCKET VOLTAGES

TUBE	POSITION	1	2	3	4	5	6	7	8
6SK7GT	RF Amplifier	0	0	0	0	0	93	6.3 AC	270
6SA7GT	Converter	0	6.3 AC	270	113	-7.5	0	0	0
6SK7GT	IF Amplifier	0	0	0	0	0	93	6.3 AC	260
6SQ7GT	Detector—AVC—1st Audio	0	0	0	0	0	88	6.3 AC	0
6K6GT	Power Output	0	0	250	270	0	175	6.3 AC	19
5Y3GT	Rectifier	0	310	0	290 AC	0	290 AC	0	310



NOTE: All voltages measured from chassis to socket contact indicated.
DC voltages measured with a 1000 ohm-per-volt meter.
All voltages are positive DC unless otherwise marked.
Volume control full on. No signal.
Tone Control in clockwise position.
Line Voltage 117 volts AC.



Parts Layout
Chassis Model 554

SERVICE PARTS LIST

Symbol	Part No.	Description
C-4	BC31B503	Cap., Molded, .05 mfd., 400 v.
C-1, 3, 10	BD210503	Cap., Paper, .05 mfd., 200 v.
C-11	BD410103	Cap., Paper, .01 mfd., 400 v.
C-7, 15	BD410104	Cap., Paper, .1 mfd., 400 v.
C-17	BD410203	Cap., Paper, .02 mfd., 400 v.
C-6, 8	BD410503	Cap., Paper, .05 mfd., 400 v.
C-19	BD610202	Cap., Paper, .002 mfd., 600 v.
C-18	BD610502	Cap., Paper, .005 mfd., 600 v.
C-5, 9	BM78A101	Cap., Mica, 100 mmf.
C-14	BM78A221	Cap., Mica, 220 mmf.
R-14	BR16E561	Resistor, 560 ohm, 1 w.
R-2, 8	BR17B102	Resistor, 1000 ohm, ⅓ w.
R-9	BR17B103	Resistor, 10M ohm, ⅓ w.
R-1, 13	BR17B104	Resistor, 100M ohm, ⅓ w.
R-5	BR17B156	Resistor, 15 meg., ⅓ w.
R-3	BR17B223	Resistor, 22M ohm, ⅓ w.
R-12	BR17B224	Resistor, 220M ohm, ⅓ w.
R-7	BR17B335	Resistor, 3.3 meg., ⅓ w.
R-11	BR17B685	Resistor, 6.8 meg., ⅓ w.
R-6	BR17E223	Resistor, 22M ohm, 1 w.
R-4	BR17G153	Resistor, 15M ohm, 2 w.

Symbol	Part No.	Description
	A-2163	Cable, Dial
	A-3123	Clamp, Cable
	A-9285	Lamp, Pilot, Mazda No. 44
	A-51160-3	Cord, Power, 6 ft.
	A-51163	Clip, Spring
C-12, 13, 16	A-51356	Cap., Electro., 15-20-20 mfd.
C-2	C-51501-1	Capacitor, Variable, 3-section
T-1	C-51502	Transformer, Power
L-2	B-51511	Coil, Assembly, RF
SP-1	C-51512	Speaker, 5" Dynamic, 485 ohm
L-3	B-51522	Coil Assembly, Osc.
	A-51531	Shaft, Drive
T-2	B-51416-2	Trans. Assembly, 1st IF
T-3	B-51417-2	Trans. Assembly, 2nd IF
	B-51591	Spring, Dial Bracket
	A-51787	Spring, Cable
	A-51801	Rivet, Pronged, 3/32 x 1/8
	B-55300-1	Channel, Rubber
SW-2	B-55500-1	Switch (Radio-Phono)
R-15	B-55550-1	Potentiometer, 500M ohm
R-10	B-55575-1	Potentiometer & Switch, 500M ohm

Order parts not listed by specifying (1) Part Name and (2) Model Number (include number following dash).

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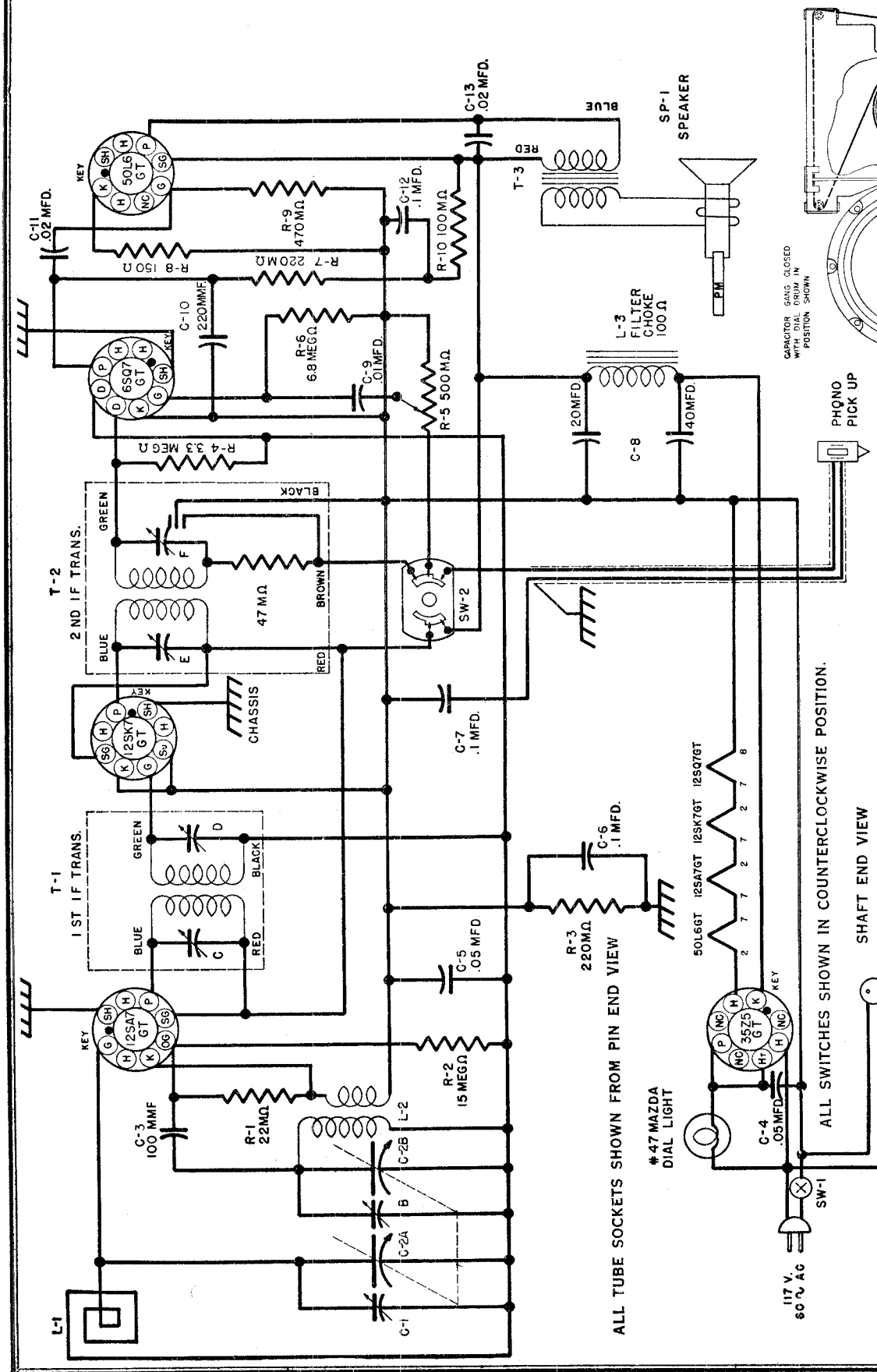
INTERNATIONAL DETROLA CORP.

MODEL 558



Frequency Range	540-1600 kc.
Intermediate Frequency	455 kc.
Power Supply	105-125 volts AC, 60 cycle
Loudspeaker	PM, 5-inch
V.C. Impedance	3.5 ohms at 400 cycles
Power Output (Undistorted)	1.0 watt
Power Output (Maximum)	1.5 watts
Tuning Drive Ratio	5 to 1

Record Changer: Detrola Model 550

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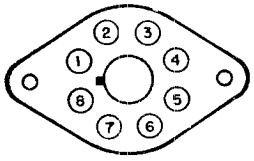
MODEL 558

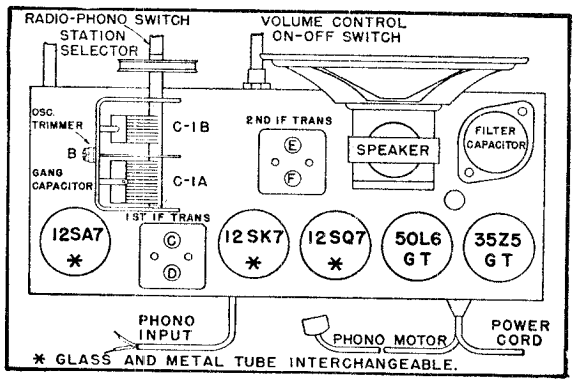
INTERNATIONAL DETROLA CORP.

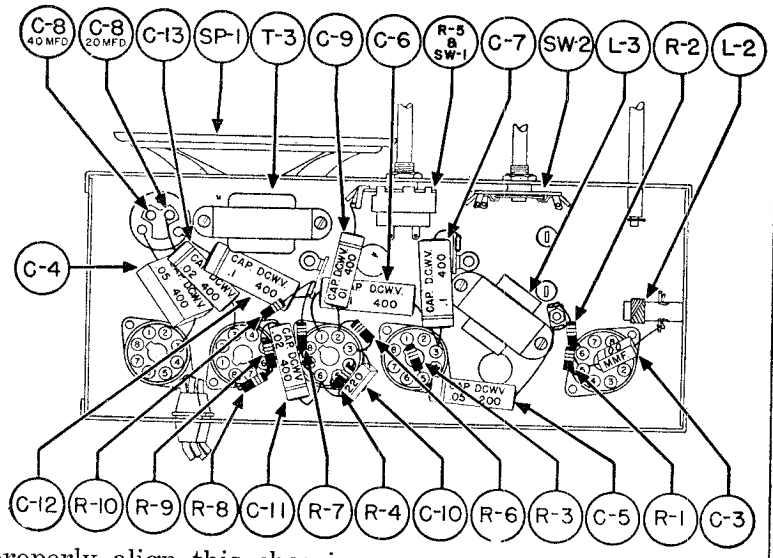
TUBE	POSITION	1	2	3	4	5	6	7	8
12SA7GT	Converter	0	36.3 AC	108	108	–5.6	0	23.8 AC	0
12SK7GT	IF Amplifier	0	11.4 AC	0	0	0	108	23.8 AC	108
12SQ7GT	Detector—1st Audio	0	0	0	0	0	43	11.4 AC	0
50L6GT	Power Output	0	85 AC	100	108	0	0	36:3 AC	7.3
35Z5GT	Rectifier	0	117 AC	112 AC	0	112 AC	0	85 AC	117



NOTE: All DC voltages measured with a 1000 ohm-per-volt meter from ON-OFF switch (—B) to socket contact indicated. All AC voltages are measured from ON-OFF switch (—B) to socket contact indicated.
All voltages are positive DC unless otherwise marked.
Volume Control full on. No signal.
Line voltage 117 volts AC.

Parts Layout
Chassis Model 558





The following equipment is necessary to properly align this chassis:

A signal generator which will provide an accurately calibrated signal at the frequencies listed.
An output meter.
A non-metallic screwdriver.
Dummy antenna: — .1 mfd. — RMA loop.

NOTE: Intermediate Frequency and Oscillator adjustments may be made with the loop disconnected provided a resistor of 10,000 to 50,000 ohms is substituted to close the 12SA7GT grid circuit. The loop alignment must be done with the loop and chassis mounted in operating position in the cabinet. A single turn loosely coupled to loop may be substituted for RMA loop.

GENERATOR	CONNECTION AT RADIO	DUMMY ANTENNA	DIAL	TO TUNE TRIMMERS	REMARKS
IF 455 kc.	12SA7GT grid	.1 mfd.	HF end	IF trimmers C D E F	Tune to max.
1620 kc.	12SA7GT grid	RMA loop	HF end	Osc. trimmer B	Set limit of band
1400 kc.	Through loop*	RMA loop	1400 kc.	Ant. trimmer A	Tune to max.

* Loop trimmer accessible through bottom of cabinet.

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INTERNATIONAL DETROLA CORP.

MODEL 558
MODEL 572
MODEL 576
MODEL 579

Chassis Model 558

Symbol	Part No.	Description
C-4	BC31B503	Cap., Molded, .05 mfd., 400 v.
C-5	BD210503	Cap., Paper, .05 mfd., 200 v.
C-9	BD410103	Cap., Paper, .01 mfd., 400 v.
C-6, 7, 12	BD410104	Cap., Paper, .1 mfd., 400 v.
C-11, 13	BD410203	Cap., Paper, .02 mfd., 400 v.
C-3	BM78A101	Cap., Mica, 100 mmf.
C-10	BM78A221	Cap., Mica, 220 mmf.
R-8	BR16C151	Resistor, 150 ohm, ½ w.
R-10	BR17B104	Resistor, 100,000 ohm, ⅓ w.
R-2	BR17B156	Resistor, 15 megohm, ⅓ w.
R-1	BR17B223	Resistor, 22,000 ohm, ⅓ w.
R-3, 7	BR17B224	Resistor, 220,000 ohm, ⅓ w.
R-4	BR17B335	Resistor, 3.3 megohm, ⅓ w.
R-9	BR17B474	Resistor, 470,000 ohm, ⅓ w.
R-6	BR17B685	Resistor, 6.8 megohm, ⅓ w.
	A-2163	Cable, Drive
	A-6158	Lamp, Pilot, No. 47 Mazda, 6.3 v.

Symbol	Part No.	Description
C-1	B-8296-1	Trimmer
C-8	A-8948	Capacitor, Electro., 40-20 mfd.
R-5	B-9051-3	Control, Pot.&Sw.(V.C.) 500M ohm.
T-1	B-51010-1	Transformer Assembly, 1st IF
T-2	B-51011-1	Transformer Assembly, 2nd IF
L-2	B-51159	Coil Assembly, Oscillator
	A-51160-1	Cord, AC Power, 6 ft.
	A-51163	Clip, Spring
C-2	C-51573-1	Cap., Variable
SW-2	B-51576-1	Switch, Radio-Phono
SP-1	C-51577	Speaker, 5-inch PM
T-3	B-51578-1	Transformer, Output
	B-51585-1	Cord (AC to Phono.)
	B-51591	Spring, Dial Bracket
L-1	B-51599	Coil, Loop
L-3	A-51726-2	Choke, Filter, 80 ma.
	A-51787	Spring, Cable

Chassis Model 572

Symbol	Part No.	Description
C-5	BC31B503	Cap., .05 mfd., 400 v. paper
C-2, 8, 21	BD210503	Cap., .05 mfd., 200 v. paper
C-22	BD410103	Cap., .01 mfd., 400 v. paper
C-7, 24	BD410104	Cap., .1 mfd., 400 v. paper
C-25	BD410203	Cap., .02 mfd., 400 v. paper
C-16, 28	BD410503	Cap., 05 mfd., 400 v. paper
C-1, 27	BD610202	Cap., .002 mfd., 600 v. paper
C-12	BM58D512	Cap., 5100 mmf., mica
C-11, 20	BM78A101	Cap., 100 mmf., mica
C-23	BM78A221	Cap., 220 mmf., mica
R-15	BR16E561	Resistor, 560 ohm, 1 w.
R-2, 9	BR17B102	Resistor, 1000 ohm, ⅓ w.
R-10	BR17B103	Resistor, 10M ohm, ⅓ w.
R-1, 14	BR17B104	Resistor, 100M ohm, ⅓ w.
R-4	BR17B150	Resistor, 15 ohm, ⅓ w.
R-5	BR17B156	Resistor, 15 meg., ⅓ w.
R-3	BR17B223	Resistor, 22M ohm, ⅓ w.
R-13	BR17B224	Resistor, 220M ohm, ⅓ w.
R-8	BR17B335	Resistor, 3.3 meg., ⅓ w.
R-16	BR17B474	Resistor, 470M ohm, ⅓ w.
R-12	BR17B685	Resistor, 6.8 meg., ⅓ w.
R-7	BR17E223	Resistor, 22M ohm, 1 w.
R-6	BR17G153	Resistor, 15M ohm. 2 w.
	A-2163	Cable, drive

Symbol	Part No.	Description
	A-9285	Lamp, pilot, Mazda No. 44
	A-51160-1	Cord, power, 6 ft.
	B-51162-3	Shaft, drive
	A-51163	Clip, spring
	A-51260	Shield, tube
C-18,19,26	A-51356	Cap., electro., 15-20-20 mfd.
C-6	C-51401-1	Capacitor, variable
SP-1	C-51413	Speaker assembly, 5-inch
T-2	B-51416-1	Trans. assembly, 1st IF
T-3	B-51417-1	Trans. assembly, 2nd IF
C-17	A-51419	Cap., electro., 10 mfd., 250 v.
L-5	B-51420	Coil assembly, oscillator
T-1	C-51421	Transformer, power
L-3	B-51422	Coil assembly, antenna loading
L-4	B-51425	Coil assembly, RF
C-13	B-51428-5	Capacitor, padder
L-2	B-51430	Coil assembly, SW antenna
SW-2	B-51435-1	Switch assembly, 2-band
R-11	B-51445-1	Control, Pot. & switch 500,000 ohm.
C-9, 10, 14, 15	A-51656	Cap. assembly, trimmer (4)
C-3	A-51657	Cap. assembly, trimmer (spec.)
	A-51787	Spring, cable
C-4	B-51859-1	Cap. assembly, Ant.—BC

Chassis Model 576

Symbol	Part No.	Description
C-4	BC31B503	Cap., Molded, .05 mfd., 400 v.
C-8	BD210303	Cap., Paper, .03 mfd., 200 v.
C-2	BD210503	Cap., Paper, .05 mfd., 200 v.
C-10	BD410103	Cap., Paper, .01 mfd., 400 v.
C-6, 13	BD410104	Cap., Paper, .1 mfd., 400 v.
C-14	BD410203	Cap., Paper, .02 mfd., 400 v.
C-16	BD610202	Cap., Paper, .002 mfd., 600 v.
C-15	BD610502	Cap., Paper, .005 mfd., 600 v.
C-7	BM78A101	Cap., Mica, 100 mmf., 500 v.
C-3	BM78A151	Cap., Mica, 150 mmf., 500 v.
C-12	BM78A221	Cap., Mica, 220 mmf., 500 v.
C-5	BM78A470	Cap., Mica, 47 mmf., 500 v.
R-11	BR16C151	Resistor, 150 ohm, ½ w.
R-9	BR17B104	Resistor, 100,000 ohm, ⅓ w.
R-4	BR17B153	Resistor, 15,000 ohm, ⅓ w.
R-3	BR17B156	Resistor, 15 meg., ⅓ w.
R-1	BR17B223	Resistor, 22,000 ohm, ⅓ w.
R-2, 8	BR17B224	Resistor, 220,000 ohm, ⅓ w.
R-6	BR17B335	Resistor, 3.3 meg., ⅓ w.
	BR17B473	Resistor, 47,000 ohm, ⅓ w.

Symbol	Part No.	Description
R-7	BR17B685	Resistor, 6.8 meg., ⅓ w.
	A-2163	Cable Drive
	A-6158	Lamp, Pilot No. 47 mazda, 6.3 v.
C-9, 11	A-8948	Cap., Electrolytic, 40-20 mfd., 150 v.
T-1	B-51010-1	Transformer Assembly, 1st IF
T-2	B-51011-1	Transformer Assembly, 2nd IF
	A-51160-1	Cord, AC-DC Line, 6 ft.
	A-51163	Clip, Spring
C-1	C-51251	Cap., Variable, 3-section
L-3	B-51256	Coil Assembly, Oscillator
L-2	B-51257	Coil Assembly, RF
	A-51260	Shield, Tube
SP-1	C-51722	Speaker, 6-inch, PM
R-10	B-51724-1	Control, Pot. & Sw. (Tone) 500M ohm.
R-5	B-51725-2	Control, Pot. (Volume) 500M ohm.
L-4	B-51726-1	Choke, Filter, 80 ma.
	A-51728	Shaft, Drive
	B-51730	Socket and Cable Assembly
	C-51735	Bracket Assembly, Welded
	A-51787	Spring, Cable
	A-51936	Clip, Indicator

Chassis Model 579

Symbol	Part No.	Description
C-4	BC31B503	Cap., paper, .05 mfd., 400 v.
C-2	BD210503	Cap., paper, .05 mfd., 200 v.
C-8	BD410103	Cap., paper, .01 mfd., 400 v.
C-6	BD410104	Cap., paper, .01 mfd., 400 v.
C-10, 11	BD410203	Cap., paper, .02 mfd., 400 v.
C-3	BM78A151	Cap., mica, 150 mmf.
C-9	BM78A221	Cap., mica, 220 mmf.
C-5	BM78A470	Cap , mica, 47 mmf.
R-9	BR16C151	Resistor, 150 ohm, ½ w.
R-3	BR17B156	Resistor, 15 megohm, ⅓ w.
R-1	BR17B223	Resistor, 22M ohm, ⅓ w.
R-2	BR17B224	Resistor, 220M ohm, ⅓ w.
R-5	BR17B335	Resistor, 3.3 megohm, ⅓ w.
R-7, 8	BR17B474	Resistor, 470M ohm, ⅓ w.
R-6	BR17B685	Resistor, 6 8 megohm, ⅓ w.
	A-2163	Cable, drive
	A-6158	Lamp, pilot, No. 47 Mazda 6.3 v.

Symbol	Part No.	Description
C-7	A-8948	Cap., electro., 40-20 mfd.
R-4	A-9051-2	Potentiometer and switch
T-1	B-51010-1	Transformer assembly, 1st IF
T-2	B-51011-1	Transformer assembly, 2nd IF
SP-1	C-51058	Speaker, 5-inch
	A-51160-1	Cord, AC line, 6 ft.
	B-51162-2	Shaft, drive
	A-51163	Clip, spring
C-1	C-51251	Capacitor, variable
L-3	B-51256	Coil, oscillator assembly
L-2	B-51257	Coil, RF assembly
	A-51260	Shield, tube
	A-51787	Spring, cable, music wire
	C-51921	Dial assembly, welded
	A-51936	Clip, indicator

Order parts not listed by specifying (1) Part Name and (2) Model Number (Including number following dash).

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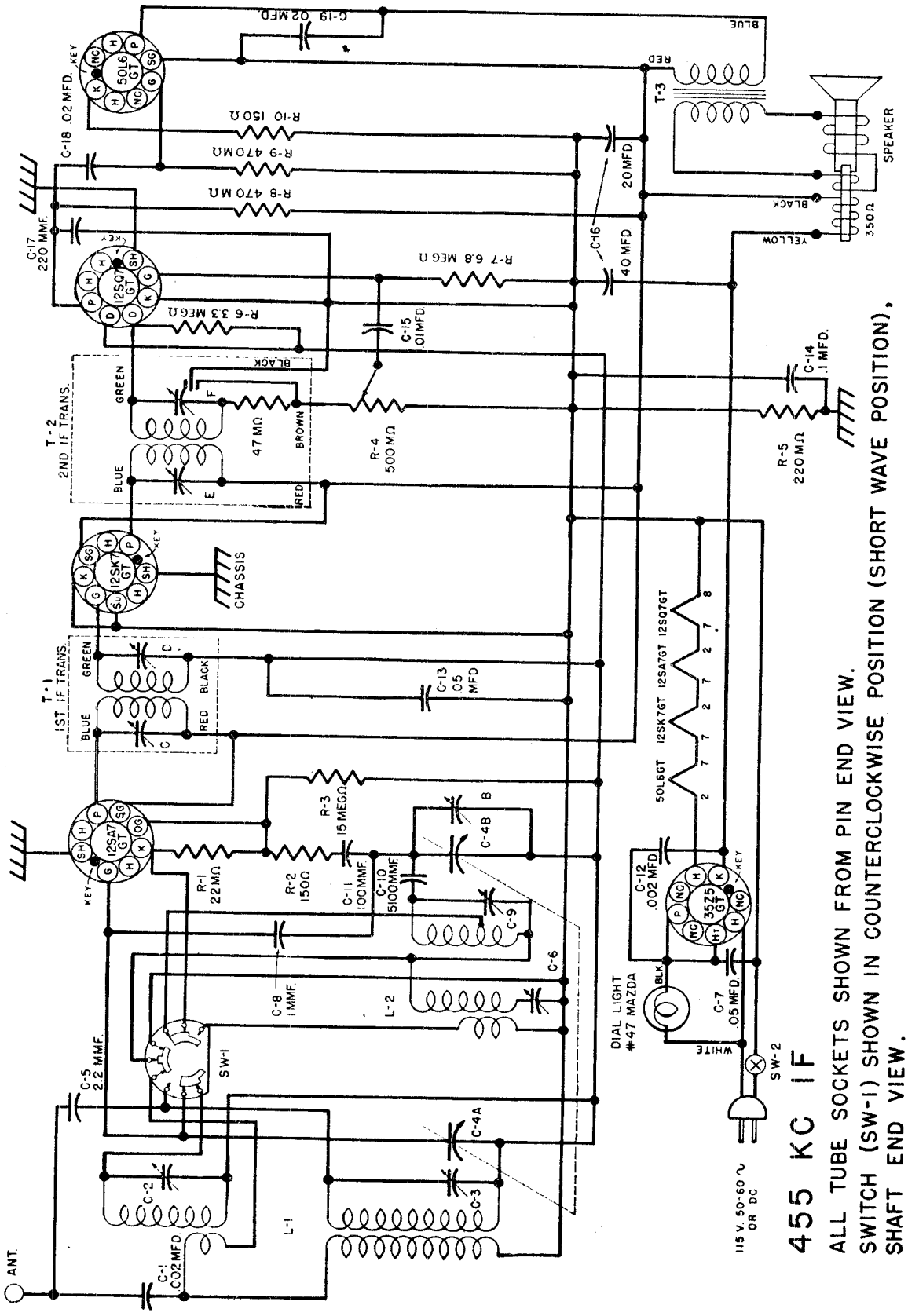
MODEL 568

INTERNATIONAL DETROLA CORP.



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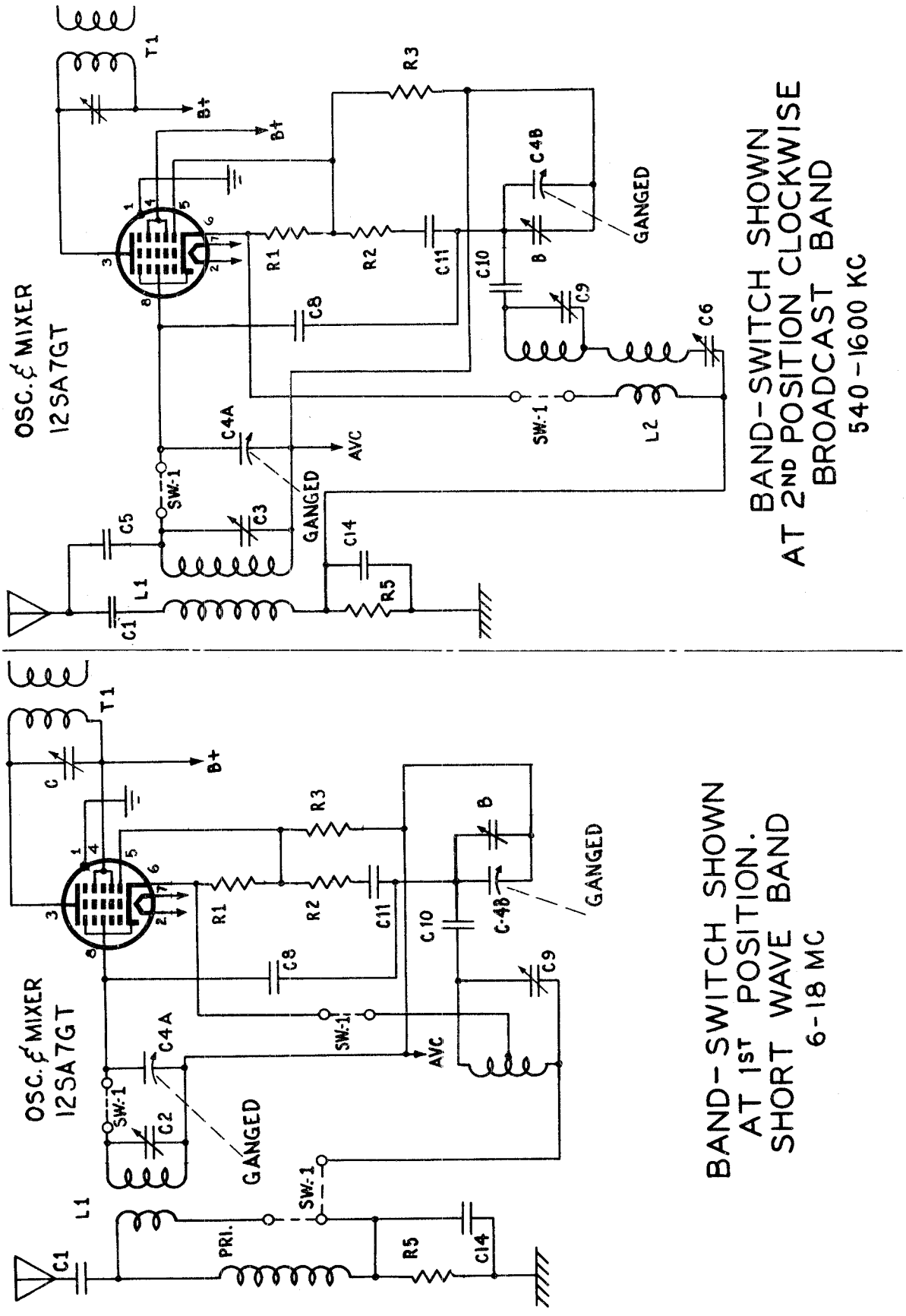
INTERNATIONAL DETROLA CORP.

MODEL 568



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MODEL 568

INTERNATIONAL DETROLA CORP.

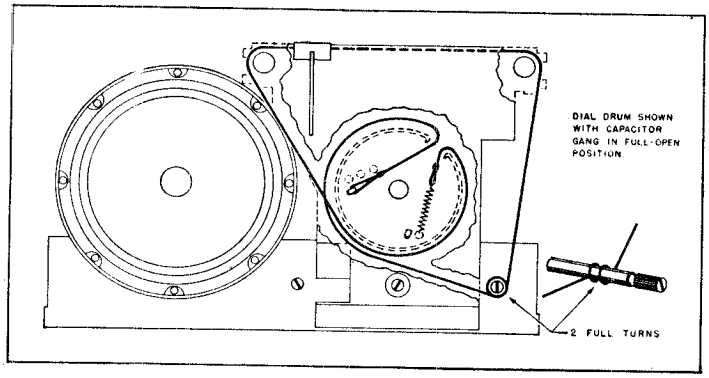
ALIGNMENT PROCEDURE

The following equipment is necessary to properly align this chassis:

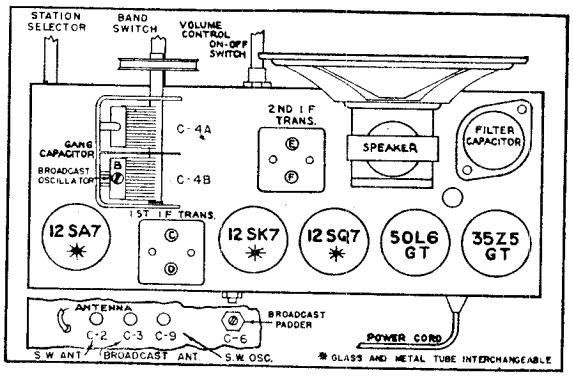
1. A signal generator which will provide an accurately calibrated signal at the frequencies listed.
2. An output meter.
3. A non-metallic screwdriver.
4. Dummy antenna: — .1 mfd. — 200 mmf. — 400 ohms

CONNECT TEST OSCILLATOR TO	DUMMY ANTENNA	INPUT SIGNAL FREQUENCY	BAND	SET DIAL AT	TRIMMERS	PURPOSE
12SA7GT grid	.1 mfd.	455 kc.	Broadcast	HF end	C D E F	Align IF
12SA7GT grid	.1 mfd.	1620 kc.	Broadcast	HF end	B	Set limit of band
Ant. terminal	400 ohms	18.3 mc.	Short Wave	HF end	C-9	Set limit of band
Ant. terminal	400 ohms	18.0 mc.	Short Wave	18 mc.	C-2	Align antenna
Ant. terminal	200 mmf.	1400 kc.	Broadcast	1400 kc.	C-3	Align antenna
Ant. terminal	200 mmf.	600 kc.	Broadcast	600 kc.	C-6	Rock gang and adjust to max.

NOTE: Recheck alignment of trimmers B and C-3 after adjusting C-6.



Dial Mechanism



Tube Layout

TUBE COMPLEMENT

1—12SA7GT Oscillator and Mixer tube
1—12SK7GT IF Amplifier tube
1—12SQ7GT Second Detector and First Audio tube
1—50L6GT Power Output tube
1—35Z5GT Rectifier tube

NOTE: The above glass tubes are interchangeable with their metal equivalent.

Electrical and Mechanical Specifications

Frequency Range ..... 540-1600 kc., 6-18 mc.
Intermediate Frequency ..... 455 kc.
Power Supply ..... 105-125 volts, 50-60 cycle AC or DC
Loudspeaker ..... Dynamic
V.C. Impedance ..... 3.5 ohms at 400 cycles
Power Output (Undistorted) ..... .75 watt
Power Output (Maximum) ..... 1.5 watts
Tuning Drive Ratio 5-1

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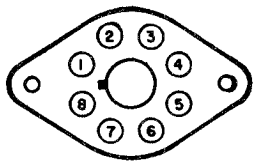
INTERNATIONAL DETROLA CORP.

MODEL 568

SOCKET VOLTAGES

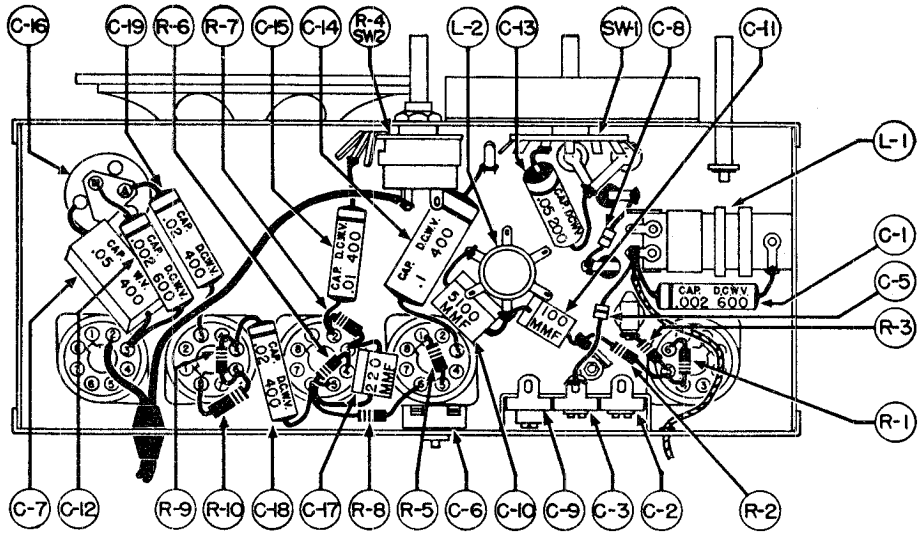
TUBE	POSITION	1	2	3	4	5	6	7	8
12SA7GT	Oscillator and Mixer	0	37.5 AC	99	99	-4.2	0	24.5 AC	0
12SK7GT	IF Amplifier	0	24.5 AC	0	0	0	99	12.5 AC	99
12SQ7GT	2nd Det.—1st Audio	0	0	0	0	0	16	12.5 AC	0
50L6GT	Power Output	0	85 AC	91.5	99	0	0	37.5 AC	5.9
35Z5GT	Rectifier	0	117 AC	112 AC	0	112 AC	0	85 AC	112



NOTE: All DC voltages measured with a 1000 ohm-per-volt meter from ON-OFF switch (—B) to socket contact indicated. All voltages are positive DC unless otherwise marked.

Volume control full on. No signal.

Line Voltage 117 volts AC.



Parts Layout Chassis Model 568

SERVICE PARTS LIST

Symbol	Part No.	Description
C-7	BC31B503	Cap., Molded Paper, .05 mfd.
C-13	BD210503	Cap., Paper, .05 mfd., 200 v.
C-15	BD410103	Cap., Paper, .01 mfd., 400 v.
C-14	BD410104	Cap., Paper, .1 mfd., 400 v.
C-18, 19	BD410203	Cap., Paper, .02 mfd., 400 v.
C-1, 12	BD610202	Cap., Paper, .002 mfd., 600 v.
C-10	BM58D512	Cap., Mica, 5100 mmf.
C-11	BM78A101	Cap., Mica, 100 mmf.
C-17	BM78A221	Cap., Mica, 220 mmf.
R-10	BR16C151	Resistor, 150 ohm, ½ w.
R-2	BR17B151	Resistor, 150 ohm, ⅓ w.
R-3	BR17B156	Resistor, 15 meg., ⅓ w.
R-1	BR17B223	Resistor, 22,000 ohm, ⅓ w.
R-5	BR17B224	Resistor, 220,000 ohm, ⅓ w.
R-6	BR17B335	Resistor, 3.3 meg., ⅓ w.
R-8, 9	BR17B474	Resistor, 470,000 ohm, ⅓ w.
R-7	BR17B685	Resistor, 6.8 meg., ⅓ w..
	A-2163	Cable, Drive
	A-6158	Lamp, Pilot, No. 47, Mazda, 6.3 v.

Symbol	Part No.	Description
C-16	A-8948	Cap., Electrolytic, 40-20 mfd.
R-4	B-9051-5	Control, Vol & Sw. 500,000 ohm
T-1	B-51010-1	Transformer Assembly, 1st IF
T-2	B-51011-1	Transformer Assembly, 2nd IF
	C-51014	Speaker, 5-inch Dynamic
	A-51160-1	Cord, Power, 6 ft.
	A-51163	Clip, Spring
C-6	B-51428-5	Capacitor, Padder
	B-51591	Spring, Dial Bracket
SW-1	B-51764-1	Switch, Band
	A-51787	Spring, Cable, Music Wire
L-1	B-51828	Coil Assembly, BC & SW Ant.
C-2, 3, 9	A-51834	Capacitor, Trimmer, 3-section
L-2	B-51836	Coil Assembly, Osc.
C-4	C-51837-1	Capacitor, Variable
C-8	B-51839-2	Capacitor, 1 mmf.
C-5	B-51839-4	Capacitor, 2.2 mmf.
	A-51869	Antenna Reel Assembly

Order parts not listed by specifying (1) Part Name and (2) Model Number (include number following dash)

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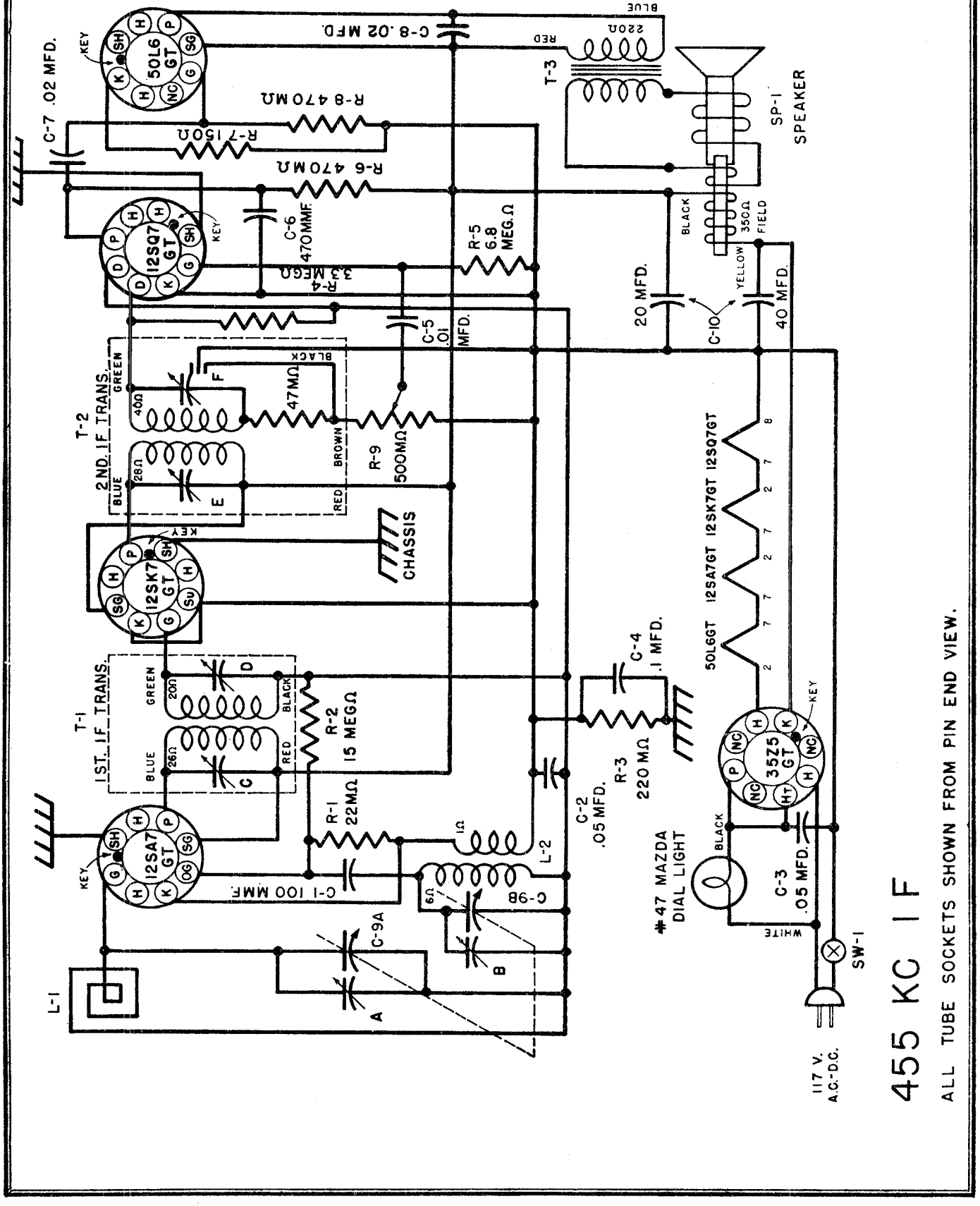
MODELS 571A, 571B

INTERNATIONAL DETROLA CORP.



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INTERNATIONAL DETROLA CORP.

MODELS 571A, 571B

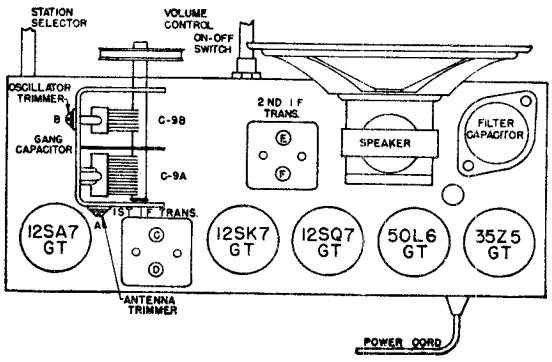
ALIGNMENT PROCEDURE

The following equipment is necessary to properly align this chassis:

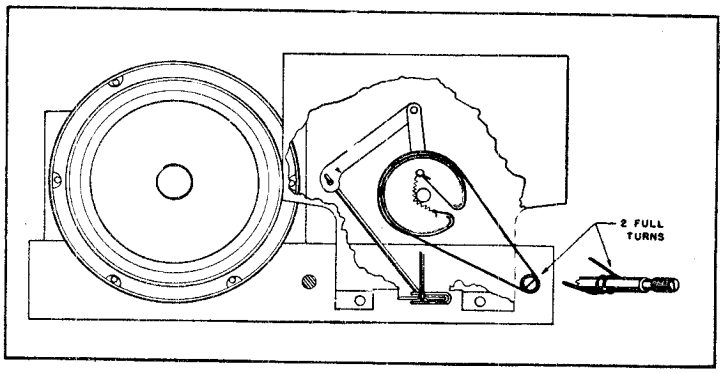
1. A signal generator which will provide an accurately calibrated signal at the frequencies listed.
2. An output meter.
3. A non-metallic screwdriver.
4. Dummy antenna: — .1 mfd., — RMA loop.

NOTE: Intermediate Frequency and Oscillator adjustments may be made with the loop disconnected provided a resistor of 10,000 to 50,000 ohms is substituted to close the 12SA7GT grid circuit. The loop alignment must be done with the loop and chassis mounted in operating position in the cabinet. A single turn loosely coupled to loop may be substituted for RMA loop.

GENERATOR	CONNECTION AT RADIO	DUMMY ANTENNA	DIAL	TO TUNE TRIMMERS	REMARKS
IF 455 kc.	12SA7GT grid	.1 mfd.	HF end	IF trimmers C D E F	Tune to max.
1620 kc.	Through loop	RMA loop	HF end	Osc. trimmer B	Set limit of band
1400 kc.	Through loop	RMA loop	1400 kc.	Ant. trimmer A	Tune to max.



Tube Layout



Dial Mechanism

TUBE COMPLEMENT

1—12SA7GT Oscillator and Mixer tube
1—12SK7GT IF Amplifier tube
1—50L6GT Power Output tube
1—35Z5GT Rectifier tube
1—12SQ7GT Second Detector and First Audio tube

NOTE: The above glass tubes are interchangeable with their metal equivalent.

Electrical and Mechanical Specifications

Frequency Range ..... 540-1600 kc.
Intermediate Frequency ..... 455 kc.
Power Supply ..... 105-125 volts AC-DC
Loudspeaker ..... Dynamic
V.C. Impedence ..... 3.5 ohms at 400 cycles
Power Output (Undistorted) ..... .75 watts
Power Output (Maximum) ..... 1.5 watts
Tuning Drive Ratio ..... 3 to 1

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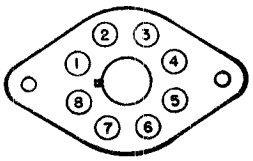
MODELS 571A, 571B

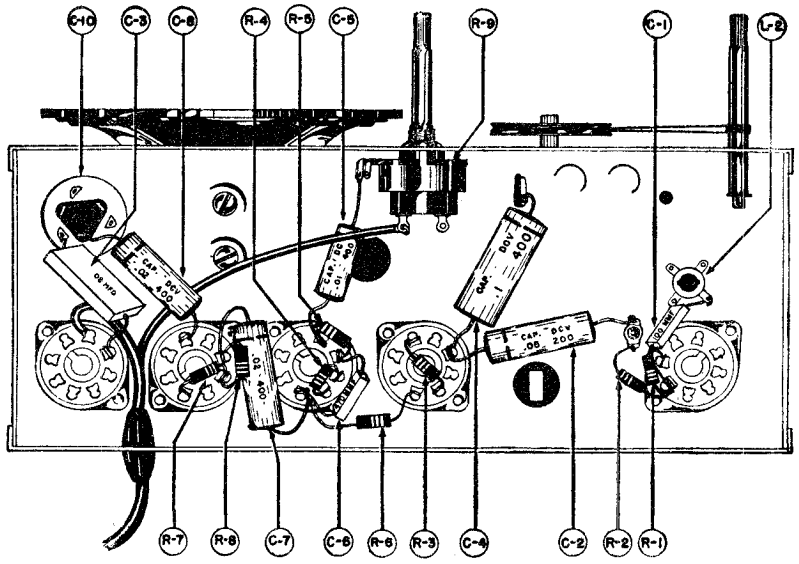
INTERNATIONAL DETROLA CORP.

SOCKET VOLTAGES

TUBE	POSITION	1	2	3	4	5	6	7	8
12SA7GT	Osc. and Mixer	0	37.5 AC	99	99	-4.2	0	24.5 AC	0
12SK7GT	IF Amplifier	0	24.5 AC	0	0	0	99	12.5 AC	99
12SQ7GT	2nd Det.—1st Audio	0	0	0	0	0	16	12.5 AC	0
50L6GT	Power Output	0	85 AC	91.5	99	0	0	37.5 AC	5.9
35Z5GT	Rectifier	0	117 AC	112 AC	0	112 AC	0	85 AC	112



NOTE: All DC voltages measured with a 1000 ohm per volt meter from ON-OFF switch (—B) to socket contact indicated. All AC voltages are measur from ON-OFF switch (—B) to socket contact indicated.
All voltages are positive DC unless otherwise marked.
Volume control full on.
Line voltage 117 volts AC.



Parts Layout Chassis Models 571A and 571B

SERVICE PARTS LIST

Symbol	Part No.	Description
C-1	BM78A101	Cap., Mica, 100 mmf.
C-2	BD210503	Cap., Paper, .05 mfd., 200 v.
C-3	BC31B503	Cap., Mold., Paper, .05 mfd.
C-4	BD410104	Cap., Paper, .1 mfd., 400 v.
C-5	BD410103	Cap., Paper, .01 mfd., 400 v.
C-6	BM78A471	Cap., Mica, 470 mmf.
C-7, 8	BD410203	Cap., Paper, .02 mfd., 400 v.
C-9	C-51155-1	Cap., Variable, 2 Section
C-10	A-8948	Cap., Electro., 40-20 mfd., 150 v.
L-1	B-51243	Loop, Antenna
L-2	B-51159	Coil, Osc. Assembly
R-1	BR17B223	Resistor, 22M ohm 1/3 w.
R-2	BR17B156	Resistor, 15 meg. 1/3 w.
R-3	BR17B224	Resistor, 220M ohm 1/3 w.
R-4	BR17B335	Resistor, 3.3 meg. 1/3 w.
R-5	BR17B685	Resistor, 6.8 meg. 1/3 w.
R-6, 8	BR17B474	Resistor, 470M ohm 1/3 w.
R-7	BR16C151	Resistor, 150 ohm. 1/2 w.
R-9	B-9051-1	Control, Vol. & Sw. 500M ohm.
T-1	B-51010	Trans., Assembly, 1st IF
T-2	B-51011	Trans., Assembly, 2nd IF
SP-1	C-51014	Speaker, 5" Dynamic, 350 ohm.
	A-2163	Cable, Drive
	A-6158	Lamp, Pilot No. 47 Mazda 6.3 v.
	A-51160-1	Cord, AC-DC Line, 6 ft.
	B-51162-1	Shaft, Drive
	A-51163	Clip, Spring
	B-51177	Bracket Assembly, Dial
	A-51202	Link, Insulating
	B-51204-1	Pointer
	A-51206	Arm, Dial Drive
	A-51237-1	Paper Back, Dial
	D-51240-1	Cabinet (571-1)
	A-51241-2	Knob
	C-51242-1	Dial, Glass Indicator
	C-51247	Back, Cabinet
	A-51249	Strip, Sponge Rubber
	A-51331	Spring, Dial Bracket
	A-51787	Spring, Cable
	B-54000	Carton Assembly

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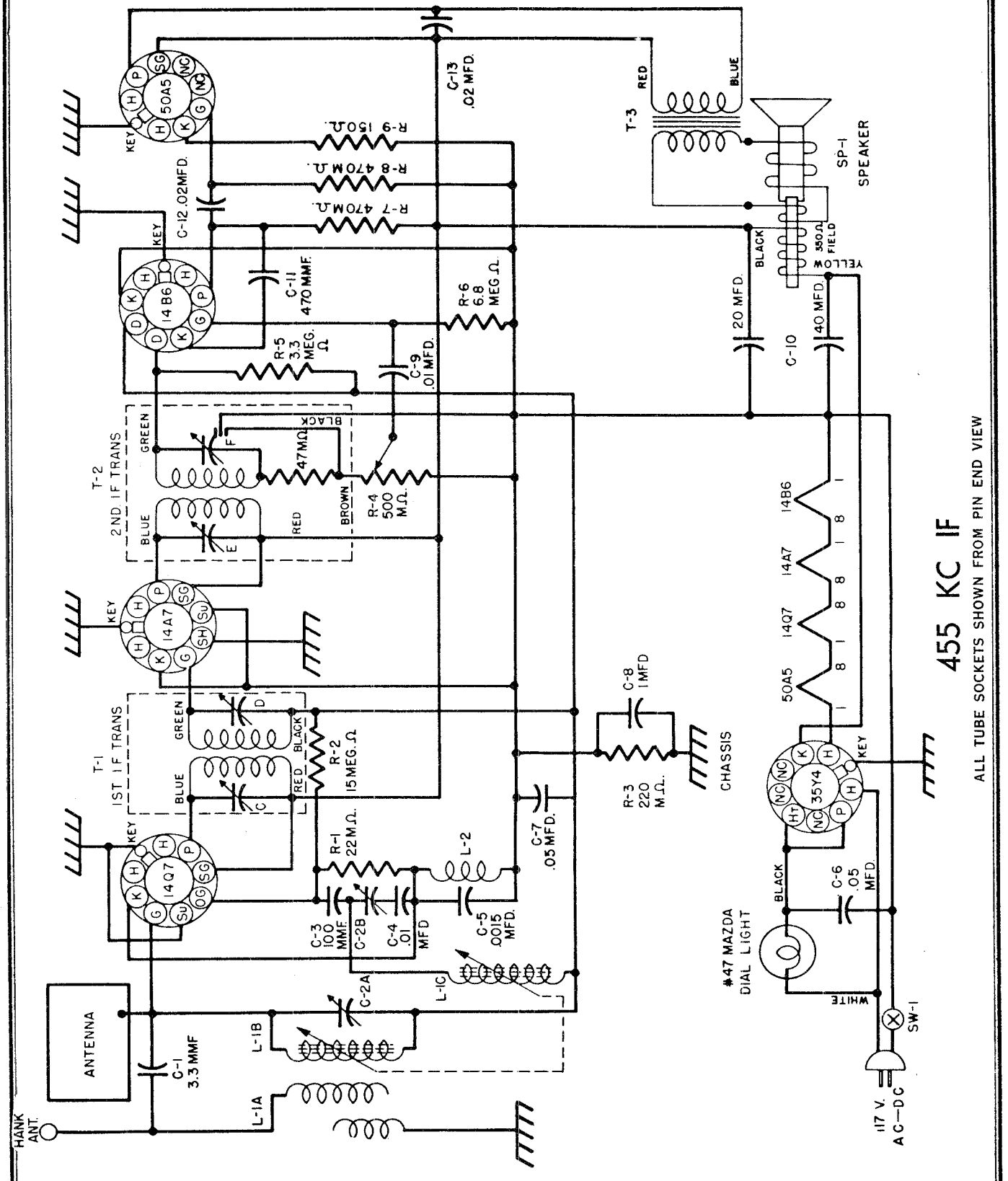
INTERNATIONAL DETROLA CORP.

MODEL 571X



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MODEL 571X

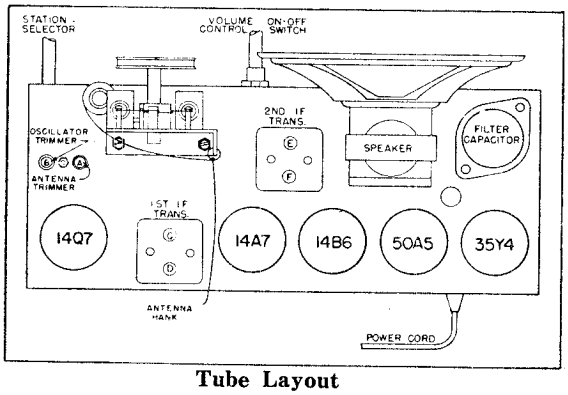
INTERNATIONAL DETROLA CORP.

ALIGNMENT PROCEDURE

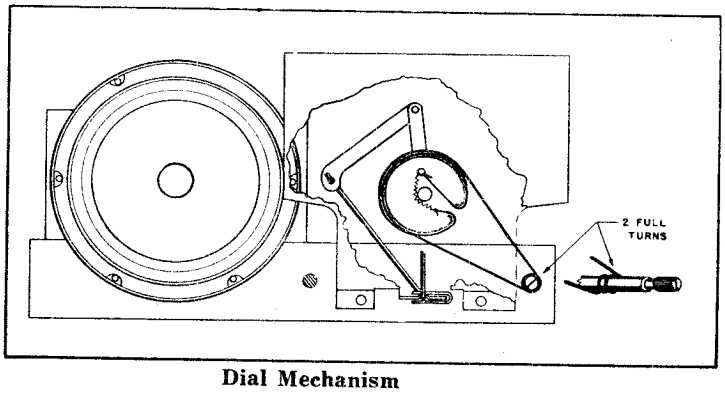
The following equipment is necessary to properly align this chassis:

1. A signal generator which will provide an accurately calibrated signal at the frequencies listed.
2. An output meter.
3. A non-metallic screwdriver.
4. Dummy antenna: — .1 mfd., — 10 mmf.

GENERATOR	CONNECTION AT RADIO	DUMMY ANTENNA	DIAL	TO TUNE TRIMMERS	REMARKS
IF 455 kc.	14Q7 grid	.1 mfd.	HF end	IF trimmers C D E F	Tune to max.
535 kc.	14Q7 grid	10 mmf.	LF end	Osc. trimmer B	Set limit of band
1400 kc.	14Q7 grid	10 mmf.	1400 kc.	Ant. trimmer A	Tune to max.



Tube Layout



Dial Mechanism

TUBE COMPLEMENT

1—14Q7 Oscillator and Mixer tube
1—14A7 IF Amplifier tube
1—50A5 Power Output tube
1—35Y4 Rectifier tube
1—14B6 Second Detector and First Audio tube

Electrical and Mechanical Specifications

Frequency Range	540-1700 kc.	Power Output (Undistorted)	.75 watts
Intermediate Frequency	455 kc.	Power Output (Maximum)	1.5 watts
Power Supply	105-125 volts AC-DC	Tuning Drive Ratio	3 to 1
Loudspeaker	5-inch Dynamic	Rated Power Input	32 watts
V.C. Impedance	3.5 ohms at 400 cycles		

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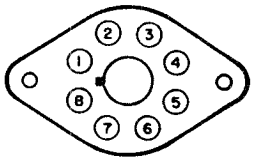
INTERNATIONAL DETROLA CORP.

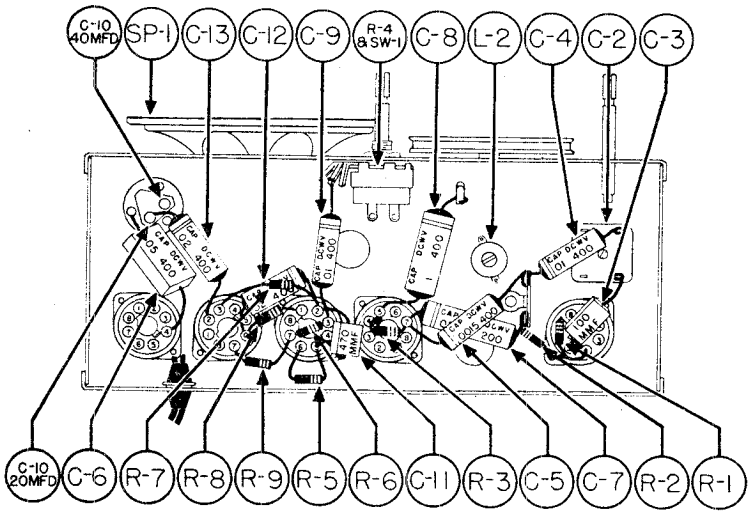
MODEL 571X

SOCKET VOLTAGES

TUBE	POSITION	1	2	3	4	5	6	7	8
14Q7	Osc. and Mixer	37.5 AC	99	99	–4.2	0	0	0	24.5 AC
14A7	IF Amplifier	12.5 AC	99	99	0	0	0	0	24.5 AC
14B6	2nd Det.—1st Audio	0	16	0	0	0	0	0	12.5 AC
50A5	Power Output	85 AC	91.5	99	0	0	0	5.9	37.5 AC
35Y4	Rectifier	117 AC	112 AC	0	112 AC	0	0	112	85 AC



NOTE: All DC voltages measured with a 1000 ohm-per-volt meter from ON-OFF switch (—B) to socket contact indicated. All AC voltages are measured from ON-OFF switch (—B) to socket contact indicated.
All voltages are positive DC unless otherwise marked.
Volume control full on.
Line voltage 117 volts AC.



Parts Layout Chassis Model 571X with Loctal Tubes

SERVICE PARTS LIST

Symbol	Part No.	Description
C-6	BC31B503	Cap., Mold. Paper, .05 mfd., 400 v.
C-7	BD210503	Cap., Paper, .05 mfd., 200 v.
C-4, 9	BD410103	Cap., Paper, .01 mfd., 400 v.
C-8	BD410104	Cap., Paper, .1 mfd., 400 v.
C-12, 13	BD410203	Cap., Paper, .02 mfd., 400 v.
C-3	BM78A101	Cap., Mica, 100 mmf.
C-11	BM78A471	Cap., Mica, 470 mmf.
R-9	BR16C151	Resistor, 150 ohm, 1/2 w.
R-2	BR17B156	Resistor, 15 megohm, 1/3 w.
R-1	BR17B223	Resistor, 22,000 ohm, 1/3 w.
R-3	BR17B224	Resistor, 220,000 ohm, 1/3 w.
R-5	BR17B335	Resistor, 3.3 megohm, 1/3 w.
R-7, 8	BR17B474	Resistor, 470,000 ohm, 1/3 w.
R-6	BR17B685	Resistor, 6.8 megohm, 1/3 w.
	A-2163	Cable, Dial Drive
	A-6158	Lamp, Pilot, No. 47 Mazda, 6.3 v.
C-10	A-8948	Cap., Elec., 40-20 mfd., 150 v.
R-4	B-9051-1	Control, Vol. & Sw., 500,000 ohm.
C-5	A-9672	Cap., Paper, .0015 mfd., 400 v.

Symbol	Part No.	Description
T-1	B-51010-1	Transformer Assy., 1st IF
T-2	B-51011-1	Transformer Assy., 2nd IF
SP-1	C-51014	Speaker, 5-inch Dynamic, 350 ohm.
	A-51160-1	Cord, Power, 6 ft.
	B-51162-1	Shaft, Dial Drive
	A-51163	Spring Clip for Dial Drive Shaft
	A-51202	Link, Dial Drive
	B-51330-1	Rubber Channel
	A-51331	Spring, Dial Bracket
	A-51778	Service Sheet
	A-51787	Spring, Cable
	A-51869	Antenna Reel Assembly
L-1A, L-1B, L-1C	D-54902	Permeability Tuner Assembly
L-2	B-54903	Coil Assembly, Cathode
C-2A, C-2B	B-54904-1	Capacitor, Trimmer
	B-55120-1	Stud, for Dial Drive Link

Order parts not listed by specifying (1) Part Name, (2) Model Number (include number following dash), (3) Run Number

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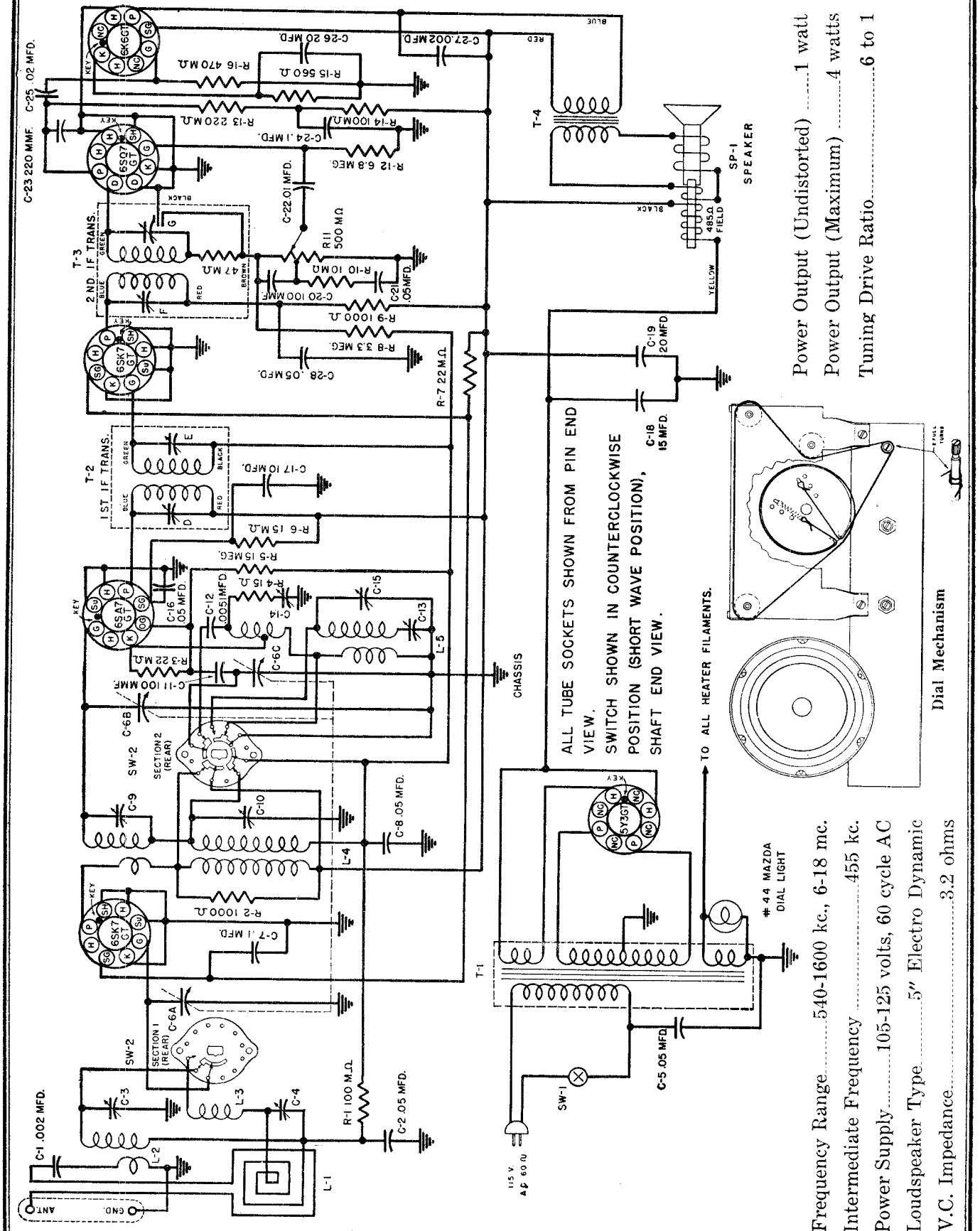
MODEL 572

INTERNATIONAL DETROLA CORP.



Power Output (Undistorted) .....1 watt
Power Output (Maximum) .....4 watts
Tuning Drive Ratio.....6 to 1

Frequency Range.....540-1600 kc., 6-18 mc.
Intermediate Frequency.....455 kc.
Power Supply.....105-125 volts, 60 cycle AC
Loudspeaker Type.....5" Electro Dynamic
V.C. Impedance.....3.2 ohms

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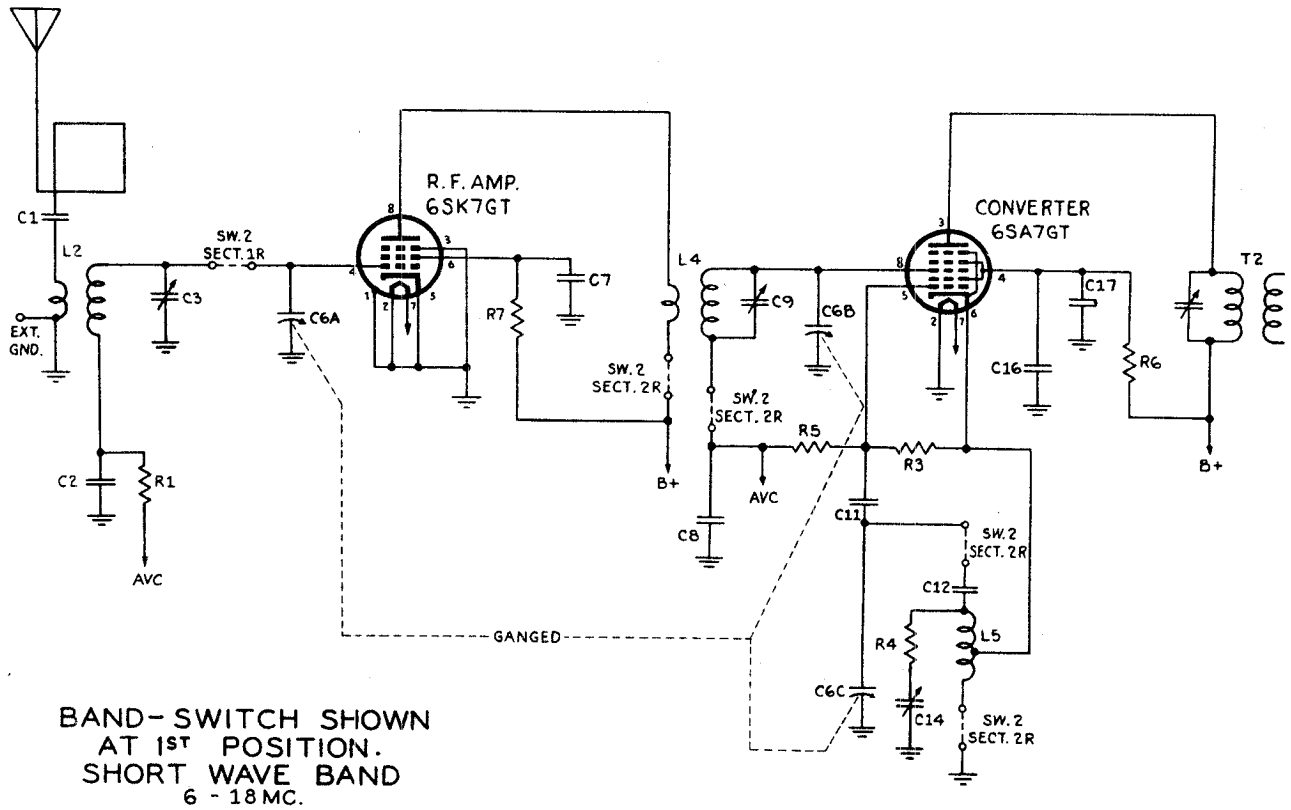
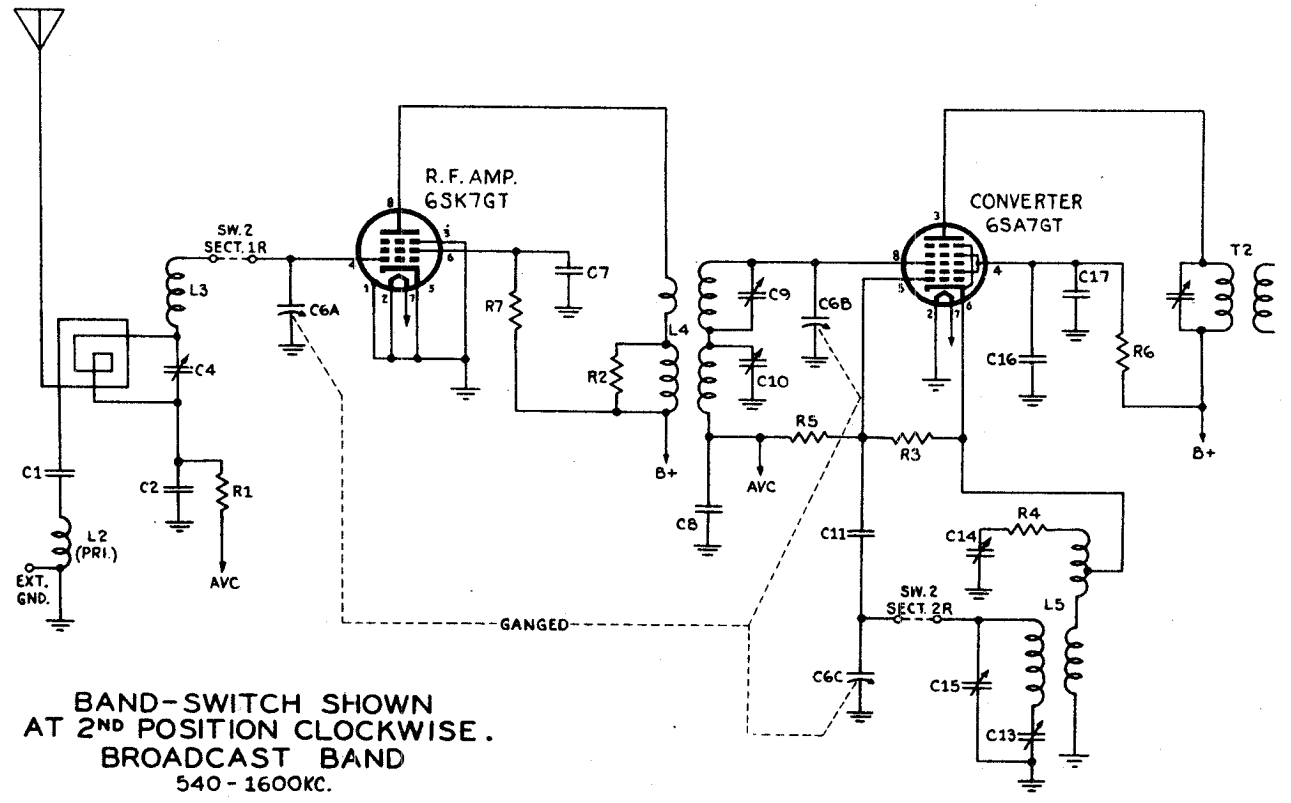
For Parts list, see P.15-7

INTERNATIONAL DETROLA CORP.

MODEL 572



BAND-SWITCH SHOWN
AT 1ST POSITION.
SHORT WAVE BAND
6 - 18 MC.



BAND-SWITCH SHOWN
AT 2ND POSITION CLOCKWISE.
BROADCAST BAND
540 - 1600KC.

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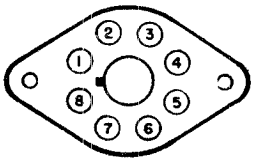
MODEL 572

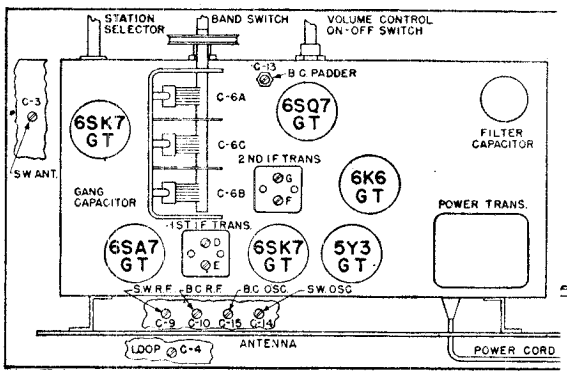
INTERNATIONAL DETROLA CORP.

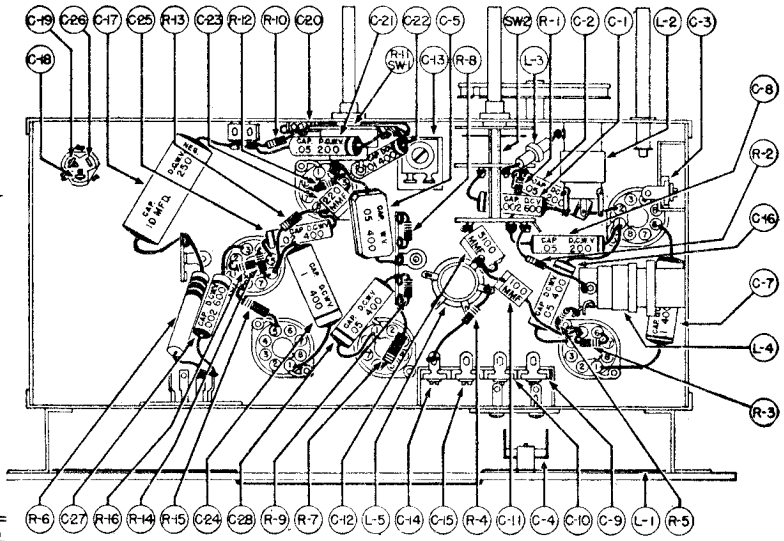
TUBE	POSITION	1	2	3	4	5	6	7	8
6SK7GT	RF Amplifier	0	0	0	0	0	107	6 AC	255
6SA7GT	Converter	0	6 AC	250	103	0	0	0	0
6SK7GT	IF Amplifier	0	0	0	0	0	105	6 AC	237
6SQ7GT	Det.—AVC—Audio	0	0	0	0	0	34	6 AC	0
6K6GT	Power Output	0	0	230	240	0	0	6 AC	18
5Y3GT	Rectifier	0	310	0	300 AC	0	300 AC	0	310



NOTE: All voltages measured from chassis to socket contact indicated. DC voltages measured with a 1000 ohm-per-volt meter.
All voltages are positive DC unless otherwise marked.
Volume control full on. Receiver not tuned to station.
Line voltage 117 volts AC.

Parts Layout
Model 572





The following equipment is necessary to properly align this chassis:

A signal generator which will provide an accurately calibrated signal at the frequencies listed.

An output meter.

3. A non-metallic screwdriver.
4. Dummy antenna: .1 mfd. — 400 ohm resistor—RMA loop.

CONNECT TEST OSCILLATOR TO	DUMMY ANTENNA	INPUT SIGNAL FREQUENCY	BAND	SET DIAL AT	TRIMMERS	PURPOSE
6SA7GT grid	.1 mfd.	455 kc.	Broadcast	HF end	D E F G	Align IF
6SK7GT RF grid	.1 mfd.	18.3 mc.	Short wave	HF end	C-14	Set limit of band
6SK7GT RF grid	.1 mfd.	16 mc.	Short wave	16 mc.	C-9	Align RF
Antenna post	400 ohms	16 mc.	Short wave	16 mc.	C-3	Align antenna
6SK7GT RF grid	.1 mfd.	1620 kc.	Broadcast	HF end	C-15	Set limit of band
6SK7GT RF grid	.1 mfd.	1400 kc.	Broadcast	1400 kc.	C-10	Align RF
6SK7GT RF grid	.1 mfd.	600 kc.	Broadcast	600 kc.	C-13	Rock gang and adjust to max.
RMA loop	Through loop	1400 kc.	Broadcast	1400 kc.	C-4	Align antenna

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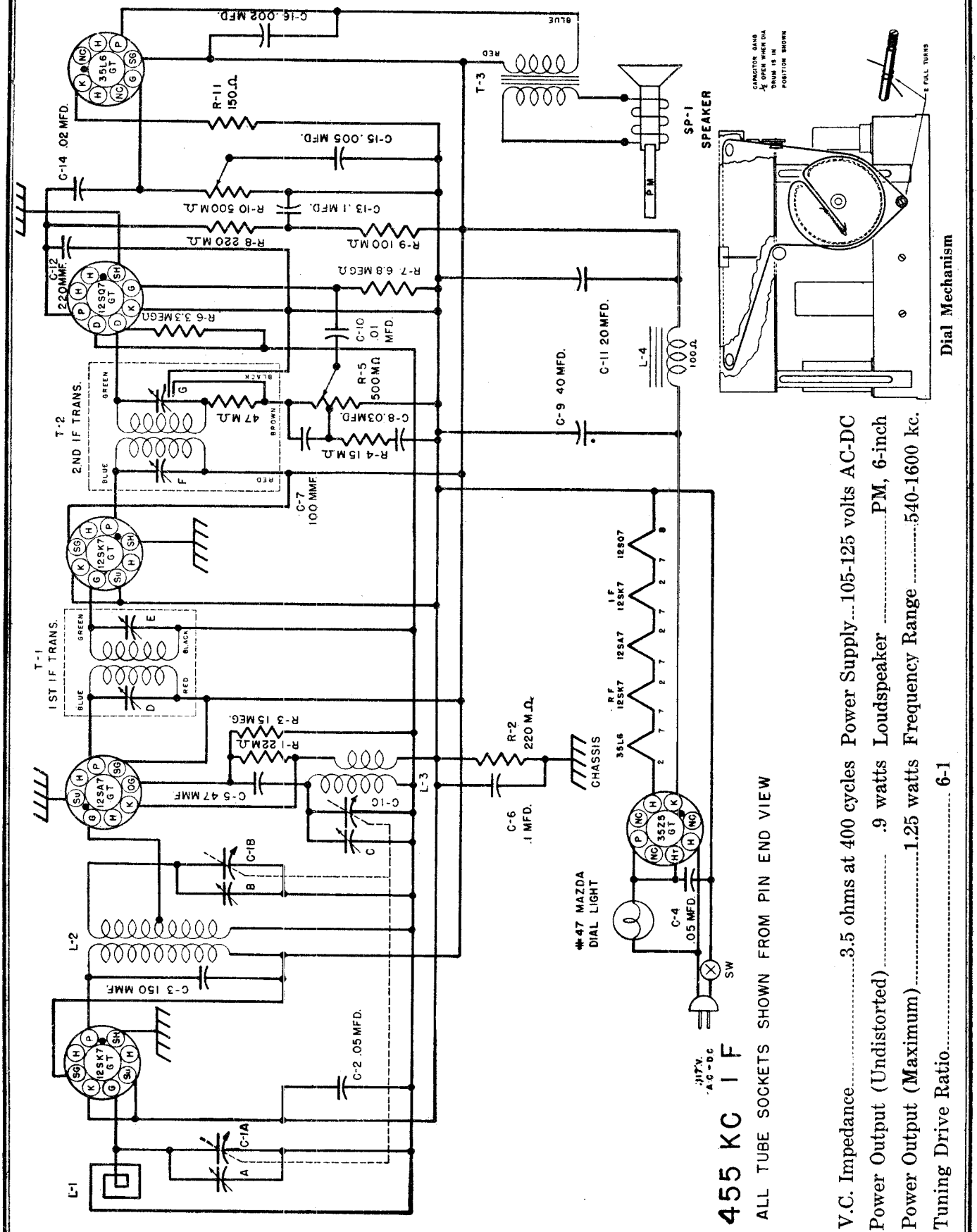
INTERNATIONAL DETROLA CORP.

MODEL 576



Dial Mechanism

V.C. Impedance.....3.5 ohms at 400 cycles Power Supply...105-125 volts AC-DC
Power Output (Undistorted).....9 watts Loudspeaker.....PM, 6-inch
Power Output (Maximum).....1.25 watts Frequency Range.....540-1600 kc.
Tuning Drive Ratio.....6-1

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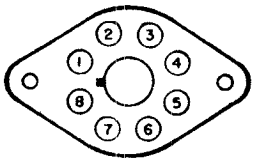
For Parts list, see P.15-7

MODEL 576

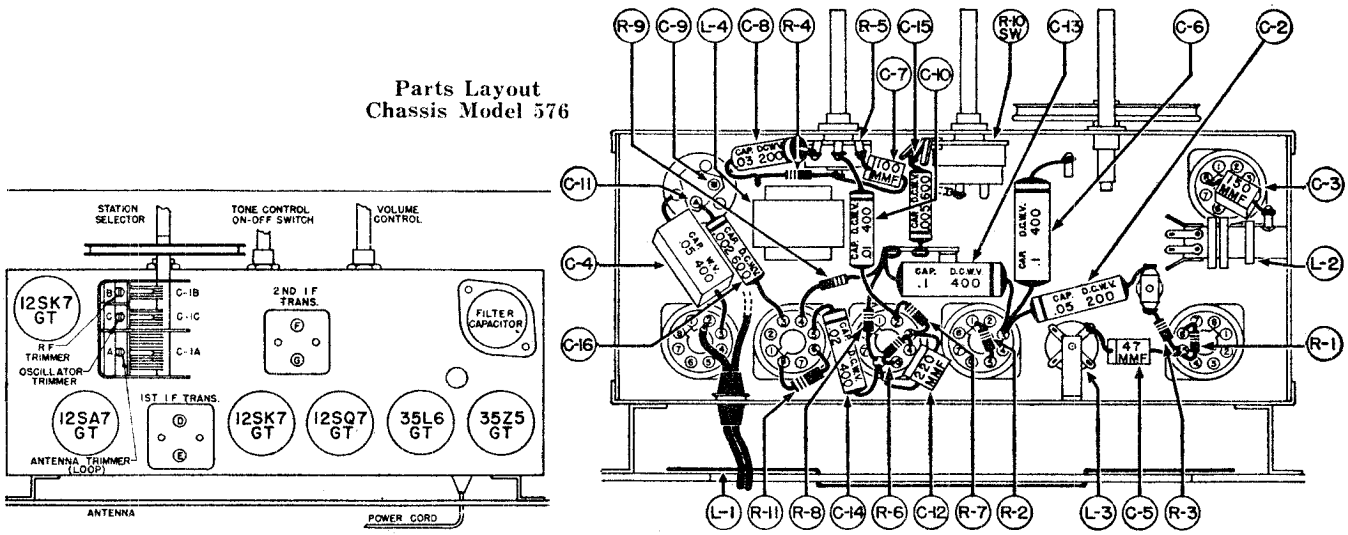
INTERNATIONAL DETROLA CORP.

TUBE	POSITION	1	2	3	4	5	6	7	8
12SK7GT	RF Amplifier	0	49.5 AC	0	0	0	105	36.5 AC	105
12SA7GT	Converter	0	24.7 AC	105	105	-6.8	0	36.5 AC	0
12SK7GT	IF Amplifier	0	24.7 AC	0	0	0	105	12.5 AC	105
12SQ7GT	2nd Det.—1st Audio	0	0	0	0	0	43	12.5 AC	0
35L6GT	Power Output	0	85.0 AC	97	105	0	0	49.5 AC	7.2
35Z5GT	Rectifier	0	117 AC	112 AC	0	112 AC	0	85 AC	114



NOTE: All DC voltages measured with a 1000 ohm-per-volt meter from ON-OFF switch (—B) to socket contact indicated.
All voltages are positive DC unless otherwise marked.
Volume Control full on. No signal.
Tone Control in clockwise position.
Line voltage 117 volts AC.

Parts Layout
Chassis Model 576



The following equipment is necessary to properly align this chassis:

A signal generator which will provide an accurately calibrated signal at the frequencies listed.
An output meter.
A non-metallic screwdriver.
Dummy antenna: — .1 mfd., — RMA loop.

Intermediate Frequency and Oscillator adjustments may be made with the loop disconnected provided a resistor of 10,000 to 50,000 ohms is substituted to close the 12SA7GT grid circuit. The loop alignment must be done with the loop and chassis mounted in operating position in the cabinet. A single turn loosely coupled to loop may be substituted for RMA loop.

GENERATOR	CONNECTION AT RADIO	DUMMY ANTENNA	DIAL	TO TUNE TRIMMERS	REMARKS
IF 455 kc.	12SA7GT grid	.1 mfd.	HF end	IF trimmers D E F G	Tune to max.
1620 kc.	Through loop	RMA loop	HF end	Osc. trimmer C	Set limit of band
1400 kc.	Through loop	RMA loop	1400 kc.	RF trimmer B	Tune to max.
1400 kc.	Through loop	RMA loop	1400 kc.	Ant. Trimmer A	Tune to max.

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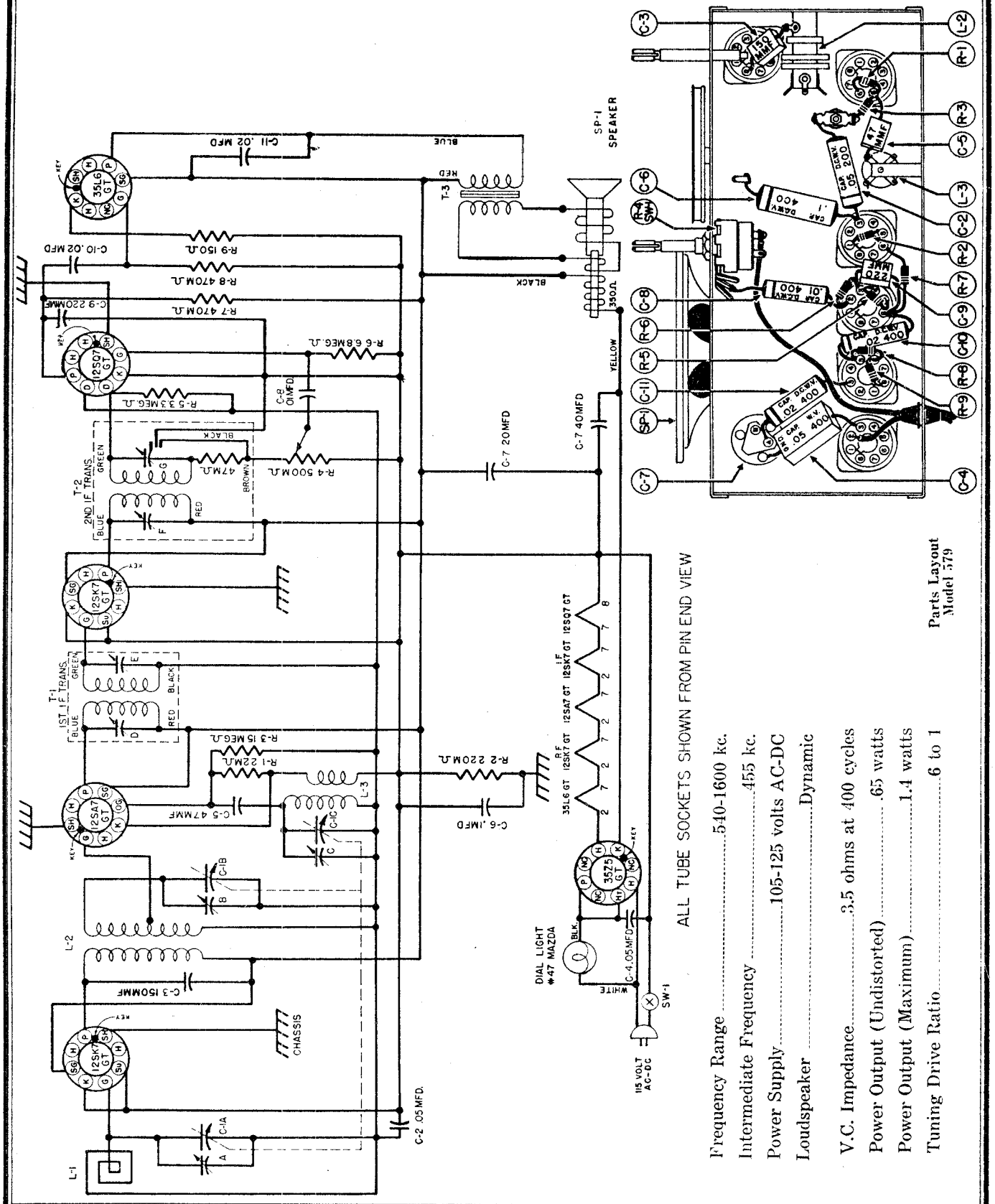
INTERNATIONAL DETROLA CORP.

MODEL 579



ALL TUBE SOCKETS SHOWN FROM PIN END VIEW

Parts Layout
Model 579

Frequency Range	540-1600 kc.
Intermediate Frequency	455 kc.
Power Supply	105-125 volts AC-DC
Loudspeaker	Dynamic
V.C. Impedance	3.5 ohms at 400 cycles
Power Output (Undistorted)	.65 watts
Power Output (Maximum)	1.4 watts
Tuning Drive Ratio	6 to 1

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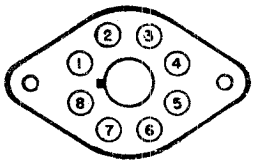
For Parts list, see P.15-7

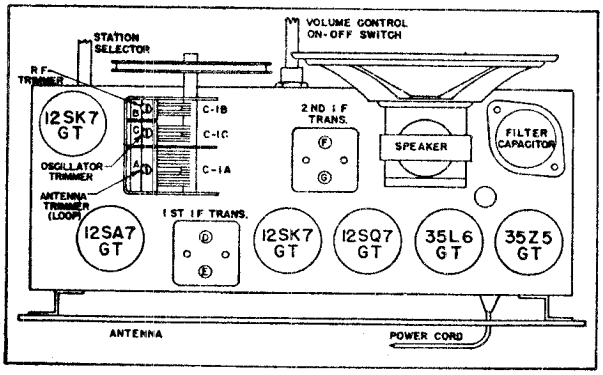
MODEL 579

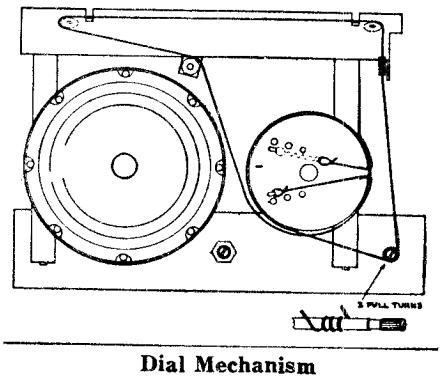
INTERNATIONAL DETROLA CORP.

TUBE	POSITION	1	2	3	4	5	6	7	8
12SK7GT	RF Amplifier	0	50 AC	0	0	0	97	38 AC	97
12SA7GT	Converter	0	25 AC	97	97	-6	0	38 AC	0
12SK7GT	IF Amplifier	0	25 AC	0	0	0	97	12 AC	97
12SQ7GT	Detector, 1st Audio	0	0	0	0	0	30	12 AC	0
35L6GT	Output	0	85 AC	92	97	0	0	50 AC	5.7
35Z5GT	Rectifier	0	117 AC	112 AC	0	112 AC	0	86 AC	125



NOTE: All DC voltages measured with a 1000 ohm-per-volt meter from ON-OFF switch (—B) to socket contact indicated. All AC voltages are measured from ON-OFF switch (—B) to socket contact indicated.
All voltages are positive DC unless otherwise marked.
Volume Control full on. No signal.
Line voltage 117 volts AC.





Dial Mechanism

The following equipment is necessary to properly align this chassis:

A signal generator which will provide an accurately calibrated signal at the frequencies listed.
An output meter.
A non-metallic screwdriver.
Dummy antenna: .1 mfd. — RMA loop.

Intermediate Frequency and Oscillator adjustments may be made with the loop disconnected provided a resistor of 10,000 to 50,000 ohms is substituted to close the 12SK7GT grid circuit. The loop alignment must be done with the loop and chassis mounted in operating position in the cabinet. A single turn loosely coupled to loop may be substituted for RMA loop.

CONNECT TEST OSCILLATOR TO	DUMMY ANTENNA	INPUT SIGNAL FREQUENCY	SET DIAL AT	TRIMMERS	PURPOSE
12SA7GT grid	.1 mfd.	455 kc.	HF end	D E F G	Align IF
12SK7GT RF grid	.1 mfd.	1620 kc.	HF end	C	Set limit of band
12SK7GT RF grid	.1 mfd.	1400 kc.	1400 kc.	B	Align RF
RMA loop	Through loop	1400 kc.	1400 kc.	A	Align antenna

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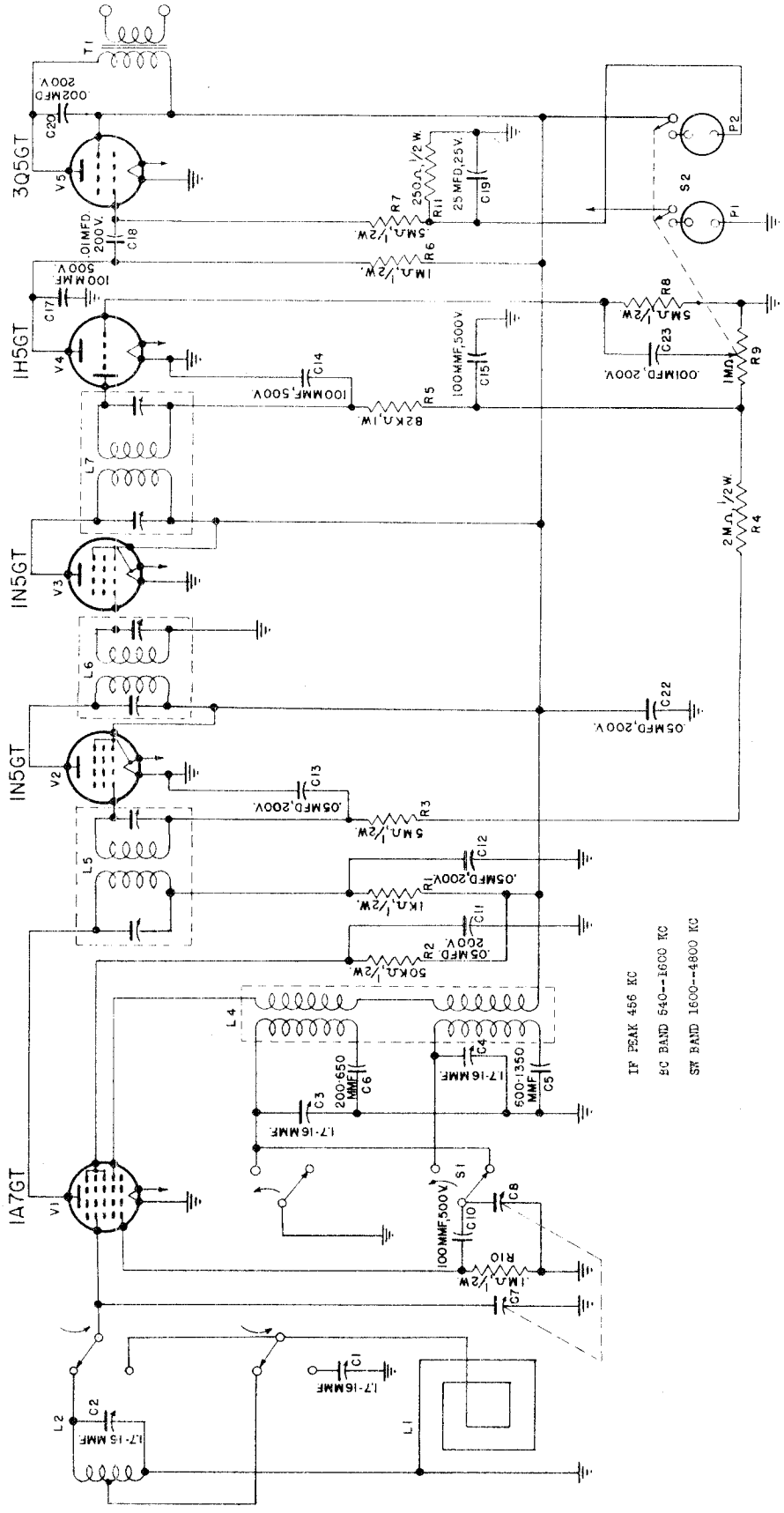
JEFFERSON-TRAVIS CORP.

MODEL MR2B



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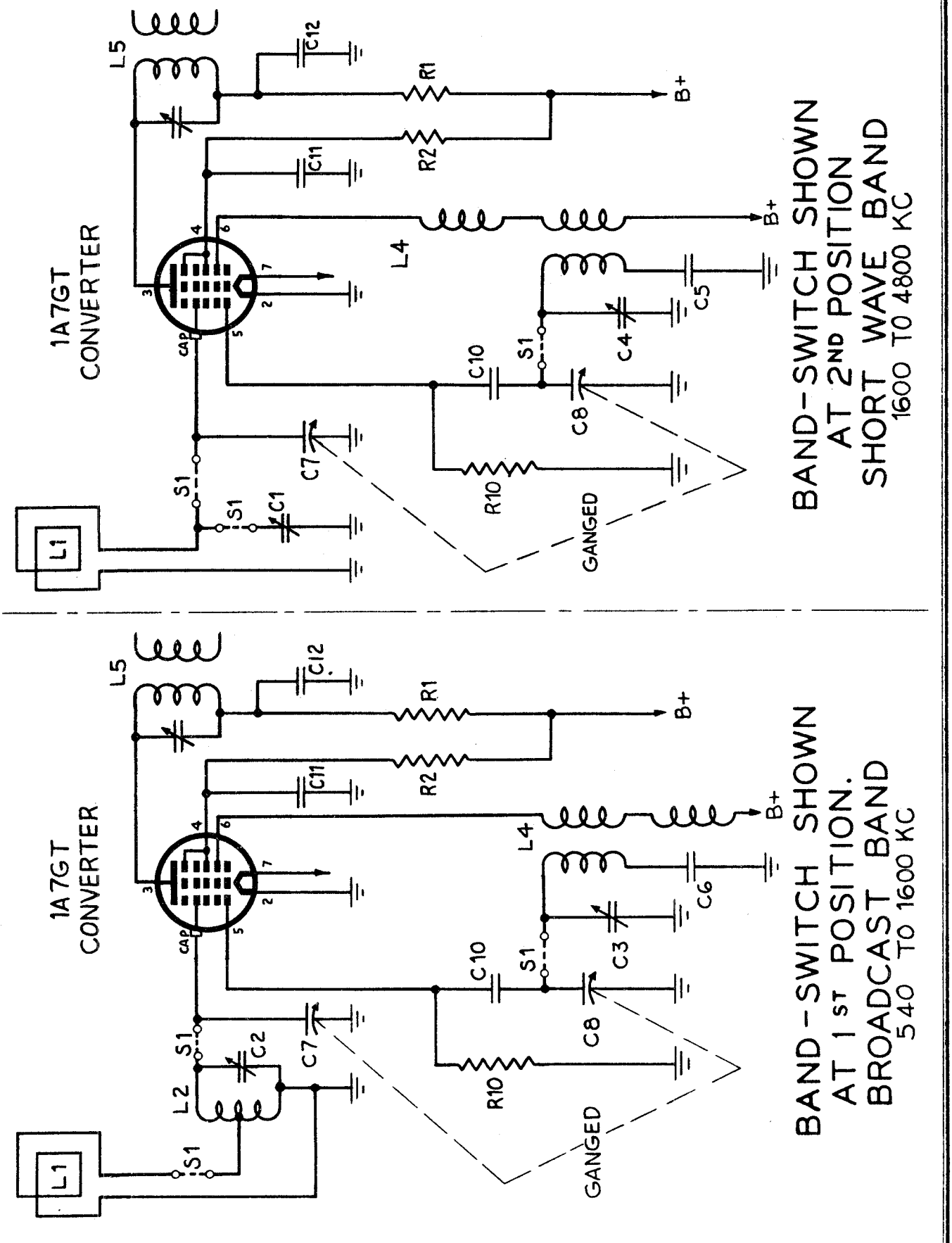
MODEL MR2B

JEFFERSON-TRAVIS CORP.



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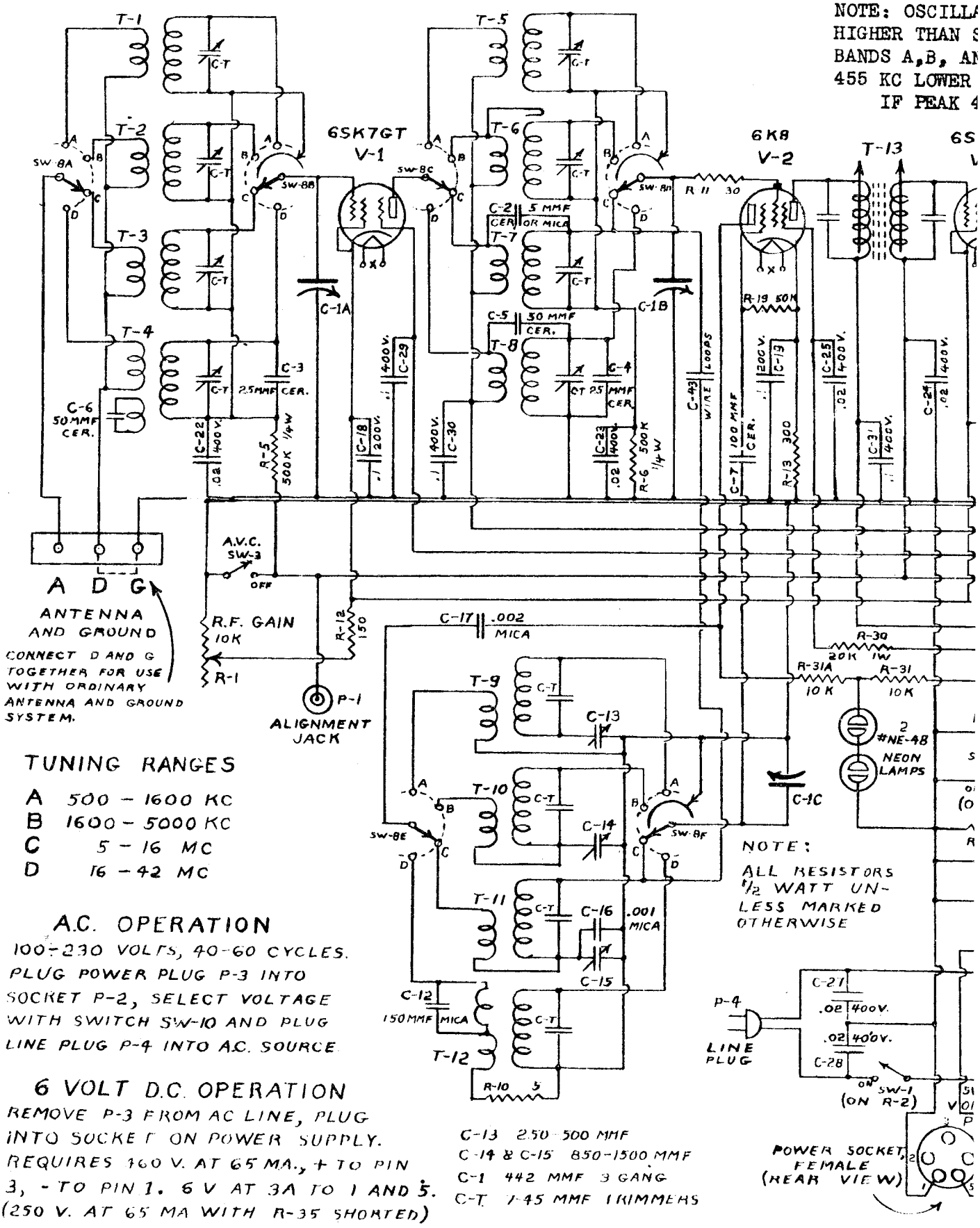
KAAR ENGIN

NOTE: OSCILL
HIGHER THAN
BANDS A, B, A
455 KC LOWER
IF PEAK



TUNING RANGES

A	500 – 1600 KC
B	1600 – 5000 KC
C	5 – 16 MC
D	16 – 42 MC

A.C. OPERATION

100-230 VOLTS, 40-60 CYCLES. PLUG POWER PLUG P-3 INTO SOCKET P-2, SELECT VOLTAGE WITH SWITCH SW-10 AND PLUG LINE PLUG P-4 INTO A.C. SOURCE.

6 VOLT D.C. OPERATION

REMOVE P-3 FROM AC LINE, PLUG INTO SOCKET ON POWER SUPPLY. REQUIRES 160 V. AT 65 MA., + TO PIN 3, - TO PIN 1. 6 V AT 3A TO 1 AND 5. (250 V. AT 65 MA WITH R-35 SHORTED)

NOTE:
ALL RESISTORS 1/2 WATT UNLESS MARKED OTHERWISE

C-13 250-500 MMF
C-14 & C-15 850-1500 MMF
C-1 442 MMF 3 GANG
C-T 7-45 MMF TRIMMERS

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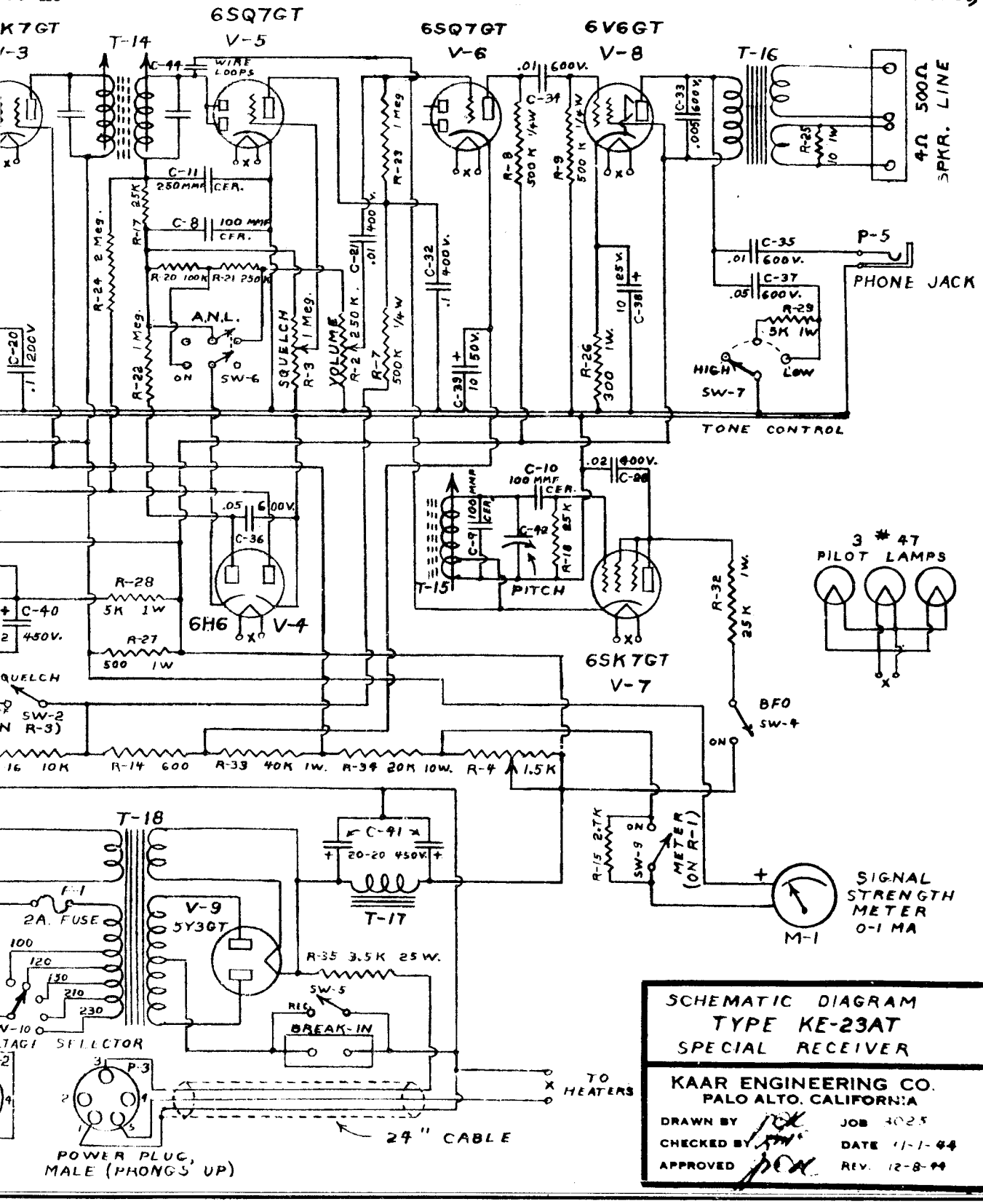
EERING CO.

ATOR IS 455 KC
SIGNAL FREQUENCY
ND C; IT IS
THAN BAND D.
455 KC

ALIGNMENT DATA

BAND	TRIM	PAD
A	1400	550
B	4400	1800
C	14	5.5
D	38	16 (BY MOVING TURNS ON COILS)

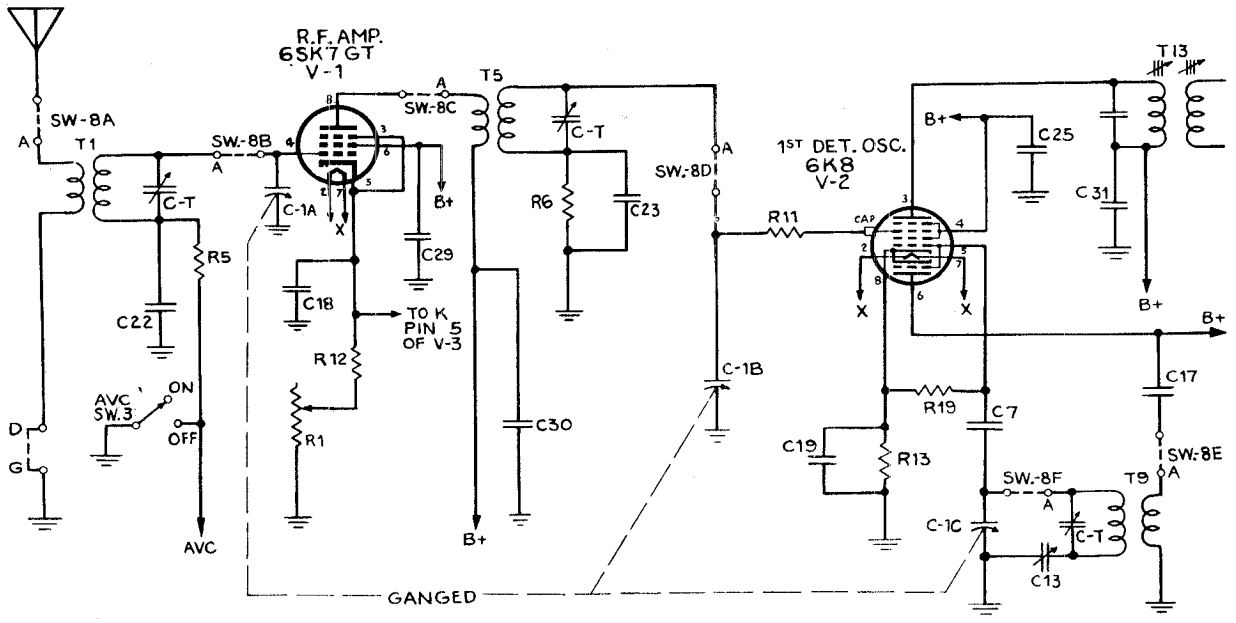


SCHEMATIC DIAGRAM
TYPE KE-23AT
SPECIAL RECEIVER

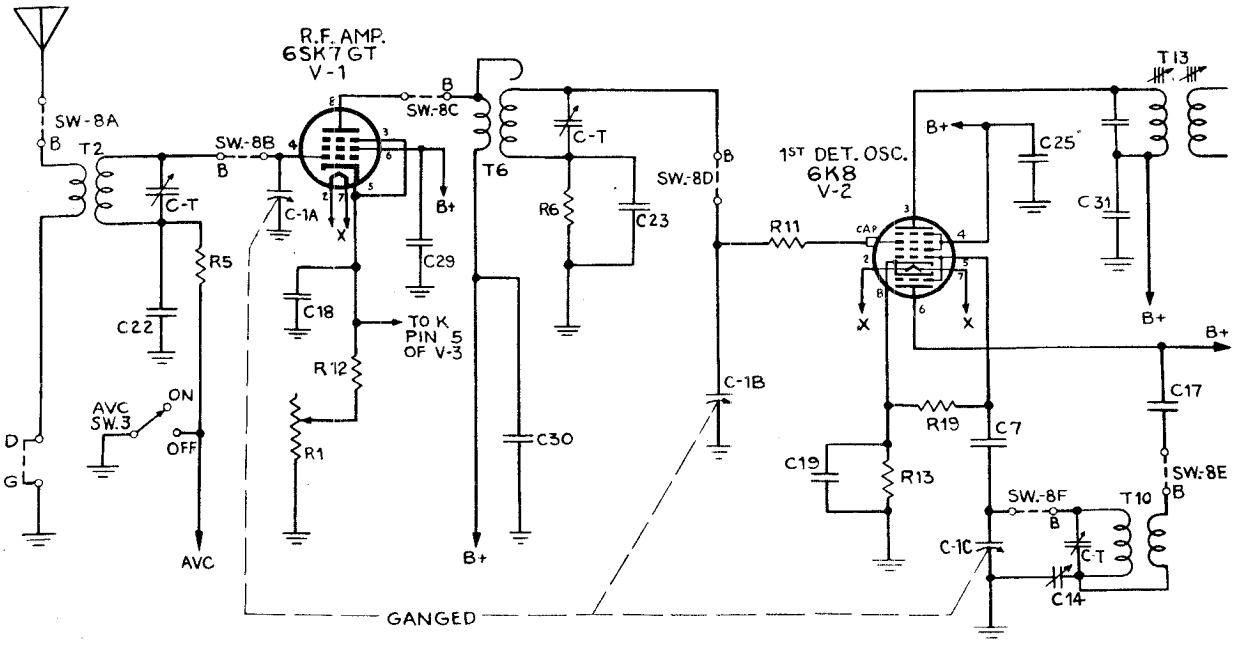
KAAR ENGINEERING CO.
PALO ALTO, CALIFORNIA

DRAWN BY
CHECKED BY
APPROVED
JOB 4025
DATE 1-1-44
REV. 12-8-44

KAAR ENGINEERING CO.



BAND-SWITCH SHOWN
AT 1ST POSITION.
BROADCAST BAND A
500 TO 1600 KC.



BAND-SWITCH SHOWN
AT 2ND POSITION
BAND B
1600 - 5000 KC.

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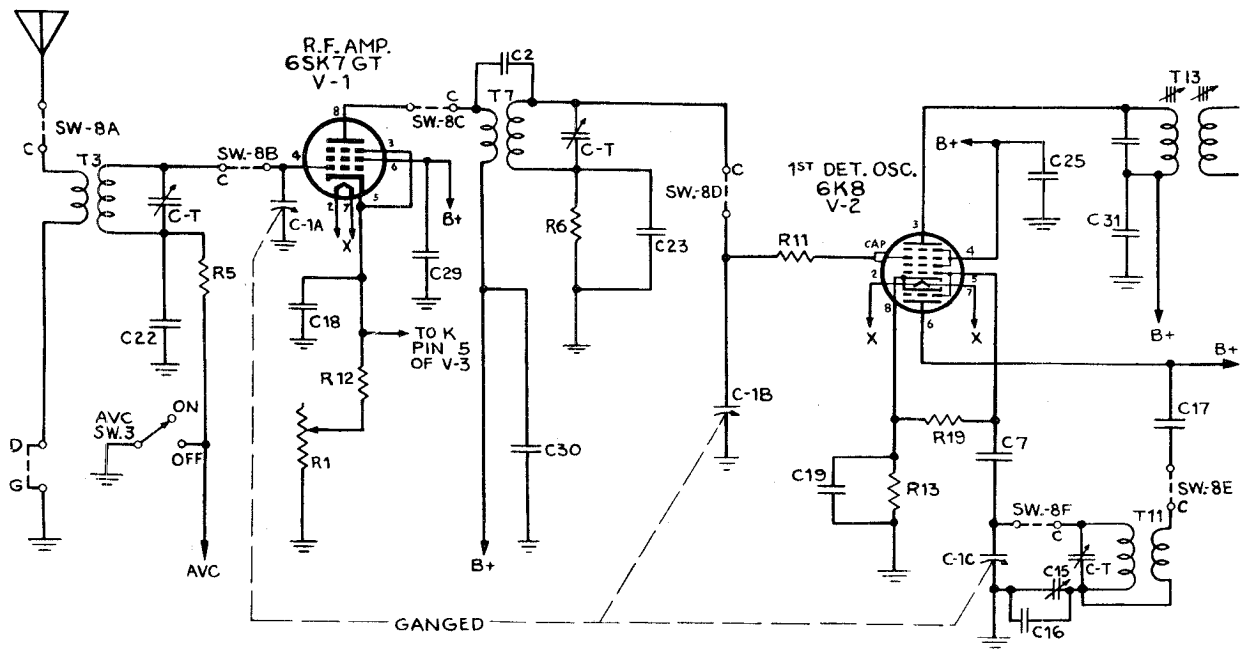
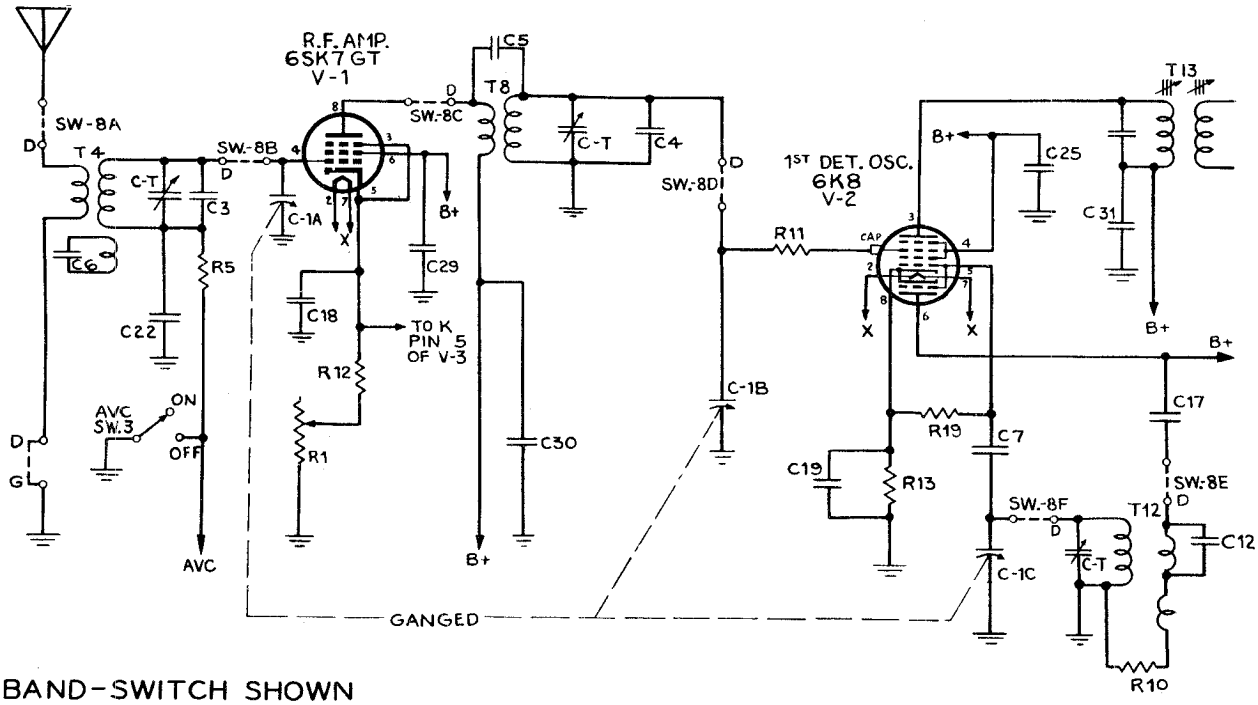
MODEL KE-23AT

KAAR ENGINEERING CO.



BAND-SWITCH SHOWN
AT 3RD POSITION
BAND C
5-16 MC.



BAND-SWITCH SHOWN
AT 4TH POSITION
BAND D
16-42 MC.

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1. DESCRIPTION

.1 GENERAL: The Kaar Engineering Company Model KE-23AT is a nine-tube general purpose communications receiver covering a frequency range from 500 KC to 42 MC, the most commonly used radio communications bands. This receiver provides a high degree of selectivity and sensitivity which should provide reception under the most difficult conditions.

1.2 POWER SUPPLY: The KE-23AT receiver is designed for operation from AC power from its built-in AC power supply. An auxiliary 24" power cable terminating in a miniature 5 prong plug provides operation from a 6 volt battery through an external power pack.

1.21 The built-in power supply provides operation from 40 - 60 cycle AC power at 100, 120, 150, 210 and 230 volts. A switch is provided for selecting any one of these voltages as necessary. The receiver will also operate satisfactorily under substantial overvoltage or undervoltage conditions, and satisfactory operation can be expected on any voltage between 90 and 250 volts.

1.22 Operation from a 6 volt battery is provided by removing the power plug from its socket and inserting it into an external power supply capable of furnishing 460 volts at 65 MA and 6 V. DC for the heaters. By making a minor circuit change underneath the chassis, the high voltage power requirement can be reduced to 230 - 250 volts at 65 MA.

1.3 SPEAKER: The 8" PM model 23ST loud speaker as furnished with this receiver is recommended for general use. Much larger speakers to provide better tone quality or very small speakers for monitoring purposes may be used satisfactorily. A 4 ohm output is provided for direct loud speaker operation. 500 ohms is also provided for feeding the output into a 500 ohm line.

1.4 DIMENSIONS: The KE-23AT receiver is mounted on a 8 3/4" x 19", 16 gage steel panel of relay rack mounting dimensions. It is housed in an 18 gage steel cabinet, with hinged lid in the top, 19" long, 9" high and 11" deep.

The model 23ST speaker cabinet is 9" high (excluding handle), 10" wide and 6" deep.

Both the receiver and speaker are finished in gray, baked enamel wrinkle with black trim and knobs.

1.5 FREQUENCY COVERAGES: The tuning range of the receiver is covered in four bands:

Band A	500 KC to 1600 KC
Band B	1600 KC to 5000 KC
Band C	5 MC to 16 MC
Band D	16 MC to 42 MC

The frequencies are calibrated directly on the main dial. The VERNIER dial in the center provides a means for fine tuning adjustments and accurate logging. One complete rotation of this dial covers one division on the 0 - 50 logging scale on the main dial. The tuning ratio is approximately 100 to 1.

1.6 TUBE COMPLEMENTS:

V-1 6SK7GT	Tuned R.F. Amplifier.	V-6 6SQ7GT	First Audio Amplifier.
V-2 6K8	First Det. Osc.	V-7 6SK7GT	Beat Frequency Oscillator.
V-3 6SK7GT	455 KC I.F. Amplifier	V-8 6V6GT	Power Output Tube.
V-4 6H6	Automatic Noise Limiter.	V-9 5Y3GT	Rectifier.
V-5 6SQ7GT	Second Det. and Squelch Control.		

Glass "GT" tubes or even "G" tubes can be used if the metal tubes indicated above are not available. Metal tubes can be substituted in all cases where glass tubes are indicated. However, if such substitutions are made for V-1, V-2 or V-3, it is quite probable that the receiver would have to be re-aligned, particularly on the higher frequency bands.

.7 CIRCUIT:

1.71 The circuit is a standard superhetrodyne with a high degree of stability. Permeability tuned intermediate frequency transformers and ceramic trimming condensers across the R.F. coils are incorporated to assure permanancy of adjustment.

1.72 A special feature of the KE-23AT is the NO-SIGNAL SQUELCH CIRCUIT. This SQUELCH (or "Q") CIRCUIT may be used in two-way communication work where "standby" operation is desirable and where the background noise with the station off would be objectionable. The SQUELCH CIRCUIT automatically silences the receiver except when a station is actually being received. This feature can also be used as a between-station quieting device preventing the rear of static between stations when tuning from one to another.

1.73 There is also provided an AUTOMATIC NOISE SILENCER which limits the noise produced by gasoline engine ignition systems or other electrical equipment, including ordinary static, that may exceed the level of the signal being received.

1.74 A BEAT FREQUENCY OSCILLATOR is provided for receiving CW (code) signals.

1.8 PERFORMANCE: For a receiver built as simply as the KE-23AT with as few tubes and component parts, the general performance is excellent.

1.81 SENSITIVITY: When measured with a standard dummy antenna input, the sensitivity of the receiver will be approximately between 1 and 5 microvolts over the range 500 KC to 16 MC, and between 3 and 15 microvolts in the 16 to 42 MC range.

1.82 SELECTIVITY: The average selectivity is approximately as follows:

Ratio: Input Voltage off Resonance to Voltage at Resonance	Kilocycles off Resonance
10 (20 DB)	7 KC
100 (40 DB)	14 KC
1000 (60 DB)	25 KC

1.83 AUDIO RESPONSE: The audio frequency response is essentially flat between 100 and 3500 cycles. The power output is approximately 2 watts with a total harmonic distortion of not over 10%.

2. INSTALLATION

2.1 A radio receiver is only as good as its installation. Reception obviously will not be as good with a poor, fluctuating or noisy power source; or a make-shift antenna; as it would be under proper conditions. Generally speaking the KE-23AT receiver should be installed according to good and acceptable practice. A filter is provided in the AC line to help minimize noise from that source. The automatic noise limiter will help reduce noise entering by way of the antenna. Two voltage regulating neon lamps are in the oscillator voltage supply circuit to minimize the effect of voltage fluctuations. The receiver has been moisture-proofed and the parts on the under side of the chassis have been sprayed with fungus resisting lacquer as an aid to operation in damp and humid climates.

2.2 ANTENNA AND GROUND: The importance of a good antenna cannot be over stressed. It is essential for satisfactory reception of weak signals.

2.21 The antenna input circuit of the KE-23AT provides for the use of a Marconi or doublet antenna. The Marconi type is usually recommended for ordinary reception and should prove satisfactory in most instances. It consists of an ordinary antenna wire of approximately #12 or 14 B&S gage strung between insulators as high as possible. The over-all length is not critical and may be some 50 to 100 feet long including the lead-in to the set. When using this type of antenna, the terminals on the rear of the set, "D" and "G", must be connected together and the antenna lead-in connected to "A".

2.22 The receiver will usually work fairly satisfactorily **without** a ground connection but a good ground connection is to be highly recommended. In many instances it will increase the signal strength and reduce noise. A six-foot rod driven in moist earth will make a satisfactory ground, or as an alternate, a cold water pipe. The lead-in from the ground should be of heavy wire, at least #12 or 14, and should be connected to "G" at the rear of the receiver.

2.23 Under special conditions when a doublet antenna may be used, the 400 ohm transmission line will then be connected between "A" and "D" with the ground connected to "G". In this case "D" and "G" are not connected together. The doublet antenna performs excellently in a direction at right angles to its length but only on the rather narrow group of frequencies for which it was designed.

2.3 SETTING UP THE RECEIVER FOR AC OPERATION:

2.31 Unpack the KE-23AT receiver and loud speaker from the shipping case and examine for possible damage. There are no loose accessories other than the instruction book.

2.32 Make sure that the tubes are firmly seated in their sockets and the grid cap is in place on the 6K8 tube.

2.33 Make sure that the power plug, P-3, on the end of the 24" power cable is firmly inserted in the power socket, P-2, at the rear of the chassis for AC operation.

2.34 Attach the 23ST speaker to the two terminals marked "4-8Ω" at the rear of the receiver.

Ordinarily the loud speaker will be placed at the side of the receiver. It is not desirable to place it on top of the cabinet since vibration from it might possibly introduce microphonic noises which would not otherwise be noticeable.

2.35 Connect the antenna lead-in or antenna transmission line in accordance with instructions in Paragraph 2.2.

2.36 Determine the voltage of the AC source which is to operate the receiver by measurement with a voltmeter. Then set the voltage selector switch, SW-10, to the nearest voltage indicated. This switch is located just behind the tuning meter, M-1. It will be necessary to loosen the set screw with a small screw driver in order to turn the switch.

CAUTION: Never turn the voltage selector switch with the receiver turned "ON". An accidental wrong setting may damage the receiver and accidental contact with the terminals at the rear of the tuning meter may cause shock.

If no voltmeter is available to test the line voltage, in cases of emergency the voltage selector switch can be turned first to the 230 volt position, the brilliancy of the pilot lamps observed, and then the switch tried in the consecutively lower positions until the brilliancy of the pilot lamps appears to be about normal. Care should be exercised in operating the receiver with this estimated setting, and at the first opportunity it should be checked with a voltmeter. Also, at the correct setting when the receiver is turned off and then on again, the two neon lamps located just in front of the 6K8, V-2, should ignite.

2.4 BATTERY OPERATION: The KE-23AT may be operated from a 6 volt storage battery with a proper vibrator power supply. It can be operated from other battery sources if the proper voltages are applied to the correct prongs of the power plug, P-3.

To set up and operate the receiver from the vibrator power supply, proceed as follows:

2.41 Proceed as directed in Paragraphs 2.31 - 2.35. Be sure the AC line cord is not plugged into an AC outlet, (in case AC power should accidentally be applied).

2.42 Remove the power plug, P-3, in the end of the 24" power cable from the power socket, P-2, at the rear of the chassis. If operation is to be from a type of vibrator power supply furnishing approximately 460 volts at 65 MA from the same type of 5 prong power socket with the correct connections, simply plug P-3 into the socket.

Although the high voltage required for the receiver is only 250 volts, a dropping resistor, R-35 (3500 ohms, 25 watts), is installed in the receiver in order to drop the 460 volts to the correct value.

2.43 If operation is to be from other power supplies, make sure that the proper voltages are applied to the proper pins on P-3 as shown in the schematic diagram. The easiest way to do this is to connect the output terminals or leads from the power supply unit used to a 5 prong female cable socket such as an Amphenol Type MP5L. If the output is approximately 240 - 250 volts at 65 MA, such as would be obtained from the Kaar Type 647X Vibrator Power Supply, then the resistor, R-35, should be shorted out by soldering a piece of wire around its terminals. (This resistor is located under the chassis at the rear near the fuse extractor post.) For power supplies furnishing voltages between 250 and 460 volts, a 10 watt resistor of the proper resistance value as calculated, or determined by experiment, may be connected across the terminals of R-35. The correct value should provide approximately 250 volts at the low potential end of the resistor when the receiver is operating.

2.44 Connect the heavy battery leads from the power supply to the 6 volt battery, the RED lead to the positive (+) and the BLACK lead to the negative (-) terminal.

2.45 When operating from a battery power source, the operation of the receiver is the same as before except that the switch, S-1, on the Volume Control does not now turn the receiver off and on. To turn the receiver off, it will be necessary to remove one of the battery leads from the storage battery. A special high current, low resistance switch may be installed in one of the battery leads if desired.

2.5 BREAK-IN CONNECTION: The KE-23AT may be used with a transmitter to form a two-way radio communication system. When the transmitter has break-in facilities, it is only necessary to run wires to the two BREAK-IN terminals on the rear of the chassis. When the STANDBY-RECEIVE switch is in the "STANDBY" position, every time the transmitter is turned off the receiver will automatically be turned on, and the receiver will be silenced while transmitting. This system will only work when the receiver is operated from its internal AC power supply. When operating from batteries with an external power supply, these BREAK-IN CONNECTIONS can not be used, and if break-in operation is desired, it will be necessary to provide for breaking the high voltage supply lead by other means, such as by a special relay operated by the transmitter.

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3. OPERATING INSTRUCTIONS

3.1 The various controls for operating the KE-23AT receiver are located across the bottom of the panel and are appropriately marked. The main tuning knob is located in the center of the panel just underneath the Vernier dial. To put the KE-23AT receiver into operation, proceed as follows.

3.11 Plug the line cord into a source of AC power as outlined in Paragraph 2.3 or connect for battery operation with an external power supply as per Paragraph 2.4.

3.12 If operating from an AC source, the receiver is turned on by rotating the VOLUME control from its "OFF" position to the right. A click will be felt and heard. As the switch connected to this control closes, the dials should light up. It will take 30 seconds or so for the tubes to heat up. If operating from a 6 volt storage battery, the receiver is turned off and on by disconnecting one of the battery leads as described in Paragraph 2.45.

3.13 Set the SELECTOR switch on position "A" for receiving broadcast stations, as they are usually the easiest to receive initially and will enable one to become accustomed to the operation of the set. In remote locations it may be that there are no near-by stations on Band A, in which case the SELECTOR switch should be set on position "C" and short wave broadcast stations tuned in instead.

3.14 The R.F. GAIN control should be turned completely to the right (clockwise) as far as it will go to position "10".

3.15 The SQUELCH control should be turned off by rotating it as far as it will go to the right (clockwise) until the switch snaps in the "OFF" position.

3.16 The AUTOMATIC NOISE LIMITER, A.N.L., and BEAT FREQUENCY OSCILLATOR, B.F.O. should be "OFF"; and the AUTOMATIC VOLUME CONTROL, A.V.C., switch "ON". Put the STANDBY-RECEIVE switch in the "RECEIVE" position.

3.17 Advance the VOLUME control to the right to a point where background noise is heard. In quiet locations it may be desirable to turn the VOLUME control full on, and when a station is turned to too loudly, reduce it to the desired volume level.

3.18 Rotate the main tuning knob until a fairly strong station is heard. The operator should then familiarize himself with the operation of each of the various controls in turn. Tune for maximum reading on Tuning Meter.

3.2 The function of each of the controls is herewith explained.

3.21 R.F. GAIN CONTROL: This control adjusts the sensitivity of the receiver and is used when the signal strength of a powerful nearby station is too great and reception is distorted. Normally, however, with the AUTOMATIC VOLUME CONTROL (A.V.C.) "ON", there will be very little use for this control when receiving voice and it is usually left turned completely to the right to position "10". The A.V.C. switch should be turned "OFF" when listening to code with the BEAT FREQUENCY OSCILLATOR (B.F.O.) "ON". With the A.V.C. "OFF", even medium powerful stations will overload the receiver and it will be necessary to reduce the sensitivity with the R.F. GAIN CONTROL for best results. The Tuning Meter operates only when the A.V.C. is turned on.

3.22 SELECTOR SWITCH: The SELECTOR switch, or "BAND CHANGE" switch as it is sometimes called, allows selection of the various frequency ranges, "A", "B" "C" or "D", as desired. Simply turn the pointer knob to the desired range.

3.23 SQUELCH CONTROL. The SQUELCH CONTROL (or "Q" control) can be used to silence the receiver except when a signal is actually being received. Its use is particularly adapted to two-way communication work where the KE-23AT may be standing by and where a considerable amount of background noise would be present when no station is being received. The squelch circuit allows the receiver to be actually inoperative until the station to which it is tuned comes on the air, when it is automatically turned on. By adjusting the SQUELCH knob, the receiver can be made to operate only on signals of a definite minimum volume. As the control is turned to the left (counter-clockwise) it takes a stronger and stronger signal to trip the squelch circuit. For instance, in position "8" a reasonably strong signal will operate the receiver, while in position "2" it would take a powerful transmitter located just a few blocks away to operate it and any weaker station on the same frequency would not then come in.

To properly set the SQUELCH for a given condition, tune in the station it is desired to receive in the ordinary manner while it is transmitting. Then when it goes off the air, turn the SQUELCH control knob to the left until the background and static noises just disappear. Then check and see if, when the transmitter again comes on the air, it can be heard.

Another way would be to turn the control knob to the left when the transmitter is on the air until it just disappears; then advance the knob slightly to the right until the station just sounds normal, but no further. This latter method is satisfactory for close-by stations, but for more distant stations which are subject to fading, it is possible that at some other time of day the signal would become weaker than it was when the control was set and then might not trip the SQUELCH circuit.

To use the SQUELCH control for a between-station quieting device, it is only necessary to set the knob at the position where average static noise just disappears when not tuned to a station. Then, when the set is tuned across the dial, only the stations stronger than the static noises will come in. This use of the control does not work too satisfactorily on the short wave bands, as the short wave stations are usually subject to so much fading that it is possible to tune right by them as they are fading and consequently miss them altogether.

3.24 VOLUME CONTROL: The main receiver "On-Off" switch is combined with the VOLUME control. To turn the receiver "On", turn the control to the right, and to turn it "Off", turn it to the left until the switch clicks and the dial lights go out. The VOLUME control is used to adjust the volume level of the received signals. When operating the receiver with the A.V.C. "OFF", best results will be obtained by advancing the VOLUME control a little further than normal and then reducing the volume to the desired level by turning the R.F. GAIN control to the left.

3.25 TONE CONTROL: The TONE control serves to reduce the intensity of the higher audio-frequencies which some listeners find desirable in assisting to reduce static or to make the tone quality "bassy". In the "HIGH" position, the receiver operates normally as there is no attenuation of the high frequencies and music, and especially voice, will be most natural. For the greatest

intelligibility of the speaking voice, this control should always be in the "HIGH" position. When in the "LOW" position, most of the treble tones are lost. Since electrical and atmospheric noises are more or less of a high pitch, there will be a marked reduction in background noise when the TONE control is in the "LOW" position, but often this advantage is lost as the excessive "drummy" or "boomy" tone of the voice is not clear and crisp. The center point provides a position half way between the high and low settings.

3.26 PITCH CONTROL AND BEAT FREQUENCY OSCILLATOR: The BEAT FREQUENCY OSCILLATOR (B.F.O.) is turned on by snapping the "B.F.O." switch to "ON". The Beat Frequency Oscillator is a miniature radio transmitter built into the receiver for producing a signal which will "beat" with the received carrier to create an audible tone or whistle. CW (code) signals are produced by virtually turning a transmitter off and on to make the dots and dashes. If it were not for the Beat Frequency Oscillator, nothing could be heard but some thumping sounds as the transmitter went off and on. By beating this oscillator with the transmitter, a tone is produced which can be read as code. The pitch of the beat note should be adjusted by the PITCH CONTROL Ordinarily the receiver is properly tuned when, with the PITCH CONTROL in the center "O" position, the tone is so low that it is inaudible. Then the control may be turned to the right or left until a tone of the desired pitch results. The pitch selected will depend upon the listener's preference, the background noises present, etc.

When listening to code signals with the B.F.O. on, the A.V.C. switch should be "OFF" and the volume controlled by turning the R.F. GAIN control to the left. The regular volume control can be left set at a comfortable listening level.

3.27 AUTOMATIC NOISE LIMITER: The AUTOMATIC NOISE LIMITER (A.N.L.) is a device for short-circuiting noises and interference which are stronger than the signal being received. It works best on noises of short duration such as spark discharge noises and the like. It is operative when the A.N.L. switch is "ON". Since the device removes a portion of the sounds coming through the receiver, there will be a certain amount of distortion, which is of much less consequence than heavy background noise when receiving a weak signal. However, when listening to stronger stations not requiring this feature, the A.N.L. should be turned "OFF" as the speech and music will then tend to be clearer.

3.28 STANDBY-RECEIVE SWITCH: Located at the center of the designation plate is the STANDBY-RECEIVE switch. This switch must always be in the "RECEIVE" position in order for the receiver to operate. When the receiver is used in conjunction with a transmitter, it is desirable to turn the receiver off while transmitting, leaving the tubes still lit in order that it can be instantly turned on without the usual delay in waiting for the tubes to warm up. This switch is used for that purpose.

At the rear of the receiver is a BREAK-IN connection which parallels this front panel switch. In using a transmitter with break-in facilities, it is only necessary to run wires from these two BREAK-IN terminals to the proper terminals on the transmitter. Then the STANDBY-RECEIVE switch should be left in the "STANDBY" position, and every time the transmitter is turned off the receiver will automatically be turned on. Complete Two-Way Radiotelephone communication can be carried on in this fashion very easily.

3.29 PHONES: A phone jack is located on the front panel for using headphones when desired. Ordinary high impedance crystal or magnetic phones can be used.

3.210 OUTPUT TERMINALS: There are two output circuits in the KE-23AT receiver, 4 Ohms and 500 Ohms. When using the Model 23SP speaker, connections should be made to the "4 Ω" terminals. For 500 Ohm output, connections should be made to the "500 Ω" terminals.

4. MAINTENANCE

4.1 The parts used in the KE-23AT Receiver are of more than adequate rating and the maintenance required ordinarily will be limited to the occasional checking of the tubes.

4.2 If the receiver is used in extremely dirty and dusty locations, it will be advisabl to blow out the dust, preferably with compressed air, every few weeks. If compressed air is not available, a soft paint brush may be used although care should be exercised in dusting around the various adjusting screws in order that their settings will not be altered.

4.3 It may be desirable every few months to oil the gear train mechanism. A drop of light machine oil on the end of a tooth pick may be applied to the various bearings.

CAUTION: Do not use too much oil. One small drop only should be applied at each point.

It also may be desirable to apply vaseline or other light grease to the gears themselves. However, in very dirty locations this may not be desirable as the grease would collect abrasive dust and cause premature wear.

4.4 Should the failure of some part occur, regular servicing technique by one familiar with this work is suggested. If parts replacement be required, standard parts of any reputable manufacturer, of the same value and voltage rating as the originals, may be used without adversely affecting the performance of the equipment.

5. ALIGNMENT PROCEDURE

5.1 GENERAL: Due to continual temperature changes, ageing of the parts and tubes, etc., it may be necessary to align the KE-23AT from time to time. Even under severe operating conditions this should seldom be necessary more than once a year. It is suggested that only someone entirely familiar with the theory of alignment of superhetrodyne receivers be permitted to make these adjustments.

Ordinarily the alignment will need only to be "touched up", and no more than a very small fraction of a turn of any of the adjusting screws should be required. This procedure is not particularly difficult. However, if certain coils and condensers are replaced, or through tampering the receiver should get badly out of alignment, trouble may be experienced in getting it correctly aligned again unless one is very thoroughly familiar with the correct procedure, as a number of apparent settings, images and the like may prove to be confusing, particularly on the higher frequency bands "C" and "D".

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NOTE: Since individual receivers may vary slightly one from the other, the dial calibration may not be exact in all cases, and alignment should not be attempted merely for making the dial calibration exact as performance may be sacrificed. Under no conditions bend the plates of the tuning condenser C-1.

To properly align the KE-23AT Receiver, certain apparatus will be required.

A very accurately calibrated source of RF signals is necessary. This may be an ordinary Test Oscillator for aligning the I.F. Amplifier, provided that 455 KC has been accurately calibrated by recent comparison with a secondary frequency standard. For properly aligning the R.F. section on the various bands, a regular laboratory type Standard Signal Generator is recommended. The frequencies that will be required will be: 455, 550, 1,400, 1,800 and 4,400 KC; and 5.5, 14, 16 and 38 MC. It is also desirable, but not essential, to have a series of frequencies lying near the mid-point of each band, such as 900 and 3,000 KC and 9 and 25 MC. It is also desirable to have provision for modulating the signal with a 400 or 1,000 cycle tone.

In order to visually observe the correct alignment, an Electronic Voltmeter or a regular rectifier type AC Voltmeter is used. If neither of these is available, then the regular tuning meter, M-1, may be used, but the small scale will make accurate adjustment difficult.

If the Electronic Voltmeter is used, connect the positive (+) lead to the chassis and insert the negative (-) lead-prong in the "ALIGNMENT JACK", the red tip-jack on the rear of the chassis. If the AC Voltmeter is used, it is connected as an output meter across the "500Ω" terminals at the rear of the receiver. When aligning the receiver, the "A.V.C." switch should be On when using the Electronic Voltmeter or the Tuning Meter of the receiver, and Off when using the AC Voltmeter as an output meter.

It is preferable to use an insulated screw driver for adjusting the various trimmers. The receiver may be left in or removed from the cabinet when aligning the R. F. section, but it must be removed when aligning the I. F. Amplifier.

5.2 ALIGNMENT OF THE I. F. AMPLIFIER: Correct alignment of the Intermediate Frequency Amplifier is perhaps most important, as all signals being received are converted to the 455 KC I.F. frequency. If the Amplifier is incorrectly aligned, it may cause the dial calibration to be excessively off or cause mis-tracking.

To align the I. F. Amplifier, proceed as follows:

5.21 To gain access to the adjusting screws, it will be necessary to remove the receiver from the cabinet. This is done by removing the four screws in the panel and then pulling the receiver forward out of the cabinet.

5.22 Connect the loud speaker. If the Electronic Voltmeter is used, turn the A.V.C. switch On. If the AC Voltmeter is used, turn the A.V.C. switch Off. The R.F. GAIN control should be turned completely On to the right, the A.N.L. switch Off, and the STANDBY-RECEIVE switch in the "RECEIVE" position. The VOLUME control may be turned about 1/2 way on just so the signal can be comfortably heard in order to give an aural indication, partly for convenience and also so that one can get the "feel" of the receiver. The B.F.O. switch should be turned off.

5.23 Remove the grid cap of the 6K8 mixer tube, V-2, and connect the Test Oscillator output to the 6K8 grid and the chassis. It may be most convenient to clip the grounded side to the variable condenser frame.

5.24 Turn on the receiver and the Test Oscillator and allow several minutes for the equipment to warm up and become stable. Since it is best to align the receiver at its normal operating temperature, in extremely cold climates it is recommended to let it run for an hour or two before proceeding with the alignment.

5.25 Apply the 455 KC signal to the 6K8 tube. If the I.F. Amplifier is considerably out of alignment, such as might be the case if a new transformer had been installed, then a fairly strong signal will have to be used in order to force it through the system. Otherwise, set the level of the Test Oscillator until some two or three volts are read on the Electronic Voltmeter, or five volts with the Volume Control turned full On on the AC Voltmeter.

5.26 Then, with a screw driver, adjust the four screws on the rear side of the I.F. transformers, T-13 and T-14, one at a time, until maximum reading on the meter is obtained. If the alignment is occasioned by the replacement of one of the transformers, then adjust the two screws on this one first and follow up with the minor adjustment of the transformer that was not replaced.

After the adjustment appears to be completed and the meter reading is at a maximum, then go back over the adjusting screws in reverse order trying for a slightly higher reading. As the meter reading increases appreciably, reduce the output of the Test Oscillator as necessary.

5.3 ALIGNMENT OF THE BEAT FREQUENCY OSCILLATOR: The Beat Frequency Oscillator oscillates at the same frequency to which the I.F. Amplifier is tuned. Its adjustment is correct if, when a station is accurately tuned in, "zero beat" occurs when the B.F.O. pitch control is at zero or mid-point. Should it be required to adjust for this condition, proceed as follows:

5.31 If the I.F. Amplifier has just been aligned, leave the setup intact. Otherwise, set up in the same manner as described above, and apply the 455 KC signal. It is preferable that the modulation be removed from the signal.

5.32 With the B.F.O. PITCH control set at the mid-point, "0", with a screw driver turn the adjusting screw of T-15 until the beat-note between the Beat Frequency Oscillator and the Test Oscillator becomes lower and lower in pitch and finally zero beats.

5.33 Check the adjustment by turning the B.F.O. pitch control to the right or left and see that the pitch increases as the control is turned either way.

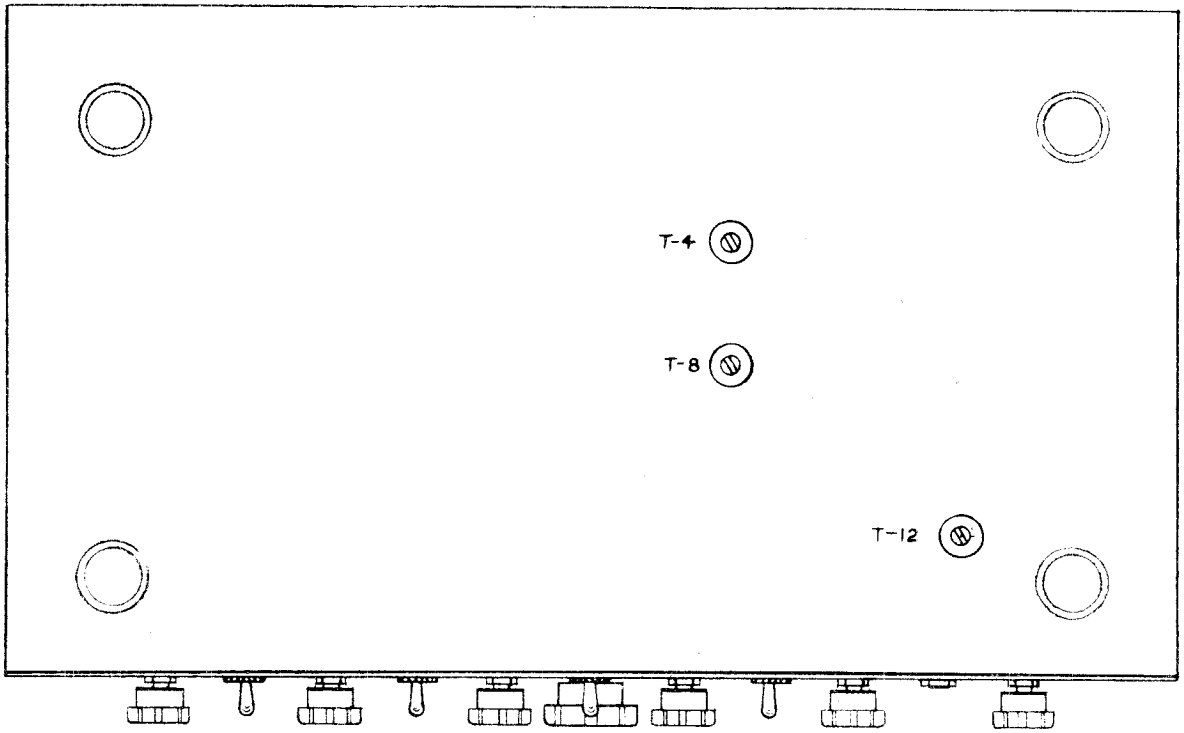
5.34 Remove the leads and replace the grid cap on the 6K8 tube.

5.4 ALIGNMENT OF THE RADIO FREQUENCY SECTION: This procedure is much more difficult than that of aligning the I.F. Amplifier. It is suggested that care be exercised if only "touching up" the trimmers not to get the receiver too far out of alignment, as difficulty may be experienced in getting it realigned correctly, particularly on Bands "C" and "D". The positions of the various trimming and padding adjusting screws are shown in the Plan View and Bottom View diagrams.

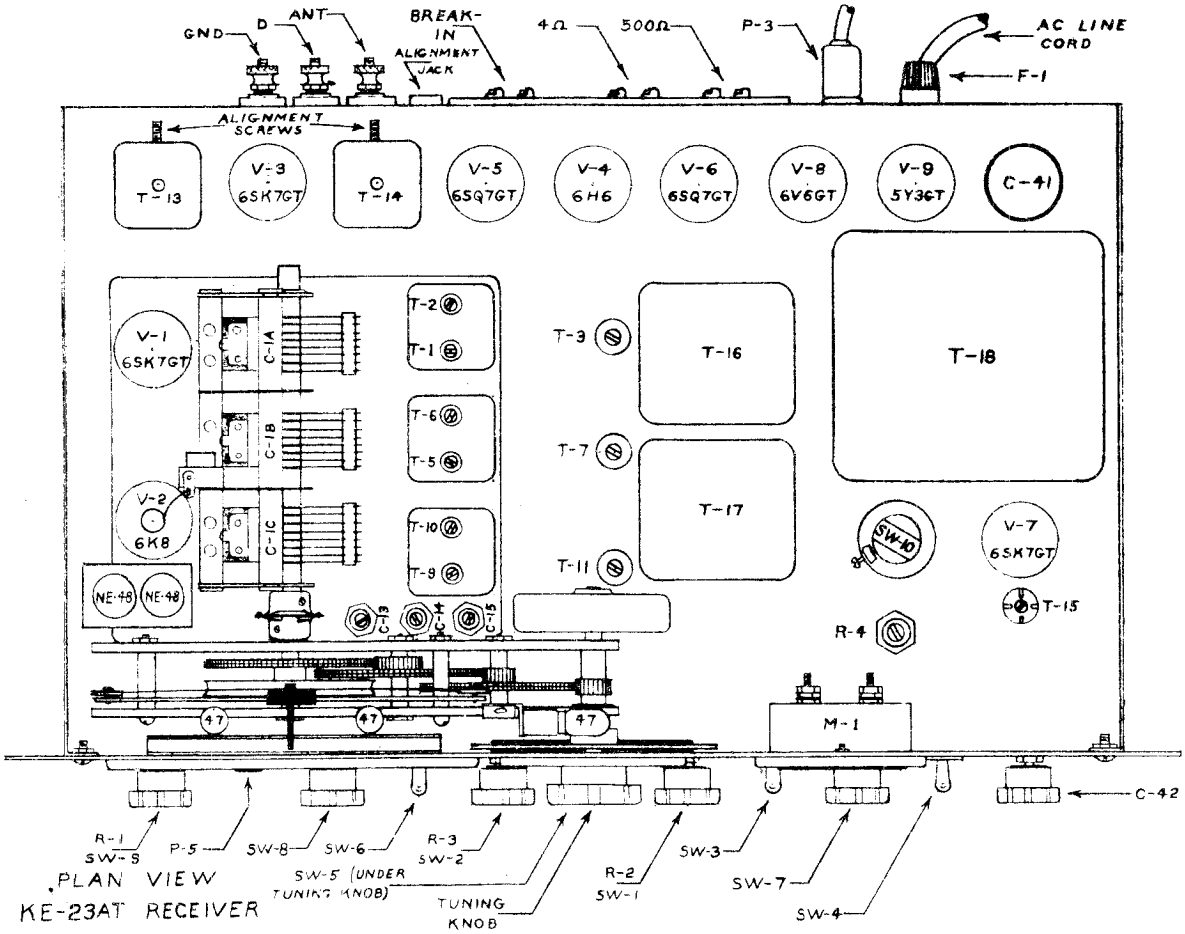
5.41 Connect the Signal Generator through a standard dummy antenna to the input terminals, A and D, (be sure D and G are connected together). If a dummy antenna is not available, a 400 Ohm resistor can be connected between the hot side of the output of the Signal Generator and the antenna terminal, A.

MODEL KE-23AT

KAAR ENGINEERING CO.



BOTTOM VIEW
KE-23AT RECEIVER



PLAN VIEW
KE-23AT RECEIVER

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5.42 Set the various switches and controls in the same position as outlined in Paragraph No. 5.22.

5.43 To align the A Band, 500 - 1,600 KC, proceed in the following order:

(1) Turn the SELECTOR switch to "A".

(2) Apply the 1,400 KC signal and tune the dial to approximately 1,400 KC. In other words, tune in the signal to be sure it is getting through. If the set is badly out of alignment, then a very strong signal may have to be used and T-9 turned to locate it.

(3) If the dial does not read exactly 1,400, then turn it so that it does. VERY CAREFULLY "trim" by turning the trimmer T-9 until the signal is again heard. Do not attempt to too accurately tune by means of the trimmer alone, instead slightly rotate the tuning dial for the maximum reading on the meter after T-9 has been approximately set. This movement should be so slight that the pointer will still point to 1,400.

(4) Trim further by adjusting T-5 and T-1 for maximum reading on the output meter, reducing the output from the Signal Generator if necessary.

(5) Apply a signal of 550 KC and tune it in on the dial.

(6) Proceed to "pad" by adjusting the padding condenser, C-13, and the dial in connection with each other. There is somewhat of a "trick" to doing this properly and one who is inexperienced in padding a superhetrodyne may find it difficult.

To properly pad, VERY CAREFULLY turn the adjusting screw of the padding condenser, C-13, to the right, clockwise, 1/8 or 1/4 turn. This should detune the receiver slightly. Then retune with the dial and observe the reading on the output meter.

If the meter reading is higher, it shows the procedure is in the right direction. Then give C-13 another 1/8 or 1/4 turn and observe the reading again. Continue until the meter ceases to read higher. If one too many fractional turns is made and the meter starts to read lower, then go back 1/8 or 1/4 turn as necessary.

If, instead of the output meter reading higher when C-13 is turned 1/8 or 1/4 of a turn it reads lower, then, instead, turn it 1/8 or 1/4 turn to the left, counter-clockwise, and proceed as above until the meximum meter reading is reached.

(7) The receiver is now correctly padded on Band A and if the intention was to "touch up" the adjustments only, no further alignment on Band A will be necessary.
However, if the receiver was considerably out of line, then it may be that the dial will not read 550 when a 550 KC signal is applied. If such is the case the pointer may be bent slightly until it reads correctly. This may make the pointer read incorrectly at 1,400 KC, and if so, it will be necessary to trim over again as outlined in (3) and (4) above.

(8) If Band A has required more adjustment than merely a "touch up" of the trimmers, then, regardless of whether the dial reads 550 at 550 KC or not, the padding procedure may have been enough to throw the trimmers out of alignment. This can be checked by returning to 1,400 KC, and see if the dial still reads 1,400. If it does not, repeat (3). Even if it does, check the adjustments T-5 and T-1 again. If T-9 requires further adjustment then repeat the entire trimming procedure, then repad again, retrim again and repad as necessary until the result of further adjustment in both cases is indiscernable.

(9) In cases of extreme misalignment it is possible to inadvertently turn T-9 an excessive amount to such a position that would cause the oscillator to oscillate at a frequency 455 KC lower than the signal frequency, 1,400 KC, instead of higher. If this happens, the apparent performance of the receiver at and around 1,400 KC will seem to be the same as with the oscillator adjusted correctly, and the receiver will pad just as it should. However, if this mistake is made, the set will not perform satisfactorily in the middle of the band, appearing insensitive or dead, and it may even whistle when tuning in stations.

A quick check for this is to attach a fairly long outside antenna to the antenna terminal, A, instead of the Signal Generator, and tune the dial from 1,400 to 550 KC. The noise in the center of the band around 900 KC should be somewhat higher than at 550 KC and possibly a little lower than at 1,400 KC, but the set should sound definitely live in the center of the band. This can also be checked with the Signal Generator, and the output should read as good as or better at 900 KC as at 550.

Should it be found that the set is dead in the middle of a band, then apply 1,400 KC to the input as before and tune in the signal, then turn the trimmer of T-9 approximately 1/4 to 3/4 turn in either direction until the signal is tuned in again with a new adjustment. Then trim and pad several times as described above and again check the performance at the center of the band.

5.44 To align the B Band, 1,600 - 5,000 KC.

(1) Turn the SELECTOR switch to position "B". The Signal Generator and output meter are left connected as before.

(2) Proceed in the same manner as outlined in Paragraph 5.43 (3) to (9) above, but trimming at 4,400 KC and padding at 1,800.

On this higher frequency range it will be found that the trimming of T-10 is somewhat more critical than T-9 was on Band A, but the padding with C-14 is less critical.

(3) It will be noted that by properly trimming T-10, the dial can be made to read correctly at 4,400 KC, and T-6 and T-2 can be easily adjusted. However, the dial reading at 1,800 KC is dependent upon the coils which are not adjustable, and it is possible that when the receiver is correctly padded on Band B that the dial will not read exactly 1,800. If such should be the case the pointer may be bent slightly to "split the difference", so to speak, between the 550 KC reading of Band A and the 1,800 KC reading of Band B. Sometimes one may wish to "split the difference" between the correct padding position and the correct dial reading, in which case the receiver may be purposely mis-padded slightly in order that the dial may read more correctly. If this is done, some performance will naturally be sacrificed.

5.45 To align the C Band, 5 - 14 MC.

(1) Turn the SELECTOR switch to "C" and proceed as before, using 14 Megacycles for trimming and 5.5 Megacycles for padding.

(2) On this higher frequency band it is extremely easy to incorrectly adjust the trimming condenser of T-11 in such a manner that the oscillator is lower in frequency than the signal, as the two settings of the trimmers fall so close together, and sometimes in merely "touching up" the adjustments, the wrong oscillator frequency may result. Therefore, it is most important when aligning the C Band to check the performance in the center of the band, around 8 - 9 MC.

NOTE: Because of an inherent characteristic of the receiver the sensitivity between 9.5 and 10 MC is somewhat less than over the rest of the range. This slightly "dead" spot is rather sharply defined and should not be confused with a general lack of sensitivity over the middle portion of the band which would be due to the trimmers being incorrectly set.

It will be found that the padding adjustment of C-15 will not be critical.

5.46 To align the D Band, 16 - 42 MC.

(1) Turn the SELECTOR switch to "D".

(2) It is to be noted that on the D Band only, the oscillator frequency is 455 KC Lower than the signal frequency, and the method of determining the correct setting is different from that used on the other bands.

(3) Apply a 38 MC signal to the receiver, adjust the trimming condenser of T-12 and obtain the correct dial reading as before. Adjust T-8 and T-4 for maximum reading on the meter. It will be noted in this case that all the adjustments are very, very critical. In adjusting T-12 it may be necessary to turn the trimmer a very small amount to an estimated setting, and then find the signal by tuning the dial, this adjustment is so critical.

(4) After T-12, T-8 and T-4 are adjusted, then check to see if the oscillator frequency is lower than the signal frequency. To do this, find the image by tuning the dial to approximately 39 MC where the signal should again be heard a little weaker than before. If the signal is heard on 39 MC the adjustment of T-12 is correct. However, if it should be heard on 37 MC and not on 39, the adjustment is incorrect and T-12 should be completely reset.

(5) It must be pointed out that in trimming the D Band it is possible to get false settings. At a false setting all of the adjustments seem to proceed normally except that the receiver lacks sensitivity generally and the performance is very poor. If this condition is suspected, the 38 MC signal should again be applied only possibly stronger, and T-12 and T-8 and T-4 arbitrarily readjusted until the 38 MC signal can be located with an entirely different set of adjustments. Then proceed to carry through the trimming procedure from the beginning.

(6) There is no padding adjustment for the D Band. Instead, the turns on the oscillator coil are moved back and forth to change the inductance, which accomplishes the same result.

It is suggested that no attempt be made to pad the D Band under a touch-up procedure. Only if one of the D Band coils has been replaced should this adjustment be attempted. The results of padding will vary from set to set but, in general, if one of the coils has been replaced it is suggested that an attempt be made to move the turns on it only, leaving the other two alone.

(7) The general padding procedure is much the same as that used with a padding condenser. A 16 MC signal is applied, the output meter reading observed as before, and one of the turns of heavy wire on T-12 moved backwards or forwards by pushing with a screw driver. Follow the signal by retuning the dial and observing if the output has gone up or gone down, repeating or reversing the procedure as necessary. After the correct point has been found, it will be necessary to retrim, much more so in this case than when aligning Bands A, B or C. Then, repad and retrim, repad and retrim as many times as necessary until the performance seems satisfactory. It is not uncommon to have to repeat as many as ten times before satisfactory performance is achieved.

(8) When the best padding seems to have been obtained, then heavy wire of the secondary of T-4 may be moved back and forth to try and better the results. It will seldom be necessary to adjust T-8.

The final check may be made at 25 MC in the center of the band. Ordinarily the sensitivity of the set at 25 MC will be greater than at 38 or 16 MC.

(9) Apply a little Duco Cement, or equivalent, to the turns of wire that have been moved in order to secure them in place.

5.47 Remove the meter and Signal Generator and replace the set in the cabinet.

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PARTS LIST

KAAR TYPE KE-23AR COMMUNICATIONS RECEIVER

Circuit Symbol	Function	Description	Type	Mfgr.
C-T	Trimming condensers, 12 units mounted across secondaries of T-1 to T-12.	7-45 mmf. variable ceramic.	CTS-2	TEL
C-1A	Antenna coil secondary tuning.	Rear section, 3 gang variable air condenser. 442 mmf. (Effective capacity.)	23	RC
C-1B	R.F. coil secondary tuning.	Center section, 3 gang variable air condenser. 442 mmf. (Effective capacity.)		
C-1C	Oscillator grid coil tuning.	Front section, 3 gang variable air condenser. 442 mmf. (Effective capacity.)		
C-2	High frequency coupling for T-7.	5 mmf. ceramic, 400 V. DC, or Two 10 mmf. mica in series.	N-750K-5 5R5Q1	E CD
C-3	Compensating capacitance for secondary of T-4.	25 mmf. ceramic, 400V. DC.	N-750K-25	E
C-4	Compensating capacitance for secondary of T-8.	Same as C-3.		
C-5	High frequency coupling for T-8.	50 mmf. ceramic, 400 V. DC.	N-750K-50	E
C-6	Tuning condenser for compensating coil of T-4.	Same as C-5.		
C-7	V-2 oscillator grid.	100 mmf. ceramic, 400 V. DC.	N-750L-100	E
C-8	V-5 diode, R.F. filter.	Same as C-7.		
C-9	Tuning condenser for T-15.	Same as C-7.		
C-10	V-7 grid.	Same as C-7.		
C-11	V-5 diode, R.F. by-pass.	250 mmf. ceramic, 400 V. DC.	N-750K-250	E
C-12	Low frequency tickler tuning of T-12.	150 mmf. mica, 500 V. DC.	P0	MC
C-13	A Band oscillator padding condenser.	250 - 525 mmf., mica compression.	HC-41	SI
C-14	B Band oscillator padding condenser.	850 - 1500 mmf., mica compression.	HC-71	SI
C-15	C Band oscillator padding condenser.	Same as C-14.		
C-16	C Band oscillator padding condenser. Fixed portion.	.001 mfd. mica, 500 V. DC.	1-W5D1	CD
C-17	V-2 oscillator plate coupling.	.002 mfd. mica, 500 V. DC.	1-W5D2	CD
C-18	V-1 cathode by-pass.	.1 mfd. 200 V. DC., moulded paper.	MPW-5157	SOL
C-19	V-2 cathode by-pass.	Same as C-18.		
C-20	V-3 cathode by-pass.	Same as C-18.		
C-21	Coupling, volume control to V-6 grid.	.01 mfd., 400 V. DC., moulded paper.	340-21	MC
C-22	V-1 grid return by-pass.	.02 mfd., 400 V. DC., moulded paper.	342-12	MC
C-23	V-2 mixer grid return by-pass.	Same as C-22.		
C-24	V-3 grid return by-pass.	Same as C-22.		
C-25	V-2 screen by-pass.	.02 mfd., 400 V. DC., moulded paper.	MPW-5143	SOL
C-26	V-7 plate by-pass.	Same as C-25.		
C-27	Power line filter	Same as C-25.		
C-28	Power line filter.	Same as C-25.		
C-29	V-1 and V-3 screen by-pass.	.1 mfd., 400 V. DC., moulded paper.	MPW-5147A	SOL
C-30	V-1 and V-3 plate return by-pass.	Same as C-29.		
C-31	V-2 plate return by-pass.	Same as C-29.		
C-32	V-6 grid return by-pass.	Same as C-29.		
C-33	V-8 plate filter.	.005 mfd., 600 V. DC., moulded paper.	340-25	MC
C-34	Coupling V-6 plate to V-8 grid.	.01 mfd., 600 V. DC., moulded paper.	342-17	MC

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Circuit Symbol	Function	Description	Type	Mfgr.
C-35	Coupling V-8 plate to phones.	Same as C-34.		
C-36	V-4 plate by-pass.	.05 mfd., 600 V. DC., moulded paper.	345-22	MC
C-37	Tone control.	.05 mfd., 600 V. DC., moulded paper.	MTW-5639	SCL
C-38	V-8 cathode by-pass.	10 mfd., 25 V. DC., tubular electrolytic.	BR-102A	CD
C-39	V-6 cathode by-pass.	10 mfd., 50 V. DC., tubular electrolytic.	BR-105	CD
C-40	Filter for V-2 plate and screen supply voltage.	12 mfd., 450 V. DC., tubular electrolytic.	BR-1245	CD
C-41	Plate supply filter condensers. One section at input of filter, other section at output.	20-20 mfd., 450 V. DC., dual section aluminum can type electrolytic.	UP-6B-J38	CD
C-42	B.F.O. pitch control. Across T-15.	13 mmf. variable air trimmer.	KE-13G0	ASP
C-43	Phase correction capacitance for C Band.	Two loops of wire around grid bus of T-7.		
C-44	B.F.O. coupling, V-7 to V-5.	1 1/2 loops of wire around diode plate lead of T-14.		
R-1	R.F. Gain Control.	1,000 Ohm wire wound variable resistor. Combined with meter switch SW-9.	X-2015	CTT
R-2	Volume Control.	250,000 Ohm potentiometer. Combined with power switch SW-1.	WC-8586	ST
R-3	Squelch Control.	1 Megohm potentiometer. Combined with SW-2.	WC-8585	ST
R-4	Meter Zero-Set Control.	1500 Ohm potentiometer.	WC-8975	ST
R-5	A.V.C. filter, V-1 grid return.	500,000 Ohm, 1/4 W., insulated carbon.	CM-1/2	ST
R-6	V-2 grid return isolation.	Same as R-5.		
R-7	Squelch dropping.	Same as R-5.		
R-8	V-6 plate.	Same as R-5.		
R-9	V-8 grid leak.	Same as R-5.		
R-10	Stabilizing resistance for T-12 oscillator coil.	5 Ohm, 1/2 W., insulated carbon.	504	E
R-11	Supressor for Control Grid, V-2.	30 Ohm, 1/2 W., insulated carbon.	504	E
R-12	V-1 and V-3 cathode.	150 Ohm, 1/2 W., insulated carbon.	504	E
R-13	V-2 cathode.	300 Ohm, 1/2 W., insulated carbon.	504	E
R-14	Voltage divider.	600 Ohm., 1/2 W., insulated carbon.	504	E
R-15	Meter compensating.	27,000 Ohm, 1/2 W., insulated carbon.	CM-1	ST
R-16	Voltage divider.	10,000 Ohm, 1/2 W., insulated carbon.	504	E
R-17	R.F. filter from diode detector, V-5.	25,000 Ohm, 1/2 W., insulated carbon.	504	E
R-18	V-7 grid leak.	Same as R-17.		
R-19	V-3 oscillator grid leak.	50,000 Ohm, 1/2 W., insulated carbon.	504	E
R-20	Audio dropping for A.N.L. tube, V-4.	100,000 Ohm, 1/2 W., insulated carbon.	504	E
R-21	Audio dropping for A.N.L. tube, V-4.	250,000 Ohm, 1/2 W., insulated carbon.	504	E
R-22	V-4 plate filter.	1 Megohm, 1/2 W., insulated carbon.	504	E
R-23	V-6 grid leak.	Same as R-22.		
R-24	A.V.C. filter.	2 Megohm, 1/2 W., insulated carbon.	504	E
R-25	Protective load across 4 Ohm winding of T-16.	10 Ohm, 1 W., insulated carbon.	518	E

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Circuit Symbol	Function	Description	Type	Mfgr.
R-26	V-8 cathode.	300 Ohm, 1 W., insulated carbon.	518	E
R-27	Meter dropping, in plate supply for V-1 and V-3.	500 Ohm, 1 W., insulated carbon.	518	E
R-28	V-2 plate and screen dropping.	5,000 Ohm, 1 W., insulated carbon.	518	E
R-29	Tone Control dropping.	Same as R-28.		
R-30	V-2 screen dropping.	20,000 Ohm, 1 W., insulated carbon.	518	E
R-31	Voltage regulator dropping in plate circuit of V-2.	10,000 Ohm, 1 W., insulated carbon.	CM-1	ST
R-31A	V-2 plate.	Same as R-31.		
R-32	V-7 plate.	25,000 Ohm, 1 W., insulated carbon.	518	E
R-33	Voltage divider.	40,000 Ohm, 1 W., insulated carbon.	518	E
R-34	Voltage divider.	30,000 Ohm, 10 W., wire wound.	10F	WL
R-35	High voltage supply dropping from external power supply.	3,500 Ohm, 25 W., wire wound.	25F	WL
SW-1	Power Switch.	SPST on R-2.		
SW-2	Squelch ON-OFF Switch.	SPST on R-3.		
SW-3	A.V.C. ON-OFF Switch.	SPST toggle.	20994	HH
SW-4	B.F.O. Switch.	Same as SW-3.		
SW-5	Stand-By Switch.	Same as SW-3.		
SW-6	A.N.L. Switch.	DPDT toggle.	20905BJ	HH
SW-7	Tone Control Switch.	Single Pole, 3 Position.	1461	CE
SW-8A to SW-8F	Band Selector Switch.	6 Pole, 4 Position, 3 gang, Isolantite.	K-23SWT	CE
SW-9	Meter Switch.	SPST on R-1.		
SW-10	Line Voltage Selector.	Single Pole, 5 Position.	36	AMT

Circuit Symbol	Function	Description	Type	Mfgr.
T-1	A Band. Antenna to V-1 grid.	Antenna coil in common shield with T-2.	AB-23AT	ML
T-2	B Band. Antenna to V-1 grid.			
T-3	C Band. Antenna to V-1 grid.	Antenna coil in shield.	C-23AT	ML
T-4	D Band. Antenna to V-1 grid.	Unshielded antenna coil.	D-23AT	KE
T-5	V-1 plate to V-2 grid, A Band.	R.F. coil in common shield with T-6.	AB-23RFT	ML
T-6	V-1 plate to V-2 grid, B Band.			
T-7	V-1 plate to V-2 grid, C Band.	R.F. coil mounted in shield.	C-23RFT	ML
T-8	V-1 plate to V-2 grid, D Band.	Unshielded R.F. Coil.	D-23RFT	KE
T-9	Oscillator coil, A Band.	Oscillator coil in common shield with T-10.	AB-23SOT	ML
T-10	Oscillator coil, B Band.			
T-11	Oscillator coil, C Band.	Oscillator coil mounted in shield.	C-23SOT	ML
T-12	Oscillator coil, D Band.	Unshielded oscillator coil.	D-23SOT	KE
T-13	V-2 plate to V-3 grid.	455 Kc. permeability tuned I.F. transformer.	912CT	ML
T-14	V-3 plate to V-5 diode plates.	Same as T-13.		
T-15	Beat frequency oscillator coil.	455 KC permeability tuned oscillator coil.	K-23-BFOT	ML
T-16	V-8 plate to 4 Ohm and 500 Ohm output terminals.	Output transformer, 8,000 Ohm plate to 500 Ohm line and 4 Ohm speaker voice coil.	4259Q	F
T-17	Smoothing choke.	15 Henry, iron core choke.	K-303Q	F
T-18	Power transformer.	Primary 100, 120, 150, 210 and 230 Volts, to 5 V. at 2 A., 6.3 V. at 3.5 A., and 520 V. CT at 75 MA.	5351Q	F

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Circuit Symbol	Function	Description	Type	Mfgr.
V-1	R.F. Amplifier.	Vacuum tube.	6SK7GT	TS
V-2	Oscillator and First Detector-Mixer.	Vacuum tube.	6K8	RCA
V-3	I.F. Amplifier.	Vacuum tube.	6SK7GT	TS
V-4	Automatic Noise Limiter.	Vacuum tube.	6H6	RCA
V-5	Diode Second Detector and Squelch Control.	Vacuum tube.	6SQ7GT	HY
V-6	First Audio Amplifier.	Vacuum tube.	6SQ7GT	HY
V-7	Beat Frequency Oscillator.	Vacuum tube.	6SK7GT	TS
V-8	Audio Output Amplifier.	Vacuum tube.	6V6GT	RCA
V-9	Rectifier.	Vacuum tube.	5Y3GT	TS
2 #NE-48	Voltage regulator for V-2.	Two neon lamps in series.	NE-48	GE
3 #47	Illumination of dials.	Three bayonet base miniature pilot lamps.	47	GE
M-1	Signal strength meter.	0 - 1 MA 3-1/2 inch milliammeter.	DW-51	GE
F-1	Fuse.	2 amp. small glass.	3AG	BS
P-1	External connection to A.V.C. for receiver alignment.	Single contact tip jack.	889R	ICA
P-2	AC supply for heaters.	5 prong miniature socket.	S5S	AMP
P-3	Plate and heater input for DC operation.	5 prong miniature cable plug.	MPM5S	AMP
P-4	Input from AC line.	Rubber AC, spring action line plug.	102	ALL
P-5	Output connection for phones.	Open circuit phone jack.	IJ-101	U

OTHER PARTS AND ACCESSORIES

Description of Part	Type	Mfgr.
Ceramic octal tube sockets for V-1 to V-9.	25-8437	UC
Miniature bayonet pilot lamp sockets.	3171	CI
2 contact neon lamp sockets.	1012 (Sockets ONLY)	GC
Fuse extractor post for 3AG fuse.	HKM	BS
Ceramic thru panel insulators for antenna and ground connections, A, D, and G.	55	EFJ
Terminal strip for 500 Ohm and 4 Ohm output connections and break-in, 6 terminals.	Special 5C	J
Small pointer knobs.	S-308-3P	KK
Large tuning knob.	S-309-3	KK
Round Vernier dial assembly.	VS-23T-2	KE
Main tuning dial scale.	TS-23T	KE
Gear-train tuning mechanism.	GT-23T	KE

The KAAR ENGINEERING COMPANY reserves the right to make parts substitutions as necessary, changes or improvements on its products from time to time without incurring obligation to install the same on equipment previously sold.

LIST OF PARTS MANUFACTURERS AND ADDRESSES

Mfgr. Symbol	Manufacturer	Address
ALL	Allied Electric Products, Inc.	82 Coit St., Irvington, N. J.
AMP	American Phenolic Corp.	1832 So. 54th Ave., Chicago, Ill.
ASP	American Steel Package Co.	Defiance, Ohio
BS	Bussman Mfg. Co.	University at Jefferson, St. Louis, Mo.
CE	Centralab	900 E. Keefe Ave., Milwaukee, Wis.
CTT	Chicago Telephone Supply Co.	Elkhart, Indiana
CI	Cinch Mfg. Corp.	2335 W. Van Buren St., Chicago, Ill.
CD	Cornell-Dubilier Electric Corp.	So. Plainfield, New Jersey
CR	Crowe Name Plate and Mfg. Co.	3701 Ravenswood Ave., Chicago, Ill.
E	Erie Resistor Corp.	644 W. 12th St., Erie, Pennsylvania
GE	General Electric Company	Bridgeport, Connecticut
GO	Gothard Mfg. Co.	Springfield, Illinois
HH	Hart & Hegeman Division (The Arrow-Hart & Hegeman Co.)	Hartford, Connecticut
EFJ	E. F. Johnson Co.	Waseca, Minnesota
HY	Hytron Corporation	76 Lafayette St., Salem, Mass.
ICA	Insuline Corp. of America	36-02 35th Ave., Long Island City, N. Y.
J	Howard B. Jones	2300 Wabansia Ave., Chicago, Ill.
KE	Kaar Engineering Company	619 Emerson St., Palo Alto, Calif.
KR	Ken-Rad Tube & Lamp Corp.	Owensboro, Kentucky
KK	Kurtz Kasch, Inc.	1415 So. Broadway, Dayton, Ohio
MC	Micamold Radio Corp.	1087 Flushing, Brooklyn, New York
ML	J. W. Miller Co.	5917 So. Main St., Los Angeles, Calif.
P	Peerless Electrical Products Co.	6920 McKinley St., Los Angeles, Calif.
RC	Radio Condenser Co.	Camden New Jersey.
RCA	R.C.A. Mfg. Co., Inc.	Camden, New Jersey.
SI	F. W. Sickles Co.	Springfield, Mass.
SOL	Solar Mfg. Corp.	Bayonne, New Jersey
ST	Stackpole Carbon Company	St. Marys, Pennsylvania
TEL	Teleradio Engineering Co.	Wilkes-Barre, Pennsylvania
TS	Tung-Sol Lamp Works	95 8th Avenue, Newark, New Jersey
UC	United Carr Fastener Co.	31 Ames St., Cambridge, Mass.
U	Utah Radio Products Co.	812 Orleans St., Chicago, Ill.
WL	Ward Leonard Co.	Mt. Vernon, New York

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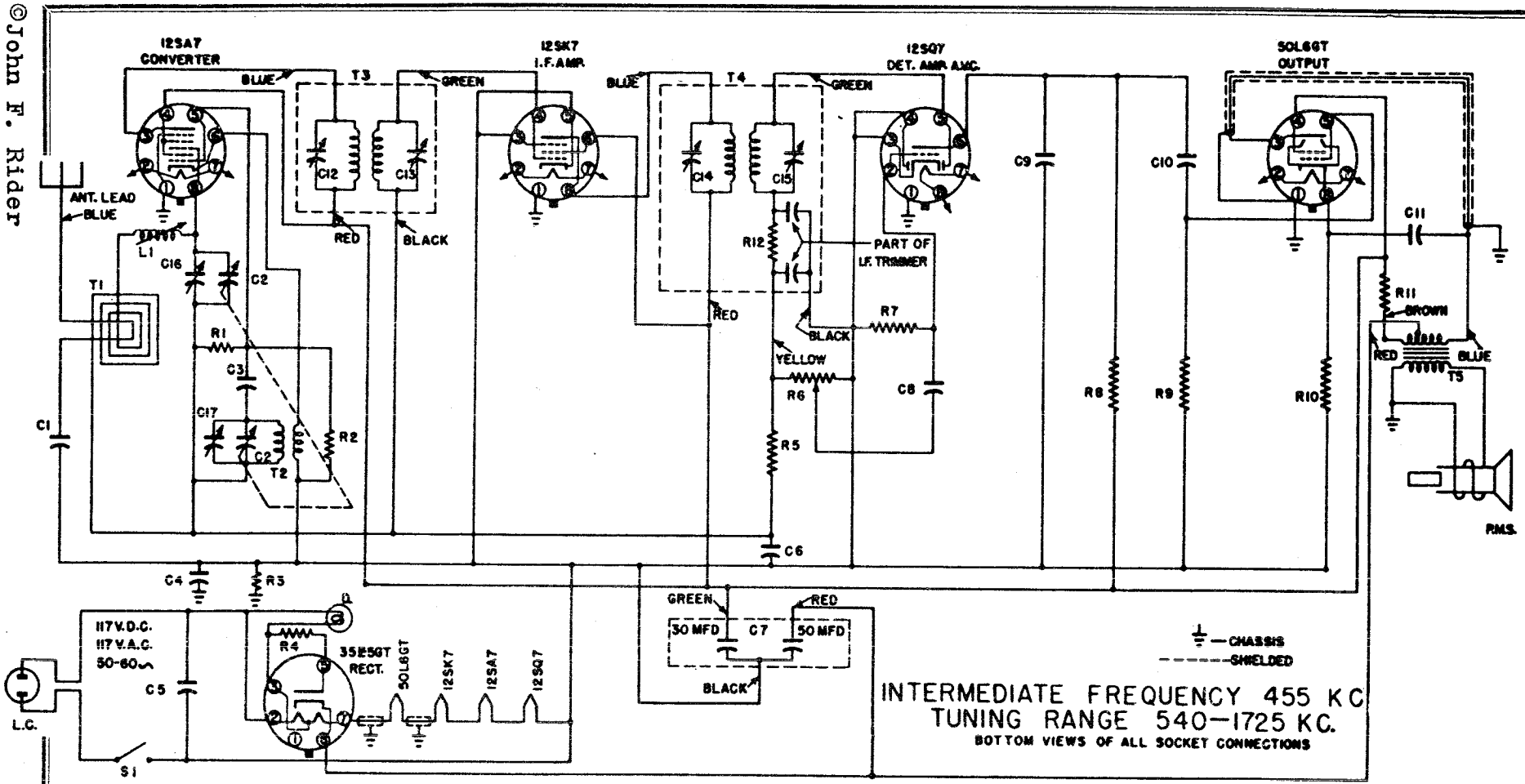

DWG. SYM.	PART NO.	DESCRIPTION
T1	852570	LOOP ANTENNA ASSEMBLY
T2	865015	OSCILLATOR COIL "
T3	853350	NO.1 I.F. TRANSFORMER "
T4	853361	" 2 " " "
T5	852531	OUTPUT " "
L1	A52697	ANT. LOAD COIL
C1	C56585	.001 MFD. 200V. PAPER CAPACITOR
C2	A52452	2 GANG VARIABLE "
C3	856055	47 MMFD. MICA "
C4	C56631	0.1 MFD. 400V. PAPER "
C5	C56696	.05 " 600V. " "
C6	C56690	" " 200V. " "
C7	852326	30-50 MFD. 150V. ELECTROLYTIC

DWG. SYM.	PART NO.	DESCRIPTION
C8	C56595	.02 MFD. 200V. PAPER CAPACITOR
C9	856059	220 MMFD. MICA "
C10	C56589	.004 MFD. 200V. PAPER "
C11	C56626	.05 " 400V. " "
C12,C13		NO.1 I.F. TRIMMERS (PART OF ASS'Y.)
C14,C15		NO.2 " " (" " ")
C16		ANT. TRIMMER ON VARIABLE CAPACITOR
C17		OSC. " " " "
R1	855496	15 MEG. 1/2W. CARBON RESISTOR
R2	855479	22,000 OHM " " "
R3	855485	220,000 " " " "
R4	855460	15 " " " "
R5	855491	2.2 MEG. " " "

DWG. SYM.	PART NO.	DESCRIPTION
R6,S1	D56340	500,000 OHM VOL. CONTROL & LINE SW.
R7	855494	6.8 MEG. 1/2W. CARBON RESISTOR
R8	855467	470,000 OHM " " "
R9	855487	470,000 " " " "
R10	855466	150 " " " "
R11	855674	1200 " 1 W. " "
R12		47,000 " 1/2W. " "
P.M.S.	853450	5" PERMANENT MAGNET SPEAKER
L.C.	A53091	LINE CORD
D.L.	A70635	DIAL LIGHT, TYPE 47

OCT. 25, 1945

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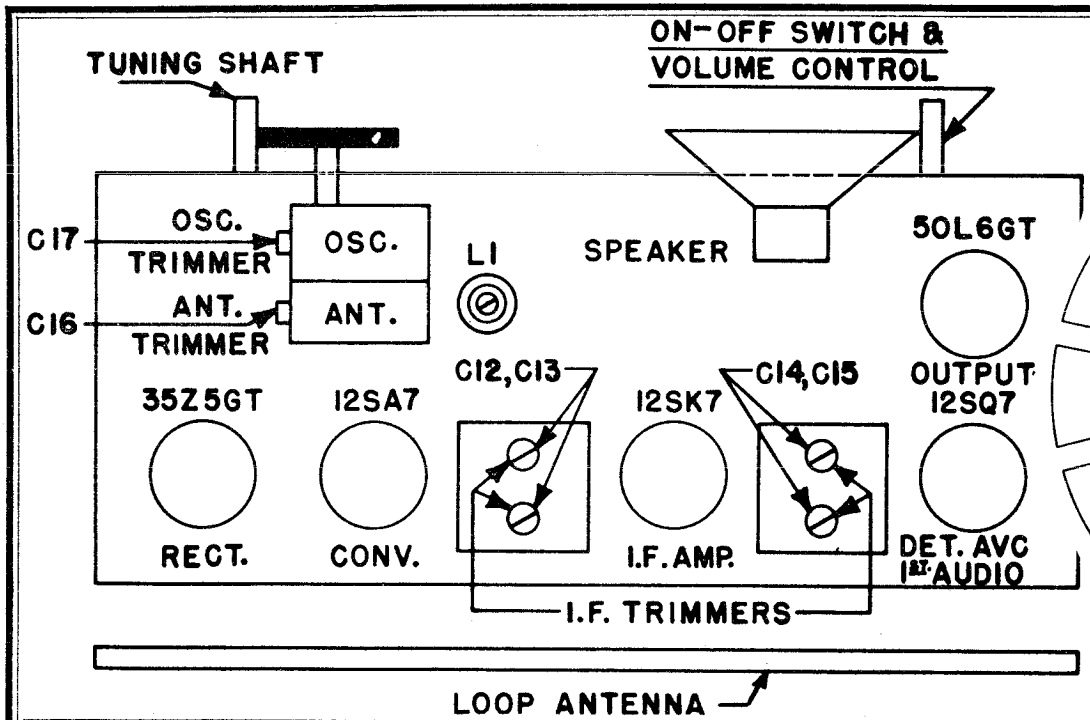
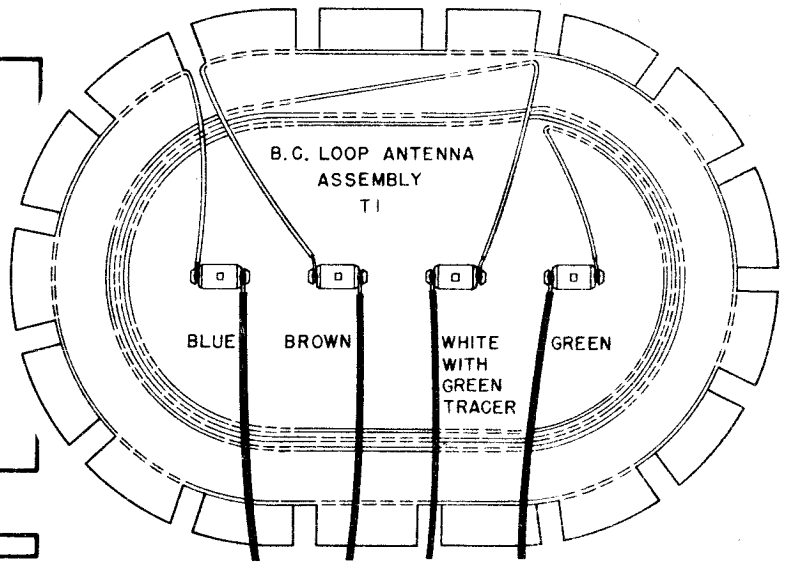


LOOP WIRING DIAGRAM



OPERATION	ALIGNMENT OF	GENERATOR CONNECTED TO	DUMMY ANTENNA	GENERATOR FREQUENCY	DIAL AND CONDENSER SETTING	TRIMMER	REMARKS
1	Set dial pointer to last mark at low frequency end of dial with gang condenser closed.						
2	2nd. IF	12SA7 grid and B-	.05 mfd.	455 KC	open	C14 & C15	Max. Output
3	1st. IF					C12 & C13	Max. Output
4	Broadcast	Ant. lead and B-	200 mmfd.	1500 KC	1500 KC	C16 & C17	Max. Output
5				600 KC	600 KC	Slug in L1	Max. Output
6	Repeat operations 4 and 5 until no further improvement in output is obtained.						

TUBE	FUNCTION	Voltage of each socket prong to B- (Prong No. 3 of 12SK7)							
		No. 1	No. 2	No. 3	No. 4	No. 5	No. 6	No. 7	No. 8
12SA7	Oscillator - Converter	0	-	90	90	0	0	-	0
12SK7	I-F Amplifier	0	-	0	0	0	90	-	90
12SQ7	Detector - AVC - 1st. Audio	0	0	0	0	0	28	-	-
50L6	Beam Power Amplifier	0	-	115	90	0	0	-	6
35Z5	Rectifier	-	-	-	-	110 AC	-	-	117

Notes: Voltage readings are for schematic diagram in this bulletin. Allow 10% ± on all measurements.
Always use meter scale which will give greatest deflection within scale limits
All DC measurements made with 1000 ohms per volt voltmeter. Position of volume control: On full (with no signal)
Voltages are DC unless otherwise specified.
Line voltage: 117 volts, 60 cycles (AC)
All voltages measured from prong No. 3 of 12SK7 tube socket, or B-.

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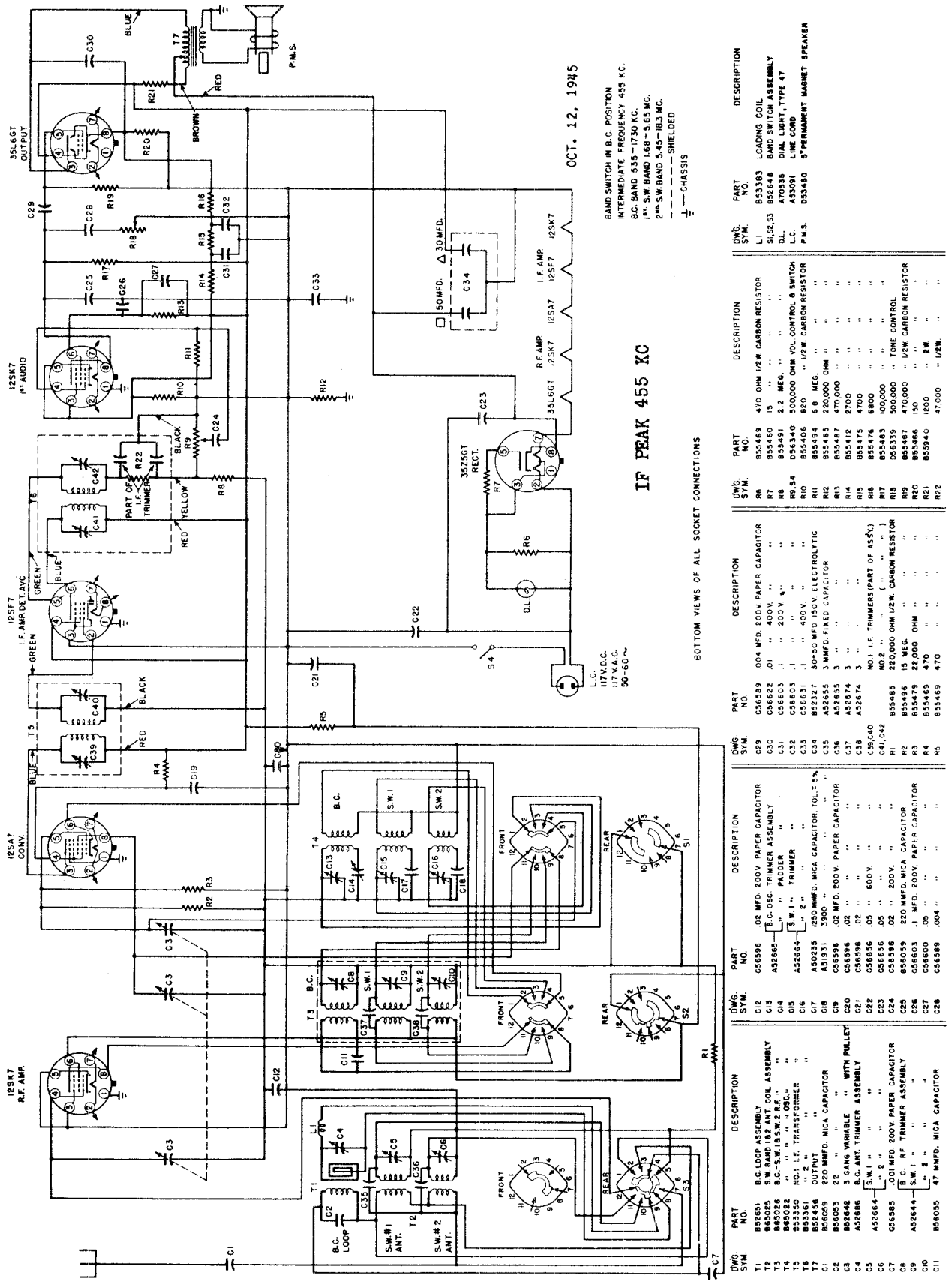

DWG. SYM.	PART NO.	DESCRIPTION
T1	852651	B.C. LOOP ASSEMBLY
T2	865025	S.W. BAND 1&2 ANT. COIL ASSEMBLY
T3	865028	B.C.-S.W.1&S.W.2 R.F. "
T4	865022	" " " " OSC. "
T5	853350	NO.1 I.F. TRANSFORMER "
T6	853354	NO.2 " " " "
T7	852456	OUTPUT "
C1	856059	220 MMFD. MICA CAPACITOR
C2	856053	.22 " " " "
C3	852648	3 GANG VARIABLE " WITH PULLEY
C4	A52686	B.C. ANT. TRIMMER ASSEMBLY
C5	A52664	S.W.1 " " " "
C6		" 2 " " " "
C7	G56585	.001 MFD. 200V PAPER CAPACITOR
C8		B.C. R.F. TRIMMER ASSEMBLY
C9	A52644	S.W.1 " " "
C10		" 2 " " "
C11	B56055	47 MMFD. MICA CAPACITOR
C12	C56596	.02 MFD. 200V PAPER CAPACITOR
C13		B.C. OSC. TRIMMER ASSEMBLY
C14	A52665	" " PADDER "
C15		S.W.1 " TRIMMER "
C16	A52664	" 2 " " "
C17	A50235	1250 MMFD. MICA CAPACITOR, TOL. ± 5%
C18	A51931	3900 " " " " " "
C19	C56596	.02 MFD. 200V. PAPER CAPACITOR
C20	C56596	.02 " " " " "
C21	C56596	.02 " " " " "
C22	C56656	.05 " 600 V. " "
C23	C56656	.05 " " " "
C24	C56596	.02 " 200V. " "
C25	B56059	220 MMFD. MICA CAPACITOR
C26	C56603	.1 MFD. 200V. PAPER CAPACITOR
C27	C56600	.05 " " " "
C28	C56589	.004 " " " "
C29	C56589	.004 MFD. 200V PAPER CAPACITOR
C30	C56622	.01 " 400 V. " "
C31	C56603	.1 " 200 V. " "
C32	C56603	.1 " " " "
C33	C56631	.1 " 400 V. " "
C34	B52327	30-30 MFD. 150 V. ELECTROLYTIC
C35	A52655	.1 MMFD. FIXED CAPACITOR
C36	A52655	.1 " " " "
C37	A52674	.1 " " " "
C38	A52674	.1 " " " "
C39,C40		NO.1 I.F. TRIMMERS (PART OF A52672)
C41,C42		NO.2 " " " " " ")
R1	B55485	220,000 OHM 1/2W. CARBON RESISTOR
R2	B55496	15 MEG. " " "
R3	B55479	22,000 OHM " " "
R4	B55469	470 " " " "
R5	B55469	470 " " " "
R6	B55469	470 OHM 1/2W. CARBON RESISTOR
R7	B55460	15 " " " "
R8	B55491	2.2 MEG. " " "
R9,S4	D56340	500,000 OHM VOL. CONTROL & SWITCH
R10	B55406	820 " 1/2W. CARBON RESISTOR
R11	B55494	6.8 MEG. " " "
R12	B55485	220,000 OHM " " "
R13	B55487	470,000 " " " "
R14	B55412	2700 " " " "
R15	B55475	4700 " " " "
R16	B55476	6800 " " " "
R17	B55483	100,000 " " " "
R18	D56339	500,000 " TONE CONTROL
R19	B55487	470,000 " 1/2W. CARBON RESISTOR
R20	B55466	150 " " " "
R21	B55940	1200 " 2W. " "
R22		47,000 " 1/2W. " "
L1,S2,S3	B53383	LOADING COIL
DL.	B52648	BAND SWITCH ASSEMBLY
L.C.	A70535	DIAL LIGHT, TYPE 47
P.M.S.	A53091	LINE CORD
	D53480	5" PERMANENT MAGNET SPEAKER

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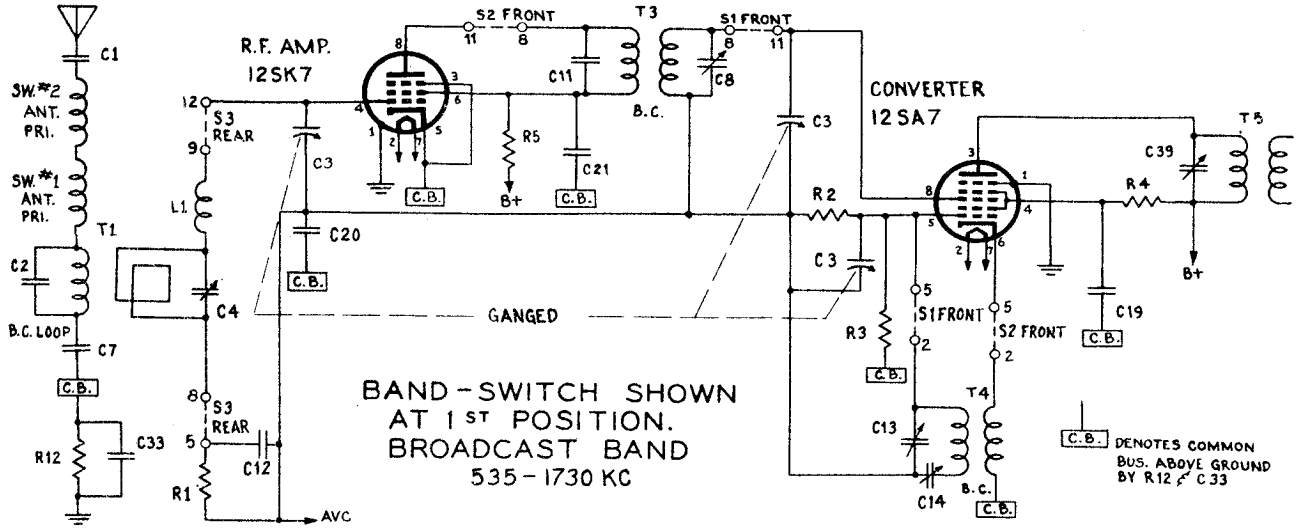

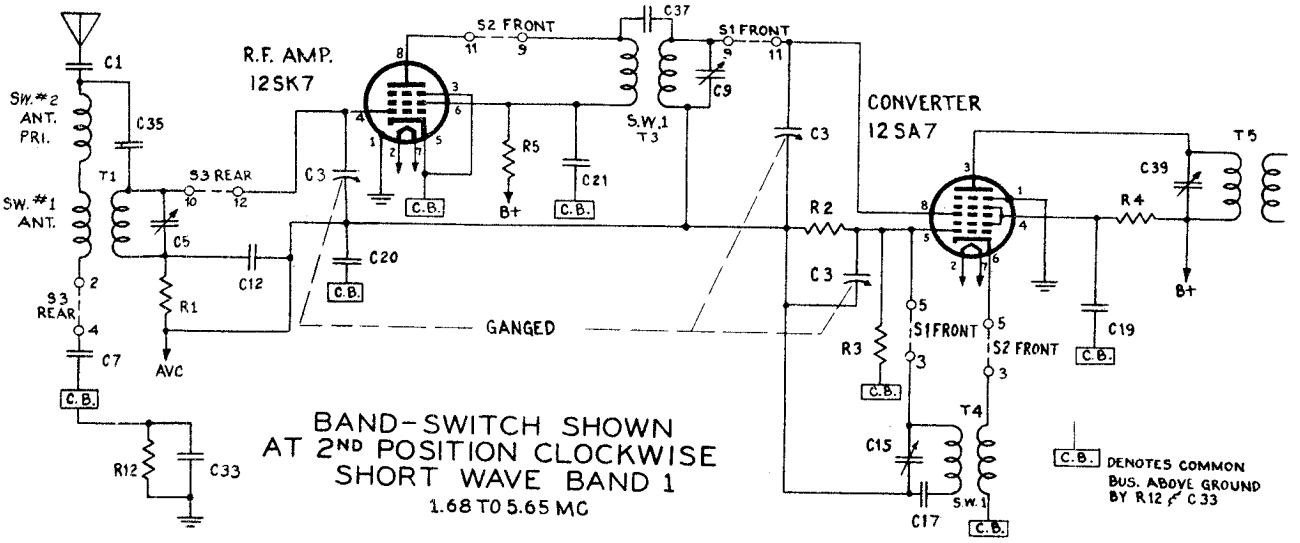

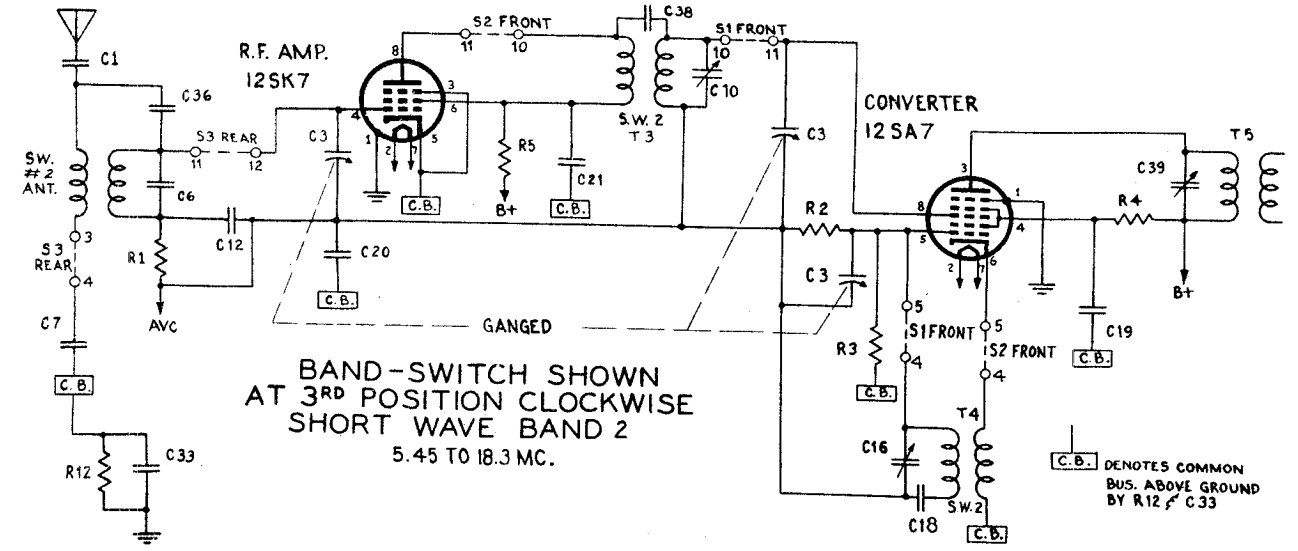

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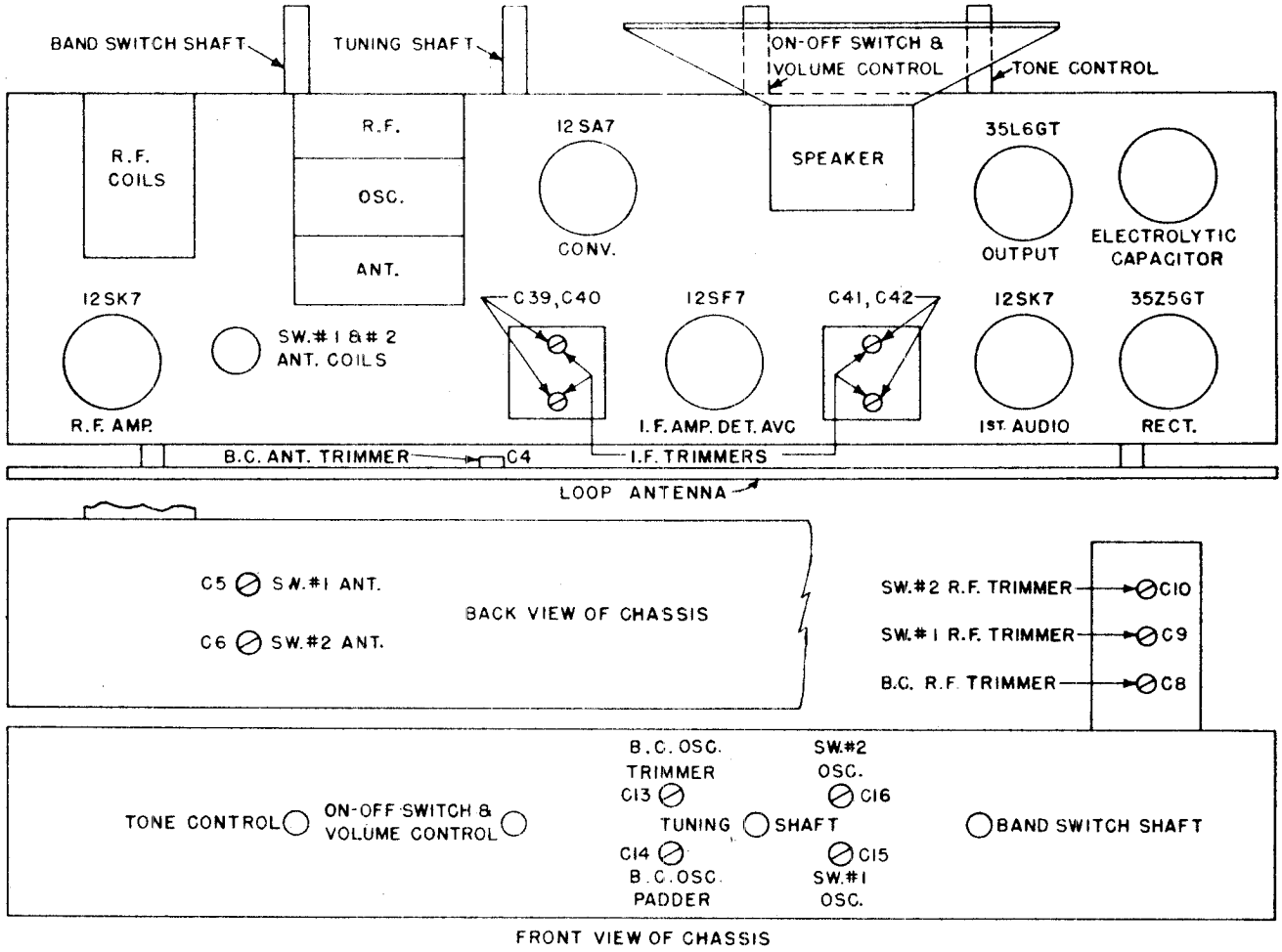

ALIGNMENT CHART

OPERATION	ALIGNMENT OF	GENERATOR CONNECTED TO	DUMMY ANTENNA	GENERATOR FREQUENCY	BAND SWITCH SETTING	DIAL AND CONDENSER SETTING	TRIMMER	REMARKS
1.	Set dial pointer to last mark at low frequency end of dial with gang condenser closed.							
2.	2nd. IF	12SA7 Grid & B-	.05 mf	455 KC	BC	open	C41 & C42	Max. Output
3.	1st. IF						C39 & C40	Max. Output
4.	BC	Ant. lead and B-	200 mmf.	1500 KC	BC	1500 KC	C13, C8, C4	Max. Output
5.				600 KC		600 KC	C14	Osc. Padder
6.	Repeat operations 4 and 5 until alignment frequencies fall on correct calibration points.							
7.	SW 1	Ant. lead and B-	400 ohms (res.)	5 MC	1	5 MC	C15, C9, C5	Max. Output
8.				1800 KC		1800 KC		**
9.	SW 2	Ant. lead and B-	400 ohms (res.)	16 MC	2	16 MC	C16*, C10, C6	Max. Output
10.				6 MC		6 MC		**

* Rock dial while trimming C16 at 16 MC

** Check sensitivity and dial calibration

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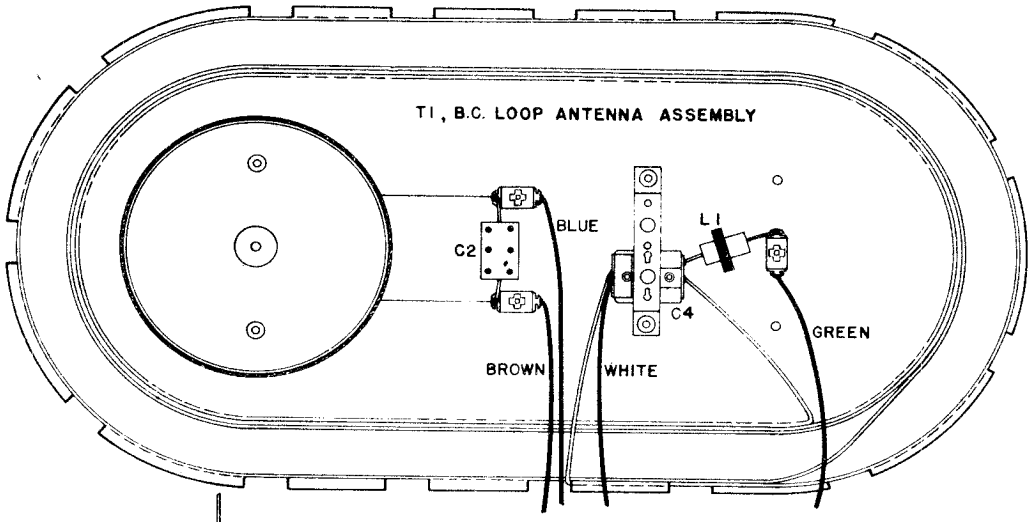
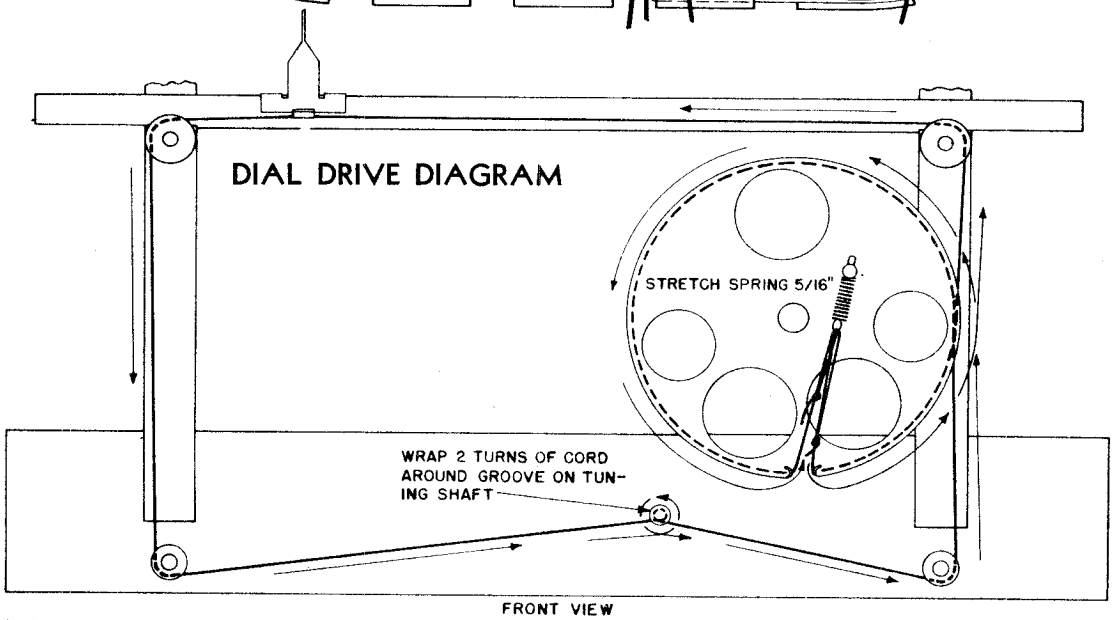
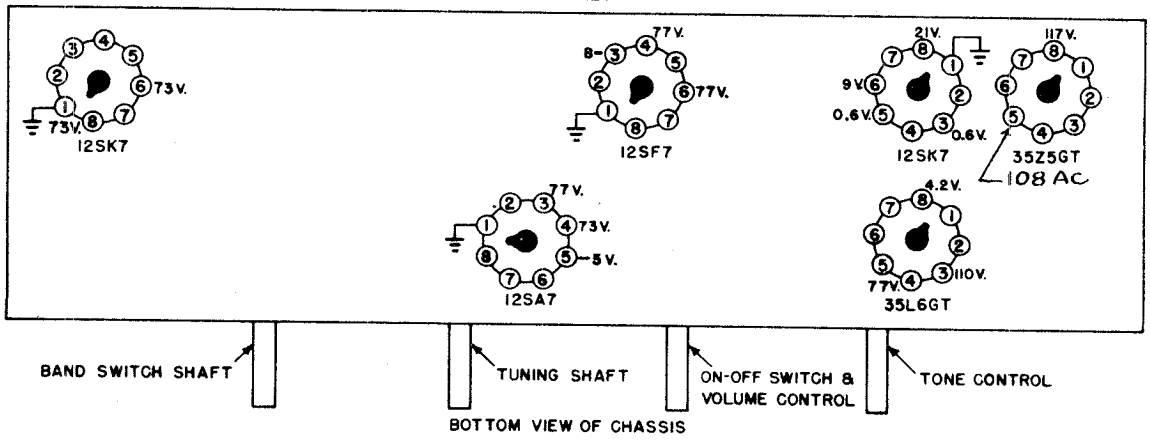
LEAR INC.

LOOP WIRING DIAGRAM



DIAL DRIVE DIAGRAM





Notes: Voltage readings are for schematic diagram in this bulletin, Allow 10% ± on all measurements.
Always use meter scale which will give greatest deflection within scale limits.
All DC measurements made with 1000 ohms per volt voltmeter.
Voltages are DC unless otherwise specified.
All voltages measured from prong No. 3 of 12SF7 tube socket, or B-.

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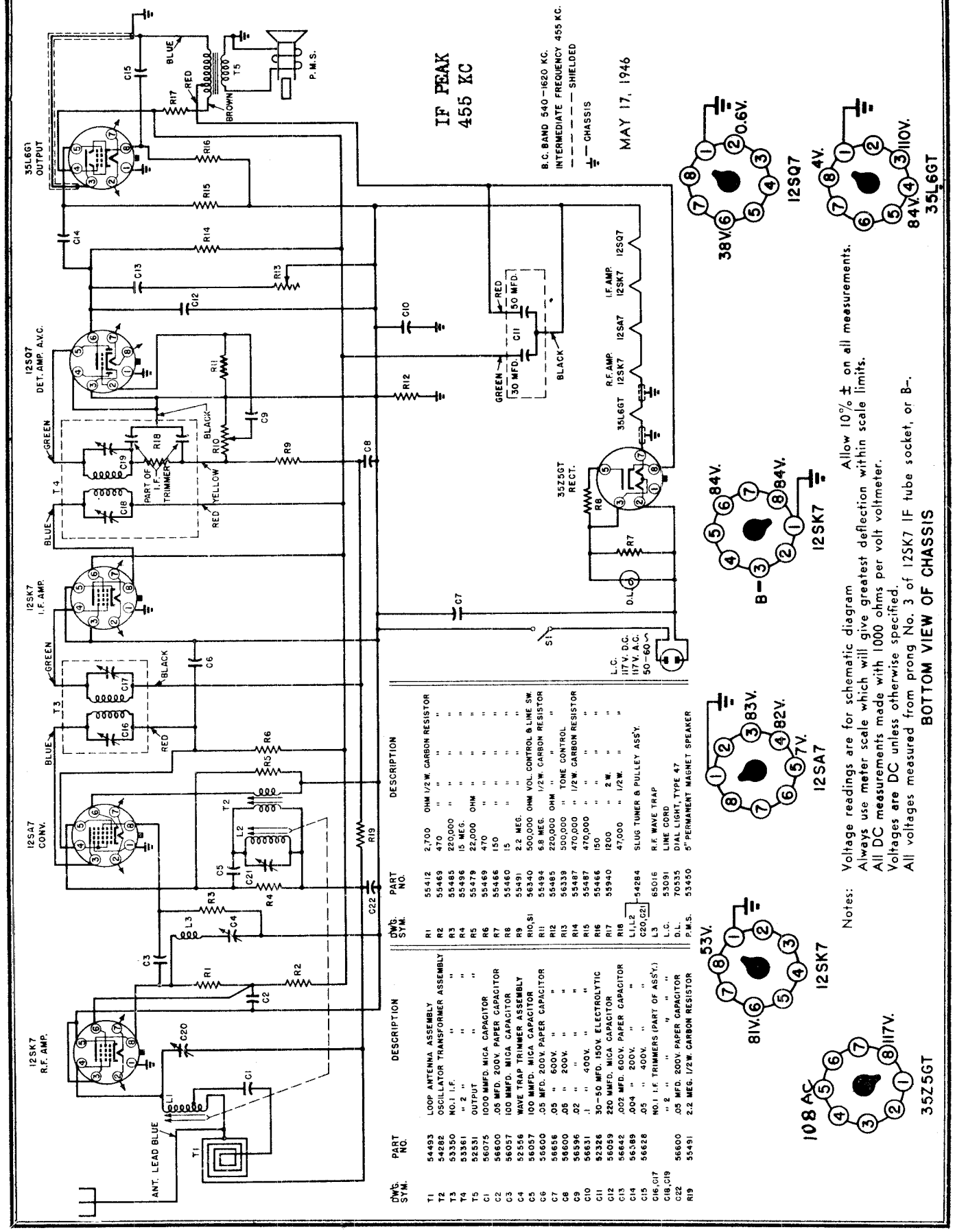
LEAR INC.

MODELS 6614, 6615, 6616, 6619

IF PEAK
455 KC

MAY 17, 1946

B.C. BAND 540–1620 KC.
INTERMEDIATE FREQUENCY 455 KC.
– – – – – – SHIELDED
⏚ — CHASSIS



DWG. SYM.	PART NO.	DESCRIPTION
T1	54493	LOOP ANTENNA ASSEMBLY
T2	54282	OSCILLATOR TRANSFORMER ASSEMBLY
T3	53350	NO. 1 I.F. " " "
T4	53361	" 2 " " " "
T5	52531	OUTPUT " " "
C1	56075	1000 MMFD. MICA CAPACITOR
C2	56600	.05 MFD. 200V. PAPER CAPACITOR
C3	56057	100 MMFD. MICA CAPACITOR
C4	52556	WAVE TRAP TRIMMER ASSEMBLY
C5	56057	100 MMFD. MICA CAPACITOR
C6	56600	.05 MFD. 200V. PAPER CAPACITOR
C7	56656	.05 " 600V. " "
C8	56600	.05 " 200V. " "
C9	56596	.02 " " " "
C10	56631	.1 " 400V. " "
C11	92326	30–50 MFD. 150V. ELECTROLYTIC
C12	56059	220 MMFD. MICA CAPACITOR
C13	56642	.002 MFD. 600V. PAPER CAPACITOR
C14	56589	.004 " 200V. " "
C15	56628	.05 " 400V. " "
C16, C17		NO. 1 I.F. TRIMMERS (PART OF ASS'Y.)
C18, C19		" 2 " " " " "
C22	56600	.05 MFD. 200V. PAPER CAPACITOR
R19	55491	2.2 MEG. 1/2W. CARBON RESISTOR

DWG. SYM.	PART NO.	DESCRIPTION
R1	55412	2,700 OHM 1/2 W. CARBON RESISTOR
R2	55469	470 " " " "
R3	55485	220,000 " " " "
R4	55496	15 MEG. " " "
R5	55479	22,000 OHM " " "
R6	55469	470 " " " "
R7	55466	150 " " " "
R8	55460	15 " " " "
R9	55491	2.2 MEG. " " "
R10, S1	56340	500,000 OHM VOL. CONTROL & LINE SW.
R11	55494	6.8 MEG. 1/2 W. CARBON RESISTOR
R12	55485	220,000 OHM " "
R13	56339	500,000 " TONE CONTROL
R14	55487	470,000 " 1/2 W. CARBON RESISTOR
R15	55487	470,000 " " " "
R16	55466	150 " " " "
R17	53940	1200 " 2 W. " "
R18		47,000 " 1/2 W. "
L1, L2	54284	SLUG TUNER & PULLEY ASS'Y.
C20, C21		
L3	65016	R.F. WAVE TRAP
L.C.	53091	LINE CORD
D.L.	70535	DIAL LIGHT, TYPE 47
P.M.S.	53450	6" PERMANENT MAGNET SPEAKER

Notes: Voltage readings are for schematic diagram. Allow 10% ± on all measurements.
Always use meter scale which will give greatest deflection within scale limits.
All DC measurements made with 1000 ohms per volt voltmeter.
Voltages are DC unless otherwise specified.
All voltages measured from prong No. 3 of 12SK7 IF tube socket, or B–.

BOTTOM VIEW OF CHASSIS

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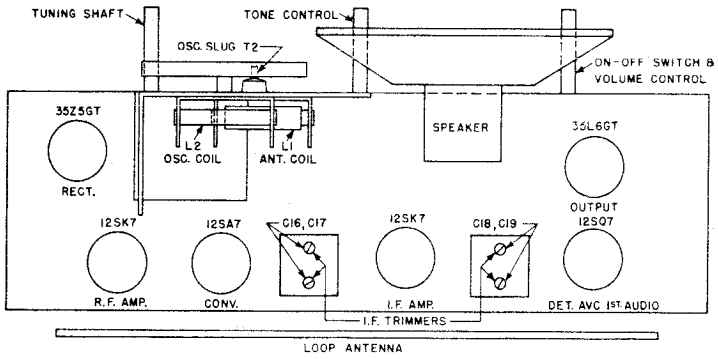
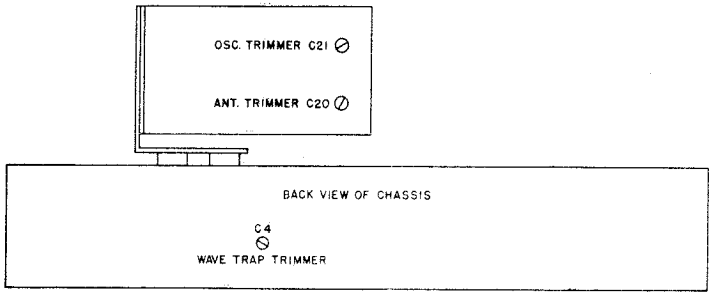
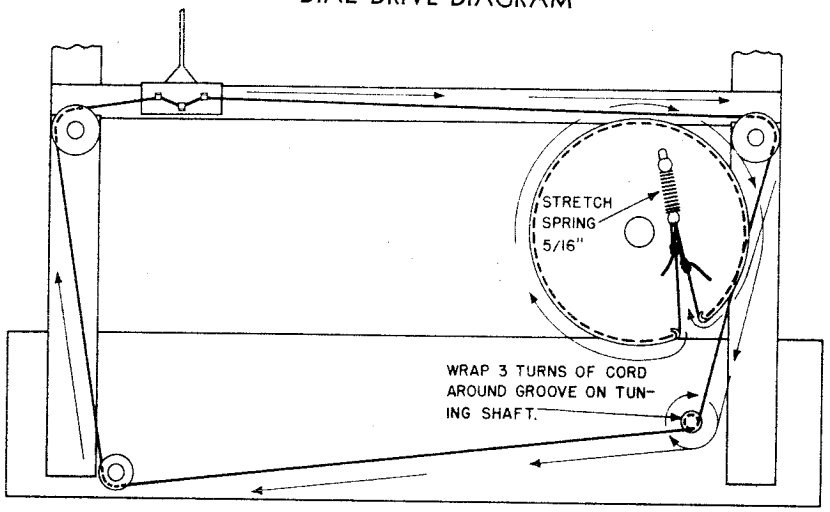


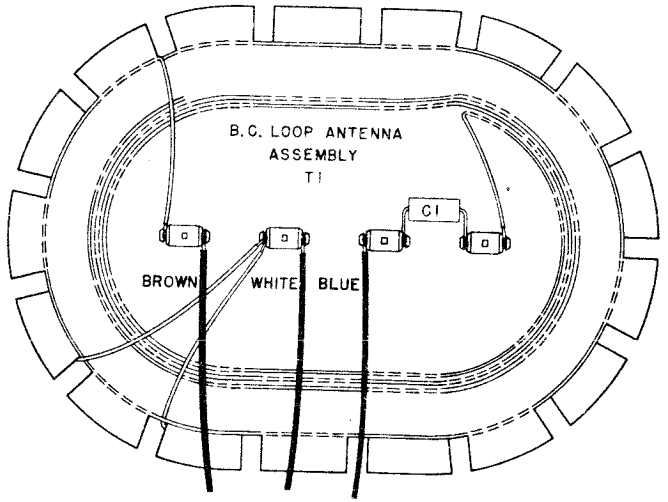


DIAL DRIVE DIAGRAM



FRONT VIEW

LOOP WIRING DIAGRAM



ALIGNMENT CHART

OPERATION	ALIGNMENT OF	GENERATOR CONNECTED TO	DUMMY ANTENNA	GENERATOR FREQUENCY	DIAL SETTING	TRIMMER	REMARKS
1	Set dial pointer at 1620 KC with tuning unit drive turned fully clockwise against stop.						
2	2nd IF	Pin No. 8 of 12SA7 and B–	.05 mf.	455 KC	1620 KC	C18, C19	Max. Output
3	1st IF					C16, C17	Max. Output
4	Wave Trap	Antenna lead (blue wire) and B–	200 mmf.	455 KC	1620 KC	C4	Min. Output
5	Osc. Trim			1620 KC	1620 KC	C21	Max. Output
6	Ant. Trim			1500 KC	1500 KC	C22	Max. Output
7	Osc. Slug			600 KC	600 KC	T2	Max. Output*
8	Repeat adjustments in operations 5 and 6 until no further increase in output is obtained.						

* Rock dial tuner slightly while adjusting T2.

Notes: Connect output meter to voice coil circuit.
Volume control on full for all adjustments.
Signal generator gain control at minimum for satisfactory output meter reading.

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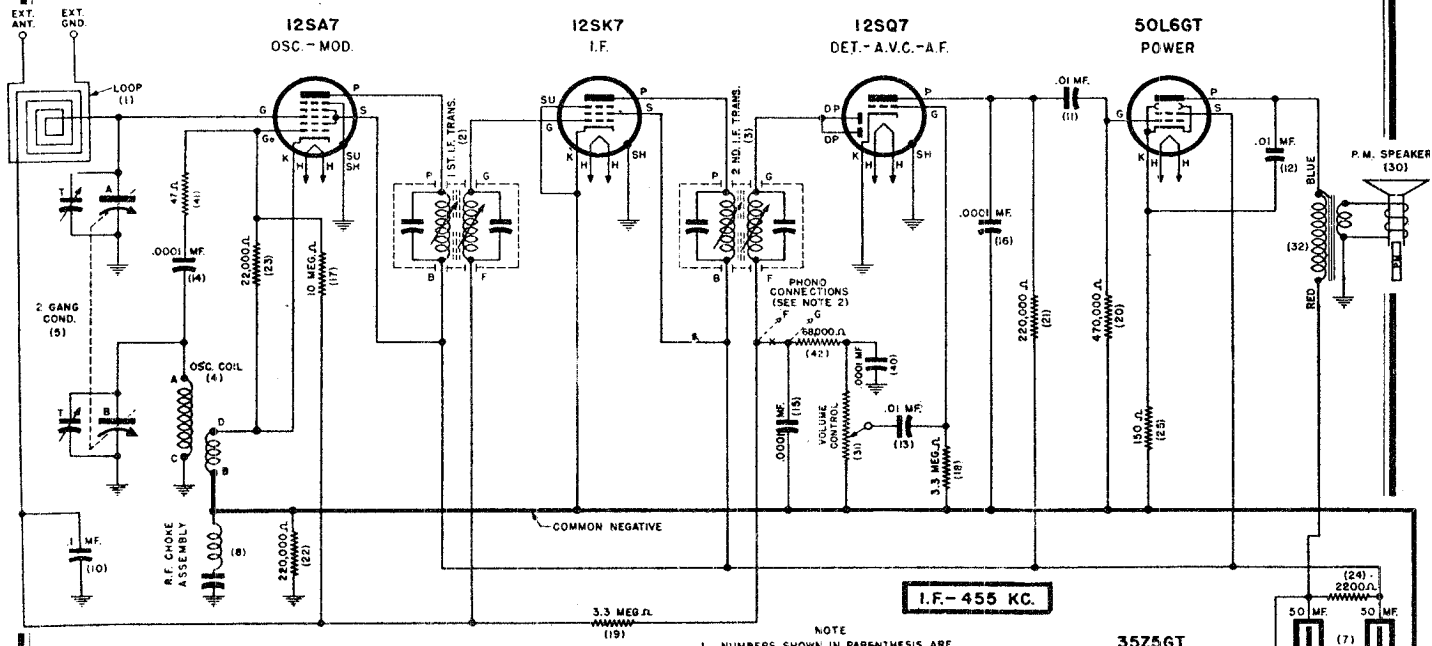
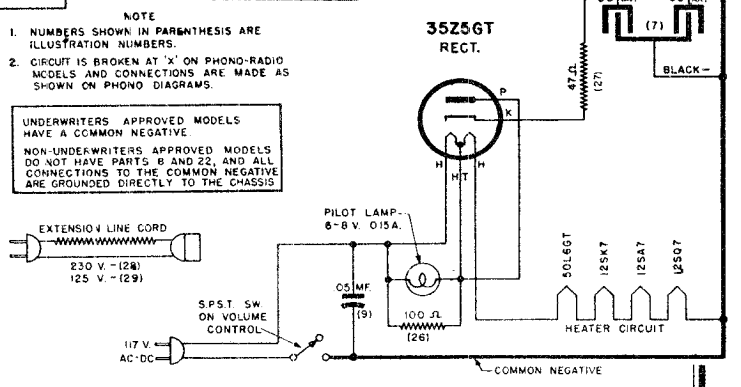
LINCOLN RADIO & TELEV. CORP.

MODEL 5A-110



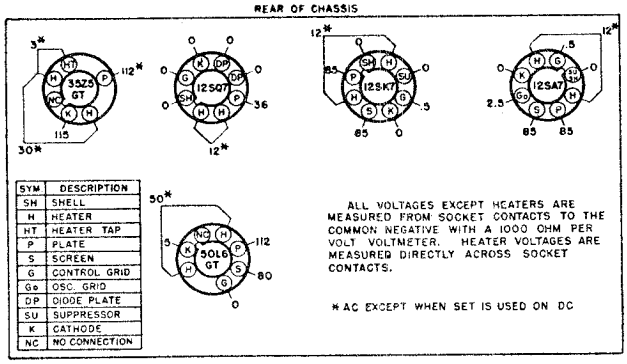


NOTE

1. NUMBERS SHOWN IN PARENTHESIS ARE ILLUSTRATION NUMBERS.
2. CIRCUIT IS BROKEN AT 'X' ON PHONO-RADIO MODELS AND CONNECTIONS ARE MADE AS SHOWN ON PHONO DIAGRAMS.

UNDERWRITERS APPROVED MODELS HAVE A COMMON NEGATIVE.

NON-UNDERWRITERS APPROVED MODELS DO NOT HAVE PARTS 8 AND 22, AND ALL CONNECTIONS TO THE COMMON NEGATIVE ARE GROUNDED DIRECTLY TO THE CHASSIS.



SYM	DESCRIPTION
SH	SHELL
H	HEATER
HT	HEATER TAP
P	PLATE
S	SCREEN
G	CONTROL GRID
Go	OSC. GRID
DP	DIODE PLATE
SU	SUPPRESSOR
K	CATHODE
NC	NO CONNECTION

ALL VOLTAGES EXCEPT HEATERS ARE MEASURED FROM SOCKET CONTACTS TO THE COMMON NEGATIVE WITH A 1000 OHM PER VOLT VOLTMETER. HEATER VOLTAGES ARE MEASURED DIRECTLY ACROSS SOCKET CONTACTS.

* AC EXCEPT WHEN SET IS USED ON DC

VOLTAGE TABLE
(BOTTOM VIEW OF CHASSIS)

PART NO. 284-8

—7-46—

Ill. No.	Part No.	Part Name	Description
1	20E24	Antenna	Loop
2	20E21	Coil	1st I.F. Transformer
3	20E22	Coil	2nd I.F. Transformer
4	20E162	Coil	Oscillator
5	24E2	Condenser	Tuning, 2 Gang (3 Hole Mtg.)
5	24E18	Condenser	Tuning, 2 Gang (2 Hole Mtg.)
7	25E1	Condenser	Dry Electrolytic, 50-50 Mfd. 150 V.
8	20E75	Choke	R.F. Choke Assembly (Und. Appd. Only)
9	23E416	Condenser	Tubular, .05 Mfd. 400 Volts
10	23E218	Condenser	Tubular, .1 Mfd. 200 Volts
11	23E211	Condenser	Tubular, .01 Mfd. 200 Volts
12	23E211	Condenser	Tubular, .01 Mfd. 200 Volts
13	23E211	Condenser	Tubular, .01 Mfd. 200 Volts
14	23E39	Condenser	Mica, .0001 Mfd.
15	23E39	Condenser	Mica, .0001 Mfd.
16	23E39	Condenser	Mica, .0001 Mfd.
17	27E106	Resistor	Carbon, 10 Megohm 1/3 Watt
18	27E335	Resistor	Carbon, 3.3 Megohm 1/3 Watt
19	27E335	Resistor	Carbon, 3.3 Megohm 1/3 Watt

Ill. No.	Part No.	Part Name	Description
20	27E474	Resistor	Carbon, 470,000 Ohm 1/3 Watt
21	27E224	Resistor	Carbon, 220,000 Ohm 1/3 Watt
22	27E224	Resistor	Carbon, 220,000 Ohm 1/3 Watt (Und. Appd. Only)
23	27E223	Resistor	Carbon, 22,000 Ohm 1/3 Watt
24	27E222-2	Resistor	Carbon, 2,200 Ohm 1 Watt
25	27E151	Resistor	Carbon, 150 Ohm 1/3 Watt
26	27E101	Resistor	Carbon, 100 Ohm 1/3 Watt
27	27E470-2	Resistor	Carbon, 47 Ohm 1/2 Watt
28		Resistor	230 Volt Extension Line Cord. Used in models not Underwriters Apprd.
29		Resistor	125 Volt Extension Line Cord. Used in models not Underwriters Apprd.
30	1E9	Speaker	5" PM
31	28E1	Volume Control	With S.P.S.T. Switch
32	22E2	Transformer	Output for Speaker
40	23E39	Condenser	Mica, .001 Mfd.
42	27E683	Resistor	Carbon, 68,000 Ohm, 1/3 W.

Part No.	Part Name	Description
7E85	Cabinet	Wood
7E86	Cabinet Back	
41E1	Cord	6 Ft. Rubber Line Cord
5E14-1	Dial Plate	Dial Back Plate Less Scale
4E1	Dial Cord	30" of 18 Lb. Dial Drive Cord
9E2	Dial Crystal	Acetate Dial Crystal
36E24-1	Dial Scale	Calibrated Scale
68E1	Dial Shaft	Drive Shaft

Part No.	Part Name	Description
19E3	Dial Shaft Bearing	Bearing For Drive Shaft
35E8	Dial Pointer	Dial Indicator
65E2	Dial Spring	Tension Spring For Drive Cord
37E27-1	Knob	
20E43	Pilot Lamp Socket	Pilot Lamp Socket Assembly
40E1	Pilot Lamp	6-8 Volt .150 Amp. Type 47 Lamp

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For alignment procedure read tabulations from left to right, and make the adjustment marked (1) first, (2) next, (3) third.

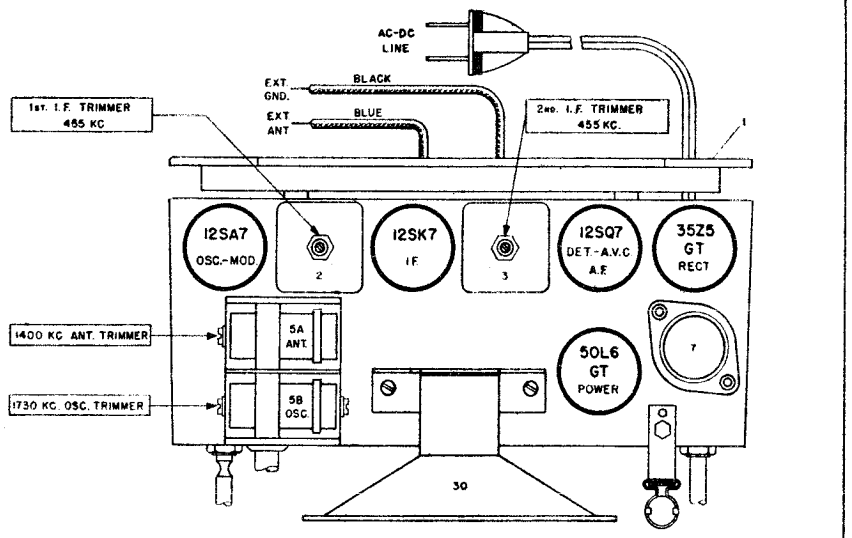
Before starting alignment:

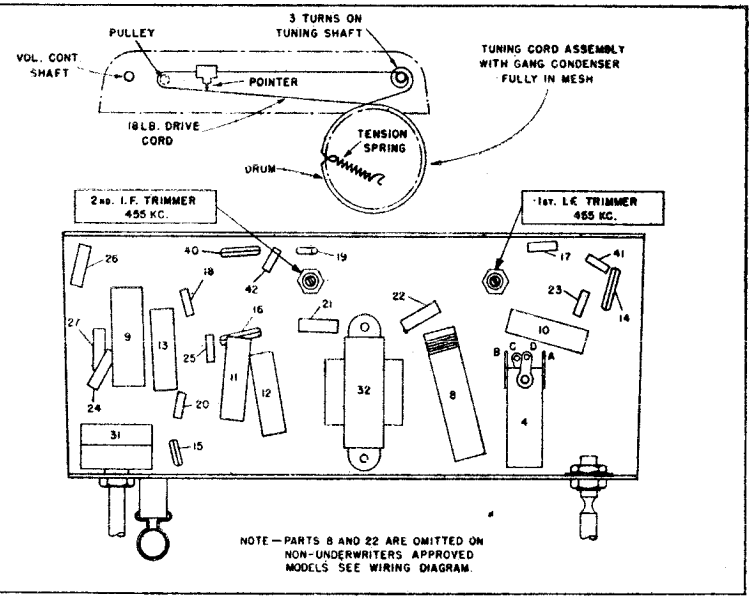
(a) Check tuning dial adjustment by tuning gang condenser until plates touch maximum capacity stop (completely in mesh) at which point the dial needle must be exactly even with the last line at the low frequency end of the dial calibration. If dial needle does not point exactly to last line move to correct position.

(b) Use an accurately calibrated test oscillator with some type of output measuring device.

(c) PLACE LOOP ANTENNA IN THE SAME POSITION IT WILL BE IN WHEN THE SET IS IN THE CABINET.

Steps	Set receiver dial to:	TEST OSCILLATOR			Refer to parts layout diagram for location of trimmers mentioned below:
		Adjust test oscillator frequency to:	Use dummy antenna in series with output of test oscillator consisting of:	Attach output of test oscillator to:	
1	Any point where no interfering signal is received.	455 K. C.	.02 MFD. condenser	High side to rear stator plates of tuning condenser. Low side to frame of condenser through a .02 Mfd. blocking condenser.	Adjust each of the second I. F. transformer trimmers for maximum output—then adjust each of the first I. F. trimmers for maximum output.
2	Exactly 1730 K. C.	Exactly 1730 K. C.	.00025 MFD. condenser	Receiver blue antenna lead Receiver black ground lead	Adjust 1730 K. C. oscillator trimmer for maximum output.
3	Approx. 1400 K. C.	Exactly 1400 K. C.	.00025 MFD. condenser	Receiver blue antenna lead Receiver black ground lead	While rocking gang condenser adjust 1400 K. C. antenna trimmer for maximum output.




PULLEY
3 TURNS ON TUNING SHAFT
VOL. CONT. SHAFT
POINTER
TUNING CORD ASSEMBLY WITH GANG CONDENSER FULLY IN MESH
18 LB. DRIVE CORD
TENSION SPRING
DRUM
2nd. I.F. TRIMMER 455 KC.
1st. I.F. TRIMMER 455 KC.
NOTE—PARTS 8 AND 22 ARE OMITTED ON NON-UNDERWRITERS APPROVED MODELS SEE WIRING DIAGRAM.

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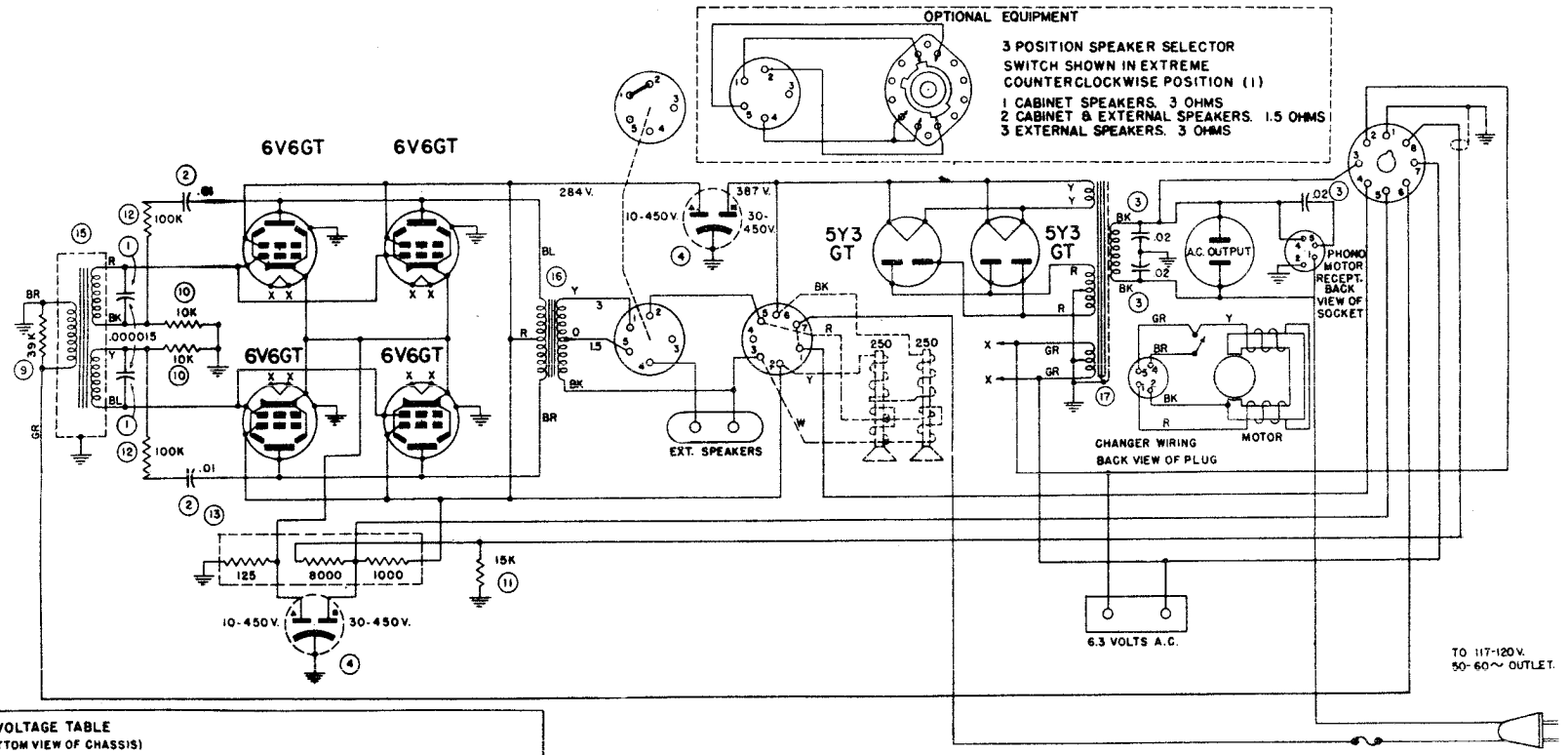
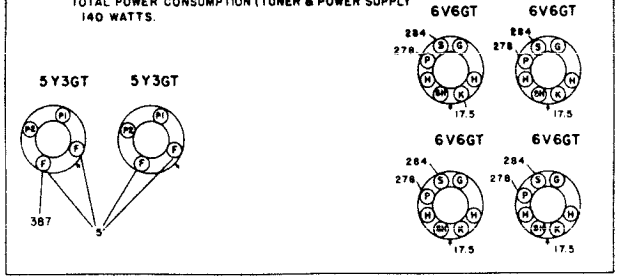


VOLTAGE TABLE
(BOTTOM VIEW OF CHASSIS)

NOTE: MEASURE HEATER AND FILAMENT VOLTAGES DIRECTLY ACROSS SOCKET TERMINALS.
ALL OTHER VOLTAGES MEASURED FROM SOCKET TERMINALS TO GROUND WITH A 1000 OHM/VOLT VOLTMETER WITH BANDSWITCH IN SHORT WAVE POSITION.
(H) HEATERS 6.3 VOLTS A.C.
MEASURE CATHODES ON 30 V. SCALE. ALL OTHERS ON 600 V. SCALE.
LINE VOLTAGE 117 V. A.C.
TOTAL POWER CONSUMPTION (TUNER & POWER SUPPLY 140 WATTS.



Power supply	117 volts 50/60 cycles AC
Power consumption	*140 watts
Power output	20 watts
Output impedance	2.5/1.7 ohms

Speakers:

	No. 582815	No. 582869
Field coil resistance	250 ohms	250 ohms
Voice coil impedance (400 cycles)	5.0 ohms	5.0 ohms

*Power consumption is for amplifier and CR-188 radio chassis.

METHOD FOR REMOVING CHASSIS FROM CABINET

JUNE, 1946

To remove the chassis, first remove all plugs and cables from the receptacles and the connector from the rear of the radio chassis. The amplifier chassis is mounted to the cabinet shelf with four screws and nuts; after they have been removed, the amplifier may be lifted from the cabinet.

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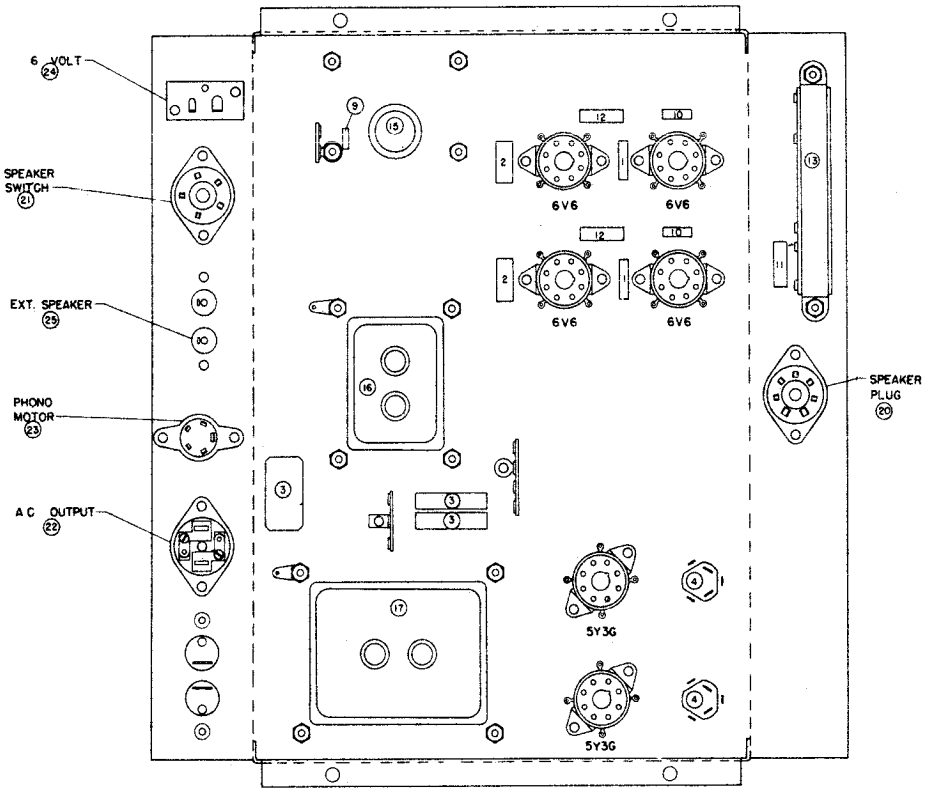

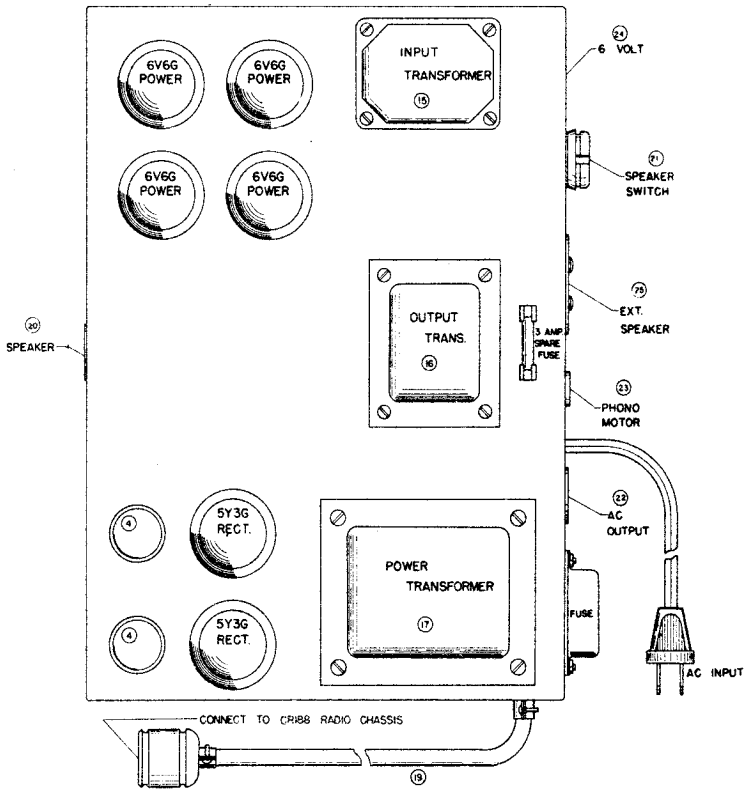

ACCESSORIES

SPEAKER SELECTOR SWITCH—Provision is made in this amplifier for connecting extension speakers and a speaker selector switch. By means of this switch, the cabinet and extension speakers may be operated separately or together while maintaining the proper load on the amplifier. This is accomplished by means of a rotary switch with a connecting plug that may be purchased from any authorized Magnavox dealer. When shipped from the factory, a shorting plug is inserted in the amplifier receptacle stamped SPEAKER SWITCH. This plug must not be removed unless the speaker selector switch is added. Then the shorting plug is replaced with a plug that is supplied as a part of the selector switch assembly.

EXTENSION SPEAKER—Two screw terminals are provided on the rear of the amplifier chassis for the connection of an extension speaker line. High-fidelity permanent-magnet extension speakers are available through all authorized Magnavox dealers.

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CR-189

REFERENCE NO.	DESCRIPTION	MAGNAVOX PART NO.
1	Coil assembly, antenna, two band	360265G1
2	Coil assembly, r-f, 42.9—48.7 mc. band	360262G1
3	Coil assembly, r-f, 87.2—108.7 mc. band	360261G2
4	Coil assembly, oscillator, two band	360263G1
5	Transformer, i-f	360258G1
6	Transformer, discriminator	360259G1
7	Transformer, power, 117 volt 50/60 cycle	300030G1
8	Choke, r-f, filament	360264G1
9	Choke, a-f, filter	350032G1
10	Capacitor, variable, three-gang tuning	260058G1
11	Capacitor, trimmer 1.5—7 mmf.	*260067G1
12	Capacitor, trimmer 4.5—25 mmf.	260042G3
13	Capacitor, two-gang trimmer, 4-70 mmf. each section	260066G1
14	Capacitor, two-gang trimmer, 4-70 mmf. each section	260065G1
15	Capacitor, ceramic, 4 mmf.	250088G28
16	Capacitor, ceramic, 35 mmf.	250088G26
17	Capacitor, molded mica, 47 mmf.	250159G96
18	Capacitor, molded mica, 100 mmf.	250159G98
19	Capacitor, molded mica, 470 mmf. +10%	250159G90
20	Capacitor, molded mica, 470 mmf. +20%	250159G102
21	Capacitor, ceramic, 500 mmf.	250088G31
22	Capacitor, paper, .01 mfd. 600V.	250129G2
23	Capacitor, paper, .05 mfd. 600V.	250129G5
24	Capacitor, electrolytic, 10 mfd. 450V.	270026G3
25	Capacitor, electrolytic, 30-10 mfd. 475V.	270023G2
30	Resistor, composition, 100 ohm ½ W.	230063G7
31	Resistor, composition, 220 ohm ½ W.	230084G9
32	Resistor, composition, 680 ohm ½ W.	230084G12
33	Resistor, composition, 1000 ohm ½ W.	230084G13
34	Resistor, composition, 3300 ohm ½ W.	230084G16
35	Resistor, composition, 4700 ohm ½ W.	230084G17
36	Resistor, composition, 4700 ohm 1 W.	230085G17
37	Resistor, composition, 6800 ohm 2 W.	230061G18
38	Resistor, composition, 22,000 ohm ½ W.	230084G21
39	Resistor, composition, 47,000 ohm ½ W.	230084G23
40	Resistor, composition, 100,000 ohm ½ W.	230084G25
41	Resistor, composition, 120,000 ohm ½ W. ±10%	230084G87
42	Resistor, composition, 100,000 ohm ½ W. ±10%	230084G86
43	Resistor, composition, 220,000 ohm ½ W.	230084G27
44	Resistor, composition, 470,000 ohm ½ W.	230084G29
45	Resistor, composition, 1 megohm ½ W.	230084G31
46	Resistor, composition, 1.5 megohm ½ W.	230084G32
47	Resistor, wire wound, 5000 ohm, 5 W.	240035G4
55	Switch, rotary, band selector and power	160163G1
56	Socket, output	180060G1
	Calibrated glass dial—CR-189A	150272G1
	Calibrated glass dial—CR-189B	150272G2

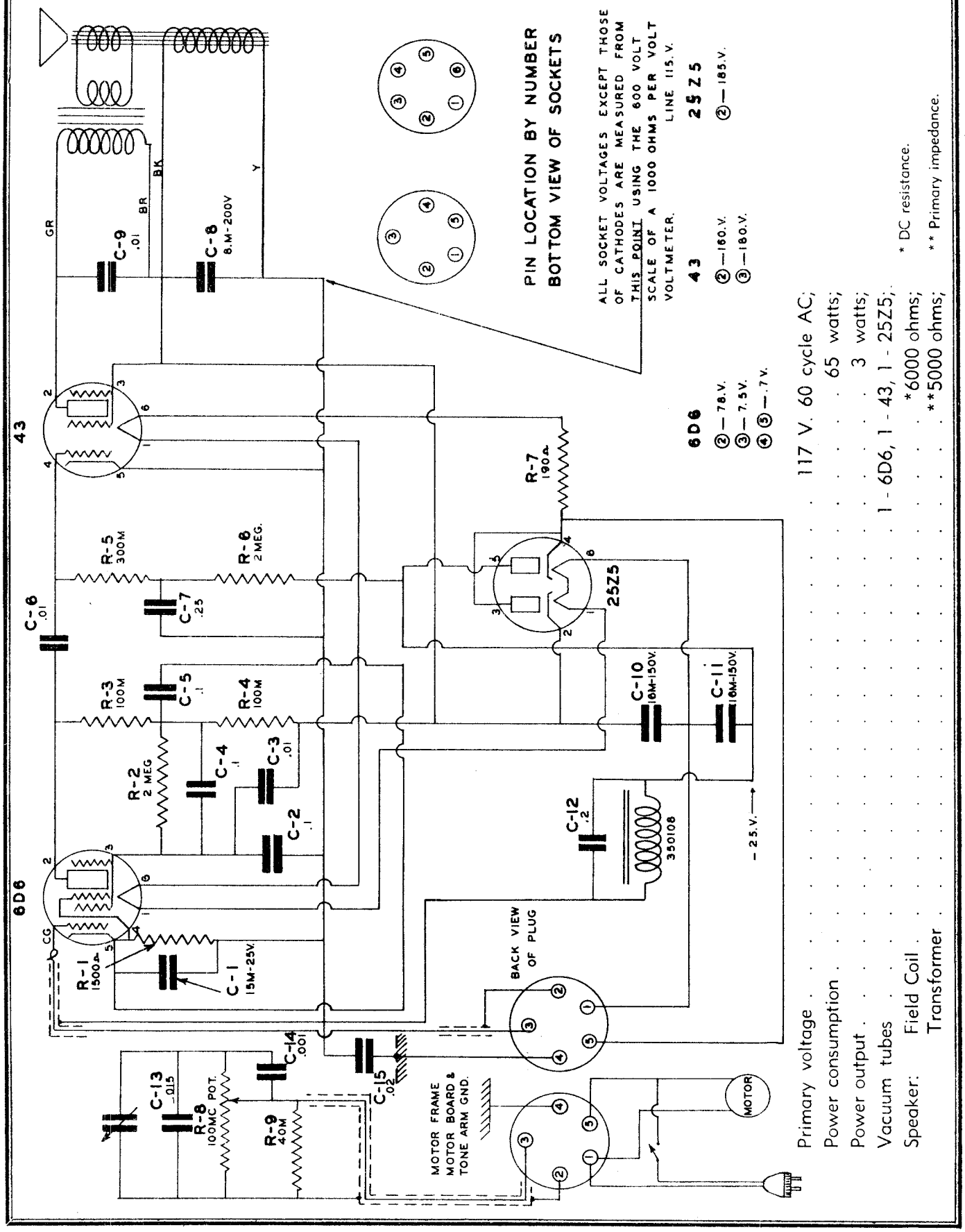
*Electrically replaces 260027G1 used in early production.

AMP-101A

REFERENCE NO.		MAGNAVOX PART NO.
1	Capacitor, molded mica, 15 mmf.	250107G93
2	Capacitor, paper, .01 mfd. 600 V.	250129G2
3	Capacitor, paper, .02 mfd. 600 V.	250129G3
4	Capacitor, electrolytic, 30-10 mfd. 450 V.	270023G2
9	Resistor, composition, 39,000 ohm ½ W.	230084G81
10	Resistor, composition, 10,000 ohm ½ W.	230084G19
11	Resistor, composition, 15,000 ohm 2 W.	230086G20
12	Resistor, composition, 100,000 ohm 1 W.	230085G25
13	Resistor, wire wound, 125-8000-1000 ohm	240037G1
15	Transformer, input	320017G1
16	Transformer, output	330024G1
17	Transformer, power, 117 V. 50-60 cycle	300026G1
19	Cable and plug assembly	460557G1
20	Socket, speaker connection	180393G3
21	Socket, speaker switch	180393G5
22	Socket, power connection	180422G1
23	Socket, phonograph motor connection	180501G5
24	Socket, 6-volt	189788G1
	Socket, octal	180194G4
	Terminal board—external speaker connection	209601G2
	Fuse mounting	182467G1
	Fuse cover	182467G2
	Fuse, 3 amp. 250 V., cartridge	180157G10
	Fuse clip for spare fuse (2 required)	180236G1

MODEL A-101P

THE MAGNAVOX CO.



Primary voltage	117 V. 60 cycle AC;
Power consumption	65 watts;
Power output	3 watts;
Vacuum tubes	1 - 6D6, 1 - 43, 1 - 25Z5;
Speaker: Field Coil	*6000 ohms; * DC resistance.
Transformer	**5000 ohms; ** Primary impedance.

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MODEL A-101P
MODEL A-106P
MODEL A-205C
MODELS A-206, A-206A

A-101P

Ref. No.	Description	Magnavox Part No.
C1	Capacitor, electrolytic, 15 mfd. 25V., 8 mfd. 200V.	274201
C2	Capacitor, tubular, .1 mfd. 200 V.	254152
C3	Capacitor, tubular, .01 mfd. 600 V.	254153
C4	Capacitor, tubular, .1 mfd. 200 V.	254152
C5	Capacitor, tubular, .1 mfd. 200 V.	254152
C6	Capacitor, tubular, .01 mfd. 600 V.	254153
C7	Capacitor, tubular, .25 mfd. 120 V.	254149
C8	Capacitor, electrolytic, 15 mfd. 25V., 8 mfd. 200V.	274201
C9	Capacitor, tubular, .01 mfd. 600 V.	254153
C10	Capacitor, electrolytic, 16 mfd. 250 V.	274212
C11	Capacitor, electrolytic, 16 mfd. 250 V.	274212
C12	Capacitor, tubular, .2 mfd. 200 V.	254182
C13	Capacitor, tubular, .015 mfd. 600 V.	254131
C14	Capacitor, tubular, .001 mfd. 600 V.	254142
C15	Capacitor, tubular, .02 mfd. 600 V.	254127
R1	Resistor, carbon, 1500 ohm ½ W.	234425
R2	Resistor, carbon, 2 megohm ½ W.	234451
R3	Resistor, carbon, 100,000 ohm ½ W.	234445
R4	Resistor, carbon, 100,000 ohm ½ W.	234445
R5	Resistor, carbon, 300,000 ohm ½ W.	234448
R6	Resistor, carbon, 2 megohm ½ W.	234451
R7	Resistor, wire wound, 190 ohm	247808
R8	Control, volume, 100,000 ohm with switch	224354
R9	Resistor, carbon, 40,000 ohm ½ W	234438
L1	Choke, filter	350108
	Socket, 6 prong marked 6D6	187328
	Socket, 6 prong marked 43	187333
	Socket, 6 prong marked 25Z5	187330
	Knob, control	144101

A-106P

Ref. No.	Description	Magnavox Part No.
C1	Capacitor, tubular, .015 mfd. 600 V.	254131
C2	Capacitor, tubular, .001 mfd. 600 V.	254142
C3	Capacitor, electrolytic, 25 mfd. 25 V.	274236
C4	Capacitor, tubular, .1 mfd. 200 V.	254152
C5	Capacitor, tubular, .015 mfd. 600 V.	254131
C6	Capacitor, tubular, .25 mfd. 120 V.	254149
C7	Capacitor, tubular, .01 mfd. 600 V.	254153
C8	Capacitor, tubular, .01 mfd. 600 V.	254153
C9	Capacitor, tubular, .02 mfd. 600 V.	254127
C10	Capacitor, electrolytic, 16 mfd. 150 V.	274212
C11	Capacitor, electrolytic, 16 mfd. 150 V.	274212
C12	Capacitor, tubular, .05 mfd. 600 V.	254159
R1	Control, volume, 100,000 ohm	224354
R2	Resistor, carbon, 40,000 ohm ½ W.	234438
R3	Resistor, carbon, 5,000 ohm ½ W.	234430
R4	Resistor, carbon, 2 megohm ½ W.	234451
R5	Resistor, carbon, 150,000 ohm ½ W.	234446
R6	Resistor, carbon, 300,000 ohm ½ W.	234448
R7	Resistor, carbon, 2 megohm ½ W.	234451
R8	Resistor, wire wound, 190 ohm	247808
	Choke, filter	350102
	Socket, 6 prong marked 6D6	187328
	Socket, 6 prong marked 43	187333
	Socket, 6 prong marked 25Z5	187330
	Knob, control	144101

A-205C

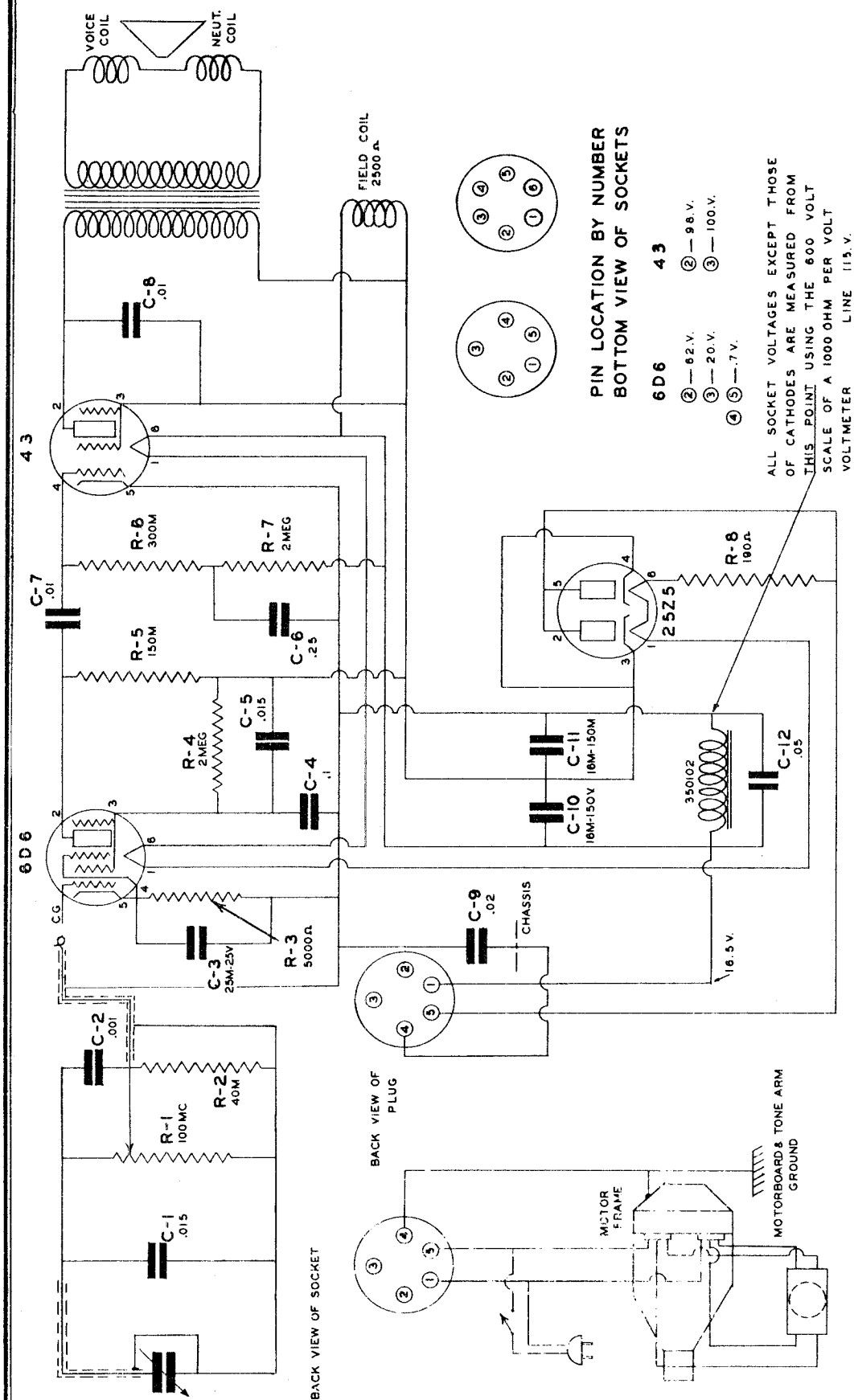
Ref. No.	Description	Magnavox Part No.
1	Capacitor, molded paper, .02 mfd. 600 V.	250056
2	Capacitor, molded paper, .01 mfd. 400 V.	250054
3	Capacitor, molded paper, .01 mfd. 400 V.	250054
4	Capacitor, electrolytic, 100-20 mfd. 150 V., 20 mfd. 25 V.	270008
5	Capacitor, electrolytic, 20 mfd. 150 V.	270005
6	Resistor, carbon, 250,000 ohm ⅓ W.	230010
7	Resistor, carbon, 3000 ohm ⅓ W.	230032
8	Resistor, carbon, 175 ohm ½ W.	230037
9	Resistor, carbon, 100 ohm ⅓ W.	239744
10	Resistor, carbon, 30 ohm ⅓ W.	230023
11	Control, volume with power switch, 2 megohm	220014
	Socket, octal marked 50L6GT	180130
	Socket, octal marked 35Z5GT	180131
	Knob, control	144100

A-206, A-206A

Ref. No.	Description	Magnavox Part No.
1	Capacitor, electrolytic, 40-40 mfd. 150 V.	270013
2	Capacitor, moulded paper, .02 mfd. 600 V.	250056
3	Capacitor, moulded paper, .02 mfd. 600 V.	250056
4	Resistor, carbon, 500,000 ohm ⅓ W.	239755
5	Resistor, carbon, 500,000 ohm ⅓ W.	239755
6	Resistor, carbon, 1000 ohm ⅓ W.	239745
7	Resistor, carbon, 88 ohm 1 W.	230047
8	Resistor, wire wound, 166 ohm	240013
9	Control, volume, 1 megohm	222518
10	Control, tone, 20,000 ohm, with power switch	220021
	Socket, octal marked 70L7GT	180050
	Switch, SPST toggle, (motor)	167402
	Escutcheon, OFF-ON	150074
	Knob, control marked VOLUME	140035
	Knob, control marked OFF-ON-TONE	140036

MODEL A-106P

THE MAGNAVOX CO.



Primary voltage . . . . . 117 V. AC-DC;
Power consumption . . . . . 60 watts;
Power output . . . . . 2 watts;
Vacuum tubes . . . . . 1 - 6D6, 1 - 43, 1 - 25Z5;
Speaker:
Field Coil . . . . . *2500 ohms;
Transformer . . . . . **4000 ohms; *DC resistance **Primary impedance

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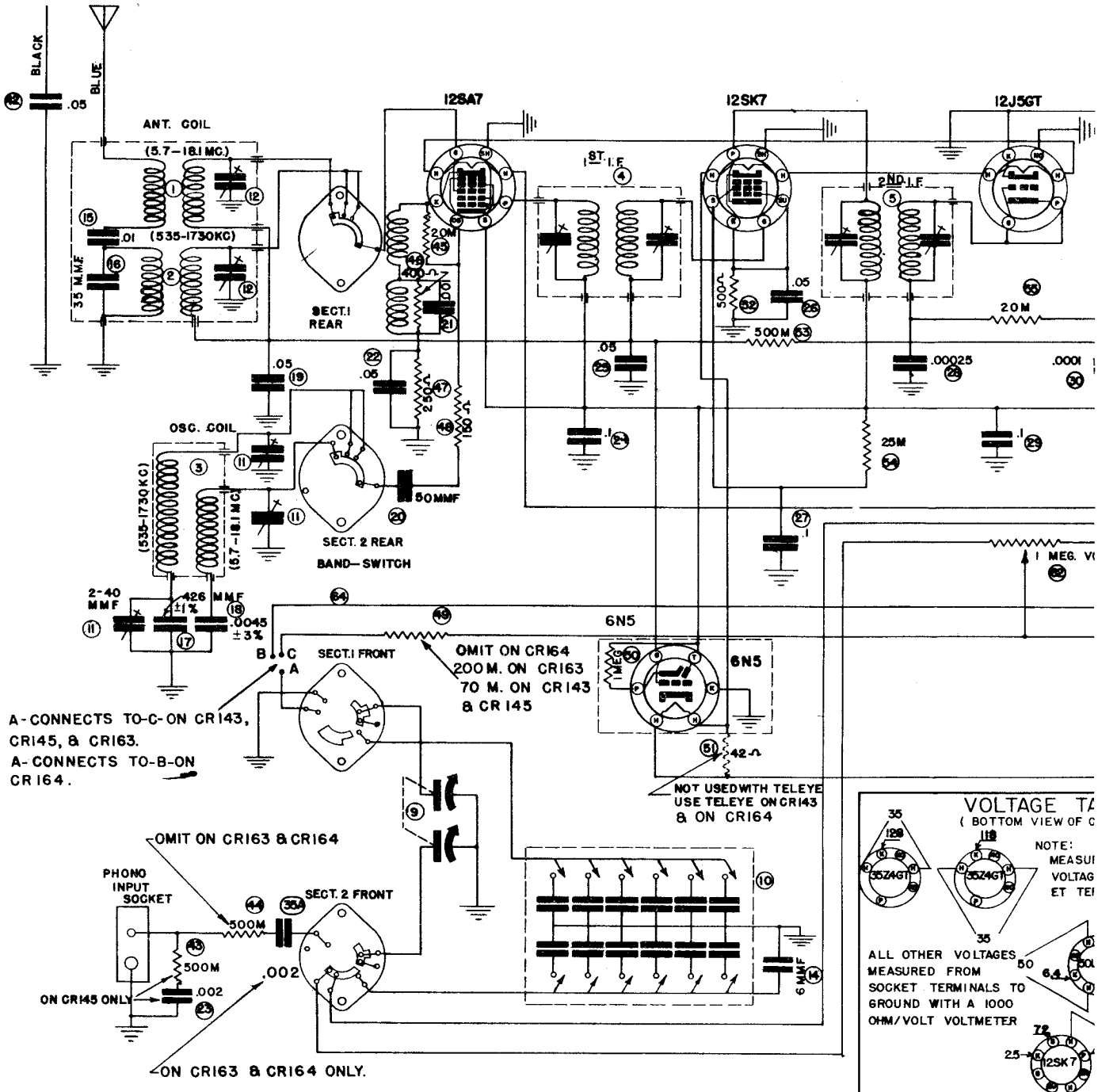
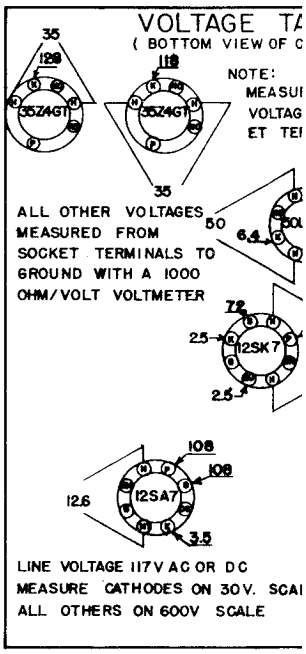
For Parts list, see P.15-5



I-F 455 KC

BAND SWITCH SHOWN IN COUNTER—CLOCKWISE POSITION, (SHORT-WAVE BAND) VIEWED FROM FRONT.



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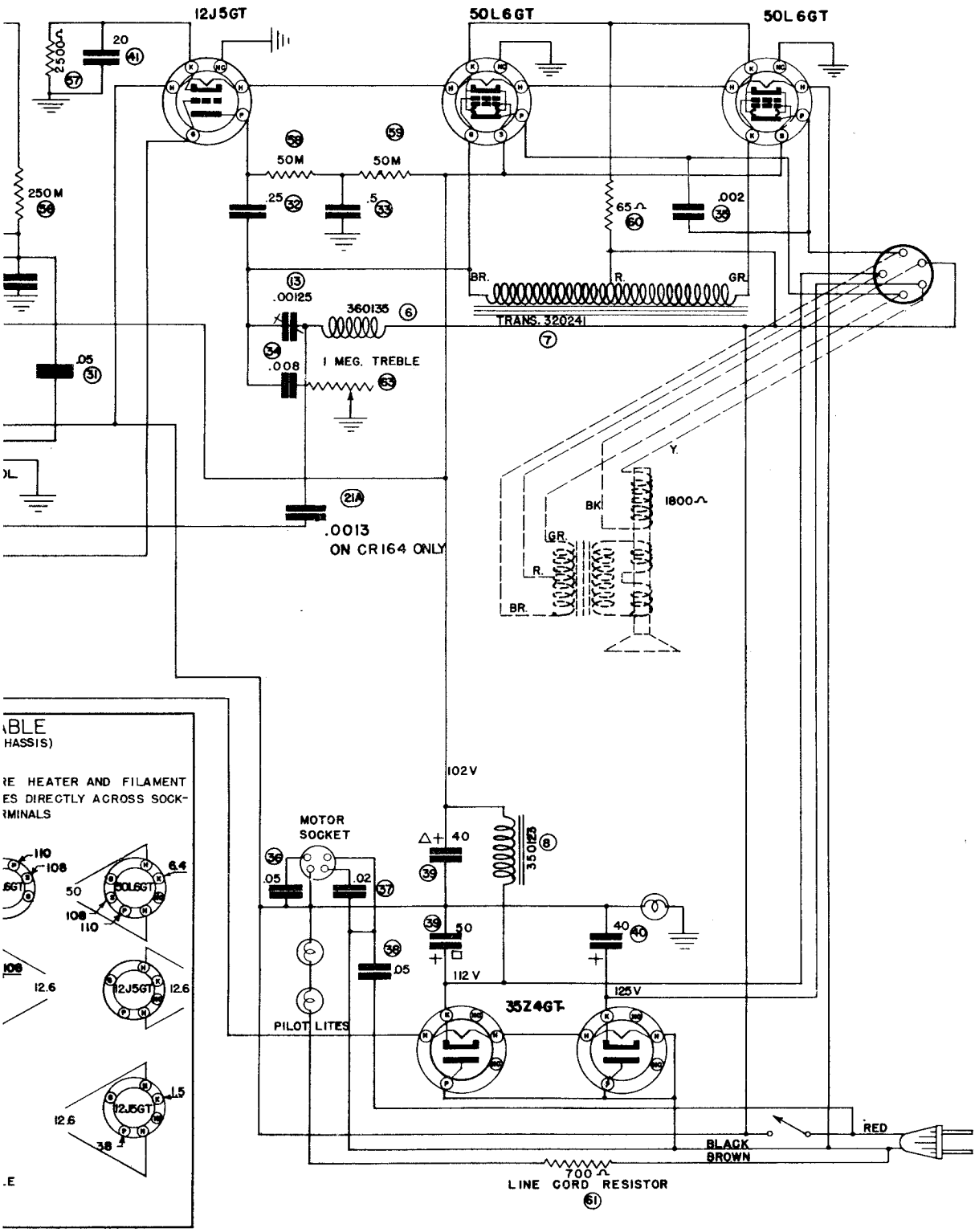
VOX CO.

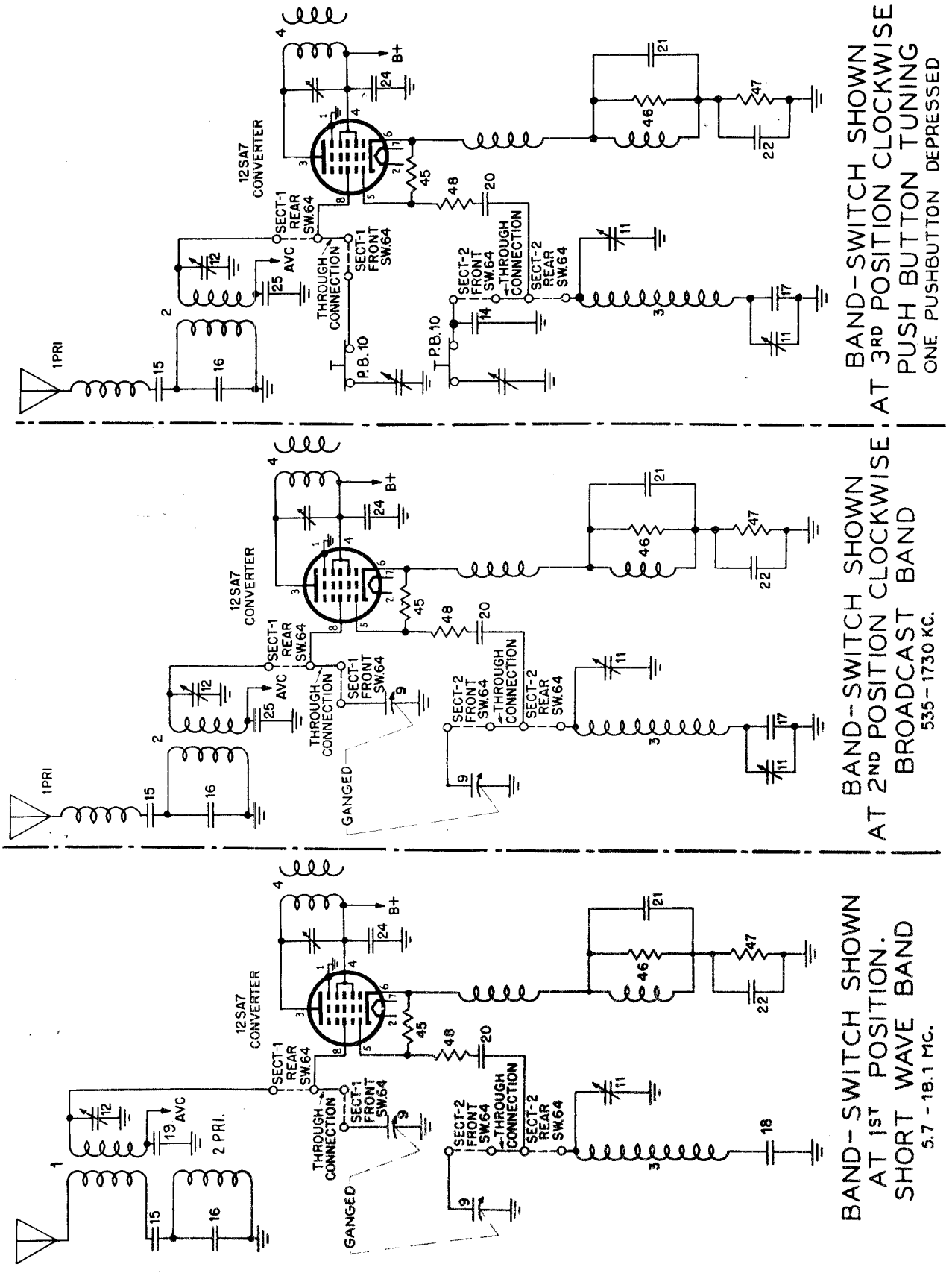
MODELS CR-143, CR-145 (Revised)
CR-163, CR-164



Schematic Diagram, Models CR-143, CR-145, CR-163, CR-164

MODELS CR-143, CR-145, CR-163, CR-165

THE MAGNAVOX CO.



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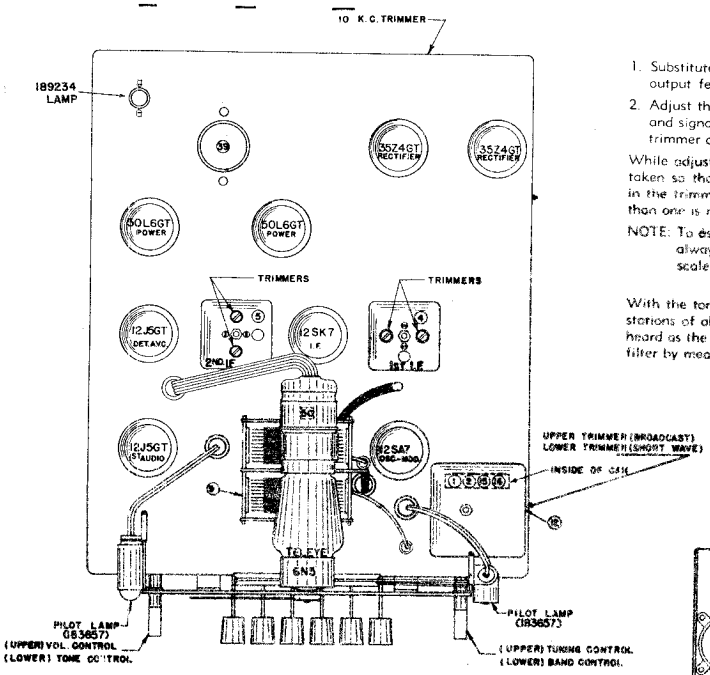
MODELS CR-143, CR-145,
CR-163, CR-165

THE MAGNAVOX CO.



Instructions for removing the CR-143 or CR-163 chassis from the Sheraton Console, American Modern, Chippendale, Hepplewhite and Berkeley cabinets.

1. Remove the plugs from the bottom of the chassis.
2. Remove the antenna-ground terminal strip from the side of the cabinet.
3. Pull the control knobs and the push button knobs from their shafts.
4. Remove the four machine screws that secure the two chassis brackets to the cabinet, and lower the chassis from the cabinet.

ALIGNMENT PROCEDURE

ALIGNING THE I-F AT 455 KILOCYCLES

1. Connect the ground lead of the signal generator to the chassis or radio ground lead. Connect the other lead of the signal generator to the oscillator grid of the 12SA7 tube through a .00025 mfd. series condenser.
2. Set the signal generator to EXACTLY 455 kilocycles and turn the receiver volume to maximum setting.
3. Peak each of the second i-f transformer trimmer condensers.
4. Peak each of the first i-f transformer trimmer condensers.

To insure most accurate trimmer setting, repeat the above adjustment several times, always using the lowest possible signal generator output consistent with readable output meter scale deflection.

ALIGNING THE 535-1730 KILOCYCLE BAND

1. Remove the signal generator lead from the grid of the 12SA7 tube. Connect it to the receiver antenna lead (blue) through a .00025 mfd. series condenser.
2. Check the tuning dial adjustment by turning the gang condenser until the plates are completely meshed, at which point the dial pointer must be exactly even with the last line at the low frequency end of the dial calibration.
3. Adjust the band selector switch for operation on the 545-1730 kilocycle BROADCAST band.
4. Set the signal generator frequency and receiver dial to EXACTLY 1400 kilocycles. Adjust the BROADCAST oscillator trimmer and the antenna trimmer to bring in the 1400 kilocycle signal generator signal to maximum output.
5. Set the signal generator and receiver frequency to 600 kilocycles. While rocking the gang condenser slightly to the right and to the left, adjust the 600 kilocycle oscillator padder to maximum output.

ALIGNING THE 5.7-18.1 MC BAND

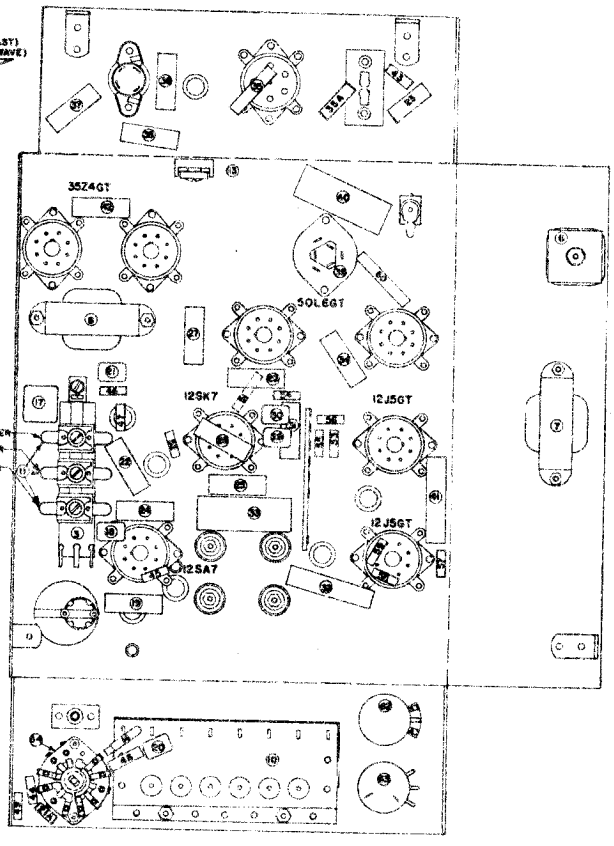
1. Substitute a 400 ohm resistor for the .00025 mfd. condenser in series with the signal generator output feeding the antenna lead.
2. Adjust the band selector switch to the 5.7-18.1 megacycle short wave band, tune the receiver and signal oscillator frequency to EXACTLY 15 megacycles and adjust the short wave oscillator trimmer and antenna trimmer for maximum output as indicated on the output meter.

While adjusting the oscillator trimmer, two peaks may be noticed, in which case, care must be taken so that the proper peak is used for aligning the receiver at 15 megacycles. Always screw in the trimmer to maximum capacity, then back off the trimmer until the second peak (if more than one is noticed), which is the correct one, is tuned in.

NOTE: To assure most accurate trimmer setting, repeat all of the above adjustments several times, always using the lowest possible test oscillator output consistent with readable output meter scale deflection.

10 KC FILTER ADJUSTMENT

With the tone control set for maximum treble response, tune the receiver to a point between two stations of about the same signal strength on adjacent channels. If a 10,000 cycle heterodyne is heard as the beat note between the two carriers, it may be eliminated by tuning the 10 kc output filter by means of the 10 kc trimmer condenser, located at the rear of the chassis.



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Ref. No.	Description	Magnavox Part No.
1	Coil, antenna, short wave	360016
2	Coil, antenna, broadcast	360015
3	Coil, oscillator	360029
4	Coil, i-f transformer, first	363700
5	Coil, i-f transformer, second	363700
6	Coil, 10 kc filter choke	360135
7	Transformer, input	320241
8	Coil, filter choke	350123
9	Capacitor, two-gang tuning	260002
10	Capacitor, push button tuner assembly	160009
11	Capacitor, three-gang trimmer	260010
12	Capacitor, two-gang trimmer	260009
13	Capacitor, 10 kc filter, .00125 mfd.	259610
14	Capacitor, temperature compensator	290002
15	Capacitor, moulded paper, .01 mfd. 400 V.	250054
16	Capacitor, moulded mica, 35 mmf.	250050
17	Capacitor, silver mica, 426 mmf. ±1%	250038
18	Capacitor, moulded mica, .0045 mfd. ±3%	259779
19	Capacitor, tubular, .05 mfd. 200 V.	254123
20	Capacitor, silver mica, 50 mmf. ±10%	250037
21	Capacitor, moulded mica, .001 mfd. ±3%	259776
21A	Capacitor, moulded mica, .0013 mfd. ±3%, CR-164 only	259777
22	Capacitor, tubular, .05 mfd. 200 V.	254123
23	Capacitor, tubular, .002 mfd. 600 V., CR-145 only	254161
24	Capacitor, tubular, .1 mfd. 200 V.	254152
25	Capacitor, tubular, .05 mfd. 200 V.	254123
26	Capacitor, tubular, .05 mfd. 200 V.	254123
27	Capacitor, tubular, .1 mfd. 200 V.	254152
28	Capacitor, moulded mica, .00025 mfd.	259772
29	Capacitor, tubular, .1 mfd. 200 V.	254152
30	Capacitor, moulded mica, .0001 mfd.	259769
31	Capacitor, tubular, .05 mfd. 200 V.	254123
32	Capacitor, tubular, .25 mfd. 200 V.	254135
33	Capacitor, tubular, .5 mfd. 200 V.	254134
34	Capacitor, tubular, .008 mfd. 600 V.	250014
35	Capacitor, tubular, .002 mfd. 600 V.	254161
35A	Capacitor, tubular, .002 mfd. 600 V., CR-163, 164 only	254161
36	Capacitor, tubualr, .05 mfd. 400 V.	254146
37	Capacitor, tubular, .02 mfd. 600 V.	254127
38	Capacitor, tubular, .05 mfd. 400 V.	254146
39	Capacitor, molanode, 50 - 40 mfd. 150 V.	270004
40	Capacitor, molanode, 40 mfd. 150 V.	270010
41	Capacitor, molanode, 20 mfd. 25 V.	273611
42	Capacitor, tubular, .05 mfd. 200 V.	254123
43	Resistor, carbon, 500,000 ohm ⅓ W., CR-145 only	239755
44	Resistor, carbon, 500,000 ohm ⅓ W.	239755
45	Resistor, carbon, 20,000 ohm ⅓ W.	239750
46	Resistor, carbon, 400 ohm ⅓ W.	230005
47	Resistor, carbon, 250 ohm ⅓ W.	230001
48	Resistor, carbon, 150 ohm ⅓ W.	230033
49	Resistor, carbon, 70,000 ohm ⅓ W.	230042
50	Resistor, carbon, 1 megohm ⅓ W.	239756
51	Resistor, carbon, 42 ohm, 2 W., CR-145 only	230040
52	Resistor, carbon, 500 ohm ⅓ W.	230043
53	Resistor, carbon, 500,000 ohm ⅓ W.	239755
54	Resistor, carbon, 25,000 ohm ⅓ W.	230002
55	Resistor, carbon, 20,000 ohm ⅓ W.	239750
56	Resistor, carbon, 250,000 ohm ⅓ W.	230010
57	Resistor, carbon, 2500 ohm ⅓ W.	239746
58	Resistor, carbon, 50,000 ohm ⅓ W.	239751
59	Resistor, carbon, 50,000 ohm ⅓ W.	239751
60	Resistor, carbon, 65 ohm 1 W.	230020
61	Power cord, 700 ohm line cord resistance	460004
62	Control, volume, 1 megohm	220008
63	Control, treble, with switch — 1 megohm	220015
64	Switch, band selector	160010
	Socket, pilot lamp	180078
	Socket, motor	180018
	Socket, phonograph input	189741
	Dial, calibrated scale	150033
	Pointer, dial	101471
	Cable, dial drive (specify length)	449801
	Spring, dial cable tension	103321
	Knob, control	140012
	Knob, push button	149593
	Lamp, #51 Mazda 6-8 V. 0.2 amp. (pilot)	183657
	Lamp, #44 Mazda 68 V. 0.25 amp. (fuse)	189234
	Socket, speaker	180059
	Escutcheon, push button	150056
	Escutcheon, dial	150035
	Crystal, for dial escutcheon	153723
	Call letter sheet for push buttons	593681

SPECIFICATIONS

Primary voltage . 117 V. 50-60 cycle AC or DC;
Power consumption . . . . . 85 watts;
Power output . . . . . 6 watts;
Speaker: Field Coil . . . . . *1800 ohms;
Transformer . . . . . **3000 ohms;
Intermediate frequency . . . . . 455 kc;
Tuning frequency range . . . . . 535-1730 kc;
5.7-18.1 mc;

Circuit: Superheterodyne with two-gang tuning condenser, six-station condenser-type push button tuner, two tuning ranges, treble control, automatic volume control, bass compensation in volume control for phonograph pickup, teleye tuning indicator (CR-143 and CR-163 only).

* DC resistance. ** Primary impedance.

Models CR-143, CR-145, CR-163 and CR-164 are basically alike. Minor circuit differences are indicated on Figure 36.

The phonograph input circuit in CR-143 and CR-145 is designed for use with a 3 oz. pressure crystal pickup; CR-163 and CR-164 phonograph input circuit accommodates the 1 oz. pressure crystal pickup.

Instructions for removing the CR-145 or CR-164 chassis from the Concerto Combination, Sheraton Table and Modern Table cabinets.

1. Remove the back from the cabinet.
2. Pull the control knobs and push button knobs from their shafts.
3. Remove the plugs from the rear of the chassis and disconnect the antenna and ground connections.
4. Completely mesh the tuning condenser plates by turning the station selector knob until the dial pointer is in the lowest frequency setting on the dial.
5. Remove the four machine screws, located on the bottom of the cabinet, that secure the chassis.
6. Slide to the rear of the cabinet, lifting the rear of the chassis to permit the dial assembly to clear the rear opening.

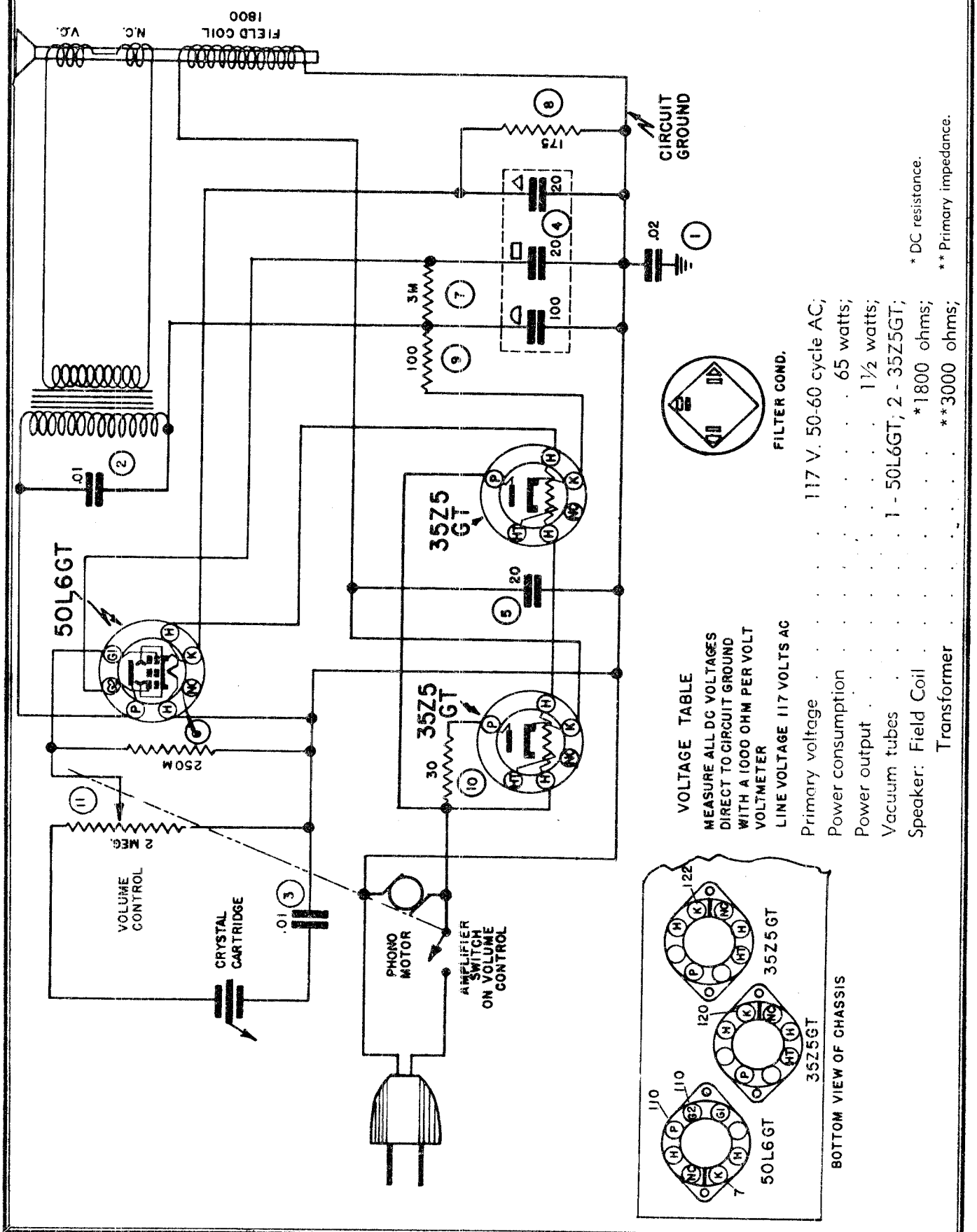
Instructions for removing the CR-143 or CR-163 chassis from the Chairside cabinet.

1. Set the cabinet on end so that the speaker is facing upward.
2. Remove the plugs from the rear of the chassis.
3. Remove the antenna-ground terminal strip from the side of the cabinet.
4. Pull the control knobs and the push button knobs from their shafts.
5. Remove the four Phillips-head wood screws securing the radio panel, and lift the panel from the cabinet.
6. Remove the four machine screws that secure the chassis to the cabinet. Two of these screws are accessible in the phonograph compartment and the other two are beneath the motorboard.
7. Slide the chassis out the top opening of the cabinet.

NOTE: If it is necessary to remove the speaker, the four mounting nuts on the speaker should be removed and the speaker taken through the bottom opening of the cabinet.

MODEL A-205C

THE MAGNAVOX CO.



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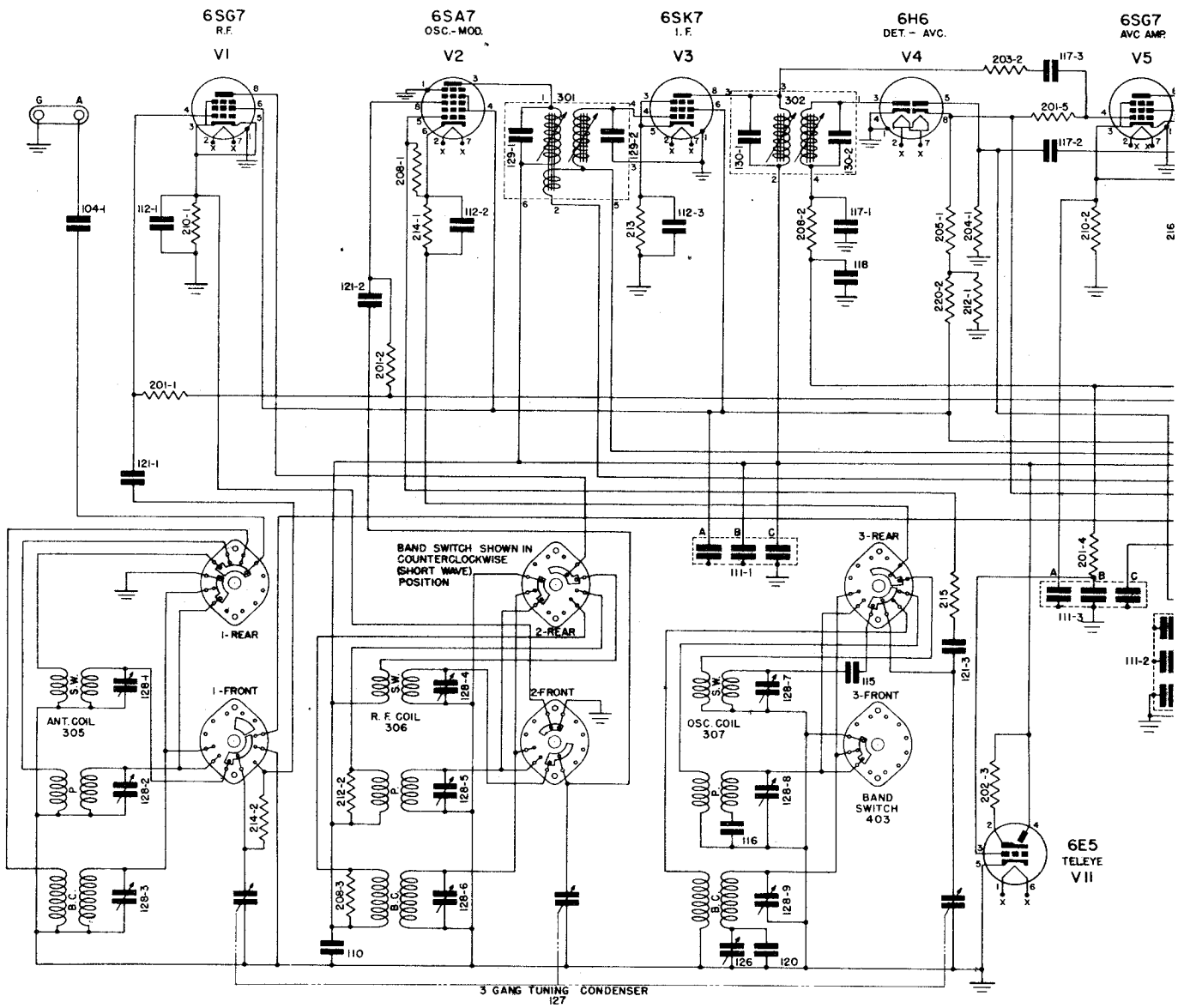
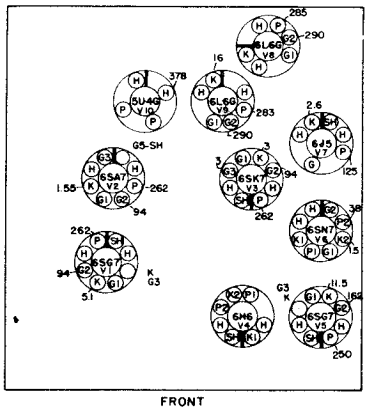
For Parts list, see P.15-5





VOLTAGE TABLE
(BOTTOM VIEW OF CHASSIS)
MEASURE HEATER & FILAMENT VOLTAGES DIRECTLY ACROSS SOCKET TERMINALS, ALL OTHER VOLTAGES MEASURED FROM SOCKET TERMINALS TO GROUND WITH A 1000 OHM/VOLT VOLTMETER WITH BAND SWITCH IN BROADCAST POSITION. ANTENNA TERMINAL SHORTED TO CHASSIS.
HEATERS (H) 6.3 VOLTS A.C.
MEASURE CATHODES ON 30 VOLT SCALE.
ALL OTHER VOLTAGES ON 600 VOLT SCALE.
LINE VOLTAGE 110 VOLTS A.C. (SWITCH 404 SHOWN IN 110V POSITION)

Model CR-183 and CR-185 radio chassis built by Magnavox for the U. S. Navy Department, were incorporated in Navy Radio-Phonograph combinations. The CR-183 chassis was used in instruments identified Models RCT, RCU and RCU-1. In combinations designated Model RCU-2, a CR-185 chassis was incorporated.

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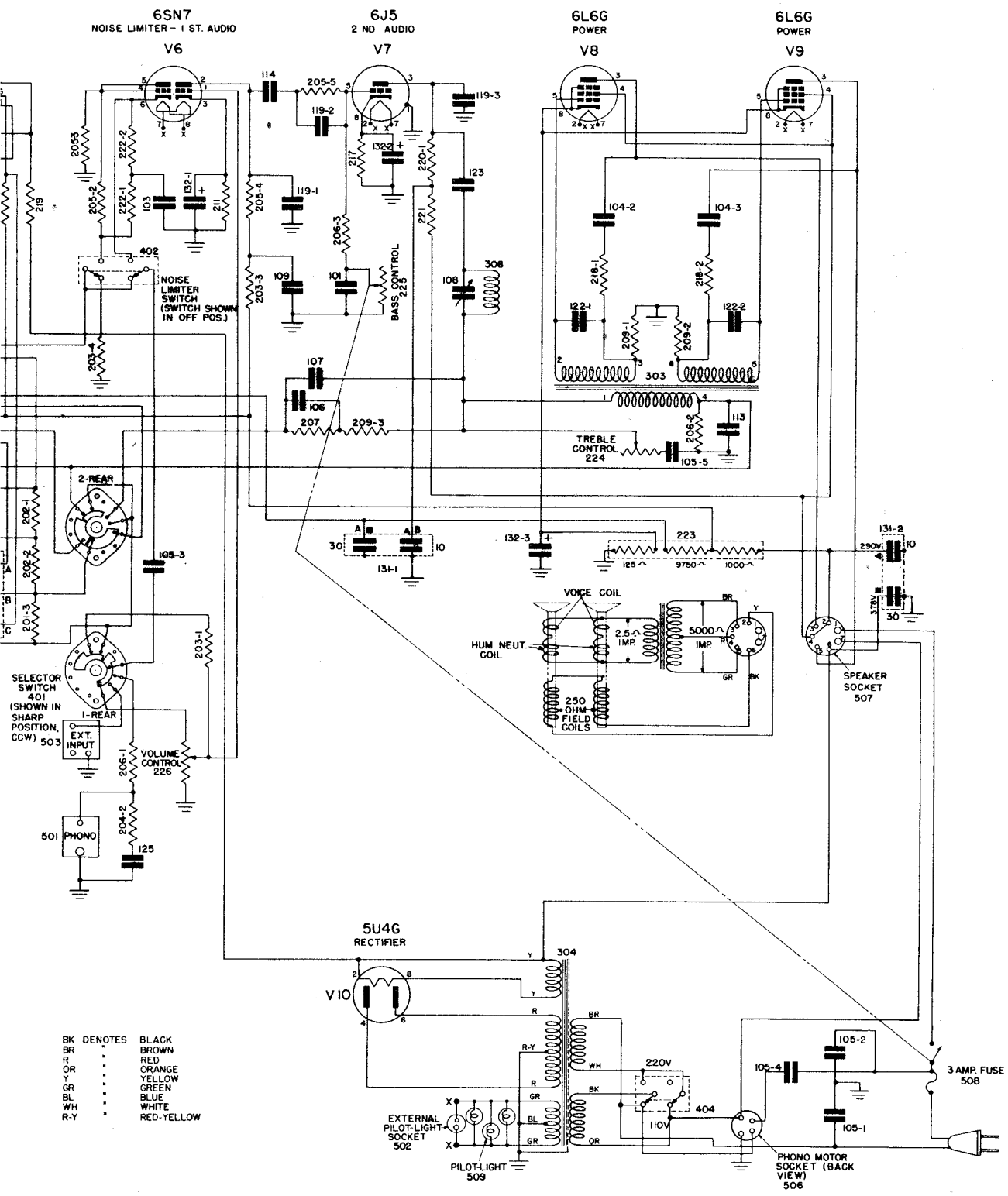
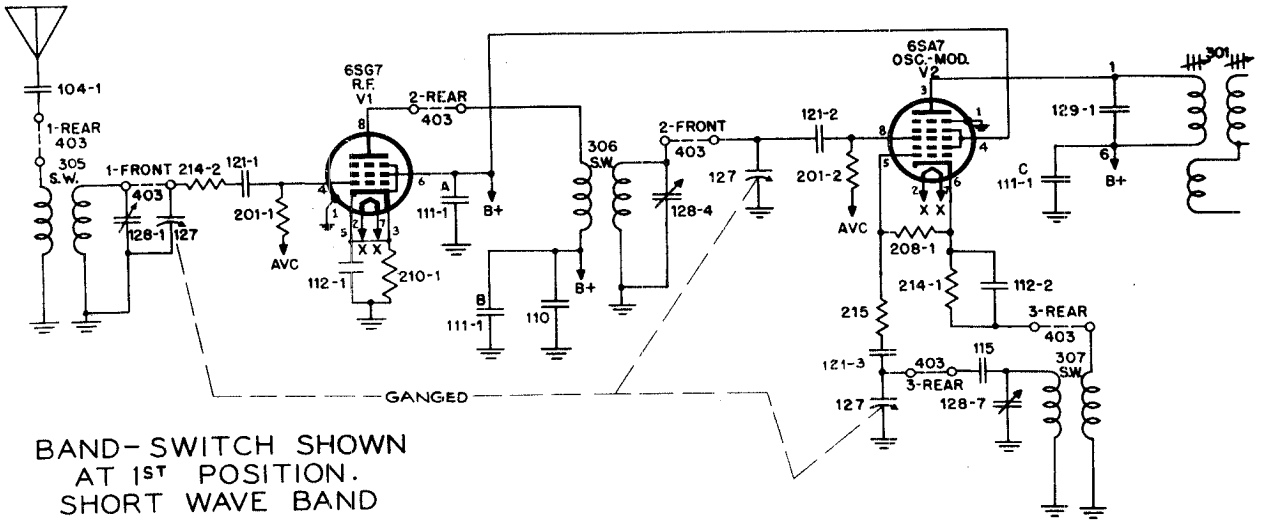
AVOX CO.

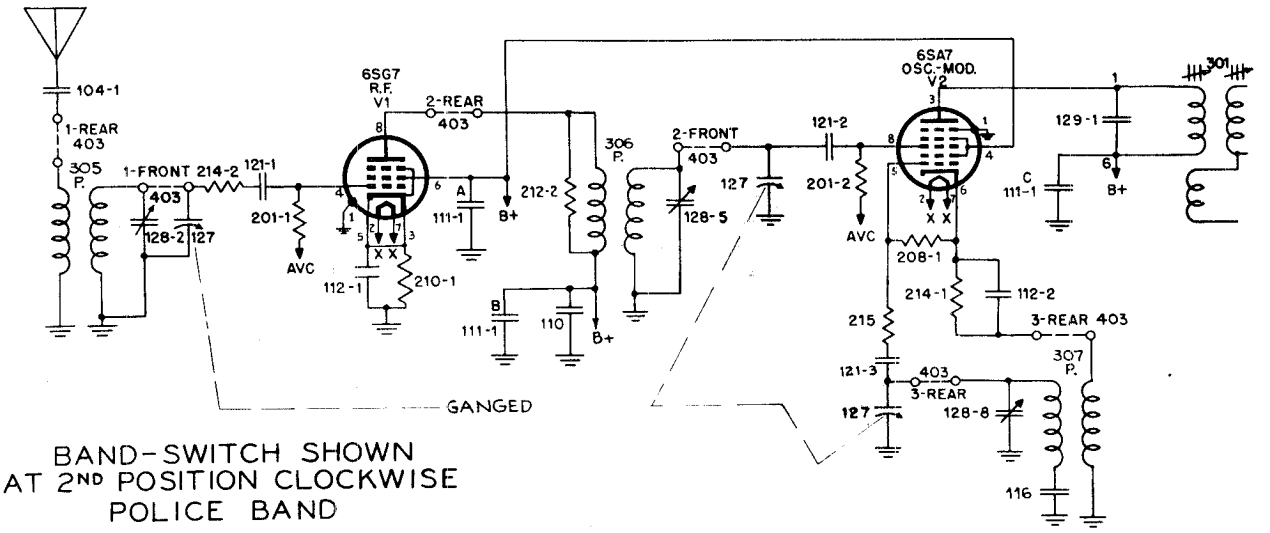


The differences between the CR-183 and the CR-185 are not extensive and the alignment procedure that follows applies to both receivers, although separate schematic diagrams are shown. Electrical values are not shown on the schematics; the reference number shown next to each part identifies the items shown in the parts list where electrical values and ratings are given.

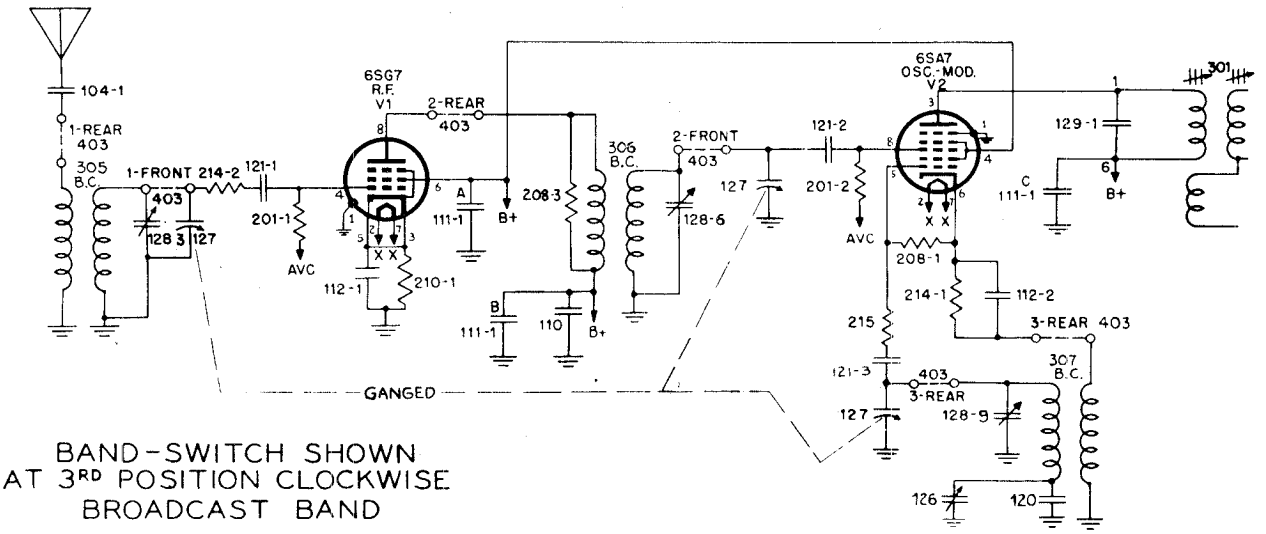
THE MAGNAVOX CO.



BAND-SWITCH SHOWN AT 1ST POSITION. SHORT WAVE BAND



BAND-SWITCH SHOWN AT 2ND POSITION CLOCKWISE POLICE BAND



BAND-SWITCH SHOWN AT 3RD POSITION CLOCKWISE BROADCAST BAND

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THE MAGNAVOX CO.
CR-183, CR-185

SHORT WAVE BAND ALIGNMENT

1. With the 400 ohm resistor in series with the test oscillator lead to the antenna of the radio receiver, set the band selector switch to SHORT WAVE.
2. Set the test oscillator frequency and receiver dial to EXACTLY 15 megacycles. Adjust the short wave oscillator trimmer, r-f trimmer and antenna trimmer for maximum deflection on the output meter.

While adjusting the oscillator trimmer, two peaks may be noticed, in which case care must be taken so that the proper peak is used for aligning the receiver at 15 megacycles. Always turn the trimmer screw clockwise to maximum capacity; then back off the trimmer until the second peak (if more than one is noticed) is reached.

NOTE: To assure most accurate trimmer setting, repeat all of the above adjustments several times, always using the lowest possible test oscillator signal, consistent with readable output meter scale deflection.

10 KC FILTER ADJUSTMENT

1. Turn the tone control to the right as far as possible for maximum treble response and the selectivity switch to the BROAD position.
2. Tune the receiver to a point between two station of about the same signal strength, located on adjacent channels 10 kc apart.
3. If a 10,000 cycle heterodyne is heard as a beat note between the two carriers, adjust the 10 kc trimmer until this beat note can no longer be heard. The 10 kc trimmer is located on the top of the radio chassis between the two 6L6G output tubes.
4. The preferred method for making this adjustment is to connect the output of an audio oscillator set at EXACTLY 10,000 cycles, to the phonograph input socket and set the 10 kc trimmer for minimum signal.

ALIGNMENT PROCEDURE

An accurate calibrated r-f test oscillator, an output indicator and a screw driver are required to align the radio receiver. The output meter should be connected across the voice coil terminals, and the test oscillator output should be kept to such a value that the reading on the output meter does not exceed one volt. Be sure that the selectivity switch is set in the SHARP position when aligning the set. This is important!

INTERMEDIATE-FREQUENCY STAGE ALIGNMENT

1. Connect the ground lead of the test oscillator to the chassis or to the ground terminal on the rear of the chassis. Connect the "high" side of the oscillator to the control grid of the oscillator section of the 6SA7 tube (pin #5), through a .00025 mfd. series capacitor.
2. Set the test oscillator to EXACTLY 455 kc and turn the receiver volume control to its maximum setting.
3. Adjust both second i-f transformer trimmers for maximum deflection on the output meter. One trimmer is accessible from the top of the i-f transformer; the other from the bottom.
4. Adjust both first i-f transformer trimmers for maximum signal as indicated on the output meter.

To assure most accurate trimmer setting, repeat the above adjustment several times, always using the lowest possible test oscillator output consistent with readable output meter scale deflection.

BROADCAST BAND ALIGNMENT

1. Check the tuning dial adjustment by turning the gang condenser until the condenser plates are completely meshed, at which point the dial pointer must coincide with the last line at the low frequency end of the dial scale. If the pointer is not in this position, remove the dial scale, loosen the screw that holds the pointer in place and set to the proper position.
2. Remove the test oscillator lead from the grid of the 6SA7 tube and connect it to the antenna terminal on the rear of the chassis through a .00025 mfd. series capacitor.
3. Set the band selector switch to BROADCAST
4. Set the test oscillator frequency and receiver dial to EXACTLY 1400 kilocycles. Adjust the broadcast oscillator trimmer, r-f trimmer and antenna trimmer for maximum deflection on the output meter.
5. Set the test oscillator and receiver frequency to 600 kilocycles. While rocking the condenser gang slightly to the right and to the left, adjust the 600 kilocycle oscillator padder for maximum output. The 600 kc padder is located on the side of the chassis below the three-band oscillator coil. If this padder requires considerable adjustment, repeat operation given in step 4.

POLICE BAND ALIGNMENT

1. Replace the .00025 mfd. test oscillator antenna series capacitor with a 400 ohm resistor.
2. Set the band selector switch to POLICE.
3. Set the test oscillator frequency and receiver dial to EXACTLY 5000 kilocycles. Adjust the police oscillator trimmer, r-f trimmer and antenna trimmer for maximum deflection on the output meter.

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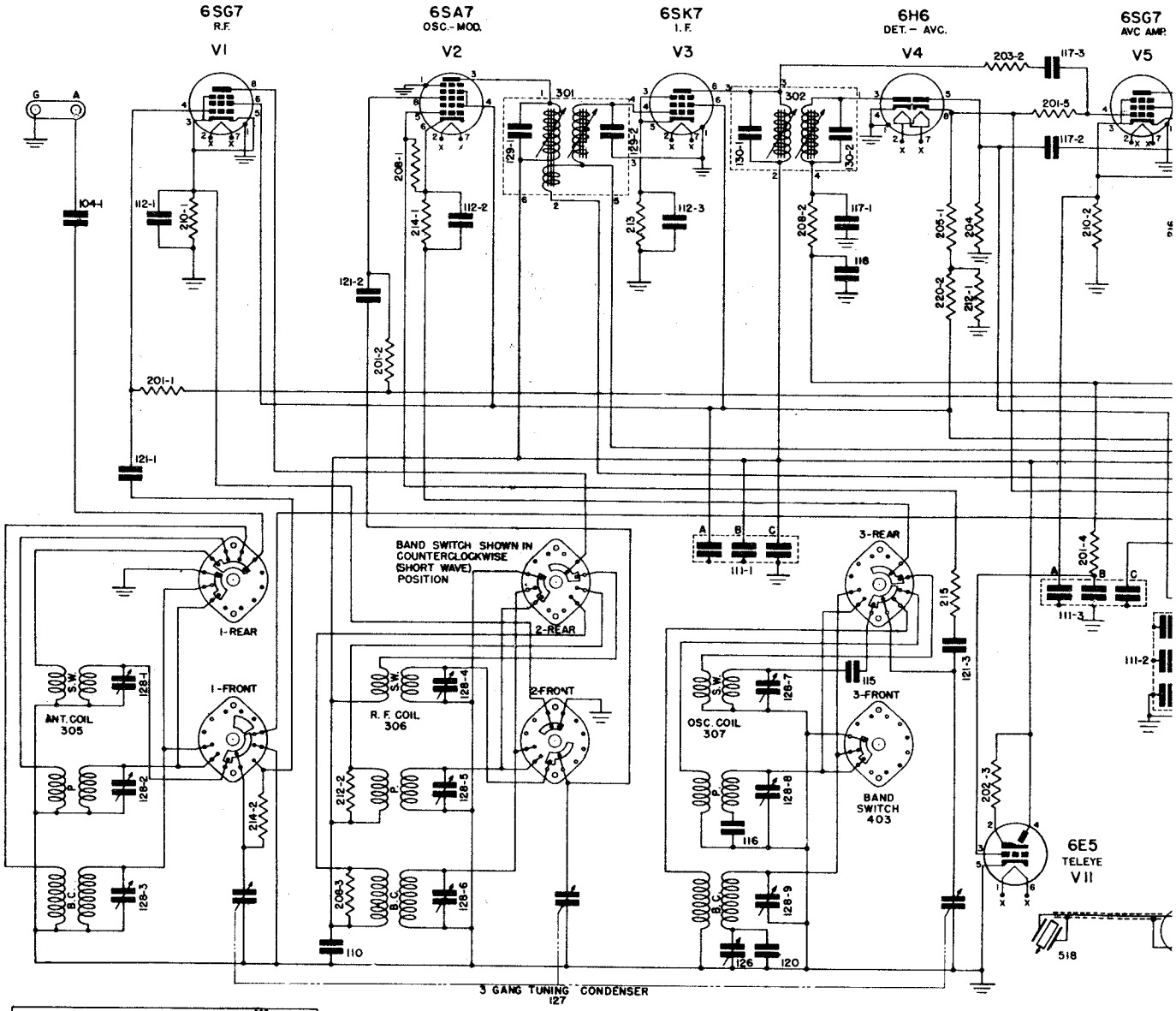

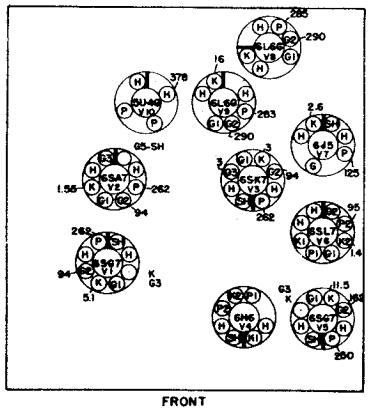

VOLTAGE TABLE
(BOTTOM VIEW OF CHASSIS)
MEASURE HEATER & FILAMENT VOLTAGES DIRECTLY ACROSS SOCKET TERMINALS, ALL OTHER VOLTAGES MEASURED FROM SOCKET TERMINALS TO GROUND WITH A 1000 OHM/VOLT VOLTMETER WITH BAND SWITCH IN BROADCAST POSITION. ANTENNA TERMINAL SHORTED TO CHASSIS.
HEATERS (H) 6.3 VOLTS A.C.
MEASURE CATHODES ON 30 VOLT SCALE.
ALL OTHER VOLTAGES ON 600 VOLT SCALE.
LINE VOLTAGE 110 VOLTS A.C. (SWITCH 404 SHOWN IN 110V POSITION)

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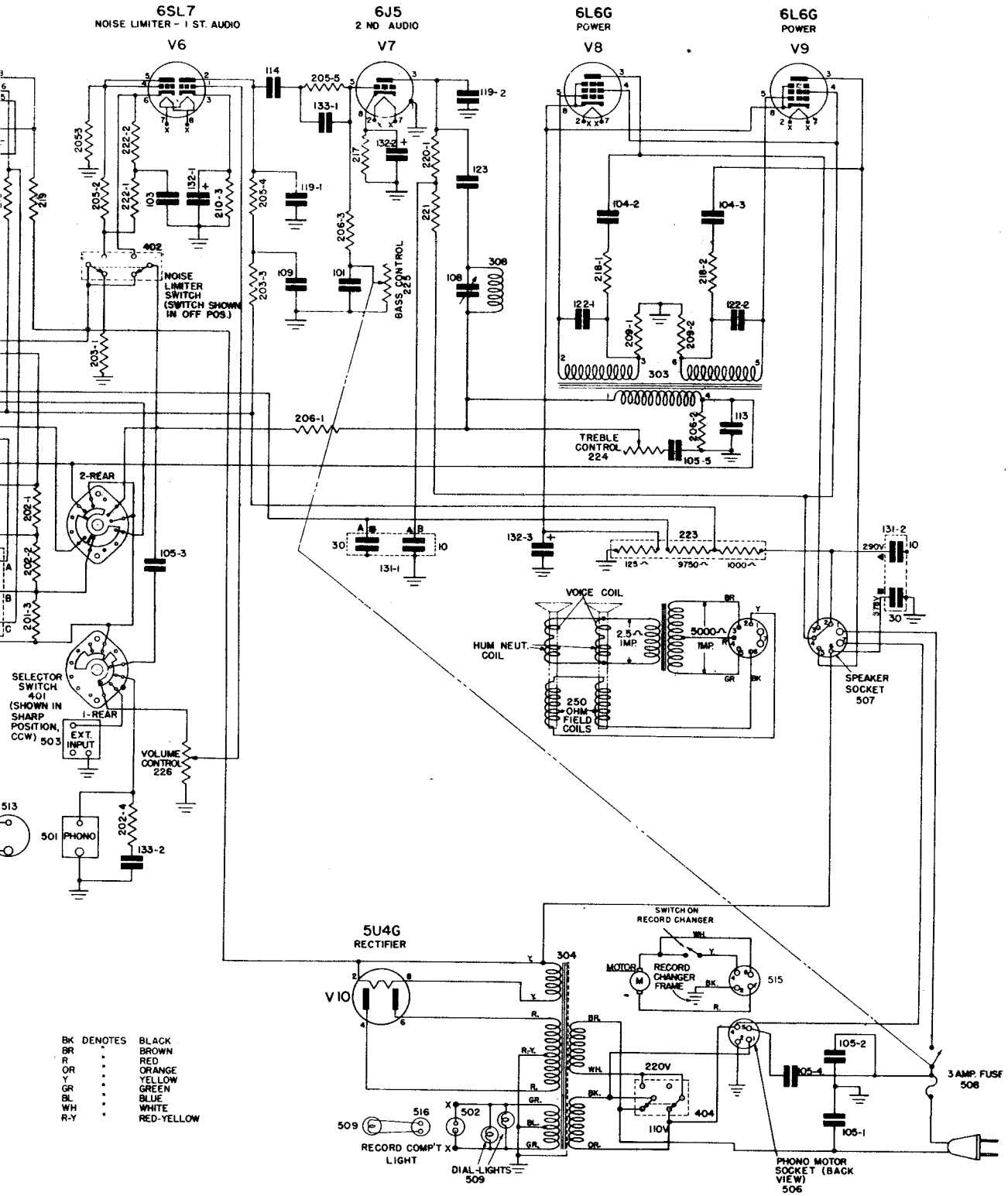
AVOX CO.

MODEL CR-185



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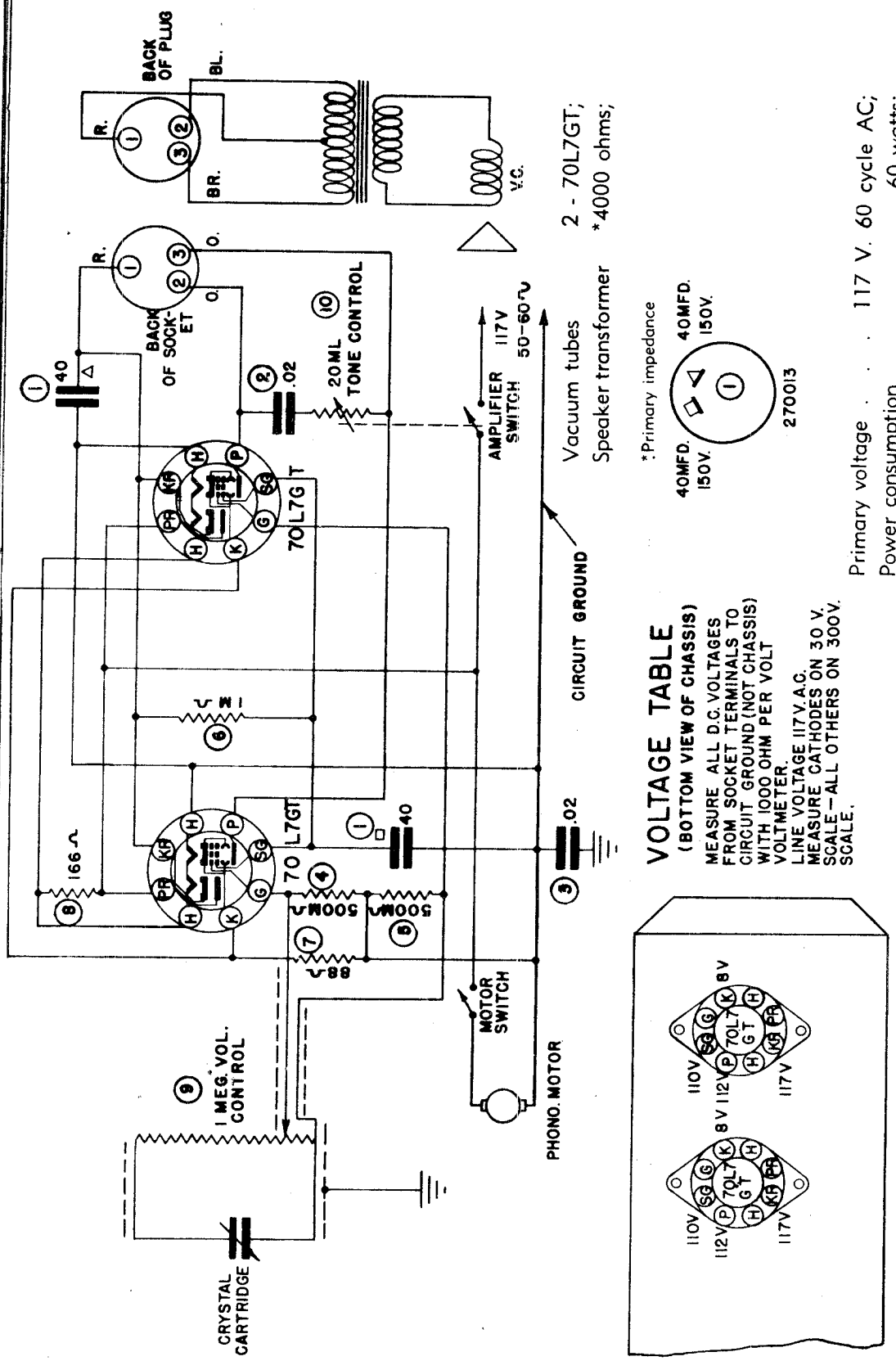
CR-183, CR-185

Ref. No.	Description	Magnavox Part No.
101	Capacitor, molded paper, .0047 mfd. ±20%, 500 V. DC (working)	250110G51
103	Capacitor, paper, tubular, .05 mfd. ±20%, 600 V. DC (working)	250104G2
104	Capacitor, molded paper, .01 mfd. ±20%, 600 V. DC (working)	250129G2
105	Capacitor, molded paper, .02 mfd. ±20%, 600 V. DC (working)	250129G3
106	Capacitor, molded mica, .0022 mfd. ±20%, 500 V. DC (working)	250109G84
107	Capacitor, molded paper, .0039 mfd. ±10%, 500 V. DC (working)	250110G41
108	Capacitor, variable, mica, 700-2000 mmfd.	250071
109	Capacitor, paper, oil-filled, 0.5 mfd. ±5%, 600 V. DC (working)	250077G5
110	Capacitor, paper, oil-filled, 0.1 mfd. ±10%, 600 V. DC (working)	250126G4
111	Capacitor, paper, oil-filled, 0.1-0.1-0.1 mfd. ±20%, 600 V. DC (working)	250126G1
112	Capacitor, molded paper, .05 mfd. ±20%, 120 V. DC (working)	250129G5
113	Capacitor, molded paper, .03 mfd. ±20%, 400 V. DC (working)	250129G4
114	Capacitor, molded mica, .0018 mfd. ±3%, 500 V. DC (working)	250109G67
115	Capacitor, molded mica, .004 mfd. ±3%, 500 V. DC (working)	250131G2
116	Capacitor, molded mica, .0013 mfd.	250131G1
117	Capacitor, molded mica, 270 mmf. ±10%, 500 V. DC (working)	250107G87
118	Capacitor, molded mica, 100 mmf. ±20%, 500 V. DC (working)	250107G98
119	Capacitor, molded mica, 470 mmf. ±20%, 500 V. DC (working)	250107G102
120	Capacitor, silver mica, 404 mmf. ±1%, 500 V. DC	250085G25
121	Capacitor, molded mica, 50 mmf. −5%, 500 V. DC (working)	250107G3040
122	Capacitor, molded mica, 15 mmf. ±20%, 500 V. DC (working)	250107G93
123	Capacitor, paper, tubular, 0.1 mfd. ±20%, 600 V. DC (working)	250104G1
125	Capacitor, molded mica, .0033 mfd. ±10%, 500 V. DC (working)	250109G85
126	Capacitor, variable, 5-50 mmf.	260042G2
127	Capacitor, 3 gang variable, 422.2 mmf.	260011
128	Capacitor, variable, 4.5-25 mmf.	260042G1
129	Capacitor, silver mica, 160 mmf. ±1%, 500 V. DC (working)	250085G28
130	Capacitor, silver mica, 170 mmf. ±1%, 500 V. DC (working)	250085G29
131	Capacitor, electrolytic, 30-10 mfd. 475 V. DC (working)	273610
132	Capacitor, electrolytic, 40 mfd. 40 V. DC (working)	270020G3
133	Capacitor, molded mica, .001 mfd. ±10%, 500 V. DC (working)	250109G64
201	Resistor, composition, pigtail, 2.2 megohms ±10%, 500 V. DC (working)	230069G33
202	Resistor, composition, pigtail, 1 megohm ±10%, ⅓ watt	230069G98
203	Resistor, composition, pigtail, 0.27 megohm ±10%, ⅓ watt	230069G91
204	Resistor, composition, pigtail, 0.22 megohm ±10%, ⅓ watt	230069G90
205	Resistor, composition, pigtail, 100,000 ohm ±10%, ⅓ watt	230069G86
206	Resistor, composition, pigtail, 47,000 ohm ±10%, ⅓ watt	230069G78
207	Resistor, composition, pigtail, 39,000 ohm ±10%, ⅓ watt	230069G91
208	Resistor, composition, pigtail, 22,000 ohm ±10%, ⅓ watt	230069G78
209	Resistor, composition, pigtail, 10,000 ohm ±10%, ⅓ watt	230069G74
210	Resistor, composition, pigtail, 4700 ohm ±10%, ⅓ watt	230069G70
211	Resistor, composition, pigtail, 2700 ohm ±10%, ⅓ watt	230069G67
212	Resistor, composition, pigtail, 1000 ohm, ±10%, ⅓ watt	230069G62
213	Resistor, composition, pigtail, 330 ohm ±10%, ⅓ watt	230069G56
214	Resistor, composition, pigtail, 150 ohm ±10%, ⅓ watt	230069G52
215	Resistor, composition, pigtail, 100 ohm ±10%, ⅓ watt	230069G50
216	Resistor, composition, pigtail, 0.15 megohm ±10%, ⅓ watt	230069G88
217	Resistor, composition, pigtail, 390 ohm ±10%, ⅓ watt	230069G57
218	Resistor, composition, pigtail, 100,000 ohm ±10%, 1 watt	230062G86
219	Resistor, composition, pigtail, 68,000 ohm ±10%, 1 watt	230062G84
220	Resistor, composition, pigtail, 15,000 ohm ±10%, 1 watt	230062G76
221	Resistor, composition, pigtail, 10,000 ohm ±10%, 1 watt	230062G74
222	Resistor, composition, pigtail, 300,000 ohm ±10%, ⅓ watt	230069G218
223	Resistor, 2-section, wire wound, lug terminals, 10,750 ohm ±10% tapped at 1000 ohms; 125 ohms ±10%	240023
224	Potentiometer, 1 megohm ±20%	220054
225	Potentiometer, 1 megohm ±20% with switch	220055
226	Potentiometer, 3 megohm ±20%	220056G2
301	Transformer, including two 160 mmf. capacitors 129-1 and 129-2	360178
302	Transformer, including two 170 mmf. capacitors 130-1 and 130-2	360179
303	Transformer, input	320013
304	Transformer, power 110-220 V. 50-60 cycle	300017
305	Transformer, antenna, 3-band	360186
306	Transformer, R.F., 3-band	360188
307	Transformer, oscillator, 3-band	360190
308	Coil, 10 kc filter	360193
401	Switch, rotary, 2-deck 4-position	160107
402	Switch, rotary, D.P.D.T.	160106
403	Switch, rotary, 3-deck, 3-position	160089
404	Switch, rotary, D.P.D.T., screwdriver slot adjustment	160091
501	Socket	189741
502	Socket	189788
503	Socket	180060
504	Socket, miniature bayonet	180078
505	Socket and cable assembly including 1 megohm resistor	180323
506	Socket, 4-prong	180018
507	Socket, 7-prong	180039
508	Fuse, cartridge, 3A. 250 V.	180157G10
509	Pilot lamp, 6-8 V. min. bayonet #51 Mazda	180161G7
510	Socket, 8-prong octal	180194G1
511	Line cord with plug	469056
512	Plug	180311G2
513	Plug, 2-prong	180311G1
514	Shell	180310G1
515	Plug, 4-prong	180053
516	Plug, 2-prong	180295G1
517	Shell	180286G1
518	Crystal cartridge	560041G1
519	Knob	140080G1
520	Knob	140078G1
521	Knob	140079G1
522	Knob	140079G2
523	Switch, rotary, S.P.S.T.	160108G1
524	Dial Assembly	631793G1

MODELS A-206, A-206A

THE MAGNAVOX CO.



VOLTAGE TABLE

(BOTTOM VIEW OF CHASSIS)

MEASURE ALL D.C. VOLTAGES FROM SOCKET TERMINALS TO CIRCUIT GROUND (NOT CHASSIS) WITH 1000 OHM PER VOLT VOLTMETER.
LINE VOLTAGE 117 V. A.C.
MEASURE CATHODES ON 30 V. SCALE—ALL OTHERS ON 300 V. SCALE.

Models A-206 and A-206A amplifier chassis are alike electrically. They differ mechanically only to the extent that A-206A has its volume and tone controls mounted on the amplifier chassis; these controls are mounted on the case motorboard remote from the amplifier when A-206 is incorporated.

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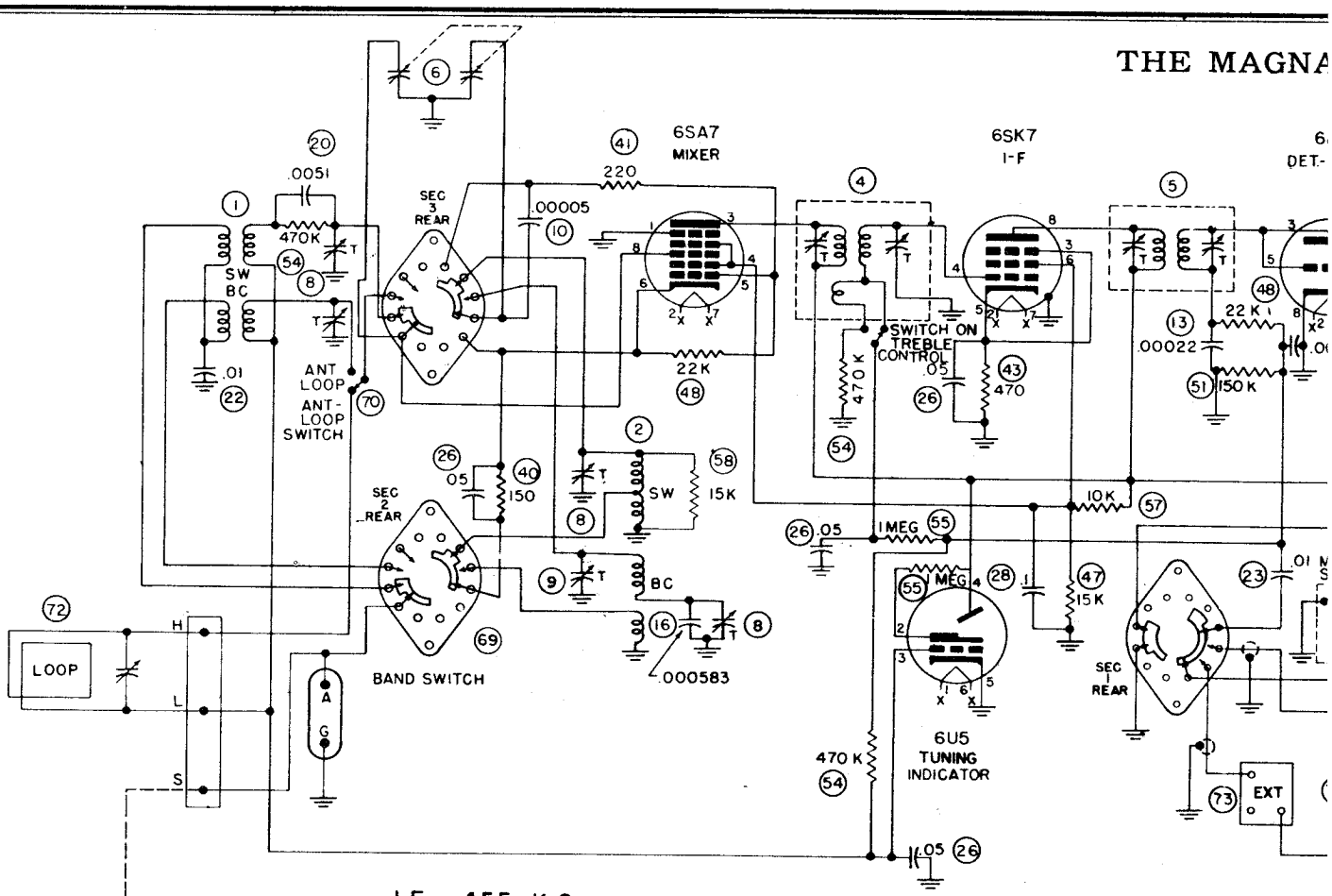
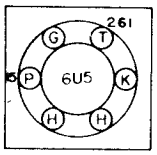
For Parts list, see P.15-5



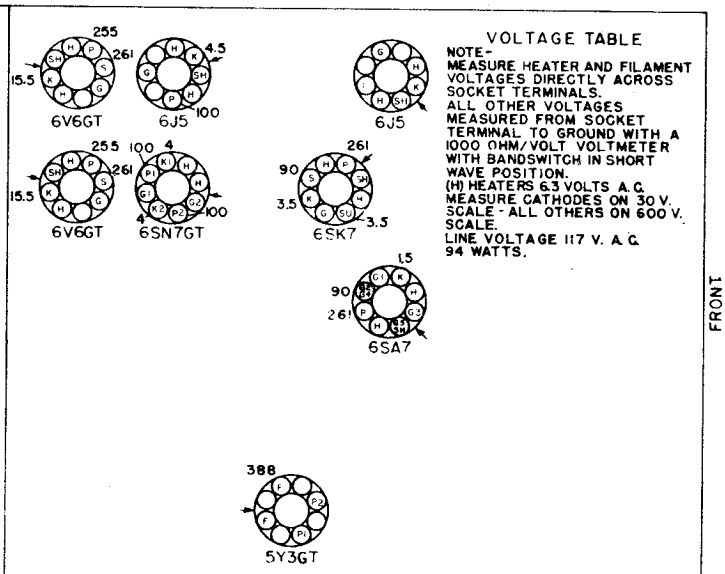
I.F. — 455 K.C.

NOTES

1. BAND SWITCH SHOWN IN COUNTER-CLOCKWISE POSITION (SHORT WAVE) VIEWED FROM THE FRONT PANEL.
2. BAND EXPANDER SWITCH SHOWN BENEATH FIRST I-F TRANSFORMER IS ACTUATED BY THE TREBLE CONTROL KNOB.
3. ALL ELECTRICAL VALUES SHOWN ARE IN MICROFARADS OR OHMS UNLESS OTHERWISE SPECIFIED.



TUNING EYE SOCKE
BACK VIEW



Dial lamps.....

Speaker:

Field coil resistance.....

Voice coil impedance (400 cycles).....

Output transformer.....

STAGE GAINS*

Antenna Post to Converter Grid at:

600 kc. .....

6 mc. .....

R-F on Converter Grid to I-F Grid at:

600 kc. .....

6 mc. .....

I-F on Converter Grid to I-F Grid at:

455 kc. .....

I-F Grid to Detector Plate at:

455 kc. .....

AUDIO GAIN

Voltage required across Volume Control to prod
.05 watt speaker output** at 400 cycles is .010
with Band Selector Switch in BDCST setting.

OSCILLATOR OUTPUT VOLTAGE

The DC voltage developed across Oscillator C
Resistor (48) at:

600 kc. .....

6 mc. .....

* Variations of ±20% are permissible. All readings made with sufficient input sig
provide .05 watt speaker output.

** .05 watt speaker output at 400 cycles is equivalent to a reading of 0.4 volts as mea
by a high resistance AC voltmeter across the speaker voice coil.

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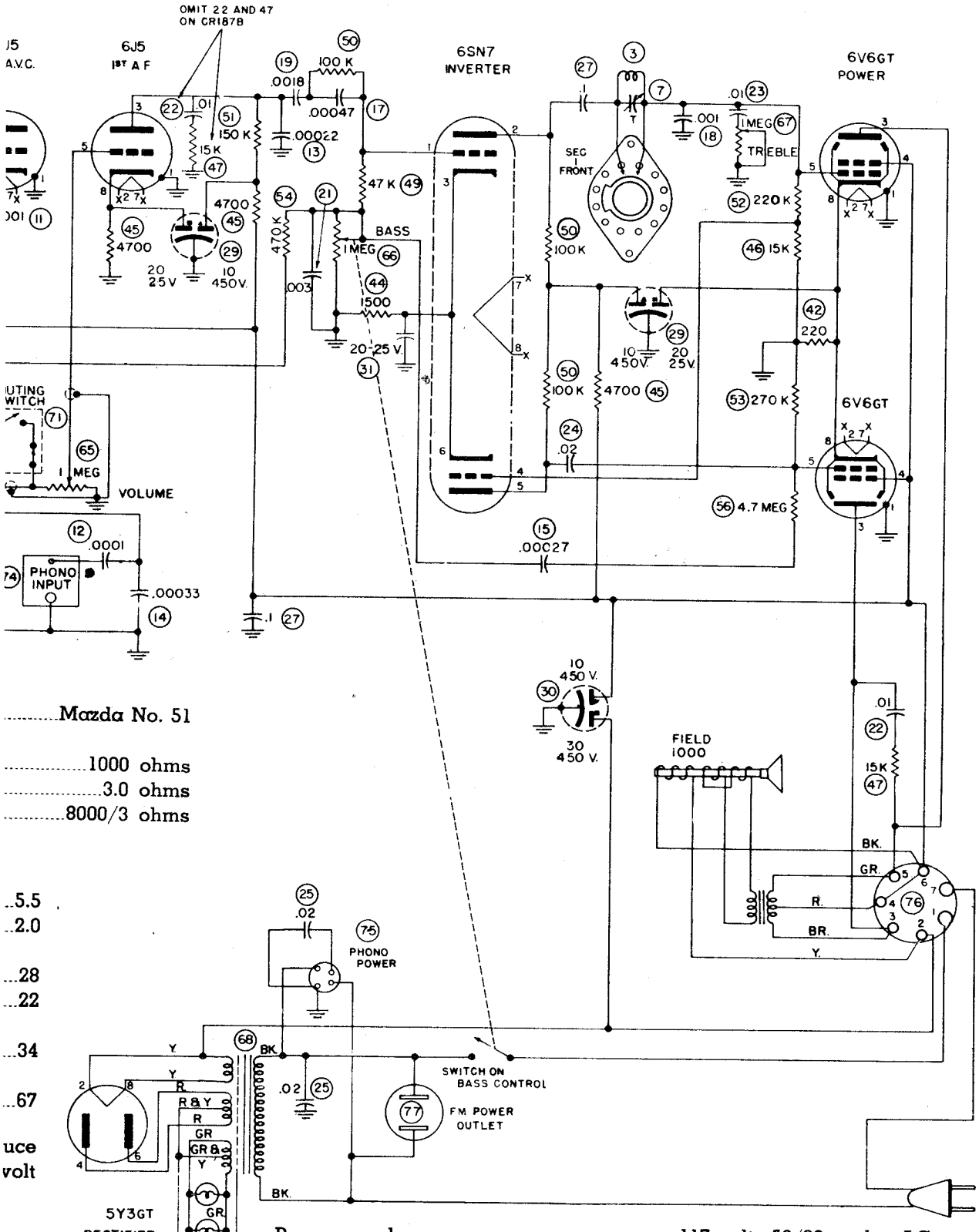


.....Mazda No. 51

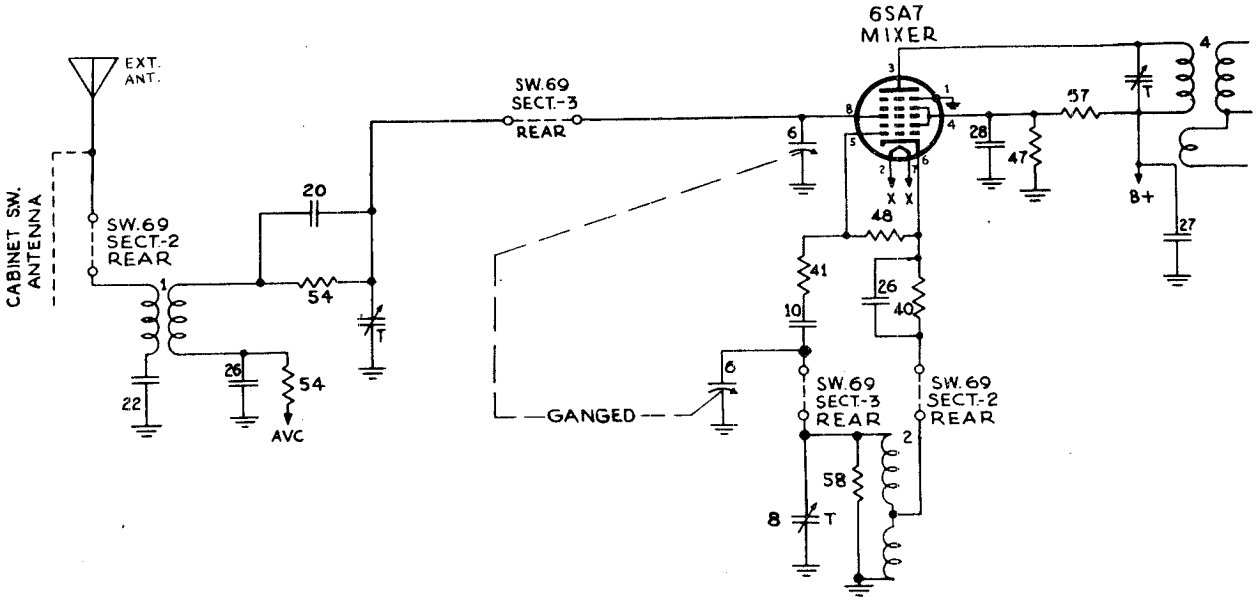
.....1000 ohms
.....3.0 ohms
.....8000/3 ohms

Power supply	117 volts 50/60 cycles AC
Power consumption	93 watts
Power output	12 watts
Intermediate frequency	455 kc.
Tuning frequency range:	
Broadcast band	520—1620 kc.
Short Wave band	5.0—18.2 mc.

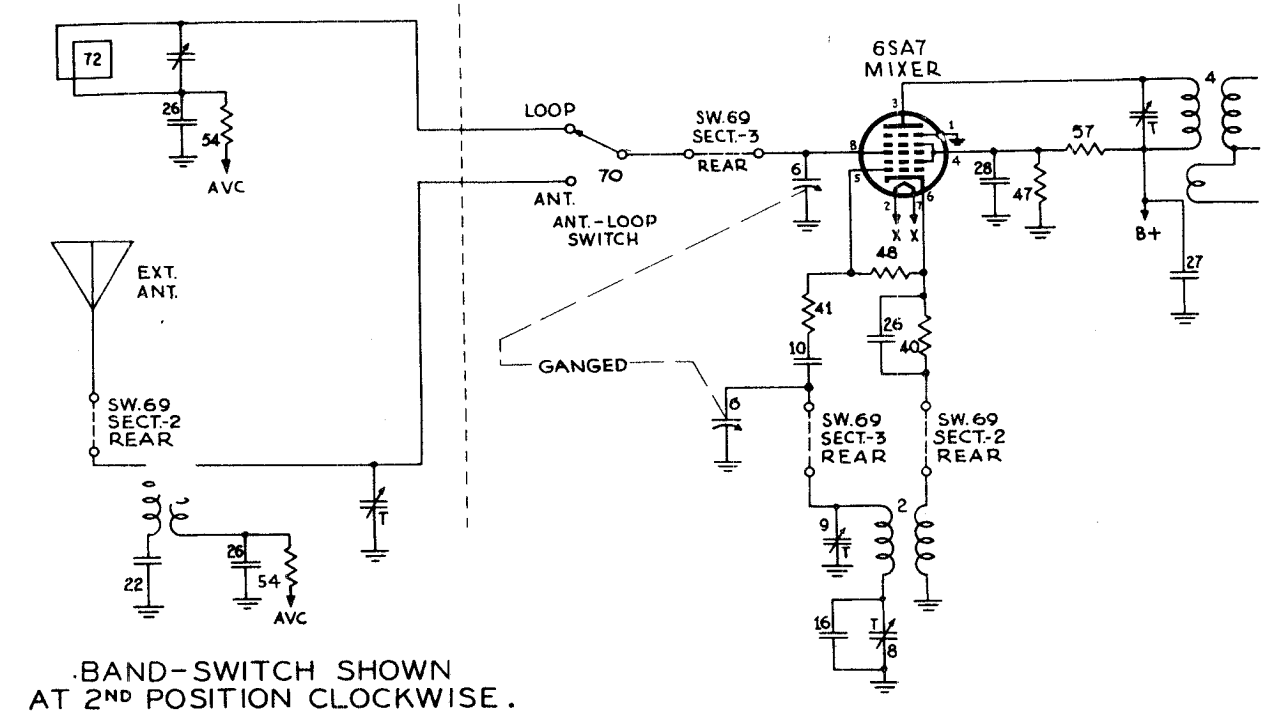
MAY, 1946

MODEL CR-187
MODEL CR-193

THE MAGNAVOX CO.



BAND-SWITCH SHOWN
AT 1ST POSITION.
SHORT WAVE BAND
5.0 - 18.2 MC.



BAND-SWITCH SHOWN
AT 2ND POSITION CLOCKWISE.
BROADCAST BAND
520 - 1620 KC.

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MODEL CR-187

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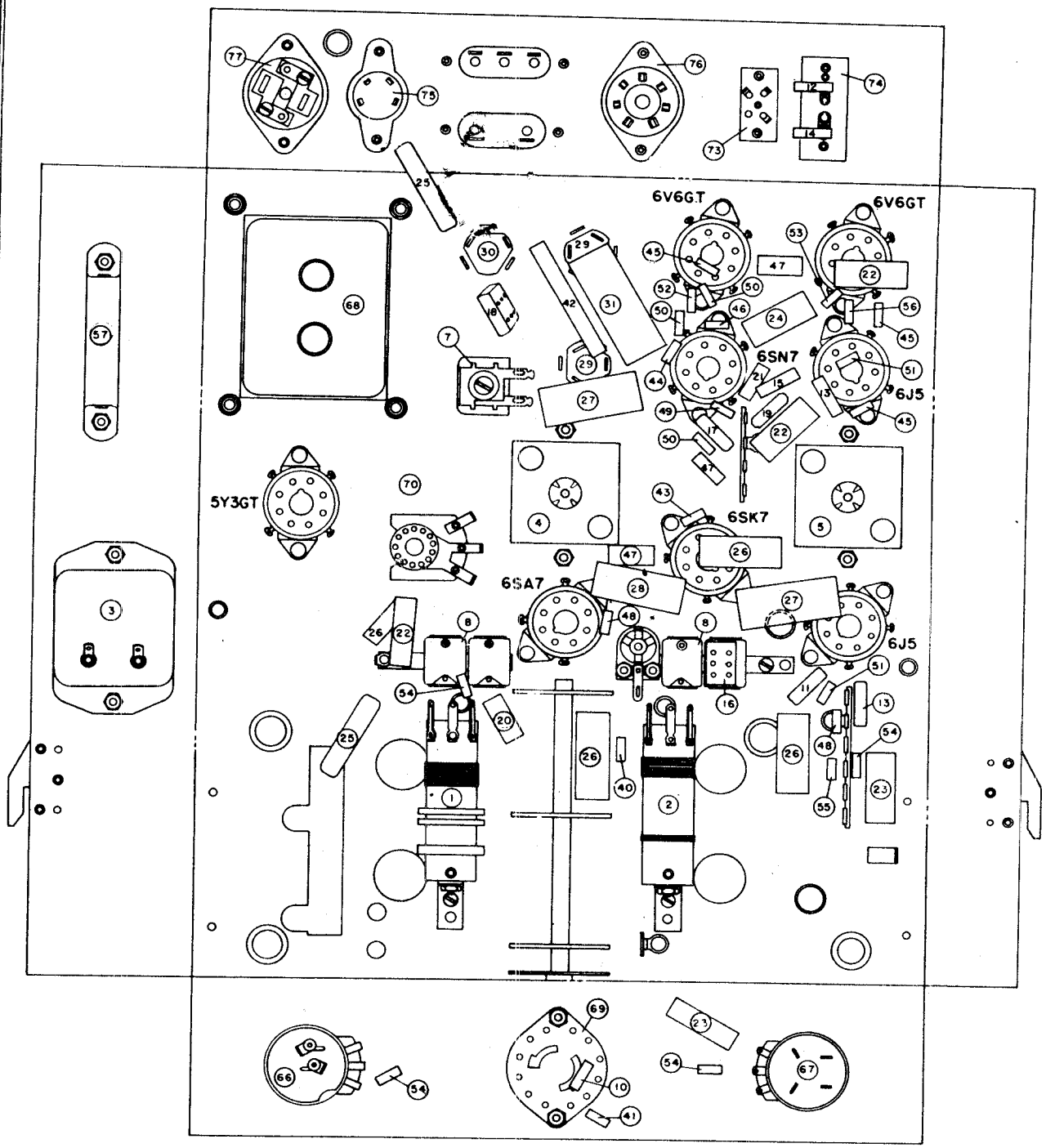

FIGURE 5

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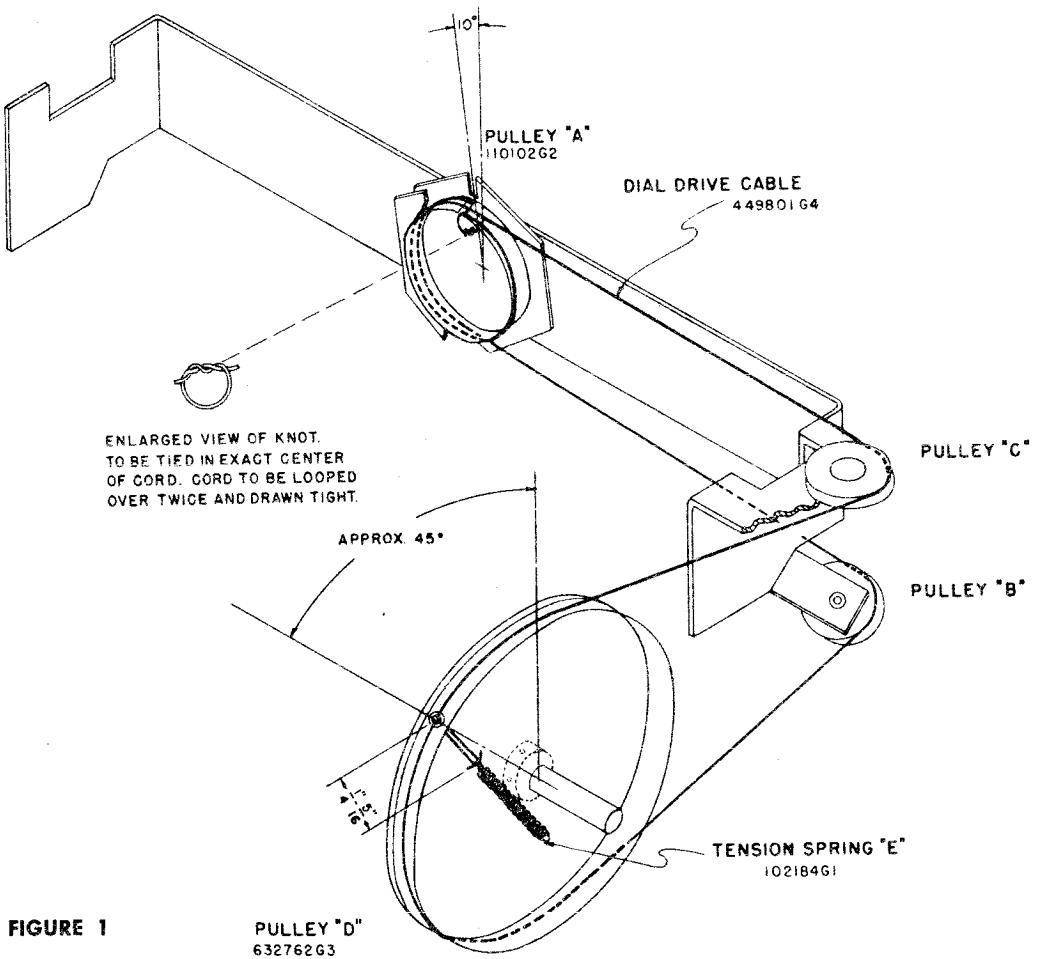

FIGURE 1

DIAL CORD REPLACEMENT

Rotate the brass pulley designated "A" in Figure 1 until the dial pointer strikes the stop at the high frequency end of the dial calibration. In this condition the slot in pulley "A" should be approximately ten degrees to the left of being vertical—see Figure 1. If the slot in the pulley is in some other position under the above mentioned conditions, the pointer set screw is probably loose and has allowed the pointer to slip. To correct this condition, first remove the glass dial and loosen the pointer screw. Then while holding pulley "A" so that its slot is approximately ten degrees to the left of vertical (when viewed from the rear) adjust the pointer until it is resting against the stop at the high frequency end of its travel. Then tighten the pointer set screw securely and replace the glass dial.

Completely unmesh the condenser gang and check the location of the hole or slot in pulley "D." If this hole is not approximately 45 degrees back from vertical as shown on Figure 1, loosen the two No. 6 Allen set screws in the hub of pulley "D" and slip the pulley on its shaft (while holding the condenser gang unmeshed) until the specified adjustment is obtained; then tighten one of the set screws securely. It will be shown later that this is a temporary setting. Next, tie a double knot in the exact center of a 25-inch length of dial cable and fold the cable back on itself so that the knot is at one end. The correct method for tying this knot is shown as an inset on Figure 1. Grasp the cable near the knotted end and slide it into the pulley slot so that the knot is against the inside rim of the pulley as shown in the sketch. The piece of cable nearest the dial frame should be wound in the direction shown for one-half turn; then over the lower pulley "B," around the bottom of the large pulley "D" and into the hole. Pull the cable taut and wrap the end around the small hook on pulley "D" temporarily.

The remaining piece of cable should be wound around pulley "A" in the direction shown, for one complete turn, over the upper pulley "C," and over the top of pulley "D." Thread the end through the small hole in pulley "D" and pull both ends of the cable taut. With one end of tension spring "E" fastened to the hook on pulley "D" lace the two free ends of the cable through the opposite end of the spring and tie a knot at a point that will allow ¼" to 5/16" of cable between the spring and the inside rim of pulley "D." Be sure to tie the knot around one coil of the spring in the manner shown.

Now with the condenser gang completely meshed, check the position of the dial pointer. If it is not in line with the last calibration mark at the low frequency end of the dial, loosen the set screw in pulley "D" and turn it until the pointer is in the specified position. Be sure that the condenser gang does not move during this adjustment. Then tighten the two screws in pulley "D" securely completing the operation.

MODEL CR-187
MODEL CR-188
MODEL CR-193

THE MAGNAVOX CO.

CONDENSER GANG DRIVE ADJUSTMENTS

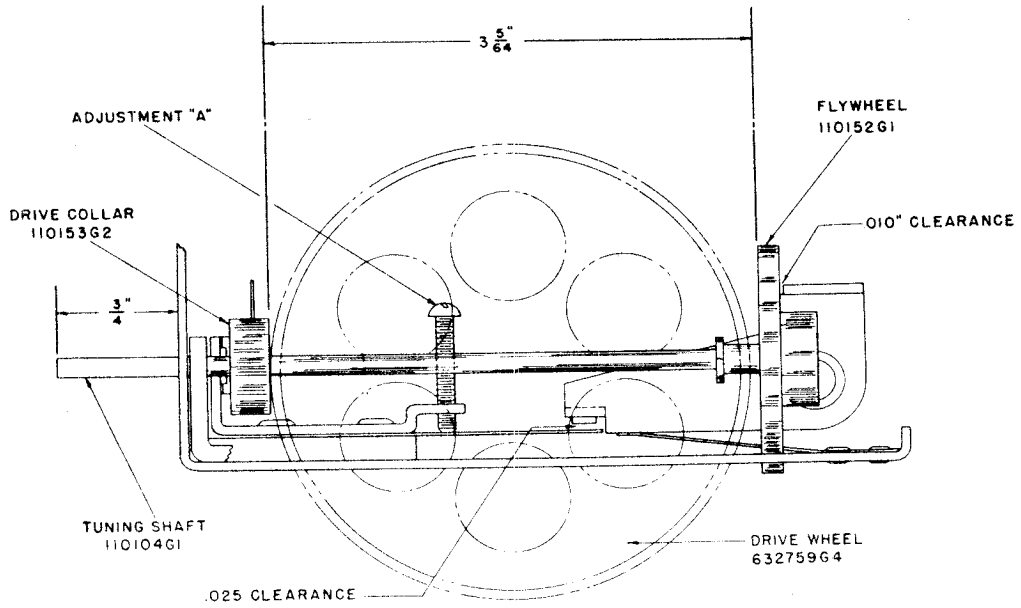

FIGURE 2

Whenever any of the mechanical parts in the condenser gang drive assembly require replacement due to rough handling or for any other reason, it is extremely important that clearances and adjustments shown on Figures 2 and 3 are affected; otherwise the tuning mechanism will be sluggish or it may slip during operation.

In reassembling the mechanism after any part was replaced, follow the procedure outlined below:

1. Assemble the Tuning Shaft, Drive Collar, Compression Spring, Spring Retainer and Flywheel in the manner shown on Figure 3. The Tuning Shaft must extend ¾" from the front of the assembly and that the spacing between the rear of the Drive Collar and the front of the Flywheel must be 3-5/64" as specified on Figure 2. Any excess length in the Tuning Shaft may extend beyond the rear of the Flywheel.

2. The distance between the rubber-tired Drive Wheel and the smaller diameter section of the Spring Retainer must be 1/32" to 1/16". This adjustment is effected by loosening the two No. 6 Allen set screws in the Drive Wheel hub and sliding the wheel on its shaft until the required clearance is obtained. When the adjustment is completed, tighten the two screws in the hub of the Drive Wheel. See Figure 3.

3. While pressing down on the Treadle Bar at the location shown on Figure 3, adjust the Thrust Bracket until the clearance between the rest of the Flywheel and the projection on the Thrust Bracket is .010" as shown on the diagram. To make this adjustment, loosen the two No. 6 Allen set screws (use No. 6 Allen Wrench—Magnavox Part No. 800044G2) in the hub of Thrust Bracket and rotate the bracket until the specified clearance is obtained when the push buttons are NOT actuated. Tighten the two screws securely when the adjustment is completed. Press each push button and check that the Drive Collar is pushed away from the rubber-tired Drive Wheel.

4. Next, adjust the clearance in the muting switch contacts by turning the Phillips-head screw designated Adjustment "A" on Figure 2, until the specified clearance of .025" is obtained (when the push buttons are NOT actuated.)

5. While pressing any one of the push buttons in as far as possible, turn the screw designated Adjustment "B" (Figure 3) until a minimum clearance of .015" is obtained between the front surface of the Drive Collar and the switch spring directly in front of it. This setting should also cause a minimum clearance of .010" between the switch contacts actuated

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MODEL CR-187
MODEL CR-188
MODEL CR-193

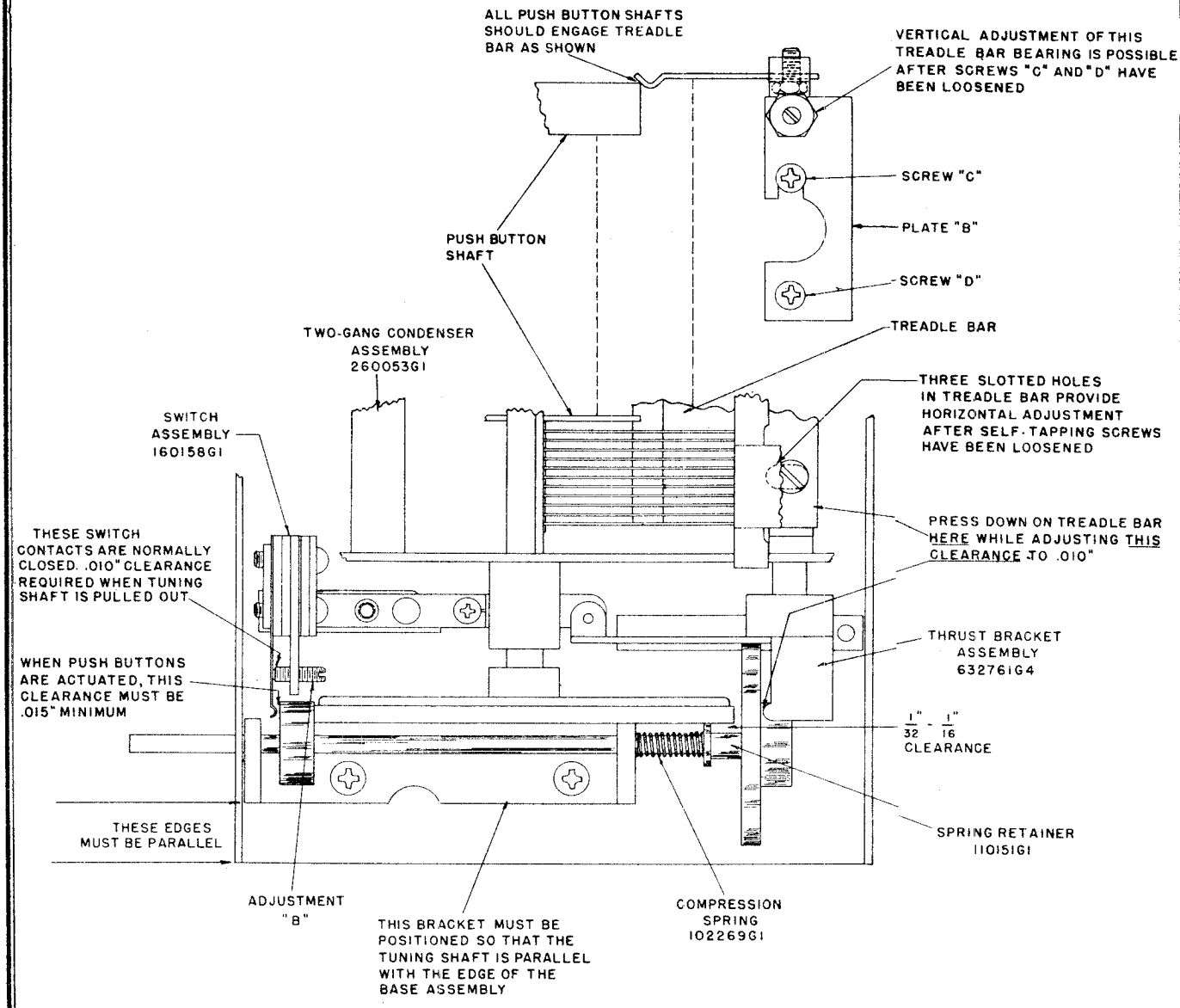
ALL PUSH BUTTON SHAFTS SHOULD ENGAGE TREADLE BAR AS SHOWN
VERTICAL ADJUSTMENT OF THIS TREADLE BAR BEARING IS POSSIBLE AFTER SCREWS "C" AND "D" HAVE BEEN LOOSENED
SCREW "C"
PLATE "B"
SCREW "D"
PUSH BUTTON SHAFT
TWO-GANG CONDENSER ASSEMBLY 260053G1
TREADLE BAR
THREE SLOTTED HOLES IN TREADLE BAR PROVIDE HORIZONTAL ADJUSTMENT AFTER SELF-TAPPING SCREWS HAVE BEEN LOOSENED
SWITCH ASSEMBLY 160158G1
PRESS DOWN ON TREADLE BAR HERE WHILE ADJUSTING THIS CLEARANCE TO .010"
THESE SWITCH CONTACTS ARE NORMALLY CLOSED. .010" CLEARANCE REQUIRED WHEN TUNING SHAFT IS PULLED OUT
THRUST BRACKET ASSEMBLY 63276IG4
WHEN PUSH BUTTONS ARE ACTUATED, THIS CLEARANCE MUST BE .015" MINIMUM
1/32" - 1/16" CLEARANCE
THESE EDGES MUST BE PARALLEL
SPRING RETAINER 110151G1
ADJUSTMENT "B"
THIS BRACKET MUST BE POSITIONED SO THAT THE TUNING SHAFT IS PARALLEL WITH THE EDGE OF THE BASE ASSEMBLY
COMPRESSION SPRING 102269G1

FIGURE 3

by pressure of the front surface of the Drive Collar, when the Tuning Shaft is pulled out. The function of this switch is to open the muting circuit when setting up the push buttons. As its contacts are wired in series with the large muting switch (contacts are shorted by pressing any push button), pulling out on the Tuning Shaft causes the small switch contacts to open the muting circuit so that a station can be heard while the push button is held in and tightened. On rare occasions it may be necessary to adjust the relation between the push button bars and the Treadle Bar. Such adjustment might be required if when pushing any of the push buttons, sufficient motion is not transmitted to the Treadle Bar to cause a disengagement between the Drive Collar and the Drive wheel.

This can usually be accomplished by loosening the two screws designated "C" and "D" on Figure 3, and moving plate "B" in the direction required to correct this condition.

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MODEL CR-187
MODEL CR-193

THE MAGNAVOX CO.

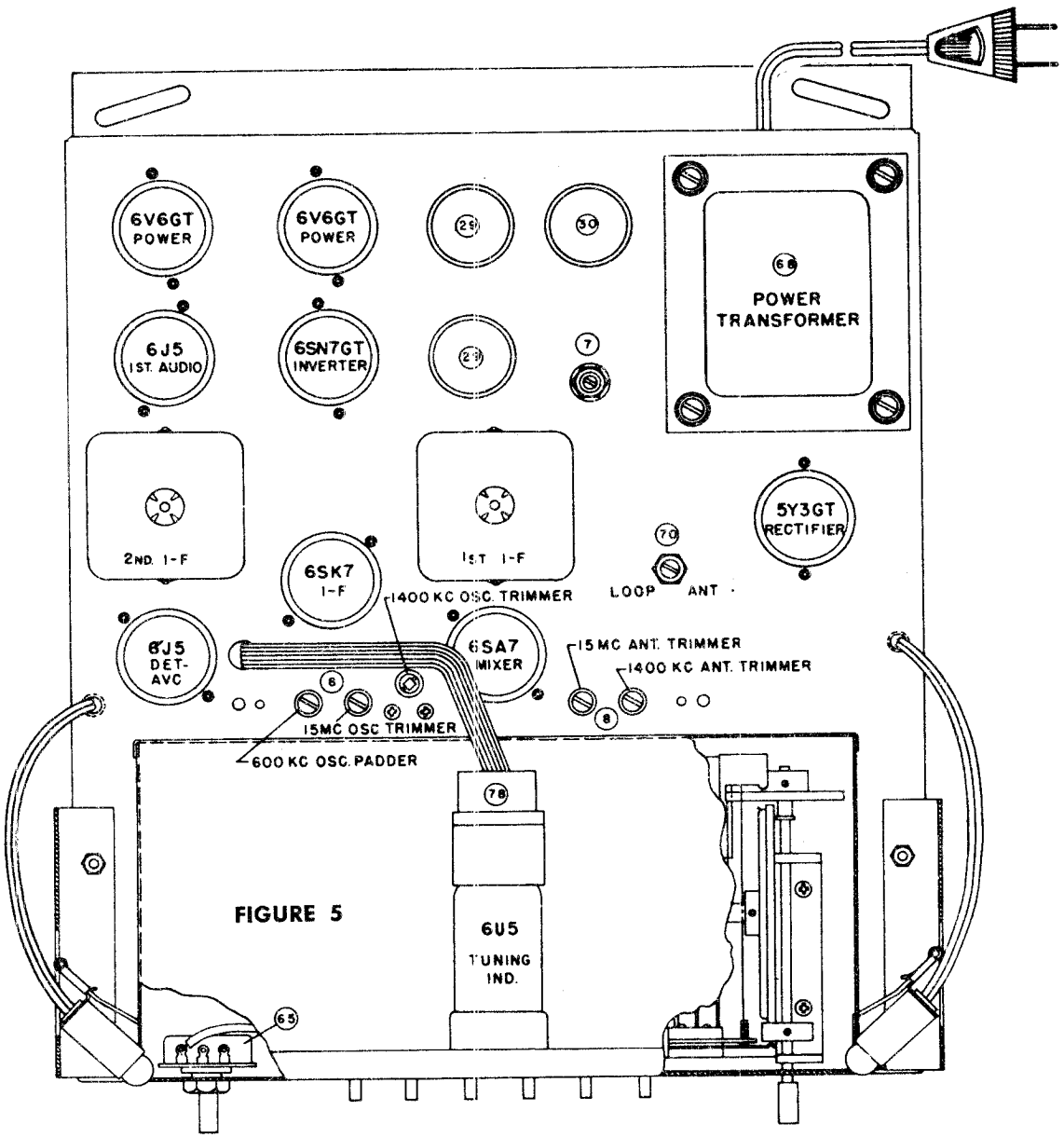

FIGURE 5

Method for Removing Chassis from Cabinet

Model CR-187 radio chassis is designed for easy removal from the cabinet in which it is installed. As the radio panel is permanently fastened to the chassis, the control knobs need not be removed when the chassis is taken out of the cabinet for service. To remove the chassis, first remove the antenna leads from their terminals and all plugs from the receptacles on the rear of the chassis. Then remove the two Phillips-head screws from the angular slots in the flange at the rear of the chassis. Lift the rear of the chassis about one inch and pull it straight back. Never remove the chassis tray from the cabinet—it has been properly positioned to bring the radio panel in place when the chassis is replaced. In replacing the chassis, slide it so that the small hooks near the front, ride inside the flanges on the sides of the chassis tray. Push the chassis forward as far as it will go and the hook should then engage the slots in the chassis tray. Replace the two Phillips-head screws and nuts and tighten securely. Replace all plugs in their receptacles and the antenna leads on their correct terminals. The antenna terminal board for the loop antenna connections is designated S-L-H. The end of the short wave antenna that is fastened to the inside of the cabinet connects to S. Always disconnect this antenna from terminal S when an outdoor antenna is used as it may pick up noise. The two terminals on the loop are designated L and H. The leads connected to these terminals should be wired to the corresponding terminals (L and H) on the chassis.

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MODEL CR-137
MODEL CR-193

The alignment of this receiver requires the use of an accurately calibrated r-f signal generator and an output meter. All trimmer condenser locations are shown on the chassis layout diagram, Figure 5. The radio volume control should be turned to maximum and the signal generator output kept as low as possible during alignment to prevent the AVC from operating and giving false readings. *Always set the Selectivity Switch to SHARP TUNE before aligning the i-f stages.* This is done by turning the Treble Control counter-clockwise as far as possible.

I-F ALIGNMENT

1. Connect the output of the signal generator to the oscillator grid (pin No. 5) of the 6SA7 tube through a .00025 mfd. capacitor. The ground on the signal generator should be connected to the radio chassis ground.

2. Turn the condenser gang until it is completely meshed, (low-frequency end of dial calibration) and set the band selector switch to BDCST as for broadcast band reception.

3. Adjust the signal generator to EXACTLY 455 kc. and peak the second i-f transformer and the first i-f transformer trimmers in that order.

On early models of the CR-187 chassis, the two i-f trimmers are located in the top of the respective i-f transformers. In later production, one trimmer is accessible from the top and the other from the bottom of each transformer as shown in the layout diagram, Figure 5.

BROADCAST BAND ALIGNMENT

1. Remove the signal generator lead from the 6SA7 grid and connect it to the radio antenna terminal through the .00025 mfd. capacitor. The ANT-LOOP switch (70) must be in the ANT. setting.
2. Check the tuning-dial pointer adjustment. When the plates of the tuning condenser are completely meshed, the dial pointer must be in line with the last calibration mark at the low frequency end of the dial. If it is not, loosen the set screws in the hub of pulley "D" shown on Figure 1 and make the necessary adjustment.
3. With the band selector still set for broadcast band reception, adjust the signal generator and the radio receiver to 600 kc. While rocking the gang condenser a few degrees to the right and to the left, adjust the 600 kc. oscillator padder for maximum indication on the output meter.
4. Set the signal generator and the radio receiver to 1400 kc.; adjust the 1400 kc. oscillator trimmer and the 1400 kc. antenna trimmer for maximum output. If considerable adjustment was necessary, recheck the 600 kc. padder setting.
5. If the loop antenna trimmer is out of adjustment it should be set after the radio chassis is in the cabinet. Set the ANT-LOOP switch (70) to the LOOP position. Adjust the signal generator to 1400 kilocycles and connect its output to a loop containing approximately five turns of wire eight inches in diameter placed eighteen inches from the receiver loop and in the same plane.
6. Set the receiver to 1400 kc. and adjust the trimmer on the receiver loop for maximum output.

SHORT WAVE BAND ALIGNMENT

1. Set the band selector switch to SW as for short wave reception and substitute a 400 ohm resistor for the capacitor in series with the signal generator lead connected to the antenna terminal on the receiver.
2. Set the signal generator and the radio receiver to 15 mc.; then adjust the 15 mc. oscillator trimmer and the 15 mc. antenna trimmer for maximum output. While adjusting the 15 mc. oscillator trimmer two peaks may be observed; only one is the correct peak for 15 mc. alignment. Screw in the trimmer to maximum capacity—then decrease the capacity until the first peak is observed. This is the correct one.

10 KC FILTER ADJUSTMENT

This chassis incorporates a 10 kc. filter circuit to eliminate the beat note heard as a whistle between stations on the broadcast band. If the trimmer is out of adjustment, the following procedure should be observed.

1. Set the Selectivity Switch to FULL RANGE by turning the Treble Control knob clockwise as far as possible.
2. Connect the output of an audio oscillator to the phonograph pickup socket on the radio chassis and adjust the oscillator to EXACTLY 10,000 cycles.
3. Set the band selector to PHONO and adjust the 10 kc. trimmer (7) for minimum output.
4. If an audio oscillator is not available for making this adjustment, set the band selector to BDCST, connect an antenna to the receiver and set the gang condenser to a point between two stations on adjacent channels having approximately the same power. If the 10 kc. trimmer is out of adjustment, a whistle will be heard. Adjust the trimmer until the whistle is eliminated.

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MODEL CR-187
MODEL CR-194

THE MAGNAVOX CO.

CR-187

REFERENCE NO.	DESCRIPTION	MAGNAVOX PART NO.
1	Coil assembly, r-f, two band	360238G1
2	Coil assembly, oscillator, two band	360239G1
3	Coil assembly, 10 kc filter	360240G1
4	Transformer, first i-f	360266G1
5	Transformer, second i-f	360267G1
6	Capacitor, variable, two-gang tuning	260053G1
7	Capacitor, variable, 10 kc trimmer	250008G1
8	Capacitor, variable, 2 gang trimmer	260021G1
9	Capacitor, variable, oscillator padder	260042G2
10	Capacitor, ceramic, 50 mmf.	250088G24
11	Capacitor, molded mica, 100 mmf. ±20%	250159G98
12	Capacitor, molded mica, 100 mmf. ±10%	250159G82
13	Capacitor, molded mica, 220 mmf.	250159G100
14	Capacitor, molded mica, 330 mmf.	250159G88
15	Capacitor, molded mica, 270 mmf.	250159G87
16	Capacitor, silvered mica, 583 mmf. ±1%	250085G33
17	Capacitor, molded mica, 470 mmf.	250159G102
18	Capacitor, molded mica, 1000 mmf.	250160G82
19	Capacitor, molded mica, 1800 mmf.	250160G67
20	Capacitor, molded mica, 5100 mmf. ±2%	250161G6
21	Capacitor, paper, .003 mfd. 400 V.	250152G43
22	Capacitor, paper, .01 mfd. 600 V.	250152G38
23	Capacitor, paper, .01 mfd. 200 V.	250152G18
24	Capacitor, paper, .02 mfd. 400 V.	250152G26
25	Capacitor, molded paper, .02 mfd. 600 V.	250129G3
26	Capacitor, paper, .05 mfd. 200 V.	250152G15
27	Capacitor, paper, .1 mfd. 400 V.	250152G22
28	Capacitor, paper, .1 mfd. 200 V.	250152G13
29	Capacitor, electrolytic, 10 mfd. 450 V., 20 mfd. 25V.	270023G6
30	Capacitor, electrolytic, 10-30 mfd. 450 V.	270023G2
31	Capacitor, electrolytic, 20 mfd. 25V.	270027G2
40	Resistor, composition, 150 ohm ½ W.	230084G8
41	Resistor, composition, 220 ohm ½ W.	230084G9
42	Resistor, composition, 220 ohm 3 W.	230064G54
43	Resistor, composition, 470 ohm ½ W.	230084G1
44	Resistor, composition, 1500 ohm ½ W	230084G14
45	Resistor, composition, 4700 ohm ½ W.	230084G17
46	Resistor, composition, 15,000 ohm ±5% ½ W.	230084G187
47	Resistor, composition, 15,000 ohm 1 W	230085G20
48	Resistor, composition, 22,000 ohm ½ W.	230084G21
49	Resistor, composition, 47,000 ohm ½ W.	230084G23
50	Resistor, composition, 100,000 ohm ½ W	230084G25
51	Resistor, composition, 150,000 ohm ½ W.	230084G26
52	Resistor, composition, 220,000 ohm ±5% ½ W	230084G215
53	Resistor, composition, 270,000 ohm ½ W.	230084G91
54	Resistor, composition, 470,000 ohm ½ W.	230084G29
55	Resistor, composition, 1 megohm ½ W.	230084G31
56	Resistor, composition, 4.7 megohm ½ W	230084G35
57	Resistor, wire wound, 10,000 ohm	240035G2
58	Resistor, composition, 15,000 ohm ½ W	230084G20
65	Control, volume, 1 megohm	220044G15
66	Control, bass, 1 megohm, with power switch	220045G2
67	Control, treble, 1 megohm, with band expander switch	220071G2
68	Transformer, power, 117 V. 50/60 cycle	300025G1
69	Switch, rotary, band selector	160156G1
70	Switch, rotary, loop to outdoor antenna	160157G1
71	Switch assembly, muting	160158G1
72	Antenna, loop assembly	*
73	Socket, external input	180060G1
74	Socket, phonograph input	189741G1
75	Socket, phonograph motor	180501G5
76	Socket, speaker	180393G3
77	Socket, FM power	180422G1
78	Socket & Cable assembly, tuning indicator	180423G1

CR-194

REFERENCE NO.	DESCRIPTION	MAGNAVOX PART NO.
1	Coil assembly, r-f, two band	360256G1
2	Coil assembly, oscillator, two band	360255G1
3	Coil assembly, 10 kc filter	360240G1
4	Transformer, first i-f	360266G1
5	Transformer, second i-f	360267G1
6	Capacitor, variable, two-gang tuning	260056G1
7	Capacitor, variable, 10 kc trimmer	250008G1
8	Capacitor, variable, 2 gang trimmer	260021G1
9	Capacitor, variable, oscillator trimmer	260042G2
10	Capacitor, ceramic, 50 mmf.	250088G24
11	Capacitor, molded mica, 100 mmf. ±20%	250159G98
12	Capacitor, molded mica, 100 mmf. ±10%	250159G82
13	Capacitor, molded mica, 220 mmf. ±20%	250159G100
14	Capacitor, molded mica, 330 mmf. ±10%	250159G88
15	Capacitor, molded mica, 270 mmf. ±10%	250159G87
16	Capacitor, silvered mica, 529 mmf. ±1%	250085G34
17	Capacitor, molded mica, 470 mmf. ±20%	260159G102
18	Capacitor, molded mica, 1000 mmf. ±20%	250160G82
19	Capacitor, molded mica, 1800 mmf. ±10%	250160G67
20	Capacitor, molded mica, 5600 mmf. ±2%	250161G7
21	Capacitor, paper, .003 mfd. 600 V.	250152G43
22	Capacitor, paper, .01 mfd. 600 V.	250152G38
23	Capacitor, paper, .01 mfd. 200 V.	250152G18
24	Capacitor, paper, .02 mfd. 400 V.	250152G26
25	Capacitor, molded paper, .02 mfd.	250129G3
26	Capacitor, paper, .05 mfd. 200 V.	250152G15
27	Capacitor, paper, .1 mfd. 400 V.	250152G22
28	Capacitor, paper, .1 mfd. 200 V.	250152G13
29	Capacitor, electrolytic, 10 mfd. 450 V.-20 mfd. 25 V.	270023G6
30	Capacitor, electrolytic, 10-30 mfd. 450 V.	270023G2
31	Capacitor, electrolytic, 20 mfd. 25 V.	270027G2
40	Resistor, composition, 150 ohm ½ W.	230084G8
41	Resistor, composition, 220 ohm ½ W.	230084G9
42	Resistor, wire wound, 125 ohm	240021G11
43	Resistor, composition, 470 ohm ½ W.	230084G11
44	Resistor, composition, 1500 ohm ½ W.	230084G14
45	Resistor, composition, 4700 ohm ½ W.	230084G17
46	Resistor, composition, 15,000 ohm ±5% ½ W.	230084G187
47	Resistor, composition, 15,000 ohm 1 W.	230085G20
48	Resistor, composition, 22,000 ohm ½ W.	230084G21
49	Resistor, composition, 47,000 ohm ½ W.	230084G23
50	Resistor, composition, 100,000 ohm ½ W.	230084G25
51	Resistor, composition, 150,000 ohm ½ W.	230084G26
52	Resistor, composition, 220,000 ohm ±5% ½ W.	230084G215
53	Resistor, composition, 270,000 ±10% ½ W.	230084G91
54	Resistor, composition, 470,000 ohm ½ W.	230084G29
55	Resistor, composition, 1 megohm ½ W.	230084G31
56	Resistor, composition, 4.7 megohm ½ W.	230084G35
57	Resistor, wire wound, 10,000 ohm	240035G2
58	Resistor, composition, 15,000 ohm ½ W.	230084G20
59	Resistor, composition, 1000 ohm 2W.	230064G62
65	Control, volume, 1 megohm	220044G15
66	Control, bass, 1 megohm, with power switch	220045G2
67	Control, treble, 1 megohm, with band expander sw.	220071G2
68	Transformer, power, 117 V. 50/60 cycle	300032G1
69	Switch, rotary, band selector	160156G1
70	Switch, rotary, loop to outdoor antenna	160157G1
72	Antenna, loop assembly	*
73	Socket, external input	180060G1
74	Socket, phonograph input	189741G1
75	Socket, phonograph motor	180501G5
76	Socket, speaker	180393G3
77	Socket, FM power	180422G1
78	Socket and cable assembly, tuning indicator	180423G1

Due to the fact that a change was made in the mechanical construction of the dial assembly after the first CR-187 radio chassis production run, it is important that you follow the procedure outlined below in ordering replacement glass dials.

If the glass dial for which a replacement is required is marked 150260, order a 150276 dial glass assembly. If the glass is marked 150281, order a 150283 dial glass assembly. These assemblies include the rubber strips cemented in their correct positions.

*The part number of the loop antenna assembly changes with different cabinets. It is therefore important that you specify the Style Number of the instrument when ordering a replacement loop antenna assembly.

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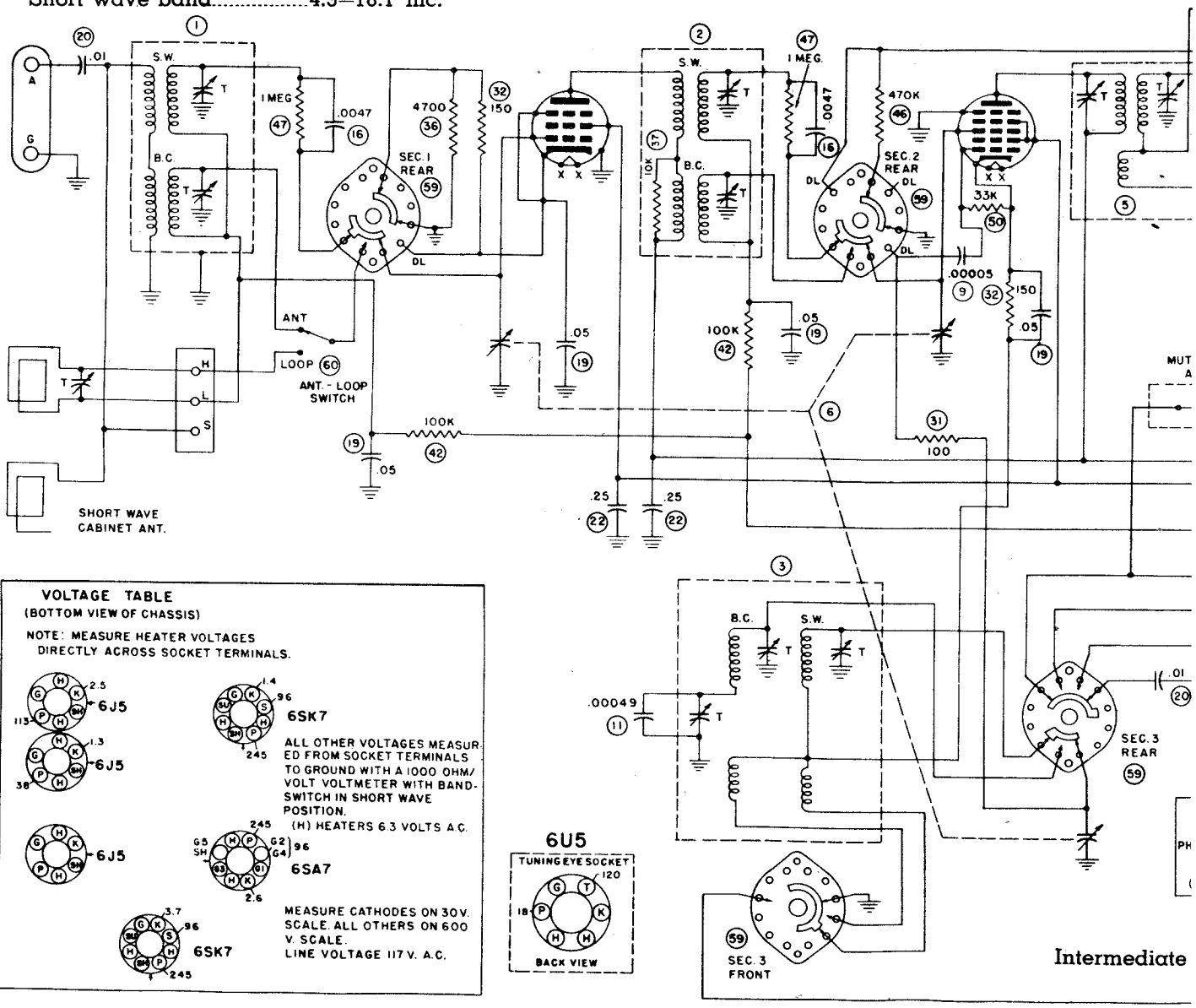
Tuning frequency range:

Broadcast band.....530—1610 kc.

Short wave band.....4.9—18.1 mc.



REFERENCE NO.	DESCRIPTION	MAGNAVOX PART NO.
1	Coil Assembly, antenna, two band	360254G1
2	Coil Assembly, r-f, two band	360254G2
3	Coil Assembly, oscillator, two band	360253G1
4	Coil Assembly, 10 kc. filter	360244G1
5	Transformer, first i-f	360266G1
6	Transformer, second i-f	360267G1
7	Capacitor, variable, three-gang tuning	260054G1
8	Capacitor, variable, 10 kc. trimmer	259610G1
9	Capacitor, ceramic, 50 mmf.	250088G25
10	Capacitor, molded mica, 510 mmf.	250159G64
11	Capacitor, silvered mica, 490 mmf. ±1%	250085G32
12	Capacitor, molded mica, 220 mmf.	250159G100
13	Capacitor, molded mica, 100 mmf.	250159G98
14	Capacitor, paper, 008 mfd.	250129G11
15	Capacitor, paper, .005 mfd.	250129(
16	Capacitor, molded mica, .0047 mfd.	250161(
17	Capacitor, paper, .004 mfd.	250129(
18	Capacitor, paper, .012 mfd.	250129(
19	Capacitor, paper, .05 mfd.	250129(
20	Capacitor, paper, .01 mfd.	250129(
21	Capacitor, paper, 0.1 mfd.	250152(
22	Capacitor, paper, 0.25 mfd.	250152(
23	Capacitor, electrolytic, 20 mfd. 25V—10 mfd. 450V.	270023(
31	Resistor, composition, 100 ohm ½ W.	230084(
32	Resistor, composition, 150 ohm ½ W.	230084(
33	Resistor, composition, 470 ohm ½ W.	230084(
34	Resistor, composition, 820 ohm ½ W.	230084(
35	Resistor, composition, 2200 ohm ½ W.	230084(
36	Resistor, composition, 4700 ohm ½ W.	230084(
37	Resistor, composition, 10,000 ohm ½ W.	230084(

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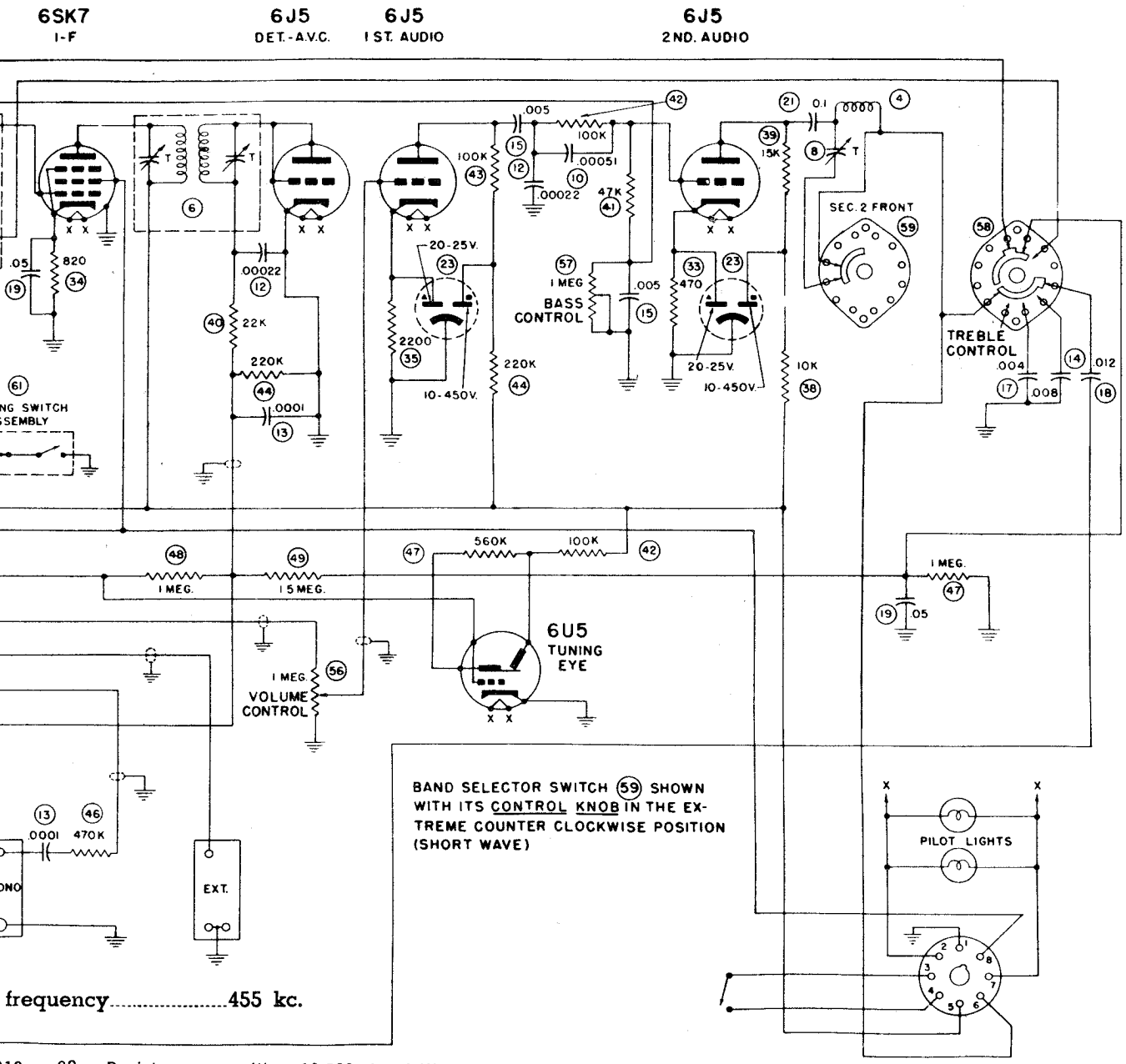
MODEL CR-188



BAND SELECTOR SWITCH (59) SHOWN WITH ITS CONTROL KNOB IN THE EXTREME COUNTER CLOCKWISE POSITION (SHORT WAVE)

frequency.....455 kc.

G10	38	Resistor, composition, 10,000 ohm 1 W.	230085G19
G5	39	Resistor, composition, 15,000 ohm 1 W.	230085G20
G7	40	Resistor, composition, 22,000 ohm ½ W.	230084G21
G13	41	Resistor, composition, 47,000 ohm ½ W.	230084G23
G5	42	Resistor, composition, 100,000 ohm ½ W.	230084G25
G9	43	Resistor, composition, 100,000 ohm 1 W.	230085G25
G22	44	Resistor, composition, 220,000 ohm ½ W.	230084G27
G21	46	Resistor, composition, 470,000 ohm ½ W.	230084G29
G6	47	Resistor, composition, 560,000 ohm ½ W.	230084G95
G7	48	Resistor, composition, 1 megohm ½ W.	230084G31
G8	49	Resistor, composition, 1.5 megohm ½ W.	230084G32
G11	50	Resistor, composition, 33,000 ohm ½ W.	230084G22
G61	56	Control, volume, 1 megohm	220044G15
G15	57	Control, bass, 1 megohm with switch	220045G2
G17	58	Switch, rotary, treble control	160161G1
G19	59	Switch, rotary, band selector	160160G1
	60	Switch, rotary, loop to outdoor antenna	160157G1
	61	Switch assembly, muting	160158G2
	62	Socket, external input	180060G1
	63	Socket, phonograph input	189741G1
	64	Plug, octal, amplifier connection	180511G14
		Antenna, loop assembly	*
		Dial glass assembly	150285

* The part number of the loop antenna changes with different cabinets. It is therefore important that you specify the Style Number of the instrument when ordering a replacement loop antenna assembly.

MAY 1946

Record Changer: Webster Model 56; for dial data and gang condenser adjustment, see Pp.15-25 to 15-27

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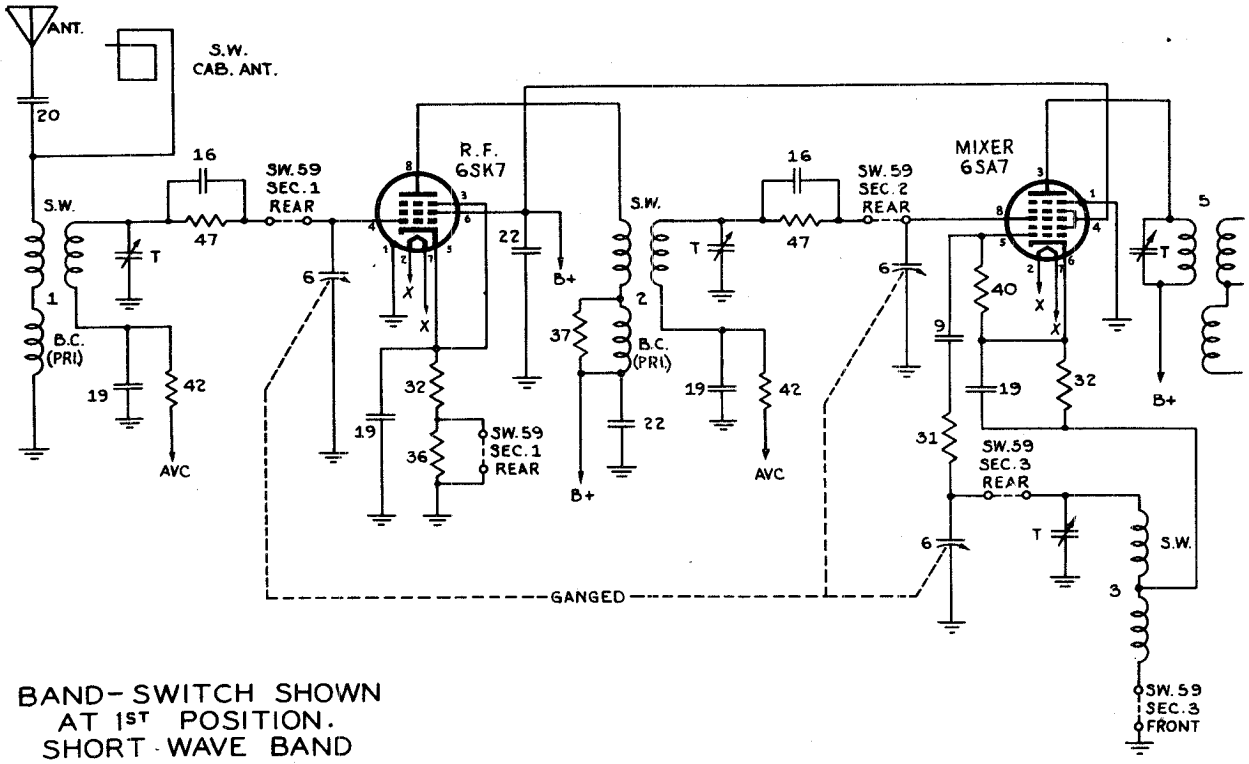
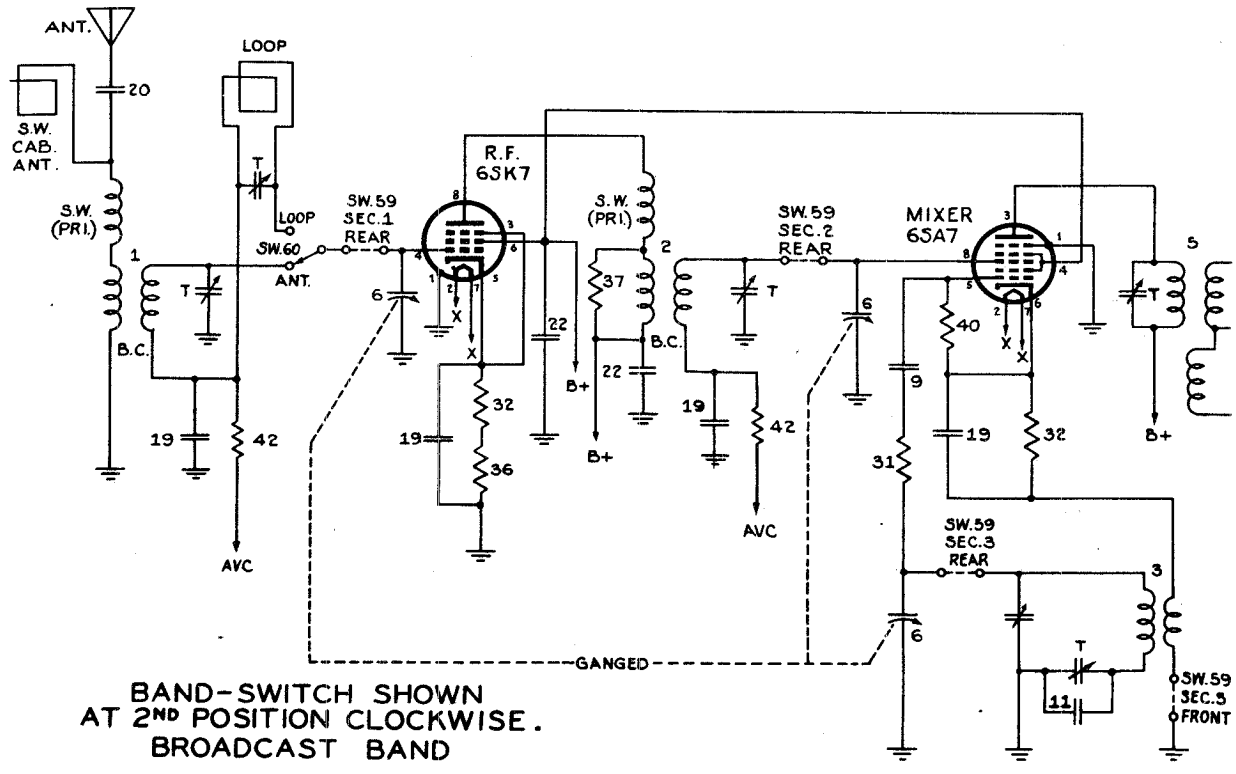


BAND-SWITCH SHOWN AT 1ST POSITION. SHORT-WAVE BAND



BAND-SWITCH SHOWN AT 2ND POSITION CLOCKWISE. BROADCAST BAND

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MODEL CR-188

THE MAGNAVOX CO.

STAGE GAINS*

Antenna Post to R-F Grid at:

600 kc.	7.0
6 mc.	1.63

R-F to Converter Grid at:

600 kc.	3.4
6 mc.	3.4

R-F on Converter Grid to I-F Grid at:

600 kc.	40.0
6 mc.	35.5

I-F on Converter Grid to I-F Grid at:

455 kc.	59

I-F Grid to Detector Plate at:

455 kc.	68

AUDIO GAIN

Voltage required across Volume Control to produce .05 watt speaker output** at 400 cycles is .014 volt with Band Selector Switch in BDCST setting.

OSCILLATOR OUTPUT VOLTAGE

The DC voltage developed across Oscillator Grid Resistor (40) at:

600 kc.	5.8
6 mc.	6.6

* Variations of ±20% are permissible. All readings made with sufficient input signal to provide .05 watt speaker output.

** .05 watt speaker output at 400 cycles is equivalent to a reading of 0.35 volts as measured by a high resistance AC voltmeter across the voice coil of either speaker.

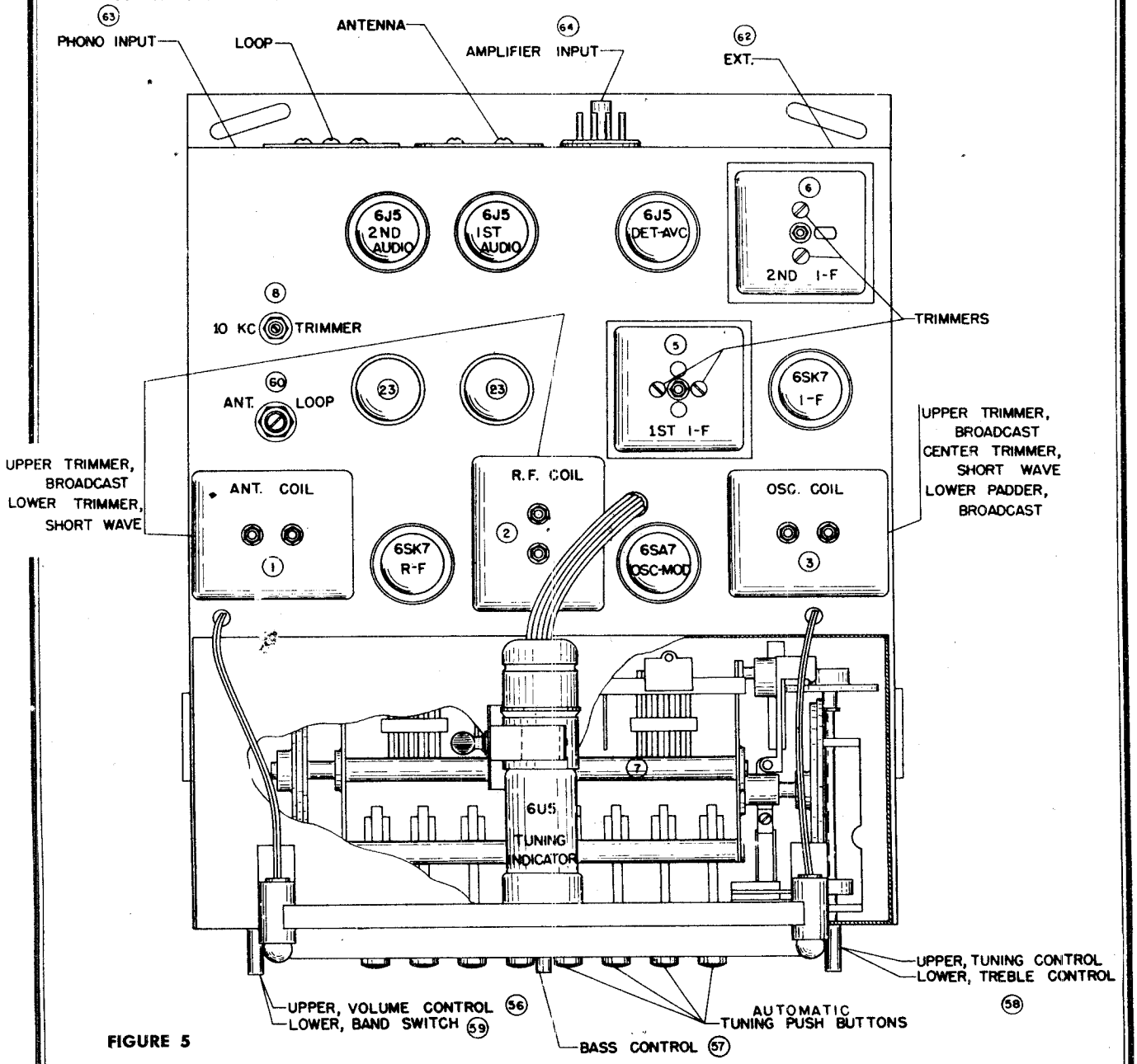

FIGURE 5

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Model CR-188 radio chassis is designed for easy removal from the cabinet in which it is installed. As the radio panel is permanently fastened to the chassis, the control knobs need not be removed when the chassis is taken out of the cabinet for service. To remove the chassis, first remove the antenna leads from their terminals and all plugs from the receptacles on the rear of the chassis. Then remove the two Phillips-head screws from the angular slots in the flange at the rear of the chassis. Lift the rear of the chassis about one inch and pull it straight back. Never remove the chassis tray from the cabinet—it has been properly positioned to bring the radio panel in place when the chassis is replaced. In replacing the chassis, slide it so that the small hooks near the front, ride inside the flanges on the sides of the chassis tray. Push the chassis forward as far as it will go and the hooks should then engage the slots in the chassis tray. Replace the two Phillips-head screws and nuts and tighten securely. Replace all plugs in their receptacles and the antenna leads on their correct terminals. The antenna terminal board for the loop antenna connections is designated S-L-H. The end of the short wave antenna that is fastened to the inside of the cabinet connects to S. Always disconnect this antenna from terminal S when an outdoor antenna is used as it may pick up noise. The two terminals on the loop are designated L and H. The leads connected to these terminals should be wired to the corresponding terminals (L and H) on the chassis.

ALIGNMENT PROCEDURE

The alignment of this receiver requires the use of an accurately calibrated r-f signal generator and an output meter. All trimmer condenser locations are shown on the chassis layout diagram, Figure 5. The radio volume control should be turned to maximum and the signal generator output kept as low as possible during alignment to prevent the AVC from operating and giving false readings. *Always set the Treble Control to SHARP TUNE before aligning the i-f stages.* This is done by turning the Treble Control Knob to the No. 1 position.

I-F ALIGNMENT

1. Connect the output of the signal generator to the oscillator grid (pin No. 5) of the 6SA7 tube through a .00025 mfd. capacitor. The ground on the signal generator should be connected to the radio chassis ground.
2. Turn the condenser gang until it is completely meshed, (low-frequency end of dial calibration) and set the band selector switch to BDCST as for broadcast band reception.
3. Adjust the signal generator to EXACTLY 455 kc. and peak the second i-f transformer and the first i-f transformer trimmers in that order.

On early models of the CR-188 chassis, the two i-f trimmers are located in the top of the respective i-f transformers as shown in the layout diagram Figure 5. In later production, one trimmer is accessible from the top and the other from the bottom of each transformer.

BROADCAST BAND ALIGNMENT

1. Remove the signal generator lead from the 6SA7 grid and connect it to the radio antenna terminal through the .00025 mfd. capacitor. The ANT-LOOP switch (60) must be in the ANT. setting.
2. Check the tuning dial pointer adjustment. When the plates of the tuning condenser are completely meshed, the dial pointer must be in line with the last calibration mark at the low frequency end of the dial. If it is not, loosen the set screws in the hub of pulley "D" shown on Figure 1 and make the necessary adjustment.
3. With the band selector still set for broadcast band reception, adjust the signal generator and the radio receiver to 600 kc. While rocking the gang condenser a few degrees to the right and to the left, adjust the 600 kc. oscillator padder for maximum indication on the output meter.
4. Set the signal generator and the radio receiver to 1400 kc.; adjust the 1400 kc. oscillator trimmer and the 1400 kc. antenna trimmer for maximum output. If considerable adjustment was necessary, recheck the 600 kc. padder setting.
5. If the loop antenna trimmer is out of adjustment it should be set after the radio chassis is in the cabinet. Set the ANT-LOOP switch (60) to the LOOP position. Adjust the signal generator to 1400 kilocycles and connect its output to a loop containing approximately five turns of wire eight inches in diameter placed eighteen inches from the receiver loop and in the same plane.
6. Set the receiver to 1400 kc. and adjust the trimmer on the receiver loop for maximum output.

SHORT WAVE BAND ALIGNMENT

1. Set the band selector switch to SW as for short wave reception and substitute a 400 ohm resistor for the capacitor in series with the signal generator lead connected to the antenna terminal on the receiver.
2. Set the signal generator and the radio receiver to 15 mc.; then adjust the 15 mc. oscillator trimmer and the 15 mc. antenna trimmer for maximum output. While adjusting the 15 mc. oscillator trimmer two peaks may be observed; only one is the correct peak for 15 mc. alignment. Screw in the trimmer to maximum capacity—then decrease the capacity until the first peak is observed. This is the correct one.

10 KC FILTER ADJUSTMENT

This chassis incorporates a 10 kc. filter circuit to eliminate the beat note heard as a whistle between stations on the broadcast band. If the trimmer is out of adjustment, the following procedure should be observed.

1. Turn the Treble Control to FULL RANGE (No. 4 position).
2. Connect the output of an audio oscillator to the phonograph pickup socket on the radio chassis and adjust the oscillator to EXACTLY 10,000 cycles.
3. Set the band selector to PHONO and adjust the 10 kc. trimmer (8) for minimum output.
4. If an audio oscillator is not available for making this adjustment, set the band selector to BDCST, connect an antenna to the receiver and set the gang condenser to a point between two stations on adjacent channels having approximately the same power. If the 10 kc. trimmer is out of adjustment, a whistle will be heard. Adjust the trimmer until the whistle is eliminated.

MODEL CR-188

THE MAGNAVOX CO.

Model CR-188 radio chassis is a two-band tuner that must be used in conjunction with a power amplifier, such as the Model AMP-101 for speaker operation. Heater and plate voltages for the CR-188 radio chassis are supplied from the amplifier chassis; it is therefore essential that the radio and amplifier chassis be interconnected during alignment or for other electrical service operations.

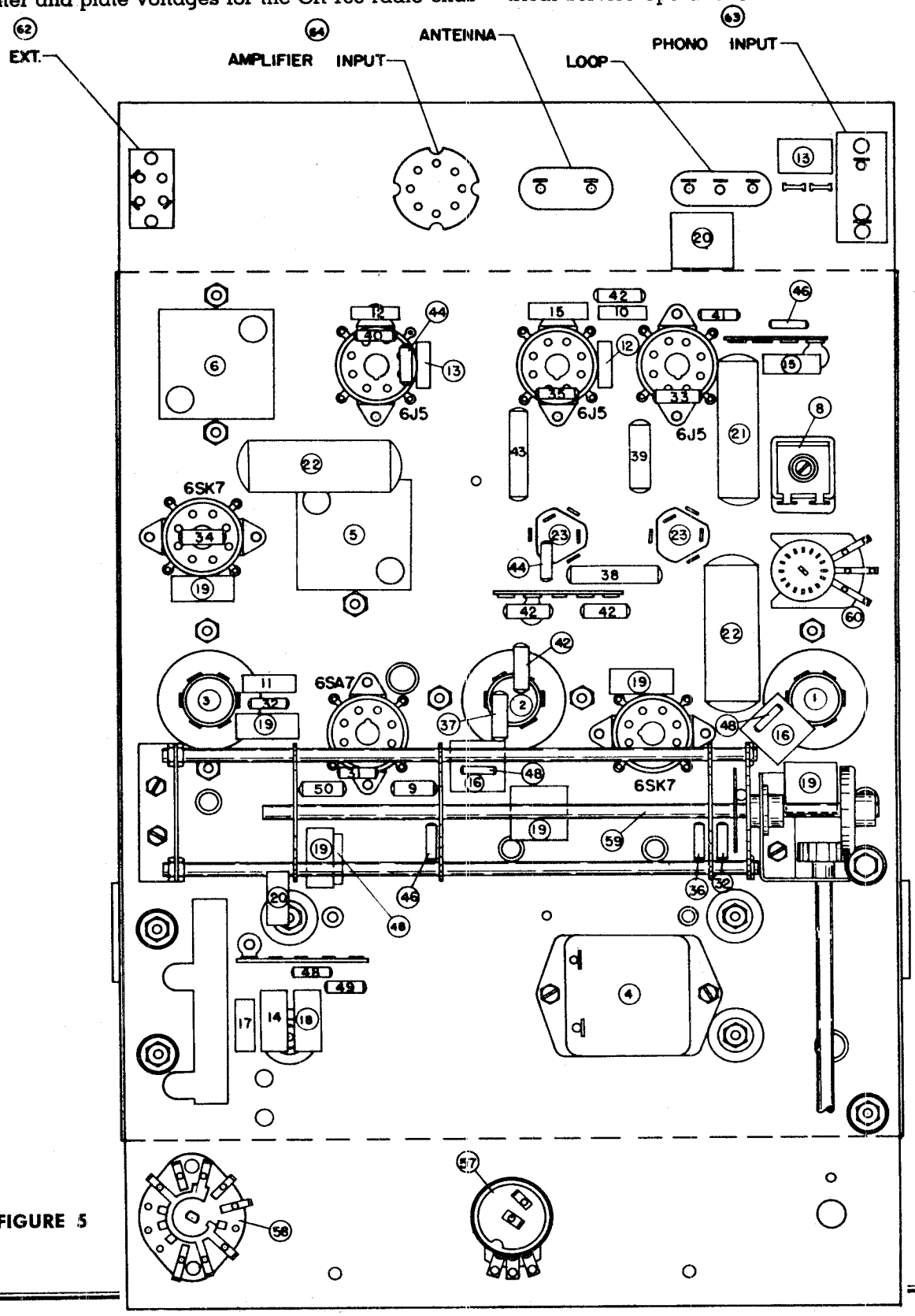

FIGURE 5

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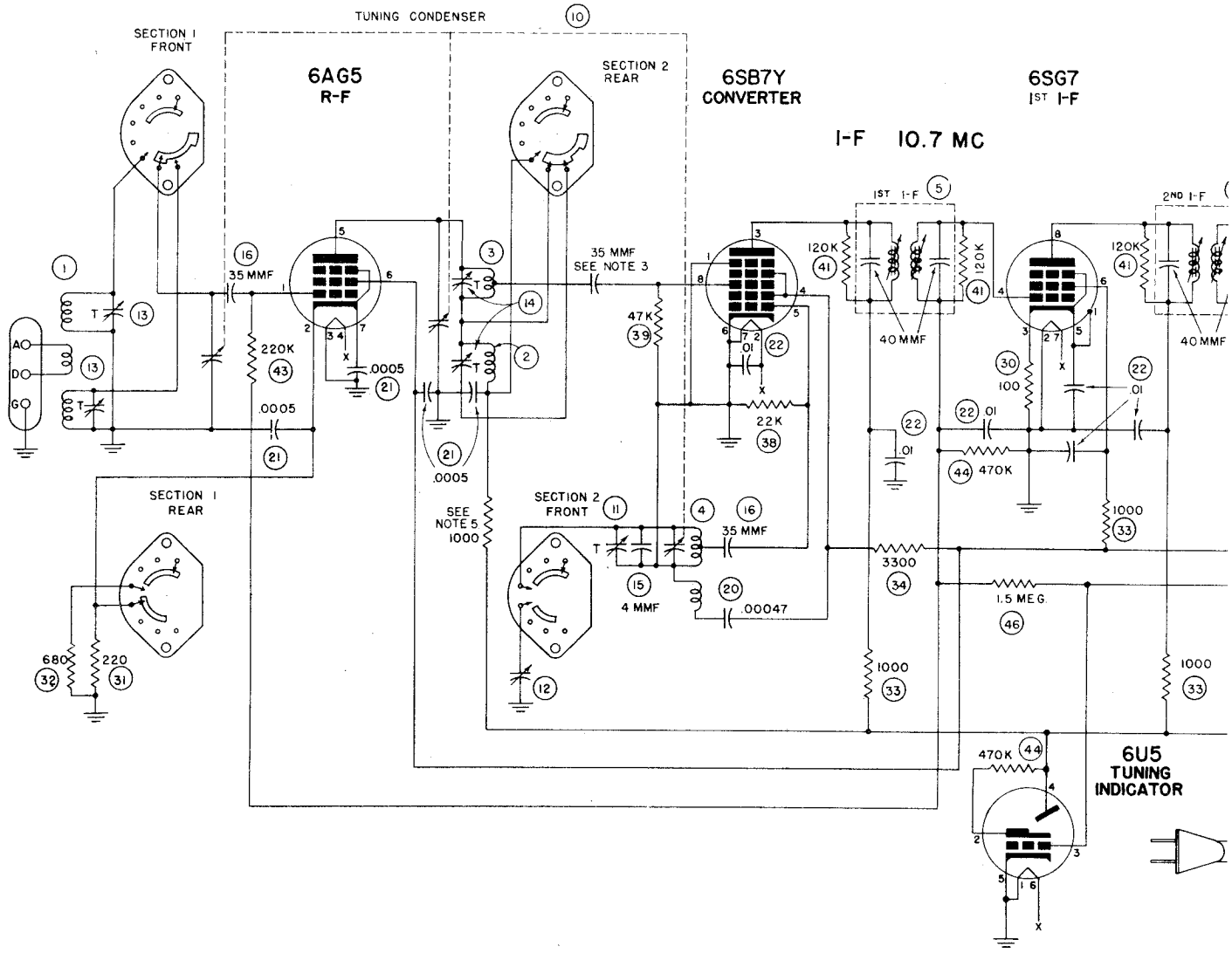
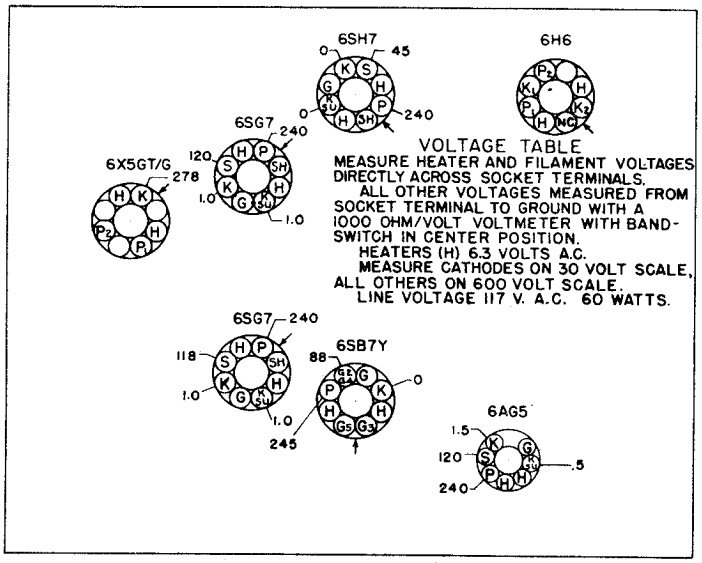
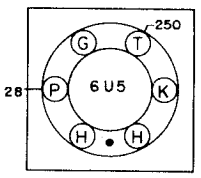


JUNE 1946


6SH7
6H6
6SG7
6X5GT/G
6SB7Y
6AG5
VOLTAGE TABLE
MEASURE HEATER AND FILAMENT VOLTAGES DIRECTLY ACROSS SOCKET TERMINALS.
ALL OTHER VOLTAGES MEASURED FROM SOCKET TERMINAL TO GROUND WITH A 1000 OHM/VOLT VOLTMETER WITH BAND-SWITCH IN CENTER POSITION.
HEATERS (H) 6.3 VOLTS A.C.
MEASURE CATHODES ON 30 VOLT SCALE, ALL OTHERS ON 600 VOLT SCALE.
LINE VOLTAGE 117 V. A.C. 60 WATTS.



TUNING IND. SOCKET
BACK VIEW

— NOTES —

1. BAND SWITCH 55 SHOWN IN COUNTERCLOCKWISE POSITION VIEWED FROM THE FRONT PANEL.
2. ALL ELECTRICAL VALUES SHOWN ARE IN MICROFARADS OR OHMS UNLESS OTHERWISE SPECIFIED.
3. SUPPLIED AS PART OF 360261G2 R-F COIL ASSEMBLY.
4. PART OF BAND SWITCH 55. POWER SWITCH IS IN OFF POSITION WHEN BAND SWITCH IS IN EXTREME COUNTERCLOCKWISE (NO. 1) POSITION. POWER IS ON IN NO. 2 AND NO. 3 POSITIONS OF BAND SWITCH.
5. SUPPLIED AS PART OF 360262G1 R-F COIL ASSEMBLY.
6. LETTERS SHOWN IN SQUARES DESIGNATE METER CONNECTION POINTS FOR ALIGNMENT AS DESCRIBED IN TEXT.

Model CR-1
Modulation
F-M recepta
ceiver. Two
age of the pr
new 100-mec
Because of t
F-M tuner m
the suffix let
tify the chan
of this F-M t
CR-189B; wh
is provided,
CR-189A.

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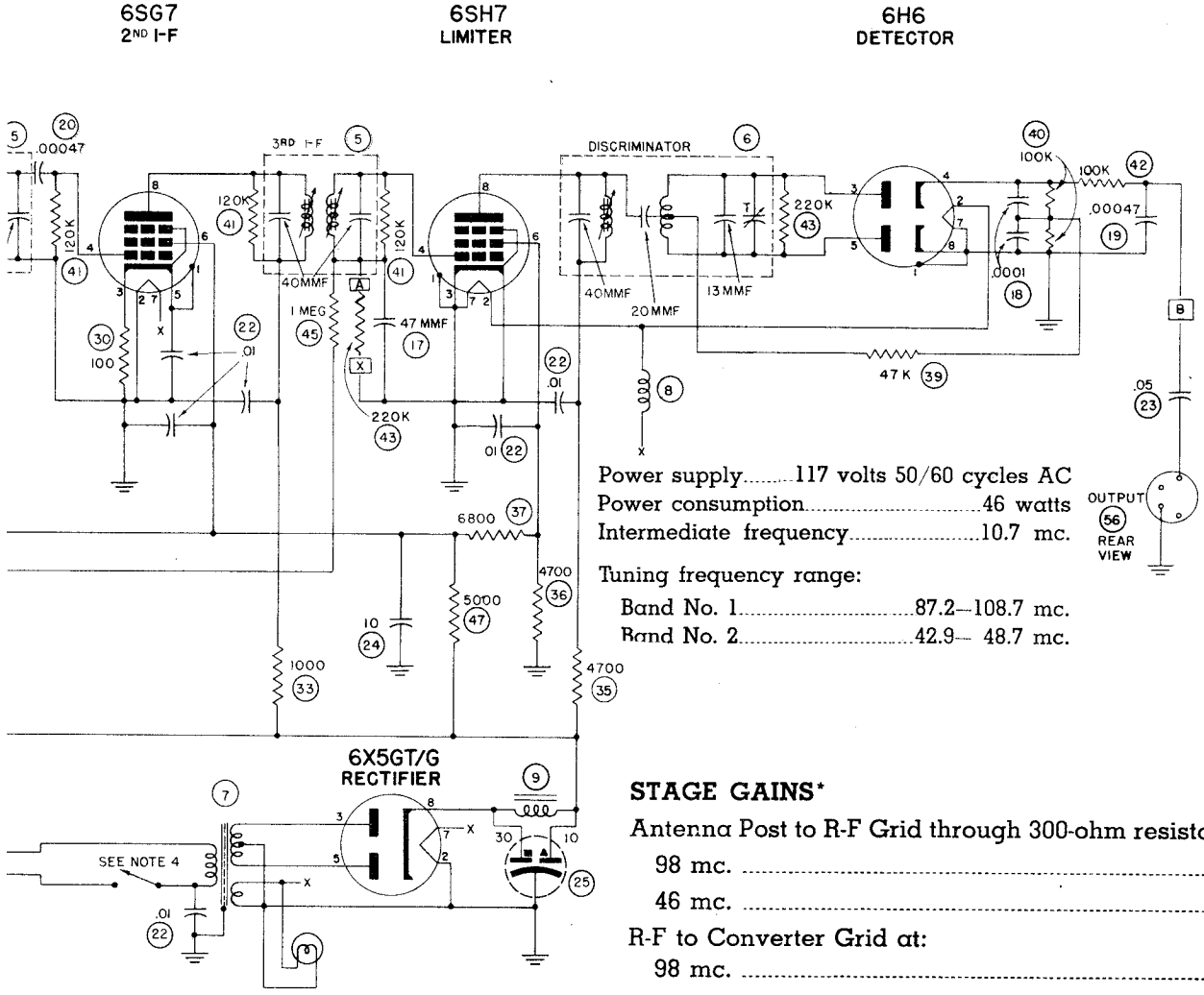
AVOX CO.

MODEL CR-189A,
CR-189B



Power supply.....117 volts 50/60 cycles AC
Power consumption.....46 watts
Intermediate frequency.....10.7 mc.

Tuning frequency range:

Band No. 1.....87.2—108.7 mc.
Band No. 2.....42.9— 48.7 mc.

39 series radio chassis are Frequency-tuners designed for connection to the cle on any Magnavox A-M radio re- band operation provides complete cover- esent 45 megacycle band as well as the jacycle band.

ne fact that in some cabinets the CR-189 ust be mounted in an inverted position, ters A and B on the model number iden- ge in dial mounting. The model number uner with an inverted dial assembly is en the upright dial assembly mounting the model number of the chassis is

STAGE GAINS*

Antenna Post to R-F Grid through 300-ohm resistor at:

98 mc.	1.2
46 mc.	1.7

R-F to Converter Grid at:

98 mc.	9.4
46 mc.	5.4

R-F on Converter Grid to 1st I-F Grid at:

98 mc.	8.7
46 mc.	8.7

I-F on Converter to 1st I-F Grid at:

10.7 mc.	10

I-F on 1st I-F Grid to 2nd I-F Grid at:

10.7 mc.	30

2nd I-F Grid to Limiter Grid at:

10.7 mc.	31

OSCILLATOR GRID VOLTAGE

The DC voltage developed across Oscillator Grid Resistor (38) at:

98 mc.	7.0
46 mc.	4.6

*Variations of ±20% are permissible. All readings made with sufficient signal to provide 15 millivolts output at 400 cycles with 22.5 kc. modulation.

For Parts list, see P.15-3

MODEL CR-189A,
CR-189B

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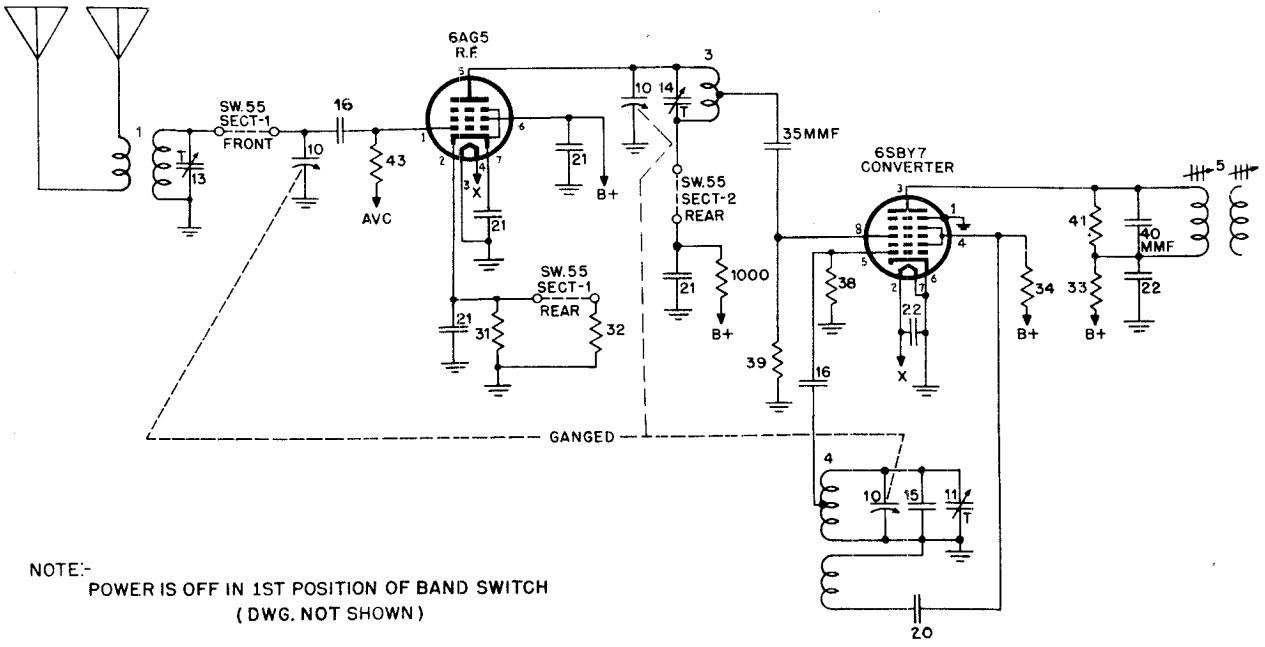
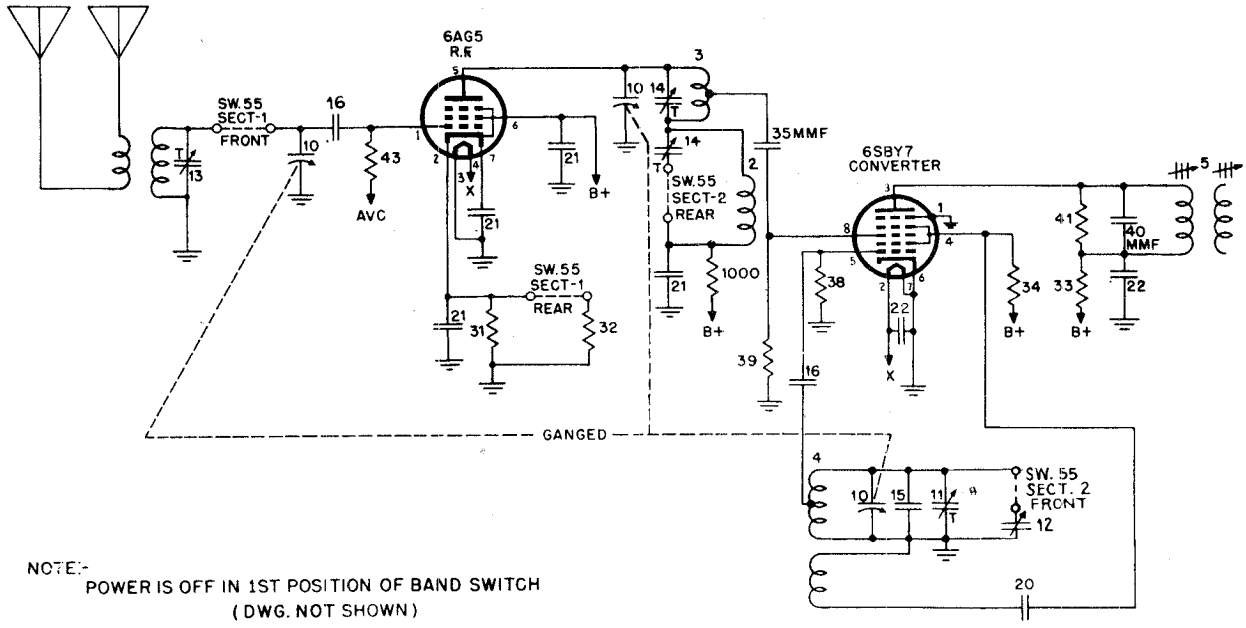


NOTE:-
POWER IS OFF IN 1ST POSITION OF BAND SWITCH
(DWG. NOT SHOWN)

BAND-SWITCH SHOWN
AT 2ND POSITION CLOCKWISE.
F M BAND 1
87.2 — 108.7 MC.



NOTE:-
POWER IS OFF IN 1ST POSITION OF BAND SWITCH
(DWG. NOT SHOWN)

BAND-SWITCH SHOWN
AT 3RD POSITION CLOCKWISE.
F M BAND 2
42.9 - 48.7 MC.

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MODEL CR-189A,
CR-189B

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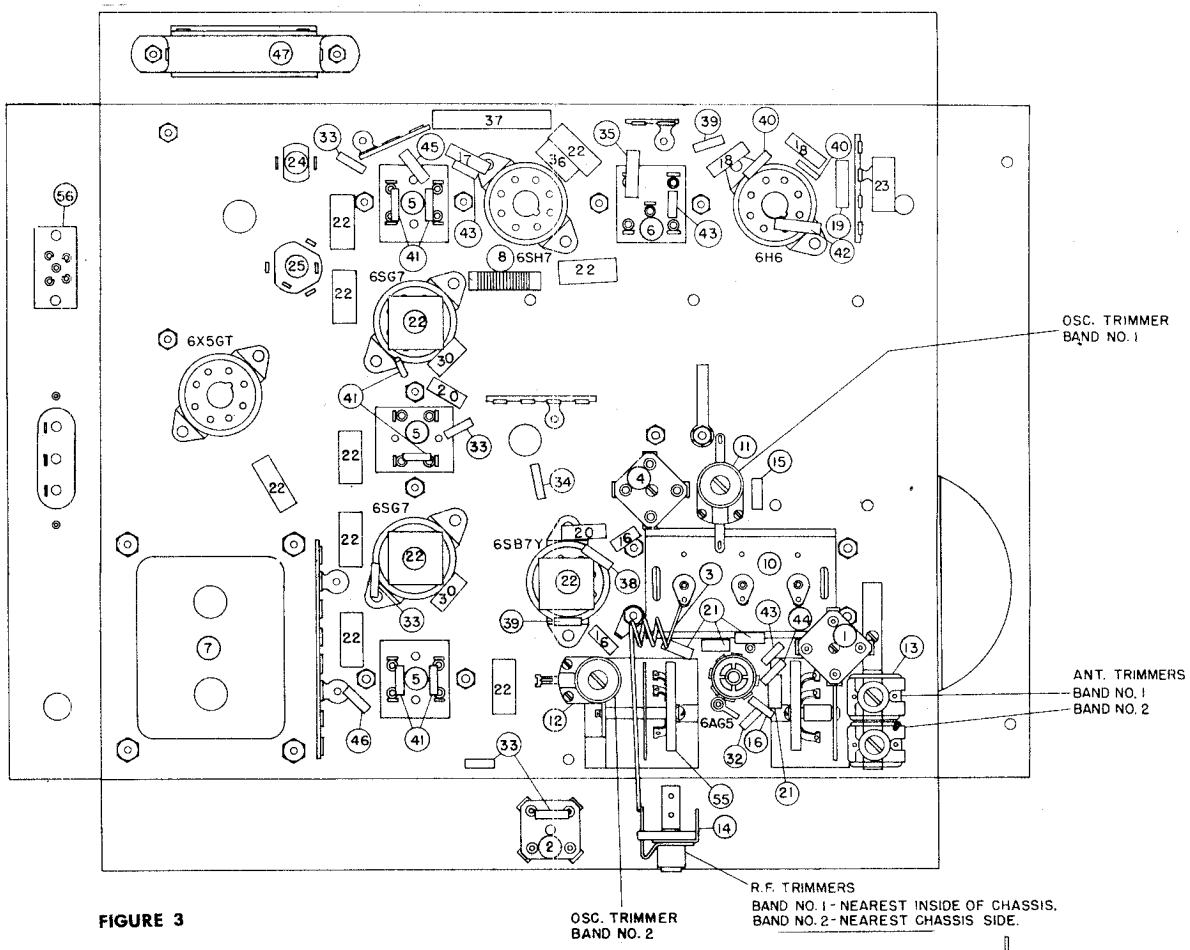
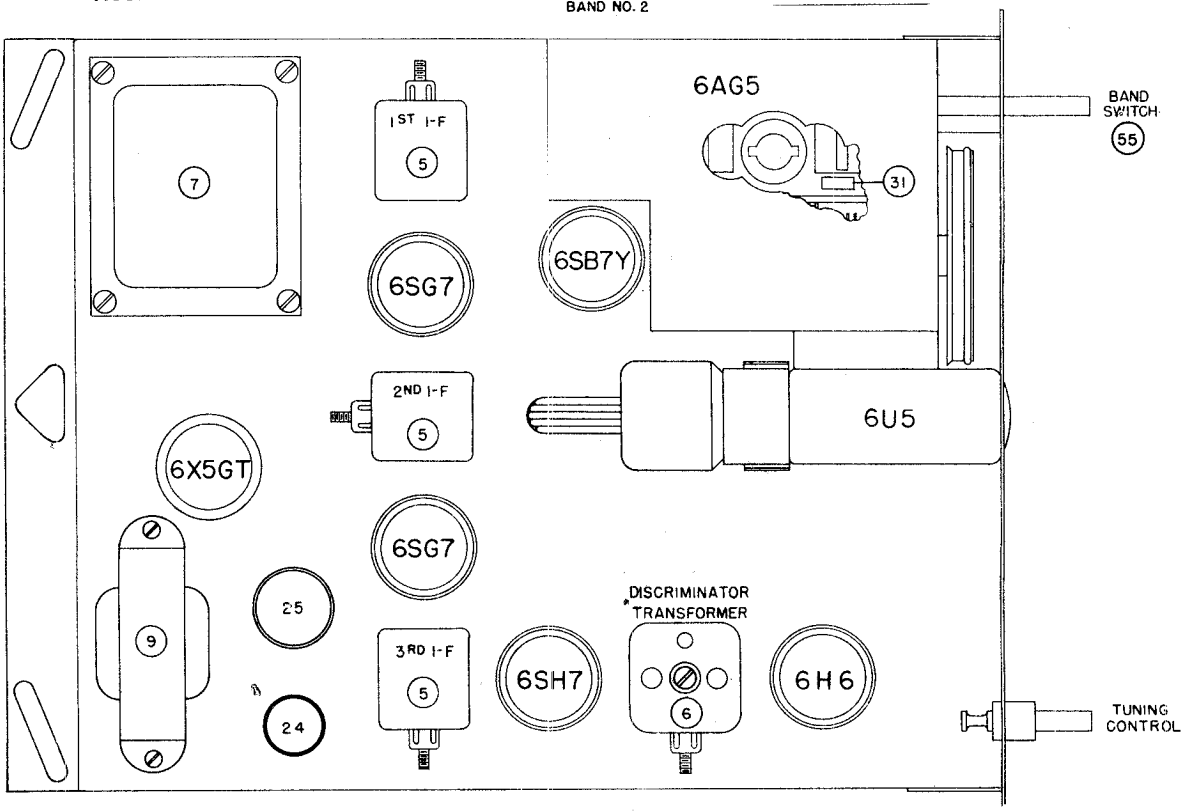


FIGURE 3



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METHOD FOR REMOVING CHASSIS FROM CABINET

As the control panel is permanently fastened to the tuner in all models except those mounted in the Regency Symphony combination, it is not necessary to remove the control knobs from the cabinet. The instructions immediately following are for all combinations except the Regency Symphony. Separate instructions for removing the CR-189A chassis from that instrument are shown in this manual.

Before removing the chassis, disconnect the antenna and ground leads from their terminals, and the output and the power cables from their receptacles. While holding the rear of the chassis in place with one hand, remove the two Phillips-head screws from the angular slots in the flange at the rear of the chassis. Then while lowering the chassis, pull back on it to disengage the hooks from the slots in the tray to which the chassis is mounted, and withdraw the chassis from the cabinet.

In replacing the chassis, slide it in so that the small hooks near the front ride inside the flanges on the sides of the chassis tray. Push the chassis forward as far as it will go so that the hooks engage the slots in the chassis tray; then lift up the rear of the chassis until the guide pin in the chassis tray projects through the triangular opening the flange on the rear of the F-M chassis. Now pull back on the chassis. A ledge on the guide pin referred to above, will hold the chassis in place while the mounting screws are started into the captivated nuts on the top of the chassis tray. These nuts are accessible through the angular slots in the chassis flange and the Phillips-head screws should be turned in to within a few turns of being tight. Now slide the chassis forward until its panel is flush with the panel of the A-M radio chassis and tighten the two Phillips-head screws securely, completing the replacement operation.

REGENCY SYMPHONY. To remove the CR-189A chassis from the Regency Symphony first remove the antenna and ground leads from their terminals and the output and power cables from their receptacles. Then pull the control knobs from their shafts and remove the two fancy-head screws from the front panel. Next, remove the two Phillips-head screws from the angular slots in the flange at the rear of the chassis and pull the chassis out of the rear of the cabinet.

In replacing the chassis, the reverse order of the above instructions should be followed.

ALIGNMENT PROCEDURE

The alignment of this F-M tuner is made in three major steps namely, I-F alignment, Discriminator alignment and R-F alignment. An F-M generator is not required in aligning this F-M tuner. Any *accurately calibrated* signal generator covering a range in the vicinity of 10.7 megacycles may be used in aligning the I-F and the Discriminator stages. For R-F alignment, the generator must cover the tuning range of the tuner or approximately 42 to 110 megacycles. If such a signal generator is not available, this alignment may be made by using an F-M radio station as a frequency standard.

I-F ALIGNMENT

1. Connect the "high" side of the signal generator to Grid 3 (pin #8) of the 6SB7Y converter tube and the "low" side of the generator to the radio chassis.
2. If a vacuum tube voltmeter is available, connect it across the 220,000 ohm resistor in the grid circuit of the 6SH7 limiter tube at points designated "A" and "X" on the schematic diagram (Figure 2) to measure the limiter grid bias voltage. Set the signal generator to exactly 10.7 megacycles and adjust the third, the second and the first i-f transformer trimmers in that order for maximum reading on the meter. A reading of 2 to 8 volts should be considered normal.

3. If a vacuum tube voltmeter is not available, connect a 0-50 or 0-200 microammeter in series with the "ground" end of the 220,000 ohm resistor in the grid circuit of the 6SH7 limiter tube at point "X" on the schematic diagram. Set the signal generator to exactly 10.7 megacycles and adjust the third, the second and the first i-f transformer trimmers in that order for maximum meter readings. A normal reading will be in the range of 10 to 35 microamperes. At the completion of these adjustments, remove the microammeter and ground the 220,000 ohm resistor to the point where it was originally connected.

DISCRIMINATOR ALIGNMENT

The accurate alignment of the discriminator transformer cannot be overemphasized. Incorrect alignment will result in badly distorted reception. The following steps should be followed in the order given:

1. A DC vacuum tube voltmeter is connected to the output circuit by connecting it from ground to point "B" on the schematic diagram. This measures the detector output voltage. Adjust the signal generator frequency to exactly 10.775 megacycles and adjust both trimmers on the discriminator transformer for maximum reading. If the indicated voltage is less than 3 volts readjust the output of the generator until the meter indicates 3 volts or more. Now adjust the signal generator frequency to 10.7 megacycles and turn the trimmer screw on the top of the discriminator until the voltage is zero. *This is an extremely important adjustment.* Reset the generator frequency to 10.775 and record the meter reading.
2. Reverse the meter connections and set the signal generator frequency to 10.625 megacycles. The meter reading now obtained must be within 10% of the reading recorded in the previous operation—if it is not, the discriminator alignment was not done accurately and must be repeated.
3. The discriminator may also be aligned using a 0-50 or 0-200 microammeter if a vacuum tube voltmeter is not available. In this case, the detector output current is measured. Connect the microammeter to the same points specified in paragraph 1 and proceed in the manner outlined in paragraphs 1 and 2 of this section. In the operation described in paragraph 1, the meter reading should be at least 20 microamperes when the trimmers are peaked at 10.775 megacycles; if not, the generator should be adjusted until that value is obtained.

BAND NO. 1 R-F ALIGNMENT

It is essential that Band No. 1—the high frequency band, is aligned prior to the alignment of Band No. 2. If this is not done, Band No. 1 alignment will be incorrect.

1. Set the Band Selector switch to Band No. 1 and check that the dial pointer is in line with the last mark at the low frequency end of the dial calibration when the condenser gang is fully meshed. If it is not, slide the pointer on its string to the correct position, and crimp the lugs (on the rear of the pointer) tightly around the string and apply a drop of cement to hold the pointer in adjustment.
2. Connect the vacuum tube voltmeter to points "A" and "X" on the schematic diagram or connect a 0-50 or 0-200 microammeter in series with the "ground" end of the 220,000 ohm resistor in the grid circuit of the 6SH7 limiter tube at point "X" on the schematic diagram.
3. An extremely accurate signal generator is a necessity in making the following adjustments and it should be connected to the antenna post through a 300 ohm resistor. If such a generator is not available, connect an F-M antenna to the antenna terminal (A) and use an F-M transmitter for a frequency standard. It is preferable that this station be located in the high frequency end of the band—102 to 108 megacycles.
4. Set the signal generator (if one is used) and the F-M tuner to exactly 108 megacycles—if an F-M station is used as a frequency standard accurately set the tuner to the frequency of the F-M station and adjust the Band No. 1 oscillator trimmer for a maximum reading on the meter. Then adjust the Band No. 1 antenna trimmer and the r-f trimmer for a maximum meter indication. If too much signal is fed to the tuner, it might appear at several settings of the tuning dial and confuse the adjustment. When the adjustments are completed, the second harmonic of the oscillator frequency will be 10.7 megacycles lower than the signal frequency.

BAND NO. 2 R-F ALIGNMENT

1. With the meter still connected to the tuner, set the Band Selector switch to Band No. 2. Set the signal generator and the F-M tuner to exactly 48 megacycles. If an F-M station is used as a frequency standard (this station should be in the high frequency end of the band) accurately set the tuner to the frequency of the F-M station. Adjust the Band No. 2 oscillator trimmer for a maximum reading on the meter. Then adjust the Band No. 2 antenna trimmer and the r-f trimmer for the highest meter reading. On Band No. 2, the oscillator frequency will be 10.7 megacycles lower than the signal frequency. This completes the alignment—remove the meter from the circuit and if the ground circuit of the 220,000 ohm resistor in the grid circuit of the 6SH7 limiter tube was opened for the connection of a microammeter, ground the resistor to restore the circuit to normal.

MODEL CR-189A,
CR-189B
MODEL CR-192A,
CR-192B

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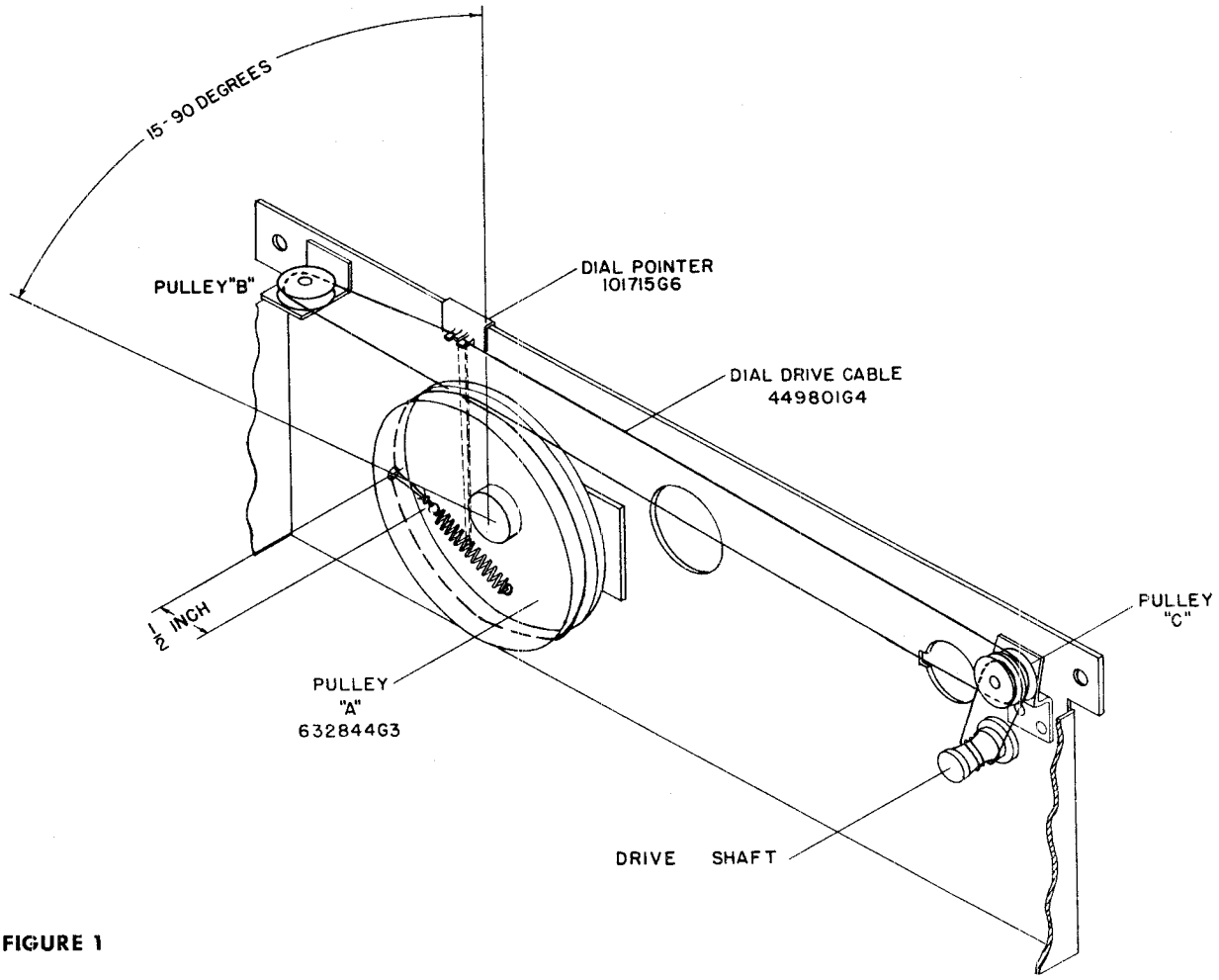

FIGURE 1

DIAL CORD REPLACEMENT

A single cable transmits motion from the dial tuning knob to rotate the condenser gang and to move the dial pointer. A 30-inch length of string is required to restring this assembly. After the broken cable is removed, turn pulley "A" (see Figure 1) until the condenser gang plates are completely meshed. In this condition, the small hole in the rim of pulley "A" should be within the limits of 15 to 90 degrees to the left of being vertical as shown in Figure 1. If this hole is at a different position from the condition specified, loosen the two screws in the coupling to the condenser gang and turn pulley "A" while holding the condenser plates meshed. Tighten the two set screws after the adjustment has been made.

Lace one end of the new length of cable through the hole in pulley "A" and temporarily fasten it to the hook to which the spring is normally fastened. Make a complete turn around pulley "A" in a counter-clockwise direction, lace it around pulley "B," then across the rear of the dial scale and over the top of the front groove in pulley "C." Proceed down around the tuning shaft for 2½ turns in a clockwise direction and wrapping the cable over pulley "D" from front to back. Continue up over the rear groove of pulley "C" in a clockwise direction for one turn and extend the cable to the left so that the loose end is to the rear of the section of cable that it crosses. The loose end of the cable should now be wound over the top of pulley "A" so that it is nearest the dial frame and into the hole in the pulley groove. Remove the other end of the cable from the hook and while holding both ends taut, insert one end of the spring on the hook in pulley "A." Lace the two free ends of the cable through the opposite end of the spring and pull the cable until the spring is stretched to within ½-inch of the rim on the pulley. Tie a double knot so that the knot is around one coil of the spring, while maintaining tension on the cable.

Turn the tuning control shaft until the condenser gang is completely meshed and slide the dial pointer on its track until it is in line with the last calibration mark at the low frequency end of the dial. Press the crimping lugs on the dial pointer together over the cable. After checking to see that the condenser gang is still completely meshed and the dial pointer is in the position specified previously, apply a few drops of cement to the cable where it is crimped by the pointer. This completes the operation.

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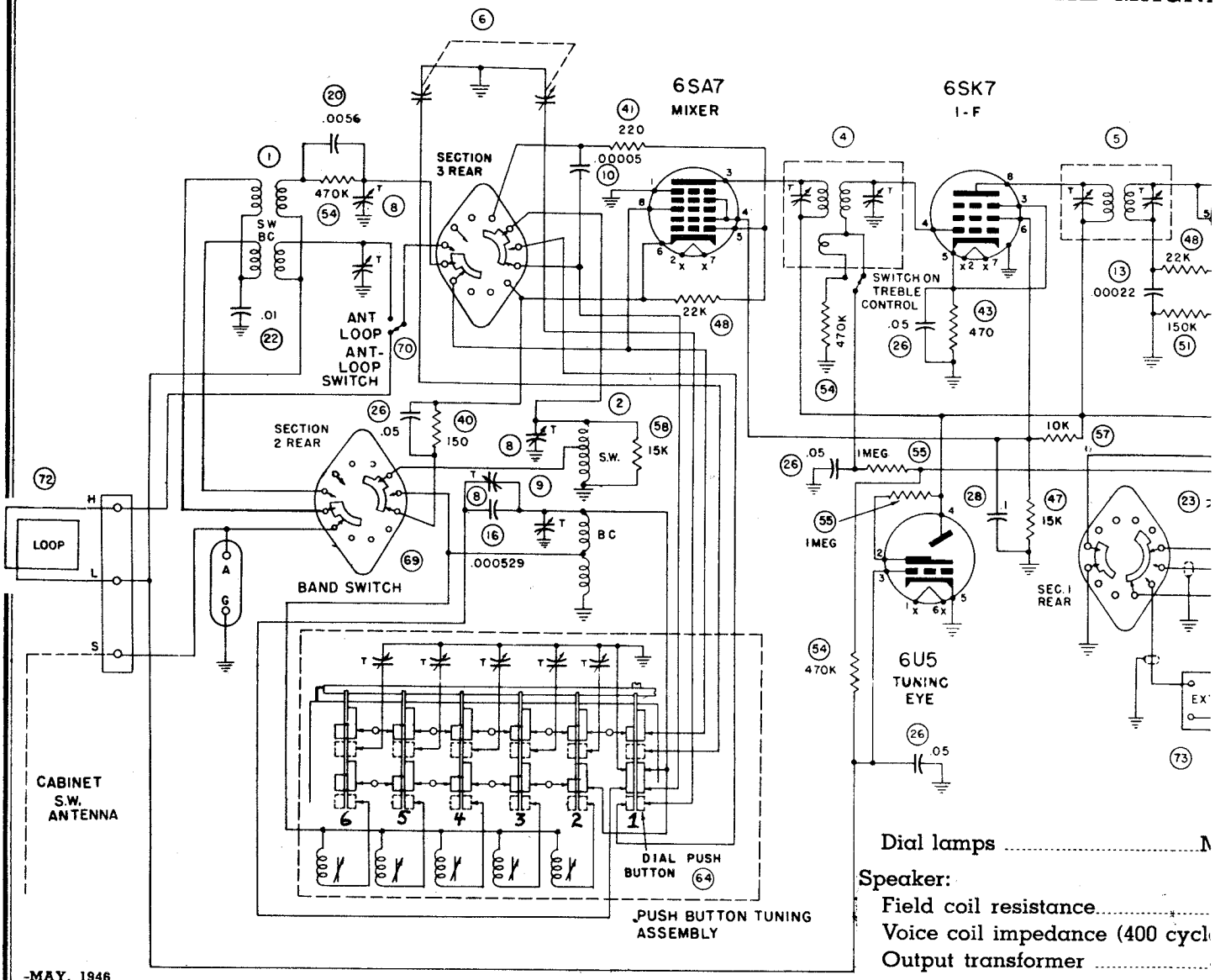

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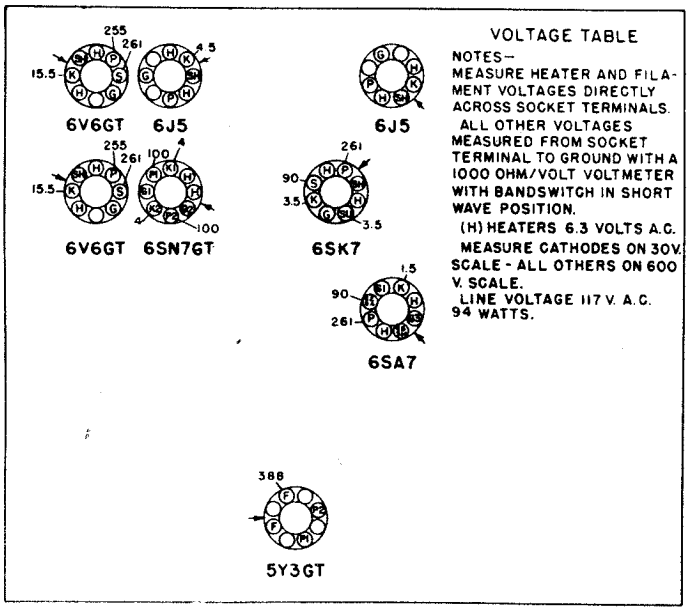
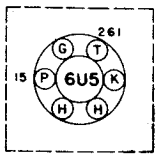

VOLTAGE TABLE
NOTES—
MEASURE HEATER AND FILAMENT VOLTAGES DIRECTLY ACROSS SOCKET TERMINALS.
ALL OTHER VOLTAGES MEASURED FROM SOCKET TERMINAL TO GROUND WITH A 1000 OHM/VOLT VOLTMETER WITH BANDSWITCH IN SHORT WAVE POSITION.
(H) HEATERS 6.3 VOLTS A.C.
MEASURE CATHODES ON 30V. SCALE - ALL OTHERS ON 600 V. SCALE.
LINE VOLTAGE 117 V. A.C. 94 WATTS.
6V6GT
6J5
6V6GT
6SN7GT
6J5
6SK7
6SA7
5Y3GT

TUNING EYE SOCKET
BACK VIEW



FRONT

Dial lamps ..... M

Speaker:

Field coil resistance.....

Voice coil impedance (400 cycl

Output transformer .....

Models CR-190A and CR-190B are alik
the difference is in the dial drive m
CR-190A drive pulley is belt driven
drive arrangement is provided on all C
The method for restringing these tw
shown on Figures 1 and 2

Power supply ..... 117 volts 50/6

Power consumption .....

Power output .....

Intermediate frequency .....

Tuning frequency range:

Broadcast band 5

Short wave band .....

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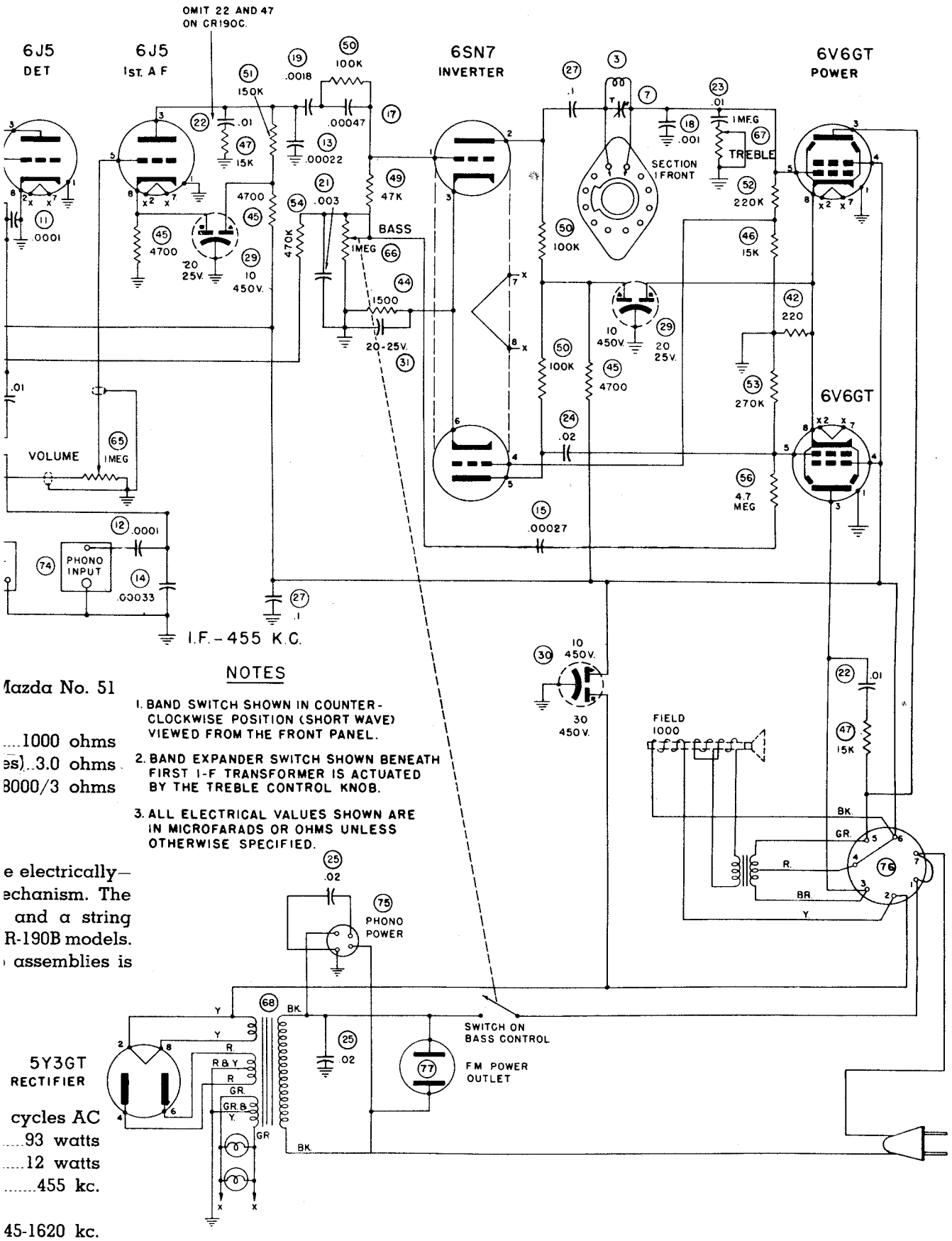

OMIT 22 AND 47 ON CR190C.
6J5 DET
6J5 1ST. A F
6SN7 INVERTER
6V6GT POWER
6V6GT
SECTION I FRONT
TREBLE
BASS
VOLUME
PHONO INPUT
I.F. - 455 K.C.
FIELD 1000
PHONO POWER
SWITCH ON BASS CONTROL
FM POWER OUTLET
5Y3GT RECTIFIER
NOTES
1. BAND SWITCH SHOWN IN COUNTER-CLOCKWISE POSITION (SHORT WAVE) VIEWED FROM THE FRONT PANEL.
2. BAND EXPANDER SWITCH SHOWN BENEATH FIRST I-F TRANSFORMER IS ACTUATED BY THE TREBLE CONTROL KNOB.
3. ALL ELECTRICAL VALUES SHOWN ARE IN MICROFARADS OR OHMS UNLESS OTHERWISE SPECIFIED.

lazda No. 51

....1000 ohms
es)...3.0 ohms
8000/3 ohms

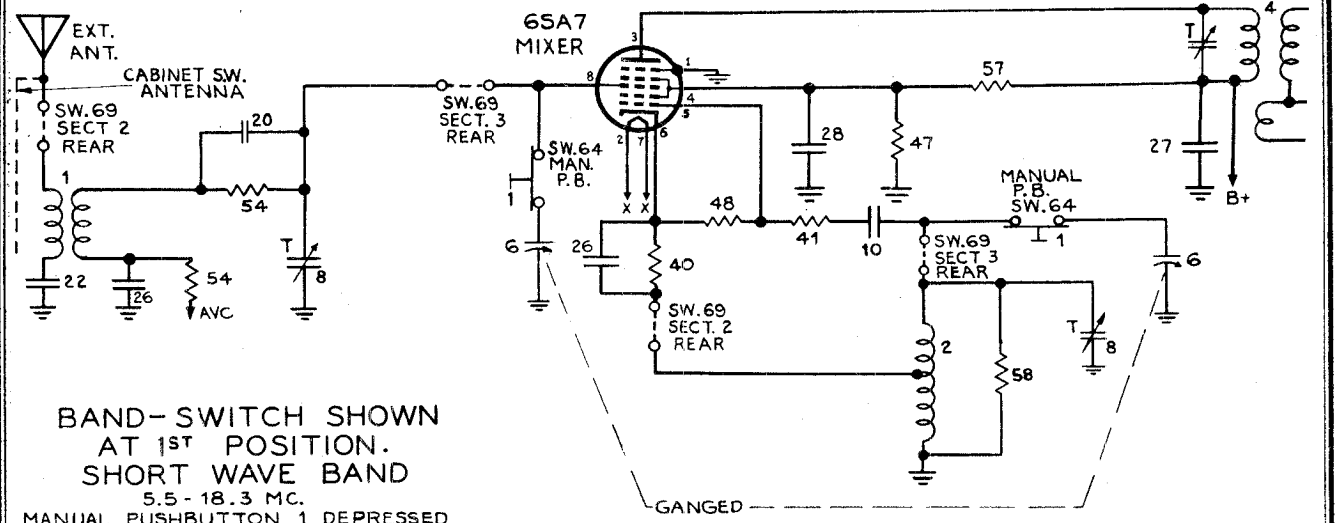
e electrically—
echanism. The
and a string
R-190B models.
assemblies is

cycles AC
.....93 watts
.....12 watts
.....455 kc.

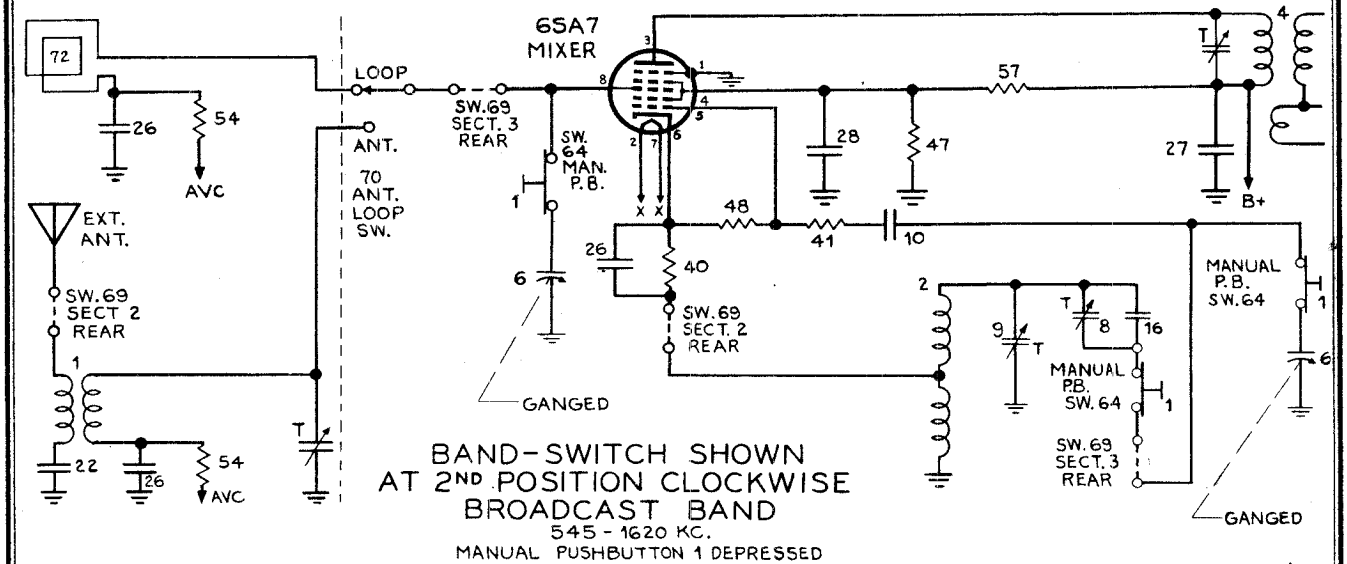
45-1620 kc.
5.5-18.3 mc.

MODEL CR-190A, 190B
MODEL CR-194

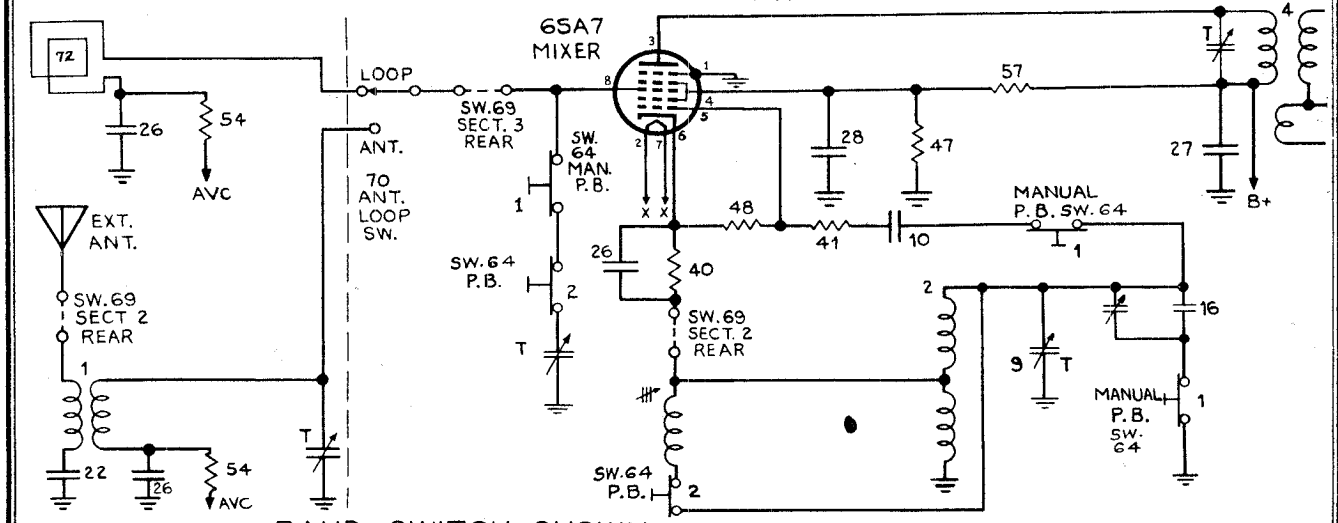
THE MAGNAVOX CO.



BAND-SWITCH SHOWN AT 1ST POSITION. SHORT WAVE BAND
5.5 - 18.3 MC.
MANUAL PUSHBUTTON 1 DEPRESSED



BAND-SWITCH SHOWN AT 2ND POSITION CLOCKWISE BROADCAST BAND
545 - 1620 KC.
MANUAL PUSHBUTTON 1 DEPRESSED



BAND-SWITCH SHOWN AT 2ND POSITION CLOCKWISE BROADCAST BAND
PUSHBUTTON 2 DEPRESSED

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DIAL CORD REPLACEMENT

As mentioned previously in this Service Bulletin, two types of drive mechanisms are used to transmit the motion from the dial tuning knob to the large pulley that is coupled to the condenser gang. These two arrangements are shown on Figures 1 and 2. The cable used to drive the dial pointer is strung the same on all CR-190A and CR-190B receivers. Separate instructions for installing a replacement belt or string on the CR-190A or CR-190B chassis are given below.

CR-190A Condenser Drive Belt Replacement—Hook one end of the belt on the right-hand edge of the slot in pulley "C" so that the smooth side contacts the pulley surface. Keeping the belt near the back of the groove in pulley "C" wrap it in a clockwise direction around that pulley (as indicated by the arrows on Figure 1) over the idler pulley and under the tuning control shaft; then around the opposite side of pulley "C." One end of the belt tension spring is hooked on the free end of the belt and the other end on the left-hand edge of the slot in pulley "C," completing the operation.

CR-190B Condenser Drive Cable Replacement—Slide a short length (approximately ½-inch) of sleeving over one end of a 19-inch length of dial cable, form a small loop and tie a knot in the manner shown on Figure 2. Hook this loop over the metal hook in pulley "C" and lace the cable through the pulley slot and around the pulley in a counter-clockwise direction when viewed from the rear of the panel, keeping the cable to the rear of the pulley groove. Lace the cable in the direction indicated by the arrow on Figure 2 wrapping 2½ turns around the smaller diameter portion of the tuning control shaft *from front to back;* then around the opposite side of pulley "C." Loop one end of tension spring "D" on the right-hand edge of the slot in pulley "C"; thread the free end of the drive cable through the opposite end of spring "D" and pull back on the cable until the spring coils are stretched to approximately one inch. Tie a double knot in the cable while maintaining tension on the spring, completing the operation.

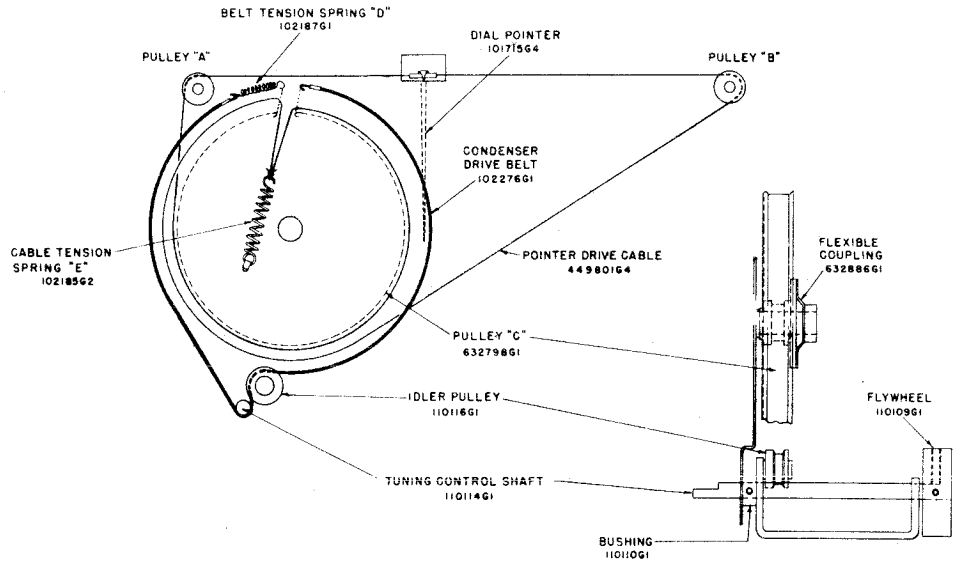


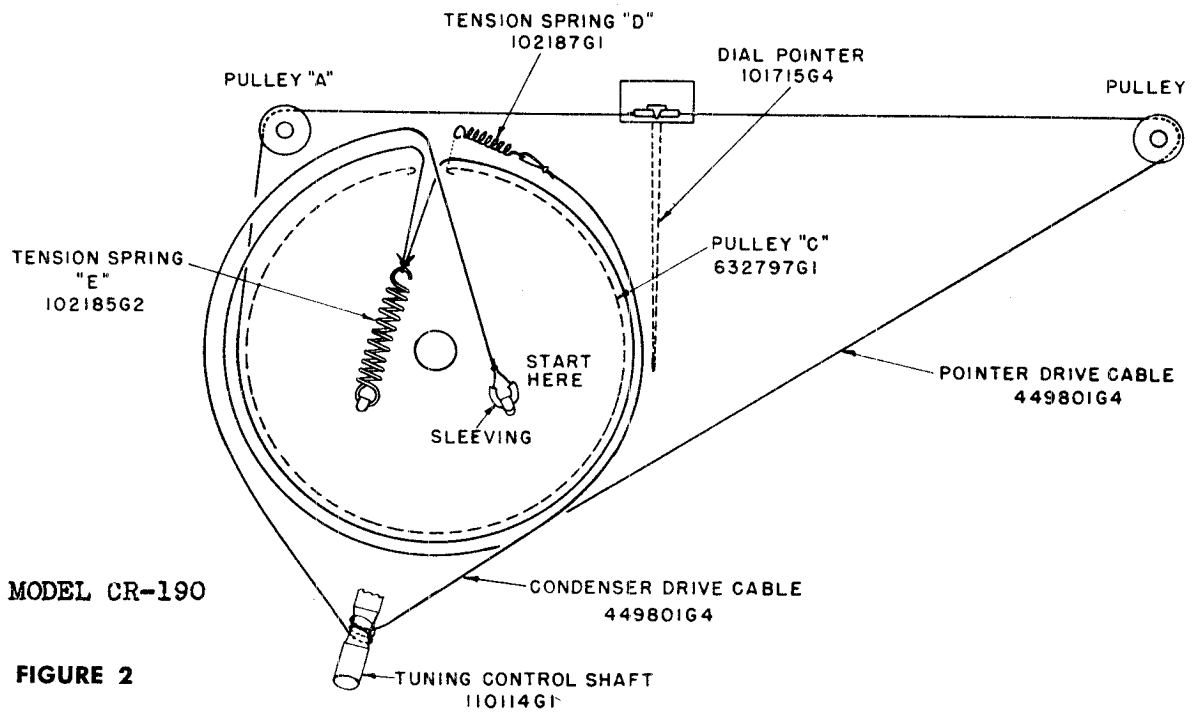
FIGURE 1

CR-190A and CR-190B Dial Pointer Drive Cable Replacement—Rotate the tuning control shaft until the slot in the groove of pulley "C" is up. Cut a piece of dial cable approximately 40 inches long and slide a short piece of sleeving over the cable. Tie a small loop in one end of the cable and temporarily hook it over the metal hook in pulley "C." Lace the other end through the slot in the pulley groove and in a counter-clockwise direction around the large pulley, then around pulley "B" and straight across the back of the dial frame; over pulley "A" and in a counter-clockwise direction around pulley "C." This last wrap around pulley "C" must be at the front of the pulley groove or nearest the panel. *This is important!* Lace the free end of the cable through the slot in pulley "C" and remove the other end of the cable from the hook. Fasten one end of tension spring "E" over the pulley hook and lace the two free ends of the drive cable through the other end of the spring. Now pull back on the cable until the tension spring coils are stretched to approximately 1⅝ inches. Tie a double knot in the cable while maintaining tension on the spring.

Turn the tuning control shaft until the condenser gang is completely meshed and slide the dial pointer on its track until it is in line with the last calibration mark at the low frequency end of the dial. The short piece of sleeving installed prior to the stringing operation should be slid to the rear of the dial pointer and the crimping lugs on the dial pointer pressed together over the sleeving. After checking to see that the condenser gang is still completely meshed and the dial pointer is in the position specified previously, apply a few drops of cement to each end of the sleeving to which the dial pointer is fastened. This completes the operation.

THE MAGNAVOX CO.

MODEL CR-190A,
CR-190B
MODEL CR-194



MODEL CR-190

FIGURE 2

PUSH BUTTON ADJUSTMENTS

MODEL CR-190 MODEL CR-194

There are six push buttons on the panel of the receiver, five of which may be pre-set to any station whose frequency is within the range covered by the respective buttons. See Figure 3. The right-hand button must be pressed for dial tuning.

Set-up Procedure—Turn on the receiver and allow it to operate for at least five minutes to permit tubes to reach normal operating conditions. Remove the push button escutcheon plate and proceed in the following manner.

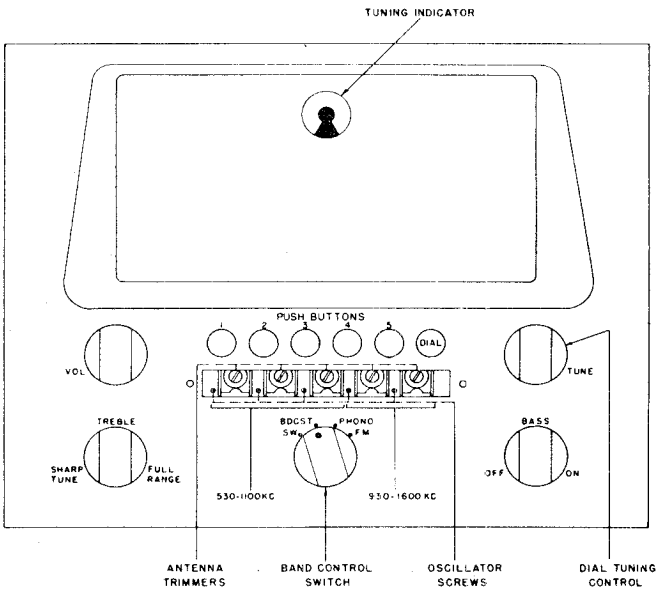


FIGURE 3

1. Turn the Band Control Switch knob to BDCST and press the push button at the right end of the assembly to permit dial tuning.

2. Using the Dial Tuning Control, carefully tune in the station to which the No. 1 push button is to be set and note the program. Be sure that the frequency of the station selected is within the frequency range covered by the No. 1 button.

3. Press the No. 1 button and carefully turn the oscillator screw for that button until the station that was tuned manually is heard. Carefully adjust the screw until the tuning indicator tube shows maximum deflection.

4. Adjust the No. 1 antenna trimmer for maximum speaker volume (tuning indicator tube shows maximum deflection).

5. Press the DIAL button to verify that the same station that was tuned manually was set up on the No. 1 button.

6. This completes the set-up of the No. 1 button. Follow the same procedure in setting up the remaining four buttons always adjusting the oscillator screw first, then the antenna trimmer screw.

7. After all five buttons have been set up, replace the escutcheon plate and insert the correct call letter tab in the space provided under each push button.

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MODEL CR-190A,
CR-190B

THE MAGNAVOX CO.

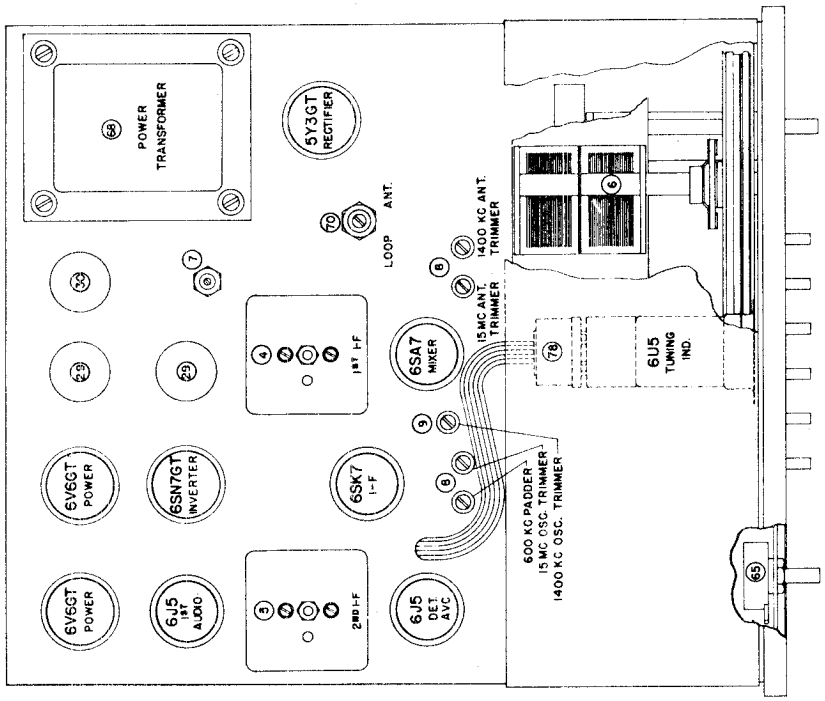


FIGURE 5

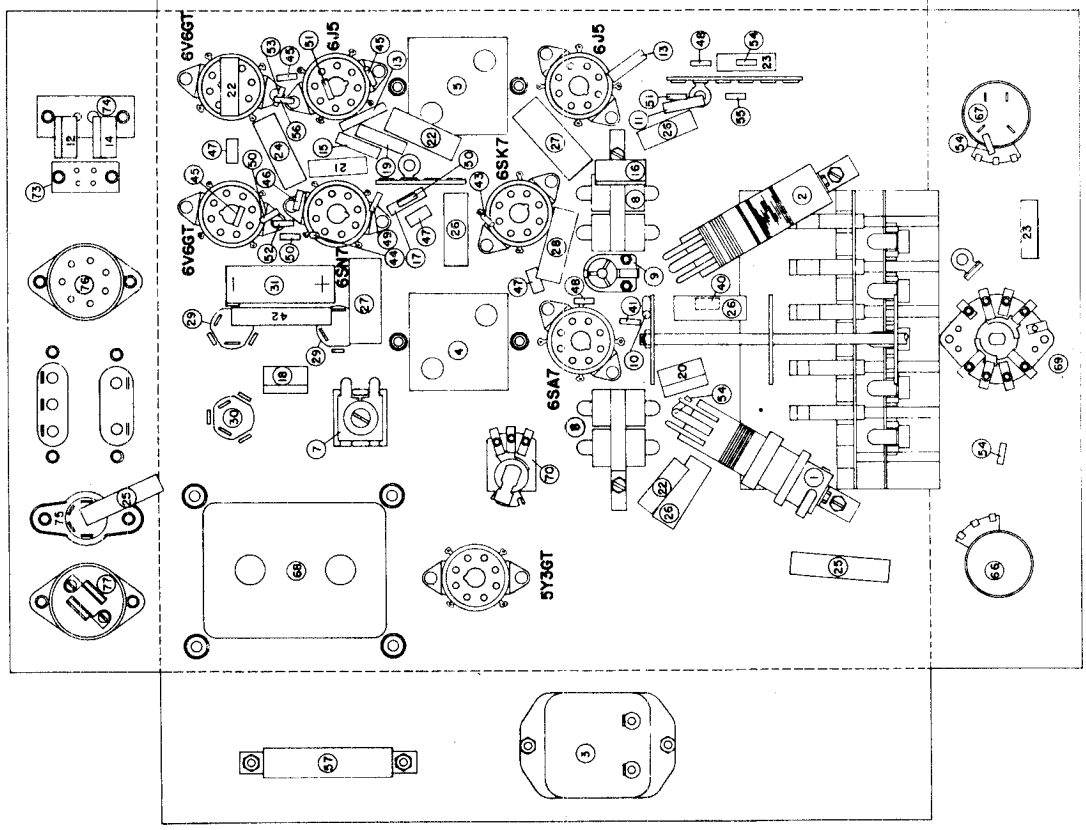
METHOD FOR REMOVING CHASSIS FROM CABINET

Model CR-190 radio chassis is designed for easy removal from the cabinet in which it is installed. As the radio panel is permanently fastened to the chassis, the control knobs need not be removed when removing the chassis, first remove the antenna leads from their terminals and all plugs from the receptacles on the rear of the chassis. Then remove the two Phillips-head screws from the designated S-L-H. The flange at the rear of the chassis. Lift the rear of the chassis about one inch and pull it straight back.

Never remove the chassis tray from the cabinet-it has been properly positioned to bring the radio panel in place when the chassis is replaced.

In replacing the chassis, slide it so that the small

re- hooks near the front, ride inside the flanges on the sides of the chassis tray. Push the chassis forward as far as it will go and the hooks should then engage the slots in the chassis tray. Replace the two Phillips-head screws and nuts and tighten securely. Replace all plugs in their receptacles and the antenna leads on their correct terminals. The antenna terminal board for the loop antenna connections is designated S-L-H. The end of the short wave antenna lead should be fastened to the inside of the cabinet connects to S. Always disconnect this antenna from terminal S when an outdoor antenna is used as it may pick up noise. The two terminals on the loop are designated L and H. The leads connected to these terminals should be wired to the corresponding terminals (L and H) on the chassis.



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The alignment of this receiver requires the use of an accurately calibrated r-f signal generator and an output meter. All trimmer condenser locations are shown on the chassis layout diagram, Figure 5. The radio volume control should be turned to maximum and the signal generator output kept as low as possible during alignment to prevent the AVC from operating and giving false readings. *Always set the Selectivity Switch to SHARP TUNE before aligning the i-f stages.* This is done by turning the Treble Control counter-clockwise as far as possible.

I-F Alignment

1. Connect the output of the signal generator to the oscillator grid (pin No. 5) of the 6SA7 tube through a .00025 mfd. capacitor. The ground on the signal generator should be connected to the radio chassis ground.

2. Turn the condenser gang until it is completely meshed (low-frequency end of dial calibration) and set the band selector switch to BDCST as for broadcast band reception.

3. Adjust the signal generator to EXACTLY 455 kc. and peak the second i-f transformer and the first i-f transformer trimmers in that order.

On early models of CR-190 chassis, the two i-f trimmers are located in the top of the respective i-f transformers as shown in the layout diagram, Figure 5. In later production, one trimmer is accessible from the top and the other from the bottom of each transformer.

Broadcast Band Alignment

1. Remove the signal generator lead from the 6SA7 grid and connect it to the radio antenna terminal through the .00025 mfd. capacitor. The ANT-LOOP switch (70) must be in the ANT setting.

2. Check the tuning dial pointer adjustment. When the plates of the tuning condenser are completely meshed, the dial pointer must be in line with the last calibration mark at the low frequency end of the dial. If it is not, slide the pointer on its string to the correct position. Be sure to crimp the lugs (on the rear of the pointer) tightly around the string to hold the pointer in adjustment.

3. With the band selector still set for broadcast band reception, adjust the signal generator and the radio receiver to 600 kc. While rocking the gang condenser a few degrees to the right and to the left, adjust the 600 kc. oscillator padder for maximum indication on the output meter.

4. Set the signal generator and the radio receiver to 1400 kc.; adjust the 1400 kc. oscillator trimmer and the 1400 kc. antenna trimmer for maximum output. If considerable adjustment was necessary, recheck the 600 kc. padder setting.

Short Wave Band Alignment

1. Set the band selector switch to SW as for Short Wave reception and substitute a 400 ohm resistor for the capacitor in series with the signal generator lead connected to the antenna terminal on the receiver.

2. Set the signal generator and the radio receiver to 15 mc.; then adjust the 15 mc. oscillator trimmer and the 15 mc. antenna trimmer for maximum output.

While adjusting the 15 mc. oscillator trimmer two peaks may be observed; only one is the correct peak for 15 mc. alignment. Screw in the trimmer to maximum capacity—then decrease the capacity until the first peak is observed. This is the correct one.

10 KC Filter Adjustment

This chassis incorporates a 10 kc. filter circuit to eliminate the beat note heard as a whistle between stations on the broadcast band. If the trimmer is out of adjustment, the following procedure should be observed.

1. Set the Selectivity Switch to FULL RANGE by turning the Treble Control knob clockwise as far as possible.

2. Connect the output of an audio oscillator to the phonograph pickup socket on the radio chassis and adjust the oscillator to EXACTLY 10,000 cycles.

3. Set the band selector to PHONO and adjust the 10 kc. trimmer (7) for minimum output.

4. If an audio oscillator is not available for making this adjustment, set the band selector to BDCST, connect an antenna to the receiver and set the gang condenser to a point between two stations on adjacent channels having approximately the same power. If the 10 kc. trimmer is out of adjustment, a whistle will be heard. Adjust the trimmer until the whistle is eliminated.

Special Service Information

The following information is provided for the serviceman who has a vacuum tube voltmeter or a similar measuring instrument available.

STAGE GAINS*

Antenna Post to Converter Grid at:

600 kc.	5.5
6 mc.	2.0

R-F on Converter Grid to I-F Grid at:

600 kc.	28
6 mc.	22

I-F on Converter Grid to I-F Grid at:

455 kc.	34

I-F Grid to Detector Plate at:

455 kc.	67

AUDIO GAIN

Voltage required across Volume Control to produce .05 watt speaker output** at 400 cycles is .010 volt with Band Selector Switch in BDCST setting.

OSCILLATOR OUTPUT VOLTAGE

The DC voltage developed across Oscillator Grid Resistor (48) at:

600 kc.	9.7
6 mc.	5.3

* Variations of ±20% are permissible. All readings made with sufficient input signal to provide .05 watt speaker output.

** .05 watt speaker output at 400 cycles is equivalent to a reading of 0.4 volts as measured by a high resistance AC voltmeter across the speaker voice coil.

MODEL CR-190A,
CR-190B
MODEL CR-193

THE MAGNAVOX CO.

CR-190

REFERENCE NO.	DESCRIPTION	MAGNAVOX PART NO.
1	Coil assembly, r-f, two band	360256G1
2	Coil assembly, oscillator, two band	360255G1
3	Coil assembly, 10 kc filter	360240G1
4	Transformer, first i-f	360266G1
5	Transformer, second i-f	360267G1
6	Capacitor, variable, two-gang tuning	260056G1
7	Capacitor, variable, 10 kc trimmer	250008G1
8	Capacitor, variable, 2 gang trimmer	260021G1
9	Capacitor, variable, oscillator trimmer	260042G2
10	Capacitor, ceramic, 50 mmf.	250088G24
11	Capacitor, molded mica, 100 mmf. ±20%	250159G98
12	Capacitor, molded mica, 100 mmf. ±10%	250159G82
13	Capacitor, molded mica, 220 mmf. ±20%	250159G100
14	Capacitor, molded mica, 330 mmf. ±10%	250159G88
15	Capacitor, molded mica, 270 mmf. ±10%	250159G87
16	Capacitor, silvered mica, 529 mmf. ±1%	250085G34
17	Capacitor, molded mica, 470 mmf. ±10%	260159G102
18	Capacitor, molded mica, 1000 mmf. ±20%	250160G82
19	Capacitor, molded mica, 1800 mmf. ±10%	250160G67
20	Capacitor, molded mica, 5600 mmf. ±2%	250161G7
21	Capacitor, paper, .003 mfd. 600 V.	250152G43
22	Capacitor, paper, .01 mfd. 600 V.	250152G38
23	Capacitor, paper, .01 mfd. 200 V.	250152G18
24	Capacitor, paper, .02 mfd. 400 V.	250152G26
25	Capacitor, molded paper, .02 mfd.	250129G3
26	Capacitor, paper, .05 mfd. 200 V.	250152G15
27	Capacitor, paper, .1 mfd. 400 V.	250152G22
28	Capacitor, paper, .1 mfd. 200 V.	250152G13
29	Capacitor, electrolytic, 10 mfd. 450 V.-20 mfd. 25 V.	270023G6
30	Capacitor, electrolytic, 10-30 mfd. 450 V.	270023G2
31	Capacitor, electrolytic, 20 mfd. 25 V.	270027G2
40	Resistor, composition, 150 ohm ½ W.	230084G8
41	Resistor, composition, 220 ohm ½ W.	230084G9
42	Resistor, composition, 220 ohm 2 W.	230064G54
43	Resistor, composition, 470 ohm ½ W.	230084G11
44	Resistor, composition, 1500 ohm ½ W.	230084G14
45	Resistor, composition, 4700 ohm ½ W.	230084G17
46	Resistor, composition, 15,000 ohm ±5% ½ W.	230084G187
47	Resistor, composition, 15,000 ohm 1 W.	230085G20
48	Resistor, composition, 22,000 ohm ½ W.	230084G21
49	Resistor, composition, 47,000 ohm ½ W.	230084G23
50	Resistor, composition, 100,000 ohm ½ W.	230084G25
51	Resistor, composition, 150,000 ohm ½ W.	230084G26
52	Resistor, composition, 220,000 ohm ±5% ½ W.	230084G215
53	Resistor, composition, 270,000 ±10% ½ W.	230084G91
54	Resistor, composition, 470,000 ohm ½ W.	230084G29
55	Resistor, composition, 1 megohm ½ W.	230084G31
56	Resistor, composition, 4.7 megohm ½ W.	230084G35
57	Resistor, wire wound, 10,000 ohm	240035G2
58	Resistor, composition, 15,000 ohm ½ W.	230084G20
65	Control, volume, 1 megohm	220044G15
66	Control, bass, 1 megohm, with power switch	220045G2
67	Control, treble, 1 megohm, with band expander sw.	220071G2
68	Transformer, power, 117 V. 50/60 cycle	300025G1
69	Switch, rotary, band selector	160156G1
70	Switch, rotary, loop to outdoor antenna	160157G1
71	Switch assembly, muting	160158G1
72	Antenna, loop assembly	*
73	Socket, external input	180060G1
74	Socket, phonograph input	189741G1
75	Socket, phonograph motor	18050[illegible]G5
76	Socket, speaker	180393G3
77	Socket, FM power	180422G1
78	Socket and cable assembly, tuning indicator	180423G1

Due to the fact that a change was made in the mechanical construction of the dial assembly after the first CR-190 radio chassis production run, it is important that you follow the procedure outlined below in ordering replacement glass dials.
If the glass dial for which a replacement is required is marked 150269, order a 150278 dial glass assembly. If the glass is marked 150282, order a 150280 dial glass assembly. These assemblies include the rubber strips cemented in their correct positions.

CR-193

REFERENCE NO.	DESCRIPTION	MAGNAVOX PART NO.
1	Coil assembly, r-f, two band	360238G1
2	Coil assembly, oscillator, two band	360239G1
3	Coil assembly, 10 kc filter	360240G1
4	Transformer, first i-f	360266G1
5	Transformer, second i-f	360267G1
6	Capacitor, variable, two-gang tuning	260053G1
7	Capacitor, variable, 10 kc trimmer	250008G1
8	Capacitor, variable, 2 gang trimmer	260021G1
9	Capacitor, variable, oscillator padder	260042G2
10	Capacitor, ceramic, 50 mmf.	250088G24
11	Capacitor, molded mica, 100 mmf. ±20%	250159G98
12	Capacitor, molded mica, 100 mmf. ±10%	250159G82
13	Capacitor, molded mica, 220 mmf.	250159G100
14	Capacitor, molded mica, 330 mmf.	250159G88
15	Capacitor, molded mica, 270 mmf.	250159G87
16	Capacitor, silvered mica, 583 mmf. ±1%	250085G33
17	Capacitor, molded mica, 470 mmf.	250159G102
18	Capacitor, molded mica, 1000 mmf.	250160G82
19	Capacitor, molded mica, 1800 mmf.	250160G67
20	Capacitor, molded mica, 5100 mmf. ±2%	250161G6
21	Capacitor, paper, .003 mfd. 400 V.	250152G43
22	Capacitor, paper, .01 mfd. 600 V.	250152G38
23	Capacitor, paper, .01 mfd. 200 V.	250152G18
24	Capacitor, paper, .02 mfd. 400 V.	250152G26
25	Capacitor, molded paper, .02 mfd. 600 V.	250129G3
26	Capacitor, paper, .05 mfd. 200 V.	250152G15
27	Capacitor, paper, .1 mfd. 400 V.	250152G22
28	Capacitor, paper, .1 mfd. 200 V.	250152G13
29	Capacitor, electrolytic, 10 mfd. 450 V., 20 mfd. 25V.	270023G6
30	Capacitor, electrolytic, 10-30 mfd. 450 V.	270023G2
31	Capacitor, electrolytic, 20 mfd. 25V.	270027G2
40	Resistor, composition, 150 ohm ½ W.	230084G8
41	Resistor, composition, 220 ohm ½ W.	230084G9
42	Resistor, wire wound 125 ohm 10 W.	240021G11
43	Resistor, composition, 470 ohm ½ W.	230084G1
44	Resistor, composition, 1500 ohm ½ W.	230084G14
45	Resistor, composition, 4700 ohm ½ W.	230084G17
46	Resistor, composition, 15,000 ohm ±5% ½ W.	230084G187
47	Resistor, composition, 15,000 ohm 1 W.	230085G20
48	Resistor, composition, 22,000 ohm ½ W.	230084G21
49	Resistor, composition, 47,000 ohm ½ W.	230084G23
50	Resistor, composition, 100,000 ohm ½ W.	230084G25
51	Resistor, composition, 150,000 ohm ½ W.	230084G26
52	Resistor, composition, 220,000 ohm ±5% ½ W.	230084G215
53	Resistor, composition, 270,000 ohm ½ W.	230084G91
54	Resistor, composition, 470,000 ohm ½ W.	230084G29
55	Resistor, composition, 1 megohm ½ W.	230084G31
56	Resistor, composition, 4.7 megohm ½ W.	230084G35
57	Resistor, wire wound, 10,000 ohm.	240035G2
58	Resistor, composition, 15,000 ohm ½ W.	230084G20
59	Resistor, composition, 1000 ohm 2 W.	230064G62
65	Control, volume, 1 megohm	220044G15
66	Control, bass, 1 megohm, with power switch	220045G2
67	Control, treble, 1 megohm, with band expander switch	220071G2
68	Transformer, power, 117 V. 50/60 cycle	300032G1
69	Switch, rotary, band selector	160156G1
70	Switch, rotary, loop to outdoor antenna	160157G1
71	Switch assembly, muting	160158G1
72	Antenna, loop assembly	*
73	Socket, external input	180060G1
74	Socket, phonograph input	189741G1
75	Socket, phonograph motor	18050[illegible]G5
76	Socket, speaker	180393G3
77	Socket, FM power	180422G1
78	Socket & Cable assembly, tuning indicator	180423G1
	Dial glass assembly	150283G1

*The part number of the loop antenna assembly changes with different cabinets. It is therefore **important that** you specify the *Style Number* of the instrument when ordering a replacement loop antenna assembly.

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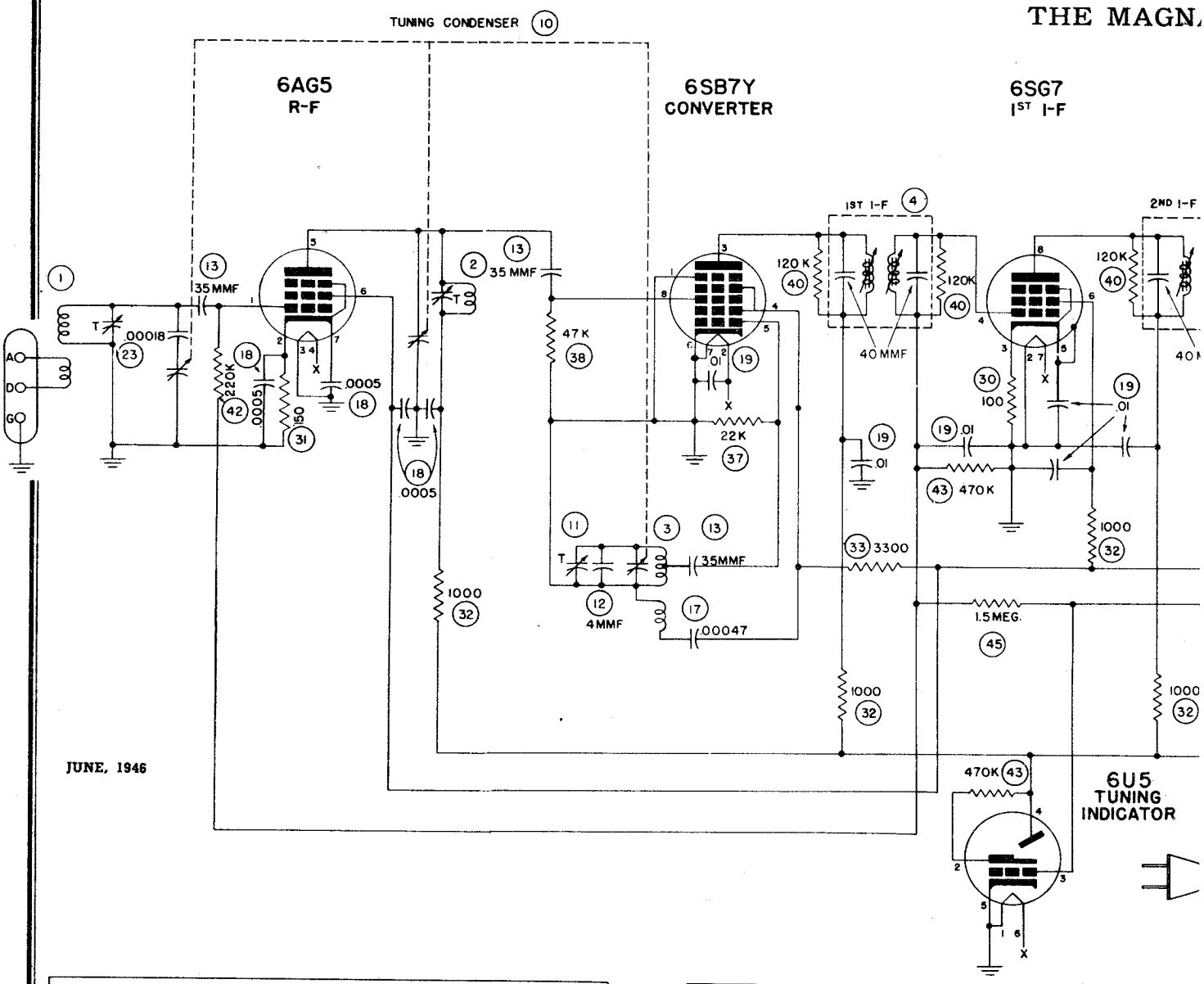

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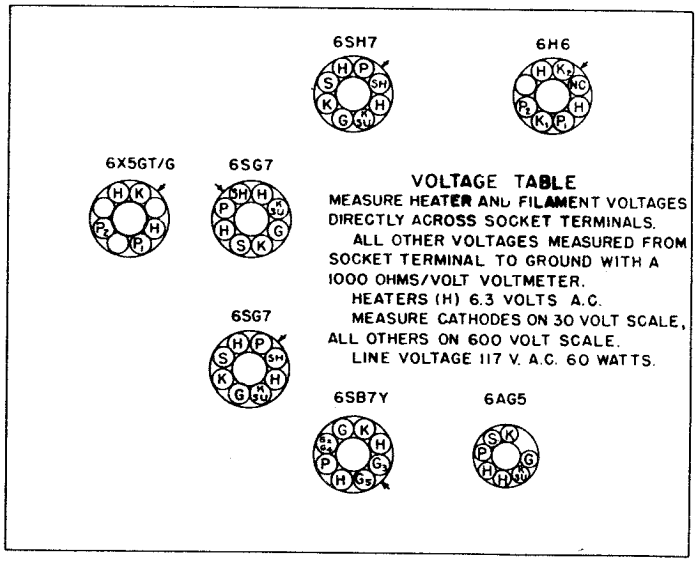


VOLTAGE TABLE

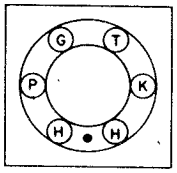
MEASURE HEATER AND FILAMENT VOLTAGES DIRECTLY ACROSS SOCKET TERMINALS.

ALL OTHER VOLTAGES MEASURED FROM SOCKET TERMINAL TO GROUND WITH A 1000 OHMS/VOLT VOLTMETER.

HEATERS (H) 6.3 VOLTS A.C.

MEASURE CATHODES ON 30 VOLT SCALE, ALL OTHERS ON 600 VOLT SCALE.

LINE VOLTAGE 117 V. A.C. 60 WATTS.



TUNING INDICATOR SOCKET
BACK VIEW

ALL ELECTRICAL VALUES SHOWN ARE IN MICROFARADS OR OHMS UNLESS OTHERWISE SPECIFIED.

I-F 10.7 MC

Model CR-192 series rc
Modulation tuners desi
F-M receptacle on any
ceiver.

Because of the fact that
F-M tuner must be mou
the suffix letters A and
tify the change in dial r
of this F-M tuner with
CR-192B; when the upri
is provided, the mode
CR-192A.

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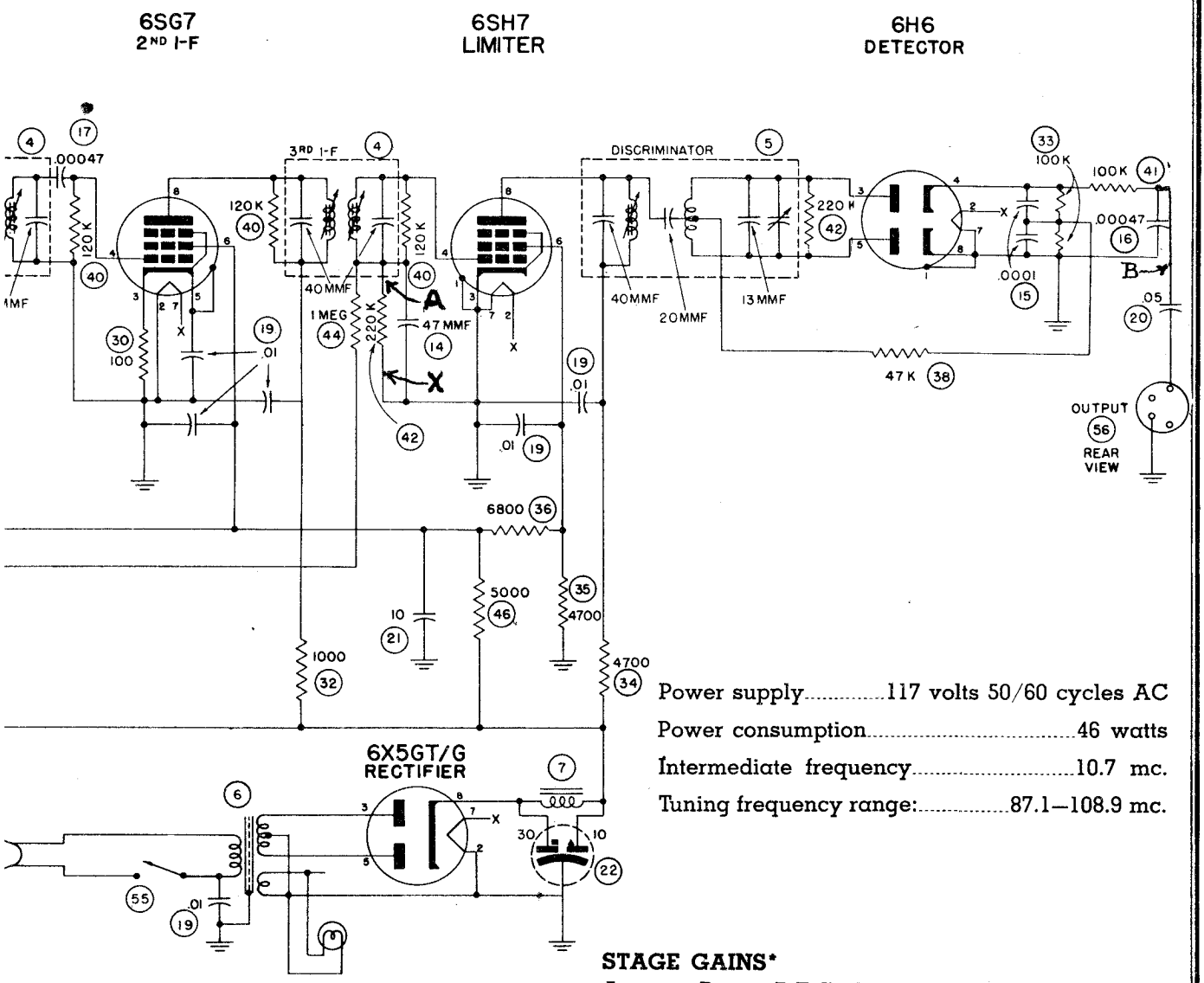
AVOX CO.

MODEL CR-192A,
CR-192B



Power supply.....117 volts 50/60 cycles AC

Power consumption.....46 watts

Intermediate frequency.....10.7 mc.

Tuning frequency range:.....87.1—108.9 mc.

Dial Lamp.....Mazda No. 51

idio chassis are Frequency-
gned for connection to the
Magnavox A-M radio re-

in some cabinets the CR-192
nted in an inverted position,
B on the model number iden-
nounting. The model number
m inverted dial assembly is
ght dial assembly mounting
l number of the chassis is

STAGE GAINS*

Antenna Post to R-F Grid through 300-ohm resistor at:
98 mc.....1.0

R-F to Converter Grid at:
98 mc.....17.5

R-F on Converter Grid to 1st I-F Grid at:
98 mc.....8.3

I-F on Converter Grid to 1st I-F Grid at:
10.7 mc.....9.2

I-F on 1st I-F Grid to 2nd I-F Grid at:
10.7 mc.....34

2nd I-F Grid to Limiter Grid at:
10.7 mc.....33

OSCILLATOR GRID VOLTAGE

The DC voltage developed across Oscillator Grid resistor (37) at:
98 mc.....7.0

*Variations of ± 20% are permissible. All readings made with sufficient signal to provide 15 millivolts output at 400 cycles with 22.5 kc. modulation.

For Dial Data, see P.15-42

THE MAGNAVOX CO.

MODEL CR-192A, CR-192B

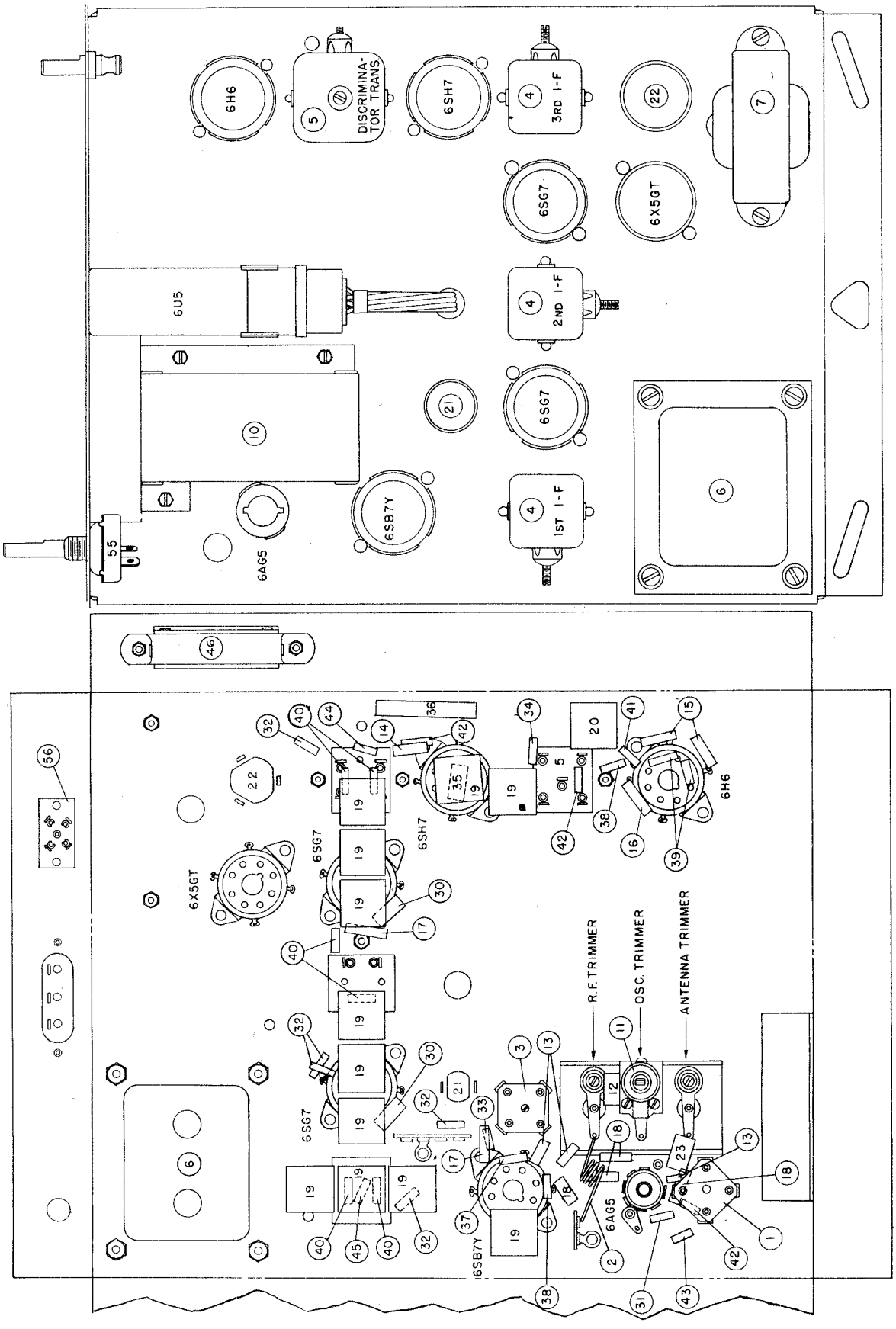


FIGURE 3

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MODEL CR-192A,
CR-192B

THE MAGNAVOX CO.

ALIGNMENT PROCEDURE

The alignment of this F-M tuner is made in three major steps namely, I-F alignment, Discriminator alignment and R-F alignment. An F-M generator is not required in aligning this F-M tuner. Any *accurately calibrated* signal generator covering a range in the vicinity of 10.7 megacycles may be used in aligning the I-F and the Discriminator stages. For R-F alignment, the generator must cover the tuning range of the tuner or approximately 87 to 110 megacycles. If such a signal generator is not available, this alignment may be made by using an F-M radio station as a frequency standard.

I-F ALIGNMENT

1. Connect the "high" side of the signal generator to Grid 3 (pin #8) of the 6SB7Y converter tube and the "low" side of the generator to the radio chassis.

2. If a vacuum tube voltmeter is available, connect it across the 220,000 ohm resistor in the grid circuit of the 6SH7 limiter tube at points designated "A" and "X" on the schematic diagram (Figure 2) to measure the limiter grid bias voltage. Set the signal generator to exactly 10.7 megacycles and adjust the third, the second and the first i-f transformer trimmers in that order for maximum reading on the meter. A reading of 2 to 8 volts should be considered normal.

3. If a vacuum tube voltmeter is not available, connect a 0-50 or 0-200 microammeter in series with the "ground" end of the 220,000 ohm resistor in the grid circuit of the 6SH7 limiter tube at point "X" on the schematic diagram. Set the signal generator to exactly 10.7 megacycles and adjust the third, the second and the first i-f transformer trimmers in that order for maximum meter readings. A normal reading will be in the range of 10 to 35 microamperes. At the completion of these adjustments, remove the microammeter and ground the 220,000 ohm resistor to the point where it was originally connected.

DISCRIMINATOR ALIGNMENT

The accurate alignment of the discriminator transformer cannot be overemphasized. Incorrect alignment will result in badly distorted reception. The following steps should be followed in the order given:

1. A DC vacuum tube voltmeter is connected to the output circuit by connecting it from ground to point "B" on the schematic diagram. This measures the detector output voltage. Adjust the signal generator frequency to exactly 10.775 megacycles and adjust both trimmers on the discriminator transformer for maximum reading. If the indicated voltage is less than 3 volts readjust the output of the generator until the meter indicates 3 volts or more. Now adjust the signal generator frequency to 10.7 megacycles and turn the trimmer screw on the top of the discriminator until the voltage is zero. *This is an extremely important adjustment.* Reset the generator frequency to 10.775 and record the meter reading.

2. Reverse the meter connections and set the signal generator frequency to 10.625 megacycles. The meter reading now obtained must be within 10% of the reading recorded in the previous operation—if it is not, the discriminator alignment was not done accurately and must be repeated.

3. The discriminator may also be aligned using a 0-50 or 0-200 microammeter if a vacuum tube voltmeter is not available. In this case, the detector output current is measured. Connect the microammeter to the same points specified in paragraph 1 and proceed in the manner outlined in paragraphs 1 and 2 of this section. In the operation described in paragraph 1, the meter reading should be at least 20 microamperes when the trimmers are peaked at 10.775 megacycles; if not, the generator should be adjusted until that value is obtained.

R-F ALIGNMENT

1. Check that the dial pointer is in line with the last mark at the low frequency end of the dial calibration when the condenser gang is fully meshed. If it is not, slide the pointer on its string to the correct position, and crimp the lugs (on the rear of the pointer) tightly around the string and apply a drop of cement to hold the pointer in adjustment.

2. Connect the vacuum tube voltmeter to points "A" and "X" on the schematic diagram or connect a 0-50 or 0-200 microammeter in series with the "ground" end of the 220,000 ohm resistor in the grid circuit of the 6SH7 limiter tube at point "X" on the schematic diagram.

3. An extremely accurate signal generator is a necessity in making the following adjustments and it should be connected to the antenna post through a 300 ohm resistor. If such a generator is not available, connect an F-M antenna to the antenna terminal (A) and use an F-M transmitter for a frequency standard. It is preferable that this station be located in the high frequency end of the band—102 to 108 megacycles.

4. Set the signal generator (if one is used) and the F-M tuner to exactly 108 megacycles—if an F-M station is used as a frequency standard accurately set the tuner to the frequency of the F-M station and adjust the oscillator trimmer for a maximum reading on the meter. Then adjust the antenna trimmer and the r-f trimmer for a maximum meter indication. If too much signal is fed to the tuner, it might appear at several settings of the tuning dial and confuse the adjustment. When the adjustments are completed, the second harmonic of the oscillator frequency will be 10.7 megacycles lower than the signal frequency.

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METHOD FOR REMOVING CHASSIS FROM CABINET

As the control panel is permanently fastened to the tuner in all models except those mounted in the Regency Symphony combination, it is not necessary to remove the control knobs from the cabinet. The instructions immediately following are for all combinations except the Regency Symphony. Separate instructions for removing the CR-192A chassis from that instrument are shown in this section.

Before removing the chassis, disconnect the antenna and ground leads from their terminals, and the output and the power cables from their receptacles. While holding the rear of the chassis in place with one hand, remove the two Phillips-head screws from the angular slots in the flange at the rear of the chassis. Then while lowering the chassis, pull back on it to disengage the hooks from the slots in the tray to which the chassis is mounted, and withdraw the chassis from the cabinet.

In replacing the chassis, slide it in so that the small hooks near the front ride inside the flanges on the sides of the chassis tray. Push the chassis forward as far as it will go so that the hooks engage the slots in the chassis tray; then lift up the rear of the chassis until the guide pin in the chassis tray projects through the triangular opening the flange on the rear of the F-M chassis. Now pull back on the chassis. A ledge on the guide pin referred to above, will hold the chassis in place while the mounting screws are started into the captivated nuts on the top of the chassis tray. These nuts are accessible through the angular slots in the chassis flange and the Phillips-head screws should be turned in to within a few turns of being tight. Now slide the chassis forward until its panel is flush with the panel of the A-M radio chassis and tighten the two Phillips-head screws securely, completing the replacement operation.

REGENCY SYMPHONY. To remove the CR-192A chassis from the Regency Symphony first remove the antenna and ground leads from their terminals and the output and power cables from their receptacles. Then pull the control knobs from their shafts and remove the two fancy-head screws from the front panel. Next, remove the two Phillips-head screws from the angular slots in the flange at the rear of the chassis and pull the chassis out of the rear of the cabinet.

REFERENCE NO.	DESCRIPTION	MAGNAVOX PART NO.
1	Coil assembly, antenna	360270G1
2	Coil assembly, r-f	360271G1
3	Coil assembly, oscillator	360263G1
4	Transformer, i-f	360258G1
5	Transformer, discriminator	360259G1
6	Transformer, power, 117 volt 50/60 cycle	300030G1
7	Choke, filter	350032G1
10	Capacitor, variable, three-gang tuning	260059G1
11	Capacitor, trimmer 1.5–7 mmf.	260067G1
12	Capacitor, ceramic, 4 mmf.	250088G28
13	Capacitor, ceramic, 35 mmf.	250088G26
14	Capacitor, molded mica, 47 mmf.	250159G96
15	Capacitor, molded mica, 100 mmf.	250159G98
16	Capacitor, molded mica, 470 mmf. +10%	250159G90
17	Capacitor, molded mica, 470 mmf. +20%	250159G102
18	Capacitor, ceramic, 500 mmf	250088G31
19	Capacitor, paper, .01 mfd. 600V.	250129G2
20	Capacitor, paper, .05 mfd. 600V.	250129G5
21	Capacitor, electrolytic, 10 mfd. 450V.	270026G3
22	Capacitor, electrolytic, 30-10 mfd. 475V.	270023G2
23	Capacitor, molded mica, 180 mmf.	250159G53
30	Resistor, composition, 100 ohm ½ W.	230084G7
31	Resistor, composition, 220 ohm ½ W.	230084G9
32	Resistor, composition, 1000 ohm ½ W.	230084G13
33	Resistor, composition, 3300 ohm ½ W.	230084G16
34	Resistor, composition, 4700 ohm ½ W.	230084G17
35	Resistor, composition, 4700 ohm 1 W.	230085G17
36	Resistor, composition, 6800 ohm 2 W.	230061G18
37	Resistor, composition, 22,000 ohm ½ W.	230084G21
38	Resistor, composition, 47,000 ohm ½ W.	230084G23
39	Resistor, composition, 100,000 ohm ½ W. ±20%	230084G25
40	Resistor, composition, 120,000 ohm ½ W. ±10%	230084G87
41	Resistor, composition, 100,000 ohm ½ W. ±10%	230084G86
42	Resistor, composition, 220,000 ohm ½ W.	230084G27
43	Resistor, composition, 470,000 ohm ½ W.	230084G29
44	Resistor, composition, 1 megohm ½ W.	230084G31
45	Resistor, composition, 1.5 megohm ½ W.	230084G32
46	Resistor, wire wound, 5000 ohm, 5 W	240035G4
55	Switch, rotary, power	160163G1
56	Socket, output	180060G1
	Calibrated glass dial—CR-192A	150287G1
	Calibrated glass dial—CR-192B	150287G2

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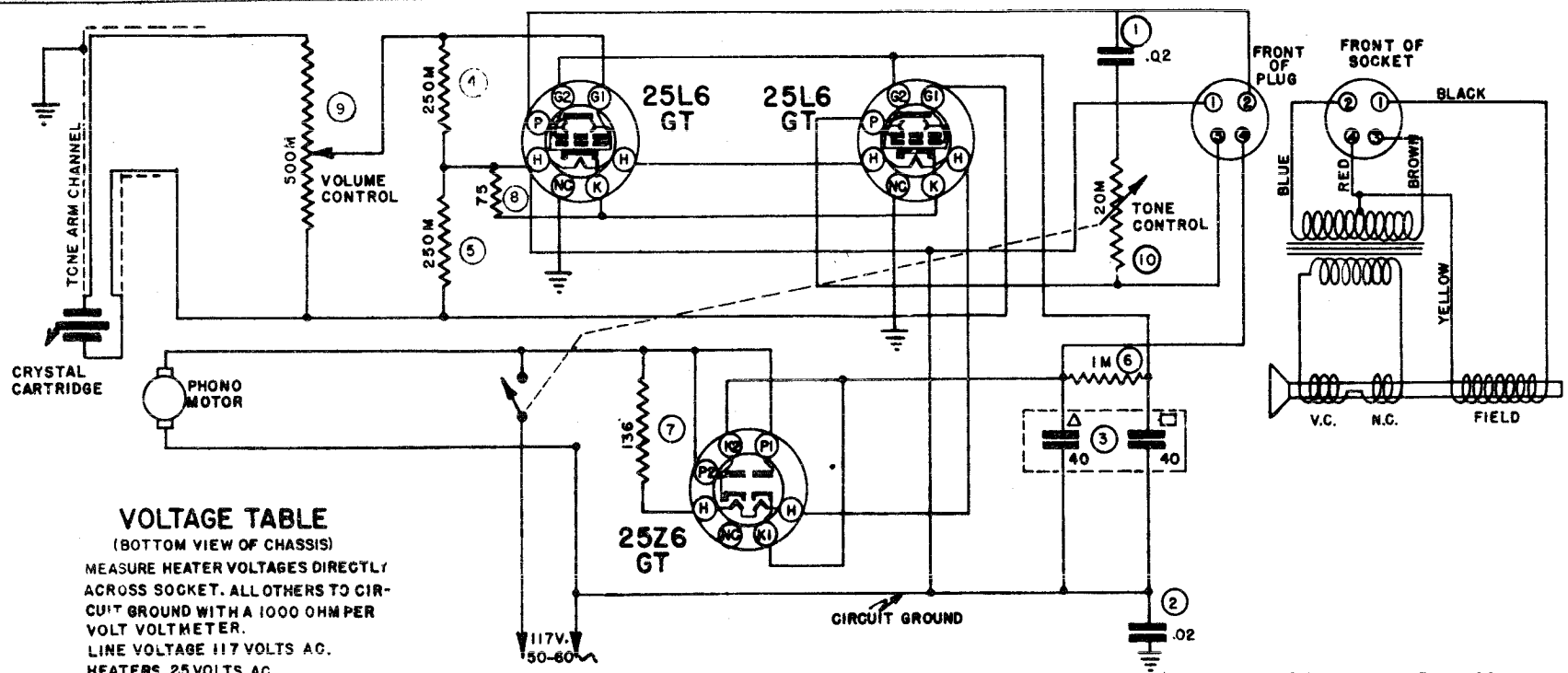


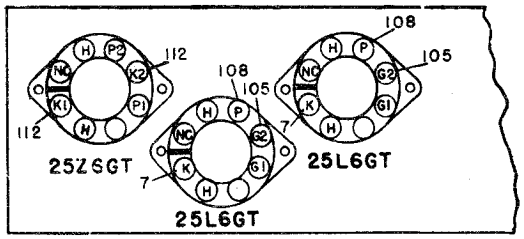
VOLTAGE TABLE

(BOTTOM VIEW OF CHASSIS)

MEASURE HEATER VOLTAGES DIRECTLY ACROSS SOCKET. ALL OTHERS TO CIRCUIT GROUND WITH A 1000 OHM PER VOLT VOLTMETER.

LINE VOLTAGE 117 VOLTS AC.

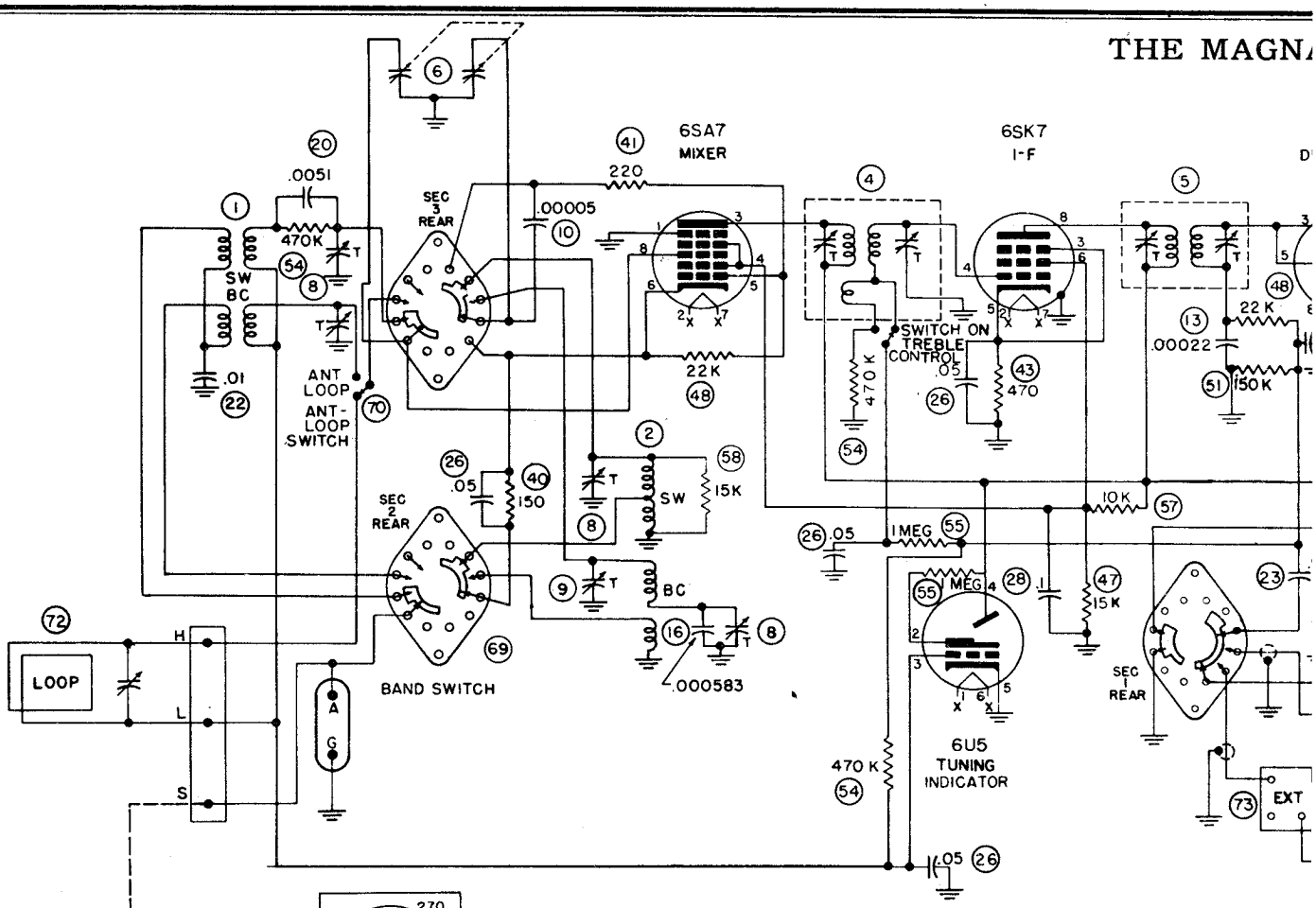
HEATERS 25 VOLTS AC



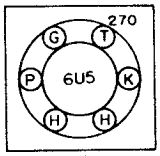
Primary voltage	117 V. AC-DC;
Power consumption	65 watts;
Power output	3 watts;
Vacuum Tubes	2 - 25L6GT; 1 - 25Z6GT;
Speaker: Field Coil	*1800 ohms;
Transformer	**3000 ohms;

* DC resistance. ** Primary impedance.

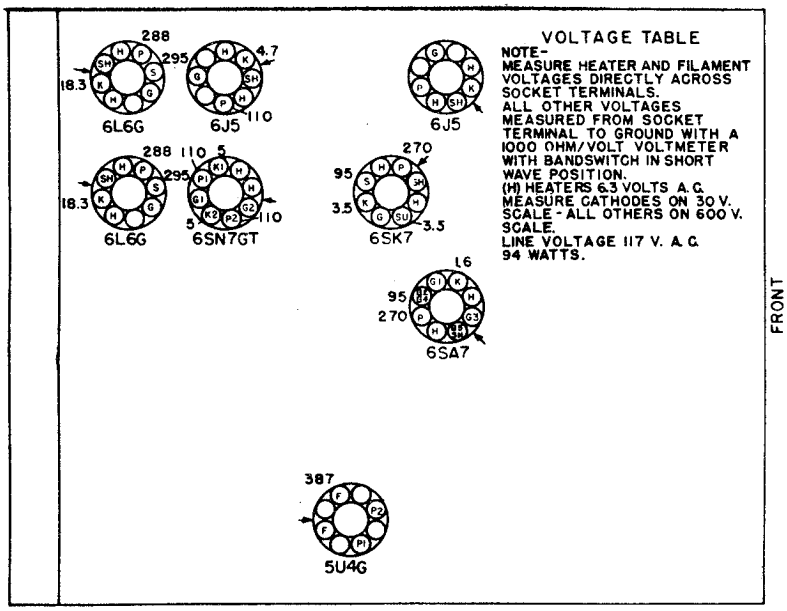
Ref. No.	Description	Magnavox Part No.
1	Capacitor, molded paper, .02 mfd. 600 V.	250056
2	Capacitor, molded paper, .02 mfd. 600 V.	250056
3	Capacitor, electrolytic, 40-40 mfd. 150 V.	270013
4	Resistor, carbon, 250,000 ohm ⅓ W.	230010
5	Resistor, carbon, 250,000 ohm ⅓ W.	230010
6	Resistor, carbon, 1000 ohm	239745
7	Resistor, wire wound, 136 ohm 15 W.	240014
8	Resistor, wire wound, 75 ohm 5 W.	230056
9	Control, volume, 500,000 ohm	220032
10	Control, tone with power switch, 20,000 ohm	220021
	Socket, octal marked 25L6GT	180128
	Socket, octal marked 25Z6GT	180129
	Knob, control stamped VOLUME	140035
	Knob, control stamped OFF-ON-TONE	140036



MAY, 1946



TUNING EYE SOCKET
BACK VIEW



Power supply	
Power consumption	
Power output	
Intermediate frequency	
Tuning frequency range:	
Broadcast band	
Short Wave band	

I.F — 455 K.C.

NOTES

1. BAND SWITCH SHOWN IN COUNTER-CLOCKWISE POSITION (SHORT WAVE) VIEWED FROM THE FRONT PANEL.
2. BAND EXPANDER SWITCH SHOWN BENEATH FIRST I-F TRANSFORMER IS ACTUATED BY THE TREBLE CONTROL KNOB.
3. ALL ELECTRICAL VALUES SHOWN ARE IN MICROFARADS OR OHMS UNLESS OTHERWISE SPECIFIED.

Dial lamps	
Speakers:	No. 5828
Field coil resistance	250 ohm
Voice coil impedance (400 cycles)	5.7 ohm
Output transformer	None

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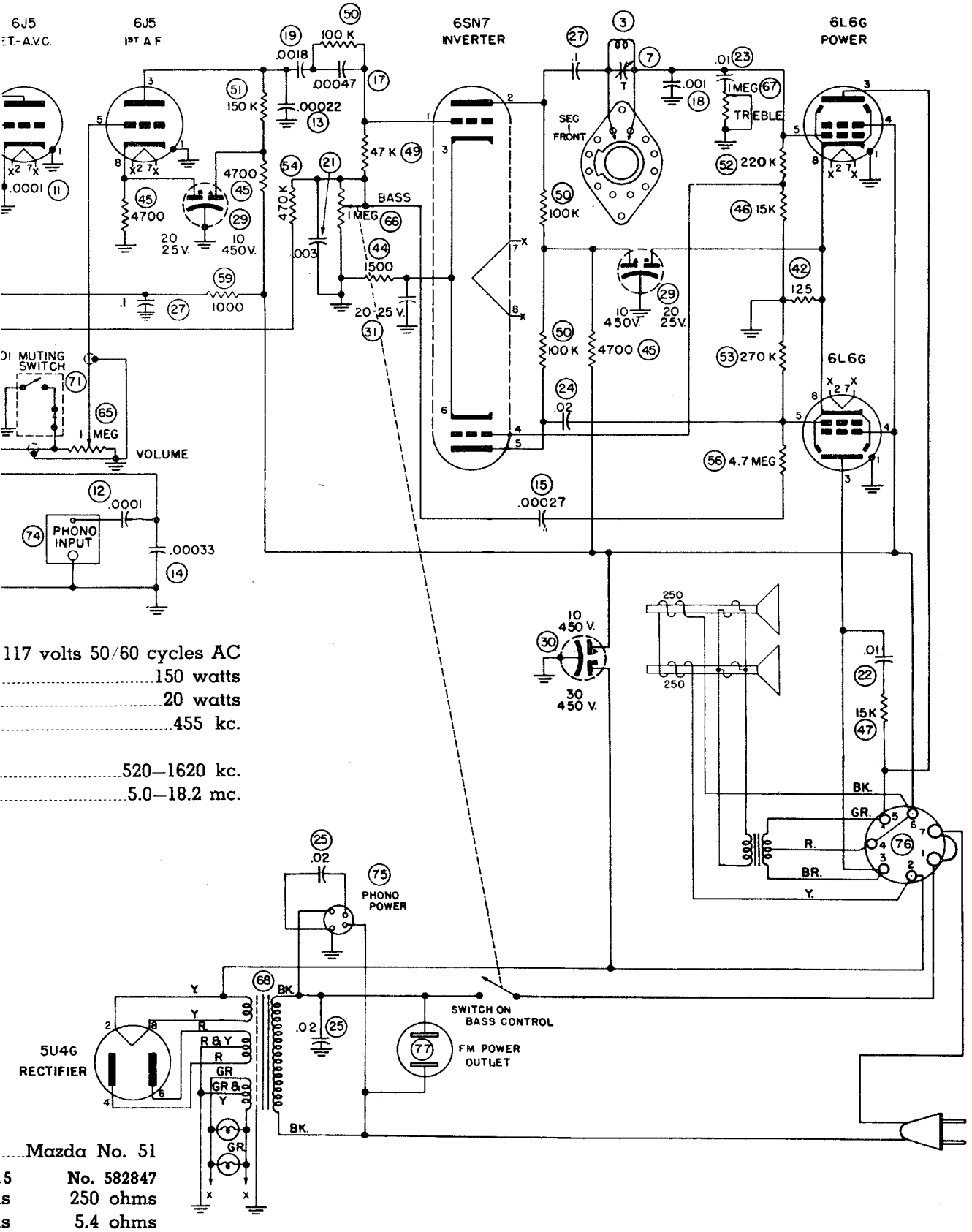
AVOX CO.

MODEL CR-193



117 volts 50/60 cycles AC
.....150 watts
.....20 watts
.....455 kc.

.....520—1620 kc.
.....5.0—18.2 mc.

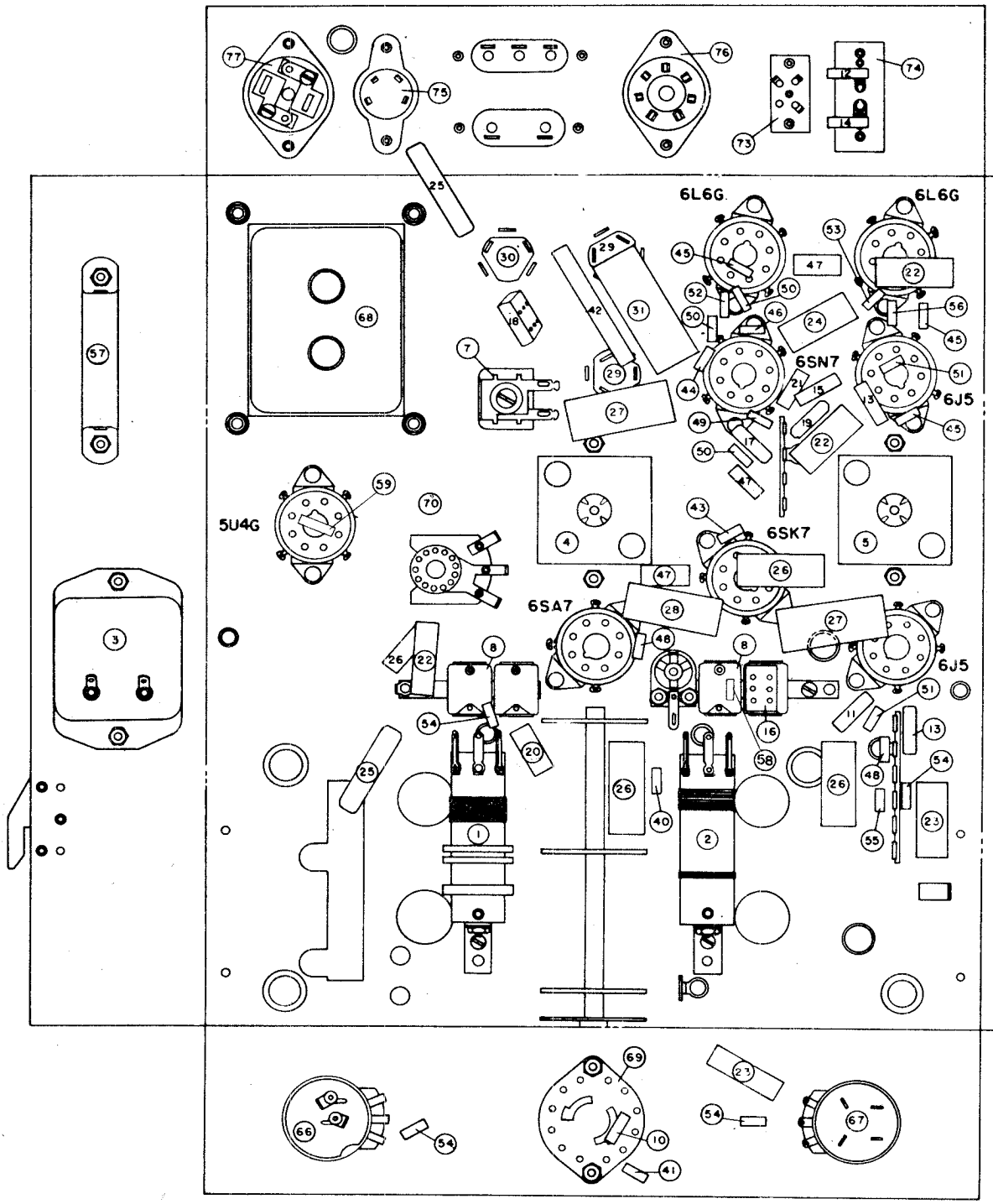
.....Mazda No. 51
.5 No. 582847
s 250 ohms
s 5.4 ohms
5,000/3 ohms

Record Changer: Seeburg Model K

• Clarified schematics, see P.15-23; for alignment and other data, see Pp.15-25 to 15-29

MODEL CR-193

THE MA



SPECIA INFO

The following information is provided for the service man who has a vacuum tube voltmeter or a simliar measuring instrument available.

STAGE GAINS*

Antenna Post to Converter Grid at:

600 kc.	5.5
6 mc.	2.0

R-F on Converter to I-F Grid at:

600 kc.	28
6 mc.	22

I-F on Converter Grid to I-F Grid at:

455 kc.	34

I-F Grid to Detector Plate at:

455 kc.	67

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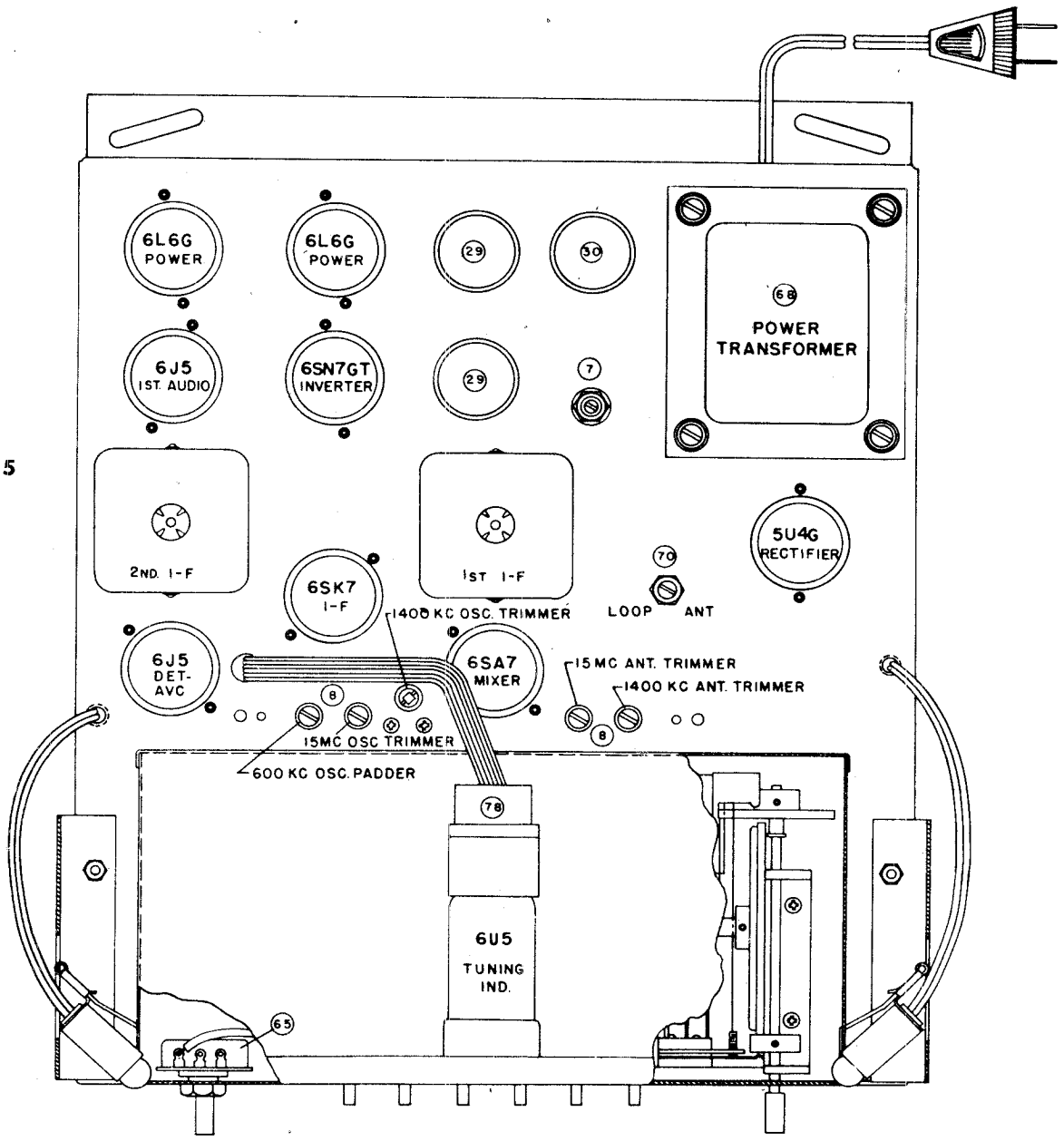


FIGURE 5

L SERVICE
IMATION

OSCILLATOR OUTPUT VOLTAGE

The DC voltage developed across Oscillator Grid Resistor (48) at:

600 kc.	5.6
6 mc.	6.0

AUDIO GAIN

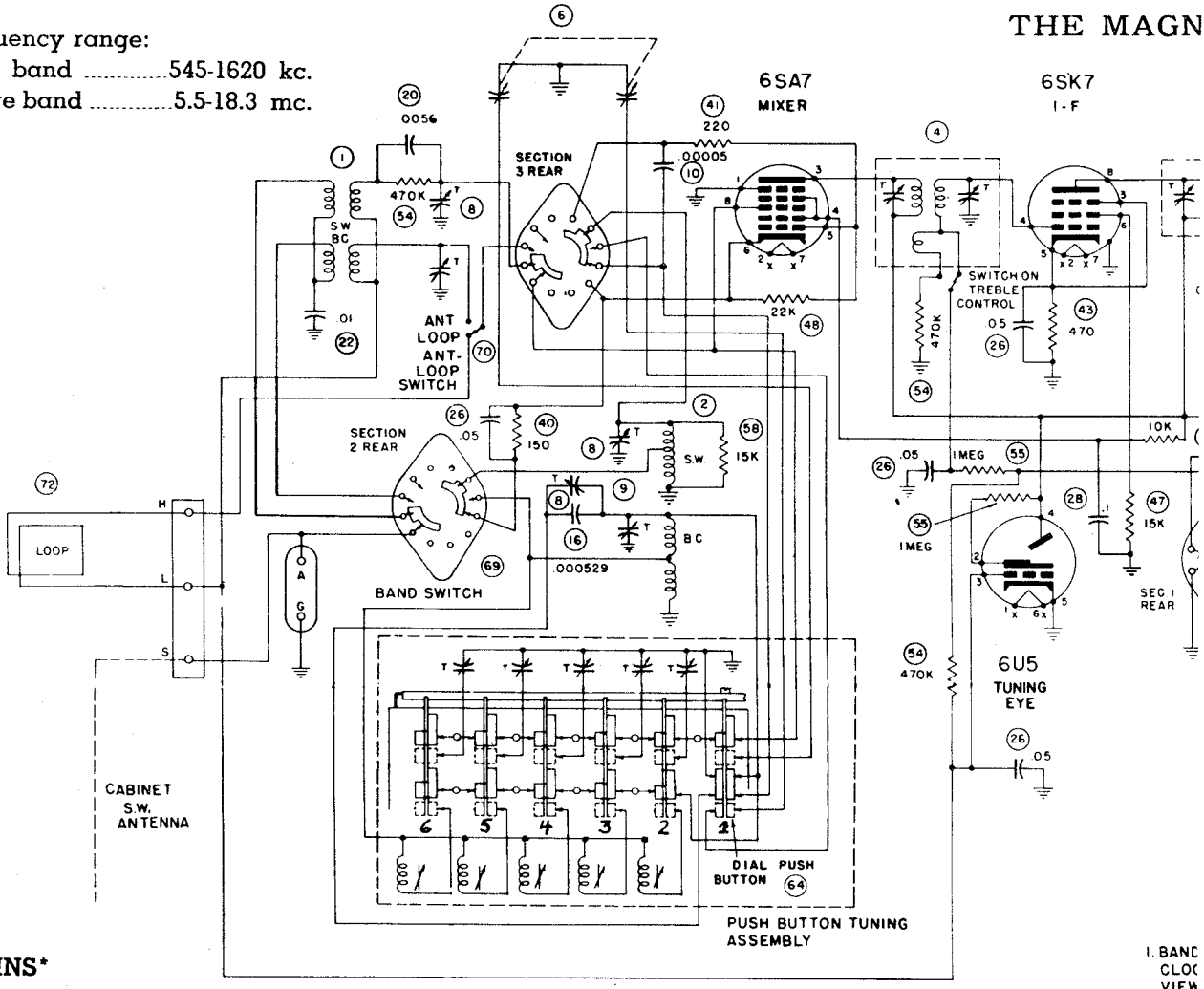
Voltage required across Volume Control to produce .05 watt speaker output** at 400 cycles is .010 volt with Band Selector Switch in BDCST setting.

* Variations of ±20% are permissible. All readings made with sufficient input signal to provide .05 watt speaker output.
** .05 watt speaker output at 400 cycles is equivalent to a reading of 0.4 volts as measured by a high resistance AC voltmeter across the voice coil of either speaker.

Tuning frequency range:

Broadcast band .....545-1620 kc.

Short wave band .....5.5-18.3 mc.



STAGE GAINS*

Antenna Post to Converter Grid at:

600 kc.	5.5
6 mc.	2.0

R-F on Converter Grid to I-F Grid at:

600 kc.	28
6 mc.	22

I-F on Converter Grid to I-F Grid at:

455 kc.	34

I-F Grid to Detector Plate at:

455 kc.	67

AUDIO GAIN

Voltage required across Volume Control to produce .05 watt speaker output** at 400 cycles is .010 volt with Band Selector Switch in BDCST setting.

OSCILLATOR OUTPUT VOLTAGE

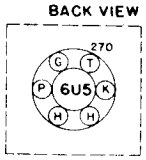
The DC voltage developed across Oscillator Grid Resistor (48) at:

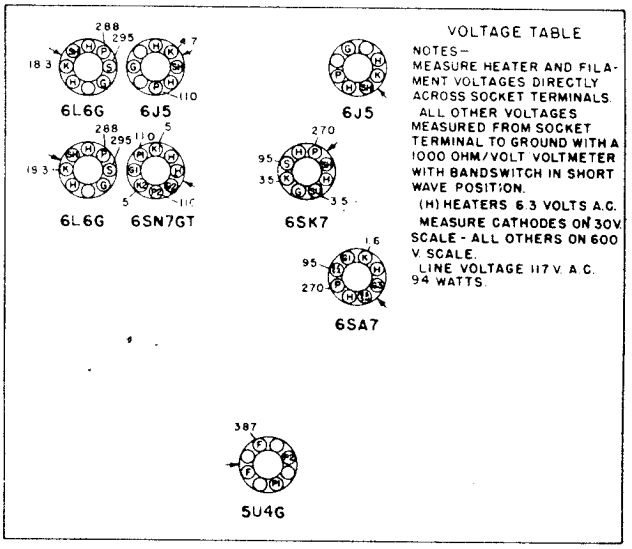
600 kc.	9.7
6 mc.	5.3

* Variations of 20% are permissible. All readings made with sufficient input signal to provide .05 watt speaker output.

** .05 watt speaker output at 400 cycles is equivalent to a reading of 0.4 volts as measured by a high resistance AC voltmeter across the voice coil of either speaker

TUNING EYE SOCKET BACK VIEW




6L6G
6J5
6L6G
6SN7GT
6J5
6SK7
6SA7
5U4G
VOLTAGE TABLE
NOTES—
MEASURE HEATER AND FILAMENT VOLTAGES DIRECTLY ACROSS SOCKET TERMINALS.
ALL OTHER VOLTAGES MEASURED FROM SOCKET TERMINAL TO GROUND WITH A 1000 OHM/VOLT VOLTMETER WITH BANDSWITCH IN SHORT WAVE POSITION.
(H) HEATERS 6.3 VOLTS A.C.
MEASURE CATHODES ON 30V SCALE - ALL OTHERS ON 600 V. SCALE.
LINE VOLTAGE 117 V. A.C. 94 WATTS.

FRONT

1. BAND CLOC VIEW

2. BAN FIRS BY 1

3. ALL IN, M OTH

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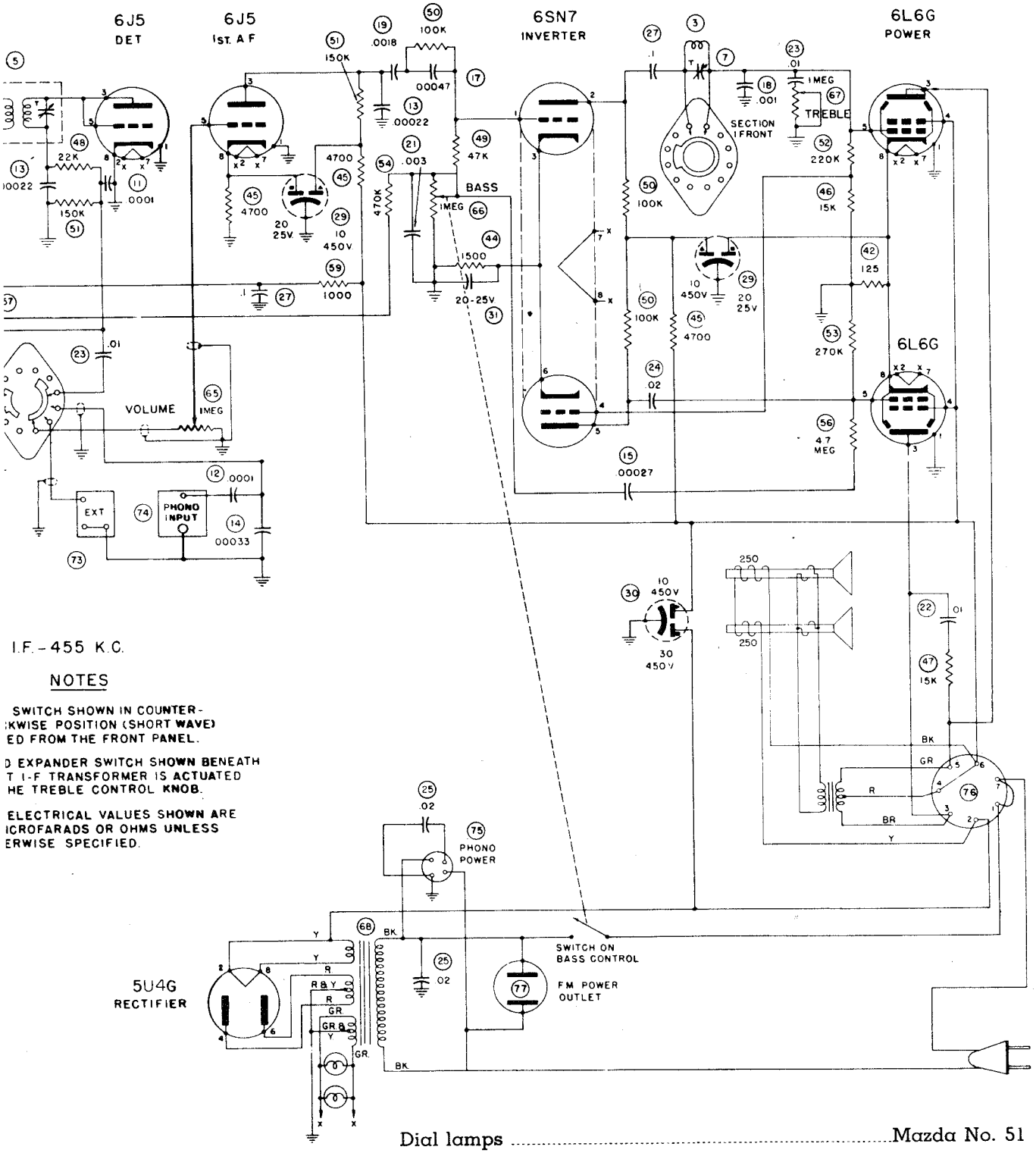
MODEL CR-194

AVOX CO.



I.F. - 455 K.C.

NOTES

SWITCH SHOWN IN COUNTER-KWISE POSITION (SHORT WAVE) ED FROM THE FRONT PANEL.

D EXPANDER SWITCH SHOWN BENEATH T I-F TRANSFORMER IS ACTUATED HE TREBLE CONTROL KNOB.

ELECTRICAL VALUES SHOWN ARE ICROFARADS OR OHMS UNLESS ERWISE SPECIFIED.

Dial lamps		Mazda No. 51
Speaker:	No. 582815	No. 582847
Field coil resistance	250 ohms	250 ohms
Voice coil impedance (400 cycles)	5.7 ohms	5.4 ohms
Output transformer	None	5,000/3 ohms
Power supply	117 volts 50/60 cycles AC	
Power consumption	150 watts	
Power output	20 watts	
Intermediate frequency	455 kc.	

For Clarified schematics, see P.15-45; for push button data, see P.15-47; for Parts list, see P.15-30

THE MAGNAVOX CO.

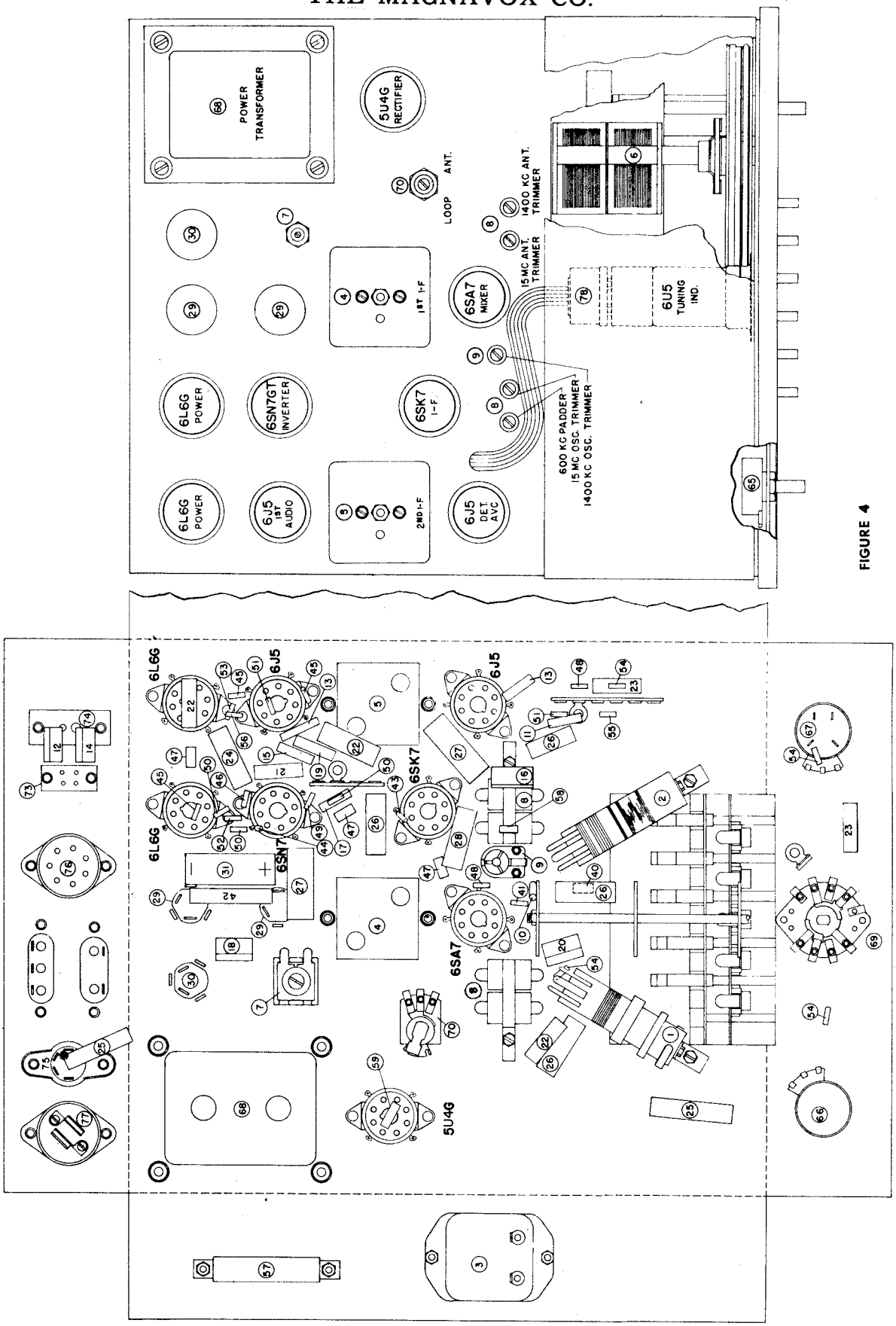


FIGURE 4

©John F. Rider

MODEL CR-194

THE MAGNAVOX CO

METHOD FOR REMOVING CHASSIS FROM CABINET

Model CR-194 radio chassis is designed for easy removal from the cabinet in which it is installed. As the radio panel is permanently fastened to the chassis, the control knobs need not be removed when the chassis is taken out of the cabinet for service. To remove the chassis, first remove the antenna leads from their terminals and all plugs from the receptacles on the rear of the chassis. Then remove the two Phillips-head screws from the angular slots in the flange at the rear of the chassis. Lift the rear of the chassis about one inch and pull it straight back.

Never remove the chassis tray from the cabinet—it has been properly positioned to bring the radio panel in place when the chassis is replaced.

In replacing the chassis, slide it so that the small hooks near the front, ride inside the flanges on the sides of the chassis tray. Push the chassis forward as far as it will go and the hooks should then engage the slots in the chassis tray. Replace the two Phillips-head screws and nuts and tighten securely. Replace all plugs in their receptacles and the antenna leads on their correct terminals. The antenna terminal board for the loop antenna connections is designated S-L-H. The end of the short wave antenna that is fastened to the inside of the cabinet connects to S. Always disconnect this antenna from terminal S when an outdoor antenna is used as it may pick up noise. The two terminals on the loop are designated L and H. The leads connected to these terminals should be wired to the corresponding terminals (L and H) on the chassis.

ALIGNMENT PROCEDURE

The alignment of this receiver requires the use of an accurately calibrated r-f signal generator and an output meter. All trimmer condenser locations are shown on the chassis layout diagram, Figure 4. The radio volume control should be turned to maximum and the signal generator output kept as low as possible during alignment to prevent the AVC from operating and giving false readings. *Always set the Selectivity Switch to SHARP TUNE before aligning the i-f stages.* This is done by turning the Treble Control counter-clockwise as far as possible.

I-F Alignment

1. Connect the output of the signal generator to the oscillator grid (pin No. 5) of the 6SA7 tube through a .00025 mfd. capacitor. The ground on the signal generator should be connected to the radio chassis ground.

2. Turn the condenser gang until it is completely meshed (low-frequency end of dial calibration), and set the band selector switch to BDCST as for broadcast band reception.

3. Adjust the signal generator to EXACTLY 455 kc. and peak the second i-f transformer and the first i-f transformer trimmers in that order.

Broadcast Band Alignment

1. Remove the signal generator lead from the 6SA7 grid and connect it to the radio antenna terminal through the .00025 mfd. capacitor. The ANT-LOOP switch (70) must be in the ANT setting.

2. Check the tuning dial pointer adjustment. When the plates of the tuning condenser are completely meshed, the dial pointer must be in line with the last calibration mark at the low frequency end of the dial. If it is not, slide the pointer on its string to the correct position. Be sure to crimp the lugs (on the rear of the pointer) tightly around the string to hold the pointer in adjustment.

3. With the band selector still set for broadcast band reception, adjust the signal generator and the radio receiver to 600 kc. While rocking the gang condenser a few degrees to the right and to the left, adjust the 600 kc. oscillator padder for maximum indication on the output meter.

4. Set the signal generator and the radio receiver to 1400 kc.; adjust the 1400 kc. oscillator trimmer and the 1400 kc. antenna trimmer for maximum output. If considerable adjustment was necessary, recheck the 600 kc. padder setting.

Short Wave Band Alignment

1. Set the band selector switch to SW as for Short Wave reception and substitute a 400 ohm resistor for the capacitor in series with the signal generator lead connected to the antenna terminal on the receiver.

2. Set the signal generator and the radio receiver to 15 mc.; then adjust the 15 mc. oscillator trimmer and the 15 mc. antenna trimmer for maximum output.

While adjusting the 15 mc. oscillator trimmer two peaks may be observed; only one is the correct peak for 15 mc. alignment. Screw in the trimmer to maximum capacity—then decrease the capacity until the first peak is observed. This is the correct one.

10 KC Filter Adjustment

This chassis incorporates a 10 kc. filter circuit to eliminate the beat note heard as a whistle between stations on the broadcast band. If the trimmer is out of adjustment, the following procedure should be observed.

1. Set the Selectivity Switch to FULL RANGE by turning the Treble Control knob clockwise as far as possible.

2. Connect the output of an audio oscillator to the phonograph pickup socket on the radio chassis and adjust the oscillator to EXACTLY 10,000 cycles.

3. Set the band selector to PHONO and adjust the 10 kc. trimmer (7) for minimum output.

4. If an audio oscillator is not available for making this adjustment, set the band selector to BDCST, connect an antenna to the receiver and set the gang condenser to a point between two stations on adjacent channels having approximately the same power. If the 10 kc. trimmer is out of adjustment, a whistle will be heard. Adjust the trimmer until the whistle is eliminated.

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MODEL CR-194

THE MAGNAVOX CO.

DIAL CORD REPLACEMENT

Two separate drive cables are used in the CR-194 dial assembly. One cable is used to transmit the motion from the dial tuning knob to the large pulley that is coupled to the condenser gang; the other cable actuates the dial pointer whenever the large pulley on the condenser gang is moved. Separate instructions for replacing either of these cables is given in the following paragraphs.

CONDENSER DRIVE CABLE REPLACEMENT

Slide a short length (approximately ½-inch) of sleeving over one end of a 19-inch length of dial cable, form a small loop and tie a knot in the manner shown on Figure 1. Hook this loop over the metal hook in pulley "C" and lace the cable through the pulley slot and around the pulley in a counter-clockwise direction when viewed from the rear of the panel, keeping the cable to the rear of the pulley groove. Lace the cable in the direction indicated by the arrow on the drawing wrapping 2½ turns around the smaller diameter portion of the tuning control shaft *from front to back;* then around the opposite side of pulley "C." Loop one end of tension spring "D" on the right-hand edge of the slot in pulley "C"; thread the free end of the drive cable through the opposite end of spring "D" and pull back on the cable until the spring coils are stretched to approximately one inch. Tie a double knot in the cable while maintaining tension on the spring, completing the operation.

DIAL POINTER DRIVE CABLE REPLACEMENT

Rotate the tuning control shaft until the slot in the groove of pulley "C" is up. Cut a piece of dial cable approximately 40 inches long and slide a short piece of sleeving over the cable. Tie a small loop in one end of the cable and temporarily hook it over the metal hook in pulley "C." Lace the other end through the slot in the pulley groove and in a counter-clockwise direction around the large pulley, then around pulley "B" and straight across the back of the dial frame; over pulley "A" and in a counter-clockwise direction around pulley "C." This last wrap around pulley "C" must be at the front of the pulley groove or nearest the panel. *This is important!* Lace the free end of the cable through the slot in pulley "C" and remove the other end of the cable from the hook.

Fasten one end of tension spring "E" over the pulley hook and lace the two free ends of the drive cable through the other end of the spring. Now pull back on the cable until the tension spring coils are stretched to approximately 1⅝ inches. Tie a double knot in the cable while maintaining tension on the spring.

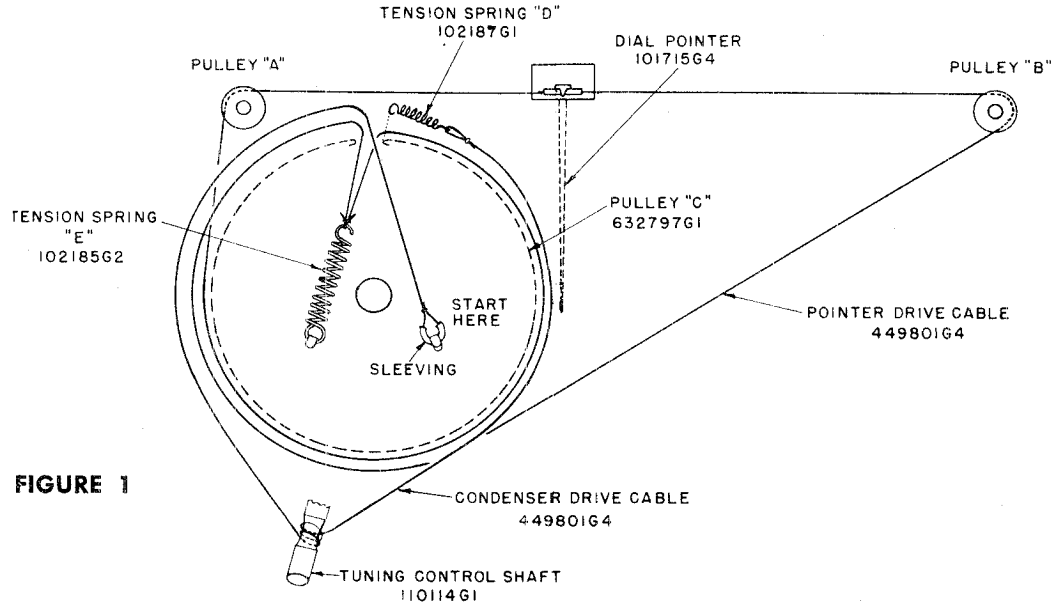

FIGURE 1

Turn the tuning control shaft until the condenser gang is completely meshed and slide the dial pointer on its track until it is in line with the last calibration mark at the low frequency end of the dial. The short piece of sleeving installed prior to the stringing operation should be slid to the rear of the dial pointer and the crimping lugs on the dial pointer pressed together over the sleeving. After checking to see that the condenser gang is still completely meshed and the dial pointer is in the position specified previously, apply a few drops of cement to each end of the sleeving to which the dial pointer is fastened. This completes the operation.

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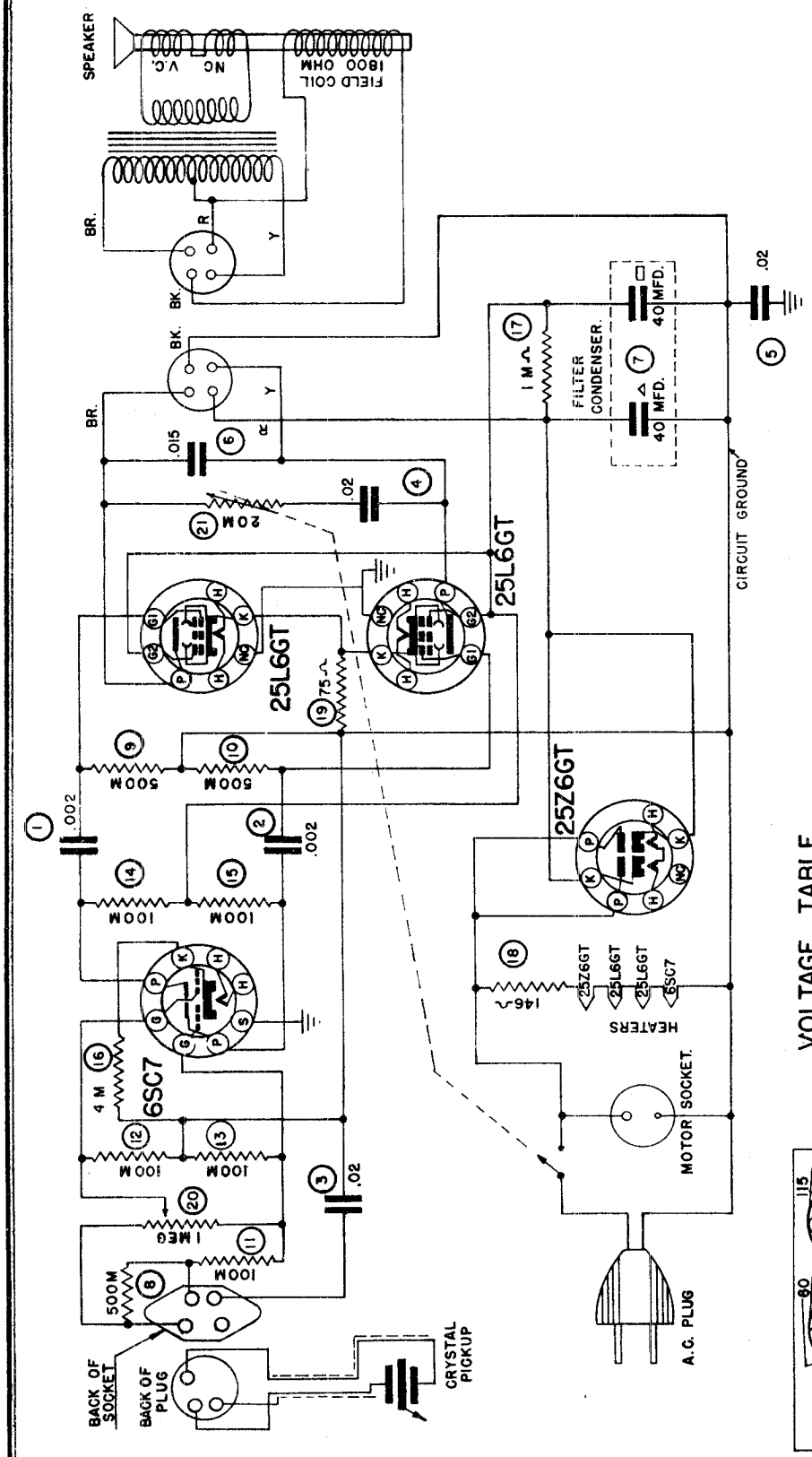
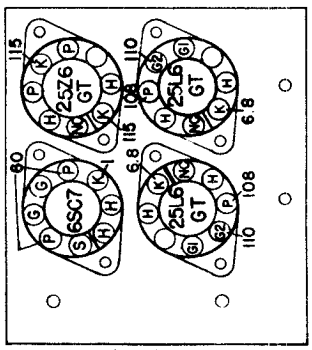
MODELS A-206F,
A-206G

THE MAGNAVOX CO.



VOLTAGE TABLE
(BOTTOM VIEW OF CHASSIS)

MEASURE ALL D.C. VOLTAGES DIRECT TO CIRCUIT GROUND WITH A 1000 OHM PER VOLT VOLTMETER. CATHODE(K) 30 V. SCALE. ALL OTHERS ON 600 V. SCALE. LINE VOLTAGE 117 VOLTS AC.



Primary voltage	117 V. 60 cycle AC;
Power consumption	65 watts;
Power output	3 watts;
Vacuum tubes	1 - 6SC7; 2 - 25L6GT; 1 - 25Z6GT;
Speaker: Field Coil	*1800 ohms;
Transformer	**3000 ohms;

* DC resistance. ** Primary impedance.

Models A-206F and A-206G are alike electrically. They differ slightly only in their mechanical layout.

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A-206F. A-206G

Ref. No.	Description	Magnavox Part No.
1	Capacitor, tubular, .002 mfd. 600 V.	254161
2	Capacitor, tubular, .002 mfd. 600 V.	254161
3	Capacitor, tubular, .02 mfd. 600 V.	250056
4	Capacitor, tubular, .02 mfd. 600 V.	250056
5	Capacitor, molded paper, .02 mfd. 600 V.	250056
6	Capacitor, molded paper, .015 mfd. 600 V.	250069
7	Capacitor, electrolytic, 40-40 mfd. 150 V.	270013
8	Resistor, carbon, 500,000 ohm ⅓ W.	239755
9	Resistor, carbon, 500,000 ohm ⅓ W.	239755
10	Resistor, carbon, 500,000 ohm ⅓ W.	239755
11	Resistor, carbon, 100,000 ohm ⅓ W.	239753
12	Resistor, carbon, 100,000 ohm ⅓ W.	239753
13	Resistor, carbon, 100,000 ohm ⅓ W.	239753
14	Resistor, carbon, 100,000 ohm ⅓ W.	239753
15	Resistor, carbon, 100,000 ohm ⅓ W.	239753
16	Resistor, carbon, 4,000 ohm ⅓ W.	230024
17	Resistor, carbon, 1,000 ohm ⅓ W.	239745
18	Resistor, wire wound, 146 ohm 15 W.	240015
19	Resistor, wire wound, 75 ohm 5 W.	230056
20	Control, volume, 1 megohm	222518
21	Control, tone with power switch, 20,000 ohm	220021
	Socket, octal marked 6SC7	180126
	Socket, octal marked 25L6GT	180128
	Socket, octal marked 25Z6GT	180129
	Socket, crystal pickup	180081
	Socket and cable assembly, motor	460052
	Socket and cable assembly, speaker	460076
	Knob, control, stamped VOLUME	140035
	Knob, control, stamped OFF-ON-TONE	140036

A-307P2

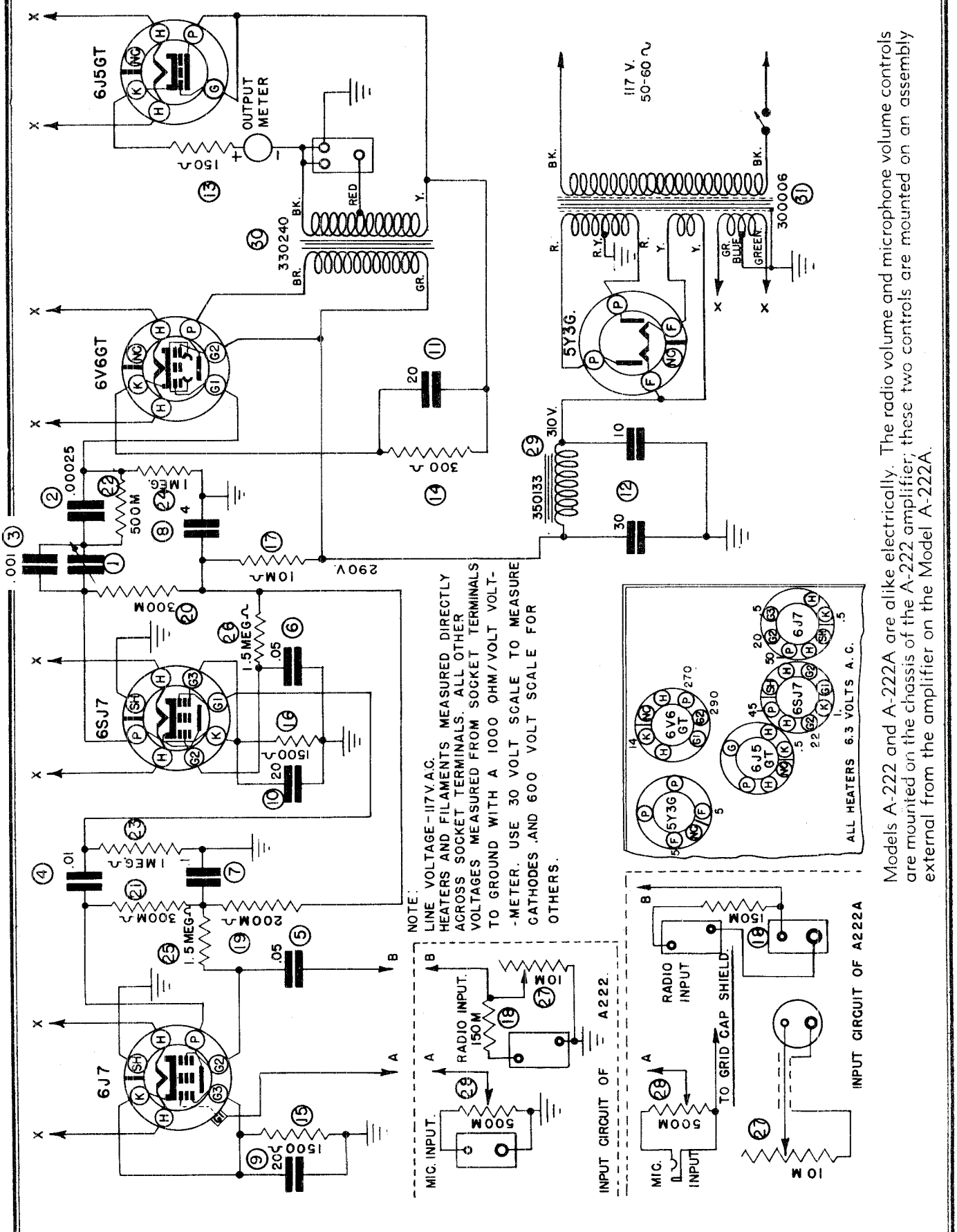
Ref. No.	Description	Magnavox Part No.
C1	Capacitor, tubular, .005 mfd. 600 V.	254180
C2	Capacitor, tubular, .00025 mfd. 600 V.	254133
C3	Capacitor, tubular, .003 mfd. 600 V.	254163
C4	Capacitor, electrolytic, 25 mfd. 25 V.	274165
C5	Capacitor, electrolytic, 10 mfd. 150 V.	270001
C6	Capacitor, tubular, .2 mfd. 200 V.	254182
C7	Capacitor, tubular, .2 mfd. 200 V.	254182
C8	Capacitor, electrolytic, 16 mfd. 150 V.	274212
C9	Capacitor, electrolytic, 16 mfd. 150 V.	274212
C10	Capacitor, electrolytic, 16 mfd. 150 V.	274212
C11	Capacitor, tubular, .2 mfd. 200 V.	254182
C12	Capacitor, tubular, .02 mfd. 600 V.	254127
R1	Control, volume 100,000—500,000 ohm	222383
R2	Resistor, carbon, 100,000 ohm ½ W.	234445
R4	Resistor, carbon, 60,000 ohm ½ W.	234440
R5	Resistor, carbon, 20,000 ohm ½ W.	234435
R6	Control, treble, 20,000 ohm, with switch	222556
R7	Resistor, carbon, 1 megohm ½ W.	234450
R8	Resistor, carbon, 5,000 ohm ½ W.	234430
R9	Resistor, carbon, 50,000 ohm ½ W.	234439
R10	Resistor, carbon, 40,000 ohm ½ W.	234438
R11	Resistor, carbon, 10,000 ohm ½ W.	234433
R12	Resistor, carbon, 10,000 ohm ½ W.	234433
R13	Resistor, carbon, 100,000 ohm ½ W.	234445
R14	Resistor, carbon, 100,000 ohm ½ W.	234445
R15	Resistor, wire wound, 60 ohm	247852
R16	Resistor, carbon, 3 megohm ½ W.	234452
R17	Resistor, carbon, 3 megohm ½ W.	234452
T1	Transformer, input	320189
	Choke, filter	350107
	Knob, control marked VOLUME	149570
	Knob, control marked TONE	149571
	Lamp, 120 V. pilot	182593
	Socket, octal marked 6C5	182658
	Socket, octal marked 25L6	182657
	Socket, octal marked 25Z5	182656
	Socket, 5 prong marked SPK	182525
	Socket, pilot lamp	182769
	Fuse, cartridge, 2 amp.	182606

A-307P6

Ref. No.	Description	Magnavox Part No.
1	Capacitor, tubular, .005 mfd. 600 V.	254180
2	Capacitor, tubular, .02 mfd. 400 V.	250015
3	Capacitor, tubular, .01 mfd. 400 V.	254158
4	Capacitor, tubular, .01 mfd. 400 V.	254158
5	Capacitor, tubular, .5 mfd. 200 V.	254134
6	Capacitor, electrolytic, 20 mfd. 15 V.	270018
7	Capacitor, electrolytic 40-40 mfd. 150 V.	270013
8	Resistor, carbon, 500,000 ohm ⅓ W.	239755
9	Resistor, carbon, 500,000 ohm ⅓ W.	239755
10	Resistor, carbon, 500,000 ohm ⅓ W.	239755
11	Resistor, carbon, 250,000 ohm ⅓ W.	230010
12	Resistor, carbon, 250,000 ohm ⅓ W.	230010
13	Resistor, carbon, 50,000 ohm ⅓ W.	239751
14	Resistor, carbon, 20,000 ohm ⅓ W.	239750
15	Resistor, carbon 4,000 ohm ⅓ W.	230024
16	Resistor, carbon, 1,000 ohm ⅓ W.	239745
17	Resistor, wire wound, 146 ohm	240015
18	Resistor, carbon, 75 ohm	230056
	Socket, octal marked 6SC7	180126
	Socket, octal marked 25L6GT	180137
	Socket, octal marked 25Z6GT	180129
	Socket, 5-prong marked SPK	180012
	Socket, 4-prong marked IN	180024
	Socket, pilot lamp	182769
	Socket, crystal pickup	180081
	Lamp, 120 V. pilot	182593

MODELS A-222
A-222A

THE MAGNAVOX CO.



Models A-222 and A-222A are alike electrically. The radio volume and microphone volume controls are mounted on the chassis of the A-222 amplifier; these two controls are mounted on an assembly external from the amplifier on the Model A-222A.

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A-222, A-222A

Primary voltage . . . . . 117 V. 60 cycle AC;
Power consumption . . . . . 46 watts;
Input impedance: Radio Input . . . . . 10,000 ohms;
Microphone Input . . . . . 500,000 ohms;
Output impedance: . . . . . 15 ohms;
Power output . . . . . 3 watts;
Vacuum tubes . . . 1-6J7; 1-6SJ7; 1-6V6GT; 1-6J5GT; 1-5Y3G;

Ref. No.	Description	Magnavox Part No.
1	Capacitor, trimmer, 250-525 mmf.	250066
2	Capacitor, molded mica, .00025 mfd.	259772
3	Capacitor, molded mica, .001 mfd.	259604
4	Capacitor, paper, .01 mfd. 400 V.	254158
5	Capacitor, paper, .05 mfd. 400 V.	254146
6	Capacitor, paper, .05 mfd. 400 V.	254146
7	Capacitor, paper, 0.1 mfd. 400 V.	254166
8	Capacitor, electrolytic, 4 mfd. 450 V.	270015
9	Capacitor, electrolytic, 20 mfd. 25 V.	273611
10	Capacitor, electrolytic, 20 mfd. 25 V.	273611
11	Capacitor, electrolytic, 20 mfd. 25 V.	273611
12	Capacitor, electrolytic, 30-10 mfd. 450 V.	273610
13	Resistor, carbon, 150 ohm ⅓ W.	230033
14	Resistor, carbon, 300 ohm 2 W.	234508
15	Resistor, carbon, 1500 ohm ⅓ W.	230041
16	Resistor, carbon, 1500 ohm ⅓ W.	230041
17	Resistor, carbon, 10,000 ohm ⅓ W.	239749
18	Resistor, carbon, 150,000 ohm ⅓ W.	239785
19	Resistor, carbon, 200,000 ohm ⅓ W.	239754
20	Resistor, carbon, 300,000 ohm ⅓ W.	230017
21	Resistor, carbon, 300,000 ohm 1 W.	234488
22	Resistor, carbon, 500,000 ohm ⅓ W.	239755
23	Resistor, carbon, 1 megohm ⅓ W.	239756
24	Resistor, carbon, 1 megohm ⅓ W.	239756
25	Resistor, carbon, 1.5 megohm ⅓ W.	230012
26	Resistor, carbon, 1.5 megohm ⅓ W.	230012
27	Control, 10,000 ohm with power switch	220023
28	Control, 500,000 ohm	220026
29	Choke, filter	350133
30	Transformer, output	330240
31	Transformer, power, 117 V. 50-60 cycle	300006
	Lamp, 6-8 V. pilot	183657
	Socket, pilot lamp	180078
	Socket, octal marked 6J7	180100
	Socket, octal marked 6SJ7	180064
	Socket, octal marked 6V6GT	180099
	Socket, octal marked 6J5GT	180085
	Socket, octal marked 5Y3G	180094
	Socket, output	180097
	Socket, radio input	180098
	Socket, microphone input	189741
	Socket, output meter	182776

A-3001

Primary voltage . . . . . 117 V. 60 cycle AC;
Power consumption . . . . . 134 watts;
Power output . . . . . 25 watts;
Vacuum tubes 1-6C5; 1-6L6G; 1-5Z3;

Speaker:	Model 132	Model 302;
Field coil	*2600 ohms	*3500 ohms;
Transformer	None	**5000 ohms;

* DC resistance. ** Primary impedance.

AMPLIFIER

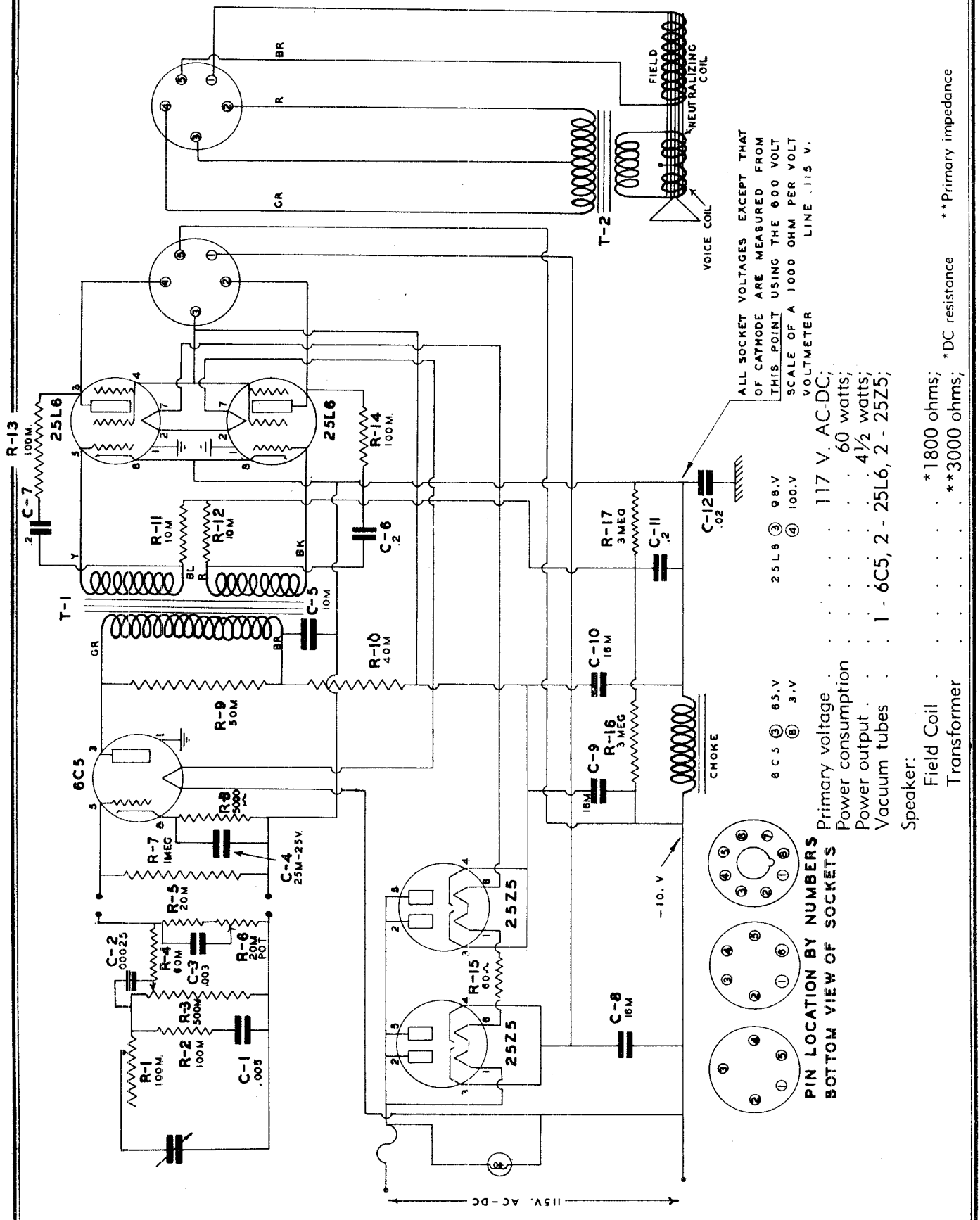
Ref. No.	Description	Magnavox Part No.
C1, C6	Capacitor, electrolytic, 25 mfd. 25 V., 25 mfd. 50 V.	274224
C2	Capacitor, tubular, .5 mfd. 400 V.	254147
C3	Capacitor, tubular, .5 mfd. 400 V.	254147
C4	Capacitor, tubular, .5 mfd. 400 V.	254147
C5	Capacitor, tubular, .002 mfd. 600 V.	254161
C7	Capacitor, tubular, .01 mfd. 600 V.	254153
C8	Capacitor, tubular, .01 mfd. 600 V.	254153
C9	Capacitor, tubular, .5 mfd. 400 V.	254147
C10	Capacitor, electrolytic, 10 mfd. 500 V.	274194
C11	Capacitor, tubular, .2 mfd. 200 V.	254182
C12	Capacitor, electrolytic, 10 mfd. 500 V.	274194
C13	Capacitor, tubular, .1 mfd. 200 V.	254152
R1	Resistor, carbon, 200,000 ohm ½ W.	234447
R2	Resistor, carbon, 2000 ohm ½ W.	234426
R3	Resistor, carbon, 15,000 ohm ½ W.	234434
R4	Resistor, carbon, 15,000 ohm ½ W.	234434
R5	Resistor, carbon, 15,000 ohm ½ W.	234434
R6	Resistor, wire wound, 200 ohm	242607
R7	Resistor, carbon, 7500 ohm 2 W.	234518
R8	Resistor, carbon, 7500 ohm 2 W.	234518
T1	Transformer, input	320187
T2	Transformer, output	330188
T3	Transformer, power, 117 V. 50-60 cycle	300106
1	Choke, tone filter	350122
	Choke, filter	350113

CONTROL PANEL

C1	Capacitor, molded mica, .002 mfd.	259603
C2	Capacitor, molded mica, .001 mfd.	259604
C3	Capacitor, molded mica, .002 mfd.	259603
R1	Control, bass, 1 megohm	222444
R2	Resistor, carbon, 150,000 ohm ½ W.	234446
R3	Control, volume, 1 megohm	222444
R4	Resistor, carbon, 50,000 ohm ½ W.	234439
R5	Control, treble, 200,000 ohm	222445
1	Choke, tone filter	362463
2	Switch, "radio-phono" changeover	169602
	Socket, Phonograph pickup cable	182465
	Socket, pilot lamp	182803

MODEL A-307P2

THE MAGNAVOX CO.



Primary voltage . . . . . 117 V. AC-DC;
Power consumption . . . . . 60 watts;
Power output . . . . . 4½ watts;
Vacuum tubes . . . 1 - 6C5, 2 - 25L6, 2 - 25Z5;

Speaker:
Field Coil . . . . . *1800 ohms;
Transformer . . . . . **3000 ohms; *DC resistance **Primary impedance

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For Parts list, see P.15-67

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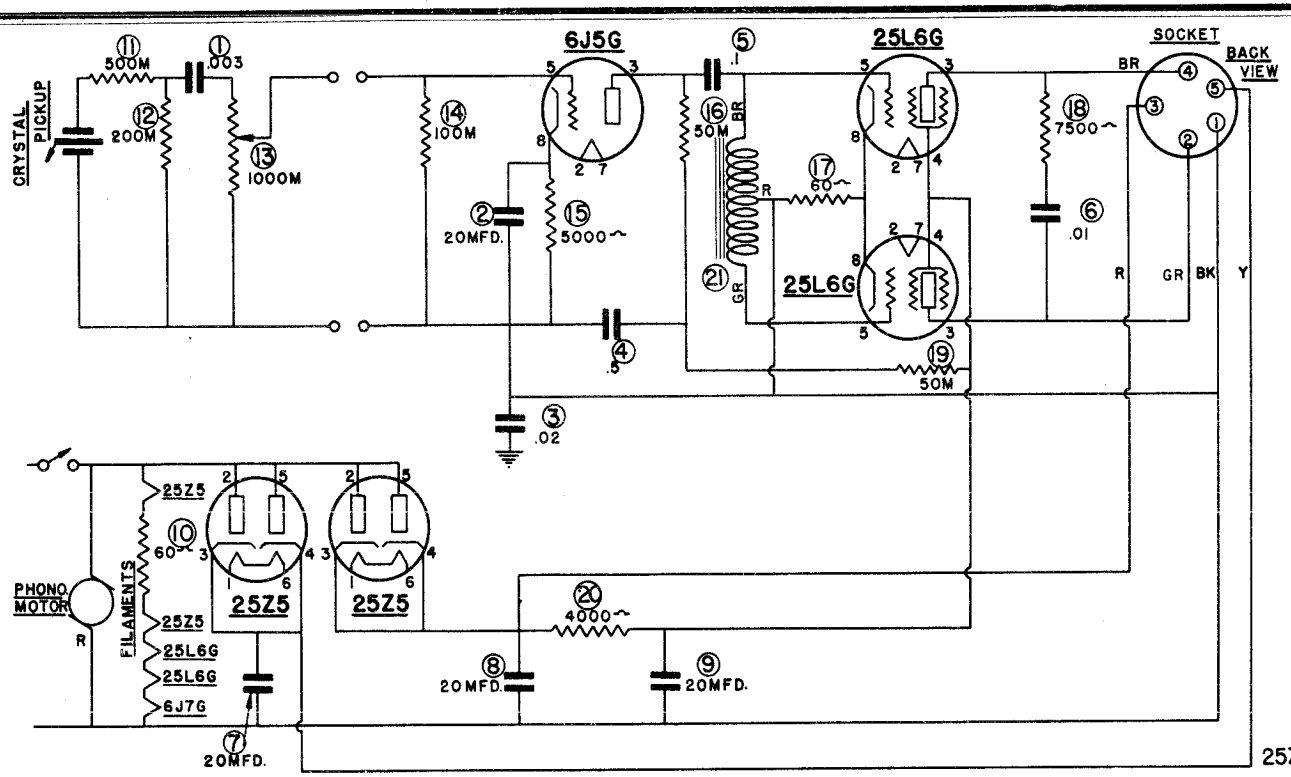
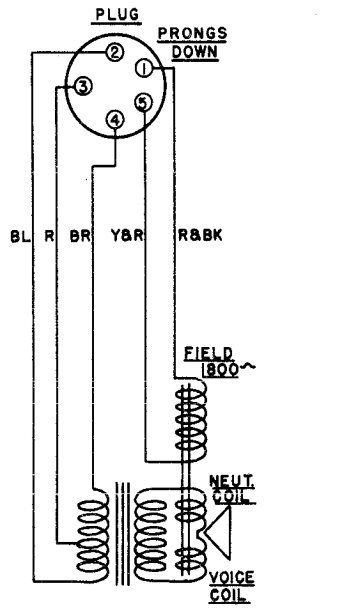
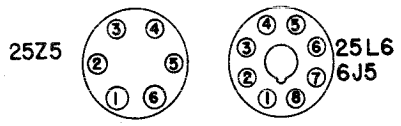




PIN LOCATION OF SOCKETS
BOTTOM VIEW



Ref. No.	Description	Magnavox Part No.
1	Capacitor, moulded mica, .003 mfd.	259778
2	Capacitor, electrolytic, 20 mfd. 25 V.	279993
3	Capacitor, tubular, .02 mfd. 600 V.	254127
4	Capacitor, tubular, .5 mfd. 200 V.	254134
5	Capacitor, tubular, .1 mfd. 400 V.	254166
6	Capacitor, tubular, .01 mfd. 400 V.	254158
7	Capacitor, electrolytic, 20 mfd. 150 V.	279992
8	Capacitor, electrolytic, 20 mfd. 150 V.	279992
9	Capacitor, electrolytic, 20 mfd. 150 V.	279992
10	Resistor, wire wound, 60 ohm 10 W.	247852
11	Resistor, carbon, 500,000 ohm ⅓ W.	239755
12	Resistor, carbon, 200,000 ohm ⅓ W.	239754
13	Control, volume, 1 megohm, with switch	223555
14	Resistor, carbon, 100,000 ohm ⅓ W.	239753
15	Resistor, carbon, 5,000 ohm ½ W.	234430
16	Resistor, carbon, 50,000 ohm ½ W.	234439
17	Resistor, carbon, 60 ohm 2 W.	234502
18	Resistor, carbon, 7,500 ohm ½ W.	239991
19	Resistor, carbon, 50,000 ohm ½ W.	234439
20	Resistor, carbon, 4,000 ohm ½ W	234429
21	Transformer, input	320233
	Socket, octal marked 6J5	189914
	Socket, octal marked 25L6	189995
	Socket, octal marked 25Z5	189996
	Knob, control	144100

NUMBERS IN CIRCUIT ARE NUMBERS SHOWN WHEN VIEWING CHASSIS FROM BOTTOM SIDE

SOCKET VOLTAGES

LINE VOLTAGE 117 V. A.C.
ALL VOLTAGES MEASURED TO CONDENSER (FILTER) GROUND WITH A 1000 OHM/VOLT VOLTMETER ON 600 V. SCALE.
MEASURE CATHODES ON 30 V. SCALE

25L6G		6J5G	
③	110 V.	③	48 V.
④	96 V.	⑧	1.2 V.
⑧	5.3 V.		

Primary voltage . . . . . 117 V. AC-DC;
Power consumption . . . . . 60 watts;
Power output . . . . . 6 watts;
Vacuum tubes . . 1 - 6J5, 2 - 25L6G, 2 - 25Z5

Speaker:
Field Coil . . . . . *1800 ohms;
Transformer . . . . . **3500 ohms;

*DC resistance

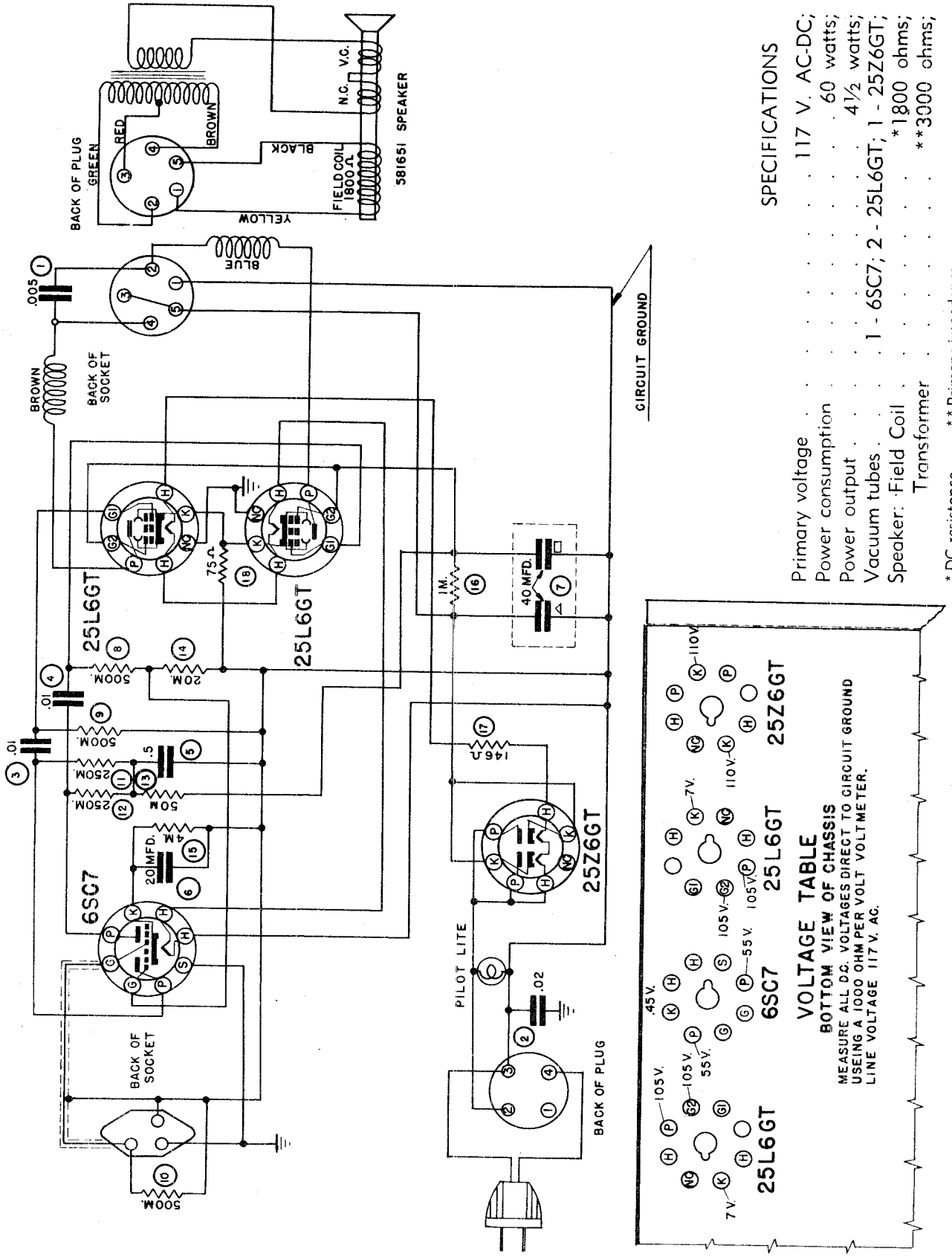
**Primary impedance

THE MAGNAVOX CO.

MODEL A-307P4 MAGNAVOX PAGE 15-71

MODEL A-307P6

THE MAGNAVOX CO.



SPECIFICATIONS

Primary voltage	117 V. AC-DC;
Power consumption	60 watts;
Power output	4½ watts;
Vacuum tubes	1 - 6SC7; 2 - 25L6GT; 1 - 25Z6GT;
Speaker: Field Coil	*1800 ohms;
Transformer	**3000 ohms;

* DC resistance. ** Primary impedance.

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For Parts list, see P.15-67

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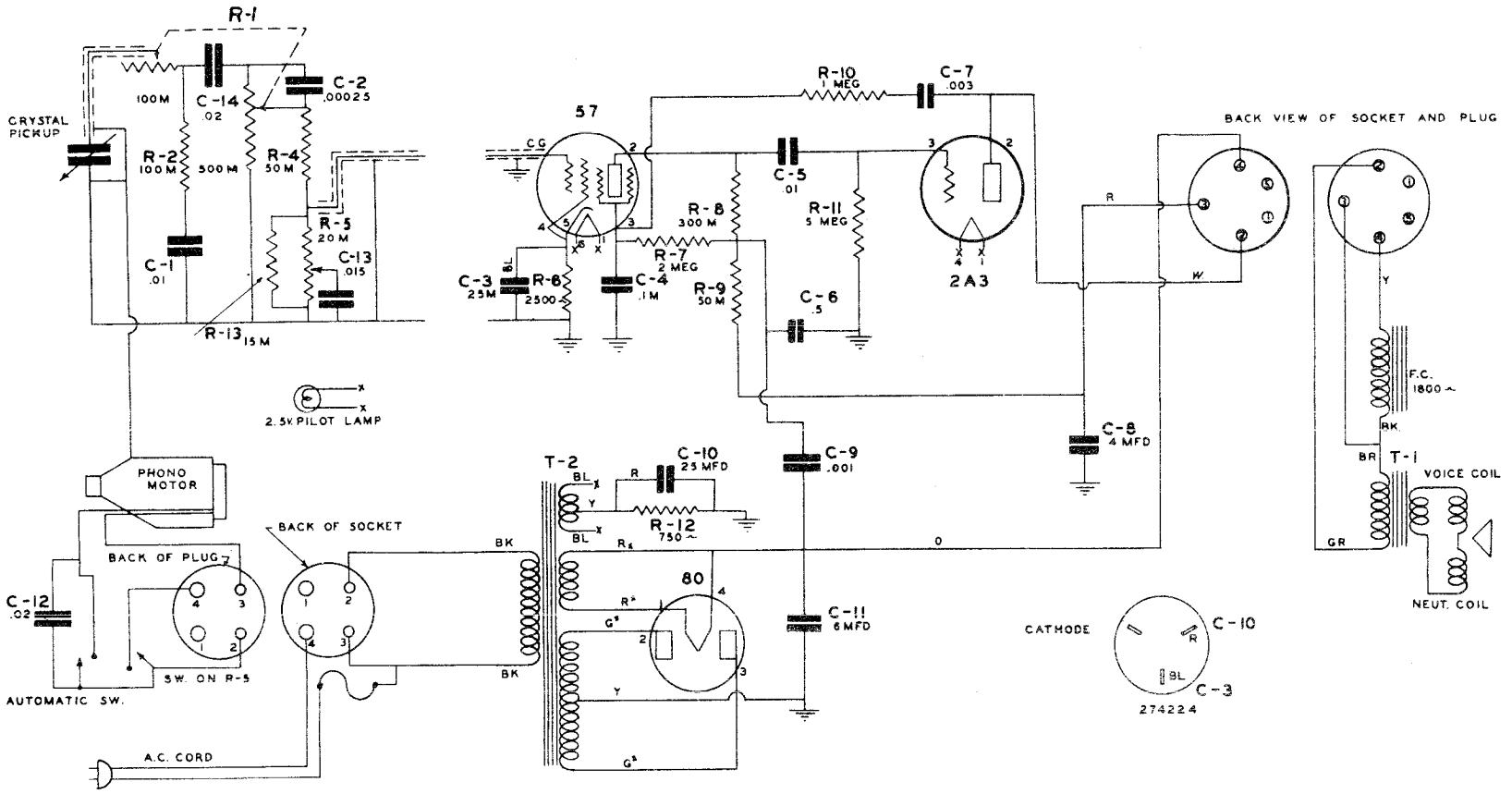
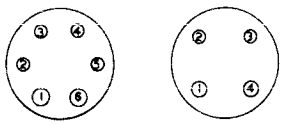




PIN LOCATION BY NUMBERS
BOTTOM VIEW OF SOCKETS

SOCKET VOLTAGES EXCEPT THOSE OF CATHODES ARE MEASURED FROM GROUND USING THE 600 VOLT SCALE OF A 1000 OHMS PER VOLT VOLTMETER. LINE 115 V.

57	2A3	OUTPUT SOCKET
②— 85 V.	②— 282 V.	②— 400 V.
③— 2.5 V.	①— 43 V.	③— 295 V.
④ ⑤— 1.3 V.		

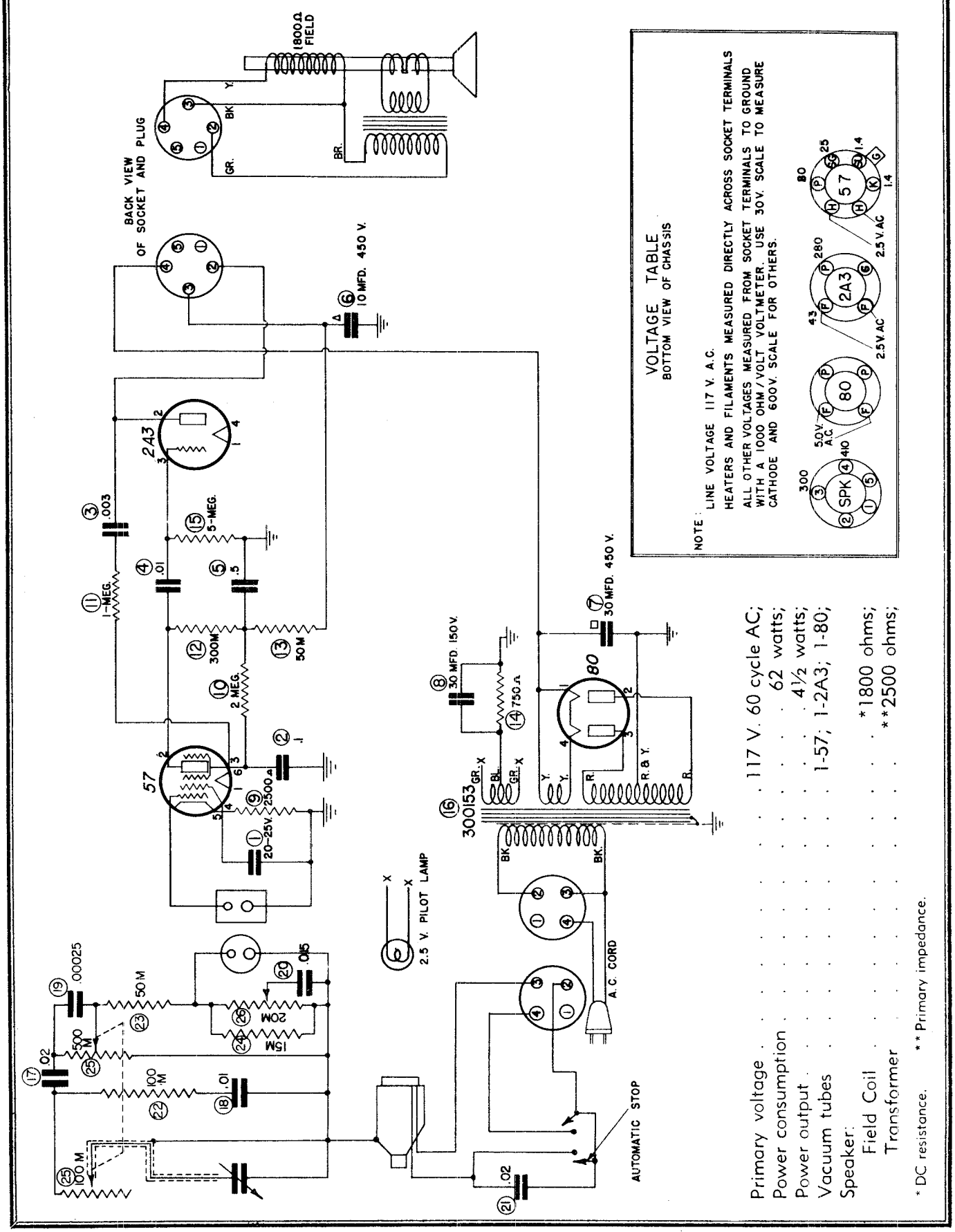
Primary voltage	117 V. 60 cycle AC;
Power consumption	62 watts;
Power output	4½ watts;
Vacuum tubes	1 57, 1 2A3, 1 80;
Speaker:	
Field Coil	*1800 ohms;
Transformer	**2500 ohms;

* DC resistance. ** Primary impedance.

For Parts list, see P.15-75

MODEL A-501B

THE MAGNAVOX CO.



Primary voltage	117 V. 60 cycle AC;
Power consumption	62 watts;
Power output	4½ watts;
Vacuum tubes	1-57; 1-2A3; 1-80;
Speaker:	
Field Coil	*1800 ohms;
Transformer	**2500 ohms;

* DC resistance. ** Primary impedance.

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A-501

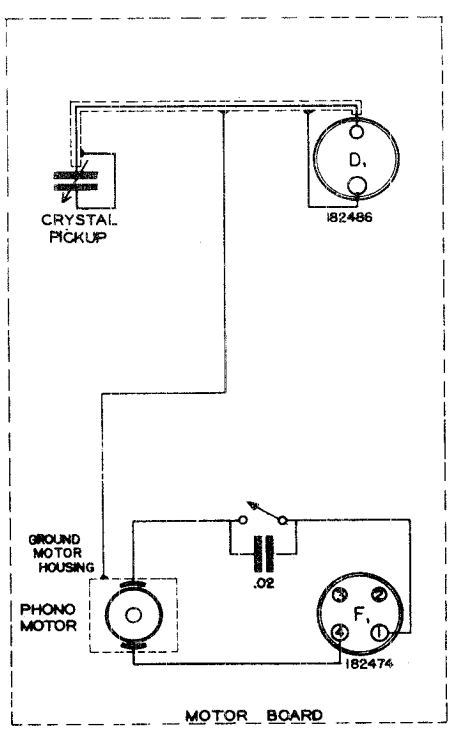
Ref. No.	Description	Magnavox Part No.
C1	Capacitor, tubular, .01 mfd. 600 V.	254153
C2	Capacitor, tubular, .00025 mfd. 600 V.	254133
C3, C10	Capacitor, electrolytic, 25 mfd. 25 V., 25 mfd. 50 V.	274224
C4	Capacitor, tubular, .1 mfd. 600 V.	254181
C5	Capacitor, tubular, .01 mfd. 600 V.	254153
C6	Capacitor, tubular, .5 mfd. 400 V.	254147
C7	Capacitor, tubular, .003 mfd. 600 V. +10%	254163
C8	Capacitor, electrolytic, 4 mfd. 500 V.	274238
C9	Capacitor, tubular, .001 mfd. 600 V.	254142
C11	Capacitor, electrolytic, 6 mfd. 500 V.	274250
C12	Capacitor, tubular, .02 mfd. 110 V. AC	259228
C13	Capacitor, tubular, .015 mfd. 600 V.	254131
C14	Capacitor, tubular, .02 mfd. 600 V.	254127
R1	Control, volume, 110,000-500,000 ohm	222383
R2	Resistor, carbon, 100,000 ohm ½ W.	234445
R4	Resistor, carbon, 50,000 ohm ½ W.	234439
R5	Control, treble, 20,000 ohm	222556
R6	Resistor, carbon, 2,500 ohm ½ W.	234427
R7	Resistor, carbon, 2 megohm ½ W.	234451
R8	Resistor, carbon, 300,000 ohm ½ W.	234448
R9	Resistor, carbon, 50,000 ohm ½ W.	234439
R10	Resistor, carbon, 1 megohm ½ W.	234450
R11	Resistor, carbon, 5 megohm 1 W.	234498
R12	Resistor, wire wound, 750 ohm	247816
T1	Transformer, power, 117 V. 60 cycle	300100
	Knob, "volume"	149570
	Knob, "tone"	149571
	Socket, pilot lamp	182458
	Socket, 6 prong marked 57	187334
	Socket, 4 prong marked 2A3	187332
	Socket, 4 prong marked 80	187326
	Socket, 5 prong (for speaker plug)	187331
	Socket, 4 prong (for motor plug)	182668
	Lamp, 2.5 V. pilot	187152
	Fuse, 2 amp. cartridge	182606

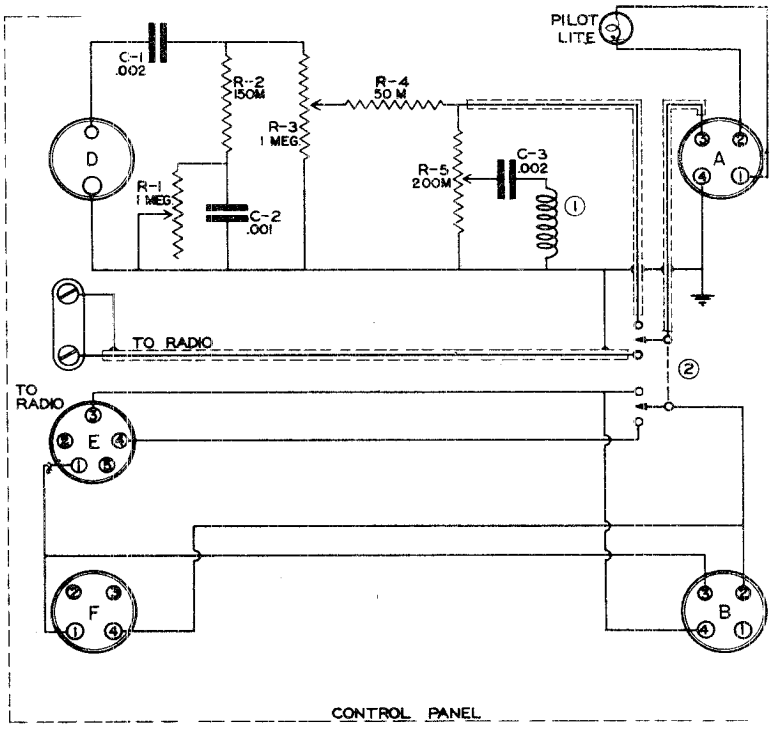
A-501B

Ref. No.	Description	Magnavox Part No.
1	Capacitor, electrolytic, 20 mfd. 25 V.	273611
2	Capacitor, tubular, .1 mfd. 600 V.	254181
3	Capacitor, tubular, .003 mfd. 600 V.	254163
4	Capacitor, tubular, .01 mfd. 600 V.	254153
5	Capacitor, tubular, .5 mfd. 400 V.	254147
6, 7	Capacitor, electrolytic, 30-10 mfd. 450 V.	273610
8	Capacitor, electrolytic, 30 mfd. 50 V.	270003
9	Resistor, carbon, 2500 ohms ½ W.	234427
10	Resistor, carbon, 2 megohm ½ W.	234451
11	Resistor, carbon, 1 megohm ½ W.	234450
12	Resistor, carbon, 300,000 ohm ½ W.	234448
13	Resistor, carbon, 50,000 ohm ½ W.	234439
14	Resistor, wire wound, 750 ohm 5 W.	240005
15	Resistor, carbon, 5 megohm ½ W.	234454
16	Transformer, power, 117 V. 60 cycle	300153
17	Capacitor, tubular, .02 mfd. 600 V.	254127
18	Capacitor, tubular, .01 mfd. 600 V.	254153
19	Capacitor, tubular, .00025 mfd. 600 V.	254133
20	Capacitor, tubular, .015 mfd. 600 V.	254131
21	Capacitor, tubular, .02 mfd. 110 V. AC	259935
22	Resistor, carbon, 100,000 ohm ½ W.	234445
23	Resistor, carbon, 50,000 ohm ½ W.	234439
24	Resistor, carbon, 15,000 ohm ½ W.	234434
25	Control, volume, 500,000—100,000 ohm	222383
26	Control, treble, 20,000 ohm	222556
	Socket, 2 prong, phonograph input	189741
	Socket, 6 prong marked 57	180011
	Socket, 5 prong marked SPK	180012
	Socket, 4 prong marked IN	180014
	Socket, 4 prong marked 2A3	180013
	Socket, 4 prong marked 80	180010
	Socket, pilot lamp	180017
	Knob, marked VOLUME	149570
	Knob, marked TONE	149571

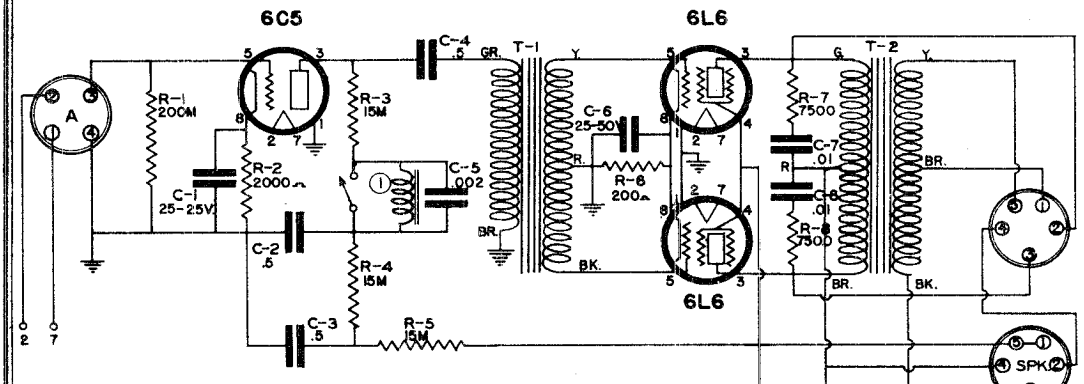
MODEL A-3001

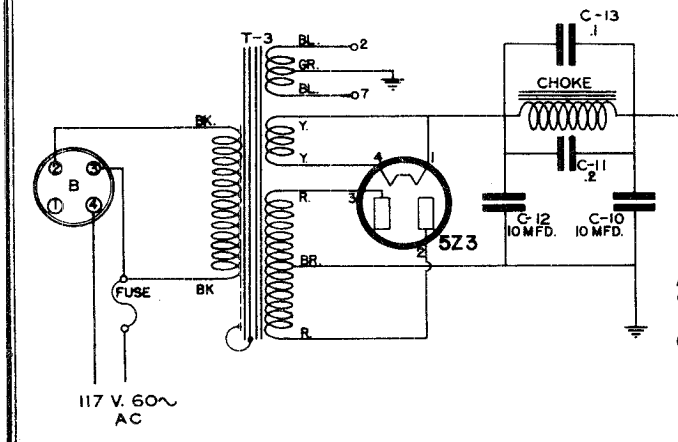
THE MAGNAVOX CO.

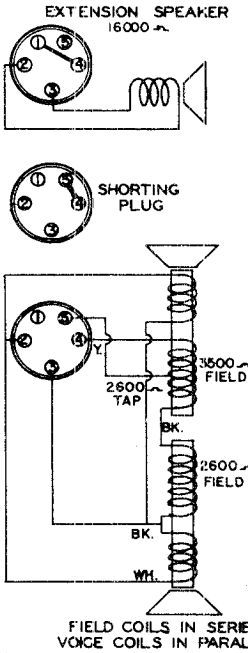




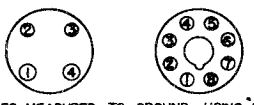
BACK VIEW OF PLUGS & SOCKETS







PIN LOCATION BY NUMBER
BOTTOM VIEW OF SOCKETS



ALL VOLTAGES MEASURED TO GROUND USING A VOLTMETER OF 1000 OHM/VOLT ON 600V. SCALE. CATHODES MEASURED ON 30V. SCALE.

6C5—
- (3) — 160V.
- (8) — 6.5V

6L6—
- (3) — 355 V.
- (4) — 310 V.
- (8) — 22.5 V.

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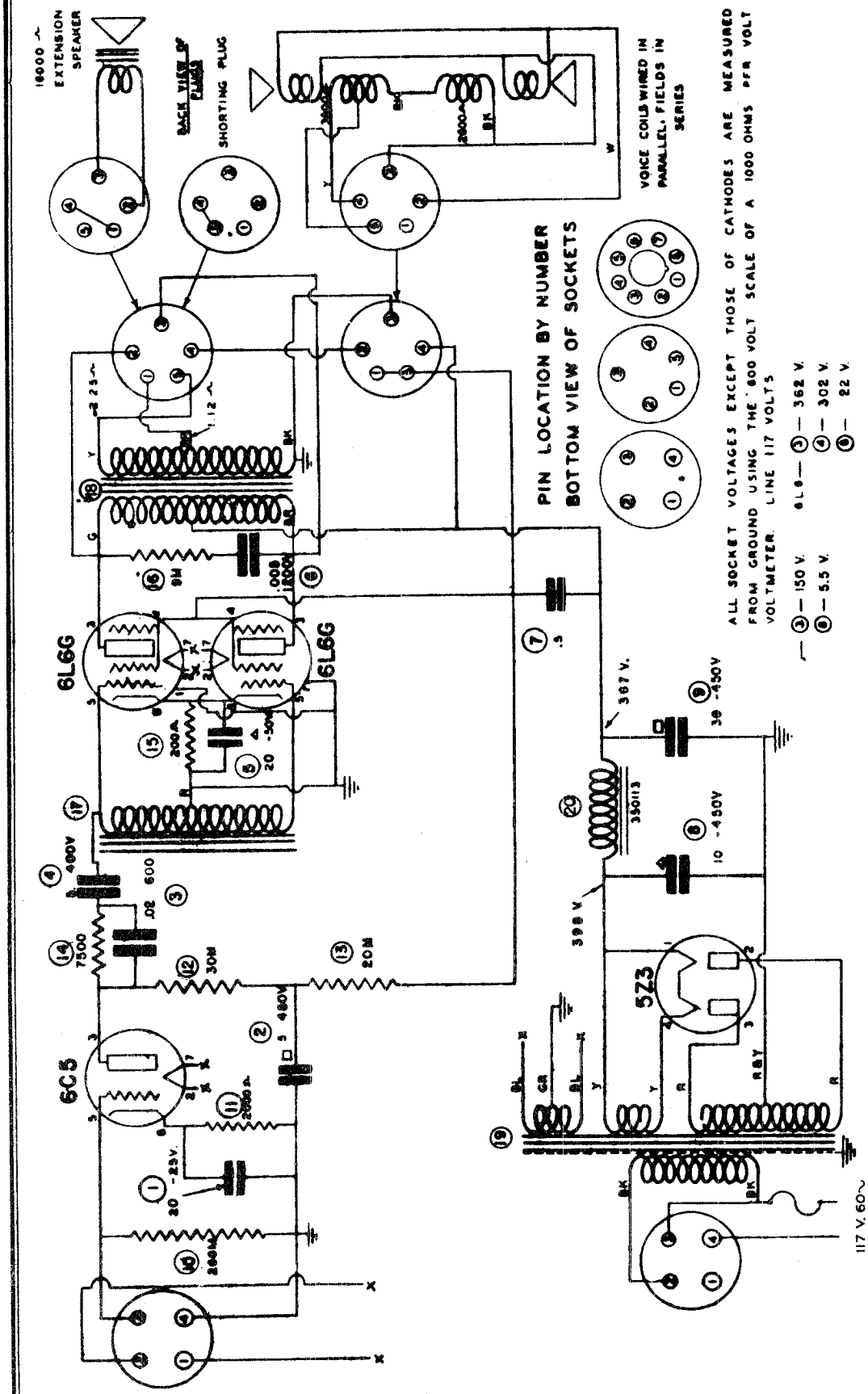
For Parts list, see P. 15-69

MODEL A-3001B

THE MAGNAVOX CO.


16000 ~ EXTENSION SPEAKER
BACK VIEW OF PLUGS
SHORTING PLUG
VOICE COILS WIRED IN PARALLEL. FIELDS IN SERIES
PIN LOCATION BY NUMBER
BOTTOM VIEW OF SOCKETS
ALL SOCKET VOLTAGES EXCEPT THOSE OF CATHODES ARE MEASURED FROM GROUND USING THE 1000 VOLT SCALE OF A 1000 OHMS PER VOLT VOLTMETER. LINE 117 VOLTS
③ — 150 V.
⑥ — 5.5 V.
6L6 — ⑤ — 362 V.
④ — 302 V.
⑧ — 22 V.
6L6G
6C5
5Z3
117 V. 60 ~ AC

Primary voltage	117 V. 60 cycle AC;
Power consumption	134 watts;
Power output	25 watts;
Vacuum tubes	1-6C5; 2-6L6G; 1-5Z3;
Speaker:	Model 302
Field Coil	*3500 ohms;
Transformer	**5000 ohms;

* DC resistance. ** Primary impedance.

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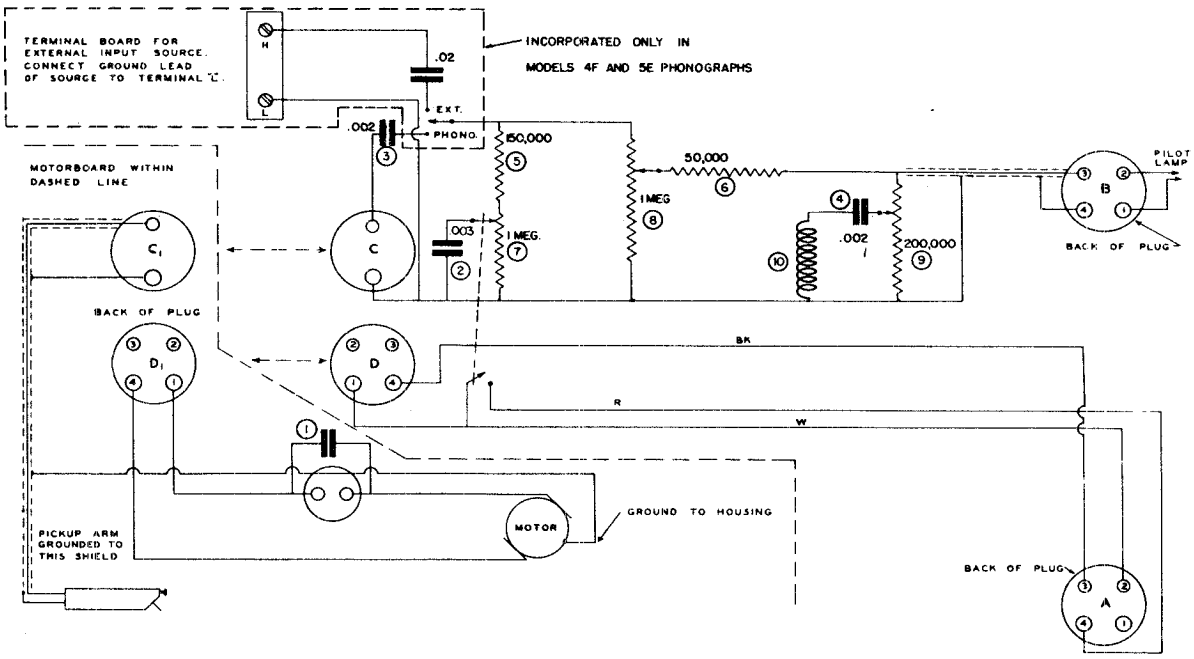
MODEL A-3001B

THE MAGNAVOX CO.



Ref. No.	Description	Magnavox Part No.
	AMPLIFIER CHASSIS	
1, 2, 5	Capacitor, electrolytic 20-20 mfd. 25 V., 5 mfd. 450 V.	270007
3	Capacitor, tubular, .02 mfd. 600 V.	254127
4	Capacitor, tubular, .5 mfd. 400 V.	254147
6	Capacitor, tubular, .005 mfd. 1200 V.	250042
7	Capacitor, tubular, .5 mfd. 400 V.	254147
8, 9	Capacitor, electrolytic 30-10 mfd. 450 V.	273610
10	Resistor, carbon, 200,000 ohm ½ W.	234447
11	Resistor, carbon, 2000 ohm ½ W.	234426
12	Resistor, carbon, 30,000 ohm 1 W.	234477
13	Resistor, carbon, 20,000 ohm 1 W.	234475
14	Resistor, carbon, 7500 ohm ½ W.	239991
15	Resistor, wire wound, 200 ohm 5 W.	240009
16	Resistor, carbon, 9000 ohm 3 W.	230039
17	Transformer, input	320240
18	Transformer, output	330188
19	Transformer, power, 117 V. 50-60 cycle	300106
20	Choke, filter	350113
	Socket, octal marked 6L6	182532
	Socket, octal marked 6C5	180051
	Socket, 5 prong marked SPK	182525
	Socket, 4 prong marked 5Z3	182530
	Socket, 4 prong—no marking	182668
	Fuse, 3 amp. 250 V. cartridge	189887
	CONTROL PANEL	
1	Capacitor, tubular, .02 mfd. 110 V.	259935
2	Capacitor, tubular, .003 mfd. 600 V.	254163
3	Capacitor, tubular, .002 mfd. 600 V.	254161
4	Capacitor, tubular, .002 mfd. 600 V.	254161
5	Resistor, carbon, 150,000 ohm ½ W.	234446
6	Resistor, carbon, 50,000 ohm ½ W.	234439
7	Control, bass, 1 megohm—with power switch	222446
8	Control, volume, 1 megohm	222444
9	Control, treble, 200,000 ohm	222445
10	Choke, filter	362463
	Knob, control	140019
	Lamp, pilot 6.3 V.	182592

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THE MAGNAVOX CO.

IDENTIFICATION OF MAGNAVOX MODELS FROM 1937 TO 1946

The list of Magnavox models in the following pages has been arranged in such a way that the identifying number for servicing these receivers is in all cases the style number (such as C101G11). This style number is on a serial plate which is attached to all phonograph and radio-phonographs. It should not be confused with the model number (such as 155B) which can not be used in locating the necessary information since instruments having as many as ten different style numbers may all have the same model number.

The model number indicates a series of instruments while the style number indicates any changes made during the production of a series. These changes might be a different phonograph pick-up, a different radio chassis, a different speaker, etc. As an example, instrument style number 101G11 is instrument model number 155B and instrument style numbers C101G13, C101G21, C101G23, C101G41, C101G43, are also model 155B. Each of the style numbers has some change.

In previous indexes of Rider's Manuals we have listed radio chassis numbers of Magnavox receivers first, giving model numbers and style numbers. To use this new listing successfully you would look up the instrument style number, which is tabulated in numerical order, and following through to the chassis number, would refer to this chassis number in past indexes. In case of record changer troubles, you would follow the same procedure and would find the details of the record changer in Rider's "Automatic Record Changers and Recorders" or in this Manual.

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STYLE NOS. C101G11
TO C103G15

THE MAGNAVOX CO.

MAGNAVOX MODEL IDENTIFICATION FROM 1937 TO 1946

The Style Number and Model Number are shown on the serial plate attached to each cabinet.

*THIS PICK-UP ARM INCLUDES ONE 563584 CRYSTAL PICK-UP.
**THIS PICK-UP ARM INCLUDES ONE 560006 CRYSTAL PICK-UP.
†THIS PICK-UP ARM INCLUDES ONE 560015 CRYSTAL PICK-UP.

INSTRUMENT STYLE No.	INSTRUMENT MODEL No.	A.M. RADIO CHASSIS MODEL No.	F.M. RADIO CHASSIS MODEL No.	RECORD CHANGER PART No.	AMPLIFIER CHASSIS MODEL No.	PHONOGRAPH PICK-UP ARM PART No.	CRYSTAL PICK-UP PART No.	TURNTABLE MOTOR PART No.	PART No. SPEAKER	CURRENT
C101G11	155B	CR-188A		520508	AMP-101A		560049G2		582815 582869	60 cyc.
C101G12	155BF	CR-188A	CR-189A	520508	AMP-101A		560049G2		582815 582869	60 cyc.
C101G13	155B	CR-188A		520508	AMP-101A		560049G2		582815 582869	60 cyc.
C101G14	155BF	CR-188A	CR-189A	520508	AMP-101A		560049G2		582815 582869	60 cyc.
C101G21	155B	CR-188A		520508	AMP-101A		560049G2		582815 582869	60 cyc.
C101G22	155BF	CR-188A	CR-189A	520508	AMP-101A		560049G2		582815 582869	60 cyc.
C101G23	155B	CR-188A		520508	AMP-101A		560049G2		582815 582869	60 cyc.
C101G24	155BF	CR-188A	CR-189A	520508	AMP-101A		560049G2		582815 582869	60 cyc.
C101G41	155B	CR-188A		520508	AMP-101A		560049G2		582815 582869	60 cyc.
C101G42	155BF	CR-188A	CR-189A	520508	AMP-101A		560049G2		582815 582869	60 cyc.
C101G43	155B	CR-188A		520508	AMP-101A		560049G2		582815 582869	60 cyc.
C101G44	155BF	CR-188A	CR-189A	520508	AMP-101A		560049G2		582815 582869	60 cyc.
C102G11	142B	CR-188A		520508	AMP-101A		560049G2		582815 582869	60 cyc.
C102G12	142BF	CR-188A	CR-189B	520508	AMP-101A		560049G2		582815 582869	60 cyc.
C102G13	142B	CR-188A		520508	AMP-101A		560049G2		582815 582869	60 cyc.
C102G14	142BF	CR-188A	CR-189B	520508	AMP-101A		560049G2		582815 582869	60 cyc.
C102G15	*242B	CR-188A		520508	AMP-101A		560049G2		582815 582869	60 cyc.
C102G16	242BF	CR-188A	CR-189B	520508	AMP-101A		560049G2		582815 582869	60 cyc.
C102G21	142B	CR-188A		520508	AMP-101A		560049G2		582815 582869	60 cyc.
C102G22	142BF	CR-188A	CR-189B	520508	AMP-101A		560049G2		582815 582869	60 cyc.
C102G23	142B	CR-188A		520508	AMP-101A		560049G2		582815 582869	60 cyc.
C102G24	142BF	CR-188A	CR-189B	520508	AMP-101A		560049G2		582815 582869	60 cyc.
C102G25	242B	CR-188A		520508	AMP-101A		560049G2		582815 582869	60 cyc.
C102G26	242BF	CR-188A	CR-189B	520508	AMP-101A		560049G2		582815 582869	60 cyc.
C102G31	142B	CR-188A		520508	AMP-101A		560049G2		582815 582869	60 cyc.
C102G32	142BF	CR-188A	CR-189B	520508	AMP-101A		560049G2		582815 582869	60 cyc.
C102G33	142B	CR-188A		520508	AMP-101A		560049G2		582815 582869	60 cyc.
C102G34	142BF	CR-188A	CR-189B	520508	AMP-101A		560049G2		582815 582869	60 cyc.
C102G35	242B	CR-188A		520508	AMP-101A		560049G2		582815 582869	60 cyc.
C102G36	242BF	CR-188A	CR-189B	520508	AMP-101A		560049G2		582815 582869	60 cyc.
C102G45	242B	CR-188A		520508	AMP-101A		560049G2		582815 582869	60 cyc.
C102G46	242BF	CR-188A	CR-189B	520508	AMP-101A		560049G2		582815 582869	60 cyc.
C103G11	151B	CR-187A		520508			560049G3		582806	60 cyc.
C103G12	151BF	CR-187A	CR-189B	520508			560049G3		582806	60 cyc.
C103G13	151B	CR-190B		520508			560049G3		582806	60 cyc.
C103G14	151BF	CR-190B	CR-189B	520508			560049G3		582806	60 cyc.
C103G15	151B	CR-187A		520508			560049G3		582806	60 cyc.

*Model 242 Series has drawer-type record changer.

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STYLE NOS. C103G16 TO C105G15

THE MAGNAVOX CO.

INSTRUMENT STYLE No.	INSTRUMENT MODEL No.	A.M. RADIO CHASSIS MODEL No.	F.M. RADIO CHASSIS MODEL No.	RECORD CHANGER PART No.	AMPLIFIER CHASSIS MODEL No.	PHONOGRAPH PICK-UP ARM PART No.	CRYSTAL PICK-UP PART No.	TURNTABLE MOTOR PART No.	PART No. SPEAKER	CURRENT
C103G16	151BF	CR-187A	CR-189B	520508			560049G3		582806	60 cyc.
C103G21	151B	CR-187A		520508			560049G3		582806	60 cyc.
C103G22	151BF	CR-187A	CR-189B	520508			560049G3		582806	60 cyc.
C103G23	151B	CR-190B		520508			560049G3		582806	60 cyc.
C103G24	151BF	CR-190B	CR-189B	520508			560049G3		582806	60 cyc.
C103G25	151B	CR-187A		520508			560049G3		582806	60 cyc.
C103G26	151BF	CR-187A	CR-189B	520508			560049G3		582806	60 cyc.
C103G41	151B	CR-187A		520508			560049G3		582806	60 cyc.
C103G42	151BF	CR-187A	CR-189B	520508			560049G3		582806	60 cyc.
C103G43	151B	CR-190B		520508			560049G3		582806	60 cyc.
C103G44	151BF	CR-190B	CR-189B	520508			560049G3		582806	60 cyc.
C103G113	151B	CR-187A		520508			560049G3		582806	60 cyc.
C103G114	151BF	CR-187A	CR-189B	520508			560049G3		582806	60 cyc.
C103G127	151B	CR-190D		520508			560049G3		582806	60 cyc.
C103G128	151BF	CR-190D	CR-189B	520508			560049G3		582806	60 cyc.
C103G213	151B	CR-187A		520508			560049G3		582806	60 cyc.
C103G214	151BF	CR-187A	CR-189B	520508			560049G3		582806	60 cyc.
C103G227	151B	CR-190D		520508			560049G3		582806	60 cyc.
C103G228	151BF	CR-190D	CR-189B	520508			560049G3		582806	60 cyc.
C103G413	151B	CR-187A		520508			560049G3		582806	60 cyc.
C103G414	151BF	CR-187A	CR-189B	520508			560049G3		582806	60 cyc.
C103G427	151B	CR-190D		520508			560049G3		582806	60 cyc.
C103G428	151BF	CR-190D	CR-189B	520508			560049G3		582806	60 cyc.
C104G11	148B	CR-187A		520508			560049G3		582806	60 cyc.
C104G12	148BF	CR-187A	CR-189B	520508			560049G3		582806	60 cyc.
C104G13	148B	CR-190B		520508			560049G3		582806	60 cyc.
C104G14	148BF	CR-190B	CR-189B	520508			560049G3		582806	60 cyc.
C104G21	148B	CR-187A		520508			560049G3		582806	60 cyc.
C104G22	148BF	CR-187A	CR-189B	520508			560049G3		582806	60 cyc.
C104G23	148B	CR-190B		520508			560049G3		582806	60 cyc.
C104G24	148BF	CR-190B	CR-189B	520508			560049G3		582806	60 cyc.
C104G31	148B	CR-187A		520508			560049G3		582806	60 cyc.
C104G32	148BF	CR-187A	CR-189B	520508			560049G3		582806	60 cyc.
C104G33	148B	CR-190B		520508			560049G3		582806	60 cyc.
C104G34	148BF	CR-190B	CR-189B	520508			560049G3		582806	60 cyc.
C104G41	148B	CR-187A		520508			560049G3		582806	60 cyc.
C104G42	148BF	CR-187A	CR-189B	520508			560049G3		582806	60 cyc.
C104G43	148B	CR-190A		520508			560049G3		582806	60 cyc.
C104G44	148BF	CR-190A	CR-189B	520508			560049G3		582806	60 cyc.
C104G115	148B	CR-187A		520508			560049G3		582806	60 cyc.
C104G116	148BF	CR-187A	CR-189B	520508			560049G3		582806	60 cyc.
C104G127	148B	CR-190D		520508			560049G3		582806	60 cyc.
C104G128	148BF	CR-190D	CR-189B	520508			560049G3		582806	60 cyc.
C104G215	148B	CR-187A		520508			560049G3		582806	60 cyc.
C104G216	148BF	CR-187A	CR-189B	520508			560049G3		582806	60 cyc.
C104G227	148B	CR-190D		520508			560049G3		582806	60 cyc.
C104G228	148BF	CR-190D	CR-189B	520508			560049G3		582806	60 cyc.
C104G315	148B	CR-187A		520508			560049G3		582806	60 cyc.
C104G316	148BF	CR-187A	CR-189B	520508			560049G3		582806	60 cyc.
C104G327	148B	CR-190D		520508			560049G3		582806	60 cyc.
C104G328	148BF	CR-190D	CR-189B	520508			560049G3		582806	60 cyc.
C104G413	148B	CR-190B		520508			560049G3		582806	60 cyc.
C104G414	148BF	CR-190B	CR-189B	520508			560049G3		582806	60 cyc.
C104G415	148B	CR-187A		520508			560049G3		582806	60 cyc.
C104G416	148BF	CR-187A	CR-189B	520508			560049G3		582806	60 cyc.
C104G419	148B	CR-187A		520508			560049G3		582806	60 cyc.
C104G427	148B	CR-190D		520508			560049G3		582806	60 cyc.
C104G428	148BF	CR-190D	CR-189B	520508			560049G3		582806	60 cyc.
C105G11	132B	CR-187B		520508			560049G3		582840	60 cyc.
C105G12	132B	CR-190C		520508			560049G3		582840	60 cyc.
C105G13	132B	CR-187B		520508			560049G3		582840	60 cyc.
C105G15	132B	CR-190E		520508			560049G3		582840	60 cyc.

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STYLE NOS. C105G16
TO EA-307P10

THE MAGNAVOX CO.

INSTRUMENT STYLE No.	INSTRUMENT MODEL No.	A.M. RADIO CHASSIS MODEL No.	F.M. RADIO CHASSIS MODEL No.	RECORD CHANGER PART No.	AMPLIFIER CHASSIS MODEL No.	PHONOGRAPH PICK-UP ARM PART No.	CRYSTAL PICK-UP PART No.	TURNTABLE MOTOR PART No.	PART No. SPEAKER	CURRENT
C105G16	132B	CR-190E		520508			560049G3		582840	60 cyc.
C105G21	132B	CR-187B		520508			560049G3		582840	60 cyc.
C105G22	132B	CR-190C		520508			560049G3		582840	60 cyc.
C105G23	132B	CR-187B		520508			560049G3		582840	60 cyc.
C105G25	132B	CR-190E		520508			560049G3		582840	60 cyc.
C105G26	132B	CR-190E		520508			560049G3		582840	60 cyc.
C105G31	132B	CR-187B		520508			560049G3		582840	60 cyc.
C105G32	132B	CR-190C		520508			560049G3		582840	60 cyc.
C105G33	132B	CR-187B		520508			560049G3		582840	60 cyc.
C105G34	132B	CR-190C		520508			560049G3		582840	60 cyc.
C105G35	132B	CR-190E		520508			560049G3		582840	60 cyc.
C105G36	132B	CR-190E		520508			560049G3		582840	60 cyc.
C105G41	132B	CR-187B		520508			560049G3		582840	60 cyc.
C105G42	132B	CR-190C		520508			560049G3		582840	60 cyc.
C105G43	132B	CR-187B		520508			560049G3		582840	60 cyc.
C105G44	132B	CR-190C		520508			560049G3		582840	60 cyc.
C105G45	132B	CR-190E		520508			560049G3		582840	60 cyc.
C105G46	132B	CR-190E		520508			560049G3		582840	60 cyc.
C106G13	154B	CR-193B		520516			560049G3		582815 582847	60 cyc.
C106G14	154BF	CR-193B	CR-189B	520516			560049G3		582815 582847	60 cyc.
C106G15	154B	CR-194B		520508			560049G3		582815 582847	60 cyc.
C106G16	154BF	CR-194B	CR-189B	520508			560049G3		582815 582847	60 cyc.
C106G23	154B	CR-193B		520516			560049G3		582815 582847	60 cyc.
C106G24	154BF	CR-193B	CR-189B	520516			560049G3		582815 582847	60 cyc.
C106G33	154B	CR-193B		520516			560049G3		582815 582847	60 cyc.
C106G34	154BF	CR-193B	CR-189B	520516			560049G3		582815 582847	60 cyc.
C106G43	154B	CR-193B		520516			560049G3		582815 582847	60 cyc.
C106G44	154BF	CR-193B	CR-189B	520516			560049G3		582815 582847	60 cyc.
RT-5	6					631600	562729	507601		60 cyc.
RT-5A	6A					631600	562729	507601		60 cyc.
RTU-5	U6					631600	562729	507602		AC-DC
RTU-5A	U6A					631600	562729	507602		AC-DC
RT-8	6					°569889	563584	500029		60 cyc.
RT-8A	6A					°569889	563584	500029		60 cyc.
RTU-8	U6					°569889	563584	507602		AC-DC
RTU-8A	U6A					°569889	563584	507576		AC-DC
RT-9	6B					°569889	563584	507576		50-60 cyc.
RT-9A	6C					°569889	563584	507602		50-60 cyc.
EA-101P	½				A-101P	631595	562729	507601	58415	60 cyc.
EA-106P	U2				A-106P	631595	562729		58416	AC-DC
EA-201	10				A-201	°°560005	560006	500015	581533	Battery
EA-201B	10A				A-201	°°560005	560006	500015	581533	Battery
EA-205	2C				A-205	°°560007	560006	500026	581543	60 cyc.
EA-205B	2C				A-205	°°560007	560006	500026	581723	60 cyc.
EA-205E	2C				A-205	‡560017	560015	500026	581723	60 cyc.
EA-205H	2C-1				A-205	‡560017	560015	500026	581723	50-60 cyc.
EA-205L	2D				A-205C	‡560017	560015	500026	582298	60 cyc.
EA-205N	2D-1				A-205C	‡560017	560015	500026	582298	50-60 cyc.
EA-307P2	U3				A-307P2	631595	562729	507602	58946	AC-DC
EA-307P4	U2A				A-307P4	°569934	563584	507602	581389	AC-DC
EA-307P5	U3				A-307P2	633541	562729	507602	58946	AC-DC
EA-307P6	U2A				A-307P4	630209	563584	507602	581389	AC-DC
EA-307P7	U3B				A-307P2	633541	562729	507602	581651	AC-DC
EA-307P8	U3B				A-307P2	630238	562729	507602	581651	AC-DC
EA-307P9	U3D				A-307P5	630341	560022	507602	581651	AC-DC
EA-307P10	U3D				A-307P6	630341	560022	507602	581651	AC-DC

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STYLE NOS. EA-401 TO TPR-337

THE MAGNAVOX CO.

INSTRUMENT STYLE No.	INSTRUMENT MODEL No.	A.M. RADIO CHASSIS MODEL No.	F.M. RADIO CHASSIS MODEL No.	RECORD CHANGER PART No.	AMPLIFIER CHASSIS MODEL No.	PHONOGRAPH PICK-UP ARM PART No.	CRYSTAL PICK-UP PART No.	TURNTABLE MOTOR PART No.	PART No. SPEAKER	CURRENT
EA-401	2A				A-401	°569889	563584	509888	581358	60 cyc.
EA-401A	2B				A-401	°569889	563584	507601	581358	50-60 cyc.
EA-401B	2A				A-401	630209	560006	500043	581358	60 cyc.
EA-401C	2A				A-206	630209	560015	500043	581779	60 cyc.
EA-401D	2F				A-206A	†560017	560015	500026	581834	60 cyc.
EA-401E	2F-1				A-206A	†560017	560015	500026	581834	50-60 cyc.
EAA-401	A2H			520173	A-206F		560031		582398	60 cyc.
EAU-401D	U2F				A-206A	†560017	563584	507602	581834	AC-DC
EAU-401F	2G				A-206E	†560017	560015	500026	582318	60 cyc.
EA-401F-1	2G-1				A-206E	†560017	560015	500026	582318	50-60 cyc.
EAU-401G	U2G				A-206E	†560017	560015	507602	582318	AC-DC
EA-501	3				A-501	631595	562729	507601	58622	60 cyc.
EA-501E	3				A-501	633541	562729	509888	58622	60 cyc.
EA-501F	3A				A-501	633541	562729	507576	58622	50-60 cyc.
EA-501G	3				A-501B	633541	562729	500029	58622	60 cyc.
EA-501H	3A				A-501B	633541	562729	507576	58622	50-60 cyc.
EA-501I	3C				A-501B	633541	562729	507576	581615	50-60 cyc.
EA-501J	3B				A-501B	633541	562729	500029	581651	60 cyc.
EA-501K	3B				A-501B	630238	562729	500029	581651	60 cyc.
EA-501L	3C				A-501B	630238	562729	507576	581615	50-60 cyc.
EA-501M	3D				A-501B	630341	560022	500029	581615	60 cyc.
EA-501N	3D-1				A-501B	630341	560022	507576	581615	50-60 cyc.
EAA-501	A3M			520173	A-206G				582318	60 cyc.
CPAR-301	35	CR-101M		529562	A-3001		562729		58869 582140	60 cyc.
CPAR-302	36	CR-101M		529650	A-3001		560008		58869 582140	50-60 cyc.
CPR-305	33	CR-109				631595	562729	507601	582125	60 cyc.
EPR-306	32	CR-103				631600	562729	507601	582125	60 cyc.
TPR-307	31	CR-102				631595	562729	507601	582124	60 cyc.
RTR-308	37	CR-101								50-60 cyc.
TPR-309	31	CR-104				631595	562729	507601	582124	60 cyc.
EPR-310	32	CR-105				631600	562729	507601	582125	60 cyc.
TPUR-311	U31	CR-107				631595	562729	507602	58946	AC-DC
CPAR-312	35A	CR-101M		529650	A-3001		560008		58869 582148	50-60 cyc.
EPR-313	32	CR-109				631600	562729	507601	582125	60 cyc.
EPUR-314	U32	CR-110				631600	562729	507602	581313	AC-DC
CPAR-315	34	CR-111		529562			562729		581314	60 cyc.
TPR-316	31	CR-106				631595	562729	507601	582124	60 cyc.
CPUR-317	U33	CR-110				631595	562729	507602	581313	AC-DC
CPAUR-318	U34	CR-112		529797			562729		581315	AC-DC
CPAR-319	35	CR-108		529562	A-3001		562729		58869 582140	60 cyc.
CPAR-320	36	CR-108		529650	A-3001		560008		58869 582140	50-60 cyc.
CPAR-321	34A	CR-111		529650			560008		581314	60 cyc.
PR-322	30	CR-117				°569889	563584	509888	581349	60 cyc.
TPR-323	31	CR-113				631595	562729	507601	581342	60 cyc.
EPR-324	32	CR-114				631600	562729	507601	581343	60 cyc.
CPR-325	33	CR-115				631595	562729	507601	581343	60 cyc.
CPAR-326	34	CR-118		529562			562729		581341	60 cyc.
CPAR-327	34A	CR-118		529650			560008		581341	60 cyc.
CPAUR-328	U34A	CR-119		529894			560008		581315	AC-DC
CPAR-329	35A	CR-108		529650	A-3001		560008		58869 582140	50-60 cyc.
CPR-330	34B	CR-118				631595	562729	507601	581341	60 cyc.
PRU-331	U30	CR-107				°569889	563584	507602	581357	AC-DC
CPUR-332	U34B	CR-119				631595	562729	507602	581315	AC-DC
PAR-333	36A	CR-108		529650	A-3001		560008		58869 582140	50-60 cyc.
EPR-334	32A	CR-114				631600	562729	507576	581343	50-60 cyc.
TPR-335	31	CR-107				631595	562729	507601	58946	60 cyc.
EPR-336	32	CR-110				631600	562729	507601	581313	60 cyc.
TPR-337	31	CR-113				633541	562729	509888	581342	60 cyc.

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STYLE NOS. TPR-338 TO CPR-401

THE MAGNAVOX CO.

INSTRUMENT STYLE No.	INSTRUMENT MODEL No.	A.M. RADIO CHASSIS MODEL No.	F.M. RADIO CHASSIS MODEL No.	RECORD CHANGER PART No.	AMPLIFIER CHASSIS MODEL No.	PHONOGRAPH PICK-UP ARM PART No.	CRYSTAL PICK-UP PART No.	TURNTABLE MOTOR PART No.	PART No. SPEAKER	CURRENT
TPR-338	31B	CR-141				630213	563584	500037	581630	60 cyc.
TPUR-339	U31B	CR-107				630213	562729	507602	58946	AC-DC
TPR-340	31C	CR-141				630213	563584	507576	581430	50-60 cyc.
CPR-341	33A	CR-118				631595	562729	507576	581343	50-60 cyc.
CPR-342	34C	CR-115				631595	562729	507576	581341	50-60 cyc.
CPR-343	38	CR-121				633541	562729	509888	581420	AC-DC
CPUR-344	U38	CR-127				633541	562729	507602	581315	60 cyc.
CPR-345	38A	CR-121				633541	562729	507576	581420	50-60 cyc.
CPAR-346	38B	CR-123		529650			560008		581419	60 cyc.
CPAUR-347	U38B	CR-127		529894			560008		581315	AC-DC
PR-348	30A	CR-117				569889	563584	507576	581349	50-60 cyc.
TPR-349	31A	CR-113				633541	562729	507576	581342	50-60 cyc.
EPR-350	32B	CR-123				633781	562729	509888	581419	60 cyc.
CPAR-351	34A	CR-125		529650			560008		581341	60 cyc.
CPAR-352	36	CR-122		529650	A-3001		560008		58869 582140	50-60 cyc.
CPAR-353	34D	CR-121		529650			560008		581420	60 cyc.
CPAR-354	34E	CR-124		529650			560008		581421 581422	60 cyc.
EPUR-355	U32	CR-110				633781	562729	507602	581313	AC-DC
CPAR-356	35A	CR-122		529650	A-3001		560008		58869 582140	50-60 cyc.
EPR-358	32	CR-114				631600	562729	509888	581343	60 cyc.
CPAUR-359	U34A	CR-126		529894			560008		581315	AC-DC
TPR-360	31D	CR-123				633541	562729	509888	581430	60 cyc.
TPUR-361	U31	CR-107				633541	562729	507602	58946	AC-DC
EPR-362	32C	CR-123				633781	562729	507576	581419	50-60 cyc.
TPR-363	31E	CR-123				633541	562729	507576	581430	50-60 cyc.
CPAR-364	34D	CR-121		529650			560008		581420	60 cyc.
CPAR-365	34E	CR-124		529650			560008		581421 581422	60 cyc.
CPR-366	40	CR-128				633781	562729	509888	581419	60 cyc.
CPAR-370	38B	CR-128		529650			560008		581419	60 cyc.
CPR-371	38	CR-121				633541	562729	509888	581420	60 cyc.
CPR-372	38A	CR-121				633541	562729	507576	581420	50-60 cyc.
CPAR-373	38B	CR-128		529650			560008		581419	60 cyc.
CPAUR-374	U38B	CR-127		529894			560008		581315	AC-DC
CPUR-375	U38	CR-127				633541	562729	507602	581315	AC-DC
PBR-378	41	CR-133				569889	563584	500015	581515	Battery
EPR-379	32B	CR-144				633781	562729	500029	581419	60 cyc.
CPR-380	40B	CR-134				633781	562729	500029	581520	60 cyc.
CPAR-381	38C	CR-121		520005			560008		581420	50-60 cyc.
EPR-382	32C	CR-144				633781	562729	507576	581419	50-60 cyc.
TPR-383	31D	CR-134				633541	562729	500029	581430	60 cyc.
CPAR-384	42	CR-136		520001			560008		581421 581422	50-60 cyc.
CPAR-385	35B	CR-122		520001	A-3001B		560008		58869 582140	50-60 cyc.
CPAR-386	36B	CR-122		520001	A-3001		560008		58869 582140	50-60 cyc.
CPR-387	40A	CR-134				633781	562729	507576	581520	50-60 cyc.
CPAR-388	34F	CR-121		529650			560008		581420	60 cyc.
CPAR-389	43	CR-151		520007			560012		581420	60 cyc.
EPR-391	44	CR-141				630213	563584	500037	581630	60 cyc.
EPR-392	45	CR-141				630213	563584	500037	581630	60 cyc.
CPAR-393	42	CR-147		520001			560008		581421 581422	50-60 cyc.
CPAR-394	34F	CR-146		520001			560008		581420	60 cyc.
CPAR-395	38C	CR-146		520005			560008		581420	50-60 cyc.
CPR-396	38	CR-146				633541	562729	500029	581420	60 cyc.
CPR-397	38A	CR-146				633541	562729	507576	581420	50-60 cyc.
EPR-398	32B	CR-140				633781	562729	500029	581420	60 cyc.
CPR-399	40B	CR-140				633781	562729	500029	581625	60 cyc.
CPAR-400	43A	CR-140		520005			560008		581420	50-60 cyc.
CPR-401	40A	CR-140				633781	562729	500029	581625	50-60 cyc.

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STYLE NOS. CPAR-402 TO CPAR-457

THE MAGNAVOX CO.

INSTRUMENT STYLE No.	INSTRUMENT MODEL No.	A.M. RADIO CHASSIS MODEL No.	F.M. RADIO CHASSIS MODEL No.	RECORD CHANGER PART No.	AMPLIFIER CHASSIS MODEL No.	PHONOGRAPH PICK-UP ARM PART No.	CRYSTAL PICK-UP PART No.	TURNTABLE MOTOR PART No.	PART No. SPEAKER	CURRENT
CPAR-402	42	CR-148		520001			560008		581421 581422	50-60 cyc.
EPR-403	32C	CR-140				633781	562729	507576	581420	50-60 cyc.
CPAR-404	61	CR-150		520007			560012		581420	60 cyc.
CPAR-405	42	CR-149		520001			560008		581421 581422	50-60 cyc.
CPAR-406	38C	CR-146		520005			560008		581420	50-60 cyc.
CPR-407	38	CR-146				630238	562729	500029	581420	60 cyc.
CPR-408	38A	CR-146				630238	562729	507576	581420	50-60 cyc.
CPAR-409	46	CR-140				630238	562729	500029	581420	60 cyc.
CPAUR-410	U43A	CR-143		520021		630238	560008		581652	AC-DC
EPUR-411	U44	CR-145					562729	507602	581651	AC-DC
EPUR-412	U45	CR-145				630238	562729	507602	581651	AC-DC
TPUR-413	U31B	CR-145				630238	562729	507602	581651	AC-DC
CPAUR-414	U38C	CR-143		529894			560008		581652	AC-DC
CPUR-415	U38	CR-143				630238	562729	507602	581652	AC-DC
EPUR-416	U32B	CR-143				633781	562729	507602	581652	AC-DC
CPUR-417	U40B	CR-143				633781	562729	507602	581652	AC-DC
CPAUR-418	U38C	CR-143		520021			560008		581652	AC-DC
CPAUR-419	U34F	CR-143		520022			560008		581652	AC-DC
CPR-420	46A	CR-140				630238	562729	507607	581420	50-60 cyc.
CPAR-421	43A	CR-140		520005			560008		581420	50-60 cyc.
CPUR-422	U46	CR-143				630238	562729	507602	581652	AC-DC
CPAR-423	34E	CR-147		529650			560008		581421 581422	60 cyc.
CPAR-424	34E	CR-147		520001			560008		581421 581422	60 cyc.
CPAUR-425	U34F	CR-143		529894			560008		581652	AC-DC
EPR-426	32B	CR-141				633541	562729	500029	581420	60 cyc.
CPR-427	42	CR-149				633541	562729	500029	581421 581422	50-60 cyc.
CPAR-428	38E	CR-156		520076			560022		581917	60 cyc.
CPAR-429	51C	CR-156	CR-158 (FM)	520090	A-222A		560023		581917	60 cyc.
CPAR-430	51C-1	CR-156	CR-158 (FM)	520091	A-222A		560023		581917	50 cyc.
CPAR-431	42	CR-152		520001			560008		581421 581422	50-60 cyc.
EPAR-432	32D	CR-140		520005			560008		581420	50-60 cyc.
EPAUR-433	U32D	CR-145		520021			560008		581652	AC-DC
CPAR-434	35C	CR-152		520001			560008		581421 581422	50-60 cyc.
CPAR-436	61A	CR-140		520005			560008		581420	50-60 cyc.
EPAR-437	32E	CR-156		520076			560022		581917	60 cyc.
EPAR-438	32E-1	CR-156		520078			560022		581917	50 cyc.
CPAR-439	61B	CR-140		520077			560008		581420	60 cyc.
CPAR-440	62	CR-154C		520080			560023		581915 581916	60 cyc.
CPAR-441	72	CR-154C		520080			560023		581913 581914	60 cyc.
CPAR-442	38E-1	CR-156		520078			560022		581917	50 cyc.
CPAR-443	72-1	CR-154C		520081			560023		581913 581914	50 cyc.
CPAR-444	62-1	CR-154C		520081			560023		581915 581916	50 cyc.
CPAR-445	49	CR-156		520080			560023		581917	60 cyc.
CPAR-446	49-1	CR-156		520081			560023		581917	50 cyc.
CPAR-447	48	CR-156		520080			560023		581917	60 cyc.
CPAR-448	48-1	CR-156		520081			560023		581917	50 cyc.
CPAR-449	42A	CR-154		520085			560022		581915 581916	50-60 cyc.
CPAR-450	38D	CR-156		520094			560022		581917	50-60 cyc.
CPAR-451	47	CR-157		520082			560025		581420	60 cyc.
TPR-452	31F	CR-159				630341	560022	500037	581630	50-60 cyc.
EPR-453	44A	CR-159				630341	560022	500037	581630	60 cyc.
CPAR-454	34G	CR-155		520080			560023		581917	60 cyc.
CPAR-455	34G-1	CR-155		520081			560023		581917	50 cyc.
CPAR-456	34G	CR-155		520080			560023		581917	60 cyc.
CPAR-457	34G-1	CR-155		520081			560023		581917	50 cyc.

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STYLE NOS. CPAR-458
TO CPAR-506

THE MAGNAVOX CO.

INSTRUMENT STYLE No.	INSTRUMENT MODEL No.	A.M. RADIO CHASSIS MODEL No.	F.M. RADIO CHASSIS MODEL No.	RECORD CHANGER PART No.	AMPLIFIER CHASSIS MODEL No.	PHONOGRAPH PICK-UP ARM PART No.	CRYSTAL PICK-UP PART No.	TURNTABLE MOTOR PART No.	PART No. SPEAKER	CURRENT
CPAR-458	38G	CR-160		520093			560022		581420	60 cyc.
CPAR-459	38G-1	CR-160		520005			560022		581420	50-60 cyc.
CPAR-460	42A	CR-161		520085			560022		581915 581916	50-60 cyc.
CPAR-461	72A	CR-154C	CR-158(FM)	520080			560023		581913 581914	60 cyc.
CPAR-462	72A-1	CR-154C	CR-158(FM)	520081			560023		581913 581914	50 cyc.
CPAR-463	50	CR-155		520080			560023		581917	60 cyc.
CPAR-464	50-1	CR-155		520081			560023		581917	50 cyc.
CPAR-465	50A	CR-155	CR-158(FM)	520080			560023		581917	60 cyc.
CPAR-466	50A-1	CR-155	CR-158(FM)	520081			560023		581917	50 cyc.
CPAR-467	51	CR-156		520080			560023		581917	60 cyc.
CPAR-468	51-1	CR-156		520081			560023		581917	50 cyc.
CPAR-469	51A	CR-156	CR-158(FM)	520080			560023		581917	60 cyc.
CPAR-470	51A-1	CR-156	CR-158(FM)	520081			560023		581917	50 cyc.
CPAR-471	51B	CR-156	CR-158(FM)	520090	A-222A		560023		581917	60 cyc.
CPAR-472	62A	CR-154C	CR-158(FM)	520080			560023		581915 581916	60 cyc.
CPAR-473	62A-1	CR-154C	CR-158(FM)	520081			560023		581915 581916	50 cyc.
CPAR-474	62B	CR-154C		520090	A-222		560023		581915 581916	60 cyc.
CPAR-475	62B-1	CR-154C		520091	A-222		560023		581915 581916	50 cyc.
CPAR-476	62C	CR-154C		520090	A-222		560023		581915 581916	60 cyc.
CPAR-477	62C-1	CR-154C	CR-158(FM)	520091	A-222		560023		581915 581916	50 cyc.
CPAR-480	72D	CR-154C		520085			560022		581913 581914	50-60 cyc.
CPAR-481	62D	CR-154C		520085			560022		581913 581914	50-60 cyc.
CPAR-482	50B	CR-155		520090	A-222		560023		581917	60 cyc.
CPAR-483	50B-1	CR-155		520091	A-222		560023		581917	50 cyc.
CPAR-484	62E	CR-154C	CR-158(FM)	520085			560022		581913 581914	50-60 cyc.
CPAR-485	72E	CR-154C	CR-158(FM)	520085			560022		581913 581914	50-60 cyc.
CPAR-489	55	CR-154C		520080			560023		581915 581916	60 cyc.
CPAR-490	55-1	CR-154C		520081			560023		581915 581916	50 cyc.
CPAR-491	55A	CR-154C		520080			560023		581915 581916	60 cyc.
CPAR-492	55A-1	CR-154C	CR-158(FM)	520081			560023		581915 581916	50 cyc.
CPAR-493	55B	CR-154C		520090	A-222		560023		581915 581916	60 cyc.
CPAR-494	55B-1	CR-154C		520091	A-222		560023		581915 581916	50 cyc.
CPAR-495	38G	CR-156		520093			560022		581917	60 cyc.
CPAR-496	38G-1	CR-156		520092			560022		581917	50-60 cyc.
CPAR-497	42A	CR-162		520085			560022		581915 581916	50 cyc.
CPAR-498	51B-1	CR-156	CR-158(FM)	520091			560023		581917	50-60 cyc.
CPAR-499	42A	CR-154		520072			560022		581915 581916	50-60 cyc.
CPAR-500	55D	CR-154C		520094			560022		581915 581916	50-60 cyc.
CPAR-501	55E	CR-154C	CR-158(FM)	520094			560072		581915 581916	50-60 cyc.
CPAR-502	72H	CR-154C		520090	A-222		560023		581913 581914	60 cyc.
CPAR-503	72H-1	CR-154C		520091	A-222		560023		581913 581914	50 cyc.
CPAR-504	72J	CR-154C	CR-158(FM)	520090	A-222		560023		581913 581914	60 cyc.
CPAR-505	72J-1	CR-154C	CR-158(FM)	520091	A-222		560023		581913 581914	50 cyc.
CPAR-506	72E	CR-154C		520072			560022		581913 581914	50-60 cyc.

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STYLE NOS. CPAR-507 TO CPAR-557

THE MAGNAVOX CO.

INSTRUMENT STYLE No.	INSTRUMENT MODEL No.	A.M. RADIO CHASSIS MODEL No.	F.M. RADIO CHASSIS MODEL No.	RECORD CHANGER PART No.	AMPLIFIER CHASSIS MODEL No.	PHONOGRAPH PICK-UP ARM PART No.	CRYSTAL PICK-UP PART No.	TURNTABLE MOTOR PART No.	PART No. SPEAKER	CURRENT
CPAR-507	72D	CR-154C	CR-158(FM)	520072			560022		581913 581914	50-60 cyc.
CPAR-508	62D	CR-154C		520072			560022		581913 581914	50-60 cyc.
CPAR-509	62E	CR-154C	CR-158(FM)	520072			560022		581913 581914	50-60 cyc.
CPAUR-510	U34F	CR-163		520022			560022		581652	AC-DC
CPAUR-511	U38C	CR-163		520021			560022		581652	AC-DC
EPUR-512	U44A	CR-164				507602	560022	630341	581630	AC-DC
TPUR-513	U31F	CR-164				507602	560022	630341	581630	AC-DC
EPAUR-514	U32D	CR-163		520021			560022		581652	AC-DC
CPAR-515	42B	CR-154		520094			560022		581915 581916	50-60 cyc.
CPAUR-516	U38E	CR-165		520151			560022		581987	AC-DC
EPAUR-517	U32E	CR-165		520151			560022		581652	AC-DC
EPR-518	45A	CR-159				500037	560022	630341	581630	60 cyc.
CPAUR-519	U38D	CR-165		520098			560022		581987	AC-DC
CPAUR-520	U49	CR-165		520151			560022		581987	AC-DC
CPAUR-521	U48	CR-165		520151			560022		581987	AC-DC
CPAR-522	49D	CR-156		520094			560022		581917	50-60 cyc.
CPAR-523	50D	CR-155		520094			560022		581917	50-60 cyc.
CPAR-524	50E	CR-155	CR-158(FM)	520094			560022		581917	50-60 cyc.
CPAR-525	51D	CR-156		520094			560022		581917	50-60 cyc.
CPAR-526	51E	CR-156	CR-158(FM)	520094			560022		581917	60 cyc.
CPAR-527	42A	CR-154		520094			560022		581915 581916	50-60 cyc.
CPAR-530	42B	CR-154		520099			560022		581915 581916	50-60 cyc.
CPAR-531	42A	CR-154		520099			560022		581915 581916	50-60 cyc.
CPAR-532	42A	CR-154		520099			560022		581915 581916	50-60 cyc.
CPAR-533	55D	CR-154C		520099			560022		581915 581916	50-60 cyc.
CPAR-534	55E	CR-154C	CR-158(FM)	520099			560022		581915 581916	50-60 cyc.
CPAR-535	50	CR-155		520080			560023		581917	60 cyc.
CPAR-536	50-1	CR-155		520081			560023		581917	50 cyc.
CPAR-537	50A	CR-155	CR-158(FM)	520080			560023		581917	60 cyc.
CPAR-538	50A-1	CR-155	CR-158(FM)	520081			560023		581917	50 cyc.
CPAR-539	50B	CR-155		520090	A-222		560023		581917	60 cyc.
CPAR-540	50B-1	CR-155		520091	A-222		560023		581917	50 cyc.
CPAR-541	42E	CR-154	CR-167(FM)	520099			560022		581915 581916	50-60 cyc.
CPAR-542	55	CR-154C		520080			560023		581915 581916	60 cyc.
CPAR-543	55-1	CR-154C		520081			560023		581915 581916	50 cyc.
CPAR-544	55A	CR-154C	CR-158(FM)	520080			560023		581915 581916	60 cyc.
CPAR-545	55A-1	CR-154C	CR-158(FM)	520081			560023		581915 581916	50 cyc.
CPAR-546	55B	CR-154C		520090	A-222		560023		581915 581916	60 cyc.
CPAR-547	55B-1	CR-154C		520091	A-222		560023		581915 581916	50 cyc.
CPAR-548	62D	CR-154C		520099			560022		581913 581914	50-60 cyc.
CPAR-549	62E	CR-154C	CR-158(FM)	520099			560022		581913 581914	50-60 cyc.
CPAR-550	42E	CR-154	CR-167(FM)	520094			560022		581915 581916	50-60 cyc.
CPAR-551	48	CR-156		520080			560023		581917	60 cyc.
CPAR-552	48-1	CR-156		520081			560023		581917	50 cyc.
CPAR-553	51	CR-156		520080			560023		581917	60 cyc.
CPAR-554	51-1	CR-156		520081			560023		581917	50 cyc.
CPAR-555	51K	CR-156	CR-169(FM)	520080			560023		581917	60 cyc.
CPAR-556	51K-1	CR-156	CR-169(FM)	520081			560023		581917	50 cyc.
CPAR-557	51B	CR-156	CR-169(FM)	520090	A-222A		560023		581917	60 cyc.

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STYLE NOS. CPAR-558
TO CPAR-613

THE MAGNAVOX CO.

INSTRUMENT STYLE No.	INSTRUMENT MODEL No.	A.M. RADIO CHASSIS MODEL No.	F.M. RADIO CHASSIS MODEL No.	RECORD CHANGER PART No.	AMPLIFIER CHASSIS MODEL No.	PHONOGRAPH PICK-UP ARM PART No.	CRYSTAL PICK-UP PART No.	TURNTABLE MOTOR PART No.	PART No. SPEAKER	CURRENT
CPAR-558	51B-1	CR-156	CR-169 (FM)	520091			560023		581917	50 cyc.
CPAR-559	50D	CR-155		520094			560022		581917	50-60 cyc.
CPAR-560	50E	CR-155	CR-158 (FM)	520094			560022		581917	50-60 cyc.
CPAR-561	48K	CR-156	CR-170 (FM)	520080			560023		581917	60 cyc.
CPAR-562	48K-1	CR-156	CR-170 (FM)	520081			560023		581917	50 cyc.
CPAR-563	49F	CR-156		520170			560023		581917	60 cyc.
CPAR-564	49F	CR-156		520172			560023		581917	60 cyc.
EPAR-566	32F	CR-156		520170			560023		581917	60 cyc.
CPAR-567	50D	CR-155		520099			560022		581917	50-60 cyc.
CPAR-568	50E	CR-155	CR-158 (FM)	520094			560022		581917	50-60 cyc.
CPAUR-569	U48D	CR-165		520098			560022		581987	AC-DC
EPAUR-570	U32D	CR-165		520098			560022		581652	AC-DC
CPAR-571	48D	CR-156		520094			560022		581917	50-60 cyc.
CPAR-572	48DK	CR-156	CR-170 (FM)	520094			560022		581917	50-60 cyc.
CPAR-573	48FK	CR-156		520170			560023		581917	60 cyc.
CPAR-574	48F	CR-156	CR-170 (FM)	520170			560023		581917	60 cyc.
CPAR-575	51F	CR-156		520170			560023		581917	60 cyc.
CPAR-576	51FK	CR-156	CR-169 (FM)	520170			560023		581917	60 cyc.
CPAR-577	48G	CR-156		520301			560023		581917	60 cyc.
CPAR-578	48GK	CR-156		520301			560023		581917	60 cyc.
CPAR-579	49G	CR-156		520301			560023		581917	60 cyc.
CPAR-580	51G	CR-156		520301			560023		581917	60 cyc.
CPAR-581	51GA	CR-156		520301			560023		581917	60 cyc.
CPAR-582	51GK	CR-156	CR-169 (FM)	520301			560023		581917	60 cyc.
CPAR-583	51D	CR-156		520099			560022		581917	50-60 cyc.
CPAR-584	51DK	CR-156	CR-158 (FM)	520099			560022		581917	50-60 cyc.
CPAR-585	51DA	CR-156	CR-169 (FM)	520099			560022		581917	50-60 cyc.
CPAR-586	51FA	CR-156	CR-158 (FM)	520170			560023		581917	60 cyc.
CPAR-587	50L	CR-155		520302			560023		581917	60 cyc.
CPAR-588	48D	CR-156		520099			560022		581917	50-60 cyc.
CPAR-589	48DK	CR-156	CR-170 (FM)	520099			560022		581917	50-60 cyc.
CPAR-590	50G	CR-155		520301			560023		581917	60 cyc.
CPAR-591	50GA	CR-155	CR-158 (FM)	520301			560023		581917	60 cyc.
CPAR-592	50GK	CR-155	CR-169 (FM)	520301			560023		581917	60 cyc.
CPAR-593	50F	CR-155		520170			560023		581917	60 cyc.
CPAR-594	50FA	CR-155	CR-158 (FM)	520170			560023		581917	60 cyc.
CPAR-595	50FK	CR-155	CR-169 (FM)	520170			560023		581917	60 cyc.
CPAR-596	50DK	CR-155	CR-169 (FM)	520099			560022		581917	50-60 cyc.
CPAR-597	42AK	CR-154	CR-170 (FM)	520099			560022		581915 581916	50-60 cyc.
CPAR-598	55DK	CR-154C	CR-169 (FM)	520099			560022		581915 581916	50-60 cyc.
CPAR-599	55G	CR-154C		520301			560023		581915 581916	60 cyc.
CPAR-600	55GA	CR-154C		520301			560023		581915 581916	60 cyc.
CPAR-601	55GK	CR-154C	CR-169 (FM)	520301			560023		581915 581916	60 cyc.
CPAR-602	55L	CR-154C		520302	A-222		560023		581915 581916	60 cyc.
CPAR-603	51F	CR-156		520170			560023		581917	60 cyc.
CPAR-604	51L	CR-156		520302	A-222		560023		581917	60 cyc.
CPAR-605	51LA	CR-156	CR-158 (FM)	520302	A-222		560023		581917	60 cyc.
CPAR-606	51LK	CR-156	CR-169 (FM)	520302	A-222		560023		581917	60 cyc.
CPAR-607	51A	CR-156	CR-158 (FM)	520080			581917		560023	60 cyc.
CPAR-608	51A-1	CR-156	CR-158 (FM)	520081			581917		560023	50 cyc.
CPAR-609	62G	CR-154C	CR-158 (FM)	520301			581913 581914		560023	60 cyc.
CPAR-610	62GA	CR-154C		520301			581913 581914		560023	60 cyc.
CPAR-611	62GK	CR-154C	CR-169 (FM)	520301			581913 581914		560023	60 cyc.
CPAR-612	72G	CR-154C		520301			581913 581914		560023	60 cyc.
CPAR-613	72GA	CR-154C	CR-158 (FM)	520301			581913 581914		560023	60 cyc.

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STYLE NOS. CPAR-614 TO CPAR-661

THE MAGNAVOX CO.

INSTRUMENT STYLE No.	INSTRUMENT MODEL No.	A.M. RADIO CHASSIS MODEL No.	F.M. RADIO CHASSIS MODEL No.	RECORD CHANGER PART No.	AMPLIFIER CHASSIS MODEL No.	PHONOGRAPH PICK-UP ARM PART No.	CRYSTAL PICK-UP PART No.	TURNTABLE MOTOR PART No.	PART No. SPEAKER	CURRENT
CPAR-614	62DK	CR-154C	CR-169 (FM)	520072			581913 581914		560022	50-60 cyc.
CPAR-615	72GK	CR-154C	CR-169 (FM)	520301			581913 581914		560023	60 cyc.
CPAR-616	72L	CR-154C		520302	A-222		581913 581914		560023	60 cyc.
CPAR-617	62DK	CR-154C	CR-169 (FM)	520099			581913 581914		560022	50-60 cyc.
CPAR-618	47F	CR-171		520170			581917		560022	60 cyc.
CPAR-619	47F	CR-171		520170			581917		560022	60 cyc.
CPAR-620	62L	CR-154C		520302	A-222		581913 581914		560023	60 cyc.
CPAR-621	62LA	CR-154C	CR-158 (FM)	520302	A-222		581913 581914		560023	60 cyc.
CPAR-622	62LK	CR-154C	CR-169 (FM)	520302	A-222		581913 581914		560023	60 cyc.
CPAR-623	38F	CR-156		520170			560023		581917	60 cyc.
CPAR-624	72LA	CR-154C	CR-158 (FM)	520302	A-222		560023		581913 581914	60 cyc.
CPAR-625	72LK	CR-154C	CR-169 (FM)	520302	A-222		560023		581913 581914	60 cyc.
CPAR-626	42G	CR-154		520301			560023		581915 581916	60 cyc.
CPAR-627	42GA	CR-154	CR-167 (FM)	520301			560023		581915 581916	60 cyc.
CPAR-628	42GK	CR-154	CR-170 (FM)	520301			560023		581915 581916	60 cyc.
CPAR-629	32F	CR-171		520170			560023		581917	60 cyc.
CPAR-630	38F	CR-171		520170			560023		581917	60 cyc.
CPAR-631	28M	CR-178		520173			560031		581917	60 cyc.
CPAR-632	52F	CR-156		520170			560023		581917	60 cyc.
CPAR-633	52FK	CR-156	CR-170 (FM)	520170			560023		581917	60 cyc.
CPAR-634	52G	CR-156		520301			560023		581917	60 cyc.
CPAR-635	52GK	CR-156	CR-170 (FM)	520301			560023		581917	60 cyc.
TPAR-636	26M	CR-168		520173			560031		582402	60 cyc.
TPR-637	20	CR-168				†560033	560031	500026	282402	60 cyc.
TPR-639	20-1	CR-168				†560033	560031	500026	582402	50 cyc.
CPAR-640	43F	CR-140		520170			560023		581917	60 cyc.
CPAR-641	35D	CR-154		520099			560022		581915 581916	50-60 cyc.
CPAR-642	72D	CR-154C		520099			560022		581913 581914	50-60 cyc.
CPAR-643	72E	CR-154C	CR-158 (FM)	520099			560022		581913 581914	50-60 cyc.
CPAR-644	72DK	CR-154C	CR-169 (FM)	520099			560022		581913 581914	50-60 cyc.
CPAR-645	47HF	CR-178		520170			560023		581917	60 cyc.
CPAR-646	47HFK	CR-178	CR-169 (FM)	520170			560023		581917	60 cyc.
CPAR-647	54F	CR-177		520170			560023		581915 581916	60 cyc.
CPAR-648	54FA	CR-177	CR-167 (FM)	520170			560023		581915 581916	60 cyc.
CPAR-649	54FK	CR-177	CR-170 (FM)	520170			560023		581915 581916	60 cyc.
CPAUR-650	U52D	CR-165		520098			560022		581987	AC-DC
EPAR-651	32NF	CR-176		520170			560023		581917	60 cyc.
EPAR-652	32HF	CR-178		520170			560023		581917	60 cyc.
CPAR-653	38HF	CR-178		520170			560023		581917	60 cyc.
CPAR-654	38HFK	CR-178	CR-169 (FM)	520170			560023		581917	60 cyc.
CPAR-655	50K	CR-155	CR-169 (FM)	520080			560023		581917	60 cyc.
CPAR-656	55G	CR-174C		520301			560023		581915 581916	60 cyc.
CPAR-657	55GA	CR-174C	CR-158 (FM)	520301			560023		581915 581916	60 cyc.
CPAR-658	55GK	CR-174C	CR-169 (FM)	520301			560023		581915 581916	60 cyc.
CPAR-659	55L	CR-174C		530302	A-222		560023		581915 581916	60 cyc.
CPAR-660	55D	CR-174C		520099			560022		581915 581916	50-60 cyc.
CPAR-661	55E	CR-174C	CR-158 (FM)	520099			560022		581915 581916	50-60 cyc.

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STYLE NOS. CPAR-662
TO CPA-3001L

THE MAGNAVOX CO.

INSTRUMENT STYLE No.	INSTRUMENT MODEL No.	A.M. RADIO CHASSIS MODEL No.	F.M. RADIO CHASSIS MODEL No.	RECORD CHANGER PART No.	AMPLIFIER CHASSIS MODEL No.	PHONOGRAPH PICK-UP ARM PART No.	CRYSTAL PICK-UP PART No.	TURNTABLE MOTOR PART No.	PART No. SPEAKER	CURRENT
CPAR-662	55DK	CR-174C	CR-169(FM)	520099			560022		581915 581916	50-60 cyc.
CAPR-663	52F	CR-176		520170			560023		581917	60 cyc.
CPAR-664	52FK	CR-176	CR-170(FM)	520170			560023		581917	60 cyc.
CPAR-665	52G	CR-176		520301			560023		581917	60 cyc.
CPAR-666	52GK	CR-176	CR-170(FM)	520301			560023		581917	60 cyc.
CPAR-667	48G	CR-176		520301			560023		581917	60 cyc.
CPAR-668	48GK	CR-176	CR-170(FM)	520301			560023		581917	60 cyc.
CPAR-669	48F	CR-176		520170			560023		581917	60 cyc.
CPAR-670	48FK	CR-176	CR-170(FM)	520170			560023		581917	60 cyc.
CPAR-671	48D	CR-176		520099			560022		581917	50-60 cyc.
CPAR-672	48DK	CR-176	CR-170(FM)	520099			560022		581917	50-60 cyc.
CPAR-673	48G	CR-176		520301			560023		581917	60 cyc.
CPAR-677	42G	CR-174		520301			560023		581915 581916	60 cyc.
CPAR-678	42GA	CR-174	CR-167(FM)	520301			560023		581915 581916	60 cyc.
CPAR-679	42GK	CR-174	CR-170(FM)	520301			560023		581915 581916	60 cyc.
CPAR-681	72D	CR-174C		520099			560022		581913 581914	50-60 cyc.
CPAR-682	72E	CR-174C	CR-158(FM)	520099			560022		581913 581914	50-60 cyc.
CPAR-683	72DK	CR-174C	CR-169(FM)	520099			560022		581913 581914	50-60 cyc.
CPAR-685	38NF	CR-176		520170			560023		581917	60 cyc.
CPAR-686	38NFK	CR-176	CR-169(FM)	520170			560023		581917	60 cyc.
CPAR-687	54F	CR-181		520170			560023		581915 581916	60 cyc.
CPAR-688	54FA	CR-181	CR-167(FM)	520170			560023		581915 581916	60 cyc.
CPAR-689	54FK	CR-181	CR-170(FM)	520170			560023		581915 581916	60 cyc.
CPAR-692	49	CR-176		520080			560023		581917	60 cyc.
CPAR-693	43M	CR-159		520173			560023		581917	60 cyc.
EPAUR-694	U32E	CR-164		520151			560022		581652	AC-DC
CPAUR-695	U48E	CR-165		520151			560022		581987	AC-DC
CPAUR-696	U52E	CR-165		520151			560022		581987	AC-DC
EPAR-697	32NF	CR-176		520170			560023		581917	60 cyc.
CPAR-698	72L	CR-174C		520302	A-222		560023		581913 581914	60 cyc.
CP-1101	4K				A-1101	630341	560023	500029	582331	60 cyc.
CP-3001A	4				A-3001A	631595	562729	507605	58869 58968	60 cyc.
CP-3001B	4A				A-3001A	631595	562729	507605	58869 58968	60 cyc.
CP-3001C	4B				A-3001A	631595	562729	507607	58869 58968	50-60 cyc.
CP-3001D	4C				A-3001A	631595	562729	507607	58869 58968	50-60 cyc.
CP-3001E	4D				A-3001A	633541	562729	509888	58869 58968	60 cyc.
CP-3001F	4E				A-3001A	633541	562729	509888	58869 58968	60 cyc.
CP-3001G	4F				A-3001B	633541	562729	507576	58869 58968	50-60 cyc.
CP-3001H	4G				A-3001B	633541	562729	509888	58869 58968	60 cyc.
CP-3001K	4H				A-3001C	630341	560022	509888	58869 58968	60 cyc.
CP-3001L	4J				A-3001C	630341	560022	509888	58869 58968	60 cyc.
CPA-3001A	5			529562	A-3001A		562729		58869 58968	60 cyc.
CPA-3001B	5A			529562	A-3001A		562729		58869 58968	60 cyc.
CPA-3001C	5B			529650	A-3001A		560008		58869 58968	60 cyc.
CPA-3001D	5C			529650	A-3001A		560008		58869 58968	60 cyc.
CPA-3001E	5D			529650	A-3001A		560008		58869 58968	60 cyc.
CPA-3001F	5E			529650	A-3001A		560008		58869 58968	60 cyc.
CPA-3001G	5D			529650	A-3001A		560008		58869 58968	60 cyc.
CPA-3001H	5E			529650	A-3001B		560008		58869 58968	60 cyc.
CPA-3001I	5G			520001	A-3001B		560008		58869 58968	60 cyc.
CPA-3001J	5F			520001	A-3001B		560008		58869 58968	60 cyc.
CPA-3001K	5H			520072	A-3001C		560022		58869 58968	50-60 cyc.
CPA-3001L	5J			520072	A-3001C		560022		58869 58968	50-60 cyc.

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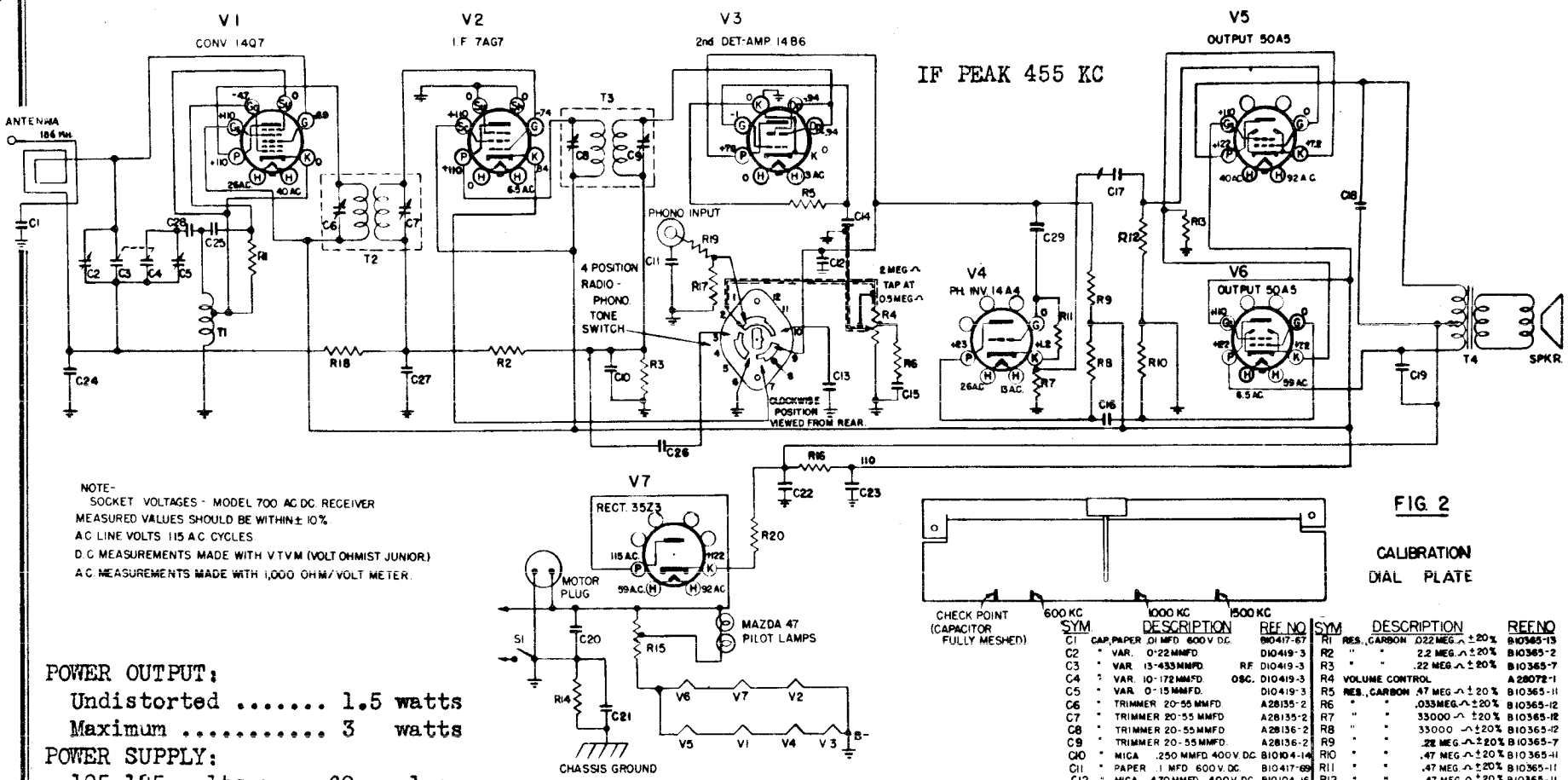

NOTE-
SOCKET VOLTAGES - MODEL 700 AC DC RECEIVER
MEASURED VALUES SHOULD BE WITHIN ± 10%
A.C. LINE VOLTS 115 A.C. CYCLES
D.C. MEASUREMENTS MADE WITH V.T.V.M. (VOLT OHMIST JUNIOR)
A.C. MEASUREMENTS MADE WITH 1,000 OHM/VOLT METER.

FIG. 2

CALIBRATION DIAL PLATE

SYM	DESCRIPTION	REF NO
C1	CAP. PAPER .01 MFD. 600 V D.C.	B10417-67
C2	" VAR. 0-22 MMFD.	D10419-3
C3	" VAR. 13-433 MMFD. R.F.	D10419-3
C4	" VAR. 10-172 MMFD. OSC.	D10419-3
C5	" VAR. 0-15 MMFD.	D10419-3
C6	" TRIMMER 20-55 MMFD.	A28135-2
C7	" TRIMMER 20-55 MMFD.	A28135-2
C8	" TRIMMER 20-55 MMFD.	A28136-2
C9	" TRIMMER 20-55 MMFD.	A28136-2
C10	" MICA .250 MMFD. 400 V. D.C.	B10104-14
C11	" PAPER .1 MFD. 600 V. D.C.	B10417-69
C12	" MICA 470 MMFD. 400 V. D.C.	B10104-16
C13	" PAPER .005 MFD. 600 V.D.C.	B10417-47
C14	" " .01 MFD. 400 V. D.C.	B10417-17
C15	" " .05 MFD. 400 V. D.C.	B10417-17
C16	" " .001 MFD. 600 V. D.C.	B10417-43
C17	" " .001 MFD. 600 V. D.C.	B10417-43
C18	" " .01 MFD. 400 V. D.C.	B10417-17
C19	" " .01 MFD. 400 V. D.C.	B10417-17
C20	" " .05 MFD. 600 V. D.C.	B10417-66
C21	" " 1 MFD. 600 V. D.C.	B10417-69
C22	" ELECTROLYTIC 40 MFD. 150 V. D.C.	A10427
C23	" " 80 MFD. 150 V. D.C.	A10427
C24	" PAPER .05 MFD. 600 V. D.C.	B10417-66
C25	" MICA 56 MMFD. 400 V. D.C.	B10104-9
C26	" PAPER .01 MFD. 400 V. D.C.	B10417-17
C27	" PAPER .01 MFD. 400 V. D.C.	B10417-17
C28	CAP. PAPER .05 MFD. 400 V. D.C.	B10417-20
C29	CAP. PAPER .01 MFD. 400 V. D.C.	B10417-17

SYM	DESCRIPTION	REF NO
R1	RES., CARBON .022 MEG. ± 20%	B10365-13
R2	" " 2.2 MEG. ± 20%	B10365-2
R3	" " .22 MEG. ± 20%	B10365-7
R4	VOLUME CONTROL	A28072-1
R5	RES., CARBON .47 MEG. ± 20%	B10365-11
R6	" " .033 MEG. ± 20%	B10365-12
R7	" " 33000 Ω ± 20%	B10365-12
R8	" " 33000 Ω ± 20%	B10365-12
R9	" " .22 MEG. ± 20%	B10365-7
R10	" " .47 MEG. ± 20%	B10365-11
R11	" " .47 MEG. ± 20%	B10365-11
R12	" " .47 MEG. ± 20%	B10365-11
R13	" " 100 Ω ± 20%	A10366-2
R14	" " .22 MEG. ± 20%	B10365-7
R15	" BLEEDER 90-Ω, TAP AT 50-Ω	A10368-2
R16	" CARBON 560 Ω ± 10%	C10351-72
R17	" " .22 MEG. ± 20%	B10365-7
R18	" " .47 MEG. ± 20%	B10365-11
R19	" " .47 MEG. ± 20%	B10365-11
R20	RES., CARBON 10-Ω 1/2 W ± 20%	C10351-1
T1	OSC. COIL	A28145
T2	I.F. COIL 455 KC	A28138-2
T3	I.F. COIL 455 KC	A28136-2
T4	AUDIO OUTPUT TRANSFORMER	A28068-2
SPKR	SPEAKER 5" X 7" P.M.	C20493-2

POWER OUTPUT:
  Undistorted ..... 1.5 watts
  Maximum ..... 3 watts
POWER SUPPLY:
  105-125 volts, a.c. 60 cycles
POWER CONSUMPTION: 45 watts
LOUDSPEAKER:
  5x7 inch oval (or 5-inch round);
  permanent magnet.
Voice Coil Impedance: 3.2 ohms at 400 cycles.

NOTES:
R19, R20 and C28, shown in the above schematic, were not included in earlier models.
The following changes were effected in later models: R2 changed from 10 to 2.2 megohms; R16 changed from 1800 to 560 ohms; R17 changed from 0.47 megohm to 0.22 megohm.
The rectifier output voltage of +110 volts, as shown above, may be 10 to 15 volts lower in earlier models due to the higher resistance of R16 in the filter section.

MAGUIRE INDUSTRIES INC.

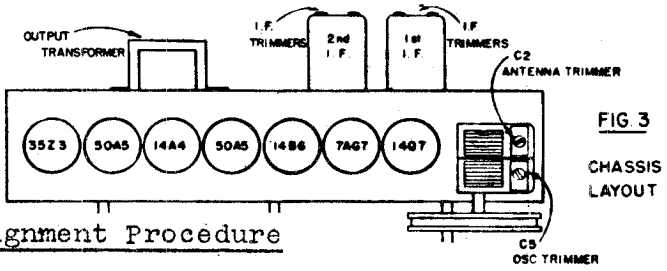

FIG. 3 CHASSIS LAYOUT

Alignment Procedure

A signal generator capable of producing a modulated radio-frequency signal, and a suitable output meter are required for proper alignment of the receiver.

Adjust the signal generator for 30%, 400 cycle modulation. At all times, use only the minimum signal intensity which will produce a readable indication on the output meter, in order to minimize alignment error due to a.v.c. action in the receiver.

Set the receiver controls for "Radio", maximum volume, and treble tone.

Make all adjustments with the signal generator connected directly to the external antenna lead of the receiver, and with the output meter across the speaker voice coil.

Use a non-metallic screwdriver in making all receiver alignment adjustments.

NOTE: The calibrated tuning dial of the receiver is fastened in the cabinet and cannot be used for reference during alignment. Therefore, calibration marks have been stamped on the plate on the front of the chassis, as shown in Figure 2. These are the reference marks referred to in the following procedure:

Step 1. Set signal generator to 455 kc. and the receiver dial to a "quiet spot" between stations. Peak the I.F trimmer condensers (Figure 3) for maximum signal indication on the output meter, beginning with the 2nd I.F. transformer.

Step 2. Turn ganged tuning condenser to maximum capacity (fully meshed) and adjust dial pointer on cord so that it coincides with the extreme left hand white mark on the metal dial plate.

Step 3. Set signal generator to 1500 kc. Turn ganged tuning condenser until pointer coincides with extreme right hand (1500 kc.) calibration mark. Adjust oscillator trimmer condenser C5 (Figure 3) for maximum indication on the output meter.

Step 4. With the signal generator and receiver dial set as in step 3, adjust the antenna trimmer condenser C2 for maximum indication on the output meter.

When chassis has been returned to cabinet after alignment, the receiver calibration should be checked against the tuning dial. It may be found necessary to slide the dial pointer slightly in either direction on the cord to correct for small deviations in calibration.

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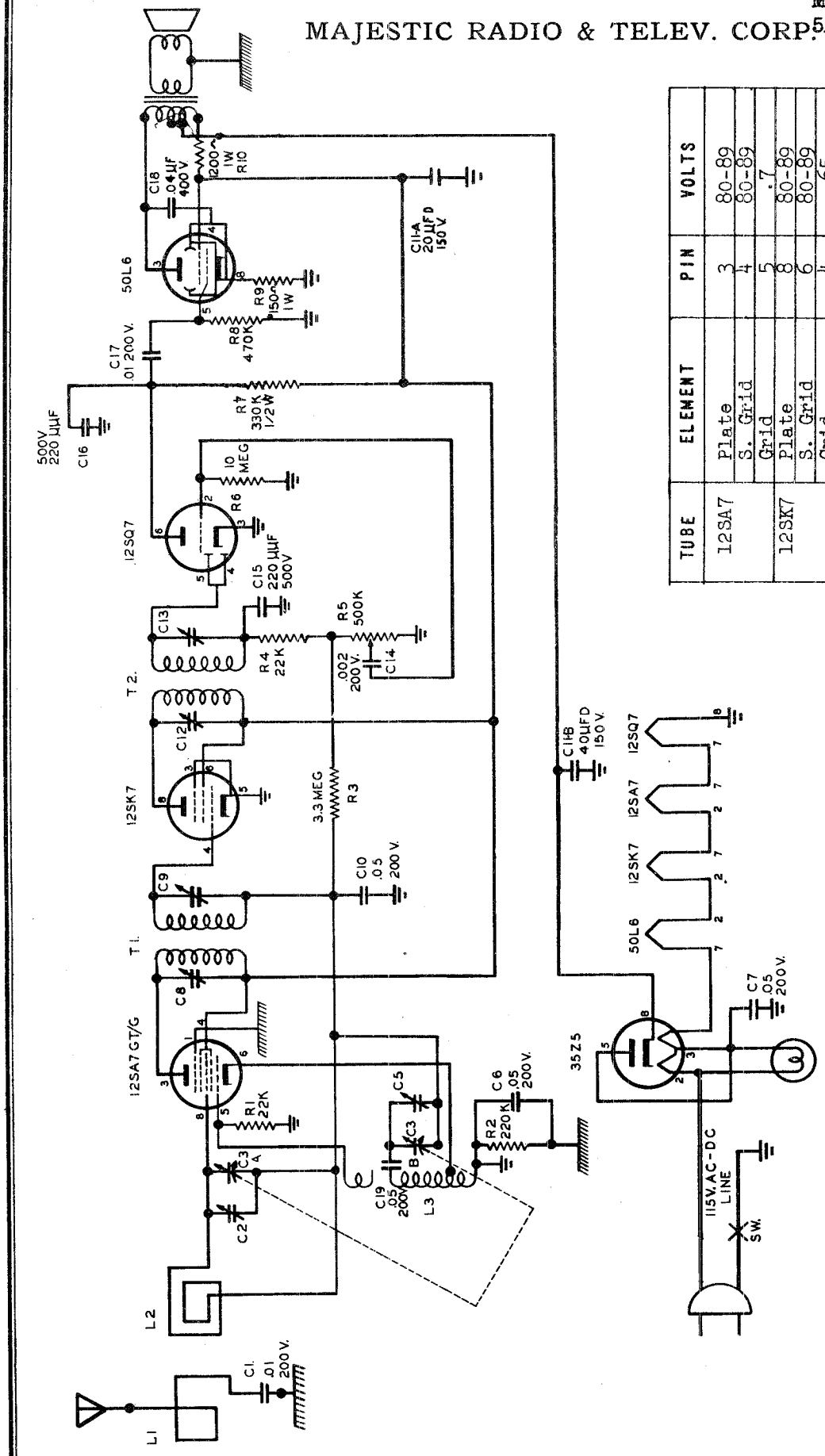
MODELS 5A410,Ch.4501;
5A430,Ch.4504

MAJESTIC RADIO & TELEV. CORP.



TUBE	ELEMENT	PIN	VOLTS
12SA7	Plate	3	80-89
	S. Grid	4	80-89
	Grid	5	.7
12SK7	Plate	8	80-89
	S. Grid	6	80-89
	Grid	4	.65
12SQ7	Plate	6	55-65
	Grid	2	.8
50L6	Plate	3	110-118
	S. Grid	4	80-89

NOTE: ALL VOLTAGES MEASURED WITH VOLTOHMYST TO B MINUS (LOW END OF VOL. CONTROL, PIN 8 OF 12SQ7, etc.) LINE VOLTAGE 117 VOLTS, NO SIGNAL, VOLUME CONTROL FULL OFF.

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MODELS 5A410,Ch.4501;
5A430,Ch.4504

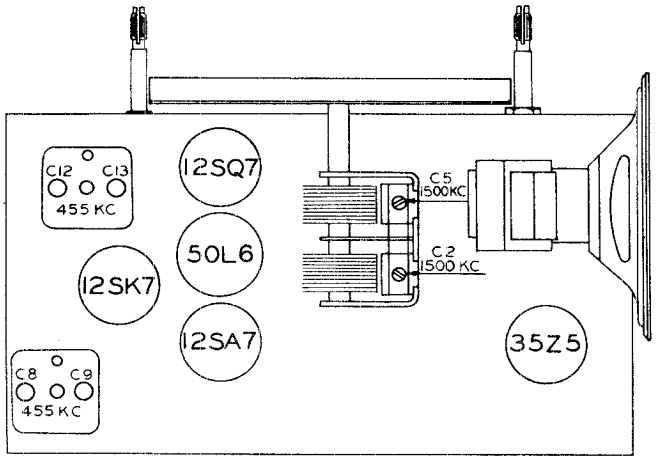
MAJESTIC RADIO & TELEV. CORP.

Before aligning, set the dial pointer as follows: Close the tuning gang condenser (plates fully meshed). Set dial pointer so that its left hand edge is in line with the right hand edge of the last mark at the low frequency end of the dial scale.

While aligning this receiver, turn the volume control full on, and keep the signal generator output as low as possible to prevent AVC action and false readings.

STEP	DUMMY ANT.	TEST OSC. CONNECTION	TEST OSC. FREQUENCY	RECEIVER DIAL	ADJUST	REMARKS
1	.01 mfd.	12SA7 grid (pin No.5)	455 kc. modulated	Any quiet spot	C13,C12,C9,C8 for max. output	Repeat in reverse order
2	--------	Loop*	1500 kc. modulated	150	C5 for maximum output	
3	--------	Loop*	1500 kc. modulated	150	C2 for maximum output	Rock gang while adjusting
4	REPEAT COMPLETE ALIGNMENT PROCEDURE CAREFULLY					

* Make a two or three turn loop about 12 inches in diameter. Connect to output terminals of the signal generator. Place this loop in a plane parallel to the receiver loop antenna and about a foot away from the receiver loop. IMPORTANT: WHEN MAKING RF. ADJUSTMENTS, THE RECEIVER LOOP ANTENNA MUST BE MOUNTED ON THE CHASSIS EXACTLY AS WHEN THE RECEIVER IS IN THE CABINET.



TUBE LAYOUT

ITEM	DESCRIPTION	PART NO.
R1,R4	22,000 ohm 20% 1/3 watt	9-184
R2	220,000 ohm 20% 1/3 watt	9-182
R3	3.3 megohm 20% 1/3 watt	9-206
R5	Volume Control with switch	13-14
R6	10 megohm 20% 1/3 watt	9-160
R7	330,000 ohm 20% 1/2 watt	9-89
R8	470,000 ohm 20% 1/3 watt	9-207
R9	150 ohm 20% 1 watt	9-251
R10	1,200 ohm 10% 1 watt	9-216
C1,C17	.01 mfd +20% -10% 200 v	6-112
C2,C3,C5	Ganged Tuning Condenser	7-16
C6	.05mfd +40% -10% 200 v	5-40
C7,C10	.05 mfd +40% -10% 200 v	5-40
C8,C9, C12,C13	Trimmer, 135 mmfd, mica	8-46
C11	20-40 mfd 150 v electrolytic	19-24
C14	.002 mfd +40% -10% 200 v	5-52
C15,C16	220 mmfd 20% 500 v mica	6-151
C18	.04 mfd +20% -10% 400 v	5-58
C19	.05 mfd + 40% - 10% 200 v	5-40
T1	1st IF Transformer	3-116
T2	2nd IF Transformer	3-117
L3	Oscillator Coil Assembly	3-158
	Speaker	22-12
	Dial Glass	117-30
	Dial Cord Tension Spring	129-29
	Dial Pointer	135-5
	MODEL 5A410	
	Cabinet, walnut	116-1
	Cabinet, white	116-2
	Loop antenna & back cover	20-7
	Knobs, walnut	128-23
	Knobs, black	128-25
	MODEL 5A430	
	Cabinet	115-6
	Loop antenna & back cover	20-17
	Knobs	128-32

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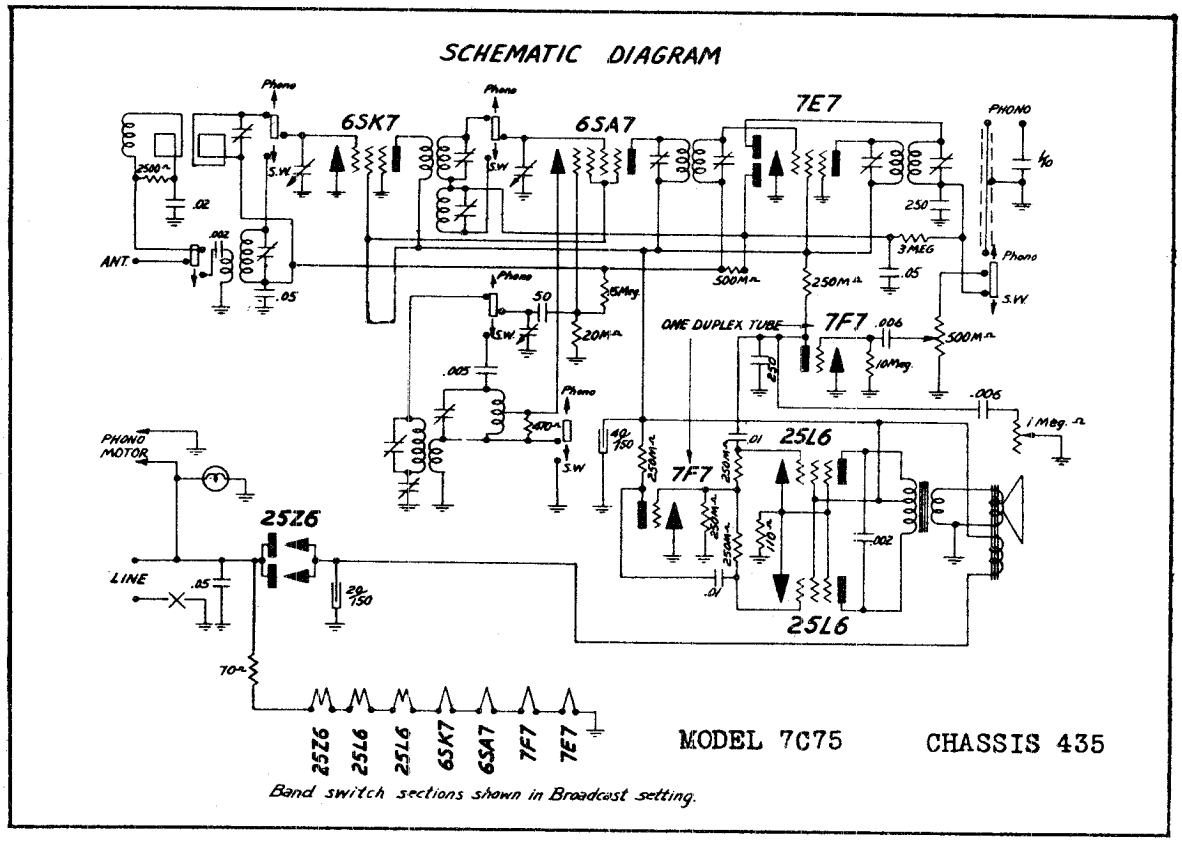
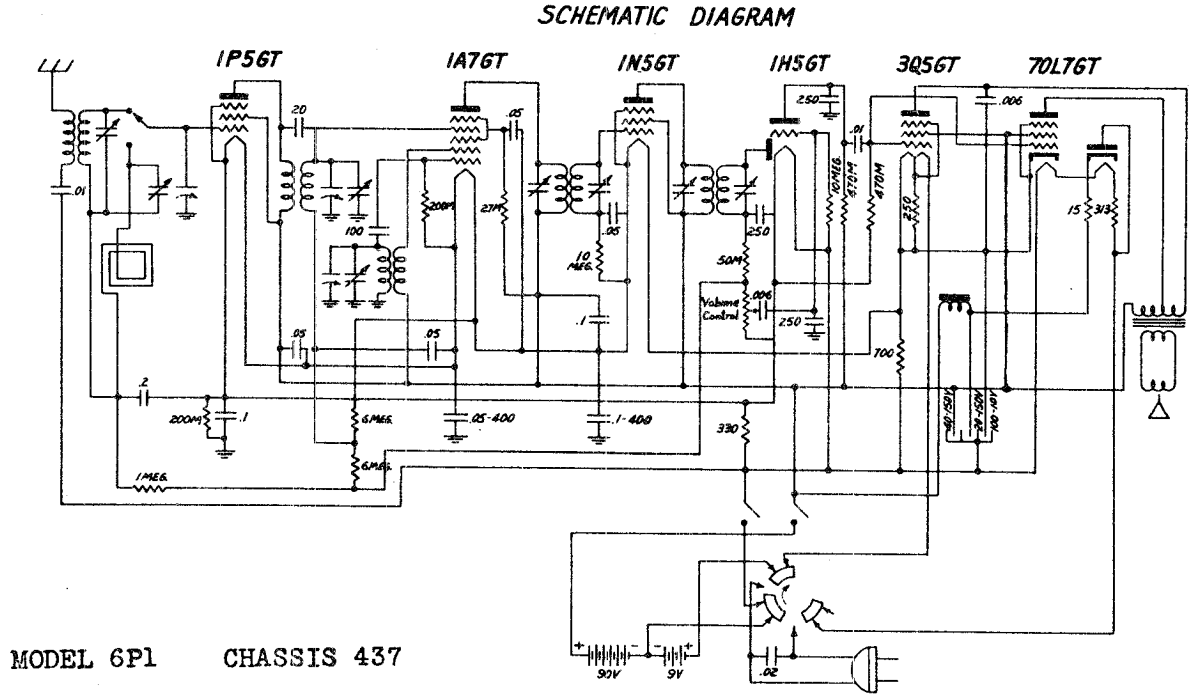
MODEL 6P1,Ch.437
MODEL 7C75,Ch.435

MAJESTIC RADIO & TELEV. CORP.



Chassis 435



Chassis 437

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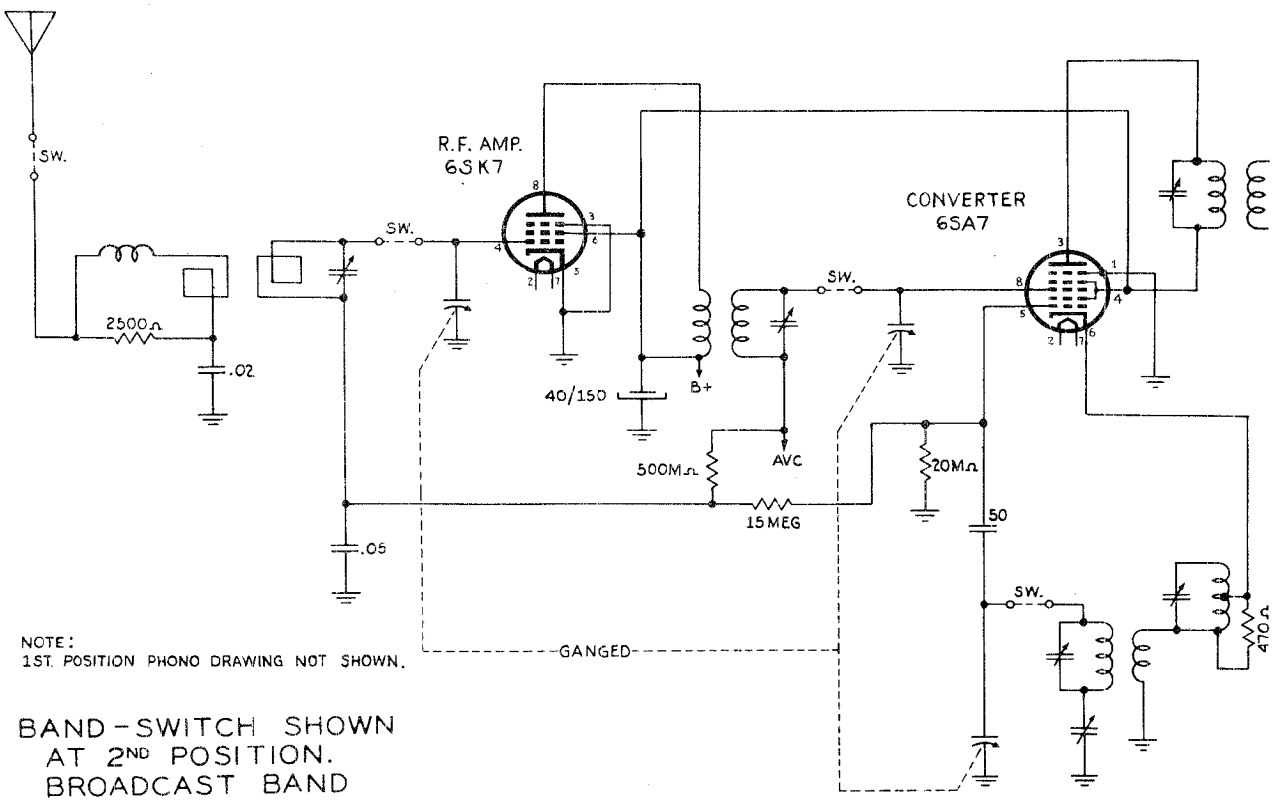
For Socket and Trimmers, see P.15-5

"clarified schematics"

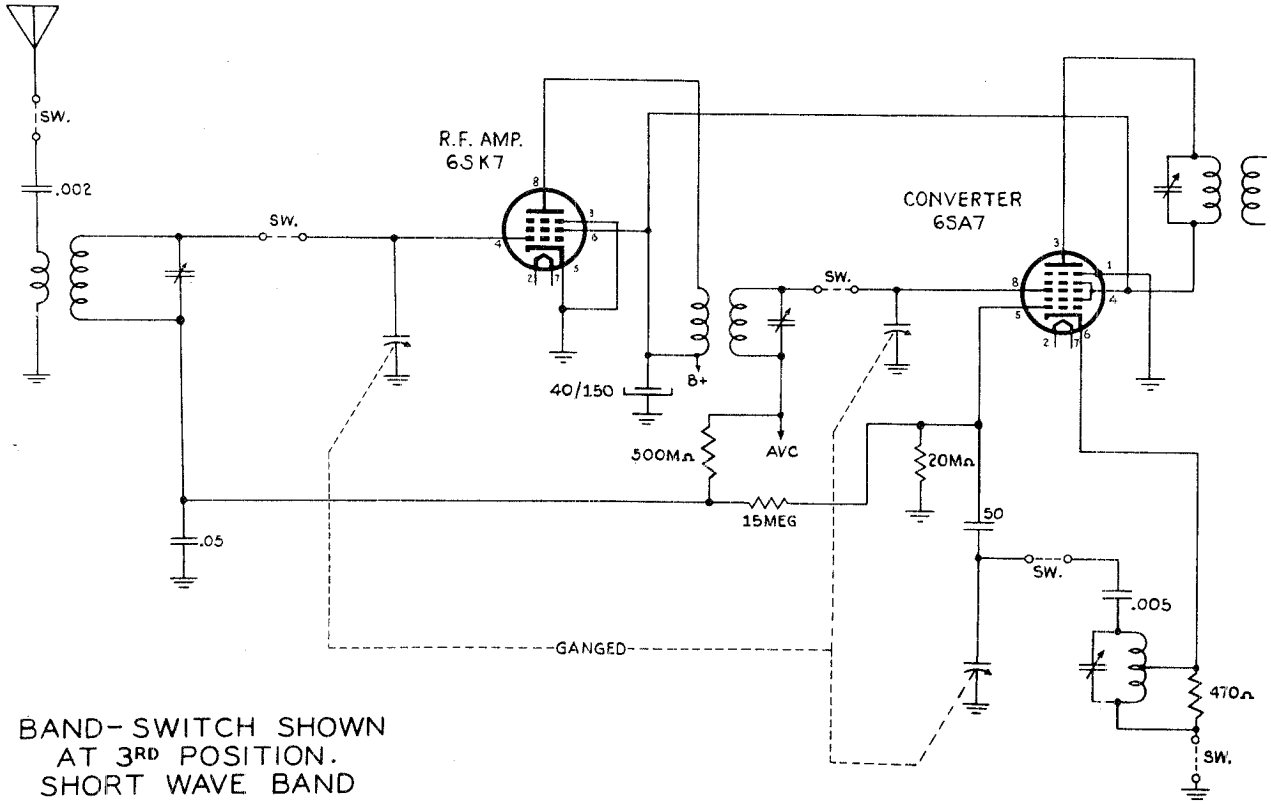
MODEL 7C75, Ch. 435

MAJESTIC RADIO & TELEV. CORP.



NOTE:
1ST. POSITION PHONO DRAWING NOT SHOWN.

BAND-SWITCH SHOWN
AT 2ND POSITION.
BROADCAST BAND



BAND-SWITCH SHOWN
AT 3RD POSITION.
SHORT WAVE BAND

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MAJESTIC RADIO & TELEV. CORP.

MODEL 6P1,Ch.437
MODEL 6T23,Ch.450X
MODEL 6T120,Ch.455
MODEL 7C75,Ch.435

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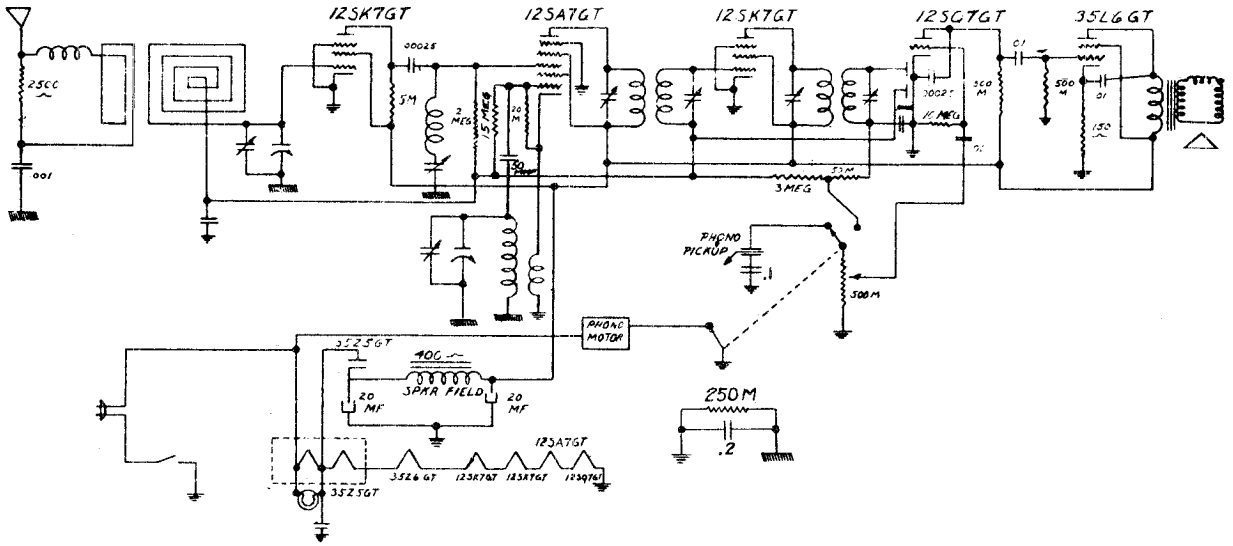
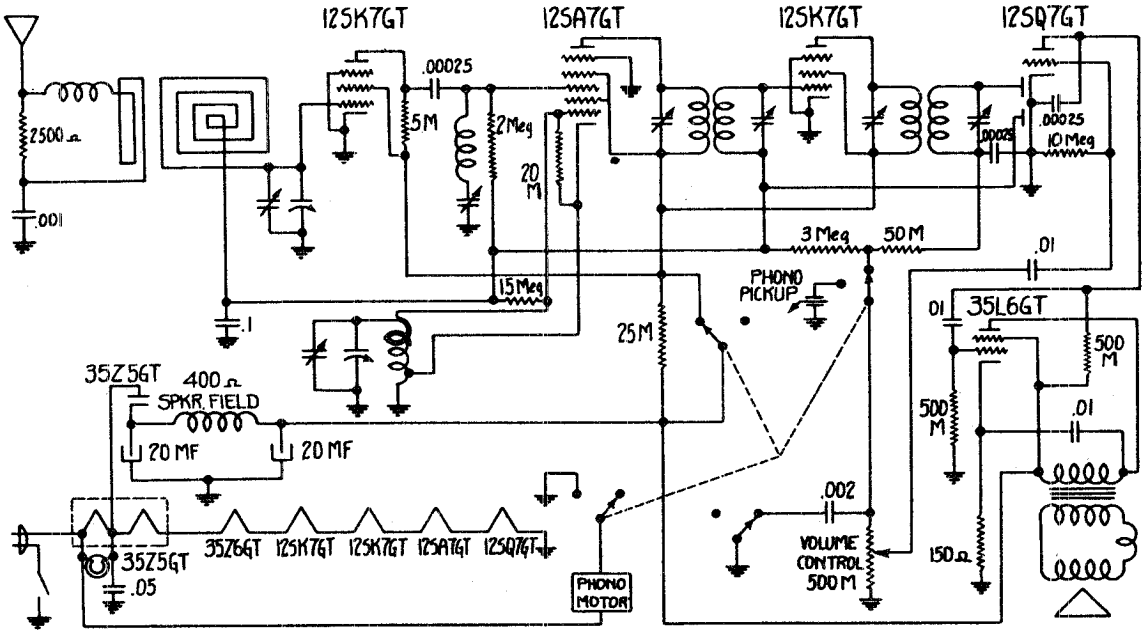
MODEL 6C137,Ch.456
MODEL 6CU35,Ch.440 MAJESTIC RADIO & TELEV. CORP.



MODEL 6CU35 CHASSIS 440

Chassis 440

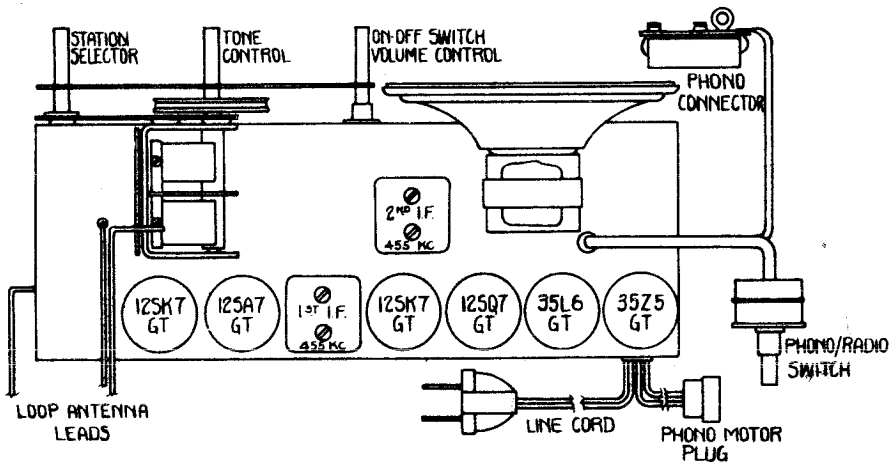


MODEL 6C137
CHASSIS 456

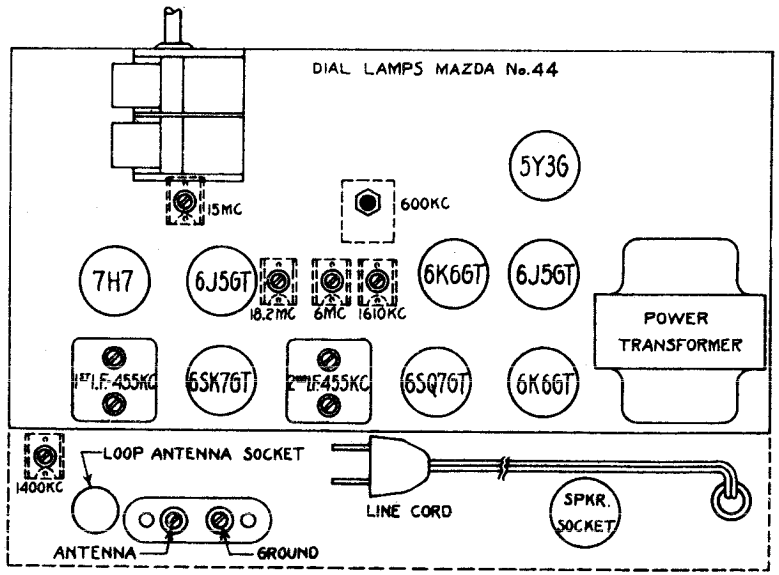
Chassis 456

MAJESTIC RADIO & TELEV. CORP.

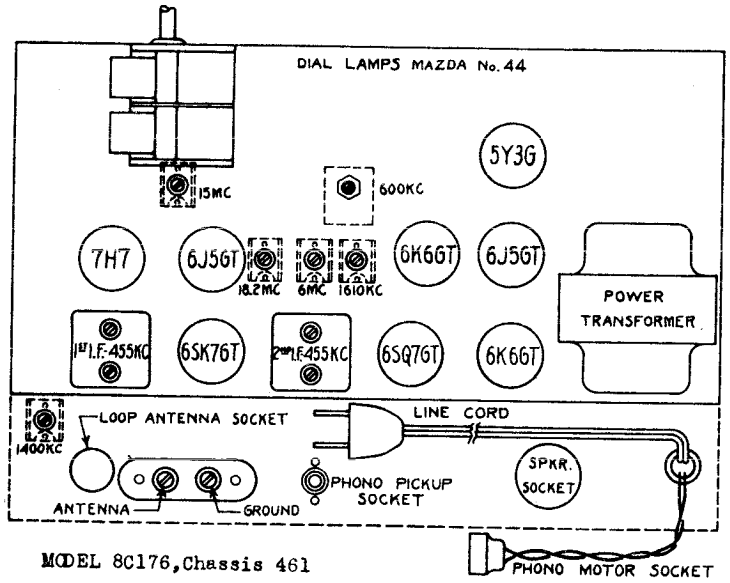
MODEL 6C137,Ch.456
MODEL 8C176,Ch.461
MODEL 8T129,Ch.459;
8K161,Ch.460



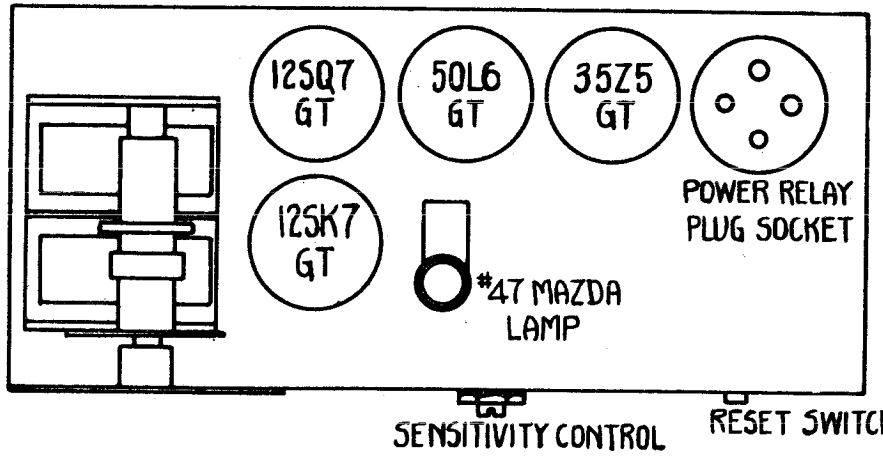
MODEL 6C137,Chassis 456



MODEL 8T129,Chassis 459
8K161,Chassis 460



MODEL 8C176,Chassis 461



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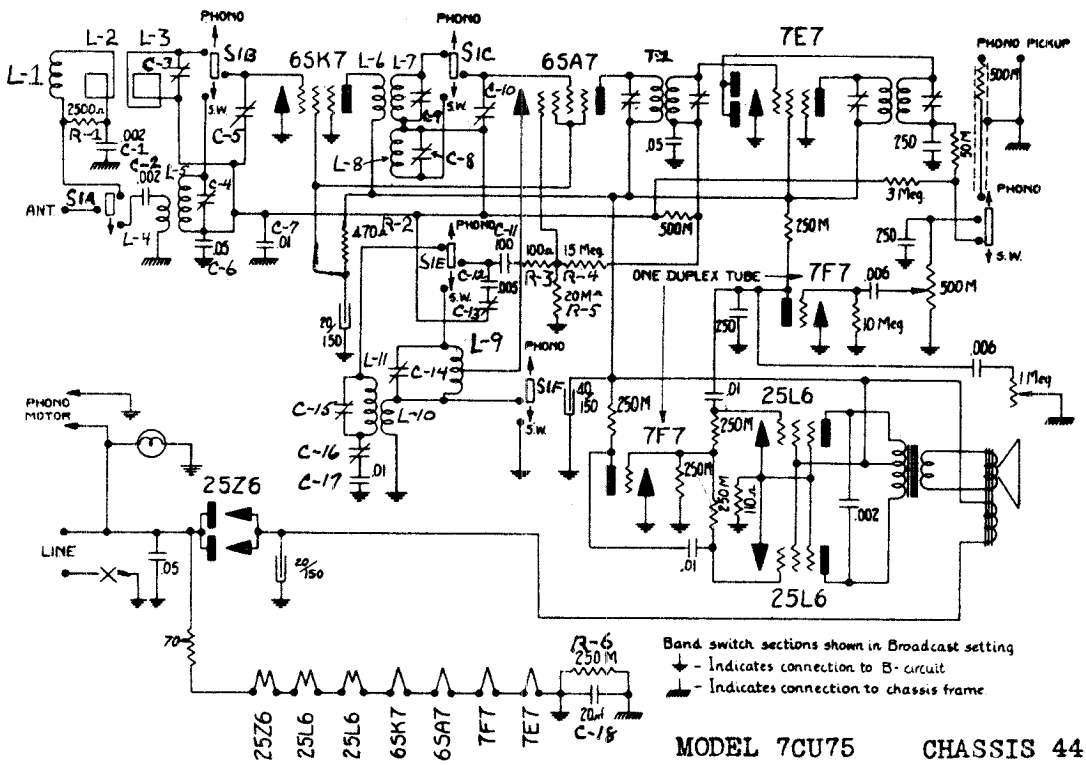
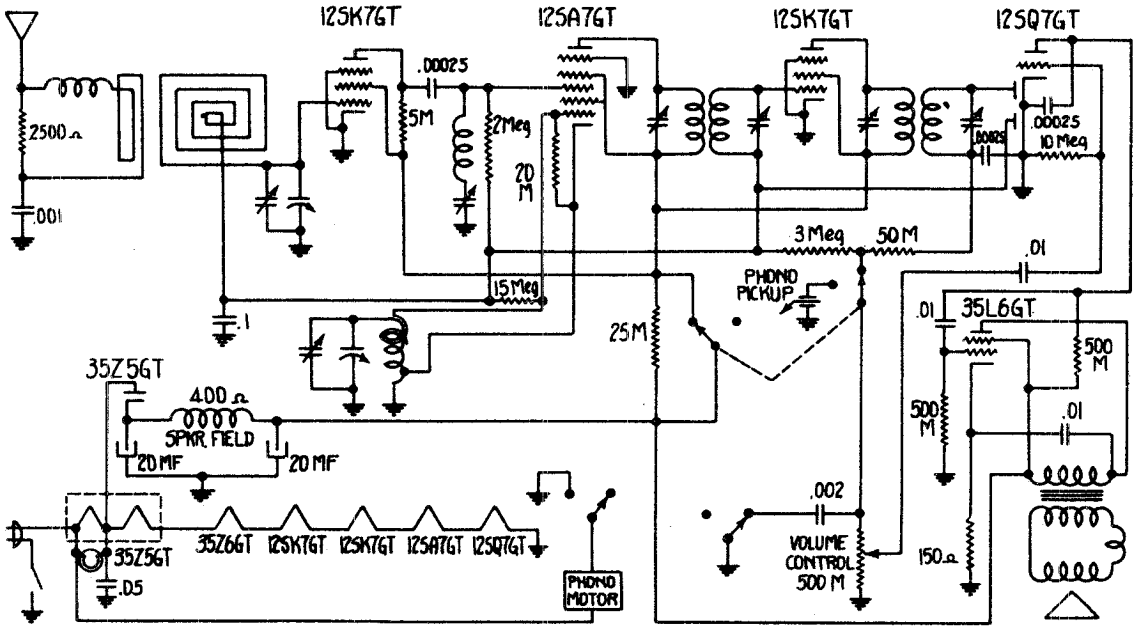
MODEL 6C141,Ch.457
MODEL 7CU75,Ch.445

MAJESTIC RADIO & TELEV. CORP.



Chassis 445



Chassis 457

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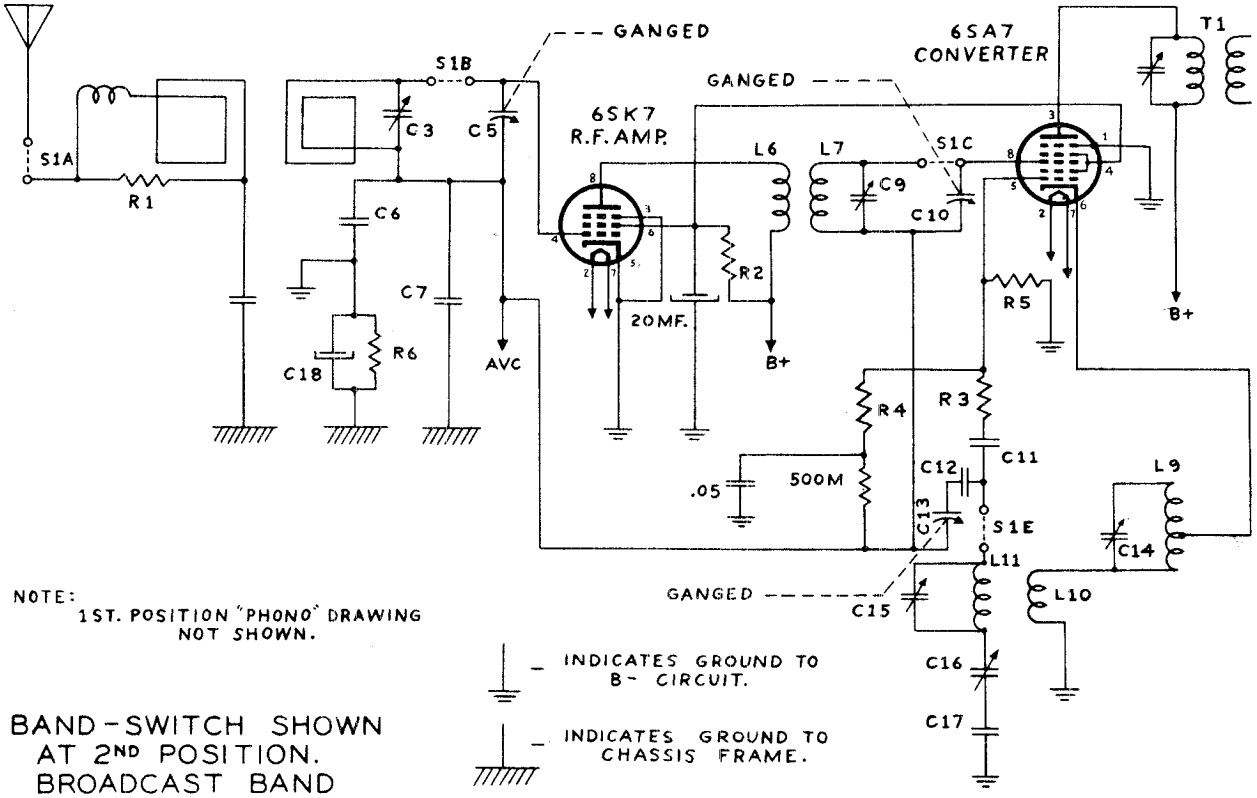
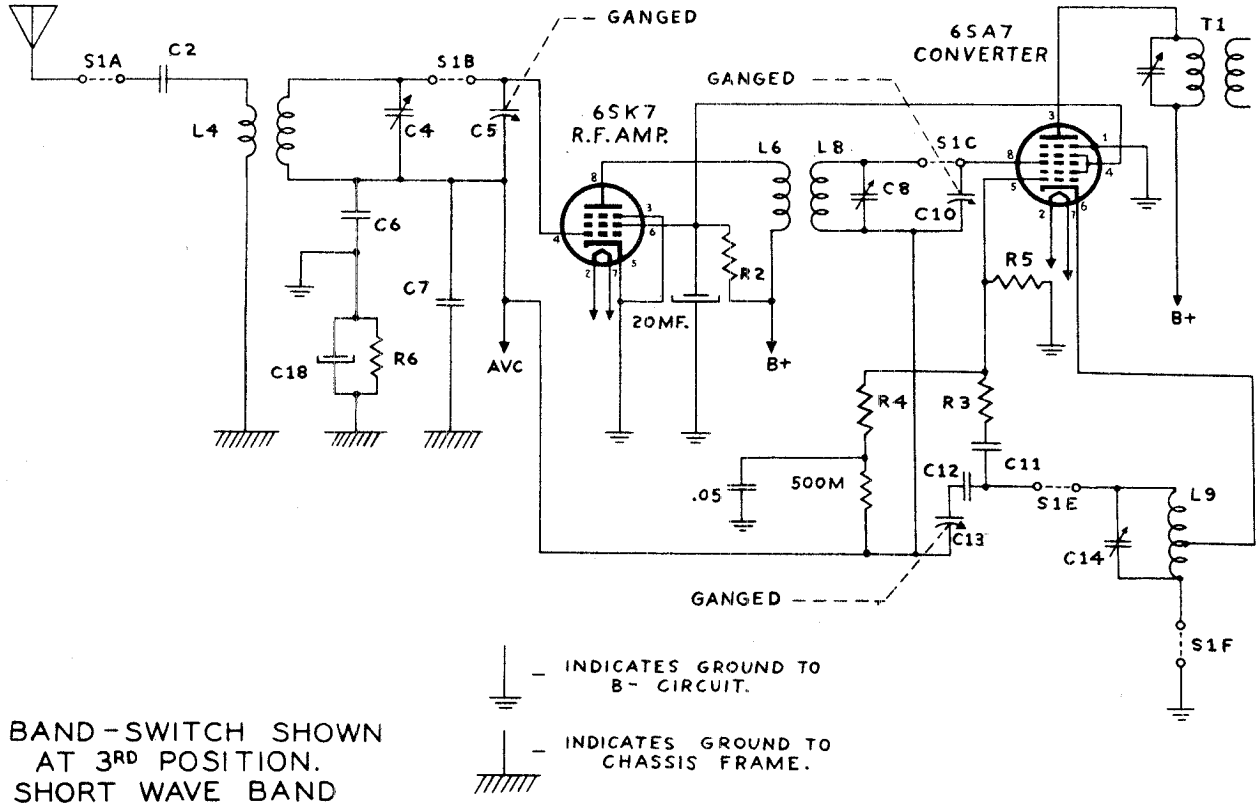
MAJESTIC RADIO & TELEV. CORP.



BAND-SWITCH SHOWN
AT 2ND POSITION.
BROADCAST BAND



BAND-SWITCH SHOWN
AT 3RD POSITION.
SHORT WAVE BAND

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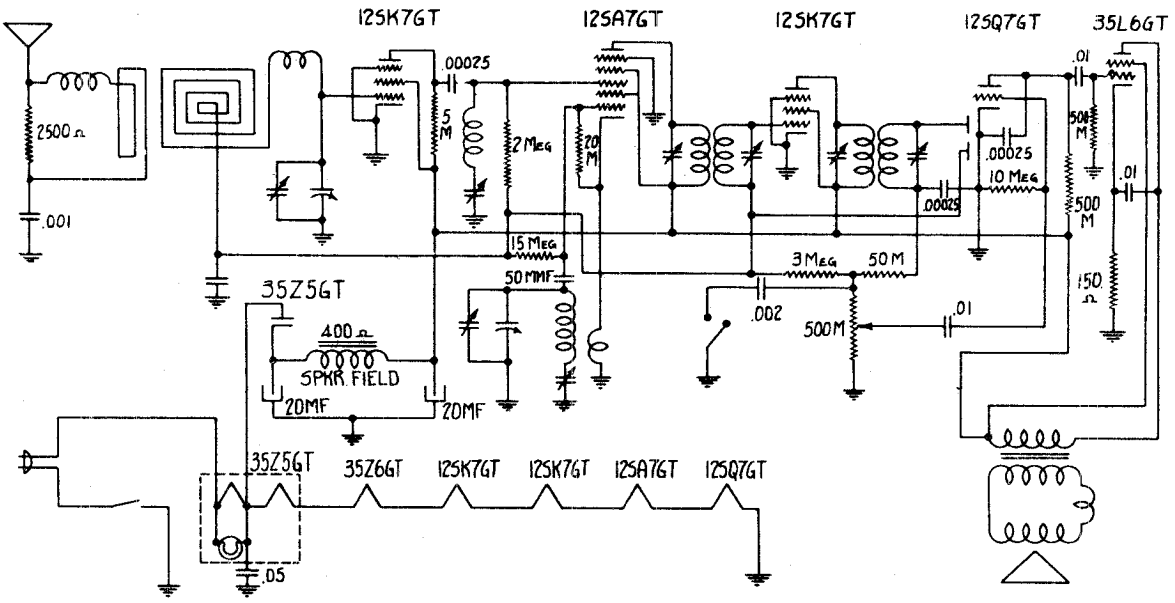
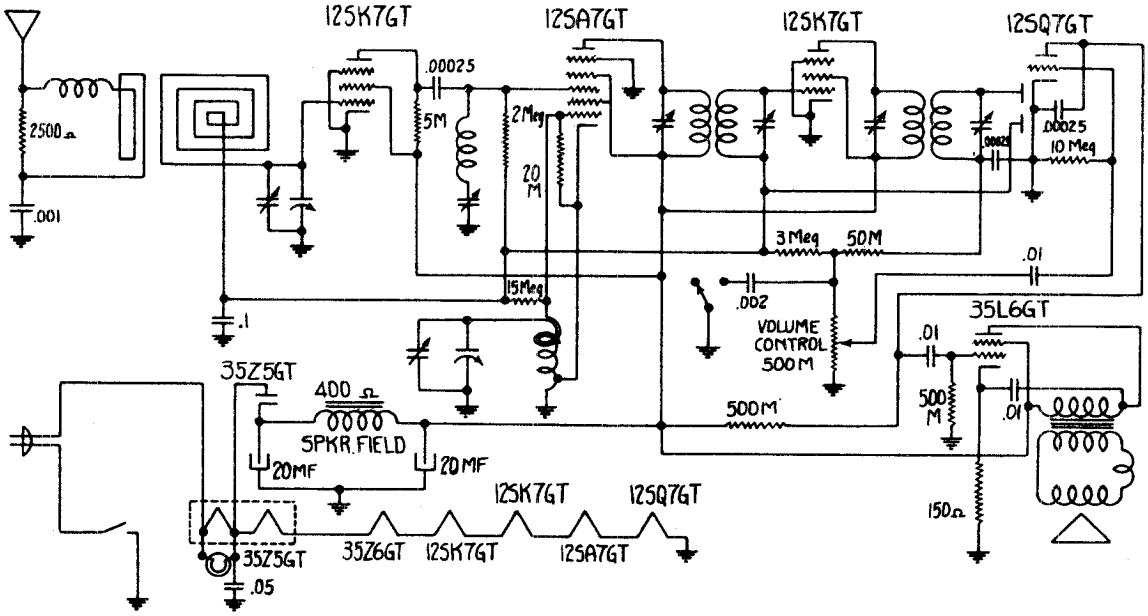
MODEL 6T23,Ch.450X
MODEL 6T120,Ch.455

MAJESTIC RADIO & TELEV. CORP.



MODEL 6T23 CHASSIS 450X

Chassis 450X



MODEL 6T120 CHASSIS 455

Chassis 455

For Socket,trimmers, see P.15-5

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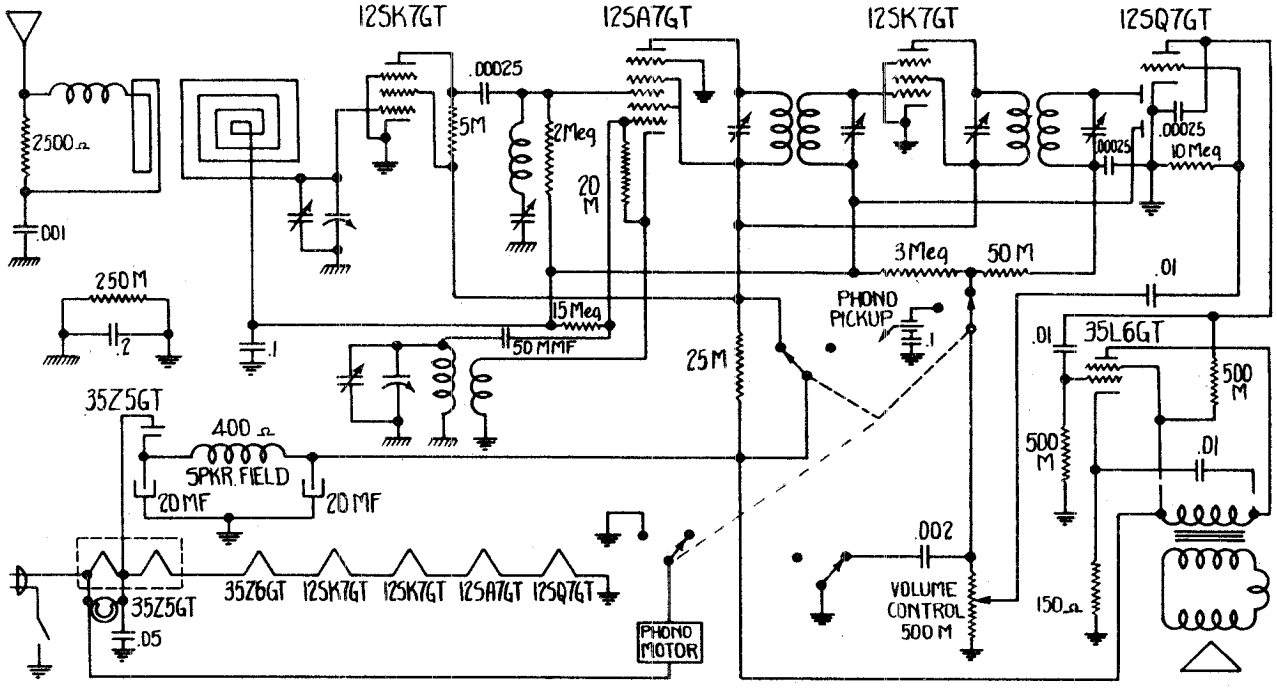
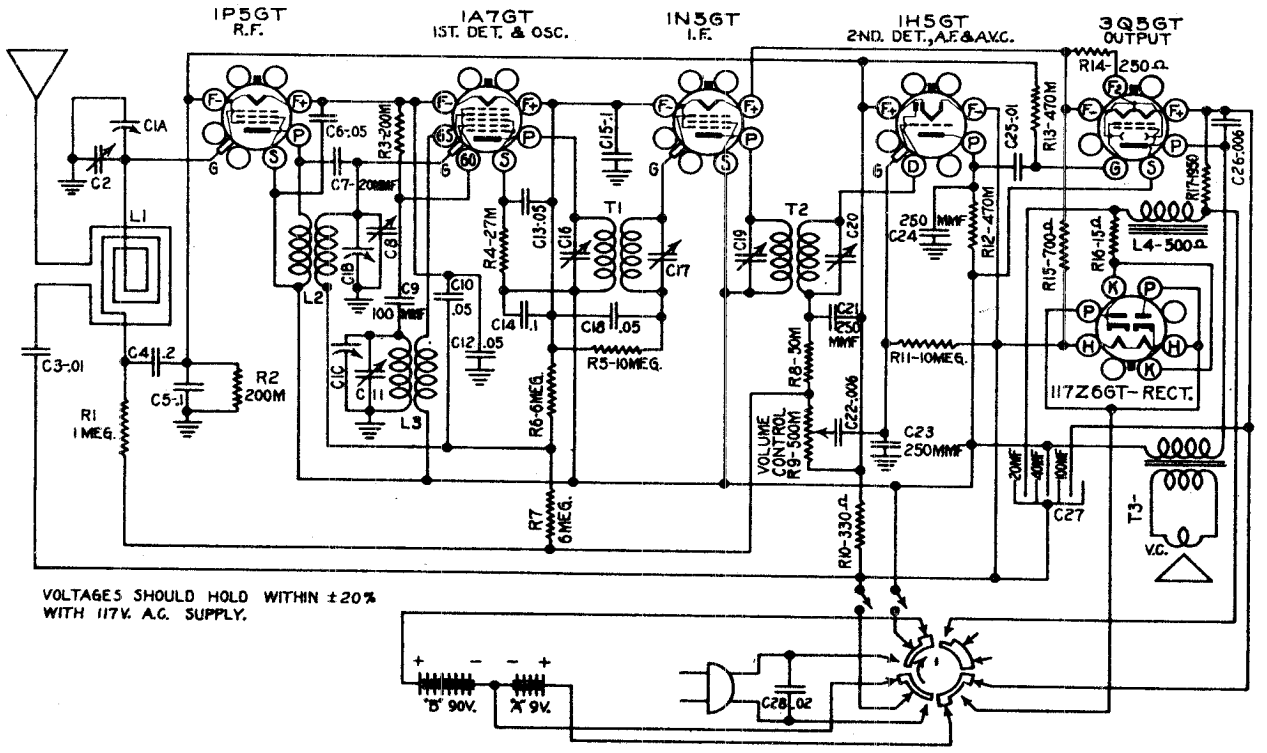
MODEL 6CU137,Ch.464
MODEL 6CU141,Ch.466

MAJESTIC RADIO & TELEV. CORP.



MODEL 6CU137 CHASSIS 464

Chassis 464



MODEL 6CU141 CHASSIS 466

Chassis 466

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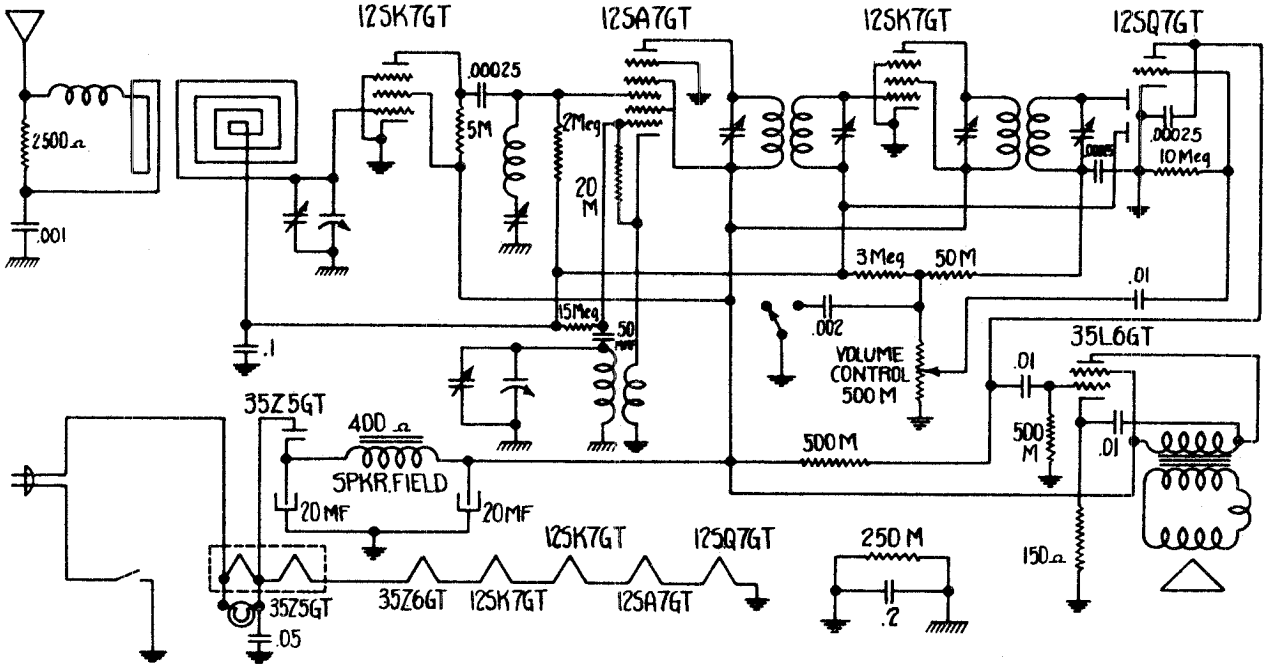
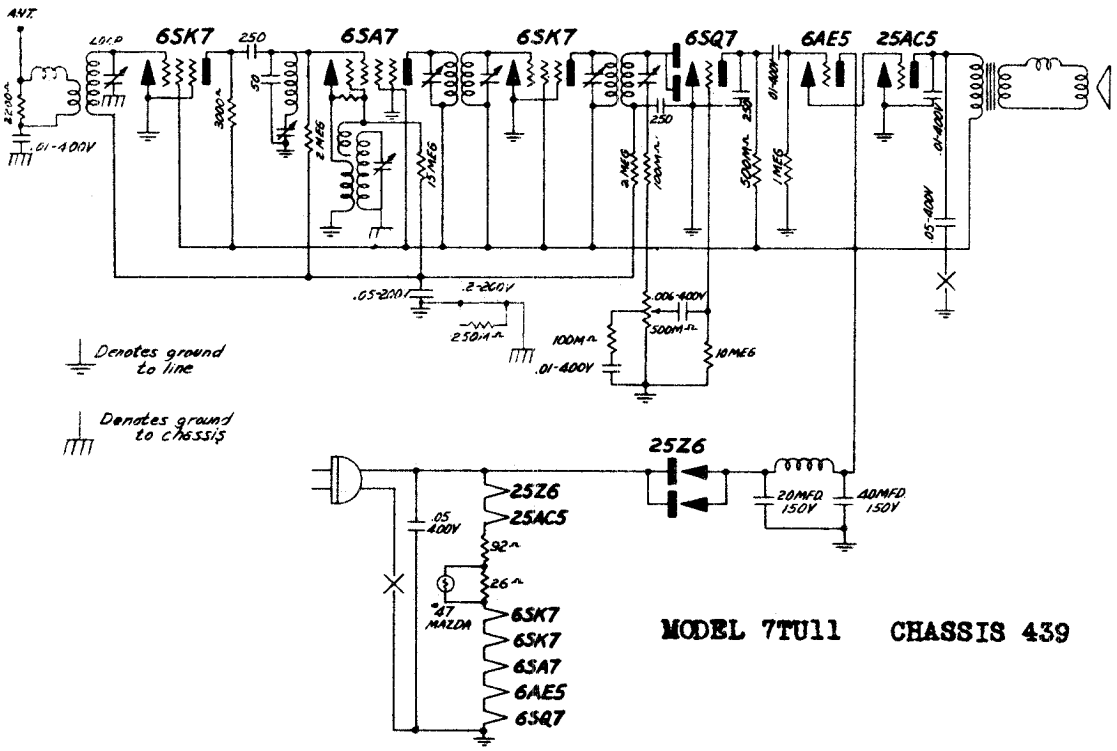
MODEL 6TU120,Ch.462
MODEL 7TU11,Ch.439

MAJESTIC RADIO & TELEV. CORP.



MODEL 6TU120 CHASSIS 462

Chassis 462



MODEL 7TU11 CHASSIS 439

Chassis 439

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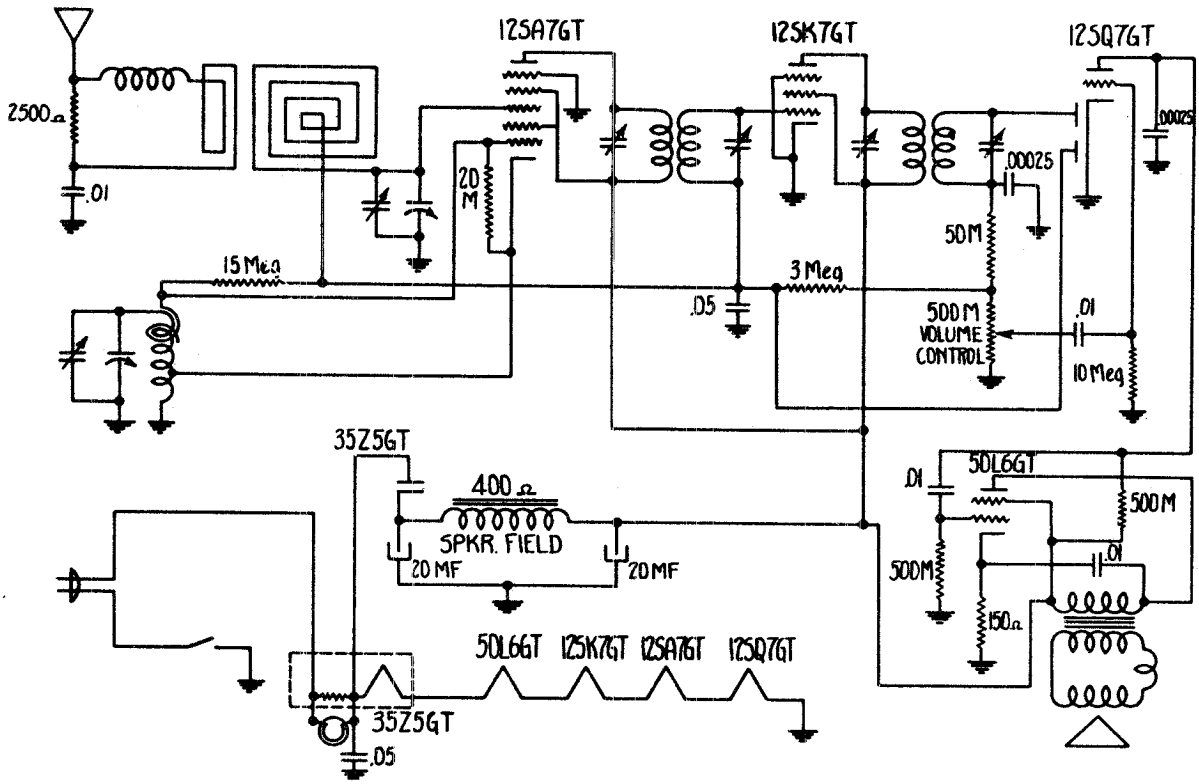
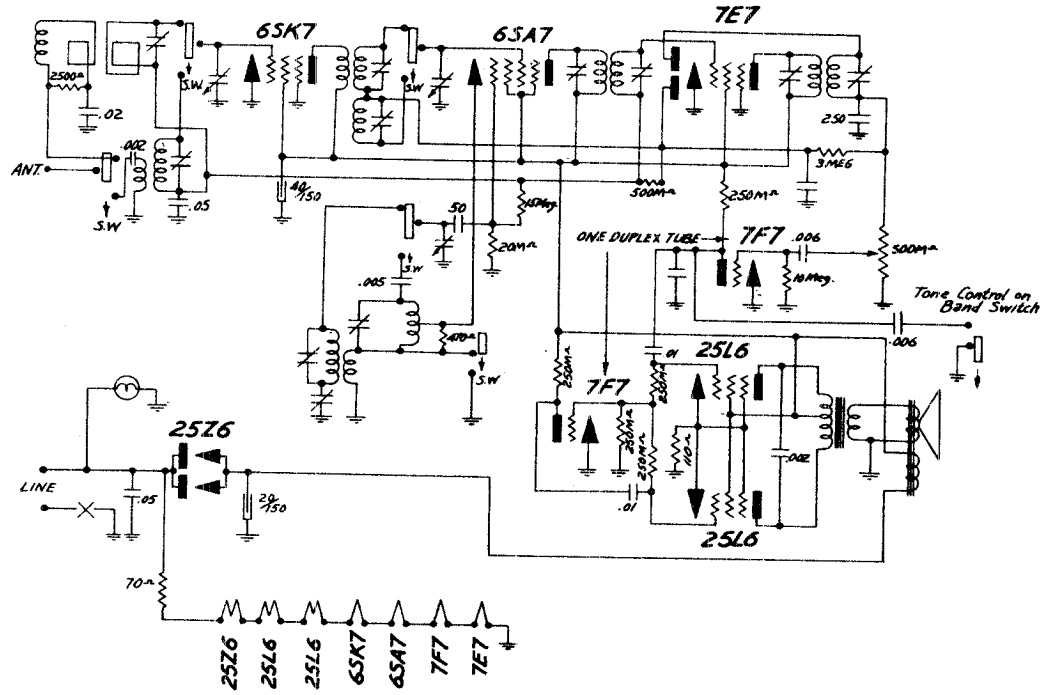
MODEL 7K60, Ch.434
MODEL 410, Ch.410

MAJESTIC RADIO & TELEV. CORP.



MODEL 410 CHASSIS 410

SCHEMATIC DIAGRAM



Band Switch shown in Broadcast - High Tone Setting.

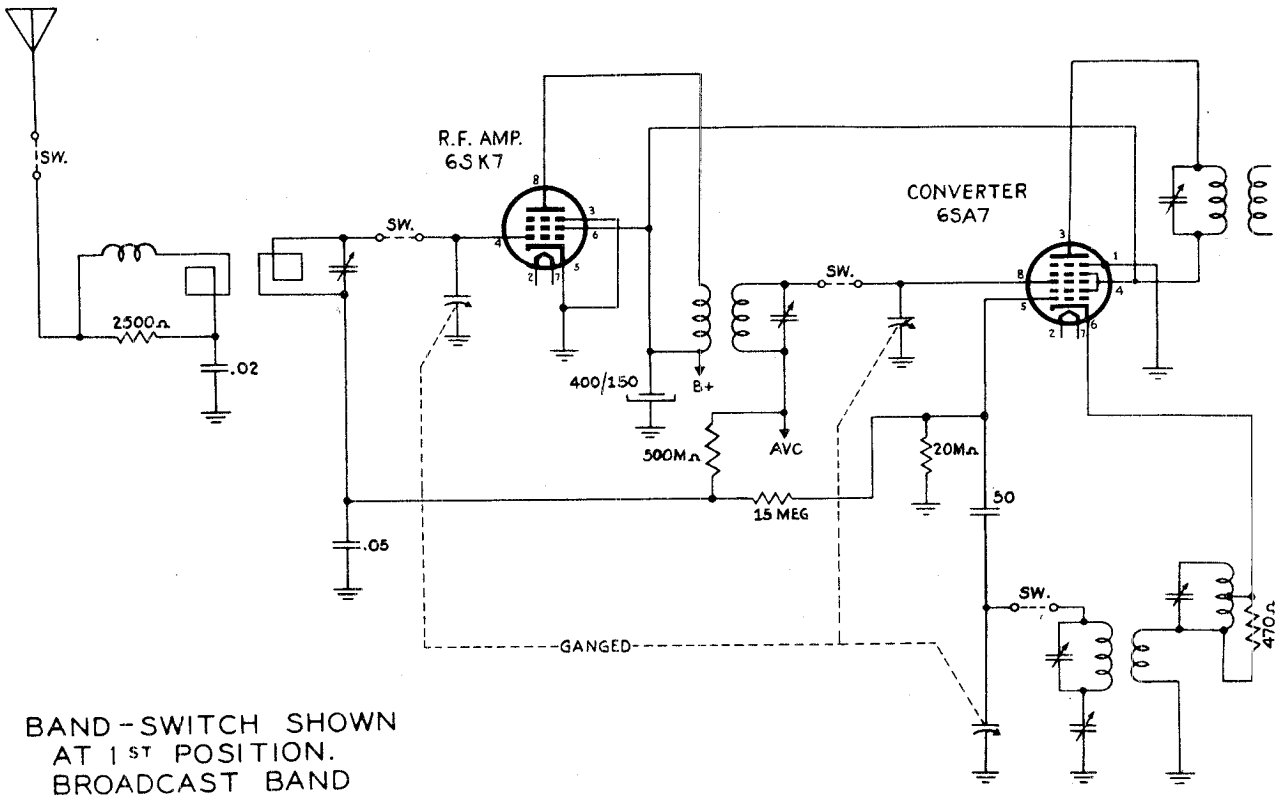
MODEL 7K60 CHASSIS 434

©John F. Rider

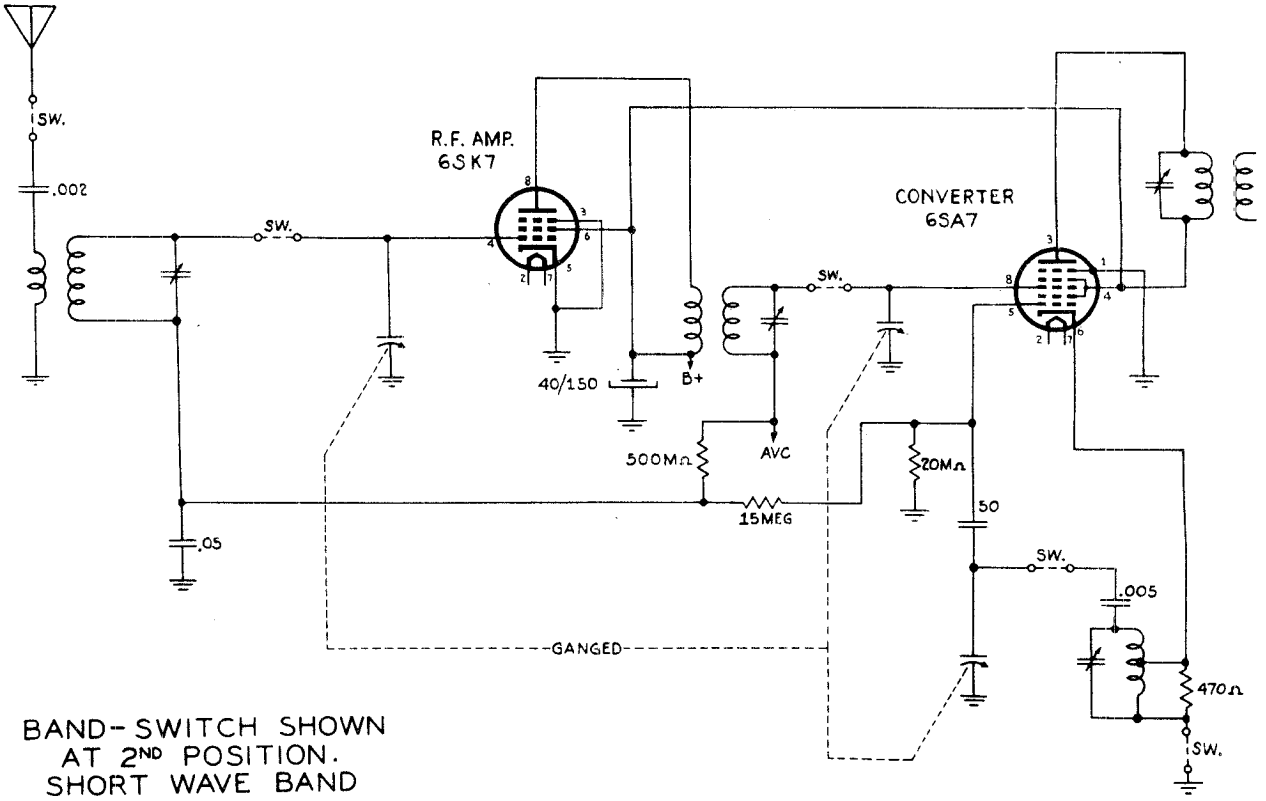
For Socket, trimmers, see P.15-33

MODEL 7K60, Ch. 434

MAJESTIC RADIO & TELEV. CORP.



BAND-SWITCH SHOWN
AT 1ST POSITION.
BROADCAST BAND



BAND-SWITCH SHOWN
AT 2ND POSITION.
SHORT WAVE BAND

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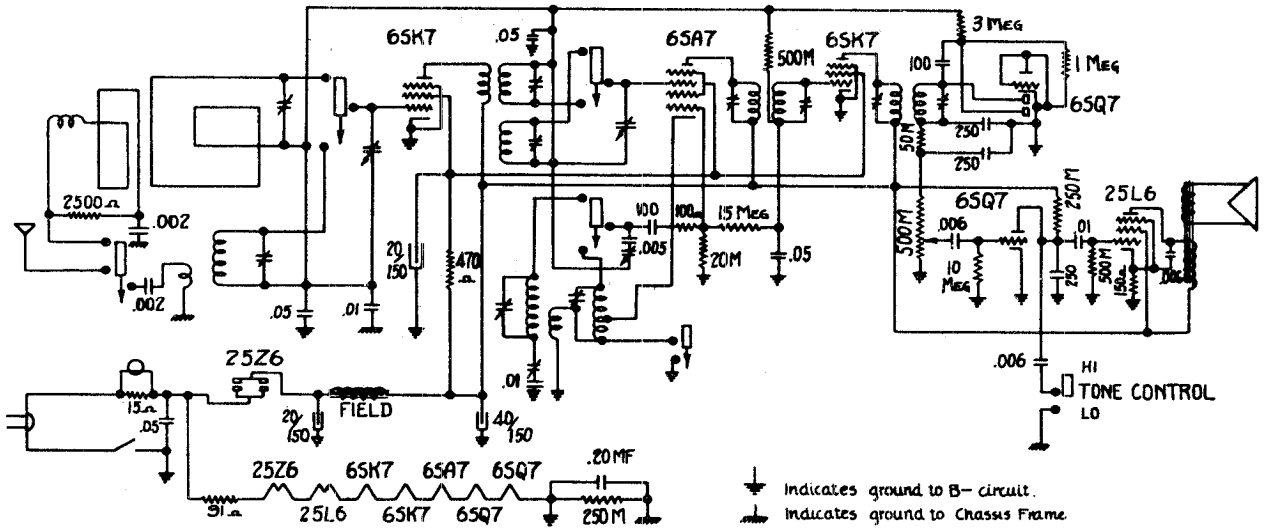
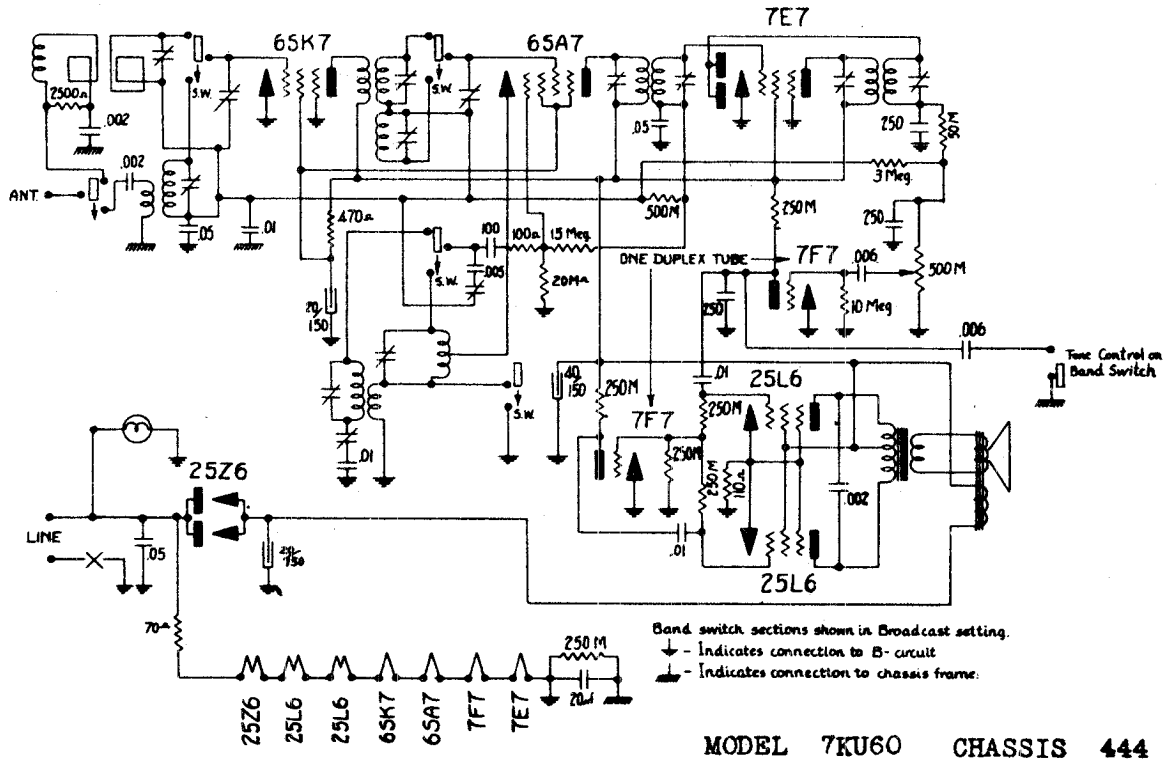
MAJESTIC RADIO & TELEV. CORP.

MODEL 7KU60, Ch. 444
MODEL 7TU20, Ch. 442



MODEL 7TU20 CHASSIS 442

Chassis 442



MODEL 7KU60 CHASSIS 444

Chassis 444

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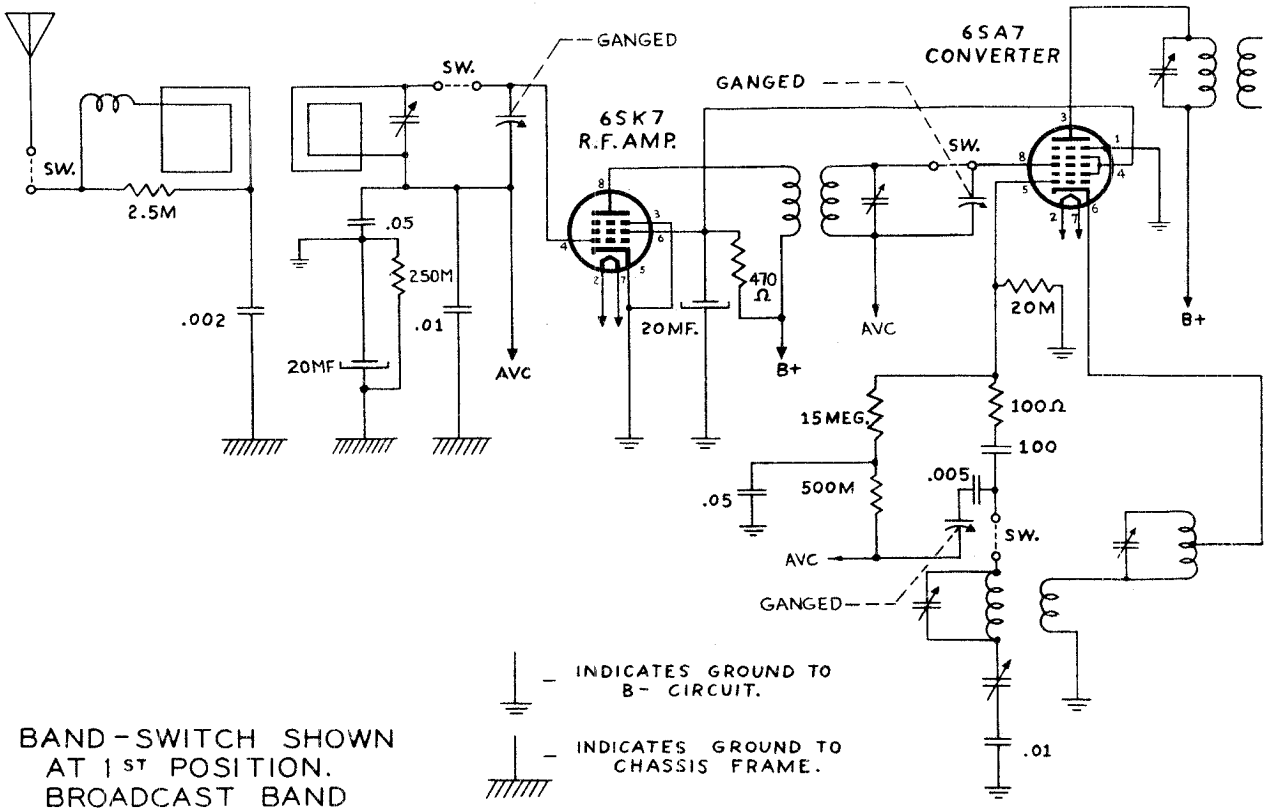
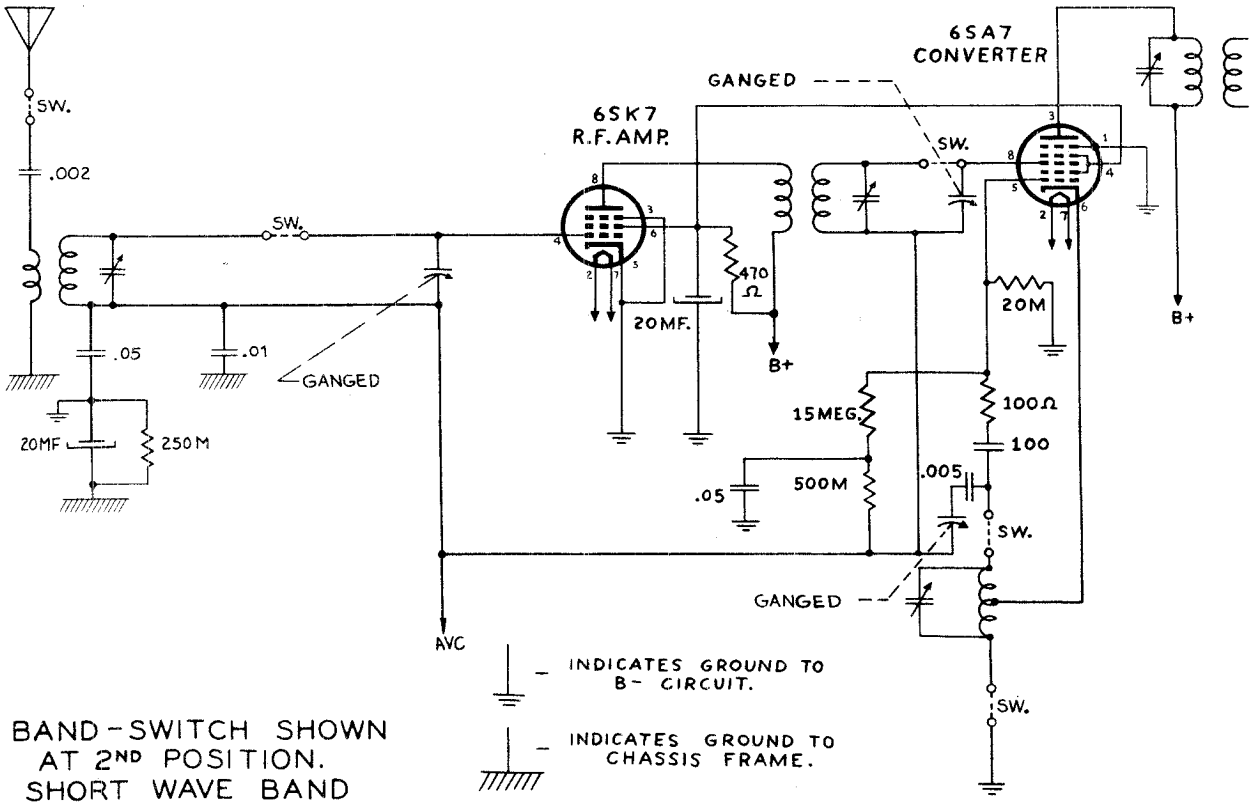
"clarified schematics"

MODEL 7KU60,Ch.444

MAJESTIC RADIO & TELEV. CORP.



BAND-SWITCH SHOWN AT 1ST POSITION. BROADCAST BAND



BAND-SWITCH SHOWN AT 2ND POSITION. SHORT WAVE BAND

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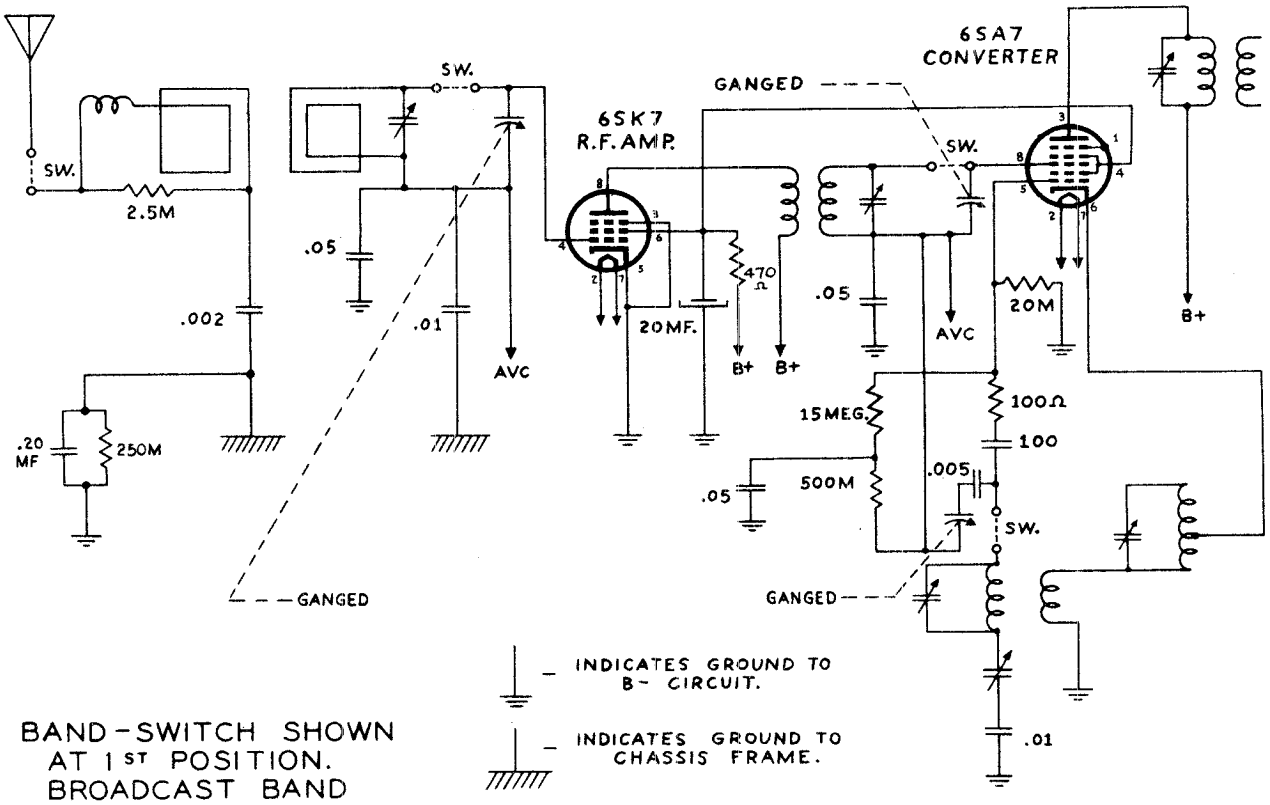
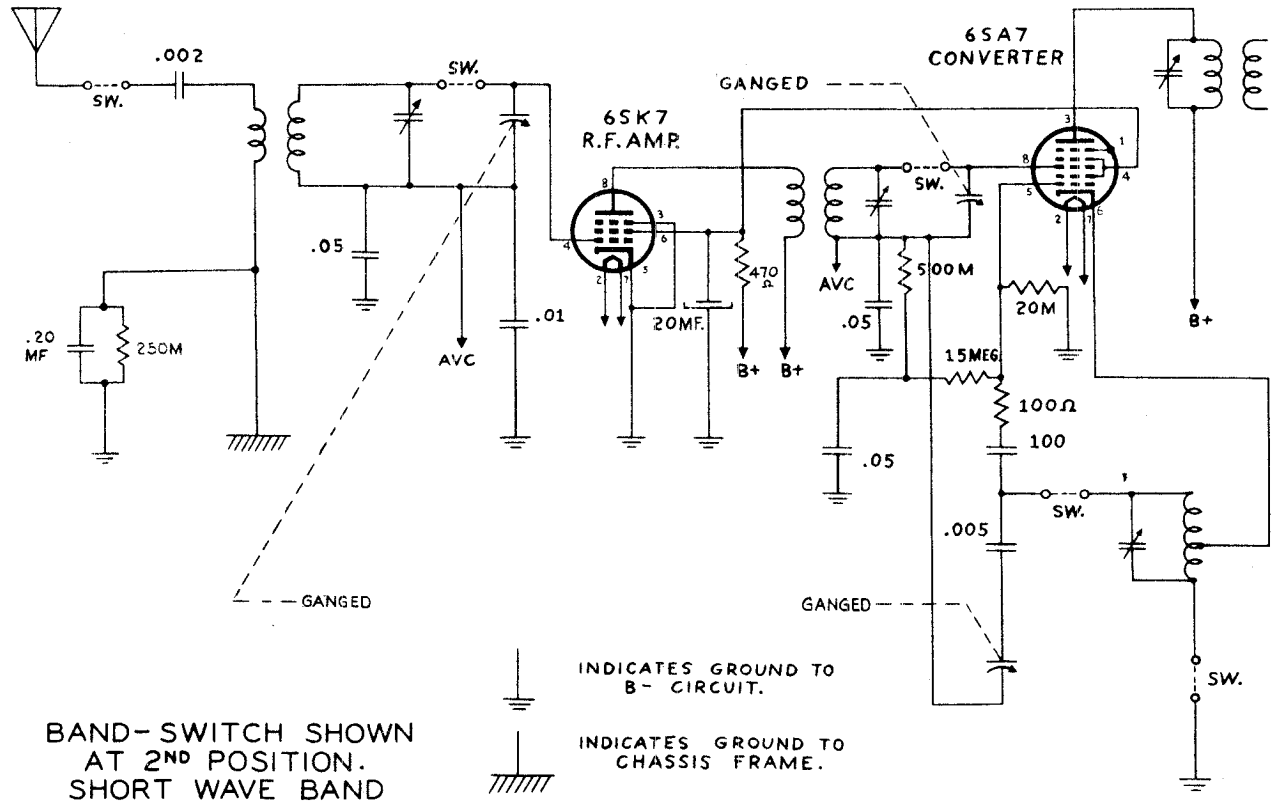
MODEL 7TU20,Ch.442

MAJESTIC RADIO & TELEV. CORP.



BAND-SWITCH SHOWN AT 1ST POSITION. BROADCAST BAND



BAND-SWITCH SHOWN AT 2ND POSITION. SHORT WAVE BAND

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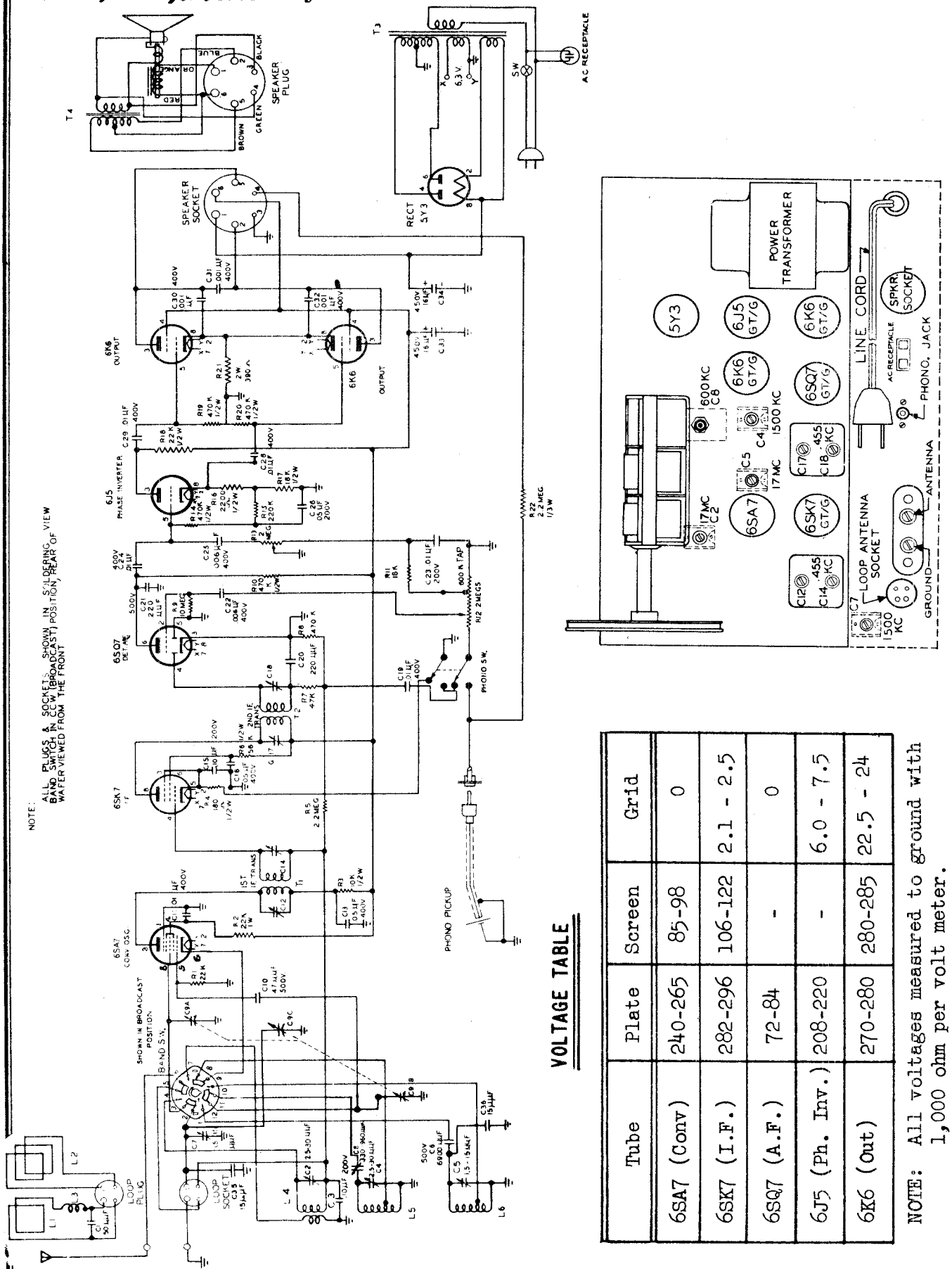
MODELS 7S433, 7S450, Ch.4702; 7S470, Ch.4703 MAJESTIC RADIO & TELEV. CORP.



VOLTAGE TABLE

Tube	Plate	Screen	Grid
6SA7 (Conv)	240-265	85-98	0
6SK7 (I.F.)	282-296	106-122	2.1 - 2.5
6SQ7 (A.F.)	72-84	-	0
6J5 (Ph. Inv.)	208-220	-	6.0 - 7.5
6K6 (Out)	270-280	280-285	22.5 - 24

NOTE: All voltages measured to ground with 1,000 ohm per volt meter.

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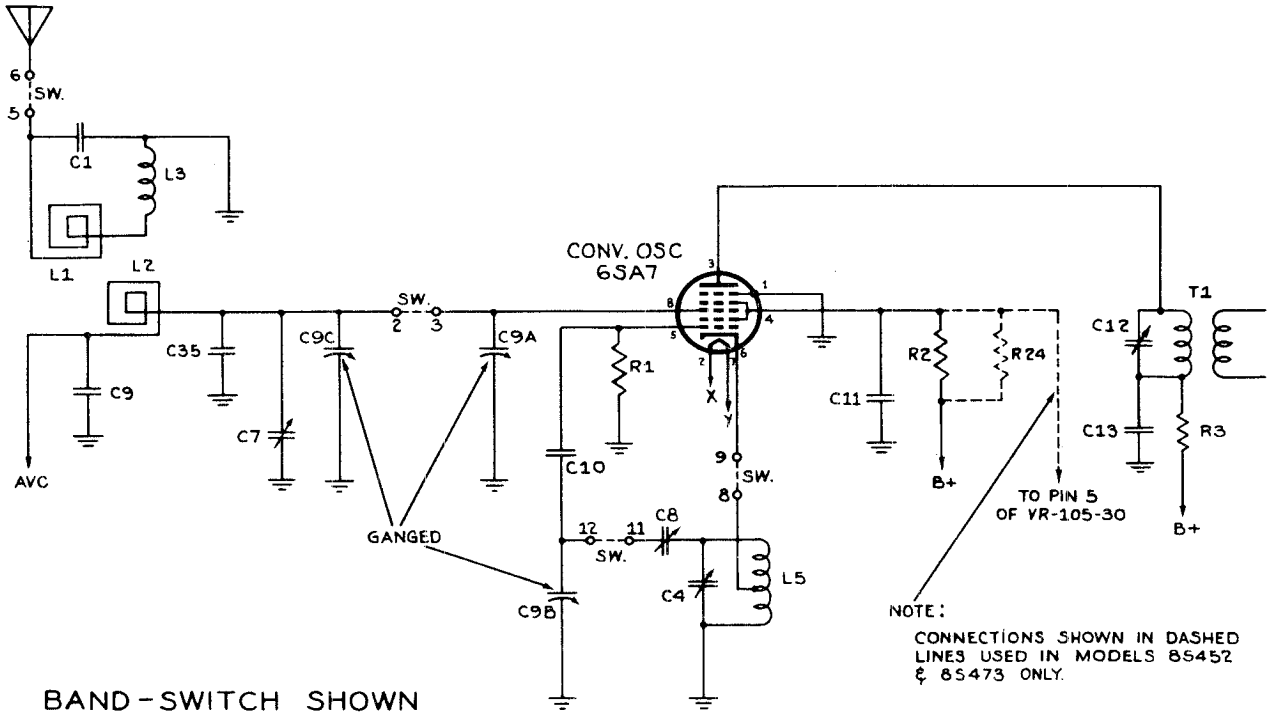
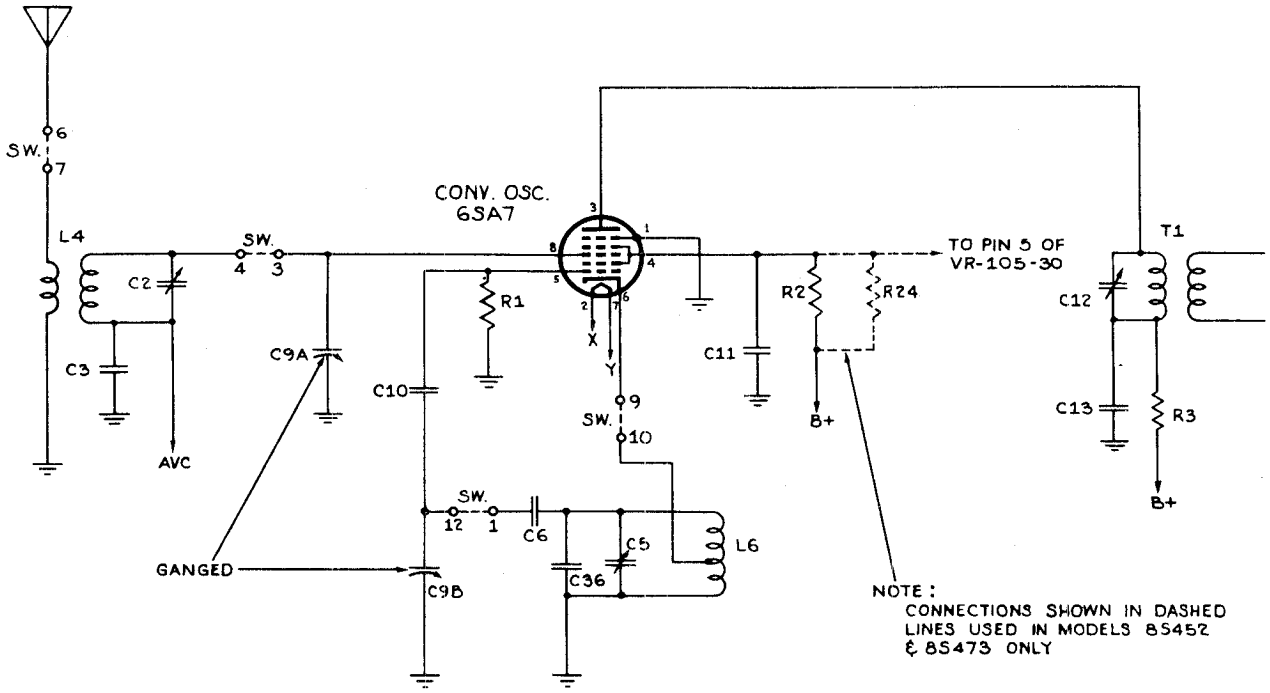
For filter box see p. 15-28. Record Changer: Seeburg Model K

MODELS 7S433, 7S450, 7S470

MAJESTIC RADIO & TELEV. CORP.



BAND-SWITCH SHOWN
AT 1ST POSITION.
BROADCAST BAND



BAND-SWITCH SHOWN
AT 2ND POSITION CLOCKWISE.
SHORT WAVE BAND

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MODELS 7S433, 7S450, 7S470
MODELS 8S452, 8S473

MAJESTIC RADIO & TELEV. CORP.

ALIGNMENT

Before aligning, close tuning condenser (plates fully meshed). Set pointer to center of extreme left hand mark on the dial.

When aligning broadcast band, connect to output of the signal generator a loop, about 12 inches in diameter, consisting of two or three turns of wire. Place this loop in a plane parallel to that of the receiver loop antenna and about a foot away from it. The receiver loop antenna should be in about the same position relative to the chassis as it is when installed in the cabinet.

While aligning, turn the volume control full on and keep the signal generator output as low as possible.

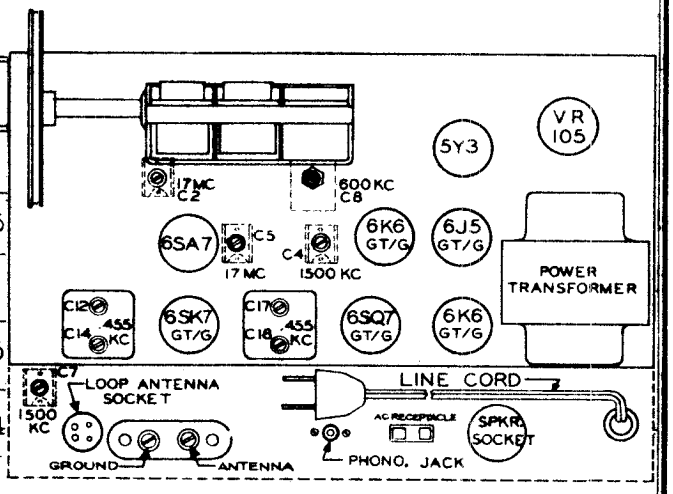
Step	Dummy Antenna	Test Oscillator Connection	Test Oscillator Frequency	Receiver Bandswitch	Receiver Dial	Adjust for Maximum	Notes
1	.01 mfd	6SA7 grid	455 kc	B.C.	Any quiet spot	C18, C17 C14, C12	
2	Loop	-	1500 kc	B.C.	150	C4, C7	
3	Loop	-	600 kc	B.C.	60	C8	Note #1
4	400 ohms	Receiver antenna post	17 mc	S.W.	17	C2, C5	

Note #1 - Rock gang while making this adjustment. Then recheck step 2.

VOLTAGE TABLE

Tube	Plate	Screen	Grid
6SA7 (Conv)	240-265	105	0
6SK7 (I.F.)	282-296	106-122	2.1 - 2.5
6SQ7 (A.F.)	72-84	-	0
6J5 (Ph.Inv.)	208-220	-	6.0 - 7.5
6K6 (Out)	270-280	280-285	22.5 - 24
VR-105	105	-	-

NOTE: All voltages measured to ground with 1,000 ohm per volt meter.



TUBE LAYOUT

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Item	Description	Part #
C1	50 mmfd ± 20% 500 v mica	6-125
C2,C4	Trimmer, 2.5 - 30 mmfd	8-35
C3,C15	.1 mfd ± 40% - 10% 200 v paper	5-39
C5	Trimmer, 1.5 - 15 mmfd	8-36
C6	6900 mmfd ± 10% 500 v mica	6-177
C7	Trimmer, 1.5 - 15 mmfd	8-36
C8	Padder, 330 - 960 mmfd	8-33
C9a,C9b,C9c	Tuning Condenser	7-18
C10	47 mmfd ± 20% 500 v ceramic	6-159
C11,C19,C24,C28 C29	.01 mfd ± 20% - 10% 400 v paper	6-132
C12,C14,C17,C18	Dual trimmer	8-41
C13,C16	.05 mfd ± 40% - 10% 400 v paper	6-130
C20,C21	220 mmfd ± 20% mica	6-151
C22,C25	.006 mfd ± 20% 400 v paper	6-133
C23	.01 mfd ± 40% - 10% 200 v paper	5-57
C26	.05 mfd ± 40% - 10% 200 v paper	5-40
C30,C31,C32	.001 mfd ± 50% - 25% 400 v paper	6-129
C33,C34	16-16 mfd 450 v electrolytic	19-16
R1	22,000 ohms 20% 1/3 watt	9-184
R2	22,000 ohms 10% 1 watt	9-186
R3	10,000 ohms 10% ½ watt	9-17
R4	180 ohms 10% ½ watt	9-173
R5,R22	2.2 megohms 20% 1/3 watt	9-183
R6	56,000 ohms 10% ½ watt	9-177
R7	47,000 ohms 10% ¼ watt	9-226
R8	470,000 ohms 10% ¼ watt	9-227
R9	10 megohms 20% 1/3 watt	9-160
R10,R14,R19,R20	470,000 ohms 10% ½ watt	9-4
R11	18,000 ohms 10% ¼ watt	9-225
R12	Volume control, 2 megohm with SPST switch	13-15
R13	Tone control, 2 megohms	14-4
R15	220,000 ohms 20% 1/3 watt	9-182
R16	2200 ohms 10% ½ watt	9-7
R17	18,000 ohms 10% ½ watt	9-95
R18	22,000 ohms 10% ½ watt	9-180
R21	390 ohms 10% 2 watt	9-185
L4	S.W. antenna coil	3-120
L5,L6	Oscillator coil	3-118
T1	1st I-F transformer	3-165
T2	2nd I-F transformer	3-166
T3	Power transformer	2-12
T4	Output transformer	22-8-2
	Bandswitch	11-46
	Phono-radio switch	11-45
	Phono-motor receptacle	15-98
	Pilot light, Mazda #44	26-7
	Dial pointer	135-6
	Dial cord spring	129-32
	Dial cord	S-1152
	Knob, phono-radio	128-45
	Knob, off-volume	128-46
	Knob, B.C. - S.W.	128-47
	Knob, bass-treble	128-48
	Knob, tuning	128-49
	Knob, plain	128-32
	Cabinets:	
	7S433	115-8
	7S450	115-12
	7S470	115-15
	Speaker, 8" electrodynamic	22-8-1
	Escutcheon, 7S433	112-23
	Glass escutcheon, 7S450, 7S470	122-18
	Metal escutcheon, 7S470	122-29
	Dial scale, 7S433	117-60
	Dial scale, 7S450, 7S470	117-51
	Escutcheon clamp, 7S450, 7S470	112-283
	Loop antenna assembly, 7S433	S-1192
	Loop antenna assembly, 7S450, 7S470	20-20
	Pilot light socket	15-84
	Speaker plug	22-8-3

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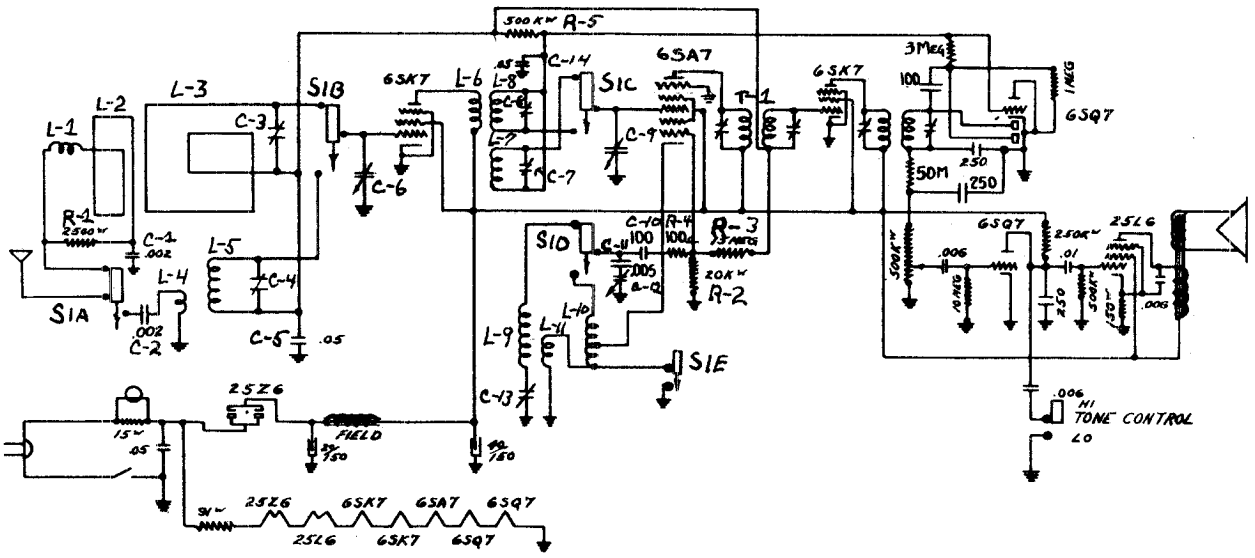
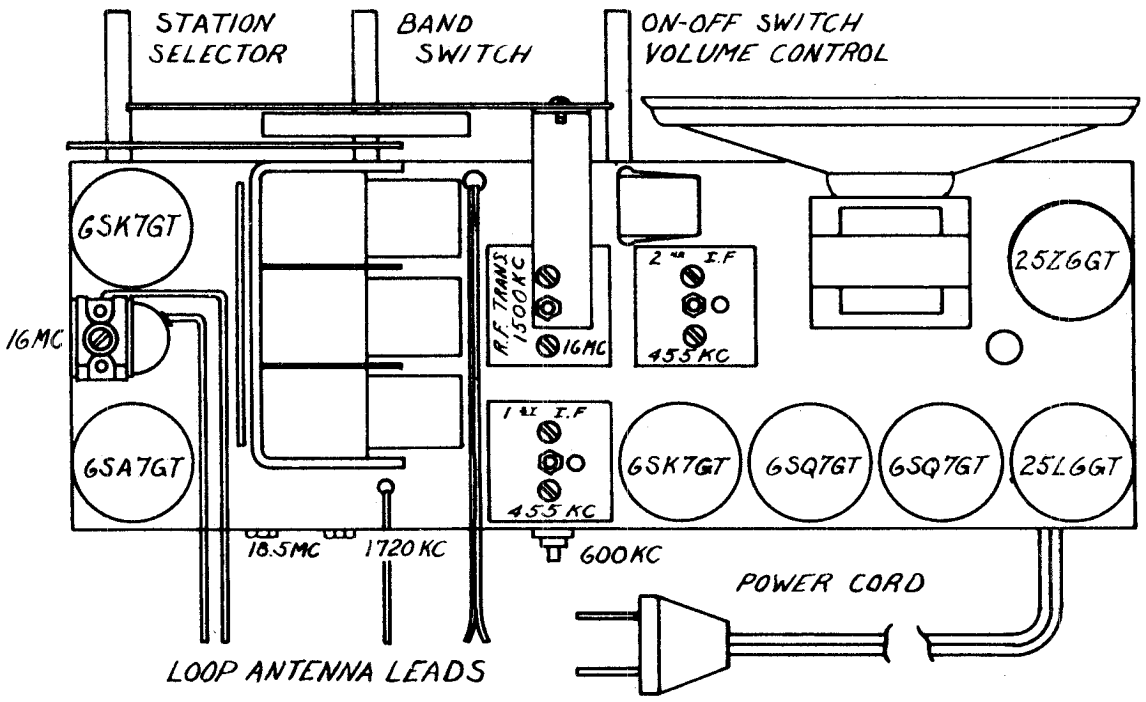
MODEL 7T20,Ch.432

MAJESTIC RADIO & TELEV. CORP.



MODEL 7T20 CHASSIS 432

Chassis 432



Tube Layout

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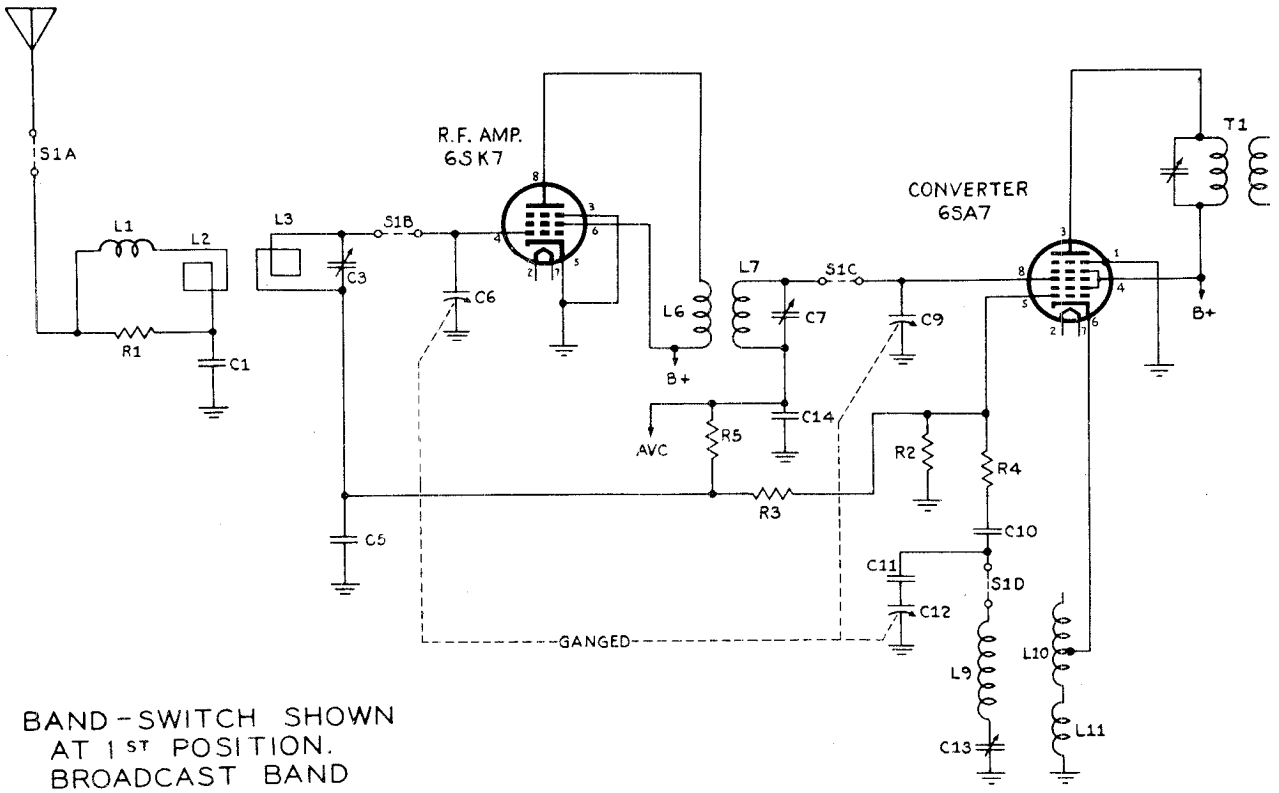
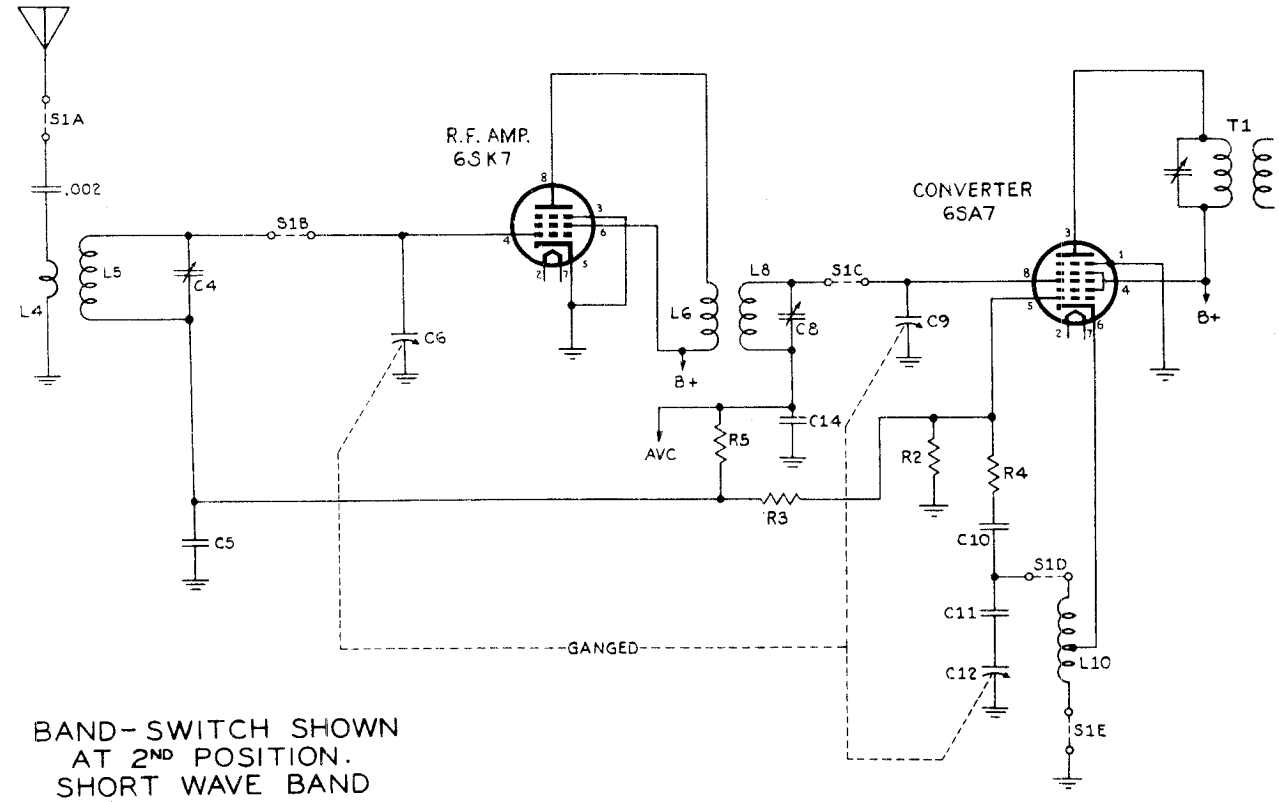
MODEL 7T20, Ch. 432

MAJESTIC RADIO & TELEV. CORP.



BAND-SWITCH SHOWN
AT 1ST POSITION.
BROADCAST BAND



BAND-SWITCH SHOWN
AT 2ND POSITION.
SHORT WAVE BAND

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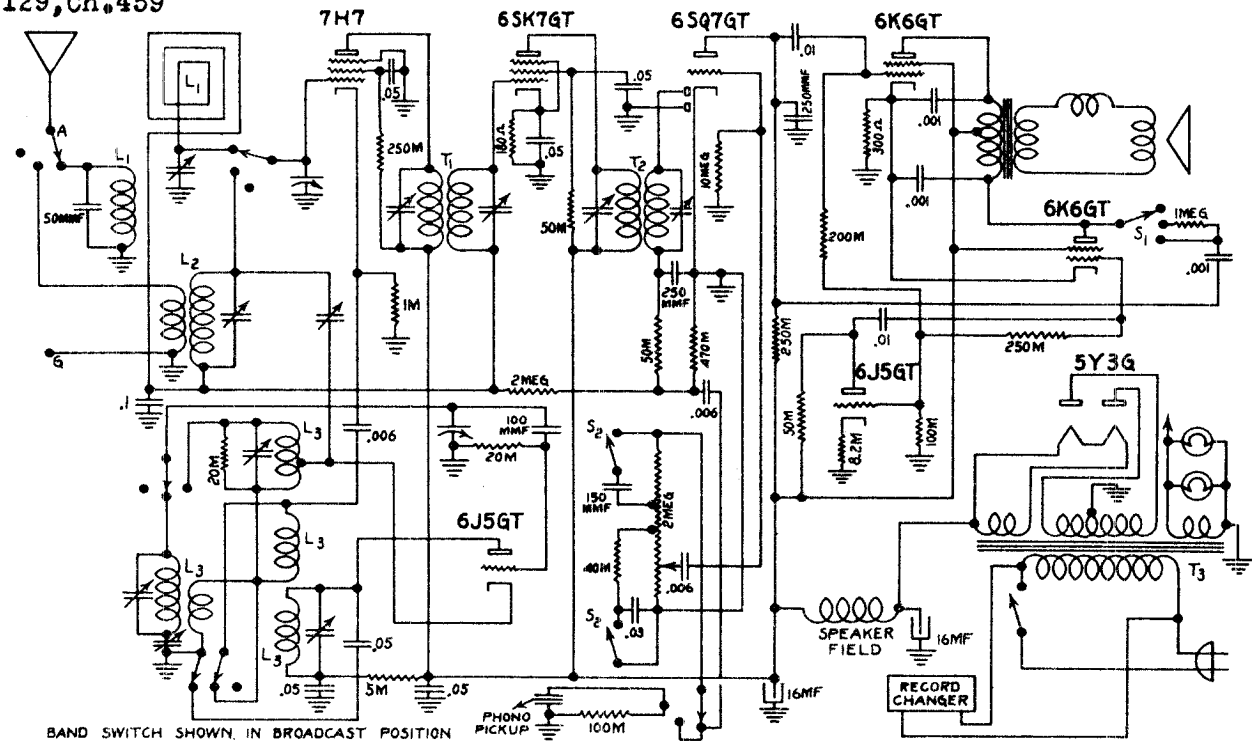
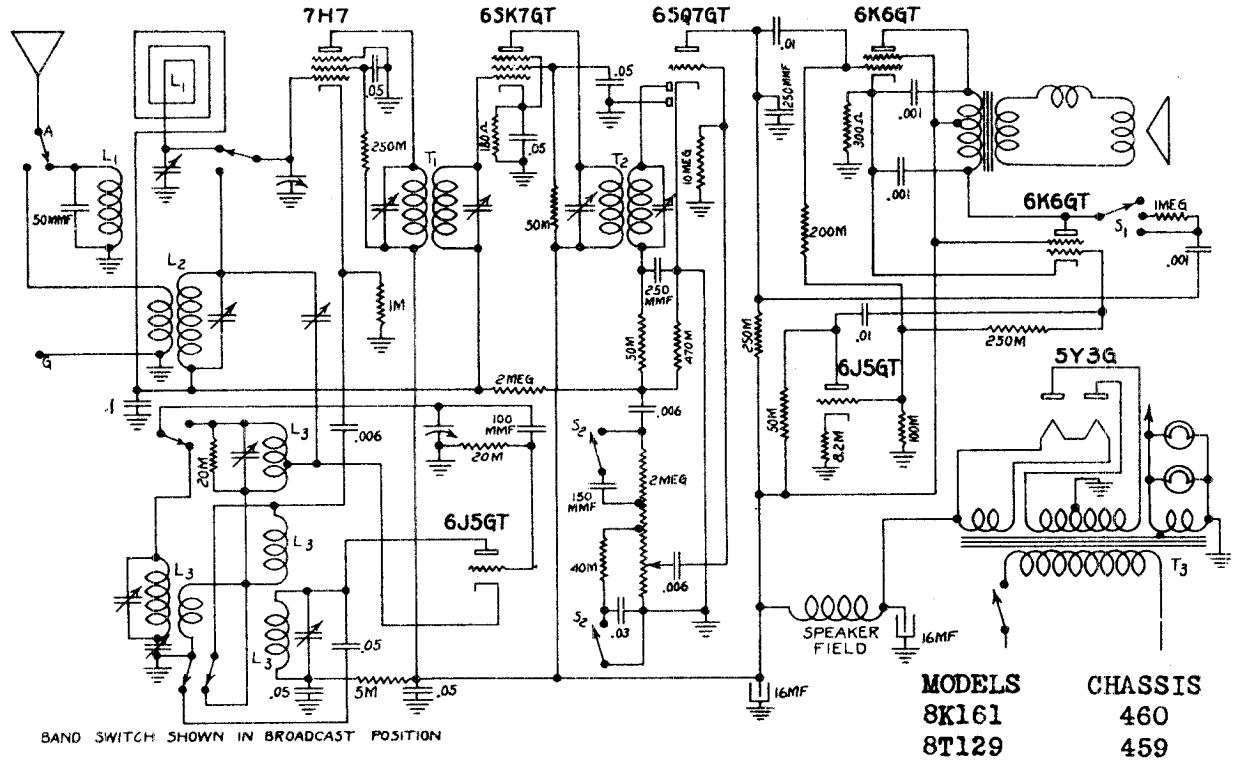
MODEL 8C176,Ch.461
MODELS 8K161,Ch.460; 8T129,Ch.459

MAJESTIC RADIO & TELEV. CORP.



MODEL 8C176 CHASSIS 461

Chassis 461



MODELS	CHASSIS
8K161	460
8T129	459

Chassis 459 - 460

For Socket and trimmers, see P.15-7

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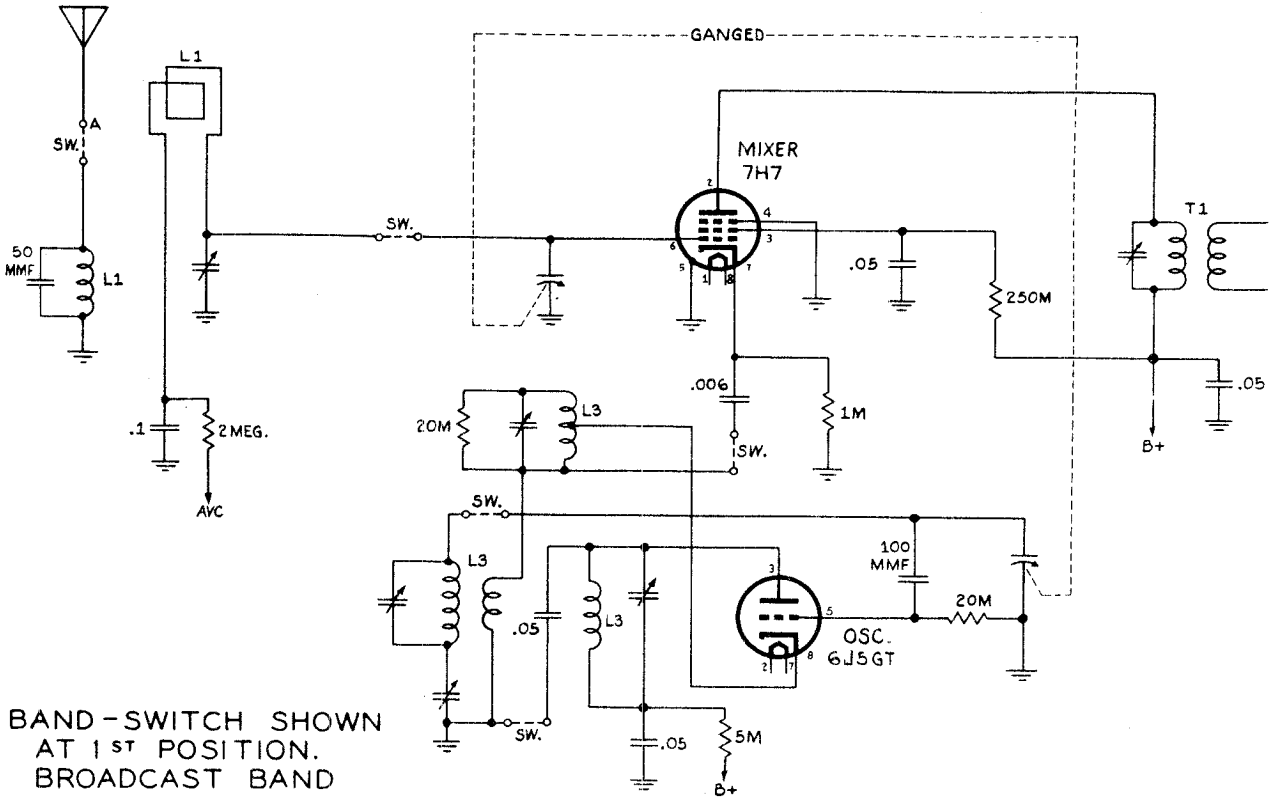
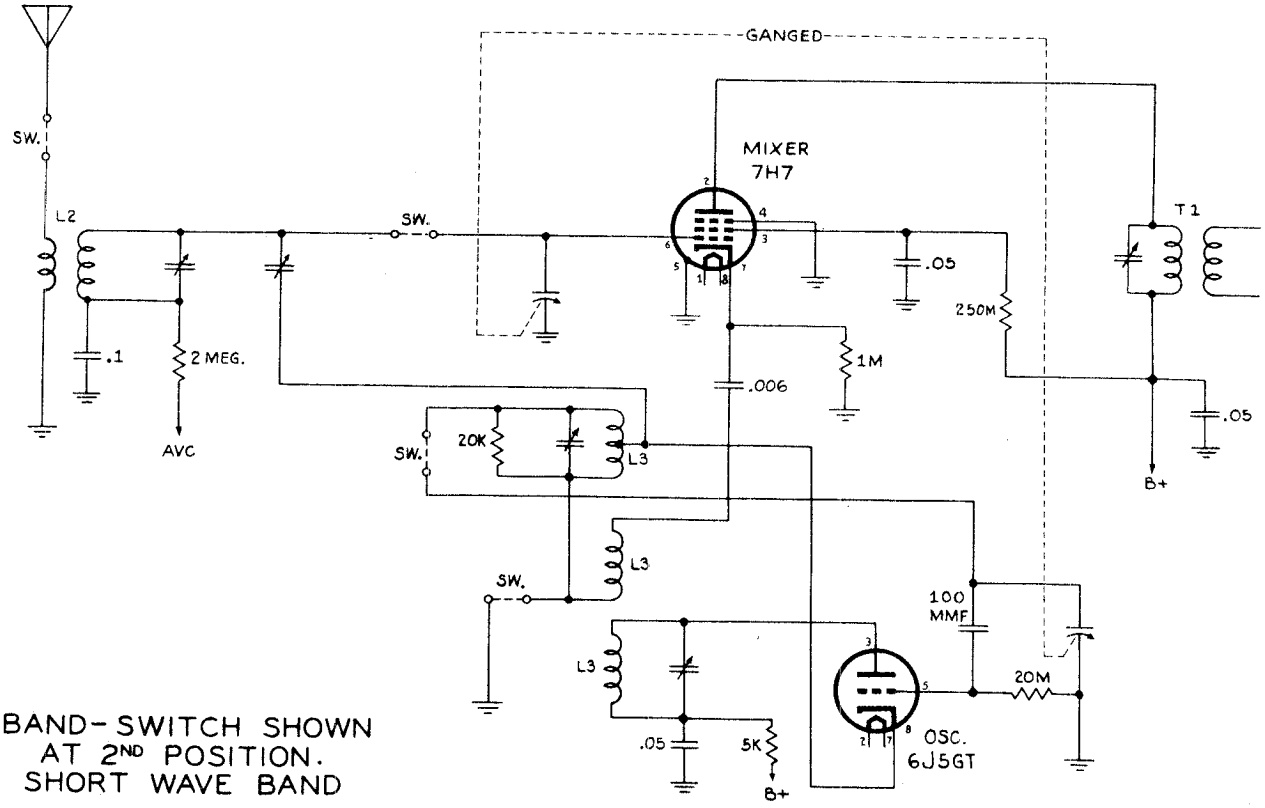
MODEL 8C176
MODELS 8K161, 8T129

MAJESTIC RADIO & TELEV. CORP.



BAND-SWITCH SHOWN AT 1ST POSITION. BROADCAST BAND



BAND-SWITCH SHOWN AT 2ND POSITION. SHORT WAVE BAND

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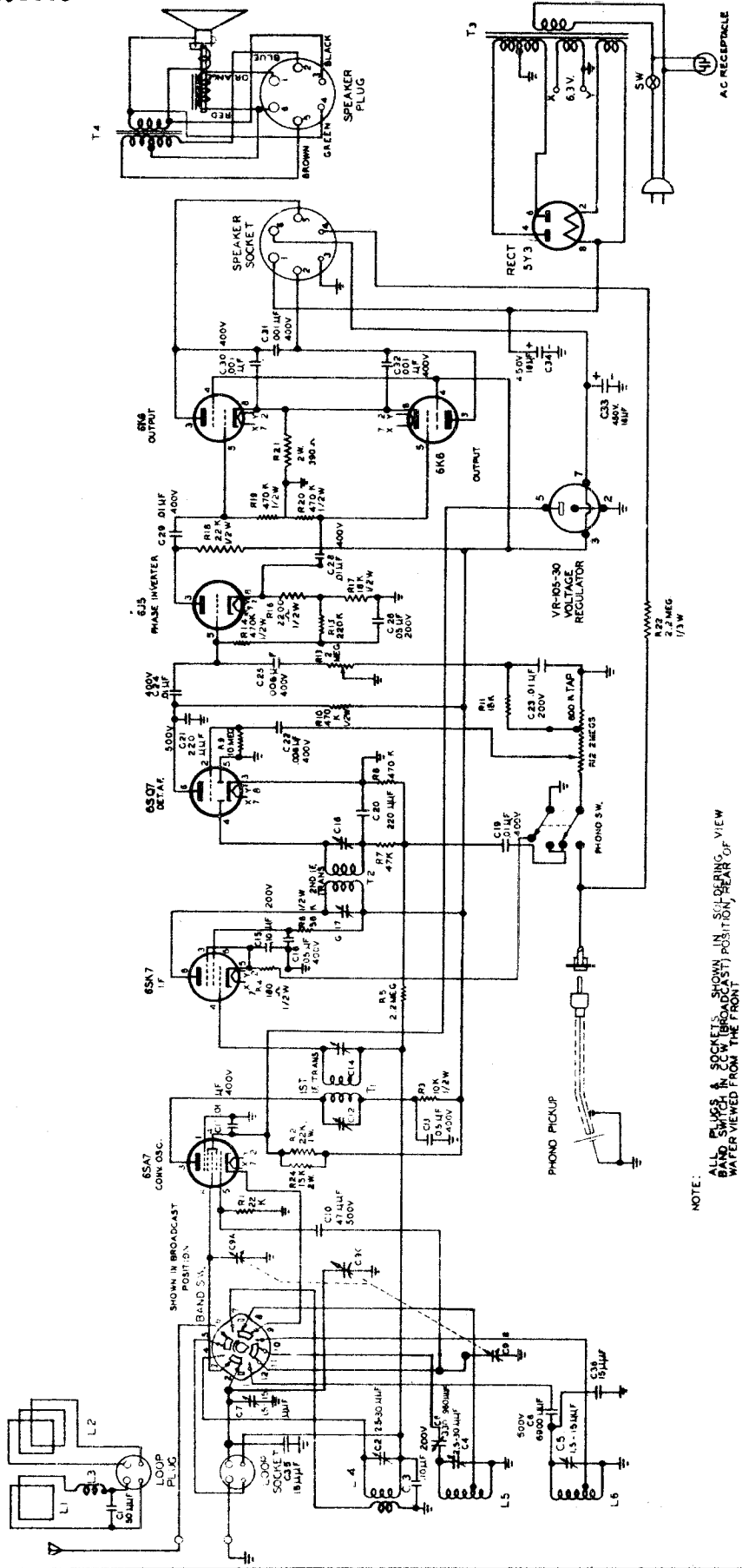
MODELS 8S452, 8S473, Ch.4809

MAJESTIC RADIO & TELEV. CORP.



SCHEMATIC DIAGRAM - CHASSIS 4809

Parts for Model 8S452 correspond to Model 7S450 and Model 8S473 to Model 7S470. R24, 15,000 ohms, 2 watts (Part number 9-299) has been added in addition to the VR-105 tube.

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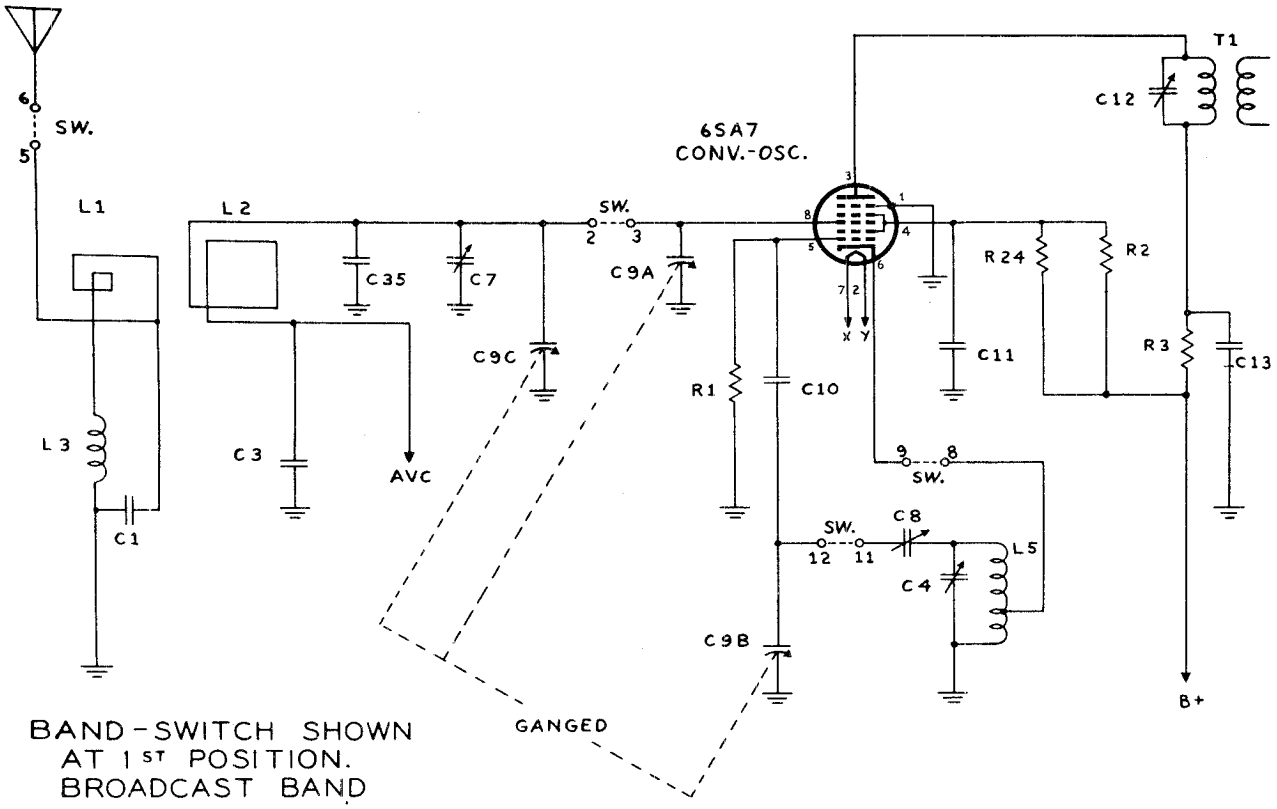
Record Changer: Milwaukee Erwood Model 10700

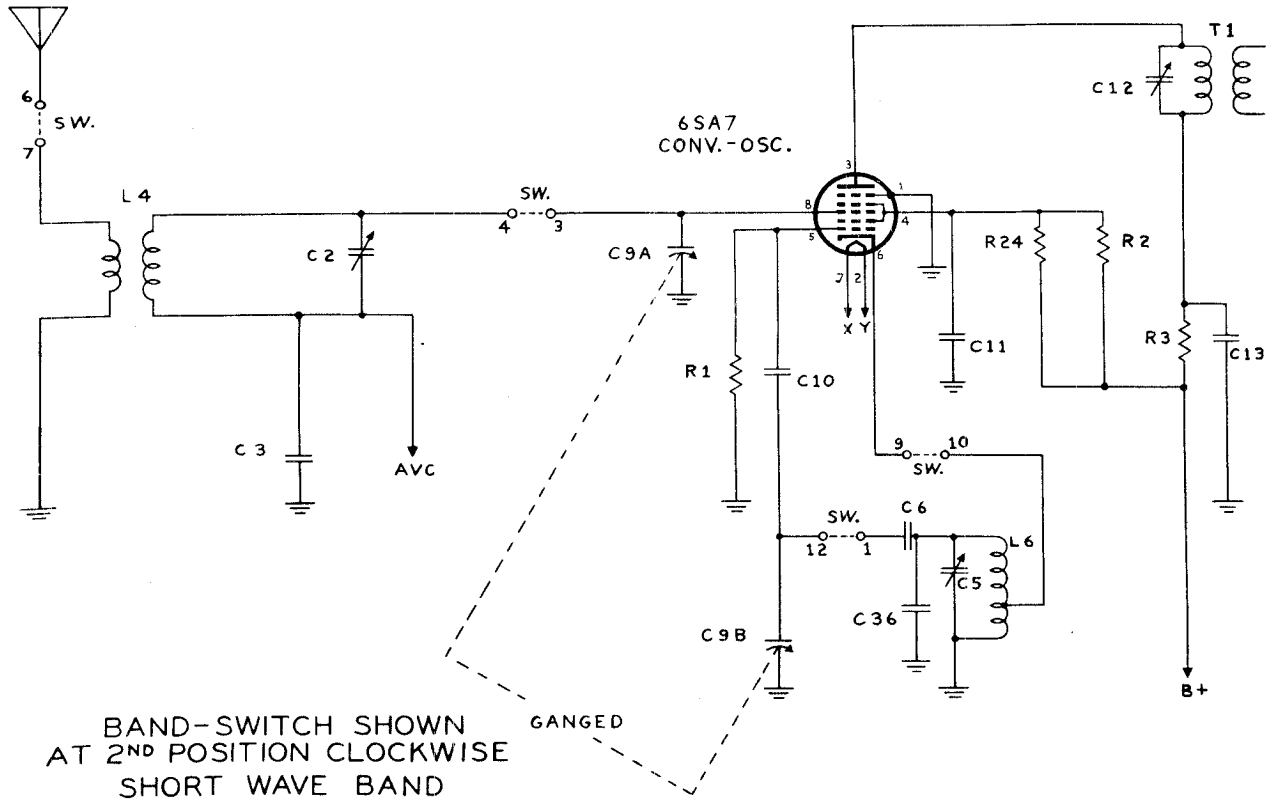
For other data, see Pp.15-20,15-21

MODELS 8S452, 8S473,
Ch. 4809

MAJESTIC RADIO & TELEV. CORP.



BAND-SWITCH SHOWN
AT 1ST POSITION.
BROADCAST BAND



BAND-SWITCH SHOWN
AT 2ND POSITION CLOCKWISE
SHORT WAVE BAND

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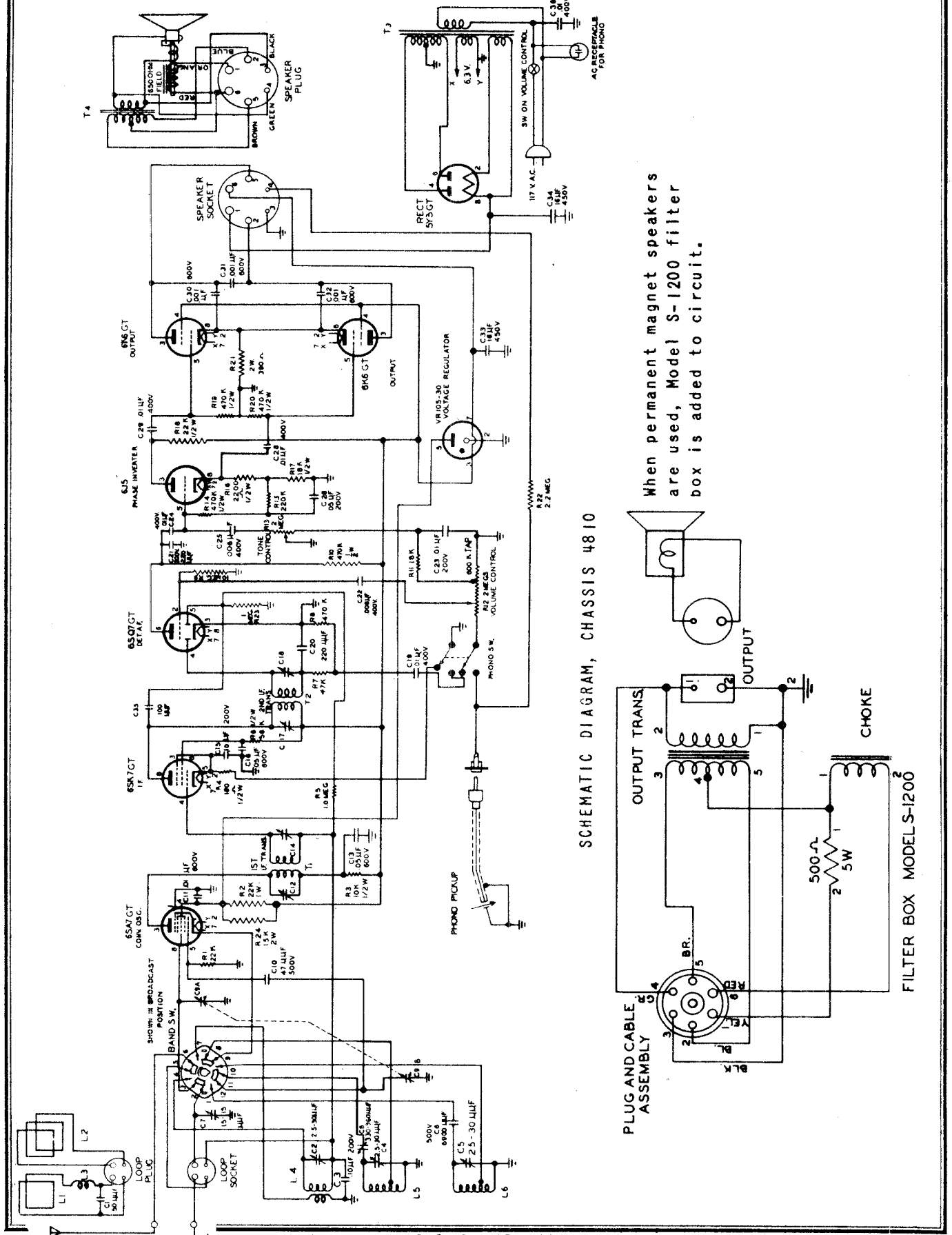
MODELS 8S452, 8S473,
Ch. 4810

MAJESTIC RADIO & TELEV. CORP.



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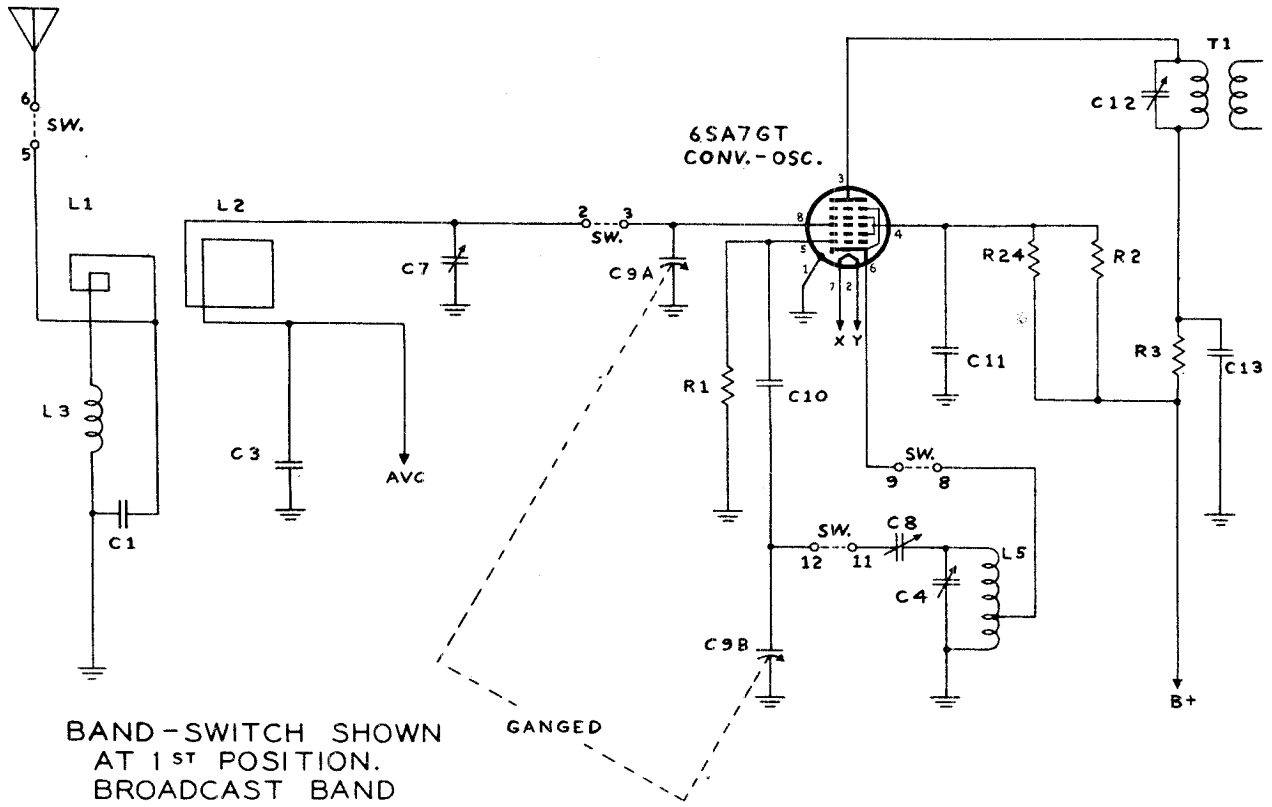
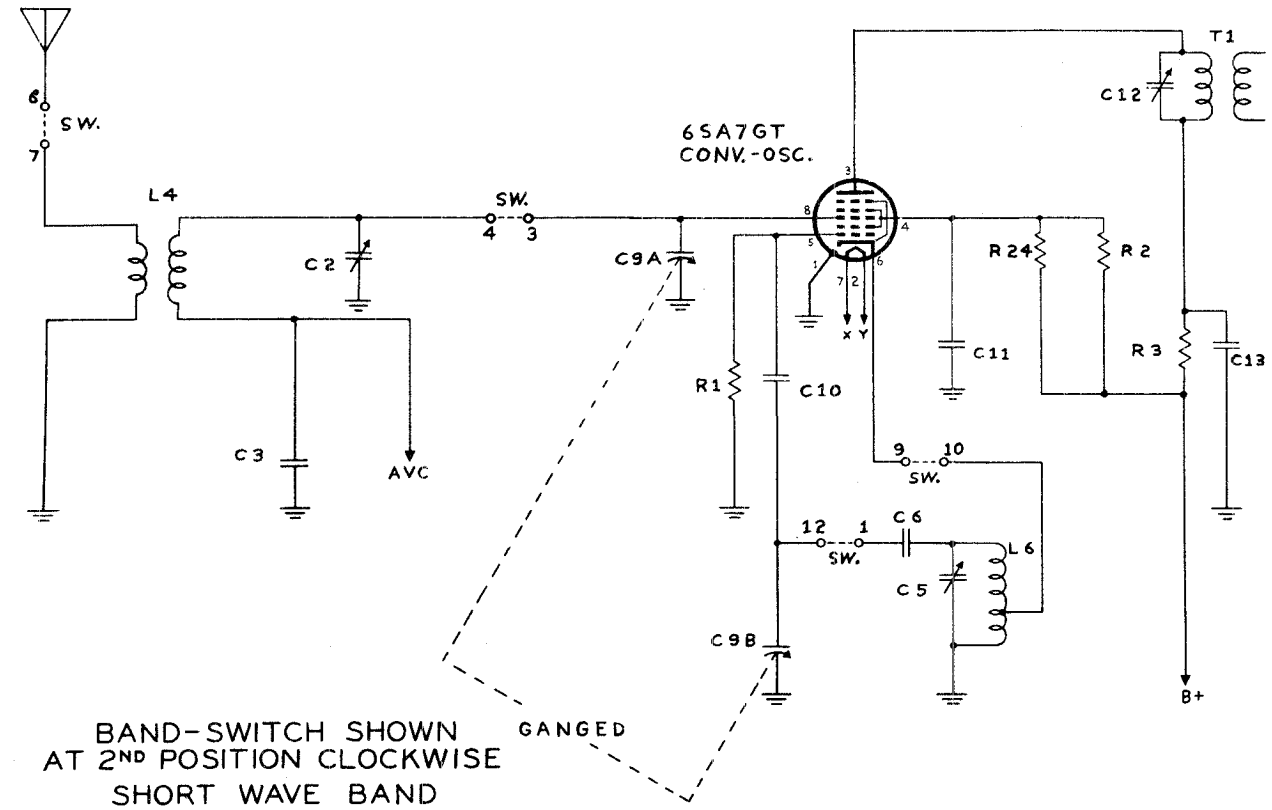
Record Changer: Model 8S452, Milwaukee Erwood Model 10700
Model 8S473, Milwaukee Erwood Model 10700, Oak Model 6666, Seeburg K

MODELS 8S452, 8S473
Ch. 4810

MAJESTIC RADIO & TELEV. CORP.



BAND-SWITCH SHOWN
AT 1ST POSITION.
BROADCAST BAND



BAND-SWITCH SHOWN
AT 2ND POSITION CLOCKWISE
SHORT WAVE BAND

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ITEM	DESCRIPTION	PART NO.
C2, C4, C5	Trimmer, 2.5 - 30 mmfd	8-35
C3, C15	.1 mfd + 40% - 10% 200 v paper	5-39
C6	6900 mmfd ± 10% 500 v mica	6-177
C7	Trimmer, 1.5 - 15 mmfd	8-36
C8	Padder, 330 - 960 mmfd	8-33
C9a, C9b, C9c	Tuning Condenser	7-22 or 7-23
C10	47 mmfd ± 20% 500 v ceramic	6-159
C11	.01 mfd 20% 600 v paper	5-74
C19, C24, C28 C29, C36	.01 mfd + 30% - 10% 400 v paper	6-132
C12, C14, C17, C18	Dual trimmer	8-41
C13, C16	.05 mfd 20% 600 v paper	5-77
C20, C21	220 mmfd ± 20% mica	6-151
C22, C25	.006 mfd ± 20% 400 v paper	6-133
C23	.01 mfd + 40% - 10% 200 v paper	5-57
C26	.05 mfd + 40% - 10% 200 v paper	5-40
C30, C31, C32	.001 mfd + 50% - 25% 600 v paper	5-79
C33, C34	16-16 mfd 450 v electrolytic	19-16
C35	100 mmfd ± 20% 500 v mica	6-232
R1	22,000 ohms 20% 1/4 watt	9-222
R2	22,000 ohms 10% 1 watt	9-186
R3	10,000 ohms 10% ½ watt	9-17
R4	180 ohms 10% ½ watt	9-272
R5, R23	1 megohm 20% 1/4 watt	9-255
R6	56,000 ohms 10% ½ watt	9-177
R7	47,000 ohms 10% 1/4 watt	9-226
R8	470,000 ohms 10% 1/4 watt	9-227
R9	10 megohms 20% 1/4 watt	9-213
R10, R14, R19, R20	470,000 ohms 10% ½ watt	9-234
R11	18,000 ohms 10% 1/4 watt	9-225
R12	Volume control, 2 megohm with SPST switch	13-15
R13	Tone control, 2 megohms	14-4
R15	220,000 ohms 20% 1/4 watt	9-220
R16	2200 ohms 10% ½ watt	9-107
R17	18,000 ohms 10% ½ watt	9-95
R18	22,000 ohms 10% ½ watt	9-180
R21	390 ohms 10% 2 watt	9-185
R22	2.2 megohms 20% 1/4 watt	9-296
R24	15,000 ohms 20% 2 watt	9-299
L4	S.W. antenna coil	3-120
L5, L6	Oscillator coil	3-118
T1	1st I-F transformer	3-165
T2	2nd I-F transformer	3-166
T3	Power transformer	2-12
T4	Output transformer	22-8-2

DESCRIPTION	PART NO.
Phono-motor receptacle	15-98
Pilot light, Mazda #44	26-7
Dial pointer	135-6
Dial cord spring	129-29
Dial cord	S-1263
Knob, phono-radio	128-45
Knob, off-volume	128-46
Knob, B.C. - S.W.	128-47
Knob, bass-treble	128-48
Knob, tuning	128-49
Knob, plain	128-32
Cabinets:	
8S452	115-12
8S473	115-15
Speaker, 8" electrodynamic	22-8-1
Speaker, 10" electrodynamic	22-14-1
Glass escutcheon	122-18
Metal escutcheon	122-29
Dial scale,	117-69
Escutcheon clamp	112-355
Loop antenna assembly	20-8
Pilot light socket	15-84
Speaker plug	22-8-3
S-1200 Filter Box	
Resistor, 500 ohms, 5 watt, wire wound	9-287
Transformer	12-23
Choke	12-29
Speakers: 8" P.M.	22-21
10" P.M.	22-22
12" P.M.	22-23

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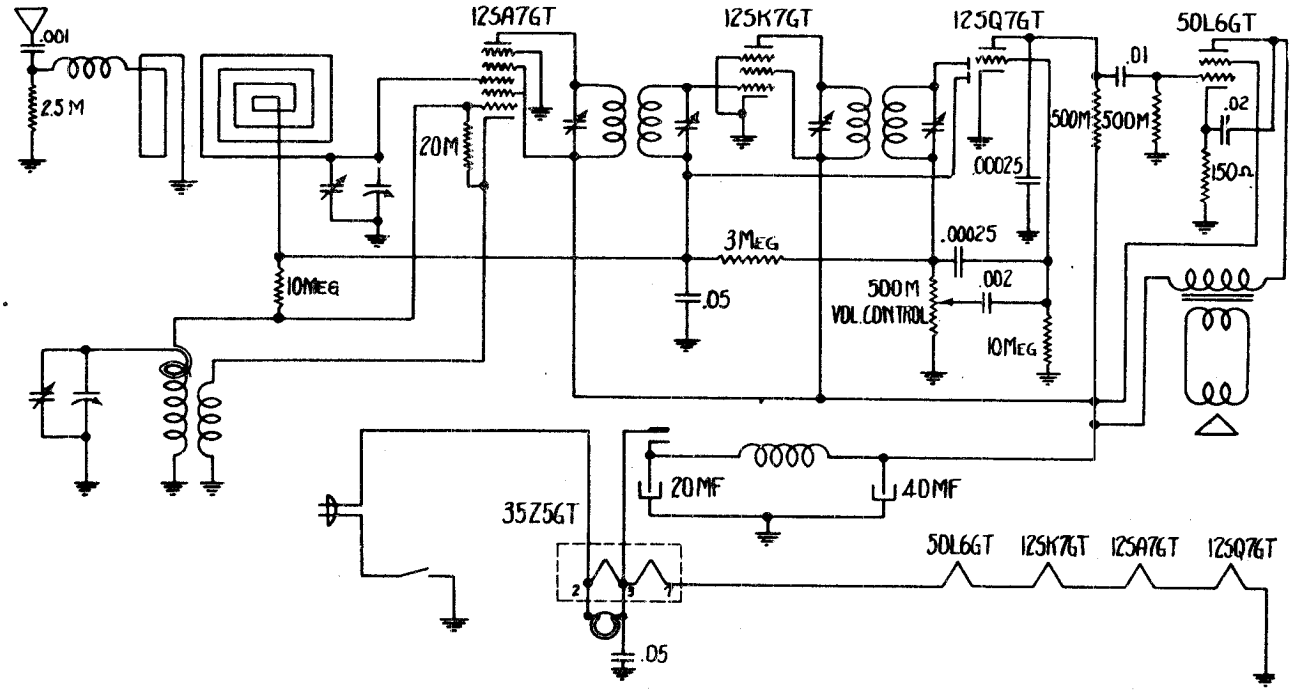
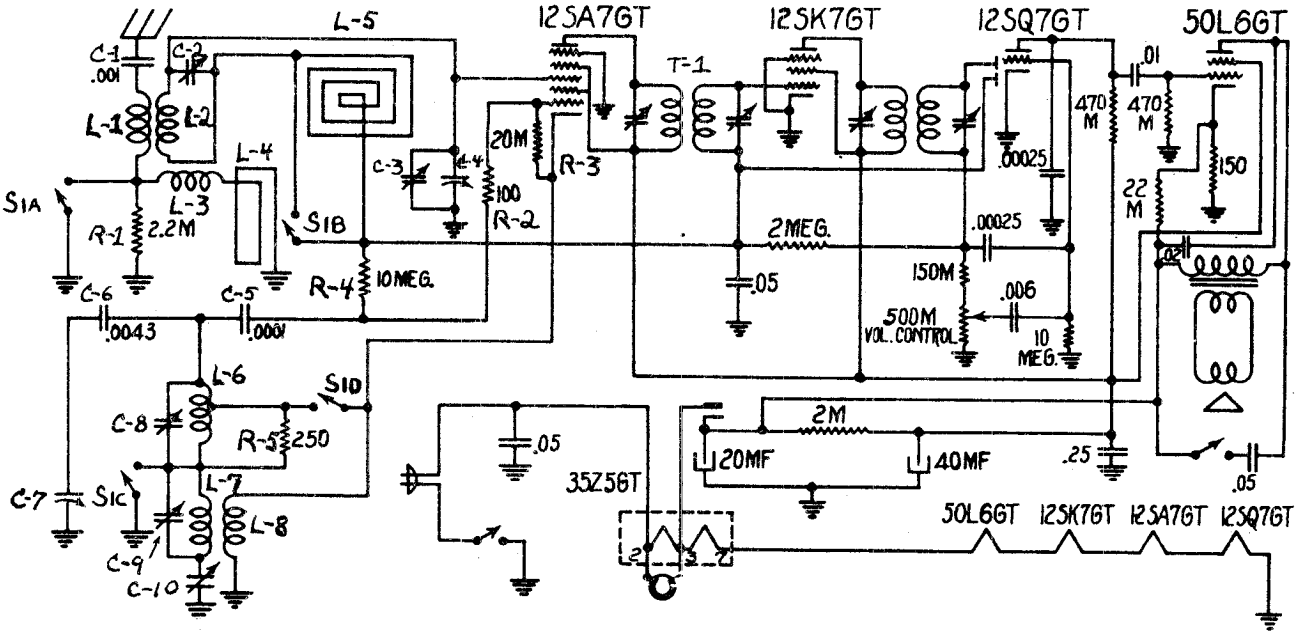
MODEL 400,Ch.400
MODEL 401,Ch.401

MAJESTIC RADIO & TELEV. CORP.



MODEL 400,Chassis 400



MODEL 401,Chassis 401

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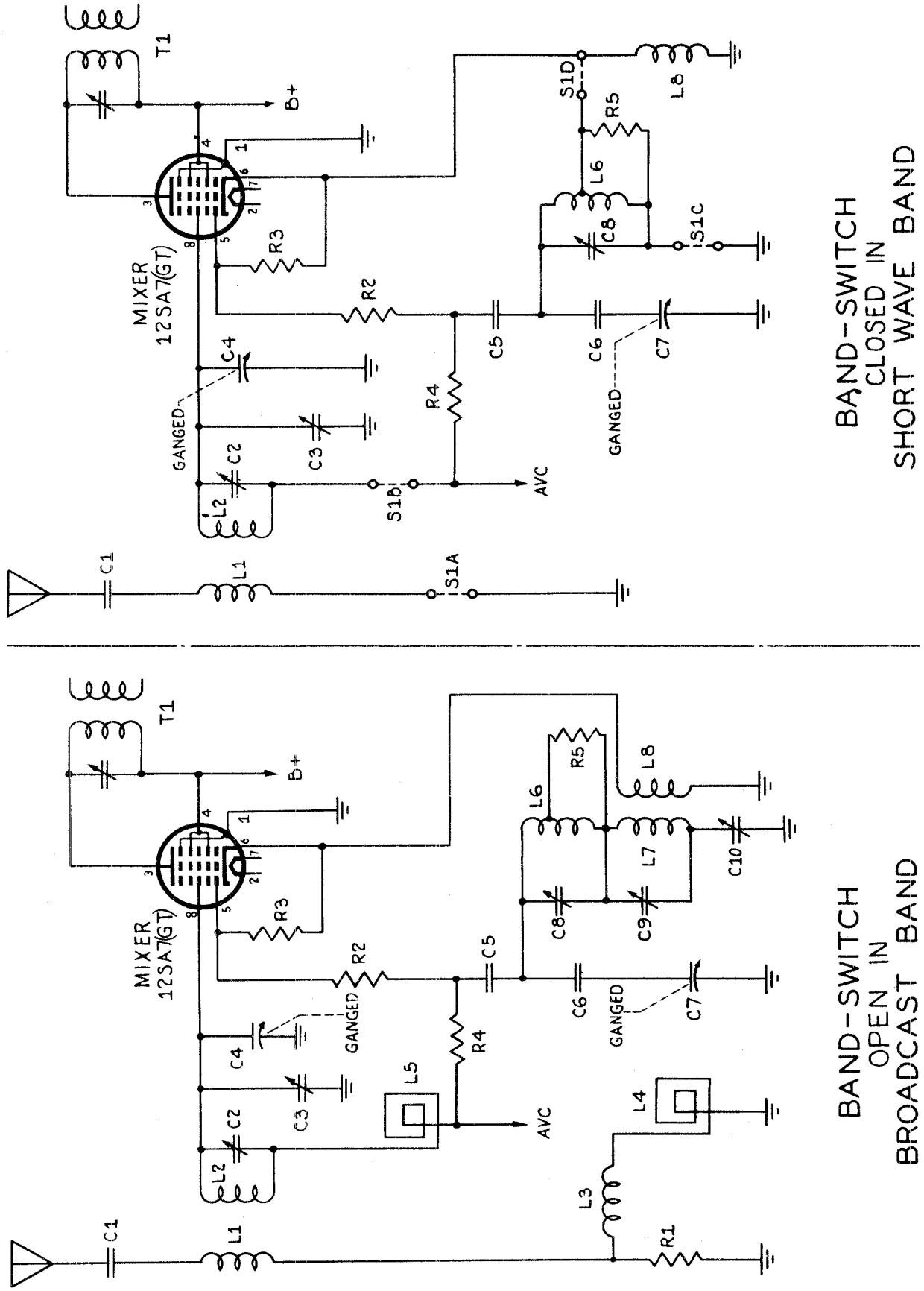
For Socket and trimmers, see P.15-33

"clarified schematics"

MODEL 401,Ch.401

MAJESTIC RADIO & TELEV. CORP.



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MAJESTIC RADIO & TELEV. CORP.

MODEL 7K60,Ch.434
MODEL 400,Ch.400
MODEL 401,Ch.401
MODEL 410,Ch.410

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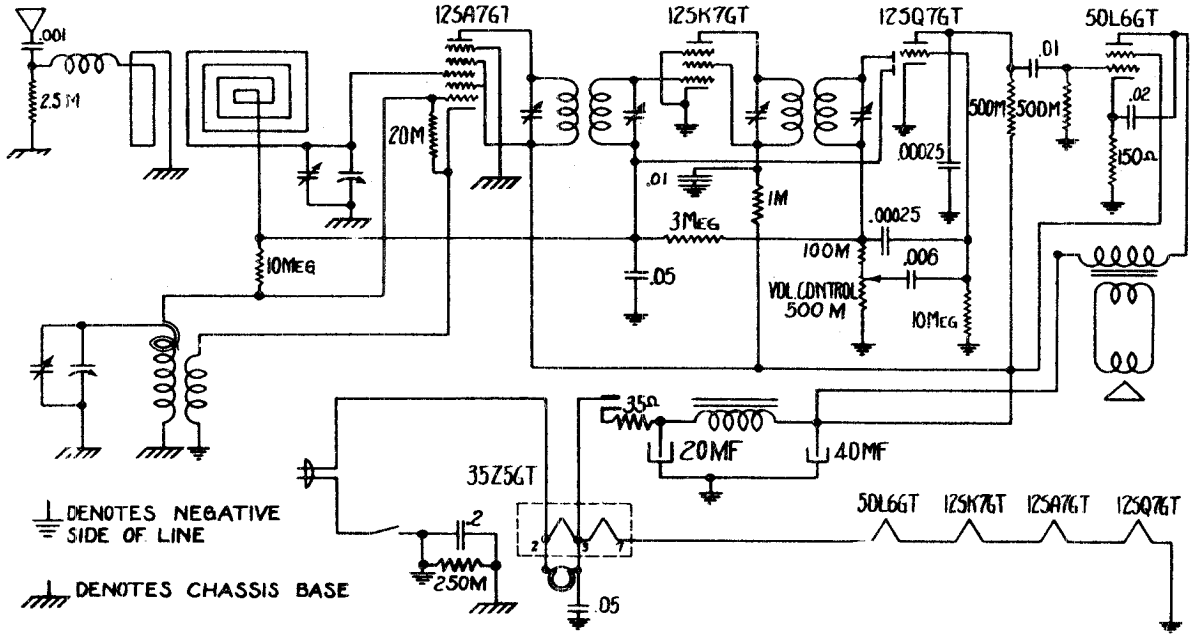
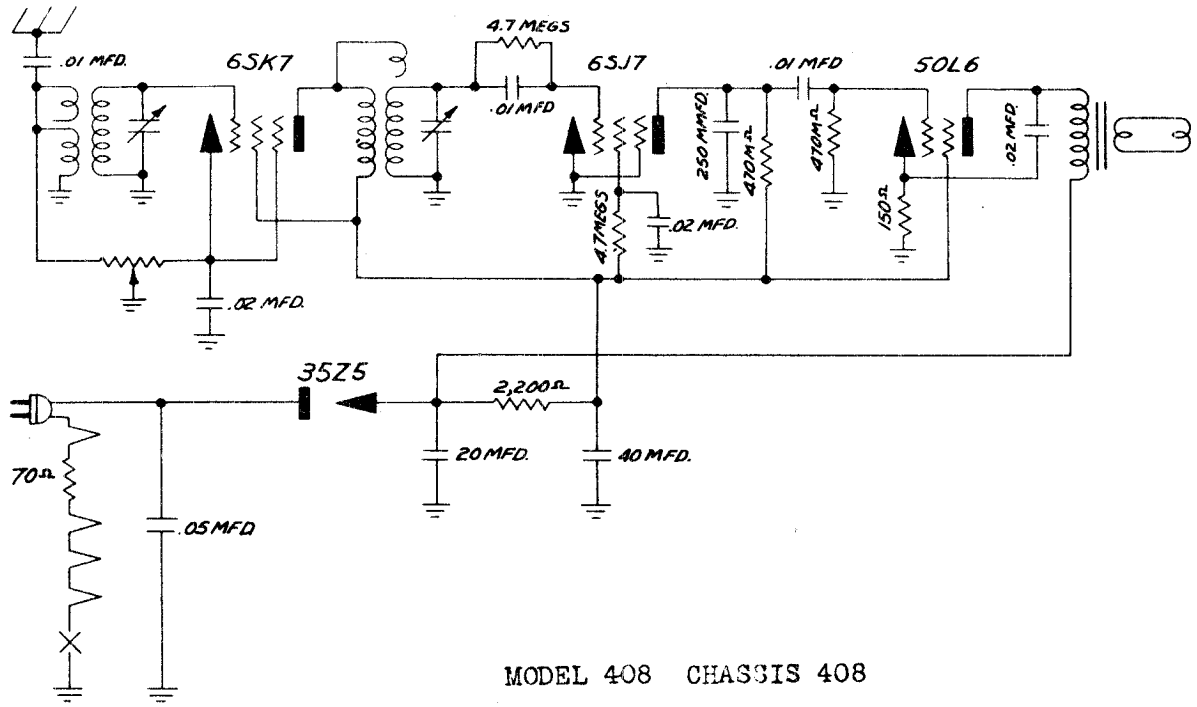
MODEL 407,Ch.407
MODEL 408,Ch.408
Camera Port.

MAJESTIC RADIO & TELEV. CORP.



MODEL 407 CHASSIS 407

Chassis 407



MODEL 408 CHASSIS 408

Chassis 408
Model Camera Port.

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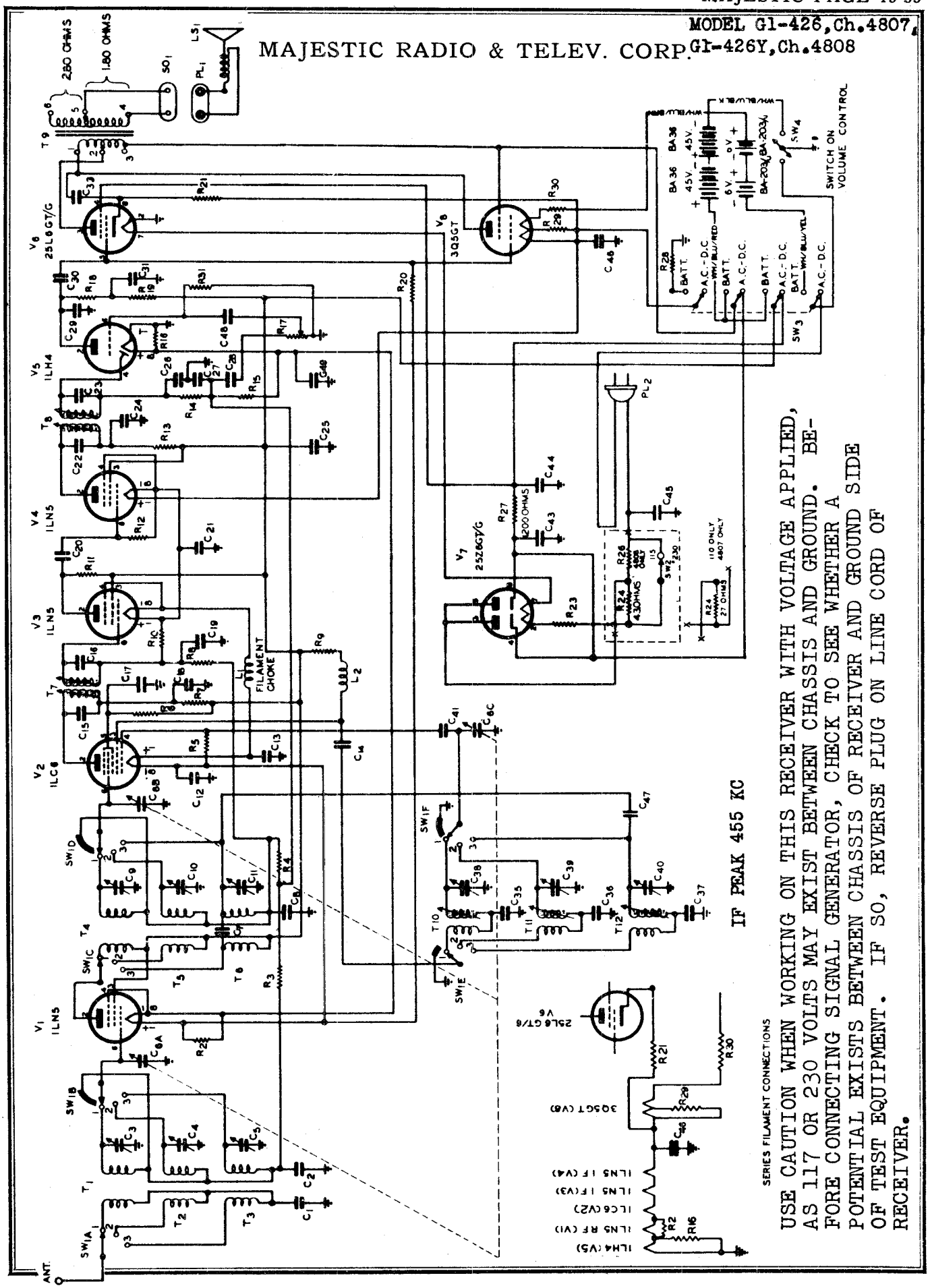
MODEL G1-426,Ch.4807,
G1-426Y,Ch.4808

MAJESTIC RADIO & TELEV. CORP.



USE CAUTION WHEN WORKING ON THIS RECEIVER WITH VOLTAGE APPLIED, AS 117 OR 230 VOLTS MAY EXIST BETWEEN CHASSIS AND GROUND. BEFORE CONNECTING SIGNAL GENERATOR, CHECK TO SEE WHETHER A POTENTIAL EXISTS BETWEEN CHASSIS OF RECEIVER AND GROUND SIDE OF TEST EQUIPMENT. IF SO, REVERSE PLUG ON LINE CORD OF RECEIVER.

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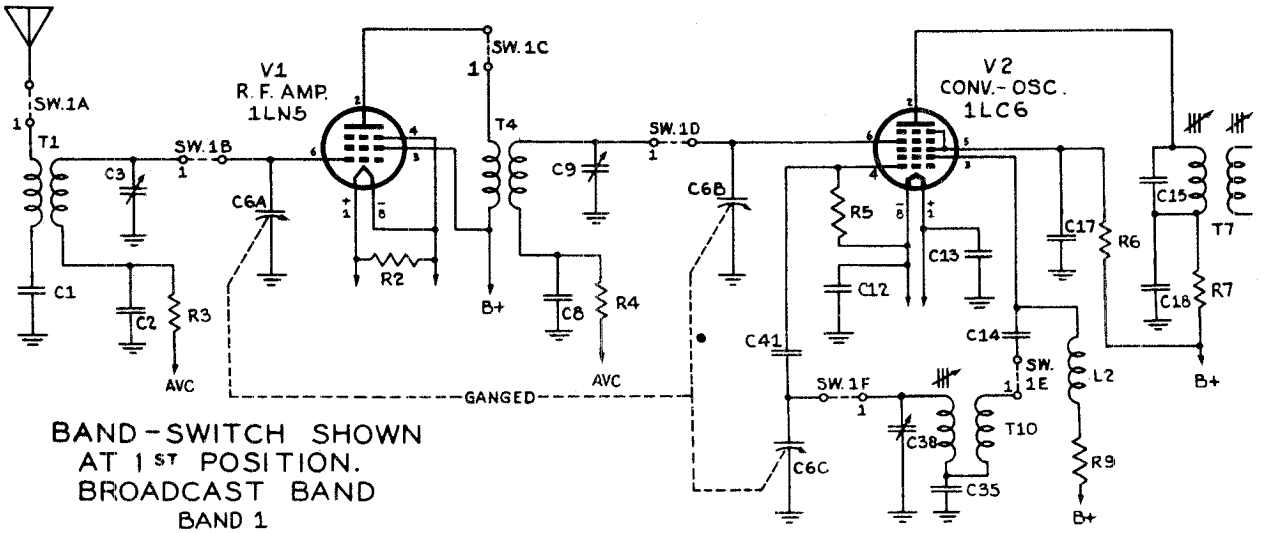
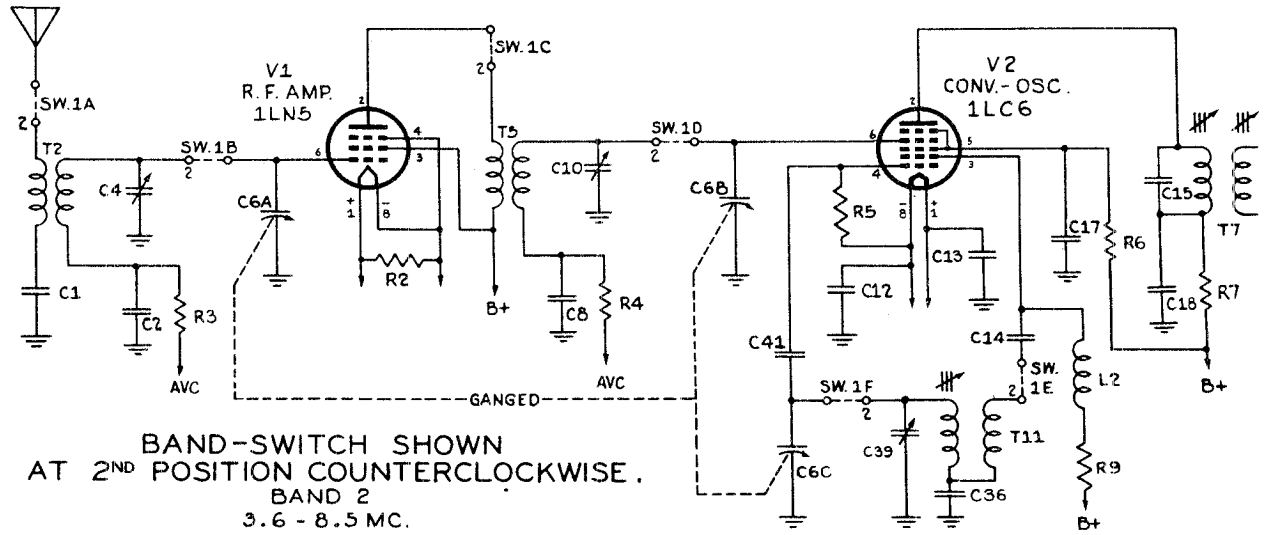
MODELS G1-426,
G1-426Y

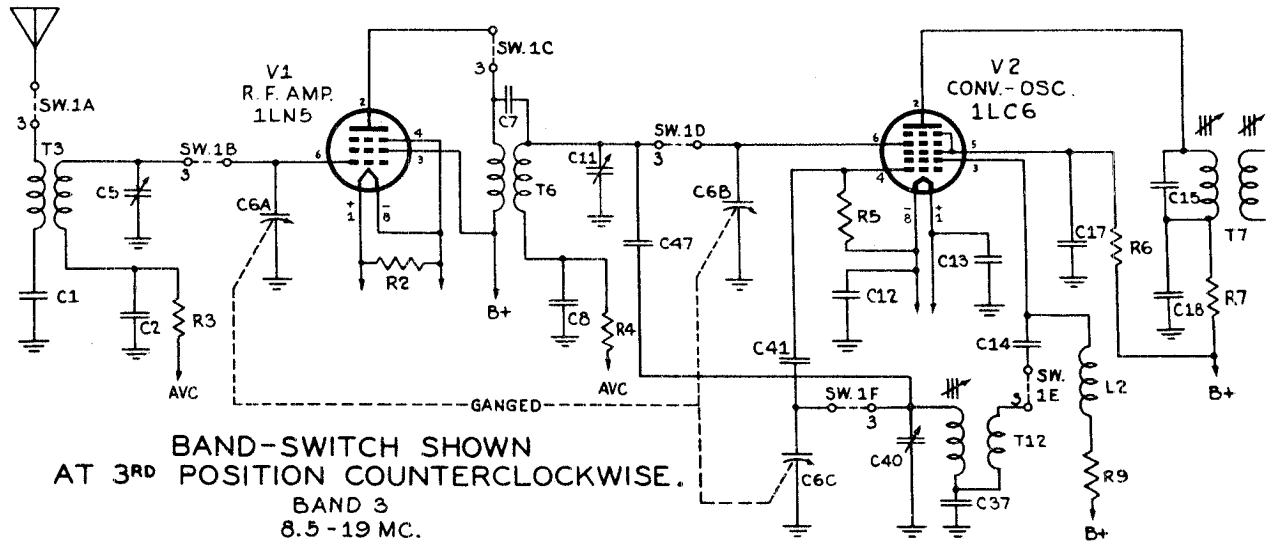
MAJESTIC RADIO & TELEV. CORP.



BAND-SWITCH SHOWN
AT 1ST POSITION.
BROADCAST BAND
BAND 1



BAND-SWITCH SHOWN
AT 2ND POSITION COUNTERCLOCKWISE.
BAND 2
3.6 - 8.5 MC.



BAND-SWITCH SHOWN
AT 3RD POSITION COUNTERCLOCKWISE.
BAND 3
8.5 - 19 MC.

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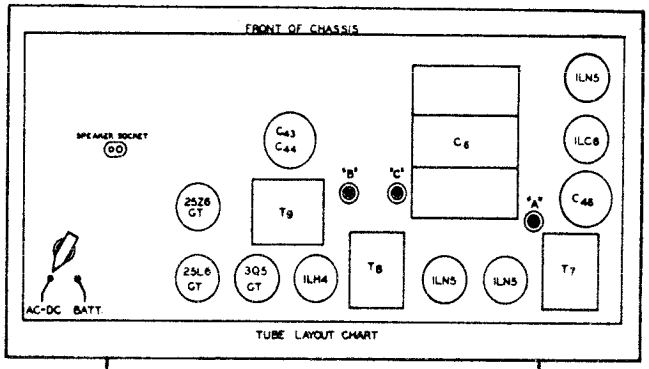
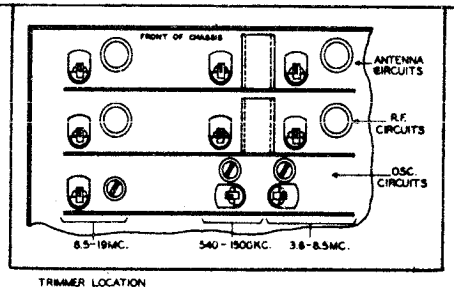
ALIGNMENT

Before aligning, make sure that the dial pointer is exactly horizontal when the tuning condenser is closed (plates fully meshed). While aligning the receiver, turn the volume control full on and keep the signal generator output as low as possible, to prevent AVC action and false readings.

Band-switch positions are extreme right for Broadcast, center for 3.6 to 8.5 mc., extreme left for 8.5 to 19 mc.

STEP	DUMMY ANT.	TEST. OSC. CONNECTION	TEST. OSC. FREQUENCY	RECEIVER BANDSWITCH	RECEIVER DIAL	ADJUST IN ORDER SHOWN	NOTES
1	.01 mfd	1LC6 grid (pin 6)	455 KC.	Right	Any Quiet Spot	T8, T7	#1
2	200 mmfd	ANT. post	600 KC.	Right	.6	"C"	#2
3	200 mmfd	ANT. post	1400 KC.	Right	1.4	Osc.Trimmer	
4	200 mmfd	ANT. post	1400 KC.	Right	1.4	R.F.Trimmer Ant.Trimmer	#3
5	400 ohms	ANT. post	4 MC.	Center	4	"B"	#2
6	400 ohms	ANT. post	8 MC.	Center	8	Osc.Trimmer	#4
7	400 ohms	ANT. post	8 MC.	Center	8	R.F.Trimmer Ant.Trimmer	
8	400 ohms	ANT. post	9 MC.	Left	9	"A"	#2
9	400 ohms	ANT. post	18 MC.	Left	18	Osc.Trimmer	#4
10	400 ohms	ANT. post	18 MC.	Left	18	R.F.Trimmer Ant.Trimmer	





VOLTAGE TABLE

TUBE	PLATE	SCREEN	PLUS FIL.	MINUS FIL.	CATHODE
1LN5 (V1)	100	100	2.5	1.4	
1LC6 (V2)	100	50 (pin 3)	4	2.5	
		40 (pin 5)			
1LN5 (V3)	55	100	5.1	4	
1LN5 (V4)	100	100	6.2	5.1	
1LH4 (V5)	60		1.4	0	
25L6 (V6)	110	115	25 A.C.	0	9
25Z6 (V7)	110AC		50 A.C.	25 A.C.	140

NOTE: All voltages measured with respect to chassis with 1,000 ohm per volt meter, line voltage 117 volts A.C.

NOTES

NOTE #1 - Ground oscillator grid (1LC6 pin 4) while adjusting I.F. transformers.

NOTE #2 - "Rock" tuning gang while making this adjustment.

NOTE #3 - Carefully repeat steps 1 through 4.

NOTE #4 - When making short wave oscillator adjustments, take great care to see that alignment is not made on the image. When the trimmer is correctly adjusted, a weaker peak will be noticed at a receiver dial adjustment which is 910 KC lower than the aligning frequency. It may be necessary to greatly increase the output of the signal generator in order to find this weaker peak.

MODELS G1-426, G1-426Y

MAJESTIC RADIO & TELEV. CORP.

ITEM	DESCRIPTION	PART NUMBER
C1,C28,C30,C48	.006 mfd +20% 600 v molded paper	6-96
C2,C8	.05 mfd +20% -10% 200 v molded paper	6-135
C3,C9,C10,C38,C39,C40	Ceramic Trimmer 7-35 mmfd	8-26
C4,C5,C11	Ceramic Trimmer 34-72 mmfd	8-49
C6A,C6B,C6C	Variable, 3 gang	7-9
C7	15 mmfd +20% 500 v fixed ceramic	6-88
C12,C13,C21,C25,C31,C49	.1 mfd +40% -10% 400 v molded paper	6-91
C14	.0022 mfd 10% 500 v mica	6-109
C15	150 mmfd 5% 500 v mica	6-106
C16,C23	82 mmfd 5% 500 v mica	6-108
C17,C19	.02 mfd +40% -10% 200 v molded paper	6-93
C18	.01 mfd +20% -10% 400 v molded paper	6-97
C20	220 mmfd 20% 400 v fixed ceramic	6-86
C22	51 mmfd 5% 500 v mica	6-107
C24	.05 mfd +40% - 10% 600 v molded paper	6-99
C26,C27,C41	100 mmfd 20% 500 v molded mica	6-82
C29	470 mmfd 20% 500 v molded paper	6-102
C33,C45	.01 mfd +40% -10% 600 v molded paper	6-98
C34,C43,C42,C44	40-40 mfd 250 v dual electrolytic	19-2
C35	430 mmfd 2% 500 v molded mica	6-101
C36	2200 mmfd 5% 500 v molded mica	6-84
C37	.003 mfd 5% 500 v molded mica	6-149
C46	1000 mfd 15 v electrolytic	19-6
J1	Phone jack	18-27
L1	Line filter choke coil	3-102
L2	R.F. choke	3-104
LS1	Speaker, P.M. 6"	22-5
SO1	Speaker receptacle	15-66
PL1	Speaker plug	18-28
R2	270 ohm 10% ¼ watt carbon	9-122
R3,R8,R10	3.3 megohms 10% ½ watt carbon	9-135
R4	3.9 megohms 10% ½ watt carbon	9-136
R5	220,000 ohm 20% ¼ watt carbon	9-115
R6	68,000 ohm 10% ¼ watt carbon	9-116
R7,R13	1,000 ohm 20% ¼ watt carbon	9-131
R9,R11	22,000 ohm 10% ¼ watt carbon	9-140
R12,R15,R18	470,000 ohm 20% ½ watt carbon	9-120
R14	47,000 ohm 20% ¼ watt carbon	9-121
R16,R29	330 ohm 10% ½ watt carbon	9-126
R17	1 megohm 20% variable with switch	13-12
R19	100,000 ohm 20% ¼ watt carbon	9-123
R20	470,000 ohm 10% ¼ watt carbon	9-118
R21	62 ohm 5% ½ watt carbon	9-137
R22	10 ohm 20% 1 watt carbon	9-128
R23	220 ohms 5% 30 watt wirewound	9-134
R24	43 ohm 5% 8 watt wirewound	9-132
R25	2200 ohm 10% ½ watt carbon	9-7
R26	260 ohm 5% 60 watt wirewound	9-133
R27	4700 ohm 10% 1 watt carbon	9-139
R28	820 ohm 10% ¼ watt carbon	9-127
R30	27 ohm 10% ¼ watt carbon	9-125
R31	12 megohms 10% ¼ watt carbon	9-138
SW1A,B,C,D	Switch wafer	11-40
SW1E,F	Switch wafer	11-41
SW3	4P 2-position switch	11-39
T1	Band 1 antenna	3-99
T2	Band 2 antenna	3-91
T3	Band 3 antenna	3-96
T4	Band 1 R.F.	3-100
T5	Band 2 R.F.	3-94
T6	Band 3 R.F.	3-95
T7	1st I.F.	3-93
T8	2nd I.F.	3-101
T9	Output transformer	12-16
T10	Band 1 oscillator	3-92
T11	Band 2 oscillator	3-97
T12	Band 3 oscillator	3-98

Chassis mounting stud assembly	111-149	Dial cord	134-5
Knobs, band switch and volume control	128-17	Dial pointer, black	135-1
Cabinet back assembly	112-190	Dial pointer, white	135-11
Tuning knob	128-18	Dial, white	112-179
AC-DC - BATT knob	128-19	Dial, black	112-336
		Dial window	117-28

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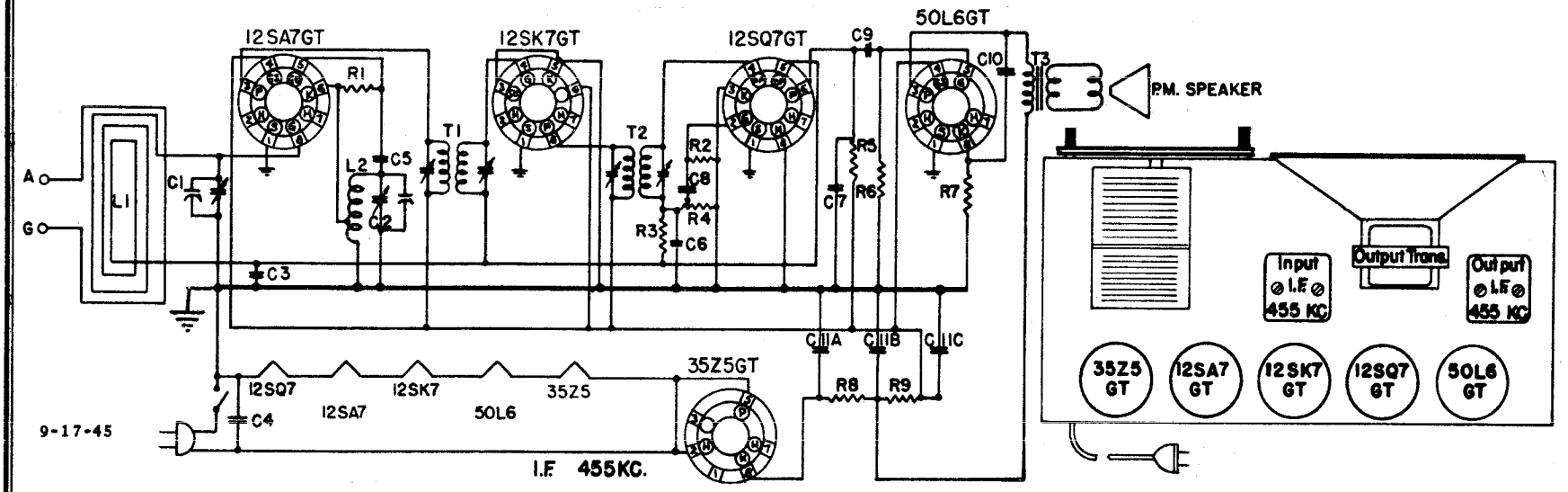
MODELS 5C5, 5C5-A,
5C5-B, 5C5-C
Trail Blazer



Circuit Symbol	Part Number	Description	Model
C1,C2	CV-10002	Condenser-Variable, with pulley	RC-5C5
C1,C2	CV-10002-A	Condenser-Variable, with pulley	RC-5C5-A
C1,C2	CV-10002-B	Condenser-Variable, with pulley	RC-5C5-B
C1,C2	CV-10002-C	Condenser-Variable, with pulley	RC-5C5-C
C3,C4,C10	CP-14503	Condenser-Paper, 0.05mfd. 400V	All
C5	CM-15500	Condenser-Mica, 0.00005mfd.	All
C6,C7	CM-15251	Condenser-Mica, 0.00025mfd.	All
C8,C9	CP-14103	Condenser-Paper, 0.01mfd. 400V	All
C11A,C11B,C11C	CL-10001	Condenser-Electrolytic 20/20/20 mfd 150V	All
R1	RC-32002	Resistor-Carbon, 20,000 ohms ½watt	All
R2	RC-31005	Resistor-Carbon, 10 megohms ½watt	All
R3	RC-32004	Resistor-Carbon, 2 megohms ½watt	All
R4	VC-10103	Control-Volume, with switch, 1 megohm	All
R5	RC-32503	Resistor-Carbon, 250,000 ohms ½watt	All

Symbol	Part Number	Description	Model
R6	RC-35003	Resistor-Carbon, 500,000 ohms ½watt	All
R7	RC-31500	Resistor-Carbon, 150 ohms ½watt	All
R8	RC-32000	Resistor-Carbon, 200 ohms ½watt	All
R9	RC-31001	Resistor-Carbon, 1000 ohms ½watt.	All
L1	AL-10000	Antenna-Loop,	RC-5C5, A,B,
L1	AL-10001-C	Antenna-Loop	RC-5C5-C
L2	TRC-10000	Coil-Oscillator	RC-5C5, A,B,
L2	TRC-10000-C	Coil-Oscillator	RC-5C5-C
T1	TS-10000	Transformer-1st I.F.	All
T2	TS-10001	Transformer-2nd I.F.	All
T3	TO-10000	Transformer-Output	All
SPKR	SR-10000	Speaker-P.M. 4" round, less T3	All
SPKR	SR-10001	Speaker-P.M. 4" round, with T3	All

VOLTAGE TABLE - Use high resistance voltmeter of 1000 ohms per volt

Type tube	1	2	3	4	5	6	7	8
12SA7	0	24AC	78	78	-7 to-12	0	12AC	-.65 to-1.2
12SK7	0	36AC	0	-.8 to-1.2	0	78	24AC	78
12SQ7	0	-.9 to-1.2	0	0	-.8 to-1.2	55	12AC	0
50L6	0	--	95	78	0	--	36AC	4 to 5
35Z5	-	82	--	78	115 AC	100	115 AC	110

MODELS 5C5,5C5-A,
5C5-B,5C5-C
Trail Blazer

JOHN MECK INDUSTRIES

The Meck Trail Blazer Models 5C5; 5C5-A; 5C5-B; 5C5-C are five tube superhetrodyne receivers covering the broadcast band from 535 to 1720 kilocycles. A loop antenna is incorporated in the top of the cabinet. When an external antenna and ground are used, connect the antenna to the red wire and the ground wire to the black wire extending from the back of the cabinet.

The circuit employs automatic volume control (A.V.C.) through the action of the type 12SQ7GT tube. These models are designed to operate on 110 to 120 volts AC-DC In operation; the incoming signal is first passed to the tuned first detector circuit and then beats with the oscillator output to produce a 455 kilocycle intermediate frequency signal.

The intermediate frequency signal is amplified in an exceptionally high gain stage, and is then rectified by the diodes of the type 12SQ7GT tube. Detection is accomplished by the diode directly connected to the output intermediate frequency transformer. A modulated direct current voltage drop is produced across the one megohm potentiometer by the rectified current. The volume is controlled by selecting any desired portion of the audio frequency voltage with the moving arm of the potentiometer which is connected to the grid of the type 12SQ7GT tube. The triode section of this tube acts as an audio amplifier and is resistance coupled to the 50L6GT output tube.

PRELIMINARY: Before attempting to align a radio set, the service man should become familiar with the general layout of the chassis and with the function and location of the various trimmer condensers. The following discussion briefly explains the action of each alignment step.

R.F. alignment and calibration are accomplished by the two trimmer condensers located on the side of the variable condenser gang. The oscillator is kept in exact step with the R.F. circuit by the special shape of the stator plates in the oscillator tuning section.

Both windings of the I.F. transformers are tuned. The I.F. trimmers are mounted in their respective I.F. coil cans, and are reached through holes in the top of each I.F. coil can.

EQUIPMENT and PRELIMINARY STEPS: A good modulated oscillator, an output meter, an isolation or a coupling transformer and a loop antenna are essential for the proper alignment. The attenuator on the oscillator must be capable of reducing the signal to a low value because the A.V.C. will function if the signal is too strong and thus make correct alignment impossible. The output meter must be sensitive enough to give a satisfactory reading with a small signal. An isolation or a coupling transformer must be used when an AC-DC radio is to be aligned. The loop antenna can be made by winding five to ten turns of insulated wire on a three or four inch form and closely coupled to the loop antenna of the receiver.

The output meter should be connected across the speaker voice coil or connected from the plate of the 50L6GT to ground or chassis through a 0.25 mfd. condenser, depending upon the type of output meter used.

All alignment adjustments must be made with the volume control full on, but with no broadcast signal being received.

I.F. ALIGNMENT: The step-by-step routine given below should be carefully followed after reading the preceding instructions:

1. The modulated oscillator must be tuned to 455 K.C.
2. Connect the high side of the oscillator output to the lug on the R.F. section of the gang condenser. The low side of the oscillator is connected to the chassis through a .01 condenser.
3. Set the gang condenser of the radio to 1720 on the dial and turn the volume control on full.
4. Adjust the four I.F. trimmers tuning each carefully to get the maximum deflection of the output meter. Reduce the oscillator output if the output meter goes off scale.
5. Repeat all four adjustments since the adjustment of each I.F. trimmer may effect the others to a certain extent.

R.F. AND OSCILLATOR ALIGNMENT:

1. Connect the oscillator output to the external loop antenna and closely couple to the loop antenna of the receiver.
2. Set the generator at 1720 KC and turn the gang condenser to 1720 on the dial. Adjust the oscillator trimmer for maximum output.
3. Set the generator at 1400 KC and turn the gang condenser to 1400 on the dial. Adjust the R.F. trimmer for maximum output while rocking the gang.
4. Set the generator at 600 KC and turn the gang to 600 KC on the dial and check for tracking.

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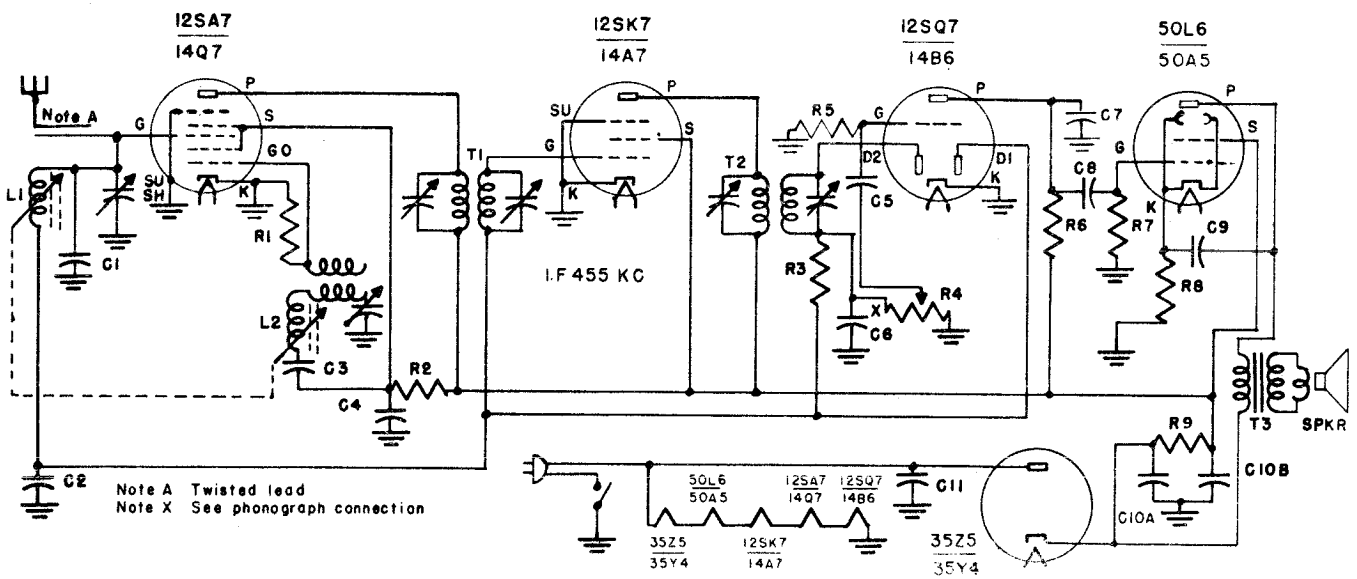
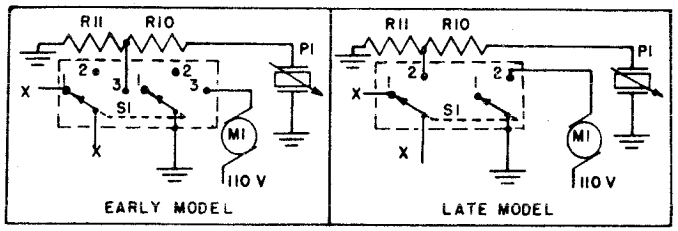


IF PEAK 455 KC



PHONOGRAPH CONNECTION

VOLTAGE TABLE - Use high resistance voltmeter of 1000 ohms per volt

Type tube	1	2	3	4	5	6	7	8
12SA7	0	24AC	78	78	-7 to-12	0	12AC	-.65 to-1.2
12SK7	0	36AC	0	-.8 to-1.2	0	78	24AC	78
12SQ7	0	-.9 to-1.2	0	0	-.8 to-1.2	55	12AC	0
50L6	0	- -	95	78	0	--	36AC	4 to 5
35Z5	-	82	--	78	115 AC	100	115 AC	110
14Q7	24AC	78	78	-7 to-12	0	-.65 to-1.2	0	12AC
14A7	36AC	78	78	0	0	-.8 to-1.2	0	24AC
14B6	0	55	-.9 to-1.2	0	-.8 to-1.2	0	0	12AC
50A5	82AC	95	78	--	---	0	4 to 5	36AC
35Y4	115AC	115AC	78	--	100	--	110	82AC

Circuit Symbol	Part Number	Description
C1	CM-15250	Condenser-Mica, 25 mmf., 500 volt
C2,C9,C11	CP-145031	Condenser-Paper, 0.05 mfd., 400 volt
C3,C5,C8	CP-14103	Condenser-Paper, 0.01 mfd., 400 volt
C4	CM-15301	Condenser-Mica, 300 mmf., 500 volt
C6,C7	CM-15251	Condenser-Mica, 250 mmf., 500 volt
C10A,C10B	CL-10001	Condenser-Elect., 20/20 mfd., 150 volt
L1, L2	VP-10000	Tuner-Permeability, assembly
R1	RC-32002	Resistor-Carbon, 20,000 ohms, ½ watt
R2	RC-34001	Resistor-Carbon, 4000 ohms, ½ watt
R3	RC-32004	Resistor-Carbon, 2 megohms, ½ watt
R4	VC-10105	Control-Volume, 1 megohm with switch
R5	RC-31005	Resistor-Carbon, 10 megohms, ½ watt
R6	RC-32502	Resistor-Carbon, 250,000 ohms, ½ watt
R7	RC-35003	Resistor-Carbon, 500,000 ohms, ½ watt
R8	RC-31500	Resistor-Carbon, 150 ohms, ½ watt
R9	RC-31001	Resistor-Carbon, 1000 ohms, ½ watt
SPKR	SR-10000	Speaker-P.M. 4" round less T3
T1	TS-10000	Transformer-1st. I.F.
T2	TS-10001	Transformer-2nd. I.F.
T3	TO-10000	Transformer-Output
PHONOGRAPH MODEL		
M1	PRS-10000	Motor-Phono, with turntable
P1	PA-10000	Pickup-Crystal
R10	RC-31004	Resistor-Carbon, 1 megohm, ½ watt
R11	RC-37503	Resistor-Carbon, 750,000 ohms, ½ watt
S1	VS-10000	Switch-Radio, phono

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MODELS PM-5C5-P,
RC-5C5-P

JOHN MECK INDUSTRIES

ALIGNMENT

PRELIMINARY: Before attempting to align the RC-5C5-P chassis, the service man should become familiar with the general layout of the chassis, with the function and location of the various trimmers. The following discussion briefly explains the action of each alignment step.

R.F. alignment and calibration are accomplished by the two trimmers mounted on top of the permeability tuner assembly. Facing the dial of the chassis, the r.f. trimmer is to the left and the oscillator trimmer to the right.

I.F. The i.f. trimmers are mounted in their respective i.f. coil cans and are reached through holes in the top of each i.f. coil can.

EQUIPMENT and PRELIMINARY STEPS: A good modulated oscillator, an output meter and an isolation transformer are essential for the proper alignment. The attenuator on the oscillator must be capable of reducing the signal to a low value because the a.v.c. will function if the signal is too strong and thus make correct alignment impossible. The output meter must be sensitive enough to give a satisfactory reading with a small signal. An isolation transformer must be used when aligning an AC-DC radio chassis.

The output meter may be connected across the voice coil of the speaker or one lead of the output meter may be connected to the plate of the output tube and the other lead of the meter to one side of a 0.25 mfd. condenser which is then connected to the chassis, depending upon the type of output meter used.

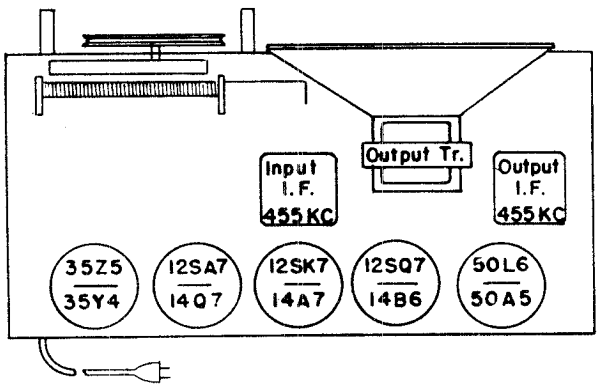
All alignment adjustments must be made with the volume control full on, but with no broadcast signal being received.

I.F. ALIGNMENT: The step-by-step routine given below should be carefully followed after reading the preceding instructions.

1. The signal generator must be set at 455 kilocycles.
2. Connect the output meter so that the output can be determined.
3. Connect the high side of the signal generator output to the antenna lead of the tuner, the white wire. The low side of the signal generator output lead is connected to the chassis through a 0.01 mfd. condenser.
4. Turn the volume control on full and turn the dial drive shaft so that the slugs of the tuner unit are all the way out against the stop.
5. Adjust the four I.F. trimmers, tuning each carefully to get the maximum deflection of the output meter. Reduce the signal generator output if the output meter goes off scale.
6. Repeat all four adjustments since the adjustment of each I.F. trimmer may effect the others to a certain extent.

OSCILLATOR and R.F. ALIGNMENT:

1. Connect the high side of the signal generator output to the insulation covering of the antenna wire and not the wire itself.
2. Set the signal generator to 1680 kilocycles with the slugs of the tuner all the way out against the stop. Adjust the oscillator trimmer, right hand trimmer screw, for maximum reading on the output meter.
3. Set the signal generator at 1120 kilocycles and turn the dial drive shaft until the 1120 kilocycle note is heard. Adjust the R.F. trimmer, left hand trimmer, for maximum reading on the output meter. Set the dial pointer on 1120 kilocycles on the dial scale. By aligning the R.F. section at 1120 kilocycles the overall alignment will be very good.



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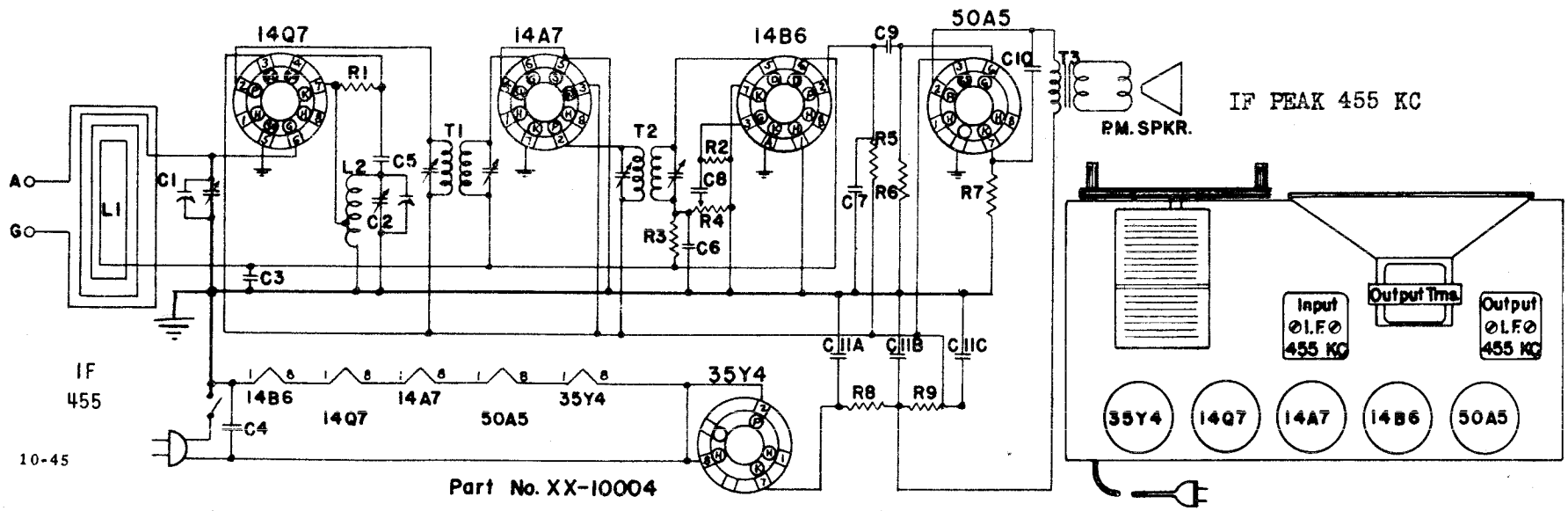

Part No. XX-10004

Circuit Symbol	Part Number	Description	Model
C1,C2	CV-10002-C	Condenser-Variable, with pulley	RC-5C5-CL
C1,C2	CV-10002-D	Condenser-Variable, with pulley	RC-5C5-DL
C3,C4,C10	CP-14503	Condenser-Paper, 0.05mfd. 400V	All
C5	CM-15500	Condenser-Mica, 0.00005mfd.	All
C6,C7	CM-15251	Condenser-Mica, 0.00025mfd.	All
C8,C9	CP-14103	Condenser-Paper, 0.01mfd. 400V	All
C11A,C11B,C11C	CL-10001	Condenser-Electrolytic 20/20/20 mfd 150V	All
R1	RC-32002	Resistor-Carbon, 20,000 ohms ½watt	All
R2	RC-31005	Resistor-Carbon, 10 megohms ½watt	All
R3	RC-32004	Resistor-Carbon, 2 megohms ½watt	All
R4	VC-10105	Control-Volume, with switch, 1 megohm	All
R5	RC-32503	Resistor-Carbon, 250,000 ohms ½watt	All

Circuit Symbol	Part Number	Description	Model
R6	RC-35003	Resistor-Carbon, 500,000 ohms ½watt	All
R7	RC-31500	Resistor-Carbon, 150 ohms ½watt	All
R8	RC-32000	Resistor-Carbon, 200 ohms ½watt	All
R9	RC-31001	Resistor-Carbon, 1000 ohms ½watt	All
L1	AL-10000-D	Antenna-Loop,	RC-5C5-DL
L1	AL-10001-C	Antenna-Loop	RC-5C5-CL
L2	TRC-10000	Coil-Oscillator	RC-5C5-DL
L2	TRC-10000-C	Coil-Oscillator	RC-5C5-CL
T1	TS-10000	Transformer-1st I.F.	All
T2	TS-10001	Transformer-2nd I.F.	All
T3	TO-10000	Transformer-Output	All
SPKR	SR-10001	Speaker-P.M. 4" round, with T3	All

VOLTAGE TABLE - Use high resistance voltmeter of 1000 ohms per volt

Type tube	1	2	3	4	5	6	7	8
14Q7	24AC	78	78	-7 to-12	0	-.65 to-1.2	0	12AC
14A7	36AC	78	78	0	0	-.8 to-1.2	0	24AC
14B6	0	55	-.9 to-1.2	0	-.8 to-1.2	0	0	12AC
50A5	82AC	95	78	--	---	0	4 to 5	36AC
35Y4	115AC	115AC	78	--	100	--	110	82AC

MODELS RC-5C5-CL, RC-5C5-DL

JOHN MECK INDUSTRIES

The Meck Trail Blazer Chassis RC-5C5-CL and RC-5C5-DL are five tube superheterodyne receivers. The RC-5C5-CL covers the broadcast band from 545 to 1520 kilocycles and the RC-5C5-DL covers the broadcast band from 535 to 1720 kilocycles. A loop antenna is incorporated in the top of the cabinet. The red and black wires extending from the back of the cabinet are used when an external antenna and ground are used. The external antenna is connected to the red wire and the ground to the black wire. DO NOT CONNECT A GROUND WIRE TO THE METAL CHASSIS.

The circuit employs automatic volume control (A.V.C.) through the action of the type 14B6 tube. These models are designed to operate on 110 to 120 volts AC-DC. In operation; the incoming signal is first passed to the tuned first detector circuit and then beats with the oscillator output to produce a 455 kilocycle intermediate frequency signal.

The intermediate frequency signal is amplified in an exceptionally high gain stage, and is then rectified by the diodes of the type 14B6 tube. Detection is accomplished by the diode directly connected to the output intermediate frequency transformer. A modulated direct current voltage drop is produced across the one megohm potentiometer by the rectified current. The volume is controlled by selecting any desired portion of the audio frequency voltage with the moving arm of the potentiometer which is connected to the grid of the type 14B6 tube. The triode section of this tube acts as an audio amplifier and is resistance coupled to the 50A5 output tube.

PRELIMINARY: Before attempting to align a radio set, the service man should become familiar with the general layout of the chassis and with the function and location of the various trimmer condensers. The following discussion briefly explains the action of each alignment step.

R.F. alignment and calibration are accomplished by the two trimmer condensers located on the side of the variable condenser gang. The oscillator is kept in exact step with the R.F. circuit by the special shape of the stator plates in the oscillator tuning section.

Both windings of the I.F. transformers are tuned. The I.F. trimmers are mounted in their respective I.F. coil cans, and are reached through holes in the top of each I.F. coil can.

EQUIPMENT and PRELIMINARY STEPS: A good modulated oscillator, an output meter, an isolation or a coupling transformer and a loop antenna are essential for the proper alignment. The attenuator on the oscillator must be capable of reducing the signal to a low value because the A.V.C. will function if the signal is too strong and thus make correct alignment impossible. The output meter must be sensitive enough to give a satisfactory reading with a small signal. An isolation or a coupling transformer must be used when an AC-DC radio is to be aligned. The loop antenna can be made by winding five to ten turns of insulated wire on a three or four inch form and closely coupled to the loop antenna of the receiver.

The output meter should be connected across the speaker voice coil or connected from the plate of the 50A5 to ground or chassis through a 0.25 mfd. condenser, depending upon the type of output meter used.

All alignment adjustments must be made with the volume control full on, but with no broadcast signal being received.

I.F. ALIGNMENT: The step-by-step routine given below should be carefully followed after reading the preceding instructions:

1. The modulated oscillator must be tuned to 455 K.C.
2. Connect the high side of the oscillator output to the lug on the R.F. section of the gang condenser. The low side of the oscillator is connected to the chassis through a .01 condenser.
3. Set the gang condenser of the radio to the low end of the dial and turn the volume control on full.
4. Adjust the four I.F. trimmers tuning each carefully to get the maximum deflection of the output meter. Reduce the oscillator output if the output meter goes off scale.
5. Repeat all four adjustments since the adjustment of each I.F. trimmer may effect the others to a certain extent.

R.F. AND OSCILLATOR ALIGNMENT:

1. Connect the oscillator output to the external loop antenna and closely couple to the loop antenna of the receiver.
2. Set the generator at 1500 KC and turn the gang condenser to 1500 on the dial. Adjust the oscillator trimmer for maximum output.
3. Set the generator at 1400 KC and turn the gang condenser to 1400 on the dial. Adjust the R.F. trimmer for maximum output while rocking the gang.
4. Set the generator at 600 KC and turn the gang to 600 KC on the dial and check for tracking.

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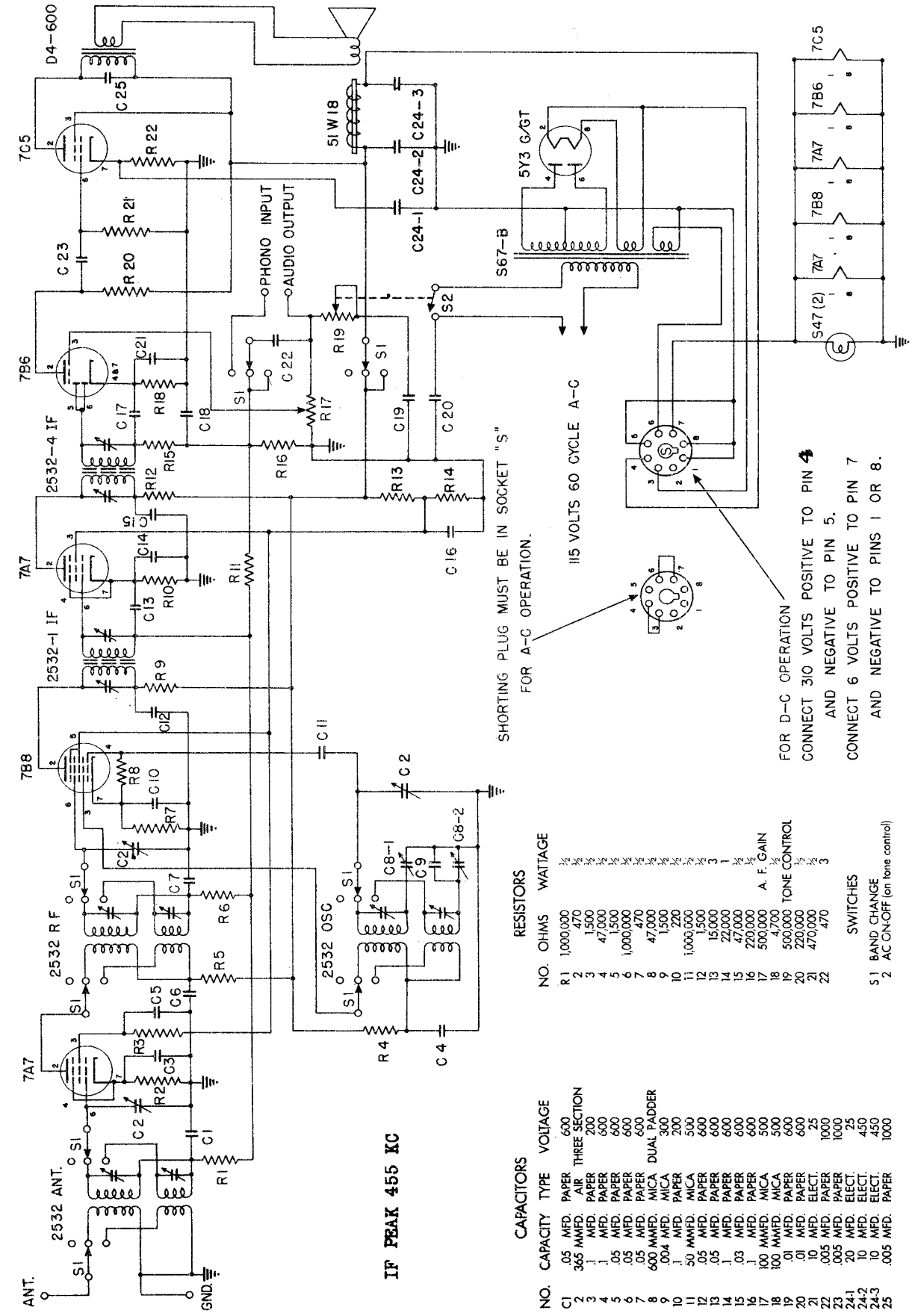
MODEL HE-621

MEGARD CORP.

SCHEMATIC DIAGRAM — HOLLYWOOD ELECTRONICS — MODEL HE-621



CAPACITORS

NO.	CAPACITY	TYPE	VOLTAGE
C1	.05 MFD.	PAPER	600
2	365 MMFD.	AIR	THREE SECTION
3	.1 MFD.	PAPER	200
4	.1 MFD.	PAPER	600
5	.05 MFD.	PAPER	600
6	.05 MFD.	PAPER	600
7	.05 MFD.	PAPER	600
8	600 MMFD.	MICA	DUAL PADDER
9	.004 MFD.	MICA	300
10	.1 MFD.	PAPER	200
11	50 MMFD.	MICA	500
12	.05 MFD.	PAPER	600
13	.05 MFD.	PAPER	600
14	.1 MFD.	PAPER	600
15	.03 MFD.	PAPER	600
16	.1 MFD.	PAPER	600
17	100 MMFD.	MICA	500
18	100 MMFD.	MICA	500
19	.01 MFD.	PAPER	600
20	.01 MFD.	PAPER	600
21	10 MFD.	ELECT.	25
22	.005 MFD.	PAPER	1000
23	.005 MFD.	PAPER	1000
24-1	20 MFD.	ELECT.	25
24-2	10 MFD.	ELECT.	450
24-3	10 MFD.	ELECT.	450
25	.005 MFD.	PAPER	1000

RESISTORS

NO.	OHMS	WATTAGE
R1	1,000,000	½
2	470	½
3	1,500	½
4	47,000	½
5	1,500	½
6	1,000,000	½
7	470	½
8	47,000	½
9	1,500	½
10	220	½
11	1,000,000	½
12	1,500	½
13	15,000	3
14	22,000	1
15	47,000	½
16	220,000	½
17	500,000	A. F. GAIN ½
18	4,700	½
19	500,000	TONE CONTROL ½
20	220,000	½
21	470,000	½
22	470	3

SWITCHES

S1 BAND CHANGE
2 AC ON-OFF (on tone control)

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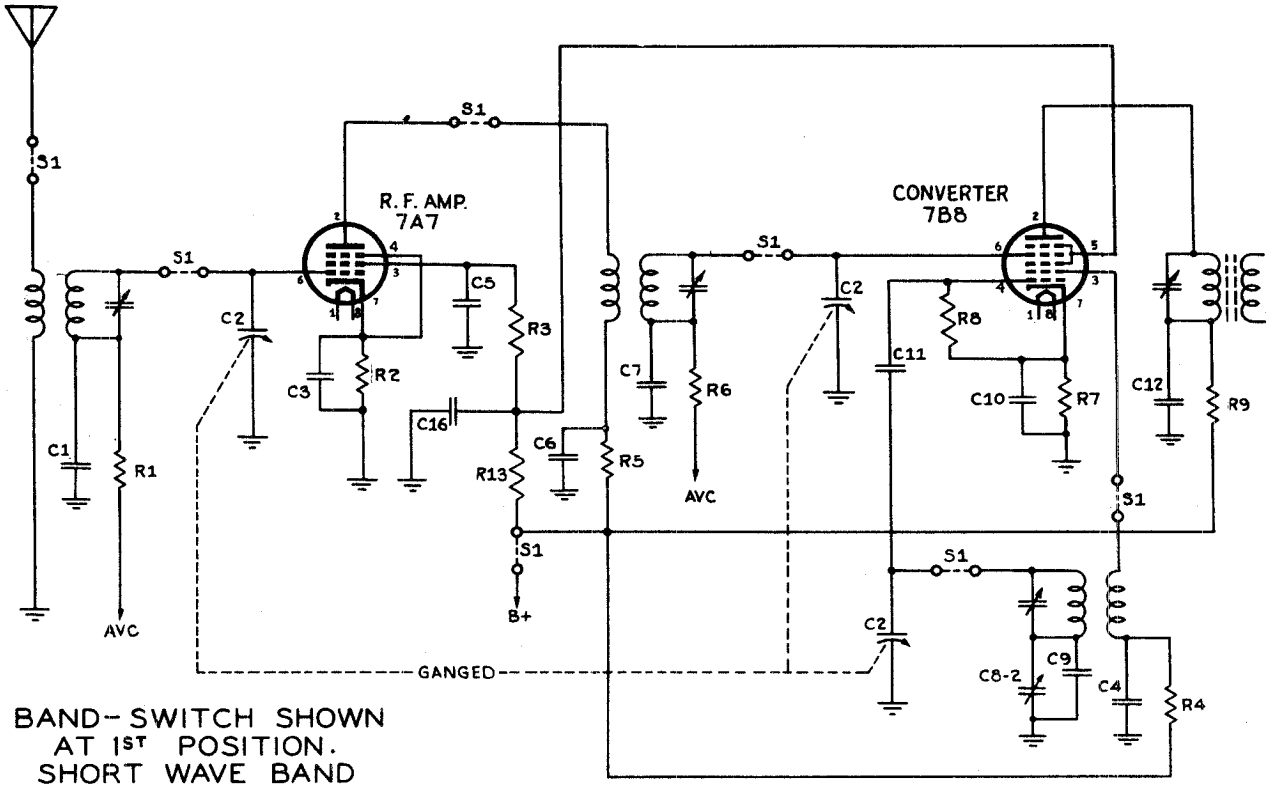
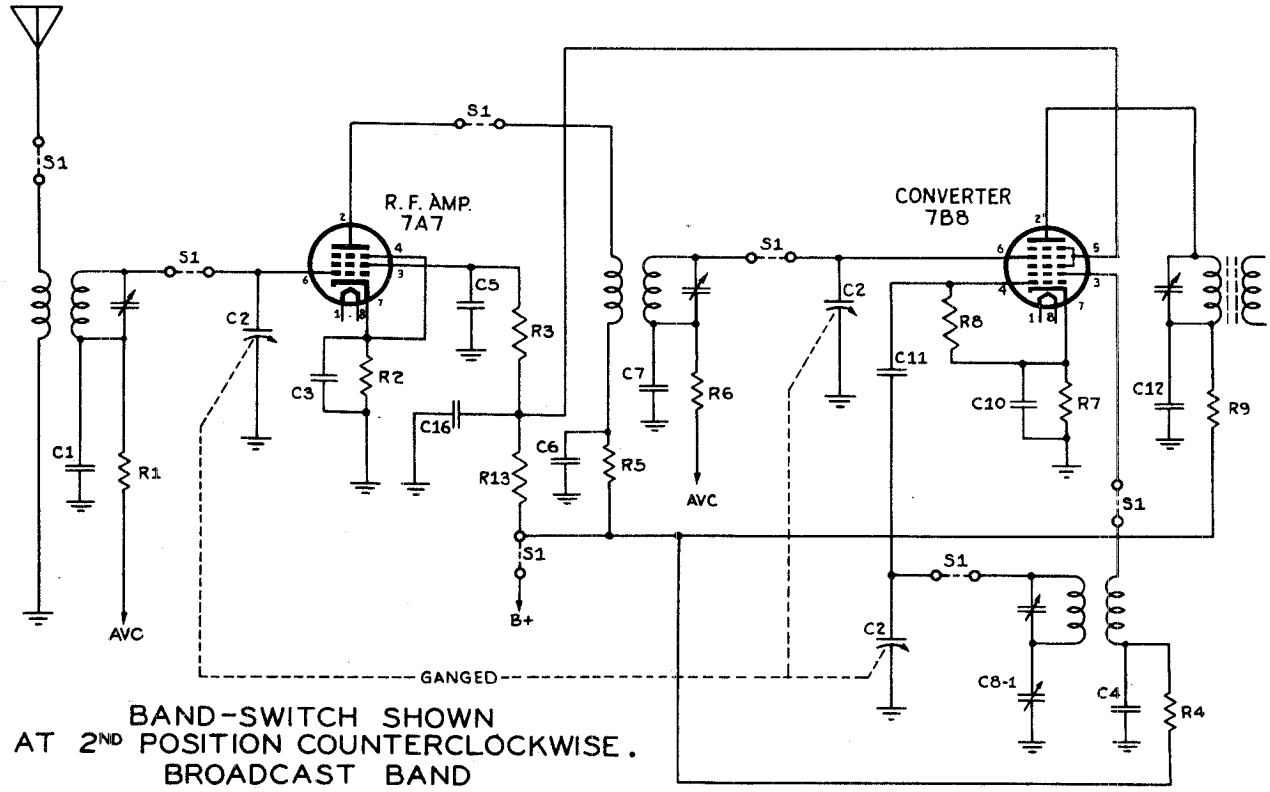
MODEL HE-621

MEGARD CORP.



BAND-SWITCH SHOWN AT 1ST POSITION. SHORT WAVE BAND



BAND-SWITCH SHOWN AT 2ND POSITION COUNTERCLOCKWISE. BROADCAST BAND

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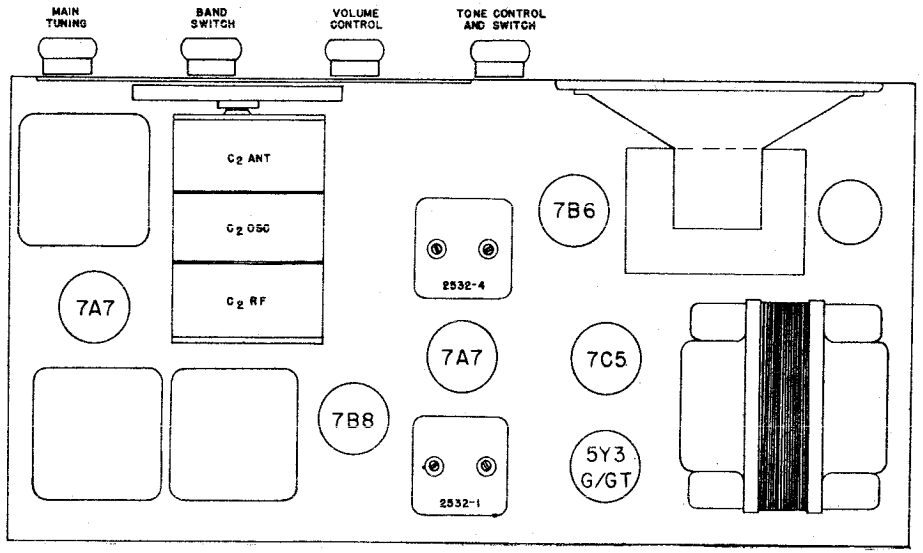
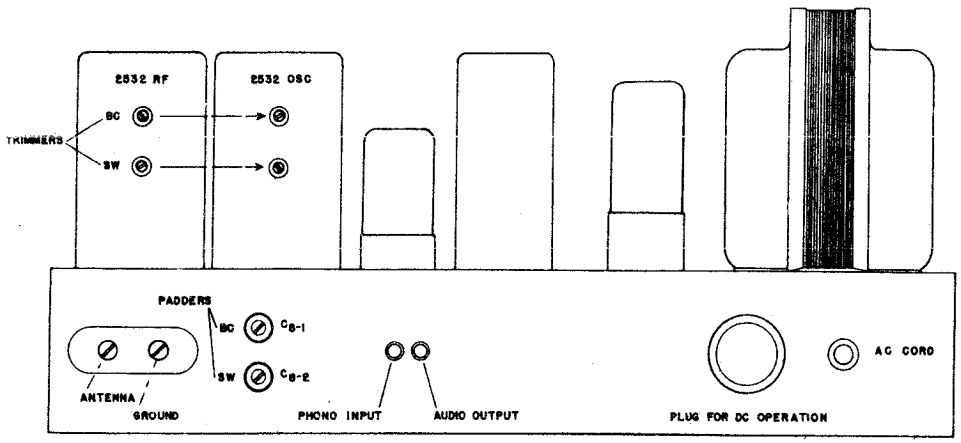
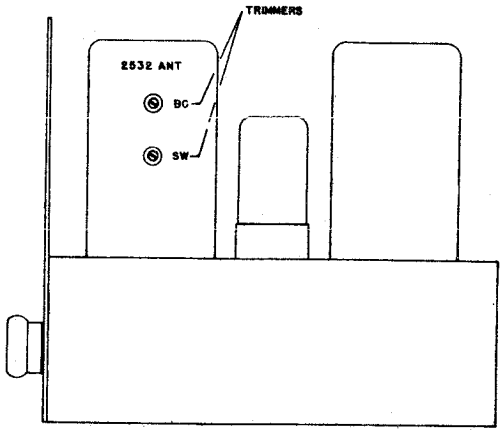
BATTERY OPERATION

The HE-621 is intended to be supplied from a 115 volt 50 to 60 cycle A.C. source but if desired the jumper wires of the plug located next to the A.C. cord on the rear apron of the chassis may be removed and the plug wired as indicated on the diagram to allow operation from batteries or a battery pack.







MEGARD CORP.

INTERMEDIATE FREQUENCY ALIGNMENT

Prepare the receiver as follows:
Remove the antenna completely.
Band switch on "BC" or middle position.
Set dial to a point near the high frequency or 1500 Kc. end where no station is received.
Turn tone and volume controls to maximum clockwise rotation

Connect a signal generator to the stator connection of the tuning condenser section C2 RF or to the RF input grid (socket connection #6) of the 7B8 tube. If there is no blocking condenser in the output lead of the signal generator, the lead should be connected through a .1 Mfd. condenser instead of directly. Connect the ground of the signal generator to the chassis of the receiver or to the terminal on the antenna ground strip marked "G".

After the above connections have been made, set the signal generator for 455 Kc. 30% modulated signal output.

Now adjust the condensers on IF transformers 2532-1 and 2532-4 for exact resonance which will be indicated by maximum signal output. An output meter of the rectifier type should be used and may be connected through a suitable coupling condenser to the plate (socket connection #2) of the 7C5 output tube or to the voice coil leads of the speaker. When making the final adjustments to the IF tuning condensers, it is advisable to use as low an input signal level as possible.

RADIO FREQUENCY ALIGNMENT

Replace the .1 Mfd. condenser in series with the generator lead with a 400 ohm resistor. Connect the generator to the terminal marked "A" on the antenna-ground strip which is mounted on the rear apron of the chassis. All trimmer adjustments are for the high frequency ends of the bands and are located in the sides of the coil shield cans. The Broadcast band trimmer is the uppermost one in each case. All padder adjustments are for the low frequency ends of the bands and are located on the rear apron of the chassis. The padder for the Broadcast band is the uppermost one.

BROADCAST BAND.

Place band switch in the middle or BC position. Set generator to 1400 Kc. and adjust the oscillator trimmer to receive the signal at the proper calibration on the receiver dial. Adjust the "BC" RF and ANT trimmers for maximum signal. Re-set generator and receiver to 600 Kc. and adjust padder condenser C8-1 for proper calibration or maximum signal. If it should prove necessary to change the adjustment of padder C8-1 to any appreciable extent, it may also be necessary to re-adjust the oscillator trimmer condenser for exact calibration at the high frequency end of the band.

SHORT WAVE BROADCAST BAND.

Place band switch in the clockwise or "SW" position. Set generator and receiver dial to 15 Mc. and adjust oscillator trimmer for proper calibration. (More than one signal may be heard as the trimmer condenser is rotated. At least two major signals will be observed. The proper signal will be the one tuned nearest maximum anti-clockwise rotation of the trimmer condenser.) Re-set receiver and signal generator to approximately 13 Mc. and adjust "SW" RF and ANT trimmers for maximum signal. (Again more than one position of the trimmers may result in maximum signal. The one nearest maximum clockwise rotation is the correct one.) Re-set signal generator to 6 Mc. and adjust padder condenser C8-2 for maximum signal.

ANTENNA

The receiver should be used with as short an antenna as may be practical under the particular conditions of use. An antenna length of 6 to 15 feet is recommended for average conditions.

PHONO OR TUNER

To use the HE-621 receiver as a tuner to feed a public address amplifier etc., output may be obtained from the jack farthest from the antenna-ground strip on the rear apron of the receiver. An amplifier of high impedance input should be used.

To use the HE-621 as an amplifier for use with a record player turntable and pickup, the output of the pickup (which should be of the high impedance type) may be plugged into the jack nearest the antenna-ground strip on the rear apron of the chassis. The band change switch should be turned to its extreme counterclockwise or "PHONO" position

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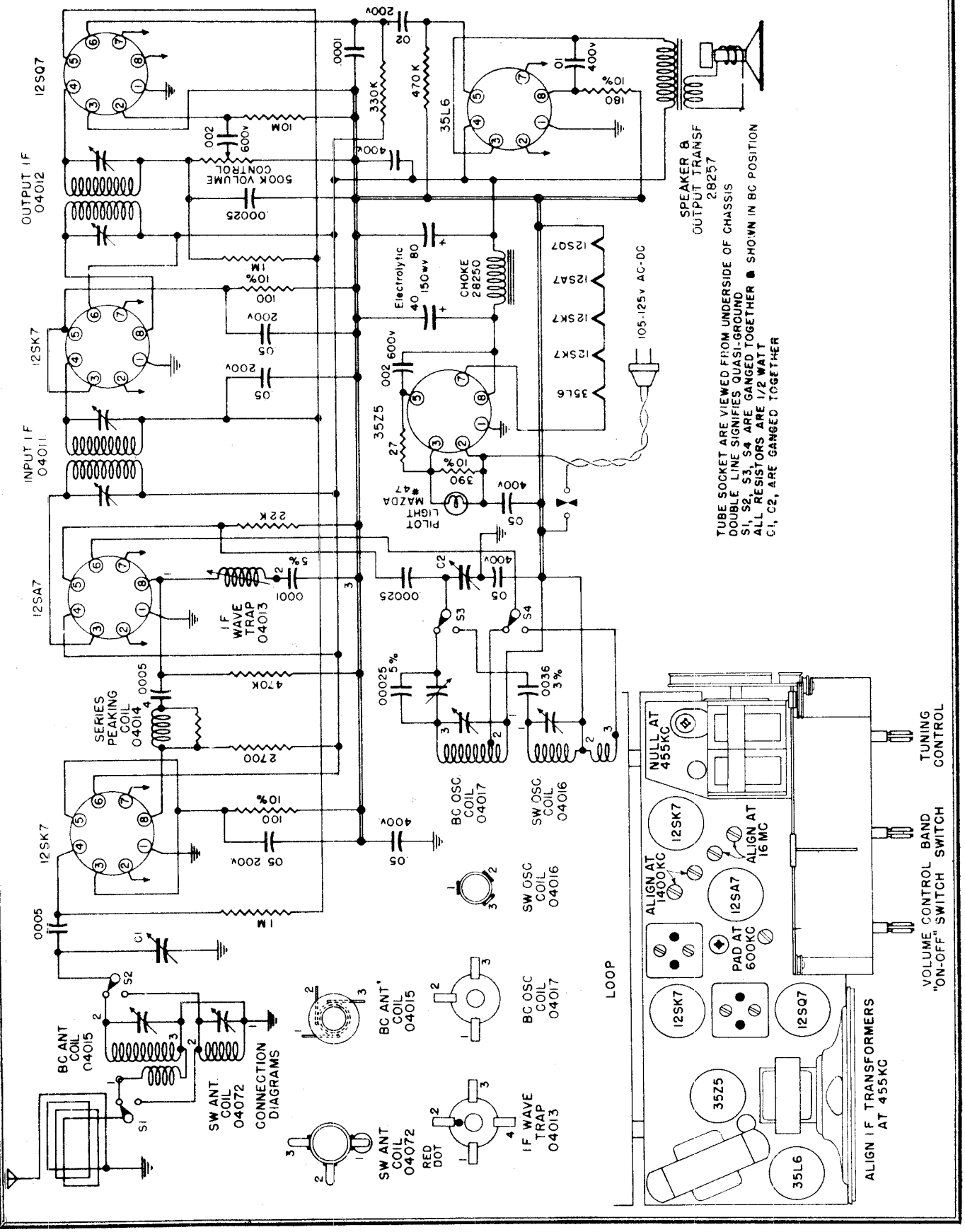
MODELS 9-1084, 9-1086

MEISSNER MFG. DIV.-
MAGUIRE INDUSTRIES INC.



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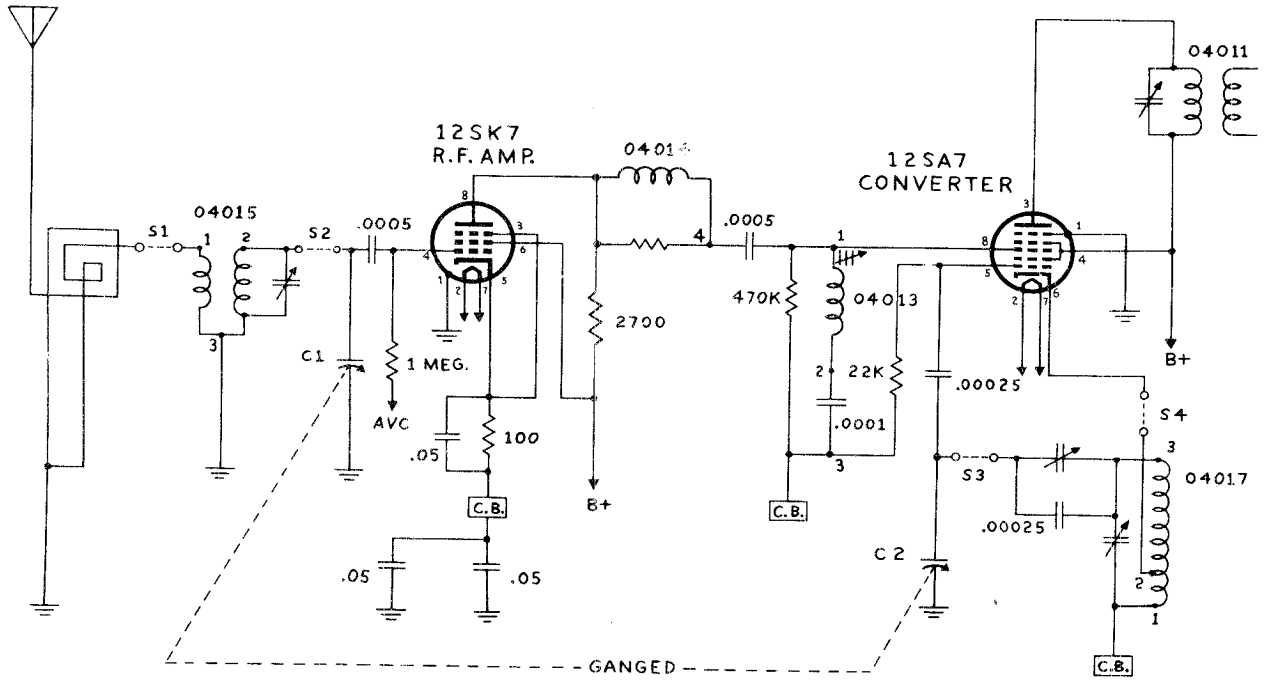
"clarified schematics"

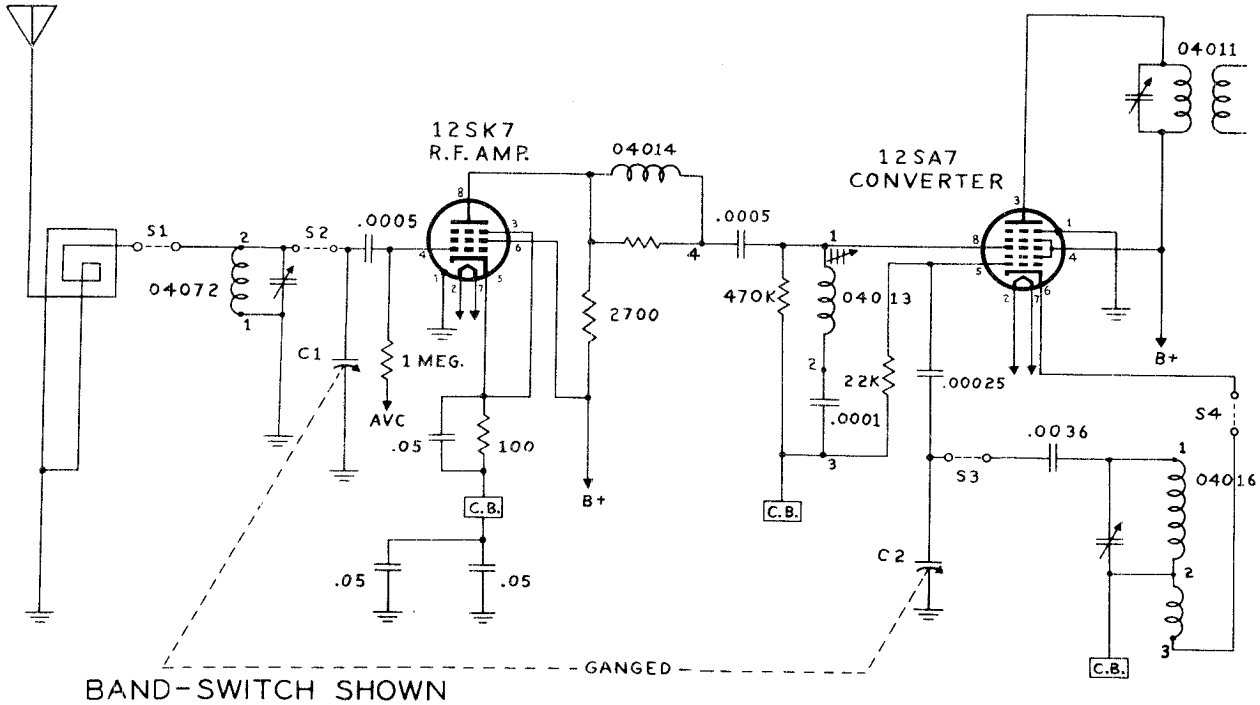
MODELS 9-1084, 9-1086

MEISSNER MFG. DIV.- MAGUIRE INDUSTRIES INC.



BAND-SWITCH SHOWN AT 1ST POSITION. BROADCAST BAND 530-1600 KC.

C.B. - DENOTES COMMON BUS



BAND-SWITCH SHOWN AT 2ND POSITION CLOCKWISE SHORT WAVE BAND 6-18 MC.

C.B. - DENOTES COMMON BUS

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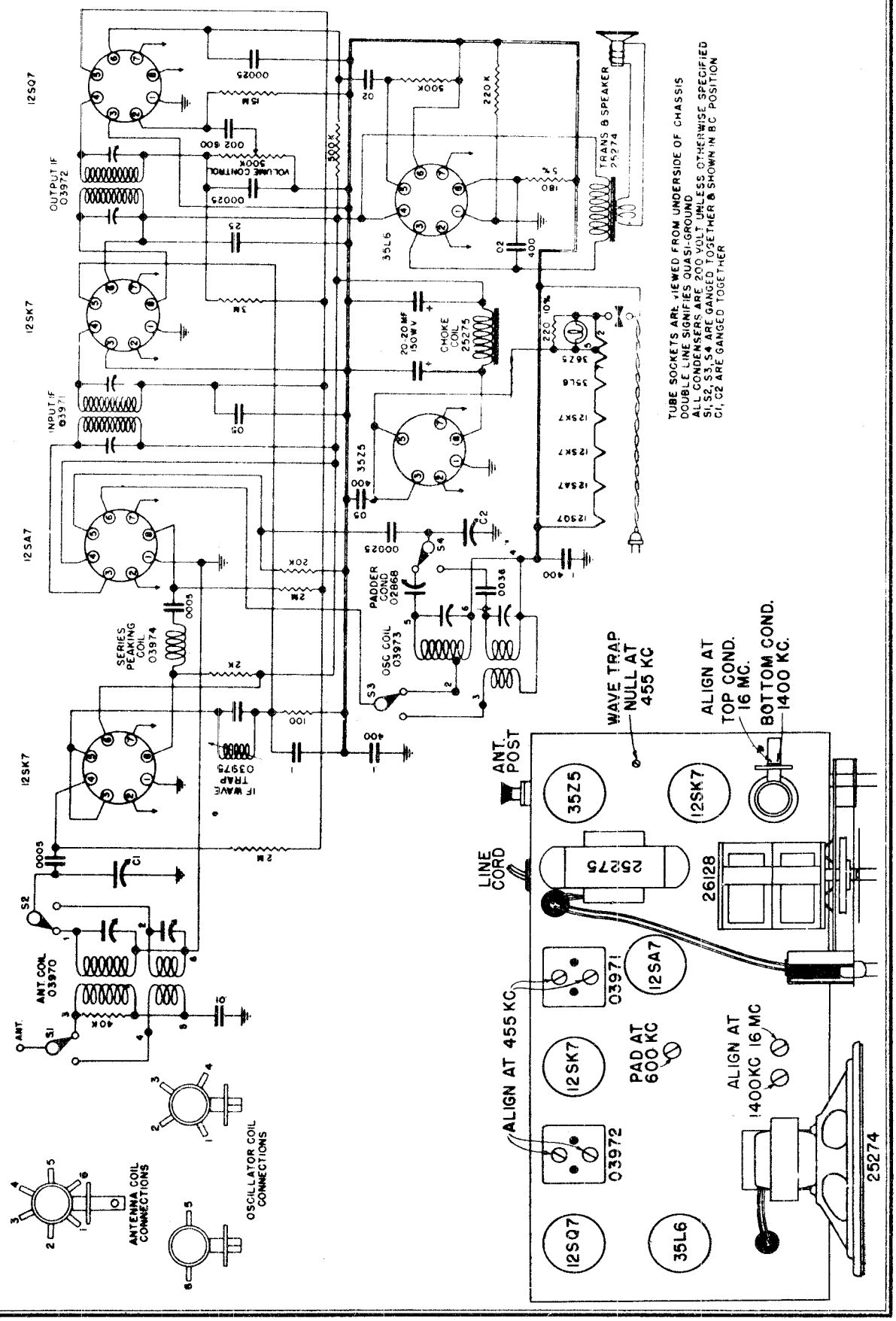
MEISSNER MFG. DIV.-
MAGUIRE INDUSTRIES INC.



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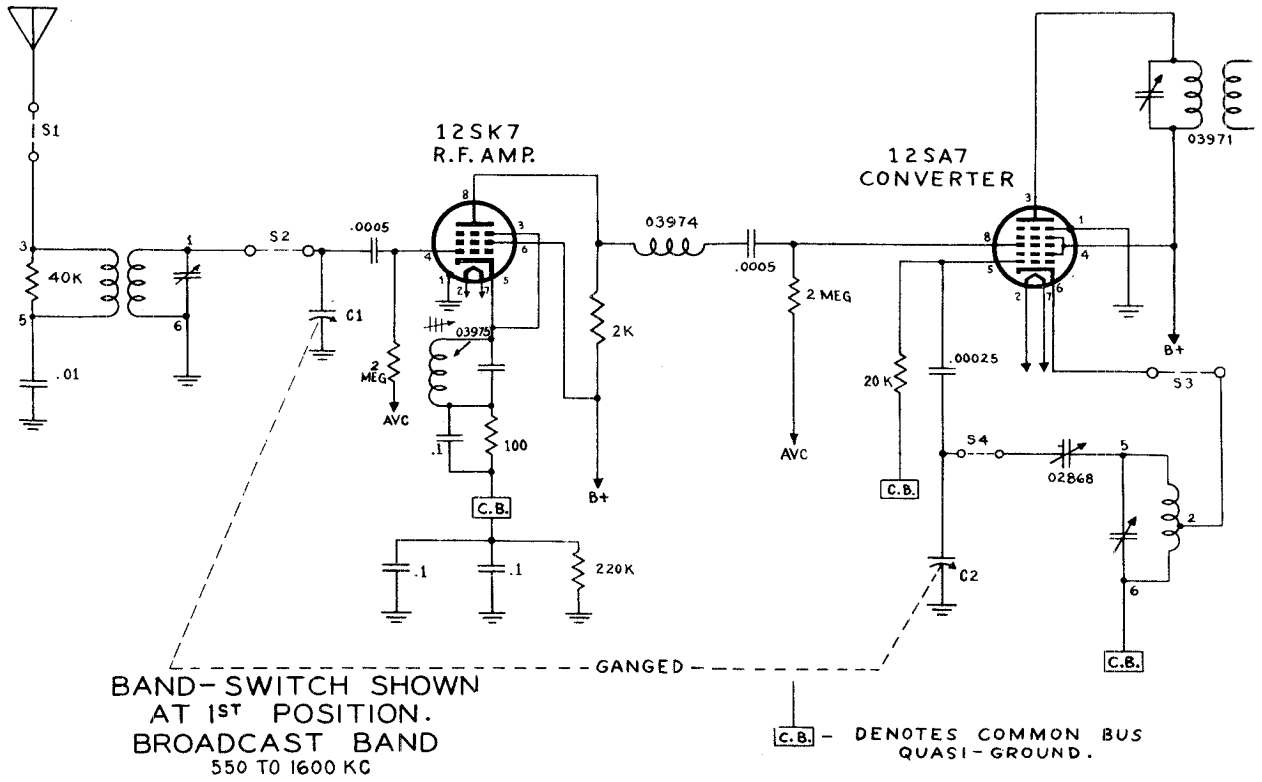
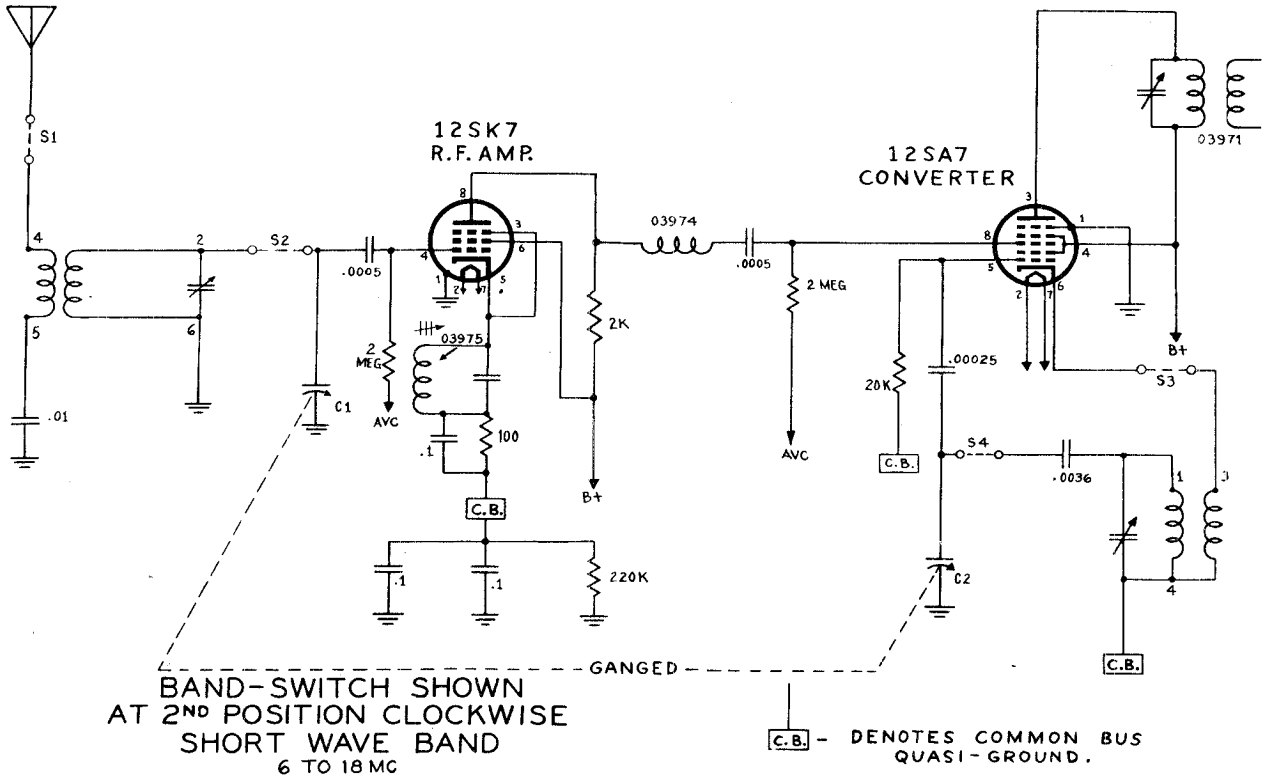
MODEL 9-1085

MEISSNER MFG. DIV.- MAGUIRE INDUSTRIES INC.





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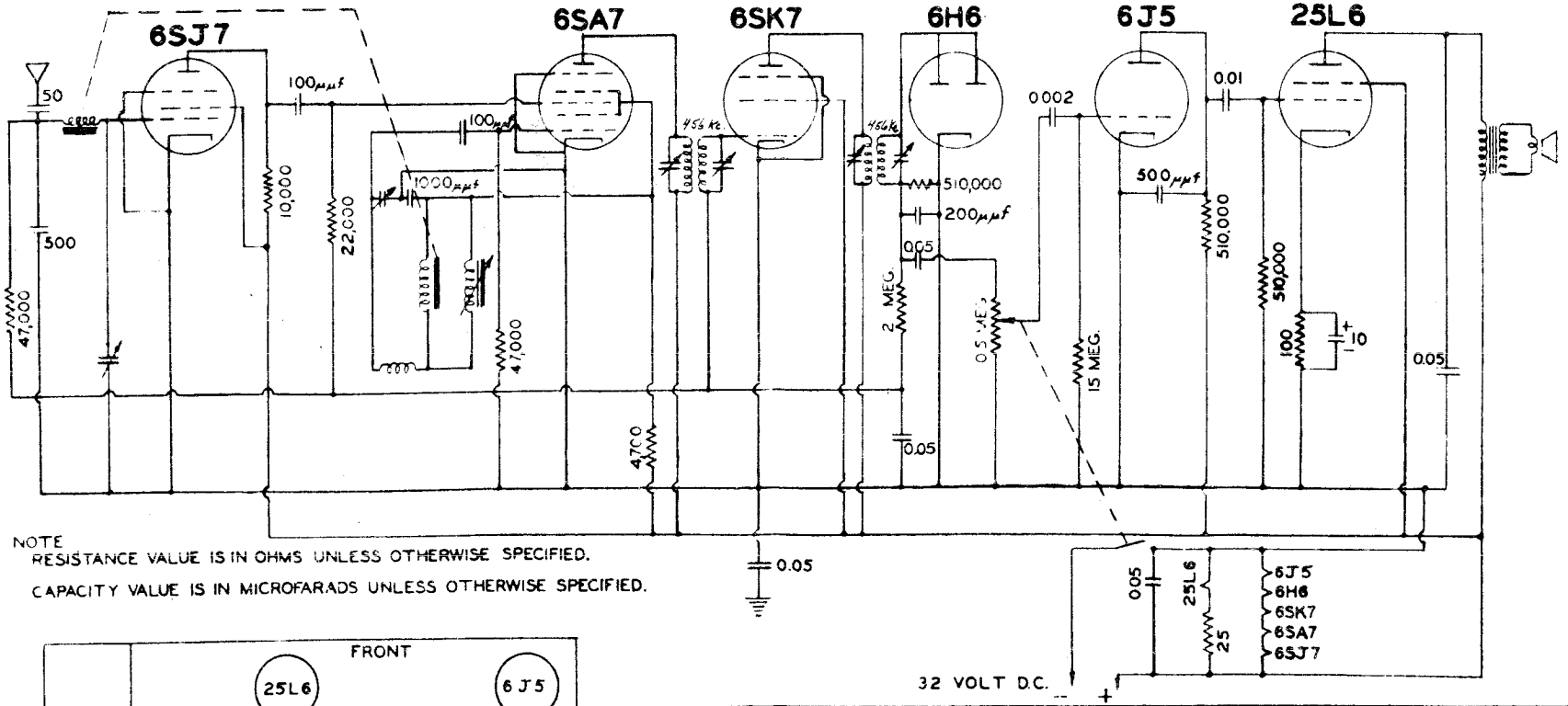
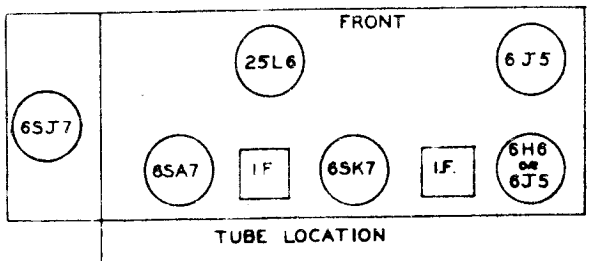




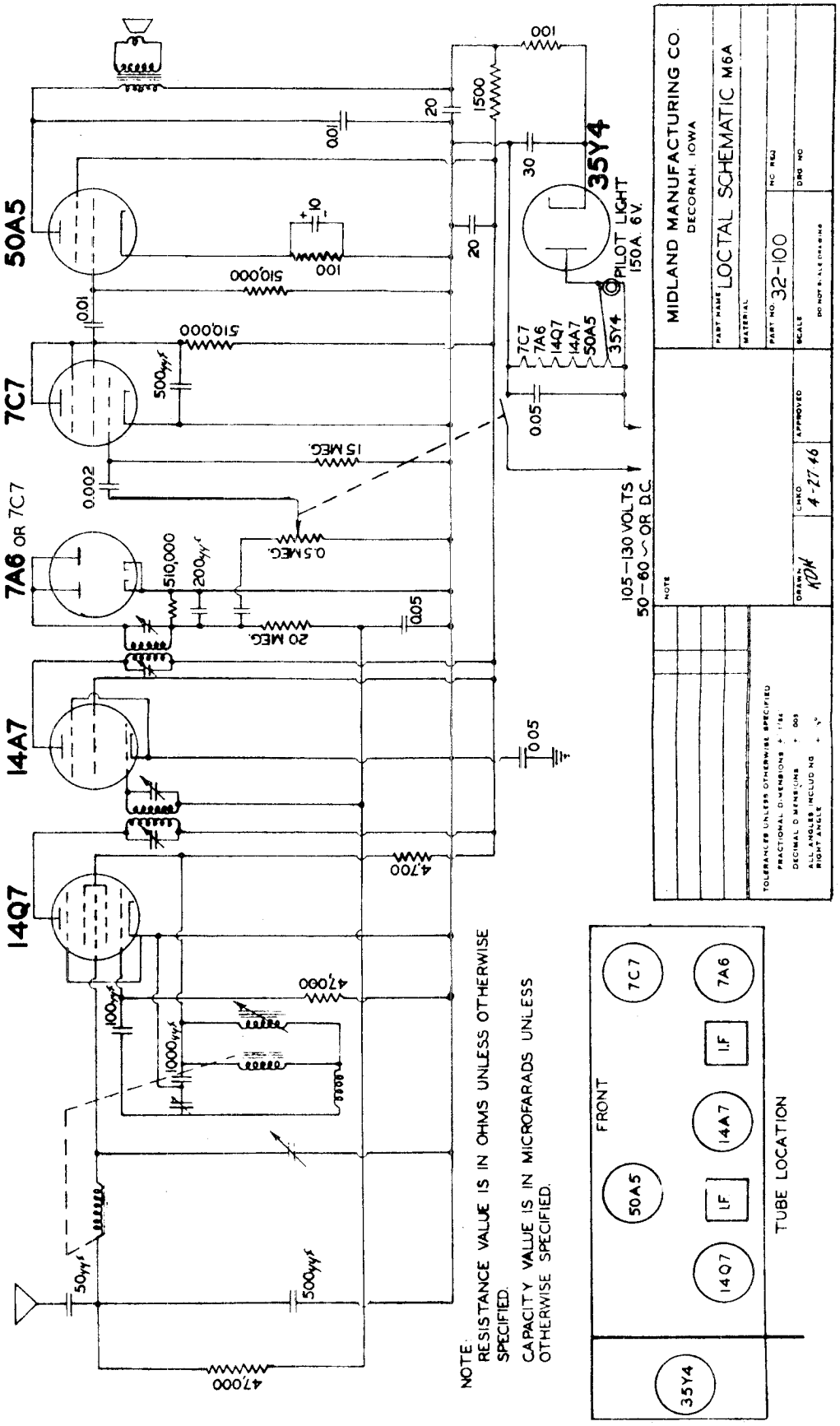
TOLERANCES UNLESS OTHERWISE SPECIFIED FRACTIONAL DIMENSIONS ± 1/64" DECIMAL DIMENSIONS ± .005 ALL ANGLES INCLUDING RIGHT ANGLE ± ½°	NOTE	MIDLAND MANUFACTURING CO. DECORAH, IOWA PART NAME SCHEMATIC B6A MATERIAL PART NO 32-104 NO REQ DRAWN KDW CHKD APPROVED 7-15-40 SCALE DRG NO

IF PEAK 456 KC

Model B6B is identical with B6A, except that a 28-D-7 tube is substituted for the 25L6 audio output tube. The plates and grids of the 28-D-7 are parallel connected.

MODELS M6A, M6D

MIDLAND MFG. CO



IF PEAK 456 KC

Some receivers of this model will be found with 470,000 ohm resistor in the AVC return of the converter grid. This was subsequently changed to 47,000 ohms to reduce hum caused by incorrect polarity of line cord.

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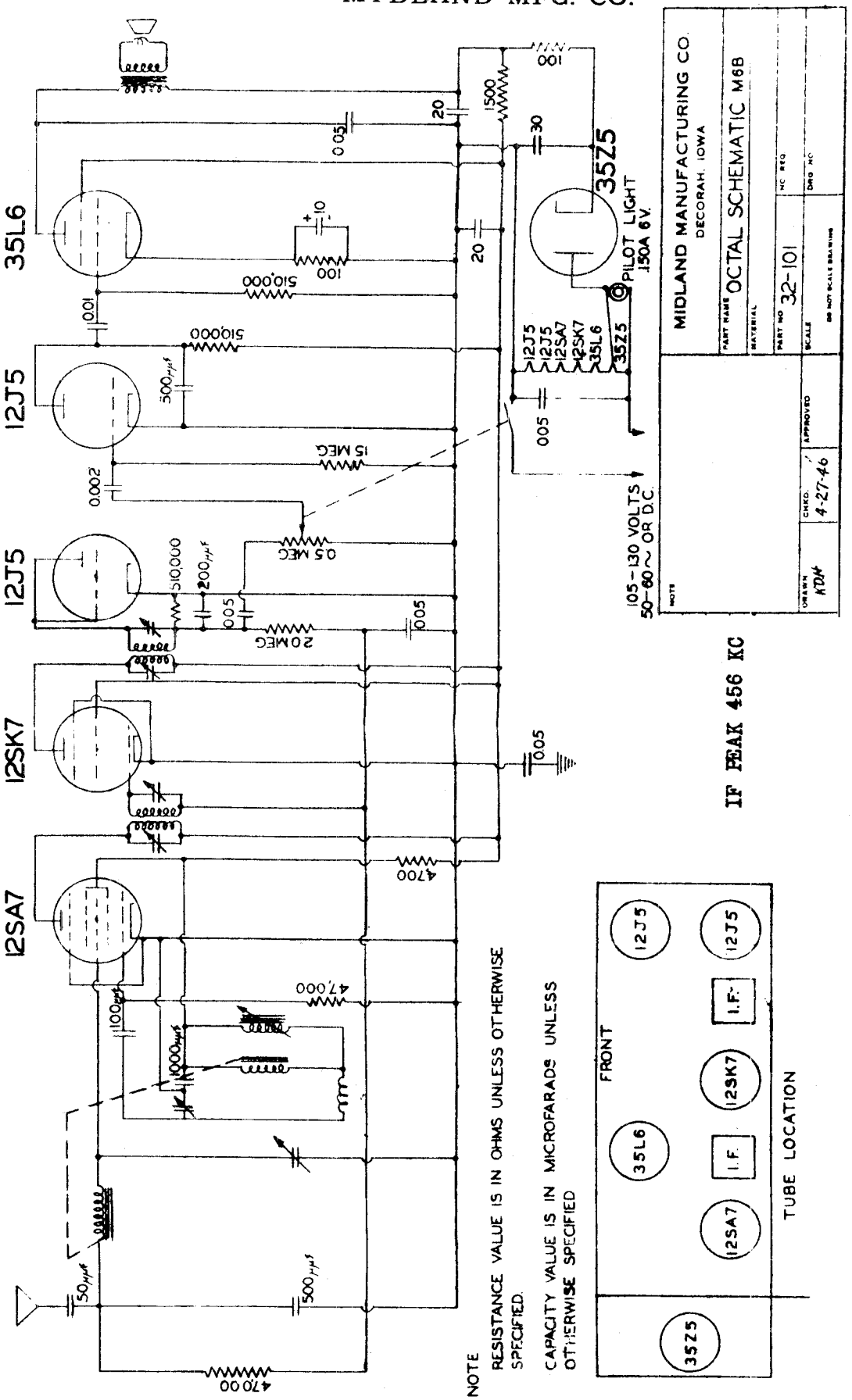
MODELS M6B, M6C

MIDLAND MFG. CO.



The 2nd Detector socket is wired for either a 12J5 or 12H6 tube.
The tuner may be either the one shown in the above schematic or that shown on the following page, P.15-4.

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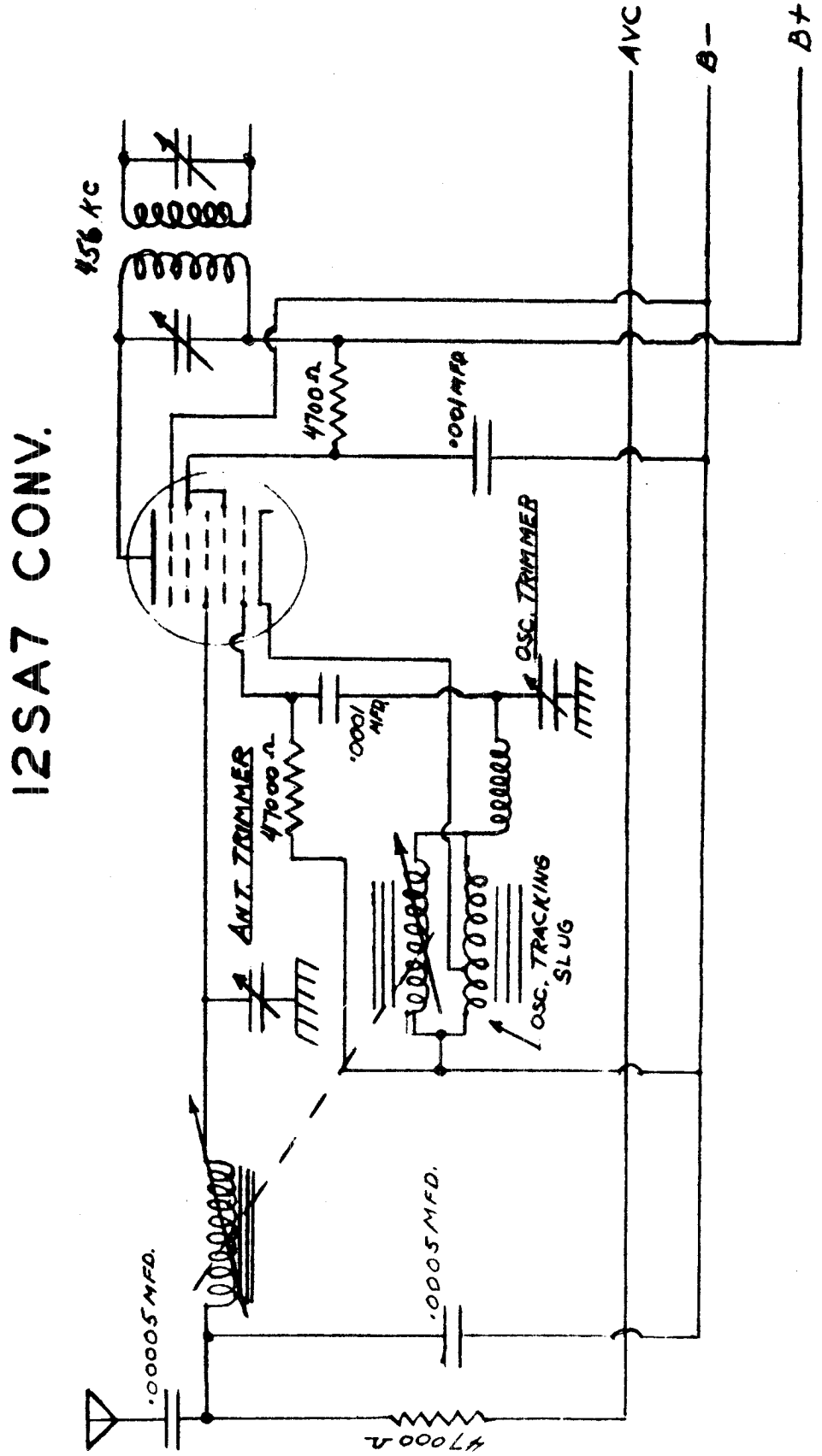
MODELS M6B, M6C

MIDLAND MFG. CO.



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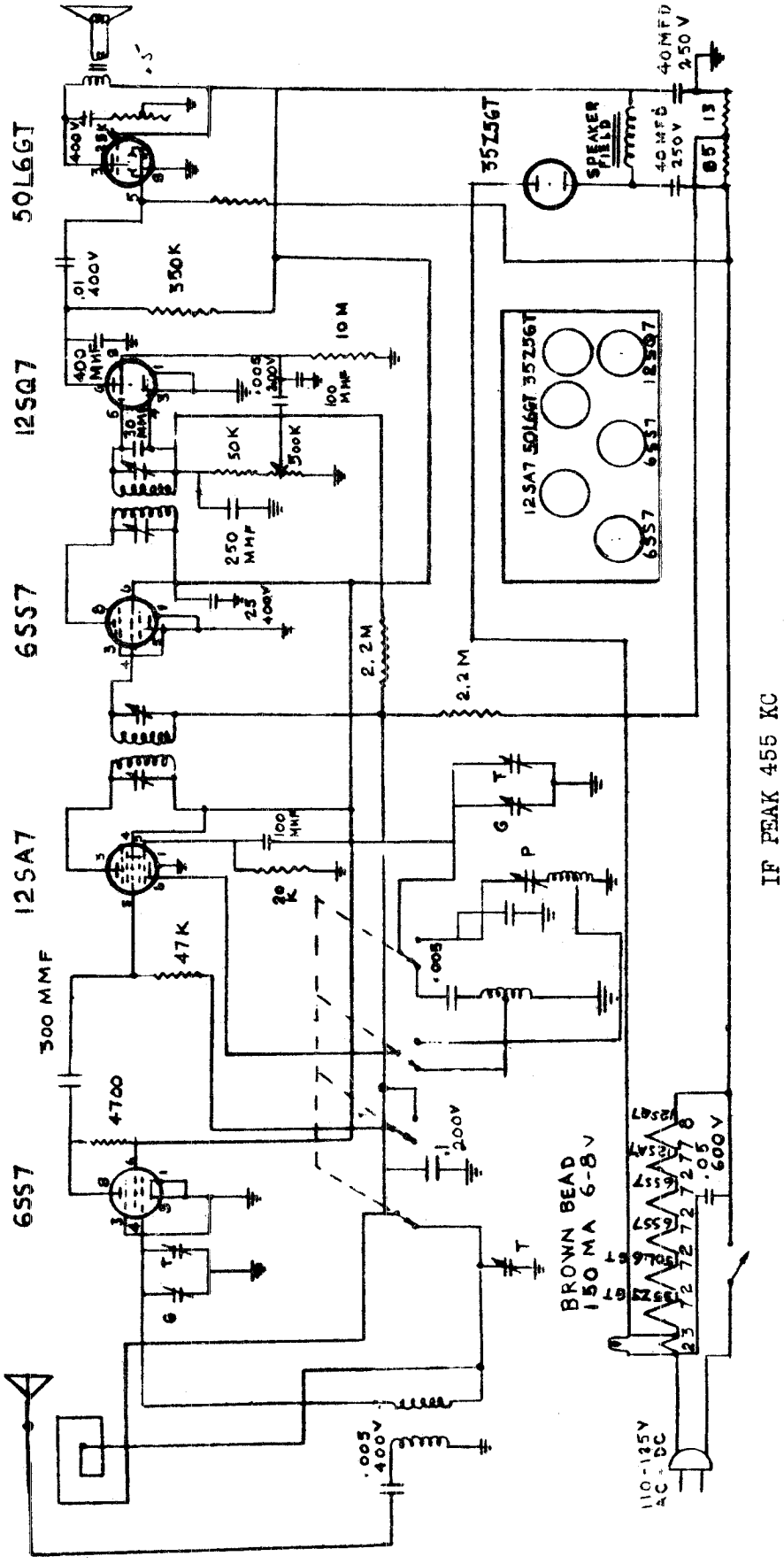
MINERVA CORP. OF AMERICA



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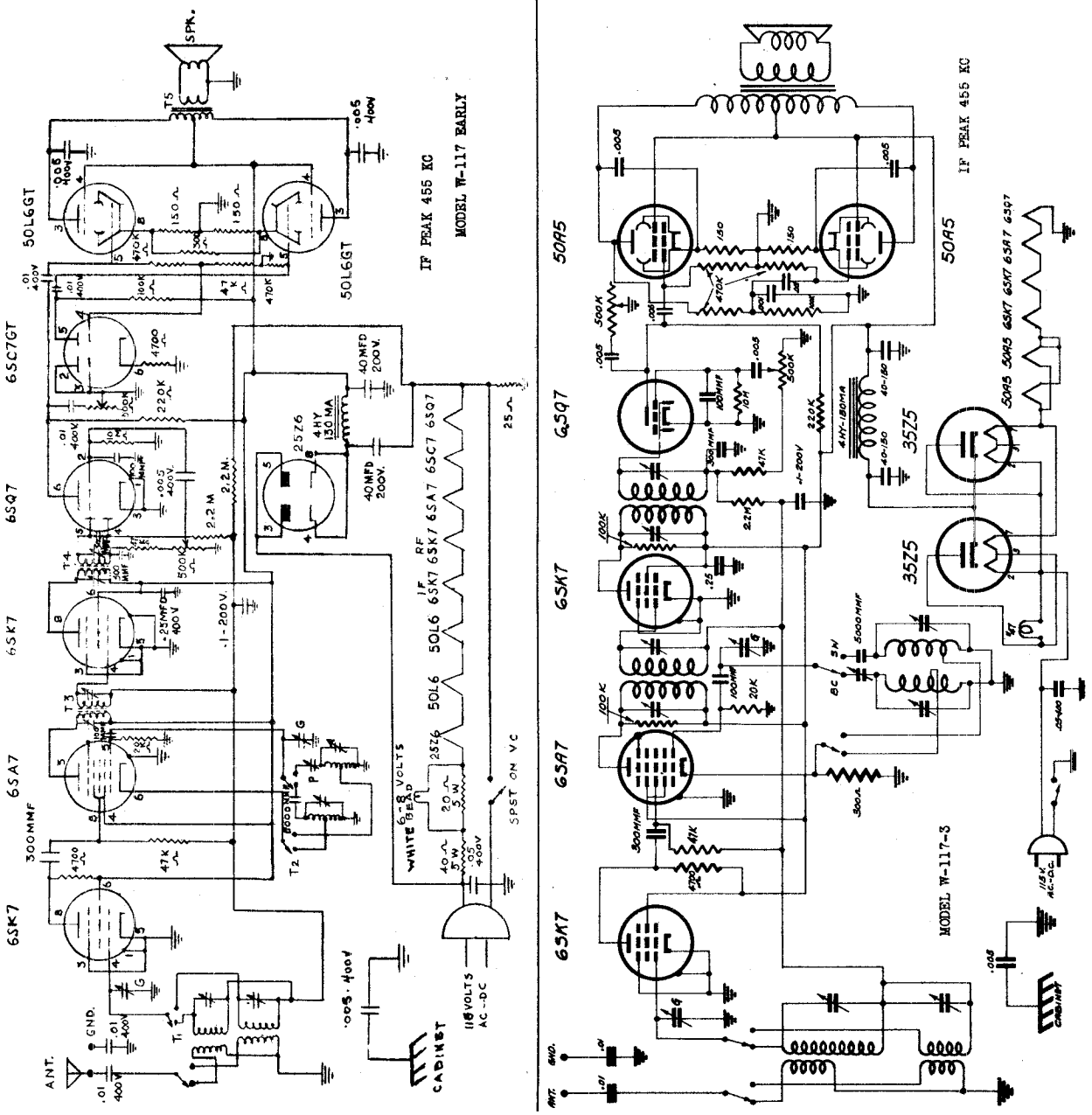
MODEL W117 Early
MODEL W117-3

MINERVA CORP. OF AMERICA



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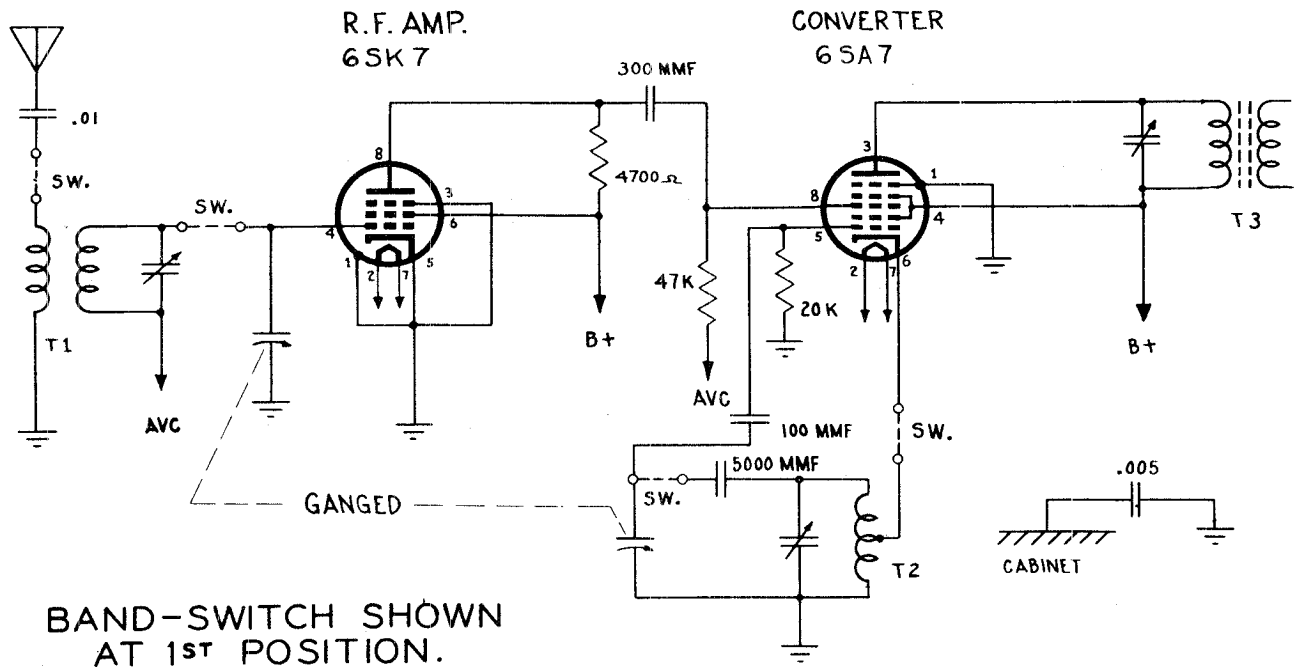
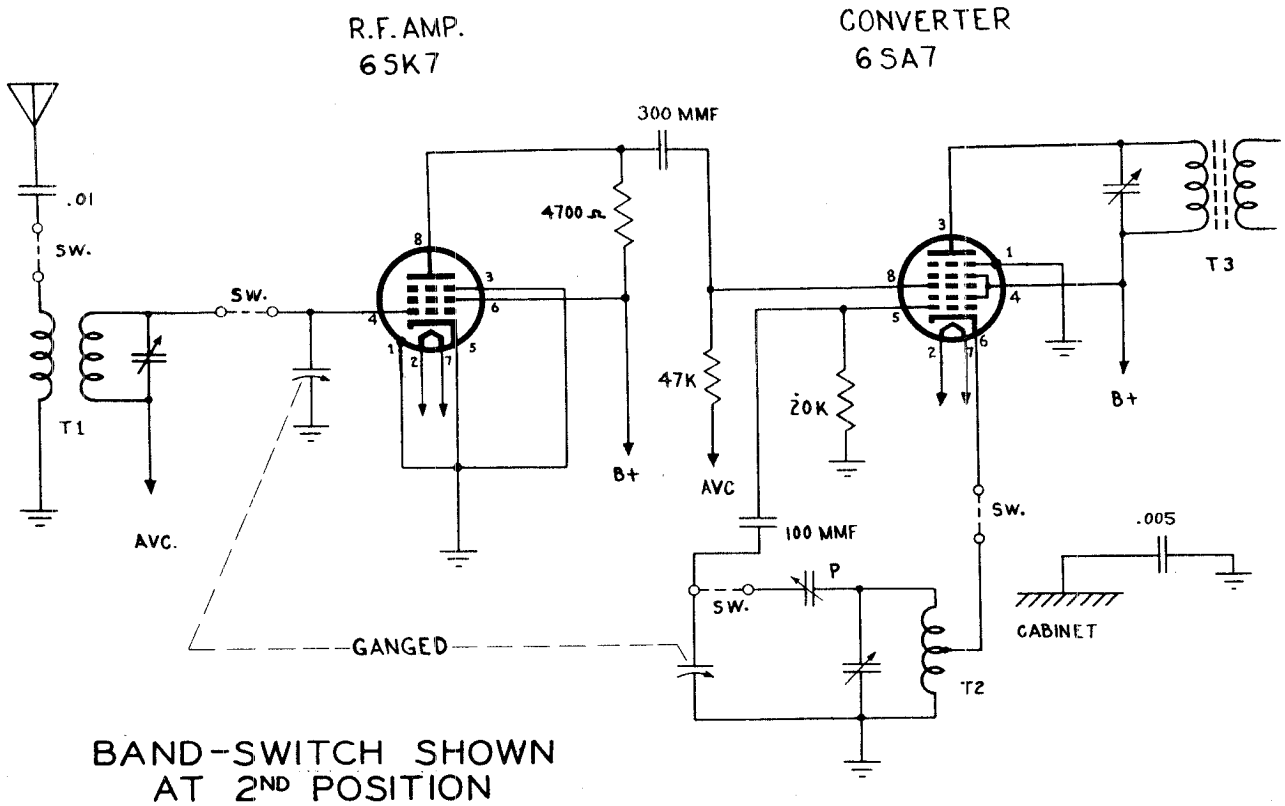
Model W117-3 Clarified schematics, P.15-4

MINERVA CORP. OF AMERICA



BAND-SWITCH SHOWN AT 1ST POSITION.



BAND-SWITCH SHOWN AT 2ND POSITION

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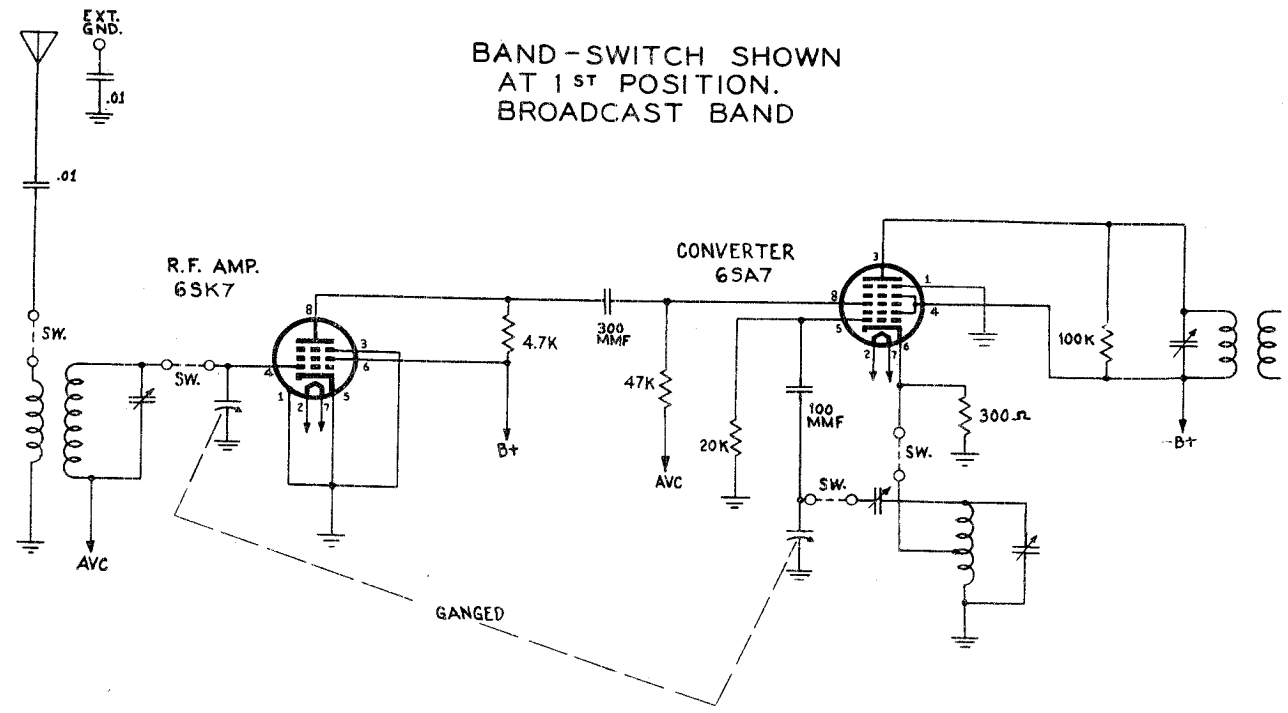
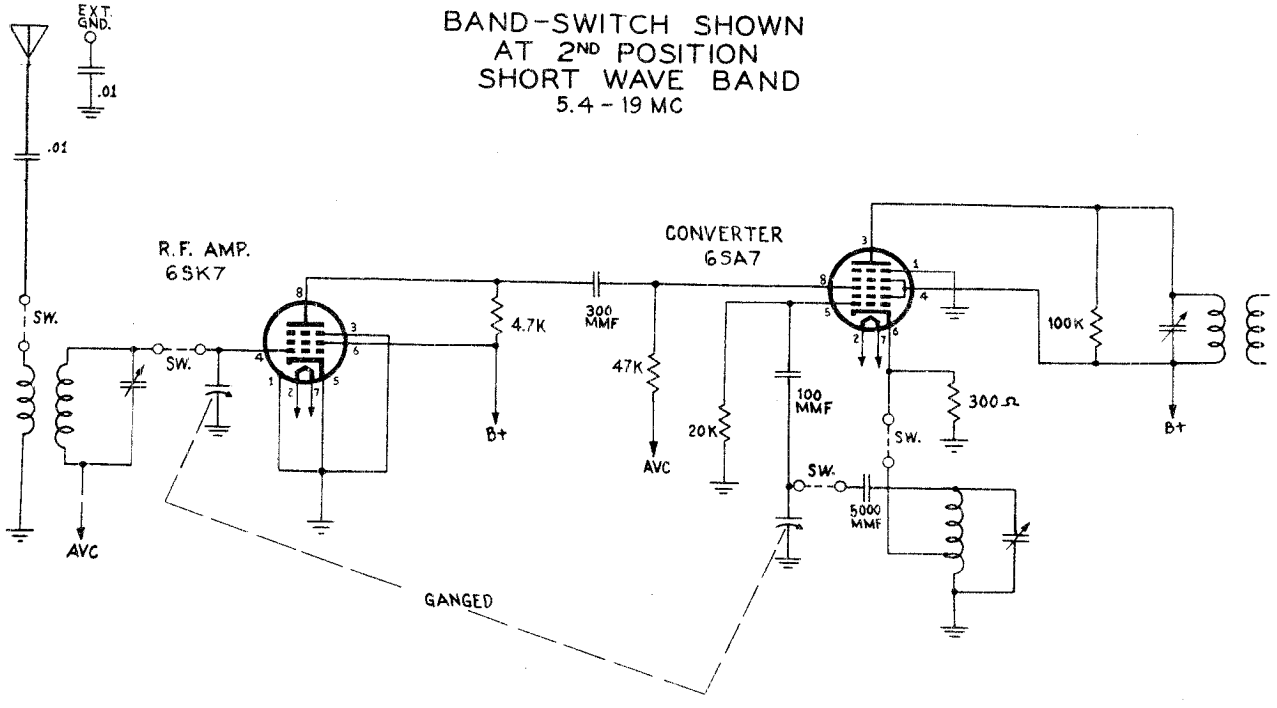
MODEL W117-3

MINERVA CORP. OF AMERICA

BAND-SWITCH SHOWN
AT 1ST POSITION.
BROADCAST BAND



BAND-SWITCH SHOWN
AT 2ND POSITION
SHORT WAVE BAND
5.4 - 19 MC



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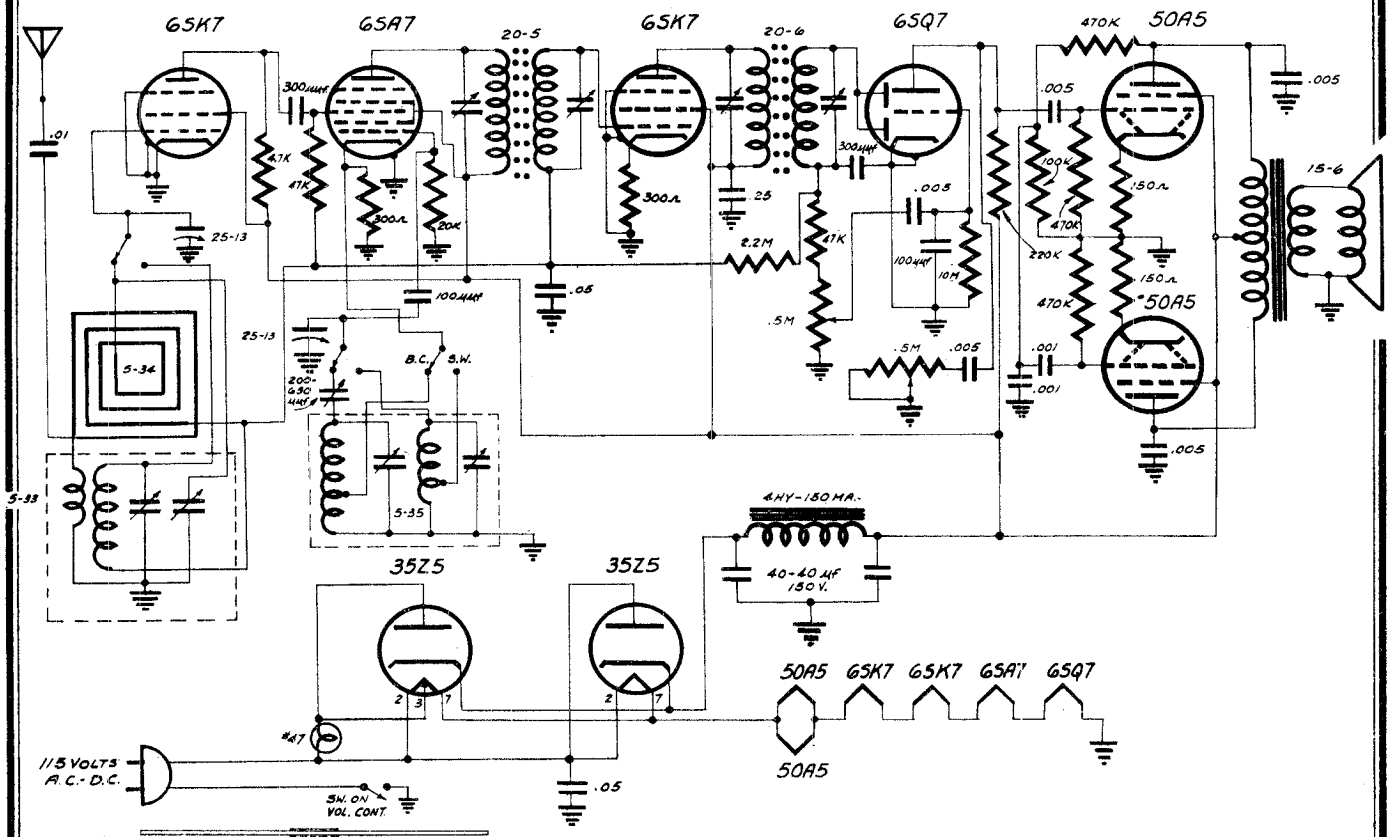
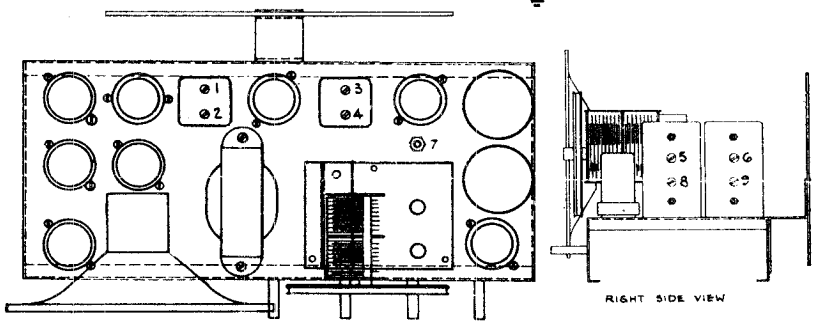
MODEL W117 Late

MINERVA CORP. OF AMERICA





Tube Complement:—

1 — 6SK7 RF Amplifier
1 — 6SA7 Converter
1 — 6SK7 IF Amplifier
1 — 6SQ7 2nd Detector, AVC, 1st Audio
2 — 50A5 Power Amplifiers
2 — 35Z5 Rectifiers

GENERATOR CONNECTION	DUMMY ANT.	FREQ.	ADJ. TRIMMERS	OUTPUT
Stator front section	.1 MFD Cond.	455 KC	1, 2, 3, 4	Max.
Antenna Post	200 MMF Cond.	1500 KC	6, 5	Max.
Antenna Post	200 MMF Cond.	600 KC	7 rockgang	Max.
Antenna Post	200 MMF Cond.	1500 KC	6, 5	Max.
Antenna Post	400 ohm Res.	18 MC	9, 8	Max.

Volume control at maximum. Tone control at treble. Keep signal generator at lowest level consistent with readable output.

Tuning Range :

Standard Broadcast 540-1640 Kcs.

International Shortwave 5.5-19 Mcs.

Power Supply: 105-125 volts direct current or 50-60 cycle alternating current.

Power Consumption:-60 watts.

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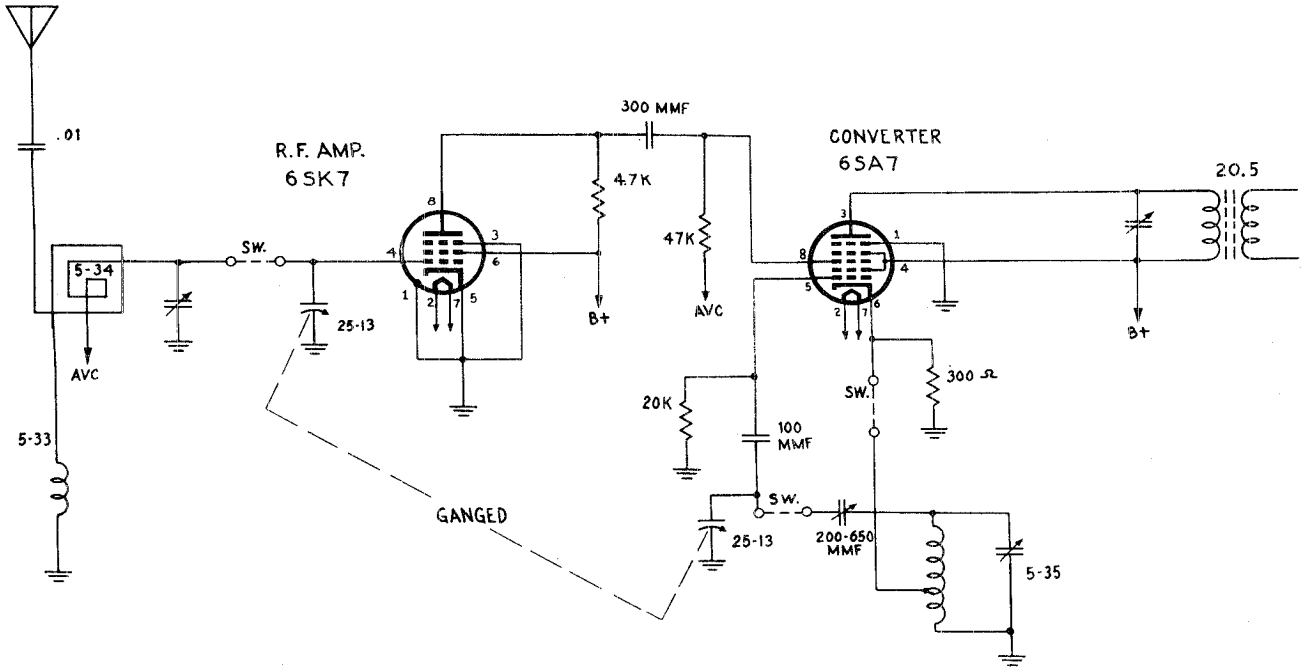
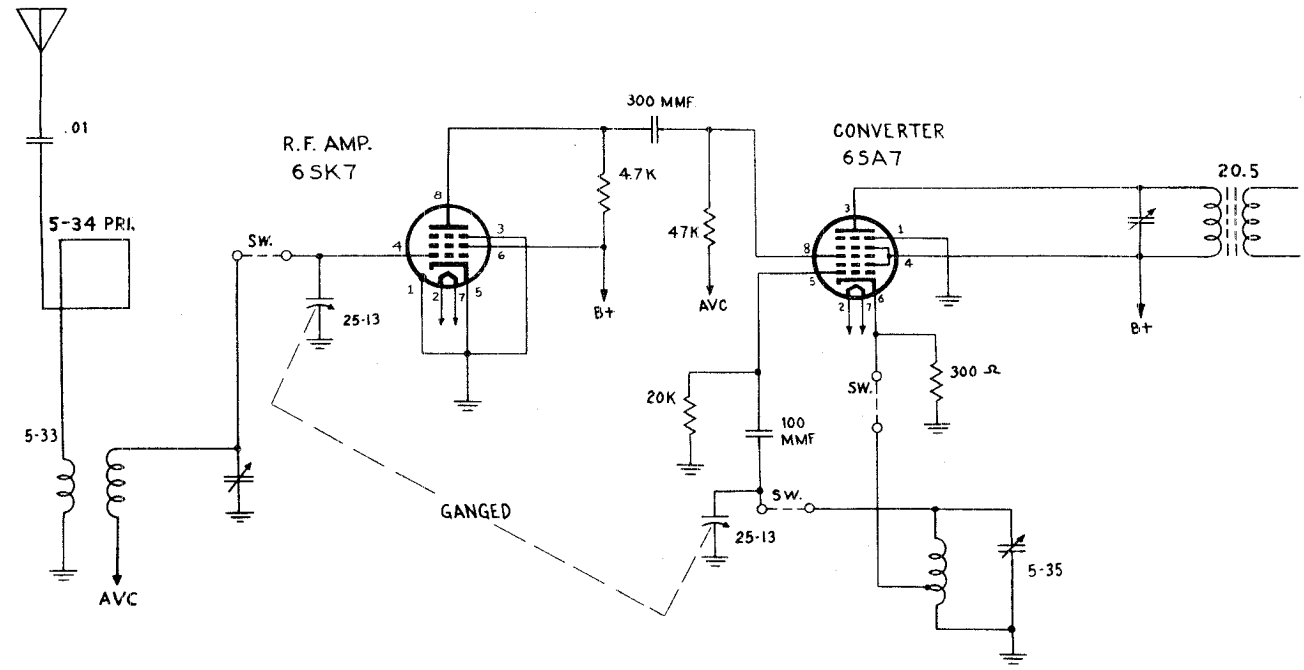
MODEL W117 Late

MINERVA CORP. OF AMERICA



BAND-SWITCH SHOWN
AT 1ST POSITION.
BROADCAST BAND
540-1640 KC.



BAND-SWITCH SHOWN
AT 2ND POSITION.
SHORT WAVE BAND
5.5-19 MC

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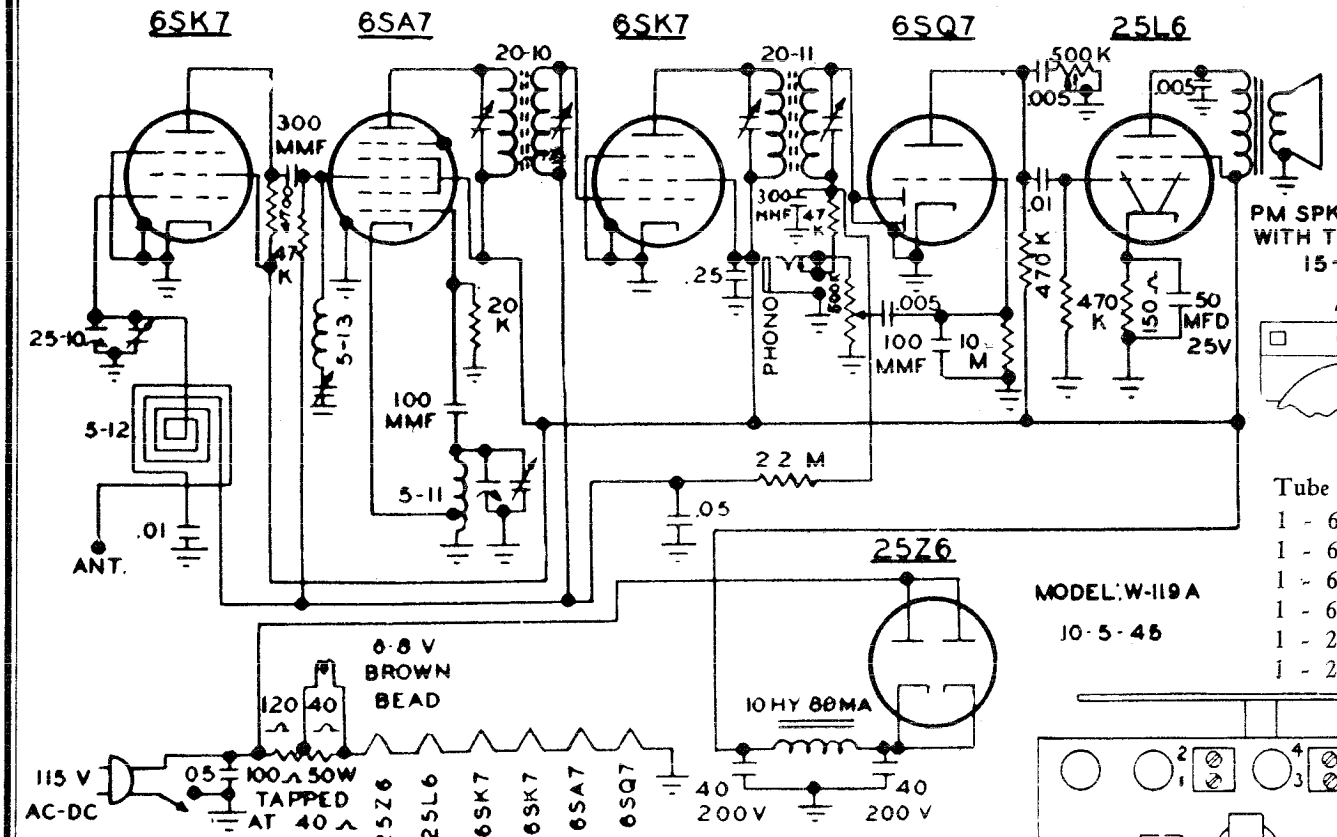
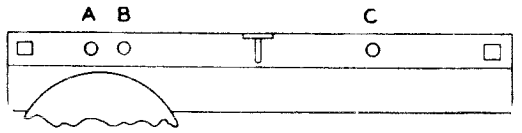


MODEL W-119A
10-5-45

ALL RESISTORS 1/2 W
ALL CONDENSERS 400 V UNLESS OTHERWISE SPEC.
K = 1000 Ω
M = 1,000,000 Ω

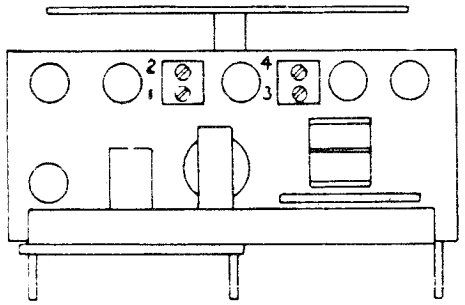
PM SPKR. WITH TRANS. 15-8

Pointer Settings:—
Gang Closed—Pointer Covers A
1400 KC —Pointer Covers C
600 KC —Pointer Covers B

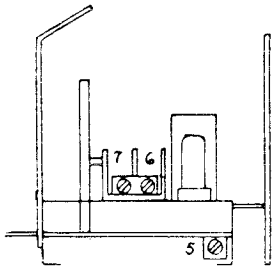


DIAL PLATE

Tube Complement:—
1 - 6SK7 RF Amplifier
1 - 6SA7 Converter
1 - 6SK7 IF Amplifier
1 - 6SQ7 2nd Detector, AVC, 1st Audio
1 - 25L6 Power Amplifier
1 - 25Z6 Rectifier



TOP VIEW

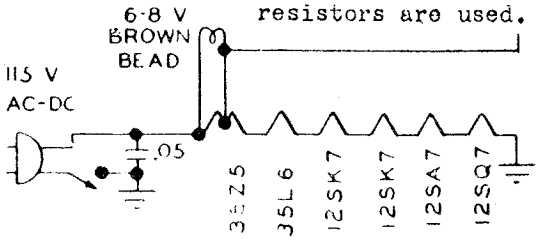


RIGHT SIDE VIEW

Power Supply—105 - 125 volts direct current or 50 - 60 cycle alternating current.

Tuning Range—Standard Broadcast 550 - 1600 KCS.

MODEL W-119 is the same as MODEL W-119A except that the following tubes and resistors are used.



Tube Complement:—
1 - 12SK7 RF Amplifier
1 - 12SA7 Converter
1 - 12SK7 IF Amplifier
1 - 12SQ7 2nd Detector, AVC, 1st Audio
1 - 35L6 Power Amplifier
1 - 35Z5 Rectifier

Generator Connection	Dummy Ant.	Freq.	Adj. Trimmers	Output
Stator front section gang open	Cond. .1 MFD	455 KC	1, 2, 3, 4	Max.
Antenna Post	200 MMF Cond.	455 KC	5	Min.
Antenna Post	200 MMF Cond.	1400 KC	6, 7	Max.

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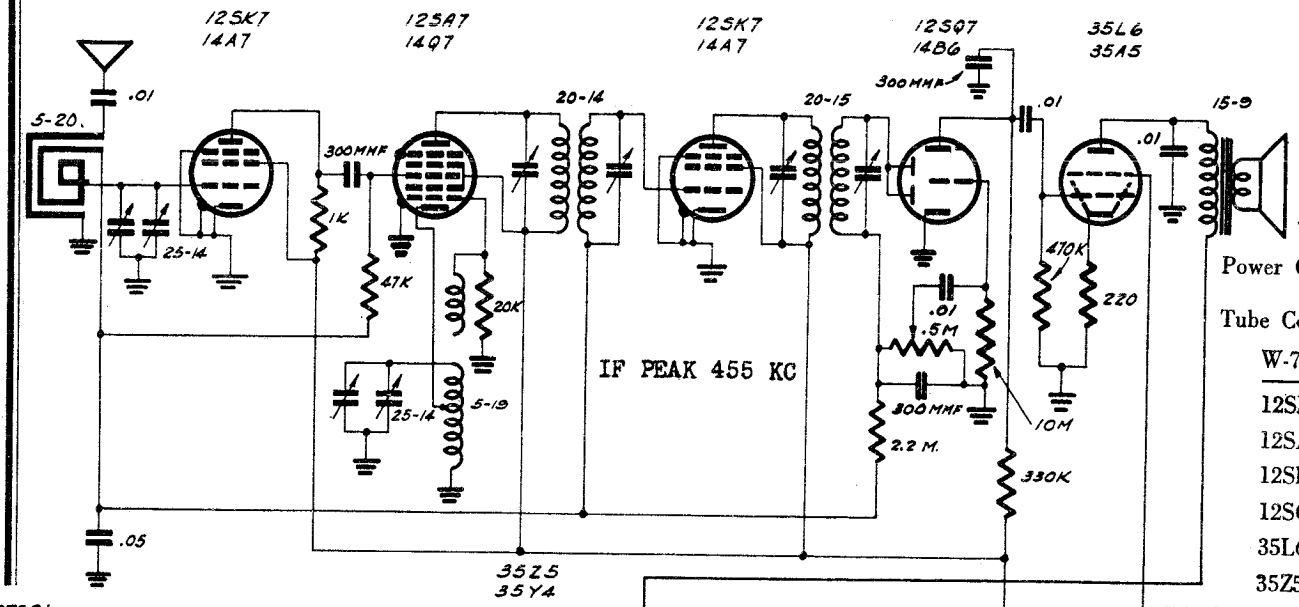
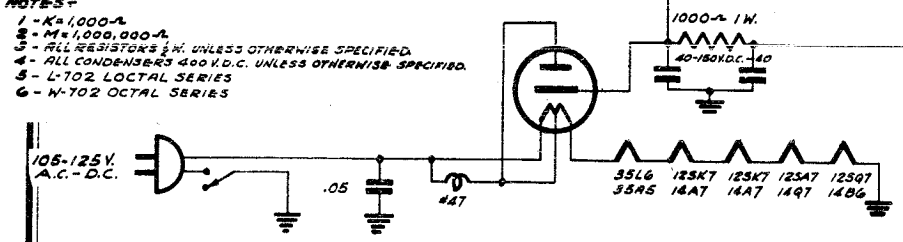


NOTES:
1 - K = 1,000 Ω
2 - M = 1,000,000 Ω
3 - ALL RESISTORS ½ W. UNLESS OTHERWISE SPECIFIED.
4 - ALL CONDENSERS 400 V.D.C. UNLESS OTHERWISE SPECIFIED.
5 - L-702 LOCTAL SERIES
6 - W-702 OCTAL SERIES



MINERVA CORP. OF AMERICA	
SCHEMATIC DIAGRAM	
MATERIAL	
PART NO.	FINISH
TOLERANCE	SCALE L-702
DRAWN BY [illegible]	MODEL: W-702
DATE May 8th 1946	No: 658
CHECKED BY [illegible]	

Power Consumption—30 watts.

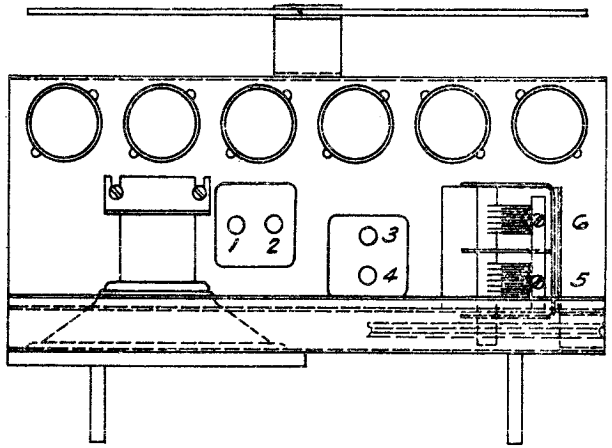
Tube Complements:—

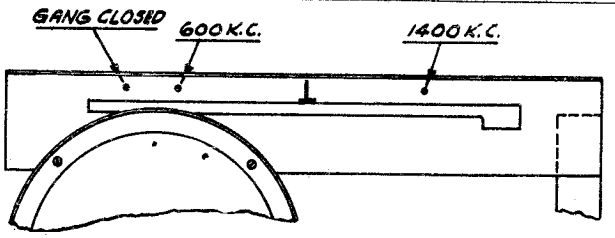
W-702	L-702	*Function*
12SK7	14A7	RF Amplifier
12SA7	14Q7	Converter
12SK7	14A7	IF Amplifier
12SQ7	14B6	2nd Det - AVC - 1st Audio
35L6	35A5	Power Amplifier
35Z5	35Y4	Rectifier

ALIGNMENT NOTES

The screws for adjusting the IF and RF Amplifiers, together with the frequencies at which adjusting is to be made, are shown in diagrams below

GENERATOR CONNECTION	DUMMY ANT.	FREQ.	ADJ. TRIMMERS	OUTPUT
Stator large section gang open	.1 MFD Cond.	455 KC	1, 2, 3, 4	Max.
Antenna Lead	200 MMF Cond.	1400 KC	5, 6	Max.





Pointer Settings:—As indicated above.

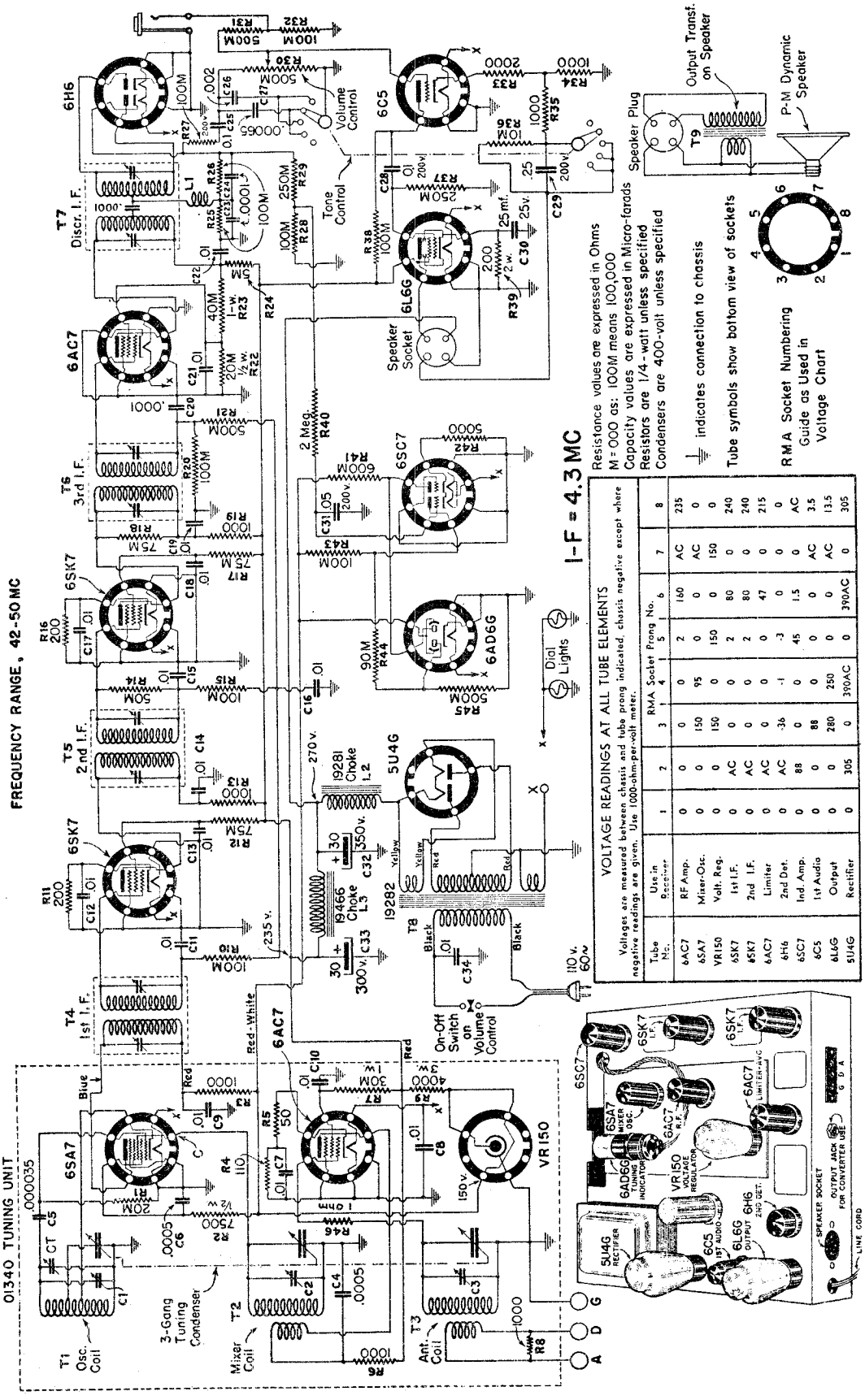
MONTGOMERY WARD

04MF-1199A

FREQUENCY-MODULATION RECEIVER

FREQUENCY RANGE, 42-50 MC

I-F = 4.3 MC



VOLTAGE READINGS AT ALL TUBE ELEMENTS

Voltages are measured between chassis and tube prong indicated, chassis negative except where negative readings are given. Use 1000-ohm-per-volt meter.

Tube No.	Use in Receiver	1	2	RMA Socket Prong No. 3	4	5	6	7	8
6AC7	RF Amp.	0	0	0	0	2	160	AC	235
6SA7	Mixer-Osc.	0	0	150	95	0	0	AC	0
VR150	Volt. Reg.	0	0	150	0	150	0	150	0
6SK7	1st I.F.	0	AC	0	0	2	80	0	240
6SK7	2nd I.F.	0	AC	0	0	2	80	0	240
6AC7	Limiter	0	AC	0	0	0	47	0	215
6H6	2nd Det.	0	AC	-36	-1	-3	0	0	0
6SC7	Ind. Amp.	0	88	0	0	45	1.5	0	AC
6C5	1st Audio	0	0	88	0	0	0	AC	3.5
6L6G	Output	0	0	280	250	0	0	AC	13.5
5U4G	Rectifier	0	305	0	390AC	0	390AC	0	305

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REPLACEMENT PARTS LIST

MISCELLANEOUS

Part No.	Description	Selling Price
M25-8437	Molded Bakelite Octal Tube Socket (8-prong)	$0.10
M25-8209	Ceramic Octal Tube Socket (8-prong)	.30
M19235	Bakelite Speaker Socket (5-prong)	.06
M19588	Tuning Eye Socket Assembly with Cable	.53
	DIAL AND KNOBS	
M19581	Linear Dial Mechanism, Complete	1.50
M19586	Translucent Dial Scale	.60
M19262	Dial Lamp, 6 to 8 volt, No. 51	.10
	Dial Lamp Socket and Bracket	.15
M19591	Tone Control Knob, Bakelite	.06
M19594	Volume Control Knob, Bakelite	.06
M19592	Tuning Control Knob, Bakelite	.06
M19266	Escutcheon for Dial Scale	.74
M19590	Escutcheon for Tuning Eye	.15
	GENERAL	
M01340	42-50 MC Tuning Unit, Complete Assembly	9.50
M19587	8" P-M Dynamic Speaker with Cord and Plug	5.45
M19580	Tone Control Switch, 2-pole, 5-position	.48
M19470	Single Circuit Output Jack	.35
M12434	Line Cord and Plug Assembly	.26
M16738	A-D-G Antenna Terminal Strip	.04
M25-5732	Terminal Strip, 1 Insulated Lug, 1 Mounting Foot	.03
M25-5731	Terminal Strip, 2 Insulated Lugs, 1 Mounting Foot	.04
M25-6715	Terminal Strip, 3 Insulated Lugs, 1 Mounting Foot	.05
M25-6716	Terminal Strip, 4 Insulated Lugs, 1 Mounting Foot	.06

TRANSFORMERS AND COILS

Part No.	Code	Description	Selling Price
M01342	T1	Antenna Coil Assembly with Trimmer	$0.50
M01342	T2	Mixer Coil Assembly with Trimmer	.50
M01346	T3	Oscillator Coil Assembly	1.06
M01348	T4	1st I.F. Transformer	.53
M01348	T5	2nd I.F. Transformer	.53
M01348	T6	3rd I.F. Transformer	.53
M01350	T7	Discriminator I.F. Transformer	3.30
M19282	T8	Power Transformer, 117-volt, 60-cycle	2.59
M19-5582	L1	R. F. Choke	.40
M19281	L2	1st Filter Choke	.38
M19466	L3	2nd Filter Choke	.36

CONDENSERS

TUBULAR

Part No.	Code	Capacitance	Voltage	Selling Price
M14110	C7,C8	.01 mfd.	400	$0.06
M14110	C9,C10	.01 mfd.	400	.06
M14110	C11,C12	.01 mfd.	400	.06
M14110	C13,C14	.01 mfd.	400	.06
M14110	C15,C16	.01 mfd.	400	.06
M14110	C17,C18	.01 mfd.	400	.06
M14110	C19,C21	.01 mfd.	400	.06
M14110	C22,C34	.01 mfd.	400	.06
M15142	C25,C28	0.1 mfd.	200	.08
M16190	C29	.25 mfd.	200	.10
M14160	G31	.05 mfd.	200	.06
		ELECTROLYTIC		
M16184	C30	25 mfd.	50	.21
M17189	C32,C33	30 mfd.	300-350	.84
		MOLDED		
M14139	C4,C6	.0005 mfd.		.10
M15132	C5	35 mmfd.		.10
M14101	C20,C23,C24	.0001 mfd.		.06
M14152	C26	.002 mfd.		.12
M15137	C27	650 mmfd.		.12
		TRIMMER		
M17171	C1	5-Plate	Ceramic	.37
M22-5255	C2,C3	3-30 mmfd.	Ceramic	.10
		SPECIAL		
M17183	CT	26 mmfd. Temperature Comp.		.22
M17190		3-gang Tuning Condenser		2.38

RESISTORS

CARBON

Part No.	Code	Resistance	Wattage	Selling Price
M14169	R1	20,000 Ohm	0.25	$0.06
M16155	R2	7,500 Ohm	0.50	.08
M14191	R3,R6,R8	1,000 Ohm	0.25	.06
M17152	R4	110 Ohm	0.25	.08
M16143	R5	50 Ohm	0.25	.08
M15189	R7	30,000 Ohm	1.00	.12
M17180	R9	4,000 Ohm	3.00	.30
M17184	R10,R15	100,000 Ohm	0.25	.08
M17184	R20,R25	100,000 Ohm	0.25	.08
M17184	R26,R27	100,000 Ohm	0.25	.08
M17184	R28,R32	100,000 Ohm	0.25	.08
M17184	R38,R43	100,000 Ohm	0.25	.08
M15136	R11,R16	200 Ohm	0.25	.08
M14195	R12,R17,R18	75,000 Ohm	0.25	.06
M14191	R13,R19	1,000 Ohm	0.25	.06
M14191	R34,R35	1,000 Ohm	0.25	.06
M14151	R14	50,000 Ohm	0.25	.06
M14155	R21,R31,R45	500,000 Ohm	0.25	.06
M16132	R22	20,000 Ohm	0.50	.08
M15188	R23	40,000 Ohm	1.00	.10
M14179	R24,R42	5,000 Ohm	0.25	.06
M14150	R29,R37	250,000 Ohm	0.25	.06
M16117	R33	2,000 Ohm	0.25	.06
M14143	R36	10,000 Ohm	0.25	.06
M16115	R39	200 Ohm	3.00	.20
M17109	R40	2 Megohm	0.25	.06
M17133	R41	600,000 Ohm	0.50	.08
M17185	R44	90,000 Ohm	0.25	.06
M17153	R46	1 Ohm	0.50	.08
		VARIABLE		
M19579	R30	500,000 Ohm	With Switch	.48

Prices Subject to Change Without Notice.

SPECIFICATIONS

Power Consumption - 110 watts (At 117 volts 60 cycles)

Power Output - - - - - - - - 6 Watts Undistorted

Selectivity - - - - 170 KC Broad at 2 times Signal

Intermediate Frequency - - - - - - - 4.3 Megacycles

Speaker - - - - - - - - - - 8" P-M Dynamic

Tuning Frequency Range - - - - 42 to 50 Megacycles

Sensitivity - - - - - - - - 10 Microvolts Average

ALIGNMENT

If distortion, weak reception or other type of unsatisfactory performance is thought to be due to improper alignment, do not attempt to align the I-F or R-F system. Because of the wide band accepted by the I-F system and the lack of suitable generators and test equipment required to do a satisfactory job, it is recommended that the chassis be sent to one of the main Montgomery Ward Service Shops.

VOLTAGES AT SOCKETS

The voltages that should be considered normal at each tube socket terminal are indicated in the table at the bottom of the schematic circuit diagram. All voltages indicated are measured between the socket terminal and ground (chassis). Readings shown are positive on the socket terminal with the chassis as the negative terminal except where a negative voltage reading is given in which case the chassis is positive. Readings marked "AC" indicate normal AC heater voltage and should not be read with a DC meter.

These voltages are read under the following conditions:

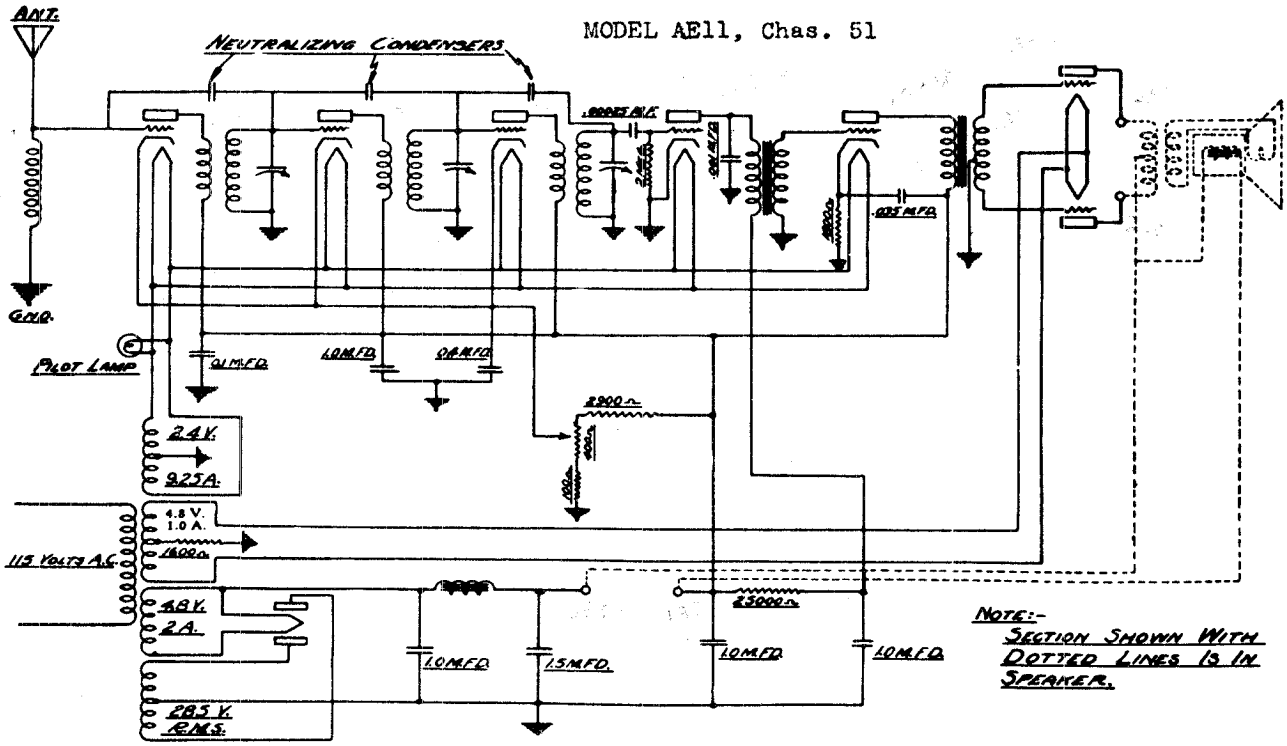
Line Voltage—117 volts
Volume Control—Maximum
No Signal Being Received

Readings are taken with a 1000-ohm-per-volt meter. Plate and screen voltages are read on the 500-volt scale. All readings under 50 volts are read on the 50-volt scale.

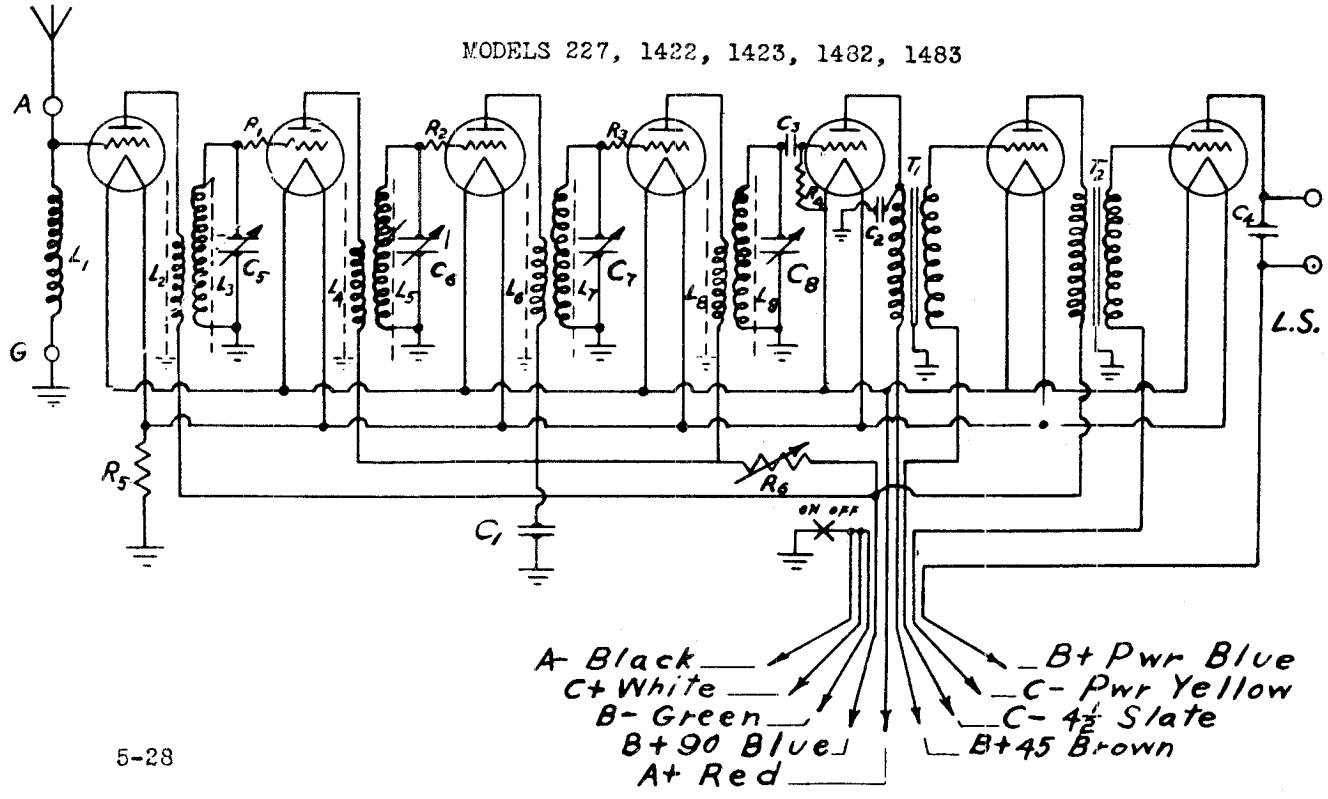
MONTGOMERY WARD

MODEL AE11, Ch. 81
MODELS 227, 1422, 1423, 1482, 1483

MODEL AE11, Chas. 51



MODELS 227, 1422, 1423, 1482, 1483



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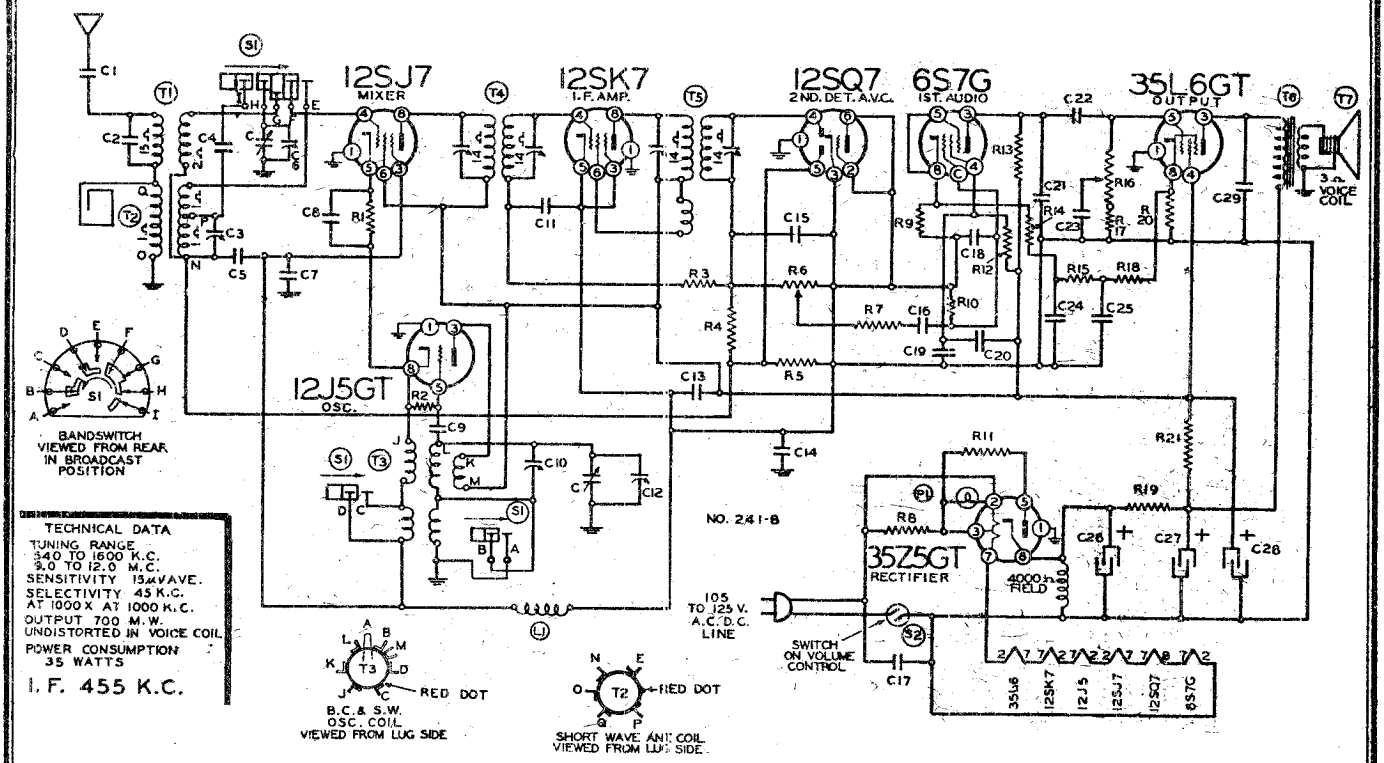
MODELS 14BR-734B, 14BR-735B

MONTGOMERY WARD


12SJ7 MIXER
12SK7 I.F. AMP.
12SQ7 2ND. DET. A.V.C.
6S7G 1ST. AUDIO
35L6GT OUTPUT
12J5GT OSC.
35Z5GT RECTIFIER
BANDSWITCH VIEWED FROM REAR IN BROADCAST POSITION
TECHNICAL DATA
TUNING RANGE 540 TO 1600 K.C. 9.0 TO 12.0 M.C.
SENSITIVITY 15 μVAVE.
SELECTIVITY 45 K.C. AT 1000 X AT 1000 K.C.
OUTPUT 700 M.W. UNDISTORTED IN VOICE COIL
POWER CONSUMPTION 35 WATTS
I. F. 455 K.C.
B.C.& S.W. OSC. COIL VIEWED FROM LUG SIDE
SHORT WAVE ANT COIL VIEWED FROM LUG SIDE
RED DOT
NO. 241-B
105 TO 125 V. A.C.D.C. LINE
SWITCH ON VOLUME CONTROL
4000Ω FIELD
3Ω VOICE COIL

Part No.	Schematic Reference	Description	No. Used In Set	Selling Price Each
		CONDENSERS		
BE100142	C20	.04 x 200 Volt Tubular Condenser	1	.12
BE100130	C21, C22	Dual Condenser—.00025 x .02 x 400 Volt	1	.24
BE10011	C29	.01 x 400 Volt Tubular Condenser	1	.12
BE1009	C11	.05 x 200 Volt Tubular Condenser	1	.12
BE10019	C16, C23	.006 x 600 Volt Tubular Condenser	2	.12
BE10020	C13, C19, C24, C25	.1 x 200 Volt Tubular Condenser	4	.12
BE10037	C1	.003 x 600 Volt Tubular Condenser	1	.12
BE100119	C7, C14	.1 x 400 Volt Tubular Condenser	2	.12
BE100127	C8	.01 x 120 Volt Tubular Condenser	1	.12
BE100128	C5	.05 x 120 Volt Tubular Condenser	1	.12
BE100138	C17	.03 x 400 Volt Tubular Condenser	1	.12
BE119129		Electrolytic Filter Cond. added for 25 cycle only. 40 mfd. x 150 Volts across C22 and 20 Mfd. x 150 Volts across C23		.70
BE119128	C26, C27, C28	Electrolytic Filter Condenser—40 mfd.—20 mfd.—20 mfd. x 150 Volts	1	.70
BE124139	C3, C10	S. W. Antenna and Oscillator Trimmer Condenser	2	.16
BE1295	C9, C18	.0001 Mica Type Condenser—20%	2	.12
BE12921	C15	.0002 Mica Type Condenser—20%	1	.12
BE12960	C2	.00015 Mica Type Condenser—10%	1	.12
BE129181	C4	.000445 Mica Type Condenser—3%	1	.18
BE12912	C19	.00025 Mica Type Condenser	1	.12
		RESISTORS		
BE13012	R2, R7	50M ohm—½ Watt Resistor—20%	2	.10
BE13038	R4	2 Megohm—½ Watt Resistor—20%	1	.10
BE13084	R19	200 Ohm—½ Watt Resistor—20%	1	.10
BE130128	R11	20 Ohm—½ Watt Resistor—20%	1	.10
BE130166	R8, R20	150 Ohm—½ Watt Resistor—10%	2	.10
BE130218	R1	5M Ohm—½ Watt Resistor—10%	1	.10
BE130257	R10	5 Megohm—½ Watt Resistor—25%	1	.10
BE130287	R21	1200 Ohm—1 Watt Resistor—10%	1	.10
BE130350	R3, R5	3. 2 Megohm—½ Watt Resistor—20%	2	.10
BE1302	R9	1M Ohm—½ Watt Resistor	1	.10
BE130354	R12	525M Ohm—½ Watt Resistor	1	.10
BE130103	R13	100M Ohm—½ Watt Resistor	1	.10
BE130193	R14, R18	3M Ohm—½ Watt Resistor	2	.10
BE130355	R15	8M Ohm—½ Watt Resistor	1	.10
BE130100	R17	150M Ohm—½ Watt Resistor	1	.10
		SOCKETS		
BE121210		Eight Prong Molded Octal Socket	6	.10
BE121273		Eight Prong Wafer Octal Socket—with Shield for Guide Pin	1	.10
		SPEAKER		
BE114271	T7	Six Inch Electro Dynamic Speaker. Less Output Transformer.		
BE105134	T6	Output Transformer for Speaker	1	.50
		COILS		
BE108206	T4	Input I. F. Coil Complete in Can	1	.76
BE108205	T5	Output I. F. Coil Complete in Can	1	.76
BE130184	T3	B. C. - S. W. Oscillator Coil	1	.60
BE111249	T2	S. W. Antenna Coil	1	.10
BE111250	T1	Loop Antenna Assembly	1	.90
BE12316	L1	Choke Coil	1	.18

Part No.	Schematic Reference	Description	No. Used In Set	Selling Price Each
		DIAL PARTS		
BE1121023		Dial Scale	1	.28
BE112964		Pointer	1	.06
BE112962		Crystal for Dial	1	.32
BE13143		Snap-in Rivets to Fasten Dial Scale	5	.02
BE112959		Dial Drum Pulley	1	.06
BE115757		Dial Support Plate with Idler Pulleys and 2 bearings	1	
BE117906		Tuning Shaft with Drive Pulley	1	.14
BE117910		Pointer Shaft	1	.06
BE120372		Coiled Tension Spring for Dial String	1	.02
BE120375		String for Dial	Yard	.12
		MISCELLANEOUS		
BE101262	R6, S3	Volume Control and Switch (1 Megohm)	1	.62
BE101263	R11	Tone Control (500M Ohms)	1	.50
BE125167	S1	Band Switch	1	.40
BE102143B	C, C6, C12	Two Gang Variable Condenser with B. C. Antenna and Osc. Trimmers and 6 Button Automatic Tuner Assembly	1	5.00
BE10798D		Line Cord and Plug	1	.30
BE107249	P1	6-8 V. Pilot Lite Bulb, Type T-47	1	.10
BE107358		Socket Assembly for Pilot Lite	1	.10
BE128656-36		Walnut Bakelite Cabinet	1	3.60
BE128656-9		Ivory Color Bakelite Cabinet	1	4.40
BE131356		Snap-in Rivets to Fasten Back	5 Doz.	.10
BE132264		No. 8-18 x ¾ Chassis Mounting Screws	2	.02
BE112972		Wood Spacers for Loop	2	.02
BE131356		Snap-in Buttons to Mount Loop	5 Doz.	.10
BE134123		Rubber Bumpers for Bottom of Cab	4	.02
BE128717		Brown Cardboard Back for Cabinet	1	.08
BE112973		Set of Station Call Letters	1	.12
BE112979		Set of Celluloid Tabs (6)	1	.06
BE128699-36		Walnut Bakelite Buttons (left)	3	.08
BE128700-36		Walnut Bakelite Buttons (right)	3	.08
BE128686-37		Knob—Walnut—"Volume"	1	.12
BE128688-37		Knob—Walnut—"Tone"	1	.12
BE128687-37		Knob—Walnut—"Tuning"	1	.12
BE128683-37		Knob—Walnut—"Band SW"	1	.12
BE128686-8		Knob—Ivory—"Volume"	1	.12
BE128688-8		Knob—Ivory—"Tone"	1	.12
BE128687-8		Knob—Ivory—"Tuning"	1	.12
BE128683-8		Knob—Ivory—"Band SW"	1	.12
BE131383		Screw Driver	1	.06

NOTICE—There is a model number label on the chassis. This model number identifies the radio as to year, manufacturer, chassis and issue number or letter. When ordering parts or writing, be sure to mention the complete model number.

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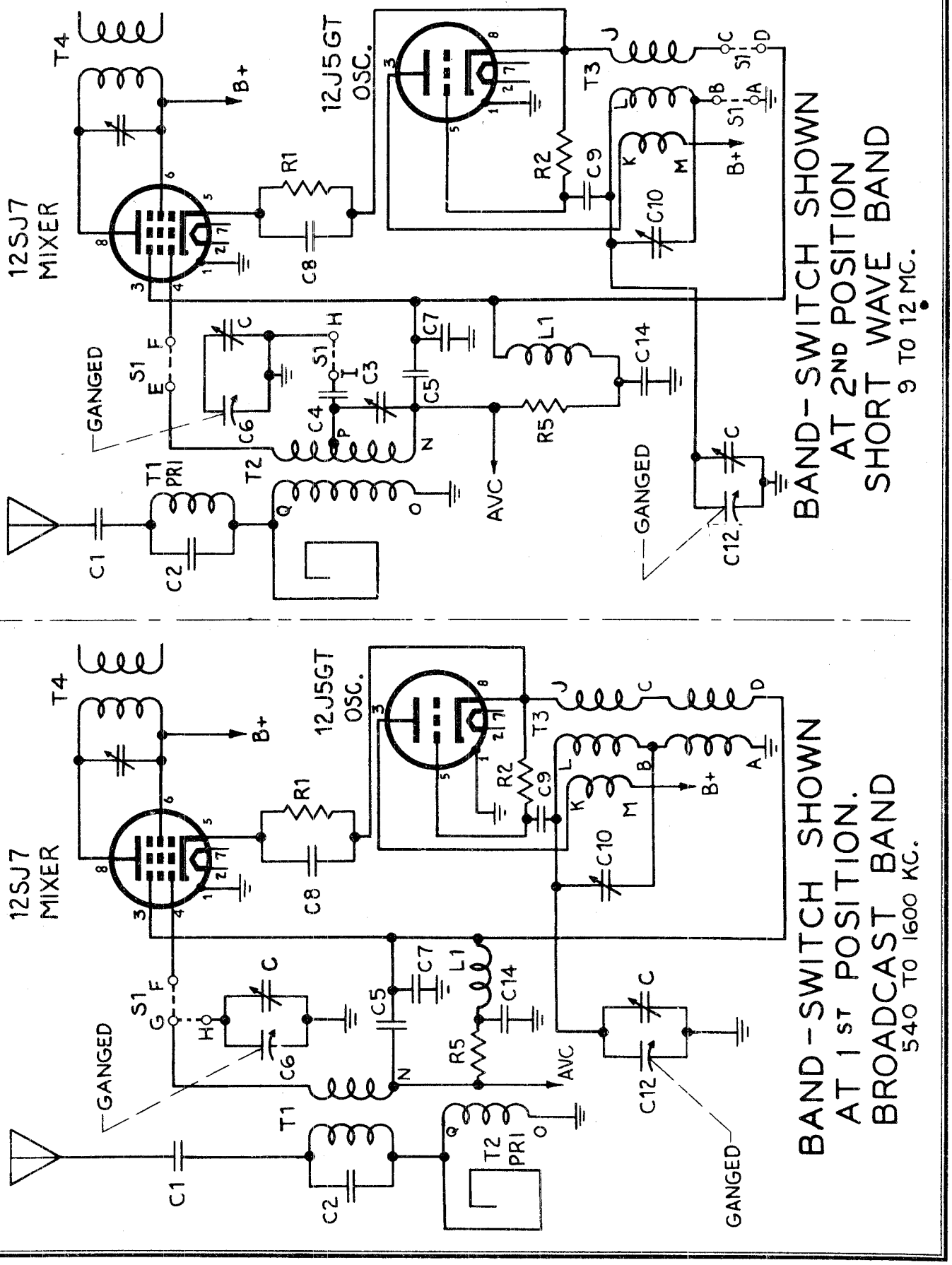
MONTGOMERY WARD

MODELS 14BR-734B
14BR-735B



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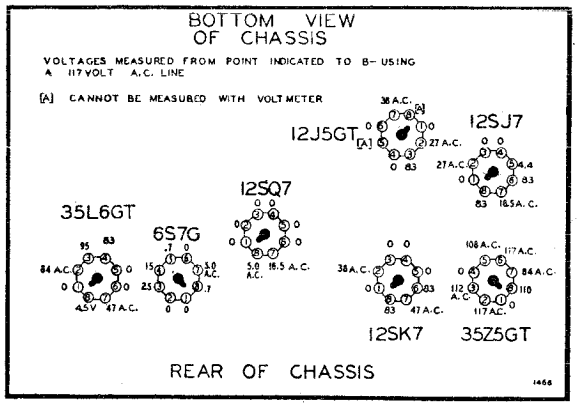
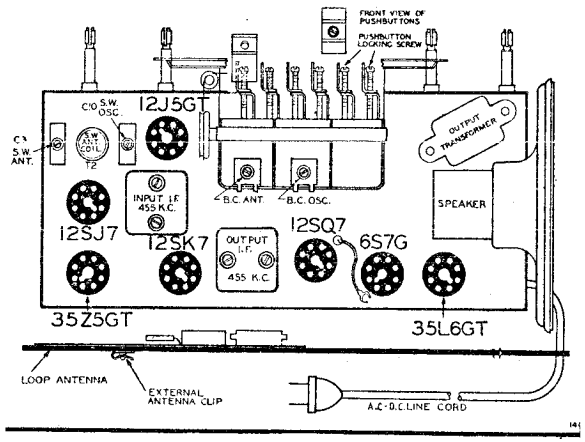


Voltage Chart



Chassis View, showing Tube Location and the Outside Antenna Clip.

SETTING THE PUSHBUTTONS

Make a list of your 6 favorite stations—push out the call letters of these stations from the call letter sheets supplied. Next insert a long slim screw driver into the hole in front of one of the pushbuttons and unscrew the pushbutton locking screw (to the left) several turns. Now with the screw driver still engaged in the locking screw slot push it all the way in. Hold it in this position and tune in the station you want with the tuning knob. Now tighten up the pushbutton locking screw by turning it to the right. Tighten firmly. Continue setting each button in the same way. When you have set your stations insert the call letter of each station in the front of the proper button and put one of the celluloid tabs over the station call letter.

To change stations simply repeat the above procedure.

If you are unable to set a station on any particular button it is probably because the pushbutton locking screw has not been fully unloosened (turned to the left).

ALIGNMENT PROCEDURE

- Volume control—Maximum all adjustments.
- Connect B—of radio chassis to ground post of signal generator through .1 Mfd. condenser.

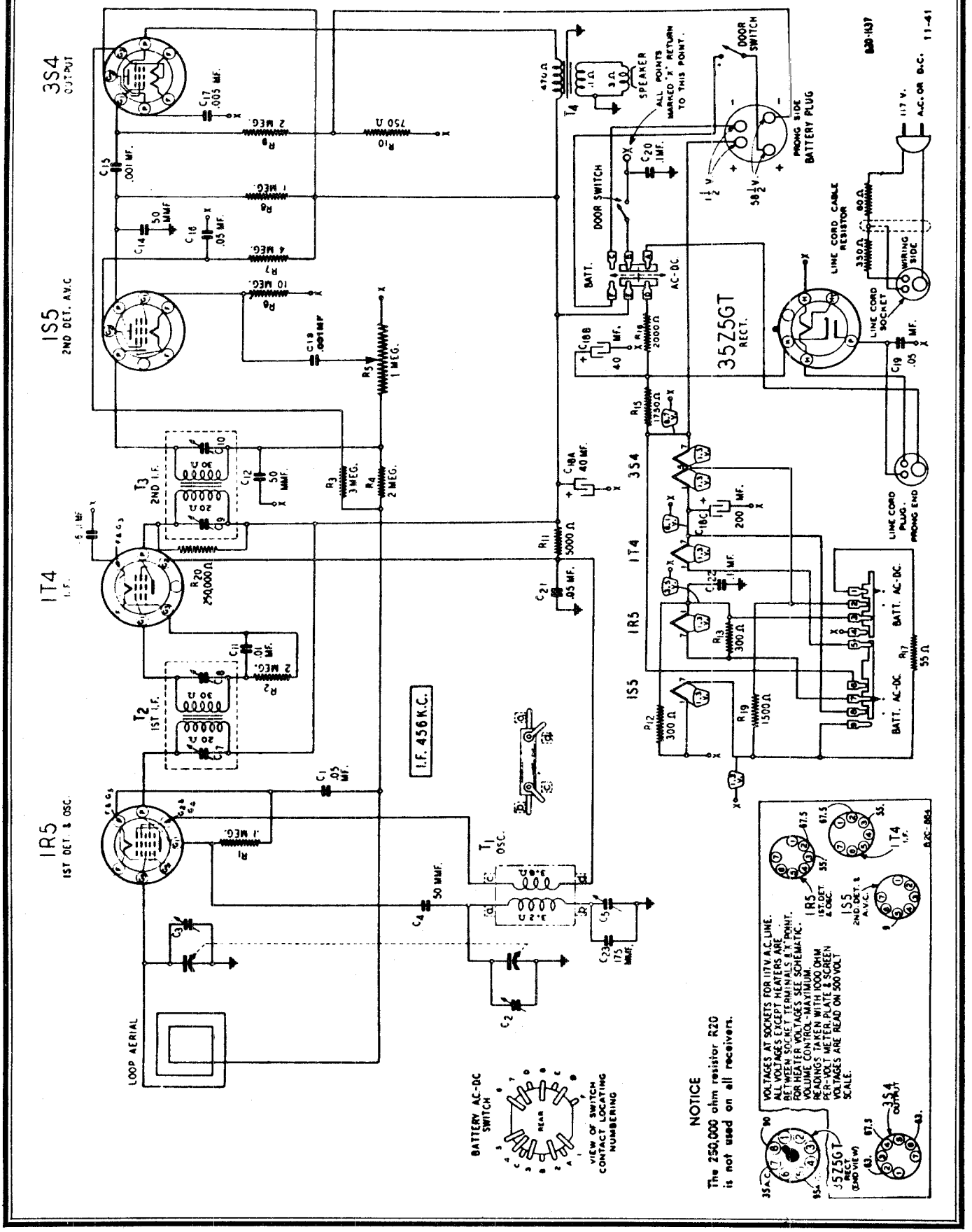
BAND	SIGNAL GENERATOR Frequency Setting	Dummy Antenna	Connection to Radio	Position of Band Switch	Variable Condenser Setting	Trimmers Adjusted to Maximum
I. F.	455 Kc.	.1 MFD.	Grid of 12SK7 I. F.	Broadcast	Rotor full open (Plates out of mesh)	Two trimmers on top of Output I. F.
	455 Kc.	.1 MFD.	Grid of 12SJ7 Mixer	Broadcast	Rotor full open (Plates out of mesh)	Two trimmers on top of Input I. F.
SHORT WAVE BAND	12 Mc.	400 Ohms	External Antenna and B—	Short Wave	Set Dial at 12 Mc.	S.W. Osc. trimmer C10 S.W. Ant. trimmer C3
BROAD-CAST BAND	1600 Kc.	.1 mmf.	Grid of 12SJ7	Broadcast	Rotor full open (Plates out of mesh)	B.C. Osc. trimmer C12 on Gang
	1400 Kc.	200 mmf.	External Antenna and B—	Broadcast	Set Dial at 1400 K. C.	B.C. Ant. trimmer C6

NOTE: The Oscillator Frequency is lower than the signal frequency and should be aligned accordingly.

The loop antenna should be connected to the radio when making all adjustments.

MODEL 14WG-538B

MONTGOMERY WARD



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MONTGOMERY WARD

SPECIFICATIONS

Input Voltages and Currents—Battery Operation

"A" Battery - - - - 1½ Volts—.25 Amp.

"B" Battery - - - - 88½ Volts—8. Ma.

Power Consumption - - - - - - 30 Watts (At 117 Volts AC Supply)

Power Output

Battery Operation - 55 Mw. Undistorted, 110 Mw. Maximum

AC Operation - - 80 Mw. Undistorted, 170 Mw. Maximum

Selectivity - 40 KC Broad at 1000 Times Signal

Intermediate Frequency - - - - - 456 KC

Speaker - - - - - - - - 4" P.M. Dynamic

Tuning Frequency Range - 535 to 1610 KC

Sensitivity - 400 Microvolts per Meter Average (For .05 Watt Output)

ALIGNMENT PROCEDURE

Volume Control—Maximum All Adjustments.

Allow Chassis and Signal Generator to "Heat Up" for several minutes.

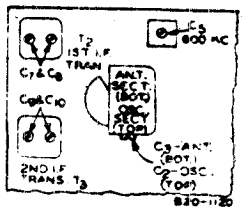
The following equipment is required for aligning:

A Signal Generator which will provide an accurately calibrated signal at the test frequencies as listed.

Output Indicating Meter—Non-Metallic Screwdriver.

Use Loop for All Adjustments—See Note "A"

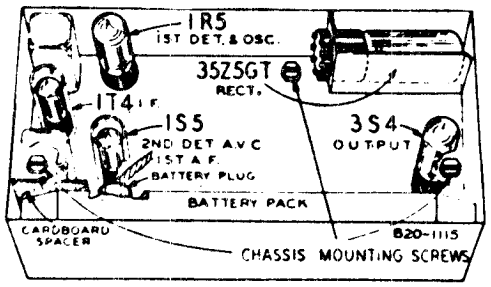
Signal Gen. FREQUENCY SETTING	CONDENSER SETTING	ADJUST TRIMMERS TO MAXIMUM (See Trimmer Illustration)
456 KC	Turn Rotor to Full Open	1st I.F. (C7) & (C8) 2nd I.F. (C9) & (C10)
1610 KC	Turn Rotor to Full Open	Oscillator (C2)
1500 KC	Turn Rotor to Max. Output Set Knob to 1500 KC	Antenna (C3)
600 KC	Turn Rotor to Max. Output	600 KC (C5) Rock Rotor—See Note B
1500 KC	Turn Rotor to Max. Output	Antenna (C3)



NOTE A—Connect a loop approximately one foot in diameter across the antenna and ground posts of the signal generator. Place radio approximately 2 feet (6" for I.F. adjustment) from loop.

NOTE B—Turn the rotor back and forth and adjust the trimmer until the peak of greatest intensity is obtained.

To replace the 35Z5GT rectifier tube, pull line cord plug out of case. Carefully pry off the 2 control knobs. Remove screw on the front panel above tuning knob at side of on-off switch plunger. Then take out the 3 chassis screws (shown in illustration) with a ¼ inch socket wrench. Carefully lift chassis, tilting it at the same time, as far as connecting wires permit. Insert a screwdriver between rectifier tube and socket and pry tube out of socket.



MISCELLANEOUS

Part No.	Description	Selling Price
12A388	4" P.M. Dynamic Speaker	$2.00
	Cone and Voice Coil Assembly (Specify part number and letters stamped on the above speaker)	.76
14X282	Grille Cloth for Speaker	.06
3A312	Tube Socket—Miniature Type	.06
3A314	Tube Socket—Octal (8 prong) Wafer Type	.06
32X221	Tube Shield	.04
13X453	"A" and "B" Battery Cable and Plug Assembly	.24
6A236	Four Prong Plug for above Battery Cable	.04
13X427	Line Cord and Plug Assembly	.76
6A235	Line Plug (on Chassis)	.08
2A201	On-Off Switch	.28
10A367	Knobs (Tuning Control and Volume Control)	.06
4X613	Front Panel Escutcheon	1.06
26A301	AC-DC—Battery Switch Assembly	.58
14X283	Speaker Grille	.28
26A346	Case Assembly complete with Door, Cover, Speaker Grille, Grille Cloth, Handle, and Loop Aerial	11.74
8X98	Rubber Feet (at Bottom of Case) Doz.	.06
4X663	Escutcheon	1.24

TRANSFORMERS AND COILS

9A1551	Loop Aerial only	.82
9A1552	T1 Oscillator Coil Assembly	.44
9A1413	T2 1st I.F. Transformer and Can Assembly	.90
9A1414	T3 2nd I.F. Transformer and Can Assembly	.90
51X94	T4 Output Transformer	.40

CONDENSERS

46X329	C1,C16,C21	.05 mf.	120 Volts	Tubular	$0.06
17A186	C5	30-120 mmf.		Trimmer	.16
47X56	C4,C12,C14	50 mmf.		Molded	.06
46X330	C6	.10 mf.	120 Volts	Tubular	.08
	C7, C8	Part of 1st I.F. Assembly			
	C9, C10	Part of 2nd I.F. Assembly			
46X328	C11	.01 mf.	120 Volts	Tubular	.06
46X334	C13,C15	.001 mf.	120 Volts	Tubular	.06
46X327	C17	.005 mf.	120 Volts	Tubular	.06
45X303	C18A	40 mf.	150 Volts	Dry Electrolytic	.64
	C18B	40 mf.	150 Volts	2 USED ON 25	
	C18C	200 mf.	12 Volts	CYCLE MODELS	
D66503	C19	.05 mf.	400 Volts	Tubular	.06
D66104	C20	.10 mf.	400 Volts	Tubular	.14
14A158		2 Section	Gang Condenser		4.50
B66104	C22	.10 mf.	200 Volts	Tubular	.15
47X184	C23	175 mmf.		Molded	.16

RESISTORS

A84104	R1	100,000 Ohm	0.2 Watt	Carbon	$0.08
A85505	R2	5 Megohm	0.2 Watt	Carbon	.06
A85205	R2	2 Megohm	0.2 Watt	Carbon	.06
A85305	R3	3 Megohm	0.2 Watt	Carbon	.06
A85205	R4,R9	2 Megohm	0.2 Watt	Carbon	.06
36X308	R5	1 Megohm	Volume Control		.30
A85106	R6	10 Megohm	0.2 Watt	Carbon	.06
A84406	R7	4 Megohm	0.2 Watt	Carbon	.08
A84105	R8	1 Megohm	0.2 Watt	Carbon	.08
A84751	R10	750 Ohm	0.2 Watt	Carbon	.08
A84502	R11	5000 Ohm	0.2 Watt	Carbon	.08
A84301	R12,R13	300 Ohm	0.2 Watt	Carbon	.08
A84901	R14	900 Ohm	0.2 Watt	Carbon	.08
43X107	R15	1750 Ohm	Wire Wound		.22
B94202	R16	2000 Ohm	0.5 Watt	Carbon	.08
A84550	R17	55 Ohm	0.2 Watt	Carbon	.08
A85605	R18	6 Megohm	0.2 Watt	Carbon	.06
A84152	R19	1500 Ohm	0.2 Watt	Carbon	.08
A85254	R20	250,000 Ohm	0.2 Watt	Carbon	.06

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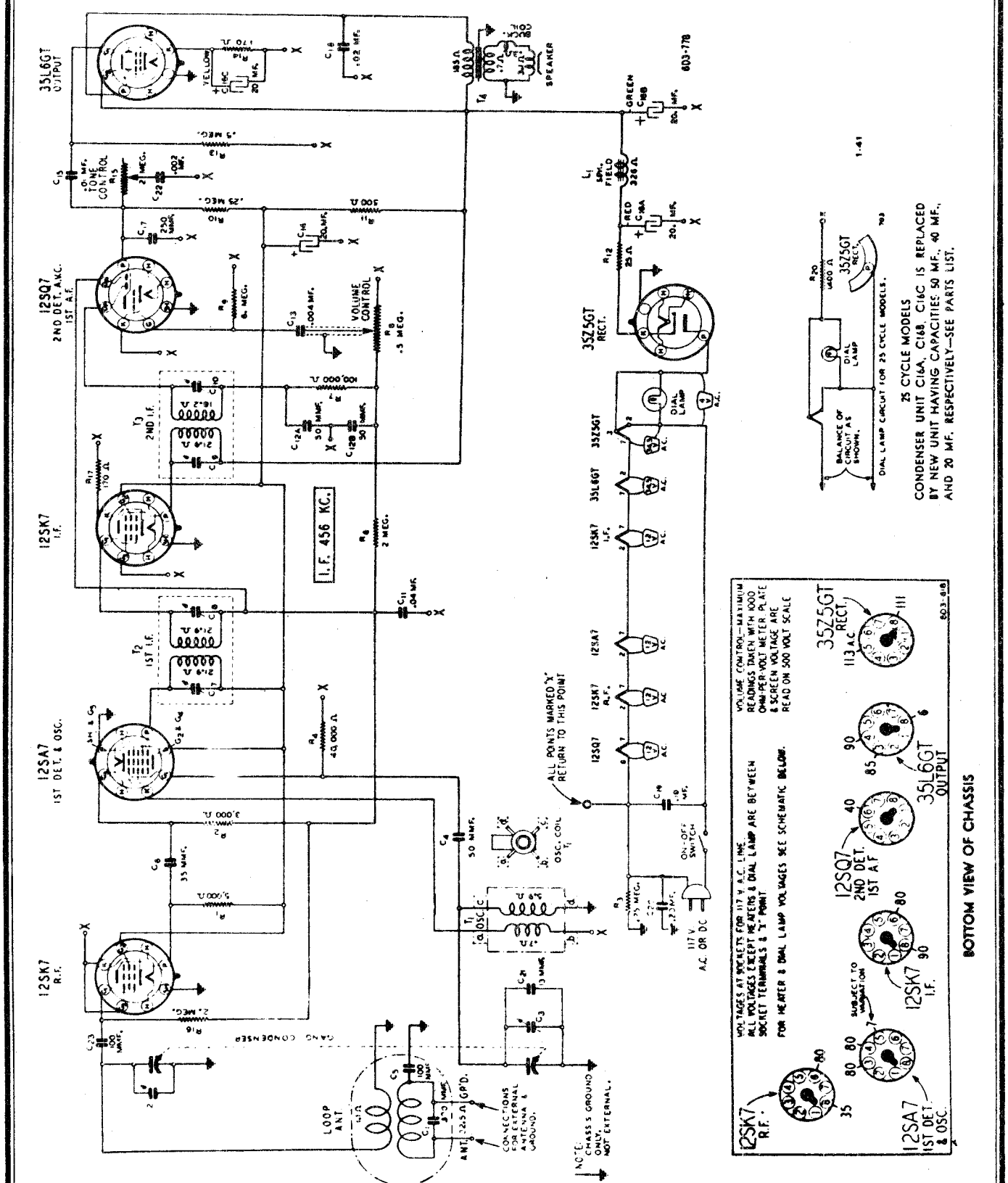
MONTGOMERY WARD

MODELS 14WG-610B, 14WG-611B



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MODELS 14WG-610B, 14WG-611B

MONTGOMERY WARD

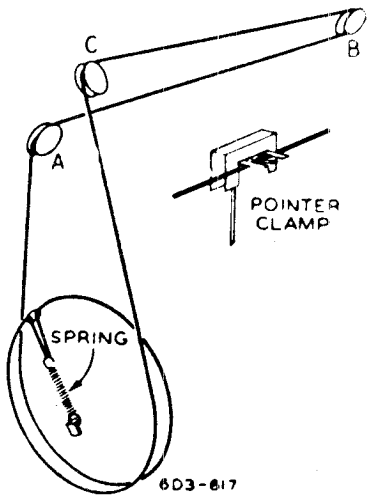
DRIVE CORD REPLACEMENT

Knot both ends of new drive cord to same loop on tension spring. The doubled drive cord should measure 16¼ inches. Turn gang condenser to full open position—See illustration.

Thread looped end of drive cord up through hole in rim of drive pulley. Pull spring flush against inside of rim. Wind right hand portion of drive cord (from drive pulley side of chassis) one turn clockwise around drive pulley. This turn should be on right side of pulley groove (from back of chassis).

Continue cord over pulleys A, B, and C as shown. Loop remaining portion of cord counter-clockwise (from spring) (drive pulley side of chassis) around drive pulley. Secure spring to hook on drive pulley—See illustration.

Calibration — Tune in a signal of known frequency. Set pointer at this frequency mark on the dial scale. Fasten pointer to drive cord —See illustration.



Power Consumption - 28 Watts (At 117 volts AC Supply)
Power Output - - - - - - - .8 Watt Undistorted
Selectivity - - 50 KC Broad at 1000 times Signal
Intermediate Frequency - - - - - - - - 456 KC

Speaker - - - - - - - - - 5" Electro Dynamic
Tuning Frequency Range - - - 528 to 1600 KC
Sensitivity (For .05 Watt Output)
External Antenna - - - - - 10 Microvolts Average

CAUTION

The metal chassis is connected to one side of the line through a .2 mfd. condenser. Both AC and DC power lines are generally grounded on one side. If the side of the line not connected to the metal chassis through this condenser is grounded and the metal chassis comes in contact with an external ground, this condenser will be connected across the line and there will be an increase in hum.

Therefore, in any service work on the chassis, keep it on a wood or other insulated surface to avoid contacts with ground. The person working on the set should avoid getting in contact with any ground.

ALIGNMENT PROCEDURE

Volume Control—Maximum All Adjustments.

Allow Chassis and Signal Generator to "Heat Up" for several Minutes.

The equipment in column at right is required for aligning:

Signal Generator which will provide an accurately calibrated signal at the test frequencies as listed.

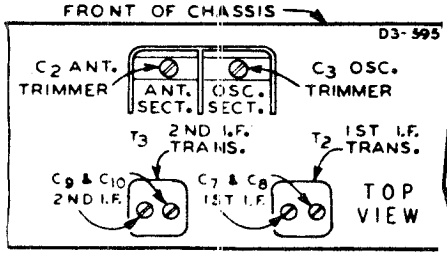
Output Indicating Meter; Non-Metallic Screwdriver.

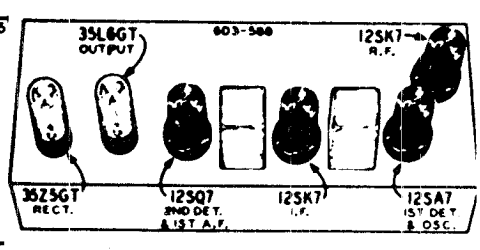
Dummy Antennas—.1 mf., 100 mmf.

SIGNAL GENERATOR FREQUENCY SETTING	SIGNAL GENERATOR ANTENNA CONNECTION	SIGNAL GENERATOR GROUND CONNECTION	DUMMY ANTENNA	CONDENSER SETTING	ADJUST TRIMMERS TO MAXIMUM (See Trimmer Illustration)
456 KC	Control Grid 12SK7—I.F.	Point "X" (12SK7—R.F. Prong No. 3)	.1 mf.	Turn Rotor to full open	2nd I.F. (C9) & (C10)
456 KC	Control Grid 12SA7—1st Det.	Same As Above	.1 mf.	Turn Rotor to full open	1st I.F. (C7) & (C8)
1600 KC	Control Grid 12SA7—1st Det.	Same As Above	.1 mf.	Turn Rotor to full open	Oscillator (C3)
1500 KC	External Antenna Clip On Loop —See Note A	External Ground Clip On Loop	100 mmf.	Turn Rotor to Max. Output Set Indicator to 1500 KC— See Note B	Antenna (C2)

NOTE A—By means of wooden blocks, stand the loop aerial assembly upright exactly 1¼ inches from the back of the chassis.

NOTE B—If the pointer is not at 1500 KC on the dial, tune in a 1500 KC signal. Set pointer at the 1500 KC mark on the dial scale.





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MONTGOMERY WARD

MODELS 14WG-610B, 14WG-611B

PROCEDURE FOR SETTING THE STATION BUTTONS

SELECTING THE STATIONS TO BE SET

There are 6 buttons on the automatic tuning dial by means of which 6 stations may be set for quick tuning.

Make a list of your favorite stations, those which you tune in regularly. There may be any number up to and including 6 in this list.

It is better to list the station with the lowest kilocycle number first, the station with the next higher kilocycle number next, and so on.

Any button may be used for any station you can receive, although it will be more convenient to set the stations so that the kilocycle numbers increase from left to right.

SETTING A STATION BUTTON

Pull the button at the left off the shaft. When this is done, the locking screw shaft will be exposed.

Insert a screwdriver in the slot of the locking screw and depress it by pressing in with the screwdriver. Loosen the locking screw by turning 3 or 4 turns in a counter-clockwise direction. Continue to press in firmly on the screwdriver, thus holding the locking screw shaft depressed. Select the first station from the list you have prepared and carefully tune in this station by means of the manual tuning control until the station is clearest and strongest.

Continue to press in firmly on the screwdriver and lock the mechanism by turning the locking screw in a clockwise direction. Tighten firmly but not excessively. The station is now set on this button.

Proceed in the same manner to set stations on any of the remaining buttons.

Remove the correct station call letter tab from the sheets supplied by bending the sheet back and forth at the score mark until the tab can be broken off. Press this tab all the way to the bottom of the space provided in the button. Cover the call letter tab with a celluloid tab, pressing this in until it snaps into place.

Replace the button on its shaft with the lip at the bottom and the button placed so that the call letters are straight up and down.

If at any time you wish to change the setting of a button from one station to another, repeat the above procedure. Changing the setting of one button will not affect the setting of any of the other buttons.

MISCELLANEOUS

SPEAKER

Stn No.	Part No.	Description	Selling Price
	12A347	5" Electro-Dynamic Speaker	$1.82
		Cone and Voice Coil Assembly (Specify part number of Speaker and letters preceding part number stamped on the speaker)	.98
	14X261	Grille Cloth for above Speaker—Ivory Cabinet	.86

GENERAL

	3A303	Tube Socket—Octal (8 prong)	.06
	10A297	Knobs (Volume Control and Tone Control)—Walnut Cabinet Ea.	.04
	10A300	Knobs (Volume Control and Tone Control)—Ivory Cabinet Ea.	.06
	13X328	Line Cord and Plug	.10
	28X265	Phosphor Bronze Ground Plate (For 2nd I.F. Can)	.06
	606	Bakelite Cabinet—Walnut	2.86
	607	Bakelite Cabinet—Ivory	3.90
	28X292	Snap Buttons (To hold Cardboard Back to Cabinet) Doz.	.12
	10A296	Tuning Control Drum—Walnut Cabinet	.06
	10A301	Tuning Control Drum—Ivory Cabinet	.10
	10A298	Station Buttons—Walnut Cabinet Ea.	.04
	10A302	Station Buttons—Ivory Cabinet Ea.	.06
	8X98	Rubber Feet (Bottom of Cabinet) Doz.	.06

TRANSFORMERS AND COILS

Stn No.	Part No.	Code	Description	Selling Price
	9A1246		Loop Antenna Assembly complete with Condensers and cardboard back—Walnut Cabinet	$1.02
	9A1239		Loop Antenna Assembly complete with Condensers and cardboard back—Ivory Cabinet	1.02
	9A1240	T1	Oscillator Coil Assembly	.20
	9A1241	T2	1st I. F. Transformer and Can Assembly	.46
	9A1242	T3	2nd I. F. Transformer and Can Assembly	.46
	51X78	T4	Output Transformer	.46

CONDENSERS

TUBULAR

Stn No.	Part No.	Code	Capacitance	Voltage	Selling Price
	46X250	C11	.04 mf.	180	$0.06
10888	46X284	C13	.004 mf.	180	.06
11256	46X249	C15	.01 mf.	180	.06
	46X306	C18	.02 mf.	300	.06
	46X307	C19	.10 mf.	300	.10
	46X304	C20	.20 mf.	180	.10
10934	46X248	C22	.002 mf.	180	.06

MOLDED

	47X150	C1	300 mmf.		
11338	47X86	C4	50 mmf.		.06
10876	47X57	C5,C23	100 mmf.		.06
10849	47X83	C6	35 mmf.		.06
	47X66	C17	250 mmf.		.10

ELECTROLYTIC

46X282	C14	20 mf.	150	Dry Electrolytic	.22
46X275	C16A	20 mf.	200	Dry Electrolytic	.40
	C16B	20 mf.	150		
	C16C	20 mf.	12	60 CYCLE MODELS	
46X276	C16A	80 mf.	200	Dry Electrolytic	.70
	C16B	40 mf.	150		
	C16C	20 mf.	12	25-40 CYCLE MODELS	

MISCELLANEOUS

	C3, C3, C7, C8	Part of Gang Condenser	
	C9, C10	Part of 1st I.F. Transformer Assembly	
	C12A, C12B	Part of 2nd I.F. Transformer Assembly	
47X112	C12A 50 mmf., C12B 50 mmf.	Dual Mica	.06
47X138	C21	13 mmf. Ceramic	.12

RESISTORS

CARBON

Stn No.	Part No.	Code	Resistance	Wattage	Selling Price
	A95502	R1	5,000 Ohm	0.2	$0.06
	A95302	R2	3,000 Ohm	0.2	.06
10971	A95254	R3,R10	250,000 Ohm	0.2	.06
11118	A95403	R4	40,000 Ohm	0.2	.06
11086	A95205	R6	2 Megohm	0.2	.06
	B95104	R7	100,000 Ohm	0.5	.06
	A95605	R9	6 Megohm	0.2	.06
	B95501	R11	500 Ohm	0.5	.06
10081	A95250	R12	25 Ohm	0.2	.06
11005	A95504	R13	500,000 Ohm	0.2	.06
	B84171	R14	170 Ohm	0.5	.08
	B95205	R16	2 Megohm	0.5	.06
	B85171	R17	170 Ohm	0.5	.06

MISCELLANEOUS

34X279	R8	500,000 Ohm	Volume Control and On-Off Switch	.40
40X247	R15	2 Megohm	Tone Control	.30
43X104	R20	1,400 Ohm	12 Wire Wound (25 CYCLE MODELS)	.30

AUTOMATIC TUNING AND DIAL ASSEMBLY

Stn No.	Part No.	Description	Selling Price
	28A75	Automatic Tuning Assembly complete with Gang Condenser and Drive Pulley	$2.38
	20X326	Locking Screws for Automatic Tuning Assembly Doz.	.10
	26A244	Dial Scale Mounting Plate complete with Pulleys less Tone and Volume Controls	.24
	52X472	Dial Scale	.42
	52X473	Paper Background for Dial Scale	.04
	28X86	Clamp Buttons to hold Dial Scale and Dial Background to Mounting Plate Doz.	.06
	15X170	Pointer for Dial Scale	.06
		36" Drive Cord (18 lb. Test)	.04
	28X95	Tension Spring for above Drive Cord Doz.	.16
	7A114	Dial Lamp Socket and Cable complete with Bracket	.10
11122	7A32	Dial Lamp (No. 51)	.10
	26A166	Call Letter Sheets and Celluloid Tabs	.06
	52X393	Celluloid Tabs Doz.	.06

Prices Subject to Change Without Notice.

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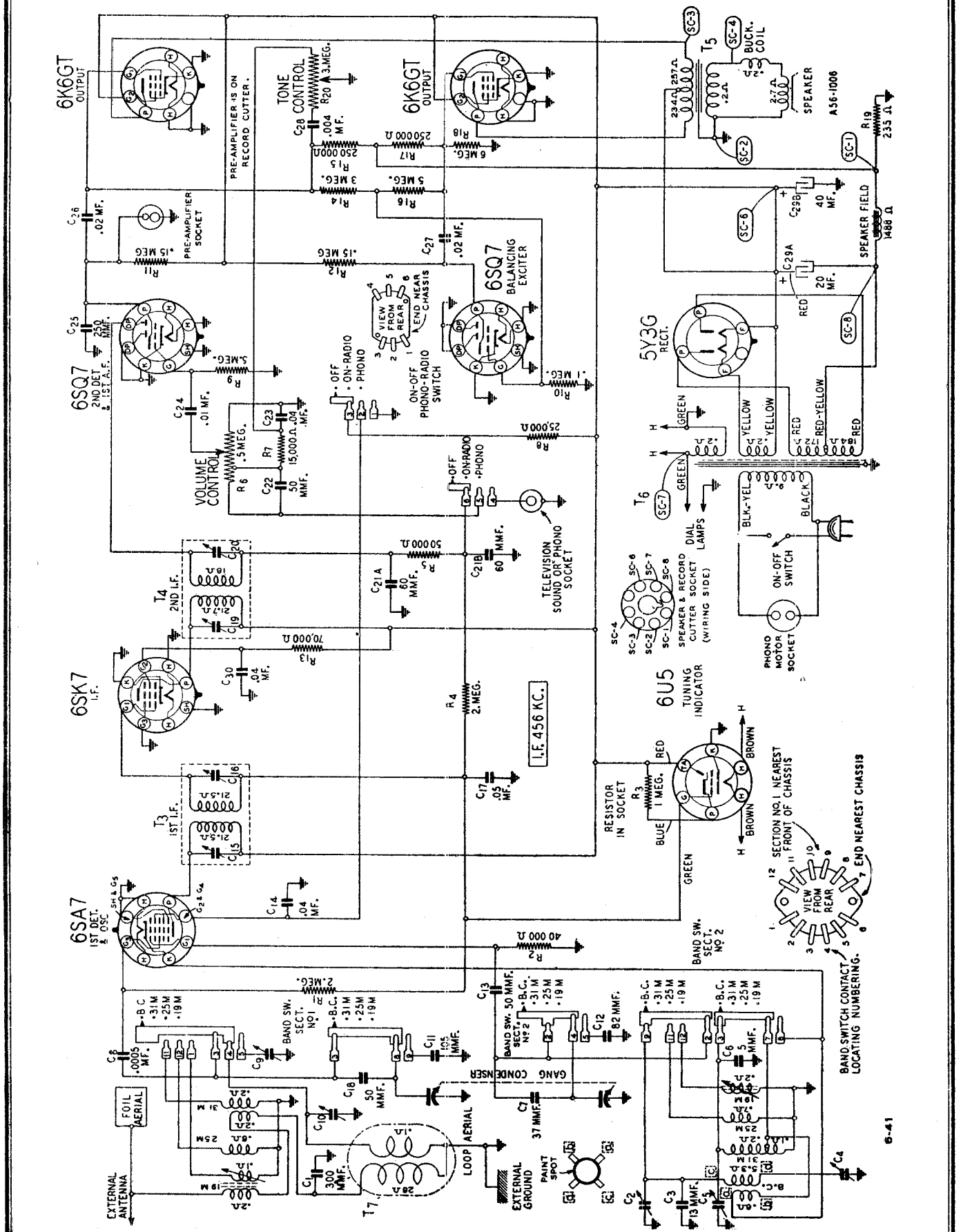
MODELS 14WG-808WA,
14WG-808MA

MONTGOMERY WARD



Record Changer: Seeburg Model B3A

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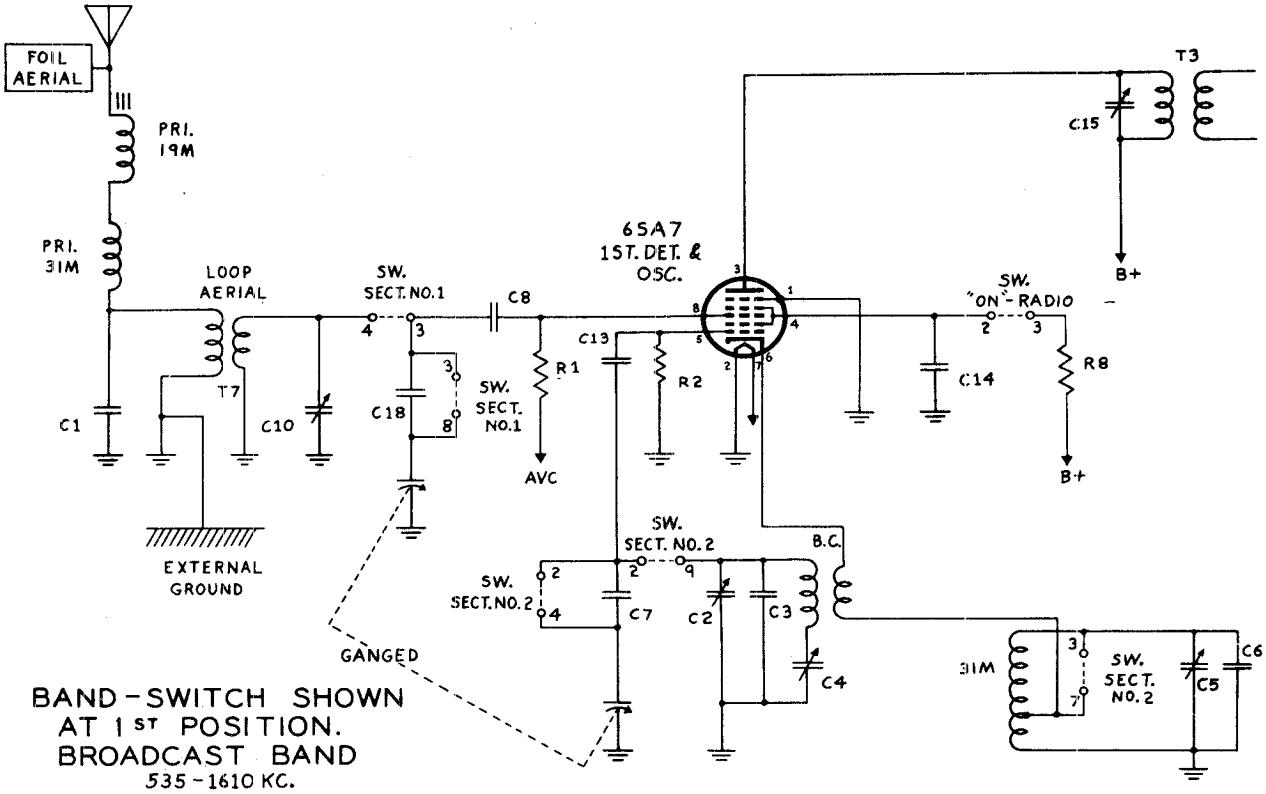
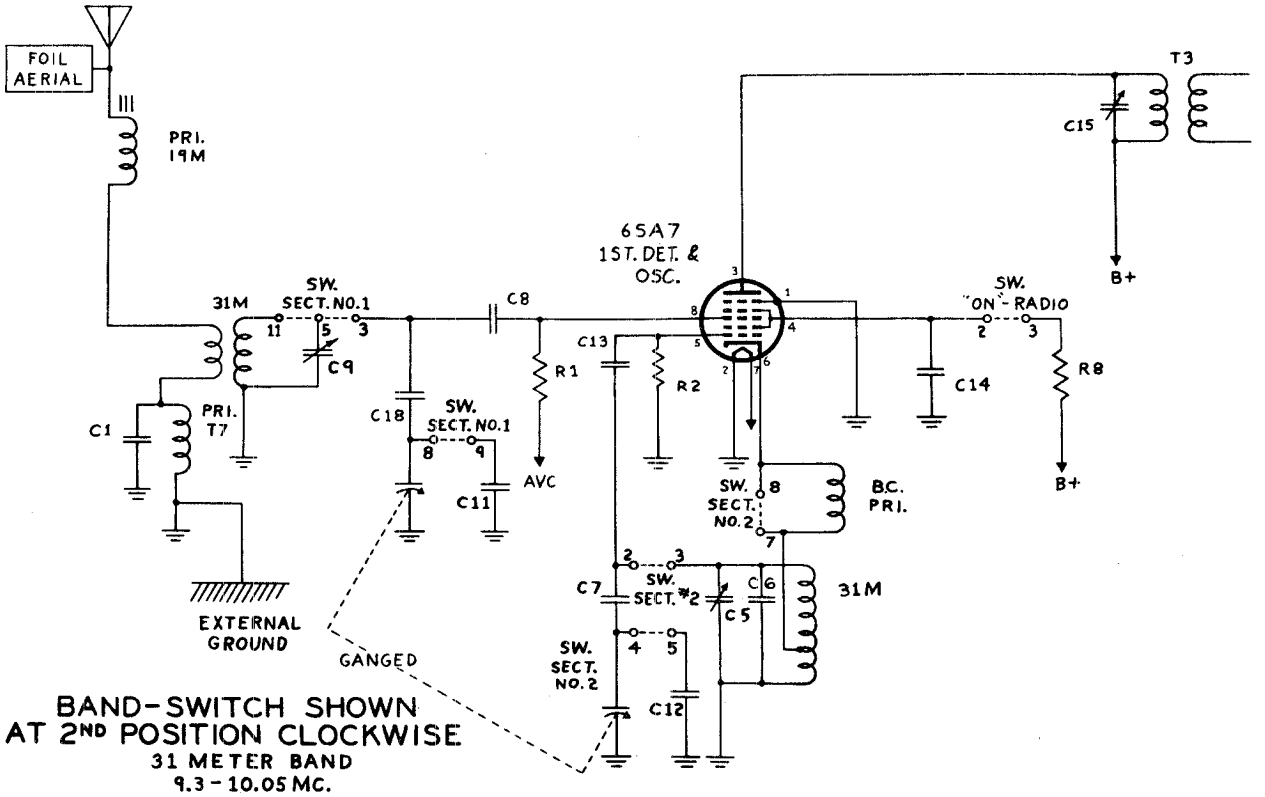
MODELS 14WG-808WA, 14WG-808MA

MONTGOMERY WARD



BAND-SWITCH SHOWN AT 1ST POSITION. BROADCAST BAND
535-1610 KC.



BAND-SWITCH SHOWN AT 2ND POSITION CLOCKWISE
31 METER BAND
9.3-10.05 MC.

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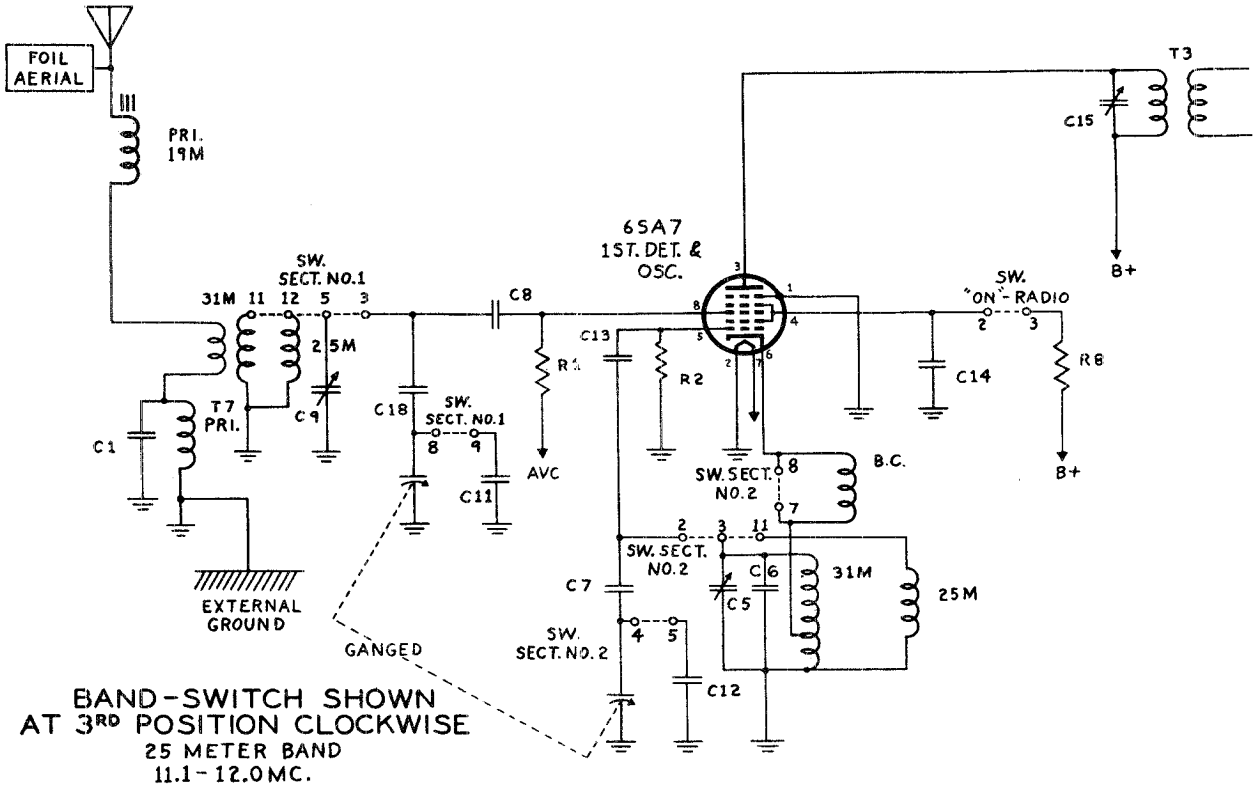
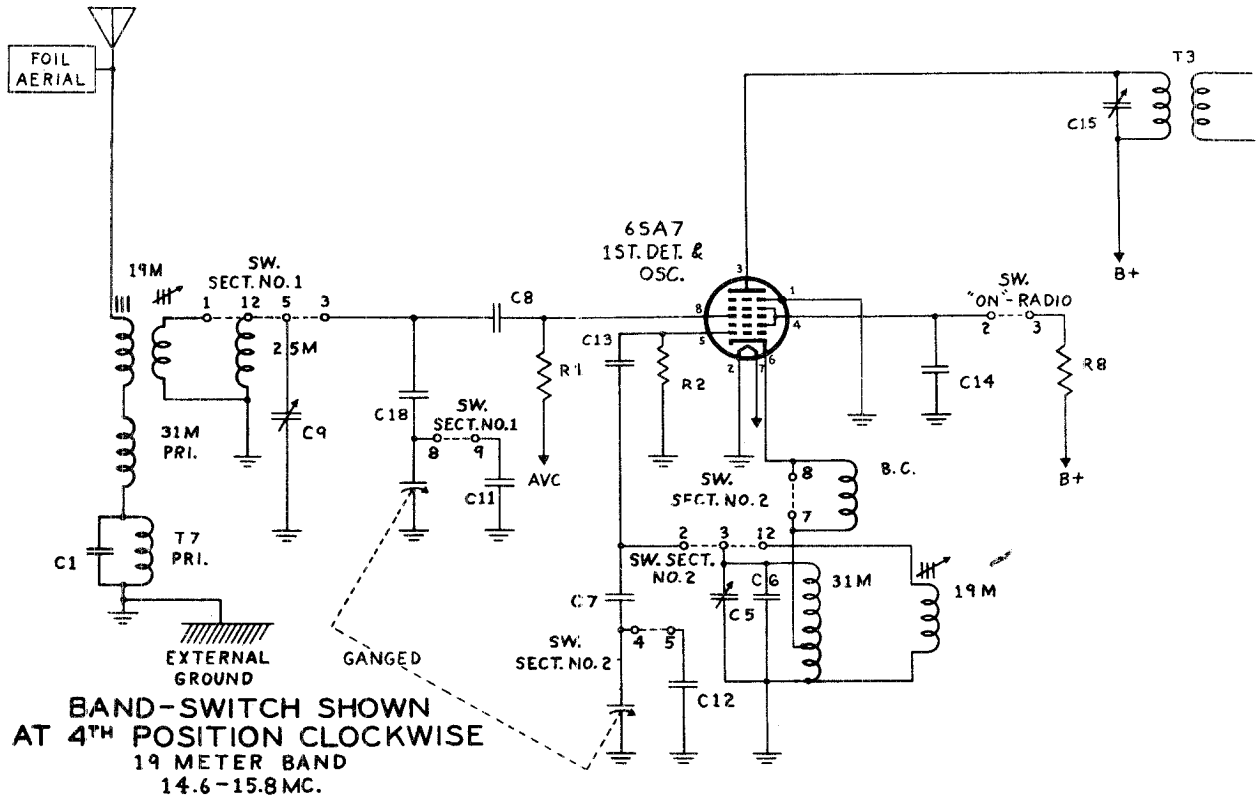
"clarified schematics"

MODELS 14WG-808WA, 14WG-808MA

MONTGOMERY WARD



BAND-SWITCH SHOWN AT 3RD POSITION CLOCKWISE
25 METER BAND
11.1-12.0MC.



BAND-SWITCH SHOWN AT 4TH POSITION CLOCKWISE
19 METER BAND
14.6-15.8MC.

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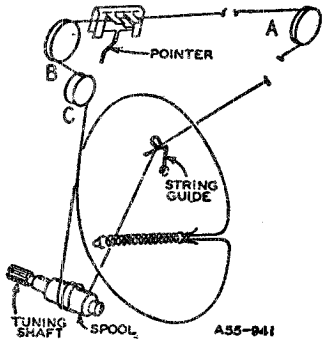
MODELS 14WG-808WA, 14WG-808MA

MONTGOMERY WARD



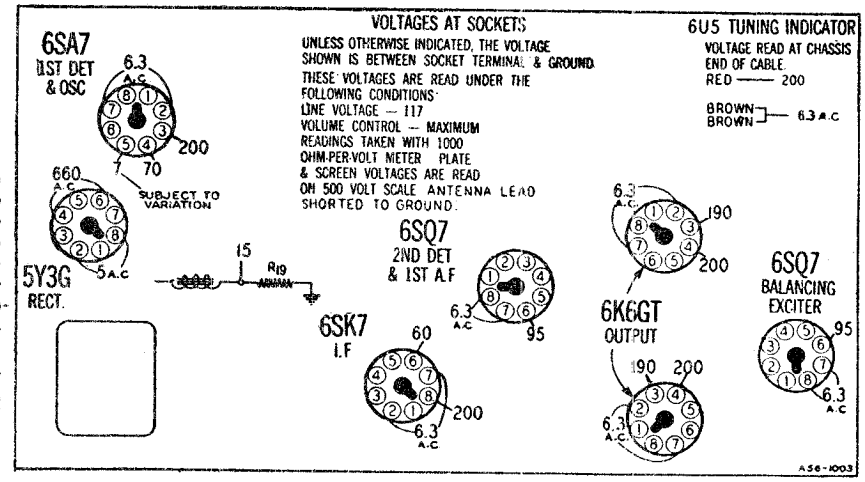
DRIVE CORD REPLACEMENT

Turn gang condenser to full closed position. Using a new drive cord 42 inches in length, tie one end to tension spring. Fasten other end of tension spring to hook on drive pulley. Pass drive cord through slot in drive pulley rim. Continue cord ½ turn counter-clockwise (from gang end of chassis) around drive pulley—See illustration. Wind 2½ turns, counter-clockwise (from rear of chassis), around wooden spool on tuning shaft. Turns should progress toward the rear of chassis.

Pass cord through wire string guide and around pulleys A, B, and C as shown. Continue cord ½ turn, counter-clockwise (from gang end of chassis) around drive pulley and pass through slot in pulley rim. Stretch tension spring and tie drive cord to tension spring.

Power Consumption - 57 Watts (at 117 volts 60 cycles)
77 Watts (Phonograph Operating)
Power Output - - - - 3.0 Watts Undistorted
4.5 Watts Maximum
Selectivity - 38 KC Broad at 1000 times Signal
Intermediate Frequency - - - - - - - 456 KC
Speaker - - - - - - - - 10" Electro-Dynamic

Band	Tuning Frequency Range	Sensitivity External Antenna (For 0.5 Watt Output)
B Range	535 to 1610 KC	15 Microvolts Aver.
19 Meter	14.6 to 15.8 MC	26 Microvolts Aver.
25 Meter	11.1 to 12.0 MC	25 Microvolts Aver.
31 Meter	9.3 to 10.05 MC	22 Microvolts Aver.



PROCEDURE FOR SETTING THE STATION BUTTONS

Make a list of your six favorite stations, those which you tune in regularly. It is better to list the station with the highest kilocycle number first, the station with the next lower kilocycle number next, and so on.

Grasp the left-hand button at the sides (depress the adjacent button) and pull it out as far as it will go. A click will be heard. If it is impossible to depress the button which is adjacent to the button you are setting, rotate the tuning knob a few turns.

Select the first station from the list you have prepared. *Carefully* tune in this station by means of the manual tuning knob until the dark sector in the tuning eye is narrowest.

Now lock the mechanism by pushing the button all the way in until it is felt to lock into place.

Proceed in the same manner to set stations on any of the remaining buttons. Any button may be used for any station you can receive, although it will be more convenient to set the stations so that the kilocycle numbers decrease from left to right.

Remove the correct station call letter tab from the sheets supplied by bending the sheet back and forth at the score mark until the tab can be broken off. Press the tab all the way to the bottom of the space provided in the button. Cover the call letter tab with a celluloid tab, pressing this in until it snaps into place.

Changing the setting of one button will not affect the setting of any of the other buttons.

REPLACING BAND SPREAD COILS

It is not practicable to make field replacements of the individual antenna and oscillator coils in the Band Spread Assembly Unit.

Should one of these coils be damaged in any way, remove the Band Spread Assembly Unit (consisting of the 3 antenna and 4 oscillator coils, the right-angle mounting plate, and the band switch) from the chassis and return to the factory for replacement.

CAUTION—Two of the coils in the band spread coil assembly, the 19 Meter Antenna and Oscillator coils, have adjustable iron cores. One of the adjusting screws extends out from the front panel of the chassis base at the left of the band switch. The other adjusting screw extends up from the chassis base in front of the 1st I.F. Transformer.

DO NOT CHANGE THE POSITION OF THESE ADJUSTING SCREWS as they have been properly set at the factory and cannot be satisfactorily re-adjusted in the field.

After each range is completed, repeat the procedure as a final check.

NOTE A—If the pointer is not at 1400 KC on the dial, remove pointer from drive cord. Set pointer at the 1400 KC mark on the dial scale. Attach pointer to drive cord.

NOTE B—Turn the rotor back and forth and adjust the trimmer until the peak of greatest intensity is obtained.

NOTE C—Reassemble chassis in cabinet.

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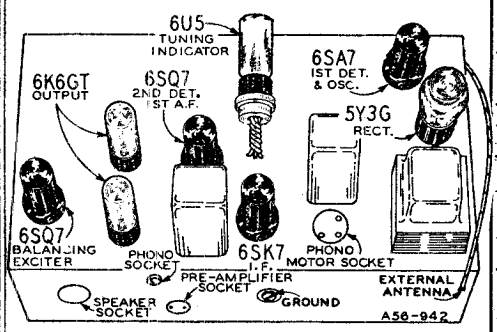
MODELS 14WG-808WA, 14WG-808MA.

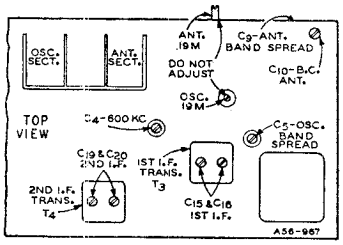
MONTGOMERY WARD

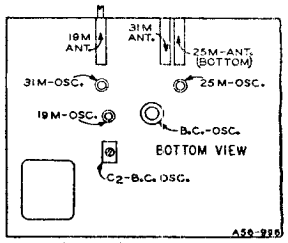
ANTENNA AND GROUND

Two built-in Air Wave Aerials are incorporated in the cabinet.

One of these, the loop aerial, is used for broadcast band reception. The other, a counterpoise foil aerial, is used for reception on the short wave band. For the reception of local or nearby stations, an outside antenna and ground are usually not required.







ALIGNMENT PROCEDURE

Volume Control—Maximum All Adjustments.

Connect Radio Chassis to Ground Post of Signal Generator with a Short Heavy Lead.

Allow Chassis and Signal Generator to "Heat Up" for several minutes.

The following equipment is required for aligning: An All Wave Signal Generator which will provide an accurately calibrated signal at the test frequencies as listed.

Output Indicating Meter—Non-Metallic Screwdriver.

Dummy Antennas—.1 mf., 100 mmf., and 400 ohms.

	SIGNAL GENERATOR FREQUENCY SETTING	CONNECTION AT RADIO	DUMMY ANTENNA	BAND SWITCH SETTING	CONDENSER SETTING	ADJUST TRIMMERS TO MAXIMUM
	Remove chassis from cabinet but do not disconnect leads to loop aerial.					
I.F.	456 KC	Grid of 1st Det.	.1 mf.	B Range	Turn Rotor to Full Open	1st I.F. (C15) & (C16) 2nd I.F. (C19) & (C20)
RANGE B	1610 KC	Antenna Lead	100 mmf.	B Range	Turn Rotor to Full Open	Oscillator Range B (C2)
	1400 KC	Antenna Lead	100 mmf.	B Range	Turn Rotor to Max. Output Set Indicator to 1400 KC—See Note A	Ant. Range B (C10)
	600 KC	Antenna Lead	100 mmf.	B Range	Turn Rotor to Max. Output	600 KC (C4) Rock Rotor—See Note B
SHORT WAVE BANDS	9700 KC	Antenna Lead	400 Ohm	31 Meter	Turn Tuning Knob until Pointer is at 9.7 MC	Oscillator Band Spread (C5)
	9700 KC	Antenna Lead	400 Ohm	31 Meter	Leave Setting as above	Antenna Band Spread (C9)
LOOP RANGE B	1400 KC	Antenna Lead See Note C	100 mmf.	B Range	Turn Rotor to Max. Output	Ant. Range B (C10)

MISCELLANEOUS

Part No.	Description	Selling Price
12A399	10" Electro-Dynamic Speaker	$4.24
	Cone and Voice Coil Assembly (Specify part number and letters stamped on above Speaker)	1.80
10A405	Knob (Tuning)—Mahogany Phono Combination	.12
10A406	Knob (Tone Control) — Mahogany Phono Combination	.06
10A407	Knob (Volume Control) — Mahogany Phono Combination	.10
10A408	Knob (Band Change Switch) — Mahogany Phono Combination	.10
10A409	Knob (Control Switch) — Mahogany Phono Combination	.10
10A372	Knob (Tuning)—Walnut Console and Phono Combination	.06
10A373	Knob (Tone Control)—Walnut Console and Phono Combination	.06
10A374	Knob (Volume Control) — Walnut Console and Phono Combination	.10
10A398	Knob (Band Change Switch) Walnut Console and Phono Combination	.10
10A404	Knob (Control Switch) Walnut Console and Phono Combination	.10
3A303	Tube or Speaker Socket—Octal (8 Prong) Molded Type	.06
3A315	Tube Socket—Octal (8 prong)—Wafer Type—6SA7 Tube	.10
3A305	Single Pin Tip Socket (Phono)	.06
3A304	Phono Motor Socket	.06
3A307	Microphone Amplifier Socket	.06
13X428	Tuning Eye Tube Socket and Cable Assembly	.28
2A209	On-Off—Radio-Phono Switch	.52
2A207	Band Change Switch	.84
8X23	Rubber Mounting Cushions (under Chassis) ea.	.04
13X328	Line Cord and Plug Assembly	.18
8X113	Rubber Mounting Cushions (at front of Chassis)—Phono Combinations only.....each	.06
25X826	Brackets for Cushions (at front of Chassis) —Phono Combinations only .....ea.	.04
8X83	Rubber Mounting Cushions (Under rear of Chassis) .....ea.	.04
25X655	Brackets for Rear Rubber Mounting Cushions	.02
26A231	Counterpoise Foil Aerial	.10

TRANSFORMERS AND COILS

Antenna & Oscillator Coils in Band Spread Assembly cannot be replaced individually—Entire Band Spread Assembly Unit must be ordered—See article "Replacing Band Spread Assembly"

26A323	Band Spread Assembly Unit complete with 3 Antenna Coils, 4 Oscillator Coils, Band Switch, Right-Angle Mounting Plate, and 4 Ceramic Condensers	$6.12
9A1461	Oscillator Coil Assembly—Broadcast Range	.18
9A1428	T3 1st I.F. Transformer and Can Assembly	.60
9A1429	T4 2nd I.F. Transformer and Can Assembly	.60
51X96	T5 Output Transformer	.72
53X245	T6 117 Volt, 60 Cycle Standard Power Transformer	2.44
53X246	T6 117 Volt 25 Cycle Standard Power Transformer	5.94
53X247	T6 117-234 Volt, 40-60 Cycle Universal Power Transformer	4.26
9A1457	T7 Loop Aerial Assembly—Broadcast Range	.78

CONDENSERS

47X150	C1	300 mmf.	Molded	$0.06
17A151	C2	2-25 mmf.	Oscillator—B Range Trimmer	.10
47X155	C3	13 mmf.	Ceramic	.12
17A155	C4	350-430 mmf.	600 K. C. Padder	.18
17A68	C5	1-12 mmf.	Oscillator Band Spread Trimmer	.18
47X156	C6	5 mmf.	Ceramic	.12
47X151	C7	37 mmf.	Ceramic	.12
D6650I	C8	.0005 mf.	400 V. Tubular	.06
17A150	C9	2-25 mmf.	Antenna Band Spread Trimmer	.10
17A150	C10	2-25 mmf.	Ant. B Range Trimmer	.10
47X153	C11	105 mmf.	Ceramic	.12
47X152	C12	82 mmf.	Ceramic	.12
47X56	C13,C22	50 mmf.	Molded	.06
D66403	C14,C30	.04 mf.	400 V. Tubular	.06
	(C15) (C16)	Part of 1st I.F. Can Assembly		
B66503	C17	.05 mf.	200 V. Tubular	.06
47X154	C18	50 mmf.	Ceramic	.18
	(C19) (C20)	Part of 2nd I.F. Can Assembly		
47X172	(C21A (C21B	60 mmf.) 60 mmf.)	Dual Mica	.10
B66403	C23	.04 mf.	200 V. Tubular	.06
B66103	C24	.01 mf.	200 V. Tubular	.06
47X65	C25	250 mmf.	Molded	.10
D66203	C26,C27	.02 mf.	400 V. Tubular	.06
B66402	C28	.004 mf.	200 V. Tubular	.06
45X305	(C29A (C29B	20 mf. 450 V.) 40 mf. 400 V.)	Dry Electrolytic	.84
		2 Section Gang Condenser (See "Automatic Tuning and Dial Assembly")		

RESISTORS

B95205	R1, R4	2.0 Megohm	0.5 W.	Carbon	$0.06
B95403	R2	40,000 Ohm	0.5 W.	Carbon	.06
B95503	R5	50,000 Ohm	0.5 W.	Carbon	.06
36X313	R6	500,000 Ohm	Volume	Control	.34
B94153	R7	15,000 Ohm	0.5 W.	Carbon	.08
B94253	R8	25,000 Ohm	2.0 W.	Carbon	.16
B95505	R9	5.0 Megohm	0.5 W.	Carbon	.06
B93104	R10	100,000 Ohm	0.5 W.	Carbon	.10
B95154	R11,R12	150,000 Ohm	0.5 W.	Carbon	.06
B94703	R13	70,000 Ohm	0.5 W.	Carbon	.08
B93305	R14	3.0 Megohm	0.5 W.	Carbon	.10
B95254	R15,R17	250,000 Ohm	0.5 W.	Carbon	.06
B94505	R16	5.0 Megohm	0.5 W.	Carbon	.08
B95605	R18	6.0 Megohm	0.5 W.	Carbon	.06
D932350	R19	235 Ohm	2.0 W.	Carbon	.20
40X261	R20	3.0 Megohm	Tone Control		.30

AUTOMATIC TUNING AND DIAL ASSEMBLY

20A87	Automatic Tuning Assembly complete with Gang Condenser and Drive Pulley, less Tuner and Pulley Mounting Plate and Station Buttons	$3.90
26A322	Tuner and Pulley Mounting Plate Assembly complete with Tuning Eye Tube Clamp, Brace Bracket, String Guide, Idler Pulleys, Tuning Shaft and Bracket	1.00
58X542	Dial Scale Glass	.30
30X184	Clamps for Dial Scale Glass	.06
58X531	Cardboard Dial Background	.06
28X56	Snap Pins (To hold Dial Background to Mounting Plate) Doz.	.06
41X62	Lucite Light Intensifier	.54
4X619	Dial Escutcheon—Walnut Console and Phono Combination	.48
4X660	Dial Escutcheon — Mahogany Phono Combination	.52
15X193	Pointer for Dial Scale	.06
	Drive Cord (18 Lb. Test)	
28X44	Tension Spring for Drive Cord	.02
19X192	"C" Washers for Tuning Shaft Doz.	.06
7A139	Dial Lamp Socket and Cable Assembly	.10
7A144	Pilot Light Socket and Cable Assembly — "On" Indicator	.16
7A32	Dial and "On" Indicator Lamps—No. 51	.10
7A147	"On" Indicator Jewel	.10
10A375	Station Buttons—Walnut Console and Phono Combination	.10
10A420	Station Buttons — Mahogany Phono Combination	.10
26A315	Set of Call Letter Sheets and Celluloid Tabs	.12
58X540	Celluloid Tabs only (Sheet of 8) Doz.	.18

TYPE S-28A65 AUTOMATIC RECORD CHANGER PARTS

SJ-22021	1/8" Snap Washer Doz.	$0.18
SH-20065	3/16" Snap Washer Doz.	.18
SB-27003	Tone Arm Lift Pin	.10
SB-27026	A.C. Switch	.30
SB-27355-A	Control Lever Assembly	1.06
SJ-22278	Turntable	1.62
SB-27079	Control Knob	.16
SB-27132-A	Selector Arm and Blade Assembly—No. 1 Nearest Tone Arm	.90
SB-27133-A	Selector Arm and Blade Assembly—No. 2	.90
SH-20014	Thrust Washer (used under Selector Arms) Doz.	.18
SB-27507	Tone Arm	1.30
SJ-22404	Tone Arm Cartridge with Sapphire Point Needle	6.36
	Retractable Pin for J-22278 Turntable	.10
SJ-22099	12" Selector Blade	.12
SB-27110	Motor Assembly—115 V., 60 cycles	4.06
SJ-22143	Motor Idler Wheel	.60
SB-27018	Switch Control Knob	.16
SB-27091	Plug Buttons Doz.	.72
	Idler Wheel Tension Spring	.10
SB-27020	Tone Arm Counter Balance Spring	.10
SB-27136	Tone Arm Bracket Assembly	1.50
SH-20143	Panel Mounting Spring	.10
SB-27545	Spring Mounting Stud	.06

Prices Subject to Change Without Notice.

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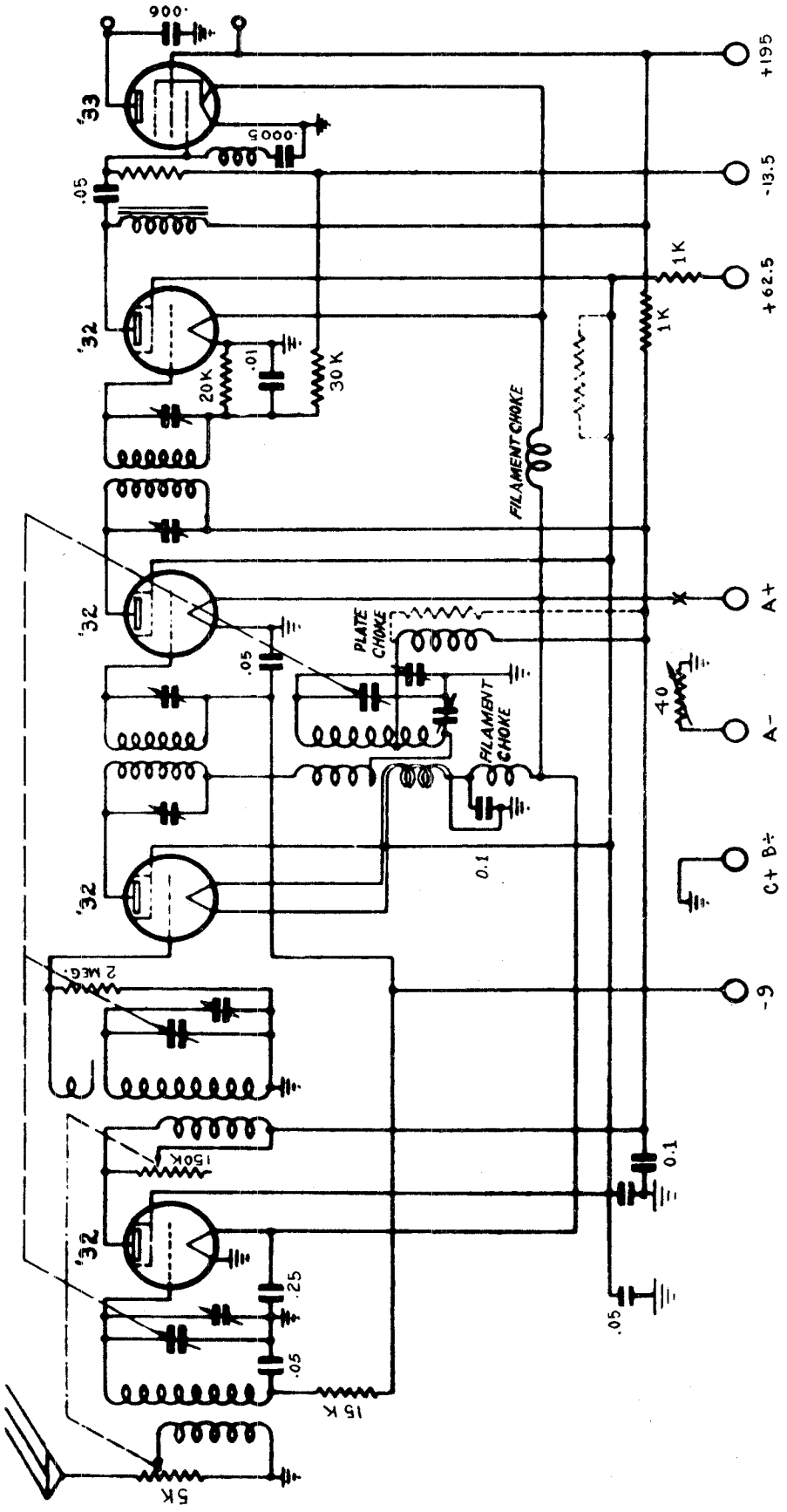

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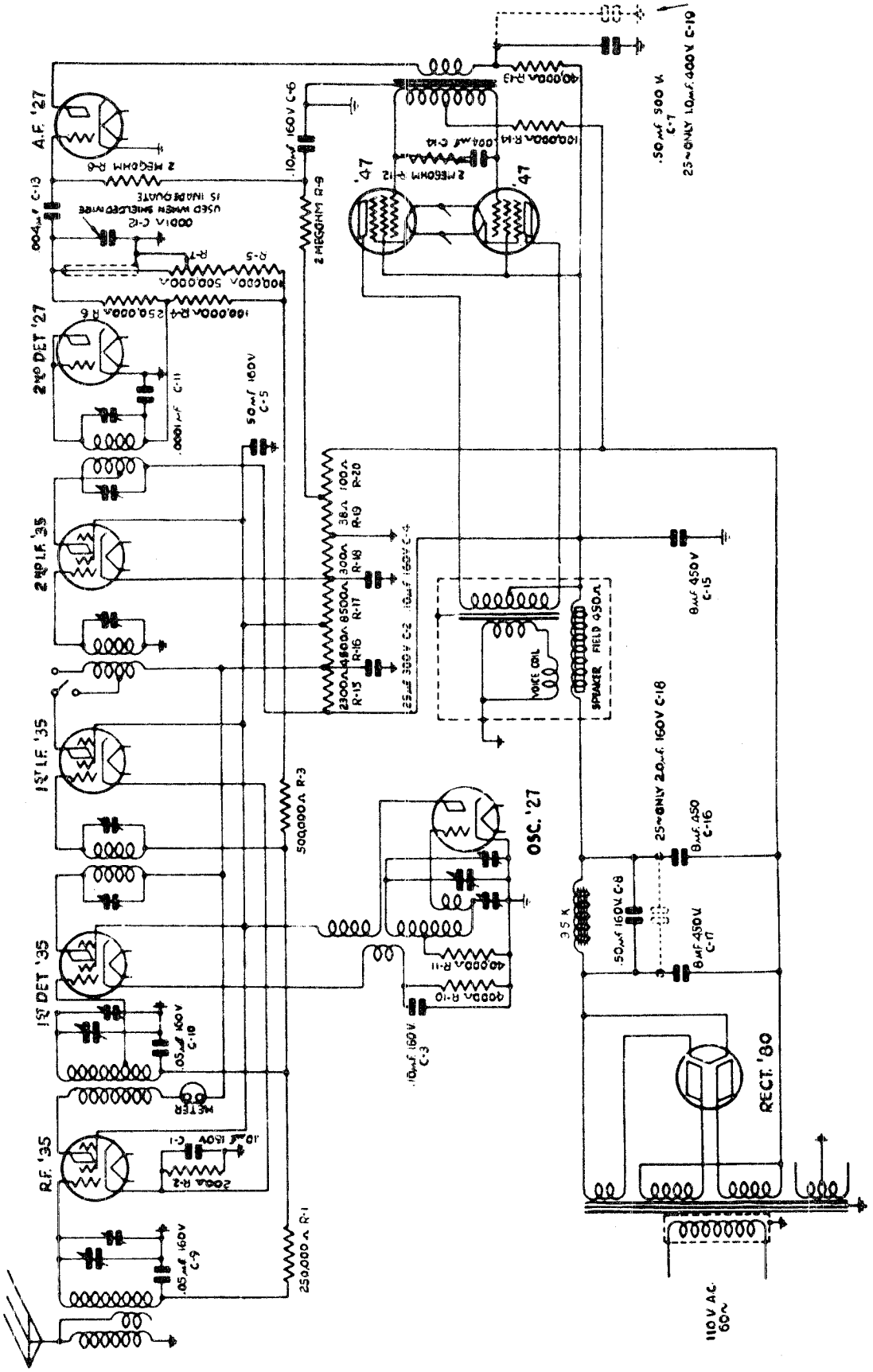
MODEL 24

MONTGOMERY WARD



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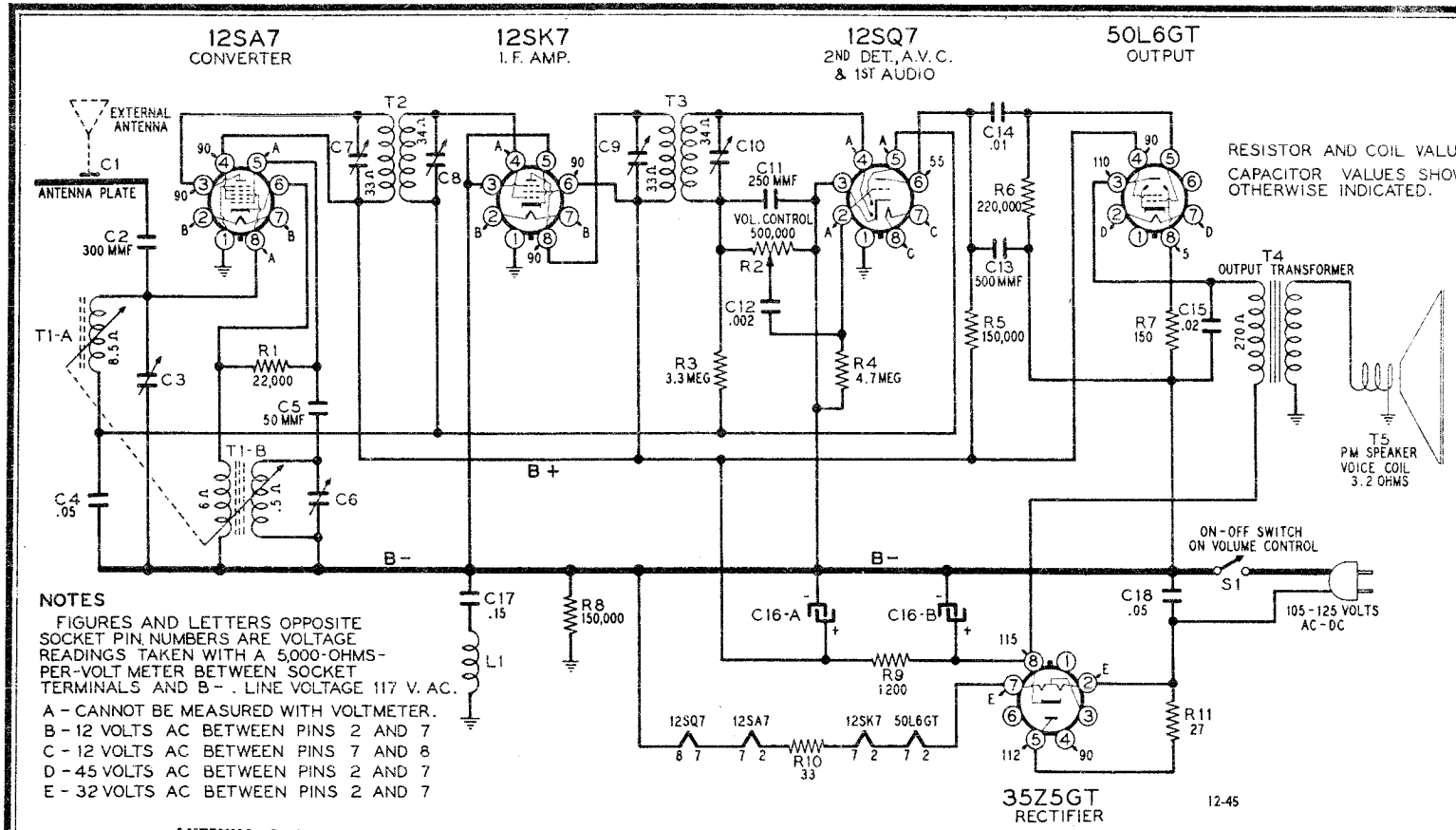


RESISTOR AND COIL VALUES SHOWN IN OHMS.
CAPACITOR VALUES SHOWN IN MFD UNLESS OTHERWISE INDICATED.

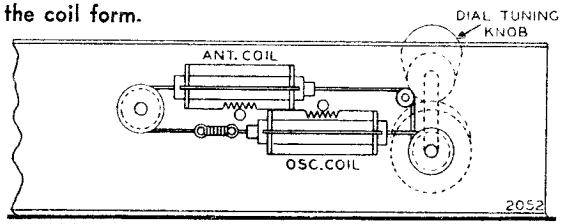
NOTES

FIGURES AND LETTERS OPPOSITE SOCKET PIN NUMBERS ARE VOLTAGE READINGS TAKEN WITH A 5,000-OHMS-PER-VOLT METER BETWEEN SOCKET TERMINALS AND B- . LINE VOLTAGE 117 V. AC.

A - CANNOT BE MEASURED WITH VOLTMETER.
B - 12 VOLTS AC BETWEEN PINS 2 AND 7
C - 12 VOLTS AC BETWEEN PINS 7 AND 8
D - 45 VOLTS AC BETWEEN PINS 2 AND 7
E - 32 VOLTS AC BETWEEN PINS 2 AND 7

ANTENNA COIL ADJUSTMENT

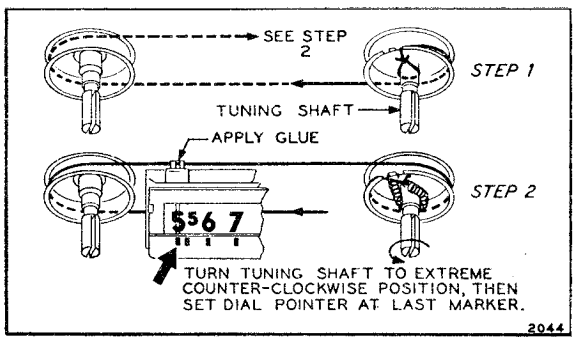
The antenna coil assembly (see illustration) is made so that it is movable left or right. When making the adjustment as required in the alignment procedure, move the coil assembly very slowly, either by hand or by pivoting one edge of the blade of a screwdriver in the hole and engaging the blade in the gear teeth of the coil form.



View of Tuning Coil Assembly.

NOTES ON DRIVE CORD REPLACEMENT

1. Eighteen inches (18") of cord are required.
2. When tying the string to the tension spring (step 2), make sure that the spring takes up all slack.



ELECTRICAL SPECIFICATIONS

Power Supply	105 to 125 volts, DC or 50-60 cycle AC, 28 watts. Also made for 25-cycle AC.
Frequency Range	540 to 1720 kc.
Intermediate Freq.	455 kc.
Selectivity	At 1000 kc, 69 kc at 1000 x signal.
Sensitivity	28 microvolts average for .05 watt output.
Power Output	0.96 watts undistorted, 1.58 watts maximum.
Loud Speaker	4", P.M., v.c. impedance 3.2 ohms.

MODELS 54BR-1501A,
54BR-1502A

MONTGOMERY WARD

Output meter across 3.2-ohm output load.
Volume control at maximum for all adjustments.

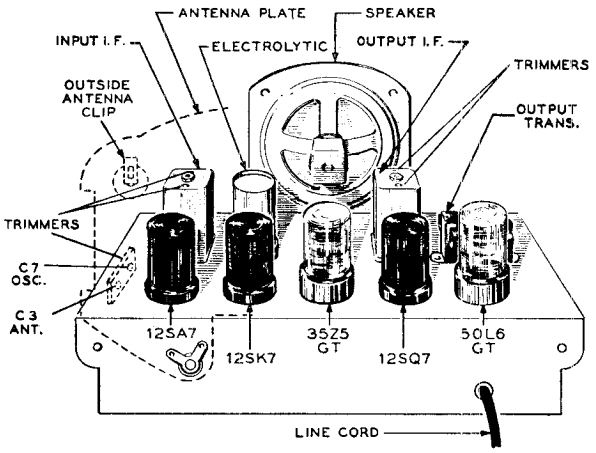
• Align for maximum output.
• Reduce input as needed to keep output near 0.4 volts

SIGNAL GENERATOR				TUNER SETTING	ADJUST TRIMMERS TO MAXIMUM OUTPUT in order shown
Frequency	Coupling Capacitor	Connection to Radio	Ground Connection		
455 kc	.1 mf	Metal antenna plate	12SQ7 Pin 3	Iron cores all the way out	Trimmers on output and input I.F. cans
1720 kc	.1 mf	Metal antenna plate	12SQ7 Pin 3	Iron cores all the way out	Oscillator trimmer C6
1720 kc	200 mmf	External antenna clip	12SQ7 Pin 3	Iron cores all the way out	Antenna trimmer C3
1400 kc	200 mmf	External antenna clip	12SQ7 Pin 3	Turn dial to 1400 kc	Adjust position of ant. coil (see coil assembly view)
1720 kc	200 mmf	External antenna clip	12SQ7 Pin 3	Turn dial to 1720 kc	Antenna trimmer C3*

*After the antenna coil has been tracked at 1400 kc, it is necessary to check the antenna trimmer C3 again at 1720 kc. If no appreciable change in trimmer adjustment is necessary, the coil is in track. If the trimmer requires considerable change, the position of the antenna coil at 1400 kc must be readjusted. These two adjustments should be made several times, until no trimmer adjustment is required at 1720 kc.

The table below lists the sensitivity at the input of each stage. The receiver should be tuned to 1000 kc for all readings. All measurements are based on an output of 50 milliwatts. This may be measured by disconnecting the speaker voice coil and substituting a 3.2-ohm, 5-watt resistor across the secondary winding of the output transformer. A reading of .4 volts AC across this resistor will be equivalent to a 50-milliwatt output with the speaker connected.

The signal source must be an accurately calibrated signal generator capable of supplying both 1000-kc and 455-kc signals modulated 30% with a 400-cycle audio signal. Variations of plus or minus 25% are usually permissible.



SIGNAL GENERATOR				INPUT FOR 50-MILLIWATT OUTPUT
Frequency	Coupling Capacitor	Connection to Radio	Ground Connection	
1000 kc	200 mmf or RMA dummy antenna	External antenna clip	12SQ7 Pin 3	28 microvolts
1000 kc	.1 mf	Converter 12SA7, pin 8	12SQ7 Pin 3	89 microvolts
455 kc	.1 mf	Converter 12SA7, pin 8	12SQ7 Pin 3	79 microvolts
455 kc	.1 mf	I.F. amplifier 12SK7, pin 4	12SQ7 Pin 3	4000 microvolts
400 cycles	.1 mf	Audio amplifier 12SQ7, pin 2	12SQ7 Pin 3	.05 volts
400 cycles	.1 mf	Power amplifier 50L6GT, pin 5	12SQ7 Pin 3	2.2 volts

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MONTGOMERY WARD

MODELS 54BR-1501A, 54BR-1502A
MODELS 54BR-1503A, 54BR-1504A

MODELS 54BR-1503B, 54BR-1504B

MODELS 54BR-1501A, 1502A

Ref. No.	Part No.	Description	Qty. Used in Set
		CAPACITORS	
C1		Washer capacitor mounted on antenna plate	1
C2	BE129114	300 mmf, 20%, mica, 500 volts	1
C3, C6	BE124137	Antenna and oscillator trimmers; dual mounted; C3 (ant.) range is 74 to 136 mmf; C6 (osc.) range is 95 to 175 mmf	1
C4	BE1009	.05 mf, 25%, 200 volts	1
C5	BE12939	50 mmf, 20%, mica, 500 volts	1
C7, C8		Primary and secondary trimmers in input IF can T2; dual mounted; range of each is 39 to 73 mmf	1
C9, C10		Primary and secondary trimmers in output IF can T3; dual mounted; range of each is 39 to 73 mmf	1
C11	BE12912	250 mf, 20%, mica, 500 volts	1
C12	BE10025	.002 mf, 25%, 600 volts	1
C13	BE1292	500 mmf, 20%, mica, 500 volts	1
C14	BE10011	.01 mf, 25%, 400 volts	1
C15	BE10026	.02 mf, 25%, 400 volts	1
C16-A, C16-B	BE11992	Dual electrolytic for 50-60 cycle models: 20 mf, 150 volts; 40 mf, 150 volts	1
	or BE11993	Dual electrolytic for 25 cycle models: 40 mf, 150 volts; 60 mf, 150 volts	1
C17	BE10091	.15 mf, 25%, 400 volts	1
C18	BE10013	.05 mf, 25%, 400 volts	1
		RESISTORS *	
R1	BEA-9B1-78	22,000 ohms, 10%, ½ watt	1
R2, S1	BE101255	500,000-ohm volume control with on-off switch	1
R3	BEA-9B1-34	3.3 megohms, 20%, ½ watt	1
R4	BEA-9B1-35	4.7 megohms, 20%, ½ watt	1
R5, R8	BEA-9B1-26	150,000 ohms, 20%, ½ watt	2
R6	BEA-9B1-27	220,000 ohms, 20%, ½ watt	1
R7	BEA-9B1-52	150 ohms, 10%, ½ watt	1
R9	BEA-9B2-63	1200 ohms, 10%, 1 watt	1
R10	BEA-9B2-4	33 ohms, 20%, 1 watt	1
R11	BEA-9B1-43	27 ohms, 10%, ½ watt	1
		COILS AND TRANSFORMERS	
L1	BE105138	RF choke coil	1
T1-A, T1-B	BE13614	Antenna and oscillator coil tuning assembly complete with cores, drive cord, and tuning drive shaft	1
T2	BE108157H	Input IF transformer complete in can with trimmers	1
T3	BE108157I	Output IF transformer complete in can with trimmers	1
T4	BE105128B	Output transformer for speaker	1
		SPEAKER	
T5	BEB-18A-10251	4-inch P. M. speaker	1
		SOCKETS	
	BE121176	Octal wafer socket stamped "12SA7"	1
	BE121177	Octal wafer socket stamped "12SK7"	1
	BE121178	Octal wafer socket stamped "12SQ7"	1
	BE121318	Octal wafer socket stamped "50L6GT"	1
	BE121181	Octal wafer socket stamped "35Z5GT"	1
	BE121216	Bakelite socket for electrolytic capacitor	1
		DIAL AND TUNING PARTS	
	BEA-6D-10049-1	Dial scale, ivory	1
	BEA-6D-10049-2	Dial scale, walnut	1
	BEA-2D-10050	Dial background	1
	BE115731	Dial bracket	1
	BEA-2G-10051	Dial pointer	1
	BE120214	Dial pointer drive cord	18"
	BE120364	Coil spring for drive cord	1
	BE128660-9	Knob, "VOLUME", ivory	1
	BE128660-46	Knob, "VOLUME", walnut	1
	BE128661-9	Knob, "TUNING", ivory	1
	BE128661-46	Knob, "TUNING", walnut	1
		MISCELLANEOUS	
S1		On-off switch on volume control R2	1
	BE115597C	Antenna plate (back plate of cabinet, includes capacitor C1), ivory	1
	BE115597	Antenna plate (back plate of cabinet, includes capacitor C1), walnut	1
	BE131193	Cinch buttons, for fastening antenna plate to cabinet	4
	BE128652-9	Cabinet, bakelite, ivory	1
	BE128652-46	Cabinet, bakelite, walnut	1
	BE10798E	Line cord and plug	1
	BEA-2H-10715	Tube shield (12SA7, 50L6GT)	2
	BE134103	Rubber washers for mounting chassis	2
	BE131263	Offset washers for mounting chassis	2
	BE13220	Screws, 6—32 x 3/8", for mounting chassis	2

MODELS 54BR-1503A, 1504A

Ref. No.	Part No.	Description	Qty. Used in Set
		CAPACITORS	
C, C3, C4	B-210-10040	2-gang capacitor assembly, including antenna and oscillator trimmers	1
C1	C-8D-10761	.01 mf, 400 volts, 20%	1
C2, C8, C9	C-8F3-10	220 mmf, 500 volts, 20%, mica	3
C5, C7	C-8F3-8	100 mmf, 500 volts, 20%, mica	2
C6	C-8D-10770	.05 mf, 200 volts, 20%	1
C10	C-8D-10788	.004 mf, 600 volts, 20%	1
C11	C-8D-10772	.02 mf, 600 volts, 20%	1
C12, C16	C-8D-10760	.1 mf, 400 volts, +20—10%	2
C13, C14, C15	A-8C-10077	Electrolytic for 60 cycles; 40 mf x 150 volts, 20 mf x 150 volts, 20 mf x 150 volts	1
C13, C14, C15	A-8C-10946	Electrolytic for 25 cycles; 60 mf x 150 volts, 40 mf x 150 volts, 40 mf x 150 volts	1
C17	C-8D-10789	.002 mf, 600 volts, 20%	1
C18	C-8D-10771	.1 mf, 200 volts, +20—10%	1
		RESISTORS *	
R1	C-9B1-13	1000 ohms, ½ watt, 20%	1
R2	C-9B1-31	1 megohm, ½ watt, 20%	1
R3	C-9B1-78	22,000 ohms, ½ watt, 10%	1
R4, R9	C-9B1-90	220,000 ohms, ½ watt, 10%	2
R5	C-9B1-82	47,000 ohms, ½ watt, 10%	1
R6, S1	A-10A-10075	Volume control (500,000 ohms) and switch	1
R7	C-9B1-34	3.3 megohms, ½ watt, 20%	1
R8	C-9B1-37	10 megohms, ½ watt, 20%	1
R10	C-9B1-94	470,000 ohms, ½ watt, 10%	1
R11	C-9B1-52	150 ohms, ½ watt, 10%	1
R12	C-9B1-43	27 ohms, ½ watt, 10%	1
R13	C-9B2-53	180 ohms, 1 watt, 10%	1
R14	C-9B2-63	1200 ohms, 1 watt, 10%	1
R15	C-9B1-5	47 ohms, ½ watt, 20%	1
		TRANSFORMERS AND COILS	
L1	A-16A-10090	Choke coil	1
T1	C-212-10435	Loop antenna assembly, for walnut cabinet (includes loop, back, resistor R1, and capacitor C1)	1
T1	C-212-10435-1	Loop antenna assembly, for ivory cabinet (includes loop, back, resistor R1, and capacitor C1)	1
T2	A-13D-10089	Oscillator coil	1
T3	B-13B-10091	Input IF transformer, complete in can. (Range of trimmers: 45-85 mmf each)	1
T4	B-13B-10092	Output IF transformer, complete in can. (Range of trimmers: 43-80 mmf each)	1
T5	B-12C-10074	Output transformer for speaker	1
		SPEAKER	
T6	B-18A-10094	4-in. x 6-in. oval P.M. speaker	1
		DIAL AND TUNING PARTS	
	B-200-10447	Dial bracket assembly	1
	B-6D-10031	Dial scale (for walnut cabinet)	1
	B-6D-10031-1	Dial scale (for ivory cabinet)	1
	A-6A-11078	Diffuser	1
	B-2M-7758	Cinch button, for fastening dial scale	7
	A-6J-10032	Crystal for dial	1
	A-2D-10036	Bracket for crystal	1
	A-2G-10095	Pointer	1
	B-2H-10039	Pointer guard (for walnut cabinet)	1
	B-2H-10039-1	Pointer guard (for ivory cabinet)	1
	A-53A-10576	Drive cord for dial pointer	36"
	A-49A-10078	Tension spring for dial drive cord	1
	A-46A-3560	Dial light bulb, 6-8 volts, type T-47	1
	A-55A-10093	Socket and bracket for dial light	1
	A-3A-10035	Tuning shaft	1
	B-29E-466	Spring washer, for tuning shaft	1
		MISCELLANEOUS	
	5C-10000-46	Cabinet, bakelite, walnut	1
	5C-10000-9	Cabinet, bakelite, ivory	1
	B-5B-10011-47	Knob, tenite, walnut	2
	B-5B-10011-8	Knob, tenite, ivory	2
	A-15B-10440	Socket, octal, for tubes	5
	B-14M-10088	Line cord and plug	1
	A-2M-10096	Stud, for fastening back to cabinet	4
	42A-10097	Screw, 8-18 x 7/8 hex head, for mounting chassis	3

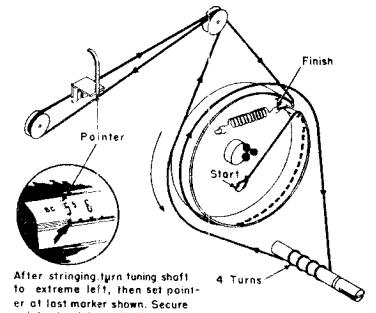
*The values of the resistors listed above are based on RMA standards. Due to conditions beyond our control some receivers have been shipped with resistors of pre-standardized values. This receiver will operate equally well with resistors of either group. An illustration of the difference follows:

Pre-standardized value—50,000 ohms, ±10%, ⅓ watt
RMA value—47,000 ohms, ±10%, ½ watt

NOTE ON TUBE REPLACEMENT

Replace a defective metal 12SK7 tube with another metal tube. Replace a glass 12SK7 tube with a metal tube or with an exact duplicate of the tube now in the set.

MODELS 54BR-1503B, 1504B



After stringing, turn tuning shaft to extreme left, then set pointer at last marker shown. Secure pointer to string with glue.

203-A

Dial Stringing Diagram

Ref. No.	Part No.	Description	Qty. Used in Set
		CAPACITORS	
C, C3, C4	B-210-10040	2-gang capacitor assembly, including antenna and oscillator trimmers	1
C1	C-8D-10761	.01 mf, 400 volts, 20%	1
C2, C8, C9	C-8F3-10	220 mmf, 500 volts, 20%, mica	3
C5, C7	C-8F3-8	100 mmf, 500 volts, 20%, mica	2
C6	C-8D-10770	.05 mf, 200 volts, 20%	1
C10	C-8D-10788	.004 mf, 600 volts, 20%	1
C11	C-8D-10772	.02 mf, 600 volts, 20%	1
C12, C16	C-8D-10760	.1 mf, 400 volts, +20—10%	2
C13, C14, C15	A-8C-10077	Electrolytic for 60 cycles; 40 mf x 150 volts, 20 mf x 150 volts, 20 mf x 150 volts	1
C13, C14, C15	A-8C-10946	Electrolytic for 25 cycles; 60 mf x 150 volts, 40 mf x 150 volts, 40 mf x 150 volts	1
C17	C-8D-10789	.002 mf, 600 volts, 20%	1
C18	C-8D-10771	.1 mf, 200 volts, +20—10%	1
		RESISTORS *	
R1	C-9B1-13	1000 ohms, ½ watt, 20%	1
R2	C-9B1-31	1 megohm, ½ watt, 20%	1
R3	C-9B1-78	22,000 ohms, ½ watt, 10%	1
R4, R9	C-9B1-90	220,000 ohms, ½ watt, 10%	2
R5	C-9B1-82	47,000 ohms, ½ watt, 10%	1
R6, S1	A-10A-10075	Volume control (500,000 ohms) and switch	1
R7	C-9B1-34	3.3 megohms, ½ watt, 20%	1
R8	C-9B1-37	10 megohms, ½ watt, 20%	1
R10	C-9B1-94	470,000 ohms, ½ watt, 10%	1
R11	C-9B1-52	150 ohms, ½ watt, 10%	1
R12	C-9B1-43	27 ohms, ½ watt, 10%	1
R13	C-9B2-53	180 ohms, 1 watt, 10%	1
R14	C-9B2-63	1200 ohms, 1 watt, 10%	1
R15	C-9B1-5	47 ohms, ½ watt, 20%	1
		TRANSFORMERS AND COILS	
L1	A-16A-10090	Choke coil	1
T1	C-212-10435	Loop antenna assembly, for walnut cabinet (includes loop, back, resistor R1, and capacitor C1)	1
	or C-212-11058		
T1	C-212-10435-1	Loop antenna assembly, for ivory cabinet (includes loop, back, resistor R1, and capacitor C1)	1
	or C-212-11058-1		
T2	A-13D-10089	Oscillator coil	1
T3	B-13B-10091	Input IF transformer, complete in can. (Range of trimmers: 45-85 mmf each)	1
T4	B-13B-10092	Output IF transformer, complete in can. (Range of trimmers: 43-80 mmf each)	1
T5	B-12C-10074	Output transformer for speaker	1
		SPEAKER	
T6	B-18A-10094	4-in. x 6-in. oval P.M. speaker	1
		DIAL AND TUNING PARTS	
	B-200-10447	Dial bracket assembly	1
	B-6D-10031	Dial scale (for walnut cabinet)	1
	B-6D-10031-1	Dial scale (for ivory cabinet)	1
	A-6A-11078	Diffuser	1
	B-2M-7758	Cinch button, for fastening dial scale	7
	A-6J-10032	Crystal for dial	1
	A-2D-10036	Bracket for crystal (walnut)	2
	A-2D-10036-1	Bracket for crystal (ivory)	2
	A-2G-10095	Pointer	1
	B-2H-10039	Pointer guard (for walnut cabinet)	1
	B-2H-10039-1	Pointer guard (for ivory cabinet)	1
	A-53A-10576	Drive cord for dial pointer	36"
	A-49A-10078	Tension spring for dial drive cord	1
	A-46A-3560	Dial light bulb, 6-8 volts, type T-47	1
	A-55A-10093	Socket and bracket for dial light	1
	A-3A-10035	Tuning shaft	1
	B-29E-466	Spring washer, for tuning shaft	1
		MISCELLANEOUS	
	5C-10000-46	Cabinet, bakelite, walnut	1
	5C-10000-9	Cabinet, bakelite, ivory	1
	B-5B-10011-17	Knob, tenite, walnut	2
	B-5B-10011-8	Knob, tenite, ivory	2
	A-15B-10440	Socket, octal, for all tubes but 12SK7	4
	121177	Socket, octal, for 12SK7	1
	B-14M-10088	Line cord and plug	1
	A-2M-10096	Stud for fastening back to cabinet	4
	42A-10097	Screw, 8-18 x 7/8 hex head, for mounting chassis	3

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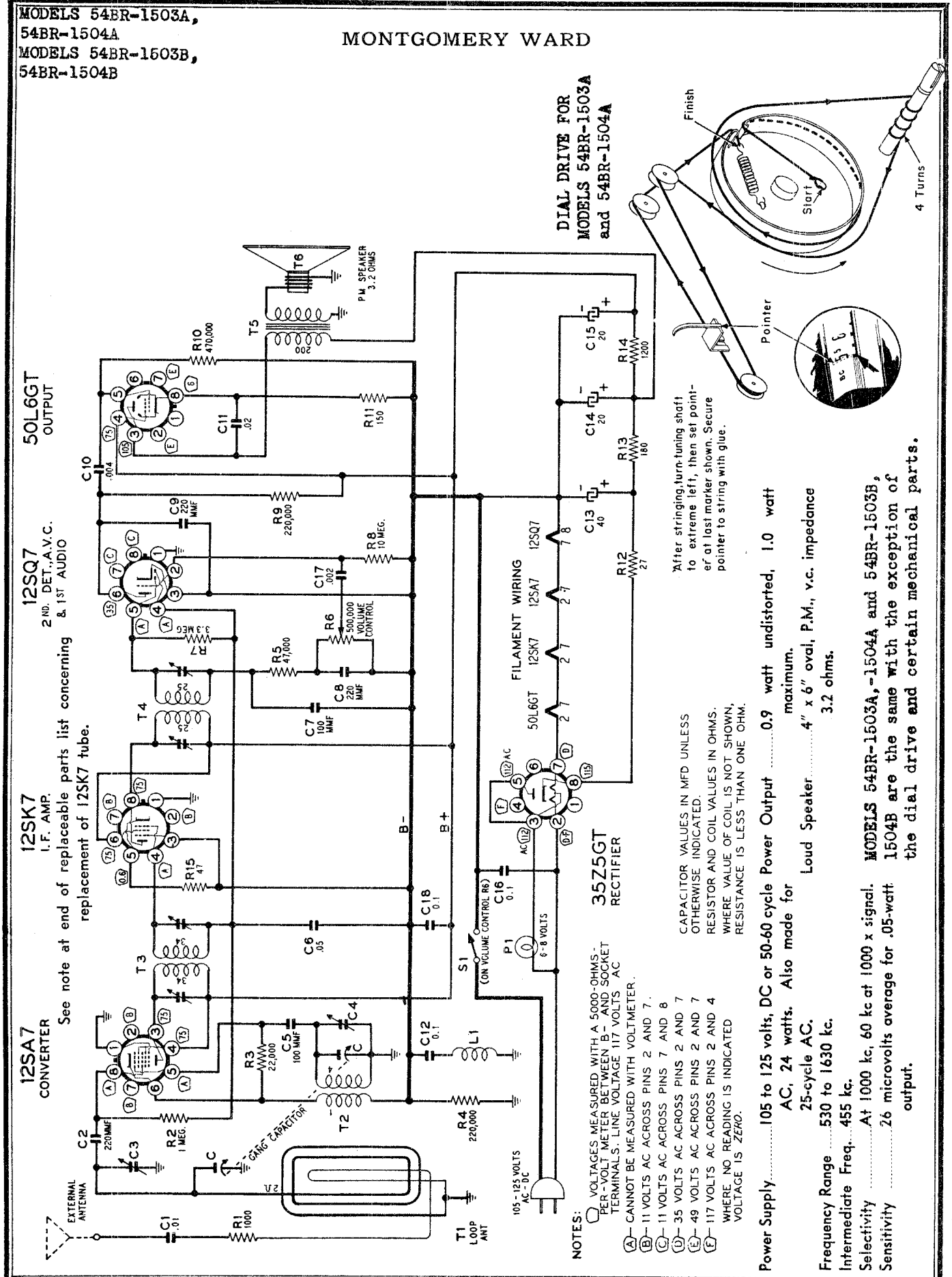
MODELS 54BR-1503A,
54BR-1504A
MODELS 54BR-1503B,
54BR-1504B

MONTGOMERY WARD


12SA7
CONVERTER
12SK7
I.F. AMP.
12SQ7
2ND. DET., A.V.C. & 1ST AUDIO
50L6GT
OUTPUT
35Z5GT
RECTIFIER
See note at end of replaceable parts list concerning replacement of 12SK7 tube.
FILAMENT WIRING
50L6GT 12SK7 12SA7 12SQ7
DIAL DRIVE FOR MODELS 54BR-1503A and 54BR-1504A
Finish
Start
4 Turns
Pointer
After stringing, turn tuning shaft to extreme left, then set pointer at last marker shown. Secure pointer to string with glue.
P.M. SPEAKER 3.2 OHMS
GANG CAPACITOR
EXTERNAL ANTENNA
105-125 VOLTS AC-DC
(ON VOLUME CONTROL R6)
6-8 VOLTS
B+
B-
CAPACITOR VALUES IN MFD UNLESS OTHERWISE INDICATED.
RESISTOR AND COIL VALUES IN OHMS.
WHERE VALUE OF COIL IS NOT SHOWN, RESISTANCE IS LESS THAN ONE OHM.
NOTES:
VOLTAGES MEASURED WITH A 5000-OHMS-PER-VOLT METER BETWEEN B- AND SOCKET TERMINALS. LINE VOLTAGE 117 VOLTS AC
(A) CANNOT BE MEASURED WITH VOLTMETER.
(B) 11 VOLTS AC ACROSS PINS 2 AND 7.
(C) 11 VOLTS AC ACROSS PINS 7 AND 8
(D) 35 VOLTS AC ACROSS PINS 2 AND 7
(E) 49 VOLTS AC ACROSS PINS 2 AND 7
(F) 117 VOLTS AC ACROSS PINS 2 AND 4
WHERE NO READING IS INDICATED VOLTAGE IS ZERO.

Power Supply.....105 to 125 volts, DC or 50-60 cycle AC, 24 watts. Also made for 25-cycle AC.

Power Output.....0.9 watt undistorted, 1.0 watt maximum.

Frequency Range.....530 to 1630 kc.

Loud Speaker.....4" x 6" oval, P.M., v.c. impedance 3.2 ohms.

Intermediate Freq....455 kc.

Selectivity.....At 1000 kc, 60 kc at 1000 x signal.

Sensitivity.....26 microvolts average for .05-watt output.

MODELS 54BR-1503A, -1504A and 54BR-1503B, 1504B are the same with the exception of the dial drive and certain mechanical parts.

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For Parts list, see P.15-21

MONTGOMERY WARD

MODELS 54BR-1503A, 54BR-1504A
MODELS 54BR-1503B, 54BR-1504B
MODELS 54BR-1503C, 54BR-1504C

ALIGNMENT PROCEDURE

Output meter across 3.2-ohm output load.
Volume control at maximum for all adjustments.
Align for maximum output. Reduce input as needed to keep output near 0.4 volts.
Loop antenna should be connected to receiver and in its proper position when making adjustments.

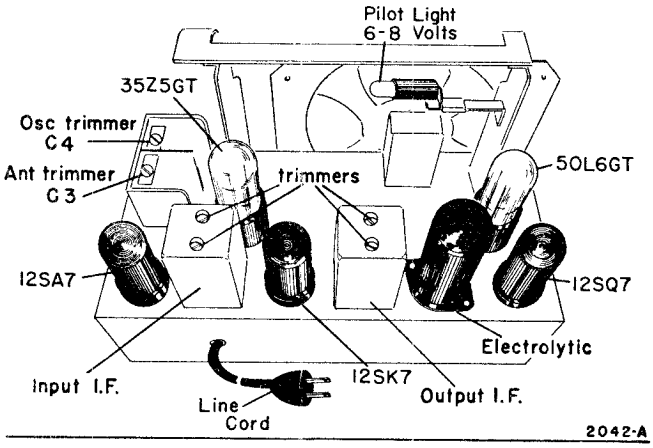
SIGNAL GENERATOR				TUNER SETTING	ADJUST TRIMMERS TO MAXIMUM OUTPUT in order shown
Frequency	Coupling Capacitor	Connection to Radio	Ground Connection		
455 kc	0.1 mf	Grid (pin 4) of 12SK7	Pin 3 of 12SK7 (B- of set)	Capacitor full open (plates out of mesh)	2 trimmers on output IF can
455 kc	0.1 mf	Grid (pin 8) of 12SA7	Pin 3 of 12SK7 (B- of set)	Capacitor full open (plates out of mesh)	2 trimmers on input IF can
1630 kc	0.1 mf	Grid (pin 8) of 12SA7	Pin 3 of 12SK7 (B- of set)	Capacitor full open (plates out of mesh)	Oscillator trimmer C4 on gang
1400 kc	200 mmf	External antenna clip	Pin 3 of 12SK7 (B- of set)	Set dial pointer at 1400 kc	Antenna trimmer C3 on gang

RECEIVER STAGE SENSITIVITIES

The table below lists the sensitivity at the input of each stage. The receiver should be tuned to 1000 kc for all readings. All measurements are based on an output of 50 milliwatts. This may be measured by disconnecting the speaker voice coil and substituting a 3.2-ohm, 5-watt resistor across the secondary winding of the output transformer. A reading of 0.4 volts AC across this resistor will be equivalent to a 50-milliwatt output with the speaker connected.

The signal source must be an accurately calibrated signal generator capable of supplying both 1000 kc and 455 kc signals modulated 30% with a 400-cycle audio signal. Variations of plus or minus 25% are usually permissible.

The volume control must be set to maximum.



Chassis View, Showing Trimmer Location

SIGNAL GENERATOR				INPUT FOR 50-MILLIWATT OUTPUT
Frequency	Coupling Capacitor	Connection to Radio	Ground Connection	
1000 kc	200 mmf or RMA dummy antenna	External antenna clip	Pin 3 of 12SK7 (B- of set)	24 microvolts
1000 kc	0.1 mf	Grid (pin 8) of converter (12SA7)	Pin 3 of 12SK7 (B- of set)	98 microvolts
455 kc	0.1 mf	Grid (pin 8) of converter (12SA7)	Pin 3 of 12SK7 (B- of set)	74 microvolts
455 kc	0.1 mf	Grid (pin 4) of I.F. amp. (12SK7)	Pin 3 of 12SK7 (B- of set)	3200 microvolts
400 cycles	0.1 mf	Grid (pin 2) of audio amp. (12SQ7)	Pin 3 of 12SK7 (B- of set)	.043 volts
400 cycles	0.1 mf	Grid (pin 5) of output amp. (50L6GT)	Pin 3 of 12SK7 (B- of set)	2.0 volts

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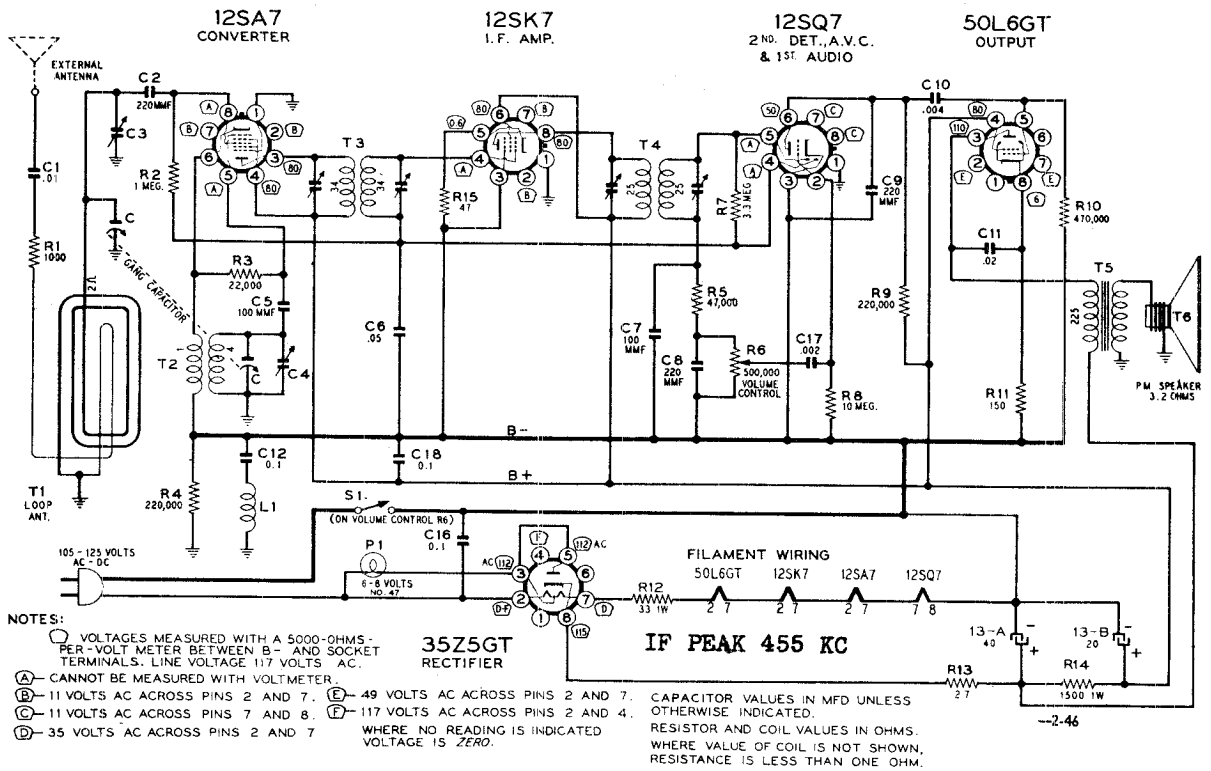
MODELS 54BR-1503C,
54BR-1504C

MONTGOMERY WARD



NOTES:

VOLTAGES MEASURED WITH A 5000-OHMS-PER-VOLT METER BETWEEN B- AND SOCKET TERMINALS. LINE VOLTAGE 117 VOLTS AC.

(A)— CANNOT BE MEASURED WITH VOLTMETER.
(B)— 11 VOLTS AC ACROSS PINS 2 AND 7.
(C)— 11 VOLTS AC ACROSS PINS 7 AND 8.
(D)— 35 VOLTS AC ACROSS PINS 2 AND 7
(E)— 49 VOLTS AC ACROSS PINS 2 AND 7.
(F)— 117 VOLTS AC ACROSS PINS 2 AND 4.

WHERE NO READING IS INDICATED VOLTAGE IS *ZERO*.

CAPACITOR VALUES IN MFD UNLESS OTHERWISE INDICATED.
RESISTOR AND COIL VALUES IN OHMS.
WHERE VALUE OF COIL IS NOT SHOWN, RESISTANCE IS LESS THAN ONE OHM.

Ref. No.	Part No.	Description	Qty. Used in Set
		CAPACITORS *	
C, C3, C4	B-210-10040	2-gang capacitor assembly, including antenna and oscillator trimmers	1
C1	C-8D-10761	.01 mf, 400 volts, 20%	1
C2, C8, C9	C-8F3-10	220 mmf, 500 volts, 20%, mica	3
C5, C7	C-8F3-8	100 mmf, 500 volts, 20%, mica	2
C6	C-8D-10770	.05 mf, 200 volts, 20%	1
C10	C-8D-10788	.004 mf, 600 volts, 20%	1
C11	C-8D-10772	.02 mf, 600 volts, 20%	1
C12, C16	C-8D-10760	.1 mf, 400 volts, +20—10%	2
C13-A,-B	11992	Electrolytic for 60 cycles; 40 mf x 150 volts, 20 mf x 150 volts	1
C13-A,-B	11993	Electrolytic for 25 cycles; 60 mf x 150 volts, 40 mf x 150 volts	1
C17	C-8D-10789	.002 mf, 600 volts, 20%	1
C18	C-8D-10771	.1 mf, 200 volts, +20—10%	1
		RESISTORS *	
R1	C-9B1-13	1000 ohms, 1/2 watt, 20%	1
R2	C-9B1-31	1 megohm, 1/2 watt, 20%	1
R3	C-9B1-78	22,000 ohms, 1/2 watt, 10%	1
R4, R9	C-9B1-90	220,000 ohms, 1/2 watt, 10%	2
R5	C-9B1-82	47,000 ohms, 1/2 watt, 10%	1
R6, S1	A-10A-10075	Volume control (500,000 ohms) and switch	1
R7	C-9B1-34	3.3 megohms, 1/2 watt, 20%	1
R8	C-9B1-37	10 megohms, 1/2 watt, 20%	1
R10	C-9B1-94	470,000 ohms, 1/2 watt, 10%	1
R11	C-9B1-52	150 ohms, 1/2 watt, 10%	1
R12	C-9B2-44	33 ohms, 1 watt, 10%	1
R13	C-9B1-43	27 ohms, 1/2 watt, 10%	1
R14	C-9B2-64	1500 ohms, 1 watt, 10%	1
R15	C-9B1-5	47 ohms, 1/2 watt, 20%	1
		TRANSFORMERS AND COILS	
L1	A-16A-10090	Choke coil	1
T1	C-212-10435 or C-212-11058	Loop antenna assembly, for walnut cabinet (includes loop, back, resistor R1, and capacitor C1)	1
T1	C-212-10435-1 or C-212-11058-1	Loop antenna assembly, for ivory cabinet (includes loop, back, resistor R1, and capacitor C1)	1
T2	A-13D-10089	Oscillator coil	1
T3	B-13B-10091	Input IF transformer, complete in can. (Range of trimmers: 45-85 mmf each)	1
T4	B-13B-10092	Output IF transformer, complete in can. (Range of trimmers: 43-80 mmf each)	1
T5	B-12C-10074	Output transformer for speaker	1
		SPEAKER	
T6	B-18A-10094	4-in. x 6-in. oval P.M. speaker	1
		DIAL AND TUNING PARTS	
	B-200-10447	Dial bracket assembly	1
	B-6D-10031	Dial scale (for walnut cabinet)	1
	B-6D-10031-1	Dial scale (for ivory cabinet)	1
	A-6A-11078	Diffuser	1
	B-2M-7758	Cinch button, for fastening dial scale	7
	A-6J-10032	Crystal for dial	1
	A-2D-10036	Bracket for crystal (walnut)	2
	A-2D-10036-1	Bracket for crystal (ivory)	2
	A-2G-10095	Pointer	1
	B-2H-10039	Pointer guard (for walnut cabinet)	1
	B-2H-10039-1	Pointer guard (for ivory cabinet)	1
	A-53A-10576	Drive cord for dial pointer	36"
	A-49A-10078	Tension spring for dial drive cord	1
	A-46A-3560	Dial light bulb, 6-8 volts, type T-47	1
	A-55A-10093	Socket and bracket for dial light	1
	A-3A-10035	Tuning shaft	1
	B-29E-466	Spring washer, for tuning shaft	1
		MISCELLANEOUS	
	5C-10000-46	Cabinet, bakelite, walnut	1
	5C-10000-9	Cabinet, bakelite, ivory	1
	B-5B-10011-17	Knob, tenite, walnut	2
	B-5B-10011-8	Knob, tenite, ivory	2
	A-15B-10440	Socket, octal, for all tubes but 12SK7	4
	121177	Socket, octal, for 12SK7	1
	B-14M-10088	Line cord and plug	1
	A-2M-10096	Stud, for fastening back to cabinet	4
	42A-10097	Screw, 8-18 x 7/8 hex head, for mounting chassis	3

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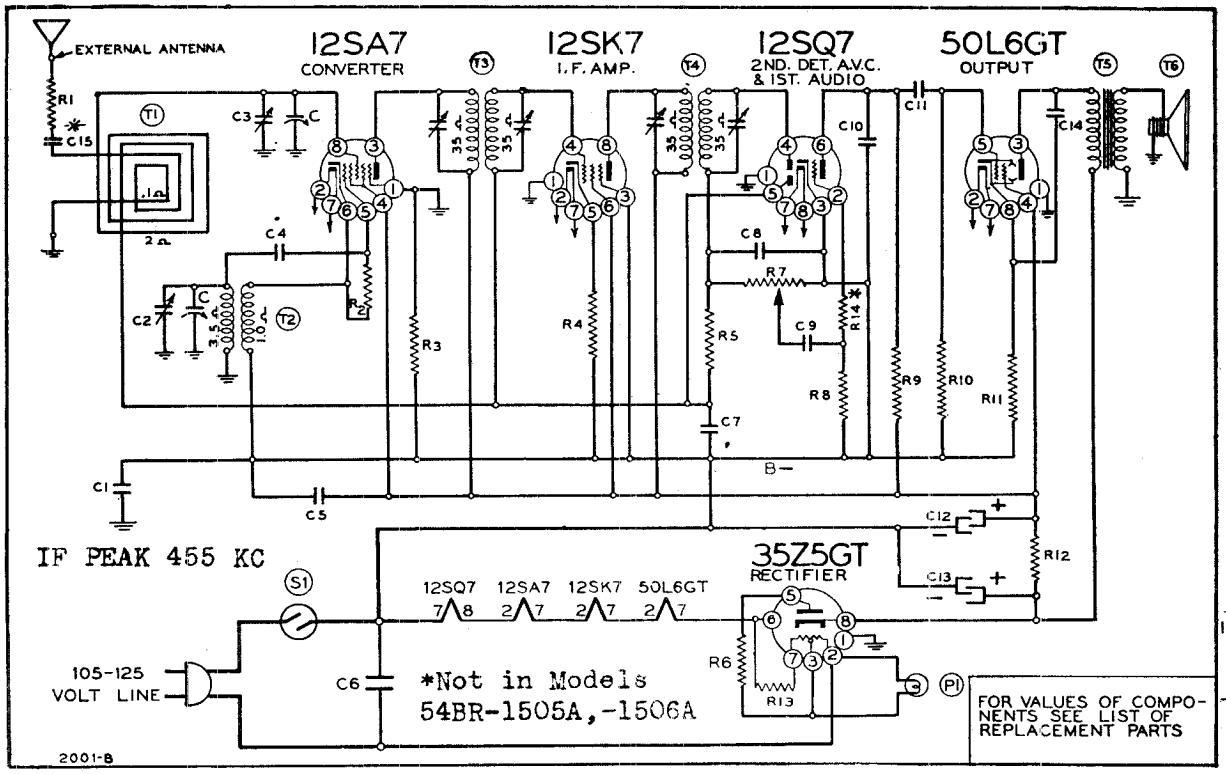
For Alignment, see P.15-23

MONTGOMERY WARD MODELS 54BR-1505A, 54BR-1506A, MODELS 54BR-1505B, 54BR-1506B



Part No.	Schematic Diagram Reference	Description	No. Used In Set
		CONDENSERS	
BE100110	C1	.2 x 400 volt tubular condenser	1
BE12921	C4	.0002 mica type condenser, 20%	1
BE1009	C5, C7	.05 x 200 volt tubular condenser	2
BE1001	C6	.1 x 400 volt tubular condenser	1
BE1295	C8	.0001 mica type condenser, 20%	1
BE10025	C9	.002 x 600 volt tubular condenser	1
BE12912	C10	.00025 mica type condenser, 20%	1
BE100106	C11	.004 x 600 volt tubular condenser	1
BE11992	C12, C13	Electrolytic filter condenser, 50 to 60 cycles, 20 mfd.–40 mfd. x 150 volts	1
BE11993	C12, C13	Electrolytic filter condenser, 25 cycles, 40 mfd.–60 mfd. x 150 volts	1
BE10026	C14	.02 x 400 volt tubular condenser	1
BEC-8D-10778	C15 *	.002 x 600 volt tubular condenser	1
		RESISTORS*	
BEA-9B1-13	R1	1,000 ohm, ½ watt resistor, 20%	1
BEA-9B1-82	R2	47,000 ohm, ½ watt resistor, 10%	1
BEA-9B1-27	R3	220,000 ohm, ½ watt resistor, 20%	1
BEA-9B1-46	R4	47 ohm, ½ watt resistor, 10%	1
BEA-9B1-34	R5	3.3 megohm, ½ watt resistor, 20%	1
BEA-9B1-42	R6	22 ohm, ½ watt resistor, 10%	1
BEA-9B1-35	R8	4.7 megohm, ½ watt resistor, 20%	1
BEA-9B1-29	R9	470,000 ohm, ½ watt resistor, 20%	1
BEA-9B1-30	R10	680,000 ohm, ½ watt resistor, 20%	1
BEA-9B1-52	R11	150 ohm, ½ watt resistor, 10%	1
BEA-9B2-63	R12	1200 ohm, 1 watt resistor, 10%	1
BEA-9B2-4	R13	33 ohm, 1 watt resistor, 20%	1
BEA-9B1-23	R14 *	47,000 ohm, ½ watt resistor, 20%	1
		COILS	
BE108140K	T3	Input I.F. coil, complete in can	1
BE108141F	T4	Output I.F. coil, complete in can	1
BE110145	T2	Oscillator coil	1
BE111252B	T1	Loop antenna only (less back)	1
BE128724		Back for loop, brown	1
BE128724B		Back for loop, ivory	1

*SPECIAL NOTE ON RESISTORS: The values of all resistors listed above are based on RMA standards. Due to conditions beyond our control some receivers have been shipped with resistors of pre-standardized values. This receiver will operate equally well with resistors of either group. An illustration of the difference follows:

Pre-standardized value—50,000 ohms, ±10%, 1/3 watt
RMA value—47,000 ohms, ±10%, 1/2 watt

NOTE ON TUBE REPLACEMENT

Replace a defective metal 12SK7 tube wtih another metal tube. Replace a glass 12SK7 tube with either a metal tube or with an exact duplicate of the tube now in the set.

Part No.	Schematic Diagram Reference	Description	No. Used in Set
		SPEAKER	
BE114248C	T6	Five-inch P.M. dynamic speaker (less output transformer)	1
BE105108B	T5	Output transformer for speaker	1
		MISCELLANEOUS	
BE101265	R7, S1	Volume control and switch (1 megohm)	1
BEB-8A-10209	C, C2, C3	Two-gang variable condenser with 5-button automatic tuner assembly	1
BE107-98		Line cord and plug	1
BE121210		Eight-prong octal socket	5
BE107249	P1	6-8 volt pilot light bulb, type T-47	1
BE107358		Socket assembly for pilot light	1
BE132264		No. 8-18 x ¾ chassis mounting screw	1
BE134123		Rubber bumper for bottom of cabinet	4
BE128655-46		Bakelite cabinet, walnut	1
BE128655-9		Bakelite cabinet, ivory	1
		DIAL AND TUNING PARTS	
BE112945B		Dial plate	1
BEB-6D-10117		Dial scale (Model 54BR-1505A only)	1
BEB-6D-10117-1		Dial scale (Model 54BR-1506A only)	1
BEB-2G-10118		Pointer	1
BE112969		Crystal for dial	1
BEA-2M-7758		Button for fastening dial scale	2
BE120375		String for dial	3 ft.
BE120372		Coiled tension spring for dial string	1
BE112959		Pulley for dial	1
BE117910		Pointer shaft	1
BEA-3A-10119		Tuning shaft	1
BE117902		Rod for pushbuttons	1
BE128795-47		Pushbutton, left, walnut	2
BE128794-47		Pushbutton, right, walnut	3
BE128795-8		Pushbutton, left, ivory	2
BE128794-8		Pushbutton, right, ivory	3
BE112973		Set of station call letters	1 set
BE112979		Set of celluloid tabs	1 set
BE128686-47		Knob, "Volume," walnut	1
BE128687-47		Knob, "Tuning," walnut	1
BE128686-8		Knob, "Volume," ivory	1
BE128687-8		Knob, "Tuning," ivory	1
BE131383		Screwdriver	1

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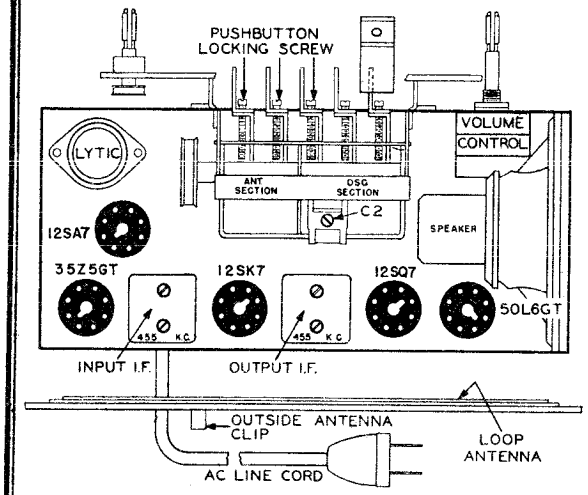
ALIGNMENT PROCEDURE

Volume control setting—Maximum (extreme clockwise) for all adjustments.
Connect ground lead of signal generator to B— of radio chassis through a 0.1 mfd. condenser.
The loop antenna should be connected to the radio and in its proper position when making all adjustments.

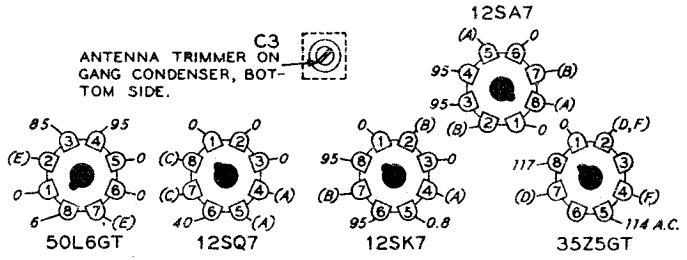
BAND	Signal Generator Frequency Setting	Dummy Antenna	Connection to Radio	Variable Condenser Setting	Trimmer Adjusted to Maximum
I. F.	455 Kc.	.1 mfd.	Grid of 12SK7 I. F.	Rotor full open (Plates out of mesh)	Two trimmers on top of Output I. F.
	455 Kc.	.1 mfd.	Grid of 12SA7 Mixer	Rotor full open (Plates out of mesh)	Two trimmers on top of Input I. F.
BROADCAST	1600 Kc.	200 mmf.	Grid of 12SA7	Rotor full open (Plates out of mesh)	B.C. Osc. trimmer C2 on Gang
	1400 Kc.	200 mmf.	External Antenna and B—	Set Dial at 1400 K. C.	B.C. Ant. trimmer C3 under Gang



A-CANNOT BE MEASURED BY VOLTMETER
B-11 VOLTS A.C. ACROSS PINS 2 AND 7
C-11 VOLTS A.C. ACROSS PINS 7 AND 8
D-33 VOLTS A.C. ACROSS PINS 2 AND 7
E-48 VOLTS A.C. ACROSS PINS 2 AND 7
F-117 VOLTS A.C. ACROSS PINS 2 AND 4

ALL VOLTAGES MEASURED WITH A 1000-OHMS/VOLT VOLTMETER BETWEEN TERMINAL INDICATED AND B-. LINE VOLTAGE 117 VOLTS A.C.

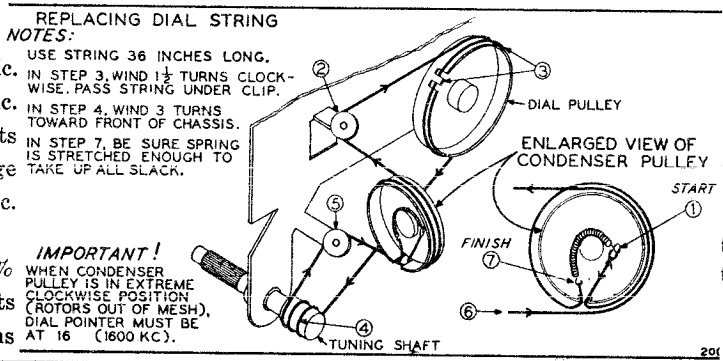
Voltages at tube socket terminals



Technical Data

Tuning range	535 to 1600 Kc.
Intermediate Frequency	455 Kc.
Power consumption	35 watts
Sensitivity (for 0.05 watt output)	30 microvolts average
Selectivity. 58 Kc. broad at 1000 times signal at 1000 Kc.	
Power output (in voice coil)	
Undistorted	1.0 watt at 10%
Maximum	1.7 watts
Voice coil impedance	3.2 ohms

BOTTOM VIEW OF CHASSIS


REPLACING DIAL STRING
NOTES:
USE STRING 36 INCHES LONG.
IN STEP 3, WIND 1½ TURNS CLOCKWISE. PASS STRING UNDER CLIP.
IN STEP 4, WIND 3 TURNS TOWARD FRONT OF CHASSIS.
IN STEP 7, BE SURE SPRING IS STRETCHED ENOUGH TO TAKE UP ALL SLACK.
IMPORTANT! WHEN CONDENSER PULLEY IS IN EXTREME CLOCKWISE POSITION (ROTORS OUT OF MESH), DIAL POINTER MUST BE AT 16 (1600 KC).
DIAL PULLEY
ENLARGED VIEW OF CONDENSER PULLEY
START
FINISH
TUNING SHAFT

SETTING THE PUSHBUTTONS

The pushbuttons may be used, after adjustment, for the automatic tuning of any five stations which you select. They can be set up in any order.

1. Turn on the radio. Allow it to warm up for at least one minute.

2. Push out the call letters of the five stations from the sheets supplied with this manual.

3. Insert the long thin screwdriver (supplied with the set) into the hole in one of the pushbuttons and turn the pushbutton locking screw several turns to the left.

4. With the screwdriver still engaged in the locking screw slot, **push** the screw all the way in. Hold it in this position and with the tuning knob tune in the station you want.

5. Now turn the pushbutton locking screw to the right and **tighten it firmly.** Remove the screwdriver.

6. Press the pushbutton all the way in (this tunes in the station) and, by rotating the tuning dial back and forth, determine whether the button has been properly set. If it has not, repeat the procedure described above.

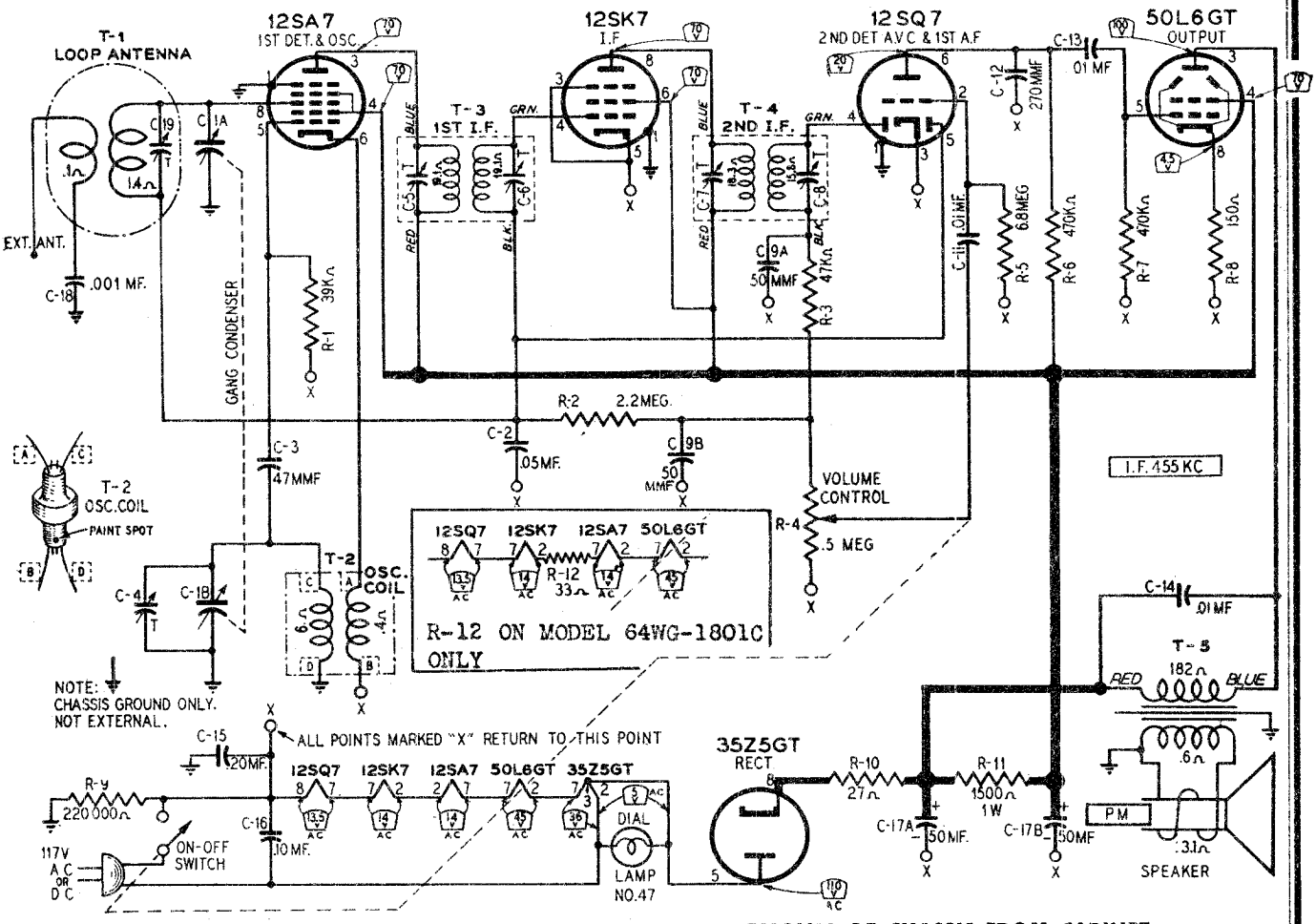
7. Insert the call letters for the station in the button and put one of the celluloid tabs over the letters.

8. Set each of the four other buttons, one for each station, in the same way. If you are unable to set a station on any particular button, it is probably because the pushbutton locking screw has not been loosened.

9. Any of the five stations may now be tuned in simply by pushing the proper button in as far as it will go.

MONTGOMERY WARD

MODELS 54WG-1801A, 54WG-1801B
MODEL 64WG-1801C



Socket voltages are shown on the schematic diagram at the tube socket terminals. All voltages except those for the heater and dial lamp are between the socket terminal and "X" point.

The readings were taken with a 1000 ohm per volt meter and all plate and screen voltages read on a 500 volt scale. Conditions of measurement are:

Line voltage.....117 volts AC
Volume control.....maximum
Signal input.....none

REMOVAL OF CHASSIS FROM CABINET

To remove the chassis from the cabinet it is necessary to pull the two control knobs and the dial pointer from their shafts. Remove the four screws in the bottom of the cabinet and the four snap pins that hold the cabinet back in place.

Care must be taken when removing the dial pointer that it is not damaged in such a manner that reinstallation will not be possible.

RECEIVER STAGE SENSITIVITIES

The table below lists the sensitivity at the input of each stage. The receiver should be tuned to 1000 KC for all readings. All measurements are based on an output of 50 milliwatts. This may be measured by disconnecting the speaker voice coil and substituting a 3.2 ohm 5 watt resistor across the secondary winding of the output transformer. A reading of .4 volts across this resistor will be equivalent to a 50 milliwatt output with the speaker connected. The volume control must be set to maximum.

The signal source must be an accurately calibrated signal generator capable of supplying both 1000 KC and 455 KC signals modulated 30% with a 400 cycle audio signal. Variations of plus or minus 25% are usually permissible.

SIGNAL GENERATOR				INPUT FOR 50 MILLIWATT OUTPUT
Freq.	Coupling Capacitor	Connection to Receiver	Ground Connection	
1000 kc	200 mmf or RMA Dummy Antenna	Loop Antenna—external antenna clip	Chassis	24 microvolts
1000 kc	.05 mf	12SA7 1st Detector pin 8	Point "X" (12SK7 pin 3)	125 microvolts
455 kc	.05 mf	12SA7 1st Detector pin 8	Same as above	100 microvolts
455 kc	.05 mf	12SK7, I-F Amp. pin 4	Same as above	2500 microvolts
400 cycles	.05 mf	12SQ7, 1st AF, pin 2	Same as above	.042 volts
400 cycles	.05 mf	50L6GT Output, pin 5	Same as above	1.9 volts

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MODELS 54WG-1801A,54WG-1801B
MODEL 64WG-1801C
MODEL 54WG-2007A,54WG-2007B

MONTGOMERY WARD

MODELS 54 WG-1801A,54 WG-2007A

Volume Control—Maximum All Adjustments.

Allow Chassis and Signal Generator to "Heat Up" for several Minutes.

The equipment in column at right is required for aligning: Signal Generator which will provide an accurately calibrated signal at the test frequencies as listed.

Output Indicating Meter; Non-Metallic Screwdriver.

Dummy Antennas—.1 mf., 50 mf.

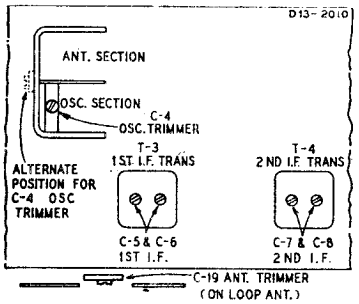
SIGNAL GENERATOR				CONDENSER SETTING	ADJUST TRIMMERS TO MAXIMUM See Trimmer Illustration
Frequency Setting	Coupling Capacitor	Connection To Radio	Ground Connection		
455 kc	.1 mf	Control Grid 12SK7—I-F	Point "X" 12SK7—I-F Prong No. 3	Turn Rotor to full open	2nd I-F (C7) & (C8)
455 kc	.1 mf	Control Grid 12SA7—1st Det.	Same as above	Turn Rotor to full open	1st I-F (C5) & (C6)
1600 kc	.1 mf	Control Grid 12SA7—1st Det.	Same as above	Turn Rotor to full open	Oscillator (C4)
1400 kc	50 mmf	External Antenna Clip on Loop See Note A	Chassis	Turn Rotor to Max. Output Set Indicator to 1400 KC— See Note B	Antenna (C19)

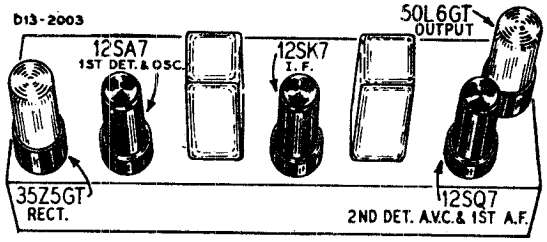
NOTE A—Re-assemble chassis in cabinet. Replace back on cabinet.

NOTE B—Tune in a 1400 KC signal. If pointer is not at the 1400 KC mark on the dial scale, pull pointer off shaft. Set pointer at the 1400 KC mark and push back on shaft.

Power Supply..... 105-125 volts AC—50-60 cycles—30 watts 105-125 volts DC
Frequency Range..... 535 to 1620 KC
Intermediate Frequency..... 455 KC
Selectivity..... 55.5 KC broad at 1000 times signal, 1000 KC
Sensitivity (for .05 watt output) with external antenna..... 25 microvolts average
Power Output..... 1.5 watts maximum, .9 watt (10% distortion)
Loud speaker..... 5" PM dynamic
Voice coil impedance..... 3.2 ohms at 400 cycles

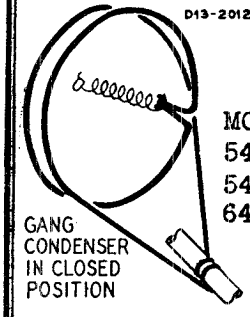
TRIMMER POSITIONS





MODELS 54WG-1801B
64WG-1801C

DRIVE CORD DIAGRAM



DRIVE CORD REPLACEMENT

MODELS 54 WG-1801A,54 WG-2007A

Turn the gang condenser to the fully closed position. Use a new drive cord 12 inches in length and tie one end to the tension spring. Fasten the other end of the tension spring to the hook on the drive pulley. Pass the cord through the slot in the drive pulley rim and continue around pulley one half turn, counterclockwise. Wind 2½ turns counterclockwise (from front of chassis) around tuning shaft. Turns should progress toward rear of chassis. (Wind 3 1/2 turns in tuning shaft for 54 WG-1801-B.) Wind cord counterclockwise around drive pulley in back of previous ½ turn. Pass cord through the slot in the pulley rim. Stretch tension spring and tie free end of cord to the spring. Cut off any excess string.

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MODELS 54 WG-1801A, 54 WG-1801B, 64WG-1801C

Ref. No.	Part No.	Description	Qty. Used in Set
		CAPACITORS	
C-1A, C-1B	14A176	Gang condenser with pulley	1
C-2	B66503	.05 mf 200 V Tubular	1
C-3	47X446	47 mmf Molded	1
C-4		Part of C-1	
C-5		Part of T-3 1st I-F Transformer	
C-6, C-7		Part of T-4 2nd I-F Transformer	
C-8			
C-9A, C-9B	47X112	Dual mica condenser, 50 mmf	1
C-11, C-13, C-14	B66103	.01 mf 200 V Tubular	3
C-12	47X445	270 mmf Molded	1
C-15	B66204	.20 mf 200 V Tubular	1
C-16	D66104	.10 mf 400 V Tubular	1
C-17A, C-17B	45X341	50 mf 150 V, 50 mf 150 V Dry electrolytic condenser	1
C-18	D66102	.001 mf 400 V Tubular	
C-19	17A116	2.5-23 mmf Trimmer	1
		RESISTORS	
		Ohms / Watts	
R-1	B84393	39,000 0.5 Carbon	1
R-2	B85225	2.2 meg 0.5 Carbon	1
R-3	B85473	47,000 0.5 Carbon	1
R-4	36X340	.5 meg Volume control and switch	1
R-5	B85685	6.8 meg 0.5 Carbon	1
R-6	B84474	470,000 0.5 Carbon	1
R-7	B85474	470,000 0.5 Carbon	1
R-8	B83151	150 0.5 Carbon	1
R-9	B85224	220,000 0.5 Carbon	1
R-10	B84270	27 0.5 Carbon	1
R-11	C85152	1500 1.0 Carbon	1
R-12	C85330	33 1.0 Carbon MODEL 64WG-1801C ONLY	1
		TRANSFORMERS AND COILS	
T-1	9A1734	"B" Band Loop antenna	1
T-2	9A1805	Oscillator coil assembly	1
T-3	9A1782	1st I-F Transformer and can assembly	1
T-4	9A1783	2nd I-F Transformer and can assembly	1
T-5	51X123	Output Transformer	1
		MISCELLANEOUS	
	12A429	5" P.M. speaker	1
		Cone and voice coil assembly for the above speaker (specify part number and letters stamped on above speaker)	1
	3A303	Tube socket—octal (8 prong) molded	5
	10A297	Knob (on-off switch, volume control) tuning	2
	28X292	Snap button (mounting loop to cabinet)	4
	13X328	Line cord and plug assembly	1
		DIAL AND DRIVE ASSEMBLY	
	25X1380	Gang condenser mounting bracket	1
	58X585	Dial	1
	20X1444	Screws, dial	4
		Speed nuts, 2-56 No. 102	4
	15X216	Pointer	1
		Clip No. 2401 (for pointer)	1
	26X463	Drive shaft (tuning)	1
	19X192	"C" washer for drive shaft	2
	7A185	Pilot light cable & socket assembly	1
		No. 47 Pilot light bulb	1
	28X310	Drive cord tension spring	1
		12" drive cord (18 lb. test)	1

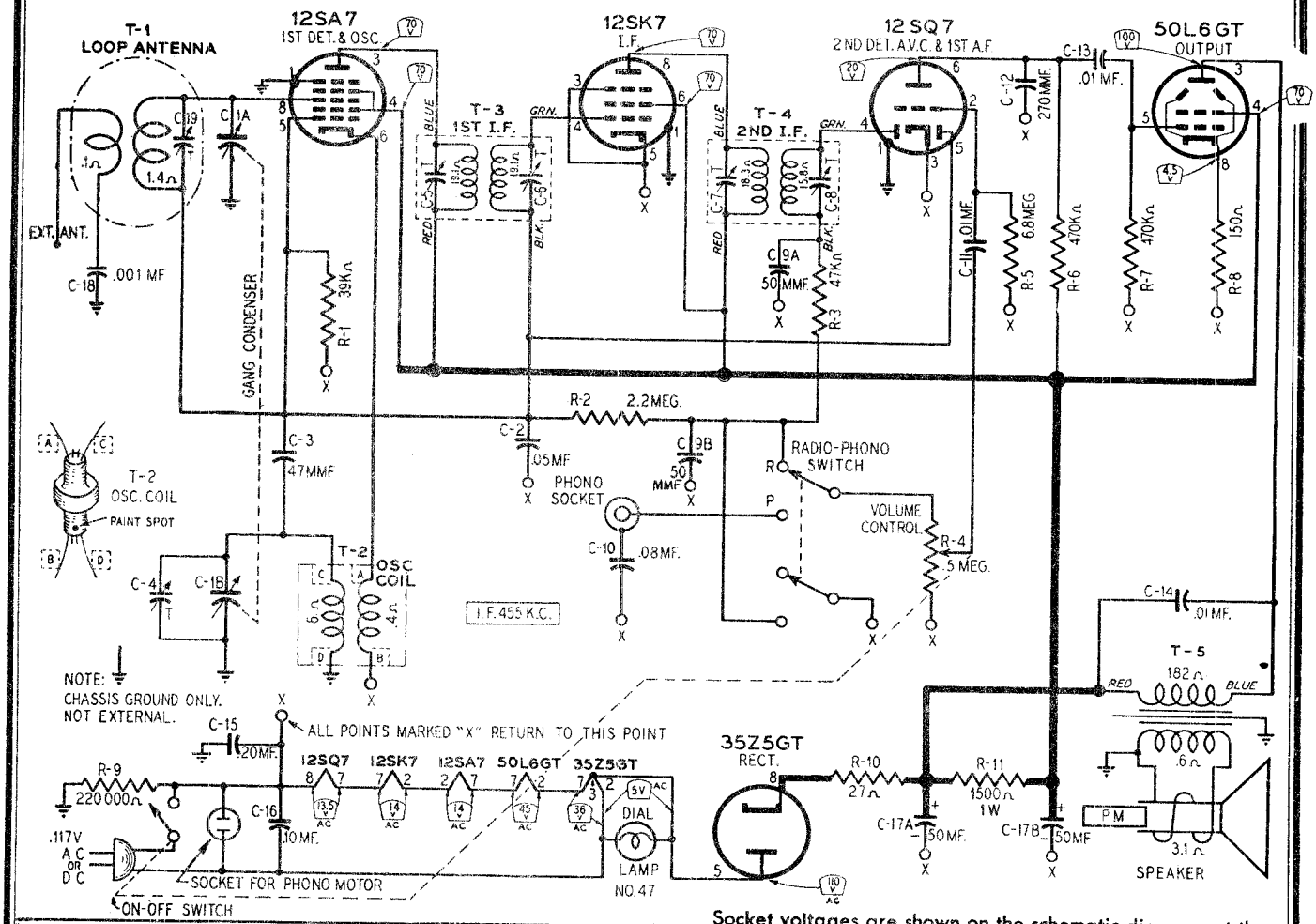
MODELS 54WG-2007A, 64WG-2007B

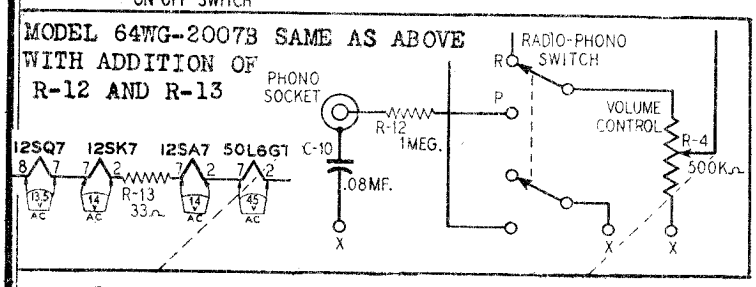
Ref. No.	Part No.	Description	Qty. Used in Set
		CAPACITORS	
C-1A, C-1B	14A176	Gang condenser with pulley	1
C-2	B66503	.05 mf 200 V Tubular	1
C-3	47X446	47 mmf Molded	1
C-4		Part of C-1	
C-5, C-6, C-7, C-8		Part of T-3 1st I-F Transformer, Part of T-4 2nd I-F Transformer	
C-9A, C-9B	47X112	Dual mica condenser, 50 mmf	1
C-10	B66803	.08 mf 200 V Tubular	1
C-11, C-13, C-14	B66103	.01 mf 200 V Tubular	3
C-12	47X445	270 mmf Molded	1
C-15	B66204	.20 mf 200 V Tubular	1
C-16	D66104	.10 mf 400 V Tubular	
C-17A, C-17B	45X341	50 mf 150 V, .50 mf 150 V Dry electrolytic condenser	1
C-18	D66102	.001 mf 400 V Tubular	
C-19	17A116	2.5-23 mmf Trimmer	1
		RESISTORS	
		Ohms / Watts	
R-1	B84393	39,000 0.5 Carbon	1
R-2	B85225	2.2 meg 0.5 Carbon	1
R-3	B85473	47,000 0.5 Carbon	1
R-4	36X340	.5 meg Volume control and switch	1
R-5	B85685	6.8 meg 0.5 Carbon	1
R-6	B84474	470,000 0.5 Carbon	1
R-7	B85474	470,000 0.5 Carbon	1
R-8	B83151	150 0.5 Carbon	1
R-9	B85224	220,000 0.5 Carbon	1
R-10	B84270	27 0.5 Carbon	1
R-11	C85152	1500 1.0 Carbon	1
R-12*	B85105	1 meg 0.5 Carbon	1
R-13*	C85330	33 1.0 Carbon	1
T-1	9A1795	"B" Band Loop Antenna	1
T-2	9A1805	Oscillator coil assembly	1
T-3	9A1782	1st I-F Transformer and can assembly	1
T-4	9A1783	2nd I-F Transformer and can assembly	1
T-5	51X119	Output Transformer	1
		MISCELLANEOUS	
	12A429	5" P.M. speaker	1
		Cone and voice coil assembly for the above speaker (specify part number and letters stamped on above speaker).	
	3A303	Tube socket—octal (8 prong) molded	5
	3A305	Single pin tip socket (Phono)	1
	10A297	Knob (on-off switch and volume control, tuning)	2
	10A526	Knob (Phono-Switch)	1
	28X292	Snap button (mounting loop to cabinet)	4
	13X328	Line cord and plug assembly	1
	2A355	Radio phono switch	1
	28A112	Phono-motor assembly	1
	2A170	Phono on-off switch	1
	6A227	Two prong motor plug	1
	28A113	Pickup arm	1
	13X542	Phono motor socket and cable assembly	1
		DIAL AND DRIVE ASSEMBLY	
	25X1380	Gang condenser mounting bracket	1
	58X585	Dial	1
	20X1444	Screws, dial	4
		Speed nuts, 2-56 No. 102	4
	15X216	Pointer	1
		Clip No. 2401 (for pointer)	1
	26X463	Drive shaft (tuning)	1
	19X192	"C" washer for drive shaft	2
	7A185	Pilot light cable and socket assembly	1
		No. 47 Pilot light bulb	1
	28X310	Drive cord tension spring	1
		12" drive cord (18 lb. test)	1

* IN MODEL 64WG-2007B ONLY

MODELS 54WG-2007A, 64WG-2007B

MONTGOMERY WARD





Socket voltages are shown on the schematic diagram at the tube socket terminals. All voltages except those for the heater and dial lamp are between the socket terminal and "X" point.

The readings were taken with a 1000 ohm per volt meter and all plate and screen voltages read on a 500 volt scale. Conditions of measurement are:

Line voltage.....117 volts AC
Volume control.....maximum
Signal input.....none

The table below lists the sensitivity at the input of each stage. All measurements are based on an output of 50 milliwatts. This may be measured by disconnecting the speaker voice coil and substituting a 3.2 ohm 5 watt resistor across the secondary winding of the output transformer. A reading of .4 volts across this resistor will be equivalent to a 50 milliwatt output with the speaker connected. The volume control must be set to maximum. The signal source must be an accurately calibrated signal generator capable of supplying both 1000 KC and 455 KC signals modulated 30% with a 400 cycle audio signal. Variations of Plus or Minus 25% are usually permissible.

SIGNAL GENERATOR				INPUT FOR 50 MILLIWATT OUTPUT
Frequency	Coupling Capacitor	Connection to Receiver	Ground Connection	
1000 kc	200 mmf or RMA Dummy Antenna	Loop Antenna—external antenna clip	Chassis	24 microvolts
1000 kc	.05 mf	12SA7 1st Detector Pin 8	Point "X" (12SK7 Pin 3)	125 microvolts
455 kc	.05 mf	12SA7 1st Detector Pin 8	Same as above	100 microvolts
455 kc	.05 mf	12SK7, I-F Amp. Pin 4	Same as above	2500 microvolts
400 cycles	.05 mf	12SQ7, 1st A-F, Pin 2	Same as above	.042 volts
400 cycles	.05 mf	50L6GT Output, Pin 5	Same as above	1.9 volts

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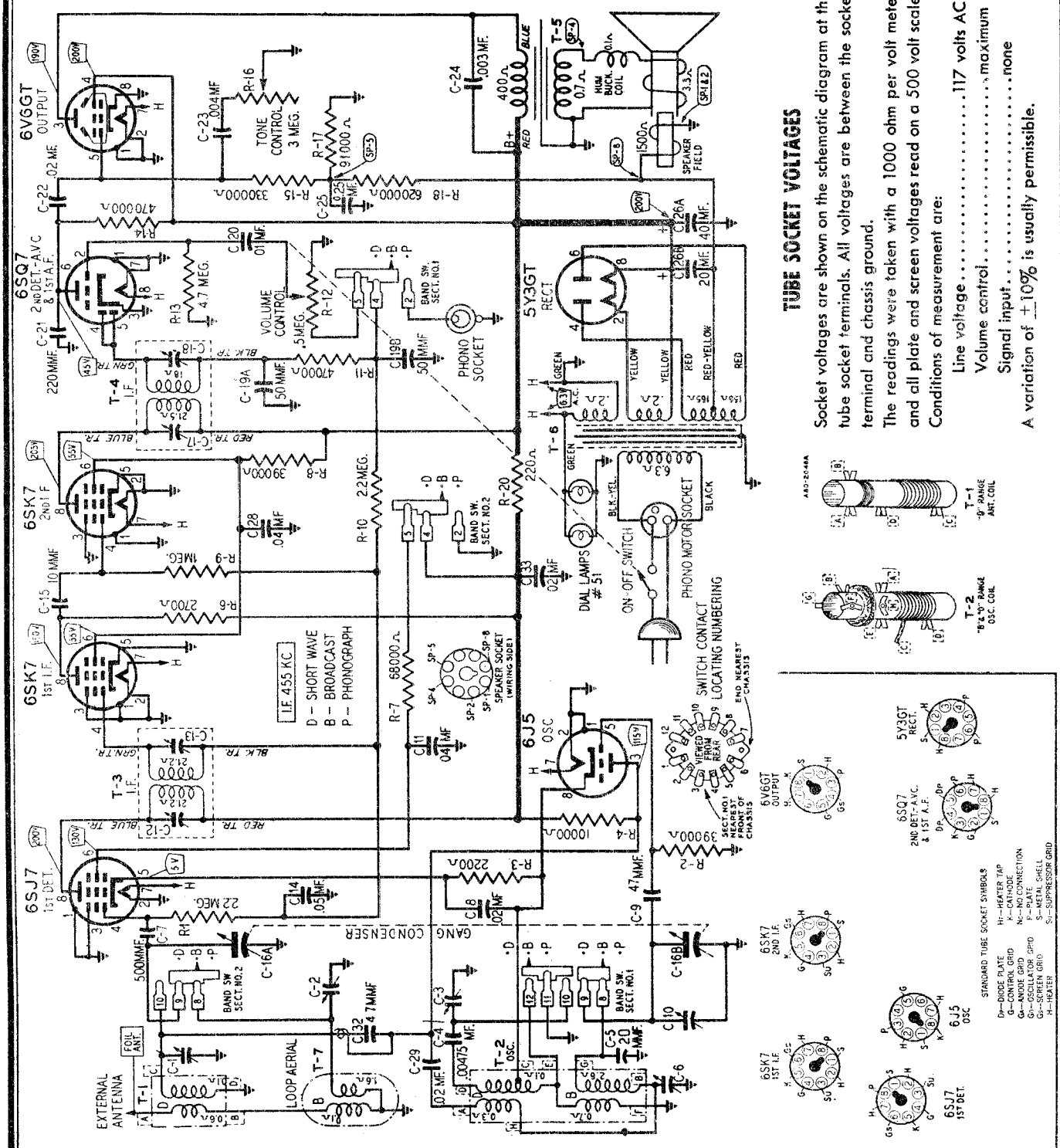
For Alignment, see P.15-28

MONTGOMERY WARD

MODELS 54WG-2500A, 54WG-2700A,
64WG-2500B, 64WG-2700A



TUBE SOCKET VOLTAGES

Socket voltages are shown on the schematic diagram at the tube socket terminals. All voltages are between the socket terminal and chassis ground.

The readings were taken with a 1000 ohm per volt meter and all plate and screen voltages read on a 500 volt scale.

Conditions of measurement are:

Line voltage.....117 volts AC
Volume control.....maximum
Signal input.....none

A variation of ±10% is usually permissible.

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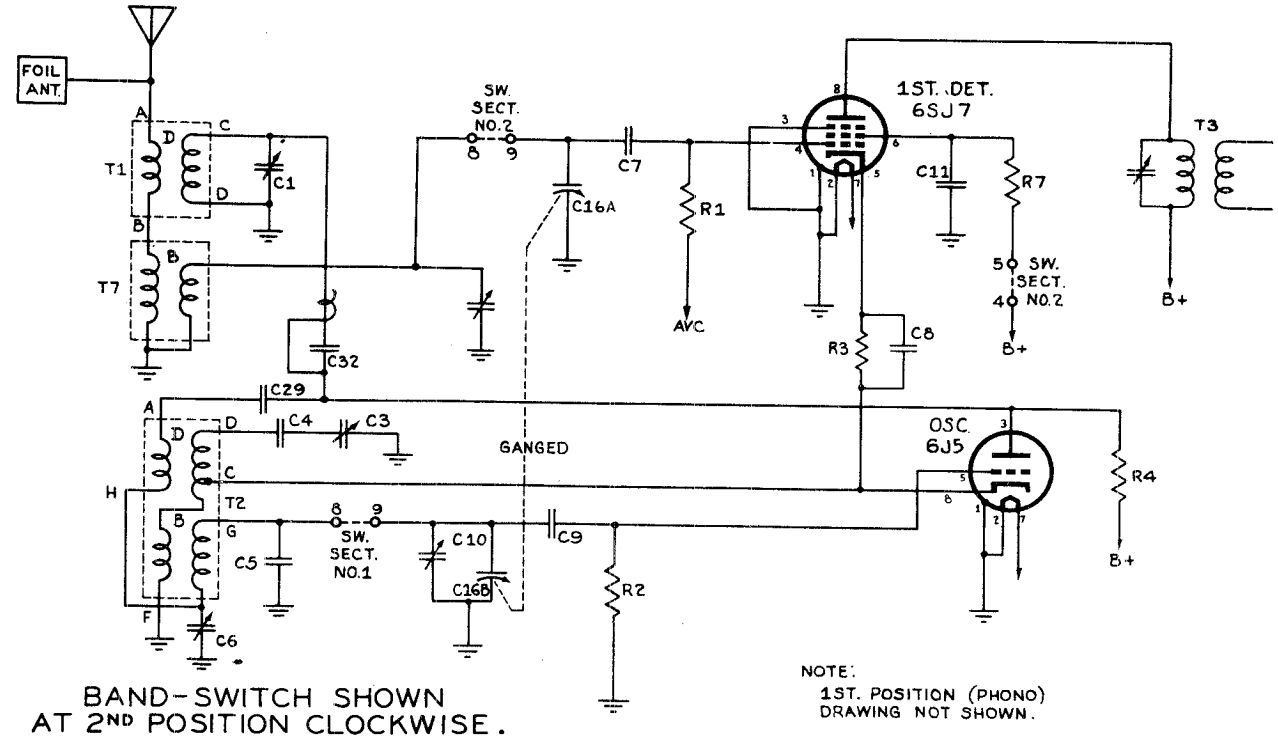
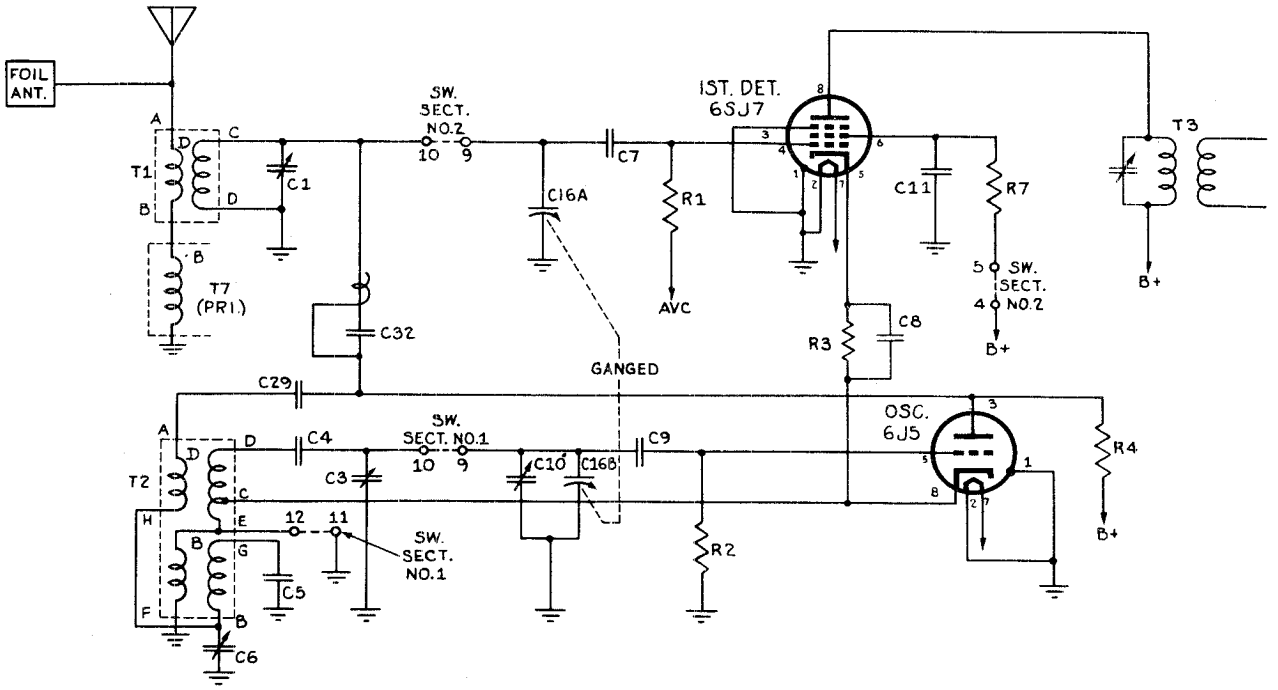
MODELS 54WG-2500A, 54WG-2700A,
64WG-2500B, 64WG-2700A

MONTGOMERY WARD



BAND-SWITCH SHOWN
AT 2ND POSITION CLOCKWISE.
BROADCAST BAND
528 - 1600 KC.

NOTE:
1ST. POSITION (PHONO)
DRAWING NOT SHOWN.



BAND-SWITCH SHOWN
AT 3RD POSITION CLOCKWISE.
SHORT WAVE BAND
5.75 - 18.3 MC.

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MODELS 54WG-2500A, 54WG-2700A, RECEIVER STAGE SENSITIVITIES 64WG-2500B, 64WG-2700A

The table below lists the sensitivity at the input of each stage. The receiver should be tuned to 1000 KC for all readings. All measurements are based on an output of .5 watts. This may be measured by disconnecting the speaker voice coil and substituting a 3.2 ohm, 5 watt resistor across the secondary winding of the output transformer. A reading of 1.26 volts across this resistor will be equivalent to a .5 watt output with the speaker connected. The volume control must be set to maximum.

The signal source must be an accurately calibrated signal generator capable of supplying both 1000 KC and 455 KC signals modulated 30% with a 400 cycle audio signal. Variations of Plus or Minus 25% are usually permissible.

SIGNAL GENERATOR				INPUT FOR .5 WATT OUTPUT
Frequency	Coupling Capacitor	Connection to Receiver	Ground Connection	
1000 kc	200 mmf or RMA Dummy Antenna	External antenna lead (white)	Chassis	2.3 microvolts
1000 kc	.05 mf	6SJ7 1st Detector, Pin 4	Same as above	17 microvolts
455 kc	.05 mf	6SJ7 1st Detector, Pin 4	Same as above	5.0 microvolts
455 kc	.05 mf	6SK7 1st I-F, Pin 4	Same as above	1300 microvolts
455 kc	.05 mf	6SK7 2nd I-F, Pin 4	Same as above	3400 microvolts
400 cycles	.05 mf	6SQ7 1st A-F, Pin 2	Same as above	.07 volts
400 cycles	.05 mf	6V6GT Output, Pin 5	Same as above	3.8 volts

ELECTRICAL SPECIFICATIONS

Power Supply.....105-125 volts AC, 50-60 cycles,
MODEL 54 WG-2500A 55 watts.
MODEL 64WG-2500B
Power Supply.....105-125 volts AC, 60 cycles,
MODEL 54 WG-2700A 55 watts normal, 72 watts phono
MODEL 64WG-2700A operating

MODELS 54WG-2500A, 54WG-2700A, *64WG-2500B, 64WG-2700A

Frequency Range.....B range—528-1600 KC
D range—5.75 to 18.3 MC
Intermediate Frequency.455 KC
Selectivity.....43 KC broad at 1000 times signal, 1000 KC
Sensitivity.....(for .5 watt output) with external antenna
B range—2.5 microvolts average
D range—12 microvolts average
Power Output.....3.5 watts maximum
2 watts, 10% distortion
Loud Speaker.....8" electro dynamic
Voice Coil Impedance..3.2 ohms at 400 cycles

*MODEL 64WG-2500B uses a 10" speaker

MODEL 64WG-2700A
MODEL 54 WG-2700A

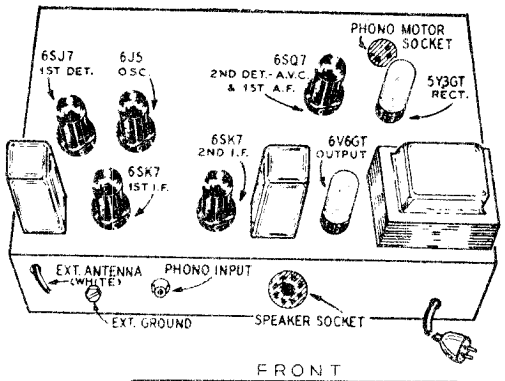
50 CYCLE OPERATION

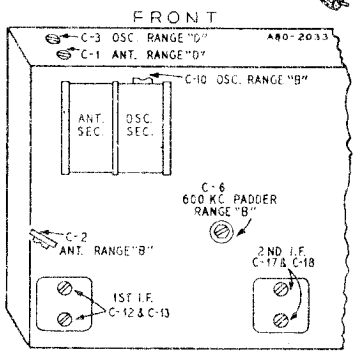
If it is desired to use the radio and record player on a 50 cycle power supply, it will be necessary to replace the metal drive pulley on the record player motor shaft with a 50 cycle pulley. This pulley is listed in the parts list.

To change the pulley, turn the record selector post to the 12" position and lift the turntable off of the record changer. Loosen the set screw holding the drive pulley on the motor shaft and remove the old pulley. Install the new 50 cycle pulley and replace the turntable.

MODELS 54WG-2500A, 54WG-2700A
64WG-2500B, 64WG-2700A

MONTGOMERY WARD

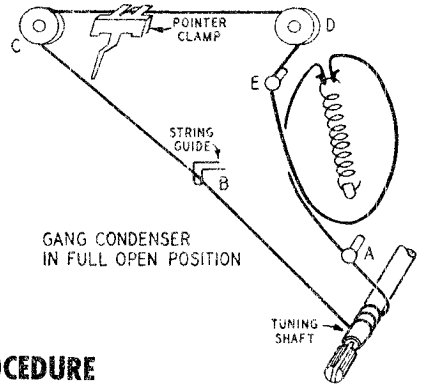




TRIMMER POSITIONS

DRIVE CORD REPLACEMENT

Turn the gang condenser to the fully open position. Use a new drive cord 40" long and tie one end to the tension spring. Hook the other end of the tension spring to the tab on the drive pulley rim and continue one half turn counterclockwise around the drive pulley. Then pass the cord around idler stud A and wind three turns clockwise around the tuning shaft (turns must progress away from chassis). Pass cord through string guide B, over pulleys C and D and around idler stud E. Wrap ¾ turn counterclockwise around drive pulley, stretch the tension spring and tie free end of the cord to spring. Cut off any excess string.



DRIVE CORD DIAGRAM

ALIGNMENT PROCEDURE

Volume Control—Maximum All Adjustments.
Connect Radio Chassis to Ground Post of Signal Generator with a Short Heavy Lead.
Allow Chassis and Signal Generator to "Heat Up" for several Minutes.

The following equipment is required for aligning:
An All Wave Signal Generator which will provide an accurately calibrated signal at the test frequencies as listed.
Output Indicating Meter; Non-Metallic Screwdriver.
Dummy Antennas—.1 mf., 100 mmf., and 400 ohms.

	SIGNAL GENERATOR		Dummy Antenna	Band Switch Setting	Condenser Setting	ADJUST TRIMMERS TO MAXIMUM
	Frequency Setting	Connection at Radio				
I-F	455 kc	6SJ7, Pin 4	.1 mf	B Range	Turn Rotor to Full Open	2nd I-F (C17) & (C18) 1st I-F (C12) & (C13)
RANGE B	1600 kc	Antenna Lead	100 mmf	B Range	Turn Rotor to Full Open	Oscillator Range B (C10)
	1400 kc	Antenna Lead	100 mmf	B Range	Turn Rotor to Max. Output Set Indicator to 1400 KC See Note A	Antenna Range B (C2)
	600 kc	Antenna Lead	100 mmf	B Range	Turn Rotor to Max. Output	600 kc (C6) Rock Rotor—See Note B
Repeat above oscillator adjustments at 1600 and 600 KC until readjusting the oscillator Range B Trimmer (C10) causes no further improvement in output.						
RANGE D	18,300 kc	Antenna Lead	400 Ohm	D Range	Turn Rotor to Full Open	Oscillator Range D (C3)
	17,000 kc	Antenna Lead	400 Ohm	D Range	Turn Rotor to Max. Output	Antenna Range D (C1) Rock Rotor—See Note B
LOOP RANGE B	Reassemble chassis in cabinet. 1400 kc	Antenna Lead	100 mmf	B Range	Turn Rotor to Max. Output	Antenna Range B (C2)

After each range is completed, repeat the procedure as a final check.

NOTE A—If the pointer is not at 1400 KC on the dial, re-set pointer at the 1400 KC mark on the dial scale.

NOTE B—Turn the rotor back and forth and adjust the trimmer until the peak of greatest intensity is obtained.

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MODELS 54 WG-2500A,*54 WG-2700A,×64 WG-2500B,*64 WG-2700A

Ref. No.	Part No.	Description	Qty. Used in Set
		CAPACITORS	
C-1	17A163	2-25 mmf Ant. "D" Range Trimmer..	1
C-3		2-25 mmf Osc. "D" Range Trimmer.	
C-2	17A149	1.2-12 mmf Loop aerial trimmer.....	1
C-4	46X289	.00475 180 V Tubular.....	1
C-5	47X482	20 mmf Molded.....	1
C-6	17A234	250-525 mmf 600 kc Padder.....	1
C-7	D66501	.0005 mf 500 V Tubular.....	1
C-8, C-29	B66203	.02 mf 200 V Tubular.....	2
C-9	47X463	47 mmf Molded.....	1
C-10		Part of gang condenser C-16.....	
C-11, C-28	D66403	.04 mf 400 V Tubular.....	2
C-12, C-13		Part of 1st I-F Assembly	
C-14	B66503	.05 mf 200 V Tubular.....	1
C-15	47X477	10 mmf Molded.....	1
C-16	14A185	2 section gang condenser complete with drive pulley.....	1
C-17, C-18		Part of 2nd I-F Assembly.....	
C-19-A, C-19B	47X112	50 mmf, 50 mmf Dual Mica.....	1
C-20	B66103	.01 mf 200 V Tubular.....	1
C-21	47X468	220 mmf Molded.....	1
C-22, C-33	D66203	.02 mf 400 V Tubular.....	2
C-23	B66402	.004 mf 200 V Tubular.....	1
C-24	D66302	.003 mf 400 V Tubular.....	1
C-25	B66254	.25 mf 200 V Tubular.....	1
C-26A, C-26B	45X277	40 mf 400 V, 20 mf 450 V Dry electrolytic..	1
C-32	47X478	4.7 mmf Molded.....	1
		RESISTORS (Ohms / Watts)	
R-1, R-10	B85225	2.2 meg. 0.5 Carbon.....	2
R-2	B84393	39,000 0.5 Carbon.....	1
R-3	B84222	2200 0.5 Carbon.....	1
R-4	C84103	10,000 1.0 Carbon.....	1
R-6	B84272	2700 0.5 Carbon.....	1
R-7	B84683	68,000 0.5 Carbon.....	1
R-8	C84393	39,000 1.0 Carbon.....	1
R-9	B85105	1.0 meg. 0.5 Carbon.....	1
R-11	B85473	47,000 0.5 Carbon.....	1
R-12	36X311	500,000 Volume control, ON-OFF switch.....	1
R-13	B85475	4.7 meg. 0.5 Carbon.....	1
R-14	B85474	470,000 0.5 Carbon.....	1
R-15	B85334	330,000 0.5 Carbon.....	1
R-16	40X259	3. meg. Tone control.....	1
R-17	B83913	91,000 0.5 Carbon.....	1
R-18	B83624	620,000 0.5 Carbon.....	1
R-20	B85221	220 0.5 Carbon.....	1

Ref. No.	Part No.	Description	Qty. Used in Set
		TRANSFORMERS AND COILS	
T-1	9A1451	Antenna transformer assembly "D" range.....	1
T-2	9A1452	Oscillator coil assembly.....	1
T-3	9A1810	1st I-F transformer and can assembly.	1
T-4	9A1811	2nd I-F transformer and can assembly	1
T-5	51X97	Output transformer.....	1
T-6	53X235	117 volt, 60 cycle standard power transformer.....	1
T-6	53X237	117 volt, 25 cycle standard power transformer.....	1
T-6	53X236	117-234 volt, 40-60 cycle Universal power transformer.....	1
T-7	9A1453	"B" Band loop antenna.....	1
		MISCELLANEOUS	
	12A398	8" Electro dynamic speaker.....	1
		Cone and voice coil assembly (specify part number and letter stamped on above speaker).....	1
	3A303	Tube socket—octal (8 prong) molded	7
	3A293	Speaker socket—octal (8 prong) molded.....	1
	3A304	Phono motor socket.....	1
	3A305	Single pin-tip socket (phono).....	1
	10A530	Knob (volume control).....	1
	10A531	Knob (tuning).....	1
	10A532	Knob (tone control).....	1
	10A533	Knob (band change switch).....	1
	13X328	Line cord and plug assembly.....	1
	2A177	Band and phono switch.....	1
	9A1229	Counterpoise antenna foil.....	1
	8X99	Rubber chassis cushions (chassis to cabinet).....	4
		DIAL AND DRIVE ASSEMBLY	
	25X839	Gang mounting bracket.....	1
	6X26	Rubber grommets (Mounting gang)	4
	20X347	Con. cushion studs (condenser and)	4
	19X163	Flat washer (bracket to chassis)	4
	24X360	Idler pulley.....	2
	20X268	Idler stud.....	4
	25X841	Brace bracket.....	1
	58X593	Dial scale glass.....	1
	30X475	Glass clamp.....	2
	58X601	Dial background.....	1
	25X838	Dial bracket.....	1
	4X871	Dial escutcheon.....	1
		No. 2 x 3/8 Phillips Fr. oval hd. Stat. bronze (screws for escutcheon mounting).....	2
		No. 2 x 5/8 Phillips Fr. oval hd. Stat. bronze (screws for escutcheon mounting).....	2
	15X225	Pointer for dial scale.....	1
		40" drive cord (18 lb. test).....	1
	28X44	Tension spring for drive cord.....	1
	26X336	Drive shaft (tuning).....	1
	25X580	Drive shaft bracket.....	1
	19X192	"C" washers for drive shaft.....	2
	7A142	Pilot light socket assembly.....	2
		Dial lamp (No. 51).....	2
	41X75	Light shield.....	2

*The parts listed in the second column apply to all models with the following exceptions for MODELS 54 WG-2700A and 64 WG-2700A:

T-6	53X235	117 volt, 60 cycle standard power transformer.....	1
T-7	9A1395	"B" Band loop antenna.....	1
	26A382	Pulley Mtg. Plate Assem. Complete with idler pulleys, idler studs, brace brackets, string guide and dial background.....	1
	12A401	8" Electro dynamic speaker.....	1
	9A1842	Counterpoise antenna foil.....	1

TYPE W-28111 RECORD CHANGER PARTS

W-15X084-6	Motor assembly, 60 cycle, 115 volt...	1
Astatic L-75	Crystal cartridge.....	1
41P544-4	50 cycle drive pulley.....	1

× The parts listed in the second column apply to all models with the following exceptions for MODEL 64 WG-2500B:

C-7	D67501	.0005 mf 400 V Tubular.....	1
	9A1842	Counterpoise antenna foil.....	1
	12A399	10" Electro dynamic speaker.....	1

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MODEL 62 Series

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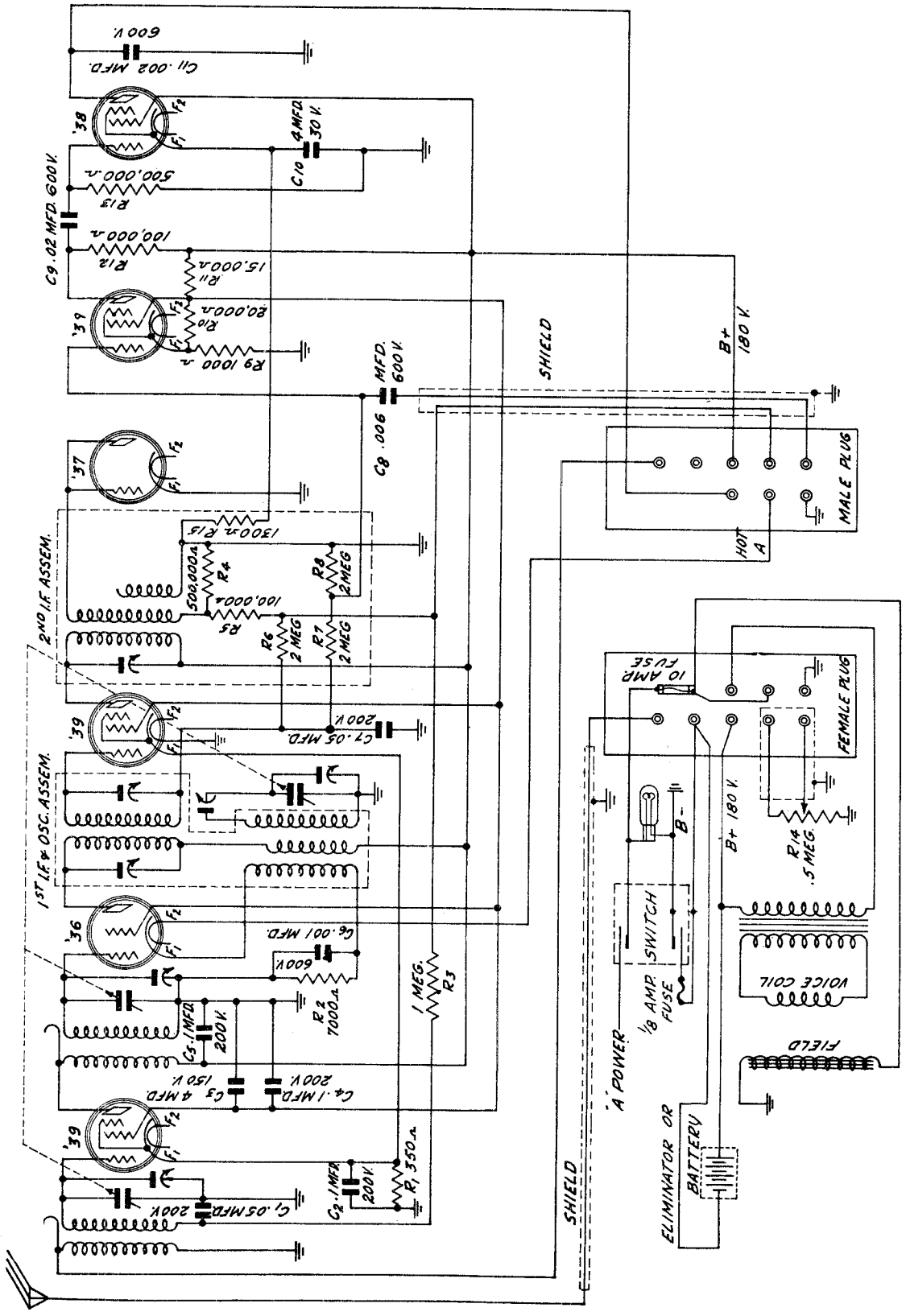

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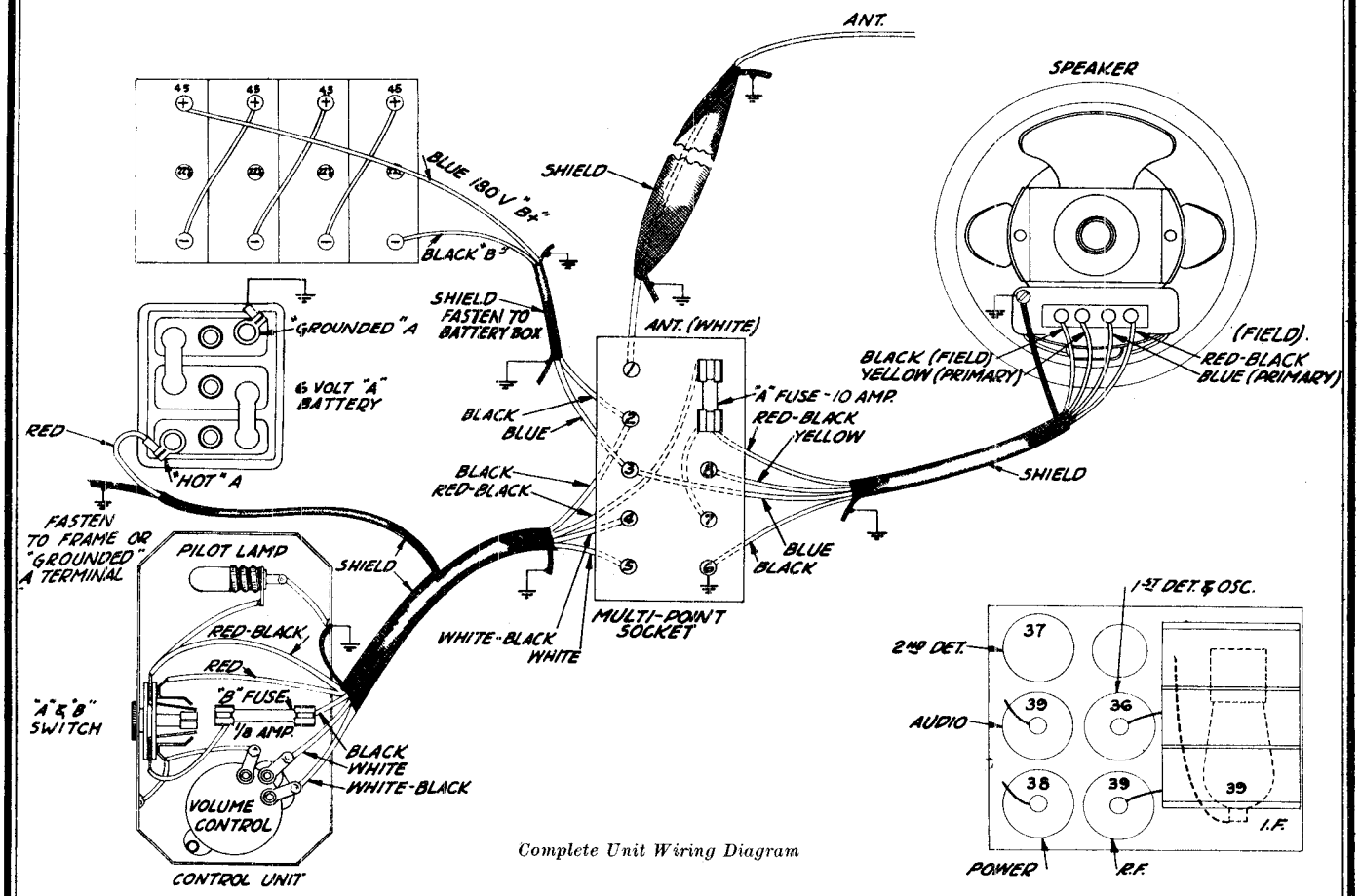
MONTGOMERY WARD



Complete Unit Wiring Diagram

Voltages at Sockets

In the following chart are given the voltages at the sockets. Before checking the voltages at the sockets, a convenient point, in some cases, to check the applied "A" and "B" voltages is at the speaker terminal strip. A high resistance voltmeter should be used.

CAUTION—Do not check the "A" and "B" voltages at the multi-point socket on the cable head, as the pilot light may be burned out when the switch is turned off. This is due to the high inductance of the speaker field, which will increase the voltage at the break of the circuit. Also, when the cable head and multi-point socket is taken off, the connections between the chassis and power unit are open so that readings are not made under load conditions.

To read the voltages at the sockets, the chassis box, in most cases, will have to be taken off of its mounting. In some instances, the cables, which may be attached to the dash or at other points, will have to be taken off. The voltages can be read at the sockets with a long plug or with a pair of long, insulated test prods. If these are not available, it will be necessary to remove the chassis from the box. The multi-point socket on the cable head is then re-connected to the multi-point plug on the chassis. Considerable care must be taken when the chassis is out of the case in this manner to prevent accidental short circuits of plus "B" or plus "A" points to ground.

All tubes must be inserted and all units connected. A signal will effect the control voltages on the R. F., I. F., and first audio tubes. If signals are received, ground the antenna and remove the second detector tube to make the other readings.

Type of Tube	*Function*	*Across Heater*	*Plate to Cathode*	*Screen to Cathode*	*Grid to Cathode*	*Normal Plate MA*
'39	R. F.	6.	177	80	3	3.6
'36	1st Det.	6.	173	76	7(1)	.9(1)
'39	I. F.	6.	177	80	3	3.6
'37	2nd Det.	6.	0		0	0
'39	1st Audio	6.	54	77	6	1.2
'38	Output	6.	159	165	15.5	10

(1) Will vary with dial setting.

NOTE: All bias voltages must be read from cathode to ground.

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CHASSIS PARTS

Part No.	Description	Cost Price	Selling Price
P-1531	No. 39 Tube Socket (Long Lug)	$0.03	$0.08
P-1556	No. 39 Tube Socket (Short Lug)	.04	.10
P-1530	No. 38 Tube Socket (Long Lug)	.03	.08
P-1529	No. 37 Tube Socket (Long Lug)	.03	.08
P-1555	No. 36 Tube Socket (Short Lug)	.04	.10
P-5021	First I. F. and Oscillator Assembly, Complete with Trimmer Condensers and can	.83	2.08
P-5022	Second I.F. Transformer Assembly, Complete with Trimmer Condenser, Resistors and Can	.91	2.28
P-5023	Antenna and Interstage R. F. Transformer Assembly, Complete with Can	.53	1.33
P-5024	Antenna R.F. Transformer	.24	.60
P-5025	Interstage R. F. Transformer	.24	.60
P-1539	Oscillator 600 K. C. Tracking Condenser	.11	.28
P-1560	Drive Gear Hub (for Gang Condenser)	.04	.10
P-30376	Condenser Drive Bushing	.03	.08
P-10224	Rubber Drive Pinion	.02	.05
P-1092	Grid Cap & Wire	.02	.05
P-1532	Multi-Point Plug	.06	.15
P-1543	Multi-Point Socket	.12	.30
P-10211	Long Rubber Bumper (for top of tubes)	.02	.05
P-10210	Short Rubber Bumper (for top of tubes)	.02	.05
P-20516	6-32 Wing Nuts (for Chassis box cover)	.02	.05

Resistors

Part No.	Key No.	Resistance	Type	Cost Price	Selling Price
P-A-90953	R-1	350 Ohms	Carbon	$0.06	$0.15
P-A-90979	R-2	7,000 Ohms	Carbon	.06	.15
P-A-90948	R-3	1 Megohm	Carbon	.06	.15
P-A-90929	R-4	500,000 Ohms	Carbon	.06	.15
P-A-90912	R-5	100,000 Ohms	Carbon	.06	.15
P-A-90949	R-6	2 Megohm	Carbon	.06	.15
P-A-90949	R-7	2 Megohm	Carbon	.06	.15
P-A-90949	R-8	2 Megohm	Carbon	.06	.15
P-A-91023	R-9	800 Ohms	Carbon	.05	.13
P-A-90930	R-10	10,000 Ohms	Carbon	.05	.13
P-A-90930	R-10-A	10,000 Ohms	Carbon	.05	.13
P-B-91020	R-11	15,000 Ohms	Carbon	.06	.15
P-A-90954	R-12	250,000 Ohms	Carbon	.06	.15
P-A-90948	R-13	1 Megohm	Carbon	$0.06	$0.15
P-91009	R-14	0—500,000 Ohms	Volume Control	.22	.55
P-A-91022	R-15	900 Ohms	Carbon	.05	.13
P-91013	R-16	0—150,000 Ohms	Tone Control	.21	.53

Condensers

Part No.	Key No.	Capacity	Type	Cost Price	Selling Price
P-80907	C-12	.02 mfd.	Metal Case (for tone Control)	$0.13	$0.33
P-80902-D	C-10 4.0 mfd. C-3 4.0 mfd. C-1 .05 mfd.		Electrolytic Condenser Block	.53	1.33
P-80903-D	C-9 .02 mfd. C-7 .05 mfd. C-5 .10 mfd. C-2 .10 mfd. C-4 .10 mfd.		Block	.42	1.05
P-80808	C-11	.002 mfd.	Molded	.07	.18
P-80822	C-8	.006 mfd.	Molded	.17	.43
P-80821	C-6	.001 mfd.	Molded	.06	.15
P-80904	Three-Gang Variable Condenser			1.05	2.63

CONTROL UNIT PARTS

Part No.	Description	Cost Price	Selling Price
P-91009	R-14 Volume Control	$0.22	$0.55
P-1567	⅛ amp. "B" Fuse	.03	.08
P-1544	Lock Switch	.24	.60
P-1563	8 Volt Pilot Lamp	.06	.15
P-1562	Control Knob	.04	.10
P-1591	Pilot Lamp Socket & Clip	.04	.10
P-1592	Dial Strip & Gear Assembly	.06	.15
P-10224	Rubber Drive Pinion	.02	.05

SHIELDED CABLES

Part No.	Description	Cost Price	Selling Price
P-70723	Shielded Antenna Cable	$0.20	$0.50
P-70724	Control Box Shielded Cable	.40	1.00
P-70725	Shielded Speaker Cable	.24	.60
P-70726	Shielded "B" Supply Cable	.34	.85

Part No.	*Description*	*Cost Price*	*Selling Price*
62-5421	Generator Condenser—*Carry 6 in stock*	$0.21 ea.	$0.49 ea.
62-5423	Distributor Suppressor—*Carry 6 in stock*	.12 ea.	.39 ea.
62-5424	Spark Plug Suppressor—*Carry 12 in stock*	.12 ea.	.39 ea.
P-1550	Flexible Drive Shaft—14 inches—*Carry 1 in stock*	.22 ea.	.55 ea.
P-1551	Flexible Drive Shaft—34 inches—*Supplied with set*	.40 ea.	1.00 ea.
P-1552	Flexible Drive Shaft—45 inches—*Carry 1 in stock*	.49 ea.	1.23 ea.
P-1566	"A" Fuse, 10 Amperes—*Carry 3 in stock*	.02 ea.	.05 ea.
P-1567	"B" Fuse, ⅛ Ampere—*Carry 3 in stock*	.03 ea.	.08 ea.
62-5400	"B" Battery Eliminator (Vibrator Type)	7.85	17.95
62-5411	Underslung Antenna	.60	1.69
261-9099	Champion Spark Plugs with built-in noise suppressors	.68	1.15

(In One Package)—Supplied with each set.

P-10216	6 Felt Strips	.04 doz.	.10 doz.
P-20514-B	Dash Mounting Plate (A)	.06 ea.	.15 ea.
P-20496	Chassis Mounting Base (D)	.10 ea.	.25 ea.
P-20495	Chassis Mounting Clamp (D)	.06 ea.	.15 ea.
P-10223	12 feet $\frac{5}{16}$" Loom (G)	.22 ea.	.55 ea.

(In One Bag)—Supplied with each set.

Quantity			
3	¼"—20 x 3" Special Square Head Bolts (A)	.10 doz.	.25 doz.
9	¼"—20 Square Nuts (A)	.03 doz.	.08 doz.
8	¼" x 1" Steel Washers, No. 266 (A)	.03 doz.	.08 doz.
4	¼" Lockwashers (A)	.03 doz.	.08 doz.
4	Flat Washers, No. 10 x ½ OD (A)	.03 doz.	.08 doz.
5	6-32 x ¼" Blued Finish Fillister Head Screws (B)	.03 doz.	.08 doz.
5	No. 6 Lockwashers (B)	.03 doz.	.08 doz.
6	No. 10213 Rubber Bands (C)	.04 doz.	.10 doz.
10	10-32 x ⅜" Blued Finish Fillister Head Screws (D)	.03 doz.	.08 doz.
10	No. 10 Lockwashers (D)	.03 doz.	.08 doz.
2	¼" Headless Cup Point Set Screw (D)	.10 doz.	.25 doz.
2	8-32 Headless Cup Point Set Screw (E)	.05 doz.	.13 doz.
4	8-32 x ⅜" Blued Finish Fillister Head Screws (E)	.03 doz.	.08 doz.
4	No. 8 Lockwashers (E)	.03 doz.	.08 doz.
2	Radio Switch Keys	.06 ea.	.15 ea.
1	No. 20511-B Steering Post Clamp (E)	.04 ea.	.10 ea.
4	Carpet Tacks (F)	.03 doz.	.08 doz.

(A)—Used for Mounting Chassis to Dash
(B)—Used for Attaching Cable Head to Chassis
(C)—For Tubes
(D)—Used for Mounting Chassis on Steering Column
(E)—Used for Mounting Control Unit
(F)—Used to Tack Back on Speaker
(G)—Used to Cover "B" Cable if Cable Is Under Car Body

Prices subject to change without notice.

MODELS 62-41,62-75

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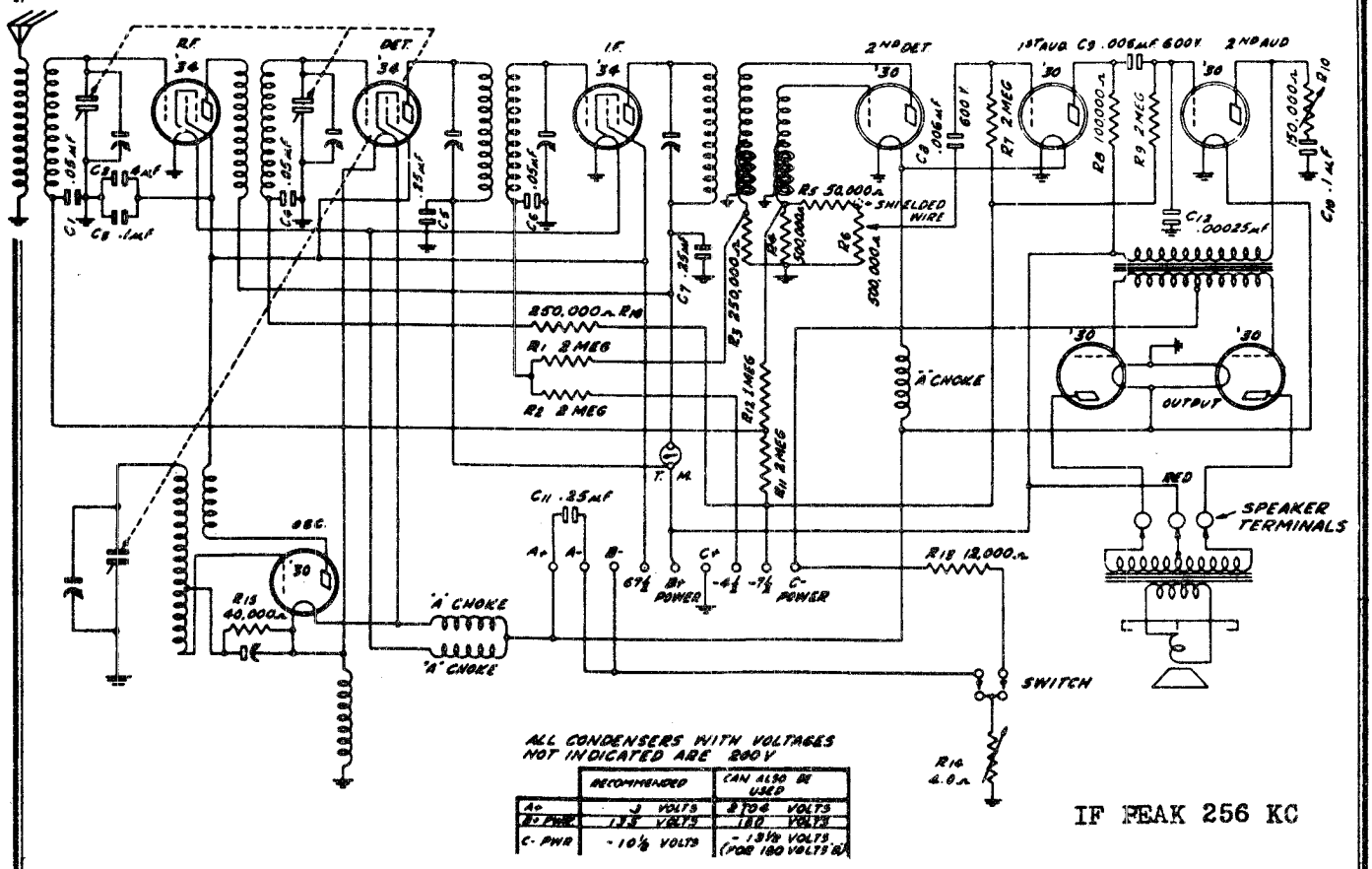

Part No.	Description	Cost Price	Selling Price
P-20388	Condenser Shield (for 3-Gang Condenser)	$ .05	$ .13
P-20406	Tube Shield	.03	.08
P-20408	Tube Shield Base	.02	.05
P-1472	No. 34 Tube Socket	.03	.08
P-1471	No. 30 Tube Socket	.03	.08
P-70733	Nine-Wire Battery Cable	.24	.60
P-1520-A	Off-On Switch	.18	.45
P-1647	Small Walnut Knob	.04	.10
P-1646	Large Walnut Knob	.04	.10
P-1508	Black Bakelite Knob for Filament Control	.05	.13
P-5041	Antenna R.F. Transformer Assembly	.16	.40
P-5040	Interstage R.F. Transformer Assembly	.18	.45
P-5042	Oscillator Coil Assembly	.24	.60
P-5043	1st I.F. Assembly, complete with can	.46	1.15
P-5044	2nd I.F. Assembly, complete with can	.48	1.20
P-5018	Filament Choke Coil	.09	.23
P-5061	Oscillator Series Filament Choke Coil	.07	.18
P-50551	Audio Transformer	.58	1.45
P-40413	Can for R.F. and Oscillator Assemblies	.05	.13
P-1627	Tuning Meter	.58	1.45
P-1393	Pointer Assembly	.06	.15
P-1382	Drive Disc Hub and Fulcrum Assembly	.07	.18
P-20434-A	Bracket for Dial Strip	.02	.05
P-1510	White Celluloid Dial Strip	.06	.15
P-20555	Tension Spring (Tone control pointer)	.02	.05
P-20556	Tension Spring (Volume control pointer)	.02	.05
P-30374	Bushing for Rubber Pinion	.03	.08
P-10224	Rubber Pinion	.02	.05
P-1634	Permanent Magnet Dynamic Speaker	3.85	9.63

RESISTORS

Part No.	Code	Resistance	Type	Cost Price	Selling Price
P-A-90949	R-1	2 Megohms	Carbon	$ .06	$ .15
P-A-90949	R-2	2 Megohms	Carbon	.06	.15
P-A-90954	R-3	250,000 ohms	Carbon	.06	.15
P-A-90929	R-4	500,000 ohms	Carbon	.06	.15
P-A-90941	R-5	50,000 ohms	Carbon	.06	.15
P- 91027	R-6	500,000 ohms	Volume Control	.24	.60
P-A-90949	R-7	2 Megohm	Carbon	.06	.15
P-A-90912	R-8	100,000 ohms	Carbon	.06	.15
P-A-90949	R-9	2 Megohm	Carbon	.06	.15
P- 91028	R-10	150,000 ohms	Tone Control	.19	.48
P-A-90949	R-11	2 Megohm	Carbon	.06	.15
P-A-90948	R-12	1 Megohm	Carbon	.06	.15
P-A-90982	R-13	12,000 ohms	Carbon	.06	.15
P- 90996	R-14	4 ohm	Filament Control	.18	.45
P-A-90916	R-15	40,000 ohms	Carbon	.06	.15
P-A-90954	R-16	250,000 ohms	Carbon	.06	.15

CONDENSERS

Part No.	Code	Capacity	Voltage	Type	Cost Price	Selling Price
P-80862-B	C-1	.05 mfd.	200 V.	Tubular	$ .07	$ .18
P-80878-A	C-2	4.0 mfd.	150 V.	Electrolytic	.19	.48
P-80864-C	C-3	.1 mfd.	200 V.	Tubular	.07	.18
P-80862-B	C-4	.05 mfd.	200 V.	Tubular	.07	.18
P-80888	C-5	.25 mfd.	200 V.	Tubular	.10	.25
P-80862-B	C-6	.05 mfd.	200 V.	Tubular	.07	.18
P-80888	C-7	.25 mfd.	200 V.	Tubular	.10	.25
P-80898	C-8	.006 mfd.	600 V.	Molded	.04	.10
P-80898	C-9	.006 mfd.	600 V.	Molded	.04	.10
P-80864-C	C-10	.1 mfd.	200 V.	Tubular	.07	.18
P-80888	C-11	.25 mfd.	200 V.	Tubular	.10	.25
P-80897	Three-Gang Variable Condenser				1.42	3.55
P-1385	Oscillator 600 K.C. Trim Cond.				.20	.50

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MODELS 62-43, 62-43X

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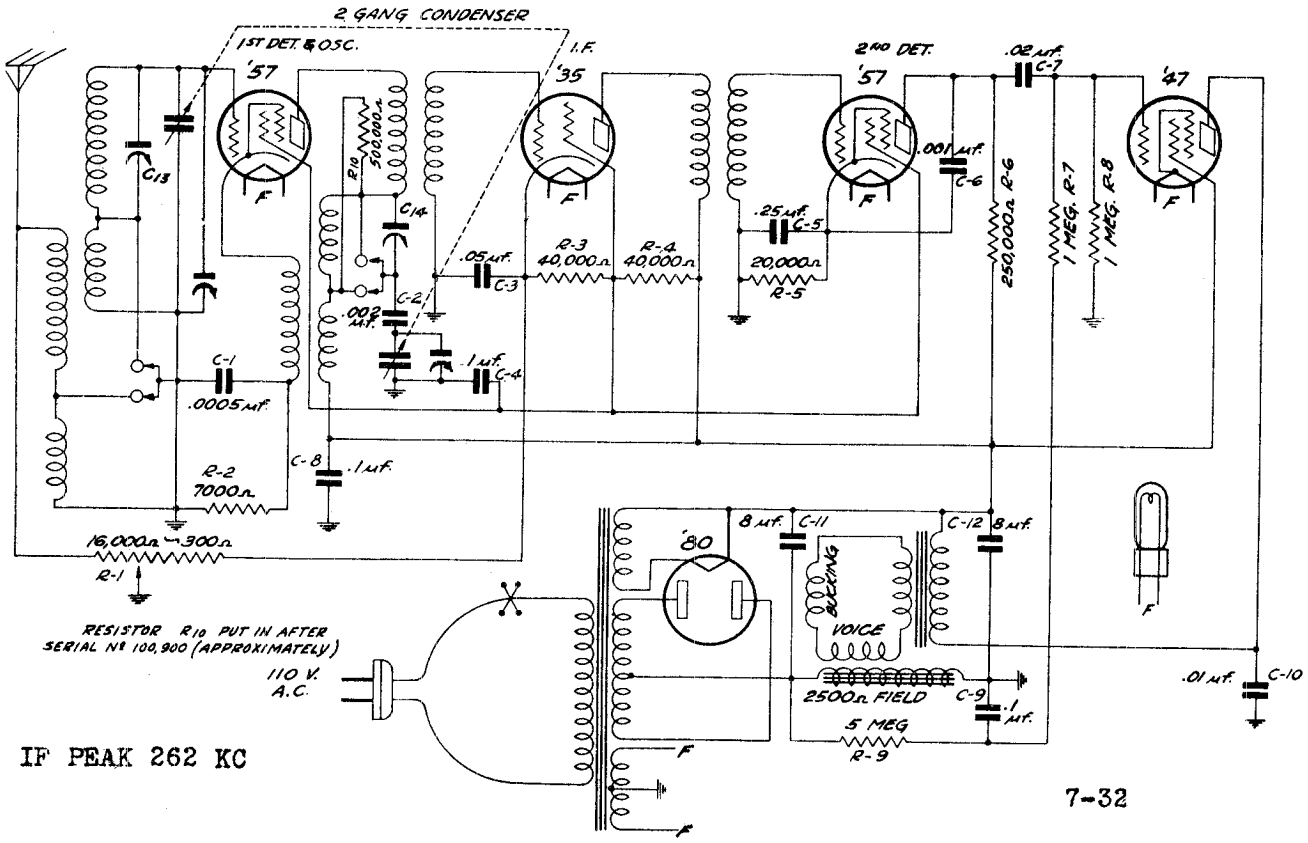

RESISTORS

Part No.	Code	Resistance	Type	Cost Price	Selling Price
P-91019	R-1	Volume Control & 110 V. A.C. Switch		.34	.85
P-A-90979	R-2	7,000 ohm	Carbon	.06	.15
P-B-91021	R-3	40,000 ohm	Carbon	.06	.15
P-B-91021	R-4	40,000 ohm	Carbon	.06	.15
P-A-90959	R-5	20,000 ohm	Carbon	.05	.13
P-A-90954	R-6	250,000 ohm	Carbon	.05	.13
P-A-90948	R-7	1,000,000 ohm	Carbon	.06	.15
P-A-90948	R-8	1,000,000 ohm	Carbon	.06	.15
P-A-91015	R-9	5,000,000 ohm	Carbon	.06	.15
P-A-90929	R-10	500,000 ohm	Carbon	.06	.15

CONDENSERS

Part No.	Code	Capacity Voltage	Type	Cost Price	Selling Price
P-80867	C-1	.0005 mfd., 600 V.	Moulded	.05	.13
P-80808	C-2	.002 mfd., 600 V.	Moulded	.07	.18
P-80890	C-3	.05 mfd., 400 V.	Tubular	.05	.13
P-80887	C-4	10 mfd., 400 V.	Tubular	.10	.25
P-80888	C-5	.25 mfd., 200 V.	Tubular	.10	.25
P-80905	C-6	.001 mfd., 400 V.	Tubular	.04	.10
P-80868	C-7	.02 mfd., 600 V.	Tubular	.06	.15
P-80887	C-8	.10 mfd., 400 V.	Tubular	.10	.25
P-80864	C-9	.10 mfd., 200 V.	Tubular	.07	.18
P-80872	C-10	.01 mfd., 600 V.	Tubular	.06	.15
P-80894	C-11	8.0 mfd., 450 V.	Electrolytic Block	.69	1.73
	C-12	8.0 mfd., 450 V.			
		2 Neg. leads, green, Pos. lead yellow, common			
P-1575	C-13	Short Wave Adjusting Condenser		.09	.23
P-1442	C-14	Oscillator 600 K.C. Trimmer Condenser		.12	.30
P-80910		Two Gang Variable Condenser		.72	1.80

Part No.	Name	Cost Price	Selling Price
P-50548	110 V. 60 Cycle Power Transformer	$0.76	$1.90
P-50558	110 V. 25 Cycle Power Transformer	1.68	4.20
P-1474	'80 Tube Socket	.04	.10
P-1464	'35 Tube Socket	.04	.10
P-1468	'47 Tube Socket	.04	.10
P-1580	'57 Tube Socket	.04	.10
P-1273	Pilot Light, 2.5 V.	.06	.15
P-20479	Mounting Strap for Electrolytic Condenser	.04	.10
P-70702	Attachment Cord and Plug	.23	.58
P-20513	L. Bracket for Broadcast Short-Wave Switch	.02	.05
P-1578	Broadcast Short-Wave Switch	.40	1.00
P-1441	Two-Terminal Mounting Strip	.02	.05
P-1515	Small Knob	.04	.10
P-1516	Large Knob	.05	.13
P-5037	R.F. Transformer Assembly	.30	.75
P-5038	1st I.F. and Oscillator Assembly, Complete with Can	.69	1.73
P-5039	2nd I.F. Assembly, Complete with Can	.53	1.33
P-30374	Bushing for Rubber Pinion	.03	.08
P-10224	Rubber Pinion	.02	.05
P-1590	Dial Strip	.06	.15
P-1497	Pilot Light Bracket & Drive Disc Assembly	.11	.28
P-1383	Drive Bracket Bearing Assembly	.07	.18
P-1478	Escutcheon	$0.13	$0.33
P-20460	Drive Shaft	.02	.05
P-20406	Tube Shield	.03	.08
P-20408	Tube Shield Base	.02	.05
P-1588-A	Electrodynamic Speaker	1.76	4.40

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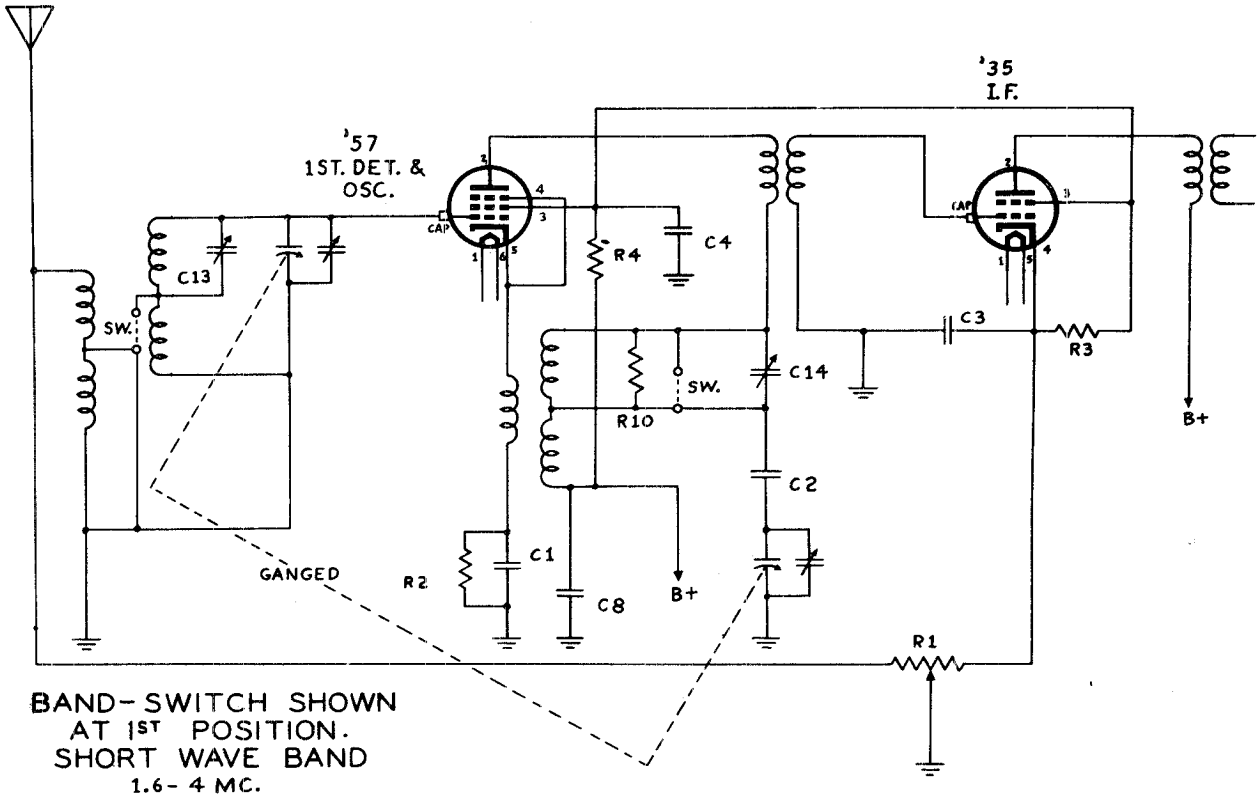
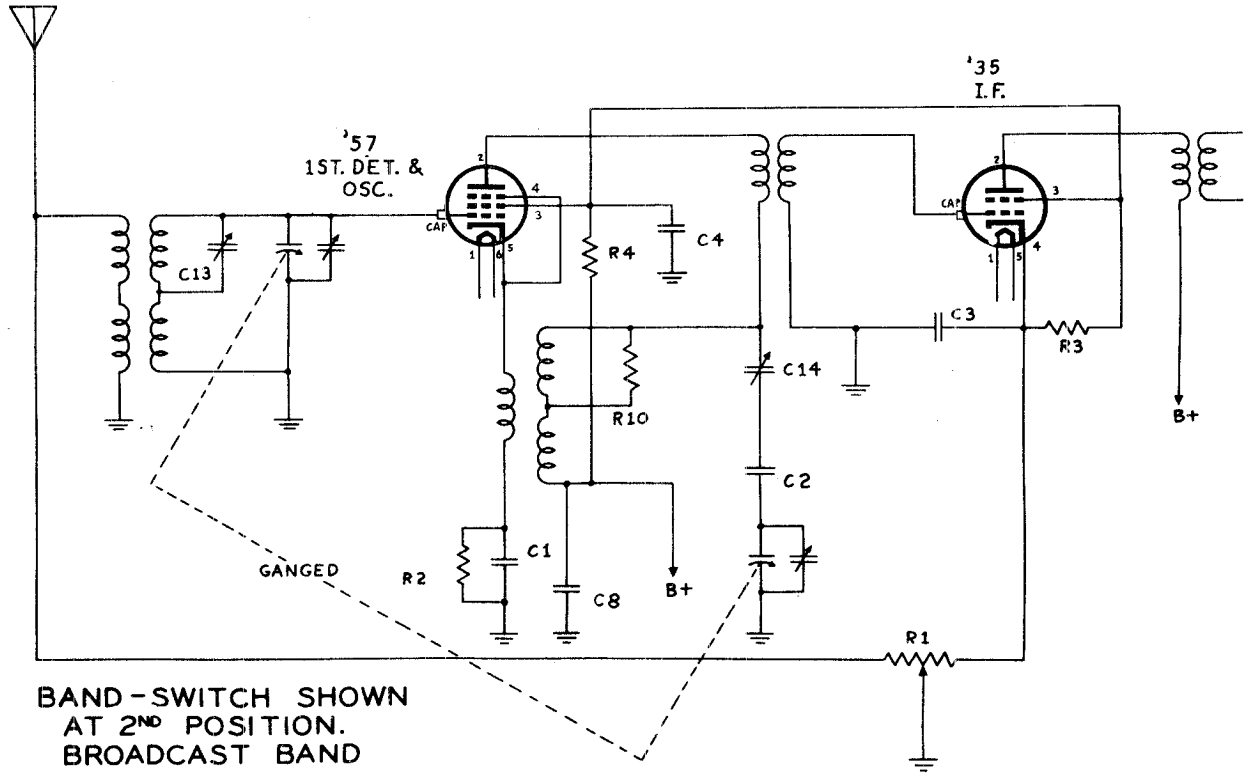
MONTGOMERY WARD



BAND-SWITCH SHOWN
AT 1ST POSITION.
SHORT WAVE BAND
1.6-4 MC.



BAND-SWITCH SHOWN
AT 2ND POSITION.
BROADCAST BAND

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Condenser Alignment

Misalignment or mistracking of condensers generally manifests itself in broad tuning and lack of volume at portions or all of the broadcast band. The receivers are all properly aligned at the factory with precision instruments and realignment should not be attempted unless all other possible causes of the faulty operation have first been investigated. A signal generator that will provide accurately calibrated signals over the broadcast band and an output indicating meter are desirable. The procedure is as follows:

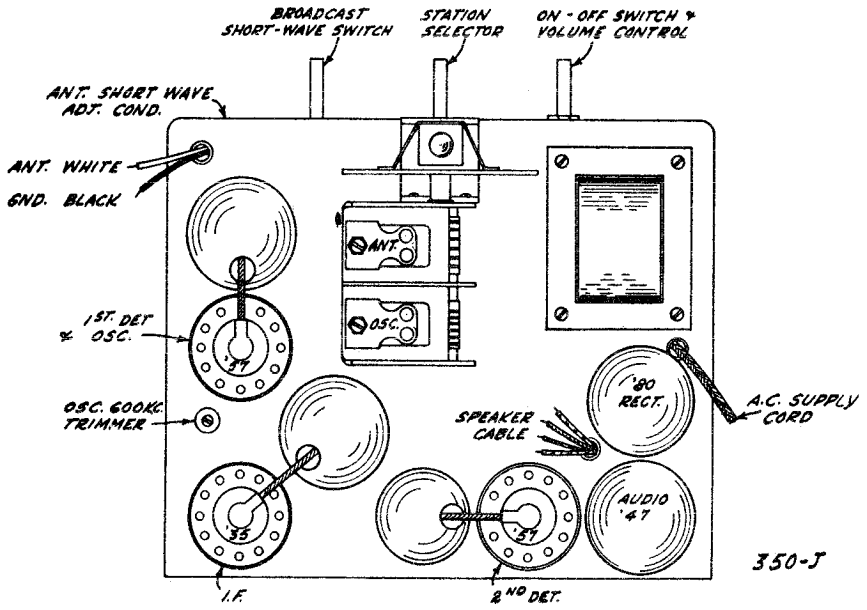
As the I.F. stages are self-tuned, no I.F. aligning at the intermediate frequency of 262 K.C. is required.

First set the signal generator for a signal of exactly 1400 K.C. Connect the antenna lead from the signal generator to the antenna lead of the receiver and the ground lead of the signal generator to the ground of the receiver. Then turn the tuning condenser rotor until the marker is at 1400 K.C. on the dial scale. In order to do this, it will be necessary to put the chassis back in the cabinet. Adjust the two trimmers on the tuning condenser for maximum output adjusting the oscillator trimmer first (section nearest back of receiver).

Next set the signal generator for a signal of 600 K.C. and adjust the oscillator 600 K.C. trimmer. This adjusting screw is between the 1st detector '57 and I.F. '35 sockets and is reached from the top of the chassis. A non-metallic screwdriver is necessary for this adjustment. Turn the tuning condenser rotor until maximum output is obtained. Then turn the rotor slowly back and forth over this setting, at the same time adjusting the 600 K.C. trimmer screw until the highest output is obtained.

Then set the signal generator again for a signal of 1400 K.C. and check the adjustment of the tuning condenser trimmers at this frequency for maximum output.

The last step is to adjust the antenna short-wave adjusting condenser. Turn the Broadcast Short-Wave switch to the short-wave position. Set the signal generator for a signal of 1700 K.C. If the generator does not cover that frequency the 2nd harmonic of an 850 K.C. signal is satisfactory. Set the signal generator for a signal of 850 K.C. and the 2nd harmonic of this signal will be 1700 K.C., the required frequency. Turn the tuning condenser rotor until maximum output is obtained. Then adjust the antenna short-wave trimmer condenser to maximum output. The adjusting nut for this condenser is reached from the front of the chassis at the right hand side. A No. 4 Spintite wrench is necessary.



Voltages at Sockets

LINE VOLTAGE 115—VOLUME CONTROL AT MAXIMUM—ANT. SHORTED TO GND.

Type of Tube	Function	Across Filament or Heater	Plate to Cathode	Screen to Cathode	Grid to Cathode	Normal Plate MA
'57	1st Det.	2.15	225	90	4	.5
'35	I.F.	2.15	230	90	3.2(1)	6.2
'57	2nd Det.	2.15	170	90	4.3	.2
'47	Audio	2.15	225	240	14(2)	23.
'80	Rect.	4.75	620 volts plate to plate			20. per plate

(1) If read with cord and plug, ground the control grid.
(2) Computed figure—cannot be accurately read with ordinary voltmeter. Voltage consists of drop across 1 megohm resistor, R 8.

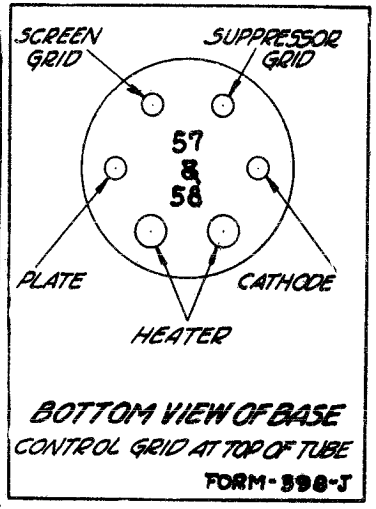
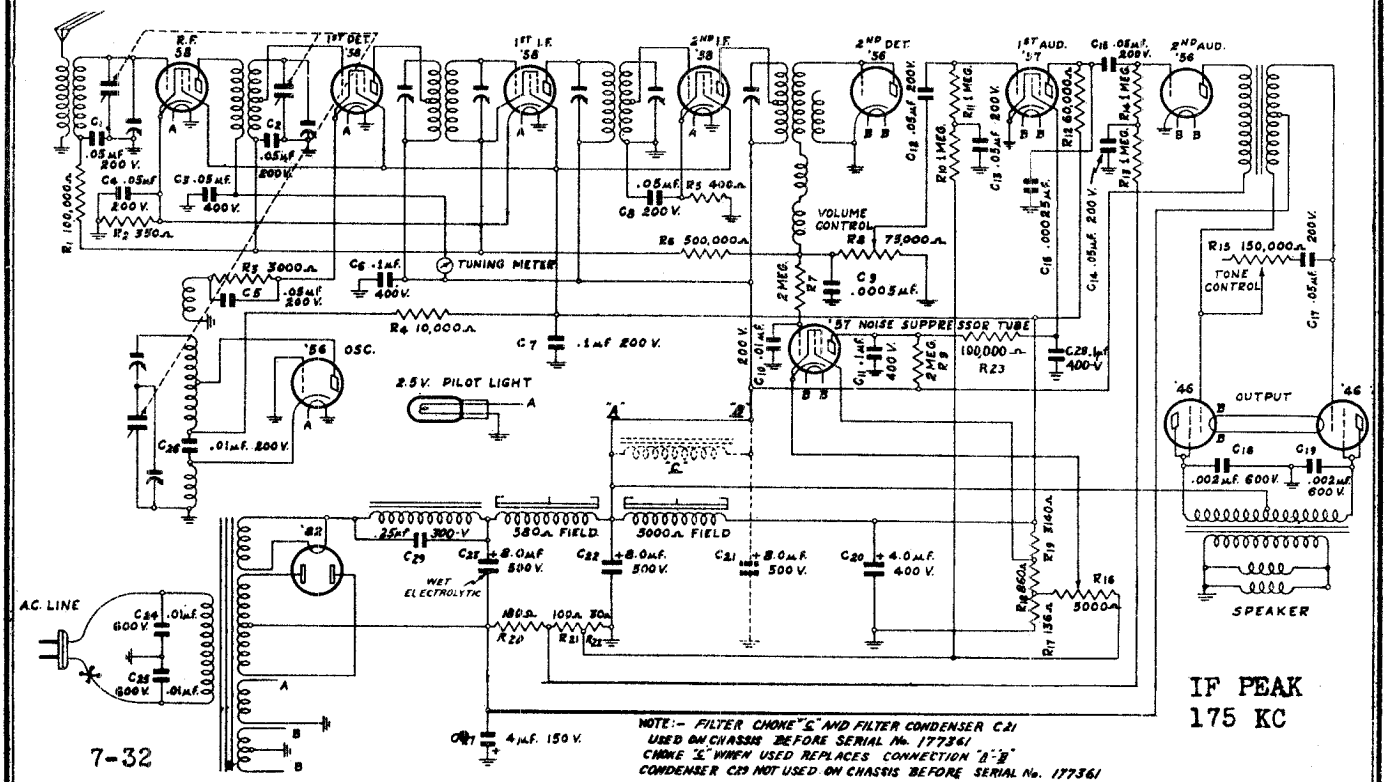


Fig. 3—Terminal Arrangement of 57 and 58 Tubes

MONTGOMERY WARD

MODELS 62-51, 62-64, 62-64X



Differences in Early Models

If the first models of this receiver a slightly different filter system was used in the power unit. Condenser C-29, which tunes the separate choke, was not used. Condenser C-21, shown with dashed lines and the choke shown with dashed lines above the 5,000 ohm speaker field in Fig. 1 were used.

In the first models of this receiver individual tubular condensers were used instead of Condenser Block No. 80922. The condensers which make up this block are shown in the parts list. If replacements of any of the condensers are required, it is recommended that the individual tubular condensers be used.

In the early models, a vitreous enamel, six-section voltage divider resistor was used instead of the wire wound type used at the present time.

Setting the Noise Suppressor

The action of the noise suppressor is to establish a certain signal strength level below which all signals are cut out, and above which all signals come through without being reduced in intensity.

The general method of using the noise suppressor is to first turn the knob to the "Power" or right hand position. At this point there is usually considerable noise received. Turn the knob to the left until the noise is eliminated, and then continue to tune the set in the regular manner to whatever stations are wanted.

When tuning for far, distant stations, the knob should be turned to the extreme right hand or "Power" position, as the weak station signals may be cut out along with the noise signals if the noise suppressor is used.

When tuning in local stations the knob may be turned well toward the left hand or "Quiet" position, as the station signals are very powerful compared with the noise signals.

If the signal of a station is distorted, turn the noise suppressor knob to the right until the signal becomes clear.

Voltages at Sockets

LINE VOLTAGE 115—ANTENNA SHORTED TO GROUND—NOISE SUPPRESSOR AT MAXIMUM CLOCKWISE POSITION

Type of Tube	Function	Across Filament or Heater	Plate to Cathode	Screen to Cathode	Grid to Cathode	Normal Plate M. A.
58	R.F.	2.4	242	90	4(1)	4
58	1st Det.	2.4	250	86	7(1)	2
56	Osc.	2.4	24		0	8
58	1st I.F.(2)	2.4	252	90	4(1)	4
58	2nd I.F.(2)	2.4	254	91	3	5.7
56	2nd Det.	2.4	0		0	0
57	1st Audio	2.4	65	55	4(3)	.4
57	NoiseSup.	2.4	55	20	3(1)	0
56	2nd Audio	2.4	255		14(4)	3.3
46	Power	2.4	260	260	34	23
82	Rectifier	2.4	880 volts plate to plate			53 per plate

(1) Read from cathode to ground.
(2) If I.F. readings are made with a cord and plug, ground the control grid through a condenser to prevent oscillation and motor boating.
(3) Read across 30 ohm section of voltage divider.
(4) Read across 30 ohm and 100 ohm section of voltage divider.

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MODELS 62-51, 62-64, 62-64X

MONTGOMERY WARD

Condenser Alignment

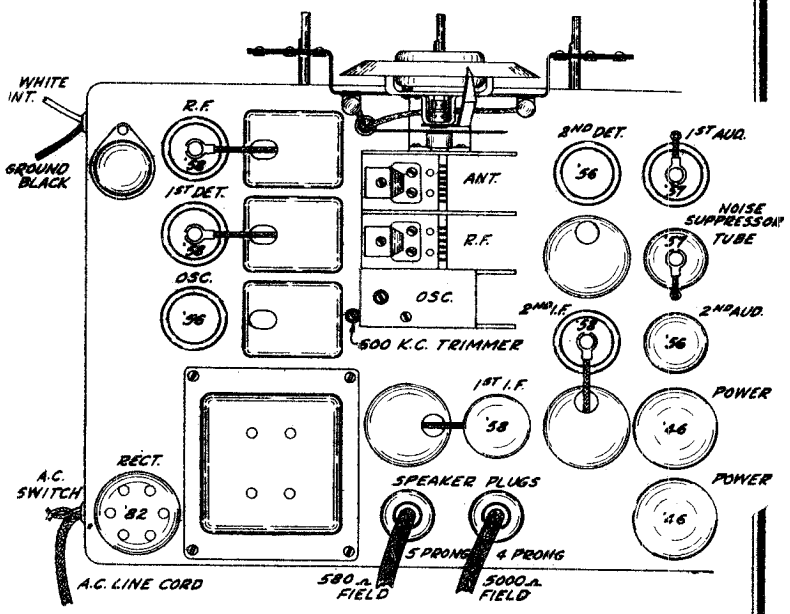
Misalignment or mistracking of condensers generally manifests itself in broad tuning and lack of volume at portions or all of the broadcast band. The receivers are all properly aligned at the factory with precision instruments and realignment should not be attempted unless all other possible causes of the faulty operation have first been investigated and unless the service technician has the proper equipment. A signal generator that will provide an accurately calibrated signal of 175 K.C. and accurately calibrated signals over the broadcast band, and an output indicating meter are desirable. The procedure is as follows:

Set the signal generator for 175 K.C. Connect the signal lead from the signal generator to the grid of the 1st detector tube through a .05 mfd. condenser. Turn the tuning condenser rotor until the plates are completely out. The ground lead from the signal generator goes to the ground lead of the receiver. Then adjust the five intermediate frequency condensers for maximum output. The adjusting screws for these condensers are reached from the bottom of the chassis.

Next set the signal generator for a signal of exactly 1400 K.C. The antenna lead from the signal generator is, in this instance, connected to the antenna lead of the receiver. Set the dial pointer on the 1400 K.C. mark on the dial scale and adjust the three trimmer condensers on the gang tuning condenser for maximum output, adjusting the oscillator trimmer first.

Next set the signal generator for a signal of 600 K.C. and adjust the oscillator 600 K.C. trimmer. The adjusting screw for this condenser is reached from the top of the chassis and is between the tuning condenser and the coil cans. A non-metallic screwdriver is necessary for this adjustment. Turn the tuning condenser rotor until maximum output is obtained. Then turn the rotor slowly back and forth over this setting, at the same time adjusting the 600 K.C. trimmer screw until the highest output is obtained.

Then set the signal generator again for a signal of 1400 K.C. and check the adjustment of the tuning condenser trimmers at this frequency for maximum output.



Part No.	Name	Cost Price	Selling Price
P-10224	Rubber Drive Pinion	.02	.05
P-30374	Bushing for Rubber Drive	.03	.08
P-1657	Tuning Meter	.58	1.45
P-1415	Pilot Lamp Socket and Clip	.04	.10
P-1273	Pilot Lamp, 2.5 V.	.06	.15
P-1540	Knob	.05	.13
P-20425-B	Chassis Bottom Plate	.11	.28
P-40412-A	Aluminum Coil Cans	.06	.15
P-10240	Rubber Cushions (in tube shields)	.02	.05
P-1054	On-Off Switch	.18	.45
P-1504	Insulated Terminal Strip with 8 lugs	.03	.08
P-1661	Dynamic Speaker (5,000 ohm field)	1.70	4.25
P-1662	Dynamic Speaker (580 ohm field)	1.77	4.43

CONDENSERS

Part No.	Code	Capacity	Voltage	Type	Cost Price	Selling Price
P-80862-P	C-1	.05 mfd.	200 V.	Tubular	$ .07	$ .18
P-80862-L	C-2	.05 mfd.	200 V.	Tubular	.07	.18
P-80890	C-3	.05 mfd.	400 V.	Tubular	.05	.13
P-80862-B	C-4	.05 mfd.	200 V.	Tubular	.07	.18
P-80862-B	C-5	.05 mfd.	200 V.	Tubular	.07	.18
P-80887-A	C-6	.10 mfd.	400 V.	Tubular	.10	.25
P-80864-C	C-7	.10 mfd.	200 V.	Tubular	.07	.18
P-80862-B	C-8	.05 mfd.	200 V.	Tubular	.07	.18
P-80855	C-9	.0005 mfd.	600 V.	Molded	.06	.15
P-80917	C-10	.01 mfd.	200 V.	Tubular	.05	.13
P-80887-A	C-11	.10 mfd.	400 V.	Tubular	.10	.25
P-80862-B	C-12	.05 mfd.	200 V.	Tubular	.07	.18
P-80862-B	C-13	.05 mfd.	200 V.	Tubular	.07	.18
P-80862-B	C-14	.05 mfd.	200 V.	Tubular	.07	.18
P-80862-B	C-15	.05 mfd.	200 V.	Tubular	.07	.18
P-80919	C-16	.00025 mfd.	600 V.	Molded	.05	.13
P-80862-B	C-17	.05 mfd.	200 V.	Tubular	.07	.18
P-80914	C-18	.002 mfd.	600 V.	Tubular	.05	.13
P-80914	C-19	.002 mfd.	600 V.	Tubular	.05	.13
*P-80915	C-20	4.0 mfd.	400 V.	Electrolytic Block	.83	2.08
	C-21	8.0 mfd.	500 V.			
	C-22	8.0 mfd.	500 V.			
†P-80924	C-20	4.0 mfd.	400 V.	Electrolytic Block	.57	1.43
	C-22	8.0 mfd.	500 V.			
P-80916	C-23	8.0 mfd.	500 V.	Wet Electrolytic	.36	.90
P-80918	C-24	.01 mfd.	600 V.	Dual Tubular	.09	.23
	C-25	.01 mfd.	600 V.			
P-80917	C-26	.01 mfd.	200 V.	Tubular	.05	.13
P-80891	C-27	4.0 mfd.	150 V.	Electrolytic	.20	.50

P-50552	Power Transformer Assembly—60 cycle	$1.95	$ 4.88
P-50563	Power Transformer Assembly—25 cycle	4.45	11.13
P-50360	Large Filter Choke Assembly	.54	1.35
P-50554	Small Filter Choke Assembly	.36	.90
P-50555	Audio Input Transformer Assembly	.72	1.80
P-50556	Audio Output Transformer Assembly	.46	1.15
P-5050	Antenna R.F. Transformer Assembly	.23	.58
P-5051	Interstage R.F. Transformer Assembly	.23	.58
P-5052	Oscillator Coil Assembly	.22	.55
P-5046	Double R.F. Choke	.16	.40
P-5047	First I.F. Transformer Assembly complete with can	.48	1.20
P-5048	Second I.F. Transformer Assembly complete with can	.50	1.25
P-5049	Third I.F. Transformer Assembly complete with can	.50	1.25
P-1636	No. 56 Tube Socket	.03	.08
P-1635	No. 46 Tube Socket	.03	.08
P-80887-A	C-28 .10 mfd. 400 V. Tubular	.10	.25
†P-80925	C-29 .25 mfd. 300 V. Tubular	.07	.18
P-80913	Three Gang Condenser	1.04	2.60
P-1442	Oscillator 600 K.C. Trimmer Condenser	.12	.30

‡P-80922 — Bypass Cond. Block — Cost .40 — Selling 1.00

Lead Color		
C-10	.01 mfd.	200 V.—White
C-14	.05 mfd.	200 V.—White-Red
C-8	.05 mfd.	200 V.—White-Red
C-6	.10 mfd.	400 V.—Yellow
C-28	.10 mfd.	400 V.—Green
C-11	.10 mfd.	400 V.—Red
C-13	.05 mfd.	200 V.—White-Green

(The first four condensers in the Condenser Block List have one side grounded to the can. The last three have a common black lead.)

RESISTORS

Part No.	Code	Resistance	Type	Cost Price	Selling Price
P-A-90912	R-1	100,000 ohm	Carbon	$0.06	$0.15
P-A-90953	R-2	350 ohm	Carbon	.06	.15
P-A-91034	R-3	3,000 ohm	Carbon	.05	.13
P-B-91037	R-4	10,000 ohm	Carbon	.05	.15
P-A-91035	R-5	400 ohm	Carbon	.05	.13
P-A-90929	R-6	500,000 ohm	Carbon	.06	.15
P-A-90949	R-7	2 Megohm	Carbon	.05	.15
P-91030	R-8	75,000 ohm	Volume Control	.24	.60
P-A-90949	R-9	2 Megohm	Carbon	.06	.15
P-A-90948	R-10	1 Megohm	Carbon	.05	.15
P-A-90948	R-11	1 Megohm	Carbon	.06	.15
P-A-91036	R-12	60,000 ohm	Carbon	.05	.13
P-A-90948	R-13	1 Megohm	Carbon	.06	.15
P-A-90948	R-14	1 Megohm	Carbon	.06	.15
P-91031	R-15	150,000 ohm	Tone Control	.19	.48
P-91032	R-16	5,000 ohm	Noise Suppressor	.19	.48
P-91033	R-17	136 ohm	Armored Wire Wound Resistor	.29	.73
	R-18	860 ohm			
	R-19	3140 ohm			
	R-20	180 ohm			
	R-21	100 ohm			
	R-22	30 ohm			
P-A-90912	R-23	100,000 ohm	Carbon	.06	.15

* Used on Models before Serial No. 177361 Only.

† Used on Models after Serial No. 177361 Only.

‡ Early models used separate condensers as shown in list. In later models block replaces condensers as shown in code list.

P-1640	Speaker Socket—Four-prong	.03	.08
P-1637	Speaker Socket—Five-prong	.03	.08
P-1670	No. 82 Tube Socket	.03	.08
P-1648	No. 58 Tube Socket	.04	.10
P-1649	No. 57 Tube Socket	.04	.10
P-40420	Tube Shield	.05	.13
P-40423	Tube Shield Cap	.03	.08
P-40424	Tube Shield Base	.02	.05
P-10142	Rubber Washer, ½" long (cond. mtg.)	.01	.03
P-10143	Rubber Washer, ¼" long (cond. mtg.)	.01	.03
P-20555	Pointer Tension Spring (Right Hand)	.02	.05
P-20556	Pointer Tension Spring (Left Hand)	.02	.05
P-1393	Dial Pointer Assembly	.05	.13
P-1389	Celluloid Dial Strip	.06	.15
P-20554	Drive Shaft	.02	.05
P-30398	Brass Take-up Collar	.03	.08
P-1382	Drive Disc and Hub Assembly	.07	.18

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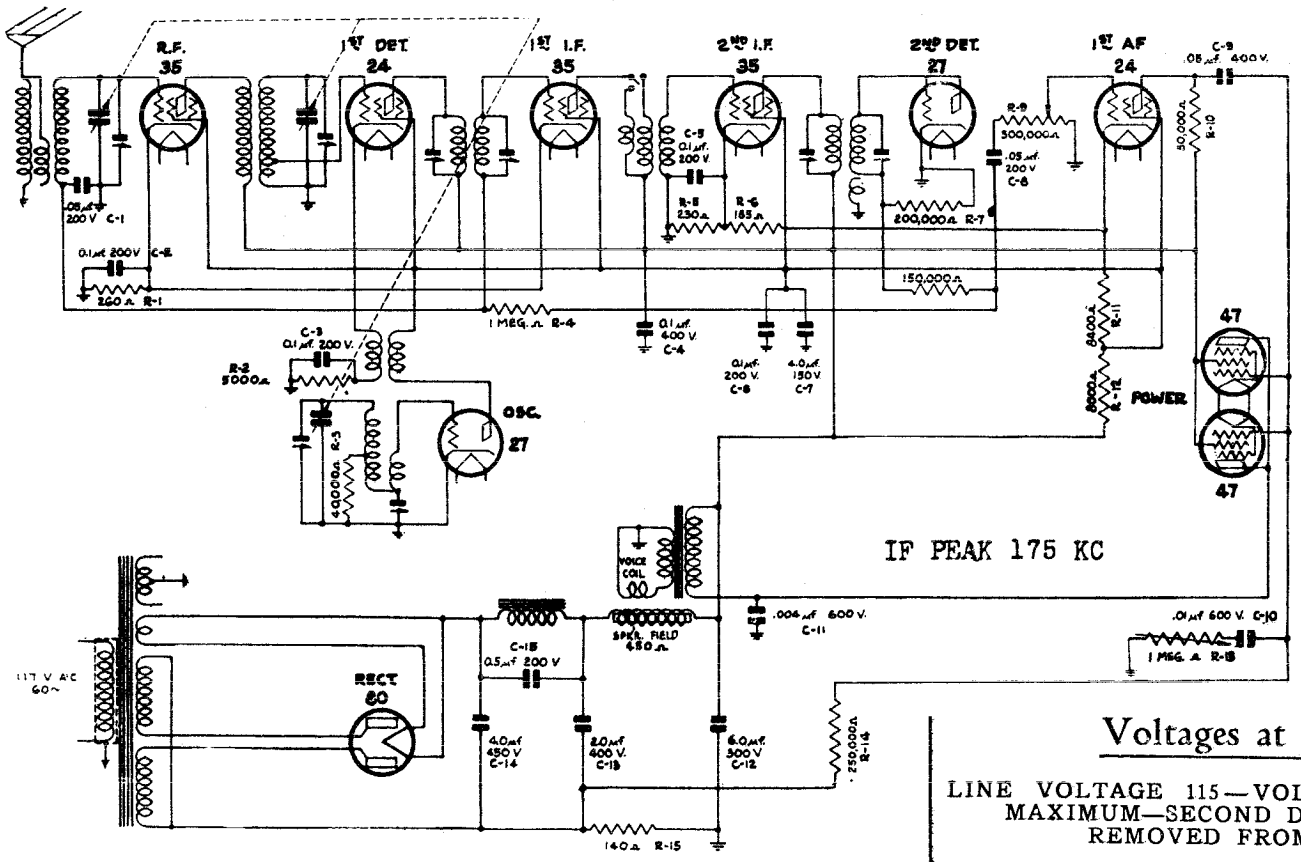


Replacing Rubber Drive

You will note that the Vernier tuning drive on this chassis uses a rubber pinion. Under normal operating conditions this rubber will last for a number of years. Should it become worn it can be readily replaced by loosening the set screw of the brass bushing located next to the rubber pinion and pulling out the station selector shaft. Place a new bushing in position, slip the station selector shaft in place and tighten the set screw.

Voltages at Sockets

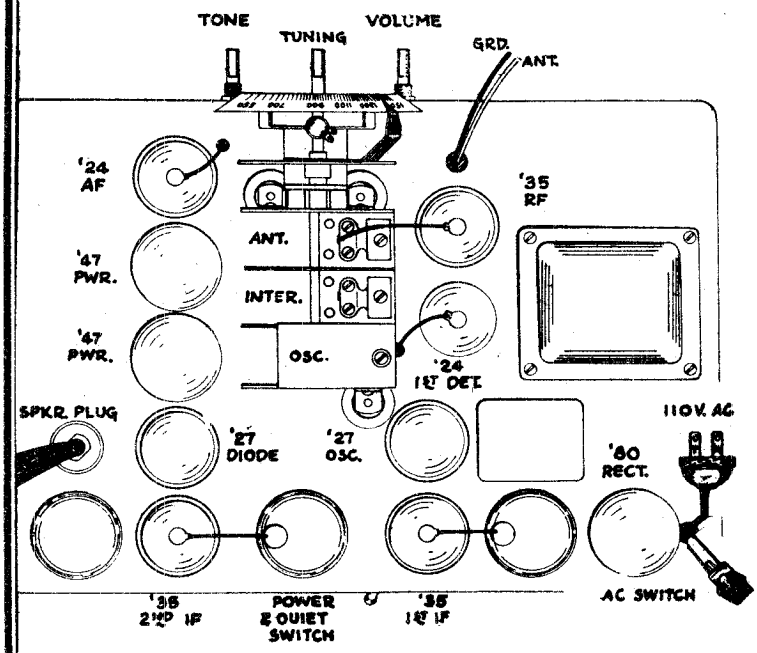
LINE VOLTAGE 115—VOLUME CONTROL AT MAXIMUM—SECOND DETECTOR TUBE REMOVED FROM SOCKET

Type of Tube	Function	Across Filament or Heater	Plate to Cathode	Screen to Cathode	Grid to Cathode	Normal Plate MA
'35	R.F.	2.2	260	103	3.8(1)	6.5
'24	1st. Det.	2.2	252	98	9.	2.2
'27	Osc.	2.2	100		8. (2)	7. (2)
'35	1st. I.F.	2.2	260	103	3.8(1)	6.5
'35	2nd. I.F.	2.2	257	100	4.5	4.7
'24	1st. Audio	2.2	200	97	7. (3)	1.
'47	2nd. Audio	2.2	240	260	18. (4)	31.
'80	Rect.	4.8	725 volts plate to plate			65 per plate

(1) Read from cathode to ground.
(2) Subject to variation with dial setting.
(3) Read across 230 and 185 ohm sections of voltage divider.
(4) Read across 140 ohm section of voltage divider resistor.
NOTE:—All readings, except heater, for second detector tube are zero.

MODEL 62-52

MONTGOMERY WARD



Condenser Alignment

Misalignment or mistracking of condensers generally manifests itself in broad tuning and lack of volume at portions or all of the broadcast band. The receivers are all properly aligned at the factory with precision instruments and realignment should not be attempted unless all other possible causes of the faulty operation have first been investigated and unless the service technician has the proper equipment. A signal generator that will provide an accurately calibrated signal of 175 K.C. and accurately calibrated signals over the broadcast band, and an output indicating meter are desirable. The procedure is as follows:

Set the signal generator for 175 K.C. Disconnect the grid cap from the first detector tube. Connect the antenna lead from the signal generator to the grid terminal of this tube. The ground lead goes to the ground connection. Then adjust the four intermediate frequency condensers for maximum output. The adjusting screws for these condensers are reached from the bottom of the chassis.

Next, set the signal generator for a signal of 1400 K.C. The input in this instance is made to the antenna lead of the receiver. Replace the grid cap on the first detector tube. Set the dial pointer on the 1400 K.C. mark on the dial scale and adjust the three trimmer condensers on the gang tuning condenser for maximum output, adjusting the oscillator trimmer first.

Then, set the signal generator for a signal of 600 K.C. The oscillator 600 K. C. trimmer condenser is underneath the chassis but the adjusting screw is reached from the top of the chassis and is adjacent to the oscillator coil can. Adjust this oscillator 600 K.C. trimmer condenser for maximum output, turning the rotor slowly back and forth over the 600 K.C. setting until highest output is obtained. A recheck may then be made of the alignment at 1400 K.C.

Part No.	Name	Cost Price	Selling Price
P-1468	No. 47 Tube Socket	.04	.10
P-1474	No. 80 Tube Socket	.04	.10
P-1521	Speaker Socket	.04	.10
P-1504	Terminal Strip (8 lugs)	.03	.08
P-1273	Pilot Lamp (2.5 v.)	.06	.15
P-1407	Pilot Light Socket (less bulb)	.06	.15
P-20408	Tube Shield Base	.01	.03
P-20406	Tube Shield	.03	.08
P-20430	Mtg. Strap for 2, 4, and 6 mfd. Electrolytic Condenser Block	.03	.08
P-20476	Mtg. Strap for 4 mfd. electrolytic cond.	.02	.05
P-70702	Attachment Cord and Plug	.23	.58
P-1540	Plain Walnut Knob	.05	.13
P-1509	Escutcheon Plate	.16	.40
P-1326	Rectangular Coil Can (Antenna)	.08	.20
P-1327	Rectangular Coil Can (Interstage)	.08	.20
P-1328	Oscillator Assembly Can	.06	.15
P-80889	Three-gang Condenser	1.43	3.58
P-10142	½" Rubber Cushions	.01	.03
P-10143	¼" Rubber Cushions	.01	.03
P-20473	Drive Shaft	.01	.03
P-30374	Rubber Drive Bushing	.03	.08
P-10182	Rubber Drive Pinion	.02	.05
P-1394	Dial Strip and Bracket Assembly	.10	.25
P-20483	Dial Strip Support Plate	.02	.05
P-1382	Drive Disc and Hub	.07	.18
P-1383	Drive Bracket and Bearing	.07	.18
P-1393	Indicator Assembly	.05	.13
P-20425	Bottom Plate	.11	.28
P-20235	J. Bolt for Chassis	.01	.03
P-1534	Electrodynamic Speaker with Cord	1.82	4.55
P-1535	Electrodynamic Speaker	1.70	4.25
P-50547	Output Transformer Assembly	$ .42	$1.05
P-50534	Power Choke Assembly	.34	.85
P-50532	Power Transformer Assembly (60 cycle)	1.66	4.15
P-1433	First I. F. Transformer assembly with can	.50	1.25
P-5032	Second I. F. Transformer assembly with can	.47	1.18
P-5033	Third I. F. Transformer assembly with can	.54	1.35
P-1502	Interstage R. F. Coil assembly less can	.24	.60
P-5036	Antenna R. F. Coil assembly less can	.28	.70

RESISTORS

Part No.	Key No.	Resistance	Type	Cost Price	Selling Price
P-90965	R2	5,000 Ohms	Carbon	$ .06	$ .15
P-90916	R3	40,000 Ohms	Carbon	.06	.15
P-90933	R4	1 Megohm	Carbon	.08	.20
P-90995	R7	200,000 Ohms	Carbon	.05	.13
P-90963-C	R8	150,000 Ohms	Carbon	.06	.15
P-90941-B	R10	50,000 Ohms	Carbon	.05	.13
P-90954-B	R14	250,000 Ohms	Carbon	.05	.13
P-90980-B	R9	0-500,000 Ohms	Volume Control	.32	.80
P-90986-B	R13	0-1 Megohm	Tone Control	.23	.58
P-91007	R1	260 Ohm	Vitreous Enamel	.35	.88
	R15	140 Ohm			
	R5	230 Ohm			
	R6	185 Ohm			
	R11	8400 Ohm			
	R12	8000 Ohm			

CONDENSERS

Part No.	Key No.	Capacity	Type	Voltage Rating	Cost Price	Selling Price
P-80862-B	C1	0.05 mfd.	Tubular	200 V.	$ .07	$ .18
P-80864-C	C2	0.1 mfd.	Tubular	200 V.	.07	.18
P-80864-C	C3	0.1 mfd.	Tubular	200 V.	.07	.18
P-80887-A	C4	0.1 mfd.	Tubular	400 V.	.10	.25
P-80864-C	C5	0.1 mfd.	Tubular	200 V.	.07	.18
P-80864-C	C6	0.1 mfd.	Tubular	200 V.	.07	.18
P-80878	C7	4.0 mfd.	Electrolytic	150 V.	.19	.48
P-80862-B	C8	0.05 mfd.	Tubular	200 V.	.07	.18
P-80890	C9	0.05 mfd.	Tubular	400 V.	.05	.13
P-80872	C10	0.01 mfd.	Tubular	600 V	.06	.15
P-80863	C11	0.004 mfd.	Tubular	600 V	.06	.15
P-80896 Electrolytic Block	C12	2.0	Green-Yellow +	300 V.	.62	1.55
	C13	4.0	Green-Red +	400 V.		
	C14	6.0	Blue-Brown +	450 V.		
P-80827	C15	0.5 mfd.	Metal Can	200 V.	.13	.33

P-1400-A	Oscillator Coil Assembly less can	.35	.88
P-1385-B	Oscillator 600 K. C. Trimmer condenser	.20	.50
P-1011-A	Quiet-Power Switch	.15	.38
P-1054	Off-On Switch	.18	.45
P-1462	No. 27 Tube Socket	.04	.10
P-1464	No. 35 Tube Socket	.04	.10
P-1461	No. 24 Tube Socket	.04	.10

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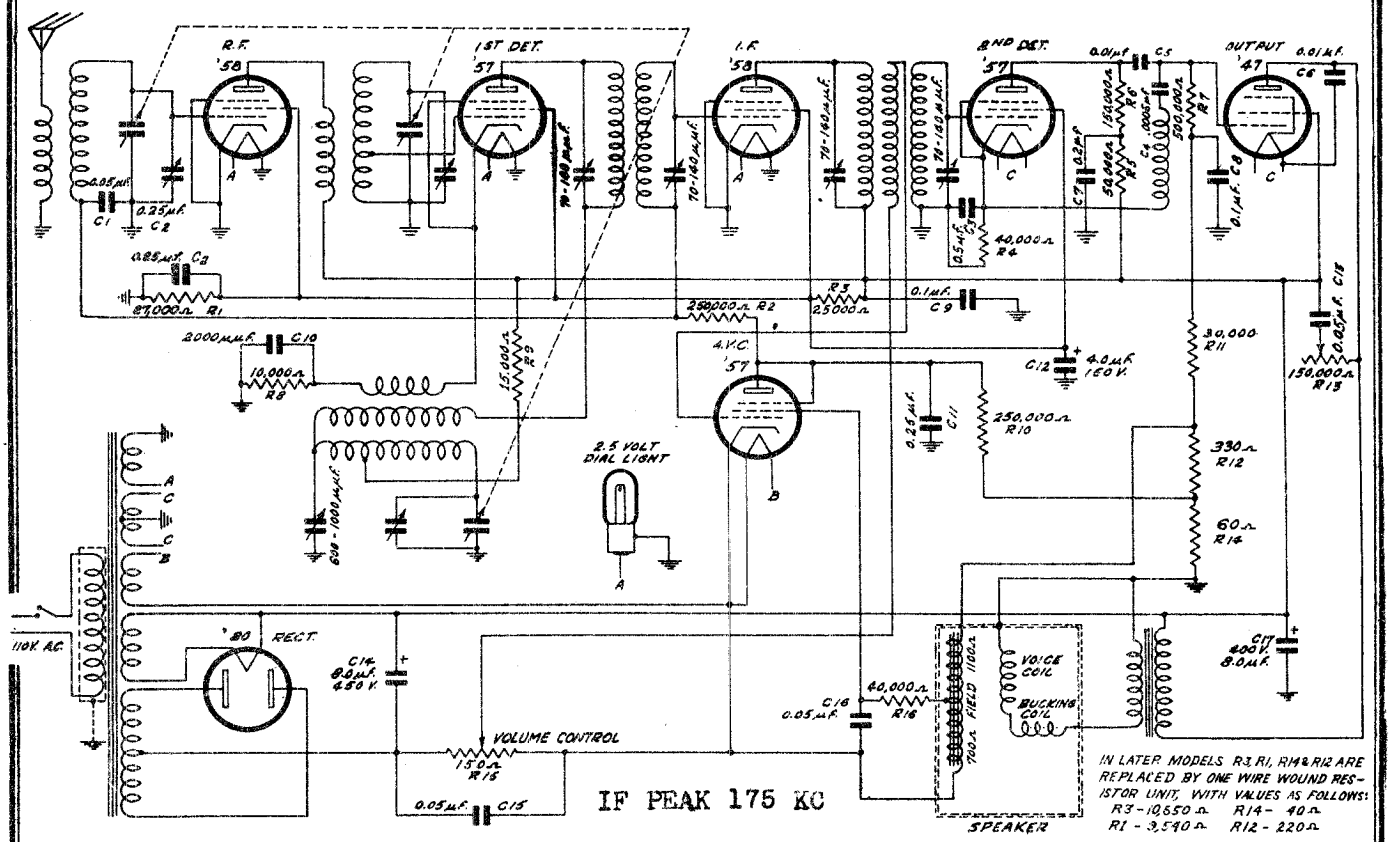
MODELS 62-53, 62-71, 62-74, 62-74X



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Part No.	Name	Cost Price	Selling Price
P-1677	No. 57 Tube Socket	$ .04	$ .10
P-1678	No. 58 Tube Socket	.04	.10
P-1468	No. 47 Tube Socket	.04	.10
P-1474	No. 80 Tube Socket	.04	.10
P-1479	Speaker Socket	.04	.10
P-40420	Aluminum Tube Shield	.05	.13
P-40425	Tube Shield Base	.02	.05
P-40411	Aluminum Coil Shield—R.F. Coils	.05	.13
P-1476	Three-Lug Insulated Terminal Strip	.03	.08
P-1513	Eleven-Lug Insulated Terminal Strip	.04	.10
P-1054	"On-Off" Switch	.18	.45
P-20529	Drive Shaft	.02	.05
P-10224	Rubber Drive Pinion	.02	.05
P-30374	Brass Bushing for Rubber Pinion	.03	.08
P-1273	Pilot Lamp 2.5 Volt	.06	.15
P-5062	Antenna R.F. Transformer Assembly	.19	.48
P-5057	Interstage R.F. Transformer Assembly	.19	.48
P-5058	Oscillator Coil Assembly	.23	.58
P-5059	1st I.F. Transformer Assembly, complete with can	.54	1.35
P-5060	2nd I.F. Transformer Assembly, complete with can	.60	1.50
P-50541	Output Transformer Assembly	.42	1.05
P-50542	Power Transformer, 60 cycle, 110 volt	1.26	3.15
P-50543	Power Transformer, 25 cycle, 110 volt	2.05	5.13
P-1497	Pilot Light Bracket and Drive Gear Assembly	.11	.28
P-1383-C	Drive Bracket and Bearing	.07	.18
P-1684	Celluloid Dial Strip	.05	.13
P-1525	Dynamic Speaker	1.32	3.30
P-1526	Dynamic Speaker—With plug	1.50	3.75

CONDENSERS

Part No.	Code	Capacity	Voltage	Type	Cost Price	Selling Price
P-80862-C	C-1	.05 mfd.	200 V.	Tubular	$ .07	$ .18
P-80888-A	C-2	.25 mfd.	200 V.	Tubular	.10	.25
P-80886-C	C-3	.5 mfd.	200 V.	Block	.38	.95
	C-7	.2 mfd.	400 V.			
	C-11	.25 mfd.	200 V.			
P-80867	C-4	.0005 mfd.	600 V.	Molded	.06	.15
P-80872-B	C-5	.01 mfd.	600 V.	Tubular	.06	.15
P-80872-B	C-6	.01 mfd.	600 V.	Tubular	.06	.15
P-80864-D	C-8	.1 mfd.	200 V.	Tubular	.06	.15
P-80887-B	C-9	.1 mfd.	400 V.	Tubular	.10	.25
P-80914	C-10	.002 mfd.	600 V.	Tubular	.05	.13
P-80891-B	C-12	4.0 mfd.	150 V.	Electrolytic	.20	.50
P-80890-B	C-13	.05 mfd.	400 V.	Tubular	.05	.13
P-80894-B	C-14	8.0 mfd.	450 V.	Electrolytic Block	.69	1.73
	C-17	8.0 mfd.	450 V.			
P-80862-C	C-15	.05 mfd.	200 V.	Tubular	.07	.18
P-80862-C	C-16	.05 mfd.	200 V.	Tubular	.07	.18
P-80849		8.0 mfd.	450 V.	Wet Electrolytic (25 Cycle only)	.53	1.33
P-1385-B	600 K.C Trimmer Condenser				.20	.50
P-80882	Three-Gang Condenser				1.37	3.43

RESISTORS

Part No.	Code	Resistance	Wattage	Type	Cost Price	Selling Price
*P-91003	R-1	27,000 ohms	.5 Watts	Carbon	$ .06	$ .15
P-90954	R-2	250,000 ohms	.2 Watts	Carbon	.06	.15
*P-91002	R-3	25,000 ohms	1.0 Watts	Carbon	.06	.15
P-90916	R-4	40,000 ohms	.2 Watts	Carbon	.06	.15
P-90941	R-5	50,000 ohms	.2 Watts	Carbon	.06	.15
P-90963	R-6	150,000 ohms	.2 Watts	Carbon	.06	.15
P-90929	R-7	500,000 ohms	.2 Watts	Carbon	.06	.15
P-90930	R-8	10,000 ohms	.2 Watts	Carbon	.05	.13
P-90905	R-9	15,000 ohms	.2 Watts	Carbon	.06	.15
P-90954	R-10	250,000 ohms	.2 Watts	Carbon	.06	.15
P-90956	R-11	30,000 ohms	.2 Watts	Carbon	.06	.15
*P-91040	R-12	330 ohms		Vitreous Enamel	.12	.30
	R-14	60 ohms				
P-90993	R-13	150,000 ohms		Tone Control	.22	.55
P-91041	R-15	150 ohms		Volume Control	19	.48
P-90916	R-16	40,000 ohms	.2 Watts	Carbon	.06	.15
†P-91048	R12	220 ohm	1.0 Watts	Armored Wire-wound Resistor	.25	.63
	R14	40 ohm	.2 Watts			
	R1	9540 ohm	1.0 Watts			
	R3	10650 ohm	2.5 Watts			

* Used in early models—in later models these resistors are replaced by resistor P-91048.
† See above.

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MODELS 62-53, 62-71, 62-74, 62-74X

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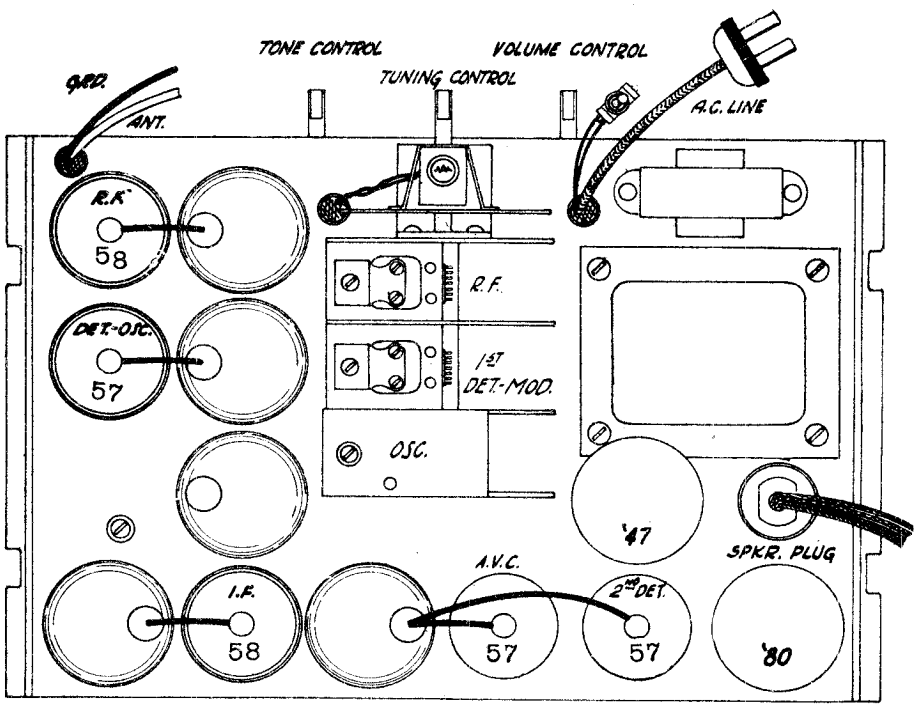

Condenser Alignment

Misalignment or mistracking of condensers generally manifests itself in broad tuning and lack of volume at portions or all of the broadcast band. The receivers are all properly aligned at the factory with precision instruments and realignment should not be attempted unless all other possible causes of the faulty operation have first been investigated and unless the service technician has the proper equipment. A signal generator that will provide an accurately calibrated signal of 175 K.C. and accurately calibrated signals over the broadcast band, and an output indicating meter are desirable. The procedure is as follows:

Set the signal generator for 175 K.C. Connect the signal lead from the signal generator to the grid of the 1st detector tube through a .05 mfd. condenser. Turn the tuning condenser rotor until the plates are completely out. The ground lead from the signal generator goes to the ground lead of the receiver. Then adjust the four intermediate frequency condensers for maximum output. The adjusting screws for these condensers are reached from the bottom of the chassis.

Next set the signal generator for a signal of exactly 1400 K.C. The antenna lead from the signal generator is, in this instance, connected to the antenna lead of the receiver. Set the dial pointer on the 1400 K.C. mark on the dial scale and adjust the three trimmer condensers on the gang tuning condenser for maximum output, adjusting the oscillator trimmer first.

Next set the signal generator for a signal of 600 K.C. and adjust the oscillator 600 K.C. trimmer. The adjusting screw for this condenser is reached from the top of the chassis and is between the I.F. and oscillator coil cans.

A non-metallic screwdriver is necessary for this adjustment. Turn the tuning condensor rotor until maximum output is obtained. Then turn the rotor slowly back and forth over this setting, at the same time adjusting the 600 K.C. trimmer screw until the highest output is obtained.

Then set the signal generator again for a signal of 1400 K.C. and check the adjustment of the tuning condenser trimmers at this frequency for maximum output.

Voltages at Sockets

LINE VOLTAGE 115—ANTENNA LEAD SHORTED TO GROUND—VOLUME CONTROL AT MAXIMUM

			For early Models with 2-section vitreous enamel resistor.				For later Models with 4-section armoured wire-wound resistor.			
Type of Tube	Function	Across Filament or Heater	Plate to Cathode	Screen to Cathode	Grid to Cathode	Normal Plate M. A.	Plate to Cathode	Screen to Cathode	Grid to Cathode	Normal Plate M. A.
'58	R.F.	2.4	282	107	4(1)	8.	258	106	2.8(1)	8.0
'57	1st Det.	2.4	270	100	5	.4	250	103	5	.4
'58	I.F.(2)	2.4	282	107	4(1)	8.	258	106	2.8(1)	8.0
'57	A.V.C.	2.4	90	40	9.5	0	103	45	10	0
'57	2nd Det.	2.4	207	98	6	.15	190	101	6	.15
'47	Audio	2.4	262	280	24(3)	31	242	260	17(3)	30
'80	Rect.	4.8				30 per plate				34 per plate

(1) Read Across R-14.
(2) If I.F. readings are made with a cord and plug, ground the control grid through a condenser to prevent oscillation.
(3) Read Across R12. and R14

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MODELS 62-55, 62-76, 62-76X

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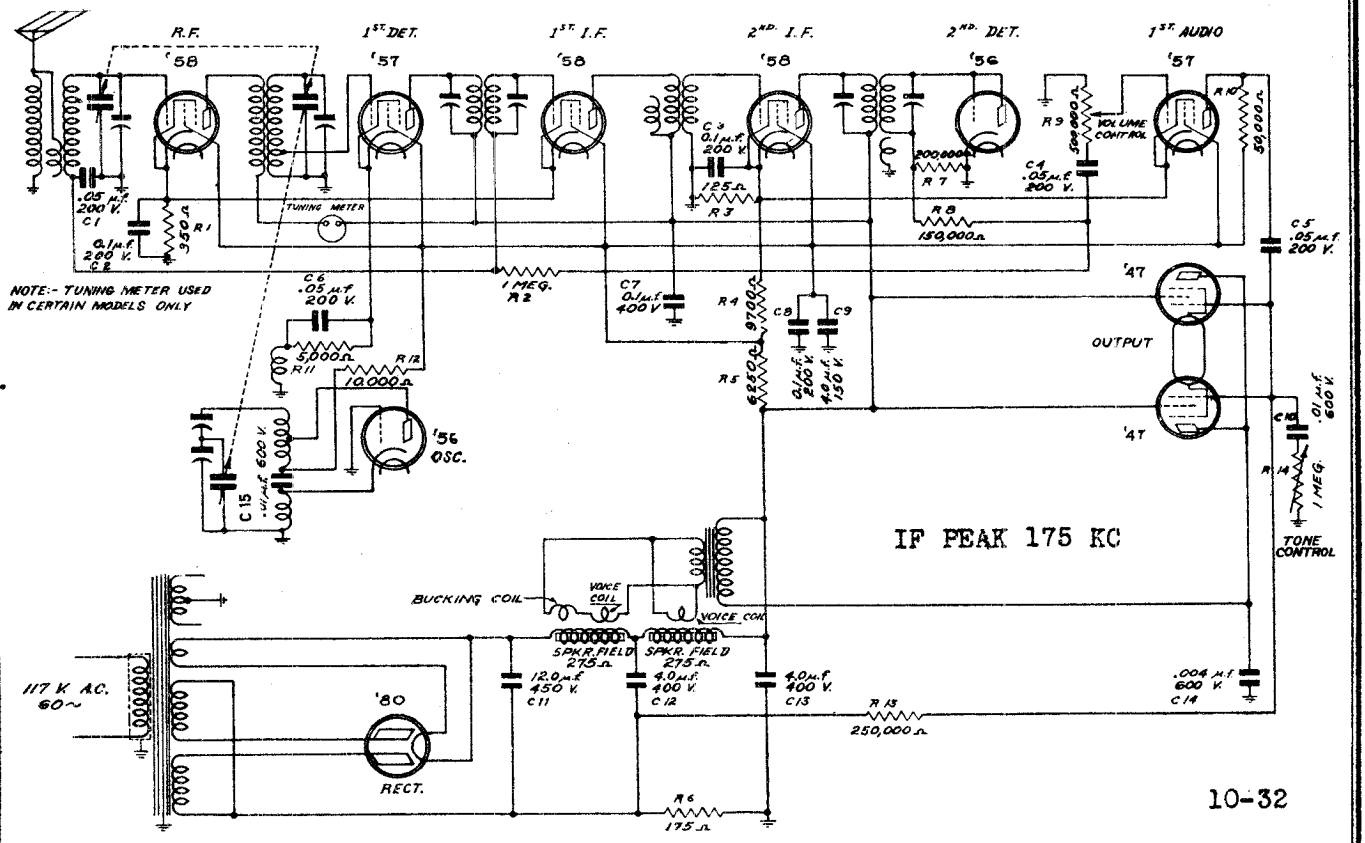

Voltages at Sockets

LINE VOLTAGE, 115 — ANTENNA LEAD SHORTED TO GROUND

Type of Tube	Function	Across Filament or Heater	Plate to Cathode	Screen to Cathode	Grid to Cathode	Normal Plate M.A.
58	R.F.	2.4	275	100	4.2(1)	5.2
57	1st Det.	2.4	265	99	5.4	.9
56	Osc.	2.4	28		0	8.6
58	1st I.F.	2.4	275	100	4.2(1)	5.2
58	2nd I.F.	2.4	275	102	3.0	8.5
56	2nd Det.	2.4	0		0	0
57	1st Audio	2.4	12	102	3.0(1)	1.8
47	Output	2.4	265	280	18.5(2)	30.0
80	Rect.	4.9				55.0 per plate

(1) Measured from cathode to ground.

(2) Measured across Resistor R6.

Voltages

Check the voltages at the sockets to see if correct voltages are being delivered to the tubes. The antenna and ground should be disconnected and the antenna and ground leads from the set connected together.

All of the D.C. voltage readings as shown on the chart are read with a 1,000 ohm per volt meter. As high a range as possible should be used. In general, the higher the resistance of the meter, the more accurate the reading will be.

Owing to the high resistance in the grid circuits of the R.F., 1st I.F., 1st audio and output tubes, the bias voltage cannot be read between the control grid and cathode of these tubes but must be read across the points as indicated in the references under the chart.

If a cable and plug are used to read the voltages, when making the readings at the I.F. socket, ground the control grid through a condenser to prevent oscillation.

The voltage chart gives the voltages with all tubes in, the speaker connected and the set in operating condition. These voltages are typical of the sets but will vary slightly with variations in individual receivers and variations in tube characteristics. All voltages in the chart are taken with a line voltage of 115. Differences in line voltage as well as differences in test equipment used will introduce other variations in the voltage readings.

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MODELS 62-55, 62-76, 62-76X

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Condenser Alignment

Misalignment or mistracking of condensers generally manifests itself in broad tuning and lack of volume at portions or all of the broadcast band. The receivers are all properly aligned at the factory with precision instruments and realignment should not be attempted unless all other possible causes of the faulty operation have first been investigated and unless the service technician has the proper equipment. A signal generator that will provide an accurately calibrated signal of 175 K.C. and accurately calibrated signals over the broadcast band, and an output indicating meter are desirable. The procedure is as follows:

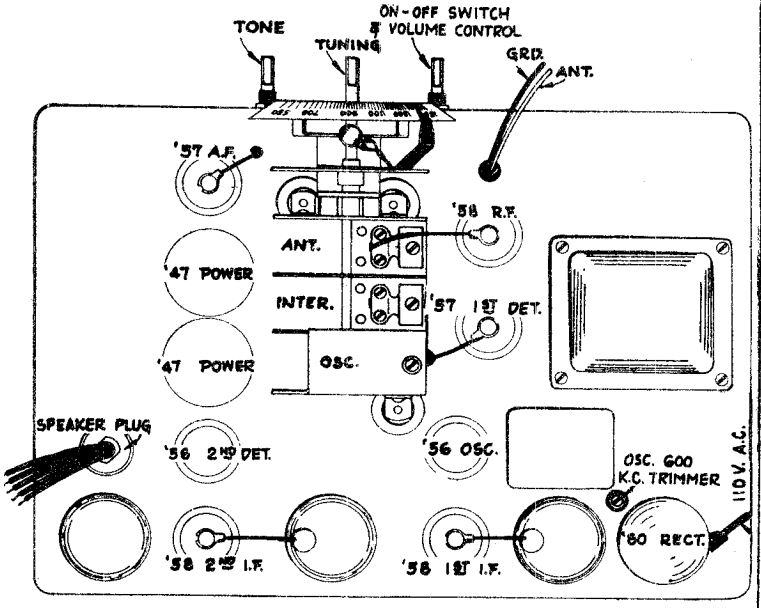
Set the signal generator for 175 K.C. Connect the signal lead from the signal generator to the grid of the 1st detector tube through a .05 mfd. condenser. Turn the tuning condenser rotor until the plates are completely out. The ground lead from the signal generator goes to the ground lead of the receiver. Then adjust the four intermediate frequency condensers for maximum output. The adjusting screws for these condensers are reached from the bottom of the chassis.

Next set the signal generator for a signal of exactly 1400 K.C. The antenna lead from the signal generator is, in this instance, connected to the antenna lead of the receiver. Set the dial pointer on the 1400 K.C. mark on the dial scale and adjust the three trimmer condensers on the gang tuning condenser for maximum output, adjusting the oscillator trimmer first.

Next set the signal generator for a signal of 600 K.C. and adjust the oscillator 600 K.C. trimmer. The adjusting screw for this condenser is reached from the top of the chassis and is between the I.F. and oscillator coil cans.

A non-metallic screwdriver is necessary for this adjustment. Turn the tuning condensor rotor until maximum output is obtained. Then turn the rotor slowly back and forth over this setting, at the same time adjusting the 600 K.C. trimmer screw until the highest output is obtained.

Then set the signal generator again for a signal of 1400 K.C. and check the adjustment of the tuning condenser trimmers at this frequency for maximum output.



Replacing Rubber Drive

You will note that the Vernier tuning drive on this chassis uses a rubber pinion. Under normal operating conditions this rubber will last for a number of years. Should it become worn it can be readily replaced by loosening the set screw of the brass bushing located next to the rubber pinion and pulling out the station selector shaft. Place a new bushing in position, slip the station selector shaft in place and tighten the set screw.

Dual Speaker Connections

Two speakers are used in this model. The fields of these speakers are connected in series and the voice coils in parallel. The resistance of each speaker field is 275 ohms

Part No.	Name	Cost Price	Selling Price
P-1703	No. 47 Tube Socket	$ .04	$ .10
P-1706	No. 56 Tube Socket	.04	.10
P-1699	No. 57 Tube Socket	.04	.10
P-1700	No. 58 Tube Socket	.04	.10
P-1696	No. 80 Tube Socket	.04	.10
P-1704	Speaker Socket	.04	.10
P-40425	Tube Shield Base	.02	.05
P-40420	Tube Shield	.05	.13
P-20425-B	Bottom Plate	.11	.28
P-40426	R.F. Coil Shields	.06	.15
P-10142	½" Rubber Washer for Gang Condenser	.01	.03
P-10143	¼" Rubber Washer for Gang Condenser	.01	.03
P-10240	Tube Cushions	.02	.05
P-40412	Oscillator Coil Shield	.06	.15
P-20461	Gang Condenser Shield	.03	.08
P-1273	2.5 V. Pilot Lamp	.06	.15
P-20473	Drive Shaft	.01	.03
P-1382-A	Drive Disc Hub and Fulcrum	.07	.18
P-1389-C	Celluloid Dial Strip	.06	.15
P-1393	Pointer Assembly	.05	.13
P-1383-C	Drive Bracket	.07	.18
P-10224	Rubber Drive Pinion	.02	.05
P-30374	Brass Bushing for Rubber Pinion	.03	.08
P-1415	Pilot Light Socket	.04	.10
P-1691	Dynamic Speaker with Plug	1.74	4.35
P-1692	Dynamic Speaker	1.56	3.90
P-50562	Power Transformer, 60 cycle, 110 Volt	1.66	4.15
P-50565	Power Transformer, 25 cycle, 110 Volt	3.14	7.85
P-50561	Output Transformer	.42	1.05
P-5067	Antenna R.F. Transformer	.24	.60
P-5066	Interstage R.F. Transformer	.24	.60
P-5052	Oscillator Coil Assembly	.22	.55
P-1433	1st I.F. Transformer Assembly, complete with can	.50	1.25
P-5068	2nd I.F. Transformer Assembly, complete with can	.50	1.25
P-5033	3rd I.F. Transformer Assembly, complete with can	.54	1.35
P-1540	Knobs	.05	.13

CONDENSERS

Part No.	Code	Capacity	Voltage	Type	Cost Price	Selling Price
P-80862	C-1	.05 mfd.	200 V.	Tubular	$ .07	$ .18
P-80864	C-2	.1 mfd.	200 V.	Tubular	.07	.18
P-80864	C-3	.1 mfd.	200 V.	Tubular	.07	.18
P-80862	C-4	.05 mfd.	200 V.	Tubular	.07	.18
P-80862	C-5	.05 mfd.	200 V.	Tubular	.07	.18
P-80862	C-6	.05 mfd.	200 V.	Tubular	.07	.18
P-80887	C-7	.1 mfd.	400 V.	Tubular	.10	.25
P-80864	C-8	.1 mfd.	200 V.	Tubular	.07	.18
P-80878	C-9	4.0 mfd.	150 V.	Electrolytic	.19	.48
P-08872	C-10	.01 mfd.	600 V.	Tubular	.06	.15
P-80923	C-11	12.0 mfd	450 V.	Electro-lytic Block	.57	1.43
	C-12	4.0 mfd.	400 V.			
P-80873-D	C-13	1.0 mfd.	400 V.	Electrolytic	.28	.70
P-80863	C-14	.004 mfd.	600 V.	Tubular	.06	.15
P-80872	C-15	.01 mfd.	600 V.	Tubular	.06	.15
P-1442	.600 K.C. Trimmer				.12	.30
P-80889	Three-Gang Variable Condenser				1.43	3.58

RESISTORS

Part No.	Code	Resistance	Wattage	Type	Cost Price	Selling Price
P-A-90953	R-1	350 ohm	.2 Watts	Carbon	$ .06	$ .15
P-A-90948	R-2	1 Megohm	.2 Watts	Carbon	.06	.15
P-91044	R-3	125 ohm		Armored Wire Wound	.25	.63
	R-4	9700 ohm				
	R-5	6250 ohm				
	R-6	175 ohm				
P-A-90995	R-7	200,000 ohm	.2 Watts	Carbon	.05	.13
P-A-90963	R-8	150,000 ohm	.2 Watts	Carbon	.06	.15
P-91043	R-9	500,000 ohm	Vol. Control & Switch		.33	.83
P-A-90941	R-10	50,000 ohm	.2 Watts	Carbon	.05	.13
P-A-90965	R-11	5,000 ohm	.2 Watts	Carbon	.06	.15
P-B-91037	R-12	10,000 ohm	.5 Watts	Carbon	.06	.15
P-A-90954	R-13	250,000 ohm	.2 Watts	Carbon	.06	.15
P-90986-C	R-14	1 Megohm		Tone Control	.23	.58

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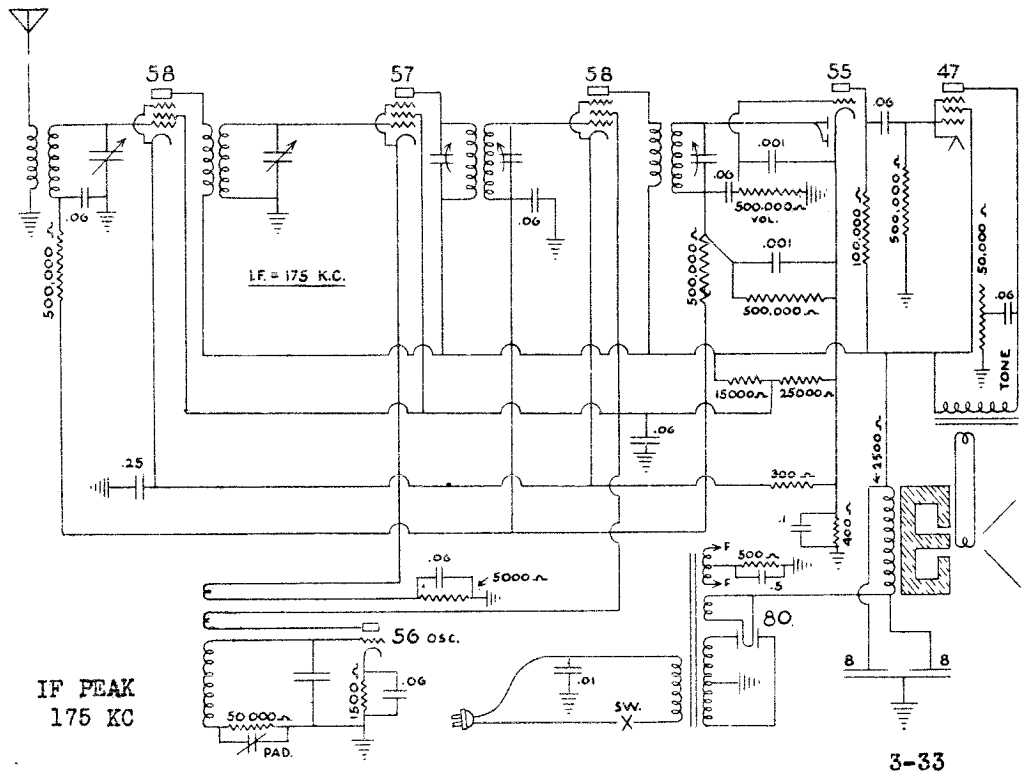

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Circuit Description And Aligning Procedure

The tubes employed are as follows, and are operated at rated voltages and biases:

R.F.	58	Osc.	56
1st Det.	57	2nd Det.	55
I.F.	58	Audio	47

Rectifier..... 80

The second detector is the new dual diode triode, the diode portion operating as a detector and providing automatic volume control—acting on the grids of the R.F. and I.F. stages. The triode portion of this tube is operated as an individually biased A.F. amplifier.

In aligning, it is first desirable to see that the I.F. transformers are properly set. Both are on top of the base, the first having two adjustments, the second but one adjustment. The intermediate frequency is 175 K.C. Couple test oscillator into grid of first detector. Use an output meter.

The tuning condenser may be adjusted for alignment or "tracking" of the tuned circuits by means of an oscillator and output meter, also. The oscillator should cover the band from 550 to 1500 K.C. The energy from the oscillator should be coupled weakly into the antenna circuit. The receiver and oscillator are first tuned to approximately 1500 K.C., and, by watching the output meter the three condenser trimmers are adjusted for maximum output. These three trimmers must then be left untouched for all further aligning.

The next step is to tune both receiver and oscillator to some point near 550 K.C. Here the alignment is made by adjusting the oscillator "pad" condenser for maximum response. It may be reached through hole in base between 1st detector and oscillator tubes. If necessary to adjust the two R.F. condenser sections it may be done by bending the slotted condenser rotor end plates. If necessary to align at points other than the ends of the "band" it may be done by bending portions of these slotted plates. Alignment of the two ends of the scale is usually quite sufficient.

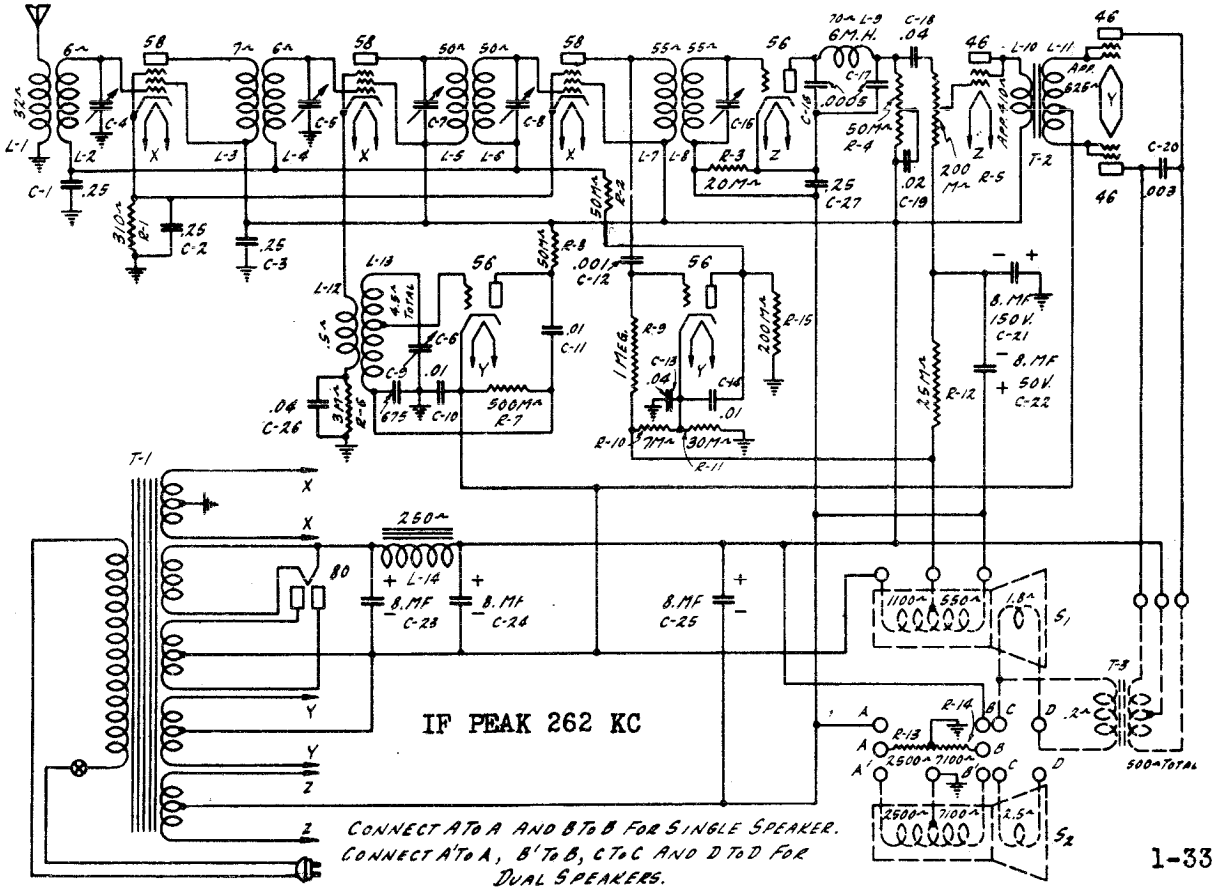
IMPORTANT: It is desirable to move the dial back and forth across the signal while making the above alignments. This is particularly necessary when altering any capacities connected with the oscillator circuit. Use an insulated or bakelite screw driver.

Be certain that good tubes are used in all sockets.

		Net Price Each	Selling Price
SOCKETS			
K-2-2-509	57 socket	$0.03	$0.08
K-3-2-509	58 socket	.03	.08
K-4-2-509	55 socket	.03	.08
K-4-7-514	56 socket	.03	.08
K-2-7-514	47 socket	.03	.08
K-2-4-508	80 socket	.03	.08
K-3-7-514	Unnumbered 5 prong socket	.03	.08
CONDENSERS			
K-3-4-301	3 gang var. tuning condenser	1.00	2.50
K-1-10-302	Dual 8 mfd. filter cond.	.53	1.33
K-2-4-226	.01 mfd. cond. 400 volt	.04	.10
K-1-6-226	.5 mfd. cond. 200 volt	.08	.20
K-2-3-226	.06 mfd. cond. 400 volt	.05	.13
K-1-3-226	.06 mfd. cond. 200 volt	.045	.11
K-1-5-226	.25 mfd. cond. 200 volt	.065	.16
K-1-3-306	.1 mfd. cond. 200 volt	.05	.13
K-3-3-474	.001 mfd. cond. molded bakelite	.06	.15
K-3-3-462	Adjustable padding cond. 1500 mmfd. max.	.15	.38
RESISTORS			
K-4-2-476	500 ohm Wire Wound Resistors, Flex.	$0.04	$0.10
K-1-3-172	300 ohm ½ watt Carbon Resistor	.05	.13
K-1-2-172	400 ohm ½ watt Carbon Resistor	.05	.13
K-1-1-4175	1500 ohm ½ watt Carbon Resistor	.05	.13
K-1-1-7366	25M ohm ½ watt Carbon Resistor	.05	.13
K-1-1-4224	50M ohm ½ watt Carbon Resistor	.05	.13
K-1-1-8484	100M ohm ½ watt Carbon Resistor	.05	.13
K-1-1-4225	500M ohm ½ watt Carbon Resistor	.05	.13
K-2-1-173	15M ohm 1 watt Carbon Resistor	.05	.13
K-2-1-172	5M ohm 1 watt Carbon Resistor	.05	.13
COILS			
K-1-6-601	Antenna Coil Assembly	.20	.50
K-1-4-602	R. F. Coil Assembly	.15	.38
K-3-3-450	Oscillator Coil Assembly	.15	.38
TRANSFORMERS			
K-6-7-201	Power Transformer 60 cycle	$1.15	$2.88 ea
K-4-5-963	No. 1 I.F. Transformer Assembly	.50	1.25 "
K-5-5-963	No. 2 I.F. Transformer Assembly	.50	1.25 "

		Net Price	Selling Price
SHIELDS			
K-0-5-103	Coil Shields	.03	.08 ea.
K-3-5-103	I.F. Transformer Shield	.04	.10 "
K-1-1-744	Inter Coil Shield for Sub Base	.50	1.25 C
K-1-8-219	Variable Cond. Shield	.10	.25 ea.
K-1-3-364	6-32 St. Spade Screws for Coil Shield	2.00	5.00 M
TERMINAL STRIPS			
K-1-1-F538	Large Term. Strip	.02	.05 ea.
K-1-2-531	Small Term. Strip	.01	.03 "
K-1-10-419	Insulator for Small Term. Strip	.50	1.25 C
K-1-2-F419	Insulator for Large Term. Strip	.50	1.25 "
K-1-1-4430	Small Double Solder Lugs	1.00	2.50 M
K-1-1-3504	200 Short Eyelets	.50	1.25 "
MISCELLANEOUS PARTS			
K-1-5-457	Tube Shield Base	$0.01	$0.03 ea.
K-1-7-101	Sub Base	.15	.38 "
K-4-4-122	Dial Assembly with Strip	.31	.78 "
K-2-6-320	Var. Cond. Mtg. Bracket, Front	.03	.08 "
K-1-6-320	Var. Cond. Mtg. Bracket, Rear	.03	.08 "
K-1-3-416	Dial Mtg. Strap	.02	.05 "
K-1-3-114	Dial Lamp Socket	.03	.08 "
K-1-1-3154	2.5 volt Dial Lamp	.07	.18 "
K-2-3-4167	Control Grid Clips	.50	1.25 C
K-2-4-116	Power Cord Set	.12	.30 ea.
K-5-7-406	Volume Control	.30	.75 "
K-4-5-369	Tone Control	.23	.58 "
K-1-3-396	⅜" Internal Tooth Shakeproof Washers	.15	.38 C
K-1-4-411	⅜" Volume Control Nut	.40	1.00 "
K-1-2-409	Large Bakelite Pattern Washer for C. Con.	.75	1.88 "
K-1-1-3410	Large Fiber Extruded Washer for Vol. Con.	.70	1.75 "
K-1-1-127	Brass Cond. Spacer (front mtg.)	.01	.03 ea.
K-1-2-127	Brass Cond. Spacer (rear mtg.)	.01	.03 "
K-2-1-3124	5/16" Gum Rubber Grommets	.50	1.25 C
K-2-1-3123	⅜" Gum Rubber Grommets	.50	1.25 "
K-1-3-437	I.F. Transformer Hold-down Clamp	.50	1.25 "
K-0-4-104	Tube Shield	.04	.10 ea.
K-0-1-635	Tube Shield Cap	.02	.05 "
K-1-7-132	Escutcheon Plate	.10	.25 "
K-1-8-134	Small Control Knob	.03	.08 "
K-2-8-134	Large Control Knob	.04	.10 "

Prices subject to change without notice.



VOLTAGES AT SOCKETS—LINE VOLTAGE 115—VOLUME CONTROL AT MAXIMUM

Type of Tube	Position of Tube	Function	"A" Volts	"B" Volts	Control Grid "C" Volts	Screen Volts	Screen Current MA	Cathode Volts	Plate Current MA	Grid Test M.A
58	1	R.F.	2.35	125	.3(1)	125	1.3	5.0	5.6	9.6
58	2	1st Det.	2.35	115	5.0(2)	115	.6	10.0	2.9	3.5
58	3	I.F.	2.35	125	.3(1)	125	1.3	5.0	5.6	9.6
56	4	2nd Det.	2.30	170	12.0			12.0	.6	.6
46	5	Driver	2.25	215	18.0(3)				18.0	21.0
56	6	Osc.	2.30	130	7-15(4)			0(4)	3.7	3.8
56	7	AVC	2.25	60(5)	2.0(6)			85.0	0	.0
46	8	Class B	2.25	310	0				6.0(7)	13.0
46	9	Class B	2.25	310	0				6.0(7)	13.0
280	10	Rect.	4.2						41 Per Plate	

(1) Actual Voltage measured across 310 ohm biasing resistor—5.0 volts.
(2) Actual Voltage measured across 3,000 ohm bias resistor—10 Volts.
(3) Read with Volume Control at minimum.
(4) Varies as shown with frequency. Actual voltage measured across 500,000 ohm bias resistor—15 to 35 Volts.
(5) Actual Voltage measured across 30,000 ohm voltage divider resistor —92 Volts.
(6) Actual Voltage measured across 7,000 ohm voltage divider resistor —22 Volts.
(7) Plate current at no signal.

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MONTGOMERY WARD

MODELS 62-79, 62-84, 62-84X, 62-94, 62-94X
MODEL 62-83

Model No. 62-83

"B" POWER UNIT PARTS

Part No.			Cost Price	Selling Price
P-80929-B	C10	.5 mfd. 160 V.	$ .13	$ .33
P-80931-A	C11	3.5 mfd. 500 V. Electrolytic	.28	.70
P-50580		"A" Choke Assembly for Dynamotor	.23	.58
P-1735		Celotex Box (Dynamotor "B" Supply)	.47	1.18
P-1745		Dynamotor (without Rubber Mountings)	6.98	17.45
P-10253		Male Rubber Dynamotor Cushion	.02	.05
P-10254		Female Rubber Dynamotor Cushion	.02	.05
P-10255		Moulded Sponge Rubber (Celotex Box)	.02	.05
P-20596		Dynamotor Base Plate	.05	.13

CONDENSERS

Part No.	Code	Capacity	Voltage	Type	Cost Price	Selling Price
P-80928-A	C1	.05 mfd.	200 V.	Bypass Cond. Block	$0.40	$1.00
	C2	.006 mfd.	600 V.			
	C3	.05 mfd.	160 V.			
	C4	.001 mfd.	600 V.			
	C5	.1 mfd.	160 V.			
	C7	.1 mfd.	300 V.			
	C8	.1 mfd.	300 V.			
P-80891-B	C6	4. mfd	150 V.	Electrolytic	.20	.50
P-80914	C9	.002 mfd	600 V.	Tubular	.05	.13
P-1442		Oscillator 600 K.C. Trimmer Condenser			.12	.30
P-80882		Three Gang Condenser Assembly			.94	2.35

RESISTORS

Part No.	Code	Resistance	Type	Cost Price	Selling Price
P-91054-A	R1	10,000—40,000 ohm	Tone Control	$0.21	$0.53
P-A-90929	R2	500,000 ohm	Carbon	.06	.15
P-A-90948	R3	1.0 megohm	Carbon	.06	.15
P-A-90912	R4	100,000 ohm	Carbon	.06	.15
P-90980-B	R5	0-500,000 ohm	Volume Control	.32	.80
P-A-91055	R6	260 ohm	Carbon	.05	.13
P-A-90979	R7	7,000 ohm	Carbon	.06	.15
P-A-90905	R8	15,000 ohm	Carbon	.06	.15
P-A-90953	R9	350 ohm	Carbon	.06	.15
P-C-91049	R10	10,000 ohm	Carbon	.05	.13
P-91053-A	R11	340 ohm	Armored Wire Wound Resistor	.13	.33
	R12	144 ohm			

Part No.		Cost Price	Selling Price
P-50578	Audio Input Transformer Assembly	$0.48	$1.20
P-50579	Audio Output Transformer Assembly	.36	.90
P-50538-A	"B" Power Filter Choke Assembly	.46	1.15
P-5072	Oscillator Coil Assembly	.22	.55
P-5059	First I.F. Transformer Complete with Can	.54	1.35
P-5071	Second I.F. Transformer Complete with Can	.51	1.28
P-5070	Antenna R.F. Transformer Assembly	.18	.45
P-5057	Interstage R.F. Transformer Assembly	.19	.48
P-1734	"B" PWR Socket Four-Prong	$ .03	$0.08
P-1704	Speaker Socket Five-Prong	.04	.10
P-1733	'36 Socket	.03	.08
P-1732	'39 Socket	.03	.08
P-1731	'41 Socket	.03	.08
P-40420	Tube Shield	.05	.13
P-40425	Tube Shield Base	.02	.05
P-1684	Dial Strip	.05	.13
P-1497	Dial Light & Bracket and Drive Disc Assembly	.11	.28
P-30374	Bushing for Rubber Drive	.03	.08
P-10224	Rubber Drive Pinion	.02	.05
P-4563-A	Dial Lamp	.06	.15
P-20460	Drive Shaft	.02	.05
P-1540	Knob	.05	.13
P-1054	On-Off Switch with Leads	.18	.45
P-10240	Rubber Cushions (in tube shield)	.02	.05
P-40411	Aluminum Coil Cans	.05	.13
P-1736	Dynamic Speaker	1.92	4.80
P-20456	Bottom Plate—Chassis	.13	.33

INTERFERENCE ELIMINATION PARTS

Part No.		Price Cost	Price Selling
62-5424	Spark Plug Suppressor	.12	.30
P-80933	Dual .5 Mfd. Generator Condenser	.24	.60

No. 62-79 62-84 62-84X 62-94 62-94X

Alignment

This receiver may be aligned on a broadcasting station or oscillator It is advisable, however, to insert a dummy 56 tube which has one filament prong removed in the AVC socket, to prevent any AVC action from making determination of the output peak difficult. The intermediate frequency is 262 K. C. and the I. F. trimming condenser adjusting screws are accessible from beneath the chassis.

These chassis may be easily distinguished by keeping in mind that the No. 62-84 uses dual dynamic speakers, while the No. 62-94 uses a single dynamic. The No. 62-79 is the same in all respects as the No. 62-84, with the exception that this chassis uses chromatic tuning and, therefore, a different tuning condenser assembly and drive. The tone, volume, and noise suppressor control are also of slightly different values.

Part No.	Description	No. Used in Set	Cost Price Each	List Price Each
U4472	Tube Shield Can—58	3	$0.04	$0.10
U4473	Tube Shield Cap—58	3	.03	.08
U4492	Tube Shield—56	1	.05	.13
U5137	Tuning Condenser Drive Assembly with Pilot Lamp	1	.32	.80
U5138	Drive Plate and Dial Chart	1	.09	.23
U5139	1st Detector Transformer (L-3, L-4)	1	.16	.40
U5143	Power Transformer, 105-125 Volts, 60 Cycles (T-1)	1	1.42	3.55
U5145	Tuning Condenser Assembly (C-4, C-5, C-6)	1	1.05	2.51
U5148	Volume Control, 200,000 Ohm with Power Switch (R-5)	1	.35	.88
U5276	Power Transformer, 105-125 Volts, 25 Cycles (T-1)	1	2.35	5.95
U5295	Tone Control, 50,000 Ohm (R-4)	1	.28	.70
U5402	Condenser, .003 Mfd., 500 Volt (C-20)	1	.05	.13
	SPEAKERS AND SPEAKER PARTS			
	Dual 8-inch Speakers			
U4247	8" Electrodynamic Speaker without Input Transformer	1	1.69	4.23
U5159	8" Electrodynamic Speaker with Input Transformer	1	2.08	5.20
U4741	Speaker Plug—6 Prong	1	.09	.23
U4742	Terminal Strip for U5159 Speaker	1	.13	.33
U4743	Input Transformer for U5159 Speaker	1	.75	1.88
U4744	Terminal Strip Cover for U5159 Speaker	1	.13	.33
	SUPPLEMENTARY PARTS LIST FOR NO. 62-94 CHASSIS			
	Add to No. 62-84 Parts List			
U4132	Resistor, 310-2500-7100 Ohm, Candohm (R-1, R-13, R-14)	1	.24	.60
U4245	8" Electrodynamic Speaker with Input Transformer	1	2.08	5.20
U4740	Input Transformer for U4245 Speaker	1	.75	1.88
U4741	Speaker Plug—6 Prong	1	.09	.23
	Omit from No. 62-84 Parts List			
U4243	Resistor, 310 Ohm, Candohm (R-1)	1	.05	.13
	Omit All Speakers and Speaker Parts on No. 62-84 Chassis Parts List			
	SUPPLEMENTARY PARTS LIST FOR NO. 62-79 CHASSIS			
	Add to No. 62-84 Parts List			
U5703	Tone Control		.28	.70
U5705	Volume Control		.35	.88
U5706	Noise Suppressor Control		.27	.68
U5708	Tuning Condenser Assembly complete with Drive		1.63	4.08
	Omit from No. 62-84 Parts List			
U3404	Condenser Drive Disc Assembly		.10	.25
U5137	Tuning Condenser Drive Assembly		.32	.80
U5138	Drive Plate and Dial Chart		.09	.23
U5145	Tuning Condenser Assembly		1.05	2.51
U5148	Volume Control		.35	.88
U5295	Tone Control		.28	.70

Part No.	Description	No. Used in Set	Cost Price Each	List Price Each
U 115	Pilot Light Lamp	1	$0.06	$0.15
U 678	Ground Binding Post	1	.01	.03
U 701	Tube Socket—280	1	.04	.10
U 705	Resistor, 25,000 Ohm, Carbon, 1 Watt (R-12)	1	.09	.23
U 861	A.C. Cord and Plug	1	.10	.25
U 929	Resistor, 50,000 Ohm, Carbon, 1 Watt (R-8)	1	.08	.20
U 962	Grid Cap Only	4	.01	.03
U1312	Horizontal Insulated Terminal	1	.01	.03
U1346	Resistor, 7,000 Ohm, Carbon, 1 Watt (R-10)	1	.09	.23
U1349	Resistor, 500,000 Ohm, Carbon, 1 Watt (R-7)	1	.09	.23
U1751	Resistor, 200,000 Ohm, Carbon, 1 Watt (R-15)	1	.09	.23
U2266	Resistor, 1 Megohm Carbon, 1 Watt (R-9)	1	.09	.23
U2333	Antenna Binding Post	1	.02	.05
U2716	Condenser, .01 Mfd., 400 Volt (C-10, C-11, C-14)	3	.09	.23
U2830	1st I. F. Transformer (L-5, L-6)	1	.38	.95
U2851	Condenser, .04 Mfd., 400 Volt (C-13, C-18, C-26)	3	.06	.15
U3063	Resistor, 30,000 Ohm, Carbon, 1 Watt (R-11)	1	.08	.20
U3087	Resistor, 3,000, Ohm, Candohm (R-6)	1	.05	.13
U3119	I. F. Shield	1	.01	.03
U3178	Dual R. F. Shield Can	1	.12	.30
U3358	Vertical Insulated Terminal	3	.01	.03
U3404	Condenser Drive Disc Assembly with Hub and Set Screws	1	.10	.25
U3568	Detector Plate Choke Assembly (L-9)	1	.11	.28
U3644	2nd I. F. Transformer (L-7, L-8)	1	.28	.70
U3853	Resistor, 50,000 Ohm, .1 Watt (R-2)	1	.06	.15
U4074	Oscillator Transformer (L-12, L-13)	1	.15	.38
U4075	Antenna Transformer (L-1, L-2)	1	.19	.48
U4085	Oscillator Series Condenser, 675 Mmf. (C-9)	1	.08	.20
U4116	Filter Condenser, Dual 8 Mfd., 450 Volt (C-23, C-24)	1	.59	1.48
U4118	Tube Socket—58	3	.04	.10
U4128	Electrolytic Condenser Clamp	1	.01	.03
U4129	Tube Socket—46	3	.04	.10
U4130	Tube Socket—56	3	.04	.10
U4131	Speaker Socket, 6 Contact	1	.04	.10
U4197	Condenser, .25 Mfd., 200 Volt (C-1, C-2, C-3, C-27)	4	.07	.18
U4199	Condenser, 8 Mmd., 450 Volt Electrolytic (C-25)	1	.38	.95
U4243	Resistor, 310 Ohm, Candohm (R-1)	1	.05	.13
U4248	Walnut Knob, small	3	.05	.13
U4249	Walnut Knob, large	1	.06	.15
U4254	Condenser, 1000 Mmf. (C-12)	1	.07	.18
U4255	Condenser, 500 Mmf. (C-16, C-17)	2	.06	.15
U4263	Audio Transformer (T-2)	1	.54	1.35
U4317	Resistor, 20,000 Ohm, Carbon, 1 Watt (R-3)	1	.07	.18
U4321	Filter Choke (L-14)	1	.29	.73
U4351	Condenser, Dual 8 Mfd., Bypass (C-21, C-22)	1	.34	.85
U4397	Oscillator Transformer Shield Can	1	.05	.13
U4435	Condenser, .02 Mfd. 400 Volt (C-19)	1	.05	.13
U4471	Tube Shield Base—56 and 58	4	.02	.05

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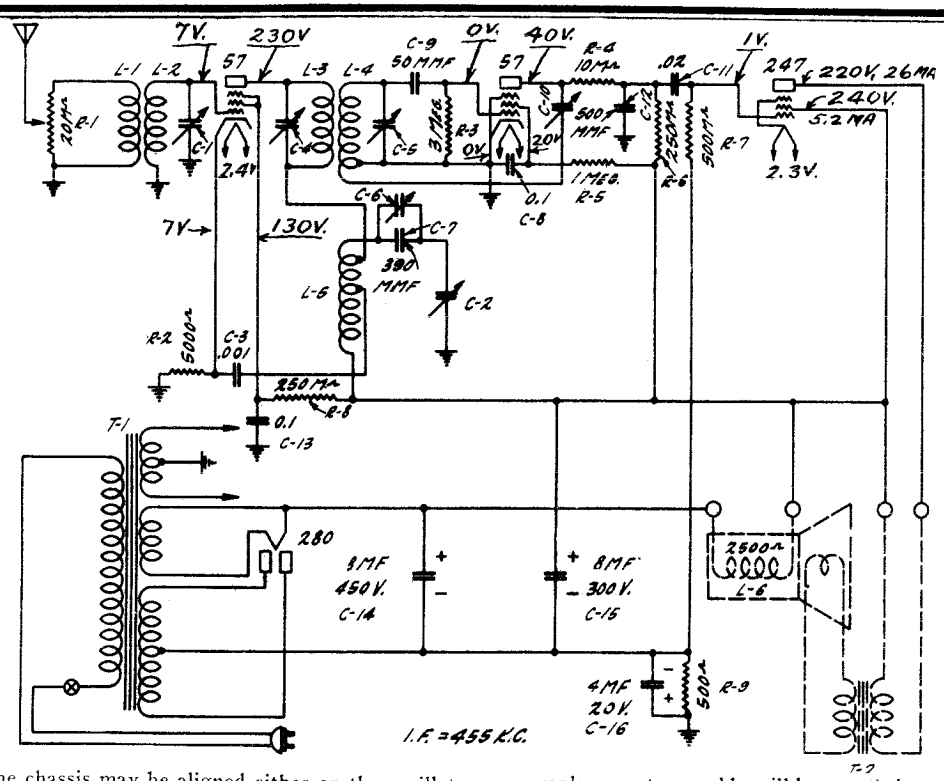
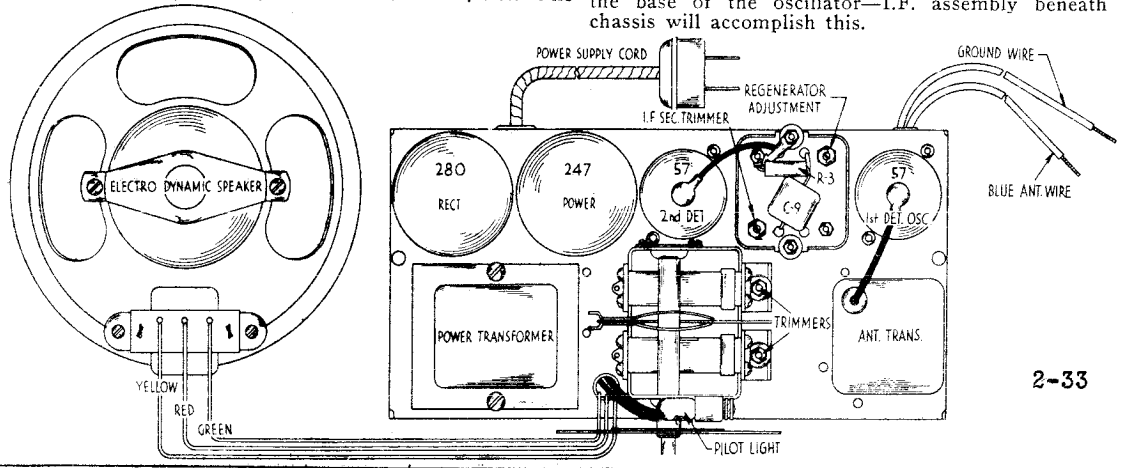


The chassis may be aligned either on the oscillator or a broadcasting station

When any defects are located in the Oscillator I.F. assembly, other than simple wiring breaks which are easily repaired, the entire unit should be replaced rather than attempting to replace any of the component parts. The replacement assembly will be supplied as a unit but none of the component parts can be supplied separately.

Aligning I.F. Condensers. During I.F. alignment, the oscillator should be rendered inoperative by shorting a portion of the oscillator coil. Connecting a wire jumper between the two vertical insulated terminals located near the base of the oscillator—I.F. assembly beneath the chassis will accomplish this.



2-33

Part No.	Description	No. Used in Set	Cost Price	Selling Price
U 115	Pilot Light Lamp	1	$0.06	$0.15
U 701	Tube Socket—280	1	.04	.10
U 861	Attachment Cord and Plug	1	.10	.25
U 962	Grid Cap Only	2	.01	.03
U1612A	Condenser, .006 Mfd., 400 Volt	1	.05	.13
U2757	Tube Socket—247	1	.04	.10
U2857	Resistor, 10,000 Ohm Carbon, 1 Watt (R-4)	1	.08	.20
U2858	Resistor, 1 Megohm, .1 Watt (R-5)	1	.08	.20
U2927	Condenser, .1 Mfd., 200 Volt (C-8, C-13)	2	.06	.15
U3358	Vertical Insulated Terminal	2	.01	.03
U3849	Resistor, 500,000 Ohm, .1 Watt (R-7)	1	.06	.15
U3998	Resistor, 250,000 Ohm, .1 Watt (R-6, R-8)	2	.06	.15
U4117	Tube Socket—57	2	.04	.10
U4254	Condenser, 1,000 Mmf. (C-3)	1	.07	.18
U4255	Condenser, 500 Mmf. (C-12)	1	.06	.15
U4256	Condenser, 390 Mmf. (C-7)	1	.06	.15
U4257	Bakelite Knob, Station Selector	1	.05	.13
U4258	Bakelite Knob, Volume Control	1	.03	.08
U4355	Condenser, 50 Mmf. (C-9)	1	.06	.15
U4435	Condenser, .02 Mfd., 400 Volt (C-11)	1	.05	.13
U4471	Tube Shield Base—57	1	.02	.05
U4472	Tube Shield Can—57	1	.04	.10
U4473	Tube Shield Cap—57	1	.03	.08
U4786	Resistor, 3 Megohm, .1 Watt (R-3)	1	.06	.15
U4789	Condenser, 4 Mfd., 20 Volt Electrolytic (C-16)	1	$0.16	$0.40
U5298	Power Transformer, 105-125 Volts, 60 Cycle (T-1)	1	.60	1.50
U5319	Escutcheon Plate, "U.S. Radio"	1	.07	.18
U5321	Dual 8 Mfd. Filter Condenser (C-14, C-15)	1	.53	1.33
U5331	Resistor, 500 Ohm Candohm (R-9)	1	.06	.15
U5338	Dial Plate and Chart	1	.08	.20
U5350	Volume Control, 0–20,000 Ohm, with Power Switch (R-1)	1	.26	.65
U5356	Antenna Transformer (L-1, L-2)	1	.14	.35
U5358	Oscillator—I. F. Assembly (L-3, L-4, L-5)	1	.91	2.28
U5359	Tuning Condenser Assembly (C-1, C-2)	1	.61	1.53
U5361	Pilot Light Socket and Mounting Bracket	1	.05	.13
U5368	Speaker Cable	1	.04	.10
U5369	Antenna Transformer Shield Can	1	.07	.18
U5373	Antenna and Ground Leads	1	.04	.10
U5374	Resistor, 5,000 Ohm Candohm (R-2)	1	.08	.20
U5399	Power Transformer, 105-125 Volts 25 Cycles	1	1.07	2.68
	ELECTRODYNAMIC SPEAKER			
U5333	6-inch Electrodynamic Speaker with Input Trans.	1	1 78	4.45
U5962	Input Transformer (T-2)	1	.38	.95

Prices subject to change without notice

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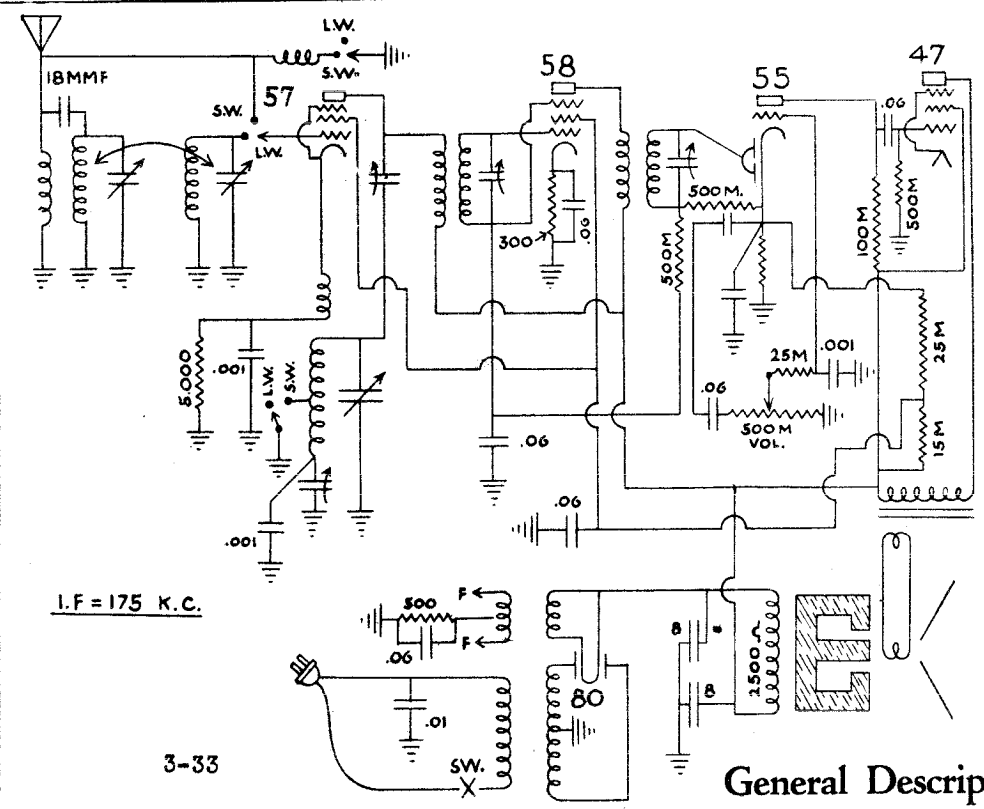


General Description and Aligning Procedure

The tubes employed are as follows, and are operated at rated voltages and biases:

Oscillator and Mixer	57
Intermediate Frequency	58
Second Detector	55
Output	247
Rectifier	280

This receiver employs a combination oscillator and first detector, or mixer. The second detector is the new dual diode-triode, the diode portion acting as detector and providing automatic volume control—acting on the grid of the type 58 I.F. tube. The triode portion of the second detector is operated as an individually biased A.F. amplifier.

The first two variable tuned circuits are not electrically coupled. They are mutually coupled by being placed close together and left unshielded. In all other respects the circuits are entirely conventional.

In aligning, it is first desirable to see that the I.F. transformers are properly set. The First I.F. transformer is on top of the base and has two adjustments. The second is inside the base but its single adjustment may be reached through a hole in the rear-center of the base. The intermediate frequency is 175 K.C.

The tuning condenser may be adjusted for alignment or "tracking" of the tuned circuits by means of an oscillator and output meter. The oscillator should cover the band from 550 to 1500 K.C. The energy from the oscillator is coupled weakly into the antenna circuit—a simple means being to place the oscillator near the antenna wire. The receiver and oscillator are first tuned to approximately 1500 K.C., and by watching the output indicator, the three condenser trimmers are adjusted for maximum output. These three trimmers must then be left untouched for all further aligning.

The next step is to tune both receiver and oscillator to some point near 550 K.C. Here the alignment is made by adjusting the oscillator "pad" condenser for maximum response. It may be reached through hole in base near the first I.F. transformer. If necessary to adjust the two R.F. condenser sections, it may be done by bending the condenser end plates. If necessary to align at points other than the ends of the "band" it may be done by bending portions of the slotted end plates of the condenser rotor sections. Alignment of the two ends of the scale is usually quite sufficient.

		Net Price	Selling Price
SOCKETS			
K-2-2-509	57 Socket	$0.03	$0.08 ea
K-3-2-509	58 Socket	.03	.08 "
K-4-2-509	55 Socket	.03	.08 "
K-2-7-514	47 Socket	.03	.08 "
K-2-4-508	80 Socket	.03	.08 "
CONDENSERS			
K-3-3-301	3 gang Var. Tuning Condenser	.95	2.38 "
K-2-10-302	Dual 8 mfd. 450 volt Condenser (Less mtg. flanges, mounted to base horiz.)	.52	1.30 "
K-1-10-302	Dual 8 mfd. 450 volt Filter Condenser (with mtg. flanges mounted to base vert.)	.53	1.33 "
K-1-6-226	.5 mfd. Condenser 200 volt	.08	.20 "
K-2-4-226	.01 mfd. Condenser 400 volt	.04	.10 "
K-1-3-226	.06 mfd. Condenser 200 volt	.045	.11 "
K-1-3-306	.1 mfd. Condenser 200 volt	.05	.13 "
K-3-3-462	Adjustable Padding Cond. 1500 mmfd. max.	.15	.38 "
K-3-3-474	.001 mfd. Molded Bakelite Condenser	.06	.15 "
RESISTORS			
K-4-2-476	500 ohm Wire Wound Flex Resistor	$0.04	$0.10 ea.
K-1-3-172	300 ohm ½ watt Resistor	.05	.13 "
K-1-2-172	400 ohm ½ watt Carbon Resistor	.05	.13 "
K-1-1-4215	5M ohm ½ watt Carbon Resistor	.05	.13 "
K-1-1-7366	25M ohm ½ watt Carbon Resistor	.05	.13 "
K-1-1-8484	100M ohm ½ watt Carbon Resistor	.05	.13 "
K-1-1-4225	500M ohm ½ watt Carbon Resistor	.05	.13 "
K-2-1-173	1.5M ohm 1 watt Carbon Resistor	.05	.13 "
K-5-7-406	Volume Control and Switch	.30	.75 "
COILS			
K-1-8-601	Antenna Coil Assembly	.20	.50 "
K-1-6-602	Int. Coil Assembly R. F.	.15	.38 "
K-3-4-450	Oscillator Coil Assembly	.15	.38 "
K-1-6-170	Antenna Choke Coil Assembly	.50	.13 "
TRANSFORMERS		Net Price	Selling Price
K-2-12-201	Power Transformer 60 cycle	$0.85	$2.13 ea.
K-3-5-963	No. 1 175 KC IF Transformer Assy	.50	1.25 "
K-2-5-963	No. 2 175 KC IF Transformer Assy	.50	1.25 "
STRIPS			
K-1-1-F538	Large Anchor Strip	.02	.05 "
K-1-2-531	Small Anchor Strip	.01	.03 "
K-1-2-F419	Insulator for Large Anchor Strip	.50	1.25 C
K-1-10-419	Insulator for Small Anchor Strip	.50	1.25 "
K-1-1-4430	Small Double Solder Lugs for above	1.00	2.50 M
K-1-1-3504	200 Short Eyelets for above	.50	1.25 C
MISCELLANEOUS			
K-1-5-457	Tube Shield Base	$0.01	$0.03 ea.
K-1-7-103	Coil Shield for RF Coils	.03	.08 "
K-1-3-364	6-32 St. Spade Screws for Coil Shield	2.00	5.00 M
K-1-1-F114	Dial Lamp Socket	2.50	6.25 C
K-1-1-3154	2.5 volt Dial Lamp	.07	.18 ea.
K-1-7-122	Dial Assembly	.21	.53 "
K-6-6-468	4 point Coil Switch	.15	.38 "
K-2-4-116	Power Cord Set	.12	.30 "
K-1-2-4168	Wire Anchor Strap	.50	1.25 C
K-1-3-437	I.F. Transformer Clamp	.50	1.25 "
K-1-3-186	No. 6x¼ Self Tapping Screws	2.50	6.25 M
K-1-1-3410	Large Extruded Fiber Washer for Vol. Cont.	.70	1.75 C
K-0-4-104	Tube Shield	.04	.10 ea.
K-0-1-635	Tube Shield Caps	.02	.05 "
K-1-8-149	Dial Strip	.03	.08 "
K-1-9-416	Chassis Hold-down Strap	.01	.03 "
K-1-8-134	Small Control Knob	.03	.08 "
K-2-8-134	Large Control Knob	.04	.10 "
K-2-3-4167	Control Grid Clip	.50	1.25 C
K-1-5-186	No. 8x1" Self Tapp. Chassis Mtg. Screws	.40	1.00 "

Prices subject to change without notice.

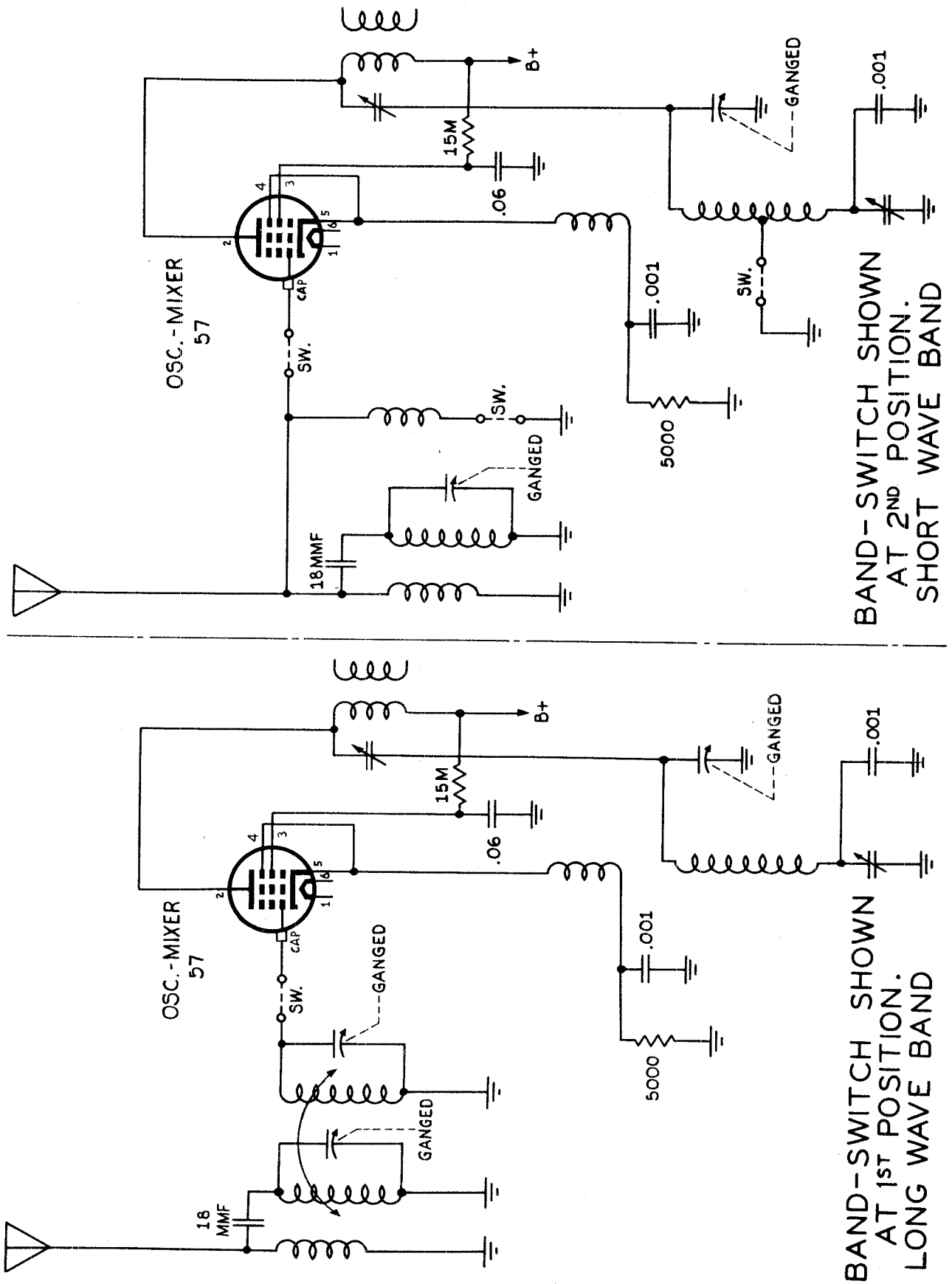
IMPORTANT: It is desirable to move the dial back and forth across the signal while making the above alignments. This is particularly necessary when altering any capacities connected with the oscillator circuit. Use an insulated or bakelite screw driver. No aligning, other than the I.F. transformers, is necessary for the short wave band (75 to 200 meters) as no attempt has been made to tune more than the oscillator.

Be certain that a good 57 tube is used in the first socket.

"clarified schematics"

MODEL 62-82

MONTGOMERY WARD



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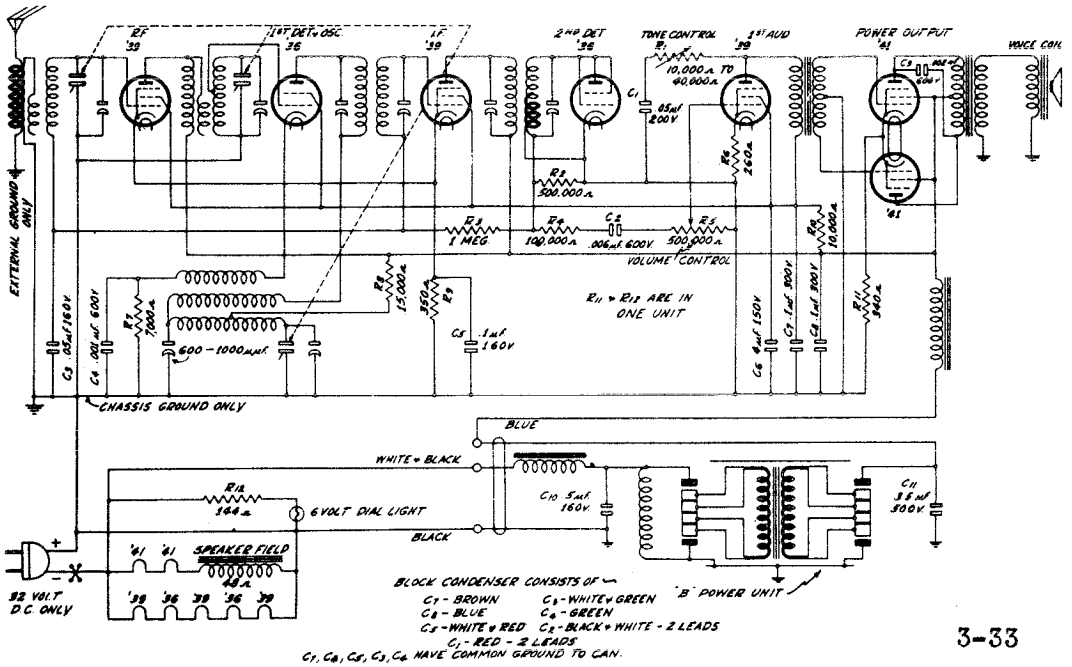


3-33

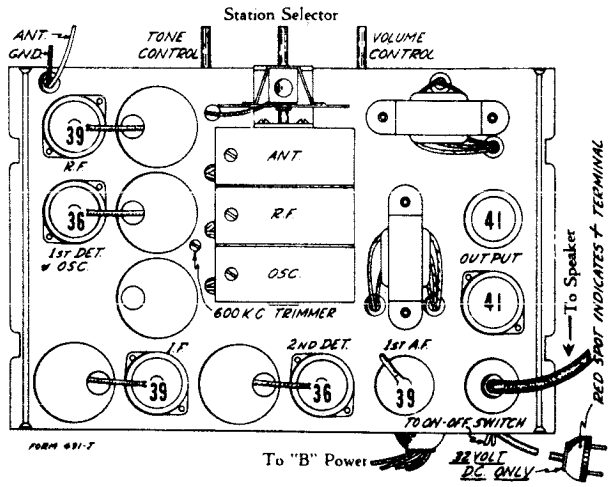
Voltages at Sockets

INPUT 32 VOLTS—GROUND R.F. GRID

Type of Tube	Function	Heater	Plate to Cathode	Screen to Cathode	Grid to Cathode	Normal Plate MA
'39	R.F.	6.4	190	90	3.0(1)	5.0
'36	1st Det. & Osc.	6.4	170	86	6.5(2)	.6
'39	I.F.	6.4	190	90	3.0(1)	5.0
'36	2nd Det.	6.4	0	0	0	0
'39	1st A.F.	6.4	70	90	1.75(1)	6.0
'41	Output	6.4	180	185	14.0	18.0

(1) Cathode to Ground.

(2) Subject to Variation with dial setting.



Condenser Alignment

Misalignment or mistracking of condensers generally manifests itself in broad tuning and lack of volume at portions or all of the broadcast band. The receivers are all properly aligned at the factory with precision instruments and realignment should not be attempted unless all other possible causes of the faulty operation have first been investigated and unless the service technician has the proper equipment. A signal generator that will provide an accurately calibrated signal of 175 K.C. and accurately calibrated signals over the broadcast band, and an output indicating meter are desirable. The procedure is as follows:

Set the signal generator for 175 K.C. Connect the signal lead from the signal generator to the grid of the 1st detector tube through a .05 mfd. condenser. Turn the tuning condenser rotor until the plates are completely out. The ground lead from the signal generator goes to the ground lead of the receiver. Then adjust the four intermediate frequency condensers for maximum output. The adjusting screws for these condensers are reached from the bottom of the chassis.

Next set the signal generator for a signal of exactly 1400 K.C. The antenna lead from the signal generator is, in this instance, connected to the antenna lead of the receiver. Keep the signal weak enough to prevent action of the A.V.C. Set the dial pointer on the 1400 K.C. mark on the dial scale and adjust the three trimmer condensers on the gang tuning condenser for maximum output, adjusting the oscillator trimmer first.

Next set the signal generator for a signal of 600 K.C. and adjust the oscillator 600 K.C. trimmer. The adjusting screw for this condenser is reached from the top of the chassis and is between the I.F. and oscillator coil cans.

A non-metallic screwdriver is necessary for this adjustment. Turn the tuning condensor rotor until maximum output is obtained. Then turn the rotor slowly back and forth over this setting, at the same time adjusting the 600 K.C. trimmer screw until the highest output is obtained.

Then set the signal generator again for a signal of 1400 K.C. and check the adjustment of the tuning condenser trimmers at this frequency for maximum output.

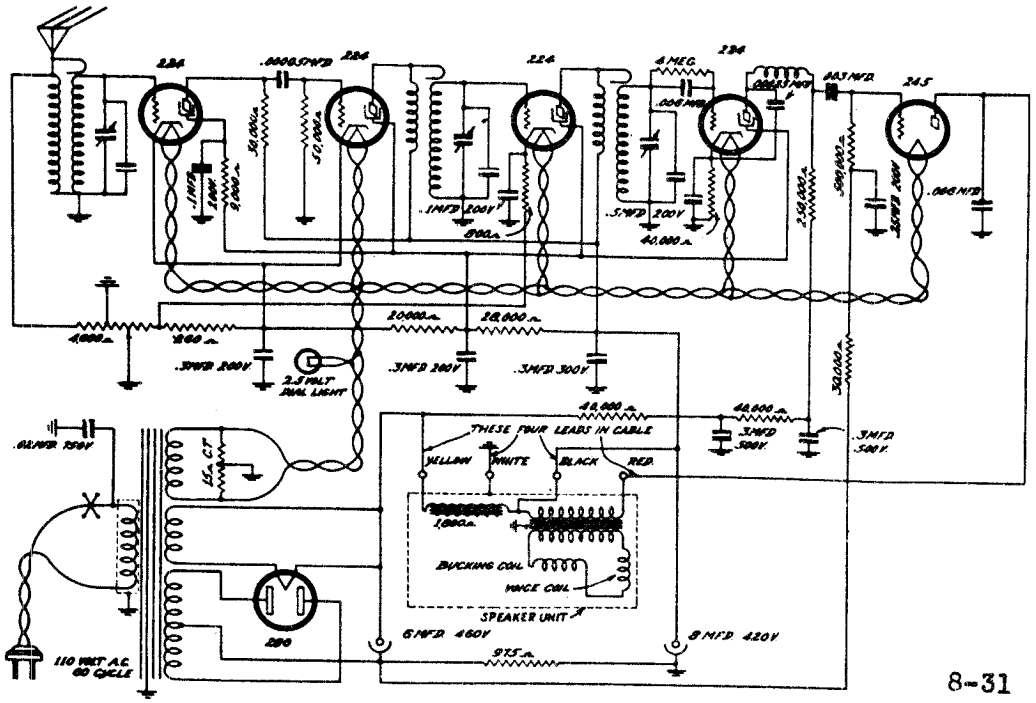
Line Voltage Range

The receiver will operate satisfactorily within a line voltage range of 28 to 36 volts. If the line voltage runs higher, it will have to be cut down and one method of doing this is to use a series resistor. Let us say the line voltage is 40. The receiver uses 1.55 amps. at 32 volts. A resistance of 5.16 ohms, therefore, capable of dissipating 12.4 watts will be required in the receiver line to cut the voltage down to 32. If the line voltage varies a variable resistor may be required.

IMPORTANT—POLARITY OF THE POWER SUPPLY TO THE RECEIVER MUST BE OBSERVED. There is a red mark on the plug. The prong of the plug at which the red mark is placed must be plugged into the positive side of the line. Use a receptacle on the 32 volt line from which the plug will not have to be removed after it has once been correctly inserted.

For Parts list, see P.15-53

MONTGOMERY WARD



8-31

When ordering repair parts, be sure to state the stock number of the part, the serial number of the chassis, and the identification number or color of the part.

Part No.	Name	Cost Price	Selling Price
RESISTORS			
P-90942	Volume Control (R1)	$ .41	$ 1.64
P-90967	Candohm Resistor Unit (R2, R3, R4)	.13	.52
P-90916	40,000 Ohm Carbon Resistor (R11, R15, R16)	.08	.32
P-90954	25,000 Ohm Carbon Resistor (R12)	.08	.32
P-90959	20,000 Ohm Carbon Resistor (R8)	.08	.32
P-90970	28,000 Ohm Carbon Resistor (R9)	.08	.32
P-90941	50,000 Ohm Carbon Resistor (R7)	.08	.32
P-90956	30,000 Ohm Carbon Resistor (R14)	.08	.32
P-90972	4 Megohm Carbon Resistor (R10)	.08	.32
P- 1094	Resistor Mounting Strip	.02	.08
P-90968	Center Tapped Resistor	.06	.24
P-90946	30,000 Ohm Carbon Resistor (R6)	.08	.32
P-90971	9,000 Ohm Carbon Resistor (R5)	.08	.32
CONDENSERS			
P-80851	Filter Condenser Block (C1, C2, C4 C5, C6, C8, C11, C13, C14, C17)	1.32	5.28
P-80849	8 Mfd. Electrolytic Condenser 460 volt	.53	2.12
P-80848	6 Mfd. 420 Volt Electrolytic Condenser	.50	2.00
P-80807	.002 Mfd. Moulder Condenser (C9)	.06	.24
P-80822	.006 Mfd. Moulded Condenser (C10)	.16	.64
P-80853	.003 Mfd. Moulded Condenser (C12)	.11	.44
P-80829A	.00005 Mfd. Moulded Condenser (C3)	.06	.24
P-80852	3-Gang Condenser and Shield	1.54	6.16
P- 1279	Detector Overload Control Assembly	.25	1.00
COILS AND TRANSFORMERS			
P-5052A	25 Cycle Power Transformer Assem.	2.41	9.64
P-50525	Power Transformer Assembly	1.50	6.00
P- 1290	Complete Set Shielded R.F. Coils	1.69	6.76
P- 1284	Shielded Antenna Coil Assembly	.46	1.84
P- 1283	Shielded Interstage Coil Assembly	.48	1.92
P- 1293	Shielded Detector Coil Assembly	.76	3.04
P- 1189	Coil Shield Assembly	.08	.32
P- 1282	R.F. Resistance Coupling Unit Ass'y	.26	1.04
P- 1171	R.F. Choke Coil	.13	.52
P- 1092	Grid Clip Assembly	.02	.08
SOCKETS			
P- 1047	224 Tube Socket	.04	.16
P- 1052	245 Tube Socket	.04	.16
P- 1062	280 Tube Socket	.04	.16
P-10131	4 Prong Socket Shield	.01	.04
P-10124	5 Prong Socket Shield	.01	.04

Tube Voltages

All D.C. voltages taken with a 1000 ohm per volt meter on the scale indicated in column headed "Meter Scale." Turn on the volume control all the way and connect the antenna and ground leads together. The grid, plate, and screen grid voltages are measured to cathode of the heater tubes and to filament of the 245 tube.

Tube	Circuit	Meter Scale	90 V.	100 V.	110 V.	120 V.	130 V.
1st R. F. 224	Grid	0—10	2	2.3	2.6	3	3.3
	Screen-Grid	0—100	52	58	63	68	73
	Plate	0—250	133	142	155	167	178
2nd R. F. 224	Grid	0—10	.4	.5	.6	.7	.8
	Screen-Grid	0—100	60	67	72	78	83
	Plate	0—1000	190	210	230	250	278
3rd R. F. 224	Grid	0—10	2	2.3	2.6	3	3.3
	Screen-Grid	0—100	60	67	72	78	83
	Plate	0—1000	190	210	230	250	278
Detec 224	Grid	0—10	.08	.09	.1	.11	.12
	Screen-Grid	0—100	48	54	59	63	67
	Plate	0—100	58	66	72	78	87
Audio 245	Grid	0—100	23	27	31	35	40
	Plate	0—1000	202	222	242	262	282
280 Rect.	Plate Current	0—100	40 mils.	45 mils.	50 mils.	56 mils.	64 mils.
280 Rect.	Filament to Ground	0—1000	265	298	330	358	392

Part No.	Name	Cost Price	Selling Price
MISCELLANEOUS			
P-70710	Dynamic Speaker Cord and Terminal Strip Assembly	.19	.76
P-70702	Attachment Cord and Plug Assembly	.23	.92
P-20384	Tube Shield	.23	.92
P- 1278	Tube Shield Clip Assembly	.02	.08
P- 1287	Pilot Lamp Assembly	.06	.24
P- 1059	Control Knob	.06	.24
P- 1280	Escutcheon Plate	.10	.40
P- 1190	A. C. Switch	.14	.56
P-10143	¼ Inch Rubber Cushion	.01	.04
P-10142	⅛ Inch Rubber Cushion	.01	.04
P- 1194	Dial and Drive Assembly	.11	.44
P- 1277	Dynamic Speaker	2.59	10.36

Prices subject to change without notice.

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Mixer, First Detector-oscillator — 1A7G

I. F. Amplifier — 1P5G

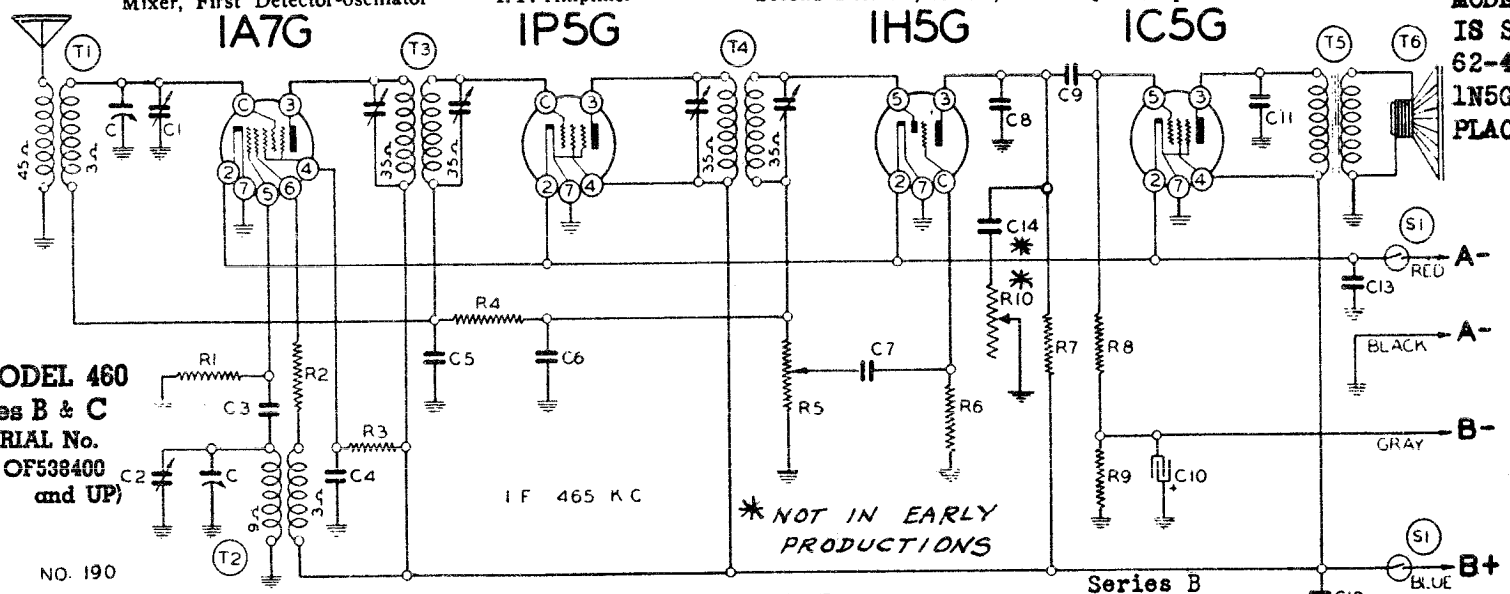
Second Detector, A.V.C., 1st Audio — 1H5G

Output — 1C5G

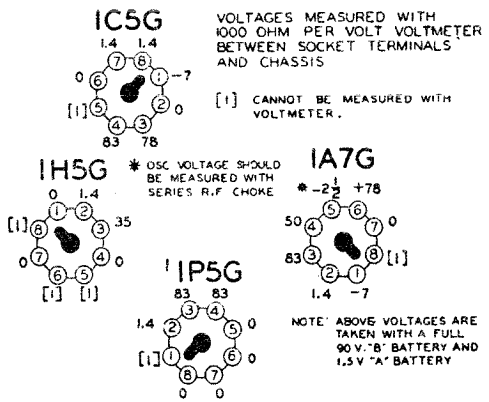
MODEL 62-1459 IS SAME AS 62-460 EXCEPT 1N5G TUBE REPLACES 1P5G

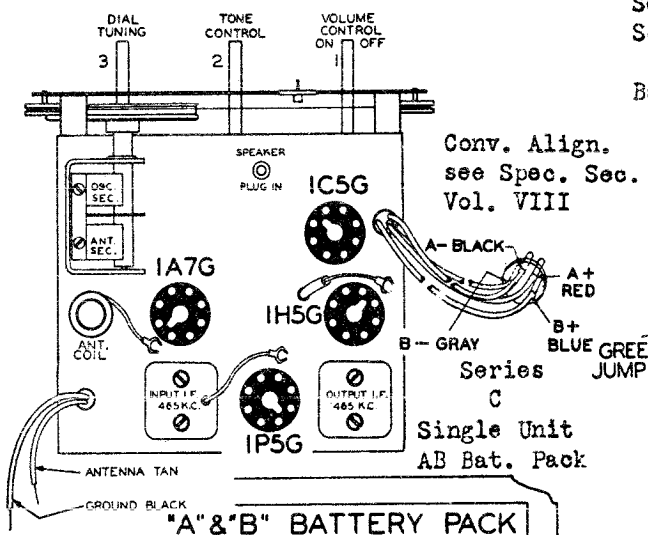
MODEL 460
Series B & C
(SERIAL No. OF538400 and UP)

NO. 190



BOTTOM VIEW OF CHASSIS

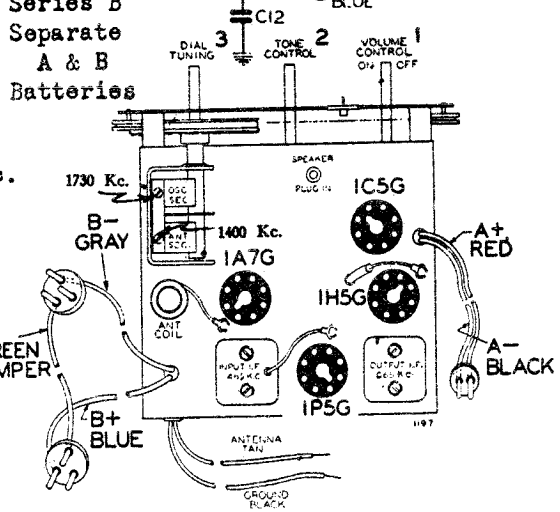

1C5G
1.4 1.4
83 78
VOLTAGES MEASURED WITH 1000 OHM PER VOLT VOLTMETER BETWEEN SOCKET TERMINALS AND CHASSIS
[1] CANNOT BE MEASURED WITH VOLTMETER.
1H5G
* OSC VOLTAGE SHOULD BE MEASURED WITH SERIES R.F CHOKE
1A7G
-2½ +78
1.4 -7
1P5G
83 83
1.4
NOTE: ABOVE VOLTAGES ARE TAKEN WITH A FULL 90 V. "B" BATTERY AND 1.5 V "A" BATTERY
REAR OF CHASSIS
924



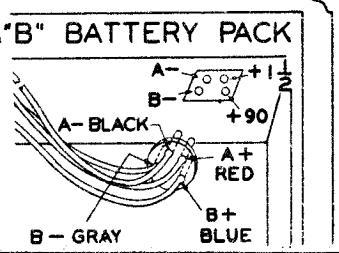
Conv. Align. see Spec. Sec. Vol. VIII

Series C Single Unit AB Bat. Pack

Series B Separate A & B Batteries



"A" & "B" BATTERY PACK



RESISTORS

Ref. No.	Part No.		Ref. No.	Part No.	
R1	130266	200M ohm—½ w.	R10 *	101119	Tone Control (1 Megohm)
R2	13018	4M ohm—½ w.			
R3	1307	40M ohm—½ w.			
R4	1304	3 megohm—½ w.			
R5	101175	1 megohm volume control			
R6	130257	5-megohm—½ w.			
R7	1303	500M ohm—½ w.			
R8	13019	1 megohm—½ w.			
R9	130200	700 ohm—½ w.			

CONDENSERS

Ref. No.	Part No.	
C	102110	2 gang variable condenser
C1		Antenna Trimmer on gang
C2		Oscillator trimmer on gang
C3	12912	.00025 mica
C4	1009	.05 x 200 v.
C5	1009	.05 x 200 v.
C6	1295	.0001 mica
C7	10012	.003 x 600 v.
C8	1295	.0001 mica
C9	10011	.01 x 400 v.

PARTS

T1	111132	Antenna Coil
T2	110122	Oscillator Coil
T3	108151B	Input I. F. - 465 kc.
T4	108153	Output I. F. - 465 kc.
T5	10591	Output Transformer
T6	114166	5 in. P. M. Speaker
S1		Off-on switch on Volume control
C10	11975	10 mfd. x 25 w. v.
C11	10012	.003 x 600 v.
C12	10064	.25 x 200 v.
C13	10020	.1 x 200 v.
* C14	10025	.002 x 600 v.

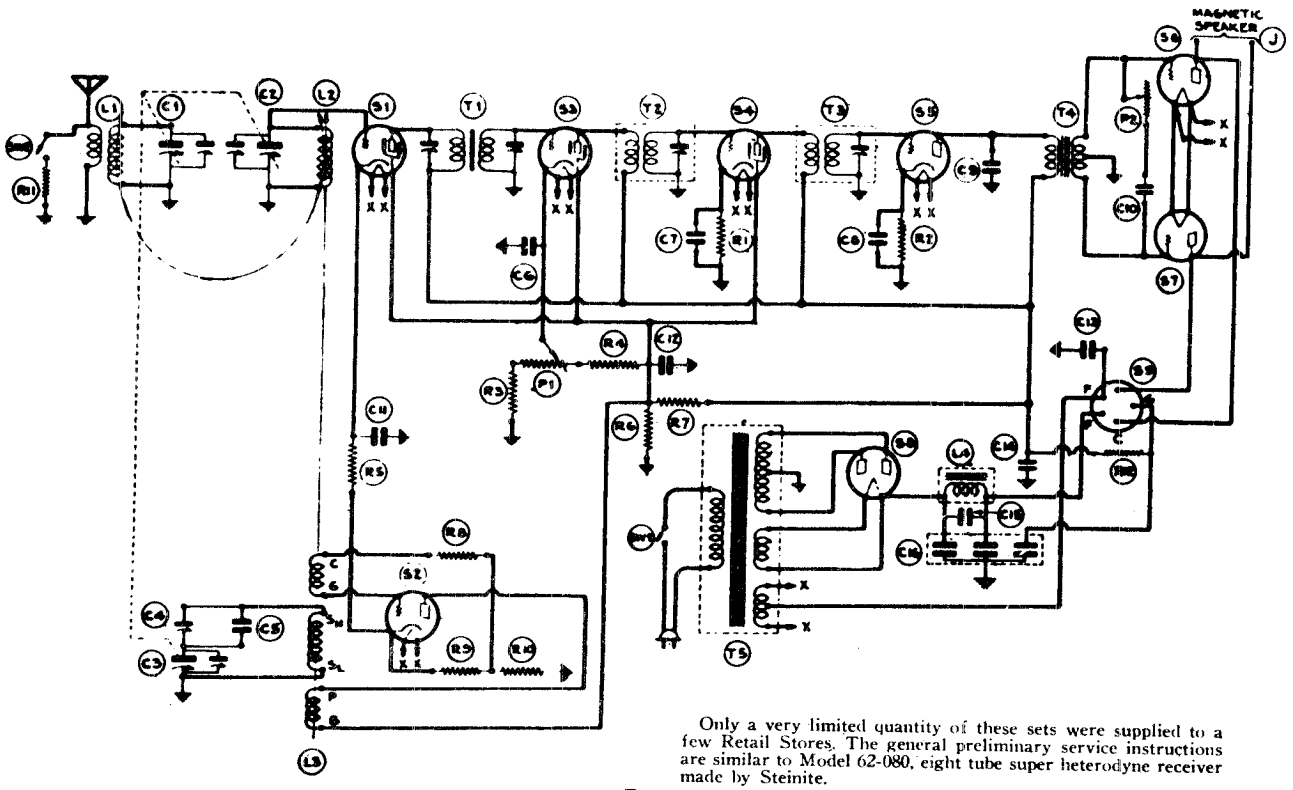
Power Output——
150 Milliwatts Undistorted,
270 Milliwatts Maximum

AUGUST 1940

FREQUENCY RANGE
535 to 1730KC

MODEL 62-1040

MONTGOMERY WARD



Only a very limited quantity of these sets were supplied to a few Retail Stores. The general preliminary service instructions are similar to Model 62-080, eight tube super heterodyne receiver made by Steinite.

Design Data

L1—161 Coil
L2—160 Coil
L3—163 Oscillator Coil
L4—339U Choke
T1—1st I.F. Transformer
T2—2nd I.F. Transformer
T3—3rd I.F. Transformer
T4—A-270 Audio Transformer
T5—360 Power Transformer
C1-C2-C3 —425 Mmfd. Max., 417 nominal
C4 —Variable 250-600 Mmfd.
C5 —750 Mmfd. Nominal 10% (Mica)
C6 —0.1 Mfd.
C7 —0.1 Mfd.
C8 —1.0 Mfd. 150 V.
C9 —.001 Mfd. Mica
C10—.003 Mfd.
C11—0.1 Mfd.
C12—1.0 Mfd. 150 V.
C13—0.1 Mfd.
C14—1.0 Mfd. 300 V.
C15—.25 Mfd.
C16—Three 4 Mfd. Units (Dry Electrolytic)

Prices subject to change without notice.

R1 —750 ohms wire wound
R2 —25,000 ohms 1 watt
R3 —200 ohms wire wound
R4 —25,000 ohms 1 watt
R5 —10,000 ohms 1 watt
R6 —10,000 ohms 1 watt
R7 —3500 ohms 3 watt
R8 —400 ohms wire wound
R9 —100 ohms—wire wound, tapped at 100 ohms
R10—1000 ohms
R11—100 ohms
R12—4000 ohms 2 watt
S1-S3-S4—'24 tubes
S2-S5—'27 tubes
S6-S7—'45 tubes
S8—'80 tube
S9—SPKR
J—Twin tip jack for magnetic speaker
P1—10,000 ohm wire wound pot.
P2—½ megohm variable tapered res.
SW1—Operating switch (on-off)
SW2—Local-Distance switch

Part No.	Description	Cost Price	Selling Price
SM 6443	Osc. Trimmer and Condenser Assem.	$ .30	$1.20
SM 4432	"Ant" B. P.	.02	.08
SM 4422	"Gnd" B. P.	.02	.08
SM 360S	Transformer (T5)	2.44	9.76
SM 6433	160 and 163 Osc. Coil Assem. (L3)	.89	3.56
SM 1040	Set I. F. Trans. (T1, T2, T3)	1.27	5.08
SM 5485	A.C. Switch (SW1)	.25	1.00
SM 3351	10' C. and P. Cable	.30	1.20
SM 4492	10,000 Ohm Pot (P1)	.25	*1.00
SM 13124	3 Gang 1040 Cond.	1.76	7.04
SM 3220	1/10 Mfd. Cond. (C11, C13)	.11	.44
SM 13120	Filter Condenser (C16)	1.36	5.44
SM 7114	.25 Mfd. Condenser (C15)	.20	.80
SM 339U	Filter Choke (L4)	.68	2.72
SM 4789	10,000 Ohm 3 Watt	.15	.60
SM 4697	25,000 Ohm 1 Watt (R4)	.09	.36
SM 4786	750 Ohm Wire Wound (R1)	.09	.36
SM 4787	4,000 Ohm 2 Watt (R12)	.12	.48

Part No.	Description	Cost Price	Selling Price
SM 3333	.025 Mfd. Condenser	.15	.60
SM 4768	1100 Ohm Tapped Resistor	.12	.48
SM 270U	Input Transformer (T4)	1.18	4.72
SM 6449	161 Antenna Coil (L1)	.67	2.68
SM 6436	100 Ohm Resistor (R9)	.30	1.20
SM 3819	Knobs, Small	.06	.24
SM 3820	Knobs, Large	.075	.30
SM 637	Tube Shield and Base	.15	.60
SM 4786	1100 Ohm Resist.	.11	.44
SM 7039	.001 Mfd. Cond. (C9)	.08	.32
SM 3311	.002 Mfd. Cond.	.09	.36
SM 4507	½ Meg. Pot (P2)	.30	1.20
SM 4743	RU100 Resistor (R11)	.06	.24
SM 6389	Local Distance Switch Assem.	.30	1.20
SM 6167	Grid Cap Assem.	.08	.32
SM 4367	Resist. Strip Insulator	.01	.04
SM 16018	Dial Drum and Scale Assem.	.27	1.08
SM-227-245-224-28	Sockets	.075	.30

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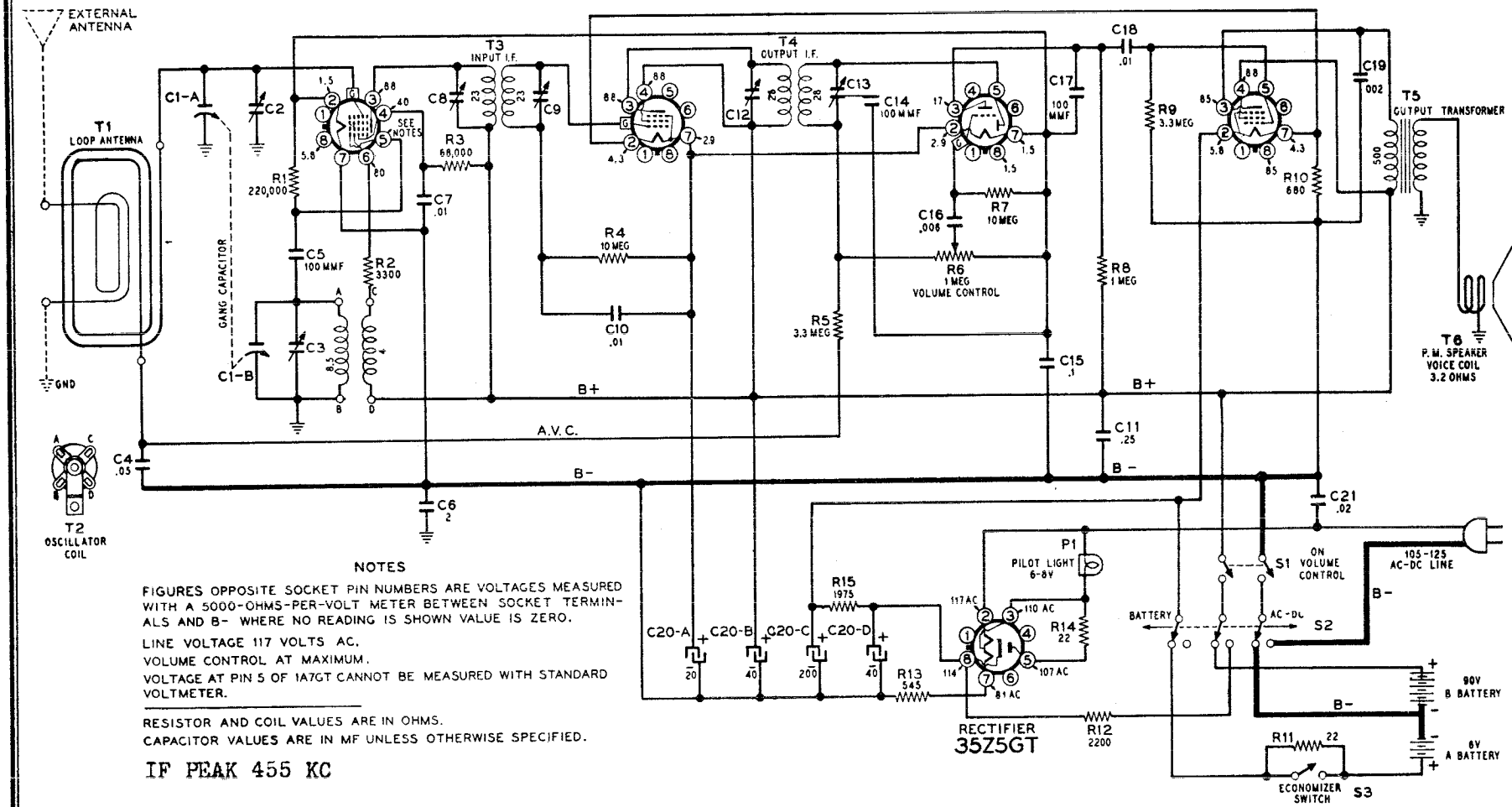


NOTES

FIGURES OPPOSITE SOCKET PIN NUMBERS ARE VOLTAGES MEASURED WITH A 5000-OHMS-PER-VOLT METER BETWEEN SOCKET TERMINALS AND B- WHERE NO READING IS SHOWN VALUE IS ZERO.

LINE VOLTAGE 117 VOLTS AC.

VOLUME CONTROL AT MAXIMUM.

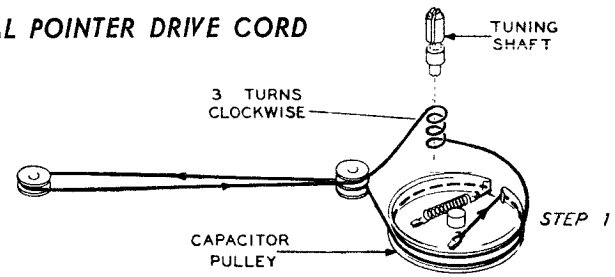
VOLTAGE AT PIN 5 OF 1A7GT CANNOT BE MEASURED WITH STANDARD VOLTMETER.

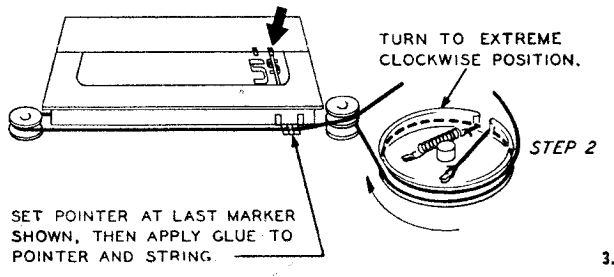
RESISTOR AND COIL VALUES ARE IN OHMS.

CAPACITOR VALUES ARE IN MF UNLESS OTHERWISE SPECIFIED.

IF PEAK 455 KC

REPLACING DIAL POINTER DRIVE CORD



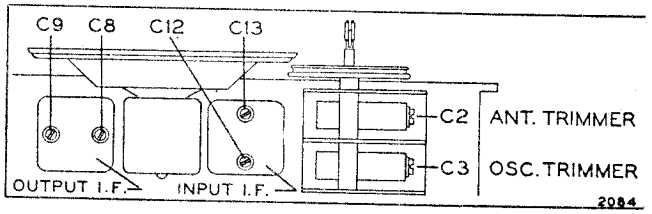


3.46

MODEL 64BR-1051A

MONTGOMERY WARD
ALIGNMENT PROCEDURE

- Output meter across 3.2 ohm output load.
- Volume control at maximum for all adjustments.
- Align for maximum output.
- Reduce input as needed to keep output near 0.4 volts.



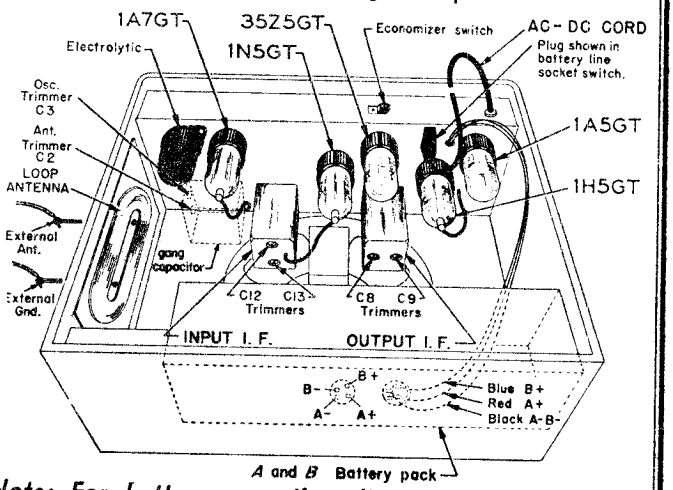
SIGNAL GENERATOR					
Frequency	Coupling Capacitor	Connection to Radio	Ground Connection	DIAL SETTING	ADJUST TRIMMERS TO MAXIMUM OUTPUT in order shown
455 kc	.1 mf	1A7GT grid cap*	1A7GT Pin 7	Rotor full open (plates out of mesh)	Input and output trimmers on IF cans
1650 kc	.1 mf	1A7GT grid cap*	1A7GT Pin 7	Rotor full open (plates out of mesh)	Osc. trimmer on gang (see trimmer view)
1400 kc	200 mmf	External antenna clip	External ground clip	1400 kc	Ant. trimmer on gang (see trimmer view)

*For these adjustments insert a 1 megohm resistor between loop antenna and 1A7GT grid cap.

RECEIVER STAGE SENSITIVITIES

The table below lists the sensitivities at the input of each stage. The receiver should be tuned to 1000 KC for all readings. All measurements are based on an output of 50 milliwatts. This may be measured by disconnecting the speaker voice coil and substituting a 3.2 ohm 5 watt resistor across the secondary winding of the output transformer. A reading of .4 volts AC across this resistor will be equivalent to a 50 milliwatt output with speaker connected. The volume control must be set to maximum.

The signal source must be an accurately calibrated signal generator capable of supplying both 1000 KC and 455 KC signals modulated 30% with a 400 cycle audio signal. Variations of plus or minus 25% are usually permissible.



Note: For battery operation, line cord plug must be inserted in battery-line socket switch as shown; switch contacts are automatically moved.

SIGNAL GENERATOR				
Frequency	Coupling Capacitor	Connection to Radio	Ground Connection	INPUT FOR 50 MILLIWATT OUTPUT
1000 kc	200 mmf or RMA dummy antenna	External antenna clip	External ground clip	25 microvolts
1000 kc	.05 mf	Converter (1A7GT) grid cap	1A7GT Pin 7	140 microvolts
455 kc	.05 mf	Converter (1A7GT) grid cap	1A7GT Pin 7	100 microvolts
455 kc	.05 mf	IF amp. (1N5GT) grid cap	1A7GT Pin 7	4500 microvolts
400 cycles	.05 mf	AF amp. (1H5GT) grid cap	1A7GT Pin 7	.06 volts
400 cycles	.05 mf	Power amp. (1A5GT) grid (pin 5)	1A7GT Pin 7	3 volts

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MONTGOMERY WARD

MODEL 64BR-1051A
MODELS 64BR-1205A, 64BR-1206A

Ref. No.	Part No.	Description	Qty. Used in Set
		CAPACITORS	
C1-A, C1-B	BEB-8A-10113	Two-gang variable capacitor	1
C2		Antenna trimmer on gang	1
C3		Oscillator trimmer on gang	1
C4	BE100-128	.05 mf, 25%, 120 volts	1
C5, C17	BE129-5	100 mmf, 20%, mica	2
C6	BE100-110	.2 mf+30%—10%, 400 volts	1
C7, C10	BE100-127	.01 mf, 25%, 120 volts	2
C8		Primary trimmer on input IF transformer, range 53 to 97 mmf	1
C9		Secondary trimmer on input IF transformer, range 53 to 97 mmf	1
C11	BE100-135	.25 mf, 25%, 120 volts	1
C12		Primary trimmer on output IF transformer, range 39 to 71 mmf	1
C13		Secondary trimmer on output IF transformer, range 39 to 71 mmf	1
C14		100 mmf+30%—10%, part of output IF can	1
C15	BE100-133	.1 mf, 25%, 120 volts	1
C16	BE100-134	.006 mf, 25%, 120 volts	1
C18	BE100-78	.01 mf, 25%, 200 volts	1
C19	BE100-25	.002 mf, 25%, 600 volts	1
C20-A, C20-B, C20-C, C20-D	BE119-126 or BE-119-133	Dry electrolytic for 50-60 cycles: 20 mf, 150 volts; 40 mf, 150 volts; 200 mf, 10 volts; 40 mf, 150 volts. Wet electrolytic for 25 cycles: 10 mf, 150 volts; 80 mf, 150 volts; 200 mf, 10 volts; 80 mf, 150 volts	1
C21	BE100-26	.02 mf, 25%, 400 volts	1
		RESISTORS*	
R1	BEA-9B1-27	220,000 ohms, 20%, ½ watt	1
R2	BEA-9B1-16	3,300 ohms, 20%, ½ watt	1
R3	BEA-9B1-84	68,000 ohms, 10%, ½ watt	1
R4, R7	BEA-9B1-37	10 megohms, 20%, ½ watt	2
R5, R9	BEA-9B1-34	3.3 megohms, 20%, ½ watt	2
R6, S1	BE101-258	1 megohm volume control with switch	1
R8	BEA-9B1-31	1 megohm, 20%, ½ watt	1
R10	BEA-9B1-60	680 ohms, 10%, ½ watt	1

Ref. No.	Part No.	Description	Qty. Used in Set
R11, R14	BEA-9B1-42	22 ohms, 10%, ½ watt	2
R12	BEA-9B1-66	2,200 ohms, 10%, ½ watt	1
R13	BE130-343	545 ohms, 5%, 14 watts, wire-wound	1
R15	BE130-344	1,975 ohms, 5%, 6 watts, wire-wound	1
		COILS AND TRANSFORMERS	
T1	BEB-13E-10240	Loop antenna assembly	1
T2	BEA-13D-10239	Oscillator coils	1
T3	BE108-201B	Input IF transformer complete in can with trimmers	1
T4	BE108-200B	Output IF transformer complete in can with trimmers and C14	1
T5	BE105-132	Output transformer	1
		SPEAKER	
T6	BE114-246B	5" P.M. speaker	1
		SOCKETS	
	BE121-171	Octal wafer socket	5
	BE121-243	Bakelite socket base for filter capacitor	1
		DIAL AND TUNING PARTS	
	BEB-6D-10115	Dial scale	1
	BEB-6D-10116	Dial calibration	1
	BE112-949	Pointer	1
	BE120-143	Coiled tension spring for dial string	1
	BE120-9	String for dial	2½'
	BE115-741	Plate for dial, with pulleys	1
	BE117-896	Tuning shaft	1
	BE131-210	"C" washer	1
	BE128-660-39	Knob, "Volume"	1
	BE128-661-39	Knob, "Tuning"	1
P1	BE107-249	Pilot bulb, 6-8 volt, No. T-47	1
	BE107-371	Pilot light socket assembly	1
		MISCELLANEOUS	
S1		On-off switch on volume control	1
S2	BE125-161	Line-battery socket switch	1
S3	BE125-166	Battery economizer switch	1
	BE120-416	Battery cable assembly	1
	BEB-2K-10114	Grill screen	1
	BE128-673-1	Grill cloth	1
	BE112-947	Escutcheon for dial	1
	BE107-370	Line cord and plug	1
	BE115-396	Tube shield	1

MODEL 64BR-1051A

ELECTRICAL SPECIFICATIONS

Power Supply	105-125 volts DC or 50-60 cycle AC, 30 watts. Also made for 25 cycle AC. Battery: Wards Battery Pack No. 62-30 Size: 10-9/16" by 2¾" by 4¼". "A"—6 volts, 50 milliamperes. "B"—90 volts, 8.5 milliamperes.
Frequency Range	530 to 1650 kc.
Intermediate Freq.	455 kc.
Selectivity	At 1000 kc, 48 kc at 1000 x signal.
Sensitivity	40 microvolts average for .05 watt output.
Power Output	80 milliwatts undistorted. 180 milliwatts maximum.
Loud Speaker	5", P.M., v.c. impedance 3.2 ohms.
Tube Complement	35Z5GT rectifier. 1A7GT converter. 1N5GT I.F. amplifier. 1H5GT detector, AVC, audio amplifier. 1A5GT output amplifier. T-47 pilot lamp, 6-8 volts.

MODELS 64BR-1205A, 1206A

ELECTRICAL SPECIFICATIONS

Power Supply	Battery: Wards Battery Pack 62-59 Size: 10¾"x 2⅝"x 6¼". "A"- 1½-volts, 250 milliamperes "B"- 90 volts, 10.5 milliamperes
Frequency Range	540 to 1700 kc.
Intermediate Freq.	455 kc.
Selectivity	At 1000 kc, 49 kc at 1000 x signal
Sensitivity	40 microvolts average for 50-milli-watt output.
Power Output	0.120 watt undistorted. 0.140 watt maximum.
Loud Speaker	5-inch; P. M.; voice coil impedance 3.2 ohms.
Tube Complement	1R5, converter 1T4, I. F. amplifier 1S5, detector, AVC, audio 3S4, output amplifier

ALIGNMENT PROCEDURE

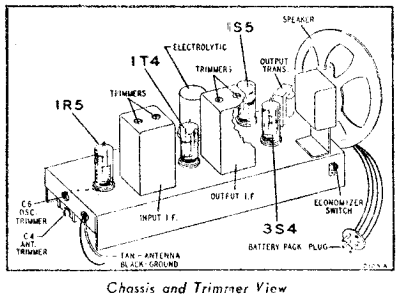
- Output meter across 3.2-ohm output load.
- Align for maximum output. Reduce input as needed to keep output near 0.4 volts.
- Volume control at maximum for all adjustments.
- Connect ground post of signal generator to radio chassis.

SIGNAL GENERATOR			TUNER SETTING	ADJUST FOR MAXIMUM OUTPUT (in order shown)
Frequency	Coupling Capacitor	Connection to Radio		
455 kc	.1 mf	Grid (pin 6) of 1R5	Iron cores all the way out	Trimmers on output and input I. F. cans
1700 kc	.1 mf	Grid (pin 6) of 1R5	Iron cores all the way out	Oscillator trimmer C6
1700 kc	200 mmf	Antenna lead	Iron cores all the way out	Antenna trimmer C4
1400 kc	200 mmf	Antenna lead	Turn dial to 1400 kc	Adjust position of ant. coil (see coil view)*

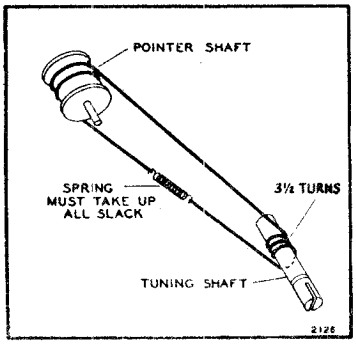
*This adjustment and the previous adjustment are interlocking; therefore repeat the two adjustments alternately for best results.

Ref. No.	Part No.	Description	Qty. Used in Set
		CAPACITORS*	
C1	BEC-8F3-11	330 mmf, 500 volts, 20%, mica	1
C2	BEB-8G-10426	45 mmf, 10%, ceramic	1
C3	BEC-8D-10787	.001 mf, 600 volts, 20%	1
C4, C6	BEA-8H-10320	Dual trimmer, antenna and oscillator. Range of each: 84-156 mmf each	1
C5	BEC-8F3-6	47 mmf, 500 volts, 20%, mica	1
C7	BEC-8D-10771	.1 mf, 200 volts, +20%—10%	1
C8	BEC-8D-10775	.25 mf, 200 volts, +20%—10%	1
C9	BEC-8D-10770	.05 mf, 200 volts, 20%	1
C10		Approx. 100 mmf. Part of I.F. can.	
C11	BEC-8D-10786	.003 mf, 600 volts, 20%	1
C12	BEC-8D-10774	.02 mf, 400 volts, 20%	1
C13	BEC-8D-10785	.006 mf, 600 volts, 20%	1
C14-A, -B	BEA-8C-10258	Dual electrolytic, 10 mf x 150 volts each section	1
C15	BEC-8D-10784	.002 mf, 600 volts, 25%	1
		RESISTORS*	
R1, R14	BEC-9B1-74	10,000 ohms, ½ watt, 10%	2
R2, R5, R9	BEC-9B1-34	3.3 megohms, ½ watt, 20%	3
R3	BEC-9B1-86	100,000 ohms, ½ watt, 10%	1
R4	BEC-9B1-76	15,000 ohms, ½ watt, 10%	1
R6	BEC-9B1-85	82,000 ohms, ½ watt, 10%	1
R7, S2	BEA-10B-10368	Volume control (1 megohm) and on-off switch	1
R8	BEC-9B1-37	10 megohms, ½ watt, 20%	1
R10	BEC-9B1-97	820,000 ohms, ½ watt, 10%	1
R11	BEC-9B1-33	2.2 megohms, ½ watt, 20%	1
R12, R13	BEC-9B1-56	330 ohms, ½ watt, 10%	2
R15	BEC-9B1-77	18,000 ohms, ½ watt, 10%	1

Ref. No.	Part No.	Description	Qty. Used in Set
		COILS AND TRANSFORMERS	
T1-A, -B	BEC-21I-10403	Tuner assembly complete, including antenna and oscillator coils	1
T2	BEB-13A-10333	Input I. F. transformer, complete in can. Range of trimmers: 53-97 mmf each	1
T3, C10	BEB-13B-10334	Output I. F. transformer, complete in can. Range of trimmers: 39-71 mmf each	1
T4	BEB-12C-10328	Output transformer	1
		MISCELLANEOUS	
	BEB-18A-10294	Speaker, 5-inch, P.M.	1
	BEA-15B-10326	Tube socket	4
S1	BEA-20C-10317	Economizer switch	1
	BEB-14A-10386	Battery cable assembly	1
	BEB-6D-10287	Dial scale (for brown cabinet)	1
	BEB-6D-10287-1	Dial scale (for ivory cabinet)	1
	BEB-6D-10290	Dial crystal	1
	BEB-2G-10118	Pointer	1
	BEA-53A-10576	Cord for dial pointer drive	14"
	BEA-49A-10078	Spring for drive cord	1
	BEB-2M-7758	Snap-in rivet for dial scale	2
	BESC-10108-46	Cabinet, brown	1
	BESC-10108-9	Cabinet, ivory	1
	BEA-5B-10373-17	Knob, volume, brown	1
	BEA-5B-10373-8	Knob, volume, ivory	1
	BEB-5B-10377-17	Knob, tuning, brown	1
	BEB-5B-10377-8	Knob, tuning, ivory	1
	BE134101	Rubber foot for cabinet	4



Chassis and Trimmer View



Replacement of Dial Pointer Drive Cord

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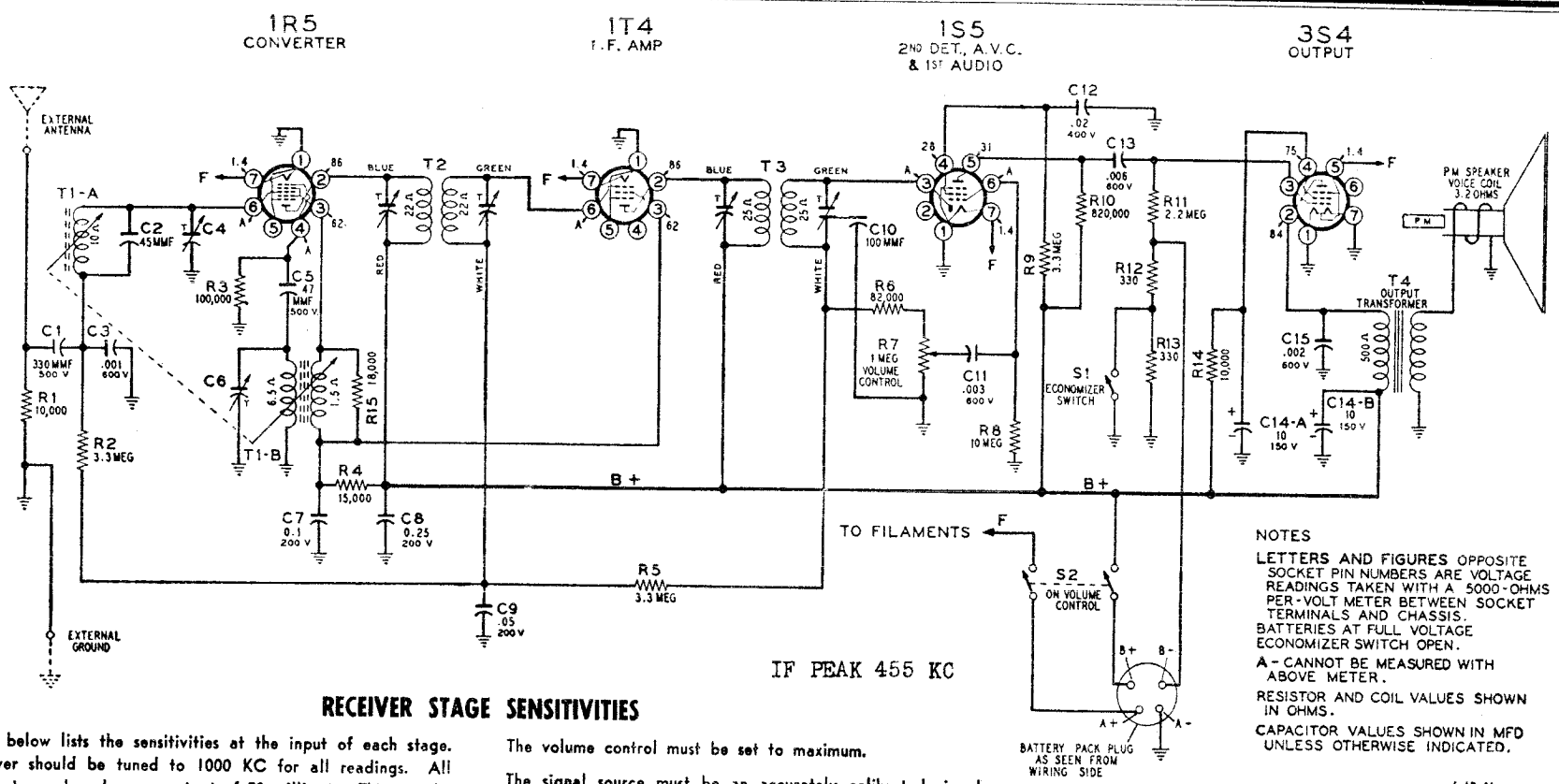


IF PEAK 455 KC

NOTES

LETTERS AND FIGURES OPPOSITE SOCKET PIN NUMBERS ARE VOLTAGE READINGS TAKEN WITH A 5000-OHMS PER-VOLT METER BETWEEN SOCKET TERMINALS AND CHASSIS. BATTERIES AT FULL VOLTAGE ECONOMIZER SWITCH OPEN.

A - CANNOT BE MEASURED WITH ABOVE METER.

RESISTOR AND COIL VALUES SHOWN IN OHMS.

CAPACITOR VALUES SHOWN IN MFD UNLESS OTHERWISE INDICATED.

6-13-46

RECEIVER STAGE SENSITIVITIES

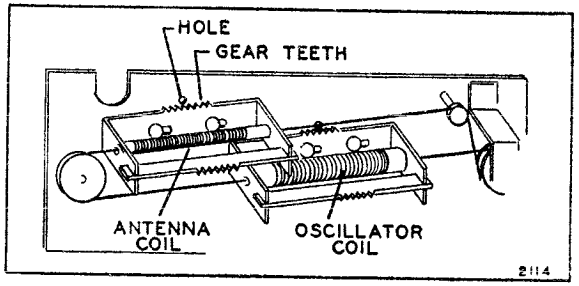
The table below lists the sensitivities at the input of each stage. The receiver should be tuned to 1000 KC for all readings. All measurements are based on an output of 50 milliwatts. This may be measured by disconnecting the speaker voice coil and substituting a 3.2-ohm, 5-watt resistor across the secondary winding of the output transformer. A reading of .4 volts AC across this resistor will be equivalent to a 50-milliwatt output with speaker connected.

The volume control must be set to maximum.

The signal source must be an accurately calibrated signal generator capable of supplying both 1000 kc and 455 kc signals modulated 30% with a 400-cycle audio signal.

Variations in sensitivities of plus or minus 25% are usually permissible.

SIGNAL GENERATOR				INPUT FOR 50-MILLIWATT OUTPUT
Frequency	Coupling Capacitor	Connection to Radio	Ground Connection	
1000 kc	200 mmf	External antenna lead	Chassis	45 microvolts
1000 kc	.1 mf	Converter 1R5 (pin 6)	Chassis	129 microvolts
455 kc	.1 mf	Converter 1R5 (pin 6)	Chassis	120 microvolts
455 kc	.1 mf	IF amp. 1T4 (pin 6)	Chassis	3400 microvolts
400 cycles	.1 mf	AF amp. 1S5 (pin 6)	Chassis	.027 volts
400 cycles	.1 mf	Power amp. 3S4 (pin 3)	Chassis	2.5 volts



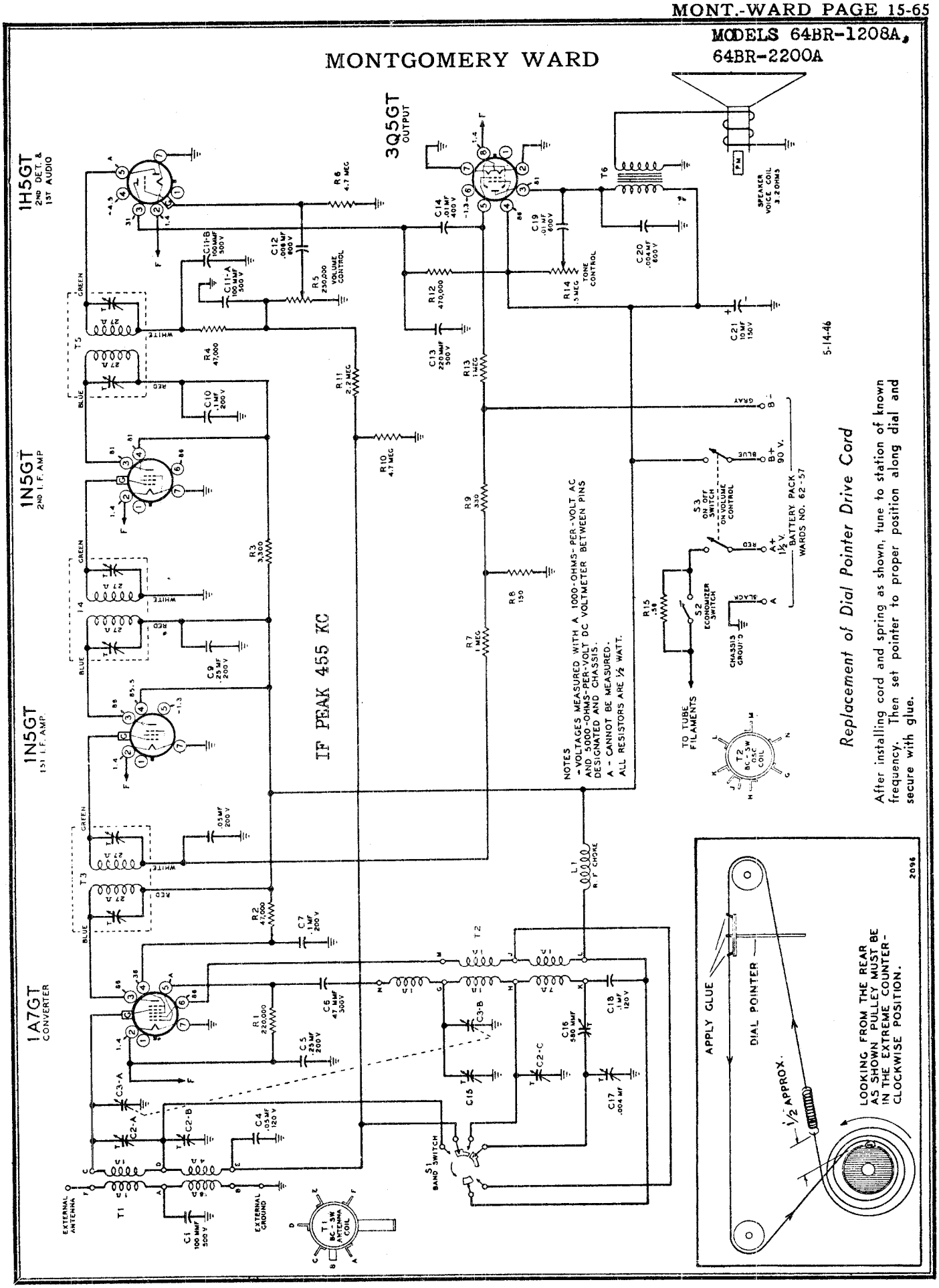
View of Coil Assembly

The antenna coil asembly is movable left or right. When making the adjustment as required in the alignment procedure, move the coil assembly very slowly, either by hand or by pivoting one edge of a screwdriver blade in the hole and engaging the blade in the gear teeth of the coil form.

For other data, see P.15-63

MONTGOMERY WARD

MODELS 64BR-1208A, 64BR-2200A



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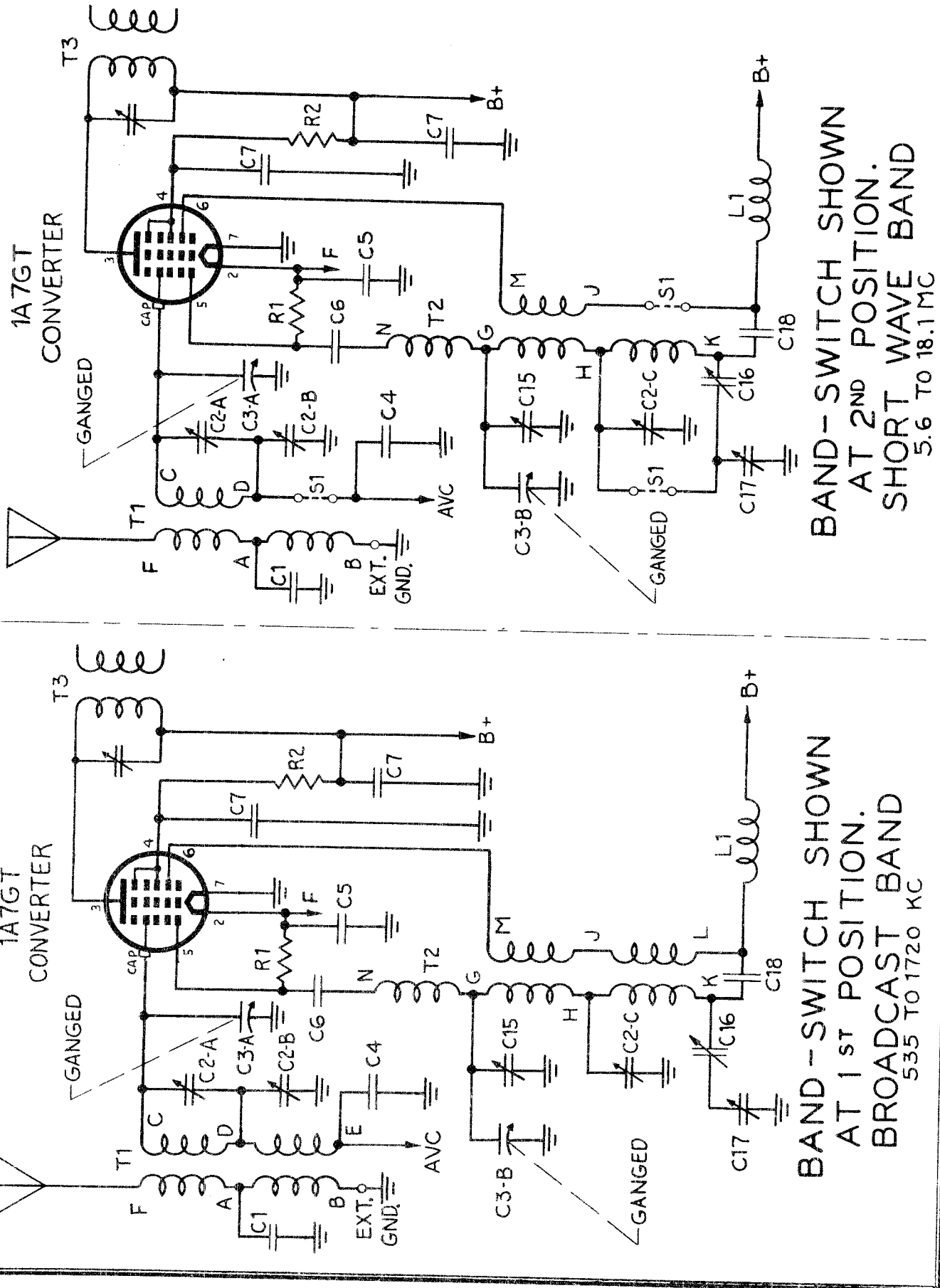
"clarified schematics"

MODELS 64BR-1208A,
64BR-2200A

MONTGOMERY WARD



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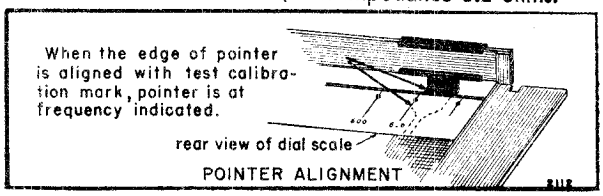
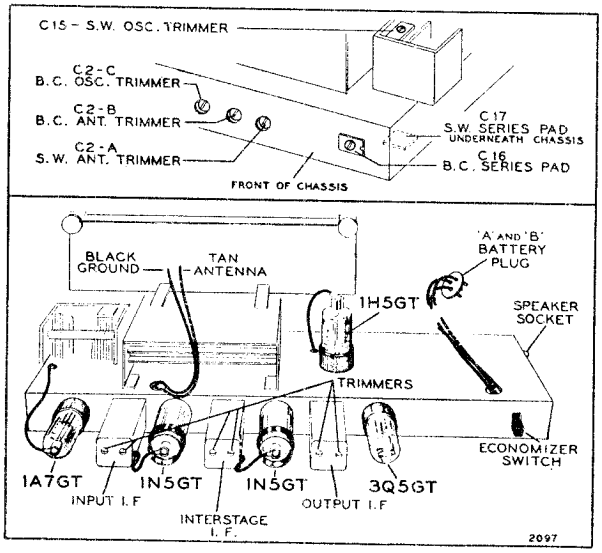
MONTGOMERY WARD

MODELS 64BR-1208A, 64BR-2200A

ELECTRICAL SPECIFICATIONS

Power Supply	Wards Battery Pack No. 62-57. Size: 16" x 6⅝" x 4½". "A"- 1½ volts, 300 ma. "B"- 90 volts, 13 ma.
Frequency Range	Broadcast—535 to 1720 kc. Short Wave—5.6 to 18.1 mc.
Intermediate Freq.	455 kc.
Selectivity	At 1000 kc, 36 kc at 1000 x signal.
Sensitivity	10 microvolts average for 50-milliwatt output.
Power Output	150 milliwatts undistorted. 250 milliwatts maximum.
Speaker	6" (1208A) or 8" (2200A). P.M., v.c. impedance 3.2 ohms.


When the edge of pointer is aligned with test calibration mark, pointer is at frequency indicated.
rear view of dial scale
POINTER ALIGNMENT



View of Chassis and Trimmers

ALIGNMENT PROCEDURE

- Output meter across 3.2-ohm output load.
- Volume control at maximum.
- Tone control at maximum treble.
- Connect ground post of signal generator to ground lead of radio.
- Align for maximum output. Reduce input as needed to keep output near 0.4 volts.

BAND SWITCH SETTING	SIGNAL GENERATOR Frequency	Coupling Capacitor	Connection to Radio	TUNER SETTING	ADJUST TO MAXIMUM OUTPUT (in order shown)
BROADCAST *(counter-clockwise)*	455 kc	.1 mf	Second I.F. (1N5GT) grid cap	Rotor full open (plates out of mesh)	Trimmers on top of output I.F. can
	455 kc	.1 mf	First I.F. (1N5GT) grid cap	Rotor full open (plates out of mesh)	Trimmers on top of interstage I.F. can
	455 kc	.1 mf	Converter (1A7GT)	Rotor full open (plates out of mesh)	Trimmers on top of input I.F. can
SHORT WAVE *(clockwise)*	18.1 mc	400 ohms	Antenna lead	Rotor full open (plates out of mesh)	S.W. osc. trimmer C15
	16 mc	400 ohms	Antenna lead	16 mc* (see below for pointer alignment)	S.W. ant. trimmer C2-A
	6 mc	400 ohms	Antenna lead	6 mc (see below for pointer alignment)	S.W. osc. series pad C17†
BROADCAST *(counter-clockwise)*	1720 kc	200 mmf	Antenna lead	Rotor full open (plates out of mesh)	B.C. osc. trimmer C2-C
	1500 kc	200 mmf	Antenna lead	1500 kc (see below for pointer alignment)	B.C. ant. trimmer C2-B
	600 kc	200 mmf	Antenna lead	600 kc (see below for pointer alignment)	B.C. osc. series pad C16†

* First set signal generator to 16 mc; then, with gang all the way out, approach 16 mc by slowly rotating gang inward. The first signal is the one on which the alignment should be made. The next signal is the image; do not align on this signal.

† Turn the dial back and forth slightly (rock) and adjust padder until peak output is obtained. After this adjustment check previous adjustments for interlocking effects.

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MODELS 64BR-1208A, 64BR-2200A

MONTGOMERY WARD

RECEIVER STAGE SENSITIVITIES

The table below lists the sensitivity at the input of each stage. The receiver should be tuned to 1000 kc for all readings on the standard broadcast band and to 10 mc for the short-wave readings. All measurements are based on an output of 50 milliwatts. This may be measured by disconnecting the speaker voice coil and substituting a 3.2-ohm, 5-watt resistor across the secondary winding of the output transformer. A reading of 0.4 volts AC across this resistor will be equivalent to a 50-milliwatt output with the speaker connected.

The signal source must be an accurately calibrated signal generator capable of supplying the frequencies designated, modulated 30% with a 400-cycle audio signal. Variations in sensitivities of plus or minus 25% are usually permissible.

The volume control should be set at maximum, and the tone control at maximum treble.

SIGNAL GENERATOR				INPUT FOR 50-MILLIWATT OUTPUT
Frequency	Coupling Capacitor	Connection to Radio	Ground Connection	
10 mc	400 ohms	Antenna lead	Ground lead	18 microvolts
1000 kc	200 mmf	Antenna lead	Ground lead	10 microvolts
10 mc	.1 mf	Converter (1A7GT) grid cap	Ground lead	32 microvolts
1000 kc	.1 mf	Converter (1A7GT) grid cap	Ground lead	35 microvolts
455 kc	.1 mf	Converter (1A7GT) grid cap	Ground lead	32 microvolts
455 kc	.1 mf	First I.F. (1N5GT) grid cap	Ground lead	630 microvolts
455 kc	.1 mf	Second I.F. (1N5GT) grid cap	Ground lead	.01 volt
400 cycles	.1 mf	Audio amp. (1H5GT) grid cap	Ground lead	.06 volt
400 cycles	.1 mf	Power amp. (1A5GT) grid (pin 5)	Ground lead	3 volts

Ref. No.	Part No.	Description	Qty. Used in Set
		CAPACITORS	
C1	BE1295	100 mmf, mica, 20%	1
C2-A,-B, -C	BE124171	Triple trimmer; S.W. antenna, C2-A; B.C. antenna, C2-B; B.C. oscillator, C2-C. Range of each is approx. 4-30 mmf	1
C3-A,-B C15	BEB-8A-10243	Two-gang variable capacitor, including S.W. oscillator trimmer	1
C4	BE100128	.05 mf, 120 volts, 25%	1
C5, C9	BE1006	.25 mf, 200 volts, 20%	2
C6	BE12939	50 mmf, mica, 20%	1
C7, C10	BE10020	.1 mf, 200 volts, 25%	2
C8	BE10022	.05 mf, 200 volts, 25%	1
C11-A,-B	BE129161	Dual, mica, 100 mmf each section	1
C12	BE10019	.006 mf, 600 volts, 25%	1
C13	BE12921	200 mmf, mica, 20%	1
C14	BE10011	.01 mf, 400 volts, 25%	1
C16	BE124173	B.C. series padder; range 420-780 mmf	1
C17	BE129125	S.W. series padder; mica, 4000-4350 mmf	1
C18	BE100133	.1 mf, 120 volts, 25%	1
C19	BE10087	.01 mf, 600 volts, 25%	1
C20	BE10071	.004 mf, 600 volts, 25%	1
C21	BE119130	10 mf, 150 volts, electrolytic	1
		RESISTORS*	
R1	BEA-9B1-27	220,000 ohms, 1/2 watt, 20%	1
R2, R4	BEA-9B1-23	47,000 ohms, 1/2 watt, 20%	2
R3	BEA-9B1-16	3300 ohms, 1/2 watt, 20%	1
R5, S3	BE101257	Volume control (250,000 ohms) and on-off switch	1
R6, R10	BEA-9B1-35	4.7 megohms, 1/2 watt, 20%	2
R7, R13	BEA-9B1-31	1 megohm, 1/2 watt, 20%	2
R8	BEA-9B1-8	150 ohms, 1/2 watt, 20%	1
R9	BEA-9B1-10	330 ohms, 1/2 watt, 20%	1
R11	BEA-9B1-33	2.2 megohms, 1/2 watt, 20%	1
R12	BEA-9B1-29	470,000 ohms, 1/2 watt, 20%	1
R14	BE101264	Tone control (500,000 ohms)	1
R15	BE130346	.56 ohms, 1/3 watt, 10%, wirewound	1
		COILS AND TRANSFORMERS	
T1	BE111248	Broadcast and S.W. antenna coil	1
T2	BE110183	Broadcast and S.W. oscillator coil	1
T3	BE108204	Input I.F. coil complete in can. Range of trimmers: 80-150 mmf each	1
T4	BE108204B	Interstage I.F. coil complete in can. Range of trimmers: 80-150 mmf each	1
T5	BE108188B	Output I.F. coil complete in can. Range of trimmers: 80-150 mmf each	1
T6	BE105119B	Output transformer	1
L1	BE1233	R.F. choke coil	1
		MISCELLANEOUS	
	BE114245	Speaker, 6-inch, P.M. (1208A)	1
	BEC-18A-11471	Speaker, 8-inch, P.M. (2200A)	1
	BE121280	Socket, for speaker plug	1
	BE121171	Socket, for tubes	5
S1	BE125160	Band switch	1
S2	BE12588B	Battery economizer switch	1
	BE107377	Battery cable assembly	1
	BE115396	Tube shield	2
	BE134128	Rubber grommet for mounting speaker	4
	BEB-6D-10043	Dial scale	1
	BED-5C-10007-37	Escutcheon	1
	BE112530	Clip for mounting escutcheon	4
	BE128686B-37	Knob, volume	1
	BE128681-37	Knob, tuning	1
	BE128680-37	Knob, tone	1
	BE128683-37	Knob, band switch	1
	BE112961	Station call letters	1 set
		TUNER ASSEMBLY PARTS	
	BE117907	Tuning shaft	1
	BE117798	Pinion gear on tuning shaft	1
	BEB-2C-7245	Gear segment	1
	BE115618	Drive link and drive link bushing	1
	BE115617	Driven link and collar	1
	BE115616	Connecting link	1
	BE120372	Spring for connecting link assembly	1
	BE128678-37	Pushbutton	6
	BE112819	Pushrod assembly, complete	6
	BEA-49A-7186	Spring for pushrod return	6
	BE112974	Paper background for dial	1
	BE112806	Drive pulley and bushing	1
	BE112971	Pointer	1
	BE120214	Cord for dial pointer drive	2 ft.
	BE120377	Spring for pointer drive cord	1

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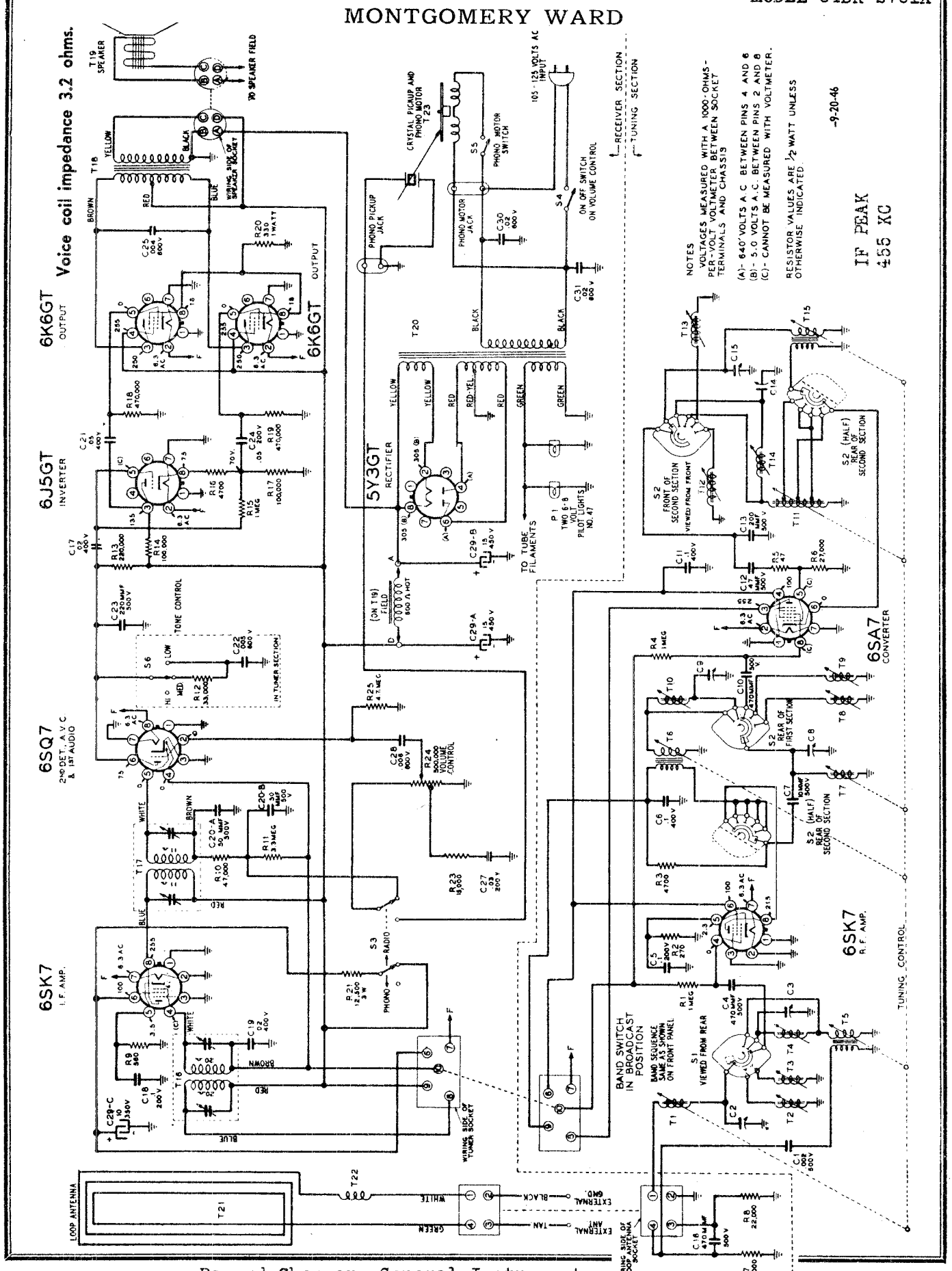
MODEL 64BR-2701A


MONTGOMERY WARD
Voice coil impedance 3.2 ohms.
6K6GT OUTPUT
6J5GT INVERTER
6SQ7 2ND DET., A.V.C. & 1ST AUDIO
6SK7 I.F. AMP.
5Y3GT RECTIFIER
6SA7 CONVERTER
6SK7 R.F. AMP.
T19 SPEAKER
TO SPEAKER FIELD
WIRING SIDE OF SPEAKER SOCKET
CRYSTAL PICKUP AND PHONO MOTOR T23
PHONO PICKUP JACK
PHONO MOTOR JACK
PHONO MOTOR SWITCH
105-125 VOLTS AC INPUT
ON OFF SWITCH ON VOLUME CONTROL
RECEIVER SECTION
TUNING SECTION
TONE CONTROL
VOLUME CONTROL
TO TUBE FILAMENTS
PILOT LIGHTS NO. 47
(ON T19) FIELD
800 Ω HOT
BAND SWITCH IN BROADCAST POSITION
BAND SEQUENCE SAME AS SHOWN ON FRONT PANEL
S1 VIEWED FROM REAR
S2 FRONT OF SECOND SECTION VIEWED FROM FRONT
S2 REAR OF FIRST SECTION
S2 (HALF) REAR OF SECOND SECTION
TUNING CONTROL
LOOP ANTENNA
EXTERNAL ANT.
EXTERNAL GND.
WIRING SIDE OF LOOP ANTENNA SOCKET
NOTES
VOLTAGES MEASURED WITH A 1000-OHMS-PER-VOLT VOLTMETER BETWEEN SOCKET TERMINALS AND CHASSIS
(A)- 640 VOLTS A.C. BETWEEN PINS 4 AND 6
(B)- 5.0 VOLTS A.C. BETWEEN PINS 2 AND 8
(C)- CANNOT BE MEASURED WITH VOLTMETER.
RESISTOR VALUES ARE 1/2 WATT UNLESS OTHERWISE INDICATED.
-9-20-46
IF PEAK 455 KC

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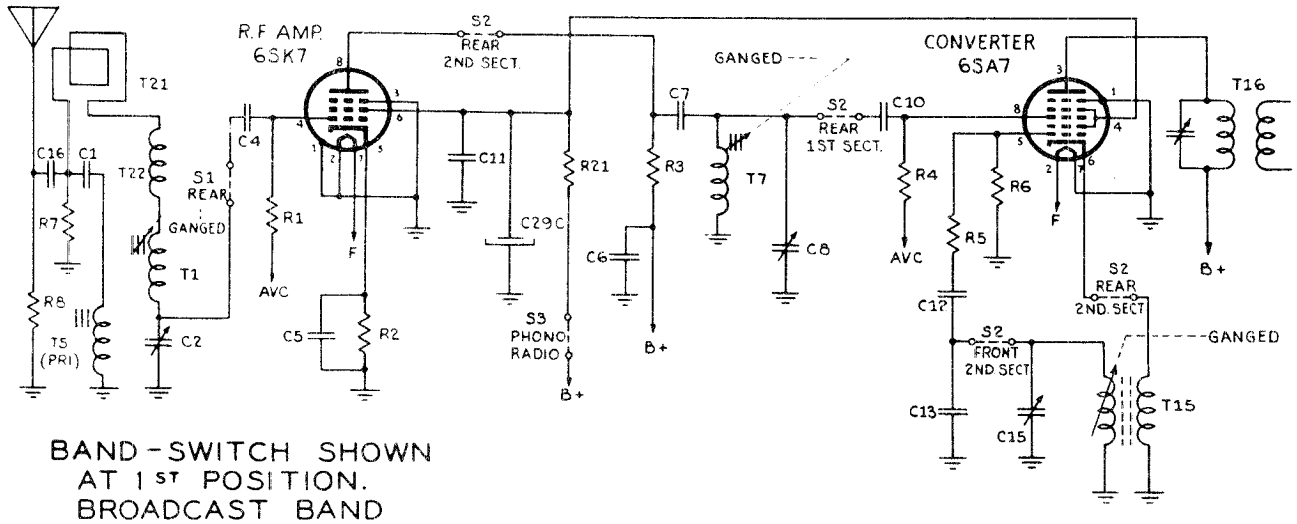
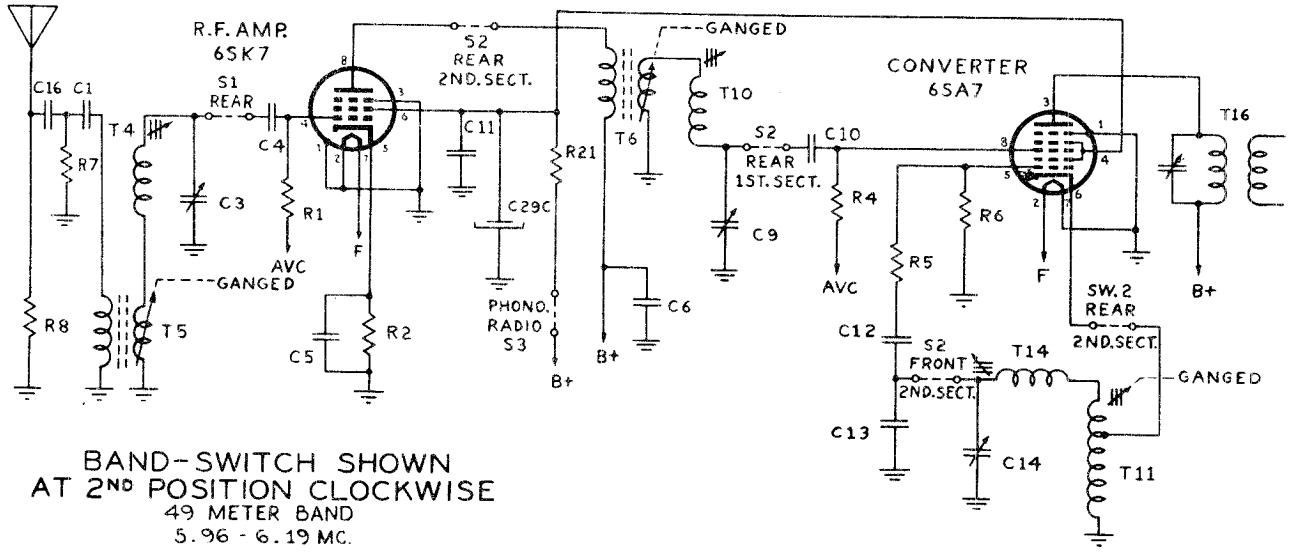
"clarified schematics"

MODEL 64BR-2701A

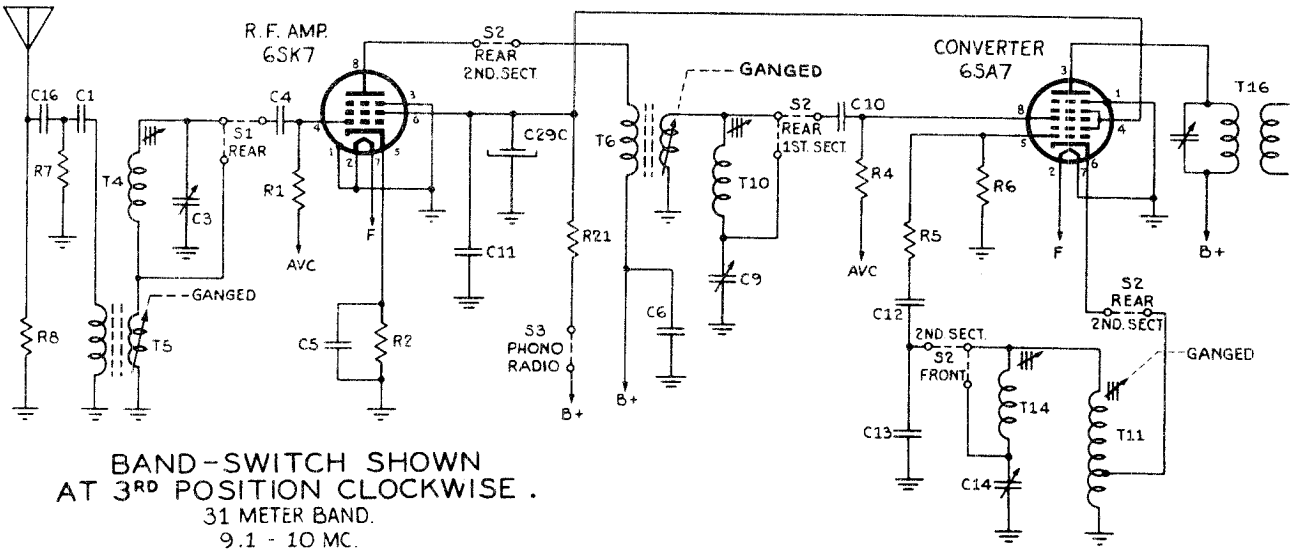
MONTGOMERY WARD



BAND-SWITCH SHOWN
AT 1ST POSITION.
BROADCAST BAND
540-1600 KC



BAND-SWITCH SHOWN
AT 2ND POSITION CLOCKWISE
49 METER BAND
5.96 - 6.19 MC.



BAND-SWITCH SHOWN
AT 3RD POSITION CLOCKWISE.
31 METER BAND.
9.1 - 10 MC.

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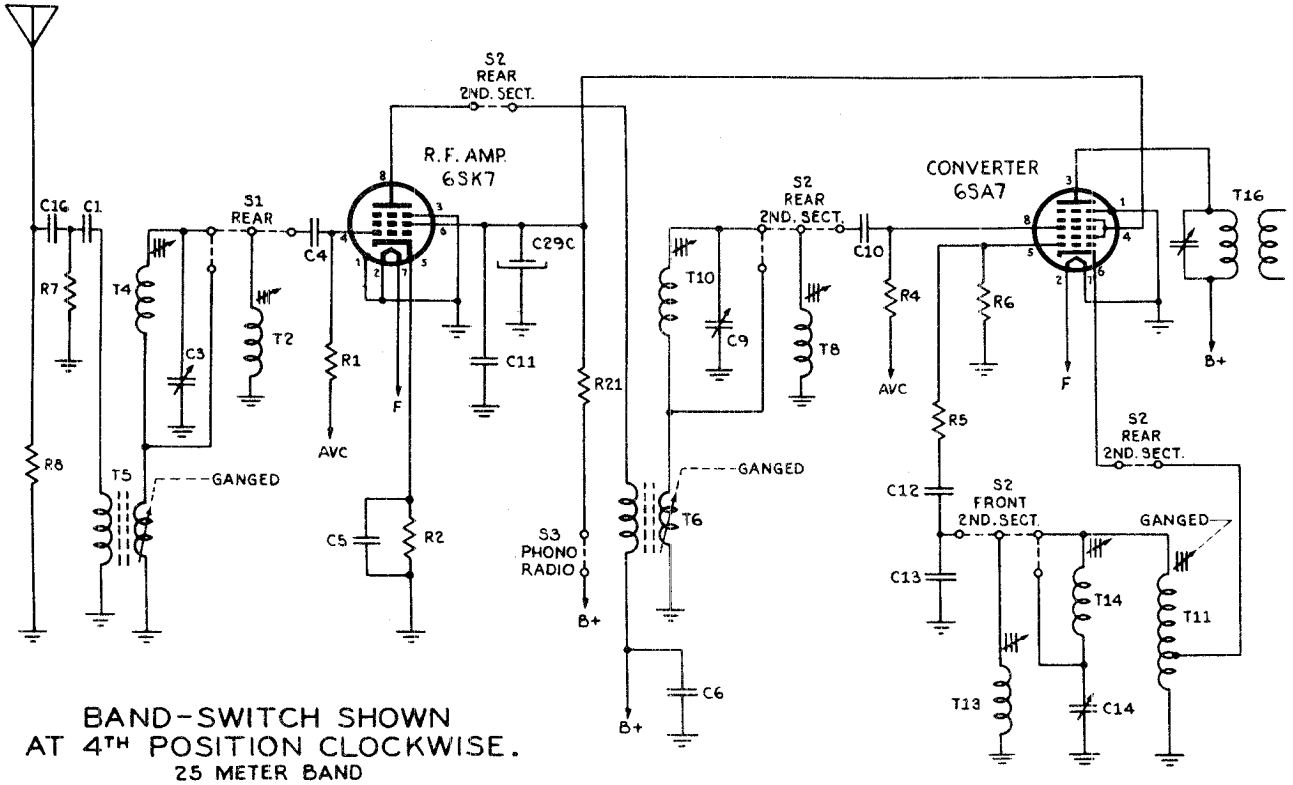
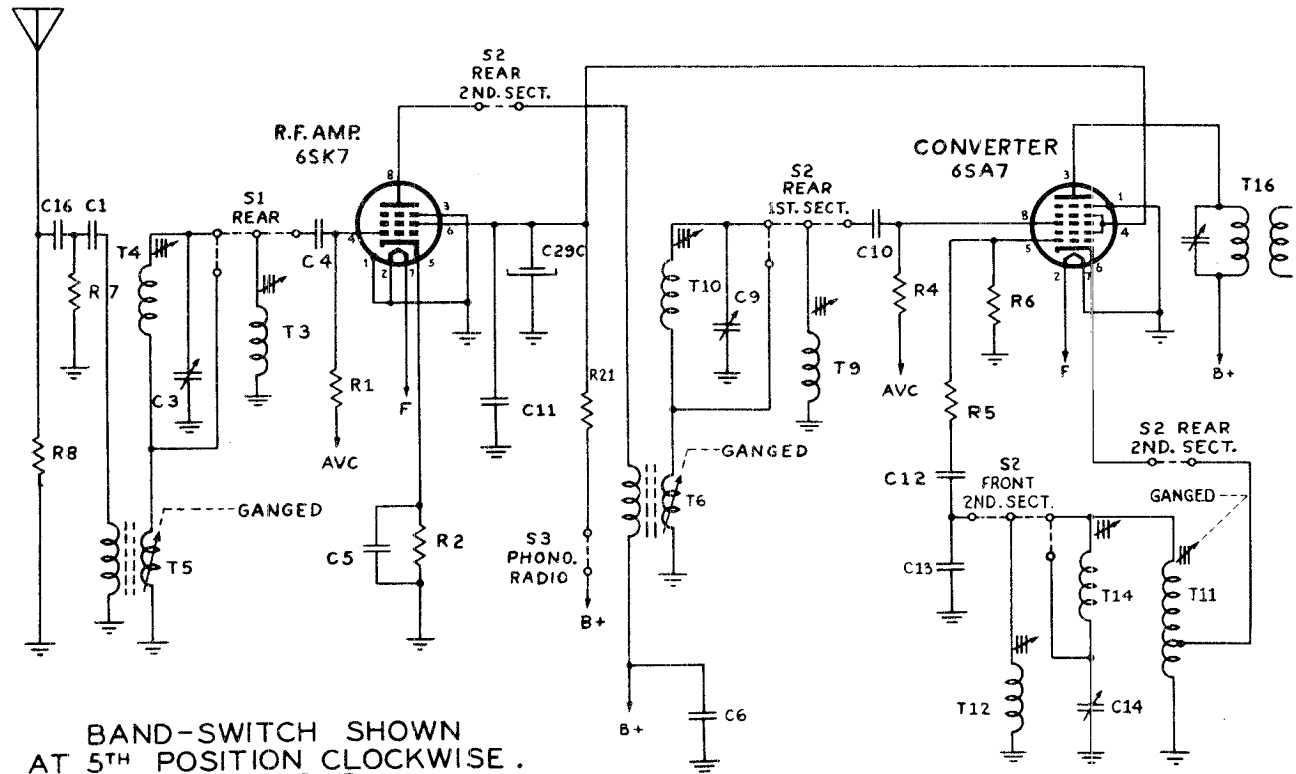
MODEL 64BR-2701A

MONTGOMERY WARD



BAND-SWITCH SHOWN AT 4TH POSITION CLOCKWISE.
25 METER BAND
11.45 - 12.16MC.



BAND-SWITCH SHOWN AT 5TH POSITION CLOCKWISE.
19 METER BAND
14.94 - 15.46 MC.

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MODEL 64BR-2701A

MONTGOMERY WARD

ALIGNMENT PROCEDURE

MECHANICAL ADJUSTMENT—The core tuning bar (see illustration of coils below) and dial pointer must be adjusted mechanically before any electrical alignment is attempted. Rotate the manual tuning control until the core bar is farthest from the coils. For proper adjustment the bar should be approximately 1/32 of an inch from the two rod guide angles.

With the core bar in this position, adjust the dial pointer to coincide with 1600 kc on the dial scale

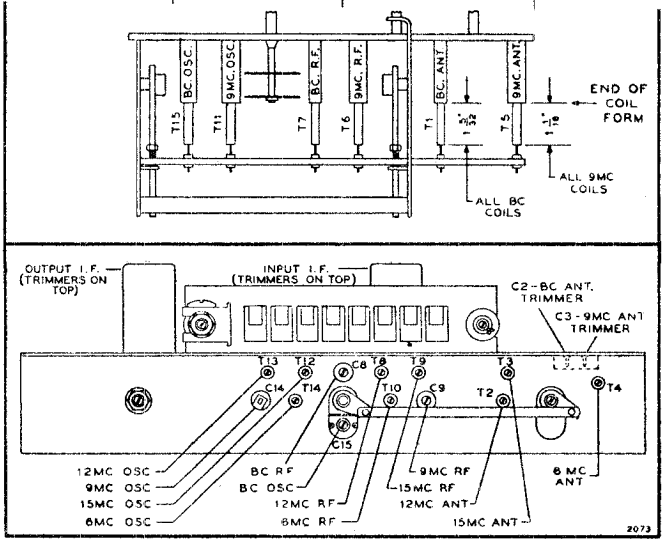
Rotate the core of each of the three broadcast coils (see illustration) until the end of the core is 1-5/32" from the end of the coil form. Rotate the three 9-mc cores until this dimension is 1-1/6" for these coils. After these adjustments have been made, the unit can be aligned electrically.

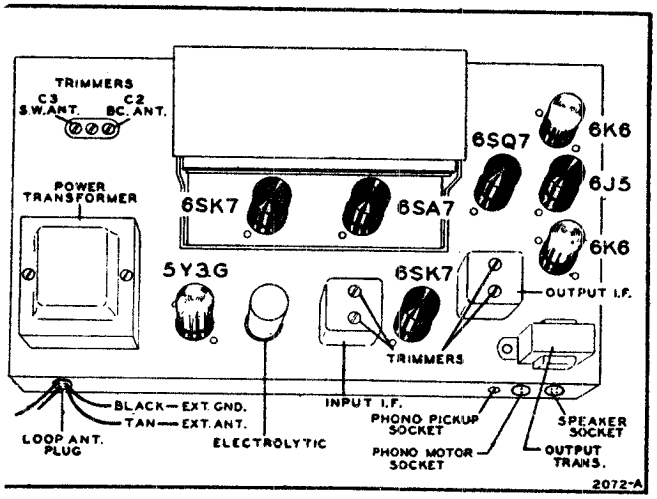
ELECTRICAL ADJUSTMENT—To align the set make the following preliminary adjustments: Set the tone pushbutton for treble tone; set the volume control at maximum; connect the ground post of the signal generator to the radio chassis; connect the output meter across a 3.2-ohm output load; and allow the receiver and signal generator to warm up for several minutes.

Align the set according to the sequence given in the chart. The indicated coupling capacitor is to be connected in series between the signal generator output lead and the receiver. Adjust the set for maximum output; reduce the input as needed to keep the output near 1.3 volts.

Locations of all the trimmers and coils are shown in the illustrations below. After adjustment, seal the coil cores with collodion or a similar substance (do not use cement).

BAND SWITCH SETTING	SIGNAL GENERATOR			DIAL POINTER SETTING	ADJUST TO MAXIMUM OUTPUT IN ORDER SHOWN
	Frequency	Coupling Capacitor	Connection to Receiver		
Broadcast (for I. F.)	455 kc	.1 mf	Grid (pin 8) of converter (6SA7)	1600 kc	Trimmers on output and input I. F. cans
Broadcast	1600 kc	200 mmf	Antenna lead	1600 kc	BC Osc. trimmer C15 BC R. F. trimmer C8 BC Ant. trimmer C2
	1400 kc	200 mmf	Antenna lead	1400 kc	Rotate cores of BC R. F. coil T7 and BC Ant. coil T1
31 Meter	9.6 mc	400 ohms	Antenna lead	9.6 mc	9 mc Osc. trimmer C14 9 mc R. F. trimmer C9 9 mc Ant. trimmer C3
49 Meter	6.1 mc	400 ohms	Antenna lead	6.1 mc	6 mc Osc. coil T14 6 mc R. F. coil T10 6 mc Ant. coil T4
25 Meter	11.8 mc	400 ohms	Antenna lead	11.8 mc	12 mc Osc. coil T13 12 mc R. F. coil T8 12 mc Ant. coil T2
19 Meter	15.2 mc	400 ohms	Antenna lead	15.2 mc	15 mc Osc. coil T12 15 mc R. F. coil T9 15 mc Ant. coil T3





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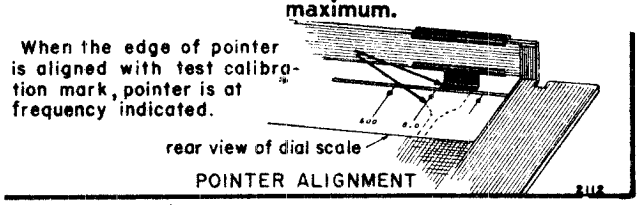
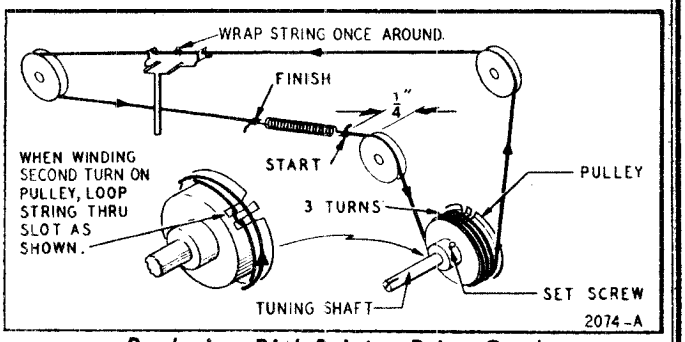
MODEL 64BR-2701A

MONTGOMERY WARD

Frequency Ranges.....Broadcast band—540 to 1600 kc.
49-meter band—5.96 to 6.19 mc.
31-meter band—9.1 to 10 mc.
25-meter band—11.45 to 12.16 mc.
19-meter band—14.94 to 15.46 mc.
Intermediate Freq.....455 kc.
Selectivity.....at 1000 kc, 35 kc at 1000 x signal
Sensitivity.....3.75 microvolts average for ½ watt output.
Power Output.....5.5 watts undistorted, 7.5 watts maximum.


When the edge of pointer is aligned with test calibration mark, pointer is at frequency indicated.
rear view of dial scale
POINTER ALIGNMENT



Replacing Dial Pointer Drive Cord

After stringing, spring must be 1/4" from idler when tuning shaft is in extreme counterclockwise position. To do this: Loosen set screw; hold tuning shaft firm and turn pulley by hand until spring is 1/4" from idler; tighten screw.

RECEIVER STAGE SENSITIVITIES

The table below lists the sensitivities at the inputs of various stages. All measurements are based on an output of ½ watt. This may be measured by disconnecting the speaker voice coil and substituting a 3.2-ohm resistor across the secondary winding of the output transformer. A reading of 1.3 volts AC across this resistor will be approximately equivalent to a ½-watt output with the speaker connected. The volume control must be set at maximum.

The signal source must be an accurately calibrated signal generator capable of supplying the frequencies designated, modulated 30% with a 400-cycle audio signal. Variations in sensitivities of plus or minus 25% are usually permissible.

BAND	SIGNAL GENERATOR				INPUT FOR 500-MILLIWATT OUTPUT
	Frequency	Dummy Antenna	Connection to Receiver	Ground Connection	
Broadcast	1000 kc	200 mmf	External Antenna clip	Chassis	3.5 microvolts
	1000 kc	.1 mf	Grid (pin 4) of R. F. amp. (6SK7)	Chassis	8.9 microvolts
	1000 kc	.1 mf	Grid (pin 8) of Converter (6SA7)	Chassis	125 microvolts
	455 kc	.1 mf	Grid (pin 8) of Converter (6SA7)	Chassis	100 microvolts
	455 kc	.1 mf	Grid (pin 4) of I. F. amp. (6SK7)	Chassis	4500 microvolts
	400 cycles	.1 mf	Grid (pin 2) of Audio amp. (6SQ7)	Chassis	.1 volt
	400 cycles	.1 mf	Grid (pin 5) of Inverter (6J5GT)	Chassis	4.8 volts
31 meter*	9.6 mc	400 ohms	External Antenna clip	Chassis	1.6 microvolts
49 meter*	6.1 mc	400 ohms	External Antenna clip	Chassis	3.0 microvolts
25 meter*	11.8 mc	400 ohms	External Antenna clip	Chassis	5.0 microvolts
19 meter*	15.2 mc	400 ohms	External Antenna clip	Chassis	9.0 microvolts

*Average sensitivity on short-wave bands at grid (pin 4) of R. F. amplifier is 8.5 microvolts.

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MODEL 64BR-2701A

MONTGOMERY WARD

REMOVABLE TUNER ASSEMBLY

Ref. No.	Part No.	Description	Qty. Used In Set
CAPACITORS*			
C1	BEB-8F-10767	.002 mf, 500 volts, 10%, mica	1
C2, C3	BE-124143	Dual, broadcast (67-123 mmf) and 9 mc (95-175 mmf) ant. trimmers	1
C4, C10	BEB-8F3-121	470 mmf, 500 volts, 10%, mica	2
C5	BEC-8D-10771	.1 mf, 200 volts, +20%—10%	1
C6, C11	BEC-8D-10760	.1 mf, 400 volts, +20%—10%	2
C7	BEB-8F5-101	10 mmf, 500 volts, 10%, silver mica	1
C8	BEA-8G-7205	Broadcast RF trimmer (120-220 mmf)	1
C9	BEA-8G-7206	9 mc RF trimmer (60-110 mmf)	1
C12	BEB-8F3-109	47 mmf, 500 volts, 10%, mica	1
C13	BEB-8F-10763	200 mmf, 500 volts, 3%, silver mica	1
C14	BE-124145	9 mc oscillator trimmer (7-35 mmf)	1
C15	BE-124144	Broadcast oscillator trimmer (15-27 mmf)	1
C22	BEC-8D-10935	.005 mf, 600 volts, +40%—15%	1
RESISTORS*			
R1, R4	BEC-9B1-31	1 megohm, 1/2 watt, 20%	2
R2	BEC-9B1-55	270 ohms, 1/2 watt, 10%	1
R3	BEC-9B1-70	4700 ohms, 1/2 watt, 10%	1
R5	BEC-9B1-46	47 ohms, 1/2 watt, 10%	1
R6	BEC-9B1-79	27,000 ohms, 1/2 watt, 10%	1
R12	BEC-9B1-22	33,000 ohms, 1/2 watt, 20%	1
COILS (complete with cores)			
T1	BE-111195	Broadcast antenna coil	1
T2	BE-111191	12 mc antenna coil	1
T3	BE-111192	15 mc antenna coil	1
T4	BE-111189	6 mc antenna coil	1
T5	BE-111190	9 mc antenna coil	1
T6	BE-10959	9 mc RF coil	1
T7	BE-10962	Broadcast RF coil	1
T8	BE-10960	12 mc RF coil	1
T9	BE-10961	15 mc RF coil	1
T10	BE-10958	6 mc RF coil	1
T11	BE-110157	9 mc oscillator coil	1
T12	BE-110159	15 mc oscillator coil	1
T13	BE-110158	12 mc oscillator coil	1
T14	BE-110156	6 mc oscillator coil	1
T15	BE-110161	Broadcast oscillator coil	1
MISCELLANEOUS			
S1	BEB-20A-10526 or BEB-20A-11053	Band switch, antenna	1
S2	BEB-20A-10527 or BEB-20A-11054	Band switch, oscillator and RF	1
S3	BE-125129	Radio-phono switch	1
S6	BEA-20F-7322-2	Tone switch, 3-position	1
	BE-121210	Socket, octal, molded (6SA7)	1
	BE-121171	Socket, laminated (6SK7GT)	1
	BEA-3A-10476	Tuning shaft	1
	BE-117798	Pinion gear on tuning shaft	1
	BE-120393	Spring, intermediate link, under ends of treadle bar	2
	BE-131251	Washer, "C," on slug tuning bar	4
	BEB-2C-7245	Gear segment	1
	BEA-2J-7439	Spring clip, for coils	9
	BE-131316B	Washer, "C", for 9 mc coils	3
	BE-134134	Grommet for core mounting (all broadcast and 9 mc coils)	6
	BE-134126	Grommet for coil mounting (broadcast RF and antenna coils)	2
	BE-134125	Grommet for coil mounting (broadcast oscillator coil)	1
	BEA-25A-7619	Grommet for all 9 mc coils	3
	BE-115659B	Pushrod, tone switch	1
	BE-115670	Pushrod, radio-phono switch	1
	BEB-202-10475	Pushrod assembly, station selectors	6
	BE-120366	Spring, pushrod return	6
	BEA-2J-7176	Cam-locking spring on pushrod ass'y	6
	BEA-2J-7627-1	Retainer spring on pushrod ass'y	6
	BE-121281	Plug, 5-prong	1
	BE-128678-37	Pushbutton	8
	BE-131210	Washer, "C," on end plate	2

MAIN CHASSIS

Ref. No.	Part No.	Description	Qty. Used In Set
CAPACITORS*			
C16	BEC-8F3-12	470 mmf, 20%, mica	1
C17, C19	BEC-8D-10774	.02 mf, 400 volts, 20%	2
C18	BEC-8D-10771	.1 mf, 200 volts, +20% —10%	1
C20-A C20-B	BE-129165B	Dual, 50 mmf each section, mica, 20%	1
C21	BEC-8D-10813	.05 mf, 400 volts, 20%	1
C23	BEC-8F3-10	220 mmf, 20%, mica	1
C24	BEC-8D-10770	.05 mf, 200 volts, 20%	1
C25	BEC-8D-10788	.004 mf, 600 volts, 20%	1
C27	BEC-8D-10992	.03 mf, 200 volts, 20%	1
C28	BEC-8D-10785	.006 mf, 600 volts, 20%	1
C29-A, -B, -C	BE-119109	Electrolytic, 15 mf x 450 volts, 15 mf x 450 volts, 10 mf x 350 volts	1
C30, C31	BEC-8J-11321	.02 mf, 600 volts, 20%	2
RESISTORS*			
R7, R8	BEC-9B1-21	22,000 ohms, 1/2 watt, 20%	2
R9	BEC-9B1-59	560 ohms, 1/2 watt, 10%	1
R10	BEC-9B1-23	47,000 ohms, 1/2 watt, 20%	1
R11	BEC-9B1-34	3.3 megohms, 1/2 watt, 20%	1
R13	BEC-9B1-27	220,000 ohms, 1/2 watt, 20%	1
R14, R17	BEC-9B1-86	100,000 ohms, 1/2 watt, 10%	2
R15	BEC-9B1-31	1 megohm, 1/2 watt, 20%	1
R16	BEC-9B1-70	4700 ohms, 1/2 watt, 10%	1
R18, R19	BEC-9B1-29	470,000 ohms, 1/2 watt, 20%	2
R20	BEC-9B2-56	330 ohms, 1 watt, 10%	1
R21	BE-10662	12,500 ohms, 3 watts, 10%	1
R23	BEC-9B1-20	15,000 ohms, 1/2 watt, 20%	1
R24, S4	BEA-10A-10832	Volume control (500,000 ohms) and on-off switch	1
R25	BEC-9B1-35	4.7 megohms, 1/2 watt, 20%	1
COILS AND TRANSFORMERS			
T16	BE-108177	Input IF coil complete in can (Range of trimmers: 110-210 mmf)	1
T17	BE-108176	Output IF coil complete in can (Range of trimmers: 80-140 mmf)	1
T18	BEB-12C-10234	Output transformer	1
T20	BE-104202B	Power transformer, for 50-60 cycles (for 25 cycles, 104203B) (for 40 cycles, 104205B)	1
SOCKETS			
	BE-121200	Socket, 4-terminal, for loop ant.	1
	BE-121279	Socket, 5-terminal, for tuner	1
	BEA-15B-11538	Socket, 4-terminal, for speaker	1
	BE-121199	Socket, 2-terminal, for phono motor	1
	BE-121210	Socket, octal, molded (all tubes except 6SK7, IF amp.)	5
	BE-121273	Socket, octal, laminated (for 6SK7, IF amplifier)	1
	BE-121280	Socket, 1-terminal, for phono pickup	1
	BEB-47A-10808-1	Socket assembly for dial light	1
MISCELLANEOUS			
T19	BEB-18B-10616	Speaker, 12" electrodynamic	1
	BEA-19A-11539	Plug on speaker leads	1
T21	BE-14MA-11066	Loop antenna (ribbon only)	1
T22	BEA-16A-11045	Choke on loop terminal board	1
	BEA-19A-11322	Plug on loop antenna leads	1
	BE-107401	Phono motor cable assembly	1
P1	BE-10724	Plug on phono pickup leads	1
	BEC-6D-10897	Dial scale	1
	BE-10794	Dial light, 6-8 volts, type 44	2
	BEB-2G-10511	Dial pointer	1
	BEB-53A-10989	String for dial pointer	32"
	BE-120377	Tension spring for dial pointer string	1
	BEB-5C-10269-48	Escutcheon, for pushbuttons	1
	BEB-5C-10257-48	Escutcheon, for dial scale	1
	BE128683-37	Knob, band switch	1
	BEB-5B-10377-37	Knob, tuning	1
	BEB-5B-10376-37	Knob, volume	1
	BE-107266	Line cord and plug	1
	BEA-2L-11293	Band switch link	1
	BE-112961	Station call letters	1 set

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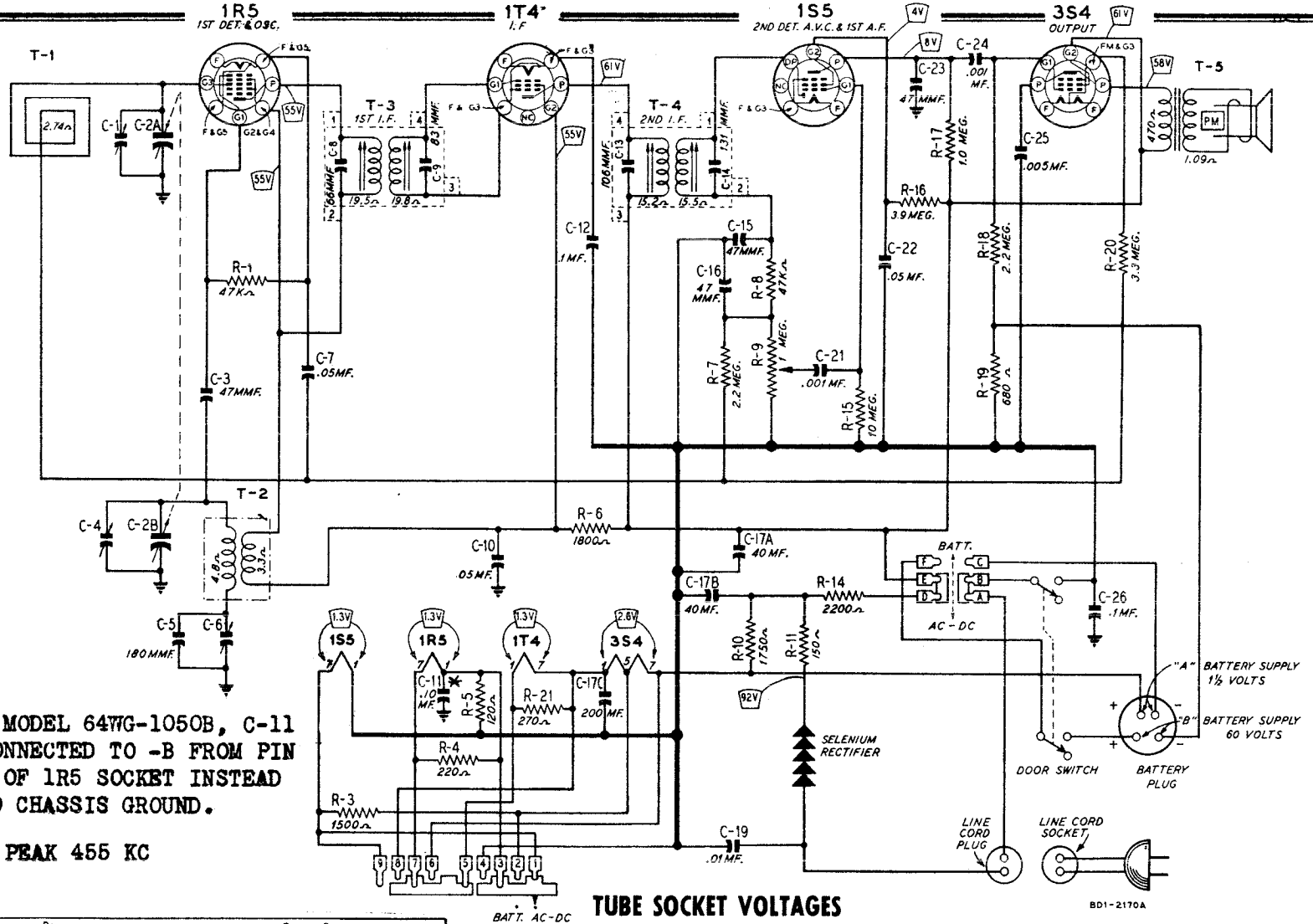
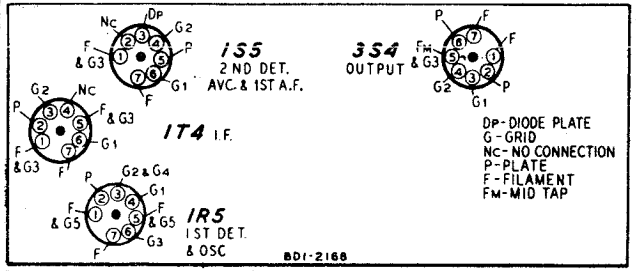


* IN MODEL 64WG-1050B, C-11 IS CONNECTED TO -B FROM PIN NO.1 OF 1R5 SOCKET INSTEAD OF TO CHASSIS GROUND.

IF PEAK 455 KC



TUBE SOCKET VOLTAGES

Socket voltages are shown on the schematic diagram at the tube socket terminals. All voltages except those for the filaments are between the socket terminal and the black or negative lead on C-17.

The readings were taken with a 1000 ohm per volt meter and all plate and screen voltages read on a 500 volt scale. Conditions of measurement are:

Line voltage.....117 volts AC
Volume control.....maximum
Signal input.....none

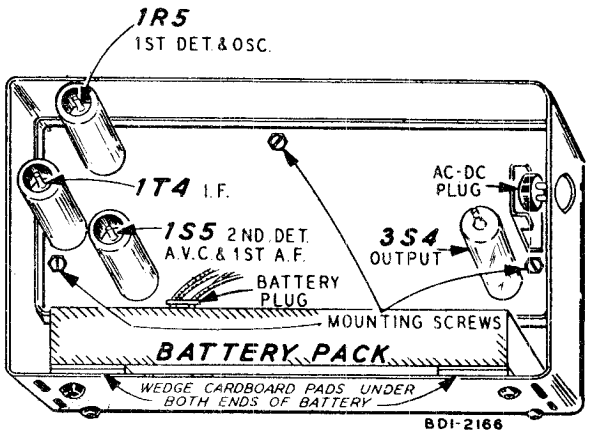
A variation of ±10% is usually permissible.

MODELS 64WG-1050A,
64WG-1050B

MONTGOMERY WARD

The table below lists the sensitivity at the input of each stage. The receiver should be tuned to 1000 KC for all readings. All measurements are based on an output of 50 milliwatts. This may be measured by disconnecting the speaker voice coil and substituting a 3.2 ohm 5 watt resistor across the secondary winding of the output transformer. A reading of .4 volts across this resistor will be equivalent to a 50 milliwatt output with the speaker connected. The volume control must be set to maximum.

The signal source must be an accurately calibrated signal generator capable of supplying both 1000 KC and 455 KC signals modulated 30% with a 400 cycle audio signal. Variations of plus or minus 25% are usually permissible.



SIGNAL GENERATOR				INPUT FOR 50 MILLIWATT OUTPUT
Freq.	Coupling Capacitor	Connection to Receiver	Ground Connection	
1000 kc	.05 mf	1R5 Mixer Pin 6	C-17 Black Lead	148 microvolts
455 kc	.05 mf	1R5 Mixer Pin 6	Same as above	118 microvolts
455 kc	.05 mf	1T4 IF Amp. Pin 6	Same as above	5000 microvolts
400 cycles	.05 mf	1S5 2nd Det. Pin 6	Same as above	.068 Volts
400 cycles	.05 mf	3S4 Output Pin 3	Same as above	4.2 volts

Volume Confrol — Maximum All Adjustments.

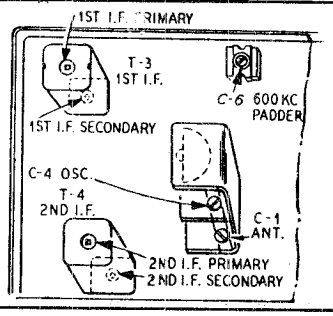
Allow Chassis and Signal Generator to "Heat Up" for several minutes.

The following equipment is required for aligning.

A Signal Generator which will provide an accurately calibrated signal at the test frequencies as listed.

Output Indicating Meter — Non-Metallic Screwdriver.

Dummy Antenna—.1 mf.



SIGNAL GENERATOR				RECEIVER	
Frequency Setting	Coupling Capacitor	Connection to Radio	Ground Connection	Condenser Setting	Adjust for maximum output. See trimmer illustration.
Remove chassis from case (See paragraph Removal of Chassis From Case) and temporarily solder a 50,000 ohm resistor across the two antenna leads on the chassis.					
455 kc	.1 mf	Control Grid 1R5—Pin 6	Chassis	Rotor to full open	1st IF Pri. & Sec. 2nd IF Pri. & Sec.
Remove temporary resistor, replace chassis in case and solder antenna leads to hinges.					
1610 kc	.1 mf	Door Hinge Above Tuning Control	Chassis	Rotor to full open	Oscillator (C-4)
1500 kc	.1 mf	Door Hinge Above Tuning Control	Chassis	Turn Rotor to Maximum Output	Set Tuning Knob at 1500 kc
1400 kc		Loop See Note A	Loop See Note A	Turn Rotor to Maximum Output	Antenna (C-1)
600 kc		Loop See Note A	Loop See Note A	Turn Rotor to Maximum Output	600 kc (C-6) Rock Rotor—See Note B
1400 kc		Loop See Note A	Loop See Note A	Turn Rotor to Maximum Output	Antenna (C-1)

NOTE A: Connect a loop approximately one foot in diameter across the antenna and ground posts of the signal generator. Place radio approximately 2 feet from loop.

NOTE B: Turn the rotor back and forth and adjust the trimmer until the peak of greatest intensity is obtained.

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MODEL 64WG-1050A

To remove the chassis from the case it will be necessary to remove the line cord if connected, and the back panel from the case. Open the front cover and carefully remove the two control knobs and the screw on the front panel above the tuning knob at the side of the ON-OFF switch plunger. Withdraw the battery pack from the case and disconnect the plug connecting to the battery pack. Then remove the 3 chassis mounting screws protruding above the chassis as shown in the tube position illustration. Carefully lift the chassis, and move it over into the battery space. Unsolder the two antenna wires at the door hinges.

OPERATING VOLTAGES—Chassis for Model 64WG-1050A are available for operation on the following power supplies:

Power Line — 105-125 Volts AC 50-60 Cycles or 105-125 Volts DC

Battery — Wards Battery Pack No. 62-32 { A Section 1.5 Volts; B Section 60 Volts

Ref. No.	Part No.	Description	Qty. Used in Set
		CAPACITORS	
C-1, C-4		Part of C-2 (Gang Capacitor)	
C-2A, C-2B	14A158	Gang Capacitor	1
C-3, C-15, C-16, C-23	47X495	47 mmf Ceramic	4
C-5	47X486	180 mmf Silvered Mica	1
C-6	17A186	30-120 mmf Trimmer	1
C-7, C-10, C-22	B66503	.05 mf 200 V Tubular	3
C-8		66 mmf Part of T-3 (1st I-F Transformer)	
C-9		83 mmf Part of T-3 (1st I-F Transformer)	
C-11	B66104	.10 mf 200 V Tubular	1
C-12	46X330	.10 mf 120 V Tubular	1
C-13		106 mmf Part of T-4 (2nd I-F Transformer)	
C-14		131 mmf Part of T-4 (2nd I-F Transformer)	
C-17A	45X350	40 mf 150 V	1
C-17B		40 mf 150 V Dry Electrolytic	
C-17C		200 mf 12 V	
C-19	B66103	.01 mf 200 V Tubular	1
C-21	46X334	.001 mf 120 V Tubular	1
C-24	B67102	.001 mf 200 V Tubular	1
C-25	B66502	.005 mf 200 V Tubular	1
C-26	D67104	.10 mf 400 V Tubular	1
		RESISTORS	
		OHMS / WATTS	
R-1, R-8	B84473	47 K 0.5 Carbon	2
R-3	B84152	1500 0.5 Carbon	1
R-4	B84221	220 0.5 Carbon	1
R-5	B84121	120 0.5 Carbon	1
R-6	B84182	1800 0.5 Carbon	1
R-7, R-18	B85225	2.2 meg 0.5 Carbon	2
R-9	36X305	1.0 meg Volume Control	1
R-10	43X107	1750 4.0 Wire wound	1
R-11	D84151	150 2.0 Carbon	1
R-14	B84222	2200 0.5 Carbon	1
R-15	B85106	10 meg 0.5 Carbon	1
R-16	B84395	3.9 meg 0.5 Carbon	1
R-17	B85105	1.0 meg 0.5 Carbon	1
R-19	B84681	680 0.5 Carbon	1
R-20	B85335	3.3 meg 0.5 Carbon	1
R-21	B84271	270 0.5 Carbon	1

ELECTRICAL SPECIFICATIONS

Power Supply — A Battery Supply 1.5 volts, .050 amps. B Battery Supply 60 volts, 8 MA or 105-125 volts AC, 50-60 cycles, 10 watts or 105-125 volts DC

Battery Pack — Wards Battery Pack No. 62-32

Frequency Range — 540-1600 kc

Intermediate Frequency — 455 kc

Selectivity — At 1000 kc, 40 kc wide at 1000 times signal

Sensitivity — 300 microvolts per meter average (for .05 watt output)

Power Output — .130 watt maximum .070 watt 10% distortion

Loud Speaker — 4" PM Dynamic

Voice Coil Imp. — 3.2 ohms at 400 cycles

Tube Complement
1 1R5 Mixer
1 1T4 IF Amplifier
1 1S5 2nd Detector AVC and 1st AF Amplifier
1 3S4 Output

Ref. No.	Part No.	Description	Qty. Used in Set
		TRANSFORMERS AND COILS	
T-1	9A1551	"B" Band Loop Antenna	1
T-2	9A1552	Oscillator Coil Assembly	1
T-3	9A1823	1st I-F Transformer and Can Assembly	1
T-4	9A1824	2nd I-F Transformer and Can Assembly	1
T-5	51X94	Output Transformer	1
		MISCELLANEOUS	
	12A447	4" P.M. Dynamic Speaker Cone and Voice Coil Assembly (Specify Part Number and Letters Stamped on Speaker)	1
	66X7	Selenium Rectifier	1
	14X351	Metal Grille (Speaker)	1
	3A312	Tube Socket—Miniature Type	4
	32X221	Tube Shield—Miniature	3
	13X453	"A" and "B" Battery Cable and Plug Assembly	1
	2A201	On-Off Switch	1
	26A409	Change-Over Switch Assembly	1
	13X545	Line Cord and Socket Assembly	1
	6A299	Line Plug (on Chassis)	1
	10A590	Knob	2
	26A407	Case and Cover Assembly Complete with Loop, Loop Cover and Back, Escutcheon and Speaker Grille	1
	26A408	Case Bottom Assembly	1
	4X939	Wraparound	1
	4X940	Rear Panel Cover	1
	4X941	Front Panel Cover	1
	67X33	Wrench (for I-F Transformer Alignment)	

MODEL 64 WG-1052A

ELECTRICAL SPECIFICATIONS

Power Supply — "A" Battery Supply—9 Volts, 50 Ma. "B" Battery Supply—90 Volts, 11 Ma. or 105-125 volts AC, 50-60 cycles, 10 watts or 105-125 volts DC

Battery Pack — Ward's Battery Pack No. 62-35

Frequency Range — 540-1600 KC

Intermediate Frequency — 455 KC

Selectivity — At 1000 KC, 53 KC wide at 1000 times signal

Sensitivity — (for .05 watt output with external antenna) 20 microvolts average

Power Output — .3 watts maximum 0.125 watt 10% distortion

Loud Speaker — 5¼" PM dynamic

Voice Coil Impedance — 3.2 ohms at 400 cycles

Ref. No.	Part No.	Description	Qty. Used in Set
		CAPACITORS	
C-2	17A123	1.0 mmf-12 mmf Trimmer	1
C-3	14A186	Gang Capacitor with Drive Pulley	1
C-4, C-10, C-17	47X476	100 mmf Moulded	3
C-5	47X463	47 mmf Moulded	1
C-6, C-7, C-8		Part of T-3 (1st I-F Transformer)	
C-28, C-29	B66403	.04 mf 200 V Tubular	3
C-11A, C-11B	45X348	20 mf 150 V / 50 mf 55 V Dry electrolytic	1
C-12, C-13		Part of T-4 (2nd I-F Transformer)	
C-14, C-15	47X112	50 mmf Dual Mica	1
C-16, C-19	B66502	.005 mf 200 V Tubular	2
C-18, C-23	B66503	.05 mf 200 V Tubular	2
C-20	D66502	.005 mf 400 V Tubular	1
C-21	D66603	.06 mf 400 V Tubular	1
C-22	B66104	.1 mf 200 V Tubular	1
C-24	B66254	.25 mf 200 V Tubular	1
C-25A, C-25B, C-25C	45X347	200 mf 35 V / 40 mf 150 V / 40 mf 150 V Dry electrolytic	1
C-27	D67104	.1 mf 400 V Tubular	1
		RESISTORS	
		Ohms / Watts	
R-1, R-7	B85225	2.2 meg. 0.5	2
R-2	B85104	100 K 0.5	1
R-4	B84123	12 K 0.5	1
R-5, R-14	B85335	3.3 meg. 0.5	2
R-6	B84153	15 K 0.5	1
R-8, R-25	B84152	1500 0.5	2
R-9	B85473	47 K 0.5	1
R-10	36X307	500 K Volume control	1
R-11, R-12	B85475	4.7 meg. 0.5	2
R-13	B85105	1.0 meg. 0.5	1
R-15, R-17	B84121	120 0.5	2
R-16	B84391	390 0.5	1
R-18	B84102	1000 0.5	1
R-19	B84821	820 0.5	1
R-20	B85330	33 0.5	1
R-21	B84471	470 0.5	1
R-22	43X215	1900 Shielded W. W. Resistor (Ballast tube)	1
R-23	D84101	100 2.0	1

REMOVAL OF CHASSIS FROM CABINET

Pull off the three control knobs and disconnect the battery plug. Unwrap the power cord from the radio at the top of the cabinet if necessary. Remove the four screws that fasten the chassis to the cabinet (2 on the outside at each end of the cabinet). Tip the chassis slightly forward and at the same time withdraw it from the cabinet.

Tube Complement
1 1R5 Mixer
2 1U4 I-F Amplifier
1 1S5 2nd Detector, AVC and 1st A-F Amplifier
1 3Q4 Power Output

OPERATING VOLTAGES—Chassis for Model 64WG-1052A are available for operation on the following power supplies:

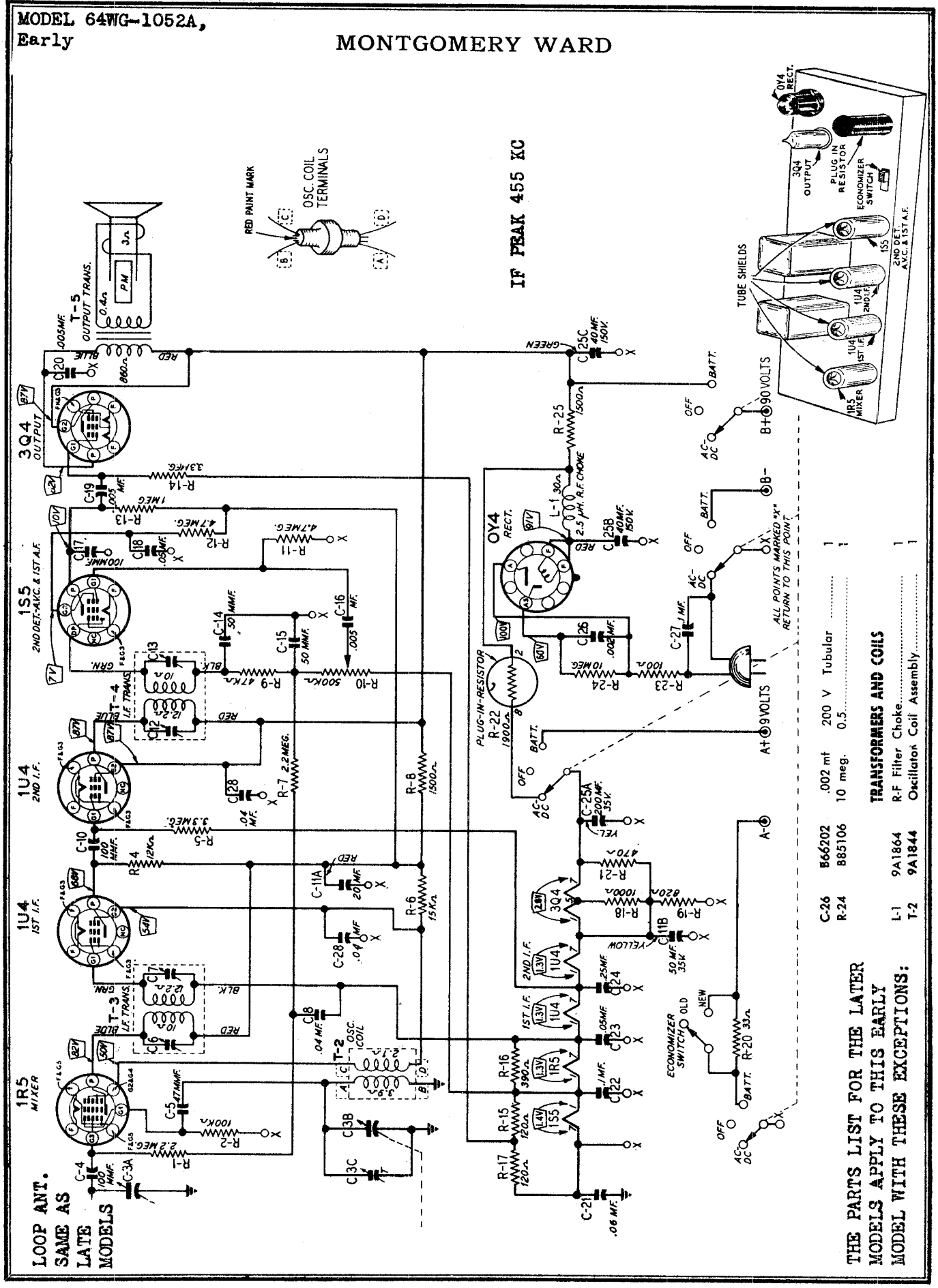
Power Line — 105-125 Volts AC 50-60 Cycles or 105-125 Volts DC

Battery — Wards Battery { A Section 9 Volts; Pack No. 62-35 { B Section 90 Volts

Ref. No.	Part No.	Description	Qty. Used in Set
		TRANSFORMERS AND COILS	
T-1	9A1843	"B" Range Loop Antenna	1
T-2	9A1896	Oscillator Coil Assembly	1
T-3	9A1840	1st I-F Transformer and Can Assem.	1
T-4	9A1841	2nd I-F Transformer and Can Assem.	1
T-5		Output Transformer (See Miscellaneous)	1
		DIAL AND DRIVE ASSEMBLY	
	26A381	Dial Scale Mounting Plate Assembly Complete with Idler Pulleys and Bracket for Drive Shaft Less Dial Scale, Brace Bracket, Drive Shaft and Gang Capacitor	1
	25X1504	Dial Brace Bracket	1
	58X633	Dial Scale	1
	28X56	Snap Button (Mtg. Dial Scale & Celluloid Crystal to Dial Bracket)	6
	17X65	Celluloid Crystal	1
	15X191	Pointer for Dial Scale	1
	25X832	Gang Capacitor Mounting Bracket	1
	6X21	Rubber Grommet (Mounting Gang Capacitor)	3
	57X176	Mounting Plate	1
	20X329	Cond. Cushion Stud	3
	28X95	Drive Cord Tension Spring	1
		23" Drive Cord (18 lb. test)	1
	4X942	Escutcheon	1
	26X489	Drive Shaft	1
	19X192	"C" Washer for Drive Shaft	2
		MISCELLANEOUS	
	12A443	5¼" P.M. Speaker complete with Output Transformer	1
		Cone and Voice Coil Assembly (Specify part number and letters stamped on speaker)	1
		Output Transformer (Specify part number and letters stamped on speaker)	1
	25A1019	Selenium Rectifier and Housing Assembly	1
	3A303	Socket-Octal (8 prong) Moulded	1
	3A312	Tube Socket (Miniature)	5
	32X221	Tube Shield	4
	2A175	On-Off Switch (Economizer)	1
	2A203	Changeover Switch (AC-DC, Battery Switch)	1
	13X429	Battery Cable and Plug Assembly	1
		Grille Cloth 4¾"x6½" (426W)	1
	10A595	Knob, Switch	1
	10A596	Knob, Tuning	1
	10A597	Knob, Volume	1
	13X328	Line Cord and Plug Assembly	1
	11X117	Shield, Volume Control and Switch (Paper)	1
	32X368	Shield, Volume Control and Switch (Metal)	1

MODEL 64WG-1052A,
Early

MONTGOMERY WARD



THE PARTS LIST FOR THE LATER MODELS APPLY TO THIS EARLY MODEL WITH THESE EXCEPTIONS:

C-26	B66202	.002 mf	200 V Tubular
R-24	B85106	10 meg.	0.5
L-1	9A1864	R-F Filter Choke	
T-2	9A1844	Oscillator Coil Assembly	

TRANSFORMERS AND COILS

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Volume Control—Maximum All Adjustments.

Allow Chassis and Signal Generator to "Heat Up" for several Minutes.

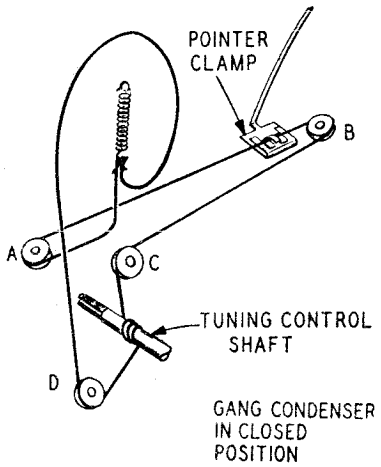
The equipment in column at right is required for aligning:

Signal Generator which will provide an accurately calibrated signal at the test frequencies as listed.

Output Indicating Meter; Non-Metallic Screwdriver.

Dummy Antenna—.1 mf., 50 mmf.

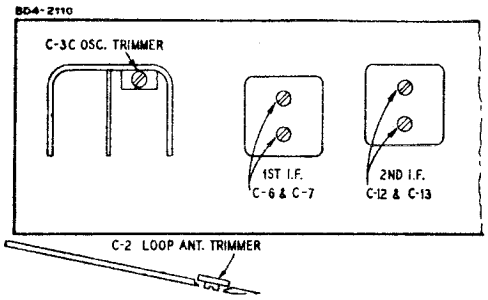
SIGNAL GENERATOR				CONDENSER SETTING	ADJUST TRIMMERS TO MAXIMUM See Trimmer Illustration
Frequency Setting	Coupling Capacitor	Connection to Radio	Ground Connection		
455 kc	.1 mf	Control Grid 1U4—1st I-F Pin 6	Point "X" At Electrolytic Capacitor Black Lead	Turn Rotor to full open	2nd I-F (C13) & (C12)
455 kc	.1 mf	Control Grid 1R5—Mixer Pin 6 See Note C	Same as above	Turn Rotor to full open	1st I-F (C7) & (C6)
1620 kc	.1 mf	Control Grid 1R5—Mixer Pin 6	Same as above	Turn Rotor to full open	Oscillator (C3C)
1400 kc	50 mmf	External Antenna Clip on Loop See Note A	External Ground connection on loop	Turn Rotor to Max. Output Set Indicator to 1400 KC See Note B	Antenna (C2)

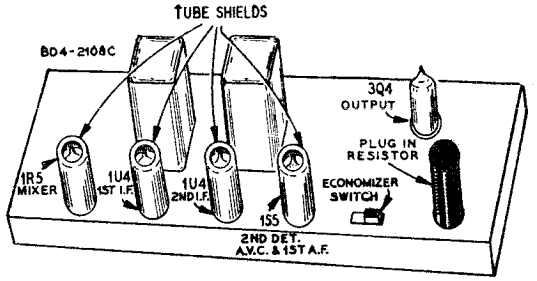


NOTE A—Re-assemble chassis in cabinet and close the cabinet back before making adjustment.

NOTE B—Tune in a 1400 KC signal. If pointer is not at the 1400 KC mark on the dial scale, move the pointer on the string to the 1400 KC mark.

NOTE C—Short out the oscillator section of the gang condenser for this adjustment only.



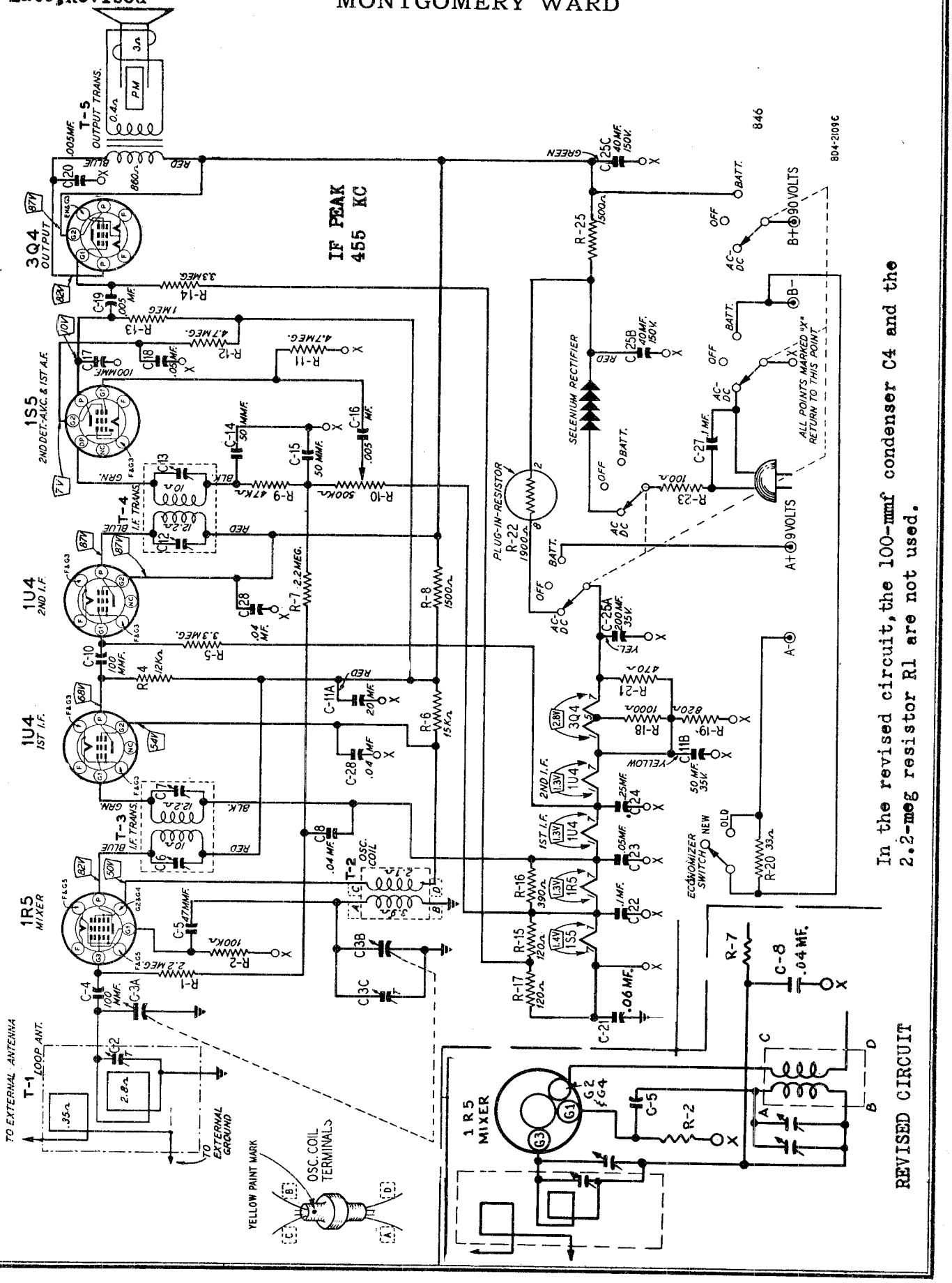


DRIVE CORD REPLACEMENT

Turn the gang condenser to the fully closed position. Use a new cord 23" long and tie one end to the tension spring. Fasten the other end of the tension spring to the hook on the drive pulley. Pass the cord through the slot in the drive pulley rim and continue around pulley rim ¼ turn clockwise. Pass cord around pulleys A, B, and C as shown in the illustration. Wind three turns clockwise (viewed from rear of chassis) around tuning control shaft. The turns must progress toward rear of chassis. Pass cord around pulley D and continue ¾ turn clockwise around large drive pulley. Pass cord through the slot in the pulley rim then stretch the tension spring and tie free end of cord to it. Cut off any excess string.

MODEL 64WG-1052A,
Late, Revised

MONTGOMERY WARD



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MODEL 64 WG-1052A

RECEIVER STAGE SENSITIVITIES

The table below lists the sensitivity at the input of each stage. The receiver should be tuned to 1000 KC for all readings. All measurements are based on an output of 50 milliwatts. This may be measured by disconnecting the speaker voice coil and substituting a 3.2 ohm 5 watt resistor across the secondary winding of the output transformer. A reading of .4 volts AC across this resistor will be equivalent to a 50 milliwatt output with the speaker connected. The volume control must be set to maximum.
The signal source must be an accurately calibrated signal generator capable of supplying both 1000 KC and 455 KC signals modulated 30% with a 400 cycle audio signal. Output variations of Plus or Minus 25% are usually permissible.

SIGNAL GENERATOR				INPUT FOR 50 MILLIWATT OUTPUT
Frequency	Coupling Capacitor	Connection to Receiver	Ground Connection	
1000 kc	200 mmf or RMA Dummy Antenna	Loop Antenna—External antenna clip	Chassis	20 microvolts
1000 kc	.05 mf.	1R5 Mixer—Pin 6	Point "X" (1S5 Pin 1)	30 microvolts
*455 kc	.05 mf.	1R5 Mixer—Pin 6	Same as above	15 microvolts
455 kc	.05 mf.	1U4 1st I-F—Pin 6	Same as above	440 microvolts
455 kc	.05 mf.	1U4 2nd I-F—Pin 6	Same as above	2200 microvolts
400 cycles	.05 mf.	1S5 1st A-F—Pin 6	Same as above	.022 volts
400 cycles	.05 mf.	3Q4 Output—Pin 3	Same as above	1.8 volt

*Short out the oscillator section of the gang condenser while making this measurement.

MODEL 54 WG-2007A

ELECTRICAL SPECIFICATIONS

Power Supply.....105-125 volts AC—60 cycles—30 watts (42 watts Phono Operating)

Frequency Range.....535 to 1620 KC

Intermediate Frequency.....455 KC

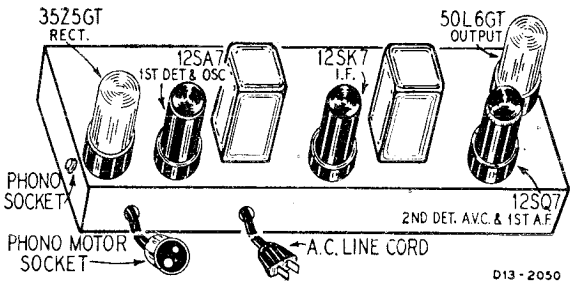
Selectivity.....55.5 KC broad at 1000 times signal, 1000 KC

Sensitivity (for .05 watt output) with external antenna.....25 microvolts average

Power Output.....1.5 watts maximum, .9 watt (10% distortion)

Loud speaker.....5" PM dynamic

Voice coil impedance.....3.2 ohms at 400 cycles



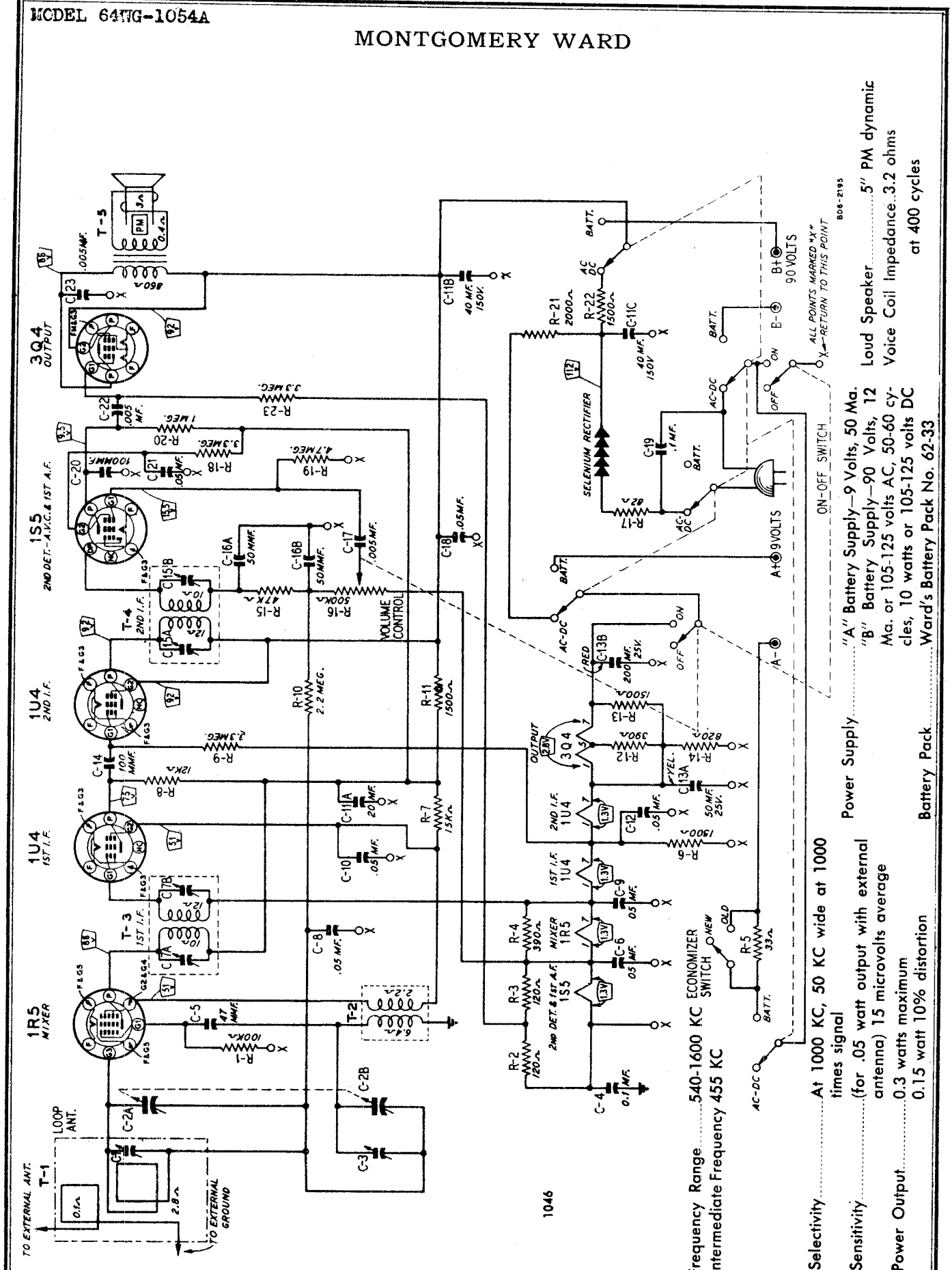
REMOVAL OF CHASSIS FROM CABINET

To remove the chassis from the cabinet it is necessary to pull the two control knobs and the dial pointer from their shafts. Remove the four screws in the bottom of the cabinet and the four snap pins that hold the cabinet back in place.

Care must be taken when removing the dial pointer that it is not damaged in such a manner that reinstallation will not be possible.

MODEL 64WG-1054A

MONTGOMERY WARD



Frequency Range.....540-1600 KC
Intermediate Frequency 455 KC

Selectivity.....At 1000 KC, 50 KC wide at 1000 times signal

Sensitivity.....(for .05 watt output with external antenna) 15 microvolts average

Power Output.....0.3 watts maximum
0.15 watt 10% distortion

Power Supply.....
"A" Battery Supply—9 Volts, 50 Ma.
"B" Battery Supply—90 Volts, 12 Ma. or 105-125 volts AC, 50-60 cycles, 10 watts or 105-125 volts DC

Loud Speaker.....5" PM dynamic
Voice Coil Impedance..3.2 ohms at 400 cycles

Battery Pack.....Ward's Battery Pack No. 62-33

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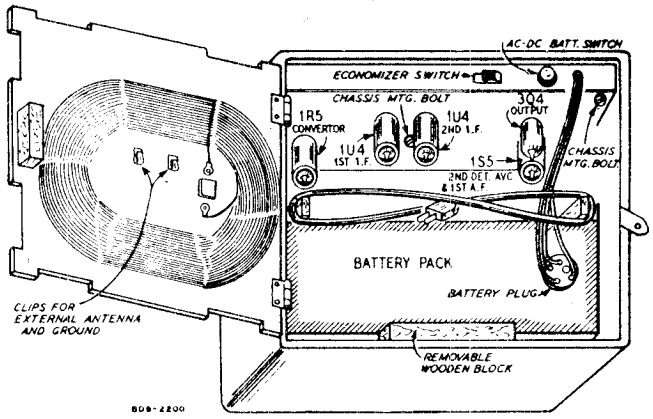
MODEL 64WG-1054A

MONTGOMERY WARD

REMOVAL OF CHASSIS FROM CABINET

To remove the chassis from the cabinet, it is necessary to pull off the 2 control knobs, disconnect the battery and then unscrew the 2 screws fastening the chassis to the cabinet. (The 2nd I-F Tube must be removed in order to reach the mounting screw in the center of the chassis.) See the tube position illustration for the location of these screws. After these screws have been removed, carefully pull out the chassis taking care not to damage the connections to the loop antenna.



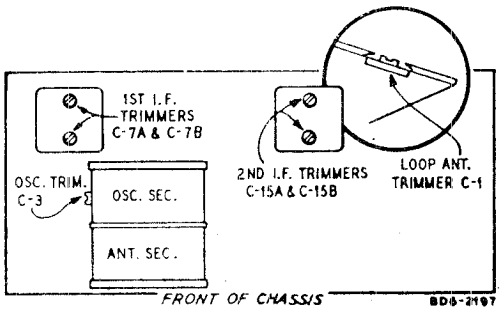
TUBE SOCKET VOLTAGES

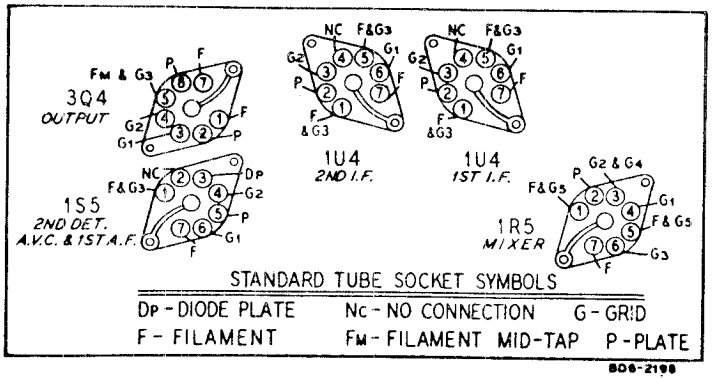
Socket voltages are shown on the schematic diagram at the tube socket terminals. All voltages except those for the filaments are between the socket terminal and "X" point.

The readings were taken with a 1000 ohm-per-volt meter and all plate and screen voltages read on a 500 volt scale. Conditions of measurement are:

Line voltage.....117 volts AC
Volume control.....maximum
Signal input.....none

A variation of ±10% is usually permissible.





SIGNAL GENERATOR				CONDENSER SETTING	ADJUST TRIMMER TO MAXIMUM See Trimmer Illustration
Frequency Setting	Coupling Capacitor	Connection to Radio	Ground Connection		
455 kc	.1 mf	Control Grid 1U4 1st I-F Pin 6	Point "X" At Electrolytic Capacitor Black Lead	Turn Rotor to full open	2nd I-F (C-15A) & (C-15B)
455 kc	.1 mf	Antenna Wire connecting to Stator of Antenna Section of Tuning Condenser	Same as above	Turn Rotor to full open	1st I-F (C-7A) & (C-7B)
1620 kc	.1 mf		Same as above	Turn Rotor to full open	Oscillator (C-3)
1400 kc	50 mmf	External Antenna Clip on Loop See Note A	External Ground connection on loop	Turn Rotor to Max. Output Set Indicator to 1400 KC See Note B	Antenna (C-1)

NOTE A—Re-assemble chassis in cabinet and close the cabinet back before making adjustment.

NOTE B—Tune in a 1400 KC signal. If pointer is not at the 1400 KC mark on the dial scale, pull pointer off shaft. Set pointer at the 1400 KC mark and push back on shaft.

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MODEL 64WG-1054A

MONTGOMERY WARD

RECEIVER STAGE SENSITIVITIES

The table below lists the sensitivity at the input of each stage. The receiver should be tuned to 1000 KC for all readings. All measurements are based on an output of 50 milliwatts. This may be measured by disconnecting the speaker voice coil and substituting a 3.2 ohm 5 watt resistor across the secondary winding of the output transformer. A reading of .4 volts AC across this resistor will be equivalent to a 50 milliwatt output. The volume control must be set to maximum.

The signal source must be an accurately calibrated signal generator capable of supplying both 1000 KC and 455 KC signals modulated 30% with a 400 cycle audio signal. Variations in sensitivity of Plus or minus 25% are usually permissible.

SIGNAL GENERATOR				INPUT FOR 50 MILLIWATT OUTPUT
Frequency	Coupling Capacitor	Connection to Receiver	Ground Connection	
1000 kc	200 mmf or RMA Dummy Antenna	Loop Antenna—External antenna clip	Chassis	15 microvolts
1000 kc	.05 mf.	1R5 Mixer—Pin 6	Point "X" (1S5 Pin 1)	30 microvolts
455 kc	.05 mf.	1R5 Mixer—Pin 6	Same as above	20 microvolts
455 kc	.05 mf.	1U4 1st I-F—Pin 6	Same as above	440 microvolts
455 kc	.05 mf.	1U4 2nd I-F—Pin 6	Same as above	2200 microvolts
400 cycles	.05 mf.	1S5 1st A-F—Pin 6	Same as above	.022 volts
400 cycles	.05 mf.	3Q4 Output—Pin 3	Same as above	2.2 volt

REPLACEMENT PARTS LIST

Use only genuine factory tested parts to insure service jobs you can depend on and to obtain original set performance

Ref. No.	Part No.	Description	Qty. Used
		CAPACITORS	
C-1	17A123	1.0-12 mmf Trimmer	1
C-2	14A192	Gang Condenser	1
C-3		Part of C-2 Gang Condenser	
C-4			
C-19	D67104	.10 mf 400 V Tubular	2
C-5	47X643	47mmf Molded	1
C-6			
C-8			
C-9			
C-10	B66503	.05 mf 200 V Tubular	7
C-12			
C-18			
C-21			
C-7A		Part of T-3 1st I-F Transformer	
C-7B			
C-11A		20 mf 150 V Dry	
C-11B	45X353	40 mf 150 V Electrolytic	1
C-11C		40 mf 150 V	
C-13A	45X354	50 mf 25 V Dry	
C-13B		200 mf 25 V Electrolytic	1
C-14	47X476	100 mmf Molded	2
C-20			
C-15A		Part of T-4 2nd I-F Transformer	
C-15B			
C-16A	47X112	50 mmf Dual Mica	1
C-16B			
C-17	B66502	.005 mf 200 V Tubular	2
C-22			
C-23	D66502	.005 mf 400 V Tubular	1
		RESISTORS	
		Ohms *Watts* *Material*	
R-1	B84104	100k 0.5 Carbon	1
R-2	B84121	120 0.5 Carbon	2
R-3			
R-4	B84391	390 0.5 Carbon	2
R-12			
R-5	B85330	33 0.5 Carbon	1
R-6			
R-11	B84152	1500 0.5 Carbon	4
R-13			
R-22			
R-7	B84153	15k 0.5 Carbon	1
R-8	B84123	12k 0.5 Carbon	1
R-9			
R-18	B85335	3.3 meg 0.5 Carbon	3
R-23			
R-10	B85225	2.2 meg 0.5 Carbon	1
R-14	B84821	820 0.5 Carbon	1
R-15	B85473	47k 0.5 Carbon	1
R-16	36X310	500k Volume Control and Switch	1
R-17	D84820	82 2.0 Carbon	1
R-19	B85475	4.7 meg 0.5 Carbon	1
R-20	B84105	1.0 meg 0.5 Carbon	1
R-21	43X220	2000 7.0 W.W.	1
		TRANSFORMERS & COILS	
T-1	26A430	Loop Antenna Assembly	1
T-2	9A1893	Oscillator Coil Assembly	1
T-3	9A1889	1st I-F Transformer & Can Assembly	1
T-4	9A1890	2nd I-F Transformer & Can Assembly	1
T-5	51X130	Output Transformer	1
		MISCELLANEOUS	
	12A446	5" P.M. Speaker	1
		Cone and Voice Coil Assembly. (Specify part number and letters stamped on speaker)	
	25A1019	Selenium Rectifier and Housing Assembly	1
	3A312	Miniature Tube Socket	5
	32X221	Tube Shield	4
	11X131	Shield, Volume Control	1
	2A368	Change over Switch (AC-DC, Battery Switch)	1
	2A175	On-Off Switch (Economizer)	1
	13X328	Line Cord and Plug Assembly	1
	30X132	Line Cord Clamp	1
	13X550	Battery Cable & Plug Assembly	1
	4X954	Escutcheon & Grille Assembly	1
	10A598	Knob (Volume)	1
	10A421	Knob (Change over Switch)	1
	10A300	Knob (Tuning)	1
	15X235	Pointer Disc	2
	19X446	Cup Washers	
	6X52	Rubber Grommet } Mtg. Gang. Cond.	2

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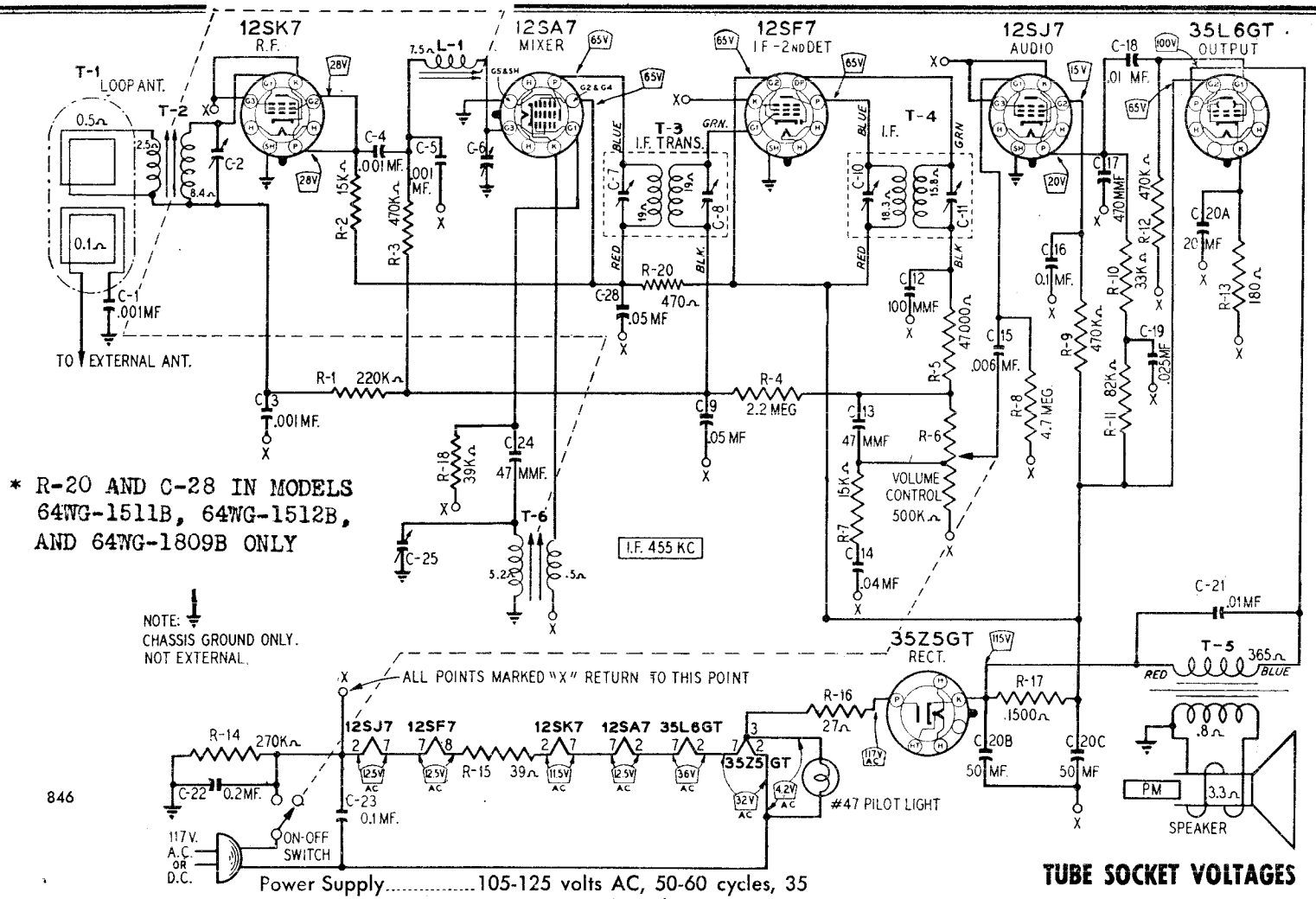

Power Supply	105-125 volts AC, 50-60 cycles, 35 watts or 105-125 volts DC
Frequency Range	540-1600 KC
Selectivity	At 1000 KC, 50 KC wide at 1000 times signal
Sensitivity	(for .05 watt output with external antenna) 15 microvolts average
Power Output	1.3 watts maximum .75 watt 10% distortion
Loud Speaker	4" x 6" PM dynamic
Voice Coil Impedance	3.2 ohms at 400 cycles

TUBE SOCKET VOLTAGES

Socket voltages are shown on the schematic diagram at the tube socket terminals. All voltages except those for the heater and dial lamp are between the socket terminal and "X" point.

The readings were taken with a 1000 ohm-per-volt meter and all plate and screen voltages read on a 500 volt scale. Conditions of measurement are:

Line voltage	117 volts AC
Volume control	maximum
Signal input	none

· A variation of ±10% is usually permissible.

MODELS 64WG-1511A,-1511B,
64WG-1512A,-1512B,
64WG-1809A,-1809B

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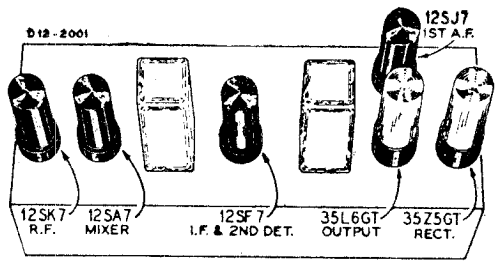
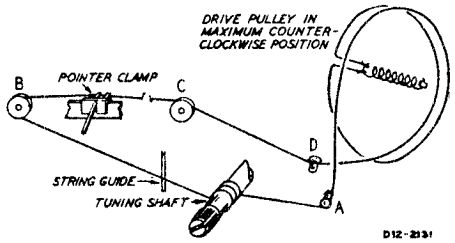


DRIVE CORD REPLACEMENT

Turn the large drive pulley counterclockwise to the stop position. Use a new drive cord 36" long and tie one end to the tension spring. Hook the other end of the tension spring over the tab on the drive pulley. Pass the cord through the slot on the drive pulley rim and continue around pulley 1¼ turns counterclockwise. Pass cord around stud A and wind three turns clockwise (from front of chassis) around the tuning shaft. Turns must progress away from chassis. Run the cord in front of the string guide, then pass cord around pulleys B and C and stud D. Pass cord under drive pulley and wind ¾ turn counterclockwise around drive pulley. Stretch tension spring and tie free end of cord to spring. Cut off any excess string.

Note: On sets having a black vinylite sleeve on the tuning shaft wind only two turns clockwise around the tuning shaft.

Attach the dial pointer to the cord and position, as instructed in paragraph DIAL CALIBRATION.

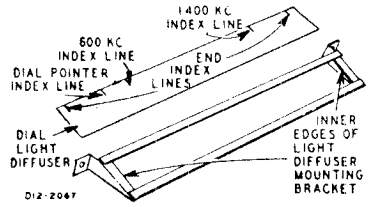


DIAL CALIBRATION

In order to align the receiver, the dial pointer must be positioned on the dial string correctly with reference to the dial. Index lines are provided on the dial light diffuser for this purpose.

Before aligning the receiver (or when replacing the dial light diffuser) check the position of the diffuser strip, making certain that the two end index lines are aligned with the inner edges of the diffuser mounting bracket opening. The bracket should be crimped at one point to prevent movement of the diffuser strip. To position the dial pointer, adjust the radio to the stop position at the low frequency end of the dial. The dial pointer should be directly over the dial pointer index line (see illustration). If not, move the pointer along the drive cord until it is directly over the index line.

The 1400 KC index line is for use when aligning the receiver.



TUNING ASSEMBLY SERVICE

Exacting requirements in the tuning assembly make it impractical to replace the drive cord, coils and components in this assembly other than the trimmer condensers. Should the drive cord break, or components other than the trimmer condensers require service, the entire assembly must be ordered and replaced as a unit.

ALIGNMENT PROCEDURE

Check dial pointer position, see Dial Calibaration paragraph.

Volume Control--Maximum All Adjustments.

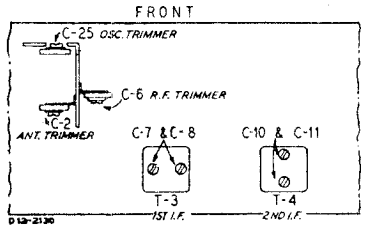
Allow Chassis and Signal Generator to "Heat Up" for several minutes.

The equipment in column at right is required for aligning:

Signal Generator which will provide an accurately calibrated signal at the test frequencies as listed.

Output Indicating Meter; Non-Metallic Screwdriver.

Dummy Antennas—.1 mf., 50 mmf.



NOTE A:—Index line is on dial light diffuser strip. See DIAL CALIBRATION paragraph.

SIGNAL GENERATOR			Coupling Capacitor	DIAL SETTING	ADJUST TRIMMERS TO MAXIMUM OUPUT IN ORDER SHOWN (See Trimmer Illustration)
Frequency Setting	Connection to Receiver	Ground Connection			
455 kc	Control Grid 12SF7—I-F (Prong No. 2)	Point "X" 12SK7—R-F (Prong No. 3)	.1 mf	1600 kc	2nd I-F (C10) & (C11)
455 kc	Control Grid 12SA7—1st Det. (Prong No. 8)	Same as above	.1 mf	1600 kc	1st I-F (C7) & (C8)
1400 kc	Control Grid 12SA7—1st Det. (Prong No. 8)	Same as above	.1 mf	1400 kc Index Line. See Note A	Oscillator (C25)
1400 kc	External Antenna Clip on Loop	Chassis	50 mmf	1400 kc Index Line. See Note A	R-F (C-6) Antenna (C-2)

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MODELS 64WG-1511A,-1511B,
64WG-1512A,-1512B,
64WG-1809A,-1809B

RECEIVER STAGE SENSITIVITIES

SIGNAL GENERATOR				
Frequency	Coupling Capacitor	Connection to Receiver	Ground Connection	INPUT FOR 50 MILLIWATT OUTPUT
1000 kc	200 mmf or RMA Dummy Antenna	Loop Antenna—External antenna clip	Chassis	15 microvolts
1000 kc	.05 mf.	12SA7 Mixer—Pin 8	Point "X" (12SK7 Pin 3)	100 microvolts
455 kc	.05 mf.	12SA7 Mixer—Pin 8	Same as above	80 microvolts
455 kc	.05 mf.	12SF7 I-F—Pin 2	Same as above	3500 microvolts
400 cycles	.05 mf.	12SJ7 1st A-F—Pin 4	Same as above	.042 volts
400 cycles	.05 mf.	35L6GT Output—Pin 5	Same as above	1 volt

Ref. No.	Part No.	Description	Qty. Used in Set
		CAPACITORS	
C-1	D67102	.001 mf 400 V Tubular	1
C-2	17A238	4-70 mmf Trimmer	1
C-3, C-4, C-5	B67102	.001 mf 200 V Tubular	3
C-6	17A243	4-70 mmf Trimmer	1
C-7, C-8		Part of T-3, 1st I-F Transformer	
C-9	B66503	.05 mf 200 V Tubular	1
C-10, C-11		Part of T-4, 2nd I-F Transformer	
C-12	47X476	100 mmf Molded	1
C-13	47X463	47 mmf Molded	1
C-14	B67403	.04 mf 200 V Tubular	1
C-15	B67602	.006 mf 200 V Tubular	1
C-16	B66104	0.1 mf 200 V Tubular	1
C-17	47X467	470 mmf Molded	1
C-18, C-21	B66103	.01 mf 200 V Tubular	2
C-19	B67253	.025 mf 200 V Tubular	1
C-20A	45X344	20 mf 25 V Dry electrolytic capacitor	1
C-20B		50 mf 150 V	
C-20C		50 mf 150 V	
C-22	B67204	0.2 mf 200 V Tubular	1
C-23	D67104	0.1 mf 400 V Tubular	1
C-24	47X446	47 mmf Molded	1
C-25	17A239	40-370 mmf Trimmer	1
*C-28	B67503	.05 mf Tubular	1
		RESISTORS	
		OHMS WATTS	
R-1	B85224	220,000 0.5 Carbon	1
R-2, R-7	B84153	15,000 0.5 Carbon	2
R-3, R-12	B85474	470,000 0.5 Carbon	2
R-4	B85225	2.2 meg. 0.5 Carbon	1
R-5	B85473	47,000 0.5 Carbon	1
R-6	36X347	500,000 Volume control and switch	1
R-8	B85475	4.7 meg. 0.5 Carbon	1
R-9	B84474	470,000 0.5 Carbon	1
R-10	B84333	33,000 0.5 Carbon	1
R-11	B84823	82,000 0.5 Carbon	1
R-13	B83181	180 0.5 Carbon	1
R-14	B84274	270,000 0.5 Carbon	1
R-15	D84390	39 2.0 Carbon	1
R-16	B84270	27 0.5 Carbon	1
R-17	C84152	1500 1.0 Carbon	1
R-18	B84393	39,000 0.5 Carbon	1
*R-20	B85471	470 0.5 Carbon	1

Ref. No.	Part No.	Description	Qty. Used in Set
		TRANSFORMERS AND COILS	
L-1		Part of tuning assembly	
T-1	9A1803	"B" Range loop antenna (for ivory plastic cabinet)	1
T-1	9A1773	"B" Range loop antenna (for walnut plastic cabinet)	1
T-1	9A1863	"B" Range loop antenna (for walnut wood cabinet)	1
T-2		Part of tuning assembly	
T-3	9A1775	1st I-F Transformer and can assembly	1
T-4	9A1776	2nd I-F Transformer and can assembly	1
T-5	51X116	Output transformer	1
T-6		Part of tuning assembly	
		DIAL AND DRIVE ASSEMBLY	
	20A97	Tuning assembly complete with coils, trimmers, etc.	1
	11X119	Fibre shield (tuner housing)	1
	28X518	Trimount stud (mtg. fibre shield)	5
	26X464	Drive shaft	1
	28X512	Ground spring (drive shaft)	1
	19X192	"C" washer	2
	25X1384	Pointer bracket	1
	24X446	Idler pulley	2
	41X78	Dial light diffuser	1
	25X1385	Holder, light diffuser	1
	15X217	Pointer	1
	25X1398	Pilot light bracket	1
		3 ft. drive cord (18 lb. test)	1
	28X95	Drive cord tension spring	1
	7A192	Pilot light socket assembly	1
		Pilot light No. 47	1
	58X645	Dial (for ivory plastic cabinet)	1
	58X646	Dial (for walnut plastic cabinet)	1
	58X650	Dial (for walnut wood cabinet)	1
	25X1461	Dial Bracket for walnut wood cabinet only	1
	4X884	Escutcheon	1
	25X1460	Escutcheon Mtg. Bracket	2
		MISCELLANEOUS	
	12A431	4" x 6" speaker with mounting bracket	1
		Cone and voice coil assembly for speaker (specify part number and letters stamped on speaker)	1
	3A303	Tube socket—octal (8 prong) molded	5
**	26A426	Tube socket and shield assembly	1
	10A297	Knob, volume control and line switch; tuning (for walnut cabinets)	2
	10A300	Knob, volume control and line switch; tuning (for ivory plastic cabinet)	2
	28X292	Snap button (mtg. loop to cabinet)	2
		6 x ¼" slotted hex head P-K type "Z" screw (mtg. loop to chassis)	2
	55X249	Cabinet (ivory plastic)	1
	55X264	Cabinet (walnut plastic)	1
	13X328	Line cord and plug assembly	1

* IN MODELS 64WG-1511B,64WG-1512B,64WG-1809B ONLY
** PART NO. 3A421 IN MODELS 64WG-1511A,64WG-1512A,64WG-1809A

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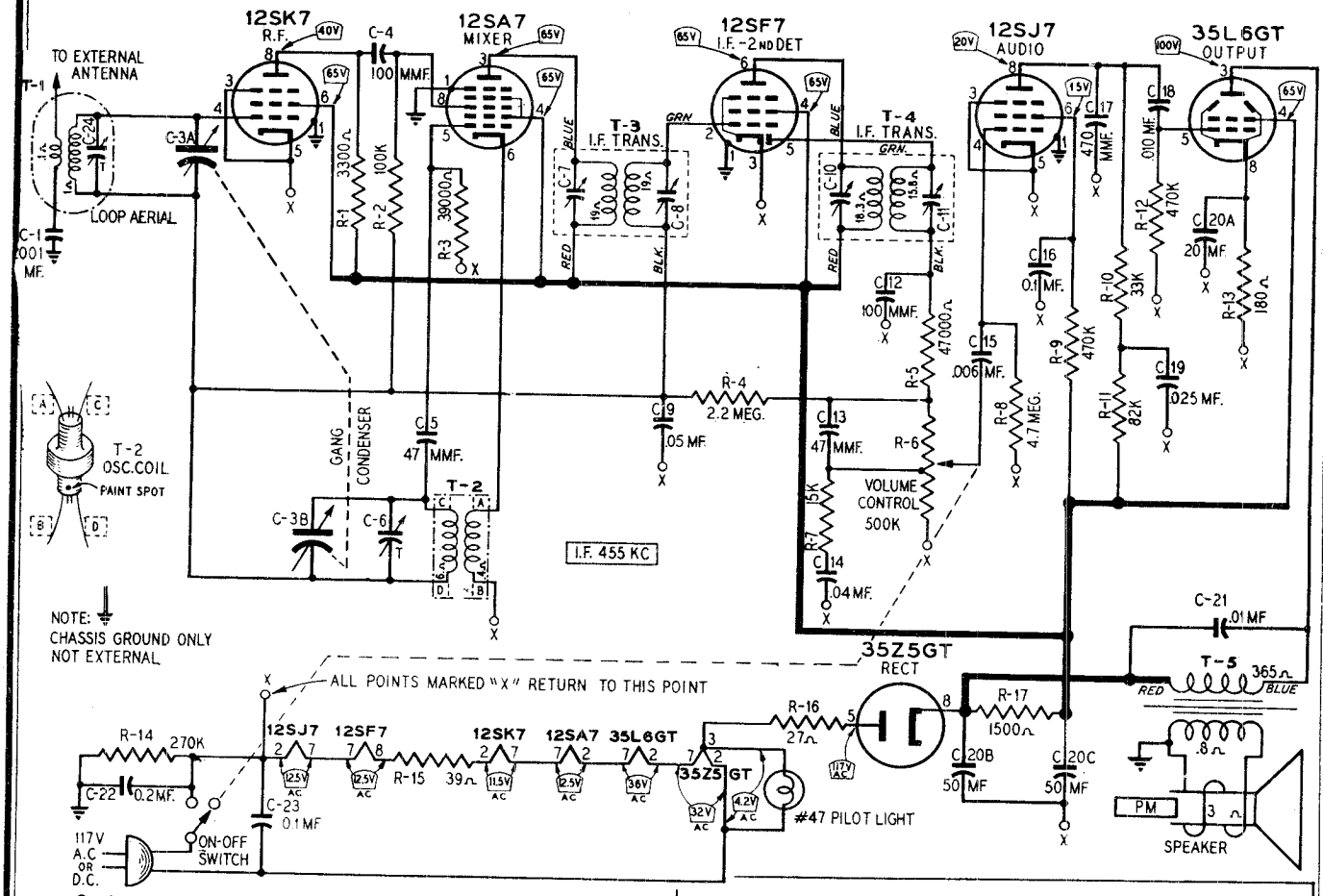
MODEL 64WG-1804A

MONTGOMERY WARD

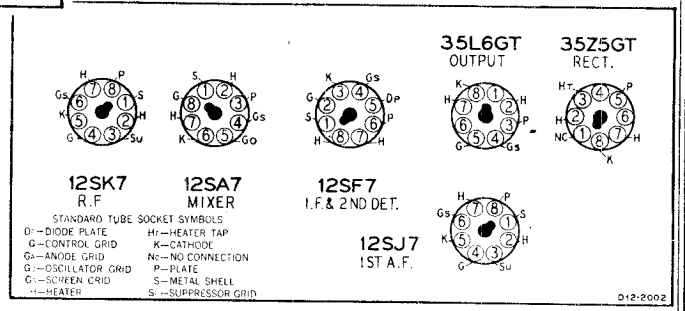


Socket voltages are shown on the schematic diagram at the tube socket terminals. All voltages except those for the heater and dial lamp are between the socket terminal and "X" point.

The readings were taken with a 1000 ohm-per-volt meter and all plate and screen voltages read on a 500 volt scale. Conditions of measurement are:

Line voltage.....117 volts AC
Volume control.....maximum
Signal input.....none

A variation of +10% is usually permissible.



The table below lists the sensitivity at the input of each stage. The receiver should be tuned to 1000 KC for all readings. All measurements are based on an output of 50 milliwatts. This may be measured by disconnecting the speaker voice coil and substituting a 3.2 ohm 5 watt resistor across the secondary winding of the output transformer. A reading of .4 volts AC across this resistor will be equivalent to a 50 milliwatt output with the speaker connected. The volume control must be set to maximum. The signal source must be an accurately calibrated signal generator capable of supplying both 1000 KC and 455 KC signals modulated 30% with a 400 cycle audio signal. Variations of Plus or Minus 25% are usually permissible.

SIGNAL GENERATOR				INPUT FOR 50 MILLIWATT OUTPUT
Frequency	Coupling Capacitor	Connection to Receiver	Ground Connection	
1000 kc	200 mmf or RMA Dummy Antenna	Loop Antenna—External antenna clip	Chassis	19.5 microvolts
1000 kc	.05 mf.	12SA7 Mixer—Pin 8	Point "X" (12SK7 Pin 3)	150 microvolts
455 kc	.05 mf	12SA7 Mixer—Pin 8	Same as above	100 microvolts
455 kc	.05 mf	12SF7 I-F—Pin 2	Same as above	3500 microvolts
400 cycles	.05 mf	12SJ7 1st A-F—Pin 4	Same as above	.042 volts
400 cycles	.05 mf	35L6GT Output—Pin 5	Same as above	1 volt

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MODEL 64WG-1804A

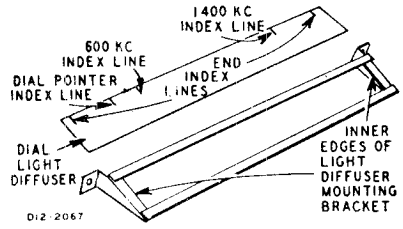
MONTGOMERY WARD

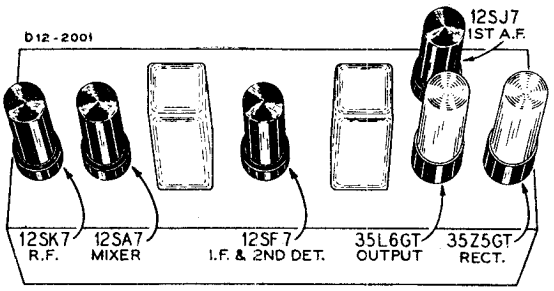
Power Supply.....105-125 volts AC, 50-60 cycles, 35 watts or 105-125 volts DC
Frequency Range.....535-1620 KC
Intermediate Frequency.455 KC
Selectivity.....At 1000 KC, 50 KC wide at 1000 times signal
Sensitivity.....(for .05 watt output with external antenna) 15 microvolts average
Power Output.....1.3 watts maximum
.75 watt 10% distortion
Loud Speaker.....4"x 6" PM dynamic
Voice Coil Impedance...3.2 ohms at 400 cycles

In order to align the receiver, the dial pointer must be positioned on the dial string correctly with reference to the dial. Index lines are provided on the dial light diffuser for this purpose.

Before aligning the receiver (or when replacing the dial light diffuser) check the position of the diffuser strip, making certain that the two end index lines are aligned with the inner edges of the diffuser mounting bracket opening. The bracket should be crimped at one point to prevent movement of the diffuser strip. To position the dial pointer, turn the gang condenser to the fully closed position. The dial pointer should be directly over the dial pointer index line. (See illustration)

The 1400 KC index line is for use when aligning the receiver.

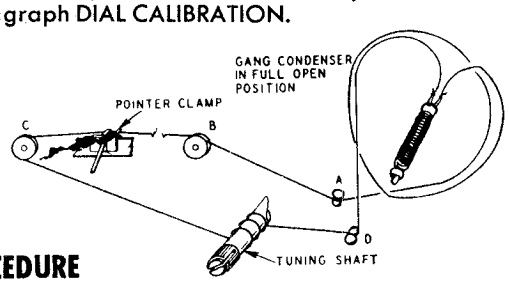




DRIVE CORD REPLACEMENT

Turn the gang condenser to the fully open position. Use a new drive cord 36" long and tie one end to the tension spring. Hook the other end of the tension spring over the tab on the drive pulley. Pass the cord through the slot on the drive pulley rim and continue around pulley ½ turn counterclockwise. Pass cord around stud D and wind three turns clockwise (from front of chassis) around the tuning shaft. Turns must progress away from chassis. Pass cord around pulleys C and B and stud A. Pass cord under drive pulley and wind 1½ turns counterclockwise around drive pulley. Stretch tension spring and tie free end of cord to spring. Cut off any excess string.

Attach the dial pointer to the cord and position as instructed in paragraph DIAL CALIBRATION.



ALIGNMENT PROCEDURE

Check dial pointer position, see Dial Calibration paragraph.

Volume Control—Maximum All Adjustments.

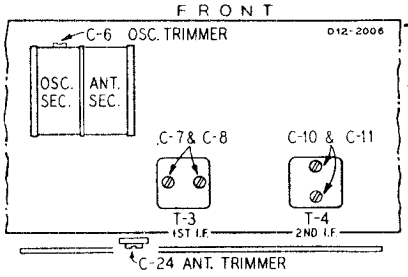
Allow Chassis and Signal Generator to "Heat Up" for several Minutes.

The equipment in column at right is required for aligning:

Signal Generator which will provide an accurately calibrated signal at the test frequencies as listed.

Output Indicating Meter; Non-Metallic Screwdriver.

Dummy Antennas—.1 mf., 50 mmf.



NOTE A:—Index line is on dial light diffuser strip. See DIAL CALIBRATION paragraph.

SIGNAL GENERATOR			Coupling Capacitor	DIAL SETTING	ADJUST TRIMMERS TO MAXIMUM OUTPUT IN ORDER SHOWN (See Trimmer Illustration)
Frequency Setting	Connection to Receiver	Ground Connection			
455 kc	Control Grid 12SF7—I-F (Prong No. 2)	Point "X" 12SK7—R-F (Prong No. 3)	.1 mf	Turn Rotor to full open	2nd I-F (C10) & (C11)
455 kc	Control Grid 12SA7—1st Det. (Prong No. 8)	Same as above	.1 mf	Turn Rotor to full open	1st I-F (C7) & (C8)
1400 kc	Control Grid 12SA7—1st Det. (Prong No. 8)	Same as above	.1 mf	Turn Rotor to 1400 kc Index Line. See Note A	Oscillator (C6)
1400 kc	External Antenna Clip on Loop	Chassis	50 mmf	Turn Rotor to 1400 kc Index Line. See Note A	Antenna (C24)

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MODEL 64WG-1804A

MONTGOMERY WARD

CAPACITORS

Ref. No.	Part No.	Description	Qty. Used in Set
C-1	D66102	.001 mf 400 V Tubular	1
C-2, C-6		Part of C-3	
C-3A, C-3B	14A179	Gang condenser with pulley	1
C-4, C-12	47X476	100 mmf Molded	2
C-5	47X446	47 mmf Molded	1
C-7, C-8		Part of T-3, 1st I-F Transformer	
C-9	B66503	.05 mf 200 V Tubular	1
C-10, C-11		Part of T-4, 2nd I-F Transformer	
C-13	47X463	47 mmf Molded	1
C-14	B66403	.04 mf 200 V Tubular	1
C-15	B66602	.006 mf 200 V Tubular	1
C-16	B66104	.1 mf 200 V Tubular	1
C-17	47X467	470 mmf Molded	1
C-18, C-21	B66103	.01 mf 200 V Tubular	2
C-19	B64253	.025 mf 200 V Tubular	1
C-20A	45X344	20 mf 25 V Dry electrolytic condenser	1
C-20B		50 mf 150 V	
C-20C		50 mf 150 V	
C-22	B66204	0.2 mf 200 V Tubular	1
C-23	D66104	.1 mf 400 V Tubular	1
C-24	17A116	2.5-23 mmf Trimmer	1

RESISTORS

		Ohms	*Watts*		
R-1	B84332	3300	0.5	Carbon	1
R-2	B85104	100,000	0.5	Carbon	1
R-3	B84393	39,000	0.5	Carbon	1
R-4	B85225	2.2 meg.	0.5	Carbon	1
R-5	B85473	47,000	0.5	Carbon	1
R-6	36X347	500,000	Volume control and switch		1
R-7	B84153	15,000	0.5	Carbon	1
R-8	B85475	4.7 meg.	0.5	Carbon	1
R-9	B84474	470,000	0.5	Carbon	1
R-10	B84333	33,000	0.5	Carbon	1
R-11	B84823	82,000	0.5	Carbon	1
R-12	B85474	470,000	0.5	Carbon	1
R-13	B83181	180	0.5	Carbon	1
R-14	B85274	270,000	0.5	Carbon	1
R-15	D84390	39	2.0	Carbon	1
R-16	B84270	27	0.5	Carbon	1
R-17	C84152	1500	1.0	Carbon	1

TRANSFORMERS AND COILS

Ref. No.	Part No.	Description	Qty. Used in Set
T-1	9A1804	"B" Range loop antenna (wood mantel)	1
T-2	9A1805	Oscillator coil assembly	1
T-3	9A1775	1st I-F Transformer and can assembly	1
T-4	9A1776	2nd I-F Transformer and can assembly	1
T-5	51X116	Output transformer	1

DIAL AND DRIVE ASSEMBLY

	24X446	Idler pulley	2
	25X1382	Idler bracket	1
	6X21	Rubber grommets (Gang condenser mounting)	3
	57X176	Mounting plate (Gang condenser mounting)	1
	20X329	Cond. cushion stud (Gang condenser mounting)	3
	58X594	Dial (for wood mantel)	1
	25X1461	Dial bracket (for dial 58X594)	1
	25X1384	Pointer bracket	1
	15X217	Pointer	1
	25X1398	Pilot light bracket	1
	7A192	Pilot light socket assembly	1
		Pilot light No. 47	1
		3 ft. drive cord (18 lb. test)	1
	28X44	Drive cord tension spring	1
	26X464	Drive shaft (tuning)	1
	19X192	"C" washer for above drive shaft	2
	41X69	Dial light diffuser	1
	25X1385	Holder, light diffuser	1
	4X884	Escutcheon (wood mantel only)	1
	25X1460	Escutcheon mounting bracket	2

MISCELLANEOUS

12A431	4" x 6" speaker with mounting bracket	1
	Cone and voice coil assembly for the above speaker (specify part number and letters stamped on above speaker)	1
3A303	Tube socket—octal (8 prong) molded	5
3A421	Tube socket—octal (8 prong) with shield	1
10A297	Knob (walnut) on-off switch, volume control and tuning	2
28X292	Snap button (mounting loop to cabinet)	2
	6 x ¼" slotted hex head P-K type "Z" screw (mounting loop to chassis)	2
13X328	Line cord and plug assembly	1

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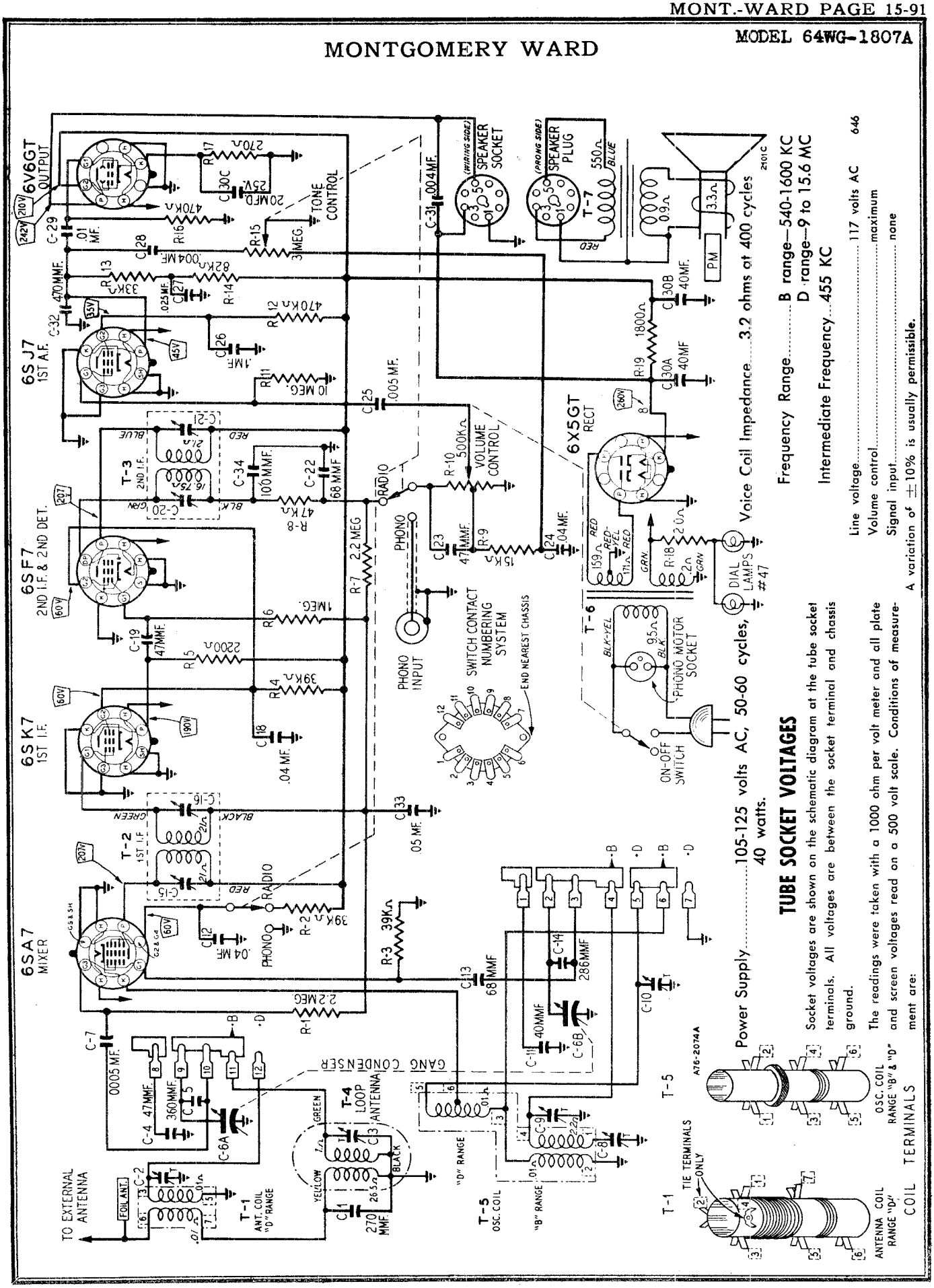
MONTGOMERY WARD

MODEL 64WG-1807A



Frequency Range.....B range—540-1600 KC
D range—9 to 15.6 MC

Intermediate Frequency...455 KC

Voice Coil Impedance....3.2 ohms at 400 cycles

Power Supply.....105-125 volts AC, 50-60 cycles, 40 watts.

Line voltage..... 117 volts AC

Volume control.....maximum

Signal input.....none

A variation of ±10% is usually permissible.

TUBE SOCKET VOLTAGES

Socket voltages are shown on the schematic diagram at the tube socket terminals. All voltages are between the socket terminal and chassis ground.

The readings were taken with a 1000 ohm per volt meter and all plate and screen voltages read on a 500 volt scale. Conditions of measurement are:

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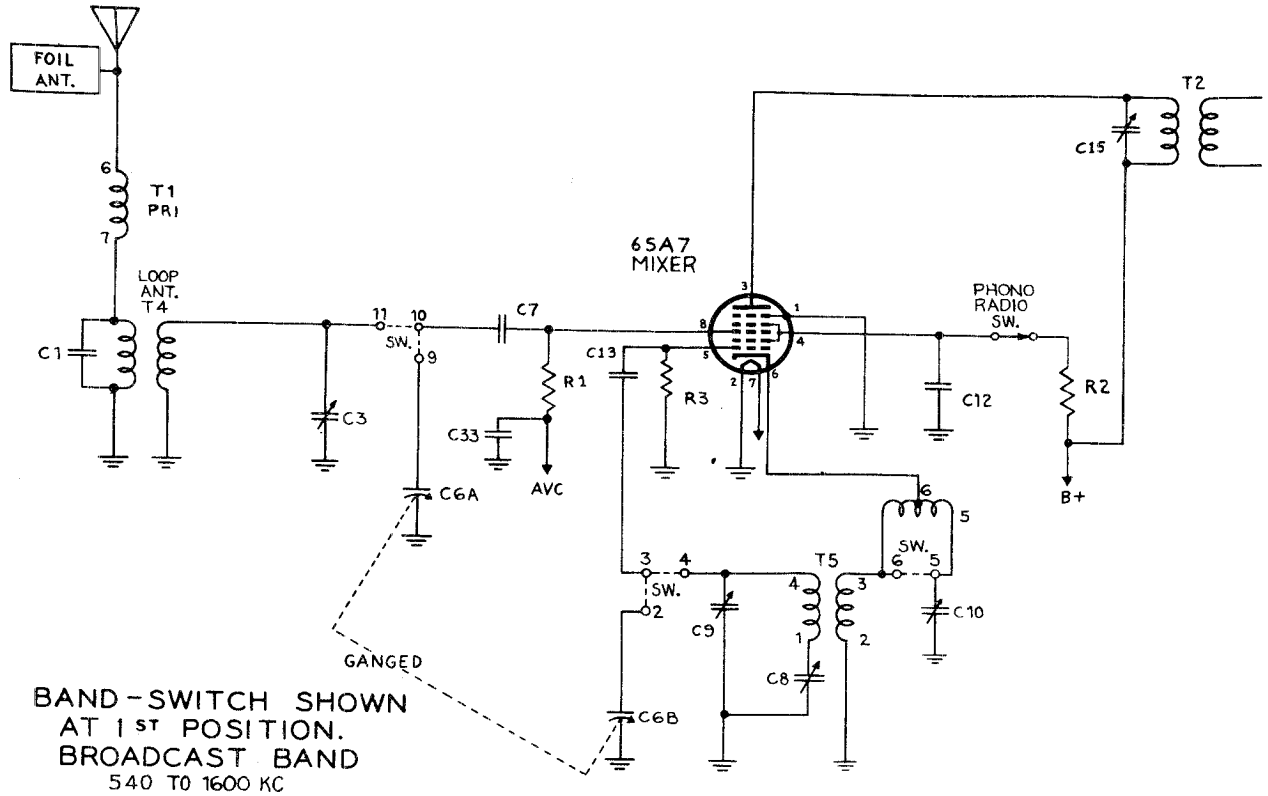
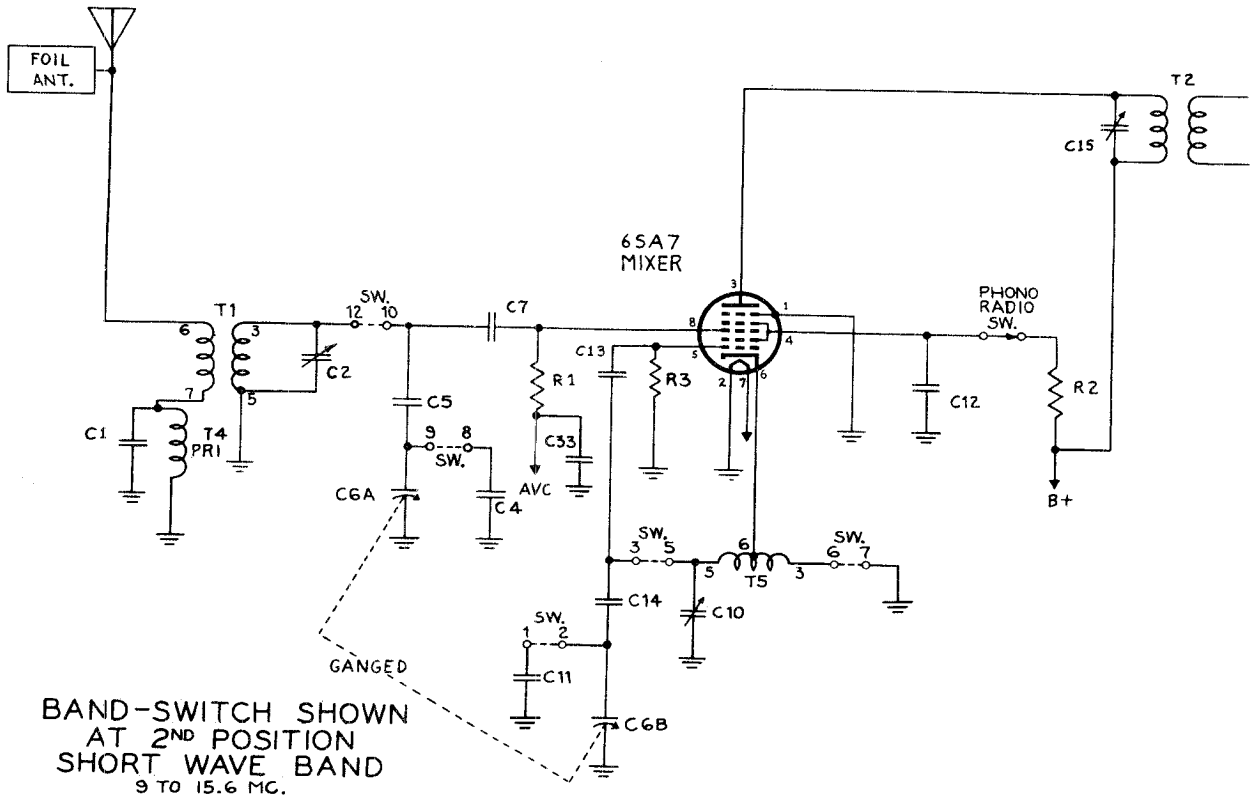
"clarified schematics"

MODEL 64WG-1807A

MONTGOMERY WARD



BAND-SWITCH SHOWN AT 1ST POSITION. BROADCAST BAND 540 TO 1600 KC



BAND-SWITCH SHOWN AT 2ND POSITION SHORT WAVE BAND 9 TO 15.6 MC.

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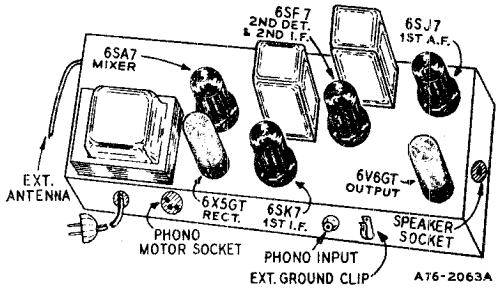
MONTGOMERY WARD

MODEL 64WG-1807A

Selectivity.....40 KC broad at 1000 times signal, 1000 KC

Sensitivity.....(for .5 watt output) with external antenna
B range—9 microvolts average
D range—20 microvolts average

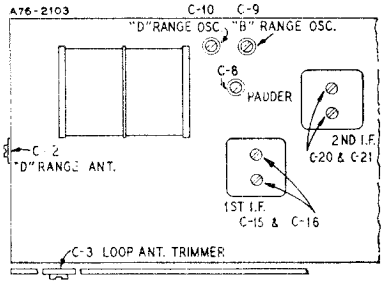
Power Output.....4 watts maximum
2.3 watts, 10% distortion

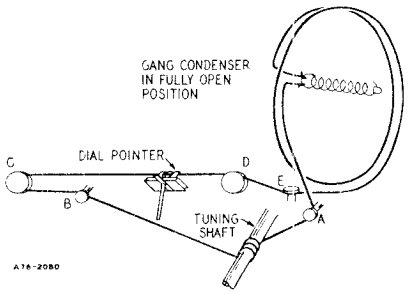


DRIVE CORD REPLACEMENT

Turn the gang condenser to the fully open position. Use a new drive cord 46" long and tie one end to the tension spring. Hook the other end of the tension spring to the tab on the drive pulley. Pass the cord through the slot in the drive pulley rim and continue one half turn counterclockwise around the drive pulley. Then pass the cord around idler stud A and wind three turns clockwise around the tuning shaft (turns must progress away from chassis). Pass cord over idler stud B, around pulleys C and D and around idler stud E. Wrap cord counterclockwise around drive pulley, stretch the tension spring and tie free end of the cord to spring. Cut off any excess string.

TRIMMER POSITIONS





DRIVE CORD DIAGRAM

ALIGNMENT PROCEDURE

Volume Control—Maximum All Adjustments.
Connect Radio Chassis to Ground Post of Signal Generator with a Short Heavy Lead.
Allow Chassis and Signal Generator to "Heat Up" for several minutes.

The following equipment is required for aligning:
An All Wave Signal Generator which will provide an accurately calibrated signal at the test frequencies as listed.
Output Indicating Meter; Non-Metallic Screwdriver.
Dummy Antennas—.1 mf., 100 mmf., and 400 ohms.

	SIGNAL GENERATOR		Dummy Antenna	Band Switch Setting	CONDENSER SETTING	ADJUST TRIMMERS TO MAXIMUM
	Frequency Setting	Connection at Radio				
I-F	455 kc	6SA7, Pin 8	.1 mf	B Range	Turn Rotor to Full Open	2nd I-F (C-20) & (C21) 1st I-F (C15) & (C16)
RANGE B	1620 kc	Antenna Lead	100 mmf	B Range	Turn Rotor to Full Open	Oscillator Range B (C9)
	1400 kc	Antenna Lead	100 mmf	B Range	Tune Rotor to Max. Output Set Indicator to 1400 KC See Note A	Antenna Range B (C3)
	600 kc	Antenna Lead	100 mmf	B Range	Tune Rotor to Max. Output	600 kc (C8) Rock Rotor—See Note B
Repeat above oscillator adjustments at 1620 and 600 KC until readjusting the oscillator Range B Trimmer (C9) causes no further improvement in output.						
RANGE D	15.6 mc	Antenna Lead	400 Ohm	D Range	Turn Rotor to Full Open	Oscillator Range D (C10)
	14 mc	Antenna Lead	400 Ohm	D Range	Tune Rotor to Max. Output	Antenna Range D (C2) Rock Rotor—See Note B
LOOP RANGE B	Reassemble chassis in cabinet. 1400 kc	Antenna Lead	100 mmf	B Range	Tune Rotor to Max. Output	Antenna Range B (C3)

After each range is completed, repeat the procedure as a final check.

NOTE A—If the pointer is not at 1400 KC on the dial, re-set pointer at the 1400 KC mark on the dial scale.

NOTE B—Turn the rotor back and forth and adjust the trimmer until the peak of greatest intensity is obtained.

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MODEL 64 WG-1807A RECEIVER STAGE SENSITIVITIES

The table below lists the sensitivity at the input of each stage. The receiver should be tuned to 1000 KC for all readings. All measurements are based on an output of .5 watts. This may be measured by disconnecting the speaker voice coil and substituting a 3.2 ohm, 5 watt resistor across the secondary winding of the output transformer. A reading of 1.26 volts across this resistor will be equivalent to a .5 watt output with the speaker connected. The volume control must be set to maximum. The signal source must be an accurately calibrated signal generator capable of supplying both 1000 KC and 455 KC signals modulated 30% with a 400 cycle audio signal. Variations of Plus or Minus 25% are usually permissible.

SIGNAL GENERATOR				INPUT FOR .5 WATT OUTPUT
Frequency	Coupling Capacitor	Connection to Receiver	Ground Connection	
1000 kc	200 mmf or RMA Dummy Antenna	External antenna lead (white)	Chassis	9 microvolts
1000 kc	.05 mf	6SA7 Mixer, Pin 8	Same as above	42 microvolts
455 kc	.05 mf	6SA7 Mixer, Pin 8	Same as above	40 microvolts
455 kc	.05 mf	6SK7 1st I-F, Pin 4	Same as above	1075 microvolts
455 kc	.05 mf	6SF7 2nd I-F, Pin 2	Same as above	3900 microvolts
400 cycles	.05 mf	6SJ7 1st A-F, Pin 4	Same as above	.08 volts
400 cycles	.05 mf	6V6GT Output, Pin 5	Same as above	3.75 volts

Ref. No.	Part No.	Description			Qty. Used in Set
CAPACITORS					
C-1	47A445	270 mmf		Moulded	1
C-2	17A164	5-50 mmf		Trimmer	1
C-3	17A123	1.0-12 mmf		Trimmer	1
C-4	47X473	47 mmf		Silvered Mica	1
C-5	47X474	360 mmf		Silvered Mica	1
C-6A, C-6B	14A178	Gang Condenser with Drive Pulley			1
C-7	B66501	.0005 mf	200 V	Tubular	1
C-8	17A155	350-430 mmf		Trimmer	1
C-9, C-10	17A109	2.5-35 mmf		Dual Trimmer Condenser	1
C-11	47X472	40 mmf		Silvered Mica	1
C-12, C-18	D66403	.04 mf	400 V	Tubular	2
C-13	47X466	68 mmf		Moulded	1
C-14	47X481	286 mmf		Silvered Mica	1
C-15, C-16	Part of T-2 (1st I-F Coil Assembly)				
C-19, C-23	47X463	47 mmf		Moulded	2
C-20, C-21	Part of T-3 (2nd I-F Coil Assembly)				
C-22	47X471	68 mmf		Moulded	1
C-24	D64403	.04 mf	400 V	Tubular	1
C-25	D66502	.005 mf	400 V	Tubular	1
C-26	D67104	.10 mf	400 V	Tubular	1
C-27	D64253	.025 mf	400 V	Tubular	1
C-28, C-31	D66402	.004 mf	400 V	Tubular	2
C-29	D66103	.01 mf	400 V	Tubular	1
C-30A	45X346	40 mf	450 V	3 Section Electrolytic	1
C-30B		40 mf	450 V		
C-30C		20 mf	25 V		
C-32	47X505	470 mmf		Moulded	1
C-33	B66503	.05 mf	200 V	Tubular	1
C-34	47X476	100 mmf		Moulded	1
RESISTORS		Ohms	Watts		
R-1, R-7	B85225	2.2 meg.	0.5	Carbon	2
R-2, R-4	C84393	39 K	1.0	Carbon	2
R-3	B84393	39 K	0.5	Carbon	1
R-5	B84222	2200	0.5	Carbon	1
R-6	B85105	1 meg.	0.5	Carbon	1
R-8	B85473	47 K	0.5	Carbon	1
R-9	B84153	15 K	0.5	Carbon	1
R-10	36X354	500 K		Volume Control and Line Switch	1
R-11	B85106	10 meg.	0.5	Carbon	1
R-12, R-16	B85474	470 K	0.5	Carbon	2
R-13	B84333	33 K	0.5	Carbon	1
R-14	B84823	82 K	0.5	Carbon	1
R-15	*40X275	3.0 meg.		Tone Control and Radio Phono Switch	1
R-17	C84271	270	1.0	Carbon	1
R-18	43X213	2.0	0.5	Wire Wound	1
R-19	D84182	1800	2.0	Carbon	1

Ref. No.	Part No.	Description	Qty. Used in Set
TRANSFORMERS AND COILS			
T-1	9A1812	"D" Range Antenna Coil Assembly	1
T-2	9A1814	1st I-F Coil Assembly	1
T-3	9A1815	2nd I-F Coil Assembly	1
T-4	9A1791	"B" Range Loop Antenna	1
T-5	9A1813	"B" Range and "D" Range Oscillator Coil Assembly	1
T-6	53X282	117 Volt, 60 Cycle, Standard Power Transformer	1
T-6	53X283	117 Volt, 25 Cycle, Standard Power Transformer	1
T-6	53X284	117-234 Volt, 40-60 Cycle, Universal Power Transformer	1
T-7		Output Transformer (See Miscellaneous)	
DIAL AND DRIVE ASSEMBLY			
	26A383	Dial Bracket Assembly Complete with Idler Pulleys	1
	6X21	Rubber Grommet	4
	20X329	Cond. Cushion Stud, Mtg. Gang Cond.	3
	58X596	Dial Background	1
	58X597	Dial Glass	1
	30X504	Dial Clamp	2
		No. 4 x 3/16" Slotted Hex Hd. P-K Type "Z" Screw (Mtg. 58X596—58X597—30X504)	4
	26X470	Drive Shaft	1
	19X192	"C" Washer (For Drive Shaft)	2
	15X222	Pointer	1
	28X113	Drive Cord Tension Spring	1
		46" Drive Cord (18 lb. Test)	1
	7A195	Pilot Light Socket Assembly	1
		No. 47 Pilot Light Bulb	2
	17X89	Crystal (For Light Shield)	1
MISCELLANEOUS			
	†12A435	6" P.M. Speaker Complete with Output Transformer	1
		Cone and Voice Coil Assembly (Specify part number and letters stamped on speaker)	1
		Output Transformer (Specify part number and letters stamped on speaker)	1
	3A303	Tube Socket—Octal (8 prong) Moulded	7
	3A304	Phono Motor Socket	1
	3A305	Phono Socket—Single Pin Tip	1
	2A345	Band Change Switch	1
	13X328	Line Cord and Plug Assembly	1
	28X292	Snap Button (Mtg. Loop to Cabinet)	4
	10A578	Knob (Tuning)	1
	10A579	Knob (Off-On, Volume)	1
	10A580	Knob (SW-BC)	1
	10A581	Knob (Tone-R.P.)	1
	9A1832	Counterpoise Antenna	1

SUBSTITUTE PARTS

The following parts are used in some receivers only. Check part number on old part before ordering and order part originally used in receiver.

*40X280 Tone Control (Substitute for 40X275)
*25X1539 Radio-Phono Switch Lever (When 40X280 is used)
*2A161 D.P.D.T. Switch (When 40X280 is used)
†12A461 6" P.M. Speaker Complete with Output Transformer

MODEL 64 WG-2009A RECEIVER STAGE SENSITIVITIES

The table below lists the sensitivity at the input of each stage. The receiver should be tuned to 1000 KC for all readings. All measurements are based on an output of 50 milliwatts. This may be measured by disconnecting the speaker voice coil and substituting a 3.2 ohm 5 watt resistor across the secondary winding of the output transformer. A reading of .4 volts AC across this resistor will be equivalent to a 50 milliwatt output with the speaker connected. The volume control must be set to maximum.

The signal source must be an accurately calibrated signal generator capable of supplying both 1000 KC and 455 KC signals modulated 30% with a 400 cycle audio signal. Variations of Plus or Minus 25% are usually permissible.

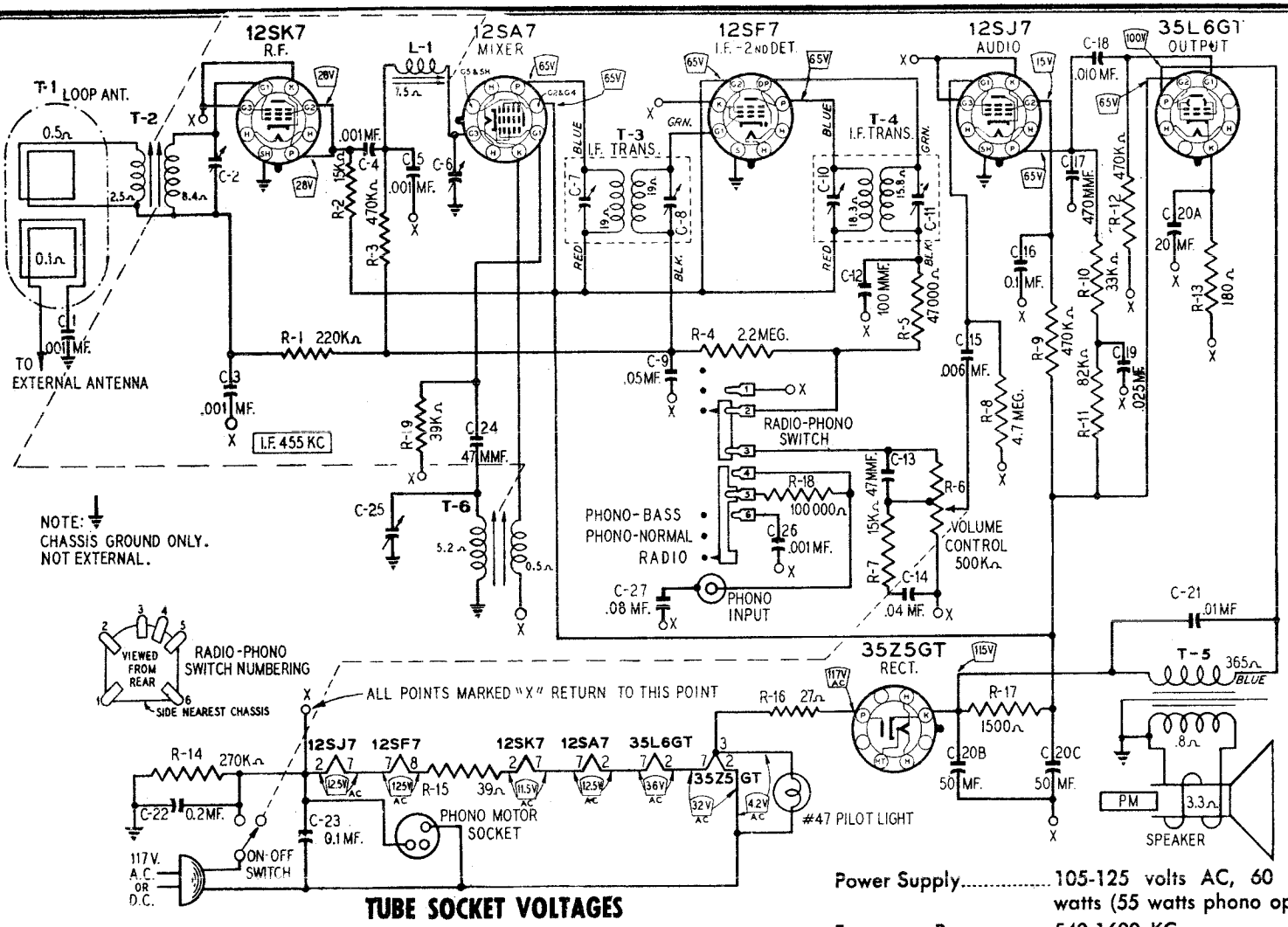
SIGNAL GENERATOR				INPUT FOR 50 MILLIWATT OUTPUT
Frequency	Coupling Capacitor	Connection to Receiver	Ground Connection	
1000 kc	200 mmf or RMA Dummy Antenna	Loop Antenna—External antenna clip	Chassis	15 microvolts
1000 kc	.05 mf.	12SA7 Mixer—Pin 8	Point "X" (12SK7 Pin 3)	100 microvolts
455 kc	.05 mf.	12SA7 Mixer—Pin 8	Same as above	80 microvolts
455 kc	.05 mf.	12SF7 I-F—Pin 2	Same as above	3500 microvolts
400 cycles	.05 mf.	12SJ7 1st A-F—Pin 4	Same as above	.042 volts
400 cycles	.05 mf.	35L6GT Output—Pin 5	Same as above	1 volt

REPLACEMENT PARTS LIST

Use only genuine factory tested parts to insure service jobs you can depend on and to obtain original set performance

Ref. No.	Part No.	Description			Qty. Used in Set
CAPACITORS					
C-1	D66102	.001 mf	400 V	Tubular	1
C-2	17A238	4-70 mmf		Trimmer	1
C-3, C-4, C-5	B66102	.001 mf	200 V	Tubular	3
C-6, C-7, C-8	17A243	4-70 mmf		Trimmer	1
		Part of T-3, 1st I-F Transformer			
C-9, C-10, C-11	B66503	.05 mf	200 V	Tubular	1
		Part of T-4, 2nd I-F Transformer			
C-12	47X476	100 mmf		Molded	1
C-13	47X463	47 mmf		Molded	1
C-14	B64403	.04 mf	200 V	Tubular	1
C-15	B66602	.006 mf	200 V	Tubular	1
C-16	B66104	0.1 mf	200 V	Tubular	1
C-17	47X467	470 mmf		Molded	1
C-18, C-21	B66103	.01 mf	200 V	Tubular	2
C-19	B64253	.025 mf	200 V	Tubular	1
C20A		20 mf	25 V	Dry electrolytic capacitor	1
C-20B, C-20C	45X345	50 mf	150 V		
		50 mf	150 V		
C-22	B67204	0.2 mf	200 V	Tubular	1
C-23	D66104	0.1 mf	400 V	Tubular	1
C-24	47X446	47 mmf		Molded	1
C-25	17A239	40-370 mmf		Trimmer	1
C-26	B64102	.001 mf	200 V	Tubular	1
C-27	B64803	.08 mf	200 V	Tubular	1
RESISTORS		Ohms	Watts		
R-1	B85224	220,000	0.5	Carbon	1
R-2, R-7	B84153	15,000	0.5	Carbon	2
R-3, R-12	B85474	470,000	0.5	Carbon	2
R-4	B85225	2.2 meg.	0.5	Carbon	1
R-5	B85473	47,000	0.5	Carbon	1
R-6	36X347	500,000	Volume control and switch		1
R-8	B85475	4.7 meg	0.5	Carbon	1
R-9	B84474	470,000	0.5	Carbon	1
R-10	B84333	33,000	0.5	Carbon	1
R-11	B84823	82,000	0.5	Carbon	1
R-13	B83181	180	0.5	Carbon	1
R-14	B84274	270,000	0.5	Carbon	1
R-15	D84390	39	2.0	Carbon	1
R-16	B84270	27	0.5	Carbon	1
R-17	C84152	1500	1.0	Carbon	1
R-18	B85104	100,000	0.5	Carbon	1
R-19	B84393	39,000	0.5	Carbon	1

Ref. No.	Part No.	Description	Qty. Used in Set
TRANSFORMERS AND COILS			
T-1		Part of tuning assembly	
T-1	9A1817	"B" Range loop antenna	1
T-2		Part of tuning assembly	
T-3	9A1775	1st I-F Transformer and can assembly	1
T-4	9A1776	2nd I-F Transformer and can assembly	1
T-5	51X116	Output transformer	1
T-6		Part of tuning assembly	
DIAL AND DRIVE ASSEMBLY			
	20A97	Tuning assembly, complete with coils, trimmers, etc.	1
	11X119	Fibre shield (tuner housing)	1
	28X518	Trimount stud (mtg. fibre shield)	5
	26X464	Drive shaft	1
	28X512	Ground spring (drive shaft)	1
	19X192	"C" washer	2
	25X1384	Pointer bracket	1
	24X446	Idler pulley	2
	41X78	Dial light diffuser	1
	25X1385	Holder, light diffuser	1
	15X217	Pointer	1
	25X1398	Pilot light bracket	1
		40" drive cord (18 lb. test)	1
	28X95	Drive cord tension spring	1
	7A196	Pilot light socket assembly	1
		Pilot light No. 47	1
	58X651	Dial	1
	30X518	Dial clamp, upper	1
	30X519	Dial clamp, lower	1
MISCELLANEOUS			
	†2A437	4" x 6" speaker with mounting bracket	1
		Cone and voice coil assembly for speaker (specify part number and letters stamped on speaker)	1
	3A303	Tube socket—octal (8 prong) molded	5
	3A421	Tube socket—octal (8 prong) with shield	1
	3A305	Phono socket—single pin tip	1
	3A422	Phono motor socket	1
	2A357	Radio-phono switch	1
	10A297	Knob, volume control and line switch, tuning	2
	10A582	Knob, radio-phono	1
	13X328	Line cord and plug assembly	1
TYPE G-28A175 RECORD CHANGER PARTS			
	G-56-72092	Motor, 60 cycle 117V	
	G-56-72096	Motor, 60 cycle 117V	
	Astatic L-75	Crystal cartridge	
	G-25-72438	50 cycle adaptor bushing	
	G-33-72435	50 cycle adaptor spring bushing	
	G-33-72436	50 cycle adaptor spring bushing	



TUBE SOCKET VOLTAGES

Socket voltages are shown on the schematic diagram at the tube socket terminals. All voltages except those for the heater and dial lamp are between the socket terminal and "X" point.

The readings were taken with a 1000 ohm-per-volt meter and all plate and screen voltages read on a 500 volt scale.

Conditions of measurement are:

Line voltage	117 volts AC
Volume control	maximum
Signal input	none

Power Supply	105-125 volts AC, 60 cycles, 35 watts (55 watts phono operating)
Frequency Range	540-1600 KC
Intermediate Frequency	455 KC
Selectivity	At 1000 KC, 50 KC wide at 1000 times signal
Sensitivity	(for .05 watt output with external antenna) 15 microvolts average
Power Output	1.3 watts maximum .75 watt 10% distortion
Loud Speaker	4"x6" PM dynamic
Voice Coil Impedance	3.2 ohms at 400 cycles

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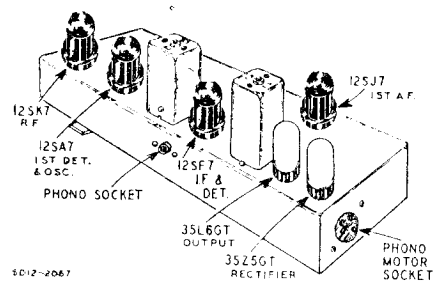
MODEL 64WG-2009A

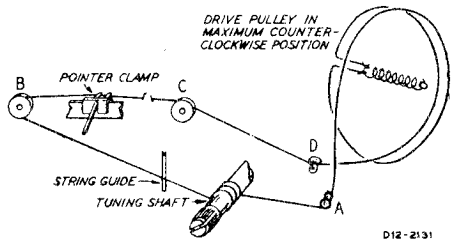
MONTGOMERY WARD



DRIVE CORD REPLACEMENT

The illustration below shows the method of stringing the drive cord. Use a new drive cord 40" long and tie one end to the tension spring. Hook the other end of the tension spring over the tab on the drive pulley. Pass the cord through the slot in the pulley rim and continue counter-clockwise around the pulley as shown. Three turns must be wound around the tuning shaft in a clockwise direction with the turns progressing away from the chassis. (On sets with a black vinylite sleeve on the tuning shaft, wind only two turns around the shaft).

Attach the dial pointer to the cord and position, as instructed in paragraph DIAL CALIBRATION.

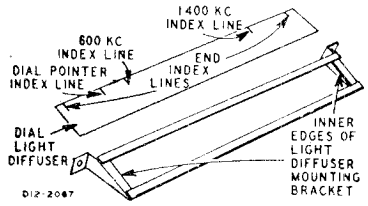


DIAL CALIBRATION

In order to align the receiver, the dial pointer must be positioned on the dial string correctly with reference to the dial. Index lines are provided on the dial light diffuser for this purpose.

Before aligning the receiver (or when replacing the dial light diffuser) check the position of the diffuser strip, making certain that the two end index lines are aligned with the inner edges of the diffuser mounting bracket opening. The bracket should be crimped to prevent movement of the diffuser strip. To position the dial pointer, adjust the radio to the "stop" position at the low frequency end of the dial. The dial pointer should be directly over the dial pointer index line. (See illustration.) If not, move the pointer along the drive cord until it is directly over the index line.

The 1400 KC index line is for use when aligning the receiver.



TUNING ASSEMBLY SERVICE

Exacting requirements in the tuning assembly make it impractical to replace the drive cord, coils and components in this assembly other than the trimmer condensers. Should the drive cord break, or components other than the trimmer condensers require service, the entire assembly must be ordered and replaced as a unit.

50 CYCLE OPERATION

If it is desired to use the radio and record player on a 50 cycle power supply, it will be necessary to install a new bushing on the motor shaft and to wire a 70 ohm, 20 watt resistor in series with the motor and the AC supply.

To install the new bushing, align the upper part of the center spindle with the lower part of the spindle and turn the record shelf to the 12" position. Lift the turntable off the record changer. On record players having a turned metal bushing fastened on with a set screw, loosen the set screw holding the old bushing to the motor shaft, remove the old pulley and install the new bushing No. G-25-72438.

On record players having a spring bushing on the motor shaft, remove the old spring bushing and install a new spring bushing No. G-33-72435.

On record players having no bushing on the motor shaft, install a spring bushing No. G-33-72436.

When replacing the turntable on the record player, make certain that the turntable rim is placed over both of the rubber drive puileys.

ALIGNMENT PROCEDURE

Check dial pointer position, see Dial Calibration paragraph.

Volume Control—Maximum All Adjustments.

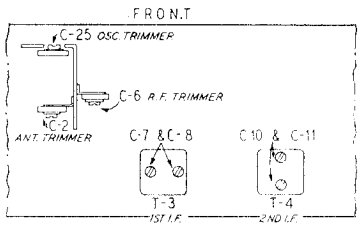
Allow Chassis and Signal Generator to "Heat Up" for several Minutes.

The equipment in column at right is required for aligning:

Signal Generator which will provide an accurately calibrated signal at the test frequencies as listed.

Output Indicating Meter; Non-Metallic Screwdriver.

Dummy Antennas—.1 mf., 50 mmf.



NOTE A:—Index line is on dial light diffuser strip. See DIAL CALIBRATION paragraph.

SIGNAL GENERATOR			Coupling Capacitor	DIAL SETTING	ADJUST TRIMMERS TO MAXIMUM OUTPUT IN ORDER SHOWN (See Trimmer Illustration)
Frequency Setting	Connection to Receiver	Ground Connection			
455 kc	Control Grid 12SF7—I-F (Prong No. 2)	Point "X" 12SK7—R-F (Prong No. 3)	.1 mf	1600 KC	2nd I-F (C10) & (C11)
455 kc	Control Grid 12SA7—1st Det. (Prong No. 8)	Same as above	.1 mf	1600 KC	1st I-F (C7) & (C8)
1400 kc	Control Grid 12SA7—1st Det. (Prong No. 8)	Same as above	.1 mf	1400 kc Index Line. See Note A	Oscillator (C25)
1400 kc	External Antenna Clip on Loop	Chassis	50 mmf	1400 kc Index Line. See Note A	R-F (C-6) Antenna (C2)

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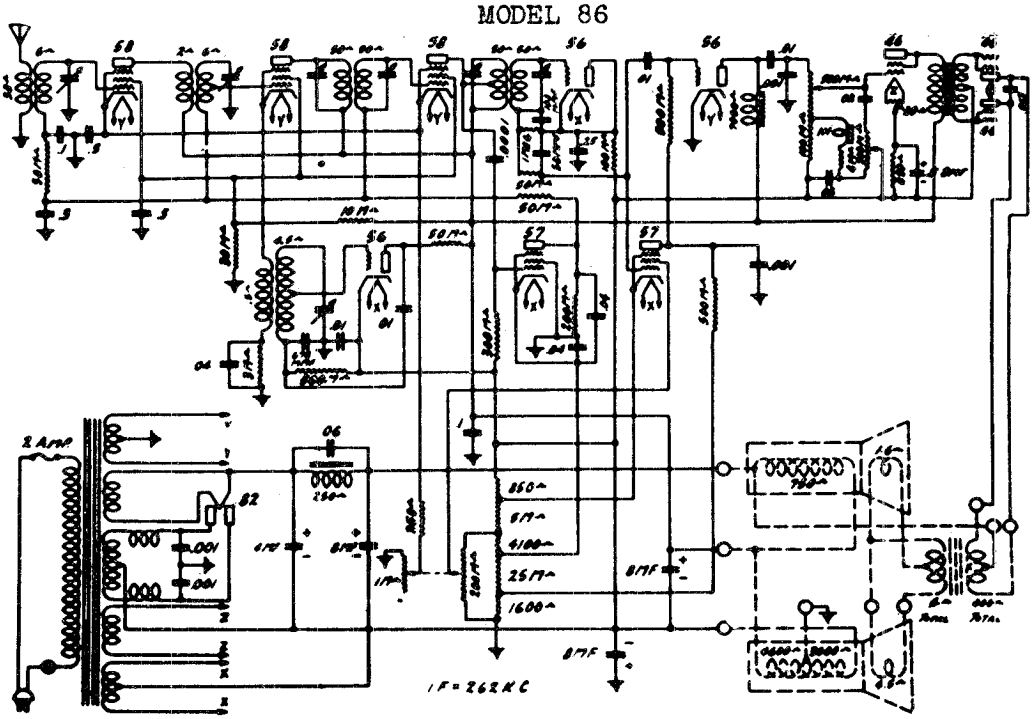
MONTGOMERY WARD

MODELS 86,3035,3037, 3065,3067

MODEL 86



MODELS 3035, 3037, 3065, 3067

R.F. Coils

Four coils are used in the chassis, and although they appear to be the same, there are three types and they cannot be interchanged.

To remove any one of the coils, remove the condenser shield, unsolder the wire leading from the condenser stator to the coil lug, remove the bottom plate of the chassis and bend out the three clips which hold the coil shield. Unsolder the leads to the coil and bend the clips holding the coil so that it may be removed. Handle any radio frequency coils carefully so the inside primary coil is not bent out of position. If this happens the receiver will oscillate. You will notice a white wire wound one-quarter turn around the grid end of the secondary having one end soldered to the plate side of the primary. This wire acts as an R.F. coupling condenser and is shown in the schematic diagram Fig. 1 as a condenser. Unless the chassis is damaged it is very rarely that an R.F. coil has to be replaced.

Part No.	Part Name	Selling Price	Your Cost
115	Pilot light bulb	$ 0.25	$ 0.07
1728	Knobs	.25	.07
1727	Knobs	.25	.07
1284	Bottom plate	1.00	.24
1838	Filter shield assembly	.35	.08
1839	R.F. shield assembly	.90	.22
2027	Insulator	.05	.01
701	Tube socket—280	.25	.06
703	Tube socket—227	.25	.06
685	Tube socket—245	.25	.06
963	Tube socket—224	.25	.06
1786	Speaker socket	.30	.07
964A	Bypass condensers	1.68	.43
1752	Shunt resistor	1.35	.34
1757	Bypass condenser	2.00	.50
1753	2500-ohm resistor, Candohm	.25	.07
1754	250-ohm resistor, Candohm	.15	.04
1836	Pilot light bracket	.20	.05
1314	Dial drum assembly, less chart	.35	.08
1818	Dial chart	.20	.05
982A	Tube shield—227	.20	.04
951A	Tube shield—224	.20	.04
1571	Tone control rheostat	1.75	.42
883	Ant-Grd. binding post	.50	.13
1810	Condenser assembly	13.00	3.25
1313	Drive drum assembly	.35	.08
1749	Drive shaft assembly	.25	.06
1372	Push pull transf. assembly	3.30	.82
1306	Filter choke assembly	2.30	.57
1312	Insulated terminal assembly	.10	.01
1809	Filter condenser assembly	10.00	2.37
1749	Electrolytic condenser	2.75	.68
1748	Power transformer	12.00	2.94
1812	R.F. transformer assembly, 2nd and 3rd	1.25	.29
1813	Ant. transformer assembly, 1st	1.25	.27
1886	R.F. transformer assembly, 4th	1.25	.29
1815	Volume control and switch assembly	1.75	.43
1755	Volume control	1.25	.28
1725	Toggle switch	.60	.15
1371	R.F. plate choke assembly	.30	.07

Part No.	Part Name	Selling Price	Your Cost
1358	.04 mfd. condenser	.40	.10
861	Attachment cord	.60	.15
1816	Chassis harness	1.00	.27
1817	R.F. harness	.20	.05
675	.1 condenser	.75	.14
1612	.006 condenser	.40	.09
123	.001 mfd. condenser	.35	.08
1758	15,000-ohm resistor, green and white	.50	.09
1348	100,000-ohm resistor, red and white	.50	.09
1349	500,000-ohm resistor, blue and white	.50	.09
929	50,000-ohm resistor, white	.50	.09
1751	200,000-ohm resistor, red and green	.50	.09
1814	R.F. shield can, 2nd-3rd	.20	.05
725	R.F. shield can, 1st-4th	.20	.05
1882	Grid cap assembly	.05	.01
562	Volume control washer	.05	.01
563	Volume control insulating disc	.05	.01
564	Toggle switch hex nut	.05	.01
565	Volume control hex nut	.05	.01
566	Volume control insulating bushing	.05	.01
567	Toggle switch washer	.05	.01
568	Toggle switch knurl nut	.05	.01
726	Sheet metal screw	.05	.01
1742	Dynamic speaker	25.00	6.34
1709	Escutcheon—Airline	.40	.10
1873	Escutcheon—Tone Control	.20	.05

NOTE—The part numbers in the list above should be used when ordering 25-cycle parts with the exception of the power transformer and choke condenser. Part 1-1772 and 1-1375 shown below should be substituted.

25-Cycle

Part No.	Part Name	Selling Price	Your Cost
1-1772	Power transformer, 110-volt, 25-cycle	$15.00	$ 3.94
1-1375	.45 condenser	.80	.20

Prices subject to change without notice.

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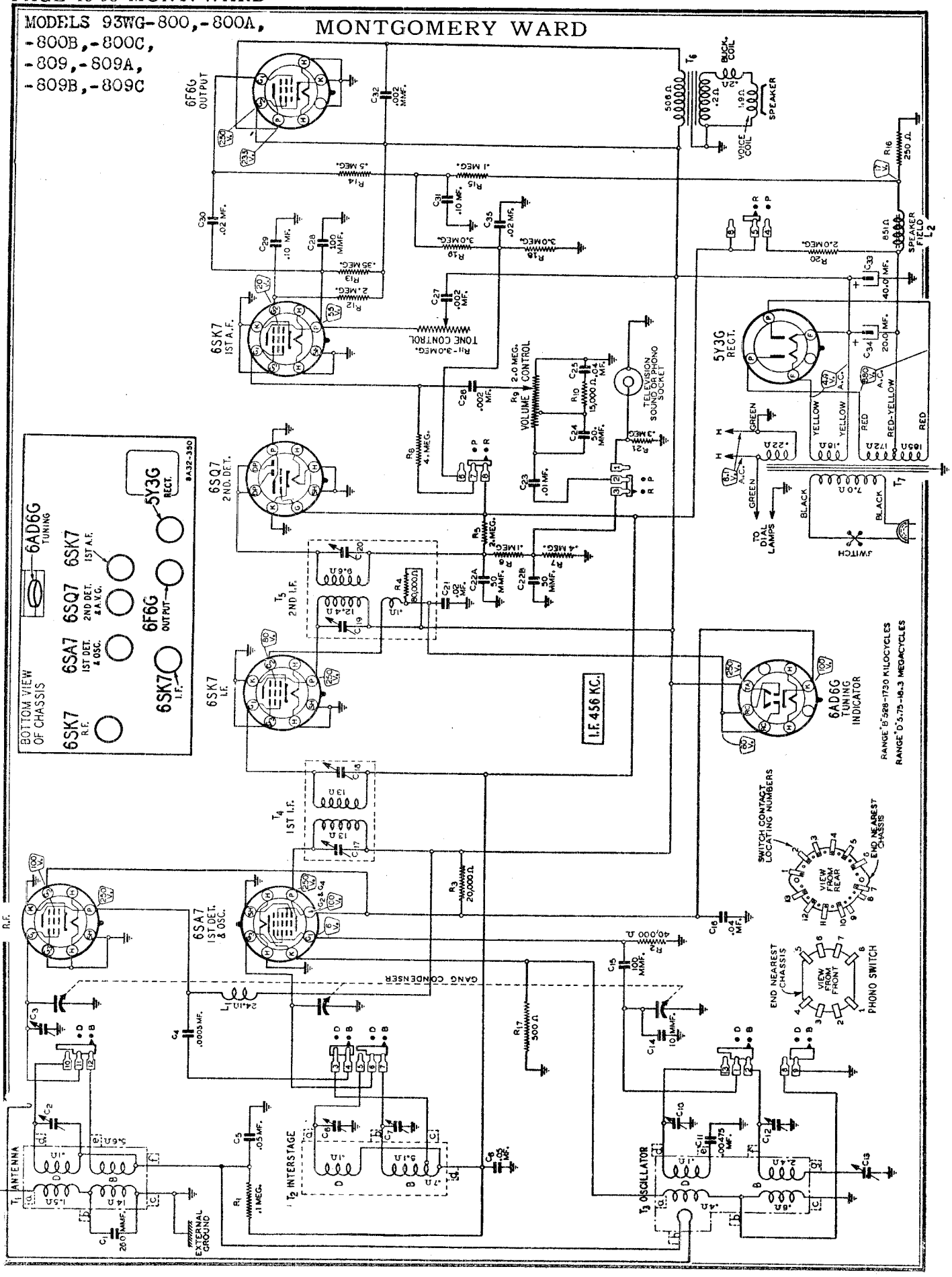
MODELS 93WG-800,-800A,
-800B,-800C,
-809,-809A,
-809B,-809C

MONTGOMERY WARD



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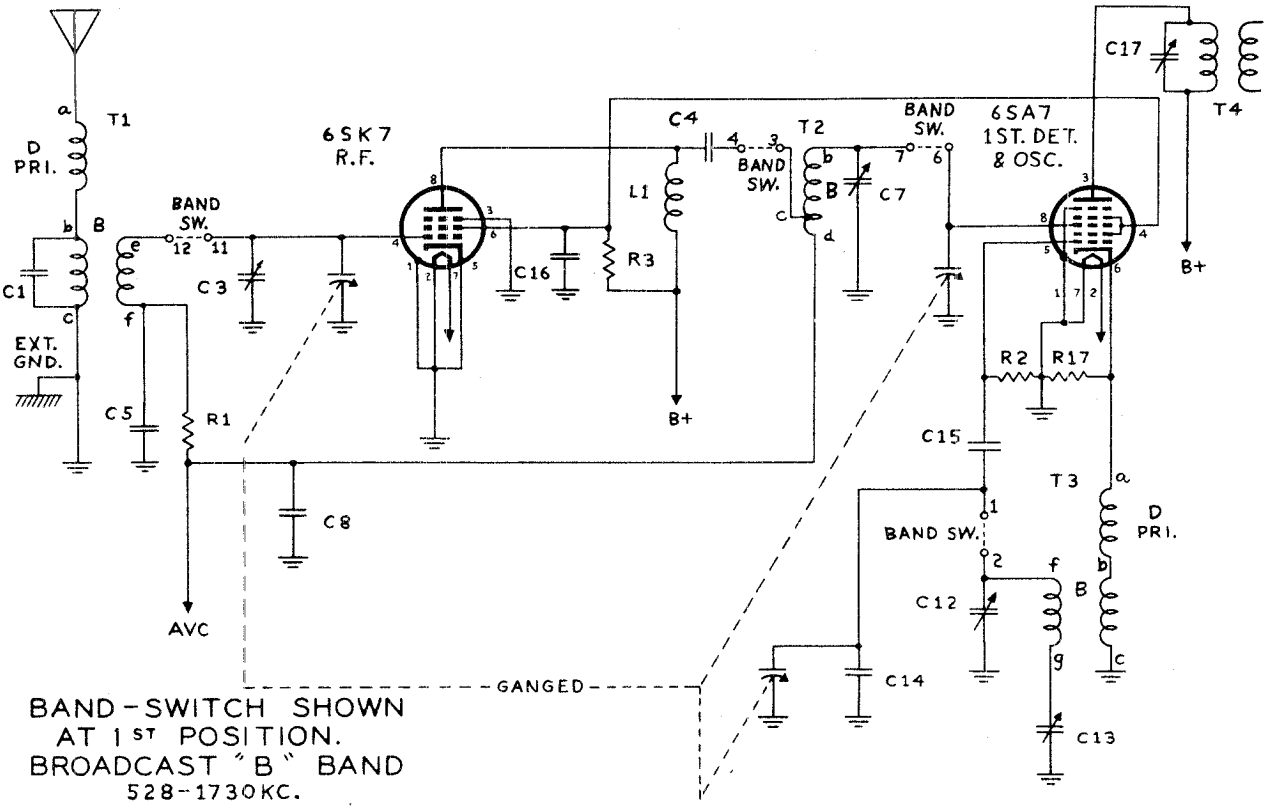
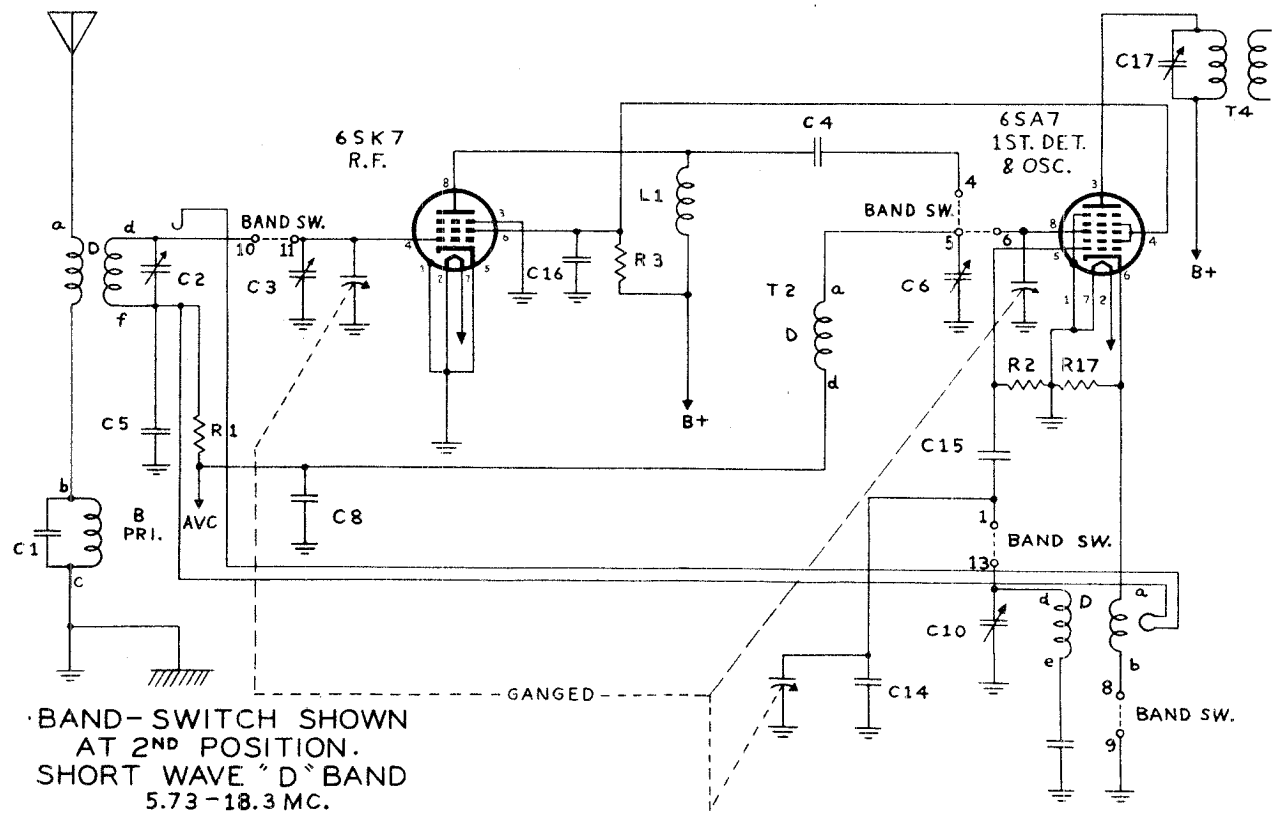
MONTGOMERY WARD

MODELS 93WG-800,-800A,
-800B,-800C,-809,
-809A,-809B,-809C



BAND-SWITCH SHOWN
AT 1ST POSITION.
BROADCAST "B" BAND
528-1730KC.



BAND-SWITCH SHOWN
AT 2ND POSITION.
SHORT WAVE "D" BAND
5.73-18.3 MC.

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ALIGNMENT PROCEDURE

Volume Control—Maximum All Adjustments.

Connect Radio Chassis to Ground Post of Signal Generator with a Short Heavy Lead.

Allow Chassis and Signal Generator to "Heat Up" for several minutes.

The following equipment is required for aligning:

An All Wave Signal Generator which will provide an accurately calibrated signal at the test frequencies as listed.

Output Indicating Meter—Non-Metallic Screwdriver.

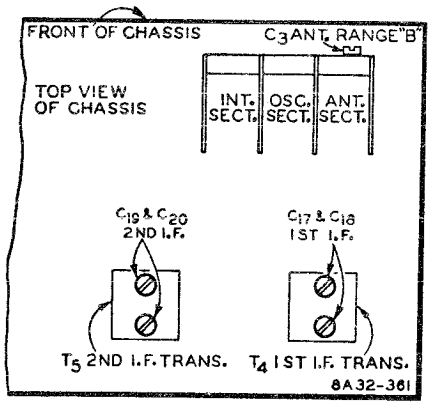
Dummy Antennas—.1 mf., 200 mmf., and 400 ohms.

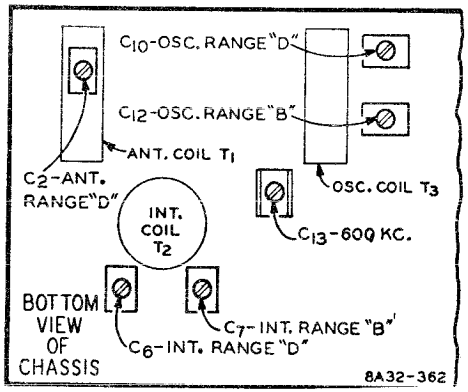
SIGNAL GENERATOR FREQUENCY SETTING	SIGNAL GENERATOR CONNECTION AT RADIO	DUMMY ANTENNA	BAND SWITCH SETTING	CONDENSER SETTING	ADJUST TRIMMERS TO MAXIMUM
I. F.					
456 KC	Grid of 1st Det.	.1 mf.	B Range	Turn Rotor to Full Open	1st I.F. (C17) & (C18) 2nd I.F. (C19) & (C20)
RANGE B					
1730 KC	Antenna Lead	200 mmf.	B Range	Turn Rotor to Full Open	Oscillator Range B (C12)
1500 KC	Antenna Lead	200 mmf.	B Range	Turn Rotor to Max. Output Set indicator to 1500 KC— See Note A	Ant. Range B (C3) Int. Range B (C7)
600 KC	Antenna Lead	200 mmf.	B Range	Turn Rotor to Max. Output	600 KC (C13) Rock Rotor—See Note B
RANGE D					
18,300 KC	Antenna Lead	400 Ohm	D Range	Turn Rotor to Full Open	Oscillator Range D (C10)
18,300 KC	Antenna Lead	400 Ohm	D Range	Keep Rotor at Full Open Position	Ant. Range D (C2) Int. Range D (C6) Rock Rotor—See Note B

Attenuate the signal from the signal generator to prevent the leveling-off action of the AVC.

After each range is completed, repeat the procedure as a final check.

NOTE A—If the indicator is not at 1500 KC, it will be necessary to re-calibrate. Loosen the set screw on the dial hub near the volume control drum. Hold the tuning control drum stationary and at the same time turn the dial drum the necessary amount in the required direction. Retighten the set screw.





Tubes

The type and position of each tube are shown in the illustration.

To replace the tuning eye tube, BE SURE THE RADIO IS TURNED OFF. Pull out the escutcheon cap which partially covers this tube. First loosen the tuning eye tube in its socket by moving it up and down and from one side to the other. At the back of the cabinet will be seen a "U" shaped tube puller attached to a cord. Place the open ends of the tube puller over the tuning eye tube and push the puller in as far as it will go. Compress the puller until the hooked end grips under the base of the tube and then pull the tube out.

Power Supply

CAUTION — Unless otherwise marked, this radio must be operated on a 117 volt, 60-cycle AC supply only. Do not insert the plug of the power cord in the receptacle unless all tubes and the speaker plug are in their proper sockets. The power rating of this radio is shown on the tube arrangement label. Receivers of this model which are to be used on 25 cycle, 230 volt, or other service are so marked on this label. If there is any doubt regarding the voltage and frequency of the power supply, consult the local power company before inserting the plug.

MONTGOMERY WARD

MODELS 93WG-800,-800A, -800B,-800C,-809, -809A.-809B, -809C

Procedure for Setting the Station Buttons

Selecting the Stations to be Set

There are 6 buttons on the automatic tuning dial by means of which 6 stations may be set for quick tuning.

Make a list of your favorite stations, those which you tune in regularly. There may be any number up to and including 6 in this list.

It is better to list the station with the lowest kilocycle number first, the station with the next higher kilocycle number next, and so on.

Any button may be used for any station you can receive, although it will be more convenient to set the stations so that the kilocycle numbers increase from left to right.

Setting a Station Button

Turn the manual tuning control so that the dial moves toward 1700 KC until the stop is reached.

At the right side of the escutcheon (from the front) will be seen a cap which covers a hole in the escutcheon —See illustration. Pull off this cap.

At the end of the tube in back of the hole in the escutcheon is the locking screw. Using a small handle screwdriver, unlock the mechanism by turning this screw in a counter-clockwise direction several turns.

TO SET STATIONS ACCURATELY, DO NOT JAR THE RADIO OR BUTTONS WHILE THE MECHANISM IS UNLOCKED.

Select the first station from the list you have prepared, and carefully tune in this station by means of the manual tuning control using the tuning eye as a guide.

With one hand, hold the manual tuning control to prevent it from turning and with the other hand, push one of the station buttons shown in the illustration *all the way in.* It is better to start with button No. 1.

Hold *this* button all the way *in.* With the other hand, see whether or not this station is still accurately tuned in by moving the tuning control a slight amount back and forth while observing the tuning eye. *Be sure to hold the button all the way in.*

Release the button slowly after the station is tuned in.

CAUTION—Do not touch this button again while the mechanism is unlocked as the setting may be altered.

Carefully tune in the second station on your list. Then hold the tuning control and push the second button slowly and firmly all the way in. Check for accurate tuning.

Proceed in the same manner to set any additional stations on your list on the remaining station buttons.

After all the stations are set, it will be necessary to lock the mechanism so that the settings will not change. Turn the manual tuning control so that the dial moves toward 1700 KC until the stop is reached. Then, with a SMALL HANDLE screwdriver, turn the locking screw in a clockwise direction until it is tight. Tighten the locking screw firmly but not excessively to avoid stripping the threads. Replace the cap over the hole.

Remove the correct station call letter tabs from the sheets supplied by bending the sheet back and forth at the score mark until the tab can be broken off. Press the tab all the way to the bottom of the space provided in the button. Cover the call letter tab with a celluloid tab, pressing this in until it snaps into place.

If at any time you wish to change the setting of a button from one station to another, repeat the above procedure. Changing the setting of one button will not affect the setting of any of the other buttons.

SPECIFICATIONS

Power Consumption 71 Watts (At 117 volts 60 cycles)

Power Output - - - - - - - 3.0 Watts Undistorted, 4.5 Watts Maximum

Selectivity - - 35 KC Broad at 1000 times Signal

Intermediate Frequency - - - - - - - 456 KC

Speaker - - - - - - - - - 8" Electro dynamic

Tuning Frequency Range

B Range..... 528 to 1730 KC
D Range.....5750 to 18300 KC

Sensitivity (For 0.5 watt output)

B Range.....2.0 Microvolts Average
D Range.....4.0 Microvolts Average

Voltages at Sockets

The voltages at sockets are shown on the schematic circuit diagram. Unless otherwise specified, the voltage indicated is between the socket terminal and ground.

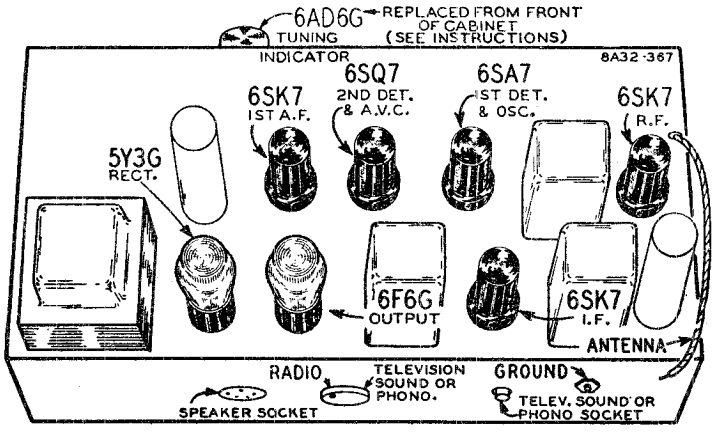
These voltages are read under the following conditions:

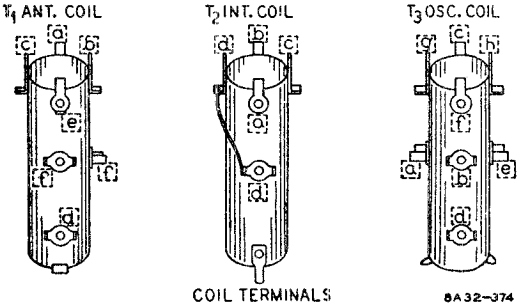
Line Voltage—117.

Volume Control—Maximum.

Antenna Shorted to Ground.

Readings taken with 1000 ohm-per-volt meter. Plate and screen voltages are read on 500 volt scale.





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MODELS 93WG-800,-800A,
-800B,-800C,-809,-809A; MONTGOMERY WARD
-809B,-809C

Replacement Parts List

MISCELLANEOUS

SOCKETS

Bin No.	Part No.	Description	Selling Price
	3A293	Tube Socket—Octal (8 prong)	$0.08
	3A294	Speaker Socket (5 prong)	.06
	3A299	Single Pin Tip Socket (Phono Connection)	.06
	3A280	Tube Socket for Tuning Eye—Octal (8 prong—Wafer Type)	.06

SPEAKER

When ordering parts for speakers, specify part number of speaker and letters preceding part number stamped on the speaker.

	12A334	8" Electro Dynamic Speaker	3.60
		Cone and Voice Coil Assembly for above Speaker	1.48
		Field Coil for above Speaker (L2)	1.50
		Output Transformer only (T6)	1.00

KNOBS AND BUTTONS

10143	10A249	Band Switch Knob	.06
10142	10A241	Tone Control Knob	.06
	10A233	Station Buttons Ea.	.04
	10A220	Phono-Radio Knob	.06

GENERAL

	13X80	Line Cord and Plug	.20
	4A92	Terminal Strip (3 insulated Lugs—1 Mounting Foot)	.04
	4A123	Terminal Strip (5 Lugs—4 Lugs insulated)	.04
	4A84	Terminal Strip (2 insulated Lugs—1 Mounting Foot)	.04
	4A86	Terminal Strip (1 insulated Lug—1 Mounting Foot)	.04
	2X289	Felt Washers (Used behind Knobs) Doz.	.04
10565	8X23	Rubber Cushions (Mounted under Chassis) Ea.	.04
	8X86	Rubber Cushions (Mounted at rear of Chassis) Ea.	.04
	25X655	Mounting Brackets for Rear Rubber Cushions Ea.	.02
	2A151	Band Change Switch	.38
	2A154	Phono-Radio Switch	.24
	28X247	Tube Puller for Tuning Eye Tube	.04

TRANSFORMERS AND COILS

Bin No.	Part No.	Code	Description	Selling Price
	9A1128	T1	Antenna Transformer Assembly	$0.60
	9A1129	T2	R.F. Interstage Transformer Assembly	.72
	9A1130	T3	Oscillator Coil Assembly	.58
	9A1131	T4	1st I.F. Transformer and Can Assembly	.64
	9A1132	T5	2nd I.F. Transformer and Can Assembly	.68
		T6	Output Transformer (See "Speaker")	
	53X201	T7	117 Volt, 60 Cycle, Standard Power Transformer	1.88
	53X202	T7	117 Volt, 25 Cycle, Standard Power Transformer	3.24
	53X203	T7	117-234 Volt, 40-60 Cycle, Universal Power Transformer	2.68
	9A1115	L1	R.F. Plate Reactor	.18
		L2	Field Coil (See "Speaker")	

CONDENSERS

TUBULAR

Bin No.	Part No.	Code	Capacitance	Voltage	Selling Price
	46X282	C4	.0005 mf.	360	$0.06
11106	46X253	C5,C8	.05 mf.	180	.06
	46X289	C11	.00475 mf.	Polystyrene Type—5% Tolerance	.14
10943	46X269	C16	.04 mf.	360	.06
	46X260	C21,C30	.02 mf.	360	.06
11256	46X249	C23	.01 mf.	180	.06
11539	46X250	C25	.04 mf.	180	.06
	46X248	C26	.002 mf.	180	.06
10934	46X268	C27,C32	.002 mf.	600	.06
	46X261	C29	.10 mf.	360	.08
10927	46X254	C31	.10 mf.	180	.06
	46X267	C35	.02 mf.	180	.06

MOLDED

10928	47X69	C1	250 mmf.	.08
10876	47X57	C15,C28	100 mmf.	.06
10625	47X56	C24	50 mmf.	.06

TRIMMER

17A115	C2	2.5-35 mmf.	Antenna Range D	.08
	C3	Part of Gang	Condenser	
17A113	C6	1.4-12 mmf.	Interstage Range D	.12
	C7	1.4-12 mmf.	Interstage Range B	
17A113	C10	1.4-12 mmf.	Oscillator Range D	.12
	C12	1.4-12 mmf.	Oscillator Range B	
17A81	C13	300-600 mmf.	600 KC Padder	.14
17A57	C17	50-120 mmf.	1st I.F.	.18
	C18	50-120 mmf.		
17A80	C19	50-120 mmf.	2nd I.F.	.14
	C20	85-185 mmf.		

ELECTROLYTIC

9151	44X40	C33	40 mf.	300 Wet	.46
9150	44X39	C34	20 mf.	390 Wet	.46

MISCELLANEOUS

47X138	C14	13 mmf.	Ceramic	
47X112	C22A	50 mmf.	Dual Mica	.06
	C22B	50 mmf.		
14A107		3 Section Gang Condenser		1.62

RESISTORS

CARBON

Bin No.	Part No.	Code	Resistance	Wattage	Selling Price
10968	A85104	R1,R6,R15	100,000 Ohm	0.2	$0.06
	A85403	R2	40,000 Ohm	0.2	.06
11550	D94203	R3	20,000 Ohm	2.0	.16
11549	A84803	R4	80,000 Ohm	0.2	.08
11086	A85105	R5	1 Megohm	0.2	.06
11057	A84404	R7	400,000 Ohm	0.2	.08
11130	A85405	R8	4 Megohm	0.2	.06
11094	A84153	R10	15,000 Ohm	0.2	.08
11086	A84205	R12	2 Megohm	0.2	.08
	A84354	R13	350,000 Ohm	0.2	.08
11085	A85504	R14	500,000 Ohm	0.2	.06
	D94251	R16	250 Ohm	2.0	.16
	A85501	R17	500 Ohm	0.2	.06
	A84305	R18,R19	3 Megohm	0.2	.08
	A85205	R20	2 Megohm	0.2	.06
	A85304	R21	300,000 Ohm	0.2	.06

VARIABLE

10430	36X267				.28
~~9295~~	~~58X256~~	R9	2 Megohm	Volume Control	~~.31~~
9294	40X241	R11	3 Megohm	Tone Control	.26

AUTOMATIC TUNING AND DIAL ASSEMBLY

Bin No.	Part No.	Description	Selling Price
	20A63	Automatic Tuning Assembly complete with Drive Gear Hub and Coupling Arm less Gang Condenser, On-Off Switch and Bracket, Locking Screw Guide, and Drive Gear	$1.74
	24X395	Drive Gear on Tuner	.02
	25X627	Guide for Locking Screw	.04
	2A153	On-Off Switch	.16
	10A248	Extension for On-Off Switch Shaft	.04
	25X650	Mounting Bracket for On-Off Switch	.02
	25X653	Support Bracket for Dial Scale Assembly—Left	.06
	25X654	Support Bracket for Dial Scale Assembly—Right	.06
	37X170	Coupling Arm and Bushing for Gang Condenser	.12
	25X649	Mounting Bracket for Volume Control	.04
	10A247	Tuning Drum or Volume Control Drum	.10
	28X246	Spring Clamp to Hold Tuning Drum and Volume Control Drum to Shaft Doz.	.08
	58X406	Dial Scale Assembly complete with 2 Support Discs and Hub	.60
	26A174	Idler Gear and Mounting Bracket Assembly	.20
	26A172	Dial Scale Shaft and Gear Assembly	.12
	37X168	Link for Coupling Arms	.02
	28X248	Tension Spring for Coupling Arms Doz.	.10
	7A94	Dial Lamp Socket Assembly (2 Sockets with Wire)	.10
	41X34	Celluloid Light Diffuser	.02
7112		Dial Lamp—No. 51 Ea.	.08
10401	17X40	Celluloid Crystal	.40
	4X331	Escutcheon for Dial Scale	.40
	4X327	Escutcheon for Tuning Eye	.20
	4X328	Cap for Tuning Eye	.12
	28X244	Plug Button for Locking Screw opening or On-Off Switch Extension Ea.	.04
	26A166	Call Letter Sheet and Celluloid Tabs	.06
	26A182	Blank Call Letter Sheet (Export) and Celluloid Tabs	.06
	58X393	Celluloid Tabs only Doz.	.06

Use only genuine factory tested parts to insure service jobs you can depend on and to obtain original set performance.

Prices Subject to Change Without Notice.

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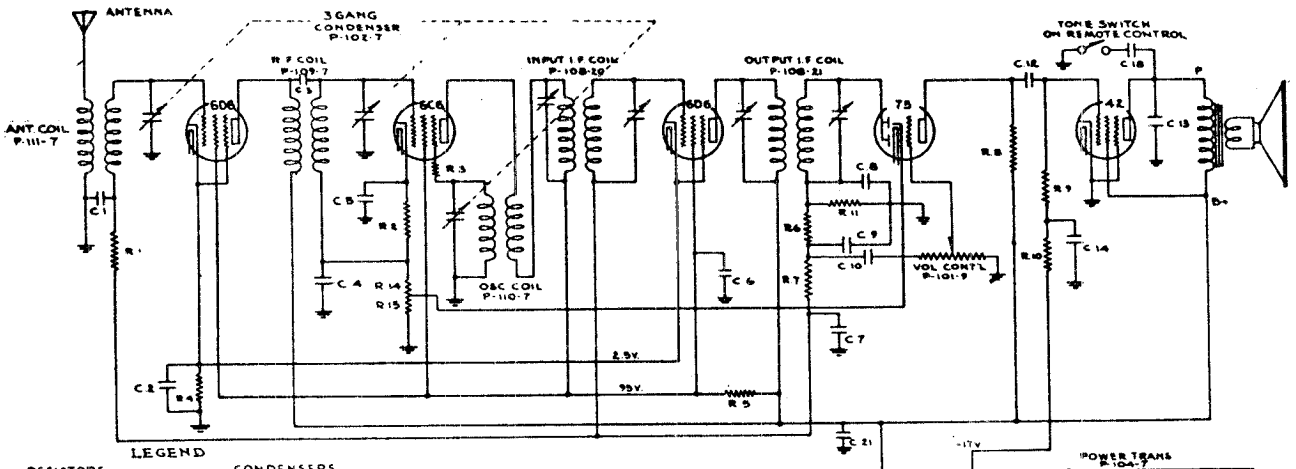
MODEL 102

MONTGOMERY WARD



LEGEND

RESISTORS

No	VALUE
R 1	250M 1/2W
R 2	450Ω
R 3	1500Ω
R 4	150Ω
R 5	25M 1W
R 6	50M 1/2W
R 7	250M 1/2W
R 8	250M 1/2W
R 9	200M 1/2W
R 10	300M 1/2W
R 11	250M 1/2W
R 12	100Ω
R 13	100Ω
R 14	5M
VAR RESISTOR (VOL CONT'L) R 15	500M - 200Ω

CONDENSERS

No	VALUE
C 1	05 X 200V.
C 2	1 X 200V.
C 3	11.5 mmf GIMMICK
C 4	05 X 200V.
C 5	05 X 200V
C 6	1 X 200V.
C 7	1 X 200V.
C 8	0005 MICA
C 9	0005 MICA
C 10	01 X 400V.
C 11	002 MICA
C 12	01 X 400V.
C 13	003 X 600V.
C 14	1 X 200V.
C 15	.5MFD X 120V.
C 16	8MFD X 350V.
C 17	8MFD X 350V.
C 18	01 X 400V.
C 19	.015 X 1400V.
C 20	5MFD X 120V.
C 21	01 X 400V.

- NOTE -

NUMBERS PREFIXED BY LETTERS ARE PART NUMBERS.
VOLTAGES TAKEN FROM POINTS INDICATED TO CHASSIS GROUND VOLUME CONTROL ON FULL
THE PHRASE GIMMICK MEANS, A WIRE WOUND AROUND ANOTHER WIRE.
RESISTORS IN ONE UNIT, P-106-14, - R 2, 4, 14, 15
CONDENSERS IN ONE UNIT, P-119-4 C. 16, 17.
CONDENSERS C 2, C 4, C 5 C 6, C 7 ARE IN ONE UNIT P-145-5.
RESISTORS AND CONDENSERS IN OUTPUT I F CAN, P-108-21, - C. 8, 9, 10 AND R. 6, 7, 11
CONDENSER, C 1, IN ANT COIL CAN P-111-12.
CONDENSERS C 19, - C 20 IN ONE UNIT P-148-4

IF PEAK 175 KC

DIAL ADJUSTMENT:

Mount control head to steering column by means of bracket and strap or under dash by means of bracket or to instrument panel (see illustrations). Attach cables as above. Tune set to some station of a known frequency (between 800 and 1200 K.C.), hold selector knob, then with a screw driver adjust the slotted screw on back of the control head, and in that way adjust the dial pointer to the correct frequency setting.

Part No.	Description	List Price Each
150-24	Selector Shaft—24"	1.50
151-2	Remote Control Head, less flexible shafts, less tone control and pilot assemblies, but with knobs and mounting hardware	4.50
152-1	Antenna cable	.40
152-2	Battery cable	.35
131-5	Black bakelite remote control knobs	.15
146-8	Die Cast Remote Control Mounting Bracket	.30
146-12	Steering Column Strap	.15
168-1	Spark-plug type suppressor	.30
168-2	Distributor plug-type suppressor	.50
168-3	Cable type suppressor	.40
168-4	Special Ford spark-plug suppressor	.35
	Unless otherwise listed, all Carbon Resistors	.20
	Unless otherwise listed, all Single Section Tubular Paper By-Pass Condensers	.25
	Unless otherwise listed, all Dual Section Tubular Paper By-Pass Condensers	.50
	Unless otherwise listed, all Molded Mica Condensers	.25
	All Sockets	.20
167-1	Dynamic Speakers	5.00
	Plate antenna (clamps to frame of car)	2.50

Note: Part No. 145-5 consisting of five separate sections can be replaced with tubular single section condensers at 25c each. It will not be necessary to replace the entire unit should any section thereof fail.

Vibrators can be reconditioned at a cost of $3.00 each, if the old unit is returned.

Part No.	Description	List Price Each
101-9	Volume Control with Switch	$1.35
101-12	Tone Control Assembly, complete	.35
102-7	Three Gang Geared Variable Condenser	4.00
104-6	Vibrator Transformer	3.00
105-3	"A" Choke—40T—No. 16E—½" Dia.	.10
105-4	380 Ohm Filter Choke	.85
106-6	200 Ohm Center Tapped Resistor	.25
106-14	5800 Ohm Metal Clad Resistor	.50
108-20	Input I. F. Transformer completely assembled in can (175 K. C.)	1.50
108-21	Output I. F. Transformer complete with can, but less resistor and Condenser Assembly (175 K. C.)	1.50
	Resistor and Condenser Assembly for 108-21	1.50
109-7	R. F. Coil	.65
110-7	Osc Coil & bracket	1.25
111-7	Antenna Coil	1.25
112-43	Volume Control Shaft complete with knob	.30
115-18	Special partition shield	.20
115-22	Tube shield	.15
116-5	6-8 Volt T-50 pilot lamp	.10
116-6	Pilot light assembly, complete, less bulb	.40
119-4	8-8 Mfd. x 350 Volt Electrolytic Filter Condenser	2.50
142-1	Plug-In Vibrator	5.00
145-5	.4 Mfd. By-Pass Block	1.00
146-14	Special bracket including battery antenna, pilot light and tone control cable fittings, but less antenna coil volume control	.50
148-4	Dual .5 Mfd. 120 Volt Condenser	.75
161-1	20 Ampere fuse	.05
147-1	Selector Control Coupling	.10
147-2	Bushing and bracket complete	.20
147-11	Volume control coupling	.10
135-5	⅜x3" carriage bolt	.05
140-3	Container complete with top and bottom	2.50
148-1	.5 Mfd. Generator Condenser	.50
148-3	.5 Mfd. Ammeter Condenser	.50
149-18	Volume Control Shaft—18"	1.25
149-24	Volume Control Shaft—24"	1.50
150-18	Selector Shaft—18"	1.25

Prices subject to change without notice.

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MODEL 102

MONTGOMERY WARD

TUBE COMPLEMENT:

1—Type 6D6—remote cut-off pentode as an R. F. amplifier.
1—Type 6C6—pentode as an oscillator and first detector.
1—Type 6D6—remote cut-off pentode as an intermediate frequency amplifier (175 K.C.).
1—Type 75 —duplex diode triode second detector automatic volume control and first audio.
1—Type 42 —pentode output tube.
1—Type 84 —high vacuum full wave rectifier.

SERVICE NOTES:

Model 670 is a six tube superheterodyne receiver with an intermediate frequency of 175 kilocycles and a tuning range of from 530 to 1550 kilocycles.

This receiver has been carefully designed to facilitate servicing, the top and bottom covers are both removable, any part is replaceable without removing the chassis from the cabinet. All adjustments are made without removing the chassis from the cabinet.

Should it ever become necessary or desirable to re-align this receiver, the proper method is as follows:

I. F. ALIGNMENT:

1. With variable condenser at its maximum capacity position and with volume control full on, connect in series with a .1 mfd. condenser, an oscillator set at 175 kilocycles to the grid cap of the 6C6 tube.

2. Adjust trimming condensers of both input and output I. F. transformers, parts number 108-20 and 108-21 (see top view of chassis) to resonance with an oscillator, as indicated on an output meter connected across the primary terminals of the speaker input transformer or between the plate and screen terminals of the type 42 output tube. The connection to the tube can be made by means of an adapter. Maximum deflection on the output meter indicates resonance.

Note: Each I. F. transformer has two adjustments, both of these adjustments on both transformers are accessible through holes located in the back of the case between the two mounting plates and directly under the louvres.

R. F. ALIGNMENT:

1. Attach oscillator connected in series with a 200 mmfd. condenser to the antenna lead and with the variable condenser at its minimum capacity position (extreme right of its rotation) and with an oscillator set at 1550 kilocycles, adjust condenser trimmer of oscillator section (Front shaft end) to resonance.

2. Re-set oscillator to 1400 kilocycles, rotate variable condenser to pick up signal, adjust antenna (center section) and R. F. (rear section) trimmers to resonance.

3. Check alignment at 1500-1000-800-600-530 kilocycles by setting oscillator to these frequencies and picking up signal by rotating condenser.

4. Bend slotted plates of antenna and R. F. sections only if necessary. UNDER NO CIRCUMSTANCES BEND PLATES OF OSCILLATOR SECTION.

NOTES:

Voltages from chassis to different points are indicated on schematic circuit diagram, and should be measured with a voltmeter having a resistance of 1000 ohms per volt.

Failure to operate, noisy or weak reception, may be due to defective tubes or poor contact between cap on top of tube and grid clip.

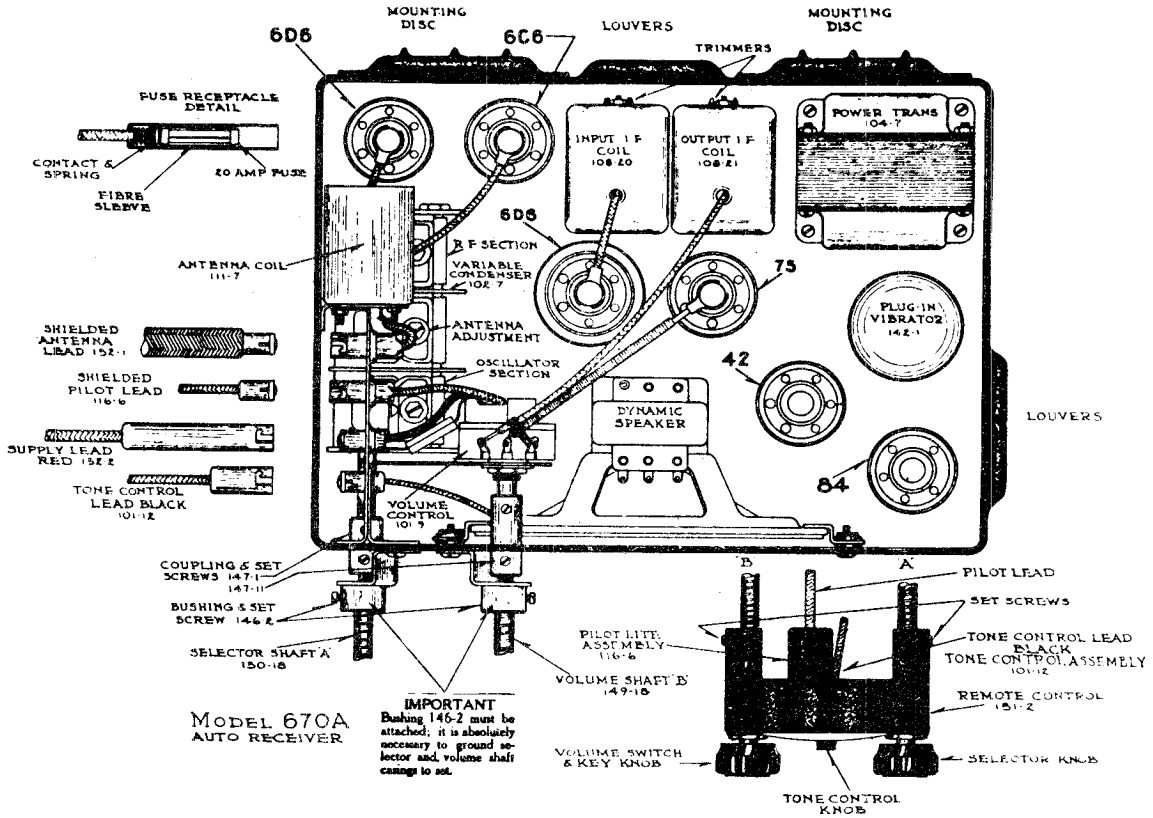
Tubes may be checked by replacing with another tube which is known to be good.

If fuse blows out frequently, and insulating sleeve has been properly placed over fuse, the trouble probably is in the vibrator and vibrator should be replaced.

NEVER ATTEMPT TO ADJUST VIBRATOR POINTS.

Case rattles may be due to one or more of the following:

Loose screws in top or bottom covers. Loose elements in tubes. Loose tube shield. Loose R. F. coil shield. Loose grill cloth.



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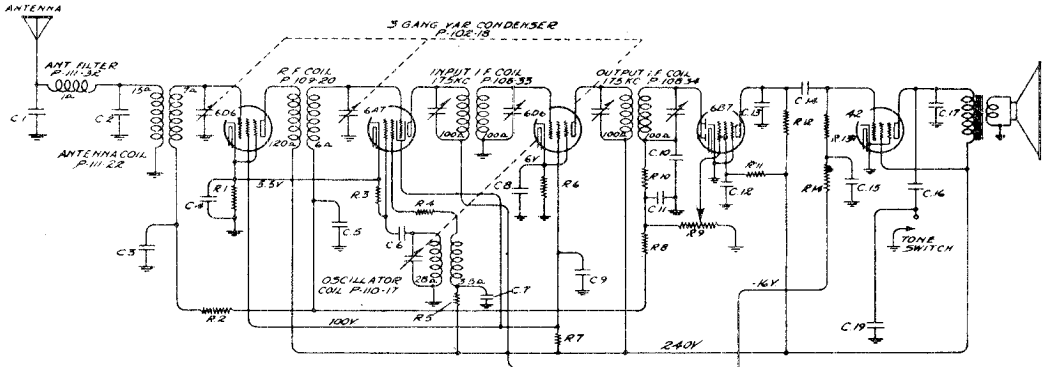
MONTGOMERY WARD

MODEL 204



RESISTORS

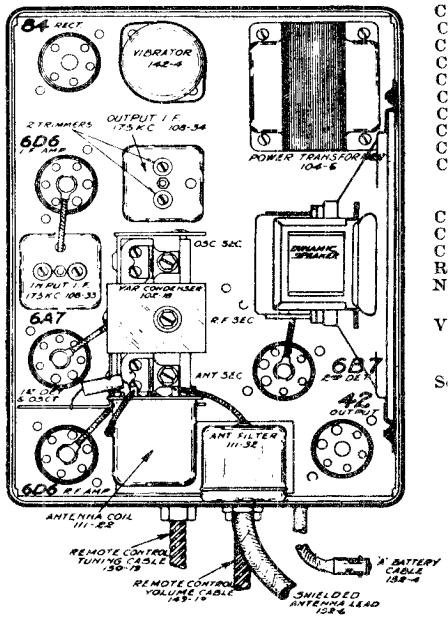
No.	Value
R.1	500 ⅓ w
R.2	100M ⅓ w
R.3	50M ⅓ w
R.4	3500 ⅓ w
R.5	20M ½ w
R.6	1500 ⅓ w
R.7	25M 1w
R.8	500M ⅓ w
R.9	1 meg vol. control P-101-21
R.10	100M ⅓ w
R.11	1 meg ⅓ w
R.12	250M ⅓ w
R.13	301M ⅓ w
R.14	301m ⅓ w
R.15	100
R.16	100

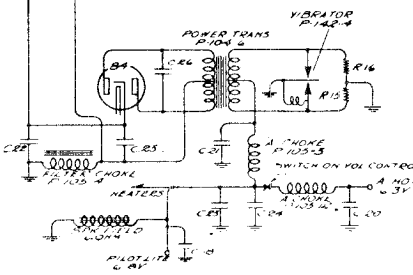
CONDENSERS

No.	Value
C.1	20 mmf mica
C.2	20 mmf mica
C.3	.01x400v
C.4	.1x200v
C.5	.05x200v
C.6	100 mmf mica
C.7	.1x200v
C.8	.1x200v
C.9	.1x200v
C.10	100 mmf mica
C.11	100 mmf mica
C.12	.1x200v
C.13	100 mmf mica
C.14	.01x400v
C.15	.25x400v
C.16	.025x400v
C.17	.006x600v
C.18	500 mmf mica
C.19	500 mmf mica
C.20	2000 mmf mica
C.21	1.0 mfdx120v
C.22	8 mfd x300v
C.23	.5 mfd x120v
C.24	.01x400v
C.25	8 mfd x300v
C.26	.01x400v

NOTE:

C.4 and C.9 are in one unit P-118-1
C.7 and C.8 are in one unit P-118-1
C.22 and C.25 are in one unit P-119-17
R.16 and R.15 are in one unit P-106-6
Numbers prefixed by letter "P" are part numbers.
Voltages taken from points indicated to chassis ground. Vol. control on full, no signal.
Serial No. 40001 up.





1935

ALIGNING INSTRUCTIONS:

All of the adjustments have been very carefully set with signal generators at the factory and require no further adjustment, unless it becomes necessary to replace a coil or transformer or if the adjustments have been tampered with in the field. Under no circumstances attempt any adjustments without first making certain that adjustment is necessary and only after voltages, tubes and condensers have been checked and found to be normal. To properly re-align this receiver, a test oscillator, as well as an output meter, must be used.

DUMMY ANTENNAS:

The dummy antennas referred to in the following instructions are:

"I.F. Dummy" —A .1 mfd. condenser connected in series with the test oscillator output lead.

"Broadcast Dummy"—A 200 mmfd. condenser connected in series with the output lead of the test oscillator.

RESONANCE INDICATOR:

Use as a resonance indicator an output meter connected across the primary of the speaker input transformer, or by means of an adapter between the plate and the screen of the type 42 output tube. Maximum deflection of the meter indicates resonance. Use only enough signal to get a readily readable output. A low range output meter or the low scale of a multi-range meter should be used.

I.F. ALIGNMENT:

1. With variable condenser in its minimum capacity position (plates entirely out of mesh) and with volume control full on, connect test oscillator set at 175 K.C., in series with I.F. dummy antenna, to the grid cap of the type 6A7 tube.
2. Adjust trimmer condensers of both input (108-33) and output (108-34) I.F. transformers to resonance with oscillator. See top view for location of these transformers. There are two adjustments on each and they are accessible from the top of the transformer shield and should be adjusted with an insulated screw driver.

BROADCAST ALIGNMENT:

1. With variable condenser in its minimum capacity position, connect test oscillator set at 1550 K.C. and in series with broadcast dummy, to the antenna lead of receiver.
2. Adjust oscillator trimmer of variable condenser to resonance (this adjustment is on the end section of the three gang condenser—see top view).
3. Shift test oscillator to 1400 K.C. and pick up signal by rotating condenser and adjust R.F. (center) and antenna (front) trimmers to resonance, see top view.

(a) Check for sensitivity at 1000, 800 and 600 K.C. by setting test oscillator to these frequencies and picking up the signal by rotating variable condenser. Under no circumstances bend plates of oscillator section, bend R.F. and antenna plates only if absolutely necessary.

DIAL ADJUSTMENT:

Tune set to some station of a known frequency (between 800 and 1200 K.C.) hold selector knob, then with a screw driver adjust the slotted screw on the back of the control head, and in that way adjust the dial pointer to the correct frequency setting.

SERVICE NOTES:

Voltages taken from different points of circuit to chassis are measured with volume control full on, all tubes in their sockets and speaker connected, with a volt meter having a resistance of 1000 ohms per volt. These voltages are clearly indicated on the circuit diagram.

In order to prevent signal from acting upon A.V.C. and affecting accuracy of voltage measurements, aerial and ground leads should be short circuited while making measurements.

All voltages are to be measured with 6.3 volts input to receiver. Resistances of coils and transformer windings are indicated in ohms on schematic circuit diagram.

To check for open by-pass condensers, shunt each condenser with another condenser of the same capacity and voltage rating, which is known to be good, until the defective unit is located.

Failure to operate, noisy or weak reception is usually due to defective tubes, the tubes making poor contact with sockets or grid clips making poor contact with the caps of the tubes. Tubes may be checked very easily by replacing with other tubes which are known to be good. If fuse blows out frequently and insulating sleeve has been properly placed over fuse, the trouble is probably in the vibrator, it should be replaced. Do not attempt to make any adjustments on the vibrators.

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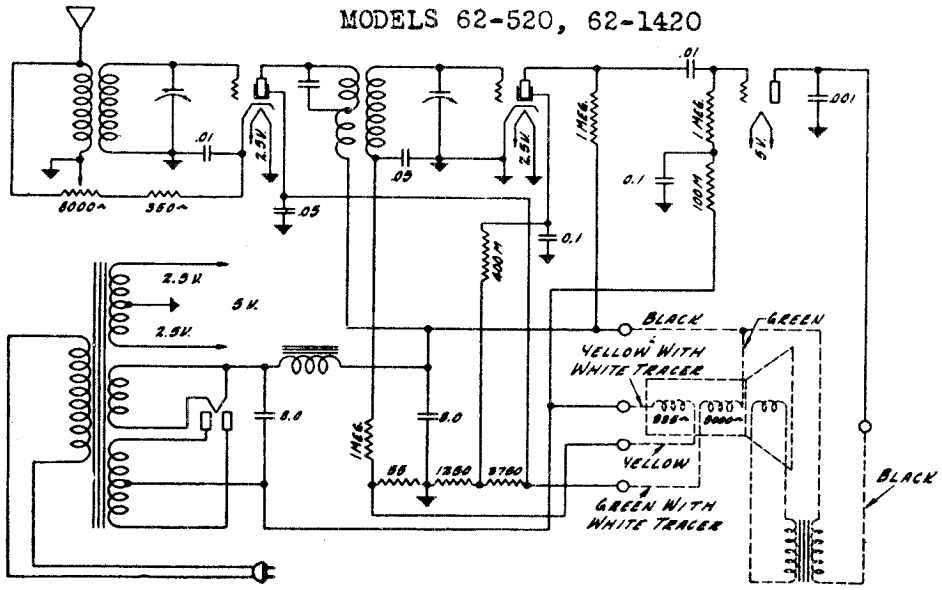
MODEL 204
MODELS 62-520,
62-1420,Ch.20W

MONTGOMERY WARD

MODELS 62-520, 62-1420



DOTTED LINES SHOWN ARE IN SPEAKER.

2-31

The Model 20W chassis is the same in general design as the 26W chassis used in our five tube midgets, and the general servicing procedure is the same.

The tubes required are—

1—171 A power tube,
2—224 screen-grid tubes,
1—280 rectifier tube.

It is possible to substitute a 235 super control tube for the 224 tube used in the RF portion of this set. When this is done, the 235 super control tube should be used in the socket between the 280 rectifier and the 171 power tube.

No. 20W CHASSIS—VOLTAGES AT SOCKETS—VOLUME CONTROL AT MAXIMUM LINE VOLTAGE. 115—PLUG IN SOCKET OF RECEIVER—TUBE IN TEST SET

Type of Tube	Position of Tube	Function	"A" Volts	"B" Volts	Control Grid "C" Volts	Screen Volts	Screen Current MA	Cathode Volts	Plate MA	Grid Test MA
224	1	1st Radio	2.5	196	2.2	85	1.4	2.2	5.	7.1
224	2	Detector	2.5	95	2.3	17	.015		.1	.2
171A	3	1st Audio	5.1	191	43.				18.	20.
280	4	Rectifier	5.1						23. Per Plate	

MODEL 204

Part No.	Description	List Price Ea.
	CONDENSERS	
	Unless otherwise listed, all single section tubular paper by-pass condensers	$ .25
	Unless otherwise listed, all dual section tubular paper by-pass condensers	.50
	Unless otherwise listed, all molded mica condensers	.25
119-17	Dual 8 mfd. electrolytic filter condenser	2.25
148-1	.5 Mfd. Generator Condenser	.50
148-3	.5 Mfd. Ammeter Condenser	.40
148-2	1.0 Mfd. x 120 Volt Condenser	.60
148-6	Special Ford Ignition Coil Condenser	.60
	COILS	
105-12	"A" Choke - 28 Turns No. 12 Wire	.10
105-3	"A" Choke - 40 Turns No. 16 Wire	.10
108-33	Input I.F. Transformer Complete with Shield	1.50
108-34	Output I.F. Transformer Complete with Resistors and Condensers, Mounted in Shield	2.50
109-20	R.F. Coil Complete - Less Shield	1.00
110-17	Oscillator Coil Complete with Bracket	.75
111-22	Antenna Coil Complete - Less Shield	1.00
111-32	Antenna Filter Assembly Complete with Shield and Antenna Cable	1.50
	RESISTORS	
	Unless otherwise listed, all carbon resistors	.20
106-6	200 Ohm Center Tapped Resistor	.25
168-2	Distributor Suppressor	.40
168-3	Cable Type Suppressor	.40
	TRANSFORMERS	
104-6	Power Transformer	3.00
105-4	380 Ohm Filter Choke	.85
	MISCELLANEOUS	
101-21	Volume Control with Switch	1.35
102-18	Three Gang Variable Condenser	4.00
113-9	Two Lug Terminal Strip	.05
113-38	Terminal Strip	.05
115-34	Antenna and R.F. Coil Shield	.15
114-26	Speaker	5.50
128-9	Set Case less Covers	2.00
128-10	Top Cover	1.35
128-11	Bottom Cover	1.35
113-30	Terminal Strip Tone Control and Dial Light	.25
142-4	Plug-in Vibrator	4.50
147-19	Flexible Cable Control Bushing	.10
152-2	Battery Cable & Fuse Assembly	.35
152-3	Fuse Insulating Sleeve	.05
152-4	Chassis Battery Cable Assembly	.30
152-6	Antenna Cable	.50
160-11	Mounting Studs Complete with Nut & Washer	.05
169-1	15 Amp. Fuse (3AG-15)	.05
	All Sockets	.10
123-1	Dome Lite Filter	.90
	Plate Antenna	3.50

Part No.	Description	List Price Ea.
	REMOTE CONTROL PARTS	
112-39	Selector Control Shaft	.20
112-41	Idler Gear	.15
112-115	Pointer Shaft	.05
112-85	Volume Control Shaft	.10
112-45	Bezel (Crystal Retainer)	.15
112-46	Celluloid Dial Crystal	.15
112-48	Pointer Shaft Gear	.05
112-114	Glass Dial	.35
112-108	Metal Disc Pointer	.10
116-13	6-8 Volt, T-51 Bulb Bayonet Base	.10
116-9	Pilot Light Assembly	.45
116-11	Tone Control Assembly Unit Complete	.35
131-5	Black Bakelite Remote Control Knobs	.15
134-32	Fibre Dial Mask	.05
146-8	Die Cast Remote Control Mounting Bracket	.30
146-12	Steering Column Strap	.15
146-25	Dash Mounting Bracket	.15
147-3	Selector Control Bushing for 112-39 Shaft	.10
147-4	Volume Control Bushing for 112-43 Shaft	.10
149-25	Flexible Volume Control Cable - 24"	1.50
150-25	Flexible Selector Control Cable - 24"	1.50
151-6	Remote Control Head complete with Steering Column Bracket	5.00
	Dash Mounting Kit (specify make and year of car)	1.25
151-8	Special General Motors Control Head	5.00
112-50	1935 Chevrolet Dash Kit for 151-8	$1.50
112-54	1935 Pontiac Dash Kit for 151-8	$1.50
112-63	1935 Oldsmobile Dash Kit for 151-8	$1.75

Vibrators can be reconditioned at a cost of $3.00 each, if the old unit is returned.

All resistors are RMA color coded - specify value and/or resistor number (per schematic diagram) and model number.

When ordering condensers, specify part number, model number and/or capacitor (per schematic diagram) and model number.

Mica condensers are coded with an additional dot indicating tolerance:

Tolerance Percent	Color of Dot
2½%	White
5%	Green
10%	Blue
15%	Yellow
20%	Red
More Than 20%	None.

All prices quoted are list and are subject to the usual trade discounts. Shipments are F.O.B. our Factory. When remitting in advance, please include postage.

WE CANNOT SUPPLY SPEAKER PARTS, CONES, TRANSFORMERS OR FIELDS SEPARATELY. WE CAN REPLACE OR REPAIR A DAMAGED SPEAKER FOR $1.50 NET, IF IT IS RETURNED TO OUR FACTORY TRANSPORTATION CHARGES PREPAID.

PRICES SUBJECT TO CHANGE WITHOUT NOTICE.

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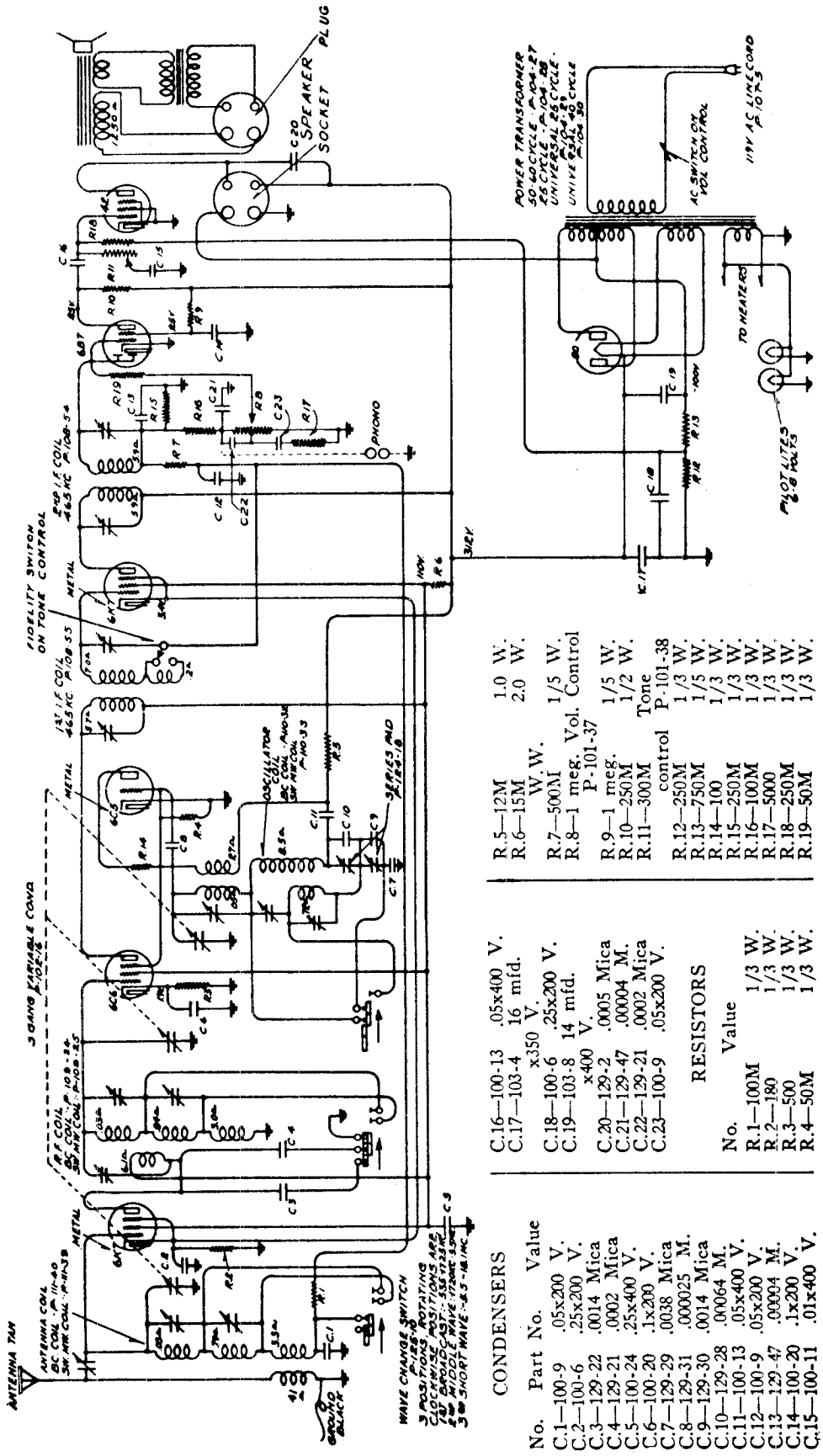
MODEL 222

MONTGOMERY WARD



CONDENSERS

No.	Part No.	Value
C.1	100-9	.05x200 V.
C.2	100-6	.25x200 V.
C.3	129-22	.0014 Mica
C.4	129-21	.0002 Mica
C.5	100-24	.25x400 V.
C.6	100-20	.1x200 V.
C.7	129-29	.0038 Mica
C.8	129-31	.000025 M.
C.9	129-30	.0014 Mica
C.10	129-28	.00064 M.
C.11	100-13	.05x400 V.
C.12	100-9	.05x200 V.
C.13	129-47	.00004 M.
C.14	100-20	.1x200 V.
C.15	100-11	.01x400 V.
C.16	100-13	.05x400 V.
C.17	103-4	16 mfd. x350 V.
C.18	100-6	.25x200 V.
C.19	103-8	14 mfd. x400 V.
C.20	129-2	.0005 Mica
C.21	129-47	.00004 M.
C.22	129-21	.0002 Mica
C.23	100-9	.05x200 V.

RESISTORS

No.	Value	
R.1	100M	1/3 W.
R.2	180	1/3 W.
R.3	500	1/3 W.
R.4	50M	1/3 W.
R.5	12M	1.0 W.
R.6	15M	2.0 W.
R.7	500M	1/5 W.
R.8	1 meg. Vol. Control P-101-37	
R.9	1 meg.	1/5 W.
R.10	250M	1/2 W.
R.11	300M	Tone control P-101-38
R.12	250M	1/3 W.
R.13	750M	1/5 W.
R.14	100	1/3 W.
R.15	250M	1/3 W.
R.16	100M	1/3 W.
R.17	5000	1/3 W.
R.18	250M	1/3 W.
R.19	50M	1/3 W.

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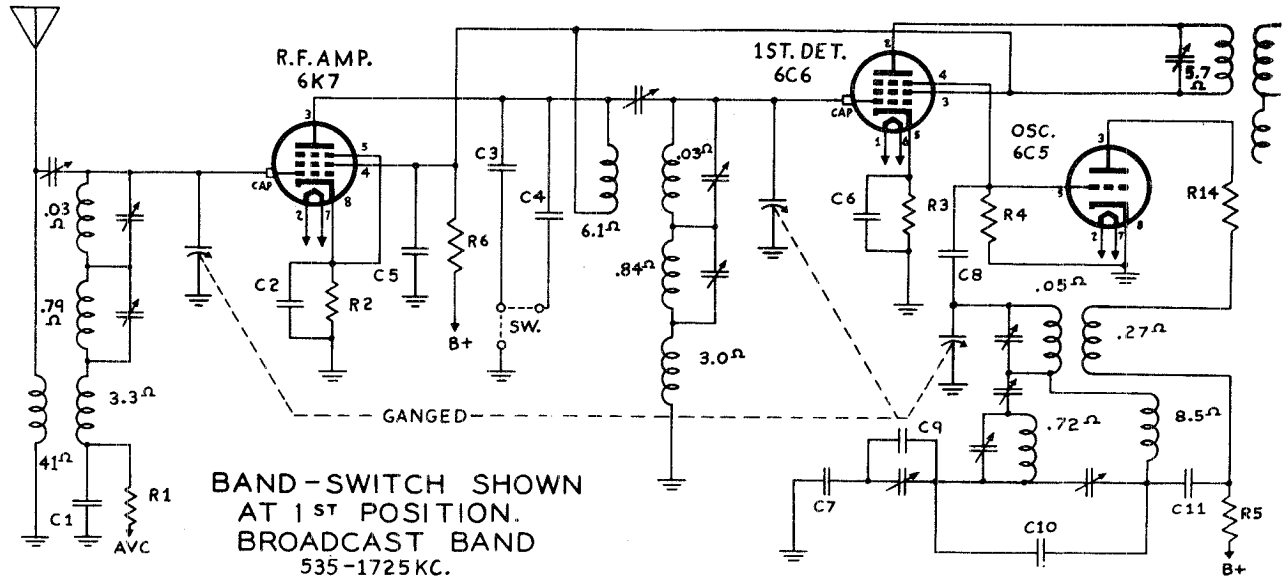
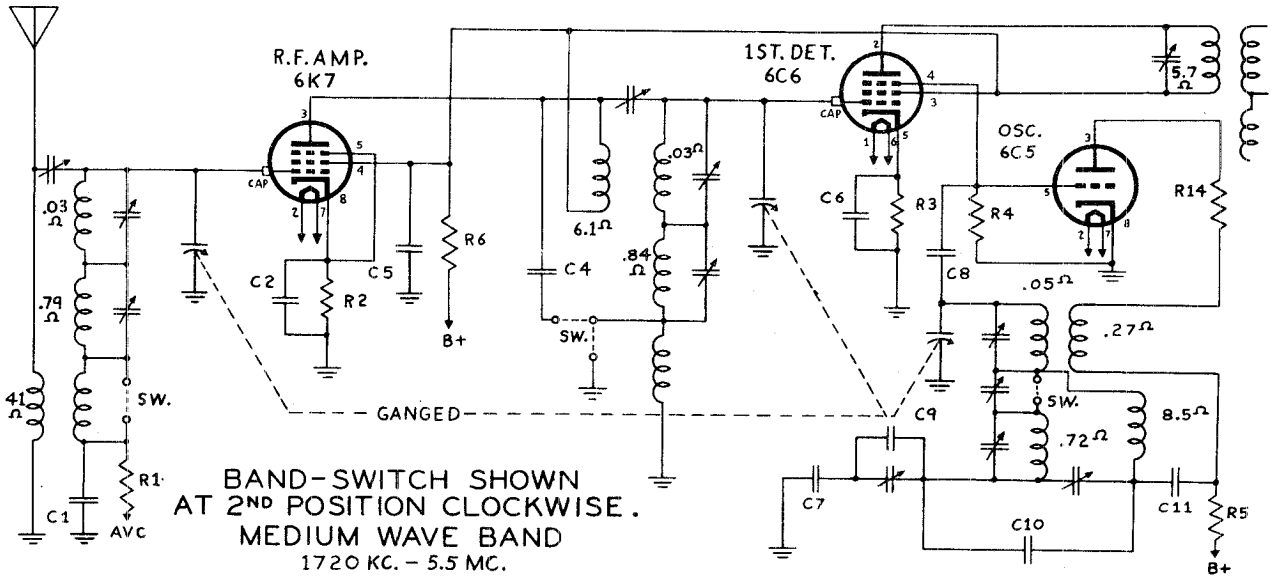
MODEL 222

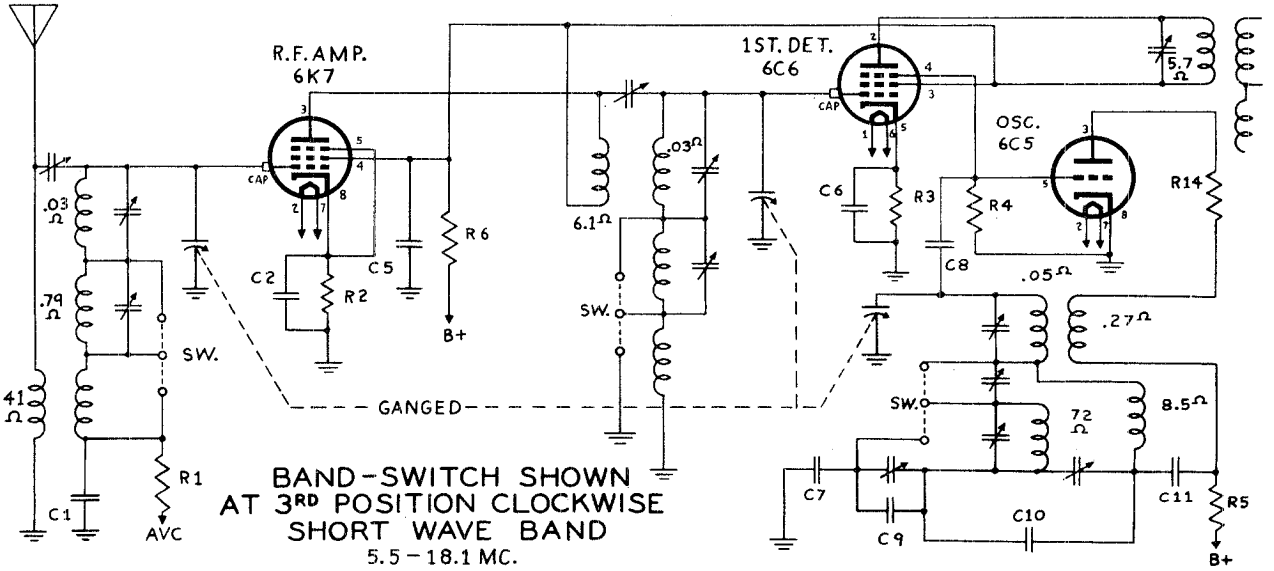
MONTGOMERY WARD



BAND-SWITCH SHOWN AT 1ST POSITION. BROADCAST BAND
535-1725 KC.



BAND-SWITCH SHOWN AT 2ND POSITION CLOCKWISE. MEDIUM WAVE BAND
1720 KC. - 5.5 MC.



BAND-SWITCH SHOWN AT 3RD POSITION CLOCKWISE SHORT WAVE BAND
5.5 - 18.1 MC.

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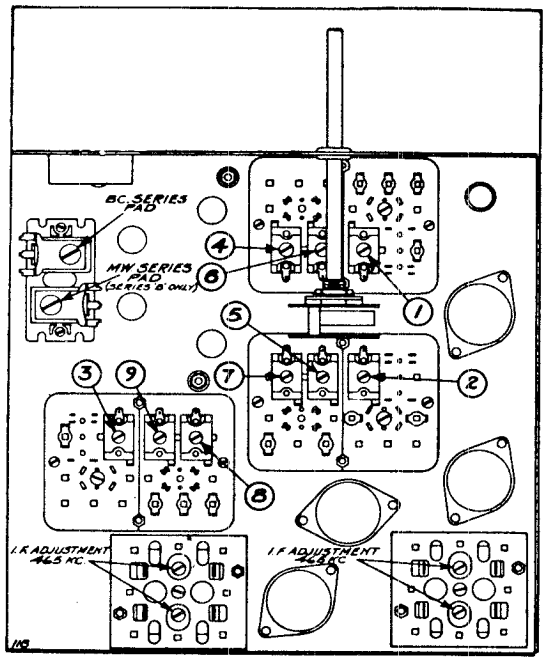
MONTGOMERY WARD

MODEL 222



ALIGNING INSTRUCTIONS

Dummy Antennas

The following dummy antennas are used in aligning and are referred to in the following alignment instructions as "Dummy 1", "Dummy 2", and "Dummy 3"

Dummy 1: (I.F.)—Consists of a .1 mfd. condenser connected in series with the external oscillator.

Dummy 2: (Broadcast)—Consists of a 200 mmfd. condenser and a 20 ohm resistor connected in series with each other and in series with the external oscillator.

Dummy 3: (Intermediate and Short Wave)—Consists of a .1 mfd. condenser and a 400 ohm resistor connected in series with each other and in series with the external oscillator.

Resonance Indicator:

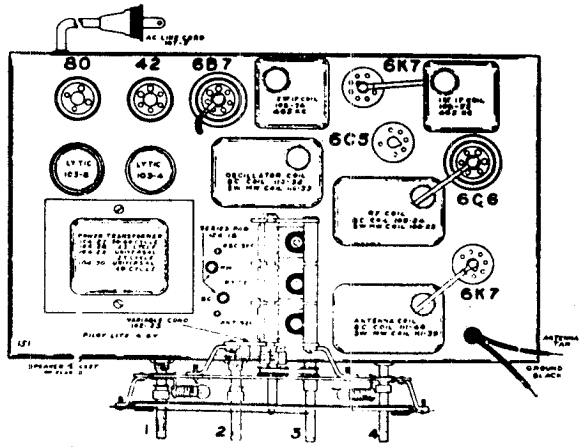
Use as a resonance indicator an output meter connected across the primary of the speaker input transformer or by means of an adapter between the plate and screen terminals of the type 42 output tube. Maximum deflection of the meter indicates resonance. Use only enough signal to get a readily readable output. A low range output meter or the low scale of a multi-range meter should be used.

ALIGNING I.F. TRANSFORMERS (465 K.C.)

Part No. 108-54 Output I.F. Transformer
Part No. 108-56 Input I.F. Transformer

These I.F. transformers have two adjustments, both of which are accessible from the underside of chassis (see bottom view).

1. With volume control full on, (the extreme right of its rotation), the wave changing switch in the broadcast position, (extreme left of its rotation), the tone control on "Hi" part of the sharp position (as much right rotation as possible without operating the Hi Fidelity switch), and with the variable condenser set to approximately 1400 kilocycles, make the following adjustments:
   (a) Connect external oscillator set at 465 kilocycles, in series with "Dummy 1", to the control grid cap of the type 6K7 tube, located between the two I.F. transformers, and adjust the output I.F. transformer to resonance.
   (b) With "Dummy 1" still connected, move oscillator output clip from grid of 6K7 to grid cap to 6C6 and adjust input I.F. transformer to resonance.
   (c) With oscillator still connected to 6C6, re-adjust output I.F. transformer.



ALIGNMENT PROCEDURE

The following adjustments to be made after the I.F.'s have been aligned as explained above.

BROADCAST BAND ALIGNMENT:

1. With wave changing switch, in the broadcast position, extreme left of its rotation, and with external oscillator set at 600 kilocycles and connected in series with "Dummy 2" to the tan antenna and black ground lead, make the following adjustments:
   (a) Adjust broadcast series pad to resonance with oscillator. Keep set in tune with oscillator by slowly rocking to and fro the variable condenser until maximum output is obtained. Note: This adjustment is accessible from the top of the chassis and is located between the variable condenser and the electrolytic condenser. See top view.
   (b) Re-set external oscillator to 1400 K.C., move dial pointer to 1400 K.C. and adjust oscillator (adjustment number 3), R.F. (adjustment number 2) and antenna (adjustment number 1) to resonance. See bottom view for location of these adjustments.
   (c) Repeat adjustments "a" and "b" until sensitivity is at its maximum.

NOTE: IT IS EXTREMELY NECESSARY IN MAKING ALL OF THESE ADJUSTMENTS THAT THE FUNDAMENTAL OSCILLATOR SIGNAL BE TUNED IN AND NOT THE IMAGE FREQUENCY WHICH WILL FALL BELOW THE FUNDAMENTAL.

SHORT WAVE BAND ALIGNMENT:

1. With wave changing switch in the short wave position, extreme right of its rotation, and with external oscillator set at 17 megacycles and connected in series with "Dummy 3" to the tan antenna and black ground lead, make the following adjustments:
   (a) Move dial pointer to 17 megacycles and adjust short wave oscillator (adjustment number 8), short wave R.F. (adjustment number 7) and short wave antenna (adjustment number 6) to resonance.
   (b) Re-set external oscillator to 6 megacycles and pick up signal by rotating variable condenser and check for sensitivity.

INTERMEDIATE BAND ALIGNMENT:

1. With wave changing switch in the intermediate wave position, center of its rotation, and with external oscillator set at 1800 K.C. and connected in series with "Dummy 3" to the tan antenna and black ground lead, make the following adjustments:
   (a) Rotate variable condenser to approximately 1800 K.C., tune in oscillator signal and adjust M.W. series pad (see top view) to resonance. Slowly rock condenser to and fro while making this adjustment to be sure maximum output is obtained.
   (b) Set external oscillator at 5 M.C., rotate condenser, pick up signal and adjust intermediate wave R.F. (adjustment number 5), intermediate wave antenna (adjustment number 4) and intermediate wave oscillator (adjustment number 9) to resonance.
   (c) Re-check broadcast alignment and if it is found necessary to re-adjust either R.F. or antenna trimmers, repeat the 17 M.C. short wave and 5 M.C. intermediate wave adjustments.

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MODEL 222

MONTGOMERY WARD

The tube complement of this chassis is as follows:

1—Type 6K7—remote cut-off pentode R.F. amplifier.
1—Type 6C6—pentode first detector.
1—Type 6C5—oscillator.
1—Type 6K7—remote cut-off pentode I.F. amplifier (465 K.C.)
1—Type 6B7 duplex diode pentode second detector, A.V.C. and audio.
1—Type 42—pentode output.
1—Type 80—high vacuum rectifier.

TUNING RANGE—

Standard Broadcast Band
535-1725 Kilocycles.

Intermediate Band
1720-5500 Kilocycles

Short Wave Band
5.5-18.1 Megacycles.

Transformers are available and chassis are sometimes equipped with universal transformers for operation on 40 and 60 cycles and with primary taps for 108, 125, 150, 220 and 250 volts (see instructions) and also sometimes equipped with 25 cycle transformers with 105-115 volt or 220 volt primaries, not universals.

Serial No. 5J154150 and up

Part No.	DESCRIPTION	List Price Each
	CONDENSERS	
100-6	.25 x 200 Volt Tubular Condenser—with Bracket	$0.35
100-9	.05 x 200 Volt Tubular Condenser	.25
100-11	.01 x 400 Volt Tubular Condenser	.25
100-13	.05 x 400 Volt Tubular Condenser	.25
100-20	.1 x 200 Volt Tubular Condenser	.25
100-24	.25 x 400 Volt Tubular Condenser—with Bracket	.35
103-4	16 Mfd. x 350 Volt Electrolytic	1.35
103-8	14 Mfd. x 400 Volt Electrolytic	1.35
118-12	.1 - .25 x 200 Volt Dual Tubular	.50
129-2	.0005 Mica - Type MT - 20%	.25
129-21	.0002 Mica - Type MT - 20%	.25
129-22	.0014 Mica - Type MW - 5%	.25
129-28	.00064 Mica - Type MT - 5%	.25
129-29	.0038 Mica - Type MW - 2½%	.50
129-30	.0014 Mica - Type MW - 20%	.25
129-31	.000025 Mica - Type MT - 15%	.25
129-47	.00004 Mica - Type MT - 30%	.25
	RESISTORS	
130-3	500M Ohm - ⅛ Watt - 20% - 100 Volts - Carbon	.20
130-11	250M Ohm - ⅛ Watt - 20% - 50 Volts - Carbon	.20
130-19	1 Meg Ohm - ⅛ Watt - 20% - 100 Volts - Carbon	.20
130-20	100M Ohm - ⅛ Watt - 20% - 50 Volts - Carbon	.20
130-22	5M Ohm - ⅛ Watt - 20% - 10 Volts - Carbon	.20
130-37	750M Ohm - ⅛ Watt - 20% - 50 Volts - Carbon	.20
130-49	12M Ohm - 1 Watt - 20% - 150 Volts - Carbon	.20
130-52	50M Ohm - ⅛ Watt - 20% - 10 Volts - Carbon	.20
130-53	180 Ohm - ⅛ Watt - 10% - 10 Volts - Carbon	.20
130-54	500 Ohm - ⅛ Watt - 20% - 10 Volts - Carbon	.20
130-60	100 Ohm - ⅛ Watt - 20% - 10 Volts - Carbon	.20
130-61	15M Ohm - 2 Watt - 20% - 180 Volts - Wire Wound	.40
130-62	250M Ohm - ⅛ Watt - 20% - 50 Volts - Carbon	.20
	COILS	
108-54	Output I.F. Coil Assembly Complete - Less Can	1.50
108-55	Input I.F. Coil Assembly Complete - Less Can	2.50
109-24	Broadcast R.F. Coil Assembly Complete	.50
109-25	Mid-Wave & Short Wave R.F. Coil Assembly Complete—Less Can	1.50
110-32	Broadcast Oscillator Coil Assembly Complete—Less Can	.50
110-33	Mid-Wave & Short Wave Oscillator Coil Assembly Complete—Less Can	1.00
111-39	Mid-Wave & Short Wave Antenna Coil Assembly Complete—Less Can	1.00
111-40	Broadcast Antenna Coil Assembly Complete—Less Can	.75
	TRANSFORMERS	
104-27	50/60 Cycle Power Transformer	4.50
104-28	25 Cycle Power Transformer	7.00
104-29	Universal - 25 Cycle Primary	7.50
104-30	Universal - 40 Cycle Primary	7.00

Part No.	DESCRIPTION	List Price Each
	SOCKETS	
121-6	Six Prong Type "6C6"	.10
121-6	Six Prong Type "42"	.10
121-7	Seven Prong Type "6B7"	.10
121-9	Four Prong Type "Spkr"	.10
121-9	Four Prong Type "80"	.10
121-12	Seven Prong Type "6K7"	.10
121-17	Six Prong Type "6C5"	.10
	SPEAKER	
114-27	Eight Inch Dynamic Speaker	6.50
114-30	Ten Inch Dynamic Speaker	8.00
	MISCELLANEOUS	
101-37	Volume Control and Switch	1.35
101-38	Tone Control and Fidelity Switch	1.35
102-23	Three Gang Variable Condenser	5.00
107-5	Line Cord & Plug	.50
115-22	Tube Shield	.15
115-35	Antenna, Oscillator and R.F. Shield	.15
115-36	I.F. Shield	.15
124-18	J-5-4D Series Dual Pad	.60
125-16	Wave Change Switch	.90
128-15	Small Wood Knob with Spring	.15
128-16	Large Wood Knob with Set Screw	.20
128-17	Large Wood Knob with Spring	.15

All resistors and mica condensers are RMA color coded—specify value and/or resistor or condenser (per schematic diagram) and model number.

Mica condensers are coded with an additional dot indicating tolerance:

Tolerance Percent	Color of Dot
2½%	White
5%	Green
10%	Blue
15%	Yellow
20%	Red
More than 20%	None.

When ordering condensers, specify part number, model and/or capacitor (per schematic diagram) and model number.

When ordering parts, always specify part and model number as well as serial number of chassis.

All prices quoted are list and are subject to the usual trade discounts.

Prices subject to change without notice.

Shipments are F.O.B. our Factory. When remitting in advance, please include postage.

WE CANNOT SUPPLY SPEAKER PARTS, CONES, TRANSFORMERS OR FIELDS SEPARATELY. WE CAN REPLACE OR REPAIR A DAMAGED SPEAKER FOR $2.50 NET, IF IT IS RETURNED TO OUR FACTORY, TRANSPORTATION CHARGES PREPAID.

Part No.	DESCRIPTION	List Price Each
	ASSEMBLIES	
112-133	Belt Take-up Assembly—Including:	.25
	1—No. 117-18 Take-up Arm	
	1—No. 117-21 Take-up Pulley	
	1—No. 117-24 Stud for Above	
	1—No. 117-22 Stud	
112-134	Switch Assembly—Including:	.65
	(Specify if Blue or Brown Desired) 2—No. 117-16 Band Indicator Arm	
	1—No. 117-15 Link	
	1—No. 117-14 Elbow	
	1—No. 117-13 Link	
	3—No. 117-23 Stud	
	3—No. 131-30 Spring Washer	
	1—No. 117-33 Threaded Stud	
	1—No. 117-22 Stud Red Cellulose	
112-135	Volume Indicator Assembly—Including:	.75
	(Specify if Blue or Brown Desired) 1—No. 112-121 Pointer Disc	
	1—No. 117-26 Bushing	
	1—No. 120-5 Spring Clip	
	1—No. 120-7 Coil Spring Fish Line	
	1—No. 117-28 Pulley	
	1—No. 115-15 Set Screw R Red Cellulose	
112-136	Tone Indicator Assembly—Including:	.75
	(Specify if Blue or Brown Desired) 1—No. 112-122 Pointer Disc	
	1—No. 117-26 Bushing	
	1—No. 120-5 Spring Clip	
	1—No. 120-7 Coil Spring Fish Line	
	1—No. 117-32 Pulley	
	1—No. 155-15 Set Screw Red Cellulose	
112-137	Dial Plate Assembly—Including:	1.25
	1—No. 117-17 Dial Plate	
	2—No. 117-11 Dial Bracket	
	4—No. 162-4 Rivets	
	2—No. 117-25 Volume & Tone Indicator Studs	
	1—No. 117-19 Bushing for Tuning Shaft	
112-138	Switch Arm Assembly—Including:	.25
	1—No. 117-12 Switch Arm	
	1—No. 147-15 Bushing	
	1—No. 154-4 Set Screw	
	DIAL PARTS ONLY	
112-117	Tuning Shaft	.05
112-118	Metal Oval Escutcheon Only	1.25
112-119	Dial Pointer with No. 132-8 Screw	.20
112-120	Band Spread Pointer Disc (Specify if Blue or Brown Desired)	.10
112-123	Oval Glass Crystal Only	.35
112-124	Glass Dial Scale	1.25
112-125	Drive Belt	.20
112-126	Pilot Light Socket	.10
112-127	Pilot Light Socket	.10
112-139	Oval Glass Retaining Ring	.10
116-5	6-8 Volt, T-50 Pilot Light	.10
117-20	Drive Belt Pulley and Set Screw	.10
117-29	Background Plate (Specify if Blue or Brown Desired)	.25
117-30	Reflector Plate	.25
120-4	Drive Belt Take-up Coil Spring	.05
131-33	Glass Retaining Clips	.025

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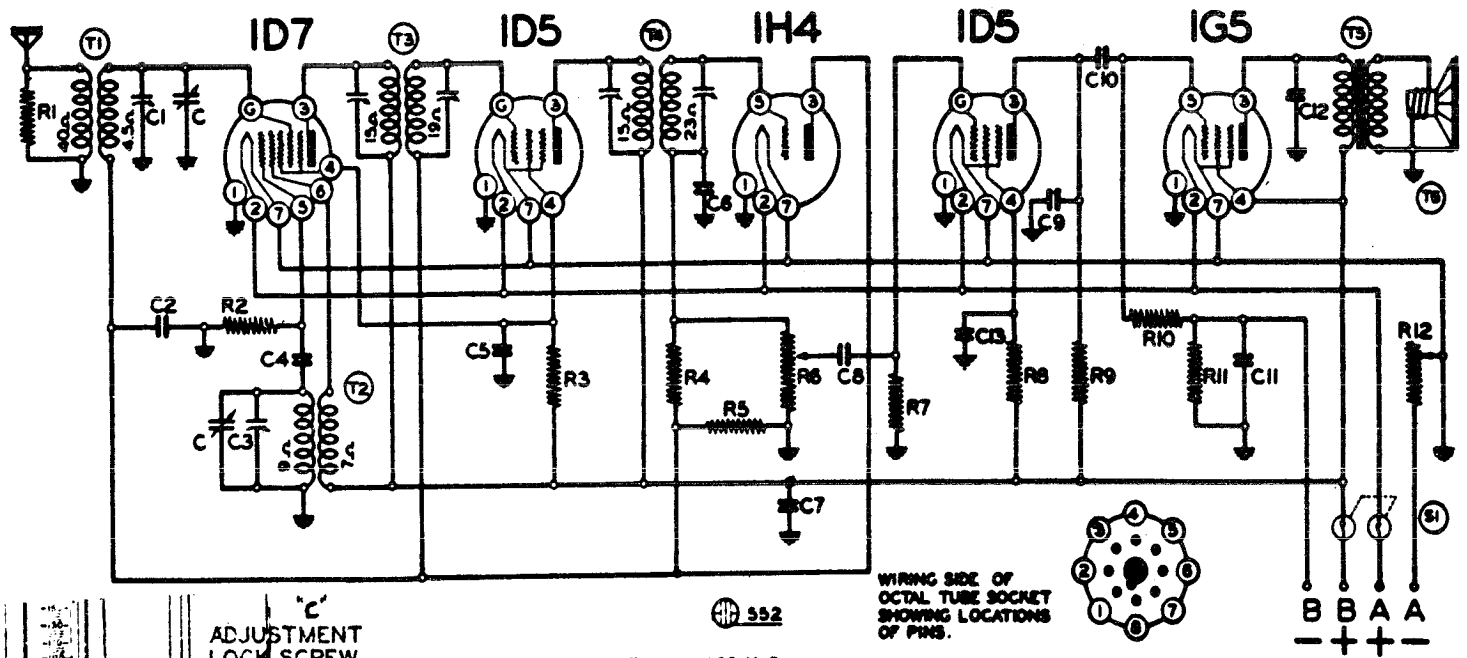

INTERMEDIATE FREQUENCY 465 K.C.

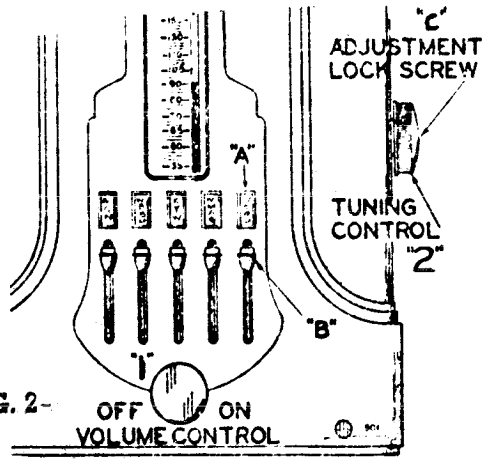

FIG. 2-

PROCEDURE FOR SETTING THE AUTOMATIC LEVERS:

There are five levers on the dial by means of which five stations may be selected, (See "B" Fig. 2).

Make a list of local stations you tune in regularly; any number up to and including five.

Punch out from the set of station call letter tabs supplied, the call letters of the stations you have selected.

Above each automatic tuner lever an opening in the escutcheon is provided for inserting the call letter tabs (See "A" Fig. 2).

Insert the call letter tabs in the rectangular openings in the escutcheon above each of the automatic tuner levers. One of the small celluloid tabs supplied should be snapped into place over each of the station call letter tabs.

-6-38

Press DOWN ALL THE WAY any one of the automatic tuner levers. Holding it down FIRMLY, tune in by means of the tuning knob (No. 2) the station indicated on the station call letter tab above this lever. Turn the tuning knob very slowly back and forth (while still holding lever in downward position) until the signal is clearest. The station will then be accurately tuned in. Release the lever.

Press down another automatic tuner lever. Holding it down FIRMLY, carefully tune in the station indicated on the call letter tab above this lever. Release this lever.

Follow this procedure until you have selected all of your favorite stations.

Now hold tuning knob securely with left hand to prevent it from turning, or Rotate the tuning knob (No. 2) to the right (clockwise) as far is it will turn and with a coin (half dollar), tighten the special locking screw ("C") in the center of the tuning knob, (See Fig. 2).

It is VERY IMPORTANT that this locking screw is turned until it is ABSOLUTELY TIGHT.

This screw will lock in place all the stations you have selected on the automatic tuner levers. (Note: Locking screw "C" is loose when radio is shipped from factory).

MODEL 559

MONTGOMERY WARD

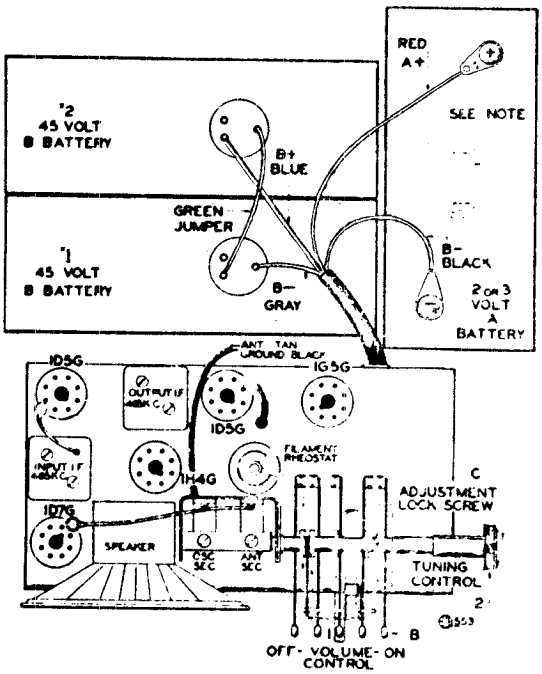

FIG. 1—TOP VIEW

DESCRIPTION:

TUBES:

The tube complement of this chassis consists of the following tubes:

1—Type 1D7G Pentagrid Mixer, First Detector-oscillator.

1—Type 1D5G. Remote Cut-off Pentode, I.F. Amplifier (465 K.C.)

1—Type 1H4G Triode Second Detector, A.V.C.

1—Type 1D5G First Audio Amplifier.

1—Type 1G5G Pentode Output Amplifier.

SERVICE NOTES:

Voltages taken from different points of circuit to chassis are measured with volume control full on, all tubes in their sockets and speaker connected, with a volt meter having a resistance of 1000 ohms per volt.

All voltages as indicated on diagram are measured with a new set of batteries.

Resistances of coil windings are indicated in ohms on the schematic circuit diagram.

To check for open by-pass condensers, shunt each condenser with another condenser of the same capacity and voltage rating, which is known to be good, until the defective unit is located.

The approximate current consumption is as follows:

"A"—360 ma., "B"—15 ma.

Failure to operate, noisy or weak reception is usually due to defective tubes, the tubes making poor contact with sockets or grid clips making poor contact with the caps of the tubes. Tubes may be checked very easily by replacing with other tubes which are known to be good.

ALIGNING INSTRUCTIONS:

CAUTION:—No aligning adjustments should be attempted without first thoroughly checking over all other possible causes of trouble, such as poor installations, open or grounded antenna systems, low battery voltage, defective tubes, condensers and resistors. In order to properly align this chassis, an oscillator (generator) is absolutely necessary. No aligning adjustments should be attempted with the chassis in the cabinet.

(See part 5, for instructions on how to remove chassis from cabinet).

Connecting "A" Battery

First—Place the A Battery as shown in Fig. 1, (Either the 2 volt Storage A or the 3 Volt Dry A).

Next—Connect the Red wire marked A plus (+) to the A plus (+) Red post on battery.

Now—Connect the Black wire marked A minus (—) to the A minus (—) post on battery.

CAUTION: Before connecting a 3-volt dry A Battery, read the instructions which are attached to the bottom of the cabinet. NOTE: A special connector plug is supplied for connecting the "A" leads to a 3-volt dry "A" battery which has socket connections, (see dotted lines on "A" battery in Fig. 1).

Connecting "B" Batteries

First—Place both B Batteries exactly as shown.

NEXT—Insert the special three-prong connector plugs into the sockets on the B batteries as shown in illustration.

NOTE:—The above procedure and illustration pertains to the new style B batteries which have sockets; however, the old style B batteries which have terminals can be used by connecting them as follows:

FIRST—Remove the special plugs by cutting the wires off at the plugs.

NEXT—Connect grey colored B minus (—) wire to minus (—) terminal of battery (marked Battery No. 1 in illustration).

NEXT—Connect one end of green connecting wire to plus (+45) terminal of Battery No. 1 and other end to the minus (—) terminal of Battery No. 2.

NOW—Connect blue B plus (+) wire to the plus (+45) terminal of Battery No. 2.

All adjustments should be made with a non-metallic screw driver.

RESONANCE INDICATOR:

Use as a resonance indicator an output meter connected across the primary of the speaker input transformer, or by means of an adapter between the plate and screen terminals of the type 1G5G output tube. Maximum deflection of the meter indicates resonance. Use only enough signal to get a readily readable output. A low range output meter or the low scale of a multi-range meter should be used.

ALIGNING I.F. TRANSFORMERS: (465 K.C.):

Part No. 108112. Output I.F. Transformer.

Part No. 108111. Input I.F. Transformer.

These I.F. transformers have two adjustments, both of which are accessible from the top of chassis (see Fig. 1).

1. With volume control full on (the extreme right of its rotation), and with the variable condenser set to approximately 1400 kilocycles, make the following adjustments:
   (a) Connect external oscillator set at 465 kilocycles, in series with .1 mfd condensor, to the control grid cap of the type 1D5G I.F. tube, and adjust the output I.F. transformer (No. 108112) to resonance.
   (b) Move oscillator output clip from grid of 1D5G to grid of 1D7G and adjust input I.F. transformer (No. 108111) to resonance.
   (c) With oscillator still connected to 1D7G. readjust output I.F. transformer (108112) if necessary.

R. F. ALIGNMENT: (535-1720 K.C.)

1. With the gang condenser in its minimum capacity position, plates entirely out of mesh, connect an external oscillator in series with a 100 mmf. condensor to the antenna lead and chassis ground and make the following adjustments:
   (a) With external oscillator set at 1720 kilocycles, adjust oscillator trimmer to resonance. This adjustment is on the top of rear section of variable gang condenser. (See Fig 1).
   (b) Re-set external oscillator to 1400 kilocycles, rotate condenser, pick up oscillator signal and adjust antenna trimmer to resonance. (Top of front section of gang condenser).
   (c) Check sensitivity at 600 and 1000 kilocycles.

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VOLTAGES AT SOCKETS

Volume Control: Maximum
Readings taken with 1000 ohm-per-volt meter

Antenna Shorted to Ground

		Voltage Between Socket Prong and Ground							
TUBE	FUNCTION	Prong No. 1	Prong No. 2	Prong No. 3	Prong No. 4	Prong No. 5	Prong No. 6	Prong No. 7	Prong No. 8
1D7G	Converter	0	+2	+83.5	+60	—15	+83.5	0	0
1D5G	I. F. Amplifier	0	+2	+83.5	+60	0	0	0	+83.5
1H4G	2nd Detector, AVC	0	+2	0	0	0	0	0	0
1D5G	1st Audio	0	+2	+30	+11	0	0	0	+83.5
1G5G	Output	0	+2	+80	+83.5	—2.5	0	0	— 6.5

LIST OF REPAIR PARTS (Serial No. 197000 and up)

Part No.	Circuit Diagram Reference	Description	List Price Each
		CONDENSERS	
1009	C5, C13	.05 x 200 Volt Tubular Condenser	.25
10011	C8, C10	.01 x 400 Volt Tubular Condenser	.25
10022	C2	.05 x 200 Volt Tubular Condenser	.25
10048	C7	.25 x 200 Volt Tubular Condenser (with Bracket)	.35
10071	C12	.004 x 600 Volt Tubular Condenser	.25
11952	C11	25MFD x 25W. Volt Electrolytic Condenser	.75
1292	C9	.005 Mica Type Condenser—20%	.25
1295	C6	.0001 Mica Type Condenser—20%	.25
12912	C4	.00025 Mica Type Condenser—20%	.25
		RESISTORS	
1309	R9	200M ohm - 1/3 Watt Resistor—20%	.20
13012	R2	50M ohm - 1/3 Watt Resistor—20%	.20
13017	R3	10M ohm - 1/3 Watt Resistor—20%	.20
13019	R7, R8, R10	1 megohm - 1/3 Watt Resistor—20%	.20
13021	R1	20M ohm - 1/3 Watt Resistor—20%	.20
13038	R4, R5	2 megohm - 1/3 Watt Resistor—20%	.20
13093	R11	450 ohm - 1/3 Watt Resistor—10%	.20
		COILS	
108111	T3	Input I. F. Coil Assembly Complete With Can	1.25
108112	T4	Output I. F. Coil Assembly Complete with Can	1.25
11085	T2	Oscillator Coil Assembly Complete	.50
11192	T1	Antenna Coil Assembly Complete	.60
		SOCKETS	
12193		Eight Prong Octal Sockets	.15
12194		Seven Prong Octal Sockets	.15
		SPEAKER	
114118	T6	Five Inch P. M. Dynamic Speaker	4.00
10557	T5	Output Transformer for Speaker	.90
		MISCELLANEOUS	
101116	R6, S1	Volume Control and Switch (1 Megohm)	1.00
101117	R12	Filament Rheostat Complete (4.75 ohms)	.50
10267	C	Two Gang Variable Condenser	3.00
10557	T5	Output Transformer for Speaker	.90
107168		Battery Connector Cable Complete	.75
11549		Goat Type Tube Shield Complete with 11548 Clamp	.15
117133B		Brass Bushings for Mounting Bottom Plate	.02
11848C		Bottom Cover Plate for Chassis	.35
12135		Plug for "B" Battery	.10
12198		Plug for "A" Battery	.10
13195		Battery Connector Lug Marked A—	.02
13196		Battery Connector Lug Marked A+	.02
128134E		Black Bakelite Volume Knob	.10
128134BR		Walnut Bakelite Volume Knob	.10
128134W		Ivory Bakelite Volume Knob	.10
128137E		Black Bakelite Tuning Knob	.15
128137BR		Walnut Bakelite Tuning Knob	.10
128137W		Ivory Bakelite Tuning Knob	.15
128142E		Black Bakelite Cabinet Complete Including Baffle, Grill Cloth and Carton	3.00
128142BR		Walnut Bakelite Cabinet Complete Including Baffle, Grill Cloth and Carton	3.00
128142W		Ivory Bakelite Cabinet Complete Including Baffle, Grill Cloth and Carton	5.00
128101		Baffle Board	.10
128129		Grill Cloth Back and Front	.15
128102B		Grill Cloth, For Side	.05
13282		No. 6 x 32 x ¼ Bottom Plate Mounting Screws, Doz.	.07
132144		No. 10 x 32 x ¾" Fibre Screw (Four used to Hold Chassis to Bottom Plate)	.10
13448B		Rubber Grommet (For Bottom Plate)	.03
13466E		Black Felt Shield for Lever Openings in Cabinet	.05
13466BR		Walnut Felt Shield for Lever Openings in Cabinet	.05
13466W		Ivory Felt Shield for Lever Openings in Cabinet	.05

Tubes are coded and guaranteed by the tube manufacturer.

Prompter service can be rendered on adjustments if defective tubes are returned direct to the tube manufacturer rather than through our factory.

All resistors are RMA color coded—specify value and/or resistor number (per schematic diagram) and model number.

When ordering condensers, specify part number, model number and/or capacitor (per schematic diagram) and model number.

Mica condensers are coded with an additional dot indicating tolerance:

Tolerence percent	Color of Dot
2½%	White
5%	Green
10%	Blue
15%	Yellow
20%	Red
More Than 20%	None

All prices quoted are list and are subject to the usual trade discounts. Shipments are F.O.B. our Factory. When remitting in advance, please include postage.

WE CANNOT SUPPLY SPEAKER CONES OR FIELDS SEPARATELY. WE CAN REPLACE OR REPAIR A DAMAGED SPEAKER FOR $1.25 NET, IF IT IS RETURNED TO OUR FACTORY, TRANSPORTATION CHARGES PREPAID.

PRICES SUBJECT TO CHANGE WITHOUT NOTICE.

DIAL PARTS LIST

112336	Clear Pyralin Tabs for Station Call Letter Tabs, Doz.	.10
112348	Set of 4 Sheets Station Call Letter Tabs, Set	.15
112370	Top and Bottom Wood Pulley Complete with 117287 Shaft for Indicator Film	.05
112371	Drive Drum for Indicator Film	.10
112372	Indicator Film	.05
112374	Center Wood Idler Pulley for Indicator Film	.03
112376	Dial Scale (Calibrated)	.35
115134	Support Bracket for Automatic Tuning Mechanism (Mounts to Variable Condenser)	.10
115135	Support Bracket for Automatic Tuning Mechanism (Right End of Mechanism)	.10
115136	Lever Complete with 117-290 Roller	.25
115144	Dial Bracket Housing (For Dial Scale)	.20
117256	Brass Spacer (Used on Cam Shaft Between Second and Third Tuner Cam on Left Side of Tuner Assembly)	.05
117257	Locking Screw for Tuning Knob	.10
117258	Tuner Cam	.05
117283	Locking Collar (For Right End of Cam Shaft)	.15
117359	Spacers (Used on Cam Shaft to Mount Dial Housing Assembly)	.05
117285	Brass Spacer (Used on Cam Shaft Between Drive Drum and Tuner Cam to Left of Drive Drum	.05
117286	Brass Spacer (Used on Cam Shaft Between Drive Drum and Tuner Cam to Right of Drive Drum)	.05
120156	Hair Pin Spring for Tuner Lever	.02
120163	Take-Up Spring for Indicator Film	.05
128128	Moulded Button Keys for Automatic Tuner Levers	.10
13143	Cinch Buttons (Used to Fasten Dial Scale to Dial Housing)	.03
131141	Compression Spring Washer (Used Between Locking Collar and first Tuner Cam on Right End of Cam Shaft)	.02
131157	Key Washers (Used on Each Side of Tuner Cams)	.02

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MODELS 3035, 3037, 3065, 3067

MONTGOMERY WARD

Gang Condenser

The gang condenser is of heavy construction and all trimming condensers are aligned at the factory and set. Very seldom do they need adjustment, however, if you are positive they are out of line they may be adjusted by means of a small modulated oscillator or signal as explained on page 3 of the 2955 service manual. The trimming condensers are located directly beneath the four holes of the condenser shield. Begin by adjusting the condenser next to the tuning dial and adjust each one carefully, always making sure that your main tuning knob is adjusted to exact resonance. Align trimming condensers with the tuning dial as near 1400 kilocycles as possible. No trimming condenser adjustment is necessary for the detector stage.

Neutralizing

The screen grid tube has such a small capacity between grid and plate that no neutralizing is necessary. There is usually as much capacity between the grid and plate prongs of the tube socket and the wiring in the chassis as there is in the tube itself.

Volume Control

The volume control is wire wound and has a resistance of 8000-ohms. It is so connected as to serve a dual purpose by varying the amount of energy to the antenna input transformer and also controlling the grid bias on the three screen grid tubes. The on, off switch is also operated from the projecting stud attached to the arm of the control.

Pilot Light

The pilot is a 3.2-volt bulb, and is shown in the schematic diagram connected to the filament line supplying the heater tubes and 245s. A flickering pilot light is caused by a defective bulb, a poor socket, a loose connection in one of the leads, or by a poorly soldered joint.

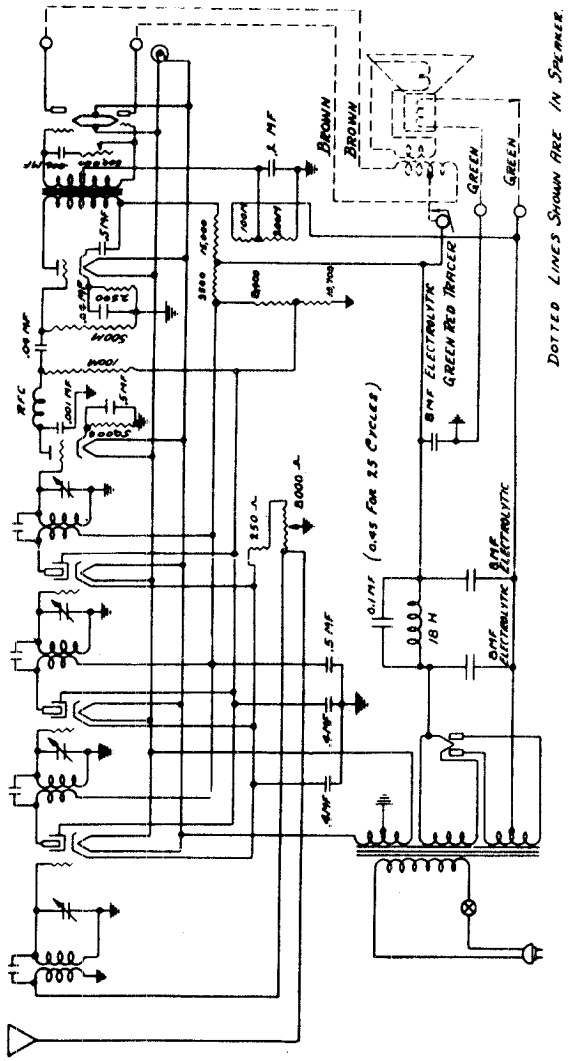
Operating Voltages

VOLTAGES AT SOCKETS—VOLUME CONTROL AT MAXIMUM—LINE VOLTAGE, 115 PLUG IN SOCKET OF RECEIVER—TUBE IN TEST SET

Type of Tube	Position of Tube	Function	A Volts	B Volts	Control Grid C Volts	Screen Volts	Screen Current MA	Cathode Volts	Plate MA	Grid Test MA
224	1	1st Radio	2.25	178	3.0	86	.45	3.0	3.4	3.8
224	2	2nd Radio	2.25	178	3.0	86	.45	3.0	3.4	5.8
224	3	3rd Radio	2.25	178	3.0	86	.45	3.0	3.4	5.8
227	4	Detector	2.25	60	9			9	.25	.3
227	5	1st Audio	2.25	160	12			12	4.5	5.5
245	6	2nd Audio	2.35	246	40				25	30
245	7	2nd Audio	2.35	246	40				25	30
280	8	Rectifier	4.9					Per plate		37

25 Cycle Chassis No. 3067 and 3037

This chassis is the same as the 60 cycle with the exception of the power transformer and the filter choke condenser. A 0.45 M.F. condenser is connected across the choke in the 25 cycle chassis, instead of the 0.1 M.F. condenser as in the 60 cycle chassis. Service instructions are the same for both.



Loud Speaker

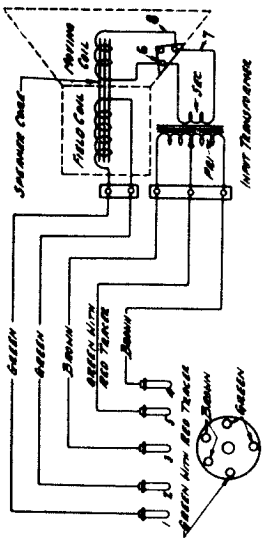


Figure 3

Fig. 3 shows the loud speaker connections and color code of wiring. The field has a resistance of 1000 ohms and is part of the filter circuit. It must therefore be connected at all times or the chassis will not operate. The speaker input transformer is mounted on the speaker chassis. The primary has a center tap connected to the positive high voltage side of the power pack and it is through this primary that the 245 tubes receive their plate supply. The secondary is a low impedance winding connecting to the voice coil of the speaker. The speaker and input transformer may be easily tested by temporarily connecting another speaker which is known to be good. Additional speakers may be used as explained on Page 7 of the instructions for the 2955 chassis, but this is not recommended.

Condenser Block

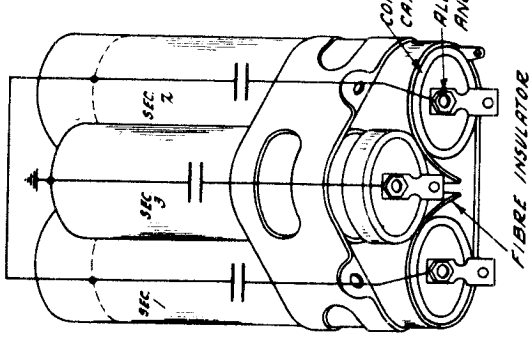


Figure 4

This is of the electrolytic type having three sections of eight M.F.D. capacity respectively. Very little trouble should be experienced with this condenser as it is self healing in case it breaks down. The connections are shown in Fig. 4.

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For Parts list, see P.15-97

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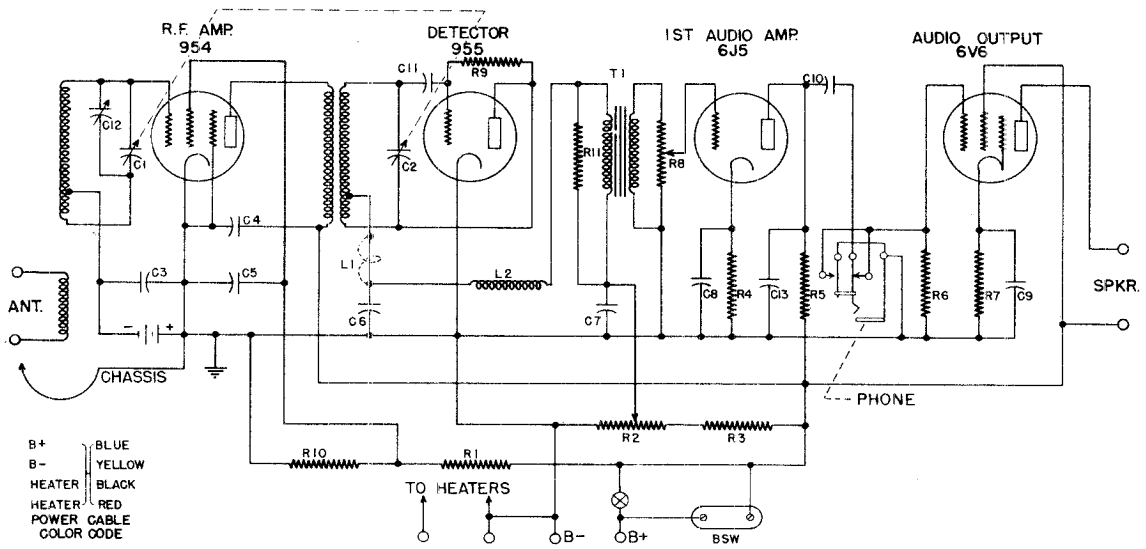

DWG. NO. 1 SCHEMATIC DIAGRAM—TYPE 1-10A RECEIVER

PARTS LIST

SYMBOL	FUNCTION	TYPE	RATING
C1	R.F. Tuning Capacitor.....	Air	15 mmf., max.
C2	Detector Tuning Capacitor.....	Air	15 mmf., max.
C3	R.F. Grid Return By-pass.....	Mica	0.003 mfd., 500 vdcw.
C4	R.F. Plate Return By-pass.....	Mica	0.003 mfd., 500 vdcw.
C5	Screen By-pass.....	Copper Plate	0.0005 mfd.
C6	Quench Frequency By-pass.....	Mica	0.003 mfd., 500 vdcw.
C7	Detector B+ By-pass.....	Elec.	8 mfd., 200 vdcw.
C8	1st Audio Cathode By-pass.....	Elec.	10 mfd., 50 vdcw.
C9	2nd Audio Cathode By-pass.....	Elec.	10 mfd., 50 vdcw.
C10	Audio Coupling Capacitor.....	Paper	0.1 mfd., 400 vdcw.
C11	Detector Grid Capacitor.....	Ceramic	50 mmf., 500 vdcw.
C12	R.F. Trimmer Capacitor.....	Air	5 mmf., max.
C13	Plate By-pass Capacitor.....	Mica	0.002 mfd., 500 vdcw.
R1	Screen Dropping Resistor.....	Fixed	33,000 ohms, 1/2 w.
R2	Regeneration Control.....	Variable	50,000 ohms
R3	Detector Plate Dropping.....	Fixed	22,000 ohms, 1 w.
R4	1st Audio Bias Resistor.....	Fixed	4,700 ohms, 1/2 w.
R5	1st Audio Plate Resistor.....	Fixed	0.1 megohm, 1/2 w.
R6	2nd Audio Grid Leak.....	Fixed	0.47 megohm, 1/2 w.
R7	2nd Audio Bias Resistor.....	Fixed	470 ohms, 1 w.
R8	Audio Gain Control.....	Comp. Var.	0.5 megohm
R9	Detector Grid Leak.....	Fixed	18 megohms, 1/2 w.
R10	Screen Bleeder.....	Fixed	47,000 ohms, 1/2 w.
R11	T1 Pri. Loading Resistor.....	Fixed	47,000 ohms, 1/2 w.
L1	Ultra-audion Choke.....	See Note #1	
L2	Quench Frequency Choke.....	Potted	250 millihenries
T1	Audio Transformer.....	Potted	4:1 ratio

Note #1: Used only on A, B and C Bands.

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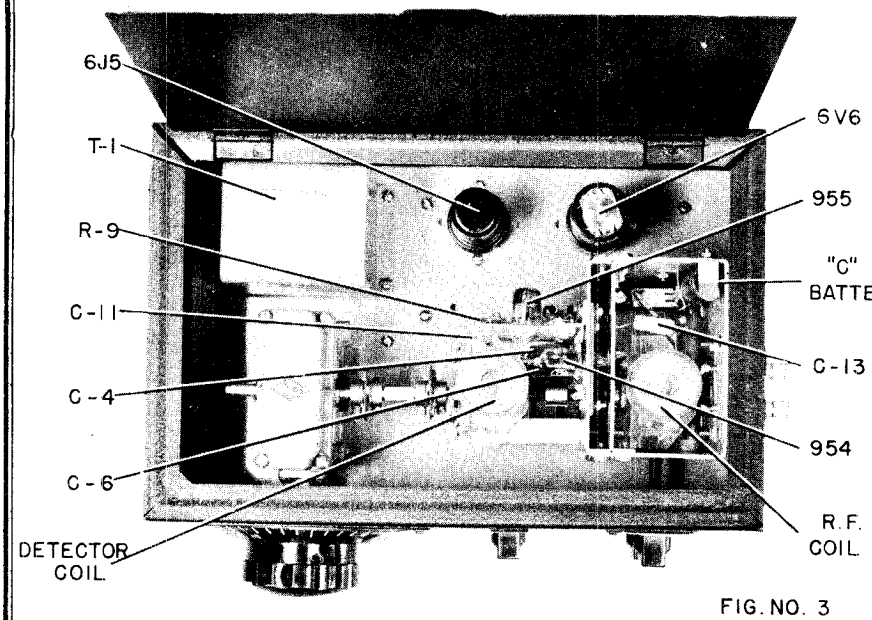
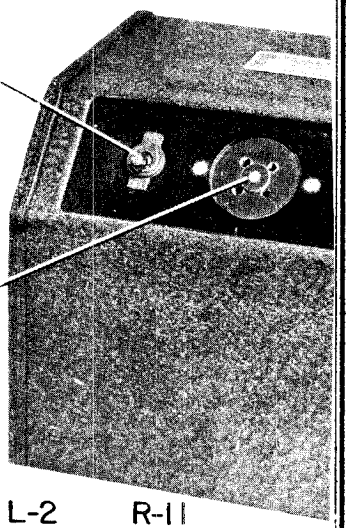


FIG. NO. 3



5886 POWER UNIT
FIG. NO. 4

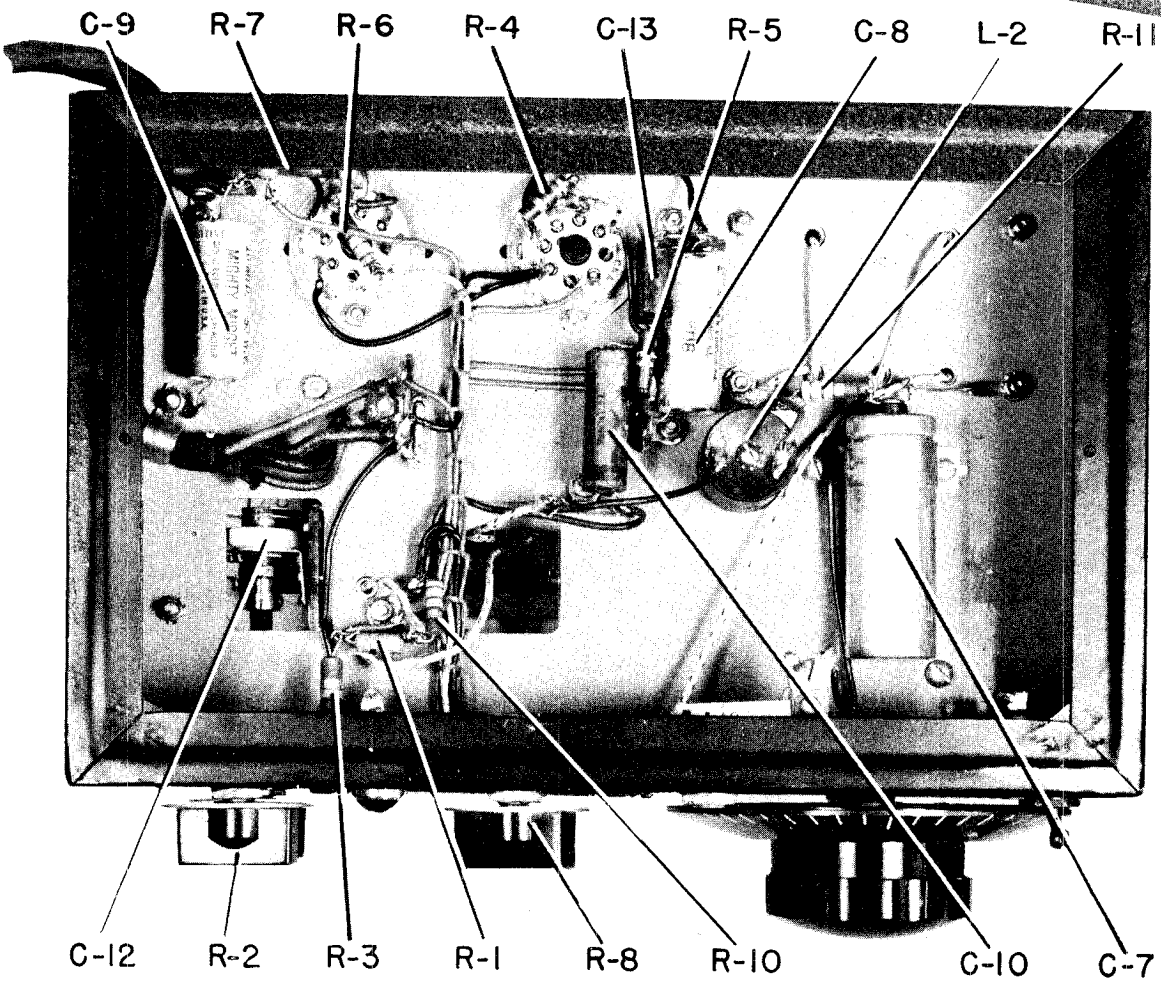


FIG. NO. 5

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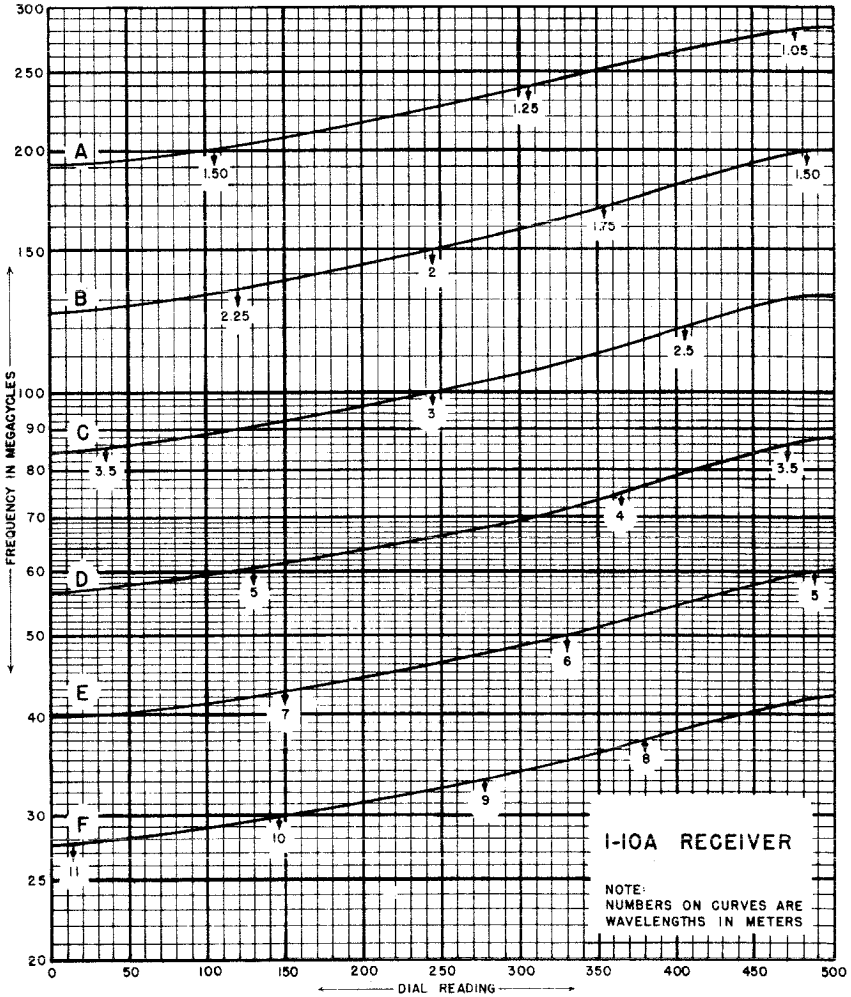
THE 1-10A RECEIVER

A complete National 1-10A communications equipment consists of the 1-10A Radio Receiver, #5886 Power Supply, and a MCS 8" PM dynamic loud-speaker with matching transformer in matching cabinets for table mounting installation.

CIRCUIT

The 1-10A Receiver employs a 4-tube circuit, consisting of one stage of tuned R.F., a self-quenching superregenerative detector, transformer coupled to a first stage of audio which, in turn, is resistance coupled to a power output stage.



DWG. NO. 2 CALIBRATION CURVES

TUNING SYSTEM

The tuning capacitors C1 and C2 plus 6 pairs of plug-in type coils are used to tune the frequency range of the receiver in six tuning bands. The frequency coverage and calibration curve of each band is shown in Dwg. 2.

The various coils are stamped "A-1", "A-2", "B-1", "B-2" etc., definitely identifying each coil. These coils are used in pairs, the letter designating the band and the number indicates the circuit position. The coil sockets of the R.F. and detector stages are marked "1" and "2", respectively, to correspond with the coil designations. The location of these coils make them readily accessible for band changing. It should be borne in mind, however, that the high frequency coils, (particularly the "A-1"), must be pushed down in the socket as far as they will go. If they are not, the inductance of the primary and secondary circuits will be increased and the calibration of the circuit will be altered.

POWER SUPPLY

The 1-10A Receiver is designed for operation from National type 5886 power unit, all voltage dividers, etc., being built in so that but one B voltage lead is necessary. The 5886 power unit is designed for operation from a 105-120 volt, 50-60 cps A.C. supply source. This power supply furnishes six volts at 1.6 amperes to the heater circuit and 180 volts at 35 milliamperes to the plate and screen circuits. A 3 volt C battery is used to supply bias to the R.F. tube. This battery is mounted in the rear right-hand corner of the R.F. compartment, being held in place by a spring clip. Two Everready type 915 cells, or equivalent, are needed. They are mounted in a bakelite tube and the positive (center) terminal of the upper cell is grounded at the top by a retaining bracket.

The 1-10A Receiver may be operated from batteries permitting portable or emergency operation. The operator is cautioned that either the loud-speaker connection or a jumper across the output terminals be maintained at all times. Failure to do this breaks the B supply to the plate of the 6V6 tube and places excessive voltage on the screen of the tube. This may result in serious damage to the tube.

If remote stand-by control is desired make a connection from the terminal on the BSW terminal panel to an external switch or relay.

BATTERY OPERATION

The 1-10A Receiver may be operated in portable or emergency service by connecting batteries to the pins of the 4 prong power plug. A 6 volt battery should be used to supply the heater circuits, (the two large prongs on the power plug), and the plate and screen circuit requirements from B batteries. To effect battery economy, the 6V6 may be removed from its socket and headphone operation used. Voltages in excess of 180 are not recommended and receiver performance will be unsatisfactory on the "A" range at voltages below 167. If lower voltages must be used, as in portable operation, resistors R1 and R3 may both be shorted out. This will allow the receiver to function normally with a maximum voltage of 90, but with reduced audio output.

In battery operation aging A and B batteries with a resultant decreasing voltage supply may render the receiver inoperative. This effect will first be noticed at the extreme ends of the "A" band.

The B supply "On/Off" Switch functions to break the positive B supply lead and in the "Off" position is useful for temporarily rendering the receiver inoperative during periods of transmission, or when changing coils, while permitting the heater circuits to remain closed. When using B battery plate supply, the switch should be thrown to the "Off" position at all times when the receiver is not in use, in order to avoid parasitic drain.

The Regeneration control functions to adjust the level at which the detector circuits go into superregeneration. This condition is indicated by a loud rushing or hissing noise. The hiss will drop down to a very low level or disappear entirely when a signal is tuned in, the reduction depending somewhat upon signal strength. Sensitivity will depend upon the adjustment of the Regeneration control, the maximum occurring just beyond the point where the hiss starts. The setting of the Regeneration control at which the detector goes into superregeneration will vary with different sets of coils and with the condition of the 955 detector tube. On the "A" range it may be necessary to advance the control to the full "On" position as the detector tube begins to wear out.

A BSW terminal panel is mounted at the rear of the receiver chassis. These terminals are connected in parallel with the B supply switch. If external (remote) stand-by control is desired, it can be accomplished by connecting a switch or relay to the terminals provided on the BSW terminal panel.

MODEL NC-2-40C

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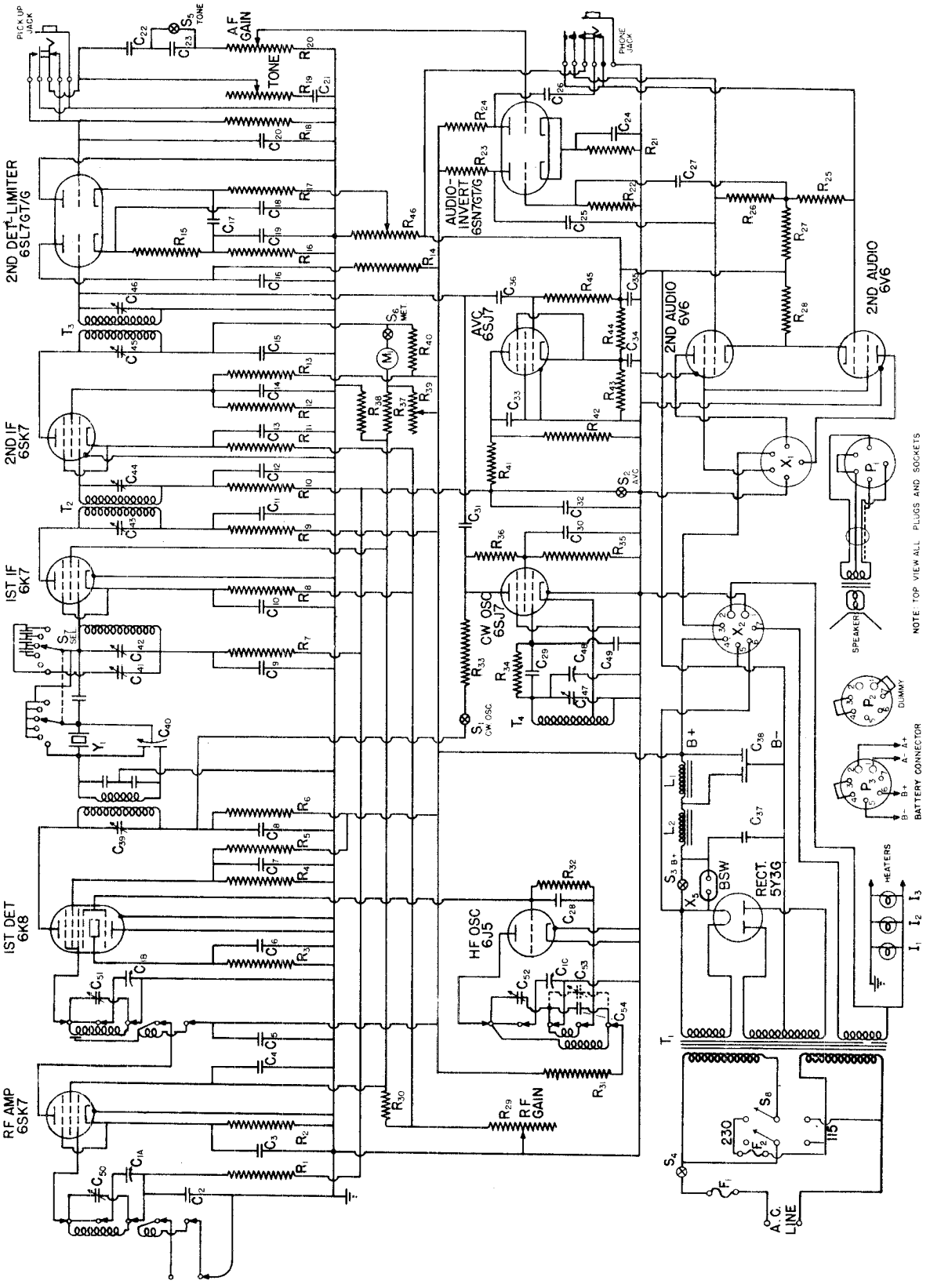

NC-2-40C
DWG. NO. 4 SCHEMATIC DIAGRAM

IF PEAK 455 KC

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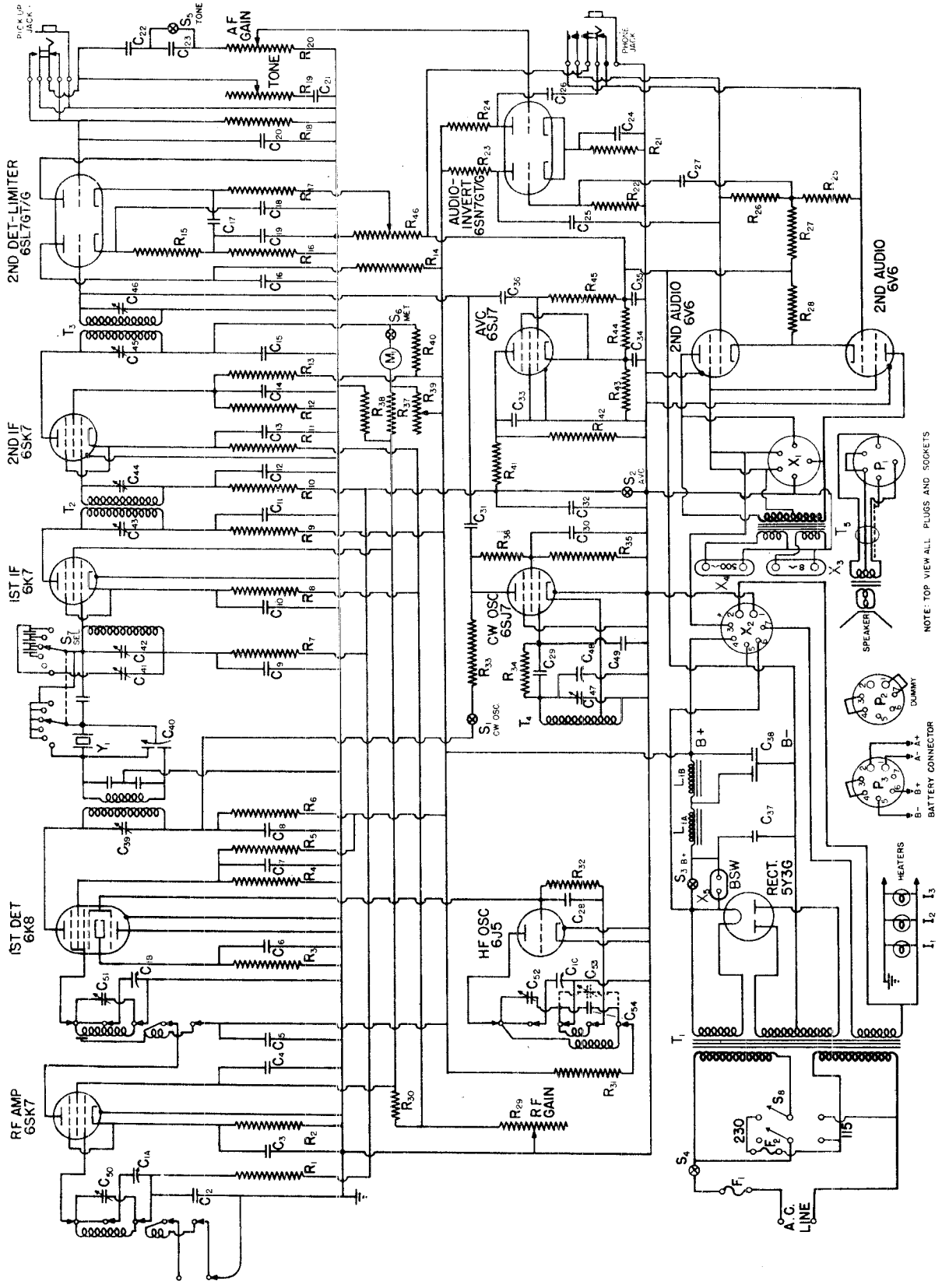
MODEL NC-2-40CS

NATIONAL CO. INC.



NC-2-40CS
DWG. NO. 5 SCHEMATIC DIAGRAM

IF PEAK 455 KC

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MODELS NC-2-40C,
NC-2-40CS

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1-1. *General*

The NC-2-40C RADIO RECEIVER is a twelve tube superheterodyne covering a continuous frequency range of from 490 to 30,000 kilocycles. The NC-2-40CS RADIO RECEIVER is identical with the NC-2-40C except for the frequency range covered and output terminations. The NC-2-40CS has a frequency range of from 200 to 400 and from 1,000 to 30,000 kilocycles.

Each equipment consists of a receiver and speaker built for either relay rack or table mounting and an instruction manual.

Throughout the text of this instruction manual all references to the NC-2-40C shall also apply to the NC-2-40CS except where indicated.

1-2. *Circuit*

The circuit employed on all bands consists of one stage of radio frequency amplification, a separate first detector and stabilized high frequency oscillator, two intermediate frequency stages, an infinite impedance second detector, a self-balancing phase inverter and audio amplifier, and a push-pull audio output stage.

The second detector utilizes one set of elements of a dual triode; the other set of elements is utilized for a series valve noise limiter. Separate tubes are used in the automatic volume control and beat frequency oscillator circuits. The latter is coupled to the second detector for C.W. reception.

A crystal filter is connected between the first detector and first I.F. amplifier tubes.

1-3. *Tube Complement*

The NC-2-40C is supplied complete with tubes which are tested in the receiver at the time of alignment.

1-4. *Tuning System*

The master tuning capacitor C-1 and six sets of coils are used to tune the frequency range of the receiver in six tuning bands.

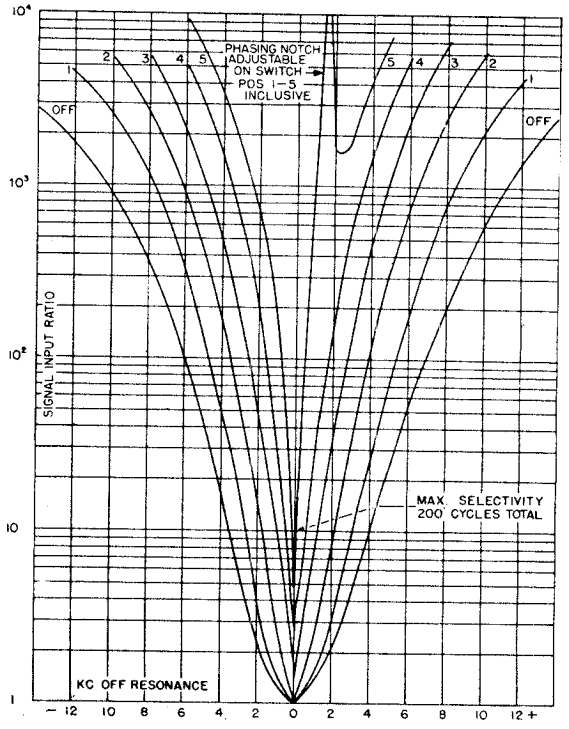
The frequency coverage of the six bands is as follows:

NC-2-40C		NC-2-40CS	
Band A	14.-30. MC	Band A	14.-30. MC
Band B	7.-14.4 MC	Band B	7.-14.4 MC
Band C	3.5-7.3 MC	Band C	3.5-7.3 MC
Band D	1.7-4. MC	Band D	1.7-4. MC
Band E	1.0-2.0 MC	Band E	1.0-2.0 MC
Band F	0.49-1. MC	Band F	200-400 KC

All transformer coils of the R.F. amplifier, first detector and H.F. oscillator stages with their associated padder and air-dielectric trimmer capacitors are mounted in a rigid aluminum casting which slides the length of the chassis, being moved by the MAIN TUNING control. The various coil assemblies are fitted with heavy contact pins which engage spring contactors mounted immediately under the variable tuning capacitor. This system permits thorough shielding of each individual coil while, at the same time, the coils in use are moved to the best position in the chassis, giving shortest leads to the tubes and master tuning capacitor, and all other coils are completely disconnected from the circuit.

1-5. *Crystal Filter*

Undoubtedly, the most efficient, flexible crystal filter yet designed is used in the NC-2-40C Receiver. Six uniform steps of selectivity, as shown in Dwg. No. 1, and a variable phasing control allow the receiver to be adjusted to almost any operating condition, a highly desirable feature for both short wave communication and broadcast band reception. The curves show that any degree of selectivity between that of full single signal operation and wide band broadcast reception is available, the ratio between the two being almost forty to one.



Dwg. No. 1. Typical Selectivity Characteristics

1-6. *Noise Limiter*

The noise limiter of the NC-2-40C Receiver is of the series valve type developed in the national laboratories. Its effectiveness and superior performance as compared to the more common types of 'silencers' were proved in the NHU and modernized NC-100 receivers. A threshold control on the front panel permits adjustment of the level at which limiting action starts.

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1-7. *Tone Control*

The tone control is used to vary the frequency characteristic of the audio amplifier. The control is particularly helpful when receiving weak signals through interference, as explained in Section 3.

1-8. *Signal Strength Meter*

A 0 to 1 milliameter, serving as a signal strength meter, is front panel mounted. It is fitted with a scale in S-Units from 1 to 9 and in DB above S-9 from 0 to 40 DB. The bridge circuit, in which the meter is connected, makes possible accurate signal input readings from below 1 microvolt to 1,000 microvolts.

1-9. *Antenna Input*

Antenna input terminals are located at the rear of the receiver chassis near the center. The input circuit is suitable for use with a single wire antenna, a balanced feed-line or a low impedance concentric transmission line. Average input impedance is 500 ohms.

1-10. *Audio Output*

(1) A headphone jack is mounted on the front panel and is wired so as to silence the loud speaker when the phone plug is inserted. The correct load impedance for the headphone circuit is 20,000 ohms, this being the usual impedance of phones having a DC resistance of between 2,000 and 3,000 ohms. Maximum audio output available at the phone jack is 15 milliwatts.

(2) A five prong speaker socket (X-1) is provided at the rear of the receiver chassis. To this socket are brought the audio output leads. The proper load impedance (total) for the output circuit is 10,000 ohms. Maximum undistorted audio power output available is 8 watts.

(3) The NC-2-40CS is provided with an output transformer (T5) having a secondary with two windings which are connected to two terminal strips on the rear of the chassis. Both 8 ohm and 500 ohm terminations in addition to the speaker socket termination of 10,000 ohms are thus provided. The 8 and 500 ohm strips are the screw terminal type.

1-11. *Power Supply*

The standard NC-2-40C Receiver is designed for operation from a 110/120 volt, or 220/240 volt, 50/60 cycle power source. A toggle switch is provided in the dual primary circuit of the power transformer to permit operation from either voltage. Normal power consumption is approximately 100 volt-amps. The built-in power supply delivers all voltages required by the heater and B supply circuits-4.5 amperes at 6.3 volts and 100 milliamperes at 250 volts, respectively. One side of the AC input line is connected through a 2 ampere and a 1 ampere fuse each housed in an extractor post marked 'FUSE' which are mounted at the rear of the receiver chassis. The 2 ampere fuse is used in the circuit for 115 volt operation; both 2 and 1 ampere fuses are used for 230 volt operation.

All NC-2-40C Receivers are equipped with a seven prong plug and socket combination to permit portable or emergency operation from batteries; See Section 2-3.

1-12. *Loud Speaker*

The loud speaker supplied with the table model NC-2-40C receiver is of the permanent magnet field type having a nominal diameter of 10 inches. A coupling transformer, mounted on the loud speaker chassis, matches the voice coil to the output impedance of the receiver. A shielded three wire cable and plug is furnished for connection between the loud speaker and receiver.

1-13. *Pick-up Jack*

A pick-up jack mounted on the front panel of the receiver may be used to connect auxiliary apparatus, such as phonograph pick-up, to the audio system of the NC-2-40C Radio Receiver. This input circuit is high impedance and feeds into the 6F8G. Audio Amplifier-Phase Inverter tube. The TONE and AF GAIN controls are operative with this connection.

2-1. *Antenna Recommendations*

When using a single-wire antenna, the lead-in should be connected to one antenna input terminal and the short flexible lead, which is attached to the chassis, should be fastened to the other terminal. The dimensions of the single-wire antenna system are not critical, the recommended length, including lead-in, being from 75 to 100 feet, although any length between 25 and 200 feet may be used.

Feed-lines of doublet systems should be connected to the two input terminals. The flexible lead is not used.

The inner conductor of a concentric transmission line should be connected to one input terminal. The outer conductor and the flexible grounding lead should be connected to the other terminal.

An external ground connection to the chassis may or may not be necessary. It should be used unless it reduces signal strength.

2-2. *AC Operation*

Insert the dummy connector plug P-2 in the seven prong socket X-2.

Insert loud speaker plug P-1 in the five prong audio output socket X-1 of the Receiver.

Connect antenna feed line.

Set primary selector switch for line voltage to be used i.e. 115 or 230.

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MODELS NC-2-40C
NC-2-40CS

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2-3. *Battery Operation*

The NC-2-40C may be operated in portable or emergency service by connecting batteries to the terminals of battery connector plug P-3 and inserting it in socket X-2, in place of plug P-2. See Fig. No. 1. For normal operation with somewhat reduced loud speaker output, a 6 volt heater supply (storage battery) should be connected to terminals 1 and 2 of plug P-3, and a 180 volt B supply should be connected to plug terminals 5 and 6. The jumper between terminals 3 and 4 (of P-3) completes the plate and screen supply circuits of the 6V6 output tubes. It may be omitted, with greater batterv economy, when operation with head-

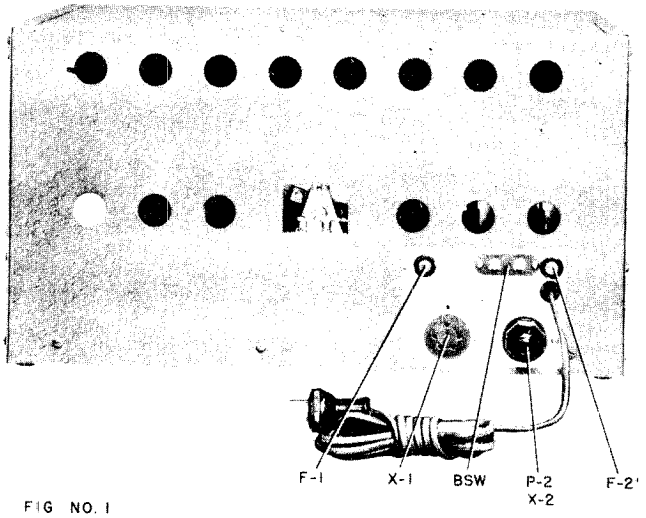

FIG NO. 1

phones only is desired. A suggested refinement is to connect a switch between terminals 3 and 4, thus permitting the 6V6 B supply to be opened at will. Alternatively, removal of speaker plug P-1 from socket X-1 will open the 6V6 B supply in the same manner, without harming the output tubes. A further economy of battery power may be effected by removing the 6V6 tubes from their sockets.

Do not attempt to use plug P-2 for battery connection, since the jumper between terminals 1 and 7 would be incorrect.

3-1. *Controls*

The MAIN TUNING control knob is located at the middle of the front panel and operates a three gang variable capacitor C-1 through approximately a 60 to 1 ratio reduction drive mechanism.

The accuracy of the calibration can be relied upon to be better than plus or minus 1%.

The tuning system of the NC-2-40C is truly single control; in fact, the MAIN TUNING control referred to above is used for band changing as well as tuning. To select any one of the six tuning bands, the MAIN TUNING control knob is pulled out about ¼ inch. When this is done, the dial and capacitor drive mechanism is disengaged and the knob is geared to the coil castings. As the knob is turned, the coil carriage is moved across the chassis until the proper coil pin contacts engage the circuit contactors, as indicated by the scale markers. Approximately one full turn of the MAIN TUNING knob is required to change from one tuning band to an adjacent tuning band. After the desired band has been selected, the tuning knob is pushed in to its original position, disengaging the coil carriage rack.

The LIMITER control, at the left-hand side of the receiver panel, is used to adjust the DC potential applied to the elements of the series valve noise limiter tube. The limiter circuit is thus provided with an adjustable threshold at which limiting starts. Any audio voltages, or peaks, in excess of this threshold are prevented from reaching the audio amplifier. With the LIMITER control set at 0, the limiter circuits will pass all but the strongest audio peak voltages; when the control is set at 10, the threshold is lowered to a point where the audio signal will be distorted due to suppression of the positive peaks.

The R.F. GAIN knob is located below and to the right of the LIMITER knob. It is used to adjust the amplification of the R.F. amplifier and two I.F. amplifier tubes. Amplification increases as the control is turned clockwise towards 9. With the knob set at 10, the meter switch is closed, connecting the signal strength meter. See Section 3-4 regarding meter use.

A CONTROL SWITCH is mounted above the R.F. GAIN control knob. In the AVC position, the automatic volume control circuits are in operation; in the MVC position, automatic volume control is turned off; in the CWO position, the beat frequency oscillator is turned on and the automatic volume control is turned off.

The POWER SUPPLY control knob is directly above the CONTROL SWITCH. In the counterclockwise position, OFF, the receiver is turned off, the primary circuit being opened by the AC line switch; in the mid-position B+ OFF, the AC line switch is turned on but the B supply circuits are incomplete since the B+ switch is opened; in the clockwise position, B+ ON, the B+ switch is closed, completing the B supply circuit. The B+ OFF position may thus be used for rendering the receiver inoperative, as may be required during transmission periods.

The PRIMARY SELECTOR SWITCH of the power transformer is mounted on the receiver chassis to the right of the power transformer. This switch selects the proper circuit arrangement of thedual primary for operation from either 115 or 230 volt power source. There is a shield provided to prevent unintentional throwing of the switch.

The A.F. GAIN control knob is located to the right of the MAIN TUNING control. It is used to adjust the audio amplification of the receiver.

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Audio amplification increases as the control is turned towards 10 on the scale.

The PHASING and SELECTIVITY controls, located above the A.F. GAIN knob, are part of the crystal filter. When the SELECTIVITY control is set at OFF, the crystal is switched out of the circuit. With the crystal switched out, the phasing control has little influence on receiver performance. With the SELECTIVITY control knob set at any point between 1 and 5, inclusive, the crystal filter is in operation, selectivity increasing as the knob is advanced to 5. The PHASING control is then used to balance the crystal bridge circuit and eliminate interferring signals or heterodynes. See Sections 3-2 and 3-3.

The C.W. OSC. control knob located to the right of the SELECTIVITY control is used for varying the frequency of the beat oscillator. At 0 on the C.W. OSC. scale, the beat oscillator is tuned to the intermediate frequency. See Section 3-3.

A TONE control knob is located above the C.W. OSC. knob and is used to vary the frequency characteristic of the audio amplifier as previously described.

A BSW terminal panel is mounted at the rear of the receiver chassis. The terminals are connected in parallel with the B+ switch. If external (remote) stand-by control is desired, it can be accomplished by connecting a switch or relay to these terminals.

3-2. *Phone Reception*

After the equipment is properly installed, in accordance with Section 2, it is placed in operation by turning the POWER SUPPLY switch to B+ ON. The LIMITER control should be set at 0. The CONTROL SWITCH should be set at AVC. The PHASING knob should be set at 0; the SELECTIVITY at OFF; the TONE control should be set to give the desired audio characteristic; the R.F. GAIN control should be advanced to some point between 8 and 10, depending upon receiving conditions; the A.F. GAIN control should be set at the point providing the desired audio volume. The receiver is now adjusted for the reception of phone signals and will tune to the frequency indicated by the MAIN TUNING dial. The C.W. OSC. knob has no influence on receiver performance under these conditions.

With the CONTROL SWITCH set in the AVC position, as recommended, the R.F. GAIN knob should be advanced as far as receiving conditions permit, or until background noise becomes objectionably loud. Audio output should be adjusted entirely by means of the A.F. GAIN knob. The operator must remember that automatic volume control action will be restricted unless the R.F. GAIN knob is fully advanced.

The CONTROL SWITCH may be set at MVC, in which case the operator must be careful not to advance the R.F. GAIN knob to a point where I.F. or audio amplifier overload occurs. Such overload is indicated by distortion. In general, the A.F. GAIN control may be set at about half way on, i.e., at 5 and the audio output adjusted by means of the R.F. GAIN control.

If a signal is weak and partially obscured by background noise and static, best signal-to-noise ratio will be obtained by turning the TONE control toward the LOW position. The most effective setting must be determined by trial as too much attenuation of high audio frequencies will impair the intelligibility of speech.

When a signal is accompanied by static peaks or noise pulses of high intensity and short duration, the best signal-to-noise ratio will be obtained by advancing the LIMITER control towards 10. The best setting must be determined by trial as too much limiter action will impair audio quality. If static peaks and noise pulses are extremely strong or if they are of fairly long duration, the effectiveness of the limiter will be best with the CONTROL SWITCH in the MVC position. In such cases both R.F. GAIN and LIMITER controls must be carefully adjusted for optimum signal-to-noise ratio.

The selectivity of the receiver may be adjusted by means of the crystal filter. The normal setting of the SELECTIVITY control in phone reception is at one of the positions affording broad selectivity. Positions 1 or 2 are recommended. Selectivity may be progressively increased by turning the SELECTIVITY control to positions 3, 4 and 5 although advancing the control too far will increase selectivity to a degree where phone signals become unintelligible.

The PHASING control is used to eliminate or attenuate heterodynes. The normal setting of the PHASING control in phone reception is at 0 on the scale. If, after a signal has been tuned in, an interfering signal causes a heterodyne or whistle, the PHASING control should be adjusted until the interference is reduced to a minimum. The setting of the PHASING control which provides maximum attenuation of the heterodyne will depend upon the pitch of the heterodyne whistle. If the beat note is above 1,000 cycles, the optimum PHASING control setting will be near 0; if the beat note is 300 or 400 cycles, the optimum PHASING control setting will be near one end of the scale or the other, depending upon whether the interfering signal has a higher or lower frequency than the desired signal.

It is recommended that the TONE control be set in the HIGH position when using the crystal filter in phone reception. The resulting attenuation of low audio frequencies tends to compensate for the side-band cutting action of the crystal filter.

3-3. *C.W. Reception*

The initial adjustment of the receiver for C.W. reception is as described in Section 3-2, except that the CONTROL SWITCH must be in the C.W.O. position. The C.W. OSC. control should be set at mid-scale.

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The sensitivity of the receiver should be adjusted by means of the R.F. GAIN control, care being taken not to advance the control to the point where strong signals will cause I.F. or audio amplifier overload, as indicated by excessive thumping.

The action of the TONE and LIMITER controls will be similar to that described under Section 3-2. When receiving C.W. signals, it will be possible to advance both TONE and LIMITER controls considerably further than is possible in phone reception, since audio distortion is relatively unimportant.

Turning the C.W. OSC. control will change the characteristic pitch of the receiver background noise. The pitch will become higher as the beat frequency oscillator is detuned from the I.F. amplifier. With the C.W. OSC. control set at 2 or 3 (on either side of 0), the characteristic pitch of the receiver background noise will be in the neighborhood of 2,000 cycles. Under these conditions, the audio beat note of any C.W. signal will show a broad peak at approximately 2,000 cycles. This peak will appear on 'one side of the carrier' only and the other side, where the audio beat note is around 2,000 cycles, will be considerably weaker. This characteristic, known as 'semi-single signal', is helpful in receiving weak signals through interference.

As stated in Section 3-2, the selectivity of the receiver may be adjusted by means of the crystal filter, the action of the SELECTIVITY and PHASING controls in C.W. reception being similar to that described. It is possible, however, to utilize the full range of crystal filter selectivity in C.W. reception. Maximum selectivity is obtained with the SELECTIVITY control set at 5. With this setting the single-signal effect, outlined above, becomes very pronounced; in other words, the audio beat note is very sharply peaked at a definite audio frequency which is determined by the setting of the C.W. OSC. control. The operator may have difficulty in finding the audio-peak when first attempting to use the crystal filter. After a signal has been accurately tuned to give peak response, the R.F. GAIN control may need to be retarded in order to prevent I.F. or audio overloading. With the receiver tuned to 'crystal peak', an interfering signal may be attenuated by proper setting of the PHASING knob since this control does not appreciably affect the desired signal.

3-4. *Measurement of Signal Strength*

To make a measurement of signal strength by means of the S-meter, the R.F. GAIN control must be advanced to 10, and the CONTROL SWITCH set at the AVC position. The crystal filter should be turned OFF by means of the SELECTIVITY control; the PHASING knob set at 0. The TONE, LIMITER and A.F. GAIN controls do not affect the meter reading.

Tuning the receiver to a signal will cause the meter to read, indicating the signal input in S-units or in decibels above the S-9 level.

With no R.F. input to the receiver, or with the antenna disconnected, the S-meter should read 0, plus or minus 1 S-unit. If it does not, the S-meter circuit requires adjustment. See Section 5-5.

Measurement of the signal strength of C.W. signals cannot be made with the beat frequency oscillator in operation.

4-1. *Tube Failures*

Failure of a vacuum tube in the receiver may reduce the sensitivity, produce intermittent operation, or cause the equipment to be completely inoperative. In such cases, all tubes should be checked either in an analyzer or similar tube testing equipment, or by replacement with tubes of proven qualities. All tubes should be marked as they are removed from the receiver so that they may be returned to their original sockets thereby reducing the necessity for realignment.

Individual tubes of the same type will vary slightly in their characteristics and it is well to remember this fact when replacements become necessary. Even though the circuit is designed to reduce the effect of such variations to a minimum, the high frequency oscillator and I.F. tubes should be selected with some care. A replacement high frequency oscillator should be checked in the receiver to make sure that the inter-electrode capacities are the same as those of the tube originally employed. This is easily determined by noting any change in dial calibration.

Substitution of new tubes in the I.F. amplifier may possibly alter overall gain and selectivity characteristics. Instructions for realignment are given in detail in Section 5-2.

One other point should be checked when trying the new high frequency oscillator; a fairly strong steady signal should be tuned in, preferably on some frequency above 10 mc.; the beat frequency oscillator should be turned off; jarring the receiver, or lightly tapping the tube, should not show any evidence of noise in the output.

4-2. *Circuit Failures*

Even though all component parts of the receiver have an ample factor of safety, failure may occur in individual cases. Excluding tubes, the most common failure will probably be due to some defect in a capacitor or resistor. Measurement of voltage in accordance with Section 4-4 will no doubt show where failure has occurred.

4-3. *Stage Gain Measurements*

The sensitivity measurements listed below are made with the equipment set up as specified in Section 5-1. The CONTROL SWITCH should be set at MVC, the A.F. GAIN at 10, the SELECTIVITY at OFF

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and the PHASING at 0. The signal generator should be adjusted to deliver a test signal of 455 plus or minus 2 kc. either modulated or unmodulated. The high output lead should be attached to the grid of the tube specified in the table below and the ground lead connected to the receiver chassis.

With 1 milliwatt output at the phone jack, the test signal should be within the limits specified below.

Terminal	Test Signal
First Det. Grid...	50 ± 10 Microvolts
First I.F. Grid...	250 ± 50 Microvolts
Sec. I.F. Grid....	50,000 ± 10,000 Microvolts
Sec. Det. Grid....	Over 1 volt

4-1. *Voltage Tabulation*

All measurements of voltages should be made with the equipment connected for normal operation with AC supply of 115 volt, 50/60 cycle or 230 volt, 50/60 cycle. Except as noted, the R.F. GAIN knob is at 9, the LIMITER knob set at 0 and the CONTROL SWITCH knob set at MVC. A DC Voltmeter of 1,000 ohms per volt sensitivity should be used. The following table must not be considered as a list of the actual operating voltages since loading effects of the measuring instrument will disturb many of the circuits and alter normal voltage distribution. All voltages are measured between specified terminal and chassis.

Tube Terminal	DC Volts ±15%
R.F. Amp. Grid.....	0
R.F. Amp. Cathode.....	3 A
R.F. Amp. Cathode.....	25 A*
R.F. Amp. Screen.....	80 B
R.F. Amp. Plate.....	230 B
First Det. Grid.....	0
First Det. Cathode.....	1 A
First Det. Screen.....	80 B
First Det. Plate.....	225 B
H.F. Osc. Grid.....	C
H.F. Osc. Cathode.....	0
H.F. Osc. Plate.....	90 B
First I.F. Grid.....	0
First I.F. Cathode.....	3 A
First I.F. Cathode.....	25 A*
First I.F. Screen.....	80 B
First I.F. Plate.....	225 B
Sec. I.F. Grid.....	0
Sec. I.F. Cathode.....	5 A
Sec. I.F. Cathode.....	25 A*
Sec. I.F. Screen.....	95 B
Sec. I.F. Plate.....	225 B
Sec. Det. Grid.....	0
Sec. Det. Cathode.....	8 A
Sec. Det. Plate.....	225 B
Limiter Grid.....	-3 A
Limiter Cathode.....	4.5 A
Limiter Cathode.....	0 D
Limiter Plate.....	0
AVC Grid.....	-25 AE
AVC Cathode.....	-45 AE
AVC Screen.....	0 E
AVC Plate.....	0 E
B.F. Osc. Grid.....	C
B.F. Osc. Cathode.....	0 F
B.F. Osc. Screen.....	10 AF
B.F. Osc. Plate.....	25 AF
Amp.-Inv. Grids.....	0
Amp.-Inv. Cathode.....	4.5 A
Amp.-Inv. Plates.....	115 B
Audio Grids.....	-20 A
Audio Cathodes.....	-40 A
Audio Screens.....	230 B
Audio Plates.....	215 B
B+ Common.....	230 B
B- Common.....	-50 B

A--0 to 50 volt meter scale
B--0 to 250 volt meter scale
C--Accurate measurement cannot be made
D--LIMITER knob set at 10
E--CONTROL SWITCH knob set at AVC
F--CONTROL SWITCH knob set at CWO
*--R.F. GAIN knob set at 0

The Power Output Tubes used in the NC-2-40C Radio Receiver may be the metal type 6V6 or the glass type 6V6GT/G. It is necessary, however, to provide glass type 6V6GT/G output tubes with metal shields to avoid oscillation in the audio amplifier. The recommended shield is Goat type G1222K with type G1004 connector.

5-1. *General*

All circuits are carefully aligned, before shipment, using precision crystal oscillators which insure close conformability to the dial calibration. No readjustment will be required, therefore, unless the receiver is tampered with or damaged.

To determine the necessity for realignment, the receiver should first be carefully checked against its normal performance as described in Section 3. In no case should realignment be attempted unless tests indicate that such realignment is necessary.

The coil group which is plugged into the circuit at any time is the one directly underneath the three gang master tuning capacitor. The coil nearest the front panel of the receiver is in the H.F. oscillator circuit, the middle coil is in the first detector circuit and the coil nearest the antenna input terminal panel is in the R.F. amplifier circuit. See Fig. No. 5.

All coils have individual trimmer capacitors. The H.F. oscillator circuits of tuning bands E & F

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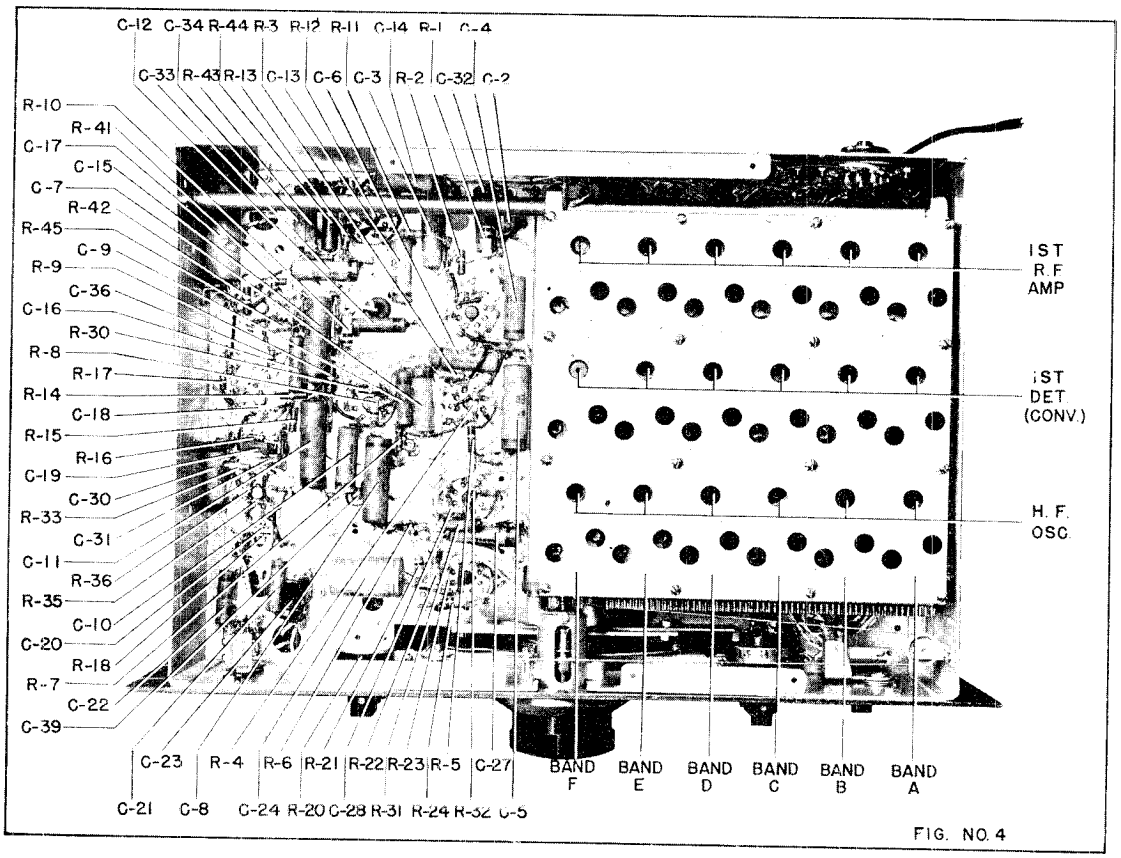

FIG. NO. 4

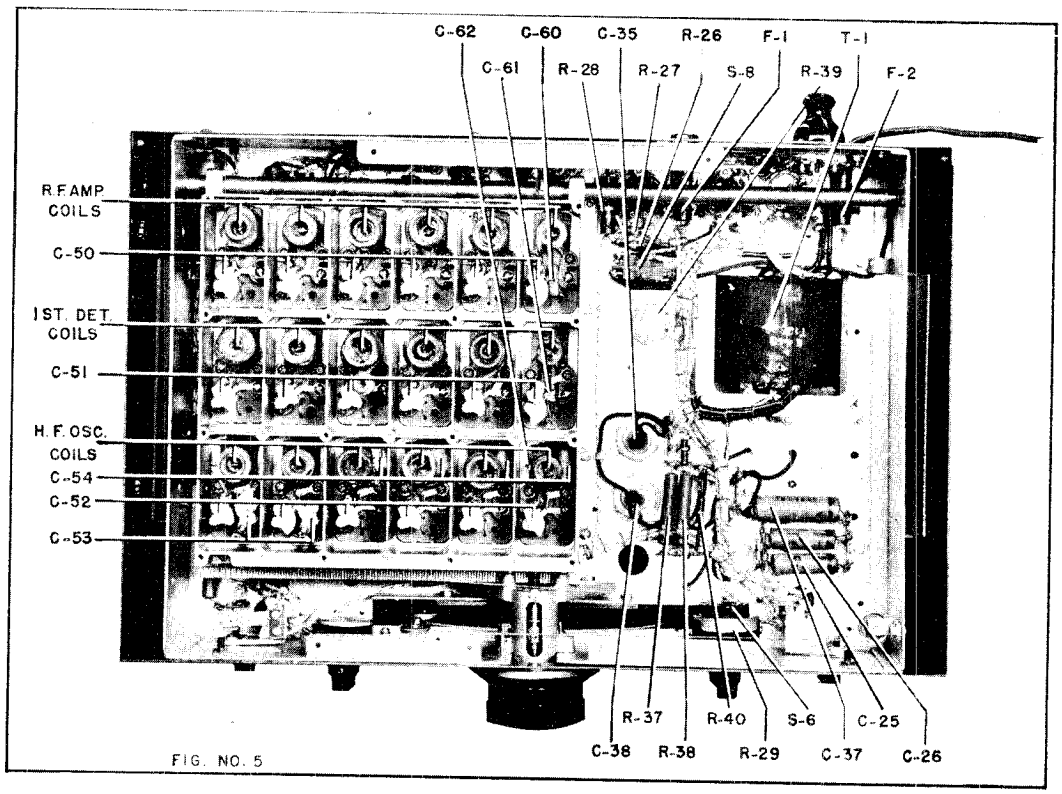

FIG. NO. 5

The two bottom views above show the NC-2-40C Receiver with the coil carriage at the extreme end of its travel. It will be noted that such construction makes all components readily accessible.

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have, also, variable series padding capacitors. These capacitors are identified in Fig. No. 5.

A screwdriver having a metal shaft may be used to make adjustments in the high frequency circuits but capacity effects will be noticeable, and the shaft should not touch any part of the aluminum casting.

Before proceeding with the alignment of any circuit of the receiver, the equipment must be set up as specified in Section 2, except that the antenna lead-in or transmission line must be disconnected. An output meter having a 20,000 ohm resistor load should be connected to the phone output jack. The POWER SUPPLY knob should be set at B+ ON and the R.F. GAIN knob set at 9. The TONE control knob should be set at N and the LIMITER knob should be retarded to 0.

Alignment of the equipment may be divided into two major steps:

(1) I.F. Amplifier Alignment
(2) H.F. Circuits Alignment
  (a) H.F. Oscillator
  (b) First Detector and R.F. Amplifier
  (c) Tracking of H.F. Circuits

The circuits MUST be tuned in the above order when complete alignment is necessary.

5-2. *I.F. Amplifier Alignment*

The intermediate frequency of the NC-2-40C Receiver is 455 kilocycles, plus or minus 2 kilocycles. The exact frequency is determined by the quartz crystal resonator Y-1.

Tuning capacitors are provided on the crystal filter and on each I.F. transformer. These capacitors are designated by symbol numbers C-39 and C-41 to C-46, inclusive on Fig. Nos. 3 and 4.

The high output lead of an accurately calibrated signal generator should be connected to the grid terminal of the first detector tube and the grounded lead to any convenient point on the chassis. The flexible lead need not be disconnected from the grid of the tube. Connection is made directly from the output jack of the signal generator, the dummy antenna being omitted. The CONTROL SWITCH of the receiver should be in the CWO position and the modulation of the signal generator turned off to provide a steady C.W. test signal. The PHASING control of the receiver should be set at 0 and the SELECTIVITY control at 5. The A.F. GAIN control should be fully advanced.

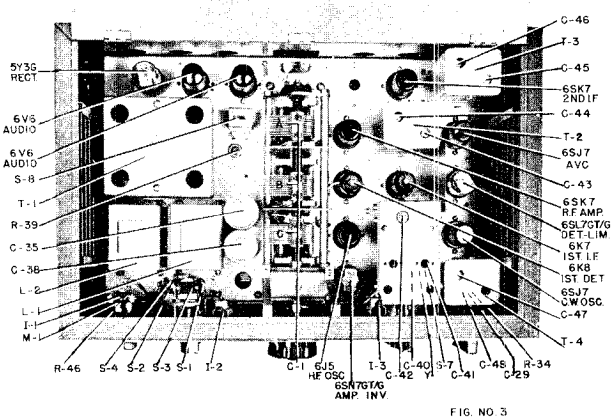

FIG. NO. 3

Adjust the output attenuator of the signal generator to provide a signal of approximately 100 microvolts and vary the tuning control of the signal generator slowly between the frequencies of 453 and 457 kilocycles. At some frequency between these limits the I.F. amplifier of the receiver will show a very sharply peaked response, as indicated on the output meter. The output attenuator of the signal generator should be retarded after the signal generator has been tuned to the I.F. peak in order to avoid I.F. or audio overload; the C.W. OSC. control must be set to provide an audio beat note in the middle of the audio range (between 400 and 1,000 cycles).

The I.F. tuning capacitors C-39 and C-43 to C-46, inclusive, should each be carefully adjusted to give a maximum reading on the output meter. The order in which the adjustments are made is not important. While making I.F. amplifier adjustments, it will be necessary to retard the attenuator of the signal generator if the readjustment increases I.F. amplifier gain to the point where overload occurs.

The crystal filter SELECTIVITY knob should then be set at 1 and the signal generator detuned between 3 and 4 kilocycles either side of the crystal frequency. Capacitor C-42 should be tuned for maximum output meter reading. After this adjustment is made, the SELECTIVITY knob should be set at OFF and the signal generator retuned to exact crystal frequency. Compensator capacitor C-41 should then be adjusted for maximum reading on the output meter.

The performance of the I.F. amplifier and audio circuits may be checked against the stage gain data in Section 4-3 after alignment has been completed. Selectivity may be checked sgainst the curves of Dwg. No. 1.

After alignment of the I.F. amplifier has been completed, the C.W. OSC. control should be set at 0 at which setting the C.W. oscillator should be at zero beat with the test signal. If zero beat does not occur at zero, readjust capacitor C-47 of transformer T-4, as shown in Fig. No. 3.

The quartz crystal resonator Y-1 may be checked at the conclusion of I.F. amplifier alignment as follows: the SELECTIVITY control should be set at 5 and the signal generator tuned to the crystal frequency. The output meter reading should be noted. When the SELECTIVITY knob is turned to OFF, the meter reading should decrease 1 to 2 db. provided the PHASING knob is at 0. An

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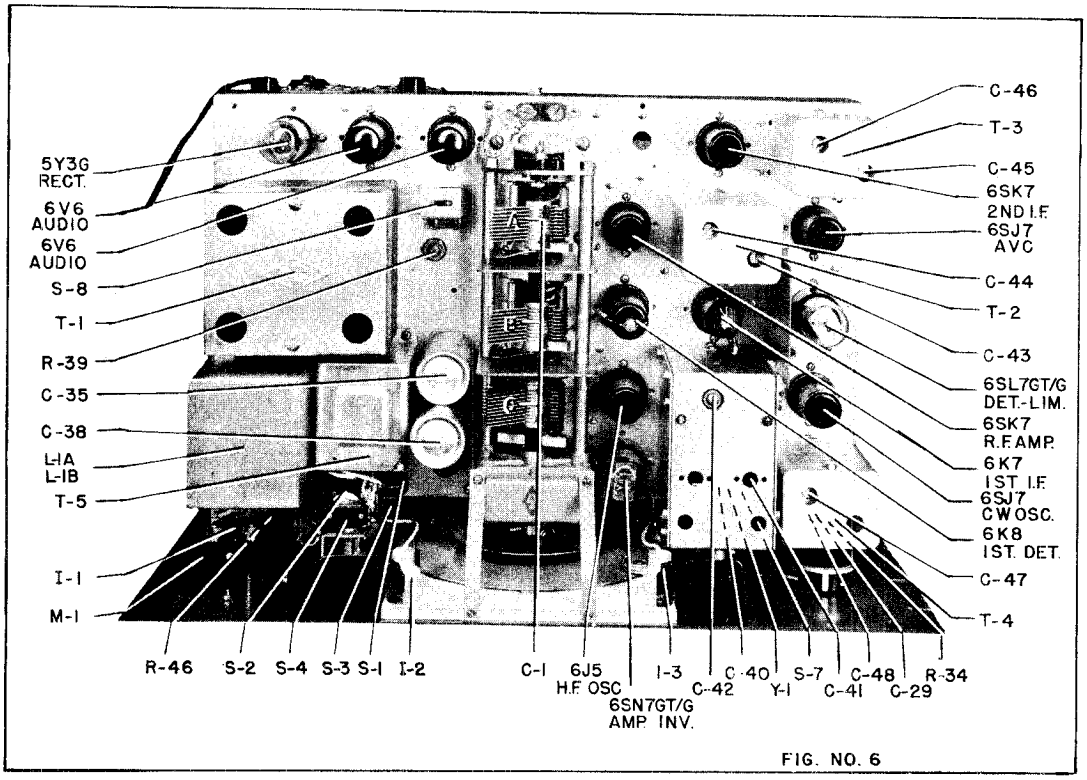

FIG. NO. 6

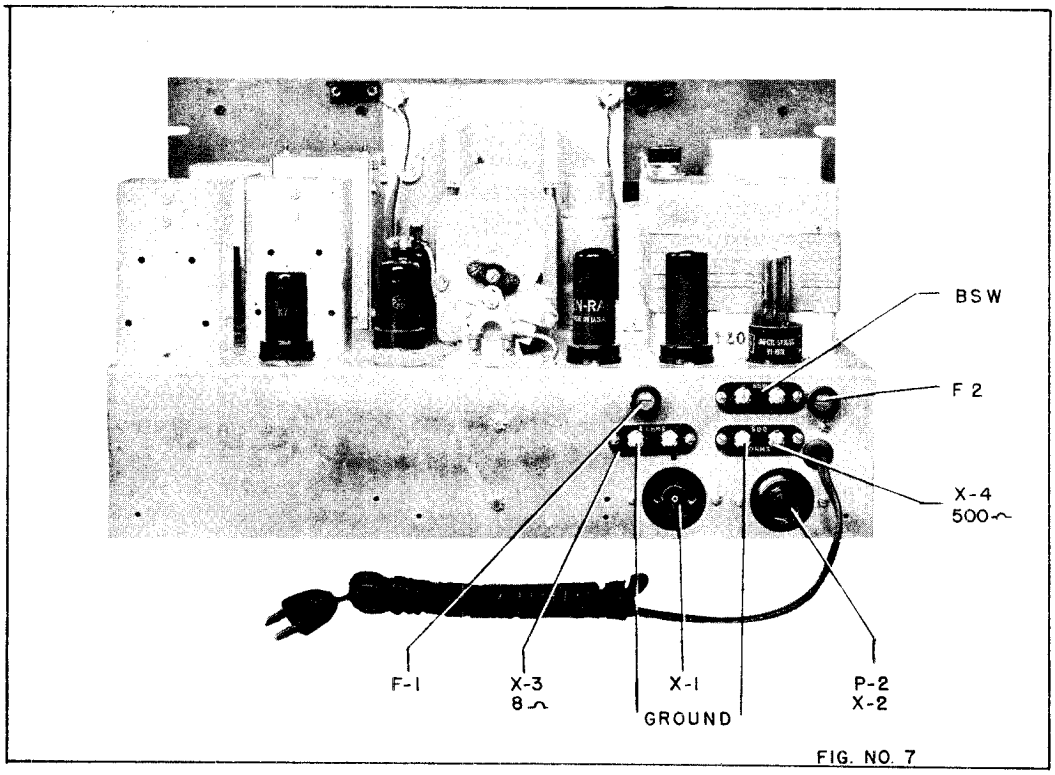

FIG. NO. 7

Top and rear views of NC-2-40CS receiver

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increase in meter reading can, in most cases, be traced to an improper adjustment in the I.F. amplifier, since the crystal resonator is mounted in a sealed holder, and it is rather unlikely that trouble will be had from that source.

5-3. *General Coverage Alignment*

(a) H.F. oscillator

Alignment is effected as follows: with the coil range to be aligned connected in the circuit and with the receiver controls set as recommended in Section 5-1, the MAIN TUNING dial should be set near the high frequency end of the range. A signal generator should be connected to the antenna input terminal through a standard IRE dummy antenna and accurately tuned to deliver a signal of the same frequency as that indicated by the receiver dial setting. If, when this signal is tuned in, the dial reading is too high, the capacity of the H.F. oscillator trimmer C-52 should be decreased to make corrections. Conversely, low dial readings are corrected by increasing the capacity of trimmer C-52.

It is imperative that the high frequency oscillator circuits operate at a higher frequency than that of the first detector and R.F. amplifier circuits. This can be checked by tuning in the image signal, which should appear at a dial reading approximately 910 kilocycles below that of the real signal. The image signal should be considerably weaker if the R.F. amplifier is correctly aligned and a stronger test signal may be required before the image can be found. If the image does not appear at the lower frequency dial setting, the H.F. oscillator circuit is incorrectly adjusted and the capacity of the H.F. oscillator trimmer capacitor in question must be decreased until the real signal and image signal appear at the proper points on the dial.

(b) First Detector and R.F. Amplifier

With the signal generator adjusted to deliver a modulated signal near the high frequency limit of the band to be checked, the receiver should be tuned to give maximum output, as indicated by the output meter. The first detector and R.F. amplifier trimmer capacitors C-51 and C-50, respectively, should then be varied until the output meter reads maximum. On the highest frequency bands, adjustment of the first detector and R.F. amplifier trimmers may change the calibration of the high frequency oscillator, necessitating retuning of the MAIN TUNING dial. If these trimmers should require considerable realignment, it may be necessary to readjust the high frequency oscillator trimmer C-52 in order to maintain correct calibration.

A very simple and quick method of first detector and R.F. trimmer alignment may be used if a signal generator is not available. This method consists of setting the trimmers at the adjustment which provides maximum circuit or background noise. It will be found that trimmer settings under this method are sufficiently sharp to provide good alignment, although the adjustment must be made with care to avoid alignment to the image frequency.

(c) Tracking of H.F. Circuits

After the H.F. oscillator, first detector and R.F. amplifier trimmers have been properly set at the high frequency limit of the band, the receiver should be tuned to a frequency toward the low frequency end. Tracking at any point up to the low frequency limit may be checked by adjusting the signal generator to the proper frequency and testing the settings of the first detector and R.F. amplifier trimmers for maximum gain. Calibration may be checked also at these points. After such a test, all trimmers checked should be reset at the high frequency end of the band since their settings are most critical at this point.

Errors in tracking near the low frequency limits of the band can be caused by defects in any of three circuit elements.

(1) The tuning capacitor section.
(2) The circuit inductance.
(3) The H.F. oscillator series padding capacitor.

In order to determine if one or more sections of the master tuning capacitor C-1 are the cause of any mistracking present, it is necessary to make the check described above on two or more different bands. If the same tracking error appears on all bands, the master tuning capacitor is definitely at fault. The error should be corrected by permanently bending the rotor or stator plates to provide the proper capacity.

If the tracking error appears only in the R.F. amplifier or first detector stage of only one band, the inductance of the tuned circuit of the stage is incorrect. Should the tracking checks indicate that the H.F. oscillator circuit of a particular band is at fault, either the inductance of the circuit, the series padding capacitor or both may be responsible.

After any change or readjustment is made to any high frequency circuit inductance or series padding capacity, it will be necessary to relign the associated trimmer at the high frequency limit of the coil range. Tracking should then be rechecked.

5-4. *S-Meter Adjustment*

The S-meter balancing resistor R-39, shown in Fig. No. 3, is used to obtain zero meter reading in the absence of signal input to the receiver. The adjustment is as follows: Set the R.F. GAIN control at 10, CONTROL SWITCH at MVC, and disconnect the antenna leads; adjust R-39 until the S-meter reads zero.

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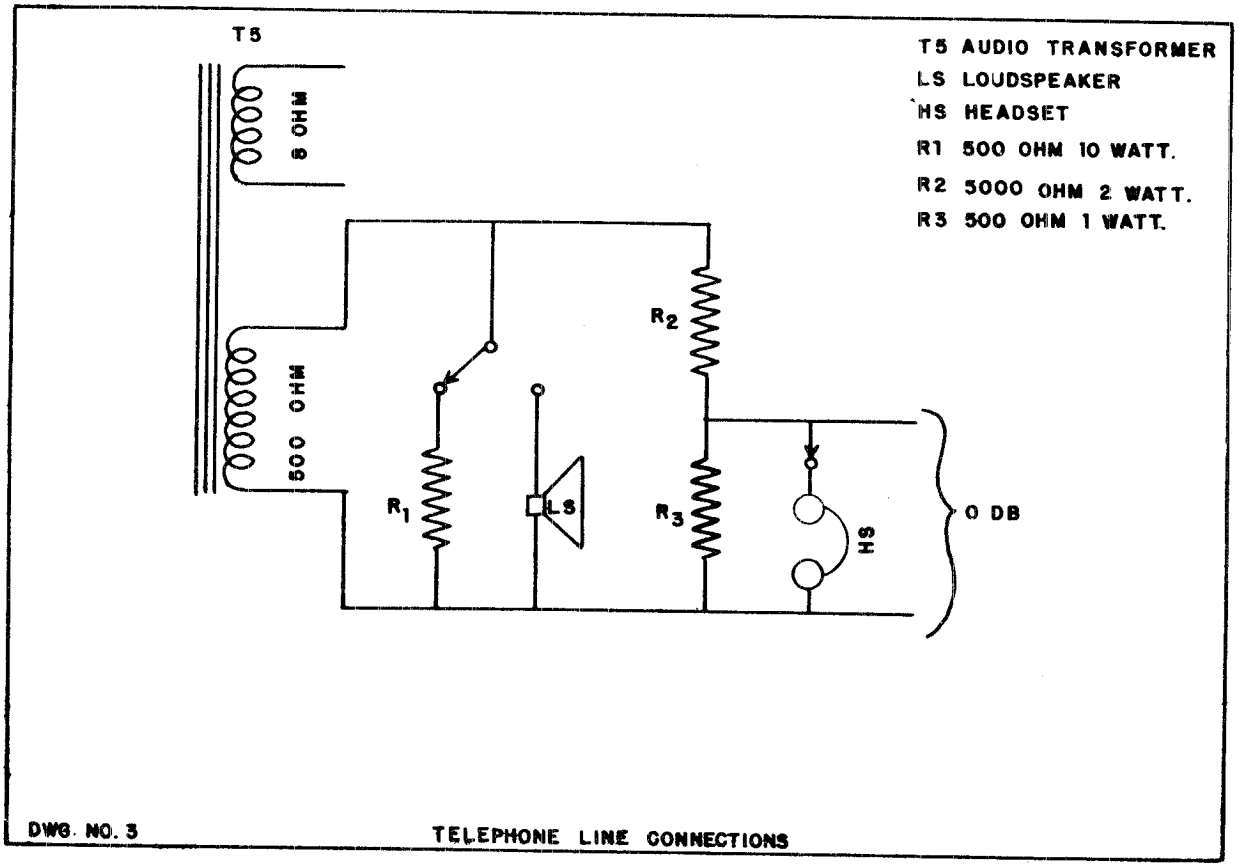
5-5. *Band Indicator Adjustment*

An adjustment for centering the band indicator markers in the horizontal slots of the dial face is located in back of the MAIN TUNING knob. It is recommended that the MAIN TUNING knob be pulled out to engage the band changing mechanism, and turned clockwise to the last position before the stop. The red band marker should then indicate the 14-30mc. tuning band. To make the adjustment, simply remove the tuning knob and set the ¼" hex-head screw as may be required. The screw is self-locking.

It is often found necessary in various communication services to provide a means for feeding the output of the receiver into a standard 500 ohm telephone transmission line at a 6 milliwatt or ODB level. Also means for monitoring the receiver and the telephone circuit may be required. The NC-2-40CS can be readily provided with a voltage divider and monitor circuit to fulfill these requirements. A suitable divider will consist of a 5000 ohm, 2 watt resistor connected in series with 500 ohm, 1 watt resistor across the 500 ohm termination of T5 (see X-4 in Fig. 7). In addition to the divider, the output circuit must be terminated at all times, either by use of a properly matched loud-speaker or a suitable load resistor. A loud-speaker or load resistor may be connected to any-one of the three output circuits, but the voltage divider mentioned above must be connected to the 500 ohm output circuit.

Drawing number 3 shows a possible circuit arrangement using a 500 ohm loud-speaker or a 500 ohm, 10 watt load resistor as the receiver load. The switch functions merely to silence the loud-speaker when required. If either a 10,000 ohm loud-speaker or an 8 ohm speaker is used no additional 500 ohm load is required across the 500 ohm receiver output circuit. Headphone monitoring connections should be made to the 500 ohm telephone line as shown because plugging the head-phones into the receiver phone jack disables the speaker output circuits. A high impedance headset is recommended for use across the 500 ohm telephone line. The total attenuation of the voltage divider is approximately 20 decibels. The power supplied to the 500 ohm telephone line corresponding to maximum receiver output is approximately 20 milliwatts.



DWG. NO. 3 TELEPHONE LINE CONNECTIONS

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NC-2-40C AND NC-2-40CS RECEIVERS PARTS LIST

SYMBOL	FUNCTION	TYPE	RATING
	CAPACITORS		
C1A	R.F. Amplifier Tuning	Air	225 mmf. max.
C1B	First Detector Tuning	Air	225 mmf. max.
C1C	H.F. Oscillator Tuning	Air	225 mmf. max.
C2	R.F. Grid Filter	Mica	.005 mfd., 300 v.d.c.w.
C3	R.F. Cathode By-pass	Paper	.1 mfd., 400 v.d.c.w.
C4	R.F. Screen By-pass	Paper	.1 mfd., 400 v.d.c.w.
C5	R.F.B+ By-pass	Paper	.1 mfd., 600 v.d.c.w.
C6	First Det. Cathode By-pass	Paper	.1 mfd., 400 v.d.c.w.
C7	First Det. Screen By-pass	Paper	.1 mfd., 400 v.d.c.w.
C8	First Det. B+ By-pass	Paper	.1 mfd., 600 v.d.c.w.
C9	First I.F. Grid Filter	Paper	.01 mfd., 600 v.d.c.w.
C10	First I.F. Cathode By-pass	Paper	.1 mfd., 400 v.d.c.w.
C11	First I.F. B+ By-pass	Paper	.1 mfd., 600 v.d.c.w.
C12	Sec. I.F. Grid Filter	Paper	.01 mfd., 600 v.d.c.w.
C13	Sec. I.F. Cathode By-pass	Paper	.1 mfd., 400 v.d.c.w.
C14	Sec. I.F. Screen By-pass	Paper	.1 mfd., 400 v.d.c.w.
C15	Sec. I.F. B+ By-pass	Paper	.1 mfd., 600 v.d.c.w.
C16	Sec. Det. Plate By-pass	Paper	.01 mfd., 600 v.d.c.w.
C17	Sec. Det. to Limiter Audio Coupling	Paper	1. mfd., 200 v.d.c.w.
C18	Sec. Det. Cathode By-pass	Ceramic	.00025 mfd., 500 v.d.c.w.
C19	Sec. Det. I.F. By-pass	Mica	.001 mfd., 500 v.d.c.w.
C20	Limiter Output By-pass	Ceramic	.00025 mfd., 500 v.d.c.w.
C21	Tone Control	Paper	.01 mfd., 600 v.d.c.w.
C22	Limiter to Inverter-Audio Coupling	Paper	.01 mfd., 600 v.d.c.w.
C23	Tone Control	Mica	.001 mfd., 500 v.d.c.w.
C24	Inverter-Audio Cathode By-pass	Elec.	10 mfd., 50 v.d.c.w.
C25	Inverter-Audio to Output Coupling	Paper	.1 mfd., 400 v.d.c.w.
C26	Inverter-Audio to Output Coupling	Paper	.1 mfd., 400 v.d.c.w.
C27	Inverter Feedback Coupling	Paper	.1 mfd., 400 v.d.c.w.
C28	H.F. Oscillator Grid	Ceramic	.0001 mfd., 500 v.d.c.w.
C29	Beat Oscillator Grid	Mica	.001 mfd., 500 v.d.c.w.
C30	Beat Oscillator Screen By-pass	Paper	.1 mfd., 400 v.d.c.w.
C31	Beat Osc. to Sec. Det. Coupling	Ceramic	2 mmf., 500 v.d.c.w.
C32	AVC Output By-pass	Paper	.1 mfd., 400 v.d.c.w.
C33	AVC Plate By-pass	Paper	.1 mfd., 400 v.d.c.w.
C34	AVC Cathode By-pass	Paper	.1 mfd., 400 v.d.c.w.
C35	B Minus By-pass	Elec.	40 mfd., 200 v.d.c.w.
C36	AVC to Sec. Det. Coupling	Ceramic	.00005 mfd., 500 v.d.c.w.
C37	Power Supply Filter	Paper	.1 mfd., 600 v.d.c.w.
C38	Power Supply Filter	Elec.	8 and 8 mfd., 475 v.d.c.w.
C39	Crystal Filter Input Tuning	Air	6 to 85 mmf.
C40	Crystal Filter Phasing Control	Air	5 and 5 mmf.
C41	Crystal Filter Compensating	Ceramic	2 to 6 mmf.
C42	Crystal Filter Output Tuning	Air	6 to 85 mmf.
C43	T-2 Primary Tuning	Air	6 to 85 mmf.
C44	T-2 Secondary Tuning	Air	6 to 85 mmf.
C45	T-3 Primary Tuning	Air	6 to 85 mmf.
C46	T-3 Secondary Tuning	Air	6 to 85 mmf.
C47	T-4 Tuning	Air	6 to 85 mmf.

PARTS LIST (Continued)

SYMBOL	FUNCTION	TYPE	RATING
	CAPACITORS (Continued)		
C48	C.W. Osc. Control	Air	1 to 10 mmf.
C49	C.W. Osc. Compensating	Ceramic	10 mmf., 500 v.d.c.w.
C50	R.F. Amplifier Trimmer	Air	See Note No. 1
C51	1st Det. Trimmer	Air	See Note No. 1
C52	H.F. Osc. Trimmer	Air	See Note No. 1
C53	H.F. Osc. Padder	Air	See Note No. 1
C54	H.F. Osc. Padder	Mica	See Note No. 1
C55	R.F. Amplifier Fixed Trimmer	Ceramic	20 mmf., 500 v.d.c.w. *
C56	1st Detector Fixed Trimmer	Ceramic	20 mmf., 500 v.d.c.w. *
C57	1st Detector Pri. to Sec. Coupling	Ceramic	2 mmf. *
C58	H.F. Osc. Padder	Ceramic	100 mmf., 500 v.d.c.w. *
C59	H.F. Osc. Trimmer	Ceramic	25 mmf., 500 v.d.c.w. *
C60	R.F. Amplifier Padder	Mica	900 mmf., 500 v.d.c.w. **
C61	1st Detector Series Padder	Ceramic	16 mmf., 500 v.d.c.w. **
C62	H.F. Osc. Padder	Ceramic	20 mmf., 500 v.d.c.w. **
	RESISTORS		
R1	R.F. Grid Filter	Fixed	500,000 Ohm, ½ w.
R2	R.F. Cathode Bias	Fixed	500 Ohm, ½ w.
R3	First Det. Cathode Bias	Fixed	250 Ohm, ½ w.
R4	First Det. Screen Bleeder	Fixed	100,000 Ohm, ½ w.
R5	First Det. Screen Dropping	Fixed	50,000 Ohm, ½ w.
R6	First Det. Plate Filter	Fixed	2,000 Ohm, ½ w.
R7	First I.F. Grid Filter	Fixed	20,000 Ohm, ½ w.
R8	First I.F. Cathode Bias	Fixed	See Note No., 2, ½ w.
R9	First I.F. Plate Filter	Fixed	2,000 Ohm, ½ w.
R10	Sec. I.F. Grid Filter	Fixed	500,000 Ohm, ½ w.
R11	Sec. I.F. Cathode Bias	Fixed	See Note No., 2, ½ w.
R12	Sec. I.F. Screen Bleeder	Fixed	100,000 Ohm, ½ w.
R13	Sec. I.F. Screen Dropping	Fixed	70,000 Ohm, ½ w.
R14	Sec. Det. Plate Filter	Fixed	2,000 Ohm, ½ w.
R15	Sec. Det. I.F. Filter	Fixed	5,000 Ohm, ½ w.
R16	Sec. Det. Load	Fixed	25,000 Ohm, ½ w.
R17	Limiter Input	Fixed	100,000 Ohm, ½ w.
R18	Limiter Output	Fixed	50,000 Ohm, ½ w.
R19	Tone Control	Comp. Var.	500,000 Ohm, 1 w.
R20	A.F. Gain Control	Comp. Var.	500,000 Ohm, 1 w.
R21	Inverter-Audio Cathode Bias	Fixed	1,000 Ohm, ½ w.
R22	Inverter Grid	Fixed	500,000 Ohm, ½ w.
R23	First Audio Plate	Fixed	50,000 Ohm, ½ w.
R24	First Audio Plate	Fixed	50,000 Ohm, ½ w.
R25	Output Grid	Fixed	250,000 Ohm, ½ w.
R26	Output Grid	Fixed	250,000 Ohm, ½ w.
R27	Inverter Feedback Coupling	Fixed	250,000 Ohm, ½ w.
R28	Output Cathode Bias	Fixed	200,Ohm, 2 w.
R29	R.F. Gain Control With Switch	W. W. Var.	10,000 Ohm, 1½ w.
R30	R.F. Gain Bleeder	Fixed	50,000 Ohm, ½ w.
R31	H.F. Osc. B+ Dropping	Fixed	50,000 Ohm, 1 w.

PARTS LIST (Continued)

* These capacitors are used only in the 200-400 kc. band of the NC-2-40CS Receiver.

** These capacitors are used only in the A band.

MODELS NC-2-40C,
NC-2-40CS

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SYMBOL	FUNCTION	TYPE	RATING
NC-2-40C AND NC-2-40CS	RESISTORS (Continued)		
R32	H.F. Osc. Grid	Fixed	50,000 Ohm, ½ w.
R33	Beat Osc. Plate Filter	Fixed	250,000 Ohm, ½ w.
R34	Beat Osc. Grid	Fixed	50,000 Ohm, ½ w.
R35	Beat Osc. Screen Bleeder	Fixed	100,000 Ohm, ½ w.
R36	Beat Osc. Screen Dropping	Fixed	100,000 Ohm, ½ w.
R37	B+ Voltage Divider	Fixed	20,000 Ohm, 2 w.
R38	B+ Voltage Divider	Fixed	20,000 Ohm, 2 w.
R39	S-Meter Adjustment	W. W. Var.	1,000 Ohm, 1 w.
R40	S-Meter Bridge	Fixed	1,000 Ohm, ½ w.
R41	AVC Plate Filter	Fixed	500,000 Ohm, ½ w.
R42	AVC Plate	Fixed	500,000 Ohm, ½ w.
R43	AVC Voltage Divider	Fixed	1,500 Ohm, 2 w.
R44	AVC Cathode Bias	Fixed	500 Ohm, 2 w.
R45	AVC Grid	Fixed	5,000,000 Ohm, ½ w.
R46	Limiter Control	W. W. Var.	10,000 Ohm, 1½ w.
	MISCELLANEOUS		
F1	AC Line Fuse	Glass Encl.	2 Amp.
F2	AC Line Fuse	Glass Encl.	1 Amp.
I1	S-Meter Lamp	No. 40	6 v., .15 amp.
I2	Dial Lamp	No. 47	6 v., .15 amp.
I3	Dial Lamp	No. 47	6 v., .15 amp.
L1	Power Supply Filter Choke	Potted	17 h., 100 ma. (NC-2-40C only)
L2	Power Supply Filter Choke	Potted	17 h., 100 ma. (NC-2-40C only)
L1A°	Power Supply Filter Choke	Potted	17 h., 100 ma. (NC-2-40CS only)
L1B°	Power Supply Filter Choke	Potted	17 h., 100 ma. (NC-2-40CS only)
M1	Signal Strength Meter	'S' Scale	0 to 1 ma.
P1	Loud Speaker Connector Plug	Molded	5 prong
P2	Dummy plug for AC Operation	Molded	7 prong
P3	Battery Connector Plug	Molded	7 prong
S1 S2	Control Switch	Two Gang	SPST 250 v., 1 amp.
S3 S4	Receiver Off-On Switch	Two Gang	SPST 250 v., 1 amp.
S5	Tone Control Switch	Part of R-19	SPST
S6	S-Meter Switch	Part of R-29	SPST
S7	Selectivity Control Switch	Rotary	2 section, ganged
S8	T1 Primary Selection Switch	Toggle	DPDT 250 v., 3 amp.
T1	Power Transformer	150 Watt	115 volt, 60 cycle and 230 volt, 60 cycle
T2	IF Transformer	Air Tuned	455 kc.
T3	IF Transformer	Air Tuned	455 kc.
T4	Beat Osc. Transformer	Air Tuned	455 kc.
T5°	Audio Output Transformer	Shield Can	10 watts (NC-2-40CS only)
X1	Audio Output Socket	Bakelite	5 prong
X2	Battery Connector Socket	Bakelite	7 prong
X3°	8 Ohm Termination Strip	Bakelite	2 connector
X4°	500 ohm Termination	Bakelite	2 connector
X5	B Connector (BSW)	Bakelite	2 Connector
Y1	Crystal Resonator	Quartz	455 kc.

Note No. 1. Capacitor rating is different in each coil range and is individually adjusted as circuit conditions may require. Definite rating cannot be listed. C53 used in E and F bands only. C54 used in A,B,C and D bands only.

Note No. 2. Resistors R8 and R11 may have values between 300 and 5,000 ohms since they are chosen to meet the circuit requirements of the particular receiver. The resistance values are determined after careful laboratory tests and cannot be changed without impairing performance.

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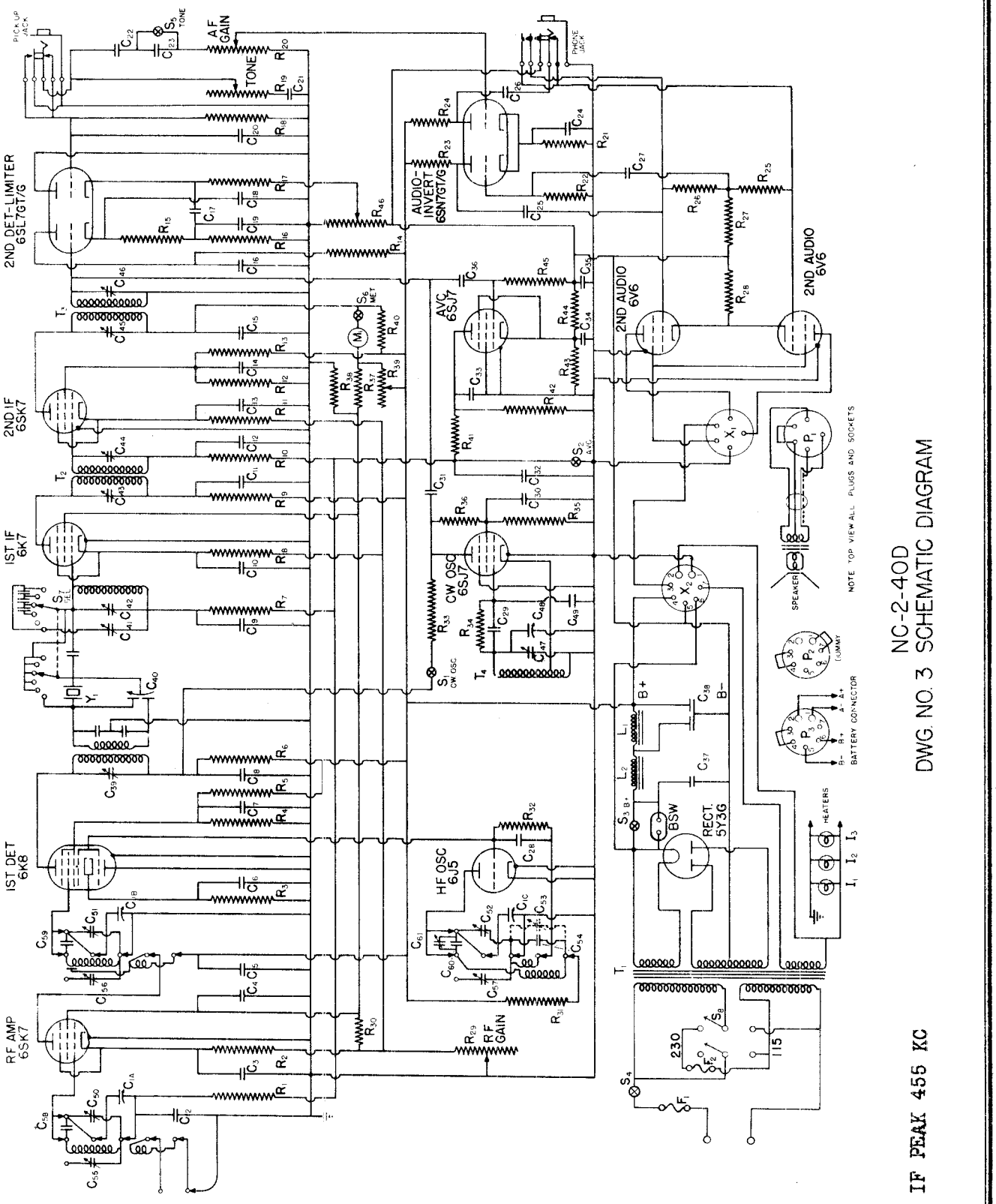

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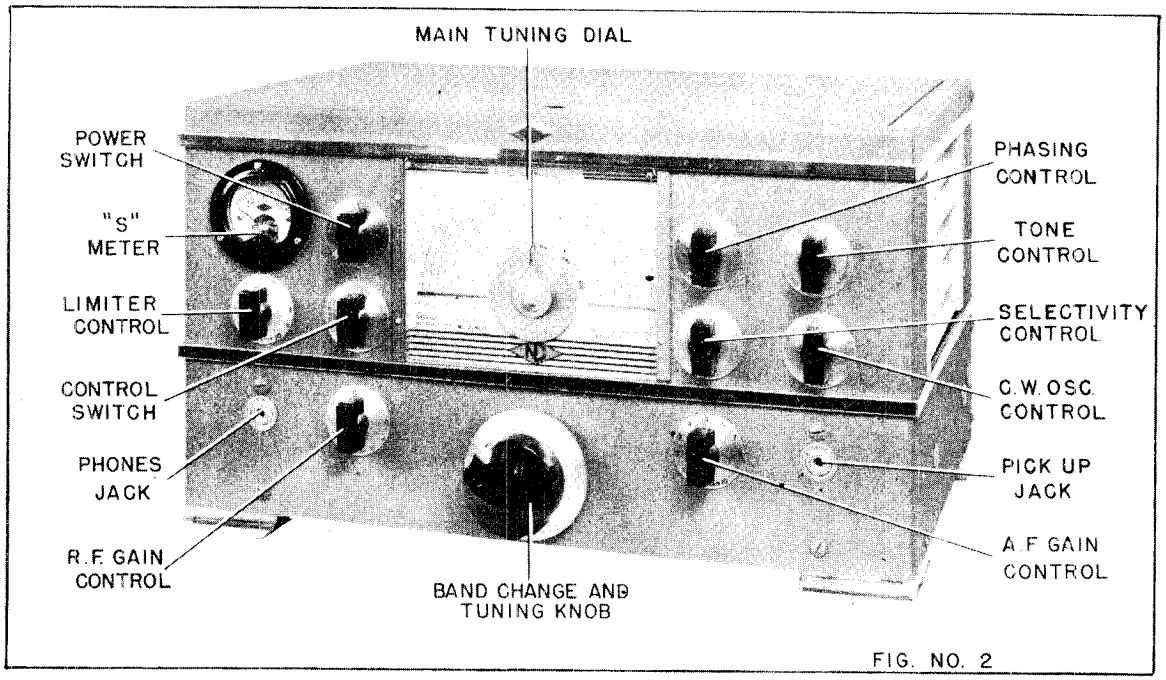
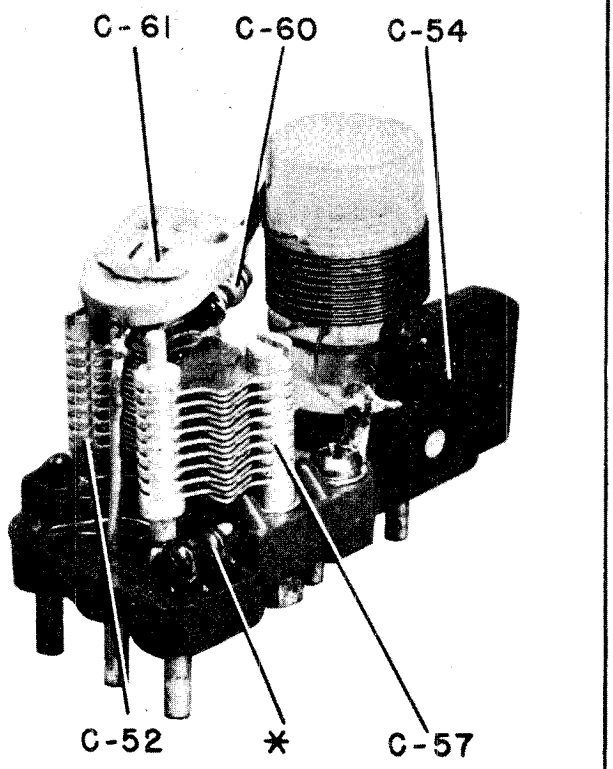
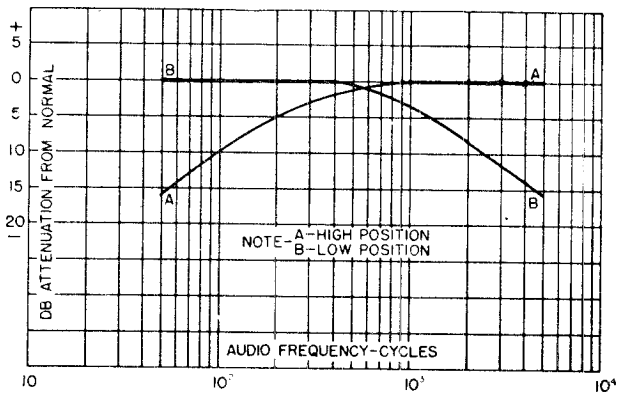


FIG. NO. 2



* FIXED BANDSPREAD TRIMMER, NOT USED ON ALL BANDS

Fig. No. 4. B-3 Coil--Typical H.F. Oscillator Bandspread Coil



Dwg. No. 2. Tone Control Action

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The circuit description, installation, operation, service and test data, and alignment data sections applying to Models NC-2-40C and NC-2-40CS (see page numbers below), also apply to Model NC-2-40D, with the exceptions of the following sections:

1-4. *Tuning System*

The master tuning capacitor C-1 and six sets of coils are used to tune the 490 to 30,000 kilocycle range of the receiver. By means of a highly developed band change mechanism, four of these same coil sets are made to spread the 10, 20, 40 and 80 meter amateur bands uniformly over the major portion of the tuning dial (HRO System). All ten ranges are calibrated

1-6. *Noise Limiter*

The noise limiter of the NC-2-40D Receiver is of the series valve type developed in the National Laboratories. Its effectiveness and superior performance as compared to the more common types of "silencers" were proved in the NHU and modernized NC-200 receivers. A threshold control on the front panel permits adjustment of the level at which limiting action starts.

1-7. *Tone Control*

The tone control is used to vary the frequency characteristic of the audio amplifier as shown in the accompanying curves, Dwg. No. 2. The control is particularly helpful when receiving weak signals through interference, as explained in Section 3.

1-13 *Pick-up Jack*

A pick-up jack mounted on the front panel of the receiver may be used to connect auxiliary apparatus, such as a phonograph pick-up, to the audio system of the NC-2-40D Radio Receiver. This input circuit is high impedance and feeds into the 6SN7GT/G Audio Amplifier-Phase Inverter tube. The TONE and A.F. GAIN controls are operative with this connection.

3-1. *Controls*

The tuning system of the NC-2-40D is truly single control; in fact, the MAIN TUNING control referred to above is used for band changing as well as tuning. To select either a general coverage or bandspread coil range, the MAIN TUNING control knob is pulled out about 1/4 inch. When this is done, the dial and capacitor drive mechanism is disengaged and the knob is geared to the coil casting. As the knob is turned, the coil carriage is moved across the chassis until the proper coil pin contacts engage the circuit contactors, as indicated by the scale markers. Approximately one full turn of the MAIN TUNING knob is required to change from one general coverage range to an adjacent general coverage range. Approximately one-quarter turn of the knob is required to shift from a general coverage range to the associated bandspread range near the high frequency end. The knob does not turn smoothly between ranges, but only a few minutes is required to become familiar with its action. After the desired range has been selected, the tuning knob is pushed in to its original position, engaging the capacitor drive and disengaging the coil carriage rack.

5-1. *General*

All coils have individual general coverage trimmer capacitors. The H.F. oscillator circuits of broadcast ranges E & F have, also, general coverage variable series padding capacitors. All coils of ranges A, B, C and D have band-spread trimmer capacitors. Variable series padding capacitors are used in all H.F. oscillator band-spread circuits. These capacitors are identified on Fig. No. 6.

Adjustment of general coverage circuits affects the alignment of the band-spread circuits. On the other hand, band-spread circuit adjustments have little effect on general coverage circuit alignment. This fact must be kept in mind when any high frequency circuit is adjusted.

Alignment of the equipment may be divided into three major steps:

(1) I.F. Amplifier Alignment
(2) General Coverage Alignment
  (a) H.F. Oscillator
  (b) First Detector and R.F. Amplifier
  (c) Tracking of H.F. Circuits
(3) Band Spread Alignment
  (a) H.F. Oscillator
  (b) First Detector and R.F. Amplifier
  (c) Tracking of H.F. Circuits

The circuits MUST be tuned in the above order when complete alignment is necessary.

5-4. *Band-Spread Alignment*

(a) H.F. Oscillator

The method of adjusting the H.F. oscillator band-spread trimmer C-57 of any band is the same as that described under Section 5-3 (a) above. As stated previously (Section 5-1), the adjustment of the general

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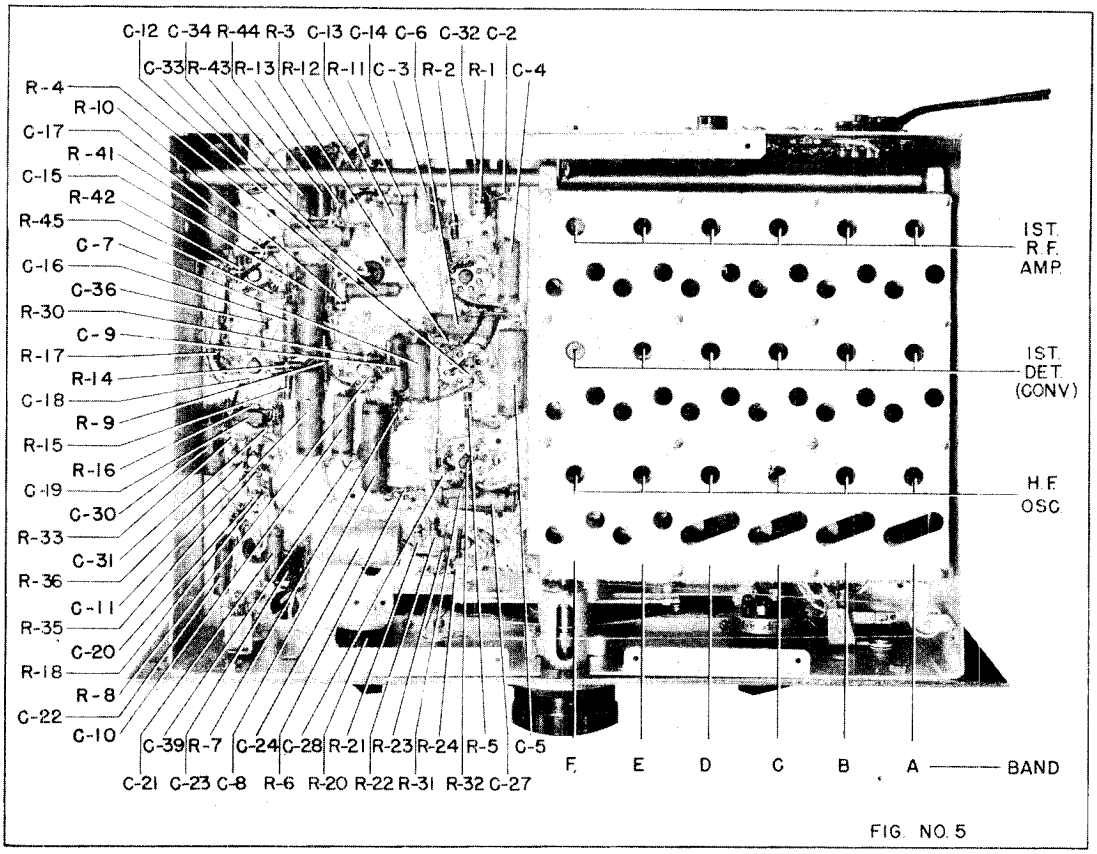

FIG. NO. 5

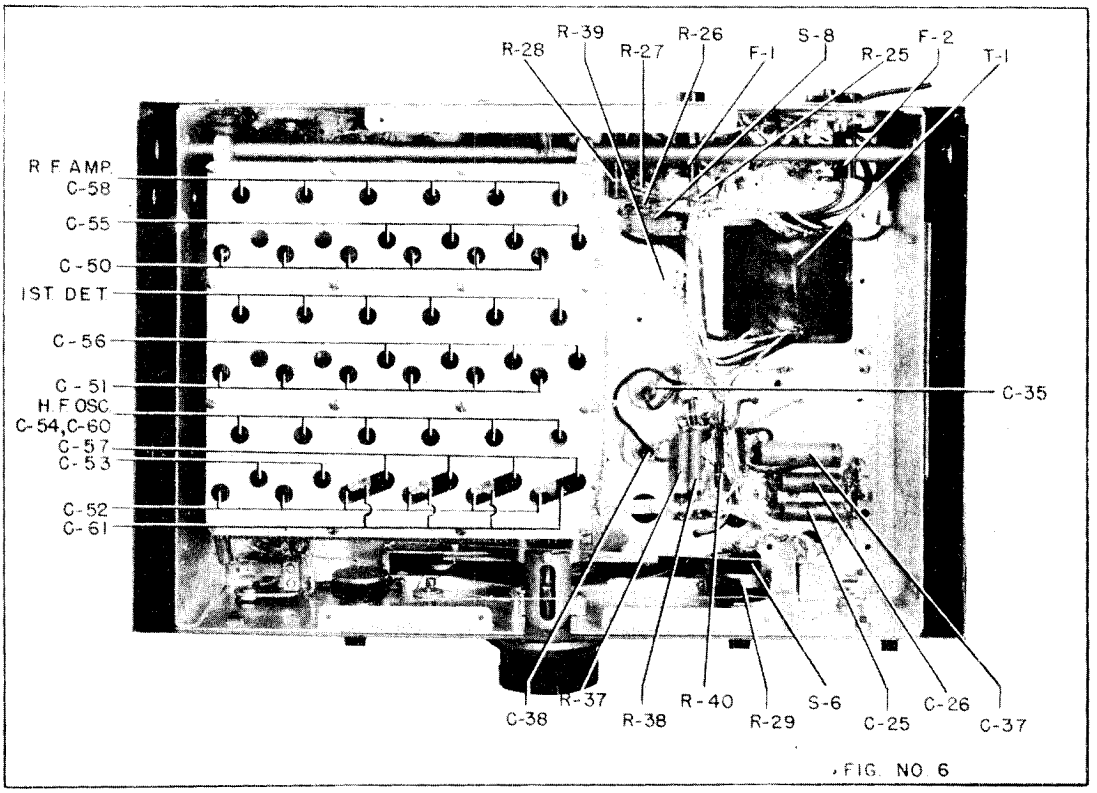

FIG. NO. 6

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Band-spread Alignment (cont'd)

coverage trimmers must not be altered at this time.

(b) First Detector and R.F. Amplifier

The method of adjusting the band-spread trimmers C-59 and C-58 of the first detector and R.F. Amplifier circuits is the same as that described under Section 5-3 (b).

(c) Tracking of H.F. Circuits

After steps (a) and (b) have been completed, the MAIN TUNING control should be turned to the low frequency band limit, and the accuracy of the dial reading checked. If the dial reading is too low, the capacity of the series padding capacitor C-61 (See Fig. No. 6) should be increased until the dial reading is correct, and vice versa. The MAIN TUNING control should then be reset at the high frequency band limit, and step (a) repeated. Recheck the low frequency dial reading and repeat the whole procedure if necessary.

The detector and R.F. amplifier stages have fixed band-spread padding capacitors. These circuits will, therefore, track properly with the H.F. oscillator stage provided that the general coverage circuits are properly aligned and that the band-spread H.F. oscillator circuits are accurately tuned.

5-5. *S-Meter Adjustment*

The S-meter balancing resistor R-39, shown in Fig. No. 3, is used to obtain zero meter reading in the absence of signal input to the receiver. The adjustment is as follows: Set the R.F. GAIN control at 10, CONTROL SWITCH at MVC, and disconnect the antenna leads; adjust R-39 until the S-meter reads zero.

5-6. *Band Indicator Adjustment*

An adjustment for centering the band indicator markers in the horizontal slots of the dial face is located in back of the MAIN TUNING knob. It is recommended that the MAIN TUNING knob be pulled out to engage the band changing mechanism, and turned clockwise to the last position before the stop. The red band marker should then indicate 28 to 30 mc. (10 meter) band-spread. To make the adjustment, simply remove the tuning knob and set the 1/4" hex-head screw as may be required. The screw is self-locking.

Symbol	*Function*	*Type*	*Rating*
	CAPACITORS		
C1A	R.F. Amplifier Tuning	Air	225 mmf. max.
C1B	First Detector Tuning	Air	225 mmf. max.
C1C	H.F. Oscillator Tuning	Air	225 mmf. max.
C2	R.F. Grid Filter	Mica	.005 mfd., 300 v.d.c.w.
C3	R.F. Cathode By-pass	Paper	.1 mfd., 400 v.d.c.w.
C4	R.F. Screen By-pass	Paper	.1 mfd., 400 v.d.c.w.
C5	R.F. B+ By-pass	Paper	.1 mfd., 600 v.d.c.w.
C6	First Det. Cathode By-pass	Paper	.1 mfd., 400 v.d.c.w.
C7	First Det. Screen By-pass	Paper	.1 mfd., 400 v.d.c.w.
C8	First Det. B+ By-pass	Paper	.1 mfd., 600 v.d.c.w.
C9	First I.F. Grid Filter	Paper	.01 mfd., 600 v.d.c.w.
C10	First I.F. Cathode By-pass	Paper	.1 mfd., 400 v.d.c.w.
C11	First I.F. B+ By-pass	Paper	.1 mfd., 600 v.d.c.w.
C12	Sec. I.F. Grid Filter	Paper	.01 mfd., 600 v.d.c.w.
C13	Sec. I.F. Cathode By-pass	Paper	.1 mfd., 400 v.d.c.w.
C14	Sec. I.F. Screen By-pass	Paper	.1 mfd., 400 v.d.c.w.
C15	Sec. I.F. B+ By-pass	Paper	.1 mfd., 600 v.d.c.w.
C16	Sec. Det. Plate By-pass	Paper	.01 mfd., 600 v.d.c.w.
C17	Sec. Det. to Limiter Audio Coupling	Paper	1. mfd., 200 v.d.c.w.
C18	Sec. Det. Cathode By-pass	Ceramic	.00025 mfd., 500 v.d.c.w.
C19	Sec. Det. I.F. By-pass	Mica	.001 mfd., 500 v.d.c.w.
C20	Limiter Output By-pass	Ceramic	.00025 mfd., 500 v.d.c.w.
C21	Tone Control	Paper	.01 mfd., 600 v.d.c.w.
C22	Limiter to Inverter-Audio Coupling	Paper	.01 mfd., 600 v.d.c.w.
C23	Tone Control	Mica	.001 mfd., 500 v.d.c.w.
C24	Inverter-Audio Cathode By-pass	Elec.	10 mfd., 50 v.d.c.w.
C25	Inverter-Audio to Output Coupling	Paper	.1 mfd., 400 v.d.c.w.
C26	Inverter-Audio to Output Coupling	Paper	.1 mfd., 400 v.d.c.w.
C27	Inverter-Feedback Coupling	Paper	.1 mfd., 400 v.d.c.w.
C28	H.F. Oscillator Grid	Ceramic	.00025 mfd., 500 v.d.c.w.
C29	Beat Oscillator Grid	Mica	.001 mfd., 500 v.d.c.w.
C30	Beat Oscillator Screen By-pass	Paper	.1 mfd., 400 v.d.c.w.
C31	Beat Osc. to Sec. Det. Coupling	Ceramic	2 mmf., 500 v.d.c.w.
C32	AVC Output By-pass	Paper	.1 mfd., 400 v.d.c.w.
C33	AVC Plate By-pass	Paper	.1 mfd., 400 v.d.c.w.
C34	AVC Cathode By-pass	Paper	.1 mfd., 400 v.d.c.w.
C35	B Minus By-pass	Elec.	40 mfd., 200 v.d.c.w.
C36	AVC to Sec. Det. Coupling	Ceramic	.00005 mfd., 500 v.d.c.w.
C37	Power Supply Filter	Paper	.1 mfd., 600 v.d.c.w.
C38	Power Supply Filter	Elec.	8 and 8 mfd., 475 v.d.c.w.
C39	Crystal Filter Input Tuning	Air	6 to 85 mmf.
C40	Crystal Filter Phasing Control	Air	5 and 5 mmf.
C41	Crystal Filter Compensating	Ceramic	2 to 6 mmf.
C42	Crystal Filter Output Tuning	Air	6 to 85 mmf.
C43	T-2 Primary Tuning	Air	6 to 85 mmf.
C44	T-2 Secondary Tuning	Air	6 to 85 mmf.
C45	T-3 Primary Tuning	Air	6 to 85 mmf.
C46	T-3 Secondary Tuning	Air	6 to 85 mmf.
C47	T-4 Tuning	Air	6 to 85 mmf.
C48	C.W. Osc. Control	Air	1 to 10 mmf.

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PARTS LIST (Continued)

Symbol	Function	Type	Rating
	CAPACITORS (Continued)		
C49	C.W. Osc. Compensating	Ceramic	10 mmf., 500 v.d.c.w.
C50	Gen. Cov. R.F. Amplifier Trimmer	Air	See Note No. 1
C51	Gen. Cov. 1st Det. Trimmer	Air	See Note No. 1
C52	Gen. Cov. H.F. Osc. Trimmer	Air	See Note No. 1
C53	Gen. Cov. H.F. Osc. Padder	Air	See Note No. 1
C54	Gen. Cov. H.F. Osc. Padder	Mica	See Note No. 1
C55	Band-Spread R.F. Amplifier Trimmer	Air	See Note No. 1
C56	Band-Spread 1st Det. Trimmer	Air	See Note No. 1
C57	Band-Spread H.F. Osc. Trimmer	Air	See Note No. 1
C58	Band-Spread R.F. Amplifier Padder	Ceramic	See Note No. 1
C59	Band-Spread 1st Det. Padder	Ceramic	See Note No. 1
C60	Band-Spread H.F. Osc. Padder	Ceramic	See Note No. 1
C61	Band-Spread H.F. Osc. Padder	Mica	3 to 30 mmf.
C62	Gen. Cov. R.F. Amplifier Padder	Mica	900 mmf., 500 v.d.c.w.*
C63	Gen. Cov. 1st Det. Series Padder	Ceramic	16 mmf., 500 v.d.c.w.*
C64	Gen. Cov. H.F. Osc. Padder	Ceramic	20 mmf., 500 v.d.c.w.*
	RESISTORS		
R1	R.F. Grid Filter	Fixed	500,000 Ohm, 1/2 w.
R2	R.F. Cathode Bias	Fixed	500 Ohm, 1/2 w.
R3	First Det. Cathode Bias	Fixed	250 Ohm, 1/2 w.
R4	First Det. Screen Bleeder	Fixed	100,000 Ohm, 1/2 w.
R5	First Det. Screen Dropping	Fixed	50,000 Ohm, 1/2 w.
R6	First Det. Plate Filter	Fixed	2,000 Ohm, 1/2 w.
R7	First I.F. Grid Filter	Fixed	20,000 Ohm, 1/2 w.
R8	First I.F. Cathode Bias	Fixed	See Note No. 2, 1/2 w.
R9	First I.F. Plate Filter	Fixed	2,000 Ohm, 1/2 w.
R10	Sec. I.F. Grid Filter	Fixed	500,000 Ohm, 1/2 w.
R11	Sec. I.F. Cathode Bias	Fixed	See Note No. 2, 1/2 w.
R12	Sec. I.F. Screen Bleeder	Fixed	100,000 Ohm, 1/2 w.
R13	Sec. I.F. Screen Dropping	Fixed	70,000 Ohm, 1/2 w.
R14	Sec. Det. Plate Filter	Fixed	2,000 Ohm, 1/2 w.
R15	Sec. Det. I.F. Filter	Fixed	5,000 Ohm, 1/2 w.
R16	Sec. Det. Load	Fixed	25,000 Ohm, 1/2 w.
R17	Limiter Input	Fixed	100,000 Ohm, 1/2 w.
R18	Limiter Output	Fixed	50,000 Ohm, 1/2 w.
R19	Tone Control	Comp. Var.	500,000 Ohm, 1 w.
R20	A.F. Gain Control	Comp. Var.	500,000 Ohm, 1 w.
R21	Inverter-Audio Cathode Bias	Fixed	1,000 Ohm, 1/2 w.
R22	Inverter Grid	Fixed	500,000 Ohm, 1/2 w.
R23	First Audio Plate	Fixed	50,000 Ohm, 1/2 w.
R24	First Audio Plate	Fixed	50,000 Ohm, 1/2 w.
R25	Output Grid	Fixed	250,000 Ohm, 1/2 w.
R26	Output Grid	Fixed	250,000 Ohm, 1/2 w.
R27	Inverter Feedback Coupling	Fixed	250,000 Ohm, 1/2 w.
R28	Output Cathode Bias	Fixed	200 Ohm, 2 w.
R29	R.F. Gain Control	W.W. Var.	10,000 Ohm, 1 1/2 w.
R30	R.F. Gain Bleeder	Fixed	50,000 Ohm, 1/2 w.
R31	H.F. Osc. B+ Dropping	Fixed	50,000 Ohm, 1 w.*

Note No. 1. Capacitor rating is different in each coil range and is individually adjusted as circuit conditions may require. Definite rating cannot be listed. C-53 used in E and F bands only. C-54 to C-61, inclusive, used in A, B, C, and D bands only.

Symbol	Function	Type	Rating
	RESISTORS (Continued)		
R32	H.F. Osc. Grid	Fixed	50,000 Ohm, 1/2 w.
R33	Beat Osc. Plate Filter	Fixed	250,000 Ohm, 1/2 w.
R34	Beat Osc. Grid	Fixed	50,000 Ohm, 1/2 w.
R35	Beat Osc. Screen Bleeder	Fixed	100,000 Ohm, 1/2 w.
R36	Beat Osc. Screen Dropping	Fixed	100,000 Ohm, 1/2 w.
R37	B+ Voltage Divider	Fixed	20,000 Ohm, 2 w.
R38	B+ Voltage Divider	Fixed	20,000 Ohm, 2 w.
R39	S-Meter Adjustment	W.W. Var.	1,000 Ohm, 1 w.
R40	S-Meter Bridge	Fixed	1,000 Ohm, 1/2 w.
R41	AVC Plate Filter	Fixed	500,000 Ohm, 1/2 w.
R42	AVC Plate	Fixed	500,000 Ohm, 1/2 w.
R43	AVC Voltage Divider	Fixed	1,500 Ohm, 2 w.
R44	AVC Cathode Bias	Fixed	500 Ohm, 2 w.
R45	AVC Grid	Fixed	5,000,000 Ohm, 1/2 w.
R46	Limiter Control	W.W. Var.	10,000 Ohm, 1 1/2 w.
	MISCELLANEOUS		
F1	AC Line Fuse	Glass Encl.	2 Amp.
F2	AC Line Fuse	Glass Encl.	1 Amp.
I1	S-Meter Lamp	No. 40	6 v., .15 a.
I2	Dial Lamp	No. 47	6 v., .15 a.
I3	Dial Lamp	No. 47	6 v., .15 a.
L1	Power Supply Filter Choke	Potted	17 h., 100 ma.
L2	Power Supply Filter Choke	Potted	17 h., 100 ma.
M1	Signal Strength Meter	"S" Scale	0 to 1 ma.
P1	Loud Speaker Connector Plug	Molded	5 Prong
P2	Dummy Plug for AC Operation	Molded	7 Prong
P3	Battery Connector Plug	Molded	7 Prong
S1	Control Switch	Two Gang	SPST 250 v., 1 a.
S2			
S3	Power Supply Switch	Two Gang	SPST 250 v., 1 a.
S4			
S5	Tone Control Switch	Pt. of R-19	SPST
S6	S-Meter Switch	Pt. of R-29	SPST
S7	Selectivity Control Switch	Rotary	2 Section, Ganged
S8	T-1 Primary Selection Switch	Toggle	DPDT, 250 v., 3 a.
T1	Power Transformer	150 Watt	115 Volt, 60 Cycle, 230 Volt, 60 Cycle
T2	I.F. Transformer	Air Tuned	455 kc.
T3	I.F. Transformer	Air Tuned	455 kc.
T4	Beat Osc. Transformer	Air Tuned	455 kc.
X1	Audio Output Socket	Bakelite	5 Prong
X2	Battery Connector Socket	Bakelite	7 Prong
X5	B Connector (BSW)	Bakelite	2 Connector
Y1	Crystal Resonator	Quartz	455 kc.

Note No. 2. Resistors R8 and R11 may have values between 300 and 5000 Ohms since they are chosen to meet the circuit requirements of the particular receiver. The resistance values are determined after careful laboratory test and cannot be changed without impairing performance.

* These Capacitors used on the A band only.

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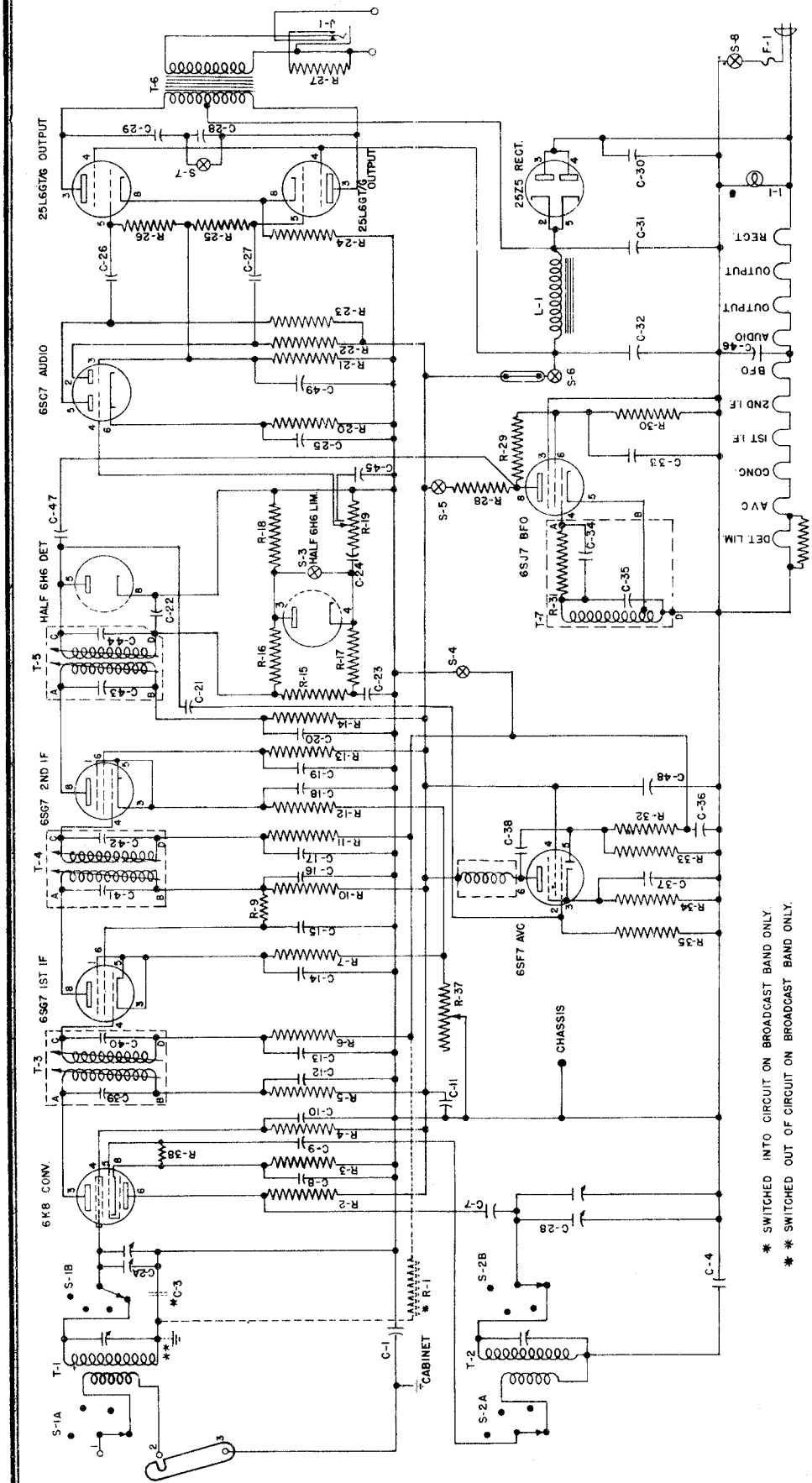

NC-46 RECEIVER
DWG. NO. I-SCHEMATIC DIAGRAM

IF PEAK 455 KC

The master tuning capacitor C2 and four sets of associated coils are used to tune the frequency range of the receiver in four tuning bands for both general coverage and bandspread operation.

The overall frequency coverage of the four bands is as follows:

Band A	11.5 -	30 0 MC
Band B	4.4 -	12.0 MC
Band C	1.55 -	4.6 MC
Rand D	0.54 -	1.6 MC

The following bands in the short wave ranges are tunable by the bandspread capacitor and are spread as follows:

3.5 -	4.0 MC	65 Divisions
7.0 -	7.3 MC	50 Divisions
14.0 -	14.4 MC	56 Divisions
28.0 -	30.0 MC	40 Divisions

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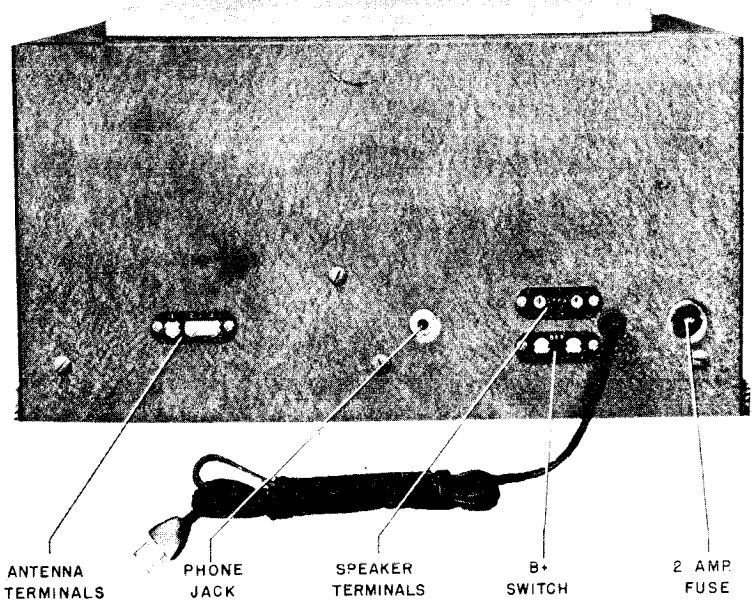

FIG. NO. 1

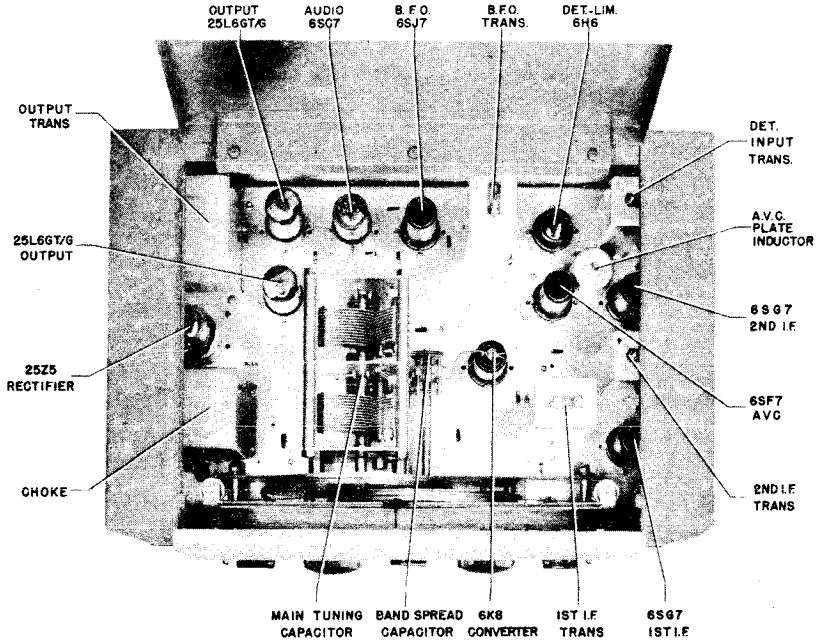

FIG. NO. 3

Circuit

The circuit employed in the NC-46 consists of a converter stage, two intermediate frequency stages, diode detector, limiter, beat frequency oscillator, AVC amplifier, phase inverter, push-pull output and rectifier stages.

The second detector utilizes one set of elements of a dual diode; the other set of elements is used for a noise limiter. Separate tubes are used in the automatic volume control and beat frequency oscillator circuits. The latter is coupled to the second detector for C.W. reception.

All voltages required by the receiver circuits are supplied by a built-in power supply.

Audio Output

Two audio output circuits are provided:

(1) A headphone jack is mounted on the rear of the receiver and is so wired as to silence the loudspeaker when the phone plug is inserted. The load impedance for the headphone output is not critical and any good set of headphones may be used.

(2) Tip-jack terminals are provided at the rear of the receiver for speaker connection. The output load impedance of the receiver is 10 ohms. This allows the use of a permanent magnet speaker with a voice coil of 8 to 10 ohms. The use of a matching output transformer is not required. Maximum undistorted audio power output available is approximately 4 watts.

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Antenna Recommendations

There is an antenna terminal strip mounted at the rear of the receiver with three screw-type connections available marked #1, #2 and #3. Terminal #3 is the ground connection. The strip is furnished with a sliding link to short out terminals #2 and #3 for operation with a single wire antenna. Doublet antennae, directive arrays etc., having two wire feeder systems may be used connecting directly to terminals #1 and #2, terminal #3 and strap not being used. For general coverage a single wire antenna of approximately 50 to 100 feet will be found to give satisfactory results. To obtain peak performance on any particular desired channel the antenna length should be approximately an odd quarter-wave length of the band in use.

Controls

The MAIN TUNING control knob is located to the left of the center of the front panel. This knob operates a two gang variable capacitor through a 30 to 1 ratio reduction drive mechanism.

The ELECTRICAL BANDSPREAD control knob is located to the right of the center of the front panel. This knob operates a separate two gang variable capacitor to provide bandspread tuning.

The BAND SELECTOR switch is located at the center of the front panel and functions to select the tuning-band desired. The band in use is indicated by the designating letters on this switch dial. The four tuning scales on the main tuning dial are marked at either end of the dial by these designating letters.

Tuning is accomplished by the following steps:

(a) Select the band to be used by means of the BAND SELECTOR switch.

(b) The frequency calibration of the main tuning dial will only be correct with the bandspread pointer set at 90. After this setting has been made the MAIN TUNING control knob is used to tune in the desired station. The bandspread pointer may then be used to give greater accuracy in logging.

The TONE CONTROL switch is located at the upper left-hand side of the receiver and functions to select the frequency characteristic of the audio amplifier as desired, i.e. HIGH or LOW. The HIGH position will give the better fidelity and the LOW a better signal to noise ratio.

The C.W.O. CONTROL switch is located to the right of the TONE CONTROL switch functioning to switch on or off the beat frequency oscillator.

The VOLUME control is located to the left of the MAIN TUNING knob functioning to adjust the audio amplification of the receiver. Part of this control is a stand-by switch permitting the A.C. line switch to remain on but with B supply circuit open.

The LIMITER CONTROL switch is located at the upper right-hand side of the front panel functioning to switch "On" or "Off" the noise limiter. This control is normally in the "Off" position

The A.V.C. CONTROL switch is located to the left of the LIMITER switch functioning to switch the automatic volume control circuits into or out of the receiver circuits.

The SENSITIVITY control is located to the right of the BANDSPREAD control knob and functions to adjust the amplification of the two I.F. amplifier tubes. Incorporated in this control is the power supply "ON" "OFF" switch; with this switch in the "Off" position the receiver is inoperative.

There is a B.S.W. terminal panel provided at the rear of the receiver to permit remote stand-by control. The terminals are connected in series with the B switch.

After the equipment is properly installed, it is placed in operation by turning the SENSITIVITY control to 10 and the VOLUME control to the point which provides the desired audio volume. The TONE control should be "On"; the C.W.O. control should be "Off"; the A.V.C. control should be "On"; the LIMITER should be "Off". The receiver is now adjusted for the reception of phone signals and can be tuned to the desired frequency and band by means of the MAIN TUNING control and BAND SELECTOR switch.

Individual tubes of the same type are apt to vary slightly in their characteristics and it is well to remember this fact when replacements become necessary. The circuit of the receiver has been designed to reduce the effect of such variations to a minimum but care should be taken in replacing the converter and I.F. amplifier tubes. A replacement converter tube should be checked in the receiver to make sure that the inter-electrode capacities are the same as those of the tube originally employed. This is readily checked by noting any change in the calibration at the high end of any tuning band. This change should not exceed two or three dial division.

Power Supply

The NC-46 Receiver is designed for operation from a 110/130 volt, A.C. or D.C. power source. Normal power consumption is approximately 65 watts. All voltages required for the heater and B supply circuits are delivered by a built-in power supply.

One side of the input power line is connected through a 2 ampere fuse to prevent any possible damage to the receiver due to a short-circuit or ground. This fuse is housed in an extractor post mounted at the rear of the receiver which permits ease in removal or inspection of the fuse.

Symbol	Type	Rating
	CAPACITORS	
C1	Paper	0.1 mfd., 400 VDCW
C2A	Air	365 mmf. max.
C2B	Air	365 mmf. max.
C3	Paper	0.01 mfd., 400 VDCW
C4	Mica	See Note #1
C5	Air	See Note #1
C6	Air	See Note #1
C7	Mica	0.0047 mfd., 500 VDCW
C8	Paper	0.1 mfd., 400 VDCW
C9	Mica	100 mmf., 500 VDCW
C10	Paper	0.1 mfd., 400 VDCW
C11	Paper	1 mfd., 200 VDCW
C12	Paper	0.1 mfd., 400 VDCW
C13	Paper	0.01 mfd., 400 VDCW
C14	Paper	0.1 mfd., 400 VDCW
C15	Paper	0.01 mfd., 400 VDCW
C16	Paper	0.1 mfd., 400 VDCW
C17	Paper	0.01 mfd., 400 VDCW
C18	Paper	0.1 mfd., 400 VDCW
C19	Paper	0.01 mfd., 400 VDCW
C20	Paper	0.1 mfd., 400 VDCW
C21	Ceramic	50 mmf., 500 VDCW
C22	Mica	270 mmf., 500 VDCW
C23	Paper	0.1 mfd., 400 VDCW
C24	Paper	0.01 mfd., 400 VDCW
C25	Electrolytic	25 mfd., 50 VDCW
C26	Paper	0.01 mfd., 400 VDCW
C27	Paper	0.01 mfd., 400 VDCW
C28	Paper	0.02 mfd., 400 VDCW
C29	Paper	0.1 mfd., 400 VDCW
C30	Paper	0.1 mfd., 400 VDCW
C31	Electrolytic	40 mfd., 200 VDCW
C32	Electrolytic	40 mfd., 200 VDCW
C33	Paper	0.1 mfd., 400 VDCW
C34	Mica	270 mmf., 500 VDCW
C35	Mica	270 mmf., 500 VDCW
C36	Paper	0.1 mfd., 400 VDCW
C37	Paper	0.1 mfd., 400 VDCW
C38	Mica	0.001 mfd., 500 VDCW
C39	Mica	510 mmf., 500 VDCW
C40	Mica	510 mmf., 500 VDCW
C41	Mica	510 mmf., 500 VDCW
C42	Mica	510 mmf., 500 VDCW
C43	Mica	510 mmf., 500 VDCW
C44	Mica	510 mmf., 500 VDCW
C45	Paper	0.01 mfd., 400 VDCW
C46	Paper	0.1 mfd., 400 VDCW
C47	Bakelite	1 mmf., 400 VDCW
	CAPACITORS (continued)	
C48	Paper	0.1 mfd., 400 VDCW
C49	Ceramic	270 mmf., 500 VDCW
Note #1. Capacitor ratings differ for each coil range and definite ratings cannot be listed.		
	RESISTORS	
R1	Fixed	470,000 Ohms, 1/2 w
R2	Fixed	10,000 Ohms, 1/2 w
R3	Fixed	220 Ohms, 1/2 w
R4	Fixed	1,000 Ohms, 1/2 w
R5	Fixed	1,000 Ohms, 1/2 w
R6	Fixed	470,000 Ohms, 1/2 w
R7	Fixed	560 Ohms, 1/2 w
R8	Not Used	
R9	Fixed	22,000 Ohms, 1/2 w
R10	Fixed	1,000 Ohms, 1/2 w
R11	Fixed	470,000 Ohms, 1/2 w
R12	Fixed	560 Ohms, 1/2 w
R13	Fixed	22,000 Ohms, 1/2 w
R14	Fixed	2,200 Ohms, 1/2 w
R15	Fixed	1,000,000 Ohms, 1/2 w
R16	Fixed	470,000 Ohms, 1/2 w
R17	Fixed	1,000,000 Ohms, 1/2 w
R18	Fixed	470,000 Ohms, 1/2 w
R19	Variable	500,000 Ohms, 1 w
R20	Fixed	3,900 Ohms, 1/2 w
R21	Fixed	270 000 Ohms, 1/2 w
R22	Fixed	270,000 Ohms, 1/2 w
R23	Fixed	270,000 Ohms, 1/2 w
R24	Fixed	68 Ohms, 1/2 w
R25	Fixed	270,000 Ohms, 1/2 w
R26	Fixed	270,000 Ohms, 1 2 w
R27	Fixed W.W.	5 Ohms, 5 w
R28	Fixed	100,000 Ohms, 1/2 w
R29	Fixed	100,000 Ohms, 1/2 w
R30	Fixed	100,000 Ohms, 1/2 w
R31	Fixed	50,000 Ohms, 1/2 w
R32	Fixed	470,000 Ohms, 1/2 w
R33	Fixed	470,000 Ohms, 1/2 w
R34	Fixed	22,000 Ohms, 1/2 w
R35	Fixed	2,200,000 Ohms, 1/2 w
R36	Fixed	100 Ohms, 1/2 w
R37	Variable	10,000 Ohms, 1 w
R38	Fixed	22,000 Ohms, 1/2 w
R39	Fixed	33,000 Ohms, 1/2 w

MODEL NC-46

NATIONAL CO. INC.

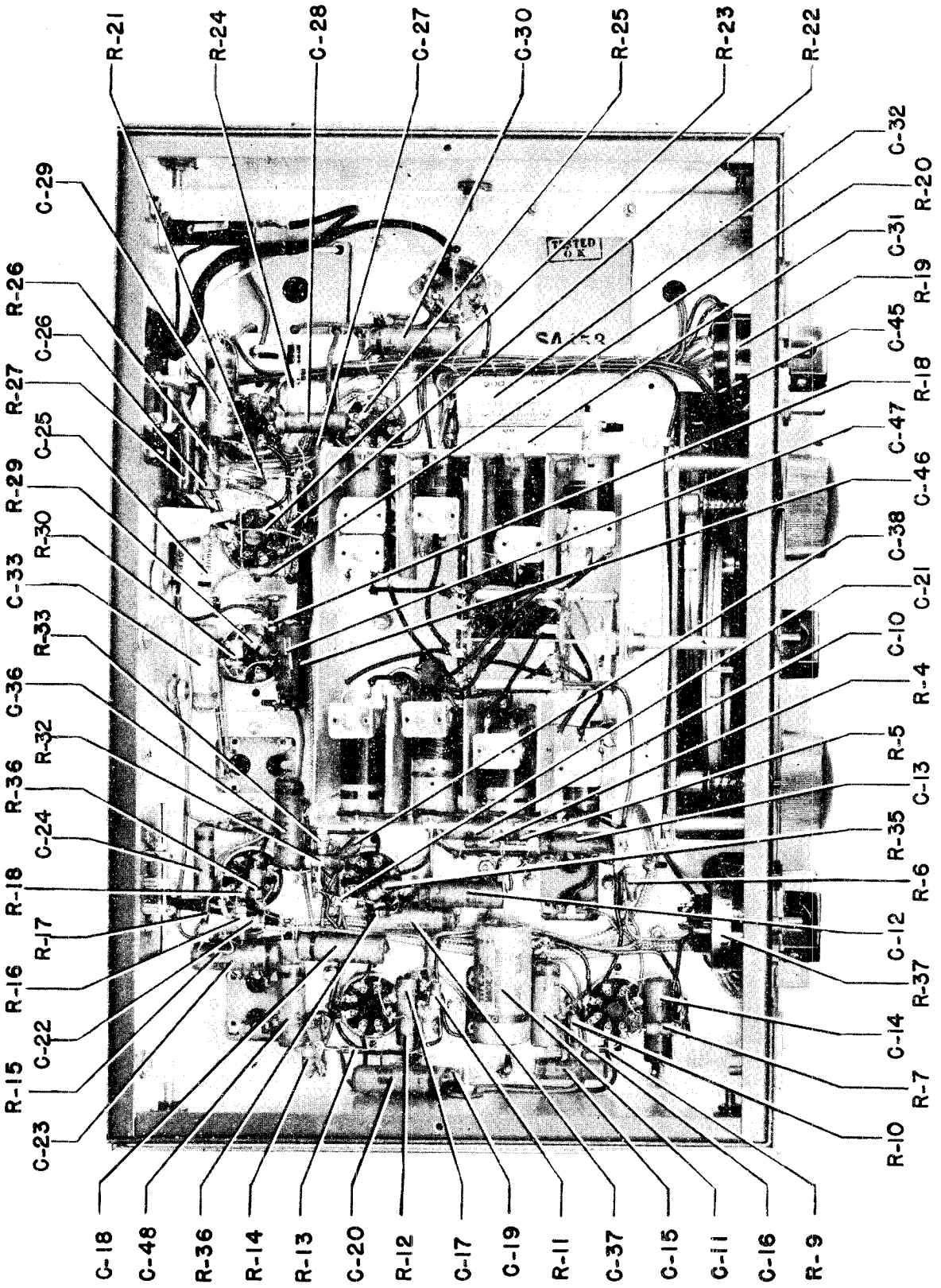

FIG. NO. 4

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NATIONAL CO. INC.

The coil groups are mounted in a cadmium plated steel compartment which is directly below the main two gang variable capacitor. The oscillator coils are mounted nearest the left-hand side of the receiver with the first detector coils at the right. All coils have individual trimmer capacitors.

I.F. Amplifier Alignment

The intermediate frequency of the NC-46 Receiver is 455 kilocycles. The three I.F. transformers are of the permeability tuned iron-core type with primary and secondary adjustments.

The first I.F. transformer adjustments, the primary of the second I.F. transformer and the secondary of the third I.F. transformer adjustments are made from inside the cabinet; the secondary of the second I.F. transformer and the primary of the third I.F. transformer adjustments are made through holes in the top of the cabinet. These holes are concealed by means of sliding buttons.

To properly align the receiver the equipment should be set up as specified except that the antenna be disconnected and the A.V.C. switch turned to "Off", the VOLUME control turned to 10 and the TONE control be switched "Off" An output meter having a 10 ohm resistive load should be connected to speaker output terminals. The high output lead of an accurately calibrated signal generator should be connected to the grid terminal of the converter tube and the grounded lead to any convenient point on the chassis. Adjust the output attenuator of the signal generator to provide a signal of approximately 100 microvolts and vary the tuning control of the signal generator slowly between the frequencies of 452 and 458 kilocycles. At some frequency between these points the I.F. amplifier of the receiver will show a sharply peaked response as indicated on the output meter. The I.F. tuned iron cores should be carefully adjusted to give a maximum reading on the output meter. The order in which these adjustments are made is not important.

Coil Alignment

Controls should be set as outlined Alignment is effected as follows:

a. H.F. Oscillator alignment

(1) Set the MAIN TUNING dial to some frequency at the high end of the tuning band to be aligned.

(2) Connect a signal generator, accurately tuned to deliver a signal of the same frequency as that indicated by the receiver dial setting, to the antenna input terminals through a standard 500 ohm dummy antenna.

(3) By checking the calibration of the receiver against the signal delivered by the signal generator, the accuracy of the H.F. oscillator alignment can be observed. If the dial reading of the receiver is found to be high it can be corrected by decreasing the capacity of the H.F. oscillator trimmer capacitor; conversely, low dial readings can be corrected by increasing the capacity of the trimmer.

(4) Care should be taken to insure that the H.F. oscillator is tuned to the fundamental frequency and not the image. This can be checked by tuning to the image frequency which should appear 910 kilocycles below the fundamental frequency and should be considerably weaker. If the operator finds the receiver is tuned to the image signal the capacity of the H.F. oscillator trimmer capacitor should be decreased until the fundamental frequency appears at the proper dial setting.

b. 1st Detector alignment.

(1) With the signal generator adjusted to deliver a modulated signal near the high frequency limit of the tuning band to be checked, the receiver should be tuned to give maximum output, as indicated by the output meter. The 1st detector trimmer capacitor should then be adjusted to give a maximum reading on the output meter. If this trimmer requires considerable realignment it may necessitate the realignment of the H.F. oscillator trimmer to maintain correct calibration.

(2) An alternate method of aligning the 1st detector in the event a signal generator is not available is to set the trimmers at the setting giving the maximum background noise. It will be found that this method gives a sufficiently sharp indication to provide good alignment.

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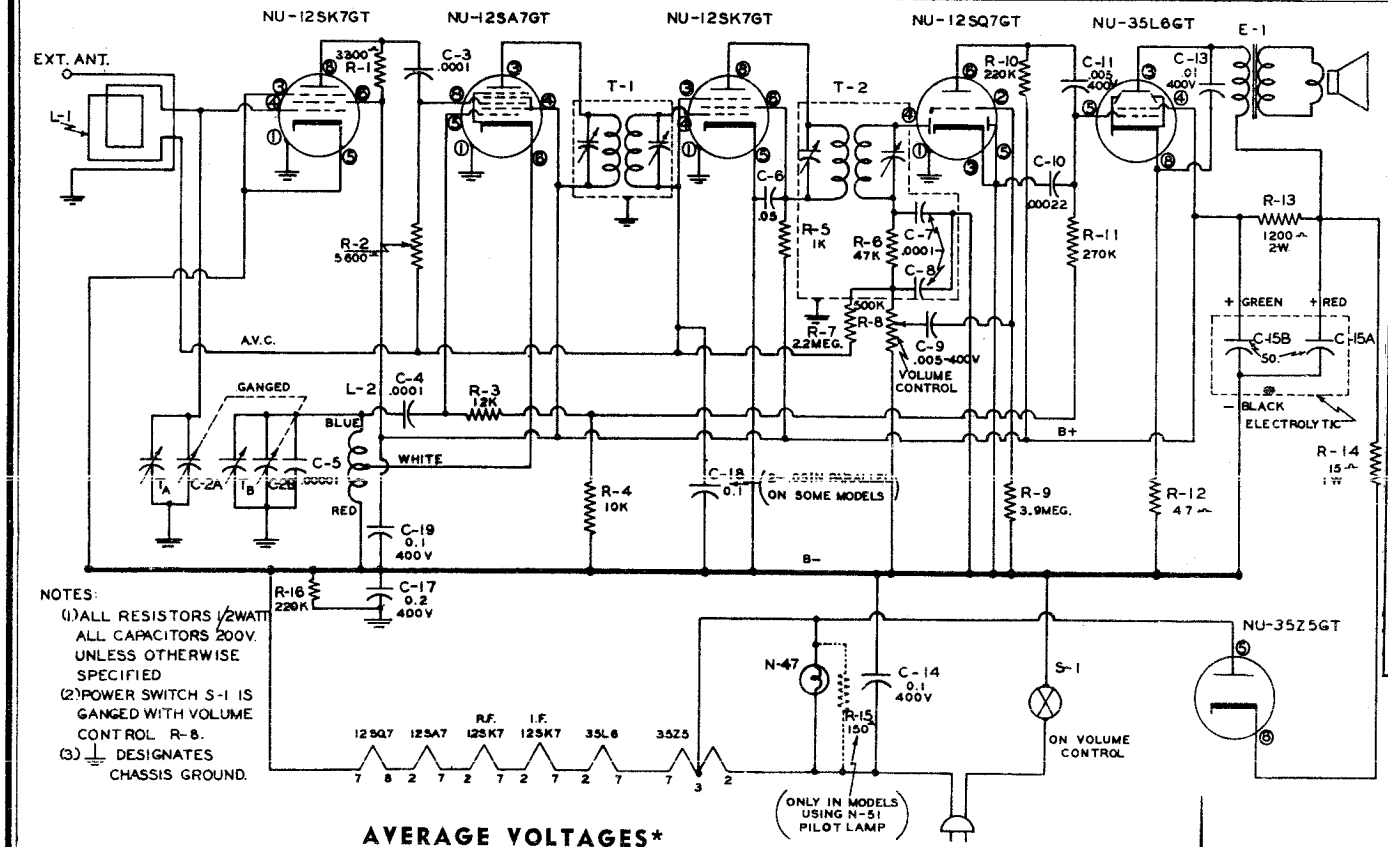


NOTES:
(1) ALL RESISTORS 1/2 WATT ALL CAPACITORS 200V. UNLESS OTHERWISE SPECIFIED
(2) POWER SWITCH S-1 IS GANGED WITH VOLUME CONTROL R-8.
(3) ⏚ DESIGNATES CHASSIS GROUND.

PARTS LIST

SYMBOL	DESCRIPTION	FACTORY PART NO.	NOTES
E-1	Complete Assembly (O.P. Transf. and P.M. Speaker)	EH6-1	Replacement of complete assembly is advisable if either part fails
Loop	Loop Antenna	LL-11	
L-2	Oscillator Coil	LO-2	
T-1	1st I.F. Trans.	TM2-1	
T-2	2nd I.F. Trans.	TM2-3	
R-8	Vol. Control With Switch (S-1)	RP5-2	NU-500M-C8 may be used as a replacement
C2-A C2-B	2 Gang Variable Capacitor	CV-6	
C15A C15B	Electrolytic Capacitor 80-40/150	CE-81	
	Dial Lamp 6-8V./.20A, in early models		N-51
	6-8V./.15A, in later models		N-47
	Dial Scale (Glass)	ND-16-1	
	Dial Pointer	ND-1-2	
	Dial Lamp Socket	JS13-163	

I. F. 455 K.C.

AVERAGE VOLTAGES*

PIN NO.	R.F. 12SK7GT		CONV. 12SA7GT		I.F. 12SK7GT		DET. 12SQ7GT		POW. AMP. 35L6GT		RECT. 35Z5GT	
	A.C.	D.C.	A.C.	D.C.	A.C.	D.C.	A.C.	D.C.	A.C.	D.C.	A.C.	D.C.
1	Zero		Zero		Zero		Zero		Zero		Zero	
2	25.0		13.0		37.0			—0.65	51.5		117.0	
3	Zero			72.0		—0.6	Zero			91.0	111.0	
4		—0.6		72.0		—0.6		—0.55		72.0	Zero	
5	Zero			—5.2	Zero		Zero			—0.4	111.0	
6		72.0	Zero			64.0		55.0		—2.1	Zero	
7	37.0		25.0		51.5		Zero		85.5		85.5	
8		43.0		—0.55		64.0	13.0			1.3		96.0

*Because of the many variables that may enter into voltage measurements it is impractical to indicate ABSOLUTE values of voltage. Readings must necessarily be AVERAGE voltages and even these are subject to a ±10% variation.

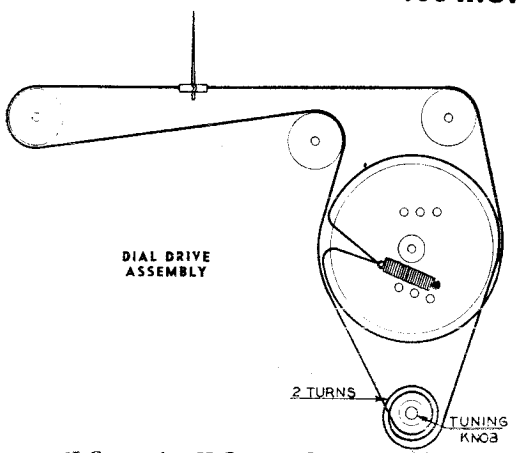
D.C. measurements shown are at 20,000Ω/volt.

A.C. measurements shown are at 1,000Ω/volt.

Readings are taken from SOCKET PINS TO COMMON NEGATIVE while viewing socket from the BOTTOM.

Volume Control set at MINIMUM.

Tuning Condenser set at Full Mesh (Maximum Capacity)



SERVICE NOTES

HUM MODULATION:

On Early Production runs Condenser C-18 consisted of two — .05 mfd. units. One ground terminal was connected to CHASSIS, the other to B—. Disconnect the CHASSIS terminal of the .05 Condenser now connected to Pin No. 1 of the NU-12SA7GT tube and connect this lead to Pin No. 5 of either of the NU-12SK7GTs or to any other convenient B— point. This effectively by-passes the A.C. Modulation hum to B— instead of to Chassis.

OSCILLATION:

Remove one side of Resistor R-2 (in grid circuit of 12SA7GT) now connected to A.V.C. bus and reconnect to cathode (#5 pin) of I.F.—12SK7GT.

TUNING Broadcast Band — 535 K.C. to 1620 K.C. — 2 Gang Variable Capacitor

POWER SUPPLY 105-125 Volts, 60 cycles A.C. — 105-125 Volts, Direct Current — Approx. 30 Watts Consumption

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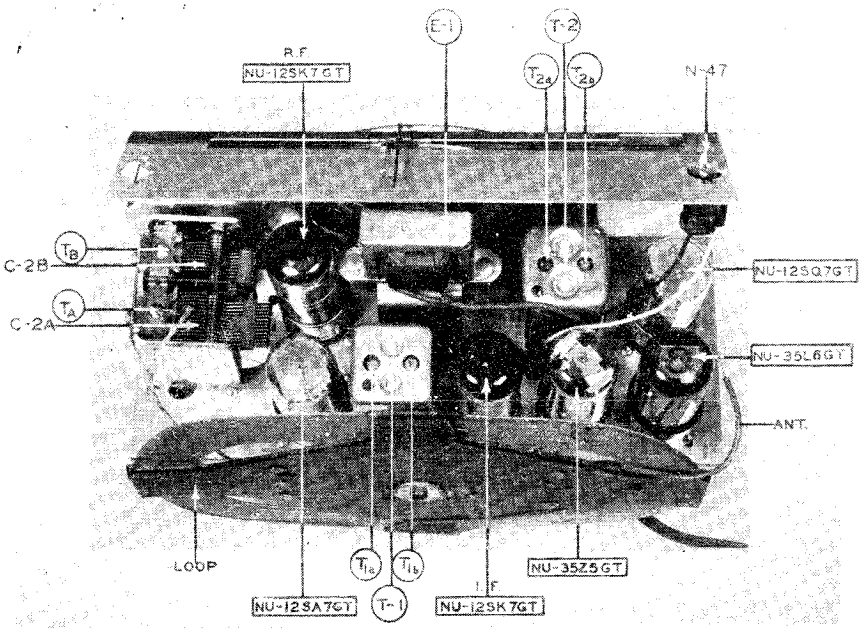

FIG. 1

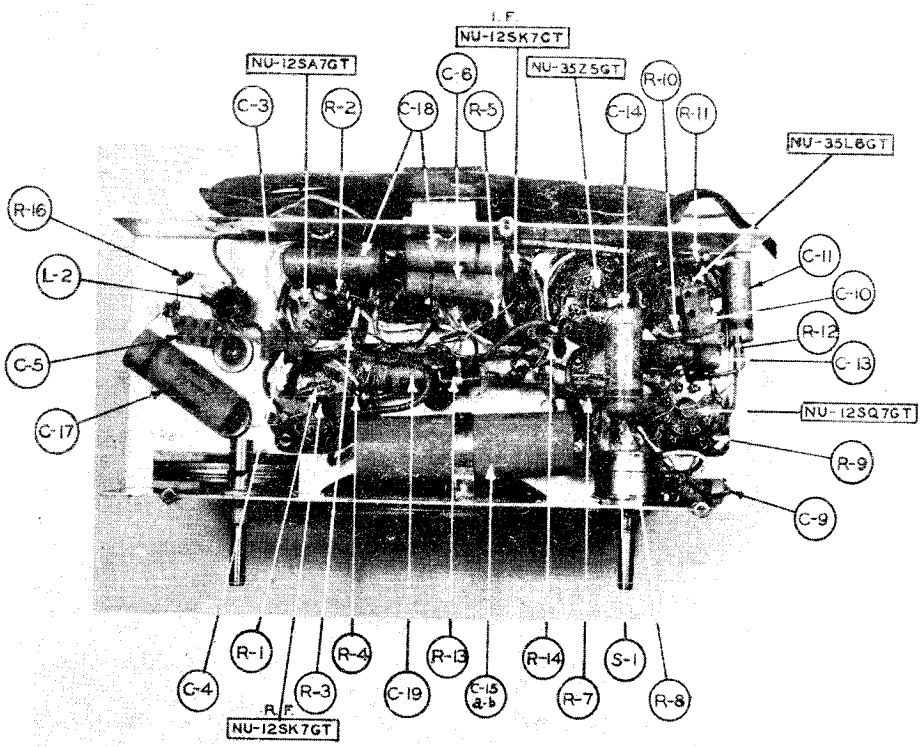

FIG. 2

ALIGNMENT PROCEDURE

PRELIMINARY.

(a) Adjust the DIAL POINTER along the dial cord to the position opposite the first right-hand *punch mark* on the dial backing-plate, with the tuning condenser gang completely out of mesh (Minimum Capacity); (b) Set VOLUME CONTROL to the FULL ON position; (c) Maintain SIGNAL GENERATOR output at MINIMUM consistent with a readable Output Meter indication; (d) OUTPUT METER across voice coil; (e) Follow sequence indicated below.

SEQUENCE	DUMMY ANTENNA	DIAL SETTING	SIGNAL GENERATOR CONNECTIONS	SIGNAL GENERATOR SETTING	ADJUST TRIMMERS	NOTES
1 I.F.	.01 mfd.	At HIGH frequency end of scale. (Min. Capacity)	High side to stator lug of C2-A (Fig. 1). Low side to B—	455 K.C.	T2a T2b T1a T1b (Fig. 1)	Adjust Trimmers for MAX. output reading
2 OSC.	3 turn coil of #18 or #20 insulated wire on 7" or 8" diameter LOOSELY Coupled to loop Antenna in Receiver	Pointer at extreme RIGHT HAND END of dial scale (Min. Capacity) Pointer will be in line with FIRST punch mark at right	Across Dummy Antenna	1700 K.C.	Tb (Fig. 1)	Adjust Trimmer for MAX. output reading
3 R.F.	Same as in 2 above	Pointer in line with punch mark SECOND from right	Same as in 2 above	1520 K.C.	Ta (Fig. 1)	Adjust Trimmer for MAX. output reading
4	Same as in 2 above	At LOW frequency end of scale (Max. Capacity)	Same as in 2 above	530 K.C.	None	530 K.C. signal should be picked up at or near this dial setting. Check operation in Seq. 2 if signal is not picked up
5	***REINSTALLING CHASSIS (AFTER ALIGNMENT):—*** (a) With chassis still on the bench, set dial pointer at the minimum capacity end of travel. (b) Slide chassis into cabinet and adjust its position so that the dial pointer is opposite and in line with the FIRST calibration mark at the right-hand end of the GLASS DIAL SCALE. (c) Tighten the chassis hold down screws. (d) Tuning should now track so that peak signal is attained at the proper frequency calibration on the glass dial scale.					

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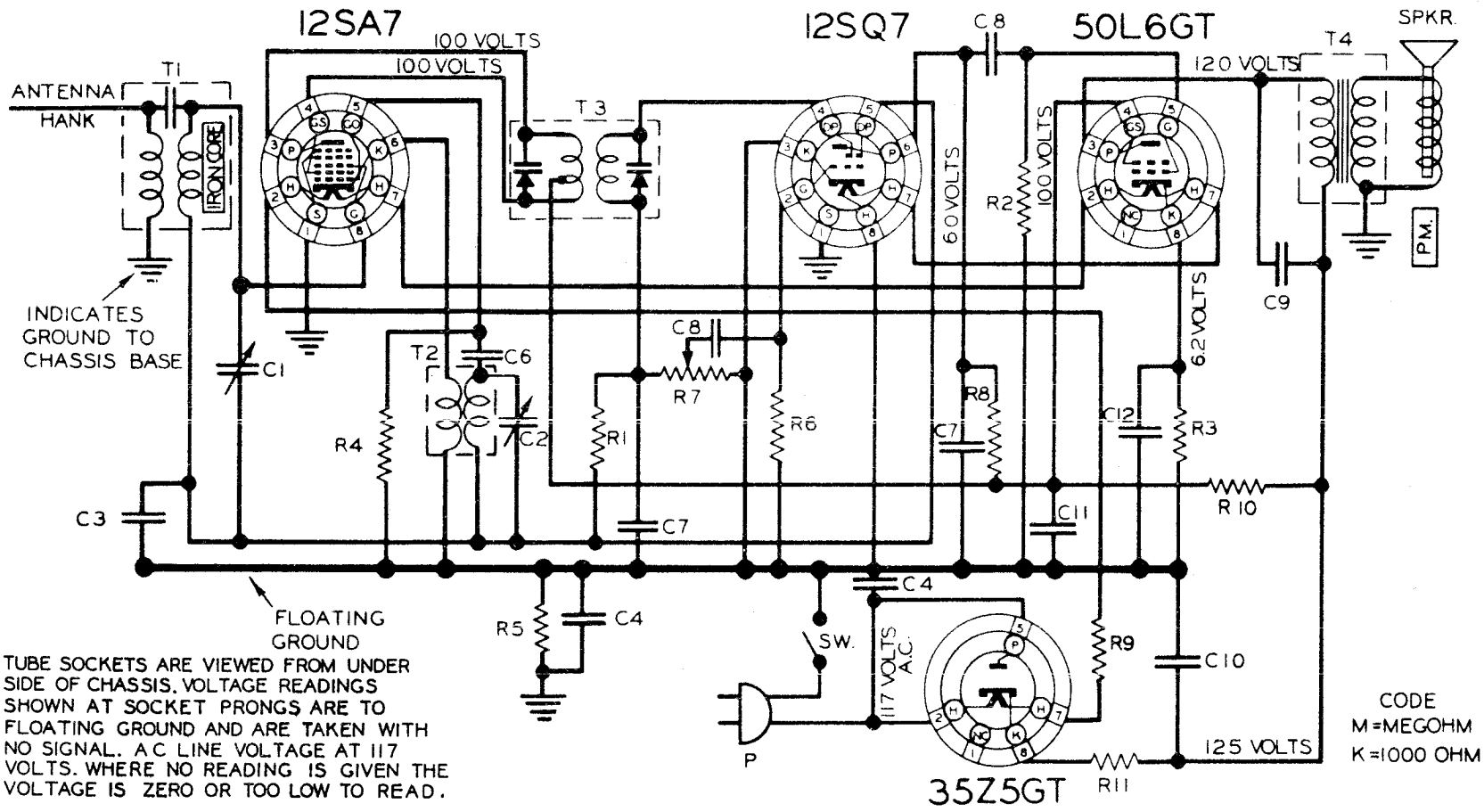


TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS. VOLTAGE READINGS SHOWN AT SOCKET PRONGS ARE TO FLOATING GROUND AND ARE TAKEN WITH NO SIGNAL. AC LINE VOLTAGE AT 117 VOLTS. WHERE NO READING IS GIVEN THE VOLTAGE IS ZERO OR TOO LOW TO READ.

REFERENCE NO.	PART NO.	DESCRIPTION
R1		Resistor, 4.7 Megohms ½ watt
R2		Resistor, 1 Megohm ½ watt
R3		Resistor, 150 ohms ½ watt
R4		Resistor, 22,000 ohms ½ watt
R5		Resistor, 330,000 ohms ½ watt
R6		Resistor, 15 Megohms ½ watt
R7	B18587	Resistor, 2 Megohms Vol. control & Sw.
R8		Resistor, 470,000 ohms ½ watt
R9		Resistor, 47 ohms 1 watt
R10		Resistor, 2,200 ohms 1 watt
R11		Resistor, 15 ohms ½ watt
C1, Cw	B17115	Condenser, variable
C3		Condenser, .05 mfd, 200 volt
C4		Condenser, .05 mfd, 400 volt
C6		Condenser, .00005 mfd, 500 volt
C7		Condenser, .0001 mfd, 500 volt
C8		Condenser, .002 mfd, 500 volt
C9		Condenser, .01 mfd, 400 volt
C10		Condenser, 40 mfd, 150 volt
C11	A19176	Condenser, 20 mfd, 150 volt
C12		Condenser, 20 mfd, 25 volt
T1	AC18255-1	Coil, antenna
T2	AC18256-1	Coil, oscillator
T3	AC18157-1	Coil, i-f
T4	AC18258-1	Output transformer
	A18263	Dial scale emblem
	E18124-1	Cabinet, walnut
	E18124-2	Cabinet, ivory
	A18261-2	Knob, tuning, ivory
	A18262-2	Knob, tuning, ivory
Spk.	B17209	Speaker
C5		Condenser, .005 mfd, 400 volt

TUBES AND FUNCTIONS

12SA7 ..... Mixer-oscillator
12SQ7 ..... Detector-AVC-AF.
50L6GT ..... Output
35Z5GT ..... Rectifier

FREQUENCY RANGE
Broadcast ..... 540-1600 kc
IF ..... 455 kc

LOUD SPEAKER
Type: Permanent magnet
Size: 4 inch
Voice coil impedance ..... 3.2 ohms

POWER SUPPLY

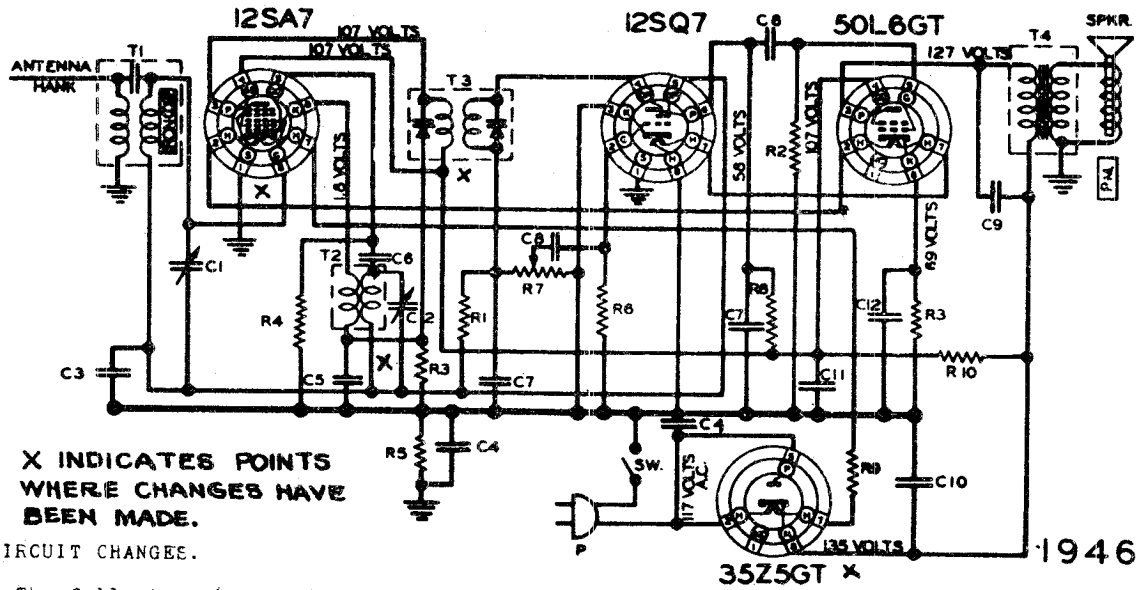
105-125 Volts, AC-DC, 35 Watts

POWER OUTPUT

Type: Beam tube
Undistorted ..... .6 Watts
Maximum ..... 2.5 Watts
Plate Load ..... 2000 Ohms

MODELS 444,444A
Chassis RE-200

NOBLITT-SPARKS INDUSTRIES INC.



CIRCUIT CHANGES.

The following changes have been made in Chassis RE-200 since the start of production.

1. Connections to pins 2 & 7 have been interchanged on 12SA7 tube.
2. A 15 ohm resistor, R-11 has been added in B+ lead at Cathode of 35Z5GT tube.
3. .005 Condenser C-5 and 150 ohm Resistor R-3 have been deleted from oscillator circuit.
4. Tap has been added to Primary of IF transformer T-3 and trimmer connected directly across primary winding.

PRELIMINARY.

ALIGNMENT PROCEDURE

Output meter connection ..... Across loudspeaker voice coil
Output meter reading to indicate 200 milliwatts (standard output) ..... 0.8 volts
Dummy antenna to be in series with signal generator output ..... See chart below
Connection of generator ground lead ..... Floating ground
Generator modulation ..... 30% 400 cycles
Position of Volume Control ..... Fully clockwise
Position of pointer with vzriable fully closed ..... 54 on dial

Position of Variable	Generator Frequency	Dummy Antenna	Generator Output Connection	Trimmers Adjusted	Trimmer Function	Approximate Sensitivity
Open	455 Kc	.05 uf	12SA7 Grid (Stator of C-1)	2 trimmers on top of T-3	IF	3000 uv
1400 Kc	1400 Kc	.00005 uf	Antenna lead	**C-2	Oscillator	360 uv

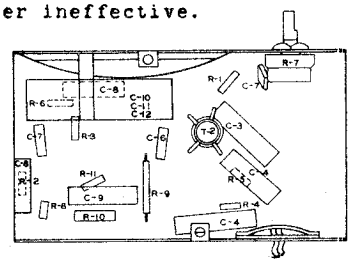
**Since the antenna section of the variable has no trimmer, the rotor of the variable should be rocked back and forth on both sides of 1400 Kc while adjusting the oscillator trimmer for maximum output. This is to obtain the combination of rotor and trimmer setting to give perfect tracking of the two sections of the variable condenser and consequently give maximum output.

Check sensitivity at 600 Kc. If weak, adjust antenna section plates for maximum output at 600 Kc. Tracking of the condenser at points other than 1400 Kc is accomplished by bending the outside plates on the variable condenser rotor, which are cut for this purpose. When bending plates to track the condenser at any given frequency, keep in mind the fact that this will effect the tracking at all frequencies below that point. A tuning wand is very helpful in checking the tracking of this condenser, to indicate whether more or less capacity is needed.

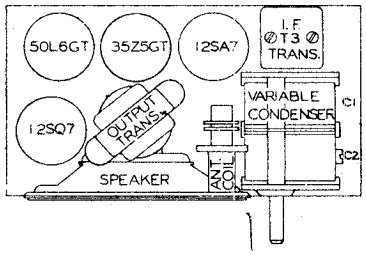
The alignment procedure should be repeated stage by stage in the original order for greatest accuracy.

Always keep the output from the test oscillator at its lowest possible value to make the AVC action of the receiver ineffective.

LOCATION OF PARTS UNDER CHASSIS



TUBE LAYOUT



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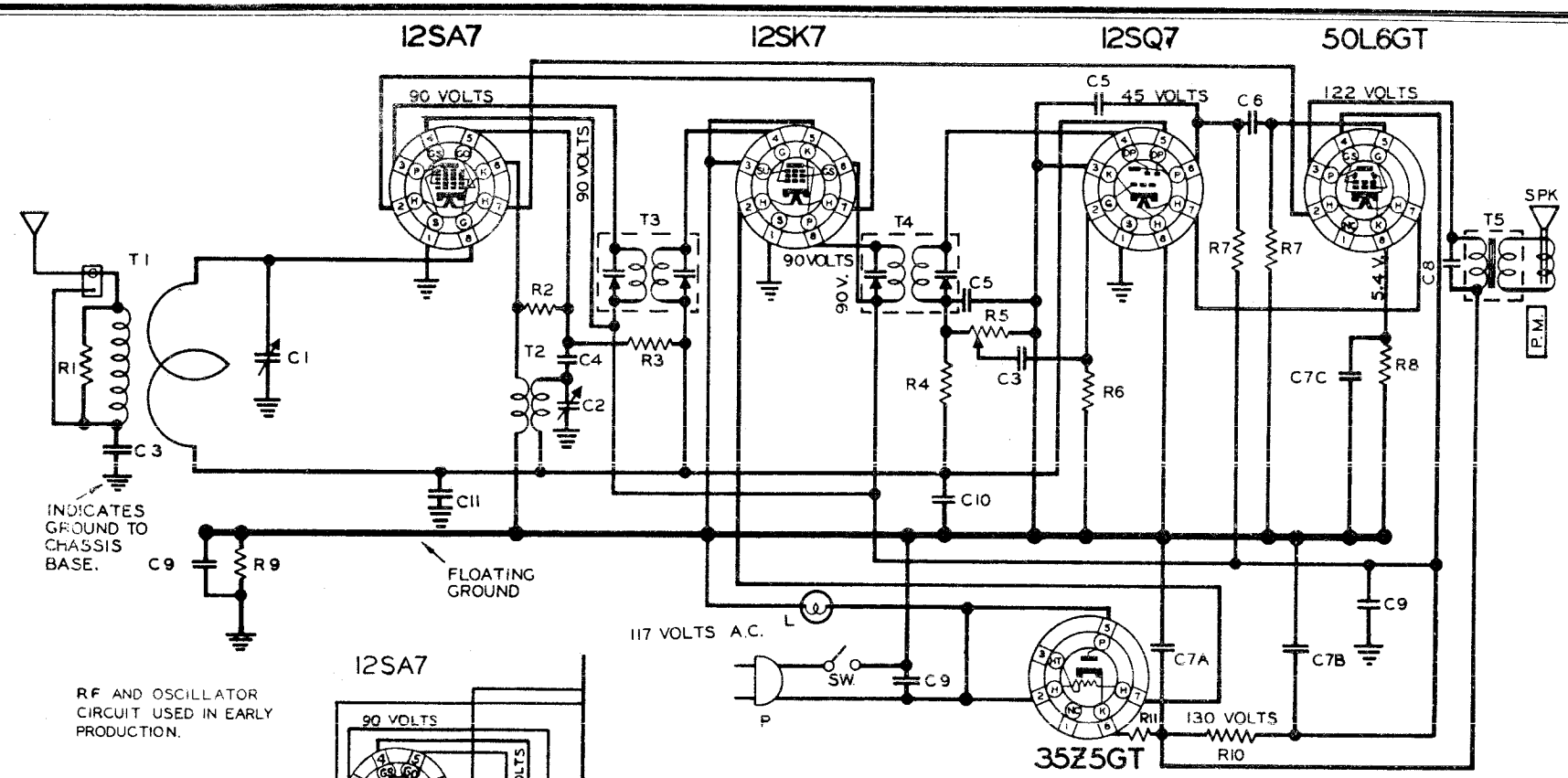
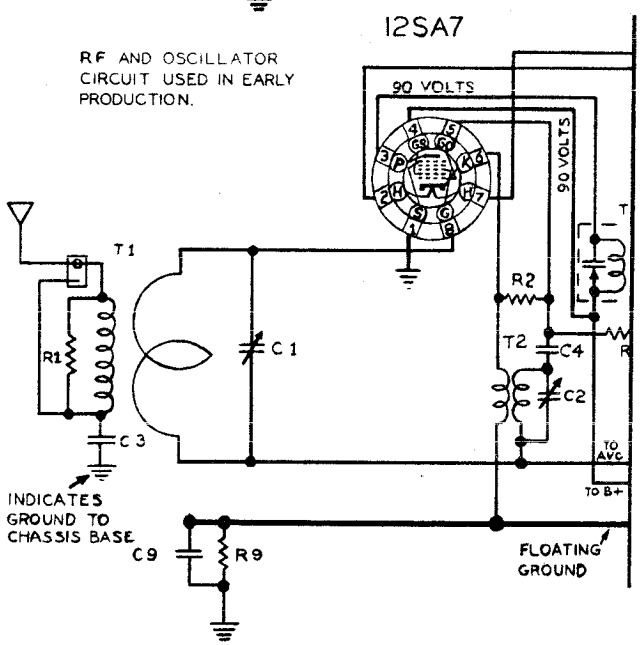


RF AND OSCILLATOR CIRCUIT USED IN EARLY PRODUCTION.



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1946

SERVICE HINTS AND CIRCUIT CHANGES.

Sets made previously to March, 1946 had the Variable Condenser rotors connected to the AVC line instead of being grounded to chassis base, and did not have the .1 ufd condenser C-11 connected from the AVC line to chassis base. (In a few sets this is a .05 ufd condenser C-9)

On the early sets, if the dial pointer, shaft, or metal pulley on variable is allowed to touch the dial scale, or plate, the rotor of variable will be grounded, causing noise and distortion. The circuit was changed to eliminate this condition.

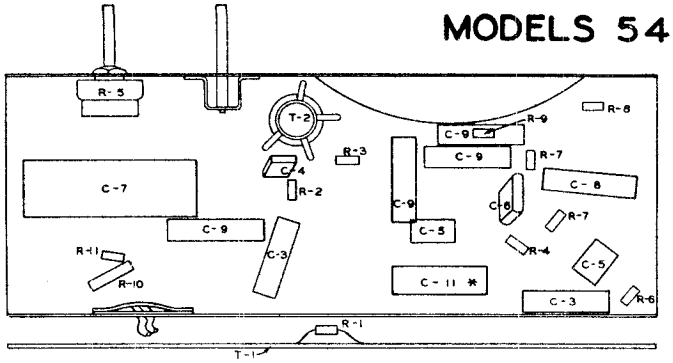
If distortion or a chopped output signal is encountered in this set, try replacing the 50L6 tube.

IF PEAK 455 KC

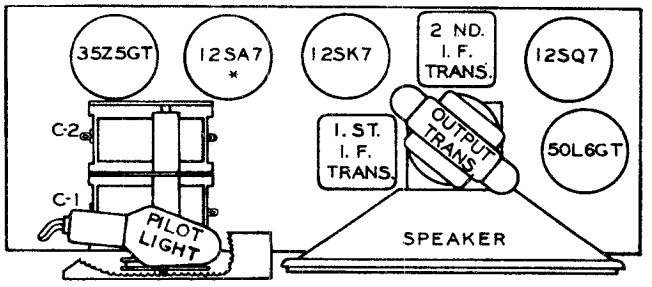
MODELS 544, 544A,
Chassis RE-201

NOBLITT-SPARKS INDUSTRIES INC.

MODELS 544 & 544A



LOCATION OF PARTS UNDER CHASSIS



OUTLINE FOR TUBE LAYOUT

* ON SETS MADE PREVIOUS TO MAY 1946 THE 12SA7 TUBE WAS LOCATED BETWEEN THE VARIABLE CONDENSER AND 1ST I.F. TRANSFORMER

PRELIMINARY.

Output meter connection ..... Across loudspeaker voice coil
Output meter reading to indicate 200 milliwatts (standard output)..... .8 volts
Dummy antenna value to be used in series with generator output ..... See chart below
Connection of generator output lead ..... See chart below
Connection of generator ground lead ..... *Floating ground
Generator modulation ..... 30% 400 cycles
Position of Volume Control ..... Fully clockwise
Position of dial pointer with variable fully closed ..... Horizontal
Place the set loop in the same position with respect to the rear of the chassis, and the same distance from the chassis, as it would be with the set mounted in the cabinet.

Position of Variable	Frequency of Generator	Dummy Antenna	Generator Output Connection	Trimmers adjusted in Order Shown for Max. Output	Function of Trimmer
Open	455	.01 mfd.	12SA7 Grid (Stator of front section of variable condenser)	Top of 2nd & 1st IF Trans.	IF
1400	1400	.00005 mfd.	Antenna Clip (With blue wire removed)	C2; C1, trimmers on Rear & Front sections of Variable Condenser	Osc. Ant.
600	600	.00005 mfd.	Antenna Clip (With blue wire removed)	**Adj. antenna section plates of variable cond. for Max. output.	Antenna

If a standard test loop is used with the signal generator for alignment of the receiver, the blue wire will be left in the antenna clip, and the approximate sensitivities should be 300 uv/m and 250 uv/m or less at 600 Kc and 1400 Kc respectively.

Approximate stage by stage sensitivities for 200 Milliwatt output.

IF. - 455 Kc. -------- 3350 uv
Mixer 455 Kc. -------- 75 uv
Mixer 1000 Kc.-------- 60 uv
Antenna 1000 Kc -------- 50 uv
Antenna 1400 Kc -------- 25 uv
Antenna 600 Kc -------- 50 uv

The alignment procedure should be repeated in the original order for greatest accuracy. Always keep the output from the signal generator at its lowest possible value to make the AVC action of the receiver ineffective.

*A floating ground connection can be obtained on either of the lugs on the back of the AC switch or the black lead on the Volume Control.

**AS THE CONDENSERS ARE ALL TRACKED BEFORE LEAVING THE FACTORY IT IS NOT PROBABLE THAT THE PLATES WILL NEED TO BE ADJUSTED UNLESS WIDE VARIATIONS IN TUBES ARE ENCOUNTERED.

The outside plates on the antenna section of the variable condenser are cut, so they can be bent in or out to give more or less capacity at any given position of the rotor, after the trimmers on the variable have been adjusted at 1400 Kc. A disc type tuning wand affords a quick method of determining whether more or less capacity is needed in the antenna circuit. If the output increases when the Iron end of the wand is placed near the loop, the plates should be bent in to give more capacity. If the output increases when the brass or aluminum end of the wand is placed near the loop the plates should be spread out. If the wand indicates

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that the plates should go closer, but cannot go closer without shorting, the oscillator section plates can be spread, but the calibration should be checked after adjusting the oscillator section. Also the band coverage should be checked to see that 540 Kc can be received.

If the receiver is weak at 1000 Kc the same procedure can be followed at 1000 Kc as outlined above for 600 Kc but this will change the tracking at 600 Kc and may affect 1400 Kc so that all points should be rechecked in the original order.

The condenser should be checked for any possible shorting of the plates after the alignment is completed.

FREQUENCY RANGE

Broadcast	540-1600 kc
IF	455 kc

TUBES & FUNCTIONS

12SA7	Mixer-oscillator
12SK7	IF Amp.
12SQ7GT	DET-AVC-AF
50L6GT	Output
35Z5GT	Rectifier

LOUD SPEAKER

Type:	Permanent magnet
Size:	5 inch
Voice coil impedance	3.2 ohms

POWER SUPPLY

105-125 Volts AC-DC, 35 Watts

POWER OUTPUT

Undistorted	.8 Watts
Maximum	2.5 Watts
Plate load	2000 ohms

Due to variations in tubes some sets which are equipped with 12SK7GT tubes may have a tendency to oscillate. This condition can usually be corrected by placing a shield on the 12SK7GT tube or replacing it with a 12SK7 metal tube. In some cases the IF transformers may need to be repeaked after changing this tube.

Several cases of weak sets have been caused by a defective 12SA7GT tube which will check good on the average tube tester. Alignment should be checked after changing this tube.

REF. NO.	PART NO.	DESCRIPTION	LIST PRICE
	E17232-1	Cabinet, Walnut	$2.38
	E17232-2	Cabinet, Ivory	2.50
	A17304	Dial Crystal	.24
	A19474-1	Knobs	.11
	A19125	Grille Cloth	.08
	A17296	Tuning Shaft	.11
	A18640-1	Dial Scale	.10
	A19132	Dial Drive Cord	.02
	A19133	Spring	.04
	A19205-3	Cap. Mtg. Clip	.03
	A19253-1	Socket	.12
	A18254-1	Socket	.12
	A19134-1	Dial Light Socket	.32
	A19135	Dial Light Bulb	.18
	A16482	Tube Shield	.06
	B20064-1	Line Cord & Plug Assy.	.75
C1 C2	B18869	Variable Condenser	3.43
C3	C20068-103	Cond., .01 mfd - 400 V P.T.	.17
C4	C20065-500	Cond., .00005 mfd - 500 V Mica	.20
C5	C20065-501	Cond., .0005 mfd - 500 V Mica	.26
C6	C20069-202	Cond., .002 mfd - 600 V P.T.	.40
C7	A19136	Cond., Electrolytic	1.34
C8	C20068-303	Cond., .03 mfd - 400 V P.T.	.18
C9	C20068-503	Cond., .05 mfd - 400 V P.T.	.19
C10	C20067-503	Cond., .05 mfd - 200 V P.T.	.17
C11	C20068-104	Cond., .1 mfd - 400 V P.T.	.22
R1	C20060-103	Resistor, 10,000 ohms ½ W	.05
R2	C20060-223	Resistor, 22,000 ohm ½ W	.05
R3	C20060-156	Resistor, 15 meg. ½ W	.05
R4	C20060-225	Resistor, 2.2 meg. ½ W	.05
R5	B17291	Volume Cont. & Sw., 1 meg.	.87
R6	C20060-475	Resistor, 4.7 meg. ½ W	.05
R7	C20060-474	Resistor, 470,000 ohm ½ W	.05
R8	C20060-151	Resistor, 150 ohm ½ W	.05
R9	C20060-334	Resistor, 330,000 ohm ½ W	.05
R10	C20070-152	Resistor, 1,500 ohm 1 W	.09
R11	C20060-150	Resistor, 15 ohm ½ W	.05
T1	AC18645-1	Antenna Loop Assy.	1.21
T2	AC18646-1	Oscillator Coil	.40
T3	AC18908-1	1st. I.F. Coil	1.04
T4	AC18909-1	2d. I.F. Coil	1.05
T5	AC18647-1	Output Transformer	.81
Spk.	C19114	Speaker	3.25
	A19473	Dial Pointer	.11
	A19141	Term. Strip	.07
	A19547	Two Conductor Shielded Leads	.12
	AC19193-1	Sp. & Trans. Assy.	3.58

MODELS 664 & 664 A

ALIGNMENT PROCEDURE

PRELIMINARY.

Output meter connection ..... Across loudspeaker voice coil
Output meter reading to indicate 200 milliwatts (standard output) ..... .8 volts
Dummy antenna value to be used in series with generator output ..... See chart below
Connection of generator output lead ..... See chart below
Connection of generator ground lead ..... Floating ground
Generator modulation ..... 30% 400 cycles
Position of Volume Control ..... Fully clockwise
Position of dial pointer with variable fully closed ..... Vertical

Place the set loop in the same position with respect to the rear of the chassis, and the same distance from the chassis, as it would be with the set mounted in the cabinet. This distance is 1 3/16" from the plate on back of chassis to back of the loop. If the position of the loop is not correct while adjustments are made on the antenna circuit, the antenna circuit will not track and the set will be weak, when placed in the cabinet.

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MODELS 664,664A
Chassis RE-206

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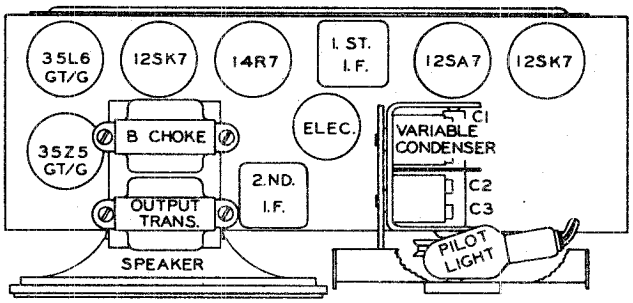
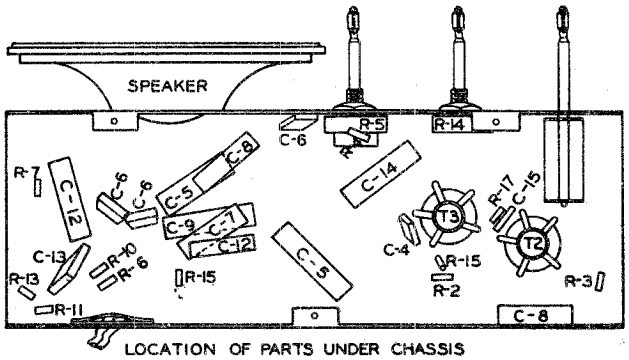


TUBE LAYOUT



LOCATION OF PARTS UNDER CHASSIS

Position of Variable	Frequency of Generator	Dummy Antenna	Generator Output Connection	Trimmers adjusted in Order Shown for Max. Output	Function of Trimmer.
Open	455	.01 mfd.	12SA7 Grid or (Stator of center section of variable condenser)	Top of 2nd & 1st IF Trans.	IF
1400	1400	.00005 mfd.	Antenna Clip (With black wire removed)	*C3; C2; C1, trimmers on Variable Condenser	Osc. RF Ant.
600	600	.00005 mfd.	Antenna Clip (With black wire removed)	**Adj. plates of variable cond. for Max. output.	Osc. RF Ant.

If a standard test loop is used with the signal generator for alignment of the receiver, the black wire will be left in the antenna clip, and the approximate sensitivities should be 250 uv/m and 150 uv/m or less at 600 Kc and 1400 Kc respectively. Sets using glass 12SA7 tube may have slightly weaker sensitivities.

Approximate stage by stage sensitivities for 200 Milliwatt output.

IF. - 455 Kc. --------	10,000 uv	Antenna 1000 Kc --------	15 uv
Mixer 455 Kc. --------	150 uv	Antenna 1400 Kc --------	15 uv
Mixer 1000 Kc. --------	170 uv	Antenna 600 Kc --------	25 uv

The alignment procedure should be repeated in the original order for greatest accuracy. Always keep the output from the signal generator at its lowest possible value to make the AVC action of the receiver ineffective.

*Trimmer C3 (oscillator) is located either on the top or bottom of the variable condenser, depending on the type variable used on any particular set.

**AS THE CONDENSERS ARE ALL TRACKED BEFORE LEAVING THE FACTORY IT IS NOT PROBABLE THAT THE PLATES WILL NEED TO BE ADJUSTED UNLESS WIDE VARIABIONS IN TUBES ARE ENCOUNTERED OR THE CONDENSER HAS BEEN DAMAGED. PLATE BENDING SHOULD NOT BE ATTEMPTED WITHOUT THE PROPER EQUIPMENT, OR BY ANYONE NOT EXPERIENCED AT TRACKING CONDENSERS.

The outside plates on the antenna & RF sections of the variable condenser are cut, so they can be bent in or out to give more or less capacity at any given position of the rotor, after the trimmers on the variable have been adjusted at 1400 Kc. A disc type tuning wand affords a quick method of determining whether more or less capacity is needed in the antenna circuit. If the output increases when the Iron end of the wand is placed near the loop, the plates should be bent in to give more capacity. If the output increases when the brass or aluminum end of the wand is placed near the loop the plates should be spread out. If the wand indicates that the plates should go closer, but cannot go closer without shorting, the oscillator section plates can be spread, or vice versa, but the calibration should be checked after adjusting the oscillator section. Also the band coverage should be checked to see that 540 Kc can be received.

Since the osc. section has much less capacity than the RF & antenna sections, plate bending will be much more effective in the osc. circuit, and a small change in or out in the plates of this section will have the same effect as a large change in the opposite direction in the other sections.

If the receiver is weak at 1000 Kc the same procedure can be followed at 1000 Kc as outlined above for 600 Kc but this will change the tracking at 600 Kc and may affect 1400 Kc so that all points should be rechecked in the original order.

The condenser should be checked for any possible shorting of the plates after the alignment is completed.

SERVICE HINTS AND CIRCUIT CHANGES.

If the dial pointer is allowed to touch the dial scale, the rotor of the variable condenser, which is connected to the AVC Line, will be grounded, causing noise & distortion.

If the set has a tendency to be microphonic, check the rubber grommets on the Variable Condenser mounting, if these are hard replace them with soft rubber grommets.

C15 (14 mmf. cond.) was added to RF Circuit and R17 was changed from 3300 ohms to 6800 ohms, after start of production.

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MODEL 558, Early
Late, Ch. RE-204

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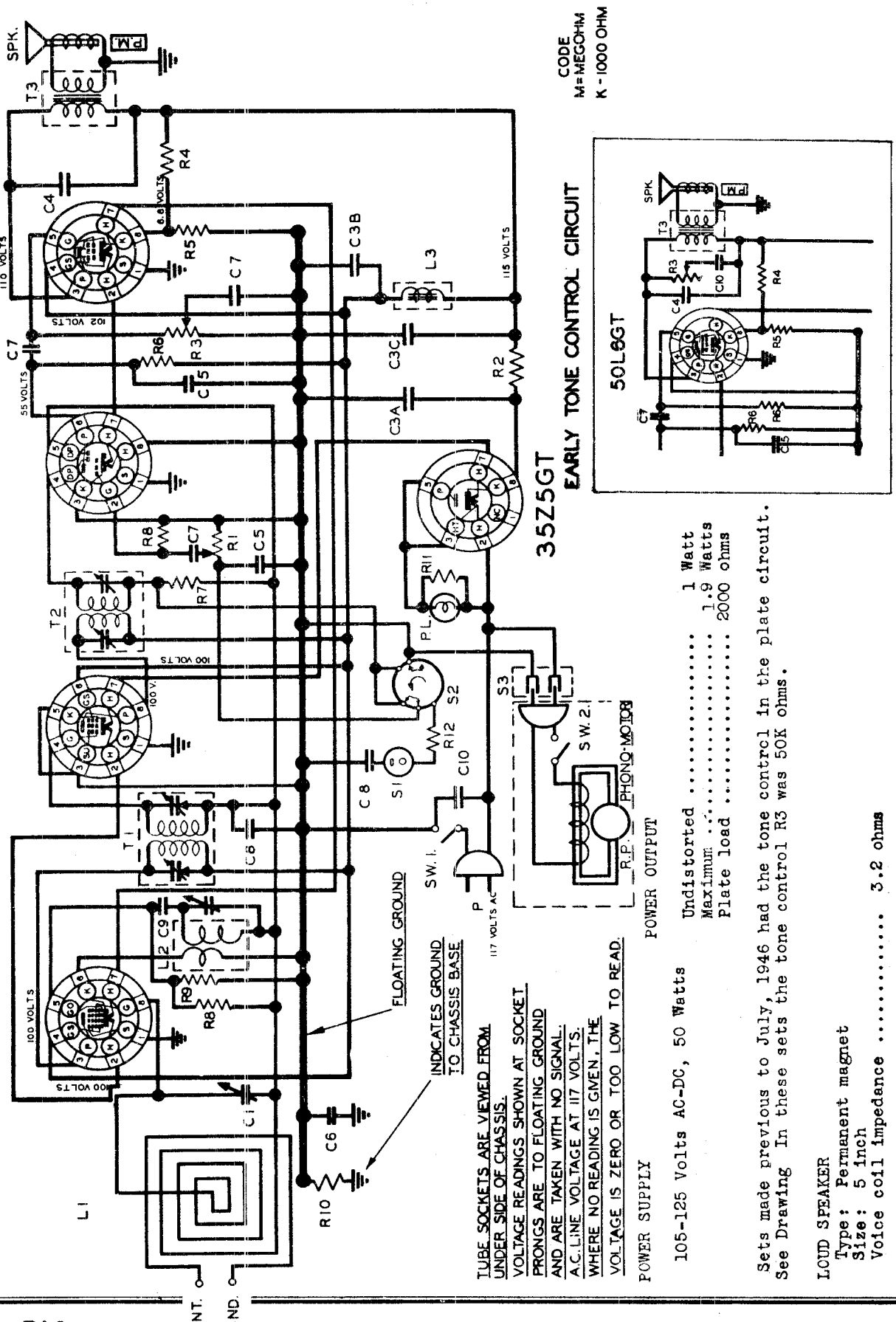
CHASSIS-RE-204



FREQUENCY RANGE
Broadcast ..... 540-1600 kc
IF ..... 455 kc

TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS.
VOLTAGE READINGS SHOWN AT SOCKET PRONGS ARE TO FLOATING GROUND AND ARE TAKEN WITH NO SIGNAL.
A.C. LINE VOLTAGE AT 117 VOLTS.
WHERE NO READING IS GIVEN, THE VOLTAGE IS ZERO OR TOO LOW TO READ.

POWER SUPPLY

105-125 Volts AC-DC, 50 Watts

POWER OUTPUT

Undistorted	1 Watt
Maximum	1.9 Watts
Plate load	2000 ohms

Sets made previous to July, 1946 had the tone control in the plate circuit. See Drawing In these sets the tone control R3 was 50K ohms.

LOUD SPEAKER
Type: Permanent magnet
Size: 5 inch
Voice coil impedance ..... 3.2 ohms

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MODEL 558,Early,
Late,Ch.RE-204

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ALIGNMENT PROCEDURE

PRELIMINARY.

Output meter connection ..... Across loudspeaker voice coil
Output meter reading to indicate 200 milliwatts (standard output)..... .8 volts
Dummy antenna value to be used in series with generator output..... See chart below
Connection of generator output lead ..... See chart below
Connection of generator ground lead ..... *Floating ground
Generator modulation ..... 30% 400 cycles
Position of Volume Control ..... Fully clockwise.
Position of dial pointer with variable fully closed...Last rectangular mark at left edge of dial

Place the set loop in the same position with respect to the rear of the chassis, and the same distance from the chassis, as it would be with the set mounted in the cabinet.

Position of Variable	Frequency of Generator	Dummy Antenna	Generator Output Connection	Trimmers adjusted in Order Shown for Max. Output	Function of Trimmer
Open	455	.05 mfd.	12SA7 Grid (Stator of rear section of variable condenser)	Top of 2nd & 1st IF Trans.	IF
1400	1400	.00005 mfd.	Antenna connection on back of loop	C2; C1, trimmers on Front & Rear sections of Variable Condenser	Osc. Ant
600	600	.00005 mfd.	Antenna connection on back of loop	**Adj. antenna section plates of variable cond. for Max. output	Antenna.

If a standard test loop is used with the signal generator for alignment of the receiver, the approximate sensitivities should be 350 uv/m and 250 uv/m or less at 600 Kc and 1400 Kc respectively.

Approximate stage by stage sensitivities for 200 Milliwatt output.

IF. - 455 Kc. --------	2600 uv	Mixer 1000 Kc. --------	75 uv
Mixer 455 Kc. --------	60 uv	Antenna 1400 Kc. -------	70 uv

The alignment procedure should be repeated in the original order for greatest accuracy. Always keep the output from the signal generator at its lowest possible value to make the AVC action of the receiver ineffective.

*A floating ground connection can be obtained on either of the lugs on the back of the AC switch.

**AS THE CONDENSERS ARE ALL TRACKED BEFORE LEAVING THE FACTORY IT IS NOT PROBABLE THAT THE PLATES WILL NEED TO BE ADJUSTED UNLESS WIDE VARIATIONS IN TUBES ARE ENCOUNTERED.

The outside plates on the antenna section of the variable condenser are cut, so they can be bent in or out to give more or less capacity at any given position of the rotor, after the trimmers on the variable have been adjusted at 1400 Kc. A disc type tuning wand affords a quick method of determining whether more or less capacity is needed in the antenna circuit. If the output increases when the Iron end of the wand is placed near the loop, the plates should be bent in to give more capacity. If the output increases when the brass or aluminum end of the wand is placed near the loop the plates should be spread out. If the wand indicates that the plates should go closer, but cannot go closer without shorting, the oscillator section plates can be spread, but the calibration should be checked after adjusting the oscillator section. Also the band coverage should be checked to see that 540 Kc can be received.

If the receiver is weak at 1000 Kc the same procedure can be followed at 1000 Kc as outlined above for 600 Kc but this will change the tracking at 600 Kc and may affect 1400 Kc so that all points should be rechecked in the original order.

The condenser should be checked for any possible shorting of the plates after the alignment is completed.

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MODEL 558, Early, Late, Ch. RE-204

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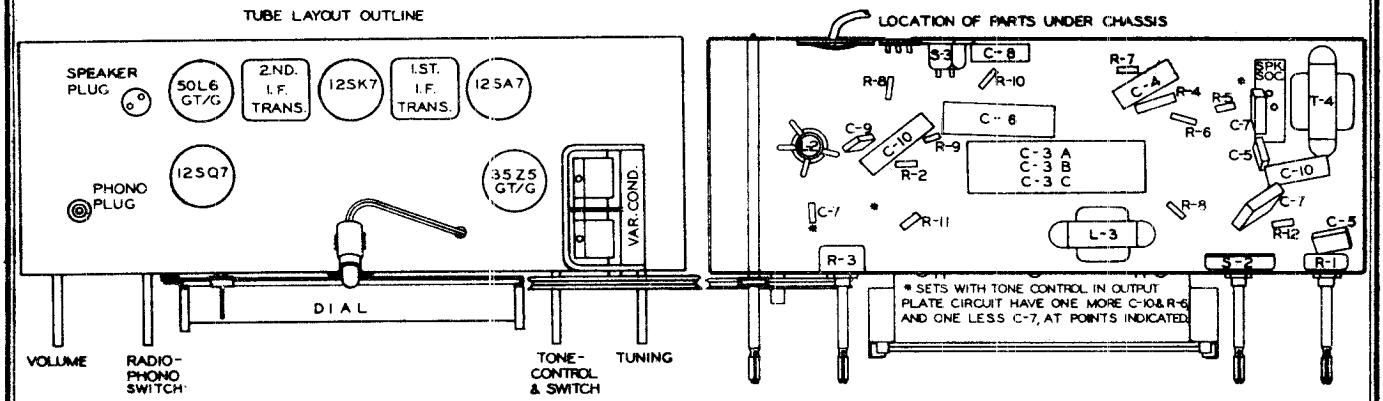
If a set is found to be microphonic when playing records, check for the presence of 4 felt washers under the chassis and a wood block $3\frac{3}{4}$" x 8" x $\frac{3}{4}$" mounted under the phono-motor board, in front of the center brace. If these are not present, installing them should correct the microphonic condition. The block should be glued to the under side of the motor board against the front side of the center brace, with two $\frac{3}{4}$" wood screws driven from the top side of the motor board into the block, to draw it up tight. Place the screws so the heads will be under the turntable.

POSITION OF POWER CORD PLUG.

On AC, the power cord plug should be tried in both its possible positions in the receptacle, and left in the position that gives least hum. Do not attempt to operate on DC.



PARTS LIST

REF. NO.	PART NO.	DESCRIPTION	LIST PRICE	REF. NO.	PART NO.	DESCRIPTION	LIST PRICE
R1	C19753	Volume Control	.65		A19628	Socket, Dial Lamp	.26
R2	C20060-150	Resistor, 15 ohms $\frac{1}{2}$ W	.05		A19135	Dial Lamp	.18
R3	C19947	Tone Control 500 K ohms &		S2	C19754	Phono-Radio Switch	.83
	or	ON-OFF Sw.	.87		R19573	Cabinet	30.00
	*C19752	Tone Control 50 K ohms	.87	RP	E19475	Phono-Motor and Turntable	6.94
R4	C20070-123	Resistor, 12 K ohms 1 W	.08		C19594	Pick-up Arm	5.55
R5	C20060-151	Resistor, 150 ohms $\frac{1}{2}$ W	.05		A19850	Needle, Semi-perm	.92
R6	C20060-474	Resistor, 470 K ohms $\frac{1}{2}$ W	.05		C19572	Escutcheon	1.38
R7	C20060-225	Resistor, 2.2 meg. $\frac{1}{2}$ W	.05		A19595	Escutcheon, On-Off Switch	.03
R8	C20060-156	Resistor, 15 meg. $\frac{1}{2}$ W	.05		A19545	On-Off Switch - (Phono-Motor)	.15
R9	C20060-223	Resistor, 22 K ohms $\frac{1}{2}$ W	.05		A19596	Rest, Pick-up arm	.14
R10	C20060-334	Resistor, 330 K ohms $\frac{1}{2}$ W	.05		AE19585-1	Antenna Loop Assy.	1.33
R11	C20060-681	Resistor, 680 ohms $\frac{1}{2}$ W	.04	L2	AC19586-1	Oscillator Coil Assy.	.37
R12	C20060-105	Resistor, 1 meg. $\frac{1}{2}$ W	.05	T1	AC19587-1	1st I.F. Coil Assy.	1.12
C1-C2	C19584	Variable Condenser - 2 gang	3.82	T2	AC19588-1	2d. I.F. Coil Assy.	1.10
C3A		Elect. Cond. 10 mfd. 150 V		L3	AC19589-1	Choke Assy.	.69
C3B	A19780	Elect. Cond. 20 mfd. 150 V	1.17	T3	AC19591-1	Output Transformer	1.00
C3C		Elect. Cond. 40 mfd. 150 V			AA19593-2	Tuning Shaft & Pulley Assy.	.47
C4	C20068-203	Condenser, .02 uf 400 V	.18		AA19639-1	Dial Cord Guide Assy.	.03
C5	C20065-501	Condenser, .0005 uf 500 V	.26		A19578	Dial Pointer	.07
C6	A19765	Condenser, .2 uf 400 V	.29		C19615	Dial Glass	.75
C7	C20069	Condenser, .002 uf 600 V	.40		A19132	Cord, Dial Drive	.02
C8	C20067-503	Condenser, .05 uf 200 V	.18		A19295	Spring, Dial Cord	.04
C9	C20065-500	Condenser, .00005 uf 500 V	.20		B20064-10	Line Cord & Plug Assy.	.75
C10	C20068-503	Condenser, .05 uf 400 V	.19		C19597	Knob, Volume	.04
	A19141	Double Terminal Strip	.04		C19598	Knob, Tuning	.04
	A19800	Triple Terminal Strip	.04		C19599	Knob, Phono-switch	.04
	A18254-1	Tube Socket	.12		C19600	Knob, Tone Control	.04
	A19234	Socket, Antenna Loop	.07		A19554	Plug, One Prong	.05
	A19552	Socket, One Prong	.07		A19556	Plug, A.C.	.21
SS	A19551	Socket, Phono-motor	.21	Spk.	C19620	Speaker	4.86
	A19579	Socket, Speaker	.08				

*On sets having Tone Control in Output Plate Circuit.

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MODELS 664,664A,
Chassis RE-206

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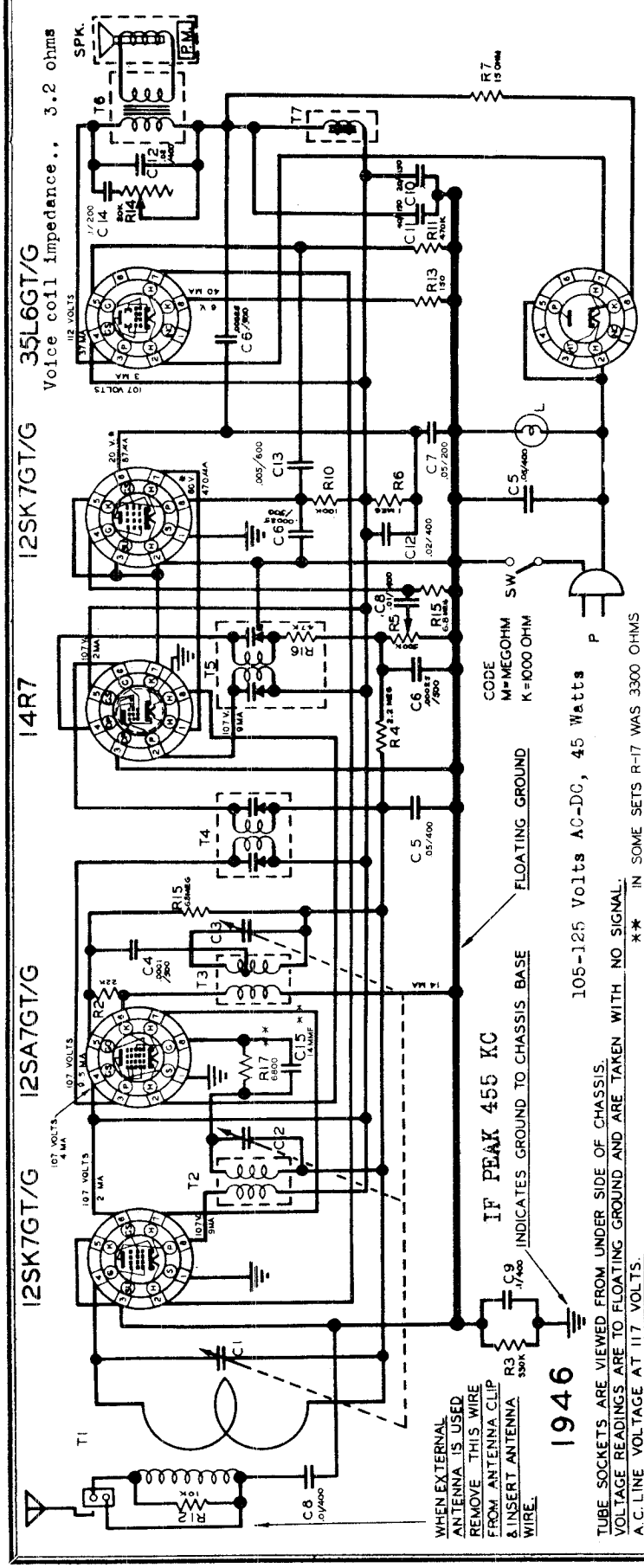

REF. NO.	PART NO.	DESCRIPTION	LIST PRICE
R2	C20060-223	Resistor, 22,000 ohm ½ W	.05
R3	C20060-334	Resistor, 330,000 ohm ½ W	.05
R4	C20060-225	Resistor, 2.2 megohm ½ W	.05
R5	C19244	Volume Cont. & Sw., 500,000 ohms	.94
R6	C20060-105	Resistor, 1 meg. ½ W	.05
R7	C20060-150	Resistor, 15 ohm ½ W	.05
R10	C20060-104	Resistor, 100,000 ohm ½ W	.05
R11	C20060-474	Resistor, 470,000 ohm ½ W	.05
R12	C20060-103	Resistor, 10,000 ohm ½ W.	.05
R13	C20060-151	Resistor, 150 ohm ½ W	.05
R14	C19279	Tone Control, 20,000 ohm	.64
R15	C20060-685	Resistor, 6.8 megohm ½ W	.05
R16	C20060-473	Resistor, 47,000 ohm ½ W	.05
R17	C20060-332	*Resistor, 6800 ohm ½ W	.05
C1	B18564	**Variable Condenser, 3 gang	4.17
C2	or		
C3	C19853		4.99
C4	C20065-101	Cond., .0001 uf. 500 V Mica	.20
C5	C20068-503	Cond., .05 uf. 400 V P.T.	.19
C6	C20065-251	Cond., .00025 uf. 500 V Mica	.23
C7	C20067-503	Cond., .05 uf. 200 V P.T.	.18
C8	C20068-103	Cond., .01 uf. 400 V P.T.	.17
C9	C20068-104	Cond., .1 uf. 400 V P.T.	.19
C10	A19239	Cond., Electrolytic 40-20 uf. 150 V	1.25
C11		Cond., .02 uf. 400 V P.T.	.18
C12	C20068-203	Cond., .005 uf. 600 V P.T.	.40
C13	C20069-502	Cond., .1 uf. 200 V P.T.	.19
C14	C20067-104	Cond., 14 mmf. 600 V Mica	.15
C15	A19182	Terminal Strip	.05
	A19674	Spacer Eyelet for Mtg. Var. Cond.	.01
	A19138-1	Cabinet, Walnut (Assy.)	$3.60
	D18422-1	Cabinet Assy., Ivory	3.75
	D18422-2	Dial Crystal	.28
	A18272	Handle	.36
	A16922	Knobs, Walnut	.05
	A19783-1	Knobs, Ivory	.05
	A19783-2	Grill Cloth	.08
	A19240	Antenna Loop Assy.	1.40
	AC18579-1	R. F. Coil	.40
	AC19860-1	Oscillator Coil	.47
	AC18580-1	1st. I. F. Coil	1.30
	AC18581-1	2d. I. F. Coil	1.70
	AC18578-1	Iron Core Choke	1.52
	AC18583-1	Output Transformer	1.52
	AC18582-1	Speaker Assy. (Spk. with Trans. Mtg. Bracket)	6.36
	AC19872-1	Speaker only	5.72
Spk.	C18550	Tuning Shaft	.14
	A19293	Dial Scale	.12
	C18432	Dial Pointer	.16
	A18572	Dial Drive Cord	.04
	A19132	Socket, tube, wafer type	.12
	A18254-1	Elect. Mtg. Wafer	.03
	A18668	Antenna Socket	.07
	A19234	Dial Light Socket	.32
	A19134-2	Dial Light Bulb, Mazda C7 Nite Lite, 7W	.18
	A19135	Socket, Loktal Type	.15
	A19400-1	Line Cord and Plug Assy.	.75
	B20064-8	Rubber Grommet for mtg. Var. Cond.	.01
	A20077-3	B18564 & C19853	
		Rubber Grommet for mtg. Var. Cond. C19853 only	.02
	A19328-2		

TUBES & FUNCTIONS

12SK7 ..... RF Amp.
12SA7 ..... Mixer-oscillator
14R7 ..... IF Amp. DET-AVC
12SK7 ..... AF Amp.
35L6 ..... Output
35Z5GT ..... Rectifier

POWER OUTPUT

Undistorted	.8 Watts
Maximum	2.5 Watts
Plate load	2000 Ohms

*In a few sets R17 was 3300 ohm ½ W.
**When ordering a replacement Variable Condenser, be sure to use the part number which is stamped on the back of the original Condenser.

For alignment see pp. 15-5,15-6

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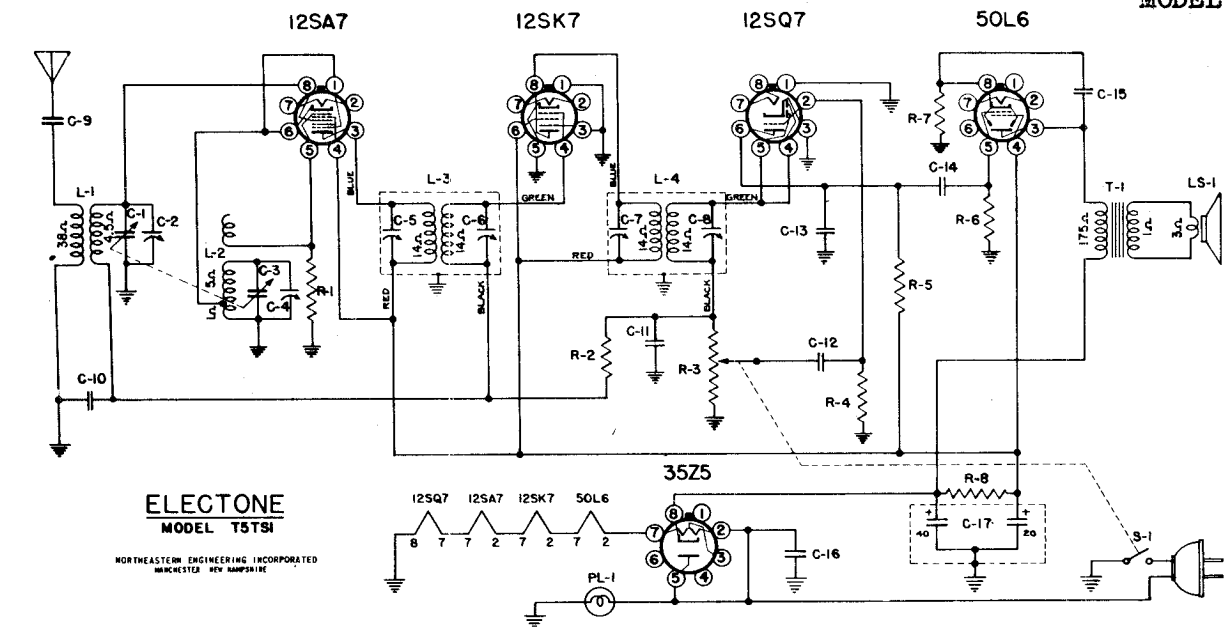
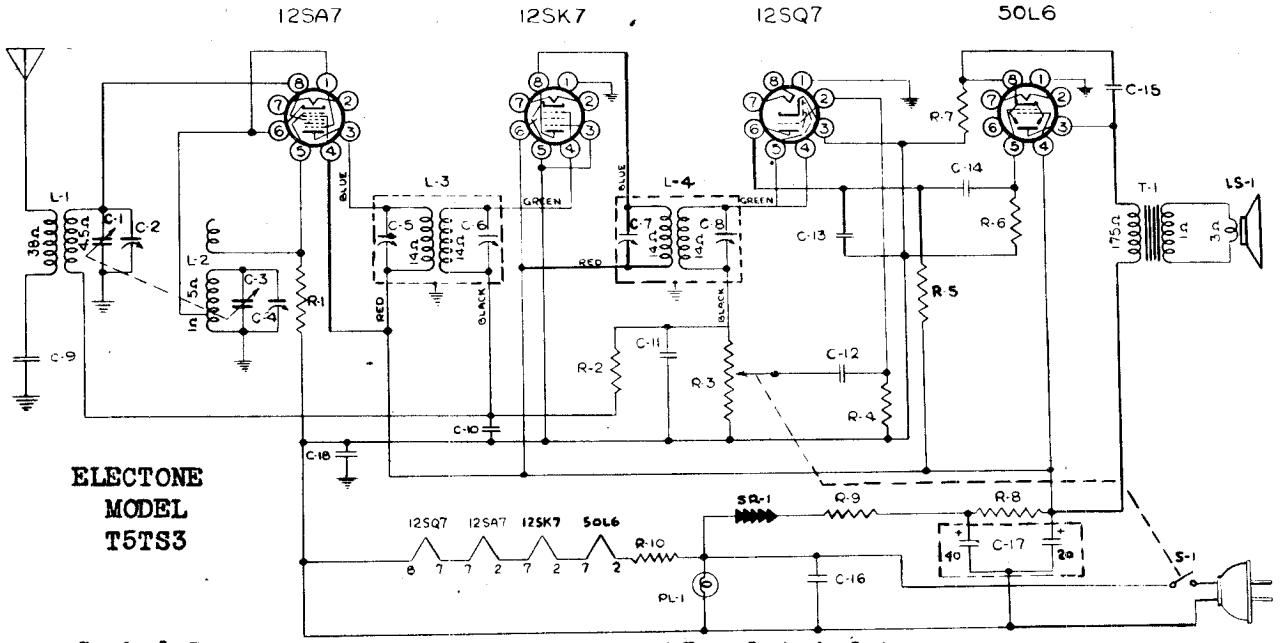
MODEL T5TS1
MODEL T5TS3

NORTHEASTERN ENGINEERING INC.





Symbol	Description
C1	Ant. Tuning cap. inc. C2
C3	Osc. tuning cap. inc. C4
C5, C6	1st i-f trimmer cap.
C7, C8	2nd i-f trimmer cap.
C9	Cap. 0.001 µfd,500 v,mica
C10	Cap. 0.05 µfd,200v,paper
C11	Cap. 0.00025 µfd,300v,mica
C12	Cap. 0.0002 µfd,600v,paper
C13	Cap. 0.00025 µfd,500v,mica
C14	Cap. 0.02 µfd,400v,paper
C15	Cap. 0.02 µfd,400v,paper
C16	Cap. 0.05 µfd,400v,paper
C17	Cap. 40/20 µfd,150v,electro
C18	Cap. 0.05 µfd,400v,paper
L1	Ant. coil
L2	Osc. coil
L3	1st i-f trans.
L4	2nd i-f trans.
LS1	Loudspeaker,5" PM
PL1	Pilot light,115v,6 watts
R1	20,000 ohms, 1/2 watt
R2	3.0 megohms, 1/2 watt
R3	Pot.amd switch (S1)500,000 ohms
R4	15.0 megohms,1/2 watt
R5	470,000 ohms,1/2 watt
R6	470,000 ohms,1/2 watt
R7	150,000 ohms,1/2 watt
R8	1,000 ohms, 5 watts
R9	15 ohms, type OW
R10	200 ohms, 10 watts
S1	Power switch (part of K3)
SR1	Selenium rectifier,100ma,5 plates
T1	Output trans.

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MODEL T5TS1
MODEL T5TS3

NORTHEASTERN ENGINEERING INC.
Model T5TS1 Broadcast Receiver

GENERAL DESCRIPTION

The Model T5TS1 **ELECTONE** is a five tube superheterodyne broadcast entertainment receiver designed for operation from either a direct or alternating current power source. The circuit utilizes multi-unit tubes and incorporates automatic volume control. The chassis is enclosed in an all-metal cabinet of modern styling and having the following dimensions: Width 12"; Depth 7"; Height 7".

ELECTRICAL SPECIFICATIONS

Power Supply	105-125 volts, 50-60 cycles, AC or 105-125 volts DC
Power Consumption	30 watts
Frequency Range	500-1700 Kcs.
Intermediate Frequency	456 Kcs.
Audio Output	1.5 watts

TUBE COMPLEMENT

Converter and Oscillator	12SA7
I.F. Amplifier	12SK7
Detector-AVC-Audio	12SQ7
Power Output	50L6GT
Rectifier	35Z5GT
Dial Lamp	Mazda #6S6

LOUDSPEAKER

Permanent Magnet.....5" Diameter

INSTALLATION FACILITIES PROVIDED

Power	5' cord and plug
Antenna	10' indoor type
Ground	None required

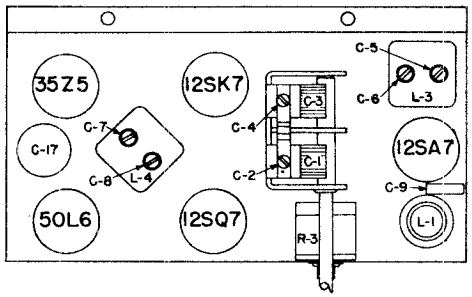

FIG. 1 - Tube and Trimmer Locations (Top View)

ALIGNMENT PROCEDURE

Alignment Frequencies:

I.F.	456 Kcs.
R.F.	1500 Kcs.

I. F. Alignment:

Connect output meter across the voice coil. Turn the receiver volume control to maximum. Connect high side of the alignment oscillator, through a .05 mfd. capacitor, to the converter grid.

Set alignment oscillator at 456 Kcs. and adjust output to give the lowest conveniently readable indication on the output meter. Adjust trimmers C-7 and C-8 in 2nd I.F. transformer to give maximum indication on output meter. Repeat this procedure for trimmers C-5 and C-6 in the 1st I.F. transformer. Repeat procedure to check accuracy.

R. F. Alignment:

Retain output meter connected as above and receiver volume control set at maximum. Connect alignment oscillator to antenna.

Set alignment oscillator at 1500 Kcs. and place in operation. Rotate receiver tuning capacitor (C-1 and C-3) to give maximum signal indication on output meter. Adjust output of alignment oscillator to give the lowest conveniently readable indication on the output meter. Adjust oscillator trimmer C-4 to peak the signal indication on output meter. Then, adjust antenna trimmer C-2 to further peak the signal. Repeat procedure to check accuracy.

Trimmer locations are shown in Figure 1.

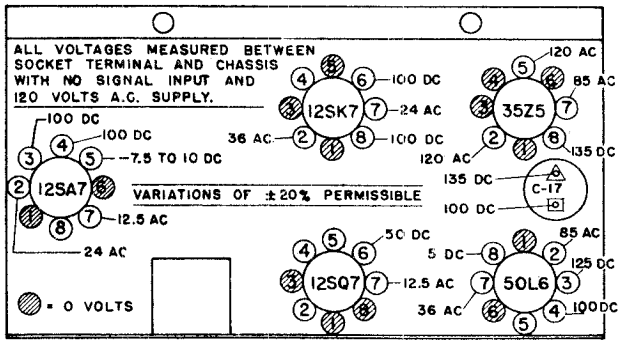

FIG. 2 - Socket Terminal Voltages (Bottom View)

NOTES:

An electronic voltmeter may be connected to the AVC bus and used for alignment indication in lieu of the output meter across the voice coil.

An electronic voltmeter or a voltmeter with a minimum resistance of 20,000 ohms per volt should be used for voltage measurements.

The polarity of the power connection must be correct when operating the receiver on direct current. If the receiver does not operate when the power plug is first inserted, remove and re-insert in opposite position. Reversal of plug position on alternating current supply may reduce hum in some cases.

CAUTION:

A direct ground connection should not be placed on the receiver at any time. Particular care should be exercised when removing and replacing chassis to insure that the insulators between chassis and cabinet are in position and that the insulation is complete and effective.

SB101-5-46-5M-W

LIST OF SYMBOLS

SYMBOL	DESCRIPTION
C-1	ANT. TUNING CAPACITOR including trimmer C-2
C-3	OSC. TUNING CAPACITOR including trimmer C-4
C-5,6	1st I.F. TRIMMER CAPACITORS
C-7,8	2nd I.F. TRIMMER CAPACITORS
C-9	CAPACITOR - 0.001 mfd. - 500 volts - Mica
C-10	CAPACITOR - 0.05 mfd. - 200 volts - Paper
C-11	CAPACITOR - 0.00025 mfd. - 500 volts - Mica
C-12	CAPACITOR - 0.002 mfd. - 600 volts - Paper
C-13	CAPACITOR - 0.00025 mfd. - 500 volts - Mica
C-14	CAPACITOR - 0.02 mfd. - 400 volts - Paper
C-15	CAPACITOR - 0.02 mfd. - 400 volts - Paper
C-16	CAPACITOR - 0.05 mfd. - 400 volts - Paper
C-17	CAPACITOR - 40/20 mfd. - 150 volts - Electrolytic

L-1	ANTENNA COIL
L-2	OSCILLATOR COIL
L-3	1st I.F. TRANSFORMER
L-4	2nd I.F. TRANSFORMER
LS-1	LOUDSPEAKER - 5" PM
PL-1	PILOT LAMP - 115 volts - 6 watts
R-1	RESISTOR - 20,000 ohms - 1/2 watt
R-2	RESISTOR - 3.0 Megohms - 1/2 watt
R-3	POTENTIOMETER AND SPST SWITCH (S-1) - 500,000 ohms
R-4	RESISTOR - 15.0 Megohms - 1/2 watt
R-5	RESISTOR - 470,000 ohms - 1/2 watt
R-6	RESISTOR - 470,000 ohms - 1/2 watt
R-7	RESISTOR - 150 ohms - 1/2 watt
R-8	RESISTOR - 1,000 ohms - 5 watts
S-1	POWER SWITCH (part of R-3)
T-1	OUTPUT TRANSFORMER

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MODEL 982375

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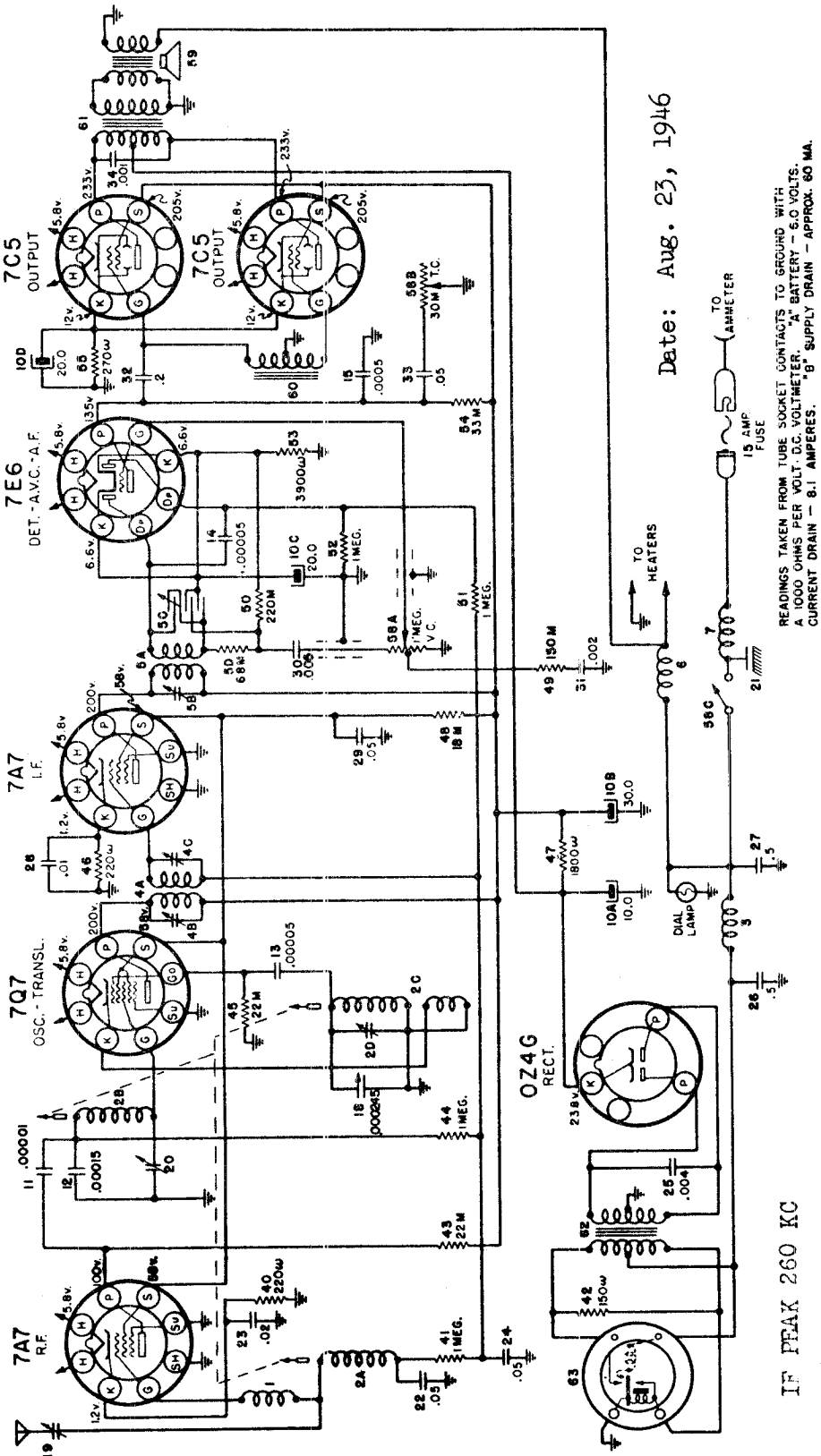

Fig. 3 - Circuit Diagram - 982375

The Oldsmobile model 982375 is a single unit DeLuxe Receiver with Automatic Push Button Tuning, in addition to Manual Tuning, Volume and Tone Controls.

The receiver was designed specifically for the 1946 Oldsmobiles. The push Button Assembly, Controls, Receiver and Speaker are built into a housing which is mounted directly behind the center of the instrument panel.

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CIRCUIT ALIGNMENT

All of the adjustable condensers in this receiver are very accurately adjusted at the factory and will need no further adjustment (excepting antenna trimmer) unless tampered with or a defective coil has been replaced. If re-alignment is found to be necessary, the circuits can be properly adjusted only with the use of a calibrated test oscillator or signal generator and an output meter.

DO NOT ATTEMPT TO PEAK THE I-F STAGES OF THIS RECEIVER WITHOUT CAREFULLY NOTING THE FOLLOWING INSTRUCTIONS:

1. Aligning I-F Stages at 260 Kilocycles

   (a) Turn volume control to the maximum position.

   (b) Connect the signal lead of the test oscillator through a .1 mfd. condenser to terminal X (See Parts Layout), which is the grid prong of the 7Q7 tube.

   (c) Connect the ground lead of the test oscillator to the chassis frame.

   (d) Connect the output meter across the speaker voice coil at the terminal board mounted on the speaker. Connect between point "Z" and ground. This terminal is color coded green on strip. (See Parts Layout)

   (e) Set the test oscillator to exactly 260 Kilocycles.

   (f) Adjust the trimmers "A", "B", "C" and "D" on the I-F Transformers for maximum output. (See Parts Layout) The adjustments should be repeated several times and during alignment the test oscillator output should be kept to as low a value as is consistent with obtaining a readable indication on the output meter.

2. Aligning at 1610 Kilocycles

   (a) Remove the signal lead of the test oscillator from the grid of the 7Q7 tube and connect to the Antenna terminal of the receiver THROUGH a .00065 mfd. MICA CONDENSER connected in place of the .1 mfd. condenser previously used. (It is very important that a .00065 mfd. mica condenser be used when aligning the antenna stage of these receivers in order that this circuit can be made to track properly.)

   (b) Tune the receiver to the extreme high frequency end of the dial.

   (c) Set the test oscillator to 1610 Kilocycles.

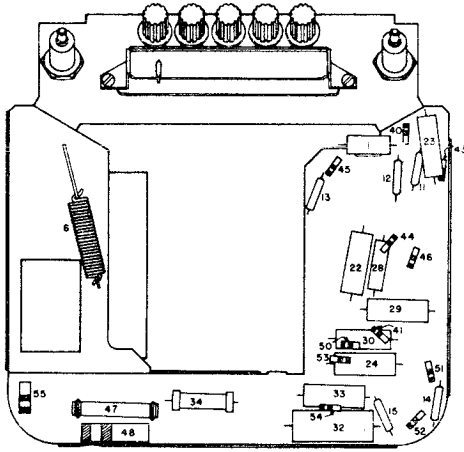
   (d) Adjust the Oscillator Trimmer Condenser "E" for maximum output. (See Parts Layout) (It is very important that this frequency be set accurately as a slight mis-setting will cause the receiver to be out of track over the high frequency end of the dial.)

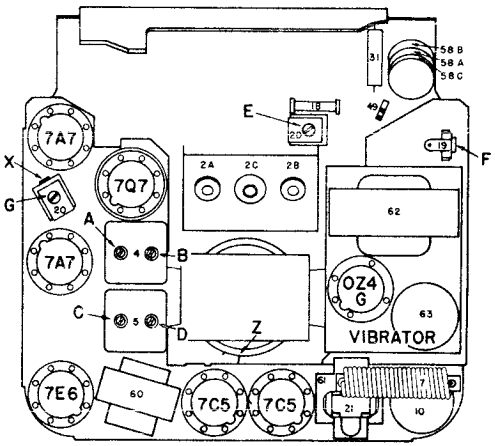
   (e) Adjust the Antenna Trimmer Condenser "F" for maximum output. (See Parts Layout)

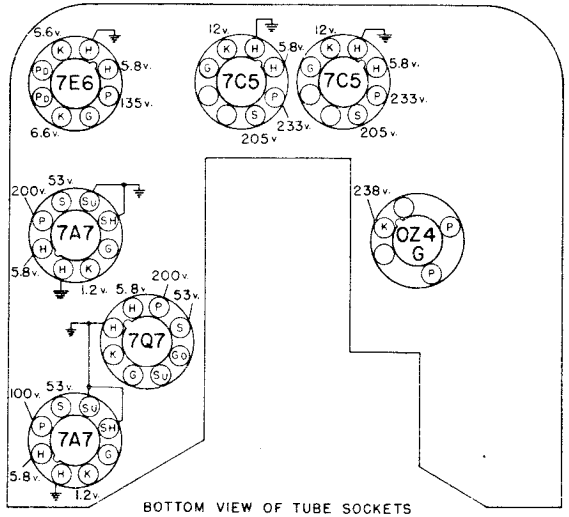
   (f) Adjust the R.F. Trimmer Condenser "G" for maximum output.

NOTE - With permeability tuning it is necessary to adjust the capacity at only one frequency. The coils are so wound that tracking is automatic and the usual low frequency adjustments are not necessary.

If the entire alignment procedure has been accomplished accurately, the receiver should be uniformly sensitive over the entire frequency range.







BOTTOM VIEW OF TUBE SOCKETS

READINGS TAKEN FROM TUBE SOCKET CONTACTS TO GROUND WITH A D.C. VOLTMETER HAVING A RESISTANCE OF 1000 OHMS PER VOLT "A" BATTERY 6.0 VOLTS. CURRENT DRAIN 8.1 AMPERES. "B" SUPPLY DRAIN APPROXIMATELY 60 MA. ALL READINGS ±10%.

RADIO DATA

MODEL NUMBER - 982375

SERIAL NUMBER - AND UP

TUBE COMPLEMENT - 7A7, 7Q7, 7A7, 7E6, 7C5, 7C5, 0Z4G

BATTERY CURRENT - 8.1 AMPERES

B+ VOLTS - 238

I.F. K.C. - 260

R.F. K.C. - 1610-535

VOICE COIL IMPEDANCE - 4 OHMS AT 400 CYCLES

VIBRATOR TYPE - NON SYNCHRONOUS

YEAR - 1946

OLDSMOBILE DIV.-GENERAL MOTORS

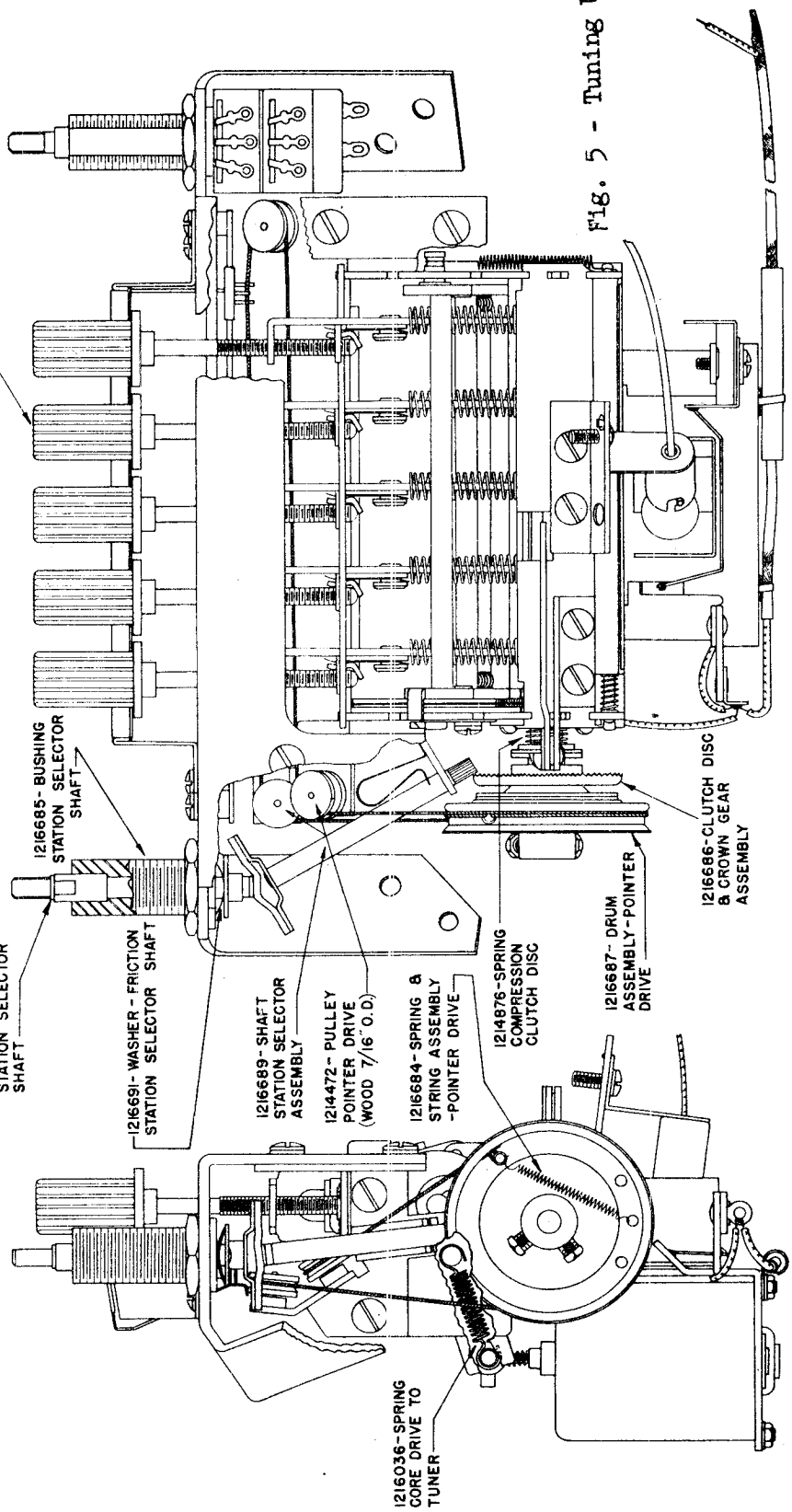

1216692 - WASHER - "U" - RETAINING - STATION SELECTOR SHAFT
1216685 - BUSHING STATION SELECTOR SHAFT
1216688 - PUSH BUTTON ASSEMBLY
1216691 - WASHER - FRICTION STATION SELECTOR SHAFT
1216689 - SHAFT STATION SELECTOR ASSEMBLY
1214472 - PULLEY POINTER DRIVE (WOOD 7/16" O.D.)
1216684 - SPRING & STRING ASSEMBLY - POINTER DRIVE
1214876 - SPRING COMPRESSION CLUTCH DISC
1216687 - DRUM ASSEMBLY - POINTER DRIVE
1216686 - CLUTCH DISC & CROWN GEAR ASSEMBLY
1216036 - SPRING CORE DRIVE TO TUNER

Fig. 5 - Tuning Unit

ANTENNA CIRCUIT

The Antenna Circuit is directly coupled to the antenna. A small adjustable condenser is provided for adjusting the antenna circuit to the antenna. This adjustment is made near the high frequency end of the band (1400 to 1600 KC.)

AUTOMATIC PUSH BUTTON TUNING

This is accomplished by a mechanical unit of rugged construction assuring accuracy. A special compensating condenser is employed in the oscillator circuit to minimize over-all receiver drift due to normal variation in car voltage and temperature ranges.

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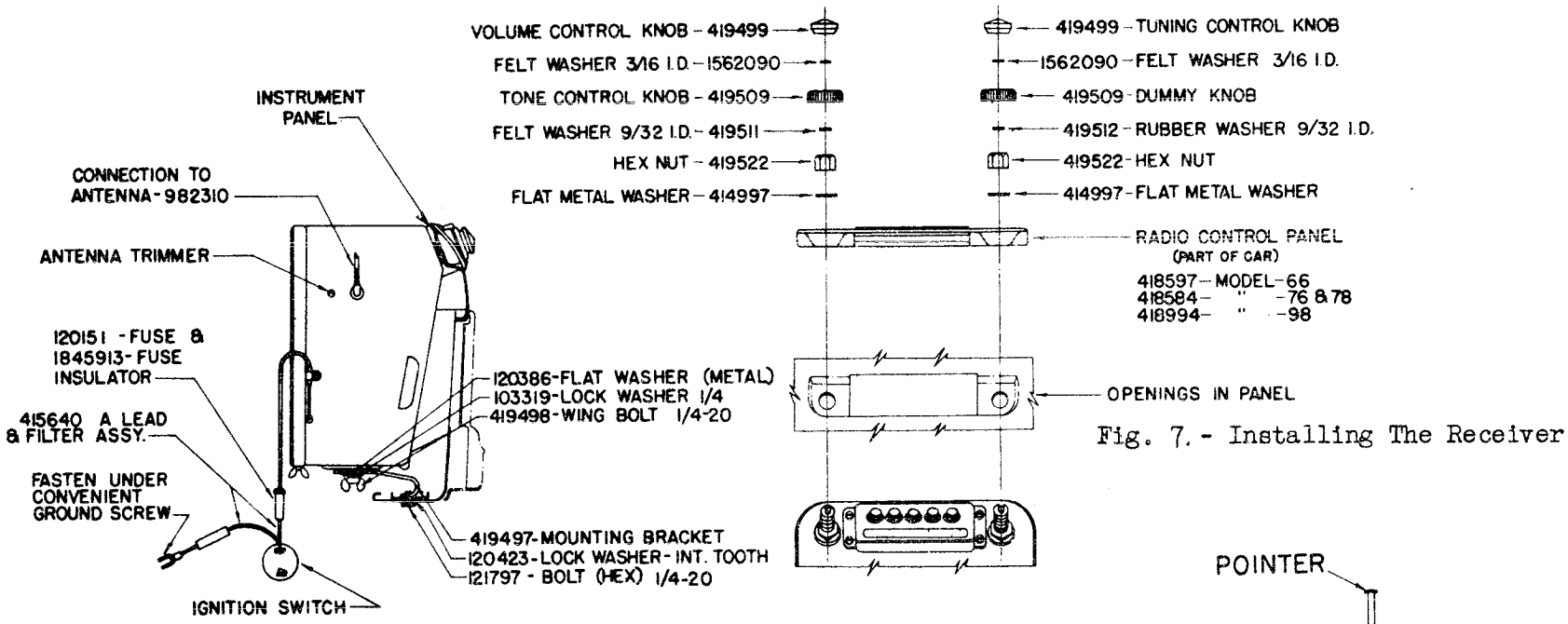
VOLUME CONTROL KNOB - 419499
FELT WASHER 3/16 I.D. - 1562090
TONE CONTROL KNOB - 419509
FELT WASHER 9/32 I.D. - 419511
HEX NUT - 419522
FLAT METAL WASHER - 414997
419499 - TUNING CONTROL KNOB
1562090 - FELT WASHER 3/16 I.D.
419509 - DUMMY KNOB
419512 - RUBBER WASHER 9/32 I.D.
419522 - HEX NUT
414997 - FLAT METAL WASHER
RADIO CONTROL PANEL
(PART OF CAR)
418597 - MODEL - 66
418584 - " - 76 & 78
418994 - " - 98
OPENINGS IN PANEL
INSTRUMENT PANEL
CONNECTION TO ANTENNA - 982310
ANTENNA TRIMMER
120151 - FUSE &
1845913 - FUSE
INSULATOR
415640 A LEAD
& FILTER ASSY.
FASTEN UNDER
CONVENIENT
GROUND SCREW
IGNITION SWITCH
120386 - FLAT WASHER (METAL)
103319 - LOCK WASHER 1/4
419498 - WING BOLT 1/4-20
419497 - MOUNTING BRACKET
120423 - LOCK WASHER - INT. TOOTH
121797 - BOLT (HEX) 1/4-20

Fig. 7. - Installing The Receiver

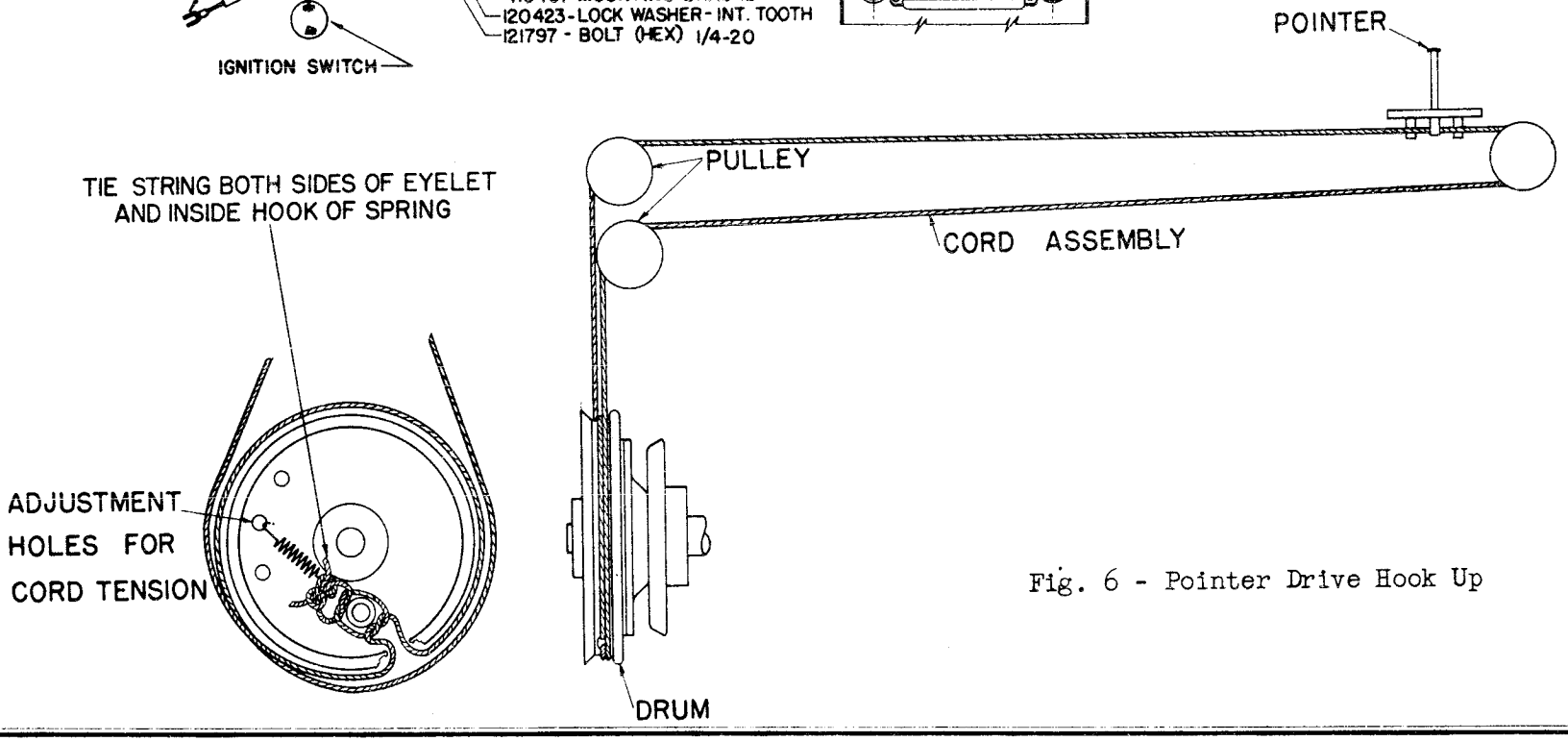

Fig. 6 - Pointer Drive Hook Up

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CHASSIS ELECTRICAL PARTS LIST

PART NO.	PART NAME	DESCRIPTION	ILLUS. NO.
1214382	Coil	Antenna Choke	1
1216665	Coil	Tuning Coil & Core Assembly	2
	Sec. A	Antenna Coil	
	Sec. B	R. F. Coil	
	Sec. C	Oscillator Coil	
	Sec. D	Oscillator Trimmer	
1213663	Coil	Hash Choke	3
1216666	Coil	1st. I.F. Assembly	4
	Sec. A	I. F. Coil Assembly	
	Sec. B	Primary Trimmer	
	Sec. C	Secondary Trimmer	
1216667	Coil	2nd. I.F. Assembly	5
	Sec. A	I. F. Coil Assembly	
	Sec. B	Primary Trimmer	
	Sec. C	Secondary Trimmer and Coupling Condenser	
	Sec. D	Resistor, 68,000 ohm	
1216668	Coil	Filament Choke	6
1216669	Coil	Spark Choke Assembly	7
1214417	Condenser	Electrolytic	10
	Sec. A	10 mfd. 350 volt	
	Sec. B	30 mfd. 300 volt	
	Sec. C	20 mfd. 25 volt	
	Sec. D	20 mfd. 25 volt	
1215189	Condenser	.00001 mfd. moulded	11
1211227	Condenser	.00015 mfd. moulded	12
1207625	Condenser	.00005 mfd. moulded	13
1207625	Condenser	.00005 mfd. moulded	14
1207636	Condenser	.0005 mfd. moulded	15
1216670	Condenser	.000245 mfd. Compensating Condenser	18
1216671	Condenser	Antenna Trimmer Condenser	19
1216672	Condenser	R. F. Trimmer Condenser	20
1212278	Condenser	Spark Condenser	21
7230592	Condenser	.05 mfd. 600 volt	22
1212099	Condenser	.02 mfd. 600 volt	23
7230592	Condenser	.05 mfd. 600 volt	24
1213854	Condenser	.004 mfd. 1500 volt	25
7240248	Condenser	.5 mfd. 100 volt	26
7240248	Condenser	.5 mfd. 100 volt	27
1208600	Condenser	.01 mfd. 600 volt	28
7230592	Condenser	.05 mfd. 600 volt	29
7233769	Condenser	.005 mfd. 800 volt	30
1209148	Condenser	.002 mfd. 800 volt	31
7234127	Condenser	.2 mfd. 200 volt	32
7233245	Condenser	.05 mfd. 600 volt	33
1212097	Condenser	.001 mfd. 800 volt	34
7237835	Resistor	220 ohm, 1/2 watt	40
1209885	Resistor	1 megohm 1/2 watt	41
1211005	Resistor	150 ohm, 1 watt	42
1214550	Resistor	22,000 ohm, 1/2 watt	43
1209885	Resistor	1 megohm, 1/2 watt	44
1214550	Resistor	22,000 ohm, 1/2 watt	45
7237835	Resistor	220 ohm, 1/2 watt	46
1214573	Resistor	1800 ohm, 2 watt	47
7239157	Resistor	18,000 ohm, 2 watt	48
1211163	Resistor	150,000 ohm, 1/2 watt	49
1214555	Resistor	220,000 ohm, 1/2 watt	50
1209885	Resistor	1 megohm, 1/2 watt	51
1209885	Resistor	1 megohm, 1/2 watt	52
1214546	Resistor	3900 ohm, 1/2 watt	53
1213845	Resistor	33,000 ohm, 1/2 watt	54
1213846	Resistor	270 ohm, 1 watt	55
1216673	Control	Control, Volume, Tone, "On-Off" Switch	58
	Sec. A	Volume, Control, 1 megohm	
	Sec. B	Tone Control, 30,000 ohm	
	Sec. C	"On-Off" Switch	

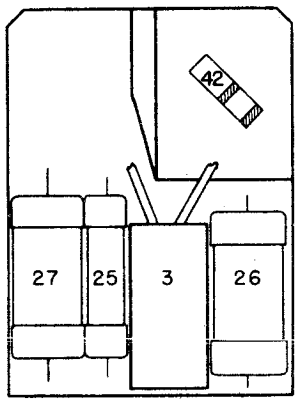


Fig. 2 - Bottom of Power Pack

PART NO.	PART NAME	DESCRIPTION	ILLUS. NO.
1216674	Speaker	6" x 9" Elliptical-Electro-Dynamic	59
1214405	Transformer	Audio Input	60
1216675	Transformer	Audio Output	61
1214411	Transformer	Power	62
1213671	Vibrator	Vibrator	63
1213583	7A7 Tube	R. F. Amplifier	
1213853	7Q7 Tube	Oscillator - Translator	
1213583	7A7 Tube	I. F. Amplifier	
1213582	7E6 Tube	Detector A.V.C. - Audio Driver	
1213586	7C5 Tube	Audio Output	
1213586	7C5 Tube	Audio Output	
7231596	0Z4G Tube	Rectifier	

CHASSIS PARTS - MISCELLANEOUS

1216676	Clip	Dial Retaining - L.H.
1216677	Clip	Dial Retaining - R.H.
1216678	Cover	Case Back
1216679	Dial Glass	Calibrated
1216680	Escutcheon	Including Dial
1216681	Gasket	Rubber, Speaker Seal
125588	Lamp, #55 Mazda	Pilot Light
1216682	Pointer	Dial
1216683	Socket and Lead Assy.	Pilot Light
7238455	Socket - Tube	8-prong Lock-in
1214420	Socket - Tube	4-prong Octal
1213684	Socket - Vibrator	4-prong
1216684	String Ass.	Pointer Drive (includes Spring)

TUNER PARTS

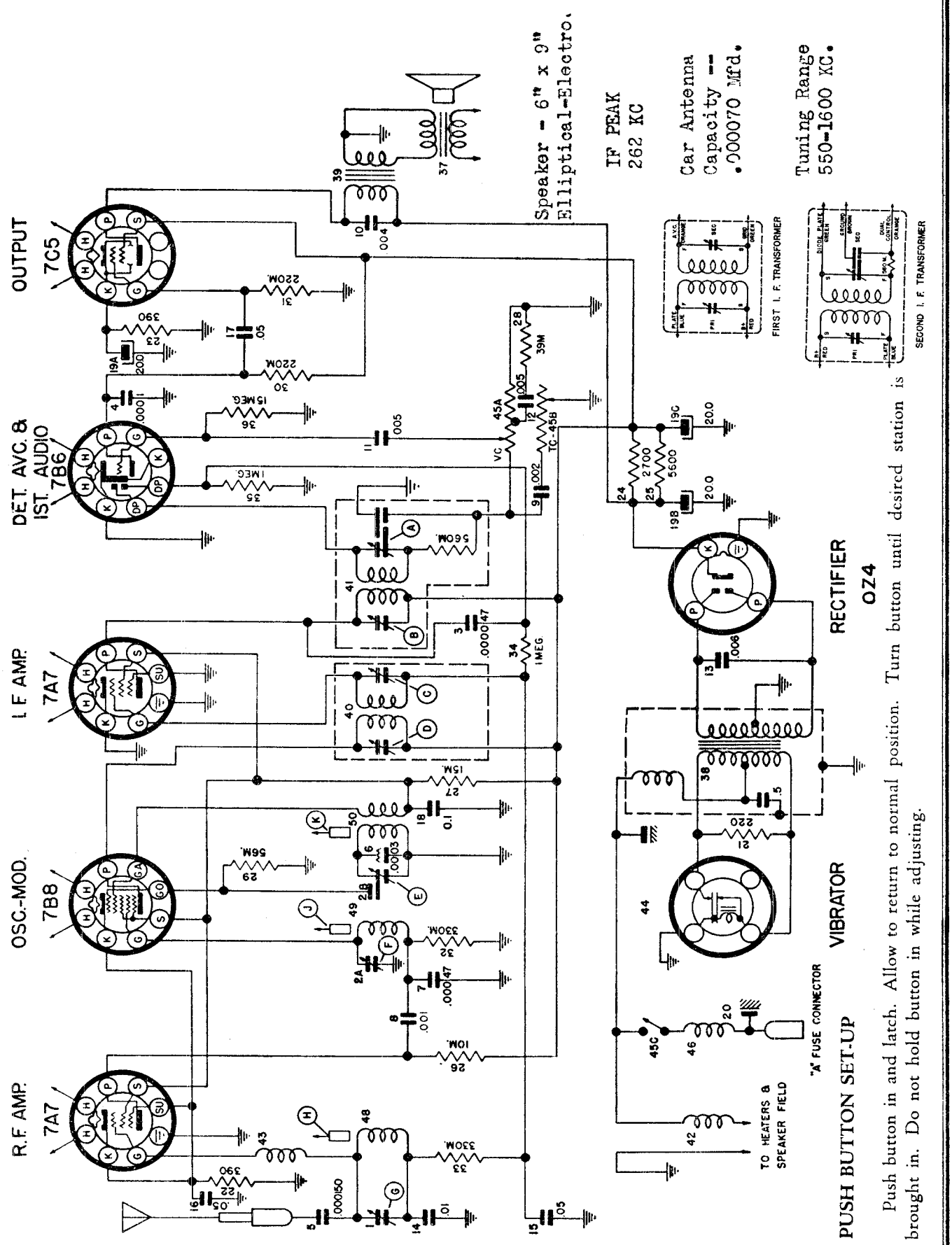
1216685	Bushing	Station Selector Shaft
1216686	Clutch Disc. and Crown Gear Assy.	
1216687	Drum Assembly	Pointer Drive
1214472	Pulley	Pointer Drive (wood 7/16" O.D.)
1216688	Push Button Assembly	
1216689	Shaft	Station Selector Assy. (Includes Coupling and Pinion Gear)
1214876	Spring	Compression - Clutch Disc
1216036	Spring	Core Drive to Tuner
1216684	Spring and String Assy.	Pointer Drive
1216690	Tuner Unit Assy.	Mechanical portion, Push Buttons included-less Manual Drive
1216691	Washer	Friction - Station Selector Shaft
1216692	Washer	"U" Retaining - Station Selector Shaft

PARTS MISCELLANEOUS

414997	Washer	Flat 33/64 I.D.
419522	Nut	#1/2-28 Hex.
419512	Washer	Rubber - 9/32 I.D. (Anti-Rattle) Dummy Control
419511	Washer	Felt - 9/32 I.D. (Anti-Rattle) Tone Control
419509	Knob	Tone and Dummy
1562090	Washer	Felt - 3/16 I.D. (Anti-Rattle) Tuning and Volume Control
419499	Knob	(Tuning & Volume Control) Includes Set Screw
419497	Bracket	Receiver Mounting
121797	Bolt	#1/4-20 x 3/8 long - Hex Head
419498	Bolt	#1/4-20 x 1/2 long - Wing Head
120386	Washer	Flat - 17/64 I.D. 5/8 O.D.
120423	Washer	Lock - (Internal Tooth)
103319	Washer	Lock #1/4 - (Split)
415640	"A" Lead Connector and Filter Condenser Assembly	
120151	Fuse	"A" Lead 15 Amp. 25V.
1845913	Tube	Fuse Insulator
1880659	Condenser	Generator - .5 mfd.
7239327	Distributor Suppressor	15,000 ohm.
1853686	Distributor Suppressor Adaptor	
415823	Static Collector	(Front Wheel)

MODEL 982376

OLDSMOBILE DIV.-GENERAL MOTORS



PUSH BUTTON SET-UP

Push button in and latch. Allow to return to normal position. Turn button until desired station is brought in. Do not hold button in while adjusting.

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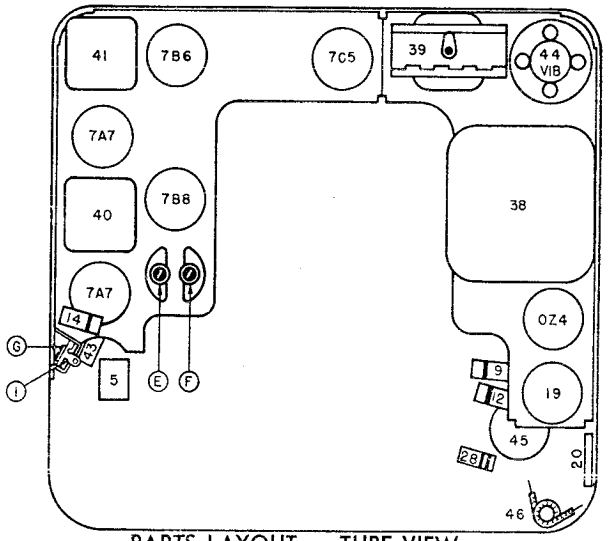
ALIGNMENT PROCEDURE

Volume Control Maximum — Tone Control on treble.

Signal Generator minimum for satisfactory output indication.

Series Condenser Or Dummy Antenna	Connect To	Signal Generator Frequency	Adjust Screws In Order
0.1 MFD	Grid side of Trimmer F	262 KC	A B C D
.000070 MFD	Antenna Terminal	1615 KC	E
.000070 MFD	Antenna Terminal	1430 KC	F G

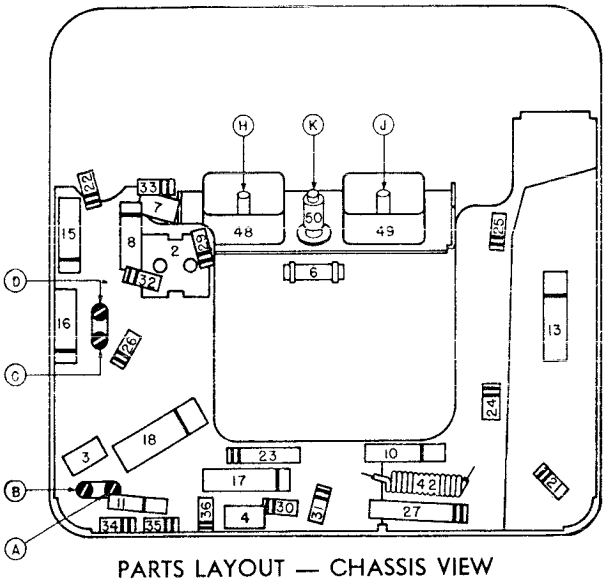
Adjust trimmer G to match car antenna (1430 KC) when radio is installed.



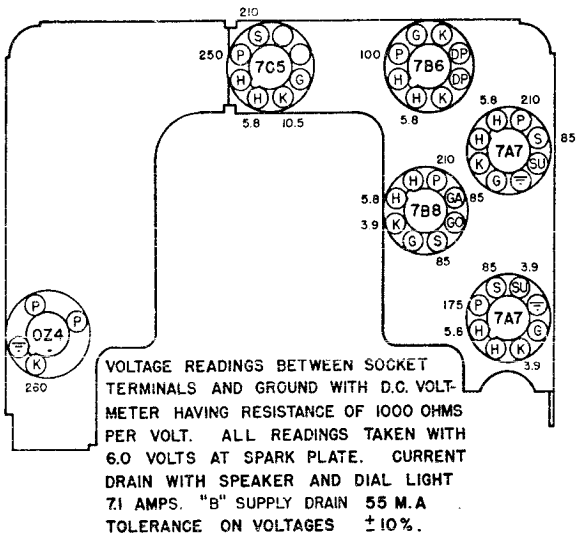
PARTS LAYOUT — TUBE VIEW

SPECIAL INSTRUCTIONS

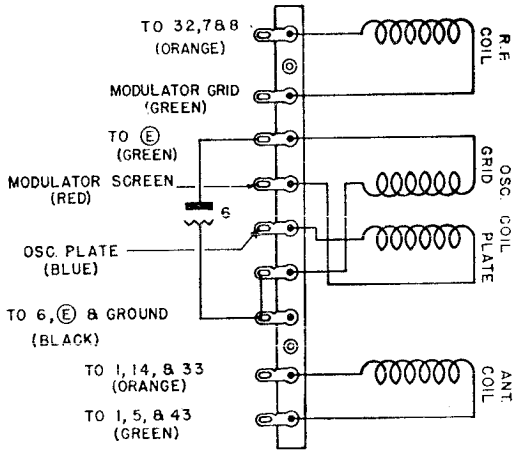
Mechanical alignment of iron cores. Tune to stop at H. F. end of dial. Adjust cores H, J, and K to extend $1\frac{5}{32}$" from end of coil form. Adjust trimmers E, F, and G, (1615 KC). Adjust cores H and J for maximum output at 1430 KC. Repeat alignment of trimmers E, F, and G at 1615 KC. Repeat alignment of cores H and J at 1430 KC. Align trimmers F and G at 1430 KC.



PARTS LAYOUT — CHASSIS VIEW


7C5
7B6
7A7
7B8
7A7
0Z4
VOLTAGE READINGS BETWEEN SOCKET TERMINALS AND GROUND WITH D.C. VOLTMETER HAVING RESISTANCE OF 1000 OHMS PER VOLT. ALL READINGS TAKEN WITH 6.0 VOLTS AT SPARK PLATE. CURRENT DRAIN WITH SPEAKER AND DIAL LIGHT 7.1 AMPS. "B" SUPPLY DRAIN 55 M.A TOLERANCE ON VOLTAGES ±10%.

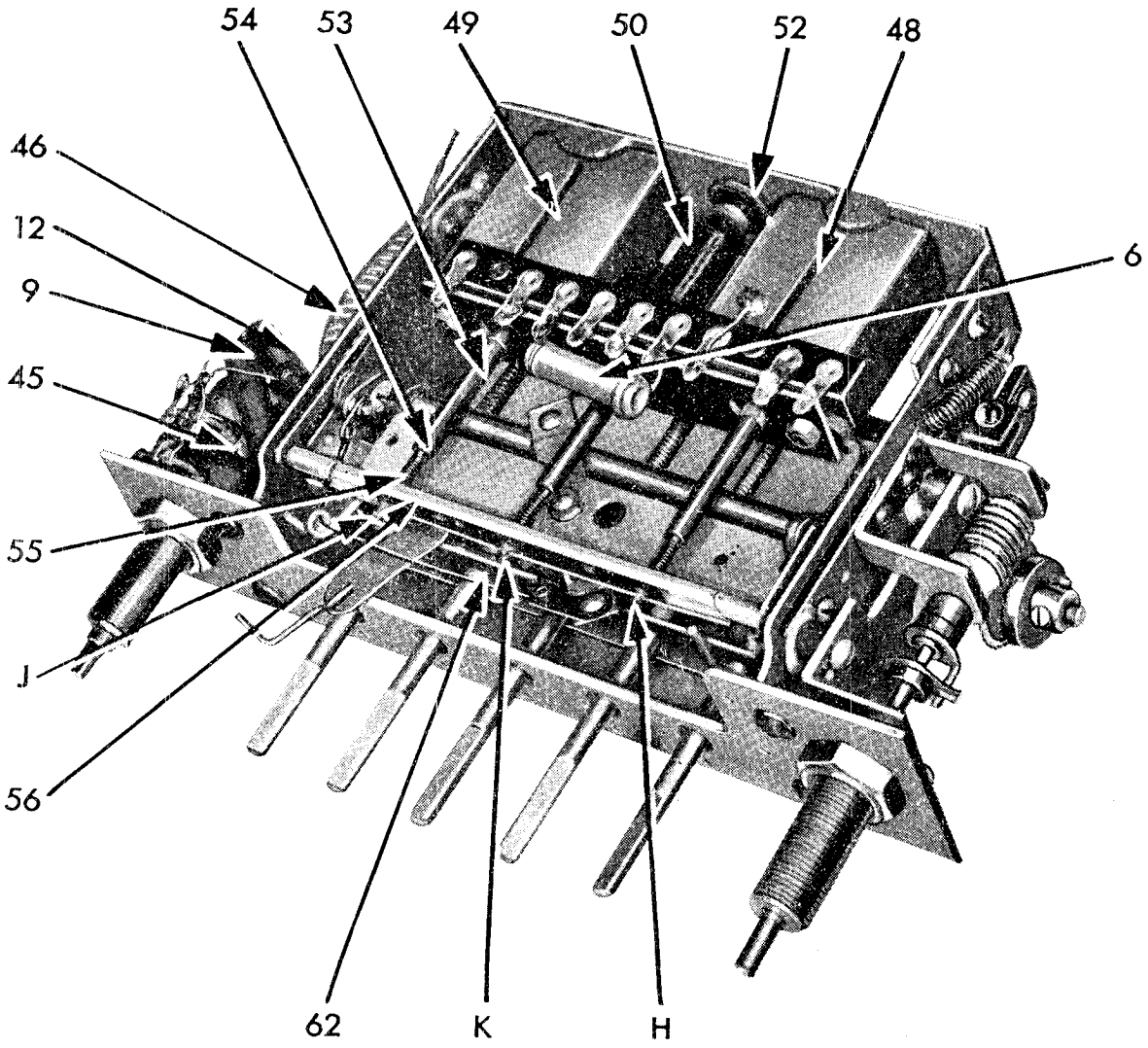
TUBE SOCKET VOLTAGE CHART



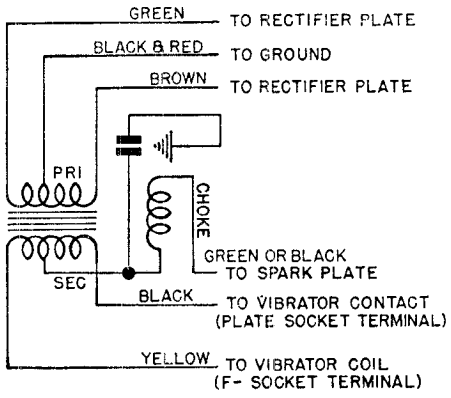
TUNER COILS

MODEL 982376

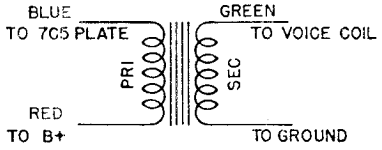
OLDSMOBILE DIV.-GENERAL MOTORS



TUNER PICTURE

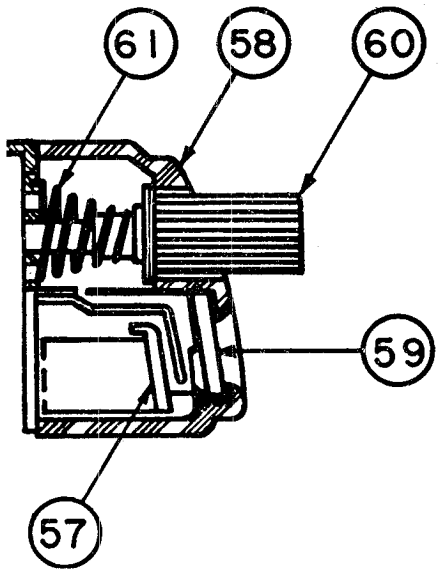


POWER TRANSFORMER



OUTPUT TRANSFORMER

TRANSFORMER CONNECTIONS



ESCUTCHEON CROSS SECTION

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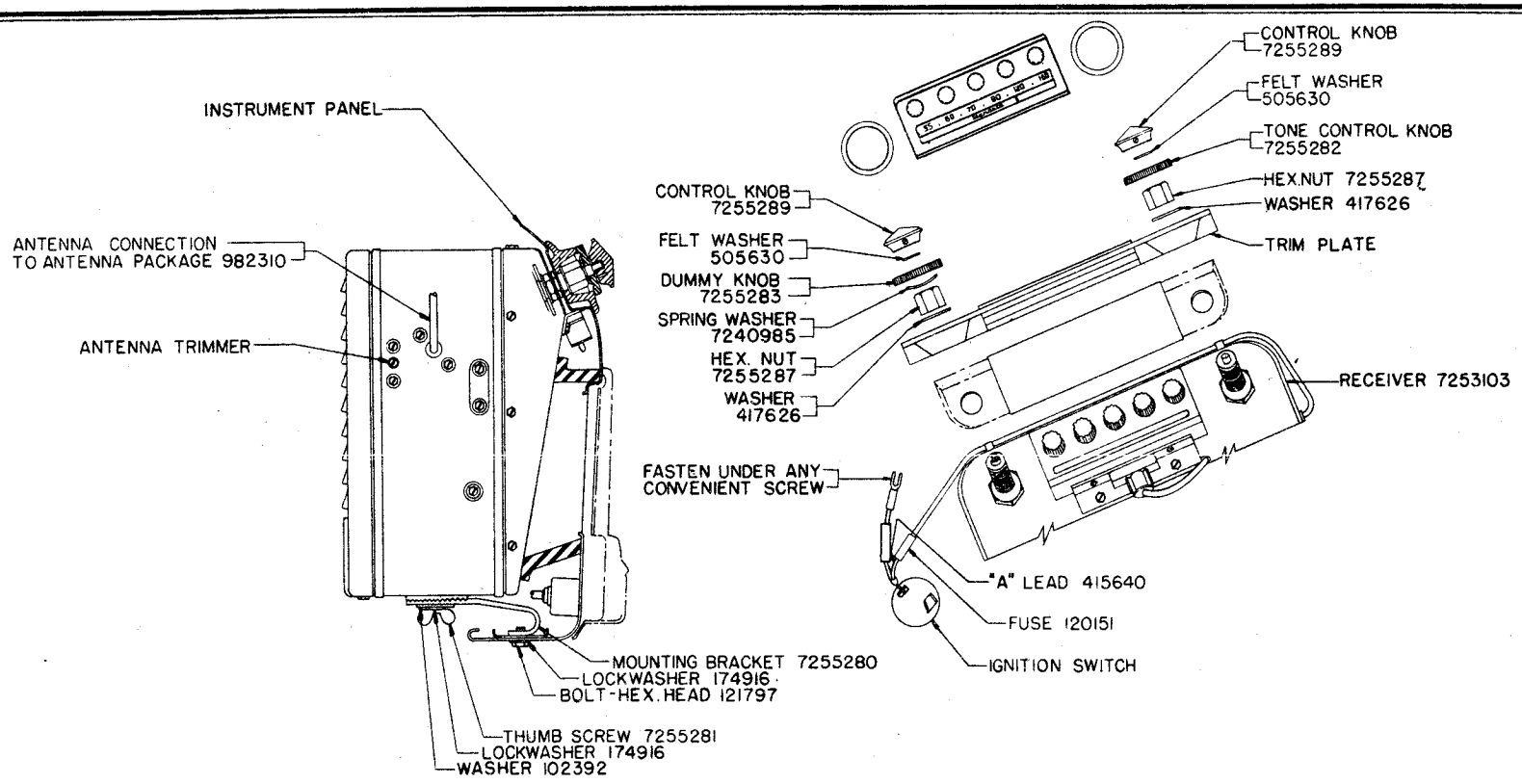

Fig. 7 - Installing The Receiver - 982376

AUTOMATIC PUSH BUTTON TUNER

The iron cored automatic tuner consists of three coils with iron cores actuated by a rugged mechanical device for varying the position of the cores in the coils. Changing the position of the cores changes the inductance of the antenna, R.F. and oscillator coils, and provides a means of tuning the radio over the entire broadcast band. A special compensating condenser is employed in the oscillator circuit to prevent the set from drifting off station due to normal variations in car and radio temperatures.

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Illus. No.	Service Part No.	Description
		CONDENSERS
1	7255662	Antenna Trimmer and Bracket Assembly
2	7242322	Dual Trimmer
3	7233313	.000047 Mfd. Molded
4	1210275	.000100 Mfd. Molded
5	7230893	.000150 Mfd. 500 V. Mica
6	7255494	.000300 Mfd. Temp Compensating (Included in Tuner Assy. Part #7255487)
7	7238879	.000470 Mfd. Molded
8	1212097	.001 Mfd. 600 V. Tubular
9	1209148	.002 Mfd. 800 V. Tubular (Included in Tuner Assy. Part #7255487)
10	7233243	.004 Mfd. 800 V. Tubular
11	7230912	.005 Mfd. 600 V. Tubular
12	7230912	.005 Mfd. 600 V. Tubular (Included in Tuner Assy. Part #7255487)
13	7240906	.006 Mfd. 1600 V. Tubular (Buffer)
14	1208600	.01 Mfd. 600 V. Tubular
15	7230592	.05 Mfd. 600 V. Tubular
16	7230592	.05 Mfd. 600 V. Tubular
17	7230592	.05 Mfd. 600 V. Tubular
18	1207908	0.1 Mfd. 400 V. Tubular
19	7240724	Electrolytic 3 Section
19A		20.0 Mfd. 25 V.
19B		20.0 Mfd. 400 V.
19C		20.0 Mfd. 400 V.
20	7241259	Spark Plate
		RESISTORS
21	7237994	220 Ohms 1 W. Insulated
22	1213482	390 Ohms ½ W. Insulated
23	1216149	390 Ohms 1 W. Insulated
24	7242844	2700 Ohms 2 W. Insulated
25	7240918	5600 Ohms 1 W. Insulated
26	1211085	10,000 Ohms 1 W. Insulated
27	7233653	15,000 Ohms 2 W. Insulated
28	1213480	39,000 Ohms ½ W. Insulated (Included in Tuner Assy. Part #7255487)
29	1213267	56,000 Ohms ½ W. Insulated
30	1214555	220,000 Ohms ½ W. Insulated
31	1214555	220,000 Ohms ½ W. Insulated
32	1214557	330,000 Ohms ½ W. Insulated
33	1214557	330,000 Ohms ½ W. Insulated
34	1213282	1 Megohm ½ W. Insulated
35	1213282	1 Megohm ½ W. Insulated
36	1213289	15 Megohm ½ W. Insulated
		MISCELLANEOUS ELECTRICAL PARTS
37	7255527	Speaker — 6" x 9" Elliptical — Electro dynamic
38	7255881	Power Transformer Assembly Complete
39	7241056	Output Transformer Assembly
40	7242079	First I. F. Transformer Assembly Complete
41	7242918	Second I. F. Transformer Assembly Complete
42	7241708	"A" Filter Choke
43	7240251	Antenna Choke Coil
44	8638	Vibrator — Non-Synchronous
45	7255298	Volume, Tone Control, and Switch } Included in Tuner Assy. #7255487
46	7241701	"A" Spark Choke } Included in Tuner Assy. #7255487
	7241179	Volume Control Cable } Included in Tuner Assy. #7255487

		MISCELLANEOUS CHASSIS PARTS
	7255257	"A" Lead Assembly
	7233944	Vibrator Socket
	7236279	Octal Base Tube Socket
	7241356	Loktal Base Tube Socket
	7241273	Dial Light Assembly (Includes Bulb #187189)
	187189	Dial Light Bulb
		TUNER UNIT AND PARTS
	7255487	Tuner and Dual Control Assembly Complete
48	7255408	Antenna Coil Assembly
49	7255408	R. F. Coil Assembly
50	7255297	Oscillator Coil Assembly Complete
	7244021	Grommet (Ant. and R. F. Coil)
52	7244020	Grommet (Oscillator Coil)
	7256097	Iron Core Parts Package
53		Iron Core and Stud Assembly
54		Spring
55		Washer
56		Speed Nut
57	7255398	Dial Backplate
58	7255277	Escutcheon Assembly (Includes Dial Glass)
59	7255275	Dial Glass
60	7255402	Push Button
61	7255397	Spring-Return
62	7242368	Cord
	7242426	Latching Button
45	7255298	Volume, Tone Control and Switch
6	7255494	Condenser — .0003 Mfd. Temp. Compensating
	7241179	Volume Control Cable
9	1209148	Condenser — .002 Mfd. 800 V. Tubular
12	7230912	Condenser — .005 Mfd. 600 V. Tubular
28	1213480	Resistor — 39,000 Ohms ½ W. Insulated
46	7241701	"A" Spark Choke
		MOUNTING AND INSTALLATION PARTS
	7255290	Control Knob Kit
		Tuning Knob Assy. (2)
		Tone Control Knob
		Dummy Knob
		Hex Nut (½ x 28 Special) (2)
		Washer — Felt (2)
		Washer-Radio Control Shaft (2)
		Control Washer — Metal Spring
	415640	"A" Lead and Condenser Assembly (Includes Ammeter Cond. 1882784)
	120151	Fuse — 15 Amp.
	1845913	Tube — Fuse Connector
	1880659	Generator Condenser .5 Mfd.
	7239327	Distributor Suppressor, 15,000 Ohms
	1853686	Suppressor Adapter
	7240138	Static Collector Assembly
	7255280	Mounting Bracket — Receiver
	7255281	Thumb Screw ¼ x ⅜

MODELS 6-501, 6-502, 6-503

OLYMPIC RADIO & TELEV. INC.

Equipment Required:

Modulated R.F. signal generator; output meter; insulated screw-driver; two .1 mfd 400 volt and one 50 mmfd 400 volt condensers.

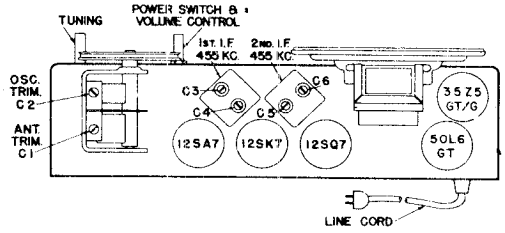
To align the receiver it is necessary to remove the chassis from the cabinet, check that the pointer is horizontal and coincides with the two horizontal reference lines on the dial. In this position the condenser should be completely closed. Connect the output meter and signal generator as follows:

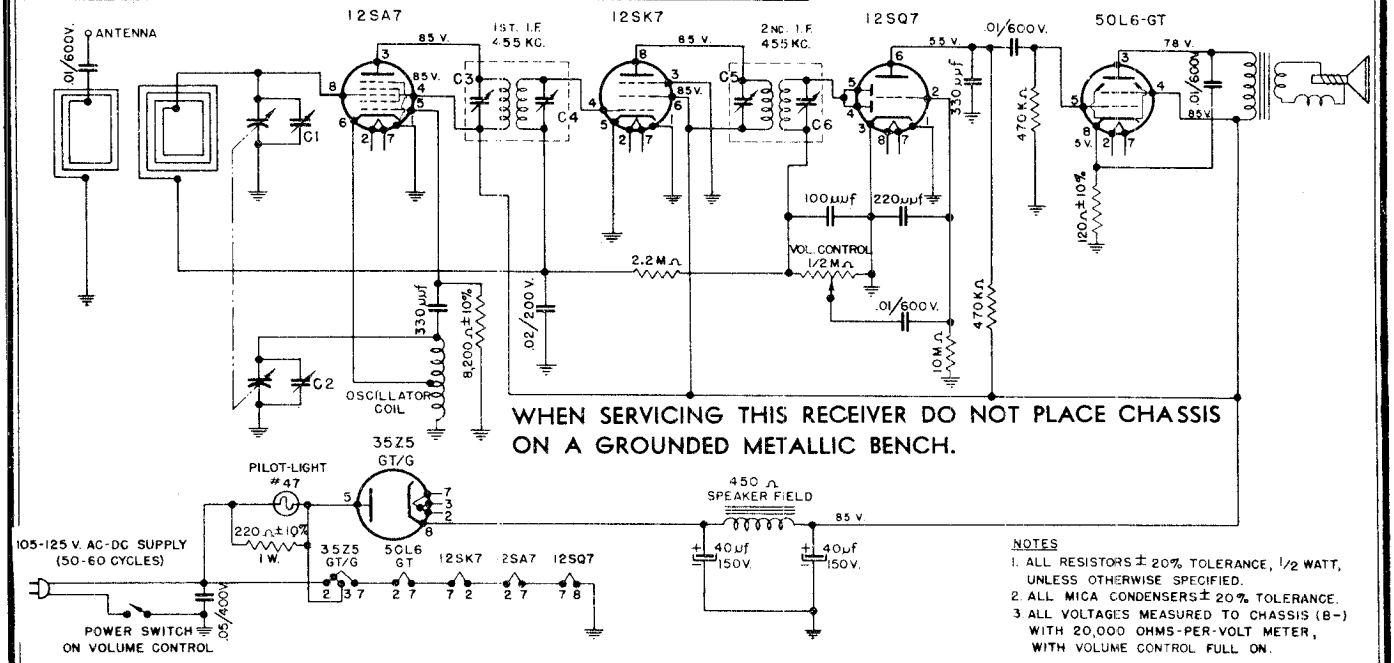
Output meter — Connect across voice coil and turn volume control to maximum.

Signal generator — Connect the low side of the signal generator to the receiver chassis thru a .1 mfd condenser and keep the output as low as possible, then proceed in the sequence shown on the alignment chart.

ALIGNMENT PROCEDURE CHART

STEP	CONNECT HIGH SIDE OF SIGNAL GENERATOR TO-	SET SIGNAL GENERATOR TO-	TURN RECEIVER DIAL TO-	ADJUST THE FOLLOWING FOR MAXIMUM OUTPUT (KEEP SIGNAL FROM SIGNAL GENERATOR AS LOW AS POSSIBLE.)
1	ANTENNA SECTION TUNING CONDENSER IN SERIES WITH .1 MFD. COND.	455 KC.	FULL CLOCKWISE POSITION (CONDENSER PLATES FULLY OPEN.)	C6, C5, C4, C3 AND REPEAT IN SAME ORDER (1ST. AND 2ND I.F. TRANSFORMERS.)
2	ANTENNA TERMINAL OF ANTENNA LOOP IN SERIES WITH 50 MMFD. COND.	1700 KC.	1700 KC. (170 ON DIAL.)	C2 (OSCILLATOR)
3		1400 KC	MAXIMUM SIGNAL (APPROX. 140 ON DIAL.)	C1 (ANTENNA)
4		REPEAT STEPS 2 AND 3		





NOTES
1. ALL RESISTORS ± 20% TOLERANCE, 1/2 WATT, UNLESS OTHERWISE SPECIFIED.
2. ALL MICA CONDENSERS ± 20% TOLERANCE.
3. ALL VOLTAGES MEASURED TO CHASSIS (B-) WITH 20,000 OHMS-PER-VOLT METER, WITH VOLUME CONTROL FULL ON.

Part No.	Description
BU-187	Pilot light bulb 6.3V (#47 Mazda)
CA-167W	Cabinet—Walnut bakelite cabinet
CA-167V	Cabinet—Ivory bakelite cabinet
CL-159	Coil—oscillator coil
CO-107	Capacitor—Electrolytic 40+40/150WV
CR-169	Crystal—dial crystal
CV-501	Condenser—2 gang variable tuning condenser
KN-352	Knob—Walnut knob
KN-353	Knob—Ivory knob
LP-163	Loop
PO-259	Pointer—moulded pointer
PT-102	Volume control and power switch
RCM20A101M	Capacitor—100 mmf ± 20% mica
RCM20A221M	Capacitor—220 mmf ± 20% mica
RCM20A331M	Capacitor—330 mmf ± 20% mica
RCP10W2203A	Capacitor—.02 mfd., 200 volts tubular
RCP10W4503A	Capacitor—.05 mfd., 400 volts tubular
RCP10W6103A	Capacitor—.01 mfd., 600 volts tubular
REB106M	Resistor—10 meg., ± 20% 1/2 watt
REB121K	Resistor—120 ohms ± 10% 1/2 watt
REB225M	Resistor—2.2 meg., ± 20% 1/2 watt
REB474M	Resistor—470,000 ohms ± 20% 1/2 watt
REB822K	Resistor—8200 ohms ± 10% 1/2 watt
REC221K	Resistor—220 ohms ± 10% 1 watt
SK-110	Speaker—5" Dynamic with output transformer
SO-190	Socket—Dial light socket assembly
SP-191	Spring—Tuning drive lock spring
TR-186	Transformer—1st or 2nd I.F. transformer

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MODELS 6-501W-U
6-501V-U, 6-502U

OLYMPIC RADIO & TELEV. INC.

Equipment Required:

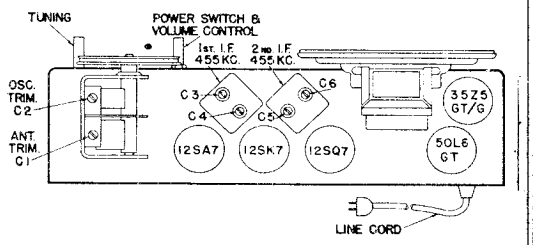
Modulated R.F. signal generator; output meter; insulated screw-driver; two .1 mfd 400 volt and one 50 mmfd 400 volt condensers.

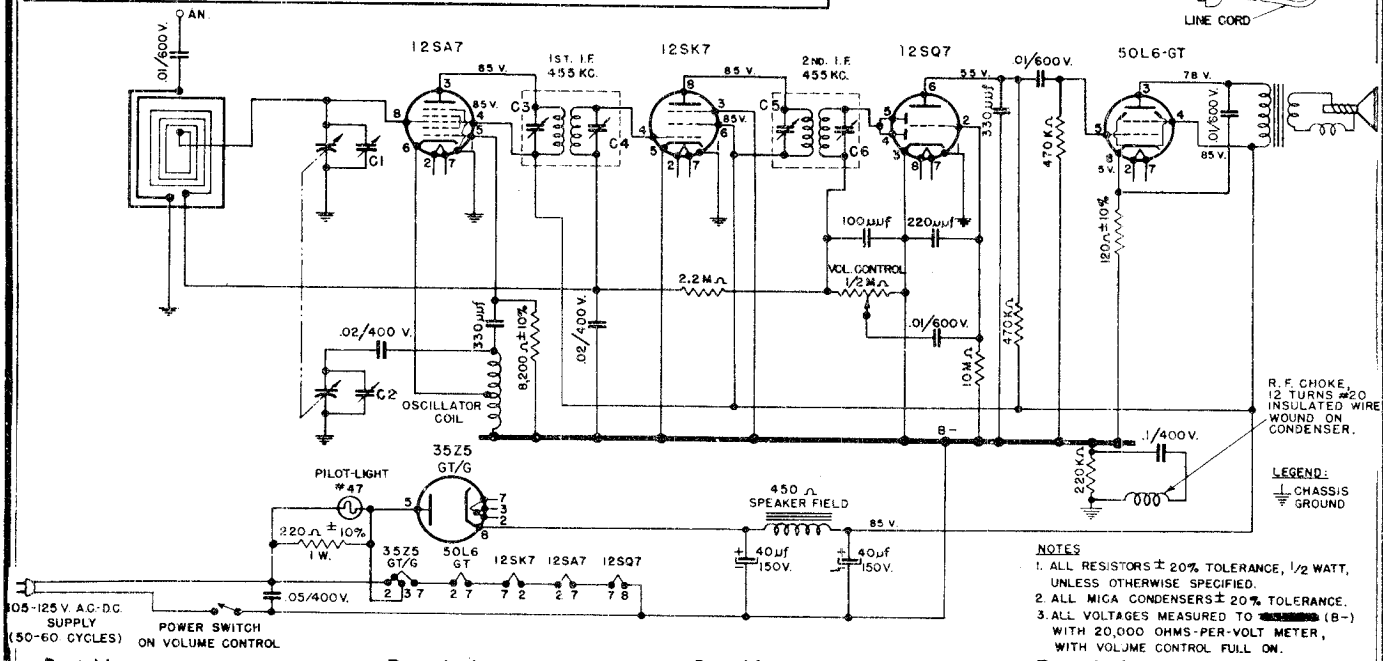
To align the receiver it is necessary to remove the chassis from the cabinet, check that the pointer is horizontal and coincides with the two horizontal reference lines on the dial. In this position the condenser should be completely closed. Connect the output meter and signal generator as follows:

Output meter — Connect across voice coil and turn volume control to maximum.

Signal generator — Connect the low side of the signal generator to the common B-bus thru a .1 mfd condenser and keep the output as low as possible, then proceed in the sequence shown on the alignment chart.

STEP	CONNECT HIGH SIDE OF SIGNAL GENERATOR TO -	SET SIGNAL GENERATOR TO -	TURN RECEIVER DIAL TO -	ADJUST THE FOLLOWING FOR MAXIMUM OUTPUT (KEEP SIGNAL FROM SIGNAL GENERATOR AS LOW AS POSSIBLE.)
1	ANTENNA SECTION TUNING CONDENSER IN SERIES WITH .1 MFD. COND.	455 KC.	FULL CLOCKWISE POSITION (CONDENSER PLATES FULLY OPEN)	C6, C5, C4, C3 AND REPEAT IN SAME ORDER (1ST. AND 2ND. I.F. TRANSFORMERS)
2	ANTENNA TERMINAL	1700 KC.	1700 KC. (170 ON DIAL)	C2 (OSCILLATOR)
3	OF ANTENNA LOOP IN SERIES WITH	1400 KC.	MAXIMUM SIGNAL (APPROX. 140 ON DIAL)	C1 (ANTENNA)
4	50 MMFD. COND.	REPEAT STEPS 2 AND 3		





NOTES
1. ALL RESISTORS ±20% TOLERANCE, 1/2 WATT, UNLESS OTHERWISE SPECIFIED.
2. ALL MICA CONDENSERS ± 20% TOLERANCE.
3. ALL VOLTAGES MEASURED TO [redacted] (B-) WITH 20,000 OHMS-PER-VOLT METER, WITH VOLUME CONTROL FULL ON.

Part No.	Description	Part No.	Description
BU-187	Pilot light bulb 6.3v (#47 Mazda)	RCM20A331M	Capacitor—330 mmf ±20% mica
CA-167W	Cabinet—Walnut bakelite cabinet	RCP10W4203A	.02/400 W. V. tubular paper condenser
CA-167V	Cabinet—Ivory bakelite cabinet	*RCP10W4104L	.1/400 W. V. tubular paper condenser
CL-569	Coil—oscillator coil	RCP10W4503A	.05/400 W. V. tubular paper condenser
CO-107	Capacitor—Electrolytic 40+40/150WV	RCP10W6103A	.01/600 W. V. tubular paper condenser
		REB106M	Resistor—10 meg., ±20% 1/2 watt
CR-169	Crystal—dial crystal	REB121K	Resistor—120 ohms ±10% 1/2 watt
CV-501	Condenser—2 gang variable tuning condenser	REB224M	Resistor—220,000 ohms ±20% 1/2 watt
		REB225M	Resistor—2.2 meg., ±20% 1/2 watt
DL-457-1	Dial—moulded, lucite dial	REB474M	Resistor—470,000 ohms ±20% 1/2 watt
KN-338	Knob—Walnut (for 6-502-U only)	REB822K	Resistor—8200 ohms ±10% 1/2 watt
KN-352	Knob—Walnut knob (for 6-501-U only)	REC221K	Resistor—220 ohms ±10% 1 watt
		SK-110	Speaker—5" Dynamic with output transformer
KN-353	Knob—Ivory knob		
LP-163	Loop—Antenna	SO-190	Socket—Dial light socket assembly
PO-259W	Pointer—moulded walnut pointer	SP-191	Spring—Tuning drive lock spring
PO-259V	Pointer—moulded ivory pointer	ST-255	Back—printed cardboard back (for 6-501-U only)
PT-102	Volume control and power switch		
RCM20A101M	Capacitor—100 mmf ±20% mica	ST-293-1	Back—printed cardboard back (for 6-502-U only)
RCM20A221M	Capacitor—220 mmf ±20% mica		
		TR-186	Transformer—1st or 2nd I.F. transformer

* When ordering specify "with r-f choke"

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MODELS 6-504, 6-504L
MODELS 6-504-U, 6-504L-U

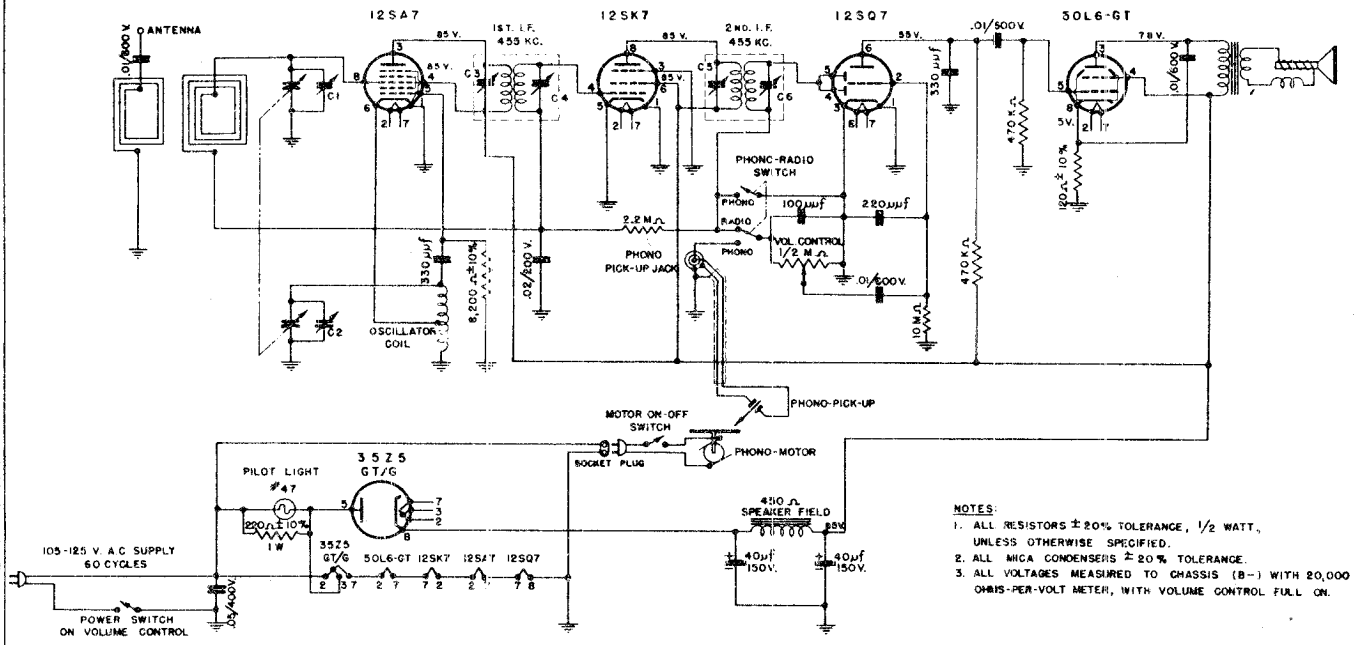
OLYMPIC RADIO & TELEV. INC.

Frequency Range of Receiver 535 - 1700 kc.

Power Requirement 105 - 125 volts 60 cycles Alternating Current (a-c) only

Power Consumption: Receiver 30 watts — Record Player 35 watts

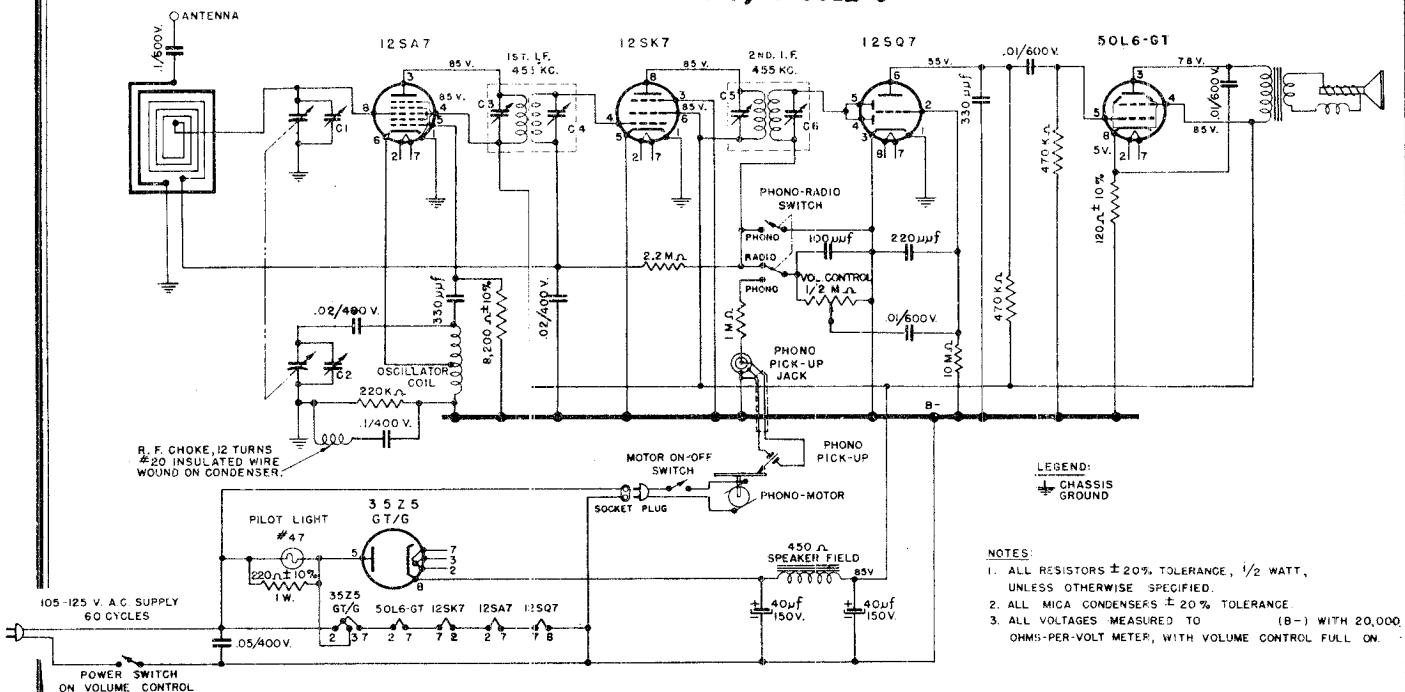
MODELS 6-504, 6-504L



NOTES:
1. ALL RESISTORS ± 20% TOLERANCE, 1/2 WATT, UNLESS OTHERWISE SPECIFIED.
2. ALL MICA CONDENSERS ± 20% TOLERANCE.
3. ALL VOLTAGES MEASURED TO CHASSIS (B-) WITH 20,000 OHMS-PER-VOLT METER, WITH VOLUME CONTROL FULL ON.

WHEN SERVICING THIS RECEIVER DO NOT PLACE CHASSIS ON A GROUNDED METALLIC BENCH.

MODELS 6-504-U, 6-504L-U



NOTES:
1. ALL RESISTORS ± 20% TOLERANCE, 1/2 WATT, UNLESS OTHERWISE SPECIFIED.
2. ALL MICA CONDENSERS ± 20% TOLERANCE
3. ALL VOLTAGES MEASURED TO (B-) WITH 20,000 OHMS-PER-VOLT METER, WITH VOLUME CONTROL FULL ON.

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ALIGNMENT INSTRUCTIONS

Equipment Required:

Modulated r-f signal generator; output meter; insulated screw driver; two .1 mfd 400 volt and one 50 mmfd 400 volt condensers.

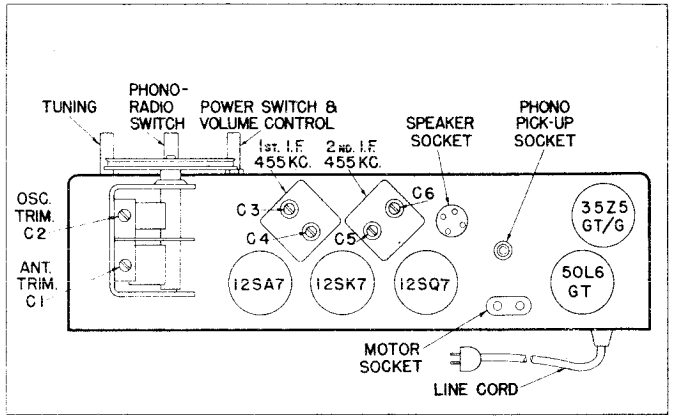
The receiver should be aligned with chassis and loop mounted in the cabinet. With the condenser completely closed the pointer should be checked so that it coincides with the two horizontal reference lines on the dial. Connect the output meter and signal generator as follows:

Output meter — Connect across voice coil and turn volume control to maximum.

Signal generator — Connect the low side of the signal generator to the receiver chassis thru a .1 mfd condenser and keep the output as low as possible, then proceed in the sequence shown on the alignment chart.

ALIGNMENT PROCEDURE CHART

STEP	CONNECT HIGH SIDE OF SIGNAL GENERATOR TO-	SET SIGNAL GENERATOR TO-	TURN RECEIVER DIAL TO-	ADJUST THE FOLLOWING FOR MAXIMUM OUTPUT. (KEEP SIGNAL FROM SIGNAL GENERATOR AS LOW AS POSSIBLE.)
1	ANTENNA SECTION TUNING CONDENSER IN SERIES WITH .1 MFD. COND.	455 KC.	FULL CLOCKWISE POSITION. (CONDENSER PLATES FULLY OPEN.)	C6, C5, C4, C3 AND REPEAT IN SAME ORDER (1ST. AND 2ND. I.F. TRANSFORMERS.)
2	ANTENNA TERMINAL	1700 KC.	1700 KC. (170 ON DIAL)	C2 (OSCILLATOR)
3	OF ANTENNA LOOP IN SERIES WITH	1400 KC.	MAXIMUM SIGNAL (APPROX. 140 ON DIAL)	C1 (ANTENNA)
4	50 MMFD. COND.	REPEAT STEPS 2 AND 3		



Models 6-504 and 6-504L

REPLACEMENT PARTS

Part No.	Description
BU-187	Pilot light bulb 6.3v (#47 Mazda)
CL-159	Coil-oscillator coil
CO-107	Capacitor-Electrolytic 40-40/150WV
CR-170	Crystal-dial crystal
CV-501	Condenser-2 gang variable tuning condenser
KN-331	Knob-Walnut knob marked MOTOR OFF-ON
KN-339	Knob-Walnut knob marked TUNING
KN-340	Knob-Walnut knob marked OFF-ON
KN-341	Knob-Walnut knob marked RADIO-PHONO
LP-355	Loop
PO-259	Pointer-moulded pointer
PT-102	Volume control and power switch
RCM20A101M	Capacitor-100 mmf ± 20% mica
RCM20A221M	Capacitor-220 mmf ± 20% mica
RCM20A331M	Capacitor-330 mmf ± 20% mica
RCP10W2203A	Capacitor-.02 mfd., 200 volts tubular
RCP10W4503A	Capacitor-.05 mfd., 400 volts tubular
RCP10W6103A	Capacitor-.01 mfd., 600 volts tubular
REB106M	Resistor - 10 meg., ± 20% 1/2 watt
REB121K	Resistor - 120 ohms ± 10% 1/2 watt
REB225M	Resistor - 2.2 meg., ± 20% 1/2 watt
REB474M	Resistor - 470,000 ohms ± 20% 1/2 watt
REB822K	Resistor - 8200 ohms ± 10% 1/2 watt
REC221K	Resistor - 220 ohms ± 10% 1 watt
SK-310	Speaker - 5" Dynamic with output transformer
SO-190	Socket - Dial light socket assembly
SP-191	Spring - Tuning drive lock spring
SW-243	Switch - Phono-Radio Switch
SW-330	Switch-spst Rotary Switch
TR-186	Transformer - 1st or 2nd I.F. transformer

REPLACEMENT PARTS Models 6-504-U and 6-504L-U

Part No.	Description
BU-187	Pilot light bulb 6.3v (#47 Mazda)
CL-569	Coil-oscillator coil
CO-107	Condenser-40-40/150WV electrolytic condenser
CR-170	Crystal-dial crystal
CV-501	Condenser-2 gang variable tuning condenser
DL-457-2	Dial-molded lucite dial
KN-625	Knob-Walnut knob marked MOTOR OFF-ON
KN-626	Knob-Walnut knob marked TUNING
KN-627	Knob-Walnut knob marked OFF-ON-VOLUME
KN-628	Knob-Walnut knob marked RADIO-PHONO
LP-355	Loop-Antenna
PO-259W	Pointer-moulded pointer, walnut
PT-102	Volume control and power switch
RCM20A101M	Condenser-100 mmf ±20% mica condenser
RCM20A221M	Condenser-220 mmf ±20% mica condenser
RCM20A331M	Condenser-330 mmf ±20% mica condenser
*RCP10W4104L	Condenser-.1/400W.V. tubular paper condenser
RCP10W4203A	Condenser-.02/400W.V. tubular paper condenser
RCP10W4503A	Condenser-.05/400W.V. tubular paper condenser
RCP10W6103A	Condenser-.01/600W.V. tubular paper condenser
REB105M	Resistor-1 megohm ±20% 1/2 Watt Resistor
REB106M	Resistor-10 meg., ±20% 1/2 Watt Resistor
REB121K	Resistor-120 ohms ±10% 1/2 Watt Resistor
REB224M	Resistor-220,000 ohms ±20% 1/2 Watt Resistor
REB225M	Resistor-2.2 meg., ±20% 1/2 Watt Resistor
REB474M	Resistor-470,000 ohms ±20% 1/2 Watt Resistor
REB822K	Resistor-8200 ohms ±10% 1/2 Watt Resistor
REC221K	Resistor-220 ohms ±10% 1 Watt Resistor
SK-310	Speaker-5" Dynamic with output transformer
SO-190	Socket-Dial light socket assembly
SP-191	Spring-Tuning drive lock spring
ST-482	Back-Masonite Back
SW-243	Switch-Phono-Radio Switch
SW-330	Switch-s.p.s.t. Rotary Switch
TR-186	Transformer-1st or 2nd I.F. Transformer

* When ordering specify "with r-f choke"

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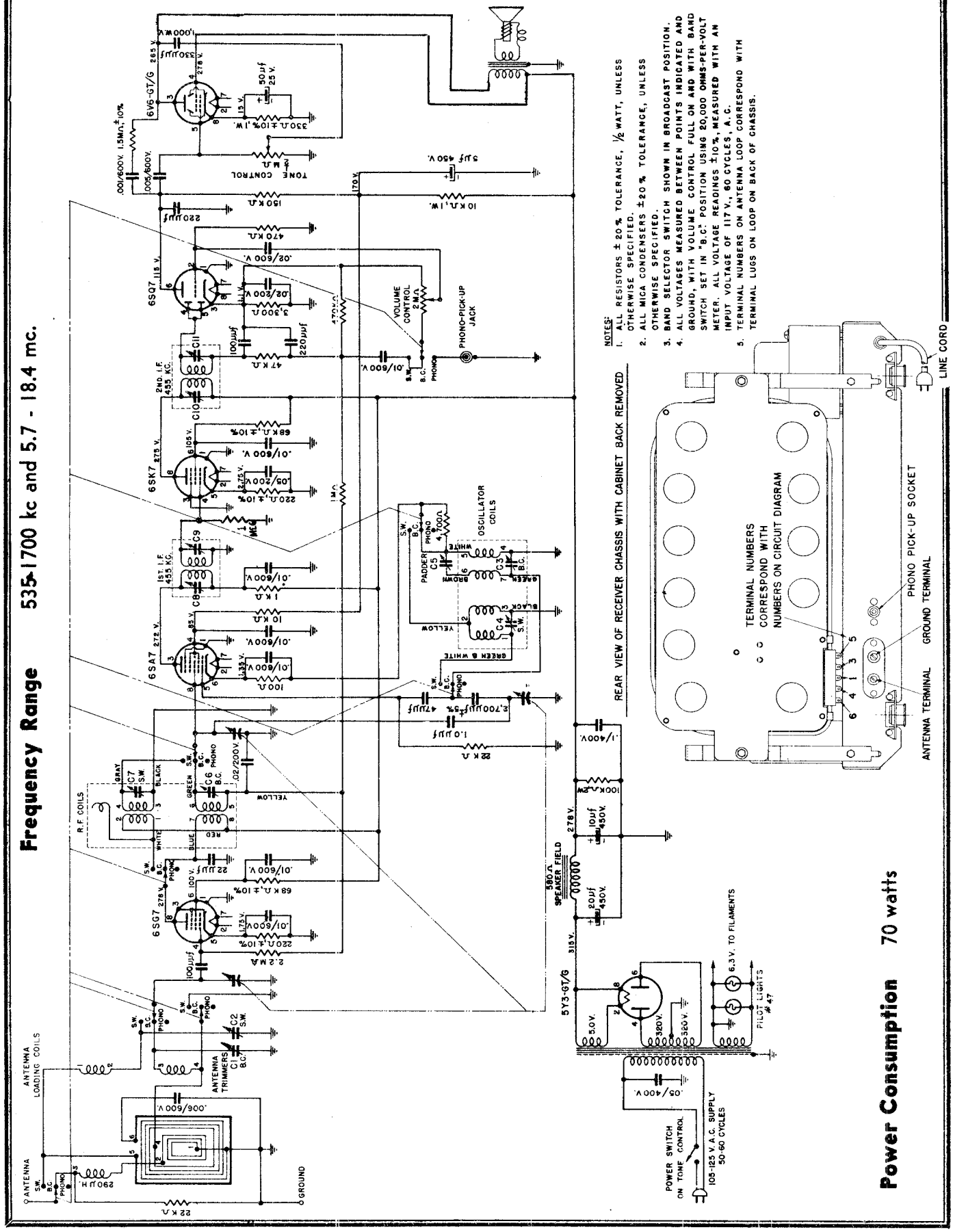
MODELS 6-601W, 6-601V, 6-602

OLYMPIC RADIO & TELEV. INC.


Frequency Range
535-1700 kc and 5.7 - 18.4 mc.
Power Consumption
70 watts
NOTES:
1. ALL RESISTORS ± 20 % TOLERANCE, ½ WATT, UNLESS OTHERWISE SPECIFIED.
2. ALL MICA CONDENSERS ±20 % TOLERANCE, UNLESS OTHERWISE SPECIFIED.
3. BAND SELECTOR SWITCH SHOWN IN BROADCAST POSITION.
4. ALL VOLTAGES MEASURED BETWEEN POINTS INDICATED AND GROUND, WITH VOLUME CONTROL FULL ON AND WITH BAND SWITCH SET IN "B.C." POSITION USING 20,000 OHMS-PER-VOLT METER. ALL VOLTAGE READINGS ±10%, MEASURED WITH AN INPUT VOLTAGE OF 117 V., 60 CYCLES, A.C.
5. TERMINAL NUMBERS ON ANTENNA LOOP CORRESPOND WITH TERMINAL LUGS ON LOOP ON BACK OF CHASSIS.
REAR VIEW OF RECEIVER CHASSIS WITH CABINET BACK REMOVED
TERMINAL NUMBERS CORRESPOND WITH NUMBERS ON CIRCUIT DIAGRAM
PHONO PICK-UP SOCKET
GROUND TERMINAL
ANTENNA TERMINAL
LINE CORD
6V6-GT/G
6SQ7
6SK7
6SAT
6SG7
5Y3-GT/G
R.F. COILS
ANTENNA LOADING COILS
ANTENNA TRIMMERS
OSCILLATOR COILS
PADDER
VOLUME CONTROL 2 MA
PHONO-PICK-UP JACK
TONE CONTROL
SPEAKER FIELD 580 Ω
6.3 V. TO FILAMENTS
PILOT LIGHTS #47
POWER SWITCH ON TONE CONTROL
105-125 V. A.C. SUPPLY 50-60 CYCLES
ANTENNA
GROUND

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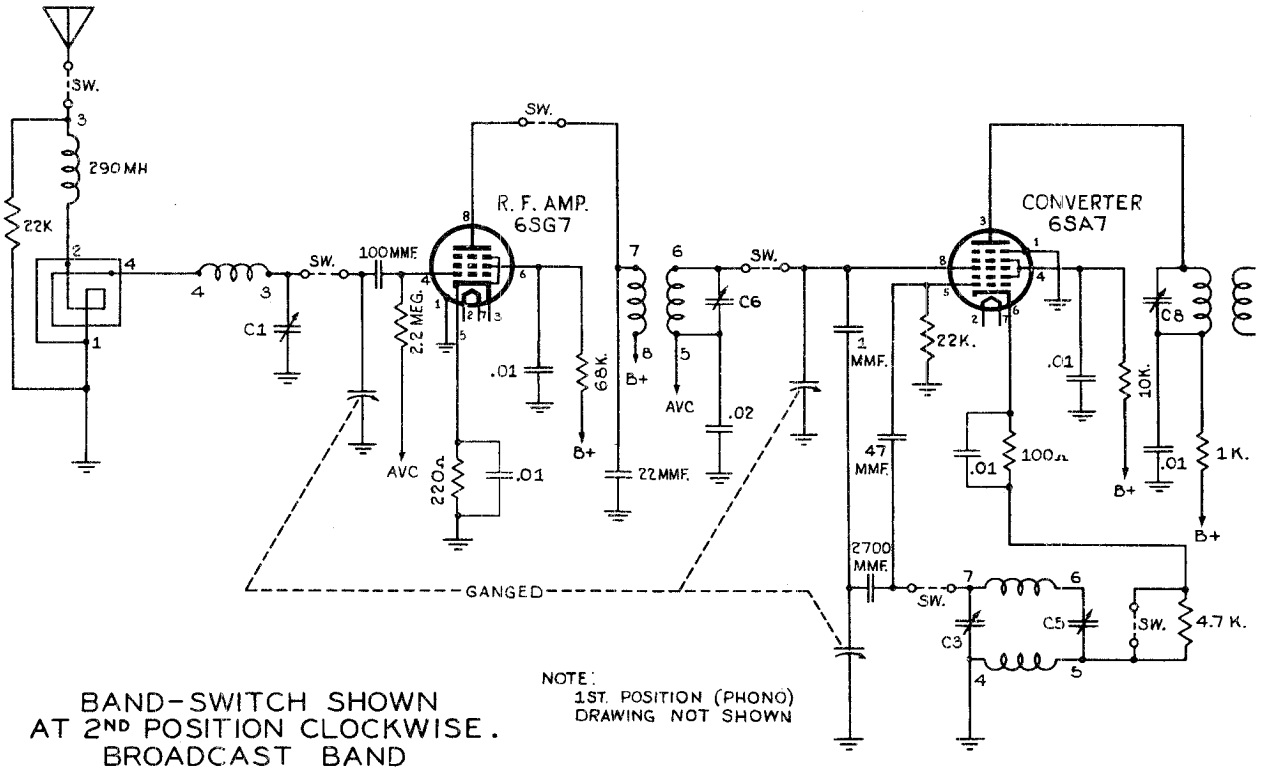
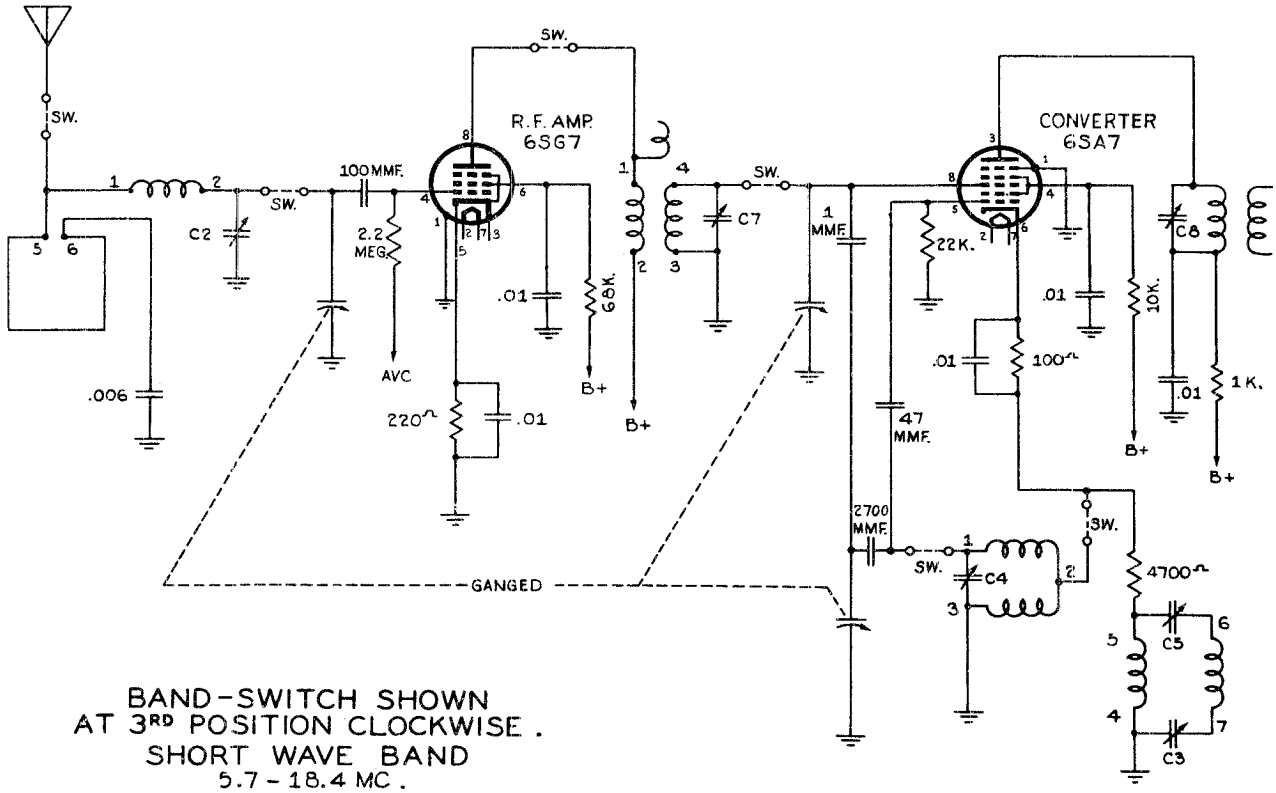
MODELS 6-601W, 6-601V, 6-602

OLYMPIC RADIO & TELEV. INC.



BAND-SWITCH SHOWN AT 2ND POSITION CLOCKWISE. BROADCAST BAND 535-1700KC.

NOTE: 1ST. POSITION (PHONO) DRAWING NOT SHOWN



BAND-SWITCH SHOWN AT 3RD POSITION CLOCKWISE. SHORT WAVE BAND 5.7-18.4 MC.

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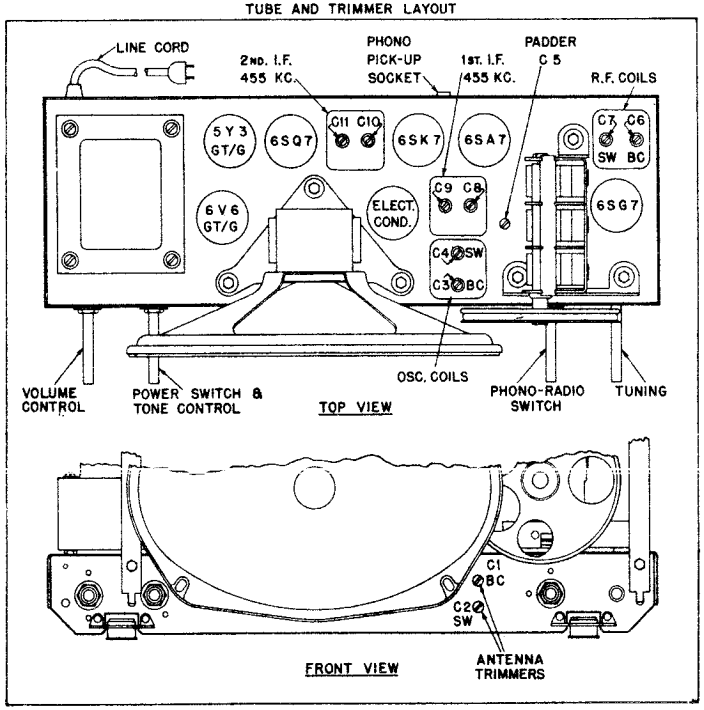
TUBE AND TRIMMER LAYOUT



ALIGNMENT PROCEDURE CHART

STEP	SET BAND SWITCH ON	CONNECT HIGH SIDE OF SIGNAL GENERATOR TO-	SET SIGNAL GENERATOR TO-	TURN POINTER TO-	ADJUST THE FOLLOWING FOR MAXIMUM OUTPUT. (KEEP SIGNAL FROM SIGNAL GENERATOR AS LOW AS POSSIBLE).
1	B.C.	R.F. SECTION OF VARIABLE CONDENSER OR PIN 4 OF THE 6SK7 TUBE IN SERIES WITH A .1 MFD, 400 VOLT CONDENSER.	455 KC.	EXTREME RIGHT HAND POSITION. (CONDENSER PLATES FULLY OPEN).	C 11 AND C 10 (2ND. I.F. TRANSFORMER)
2	B.C.	R.F. SECTION OF VARIABLE CONDENSER OR PIN 8 OF THE 6SA7 TUBE IN SERIES WITH A .1 MFD, 400 VOLT CONDENSER.	455 KC.	EXTREME RIGHT HAND POSITION. (CONDENSER PLATES FULLY OPEN).	C 9 AND C 8 (1ST. I.F. TRANSFORMER)
3	B.C.	REPEAT STEPS 1 AND 2			
4	B.C.	USE RADIATED SIGNAL (CONNECT BOTH SIDES OF SIGNAL GENERATOR TO RADIATION LOOP).	1700 KC.	1700 KC. CALIBRATION POINT ON DIFFUSER PLATE.	C 3 (OSCILLATOR TRIMMER)
5	B.C.		1400 KC.	RESONANCE, APPROXIMATELY 1400 KC. CALIBRATION POINT ON DIFFUSER PLATE.	C 6 AND C 1 (R.F. AND ANTENNA TRIMMERS)
6	B.C.		600 KC.	RESONANCE, APPROXIMATELY 600 KC. CALIBRATION POINT ON DIFFUSER PLATE.	C 5 (PADDER) ROCK VARIABLE FOR MAXIMUM SIGNAL
7	B.C.	REPEAT STEPS 4, 5 AND 6			
8	S.W.		18 MC.	18 MC. CALIBRATION POINT ON DIFFUSER PLATE	C 4 (OSCILLATOR TRIMMER) SECOND PEAK FROM TIGHT POSITION. C 7 (R.F. TRIMMER) SECOND PEAK FROM TIGHT POSITION. C 2 (ANTENNA TRIMMER)
9	S.W.		6 MC.	RESONANCE	CHECK THAT POINTER (AT RESONANCE) COINCIDES WITH 6 MC. CALIBRATION POINT. IF NOT REPEAT STEP 8.
10	S.W.	REPEAT STEPS 8 AND 9			

NOTE: In order to adjust the short wave oscillator trimmer and the short wave r-f trimmer accurately to the fundamental frequency and not to the image signal, turn the trimmers first to the maximum capacity position (fully tight). From this position loosen the trimmer through one peak indication on the outputmeter until a second peak is obtained. Adjust for maximum output on this second peak.

To check whether this procedure has been accurately performed, ascertain that an image signal can be received (much weaker) by tuning the signal generator to a frequency 910 kilocycles above the alignment frequency.

SERVICE AND ALIGNMENT INSTRUCTIONS

To insure proper alignment, it is suggested to use a radiated signal. To radiate a signal connect a loop of about 6" to 8" diameter, 1 turn of #14 or #12 wire across the output of the signal generator and place this loop parallel to the loop of the receiver to be aligned, at a distance of about 8" or 10".

Equipment required: Modulated r-f signal generator, output meter, insulated screw driver, one .1 mfd 400 volt condenser.

With the receiver removed from the cabinet, connect output meter across voice coil. Connect ground side of the signal generator to receiver chassis. Turn volume control fully on, and keeping the output of the signal generator as low as possible, proceed in the sequence as shown on the alignment chart.

To facilitate alignment of the receiver, when removed from cabinet, calibration points are provided on the light diffuser plate which is mounted on the chassis. These points are from left to right.

.(Dot, Reference point); 600 kc; 1000 kc; 1400 kc; 1700 kc for the broadcast band and .(Dot, reference point); 6 mc; 12 mc; 18 mc for the short wave band.

Before aligning close the variable condenser fully counterclockwise (plates fully closed) and check that pointer coincides with the reference dot (extreme left dot) on the diffuser plate.

MODELS 6-601W, 6-601V, 6-602
MODELS 6-617, 6-617U

OLYMPIC RADIO & TELEV. INC.

MODELS 6-601W, 6-601V, 6-602

Part No.	Description
BU 187	Bulb—#47 Mazda 6.3V pilot light bulb
CA 143W	Cabinet—walnut bakelite cabinet
CA 143V	Cabinet—ivory bakelite cabinet
CA 152	Cabinet—wood (for 6-602 only)
CL 211	Coil—antenna loading coil
CL 212	Coil—oscillator coil, shielded
CL 224	Coil—R.F. coil, shielded (BC & SW)
CO 158	Condenser—20/10/5/450 W.V. & 50/25 W.V. electrolytic condenser
CO 311	Condenser—1.0 mmfd ±20% fixed condenser
CT 389	Condenser—3-35 mmfd dual trimmer condenser
CT 440	Condenser—350-780 mmfd padder condenser
CV 144	Condenser—3 gang variable condenser
DL 378	Dial—glass dial scale
KN 422	Knob—walnut knob marked "VOLUME" (for 6-601 W & 6-602)
KN 423	Knob—walnut knob marked "OFF-ON TONE" (for 6-601W & 6-602)
KN 425	Knob—walnut knob marked "TUNING" (for 6-601W & 6-602)
KN 430	Knob—walnut knob marked "SW-BC-PH" (for 6-601W & 6-602)
KN 426	Knob—ivory knob marked "VOLUME" (for 6-601V)
KN 427	Knob—ivory knob marked "OFF-ON TONE" (for 6-601V)
KN 429	Knob—ivory knob marked "TUNING" (for 6-601V)
KN 431	Knob—ivory knob marked "SW-BC-PH (for 6-601V)
LP 213	Loop—Antenna
PO 334	Pointer
PT 239	Control—2 megohm volume control (for model 6-602)
PT 240	Control—½ megohm tone control (with S.P.S.T. switch) (for model 6-602)
PT 435	Control—2 megohm volume control (for models 6-601W & 6-601V)
PT 436	Control—½ megohm tone control (with S.P.S.T. switch) (for models 6-601W & 6-601V)
RCM20A101M	Condenser—100 mmfd ±20% mica condenser
RCM20A220M	Condenser—22 mmfd ±20% mica condenser
RCM20A221M	Condenser—220 mmfd ±20% mica condenser
RCM20A470M	Condenser—47 mmfd ±20% mica condenser
RCM30B272J	Condenser—2700 mmfd ±5% mica condenser
RCM40A331M	Condenser—330 mmfd ±20% 1000 W.V. mica condenser
RCP10W2203A	Condenser—.02/200 W.V. tubular paper condenser
RCP10W2503A	Condenser—.05/200 W.V. tubular paper condenser
RCP10W4104L	Condenser—.1/400 W.V. tubular paper condenser
RCP10W4503A	Condenser—.05/400 W.V. tubular paper condenser
RCP10W6102A	Condenser—.001/600 W.V. tubular paper condenser
RCP10W6103A	Condenser—.01/600 W.V. tubular paper condenser
RCP10W6203A	Condenser—.02/600 W.V. tubular paper condenser
RCP10W6502A	Condenser—.005/600 W.V. tubular paper condenser
RCP10W6602K	Condenser—.006/600 W.V. tubular paper condenser
REB 101M	Resistor—100 ohms ±20% ½ watt resistor
REB 102M	Resistor—1000 ohms ±20% ½ watt resistor
REB 103M	Resistor—10,000 ohms ±20% ½ watt resistor
REB 105M	Resistor—1 megohm ±20% ½ watt resistor
REB 154M	Resistor—150,000 ohms ±20% ½ watt resistor
REB 155K	Resistor—1.5 megohms ±10% ½ watt resistor
REB 221K	Resistor—220 ohms ±10% ½ watt resistor
REB 223M	Resistor—22000 ohms ±20% ½ watt resistor
REB 225M	Resistor—2.2 megohms ±20% ½ watt resistor
REB 332M	Resistor—3300 ohms ±20% ½ watt resistor
REB 472M	Resistor—4700 ohms ±20% ½ watt resistor
REB 473M	Resistor—47,000 ohms ±20% ½ watt resistor
REB 474M	Resistor—470,000 ohms ±20% ½ watt resistor
REB 683K	Resistor—68,000 ohms ±10% ½ watt resistor
REC 103M	Resistor—10,000 ohms ±20% 1 watt resistor
REC 331K	Resistor—330 ohms ±10% 1 watt resistor
RED 104M	Resistor—100,000 ohms ±20% 2 watt resistor
SK 325	Speaker—6"x9" oval dynamic, 580 ohms with 5000 ohm output transformer
SO 188	Socket—Pilot light "U" socket ass'y.
SP 191	Spring—dial drive lock spring
ST 367	Back—printed cardboard back (for models 6-601W & 6-601V)
ST 368	Back—printed cardboard back (for model 6-602)
ST 385	Light Diffuser
SW 387	Switch—SW-BC-Phono 3 position, 3 wafer switch (for model 6-602)
SW 646	Switch—SW-BC-Phono 3 position, 3 wafer switch (for models 6-601W & 6-601V)
TR 112	Transformer—power transformer
TR 118	Transformer—1st & 2nd I.F. transformer 455KC

MODELS 6-617, 6-617U

Part No.	Description
BU-187	#47 pilot light bulb 6.3V (#47 Mazda)
CL-210	Coil—oscillator coil
CL-608	Coil—r-f coil
CL-609	Coil—antenna loading coil
CO-158	Condenser—20/10/5/450 WV & 50/25WV electrolytic condenser
CV-145	Condenser—3-gang variable condenser
DL-366	Dial—glass dial scale
KN-418	Knob—Walnut knob marked "VOLUME"
KN-419	Knob—Walnut knob marked "OFF-ON-TONE"
KN-420	Knob—Walnut knob marked "PHONO-RADIO"
KN-421	Knob—Walnut knob marked "TUNING"
LP-179	Loop—antenna
PO-181	Pointer
PT-105	Control—2 megohm volume control
PT-106	Control—½ megohm tone control with power switch S.P.S.T.
RCM20A101M	Condenser—100 mmfd ±20% mica
RCM20A220M	Condenser— 22 mmfd ±20% mica
RCM20A221M	Condenser—220 mmfd ±20% mica
RCM40A331M	Condenser—330 mmfd ±20% mica condenser, 1000 WV
RCM20A470M	Condenser— 47 mmfd ±20% mica
RCP10W2203A	Condenser—.02/200WV tubular paper
RCP10W2503A	Condenser—.05/200WV tubular paper
RCP10W4104L	Condenser—.1/400WV tubular paper
RCP10W4503A	Condenser—.05/400WV tubular paper
RCP10W6102A	Condenser—.001/600WV tubular paper
RCP10W6103A	Condenser—.01/600WV tubular paper
RCP10W6502A	Condenser—.005/600WV tubular paper
REB102M	Resistor—1000 ohms ±20% ½ watt resistor
REB105M	Resistor—1 megohm ±20% ½ watt resistor
REB154M	Resistor—150,000 ohms ±20% ½ watt resistor
REB155K	Resistor—1.5 megohm ±10% ½ watt resistor
REB221K	Resistor—220 ohms ±10% ½ watt resistor
REB223M	Resistor—22,000 ohms ±20% ½ watt resistor
REB224M	Resistor—220,000 ohms ±20% ½ watt resistor
REB331M	Resistor—330 ohms ±20% ½ watt resistor
REB332M	Resistor—3300 ohms ± 20% ½ watt resistor
REB334M	Resistor—330,000 ohms ±20% ½ watt resistor
REB472M	Resistor—4700 ohms ±20% ½ watt resistor
REB473M	Resistor—47,000 ohms ±20% ½ watt resistor
REB474M	Resistor—470,000 ohms ±20% ½ watt resistor
REB683K	Resistor—68,000 ohms ±10% ½ watt resistor
REC103M	Resistor—10,000 ohms ±20% 1 watt resistor
REC331K	Resistor—330 ohms ±10% 1 watt resistor
RED473M	Resistor—47,000 ohms ±20% 2 watt resistor
SK-325	Speaker—6" x 9" oval dynamic speaker 580 ohms field coil with output transformer
SP-191	Spring—drive shaft retaining spring
SP-218	Spring—⅞" lg. pointer drive spring
ST-369	Back— Masonite back,
SW-141	Switch—phono-radio switch D.P.D.T.
TR-112	Transformer—power transformer
TR-118	Transformer—I.F. transformer, 1st & 2nd

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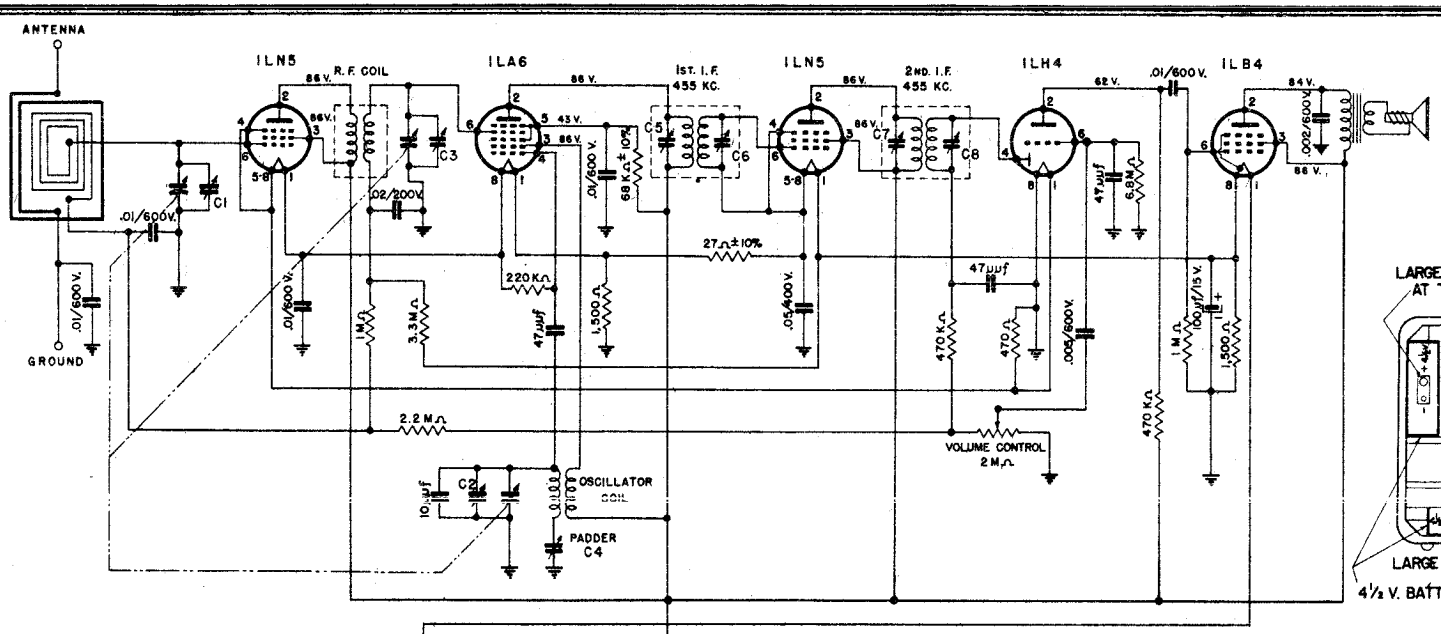
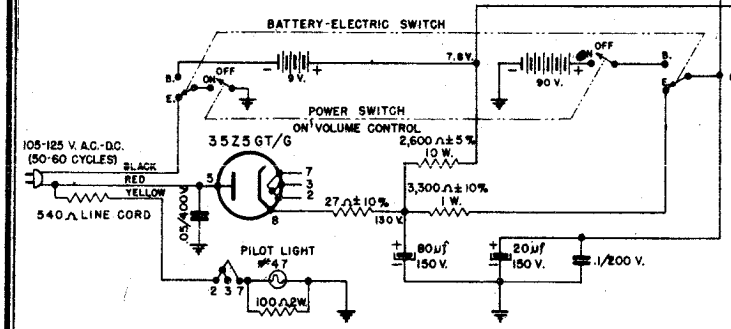
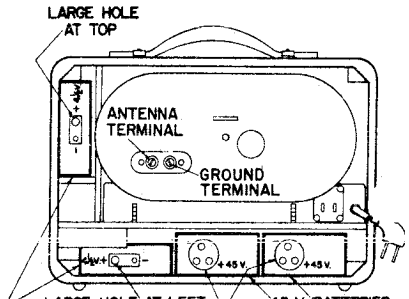




NOTES:

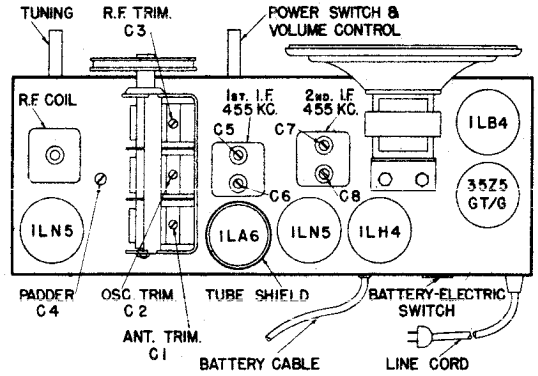
1. ALL RESISTORS ± 20 % TOLERANCE, 1/2 WATT, UNLESS OTHERWISE SPECIFIED.
2. ALL MICA CONDENSERS ± 20 % TOLERANCE.
3. ALL VOLTAGES MEASURED BETWEEN POINTS INDICATED AND GROUND, WITH VOLUME CONTROL FULL ON, USING 20,000 OHMS-PER-VOLT METER. ALL VOLTAGE READINGS ± 10 %, EXCEPT FILAMENT VOLTAGE WHICH SHOULD BE KEPT WITHIN ± 5%. ALL READINGS MEASURED ON ELECTRIC POWER OPERATION WITH AN INPUT VOLTAGE OF 117 V., 60 CYCLES, A.C.
4. 1LA6 TUBE IS ENCLOSED IN METAL SHIELD.



REAR VIEW OF CABINET
SHOWING PLACEMENT OF BATTERIES

ALIGNMENT PROCEDURE CHART

STEP	CONNECT HIGH SIDE OF SIGNAL GENERATOR TO-	SET SIGNAL GENERATOR TO-	SET POINTER TO-	ADJUST THE FOLLOWING FOR MAXIMUM OUTPUT. (KEEP SIGNAL FROM SIGNAL GENERATOR AS LOW AS POSSIBLE.)
1	R.F. SECTION OF VARIABLE CONDENSER IN SERIES WITH .1 MFD. COND.	455 KC.	EXTREME RIGHT HAND POSITION. (CONDENSER PLATES FULLY OPEN.)	C8, C7, C6, C5 AND REPEAT IN SAME ORDER (1ST. AND 2ND. I.F. TRANSFORMERS.)
2	ANTENNA TERMINAL OF ANTENNA LOOP IN SERIES WITH 50 MMFD. COND.	1500 KC.	1500 KC. (150 ON DIAL)	C2, C3, C1 OSCILLATOR, R.F. AND ANTENNA TRIMMERS
3		600 KC.	600 KC. (APPROX. 60 ON DIAL)	C4 PADDER ROCK DIAL FOR MAXIMUM SIGNAL
4		REPEAT STEPS 2 AND 3		



TOP VIEW OF CHASSIS

NOTE: 1LA6 TUBE IS ENCLOSED IN METAL SHIELD.

Power Consumption on electric operation — 20 watts

OLYMPIC RADIO & TELEV. INC.

OLYMPIC PAGE 15-9
MODEL 6-606

MODEL 6-606

OLYMPIC RADIO & TELEV. INC.

SERVICE AND ALIGNMENT INSTRUCTIONS

WHEN SERVICING THIS RECEIVER DO NOT PLACE CHASSIS ON A GROUNDED METALLIC BENCH.

For tube replacement it is not necessary to remove the chassis from the cabinet. Access to the tubes may be made by removing the center screw on the loop holding same to the bracket, and then lifting loop carefully off the bracket so as to avoid breaking of wires connecting same.

For ALIGNMENT the chassis must be removed from case. Remove first batteries and then the three screws holding chassis to the bottom of the shelf.

ALIGNMENT

Equipment Required: Modulated r-f signal generator; output meter; insulated screw driver; two .1 mfd 400 volt and one 50 mmfd 400 volt condensers.

Turn variable condenser fully counterclockwise (plates fully closed) and check that pointer coincides with the first thin calibration mark on the dial. Connect the output meter and signal generator as follows:

Output meter: Connect across voice coil and turn volume control to maximum.

Signal generator: Connect the low side of the signal generator to the receiver chassis thru a .1 mfd condenser and keep output as low as possible, then proceed in the sequence shown on the alignment chart.

Part No.	Description
BK-405	Bracket-Resistor mounting bracket
BU-187	Bulb-pilot light bulb 6.3v (#47 Mazda)
CA-229	Cabinet-portable cabinet
CB-335	Cable-battery cable
CL-176	Coil-R.F. coil, shielded
CL-177	Coil-oscillator coil
CO-182	Condenser-80/20/150WV & 100/15WV electrolytic condenser
CR-299	Crystal-dial crystal
CT-388	Condenser-220-680 mmfd padder condenser
CV-146	Condenser-3 gang variable condenser (with pulley)
DL-391	Dial-metal dial scale
ES-274-1	Escutcheon-moulded escutcheon
KN-260	Knob-walnut knob
KN-261	Knob-walnut knob with dot
LC-315	Line Cord-540 ohms resistance line cord
LP-178	Loop-Antenna
PO-395	Pointer-dial pointer
PT-383	Control-volume control 2 megohms with D.P.S.T. switch
RCM20A100M	Condenser-10 mmfd ±20% mica condenser
RCM20A470M	Condenser-47 mmfd ±20% mica condenser
RCP10W2104A	Condenser-.1-200WV paper tubular condenser
RCP10W2203A	Condenser-.02/200WV paper tubular condenser
RCP10W4503A	Condenser-.05/400WV paper tubular condenser
RCP10W6103A	Condenser-.01/600WV paper tubular condenser
RCP10W6202M	Condenser-.002/600WV paper tubular condenser
RCP10W6502A	Condenser-.005/600WV paper tubular condenser
RE-407	Resistor-2600 ohms ±5% 10 watt resistor
REB105M	Resistor-1 megohm ±20% 1/2 watt resistor
REB152M	Resistor-1500 ohms ±20% 1/2 watt resistor
REB224M	Resistor-220,000 ohms ±20% 1/2 watt resistor
REB225M	Resistor-2.2 megohms ±20% 1/2 watt resistor
REB270K	Resistor-27 ohms ±10% 1/2 watt resistor
REB335M	Resistor-3.3 megohms ±20% 1/2 watt resistor
REB471M	Resistor-470 ohms ±20% 1/2 watt resistor
REB474M	Resistor-470,000 ohms ±20% 1/2 watt resistor
REB683K	Resistor-68,000 ohms ±10% 1/2 watt resistor
REB685M	Resistor-6.8 megohms ±20% 1/2 watt resistor
REC332K	Resistor-3 300 ohms ±10% 1 watt resistor
RED101M	Resistor-100 ohms ±20% 2 watt resistor
SD-607	Shield-Tube Shield
SK-156	Speaker-5" P.M. Speaker with output transformer
SO-572	Socket-pilot light socket assembly
SP-191	Spring-Drive shaft retaining spring
SW-185	Switch-battery-electric D.P.D.T. slide switch
TR-186	Transformer-I.F. 455 K.C. Transformer

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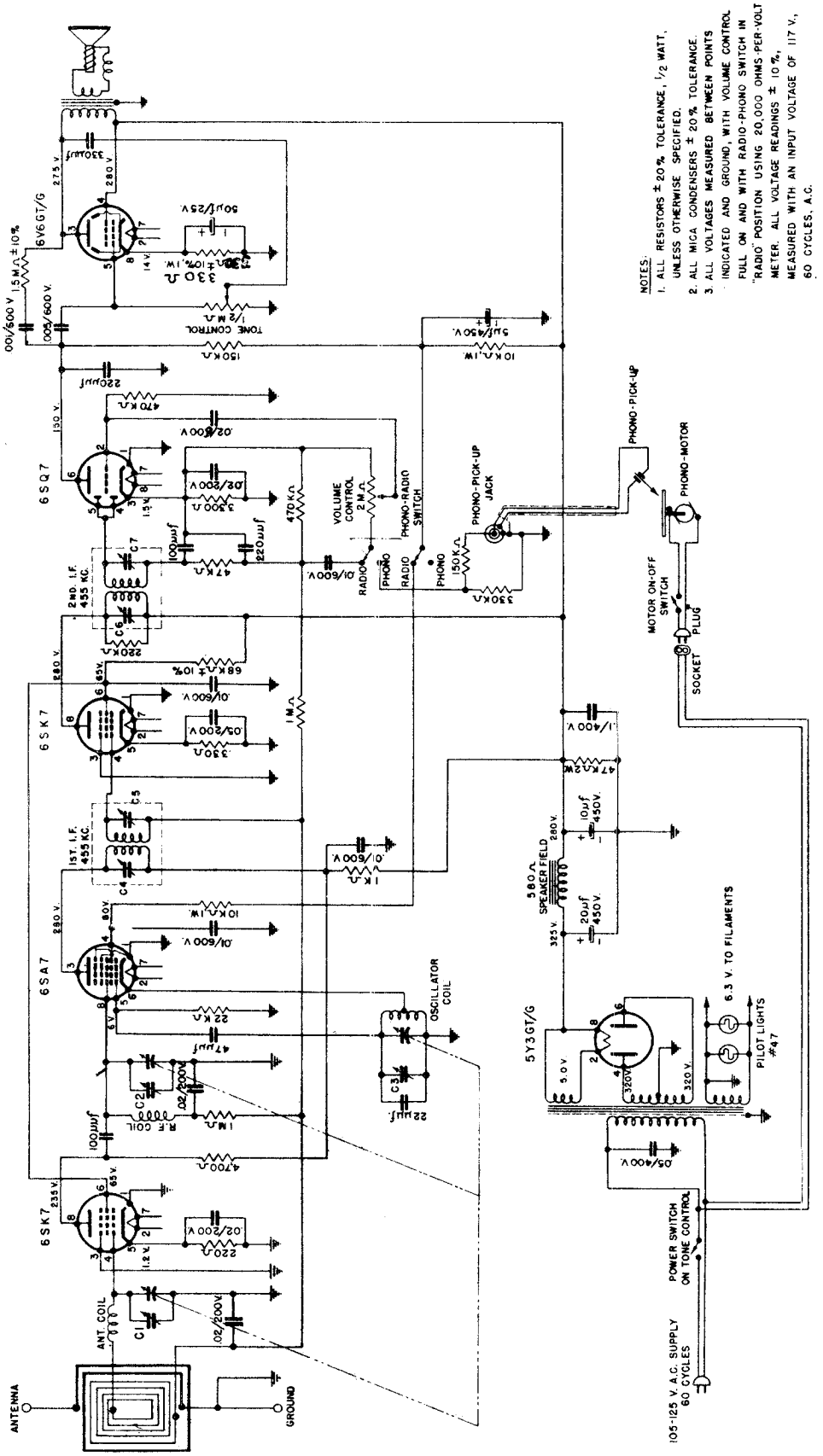
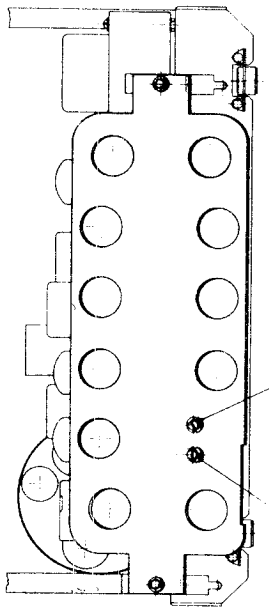
MODELS 6-617, 6-617U

OLYMPIC RADIO & TELEV. INC.



NOTES:
1. ALL RESISTORS ± 20% TOLERANCE, 1/2 WATT, UNLESS OTHERWISE SPECIFIED.
2. ALL MICA CONDENSERS ± 20% TOLERANCE.
3. ALL VOLTAGES MEASURED BETWEEN POINTS INDICATED AND GROUND, WITH VOLUME CONTROL FULL ON AND WITH RADIO-PHONO SWITCH IN "RADIO" POSITION USING 20,000 OHMS-PER-VOLT METER. ALL VOLTAGE READINGS ± 10%, MEASURED WITH AN INPUT VOLTAGE OF 117 V., 60 CYCLES, A.C.



REAR VIEW OF RECEIVER CHASSIS WITH CABINET BACK REMOVED

Frequency Range: 530 — 1700 K.C.

Power Requirement: 105 — 125 volts a-c 60 cycles

Power Consumption: Receiver 70 Watts

Receiver with Record-Changer 85 Watts

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Record Changer: General Instruments Model 205, Seeburg K

For parts list, see P.15-8

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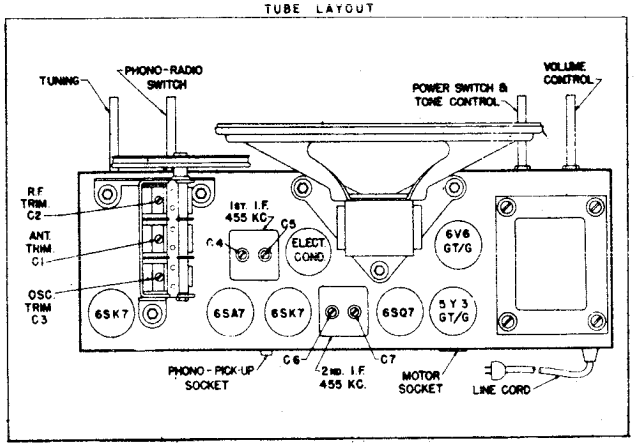
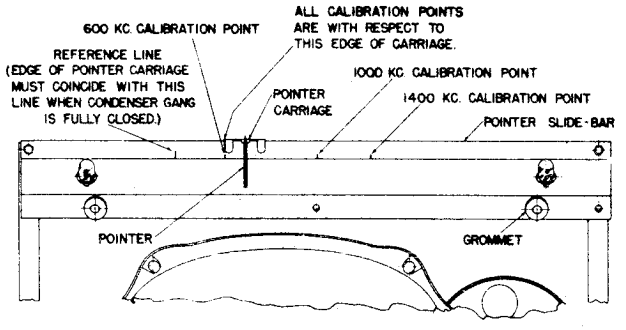
TUBE LAYOUT




600 KC. CALIBRATION POINT
ALL CALIBRATION POINTS ARE WITH RESPECT TO THIS EDGE OF CARRIAGE.
REFERENCE LINE (EDGE OF POINTER CARRIAGE MUST COINCIDE WITH THIS LINE WHEN CONDENSER GANG IS FULLY CLOSED.)
1000 KC. CALIBRATION POINT
POINTER CARRIAGE
1400 KC. CALIBRATION POINT
POINTER SLIDE-BAR
POINTER
GROMMET

FRONT VIEW OF DIAL BACK-PLATE SHOWING CALIBRATION POINTS

ALIGNMENT PROCEDURE CHART

STEP	CONNECT HIGH SIDE OF SIGNAL GENERATOR TO-	SET SIGNAL GENERATOR TO-	TURN POINTER TO-	ADJUST THE FOLLOWING FOR MAXIMUM OUTPUT. (KEEP SIGNAL FROM SIGNAL GENERATOR AS LOW AS POSSIBLE.)
1	R.F. SECTION OF THE VARIABLE COND. IN SERIES WITH A .1/400 MFD. COND.	455 KC.	EXTREME RIGHTHAND POSITION. (CONDENSER PLATES FULLY OPEN.)	C7, C6, C5, C4 AND REPEAT IN SAME ORDER (1ST. AND 2ND. I.F. TRANSFORMERS.)
2	ANTENNA TERMINAL OF ANTENNA LOOP IN SERIES WITH 50 MMFD. COND.	1400 KC.	1400 KC. CALIBRATION POINT	C3, C2, C1.
3		600 KC.	RESONANCE	CHECK THAT POINTER EDGE AT RESONANCE COINCIDES WITH 600 KC. CALIBRATION POINT. IF DEVIATION IS TOO LARGE REPEAT STEP 2.

SERVICE AND ALIGNMENT INSTRUCTIONS

To service this receiver it is first necessary to remove the motorboard with the record changer and then remove the chassis through the top opening of the cabinet. To lift the entire motorboard with the changer, unfasten the six screws holding the motorboard in place, disconnect motor and pick-up plugs from chassis, and lift up. It is unnecessary to remove the screws holding the metal-shield in front. CAUTION: WHEN REMOVING THE CHANGER BE SURE TO PLACE IT IN A POSITION WHEREBY THE CHANGER MECHANISM WILL NOT BE DAMAGED.

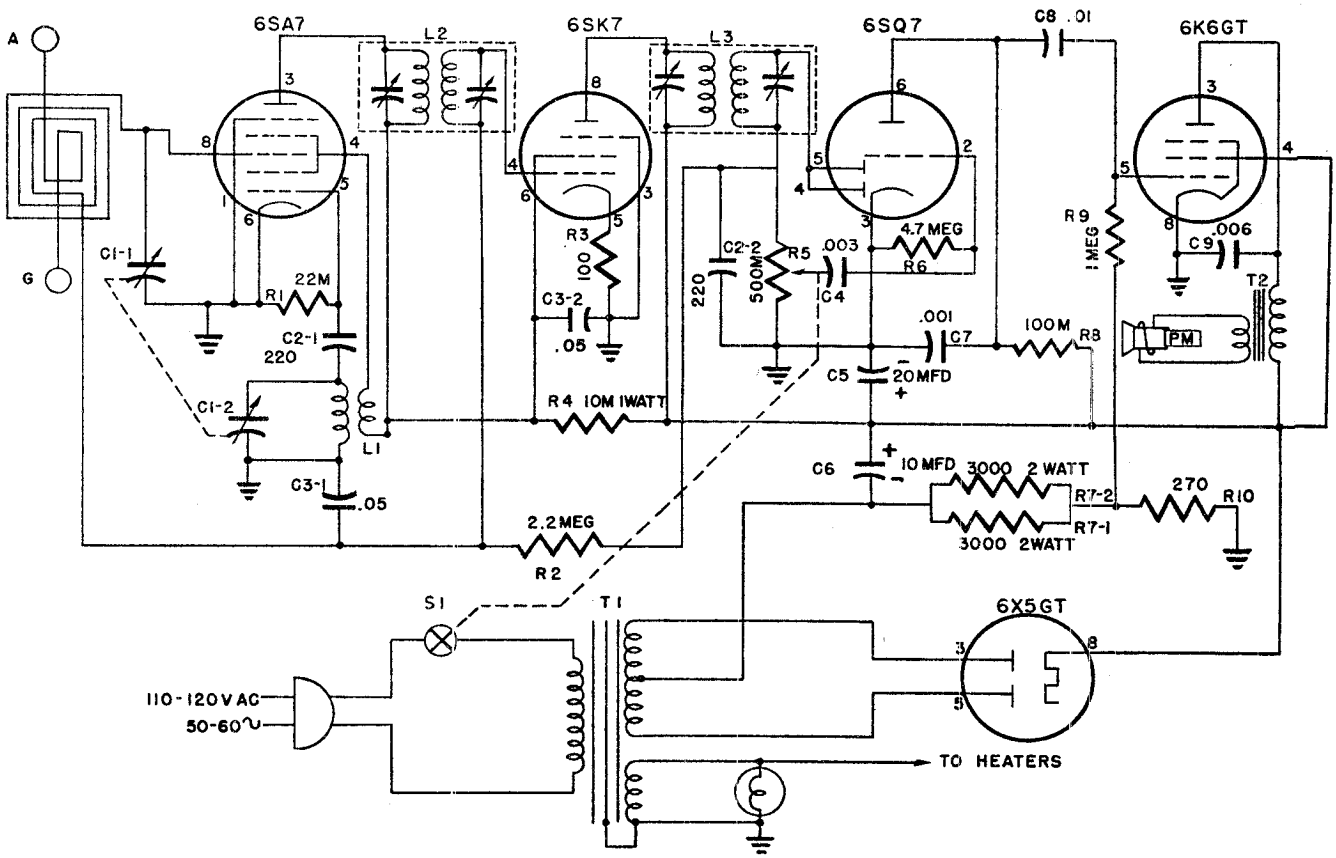
Equipment Required: Modulated r-f signal generator; output meter; insulated screw driver; one .1 mfd 400 volts and one 50 mmfd 400 volts condenser.

With the receiver removed from the cabinet, connect output meter across voice coil. Connect ground side of the signal generator to chassis; turn volume control fully on, and keeping the output of the signal generator as low as possible, proceed in the sequence as shown on the alignment chart.

To facilitate alignment of the receiver when removed from cabinet, calibration points are provided on the pointer slide bar (see drawing).

Before aligning, close the variable condenser fully counterclockwise (plates fully closed) and check that pointer carriage coincides with the "reference line" on the pointer slide bar.

PACKARD BELL CO.



ALIGNMENT PROCEDURE

Alignment procedure consists of the four steps outlined in the Alignment Procedure Chart. Test oscillator leads should be connected to the mixer grid and ground in series with an .01 Mfd. capacitor (dummy load) for the I. F. alignment (Step No. 1).

The alignment procedure outlined in steps 2 to 4 utilizes a standard test loop.* The test oscillator leads should be connected across this loop. The loop should be placed about two feet from the receiver loop in a vertical position.

Upon completion of the I. F. Alignment the variable condenser should be "Rocked" to gain assurance that the I. F.'s have not been aligned to the image frequency.

*NOTE: Hazeltine Test Loop #1150

ALIGNMENT CHART

STEP	CONNECT TEST OSC. TO	TEST OSC. SETTING	POINTER SETTING	ADJUST FOR MAXIMUM OUTPUT
1	Mixer grid & Grd. .01 Mfd Dummy Load	455 KC	550 KC	Trimmers A, B, C & D
2	Standard* Test Loop	1750 KC	1750 KC	Trimmer F to 1750 KC
3	Standard Test Loop*	1330 KC	1330 KC	Trimmer E Set Pointer to 1330 KC
4	Standard Test Loop*	570 KC	570 KC	Loop

REMARKS: *Hazeltine Test Loop #1150

Electrical Rating

Line Voltage . . . 110-120 Volts 50-60 cycle A.C.
Power Consumption . . . 32 watts

Tuning Frequency Range

550 to 1740 kc

Intermediate Frequency

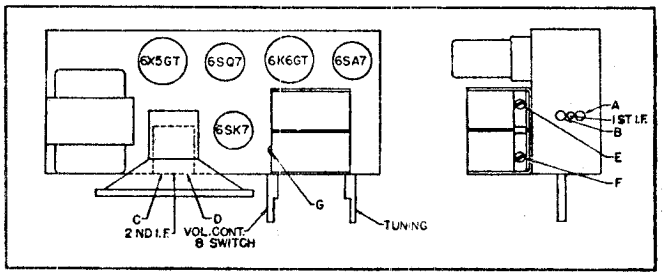
455 kc

Electrical Power Output

Maximum . . . 1.8 watts

Loudspeaker

Type . . . Permanent Magnet
Outside Cone Diameter . . . 4"
Voice Coil Impedance . . . 3.2 ohms at 400 cycles
Magnet Rating . . . 1.0 Oz. Alnico five



TRIMMER LOCATION

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MODEL 5FP

PACKARD BELL CO.

SPECIAL SERVICE INFORMATION

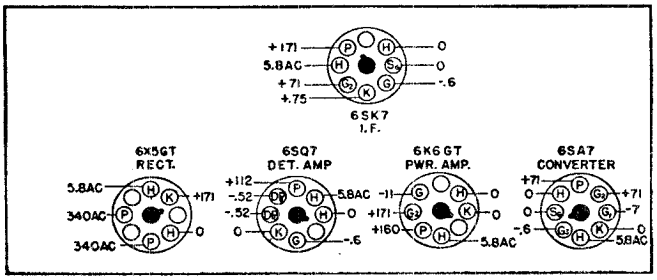
STAGE GAIN MEASUREMENTS

Measurements taken with volume control fully advanced.
Standard Output . . . 50 milliwatts Dummy Antenna . . . 220 mmf
Converter gain . . . 80 X at 1000 KC
Converter to 1st I. F. . . . 140 X at 455 KC
1st I. F. to 2nd Detector . . . 105 X at 455 KC
Overall Audio Gain . . . 536 X at .5 watts at 400 cycles
Oscillator Grid Voltage at 117 volts AC line voltage
1750 KC . . . 2.65 volts AC*
1330 KC . . . 2.1 volts AC*
750 KC . . . 1.84 volts AC*
550 KC . . . 1.72 volts AC*

*Measurements made with A.C. V.T.V.M.

Input loading above 10 megohms

All D.C. voltages measured with vacuum tube voltmeter from socket contacts to chassis. A.C. voltages measured with a 1000 ohm per volt A.C. meter. Volume control fully advanced, no signal, 117 volts A.C. line voltage. All voltages shown are positive D.C. unless otherwise noted.



SOCKET VOLTAGES

Tubes

Tube	Function
6X5-GT	Rectifier
6K6-GT	Power Amplifier
6SQ7	Detector Amplifier
6SK7	I. F. Amplifier
6SA7	Frequency Converter

D.C. RESISTANCE MEASUREMENTS

1st I. F. Coil
primary . . . 17.5 ohms
secondary . . . 17.5 ohms
2nd I. F. Coil
primary . . . 13 ohms
secondary . . . 14 ohms
Oscillator Coil
primary . . . 1.2 ohms
secondary . . . 4.5 ohms

TABLE OF REPLACEABLE PARTS

PART NO.	SYMBOL	DESCRIPTION
21004		Cabinet, Plastic
23503	C1-1	Capacitor, Variable; 2 gang
	C1-2	with pulley
23228	C2-1	Capacitor, Mica: 220 mmf
	C2-2	
23009	C3-1	Capacitor, Paper: .05 Mfd. 400 V
	C3-2	
23016	C4	Capacitor, Paper: .003 Mfd. 600 V
24003	C5	Capacitor, Electrolytic: 20 Mfd. 350 WV
24005	C6	Capacitor, Electrolytic: 10 Mfd. 350 WV
23001	C7	Capacitor, Paper: .001 Mfd. 600 V
23006	C8	Capacitor, Paper: .01 Mfd. 600 V
23015	C9	Capacitor, Paper: .006 Mfd. 600 V
29203	L1	Coil, oscillator
29002	L2	Coil, I.F.: 1st, 455 kc
29003	L3	Coil, I.F.: 2nd, 455 kc
25001	R5 & S1	Control, volume: 500,000 ohms, with A.C. switch
55003		Crystal, dial
52004		Knobs
29308		Loop, Assembly
54001		Pilot Light, bayonet base: T44
67005		Pointer, Plastic
73041	R1	Resistor, carbon: 22,000 ohms ±10% ½ watt
73055	R2	Resistor, carbon: 2.2 megohms ±20% ½ watt
73013	R3	Resistor, carbon: 100 ohms ±10% ½ watt
73073	R4	Resistor, carbon: 10,000 ohms ±10% 1 watt
73057	R6	Resistor, carbon: 4.7 megohms ±20% ½ watt
73122	R7-1	Resistor, carbon: 3000 ohms
	R7-2	±10% 2 watt
73047	R8	Resistor, carbon: 100,000 ohms ±20% ½ watt
73053	R9	Resistor, carbon: 1 megohm ±20% ½ watt
73018	R10	Resistor, carbon: 270 ohms ±10% ½ watt
38003		Scale, dial
79009		Socket, pilot light
79002		Socket, tube: 8 prong octal, wafer type
84002		Spring, dial
83003		Speaker, PM:4"
89002	T1	Transformer, power
89402	T2	Transformer, output

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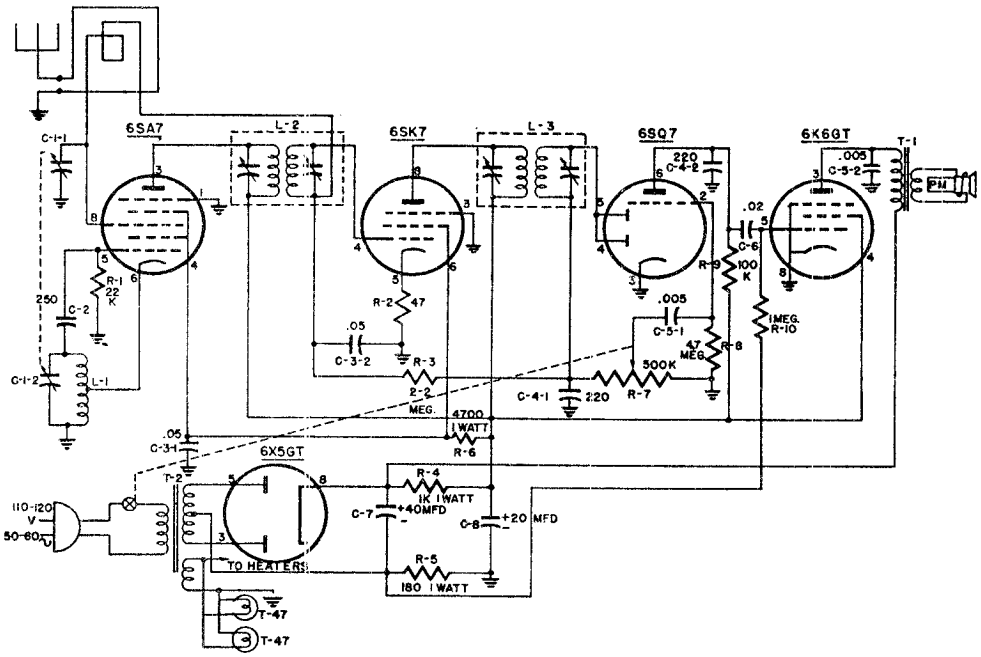

ALIGNMENT PROCEDURE

Alignment Procedure consists of the four steps outlined in the Alignment Procedure Chart.

Connect the test oscillator leads to the mixer grid and ground in series with a .01 Mfd. capacitor (dummy load) for step No. 1, I.F. Alignment. The receiver loop must be shifted in order to reach trimmers A, B, C, and D (see Fig. 1). Return the loop to its original position before proceeding with the balance of the alignment.

Upon completion of the I.F. Alignment, the variable condenser should be "Rocked" to assure that the I.F.s have not been aligned to the image frequency.

The procedure outlined in steps 2 to 4 utilizes a standard test loop*. Connect the test oscillator leads across this loop and place it in a vertical position about two feet from the receiver loop.

*NOTE: Hazeltine Test Loop No. 1150.

ALIGNMENT CHART

STEP	CONNECT TEST OSC. TO	TEST OSC. SETTING	POINTER SETTING	ADJUST FOR MAXIMUM OUTPUT
1	Mixer grid & Grd. .01 Mfd. Dummy Load	455 KC	550 KC	Trimmers A, B, C & D
2	Standard Test Loop*	1750 KC	1750 KC	Trimmer F to 1750 KC
3	Standard Test Loop*	1330 KC	1330 KC	Trimmer E
4	Standard Test Loop*	570 KC	570 KC	Loop

*REMARKS: Hazeltine Test Loop No. 1150.

Electrical Rating

Line Voltage . . . 110-120 volts, 50-60 cycle A.C.
Power Consumption . . . 33 watts

Tuning Frequency Range

540 to 1740 kc

Intermediate Frequency

455 kc

Electrical Power Output

Maximum . . 2.8 watts

Loudspeaker

Type . . . Permanent Magnet
Outside Cone Diameter . . . 5"
Voice Coil Impedence . . . 3.2 ohms at 400 cycles
Magnet Rating . . . 1.0 oz. Alnico No. 5

Tubes	Function
6SA7	Frequency Converter
6SK7	I.F. Amplifier
6SQ7	Detector Amplifier
6K6-GT	Power Amplifier
6X5-GT	Rectifier

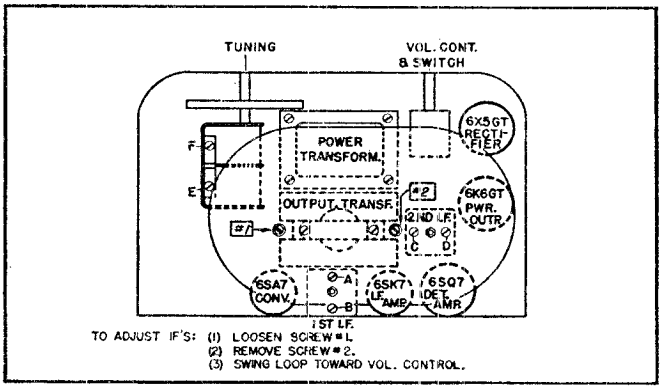

Fig. 1 — Trimmer Location

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MODEL 551

PACKARD BELL CO.

TABLE OF REPLACEABLE PARTS

PART NO.	SYMBOL	DESCRIPTION
A21001E		Cabinet, wood: walnut
B21001E		Cabinet, wood: bleach
C21001E		Cabinet, wood: fabricoid covered
A21002D		Cabinet, plastic: ivory
B21002D		Cabinet, plastic: walnut
24003	C8	Capacitor, electrolytic: 20 Mfd. 350 WV
24004B	C7	Capacitor, electrolytic: 40 Mfd. 350 WV
23206	C4-1	Capacitor, mica: 220 Mmf
	C4-2	
23016	C9	Capacitor, paper: .003 Mfd. 600 volt
23004	C5-1	Capacitor, paper: .005 Mfd. 600 volt
	C5-2	
23007	C6	Capacitor, paper: .02 Mfd. 600 volt
23009	C3-1	Capacitor, paper: .05 Mfd. 600 volt
	C3-2	
23502G	C1-1	Capacitor, variable: two gang
	C1-2	
29004A	L2	Coil, 1st I.F.: 455 KC
29001A	L3	Coil 2nd I.F.: 455 KC
29301D		Coil, loop antenna
29202	L1	Coil, oscillator
25003A	R7 & S1	Control, volume: 500,000 ohms, with A.C. switch
55001		Crystal, dial: for wood cabinet
55002		Crystal, dial: for plastic cabinet
38005		Dial, scale: for wood cabinet
38009		Dial, scale: for plastic cabinet
A47002C		Grille, plastic: walnut
B47002C		Grille, plastic: ivory
A49001E		Handle, plastic: walnut
B49001E		Handle, plastic: ivory
C52015C		Knob, walnut
A52015C		Knob, ivory
54002		Lamp, bayonet base: T-44
67004		Pointer, slide
67006		Pointer, wire
73009	R2	Resistor, carbon: 47 ohm ±10%, ½ watt
73077	R5	Resistor, carbon: 180 ohm ±10%, 1 watt
73071	R4	Resistor, carbon: 1000 ohm ±10%, 1 watt
73075	R6	Resistor, carbon: 4700 ohm ±10%, 1 watt
73041	R1	Resistor, carbon: 22,000 ohm ±10%, ½ watt
73047	R9	Resistor, carbon: 100,000 ohm ±20%, ½ watt
73053	R10	Resistor, carbon: 1 megohm ±20%, ½ watt
73055	R3	Resistor, carbon: 2.2 megohm ±20%, ½ watt
73057	R8	Resistor, carbon: 4.7 megohm ±20%, ½ watt
79009A		Socket, lamp
79002		Socket, tube
83203		Speaker, permanent magnet: 5"
89401B	T1	Transformer, output
89001A	T2	Transformer, power

All D.C. voltages measured with a vacuum tube voltmeter from socket contacts to chassis. A.C. voltages measured with a 1000 ohm per volt A.C. meter from socket contacts to chassis. Volume control fully advanced. No signal. 117 A.C. line voltage. All voltages shown are positive D.C. unless otherwise noted.

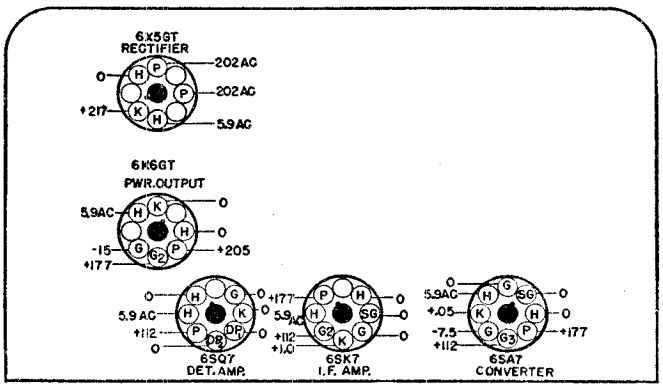

Fig. 2 — Socket Voltages

SPECIAL SERVICE INFORMATION

STAGE GAIN MEASUREMENTS

Dummy Antenna . . . 200 mmf Standard Output . . . 50 mw
Volume Control . . . Maximum
Converter grid to 1st I.F. grid . . . 63 X at 1000 KC
Converter grid to 1st I.F. grid . . . 72 X at 455 KC
1st I.F. grid to 2nd detector . . . 75 X at 455 KC
Overall audio gain . . . 356 X at .5 watts 400 cycles

OSCILLATOR GRID VOLTAGES

At 117 volt A.C. line voltage.

1750 KC . . . 20.0 volts A.C.*
1330 KC . . . 19.0 volts A.C.*
750 KC . . . 17.5 volts A.C.*
550 KC . . . 17.0 volts A.C.*

*Measurements made with A.C. — V.T.V.M., input loading above 10 megohms.

D.C. RESISTANCE MEASUREMENTS

1st I.F. Coil

primary . . . 14.5 ohms
secondary . . . 14.5 ohms

2nd I.F. Coil

primary . . . 14.5 ohms
secondary . . . 14.5 ohms

Oscillator Coil

start to finish . . . 8 ohms
start to tap . . . 7 ohms

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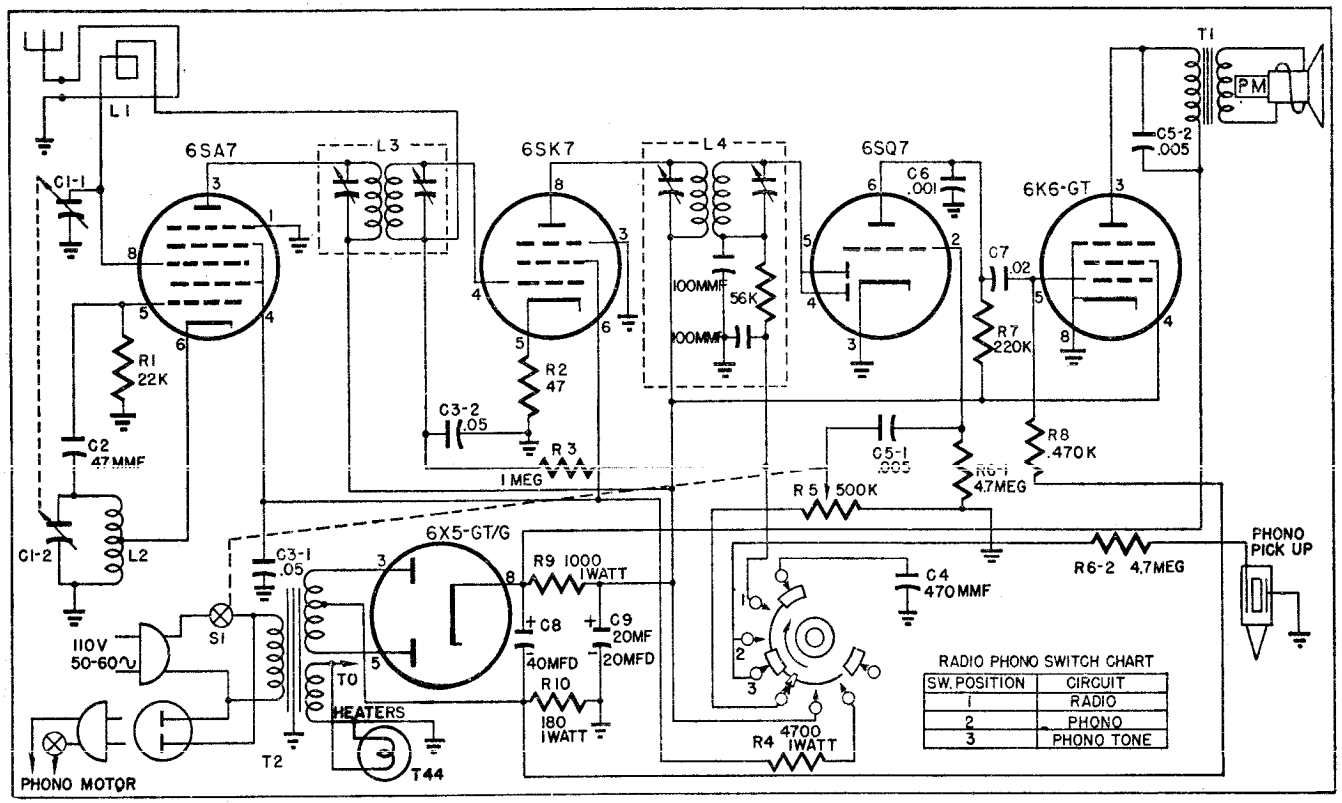

GENERAL INFORMATION

Model 561 is a five tube superheterodyne receiver and phonograph combination. This model employs a permanent magnet speaker and a "HI-Q" loop antenna. It is enclosed in a fabricoid covered carrying case.

The schematic diagram shows a tweet filter network in the 2nd I.F. This network is comprised of two 100 Mmf capacitors and a 56,000 ohm resistor. Also shown is a .005 Mfd. capacitor parallel with the primary of the output transformer. In a few of the earlier models a 220 Mmf. AVC by-pass was used in place of the tweet filter, and the .005 Mfd. capacitor is connected to the plate of the 6K6-GT and ground.

ALIGNMENT PROCEDURE

Alignment procedure consists of the four steps outlined in the Alignment Procedure Chart.

For step No. 1, I.F. Alignment, connect the test oscillator leads to the mixer grid and ground in series with a .01 Mfd. capacitor (dummy load). Upon completion of this step, "Rock" the variable condenser to assure that the I.F.s have not been aligned to the image frequency.

Steps 2 to 4 employ a standard test loop.* Connect the test oscillator leads across this loop and place it in a vertical position about two feet from the receiver loop.

*NOTE: Hazeltine Test Loop #1150.

ALIGNMENT CHART

STEP	CONNECT TEST OSC. TO	TEST OSC. SETTING	POINTER SETTING	ADJUST FOR MAXIMUM OUTPUT
1	Mixer grid & Grd. .01 Mfd. Dummy load	455 KC	540 KC	Trimmers # A, B, C & D
2	Standard* Test Loop	1750 KC	1750 KC	Trimmer #E to 1750 KC
3	Standard* Test Loop	1300 KC	1300 KC	Trimmer #F
4	Standard* Test Loop	570 KC	570 KC	Loop

*REMARKS: Hazeltine Test Loop #1150

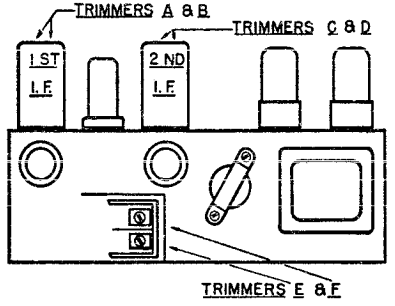

FIG. 2—TRIMMER LOCATION

MODEL 561

PACKARD BELL CO.

D.C. RESISTANCE MEASUREMENTS

1st I.F. Coil and 2nd I.F. Coil*		Oscillator Coil	
Primary	. . . 14.5 ohms	Start to Finish	. . . 8 ohms
Secondary	. . . 14.5 ohms	Start to Tap	. . . 7 ohms

*To obtain the true reading of the secondary of the 2nd I.F. coil, the coil must be removed from the can. This is true because of a 56,000 ohm resistor in series with the AVC lead.

All D.C. voltages measured with a vacuum tube voltmeter from socket contacts to chassis. A.C. voltages measured with a 1000 ohms per volt A.C. meter from socket contacts to chassis.

Volume control . . . maximum — No signal

117 volts A.C. line voltage

Switch in radio position

All voltages shown are positive D.C. unless otherwise noted.

TABLE OF REPLACEABLE PARTS

PART NO.	REF. SYMBOL	DESCRIPTION
23508B	C1-1 C1-2	Capacitor, variable: two gang with pulley
23225	C2	Capacitor, mica: 47 Mmf.
23009	C3-1 C3-2	Capacitor, paper: .05 Mfd. .600 volt
23229	C4	Capacitor, mica: 470 Mmf.
23004	C5-1 C5-2	Capacitor, paper: .005 Mfd. .600 volt
23001	C6	Capacitor, paper: 001 Mfd. .600 volt
23007	C7	Capacitor, paper: .01 Mfd. .600 volt
24011	C8	Capacitor, electrolytic: 40 Mfd. .350 WV
24012	C9	Capacitor, electrolytic: 20 Mfd. .350 WV
21014E		Cabinet, wood: fabricoid covered
29309A	L1	Loop, antenna
29202A	L2	Coil, oscillator
29004D	L3	Coil, 1st I.F. .455 KC
29007	L4	Coil, 2nd I.F. .455 KC (2- 100 Mmf. mica capacitors & 56,000 ohm resistor are included in this assembly)
32003B		Cord, AC
40002		Cord, dial drive
38023A		Dial, scale
54001		Lamp, dial: 250 MA, bayonet base
65007B		Plate, dial
67004		Pointer, slide
67007		Pointer, wire
69003		Pulley, dial drive
77003		Shaft, dial
73041	R1	Resistor, carbon: 22K, 10%, ½ watt
73009	R2	Resistor, carbon: 47 ohms, 10%, ½ watt
73053	R3	Resistor, carbon: 1 megohm, 20%, ½ watt
73075	R4	Resistor, carbon: 4700 ohms, 10%, 1 watt
25011	R5 & S1	Control, volume: 500K with AC switch
73057	R6-1 R6-2	Resistor, carbon: 4.7 megohm, 20%, ½ watt
73049	R7	Resistor, carbon: 220K, 20%, ½ watt
73051	R8	Resistor, carbon: 470K, 20%, ½ watt
73071	R9	Resistor, carbon: 1000 ohms, 10%, 1 watt
73077	R10	Resistor, carbon: 180 ohms, 10%, 1 watt
79002		Socket, tube: wafer type, octal
79005		Socket, phono pick-up
79007		Socket, phono motor plug
79010B		Socket, dial lamp: bayonet base
84001A		Spring, dial cord
86005B	S2	Switch, rotary: wafer type, phono-radio
86701	S3	Switch, phono motor
89401B	T1	Transformer, output
89001	T2	Transformer, power
52014		Knob, plastic: round, for vol. control & dial tuning
52001A		Knob, plastic: bar, for phono-radio switch
53037		Insulator, motor switch
49006		Handle, plastic
83202		Speaker, permanent magnet: 5"
59003		Needle, phono: permanent
58012		Motor, phono: with 9" turntable
58007		Motor, alternate for above
84024		Bushing, phono motor: for 50 cycle operation
63001		Phono pick-up
63012		Crystal cartridge, Shure P-87
66004		Plug, phono pick-up
28006		Clamp, turntable holding

Electrical Rating
Line Voltage . . . 110-120 volt 50-60 cycle A.C.
Power Consumption . . . 48 watts

Tuning Frequency Range
540 to 1750 KC

Intermediate Frequency
455 KC

Electrical Power Output
Maximum . . . 2.3 watts

Loudspeaker
Type . . . Permanent Magnet
Outside Cone Diameter . . . 5"
Voice Coil Impedence . . . 3.2 ohms at 400 cycles
Magnet Rating . . . 2.5 oz. Alnico #5

Tubes
6SA7 . . . Frequency Converter
6SK7 . . . I.F. Amplifier
6SQ7 . . . Detector Amplifier
6K6-GT . . . Power Amplifier
6X5-GT/G . . . Rectifier

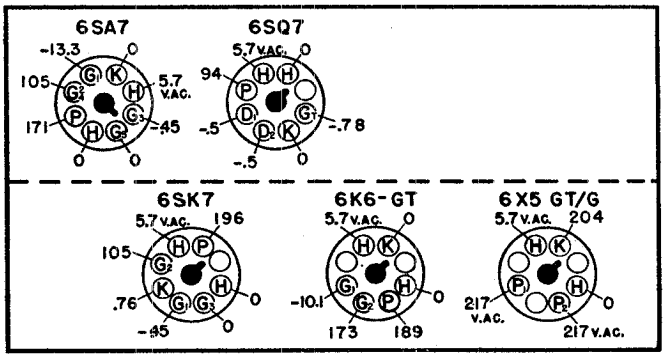

FIG. 1—SOCKET VOLTAGES

STAGE GAIN MEASUREMENTS

Measurements taken with volume control maximum, and switch in RADIO position. AVC shorted out.
Standard Output . . . 50 milliwatts
Dummy Antenna . . . 200 Mmf.
Antenna to Converter Grid . . . 4.65 X at 1000 KC
Converter Grid to 1st I.F. Grid . . . 79 X at 1000 KC
Converter Grid to 1st I.F. Grid . . . 95 X at 455 KC
1st I.F. Grid to 2nd Detector . . . 62.3 X at 455 KC
Overall Audio Gain . . . 700 X at .5 watts 400 cycles

OSCILLATOR GRID VOLTAGES

Measured at Oscillator grid to ground, no signal, with A.C. V.T.V.M. input loading above 10 megohms. 117 volts A.C. line voltage. Switch in RADIO position.

1750 KC . . . 19.8 volts AC
1300 KC . . . 19.8 volts AC
750 KC . . . 18.3 volts AC
570 KC . . . 17.2 volts AC

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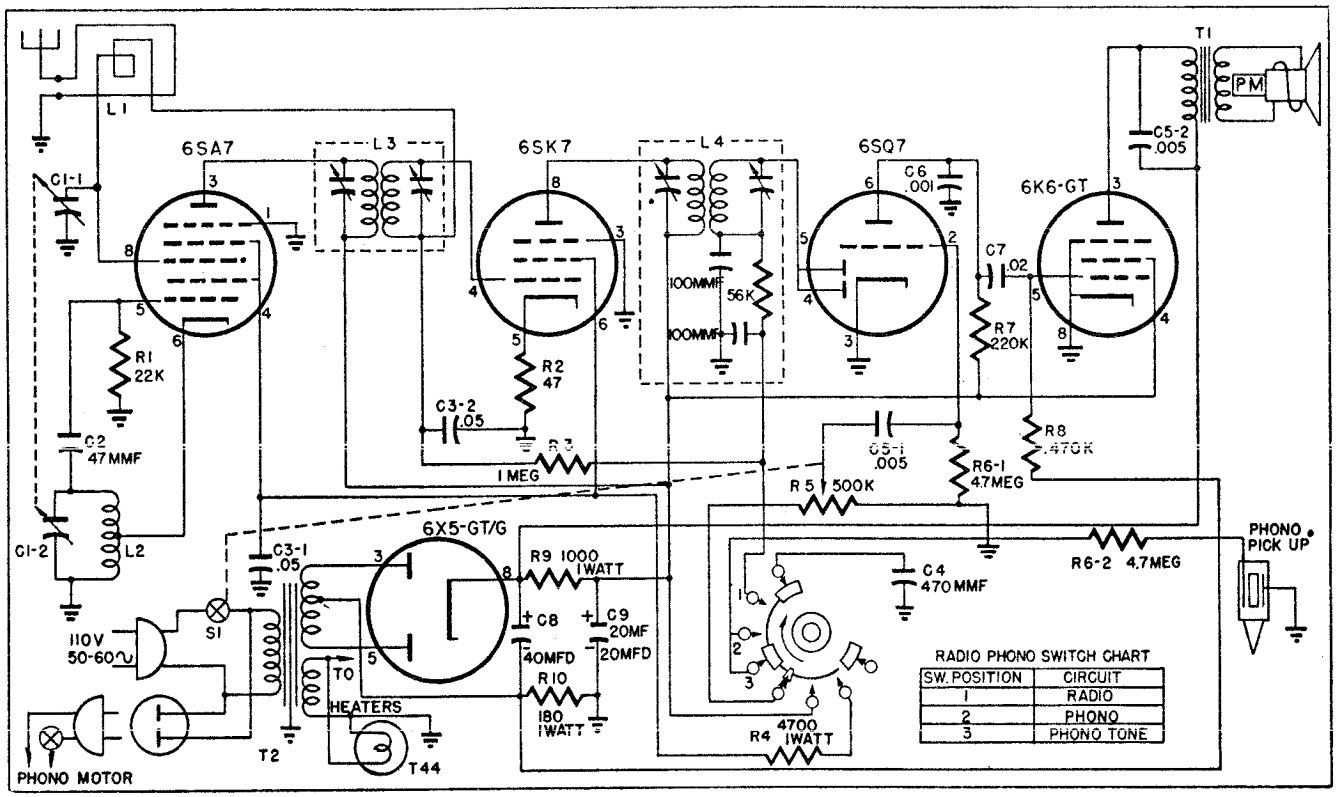

GENERAL INFORMATION

Model 563 is a combination superheterodyne receiver and phonograph. This model employs a permanent magnet speaker and a specially designed "Hi Q" loop antenna. The model is capable of playing ten or twelve-inch records and is enclosed in a fabricoid covered carrying case.

ALIGNMENT PROCEDURE

Alignment procedure consists of the four steps outlined in the Alignment Procedure Chart.

For step No. 1, I.F. Alignment, connect the test oscillator leads to the mixer grid and ground in series with a .01 Mfd. capacitor (dummy load). Upon completion of this step, "Rock" the variable condenser to assure that the I.F.s have not been aligned to the image frequency.

Steps 2 to 4 employ a standard test loop.* Connect the test oscillator leads across this loop and place it in a vertical position about two feet from the receiver loop.

*NOTE: Hazeltine Test Loop #1150.

ALIGNMENT CHART

STEP	CONNECT TEST OSC. TO	TEST OSC. SETTING	POINTER SETTING	ADJUST FOR MAXIMUM OUTPUT
1	Mixer grid & Grd. .01 Mfd. Dummy load	455 KC	540 KC	Trimmers # A, B, C & D
2	Standard* Test Loop	1750 KC	1750 KC	Trimmer #E to 1750 KC
3	Standard* Test Loop	1500 KC	1500 KC	Trimmer #F
4	Standard* Test Loop	600 KC	600 KC	Loop

*REMARKS: Hazeltine Test Loop #1150

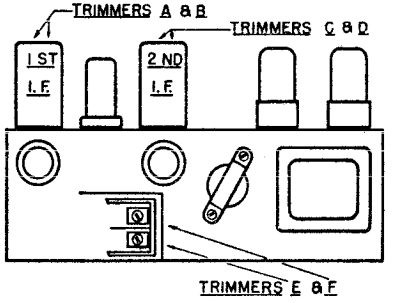

FIG. 2—TRIMMER LOCATION

MODEL 563

PACKARD BELL CO.

D.C. RESISTANCE MEASUREMENTS

1st I.F. Coil and 2nd I.F. Coil*
Primary . . . 14.5 ohms
Secondary . . . 14.5 ohms

Oscillator Coil
Start to Finish . . . 8 ohms
Start to Tap . . . 7 ohms

*To obtain the true reading of the secondary of the 2nd I.F. coil, the coil must be removed from the can. This is true because of a 56,000 ohm resistor in series with the AVC lead.

TABLE OF REPLACEABLE PARTS

PART NO.	REF. SYMBOL	DESCRIPTION
21035A		Cabinet, wood: fabricoid covered
23508B	C1-1	Capacitor, variable: two gang with pulley
	C1-2	
23225	C2	Capacitor, mica: 47 Mmf.
23009	C3-1	Capacitor, paper: .05 Mfd. .600 volt
	C3-2	
23229	C4	Capacitor, mica: 470 Mmf.
23004	C5-1	Capacitor, paper: .005 Mfd. .600 volt
	C5-2	
23001	C6	Capacitor, paper: 001 Mfd. .600 volt
23007	C7	Capacitor, paper: .01 Mfd. .600 volt
24011	C8	Capacitor, electrolytic: 40 Mfd. .350 WV
24012	C9	Capacitor, electrolytic: 20 Mfd. .350 WV
29309A	L1	Loop, antenna
29202A	L2	Coil, oscillator
29004D	L3	Coil, 1st I.F. .455 KC
29007	L4	Coil, 2nd I.F. .455 KC (2- 100 Mmf. mica capacitors & 56,000 ohm resistor are included in this assembly)
32003B		Cord, AC
40002		Cord, dial drive
38023A		Dial, scale
54001		Lamp, dial: 250 MA, bayonet base
65007B		Plate, dial
67004		Pointer, slide
67007		Pointer, wire
69003		Pulley, dial drive
77003		Shaft, dial
73041	R1	Resistor, carbon: 22K, 10%, ½ watt
73009	R2	Resistor, carbon: 47 ohms, 10%, ½ watt
73053	R3	Resistor, carbon: 1 megohm, 20%, ½ watt
73075	R4	Resistor, carbon: 4700 ohms, 10%, 1 watt
25011	R5 & S1	Control, volume: 500K with AC switch
73057	R6-1	Resistor, carbon: 4.7 megohm, 20%, ½ watt
	R6-2	
73049	R7	Resistor, carbon: 220K, 20%, ½ watt
73051	R8	Resistor, carbon: 470K, 20%, ½ watt
73071	R9	Resistor, carbon: 1000 ohms, 10%, 1 watt
73077	R10	Resistor, carbon: 180 ohms, 10%, 1 watt
79002		Socket, tube: wafer type, octal
79005		Socket, phono pick-up
79007		Socket, phono motor plug
79010B		Socket, dial lamp: bayonet base
84001A		Spring, dial cord
86005B	S2	Switch, rotary: wafer type, phono-radio
86701	S3	Switch, phono motor
89401B	T1	Transformer, output
89001	T2	Transformer, power
52014		Knob, plastic: round, for vol. control & dial tuning
52001A		Knob, plastic: bar, for phono-radio switch
53037		Insulator, motor switch
49006		Handle, plastic
83202		Speaker, permanent magnet: 5"
59003		Needle, phono: permanent
58012		Motor, phono: with 9" turntable
84024		Bushing, phono motor: for 50 cycle operation
63001		Phono pick-up
63012		Crystal cartridge, Shure P-93
66004		Plug, phono pick-up
28006		Clamp, turntable holding

STAGE GAIN MEASUREMENTS

Measurements taken with volume control maximum, and switch in RADIO position. AVC shorted out.
Standard Output . . . 50 milliwatts
Dummy Antenna . . . 200 Mmf.
Antenna to Converter Grid . . . 4.65 X at 1000 KC
Converter Grid to 1st I.F. Grid . . . 79 X at 1000 KC
Converter Grid to 1st I.F. Grid . . . 95 X at 455 KC
1st I.F. Grid to 2nd Detector . . . 62.3 X at 455 KC
Overall Audio Gain . . . 700 X at .5 watts 400 cycles

OSCILLATOR GRID VOLTAGES

Measured at Oscillator grid to ground, no signal, with A.C. V.T.V.M. input loading above 10 megohms. 117 volts A.C. line voltage. Switch in RADIO position.

1750 KC . . . 19.8 volts AC
1300 KC . . . 19.8 volts AC
750 KC . . . 18.3 volts AC
570 KC . . . 17.2 volts AC

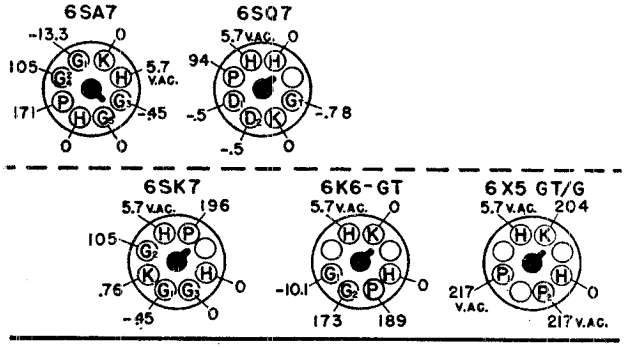

FIG. 1—SOCKET VOLTAGES

Electrical Rating
Line Voltage . . . 110-120 volt 50-60 cycle A.C.
Power Consumption . . . 48 watts

Tuning Frequency Range
540 to 1750 KC

Intermediate Frequency
455 KC

Electrical Power Output
Maximum . . . 2.3 watts

Loudspeaker
Type . . . Permanent Magnet
Outside Cone Diameter . . . 5"
Voice Coil Impedence . . . 3.2 ohms at 400 cycles
Magnet Rating . . . 2.5 oz. Alnico #5

Tubes
6SA7 . . . Frequency Converter
6SK7 . . . I.F. Amplifier
6SQ7 . . . Detector Amplifier
6K6-GT . . . Power Amplifier
6X5-GT/G . . . Rectifier

All D.C. voltages measured with a vacuum tube voltmeter from socket contacts to chassis. A.C. voltages measured with a 1000 ohms per volt A.C. meter from socket contacts to chassis.

Volume control . . . maximum — No signal

117 volts A.C. line voltage

Switch in radio position

All voltages shown are positive D.C. unless otherwise noted.

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MODEL 566

PACKARD BELL CO.

1st I.F. Coil

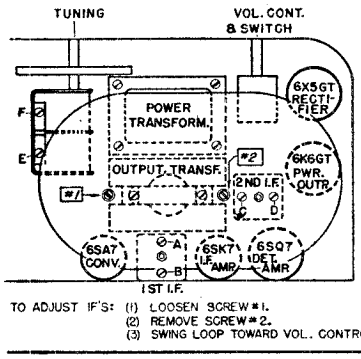
primary . . . 14.5 ohms
secondary . . . 14.5 ohms

2nd I.F. Coil

primary . . . 14.5 ohms
secondary . . . 14.5 ohms

Oscillator Coil

start to finish . . . 8 ohms
start to tap . . . 7 ohms



TO ADJUST IF'S: (1) LOOSEN SCREW #1.
(2) REMOVE SCREW #2.
(3) SWING LOOP TOWARD VOL. CONTROL.

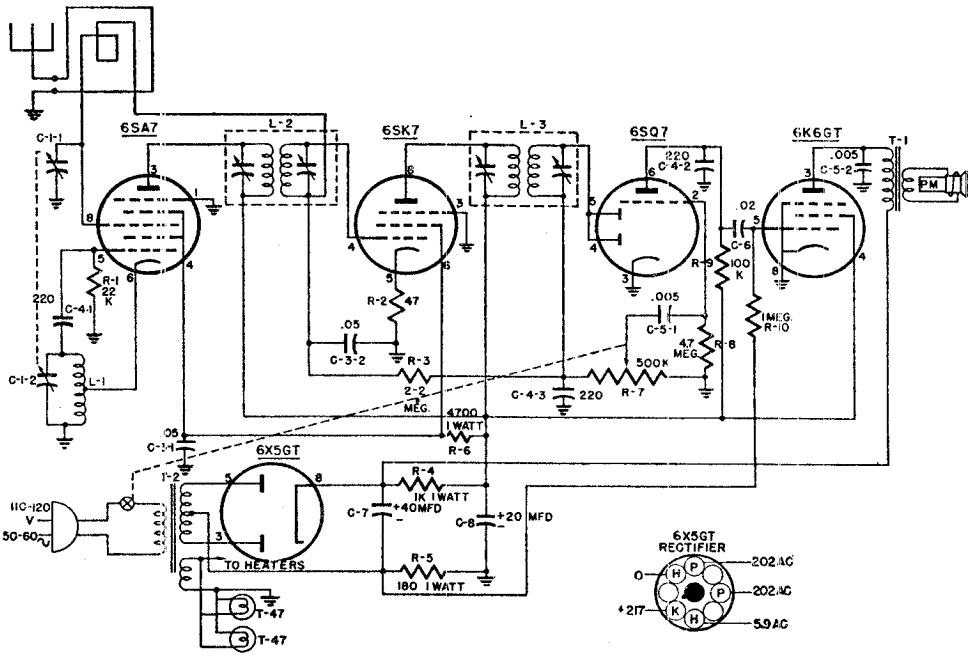


Fig. 1 — Trimmer Location

Alignment Procedure consists of the four steps outlined in the Alignment Procedure Chart.

Connect the test oscillator leads to the mixer grid and ground in series with a .01 Mfd. capacitor (dummy load) for step No. 1, I.F. Alignment. The receiver loop must be shifted in order to reach trimmers A, B, C, and D (see Fig. 1). Return the loop to its original position before proceeding with the balance of the alignment.

Upon completion of the I.F. Alignment, the variable condenser should be "Rocked" to assure that the I.F.s have not been aligned to the image frequency.

The procedure outlined in steps 2 to 4 utilizes a standard test loop*. Connect the test oscillator leads across this loop and place it in a vertical position about two feet from the receiver loop.

*NOTE: Hazeltine Test Loop No. 1150.

ALIGNMENT CHART

STEP	CONNECT TEST OSC. TO	TEST OSC. SETTING	POINTER SETTING	ADJUST FOR MAXIMUM OUTPUT
1	Mixer grid & Grd. .01 Mfd. Dummy Load	455 KC	550 KC	Trimmers A, B, C & D
2	Standard Test Loop*	1740 KC	1740 KC	Trimmer F to 1750 KC
3	Standard Test Loop*	1500 KC	1500 KC	Trimmer E
4	Standard Test Loop*	600 KC	600 KC	Loop

*REMARKS: Hazeltine Test Loop No. 1150.

All D.C. voltages measured with a vacuum tube voltmeter from socket contacts to chassis. A.C. voltages measured with a 1000 ohm per volt A.C. meter from socket contacts to chassis. Volume control fully advanced. No signal. 117 A.C. line voltage. All voltages shown are positive D.C. unless otherwise noted.

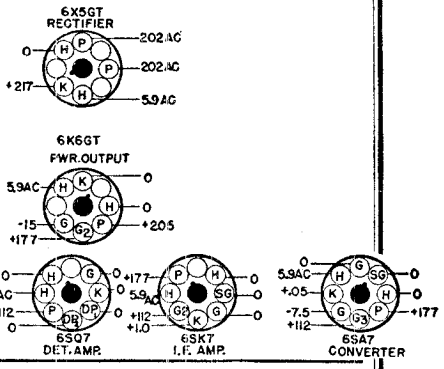


Fig. 2 — Socket Voltages

OSCILLATOR GRID VOLTAGES

At 117 volt A.C. line voltage.

1750 KC . . . 20.0 volts A.C.*
1330 KC . . . 19.0 volts A.C.*
750 KC . . . 17.5 volts A.C.*
550 KC . . . 17.0 volts A.C.*

*Measurements made with A.C. — V.T.V.M., input loading above 10 megohms.

Electrical Rating

Line Voltage . . . 110-120 volts, 50-60 cycle A.C.
Power Consumption . . . 33 watts

Tuning Frequency Range

540 to 1740 kc

Intermediate Frequency

455 kc

Electrical Power Output

Maximum . . 2.8 watts

Loudspeaker

Type . . . Permanent Magnet
Outside Cone Diameter . . . 5"
Voice Coil Impedence . . . 3.2 ohms at 400 cycles
Magnet Rating . . . 1.0 oz. Alnico No. 5

STAGE GAIN MEASUREMENTS

Dummy Antenna . . . 200 mmf Standard Output . . . 50 mw
Volume Control . . . Maximum
Converter grid to 1st I.F. grid . . . 63 X at 1000 KC
Converter grid to 1st I.F. grid . . . 72 X at 455 KC
1st I.F. grid to 2nd detector . . . 75 X at 455 KC
Overall audio gain . . . 356 X at .5 watts 400 cycles

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MODEL 566

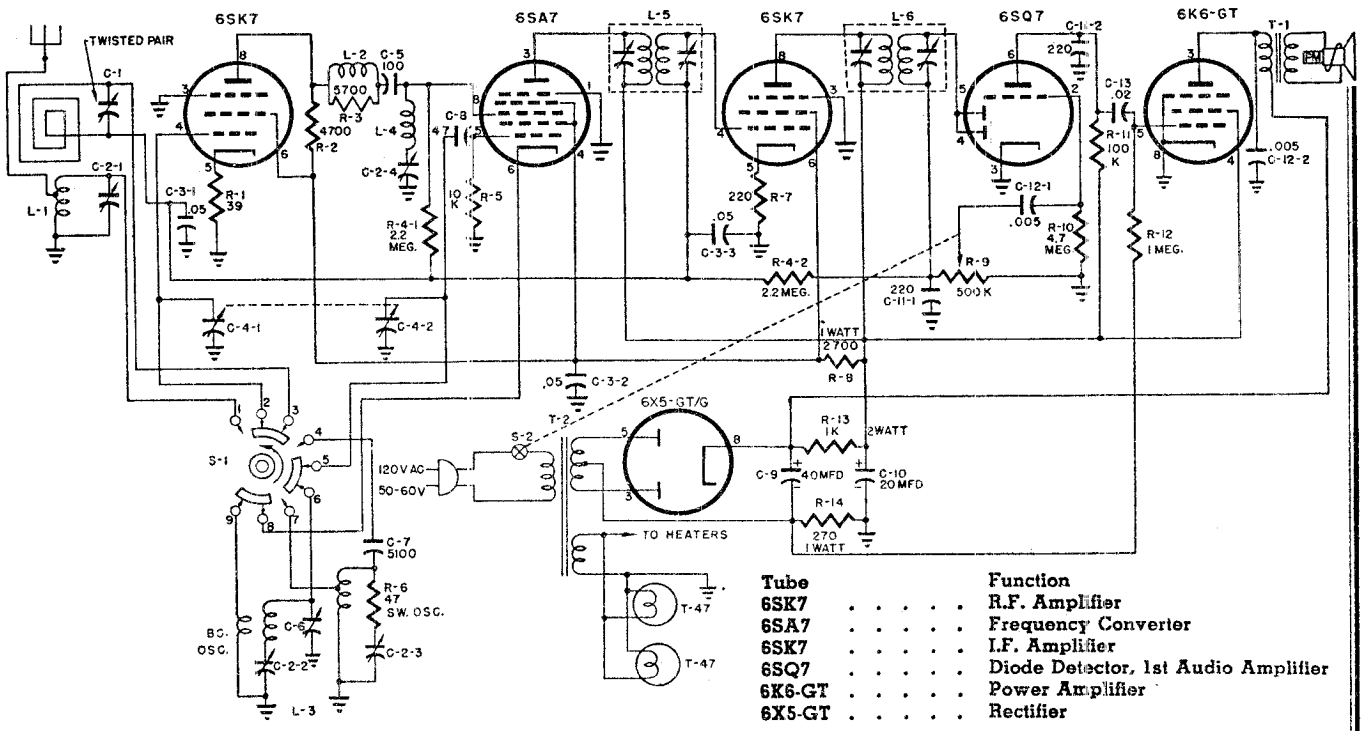
PART NO.	SYMBOL	DESCRIPTION
A21003D		Cabinet, wood: walnut
B21003D		Cabinet, wood: bleach
A49404E		Handle, plastic: walnut
B49404E		Handle, plastic: ivory
C52008D		Knob, plastic: walnut
A52008D		Knob, plastic: ivory
A47001E		Grille, plastic: walnut
B47001E		Grille, plastic: ivory
A55004		Crystal, dial
29313		Coil, loop antenna
29309		(Alternate for above)
38037		Dial scale, stationized
54002		Lamp, bayonet base: T-44
67004		Pointer, slide
67006		Pointer, wire
79009A		Socket, lamp
79002		Socket, tube
83203		Speaker, permanent magnet: 5"
23502H	C1-1	Capacitor, variable: two gang
	C1-2	
23009	C3-1	Capacitor, paper: .05 Mfd. 600 volt
	C3-2	
23206	C4-1	Capacitor, mica: 220 Mmf
	C4-2	
	C4-3	
23004	C5-1	Capacitor, paper: .005 Mfd. 600 volt
	C5-2	
23007	C6	Capacitor, paper: .02 Mfd. 600 volt
24004B	C7	Capacitor, electrolytic: 40 Mfd. 350 WV
24003	C8	Capacitor, electrolytic: 20 Mfd. 350 WV
23016	C9	Capacitor, paper: .003 Mfd. 600 volt
29202	L1	Coil, oscillator
29004A	L2	Coil, 1st I.F.: 455 KC
29001A	L3	Coil 2nd I.F.: 455 KC
73041	R1	Resistor, carbon: 22,000 ohm ±10%, ½ watt
73009	R2	Resistor, carbon: 47 ohm ±10%, ½ watt
73055	R3	Resistor, carbon: 2.2 megohm ±20%, ½ watt
73071	R4	Resistor, carbon: 1000 ohm ±10%, 1 watt
73077	R5	Resistor, carbon: 180 ohm ±10%, 1 watt
73075	R6	Resistor, carbon: 4700 ohm ±10%, 1 watt
25003A	R7 & S1	Control, volume: 500,000 ohms, with A.C. switch
73057	R8	Resistor, carbon: 4.7 megohm ±20%, ½ watt
73047	R9	Resistor, carbon: 100,000 ohm ±20%, ½ watt
73053	R10	Resistor, carbon: 1 megohm ±20%, ½ watt
89401B	T1	Transformer, output
89001A	T2	Transformer, power

MODEL 661

PART NO.	REF. SYMBOL	DESCRIPTION
19010		Bushing, drive shaft
21009F		Cabinet
23400A	C1-1	Capacitor, trimmer: 3-30 Mmf.
	C1-2	
23406	C1-3	Capacitor, trimmer: 3-30 Mmf.
23500C	C2-A,B & C	Capacitor, variable: three gang
23225	C3-1	Capacitor, mica: 47 Mmf.
	C3-2	
23009	C4-1	Capacitor, paper: .05 Mfd. 400 volt
	C4-2	
	C4-3	
23402	C5	Capacitor, padder: 300-800 Mmf.
23004	C6-1	Capacitor, paper: .005 Mfd. 600 volt
	C6-2	
23022	C7	Capacitor, paper: .01 Mfd. 400 volt
23007	C8	Capacitor, paper: .02 Mfd. 600 volt
24001	C9	Capacitor, electrolytic: 20 Mfd. 450 volt
24003	C10	Capacitor, electrolytic: 20 Mfd. 350 volt
23228	C11-1	Capacitor, mica: 220 Mmf.
	C11-2	
	C11-3	
	C11-4	
	C12	Capacitor, mica: 470 Mmf.
29305	L1	Coil, loop antenna
29403	L2	Coil, antenna
29102A	L3	Coil, R.F.
29205	L4	Coil, oscillator
29004D	L5	Coil, 1st I.F.: 455 KC
29001D	L6	Coil, 2nd I.F.: 455 KC
32004A		Cord, A.C.: 6'
38024		Dial scale
40002		Dial drive cord
52025		Knob, plastic
54001		Lamp, dial: bayonet base, T-44
58008		Record changer
59003		Needle, phono: permanent
62020A		Panel, dial
66004		Plug, phono pick-up
66008		Plug, phono motor
67002		Pointer, slide
67009		Pointer, wire
69003A		Dial drive pulley

PART NO.	REF. SYMBOL	DESCRIPTION
73055	R1-1	Resistor, carbon: 2.2 megohms, 20%,
	R1-2	½ watt
73008	R2-1	Resistor, carbon: 39 ohms, 10%,
	R2-2	½ watt
73041	R3	Resistor, carbon: 22,000 ohms, 10%, ½ watt
73020	R4	Resistor, carbon: 390 ohms, 10%, ½ watt
73053	R5	Resistor, carbon: 1 megohm, 20%, ½ watt
25003B	R6 & S1	Control volume: 500,000 ohms, with A.C. switch
73057	R7	Resistor, carbon: 4.7 megohms, 20%, ½ watt
73049	R8-1	Resistor, carbon: 220,000 ohms, 20%,
	R8-2	½ watt
73051	R9	Resistor, carbon: 470,000 ohms, 20%, ½ watt
25005A	R10	Control, tone: 3 megohms
73021	R11	Resistor, carbon: 470 ohms, 10%, ½ watt
73125	R12	Resistor, carbon: 10,000 ohms, 10%, 2 watt
73214	R13	Resistor, carbon: 2,000 ohms, 10%, 1 watt
73081	R14	Resistor, carbon: 150 ohms, 10%, 1 watt
77002		Shaft, dial
79002		Socket, tube: 8 prong octal, wafer type
79005		Socket, phono pick-up
79007		Socket, A.C. phono motor
79010B		Socket, dial lamp: bayonet base
83303A		Speaker, permanent magnet: 6½"
84001B		Spring, dial cord
84002A		Spring, knob
86008	S2	Switch, rotary: wafer type, Phono-Radio
89409C	T1	Transformer, output
89010A	T2	Transformer, power

PACKARD BELL CO.



Tube	Function
6SK7	R.F. Amplifier
6SA7	Frequency Converter
6SK7	I.F. Amplifier
6SQ7	Diode Detector, 1st Audio Amplifier
6K6-GT	Power Amplifier
6X5-GT	Rectifier

*STAGE GAIN MEASUREMENTS
Dummy Antenna . . . 200 mmf
Standard Output . . . 50 mw
Volume Control . . . maximum

Antenna to R.F. grid . . . 8X at 1000 KC
R.F. grid to converter grid . . . 4X at 1000 KC
Converter grid to 1st I.F. grid . . . 45X at 455 KC
1st I.F. grid to 2nd detector . . . 70X at 455 KC
Overall audio gain . . . 600X at .5 watts 400 cps

*NOTE: Measurements made with A.C. V.T.V.M. AVC shorted out.

OSCILLATOR GRID VOLTAGES

117 AC line voltage
1740 KC . . . 2.5 volts AC*
1200 KC . . . 2.6 volts AC*
750 KC . . . 2.8 volts AC*
540 KC . . . 2.7 volts AC*

*NOTE: Measurements made with A.C. V.T.V.M. Input loading above 10 megohms.

D.C. RESISTANCE MEASUREMENTS

1st I.F. Coil
primary . . . 14.5 ohms
secondary . . . 14.5 ohms

2nd I.F. Coil
primary . . . 14.5 ohms
secondary . . . 15 ohms

Oscillator Coil: (Short Wave and Standard Broadcast wound on same form.)

Short Wave:
Start to finish . . . 2 ohms
Start to tap . . . 1 ohm

Broadcast:
Primary . . . 2 ohms
Secondary . . . 9 ohms

ELECTRICAL RATING
Line Voltage . . . 110-120 volt 50-60 cycle AC
Power Consumption . . . 30 watts

TUNING FREQUENCY RANGE
Standard Broadcast . . . 540 to 1740 KC
Short Wave . . . 5.7 to 18.2 MC

INTERMEDIATE FREQUENCY
455 KC

ELECTRICAL POWER OUTPUT
Maximum . . . 2.5 watts

LOUDSPEAKER
Type . . . Permanent Magnet
Outside Cone Diameter . . . 5"
Voice Coil Impedance . . . 3.2 ohms at 400 cycles
Magnet Rating . . . 1 Oz. Alnico 5

All voltages measured from socket contacts to chassis. D.C. voltages measured with a vacuum tube voltmeter. A.C. voltages measured with a 1000 ohms per volt A.C. meter.

Volume control maximum.

No signal.

117 volts A.C. line voltage.

All voltages shown are positive D.C. unless otherwise noted.

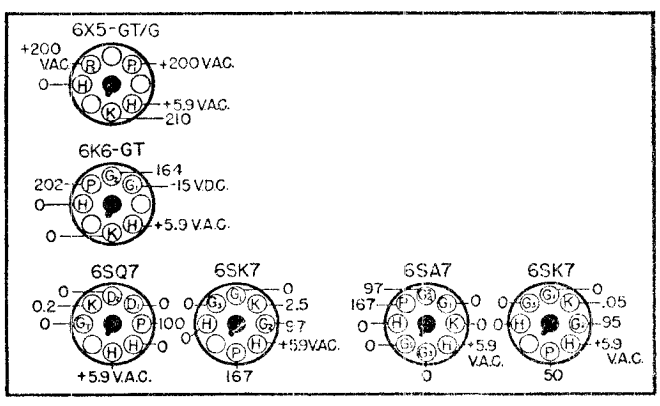


FIG. 2 — VOLTAGE CHART

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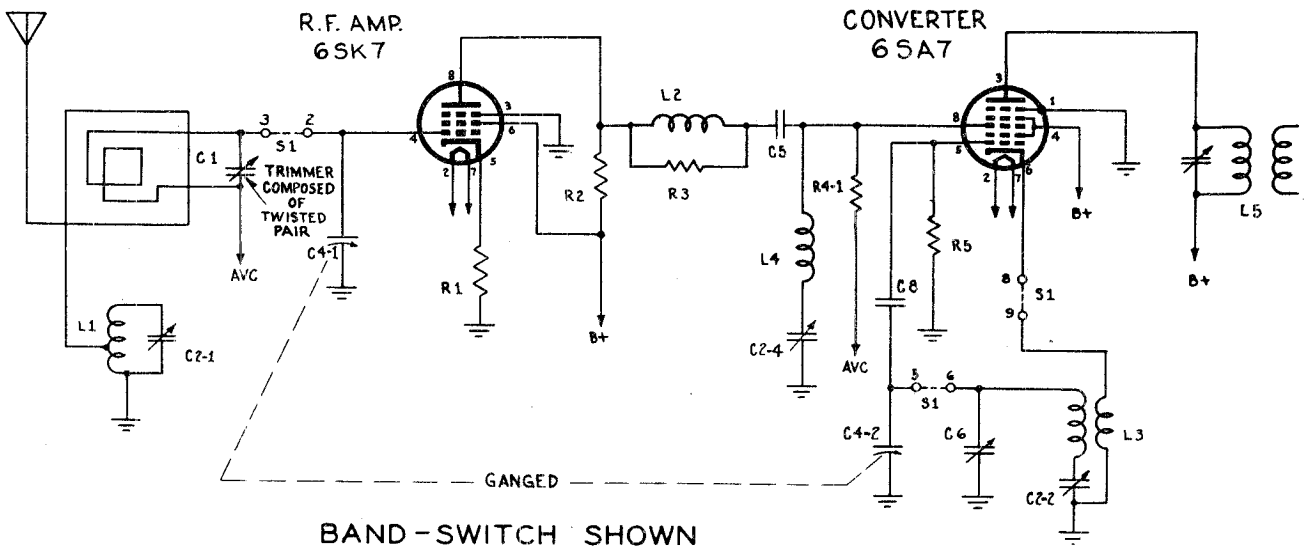
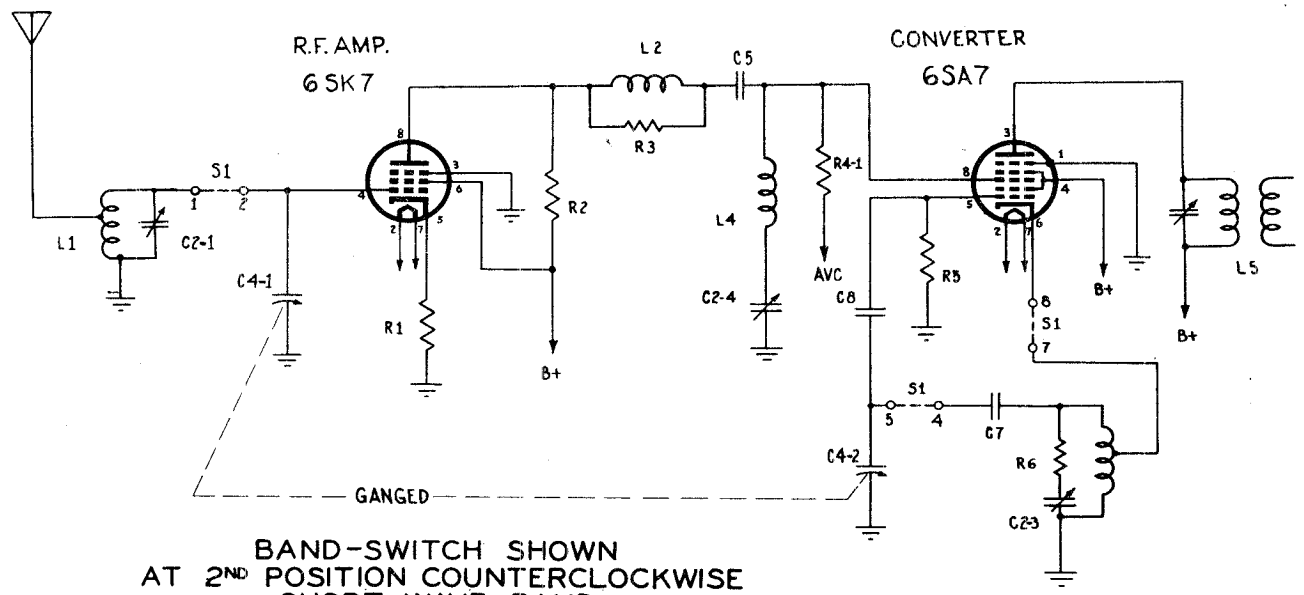


BAND-SWITCH SHOWN
AT 1ST POSITION.
BROADCAST BAND
540 TO 1740KC



BAND-SWITCH SHOWN
AT 2ND POSITION COUNTERCLOCKWISE
SHORT WAVE BAND
5.7 TO 18.2 Mc.

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ALIGNMENT PROCEDURE

The alignment procedure consists of the eight steps outlined in the alignment procedure chart.

Connect the test oscillator leads to the mixer grid and ground in series with a .01 mfd. capacitor (dummy load) for steps 1 and 2, I.F. alignment. The receiver loop must be shifted in order to reach trimmers A, B, C, and D (see Fig. No. 1). Return the loop to its original position before proceeding with the balance of the alignment.

Upon completion of the I.F. alignment, the variable condenser should be "Rocked" to assure that the I.F.s have not been aligned to the image frequency.

The procedure outlined in steps 3 to 5 utilizes a standard test loop.* Connect the test oscillator leads across this loop and place it about two feet from the receiver loop in a vertical position.

Steps 6 and 7 cover the short wave alignment. Connect the test oscillator leads to the short wave antenna and ground in series with a 400 ohm resistor.

ALIGNMENT CHART

STEP	CONNECT TEST OSC. TO	TEST OSC. SETTING	POINTER SETTING	ADJUST FOR MAXIMUM OUTPUT
1	Mixer grid & Grd. .01 Mfd. Dummy Load	455 KC	550 KC	Trimmers No. F, G, H & I
2	Mixer grid & Grd. .01 Mfd. Dummy Load	455 KC	550 KC	Trimmer No. A Minimum Output
3	Standard Test Loop*	1750 KC	1750 KC	Trimmer No. C to 1750 KC
4	Standard Test Loop*	600 KC	600 KC	Trimmer No. D to 600 KC
5	Standard Test Loop*	Repeat Steps 3 and 4		
6	S.W. Antenna thru 400 ohms	18.2 MC	18.2 MC	Trimmer No. B to 18.2 MC
7	S.W. Antenna thru 400 ohms	15.0 MC	15.0 MC	Trimmer No. E

*REMARKS: Hazeltine Test Loop No. 1150.

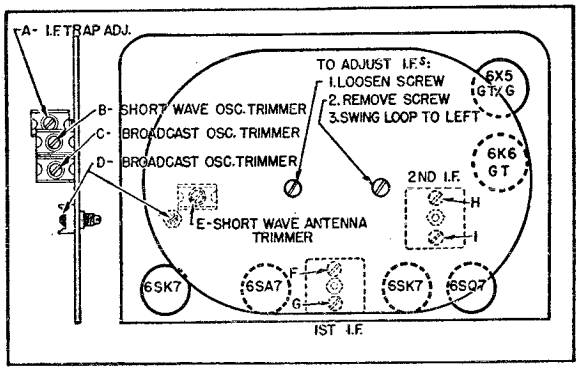

FIG. 1 — TRIMMER LOCATIONS

PART NO.	REF. SYMBOL	DESCRIPTION
23403A	C2-1 C2-2 C2-3 C2-4	Capacitor, trimmer: 3 to 50 Mmf.
23009	C3-1 C3-2 C3-3	Capacitor, paper: .05 Mfd. 600 volt
23504D	C4-1 C4-2	Capacitor, variable: two gang
23510	C4-1 C4-2	Capacitor, variable: two gang (alternate for 23504D)
23227	C5	Capacitor, mica: 100 Mmf.
23230	C7	Capacitor, mica: 5100 Mmf.
23404A	C8	Capacitor, padder: 300 to 850 Mmf.
23225	C8	Capacitor, mica: 47 Mmf.
24004B	C9	Capacitor, electrolytic: 40 Mfd. 350 WV
24003	C10	Capacitor, electrolytic: 20 Mfd. 350 WV
23206	C11-1 C11-2	Capacitor, mica: 220 Mmf.
23004	C12-1 C12-2	Capacitor, paper: .005 Mfd. 600 volt
23007	C13	Capacitor, paper: .02 Mfd. 600 volt
29402	L1	Coil, antenna: short wave
29006	L2 & R3	Coil, peaking
29204A	L3	Coil, oscillator: BC & SW
29005	L4	Coil, I.F. trap
29004D	L5	Coil, 1st I.F.: 455 KC
29001D	L6	Coil, 2nd I.F.: 455 KC
73008	R1	Resistor, carbon: 39 ohms 10%, ½ watt
73033	R2	Resistor, carbon: 4700 ohms 10%, ½ watt
73055	R4-1 R4-2	Resistor, carbon: 2.2 megohm 20%, ½ watt
73037	R5	Resistor, carbon: 10,000 ohms 10%, ½ watt
73009	R6	Resistor, carbon: 47 ohms 10%, ½ watt
73041	R7	Resistor, carbon: 22,000 ohms 10%, ½ watt
73079	R8	Resistor, carbon: 2700 ohms 10%, 1 watt
25003A	R9 & S2	Control, volume: 500K, with AC switch
73057	R10	Resistor, carbon: 4.7 megohm 20%, ½ watt
73047	R11	Resistor, carbon: 100,000 ohms 20%, ½ watt
73053	R12	Resistor, carbon: 1 megohm 20%, ½ watt
73126	R13	Resistor, carbon: 1000 ohms 10%, 2 watt
73074	R14	Resistor, carbon: 270 ohms 10%, 1 watt
86002C	S1	Switch, band: wafer type
89401B	T1	Transformer, output
89001A	T2	Transformer, power
11001A		Arm, switch extension: for short wave switch
11002		Arm, switch extension: for short wave switch
19001C		Bushing, short wave switch
A21003D		Cabinet, walnut wood
B21003D		Cabinet, bleached wood
32004A		Cord, AC
32013		Cord, AC (alternate for 32004A)
34002D		Cover, volume control
38026A		Dial scale, stationized
38007		Dial scale, export
40002		Dial cord
A47001E		Grille, plastic: walnut
B47001E		Grille, plastic: ivory
A49404E		Handle, plastic: walnut
B49404E		Handle, plastic: bleach
C52008D		Knob, plastic: walnut
A52008D		Knob, plastic: bleach
54002		Lamp, dial: bayonet base, 150 MA
29302C		Loop, antenna
A55004		Crystal, dial
67004		Slide, pointer
67008		Pointer, wire
69003A		Pulley, idler
78006		Shield, tube
79002		Socket, tube: wafer type, octal
79009B		Socket, lamp: bayonet base
83001		Speaker, permanent magnet, 5"
84001B		Spring, dial

MODEL 661

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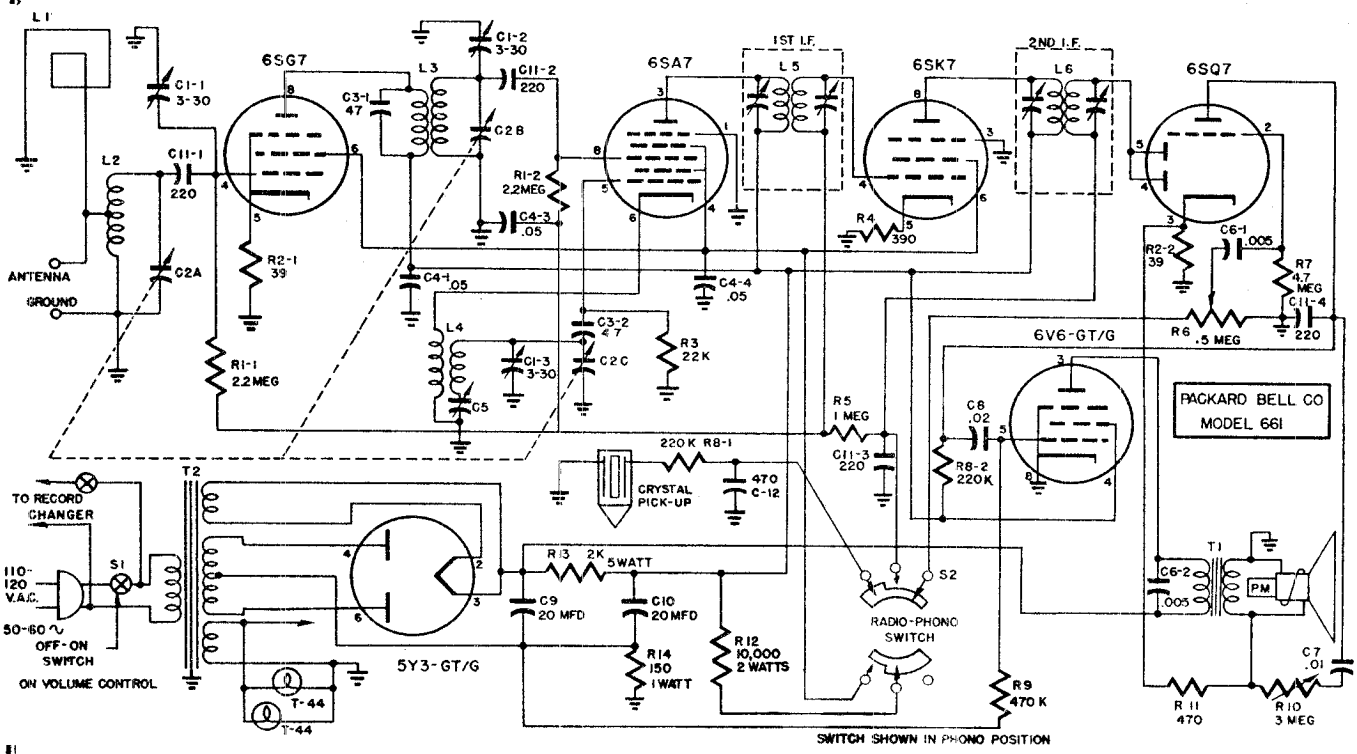

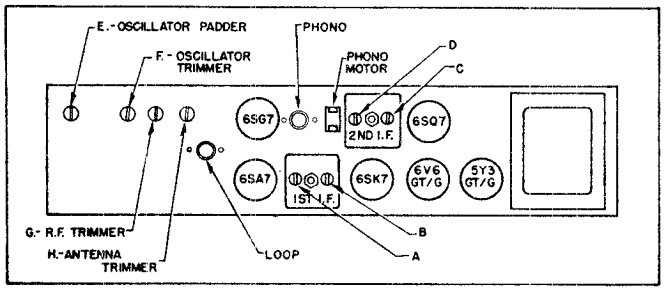

FIG. 2 TRIMMER LOCATION

ALIGNMENT PROCEDURE

Alignment procedure consists of the 5 steps outlined in the Alignment Procedure Chart.

Connect the test oscillator leads to the mixer grid and ground in series with an .01 Mfd. capacitor (dummy load) for step No. 1. I.F. Alignement. Upon completing this step "Rock" the variable condenser to assure that the I.F.s have not been aligned to the image frequency.

Use the Hazeltine Standard Test Loop No. 1150, or a reasonable substitute, for the balance of the alignment. Place the test loop about two feet from the receiver loop in a vertical position.

It will be noted that all alignment trimmers are accessible without removing the chassis from the cabinet. (See Fig. 2, Trimmer location.)

ALIGNMENT CHART

STEP	CONNECT TEST OSC. TO	TEST OSC. SETTING	POINTER SETTING	ADJUSTMENT FOR MAX. OUTPUT
1	Mixer Grid & Grd. .01 Mfd. Capacitor	455 KC	540 KC	Trimmers A, B, C & D
2	Standard* Test Loop	1740 KC	1740 KC	Trimmer F to 1740 KC
3	Standard* Test Loop	600 KC	600 KC	Trimmer E to 600 KC
4	Standard* Test Loop	1500 KC	1500 KC	Trimmers G & H
5	REPEAT	STEPS	2, 3 & 4	

*NOTE: Hazeltine Test Loop No. 1150

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Record Changer: Detrola Model 550 For Parts list, see P.15-10

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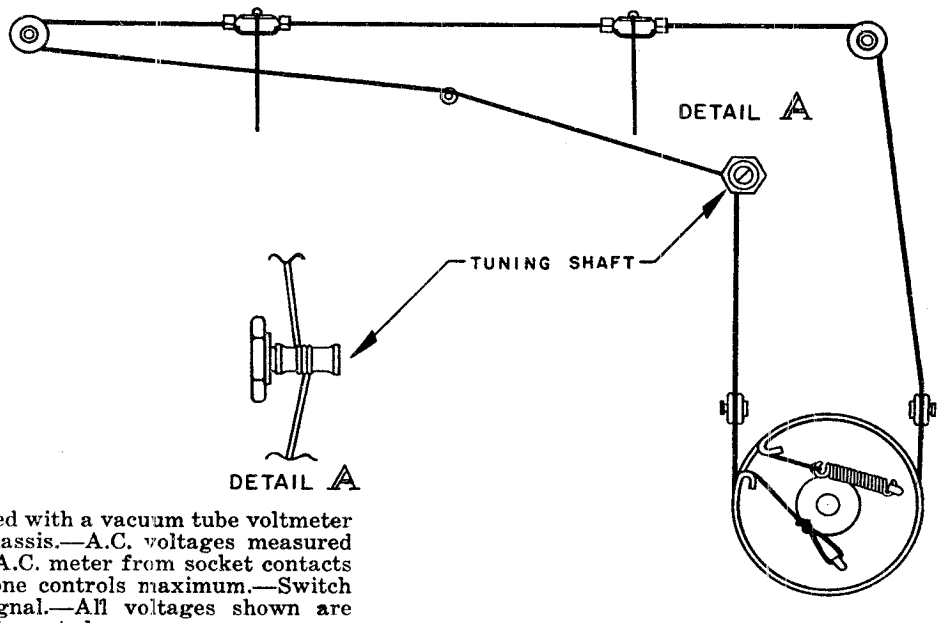

All D.C. voltages measured with a vacuum tube voltmeter from socket contacts to chassis.—A.C. voltages measured with a 1000 ohms per volt A.C. meter from socket contacts to chassis.—Volume and tone controls maximum.—Switch in Radio position.—No signal.—All voltages shown are positive D.C. unless otherwise noted.

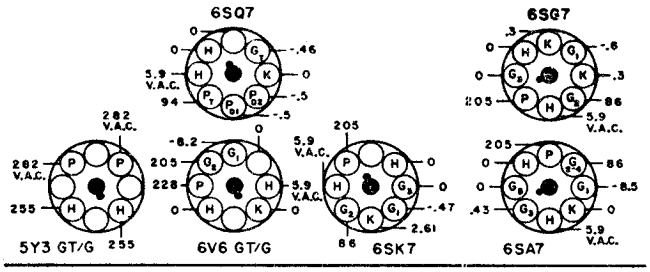

FIG. 1 SOCKET VOLTAGES

STAGE GAIN MEASUREMENTS:

Measurements taken with volume and tone controls maximum.

Switch in RADIO position.

AVC shorted out.

Standard Output . . . 50 milliwatts

Dummy Antenna . . . 200 Mmf.

Antenna to R.F. Grid . . . 4X at 1000 KC
R.F. Grid to Converter Grid . . . 21X at 1000 KC
Converter Grid to 1st I.F. Grid . . . 32X at 1000 KC

1st I.F. Grid to 2nd Detector . . . 48X at 455 KC
Overall Audio Gain . . . 253X at .5 watts 400 cycles

OSCILLATOR CATHODE VOLTAGES:

Measured at 120 volts AC line voltage with AC vacuum tube voltmeter input loading above 10 megohms.

1500 KC . . . 2.75 volts AC
1000 KC . . . 2.5 volts AC
800 KC . . . 2.62 volts AC
600 KC . . . 2.9 volts AC

D.C. RESISTANCE MEASUREMENTS:

1st & 2nd I.F. Coils		**Antenna Coil**	
Primary	14.5 ohms	Start to Tap	1.5 ohms
Secondary	14.5 ohms	Start to Finish	2 ohms
Oscillator Coil		**R.F. Coil**	
Primary	1 ohm	Primary	58 ohms
Secondary	6 ohms	Secondary	4.2 ohms

NOTE: Due to the variation of winding methods, the D.C. resistance on all coils is subject to a 20% tolerance.

The permanent magnet speaker contained in this model is equipped with the ADJUST-A-CONE feature. This feature provides the radio service technician with a quick and simple means of centering an "Off Center" or "Dragging" voice coil.

Centering the voice coil is accomplished by simply adjusting the two screws on the spider support until the voice coil moves freely in the air gap. This adjustment is very critical, consequently the use of an audio oscillator is recommended. Set the audio oscillator at cone resonance, which should be approximately 120 cycles, when making this adjustment.

In most cases, a very slight turn of either adjustment screw will correct an "Off Center" voice coil.

In the first run of sets a 39 ohm resistor was used in the cathode circuit of the 6SG7. This resistor has been replaced by a 220 ohm resistor. This change was made to stabilize the R.F., thereby eliminating critical dressing of leads surrounding the 6SG7.

Electrical Rating:
Line Voltage . . . 110-120 volts, 50-60 cycle A.C.
Power Consumption . . . 68 watts

Tuning Frequency Range:
540 to 1740 KC

Intermediate Frequency:
455 KC

Electrical Output:
Maximum . . . 4 watts

Loudspeaker:
Type . . . Permanent Magnet
Outside Cone Diameter . . . 6½"
Voice Coil Impedance . . . 3.5 ohms at 400 cycles
Magnet Rating . . . 2.15 Oz. Alnico 5

Tubes:

Tube	Function
6SG7	R.F. Amplifier
6SA7	Frequency Converter
6SK7	I.F. Amplifier
6SQ7	Detector Amplifier
6V6-GT/G	Power Amplifier
5Y3-GT/G	Rectifier

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MODEL 1052

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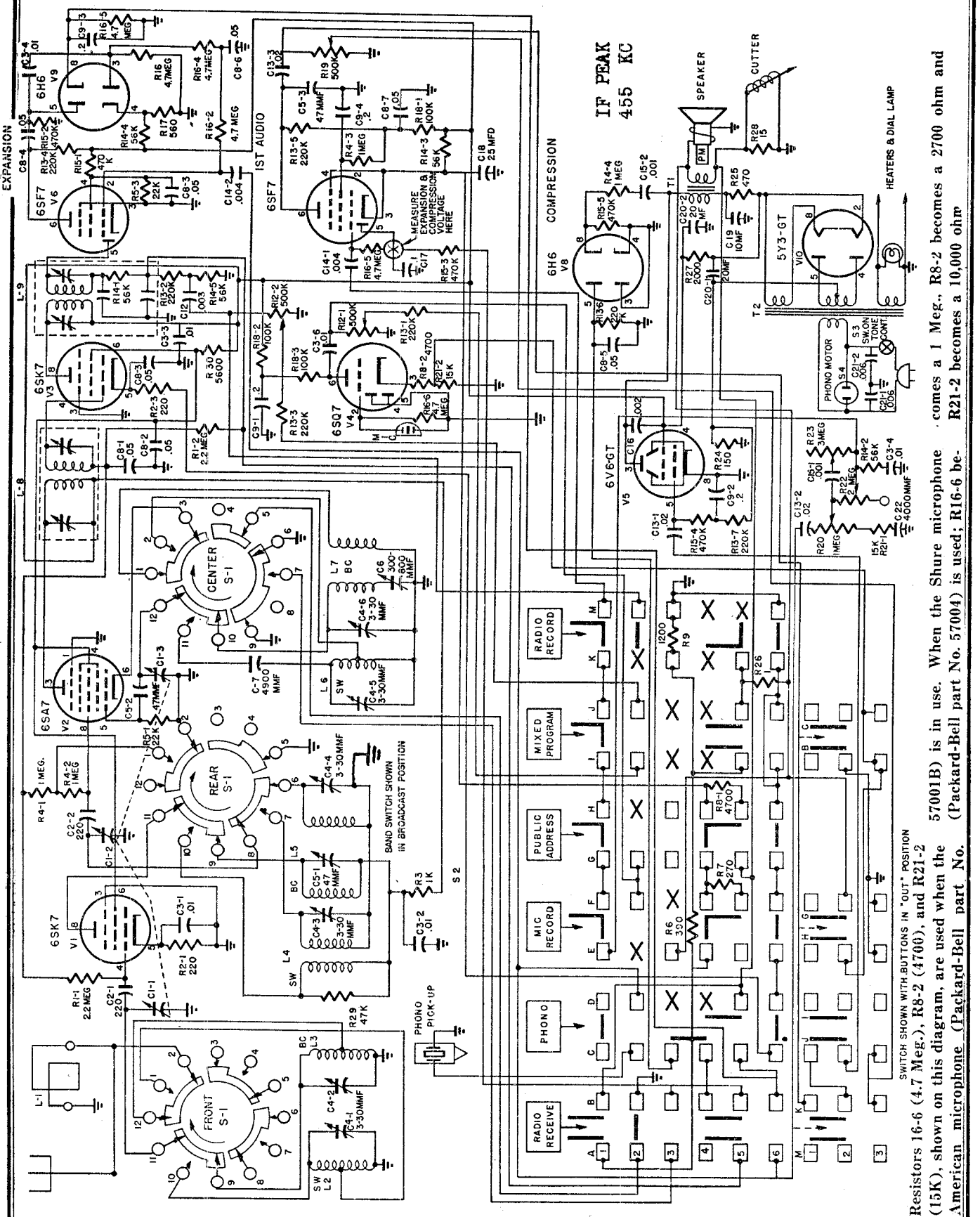

Resistors 16-6 (4.7 Meg.), R8-2 (4700), and R21-2 (15K), shown on this diagram, are used when the 57001B) is in use. When the Shure microphone comes a 1 Meg., R8-2 becomes a 2700 ohm and American microphone (Packard-Bell part No. (Packard-Bell part No. 57004) is used; R16-6 be- R21-2 becomes a 10,000 ohm

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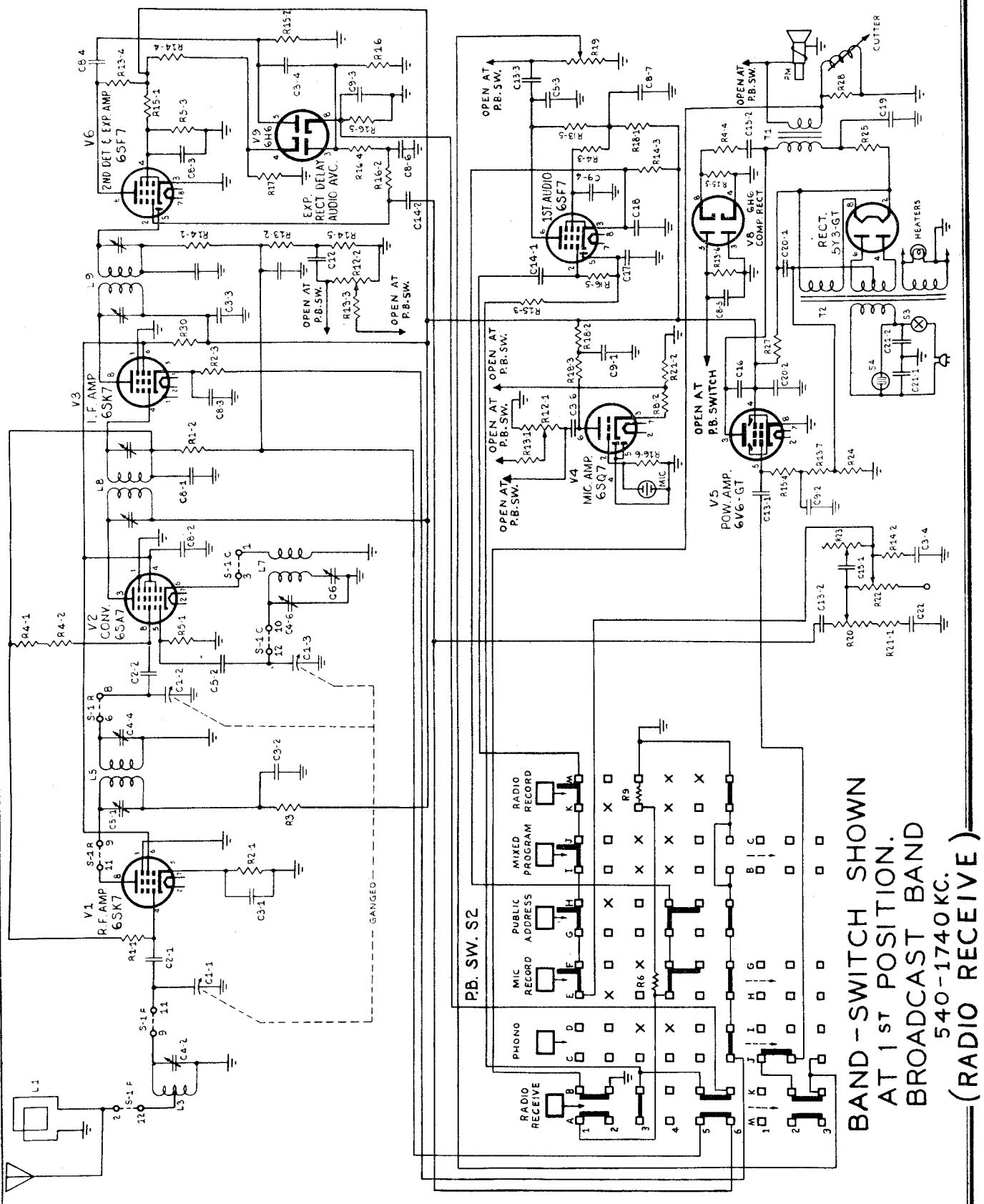

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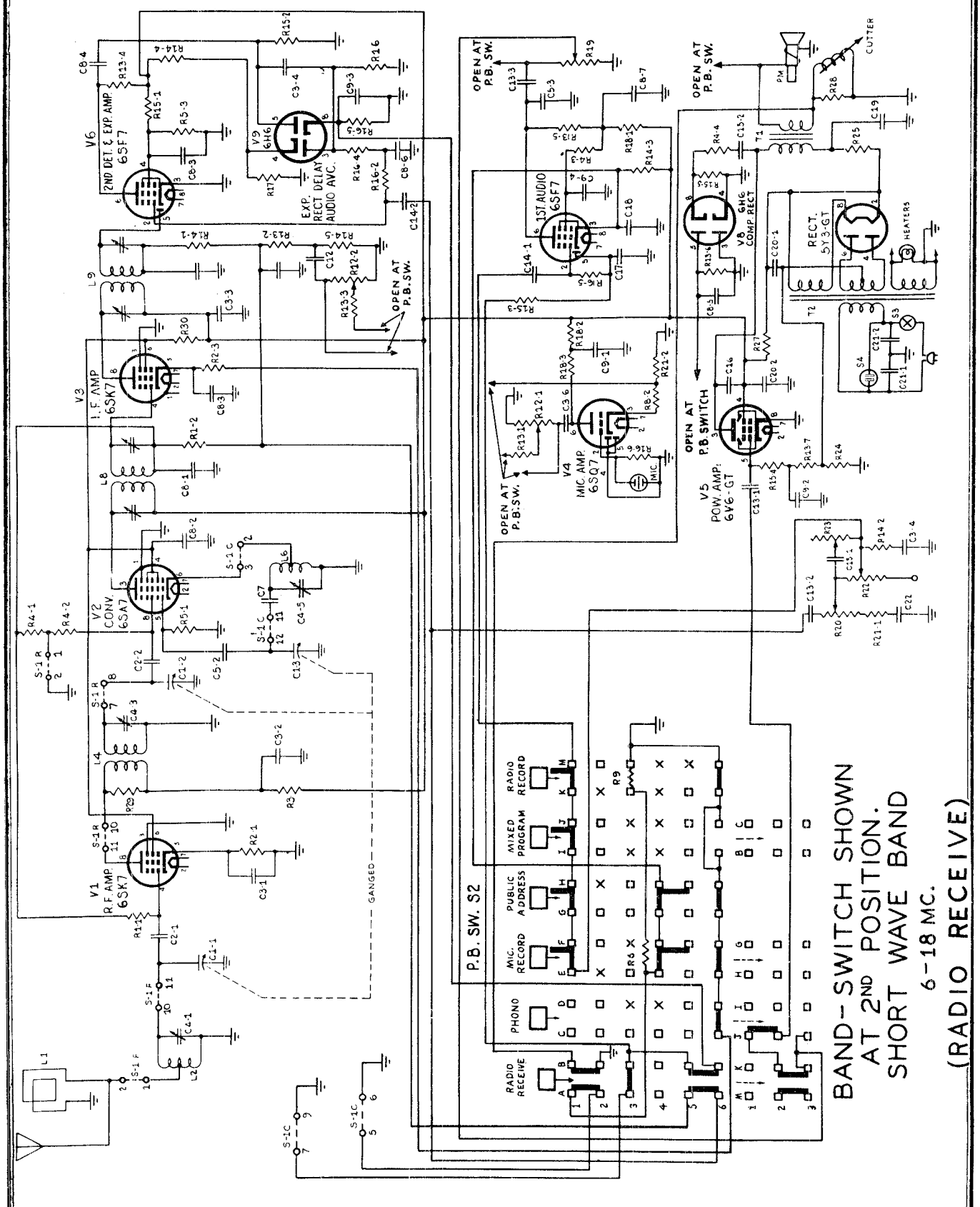

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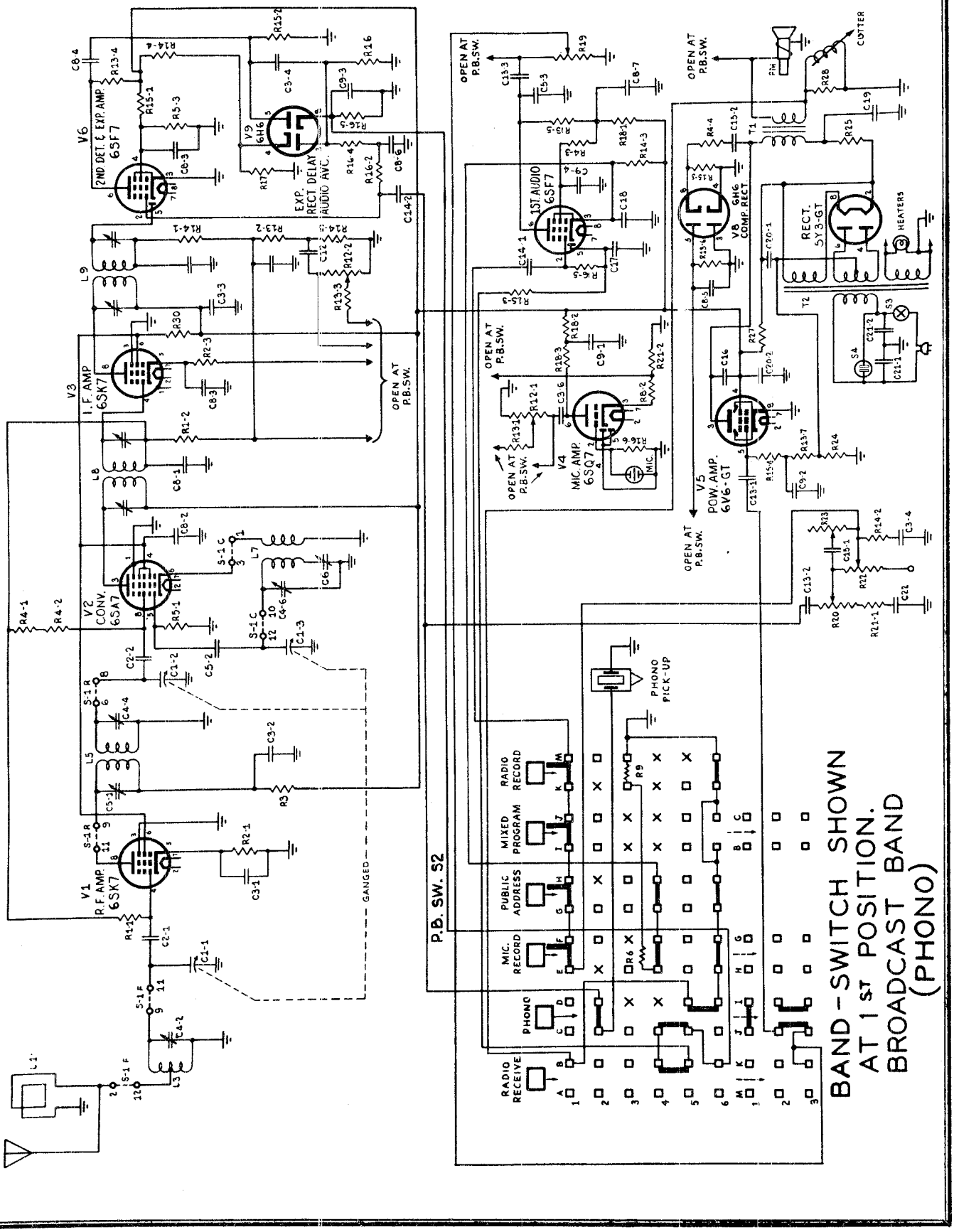

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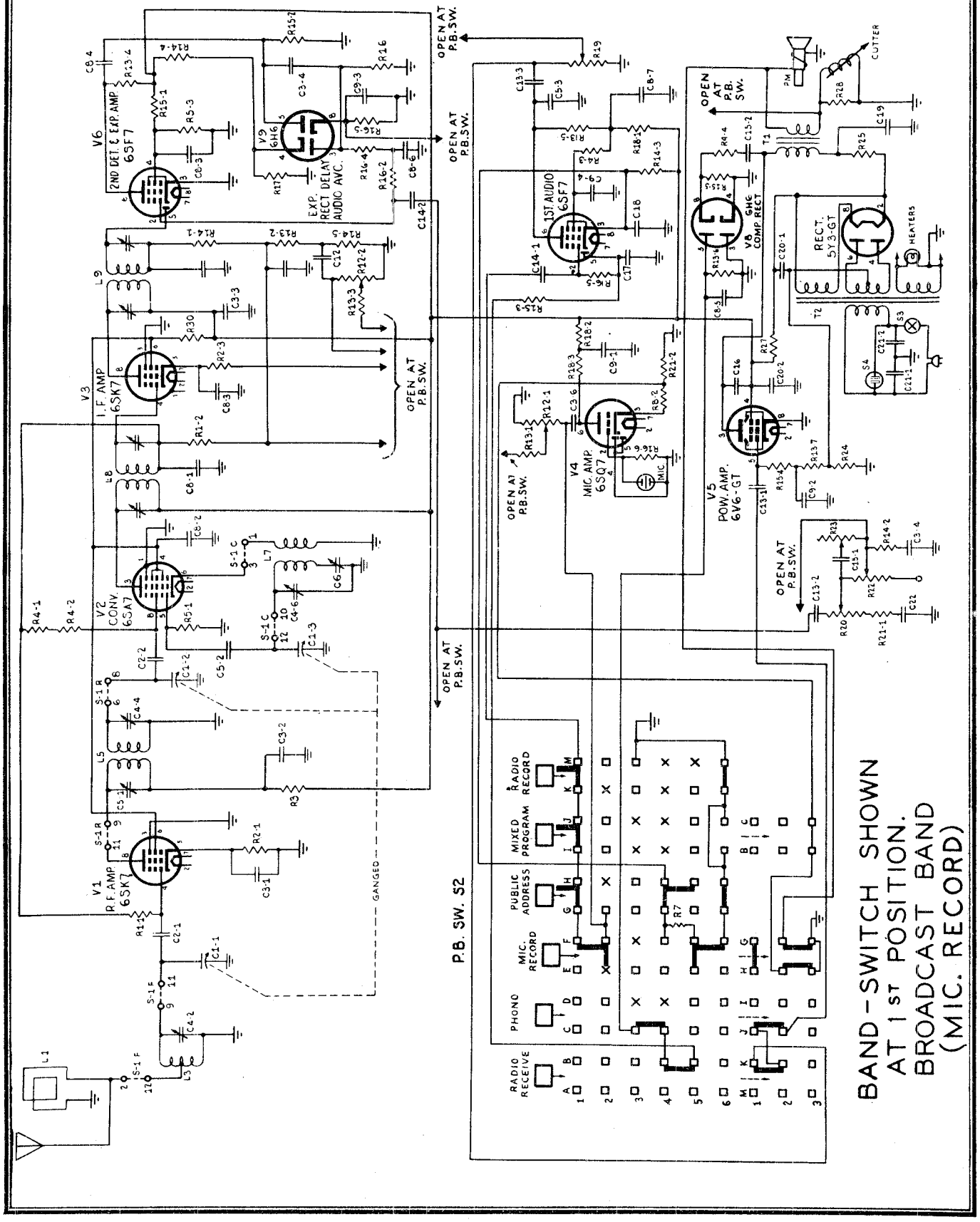

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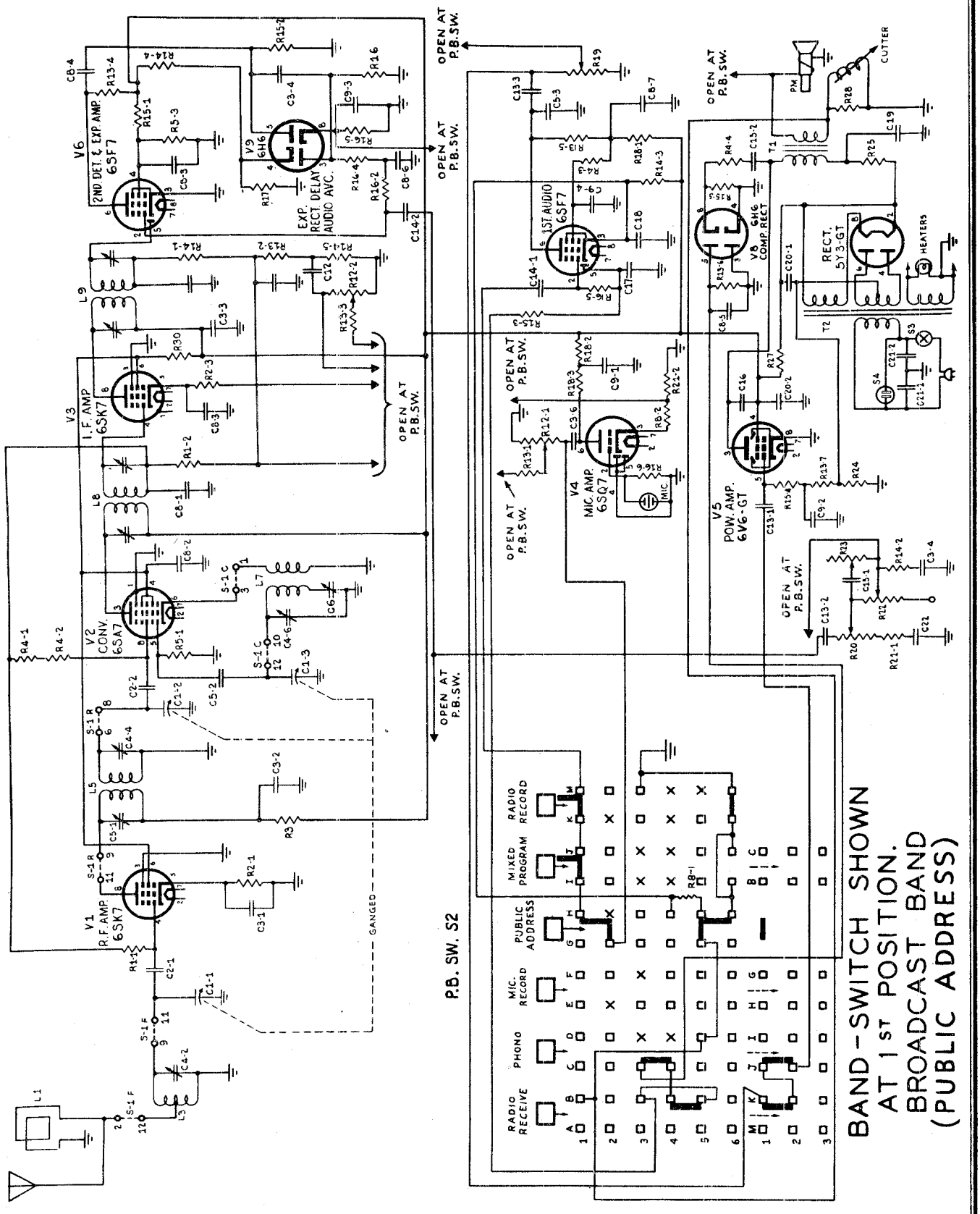

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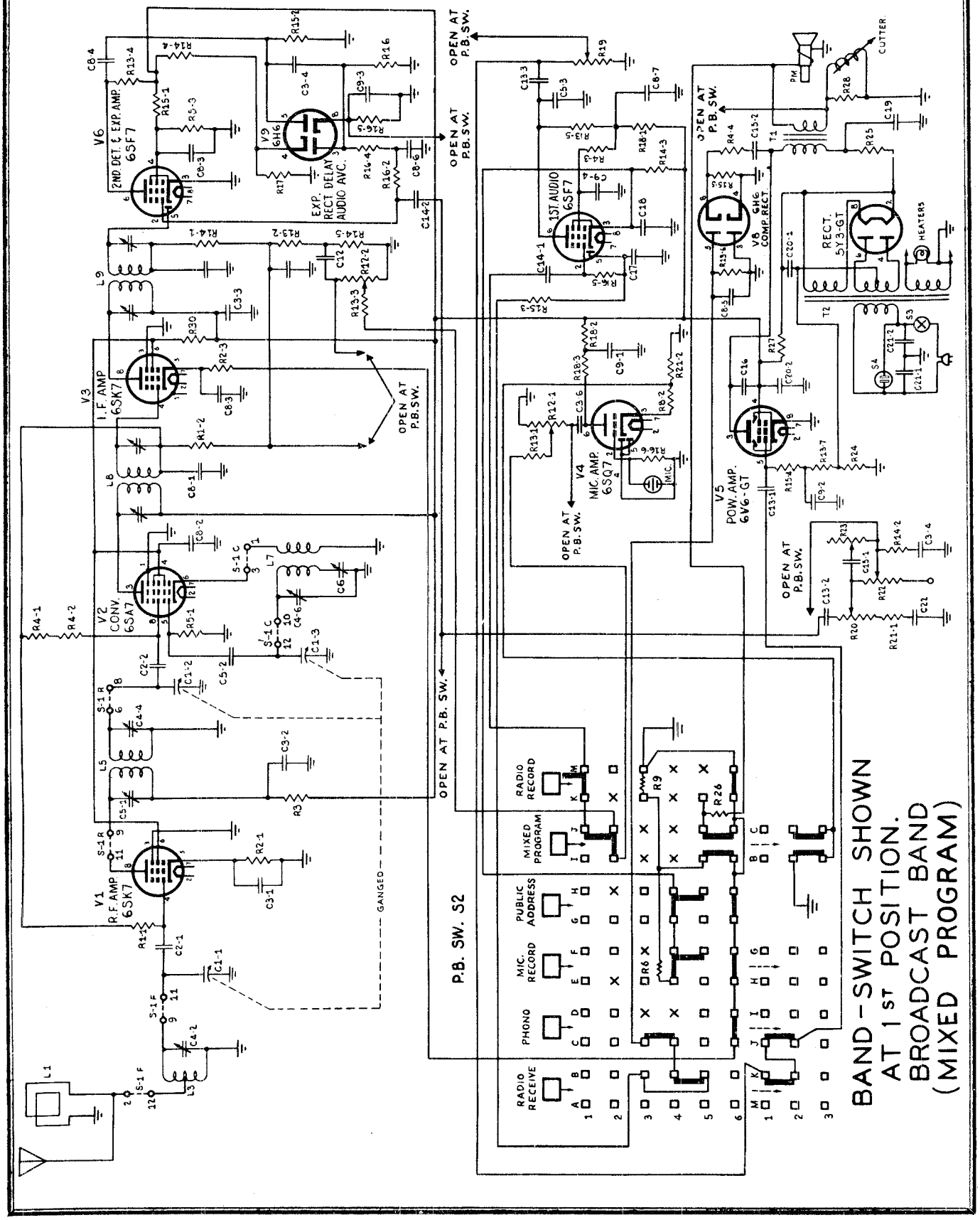

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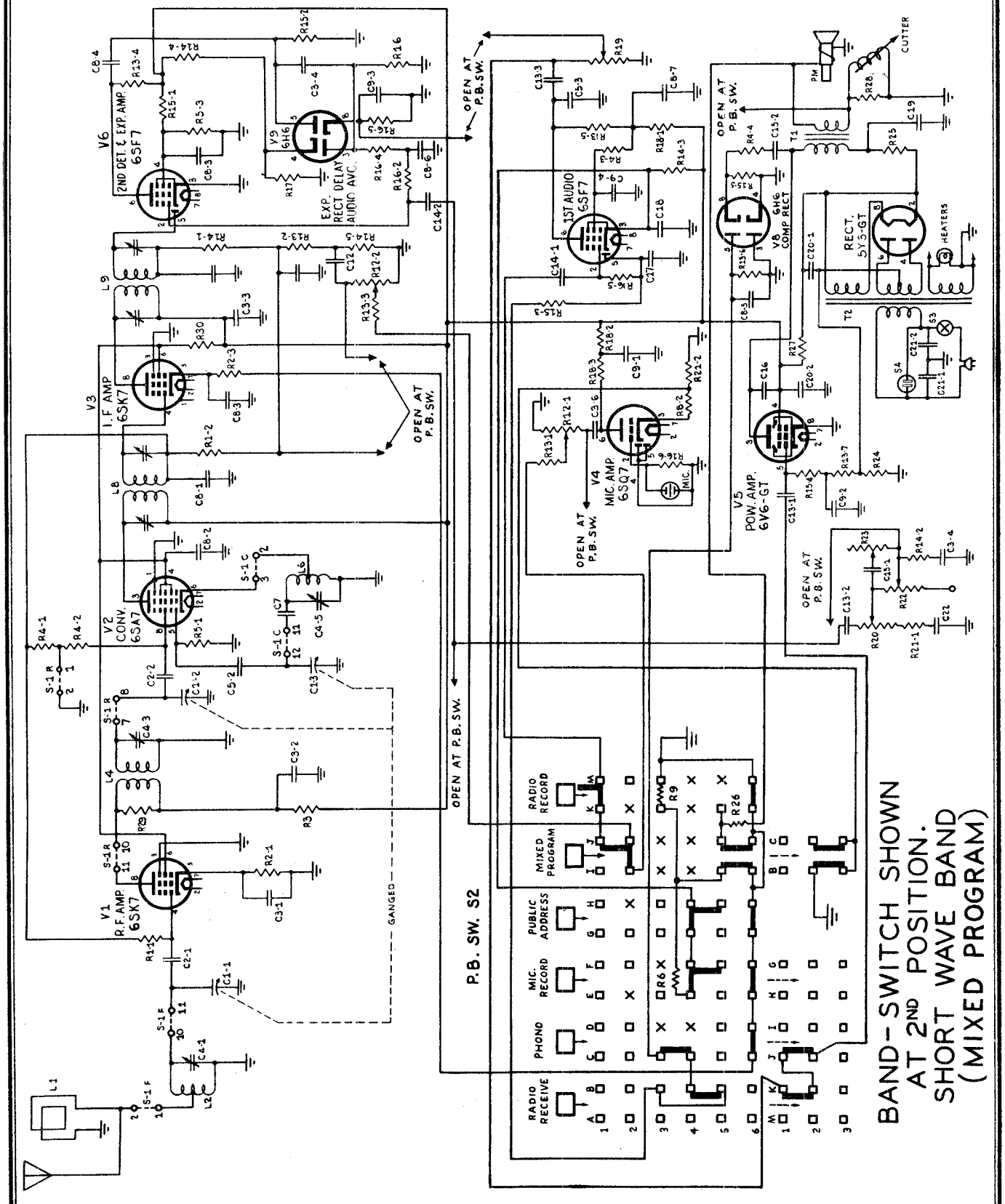

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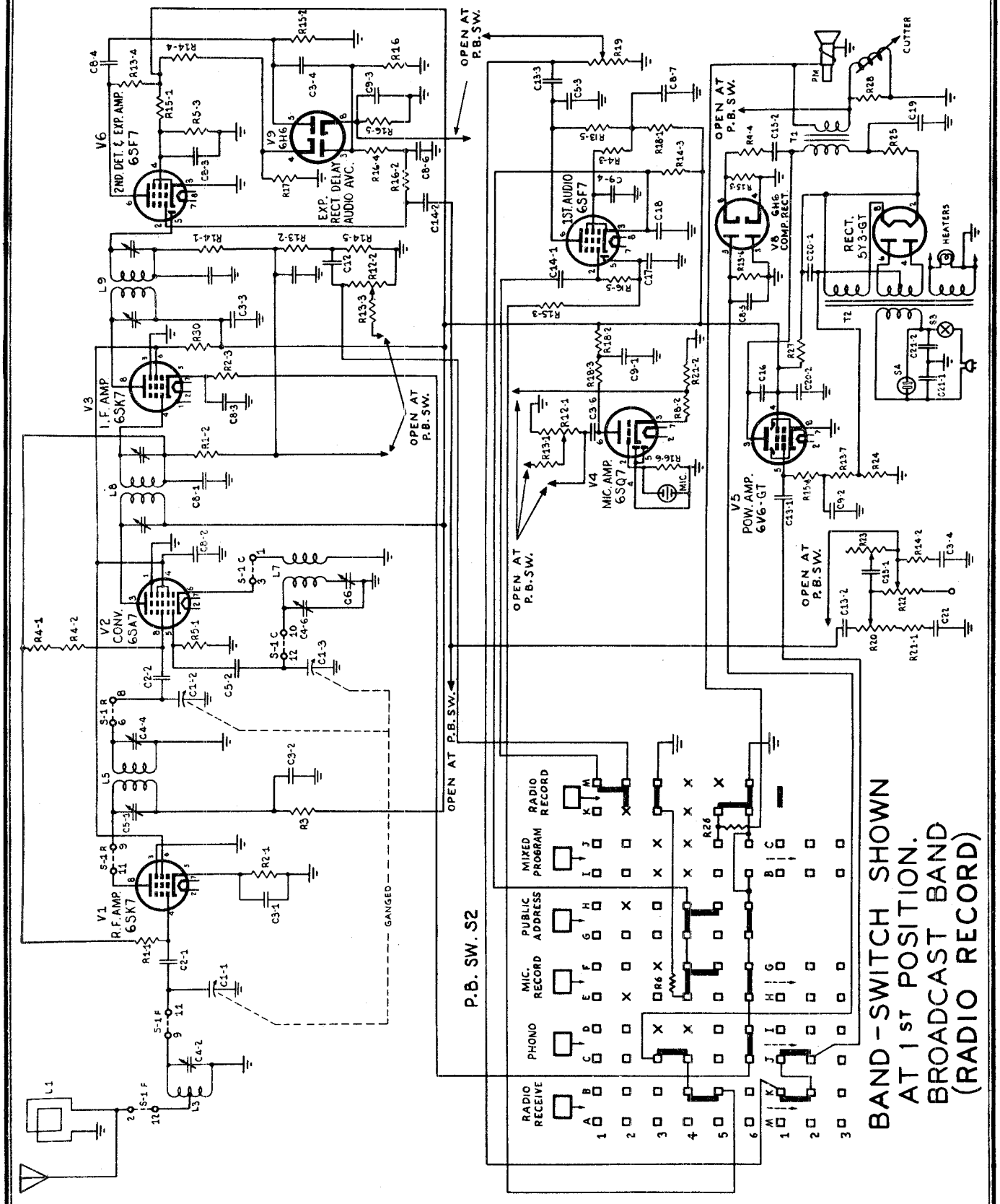

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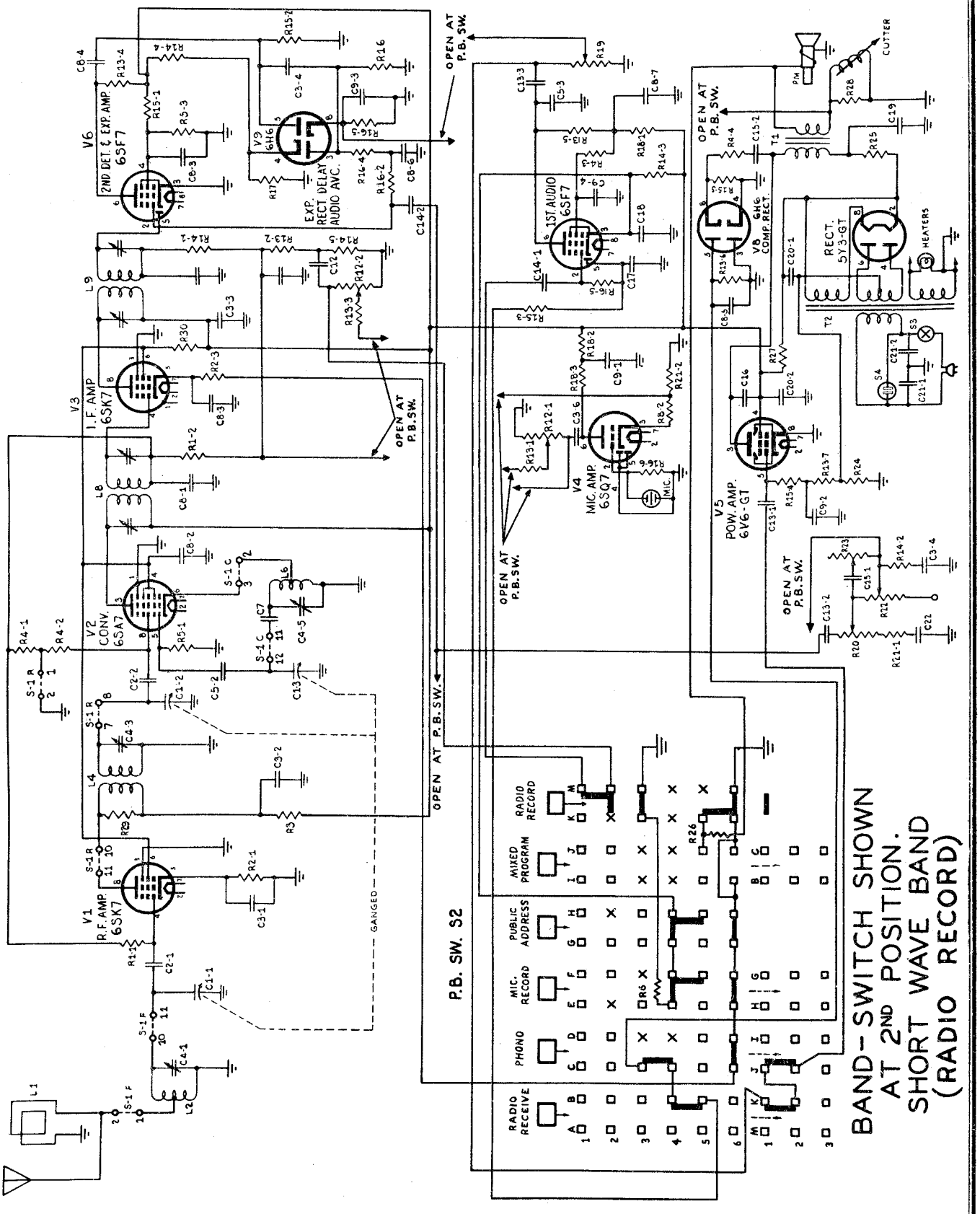

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Expanson is switched into grid of 1st audio, (6SF7) when "RADIO RECEIVE" button is depressed by connecting switch contacts B-5 and B-6.

Expansion is switched into grid of 1st audio, (6SF7) when "PHONO" button is depressed by connecting switch contacts C-4 and C-5.

Expansion is in the circuit ONLY when the "RADIO RECEIVE" and "PHONO" buttons are depressed.

Compression switched out of Radio Receive by breaking contact from B-4 to B-5.

Compression switched out of Phonograph by breaking contact from C-3 to C-4.

Compression is in circuit on ALL RECORD POSITIONS and PUBLIC ADDRESS.

ALIGNMENT PROCEDURE

Alignment procedure consists of the 7 steps outlined in the Alignment Procedure Chart.

Connect the test oscillator leads to the mixer grid and ground in series with an .01 Mfd. capacitor (dummy load) for step No. 1, I.F. alignment. Upon completing this step, "Rock" the variable condenser to assure that the I.F.s have not been aligned to the image frequency.

Use the Hazeltine Standard Test Loop #1150 for the balance of the alignment. Place the test loop about two feet from the receiver loop in a vertical position.

Step	*Connect Test Osc. To*	*Test Osc. Setting*	*Pointer Setting*	*Adjustment For Maximum Output*
1	Mixer Grid & Grd. .01 Mfd. Capacitor	455 KC	540 KC	Trimmers ABC & D
2	Standard Test Loop*	1750 KC	1750 KC	Trimmer F to 1750 KC
3	Standard Test Loop*	600 KC	600 KC	Trimmer G to 600 KC
4	Standard Test Loop*	1500 KC	1500 KC	Trimmers I & J
5	Repeat Steps 2, 3 & 4			----
6	Standard Test Loop*	18 MC	18 MC	Trimmer E to 18 MC
7	Standard Test Loop*	15 MC	15 MC	Trimmers K & H

***REMARKS: Hazeltine Test Loop No. 1150.**

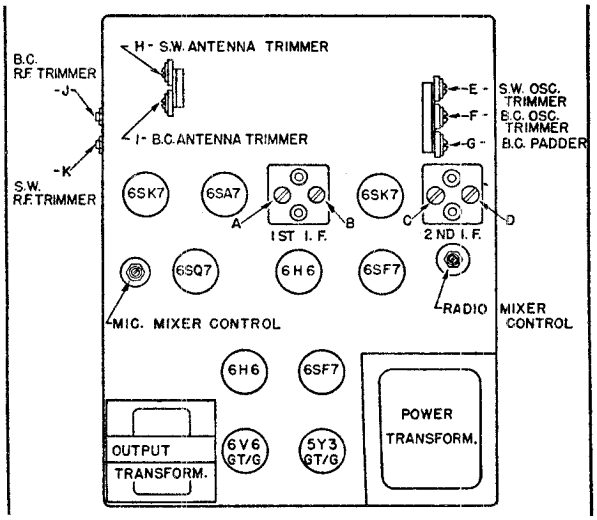

FIG. 1 TRIMMER LOCATION

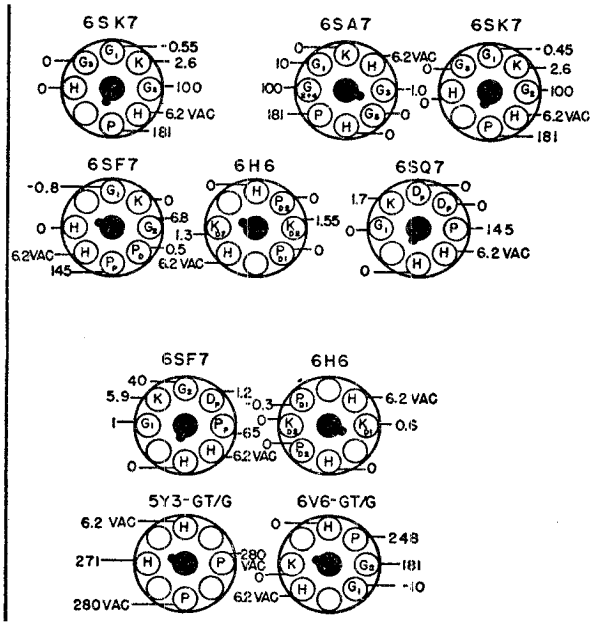

FIG. 2 VOLTAGE CHART

All D.C. voltages measured with a vacuum tube voltmeter from socket contacts to chassis. A.C. voltages measured with a 1000 ohms per volt A.C. meter from socket contacts to chassis. Volume control maximum. No signal. 117 volts A.C. line voltage. All voltages shown are positive D.C. unless otherwise noted.

Recording Head Pressure

The proper recording head pressure may be identified by the small red dot painted on the indicator on the cutter arm. This pressure is 1¼ Oz.

Brief Description of Expansion and Compression Circuits

V6, 6SF7 and V9, 6H6 embrace the expansion circuit. Referring to Figure 3, Schematic Diagram, it will be noted that expansion is present in the circuit at all times on Phono and Radio Receive. V6, 6SF7 serves as the 2nd Detector and expansion amplifier, while V9, 6H6 functions as the expansion rectifier in one diode section and furnishes delayed audio AVC in the other diode section. V8, 6H6 functions as the compressor.

How to Check Expansion Voltage

The following method is suggested for checking expansion voltage.

Feed a 1 volt (RMS) 400 cycle signal into the phono input plug. Make certain the phono button is depressed. Connect the leads of a vacuum tube voltmeter* to the location indicated on Figure 3, Schematic Diagram and ground. The voltage at this point should be between 3 and 4 volts positive DC. As a cross check measure the cathode voltage of V7, 6SF7 which should read about 5 volts DC. The expansion voltage should be approximately 1 volt less.

How to Check Compression Voltage

Depress the Radio Record button. Feed a 1 volt (RMS) 400 cycle signal into the diode return of the 2nd I.F. (brown lead). In the same manner outlined in the preceding paragraph measure the compression voltage, which should be approximately a minus 2 to 3 volts DC.

***NOTE: VTVM input loading above 10 megohms.**

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Part No.	Ref. Symbol	Description
23500C	C1-1	Capacitor, variable: 3 gang
	C1-2	
	C1-3	
23206	C2-1	Capacitor, mica: 220 Mmf., 20%
	C2-2	
23006	C3-1	Capacitor, paper: .01 Mfd., 600 volt
	C3-2	
	C3-3	
	C3-4	
	C3-5	
	C3-6	
23400A	C4-1	Capacitor, trimmer: dual 3-30 Mmf.
	C4-2	
	C4-3	
	C4-4	
23401	C4-5	Capacitor, trimmer: dual 3-30 Mmf.
	C4-6	
23225	C5-1	Capacitor, mica: 47 Mmf., 20%
	C5-2	
	C5-3	
23402	C6	Capacitor, padder: 300 to 800 Mmf.
23207A	C7	Capacitor, mica: 4900 Mmf., 5%
23010	C8-1	Capacitor, paper: .05 Mfd., 600 Volt
	C8-2	
	C8-3	
	C8-4	
23017	C8-5	Capacitor, paper: .05 Mfd., 200 volt
	C8-6	
	C8-7	
	C8-8	
23018	C9-1	Capacitor, paper: .2 Mfd., 200 volt
	C9-2	
	C9-3	
	C9-4	
23016	C12	Capacitor, paper: .003 Mfd., 600 volt
23007	C13-1	Capacitor, paper: .02 Mfd., 600 volt
	C13-2	
	C13-3	
23003	C14-1	Capacitor, paper: .004 Mfd., 600 volt
	C14-2	
23001	C15-1	Capacitor, paper: .001 Mfd., 600 volt
	C15-2	
23002	C16	Capacitor, paper: .002 Mfd., 600 volt
23019	C17	Capacitor, paper: .1 Mfd., 200 volt
24006	C18	Capacitor, electrolytic: 25 Mfd., 25 WV
24002	C19	Capacitor, electrolytic: 10 Mfd., 450 WV
24001	C20-1	Capacitor, electrolytic: 20 Mfd., 450 WV
	C20-2	
23901	C21-1	Capacitor, paper: 2X .006 Mfd., 600 volt
23901	C21-2	(enclosed in metal case)
28004A		Clip, turntable holding
29303A	L1	Loop Ass'y, antenna
29401	L2	Coil, antenna: short wave
29400	L3	Coil, antenna: standard broadcast
29201	L4	Coil, oscillator: short wave
29205	L5	Coil, oscillator: standard broadcast
32003B		Cord, A.C.
32501		Cord, waxed linen
36019		Recording head, (cutting head)
36021		Cartridge, recording head
38002B		Dial scale
40002		Dial cord
40100A		Dial drive, vernier
41002		Escutcheon, motor switch
47004		Grille, front panel
52001A		Knob, round: controls
52014		Knob, bar: controls
52023		Knob, push buttons
54001		Lamp, dial: T-44
57001B		Microphone with cable
57002		Handle, microphone
57003		Base, microphone
58001A		Motor, A.C.: recorder & phono
58006		Turntable, recorder & phono
59003		Needle, permanent: phono
59001		(alternate for above)
59002		Stylus (recording needle)
62004D		Panel, front
62005D		Panel, motorboard
63002A		Pick-up, phono: ass'y
63003A		Cartridge, phono pick-up
66005		Plug, microphone
66008		Plug, AC motor
67001A		Pointer ass'y, dial scale
68038		Decal, bandswitch
69001		Pulley, dial
69004		Pulley, idler
69005		Pulley, drive

Part No.	Ref. Symbol	Description
12002A		Baffle, speaker
14004A		Base, phono pick-up
21005D		Cabinet, wood: fabricoid covered
21019C		Cabinet, power cord holder
21020C		Cabinet, mike cord holder
22001		Cable, loop antenna
22004A		Cable, speaker
22005		Cable, phono pick-up
73055	R1-1	Resistor, carbon: 2.2 megohm, 20%,
	R1-2	½ watt
73017	R2-1	Resistor, carbon: 220 ohms, 10%, ½ watt
	R2-2	
73025	R3	Resistor, carbon: 1000 ohms, 10%, ½ watt
73053	R4-1	Resistor, carbon: 1 megohm, 20%, ½ watt
	R4-2	
	R4-3	
73041	R5-1	Resistor, carbon: 22,000 ohms, 10%,
	R5-2	½ watt
73020	R6	Resistor, carbon: 390 ohms, 10%, ½ watt
73018	R7	Resistor, carbon: 270 ohms, 10%, ½ watt
73033	R8-1	Resistor, carbon: 4700 ohms, 10%, ½ watt
	R8-2	
73026	R9	Resistor, carbon: 1200 ohms, 10%, ½ watt
25800	R12-1	Control, mixer: 500,000 ohms
	R12-2	
73049	R13-1	Resistor, carbon: 220,000 ohms, 20%,
	R13-2	½ watt
	R13-3	
	R13-4	
	R13-5	
	R13-6	
	R13-7	
73060	R14-1	Resistor, carbon: 56,000 ohms, 10%,
	R14-2	½ watt
	R14-3	
	R14-4	
	R14-5	
73051	R15-1	Resistor, carbon: 470,000 ohms, 20%,
	R15-2	½ watt
	R15-3	
	R15-4	
	R15-5	
73057	R16-1	Resistor, carbon: 4.7 megohms, 20%,
	R16-2	½ watt
	R16-3	
	R16-4	
	R16-5	
	R16-6	
73022	R17	Resistor, carbon: 560 ohms, 10%, ½ watt
73047	R18-1	Resistor, carbon: 100,000 ohms, 20%,
	R18-2	½ watt
	R18-3	
25500A	R19	Control, volume: 3 section; front 1 megohm
	R20	(R20) center 2 megohm (R22) rear 500,000
	R22	ohms (R19)
73039	R21-1	Resistor, carbon: 15,000 ohms, 10%,
	R21-2	½ watt
25002A	R23 & S3	Control, tone: 3 megohm, with AC switch
73081	R24	Resistor, carbon: 150 ohms, 10%, 1 watt
73078	R25	Resistor, carbon: 470 ohms, 10%, 1 watt
73905	R26	Resistor, wire wound: 1 ohm, 10%, 1 watt
73902	R27	Resistor, wire wound: 2000 ohms, 10%,
		5 watt
73903	R28	Resistor, wire wound: 15 ohms, 10%, 1 watt
73045	R29	Resistor, carbon: 47,000 ohms, 10%, ½ watt
73127	R30	Resistor, carbon: 5600 ohms, 10%, 2 watt
78008		Shield, microphone plug
78019		Shield, AC switch
79002		Socket, tube: 8 prong octal, wafer type
79004		Socket, microphone plug
79005		Socket, speaker & recording head plugs
79007		Socket, AC phono motor plug
79010B		Socket, dial lamp: bayonet base
79023		Socket, loop antenna plug
83300		Speaker, permanent magnet: 6 ⅛"
84012		Spring, microphone holding
84013		Spring, recording head holding
84001B		Spring, dial cord
84003		Spring, round & bar knobs
84011		Spring, push button knobs
86001A		Switch, rotary: wafer type, band switch
86301		Switch, push button section
86701A		Switch, slide: AC motor, SPST
89400A	T1	Transformer, output
89003A	T2	Transformer, power
63017		Phono pick-up rest
10507		Automatic cutter arm lift, ass'y

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MODEL 1052
MODEL 1054

PACKARD BELL CO.

MODEL 1052

ELECTRICAL RATING
Line Voltage . . . 110-120 volts 50-60 cycle AC
Power Consumption . . . 90 watts

TUNING FREQUENCY RANGE
Standard Broadcast . . . 540 to 1740 KC
Short Wave . . . 6 to 18 MC

INTERMEDIATE FREQUENCY
455 KC

ELECTRICAL POWER OUTPUT
Undistorted . . . 2 watts
Maximum . . . 4.5 watts

LOUDSPEAKER
Type . . . Permanent Magnet
Outside Cone Diameter . . . 6⅛"
Voice Coil Impedance . . . 3.2 ohms at 400 cycles
Magnet Ratng . . . 2.5 Oz. Alnico 5

TUBES

Tube	Function
6SK7	R.F. Amplifier
6SA7	Frequency Converter
6SK7	I.F. Amplifier
6SF7	2nd Detector & Expansion Amplifier
6H6	Expansion Rectifier & Delayed Audio AVC
6SQ7	Microphone Amplifier
6SF7	1st Audio
6H6	Compression Rectifier
6V6-GT	Power Amplifier
5Y3-GT	Rectifier

STAGE GAIN MEASUREMENTS
Measurements taken with volume and tone control maximum.
Switch in RADIO position. AVC shorted out.
Standard Output . . . 50 milliwatts
Dummy Antenna . . . 200 Mmf.

Antenna Grid to R.F. Grid . . . 5X at 1000 KC
R.F. Grid to Converter Grid . . . 9X at 1000 KC
Converter Grid to 1st I.F. Grid . . . 64X at 455 KC
1st I.F. Grid to 2nd Detector . . . 150X at 455 KC
Overall Audio Gain . . . 565X at 1 watt 400 cycles

OSCILLATOR CATHODE VOLTAGES
Measured at 117 volts AC line voltage with A.C. V.T.V.M. input loading above 10 megohms.
1750 KC . . . 3.15 volts AC
1300 KC . . . 3.10 volts AC
750 KC . . . 3.00 volts AC
550 KC . . . 3.4 volts AC

D.C. RESISTANCE MEASUREMENTS

I.F. Coils

1st I.F.	2nd I.F.
Primary . . . 17 ohms	Primary . . . 17 ohms
Secondary . . . 17 ohms	Secondary . . . 17 ohms*

***NOTE: The true reading of the secondary of the 2nd I.F. can only be obtained by removing the coil from the can. This is so because of the 56K resistor in series with the AVC lead inside the can.**

Oscillator Coils

Broadcast	Short Wave
Primary . . . 1 ohm	Start to Finish . . . 4 ohms
Secondary . . . 6 ohms	Start to Tap . . . 2 ohms

Antenna Coils

Broadcast	Short Wave
Start to Finish . . . 12.2 ohms	Start to Finish . . . .25 ohms
Start to Tap . . . 10.5 ohms	Start to Tap . . . .20 ohms

R.F. Coils

Broadcast	Short Wave
Primary . . . 75 ohms	Primary . . . 5.5 ohms
Secondary . . . 6.5 ohms	Secondary . . . 0.2 ohms

***NOTE:* Due to the variation of winding methods, the D.C. Resistance of all coils is subject to a 20% tolerance.**

MODEL 1054

Electrical Rating
Line Voltage . . . 110-120 volt 50-60 cycle AC
Power Consumption . . . 106 watts

Tuning Frequency Range
Standard Broadcast . . . 540 to 1740 KC
Short Wave . . . 6 to 18 MC

Intermediate Frequency
455 KC

Electrical Power Output
Undistorted . . . 3.5 watts
Maximum . . . 6 watts

Loudspeaker
Type . . . Permanent Magnet
Outside Cone Diameter . . . 10"
Voice Coil Impedence . . . 3.2 ohms at 400 cycles
Magnet Rating . . . 6.8 Oz. Alnico 5

Tubes

Tube	Function
6SK7	R.F. Amplifier
6SA7	Frequency Converter
6SK7	I.F. Amplifier
6SF7	2nd Detector & Expansion Amplifier
6H6	Expansion Rectifier & Delayed Audio AVC
6SQ7	Microphone Amplifier
6SF7	1st Audio Amplifier
6H6	Compression Rectifier
6V6-GT/G	Power Amplifier
5Y3-GT/G	Rectifier

STAGE GAIN MEASUREMENTS
Measurements taken with volume and tone controls maximum.
Band switch in standard broadcast position. AVC shorted out.
Standard Output . . . 50 milliwatts
Dummy Antenna . . . 200 Mmf.
Antenna Grid to R.F. Grid . . . 6X at 1000 KC
R.F. Grid to Converter Grid . . . 12.5X at 1000 KC
Converter Grid to 1st I.F. Grid . . . 61X at 455 KC
1st I.F. Grid to 2nd Detector . . . 120X at 455 KC
Overall Audio Gain . . . 620X at 1 watt 400 cycles

OSCILLATOR CATHODE VOLTAGES
Measured at 117 volts A.C. line voltage with A.C. V.T.V.M. input loading above 10 megohms.
1750 KC . . . 3.4 volts AC
1300 KC . . . 3.2 volts AC
750 KC . . . 3.2 volts AC
550 KC . . . 3.7 volts AC

D.C. RESISTANCE MEASUREMENTS

I.F. COILS

1st I.F.	2nd I.F.
Primary . . . 17 ohms	Primary . . . 17 ohms
Secondary . . . 17 ohms	Secondary . . . 17 ohms*

*NOTE: To obtain the true reading of the secondary of the 2nd I.F. it must be removed from the can. This is so because of the 56,000 ohm resistor in series with the AVC lead inside the can.

OSCILLATOR COILS

Broadcast	Short Wave
Primary . . . 1 ohm	Start to Finish . . . 4 ohms
Secondary . . . 6 ohms	Start to Tap . . . . 2 ohms

ANTENNA COILS

Broadcast	Short Wave
Start to Finish . . 12.2 ohms	Start to Finish . . . .25 ohms
Start to Tap . . . . 10.5 ohms	Start to Tap . . . . .20 ohms

R.F. COILS

Broadcast	Short Wave
Primary . . . . 75 ohms	Primary . . . 5.5 ohms
Secondary . . . 6.5 ohms	Secondary . . . .2 ohms

NOTE: Due to the variation of winding methods, the D.C. resistance on all coils is subject to a 20% tolerance.

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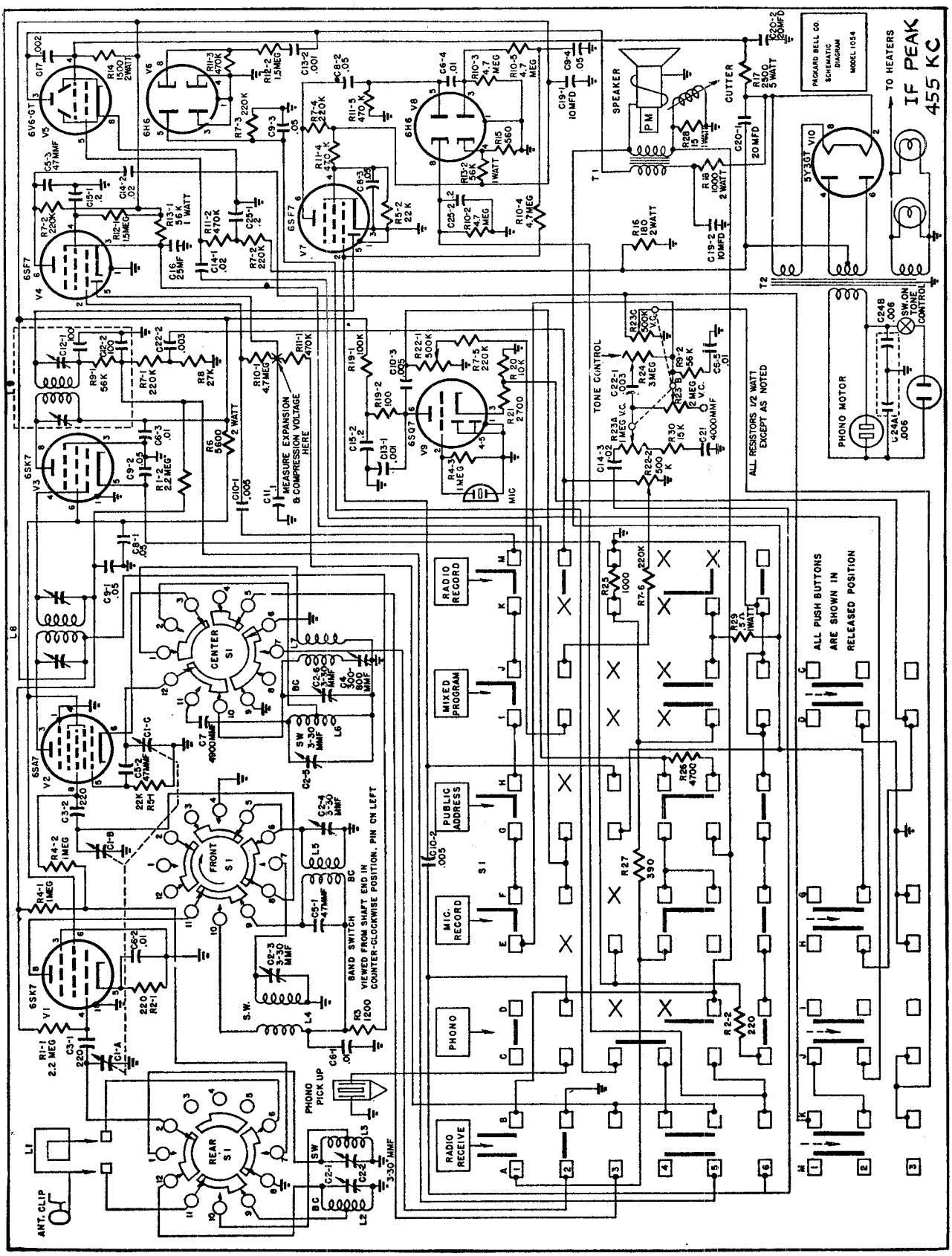

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Record Changer: Packard Bell Model 58004-B

"clarified schematics"

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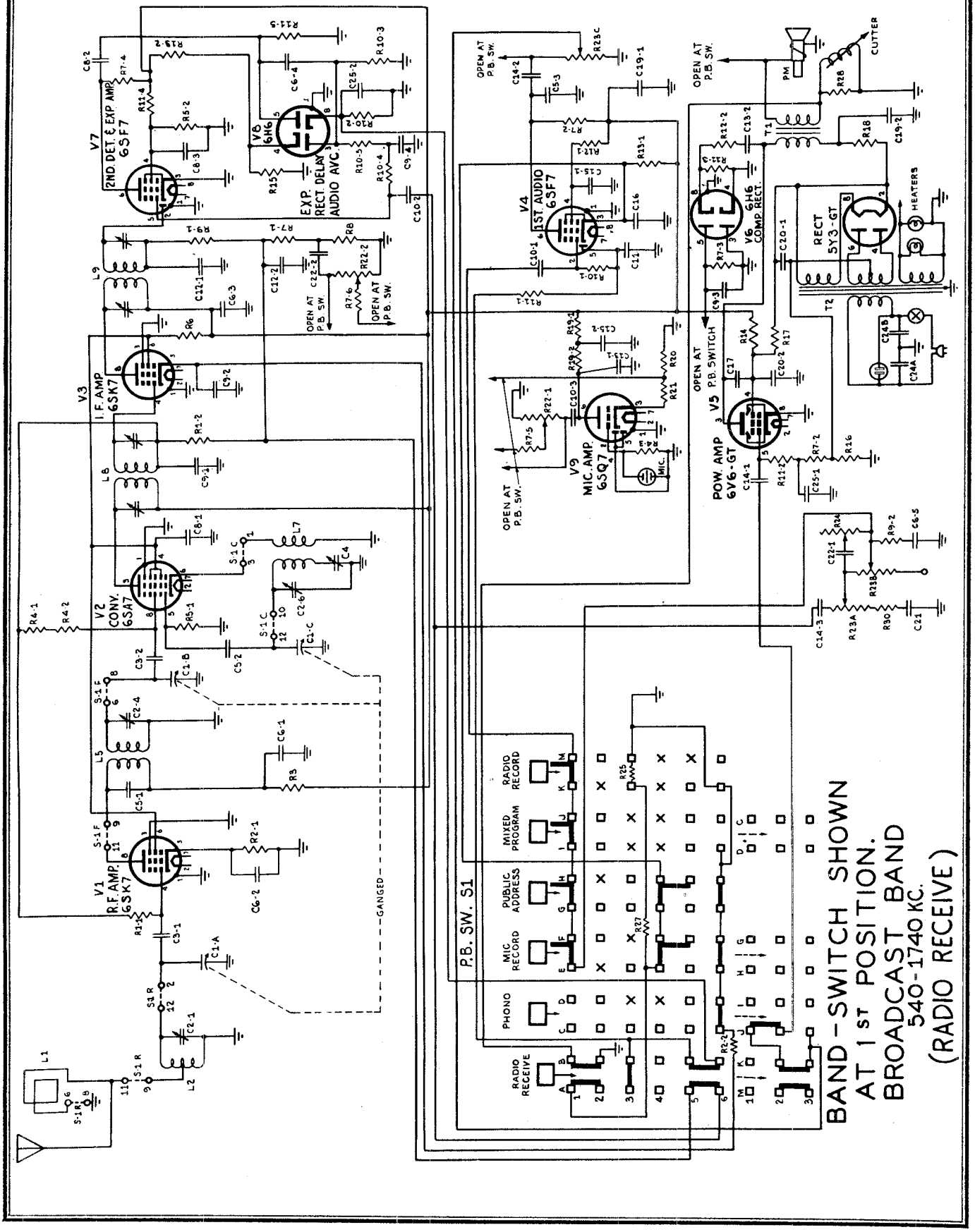

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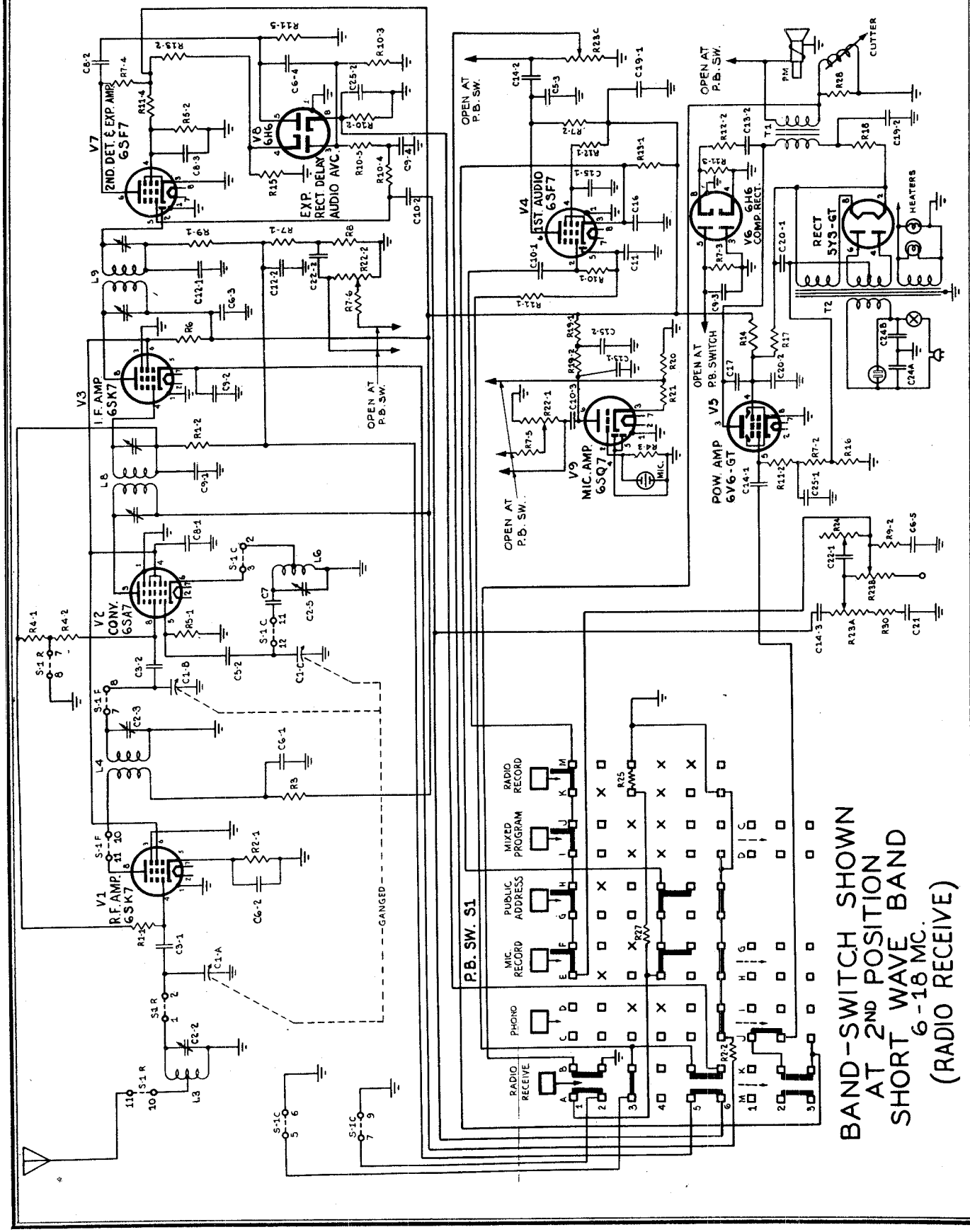

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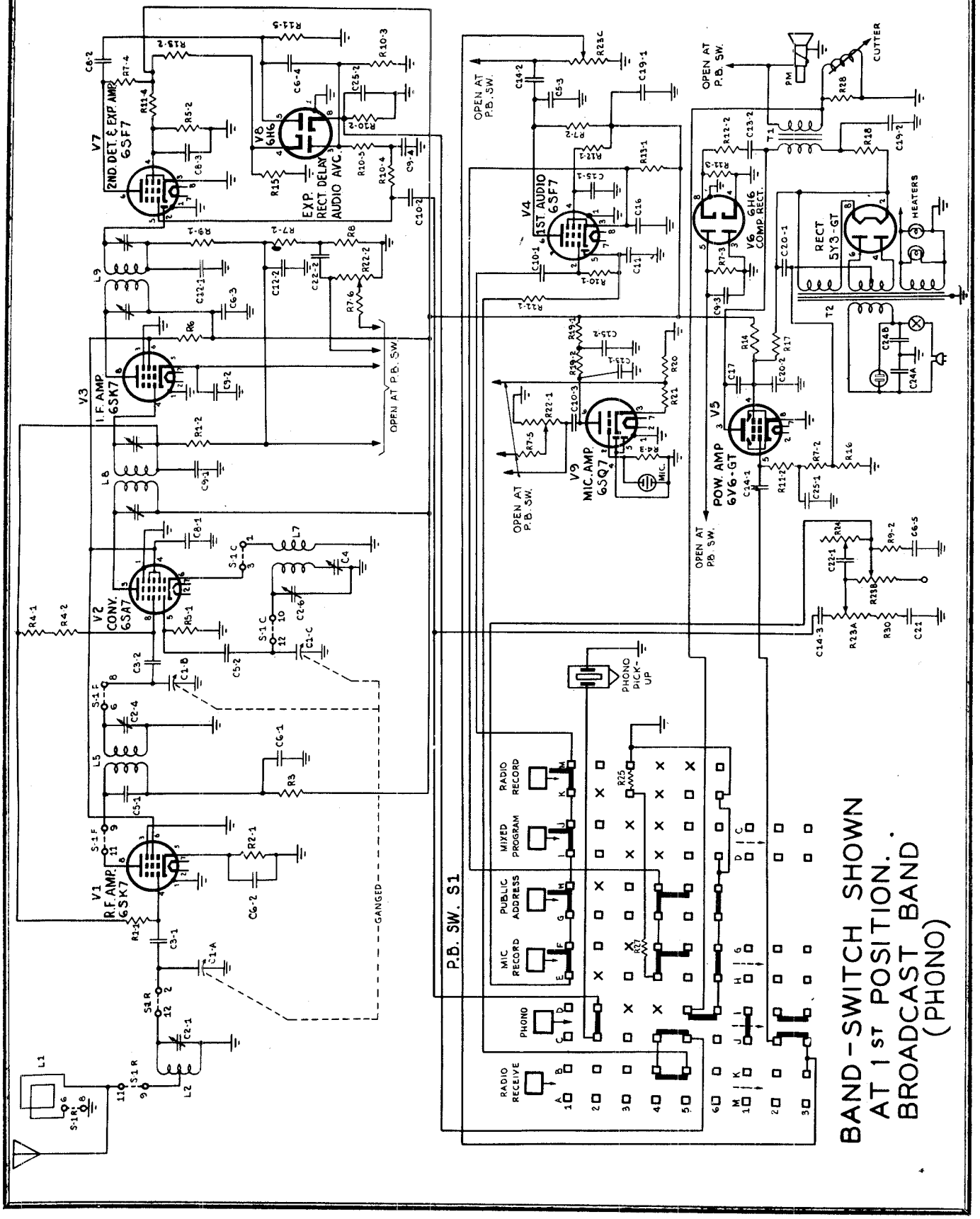

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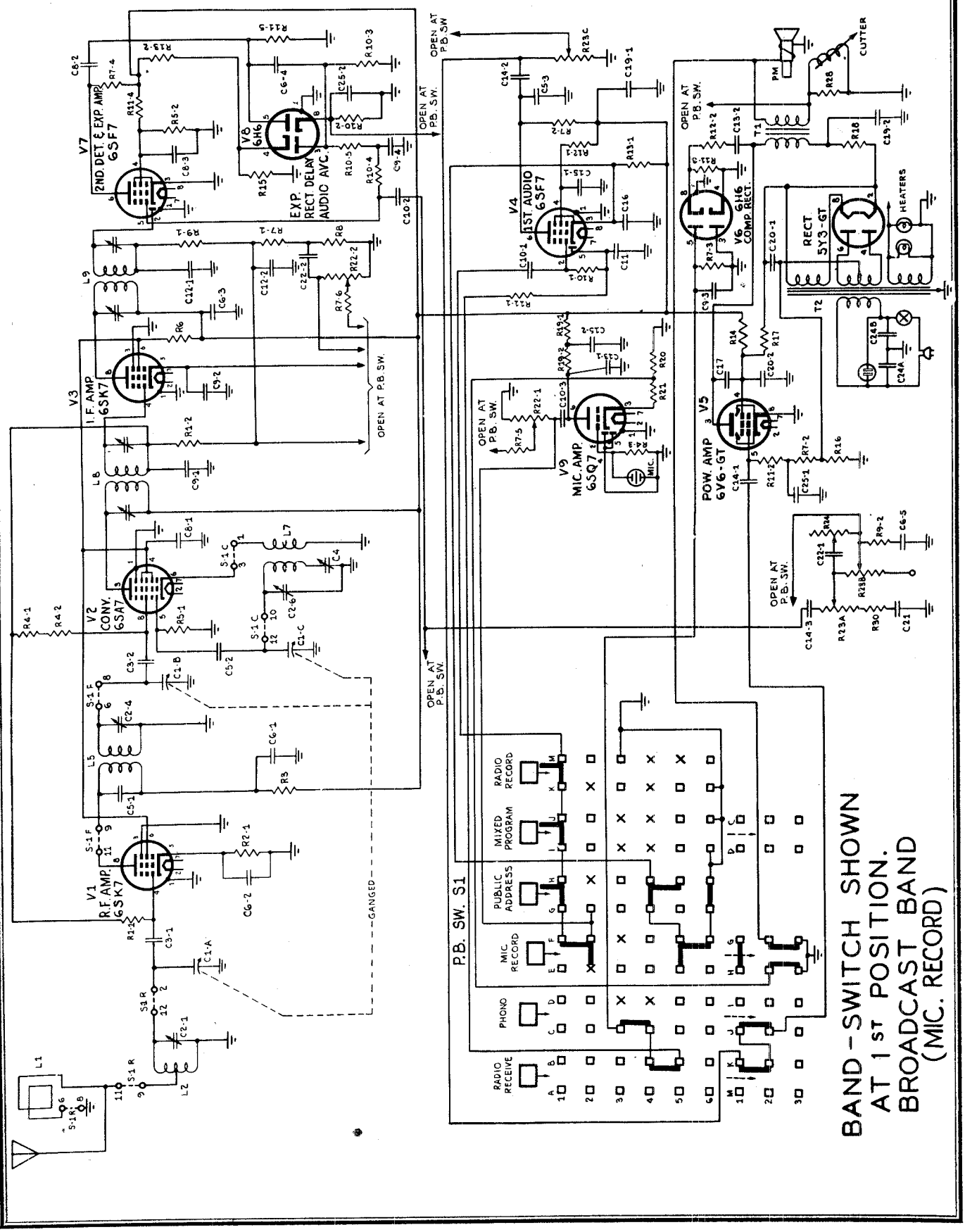

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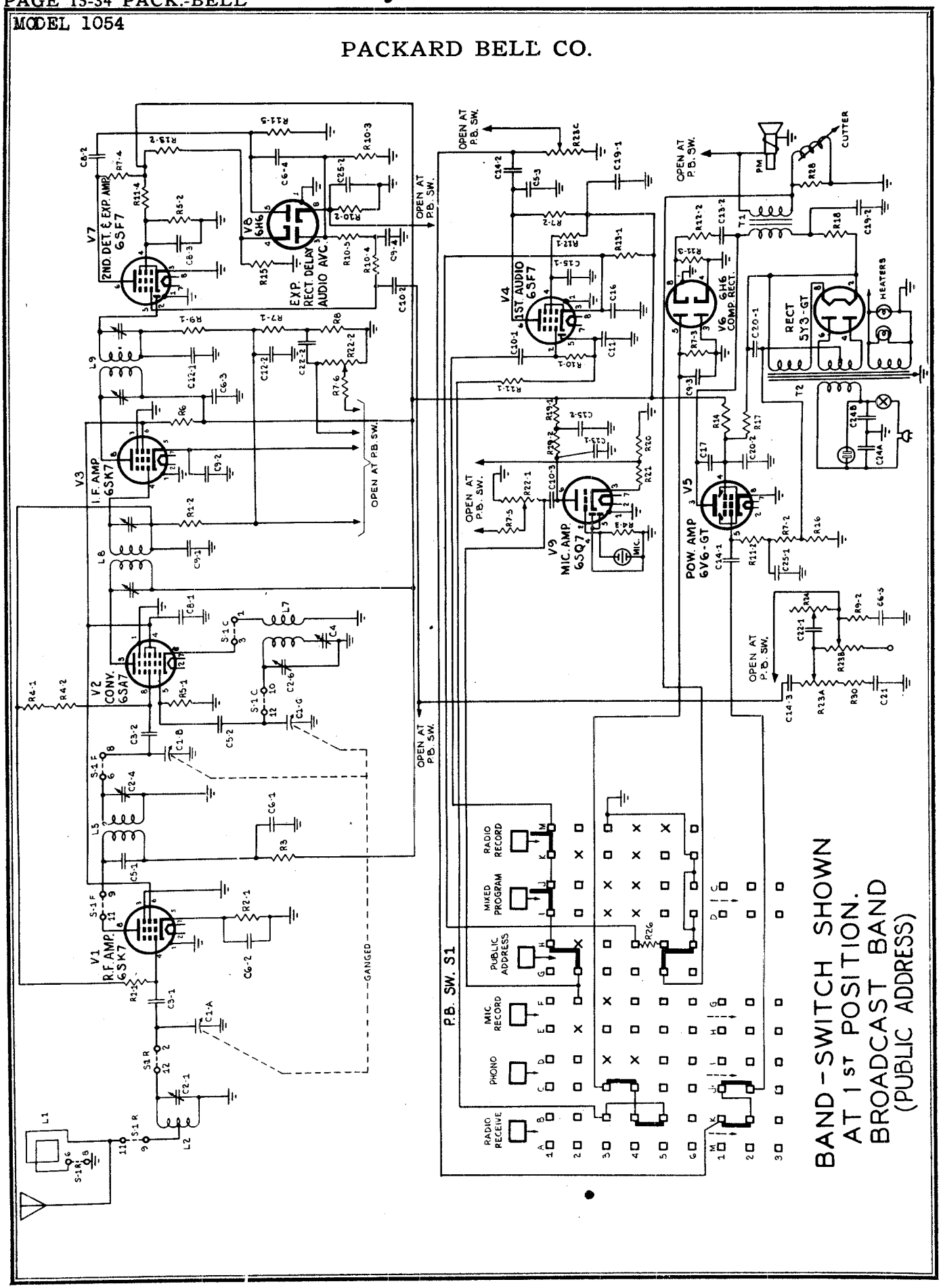

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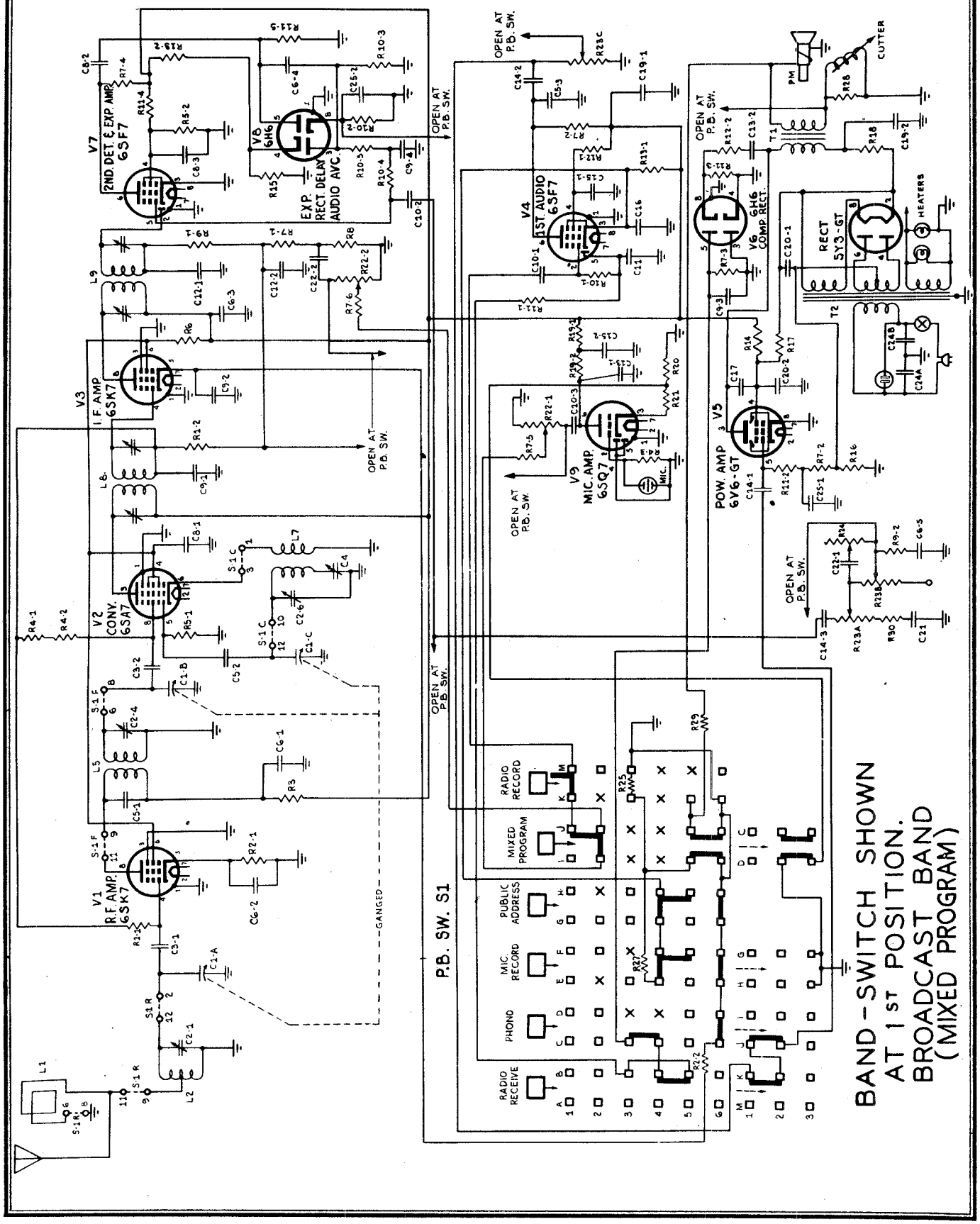

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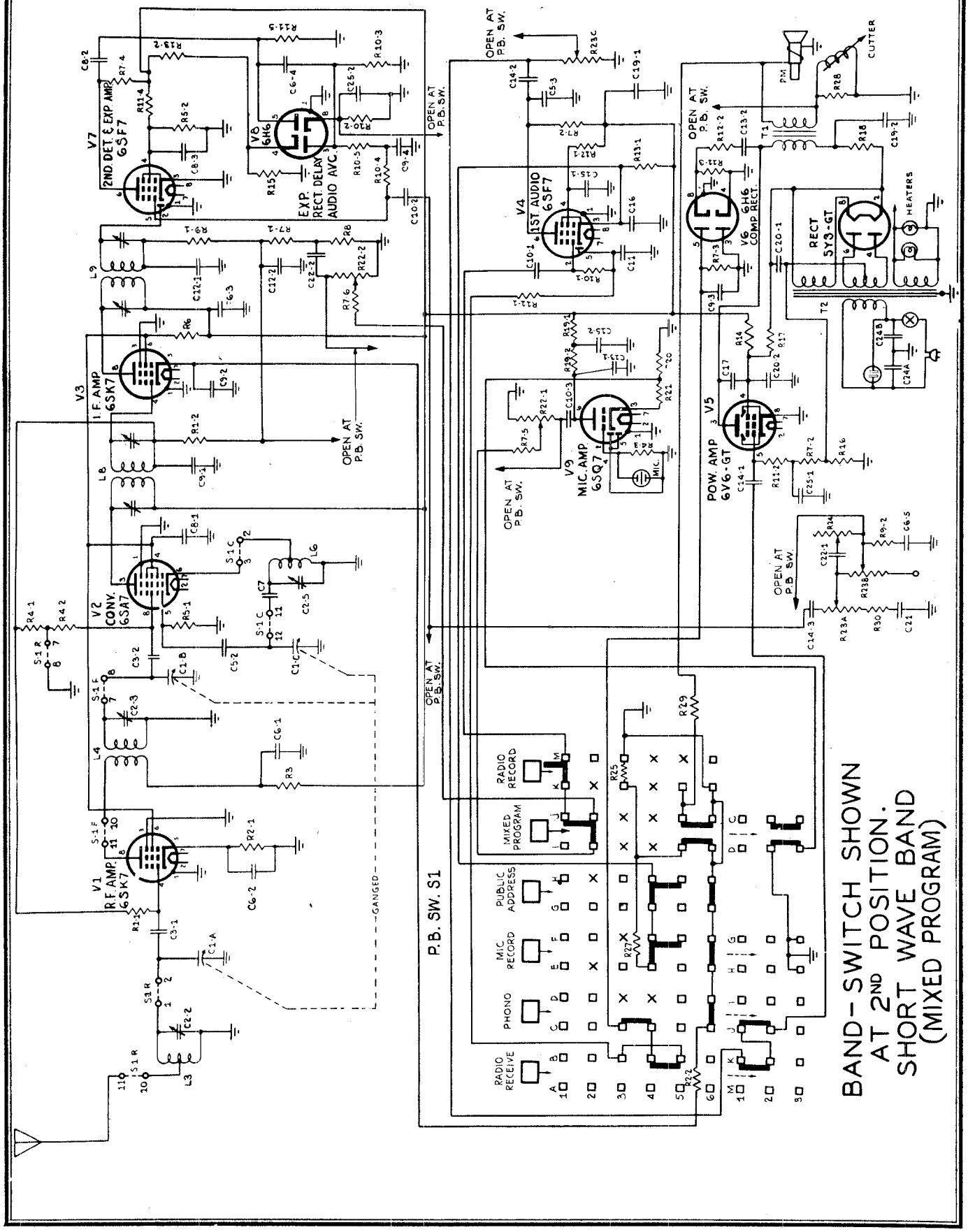

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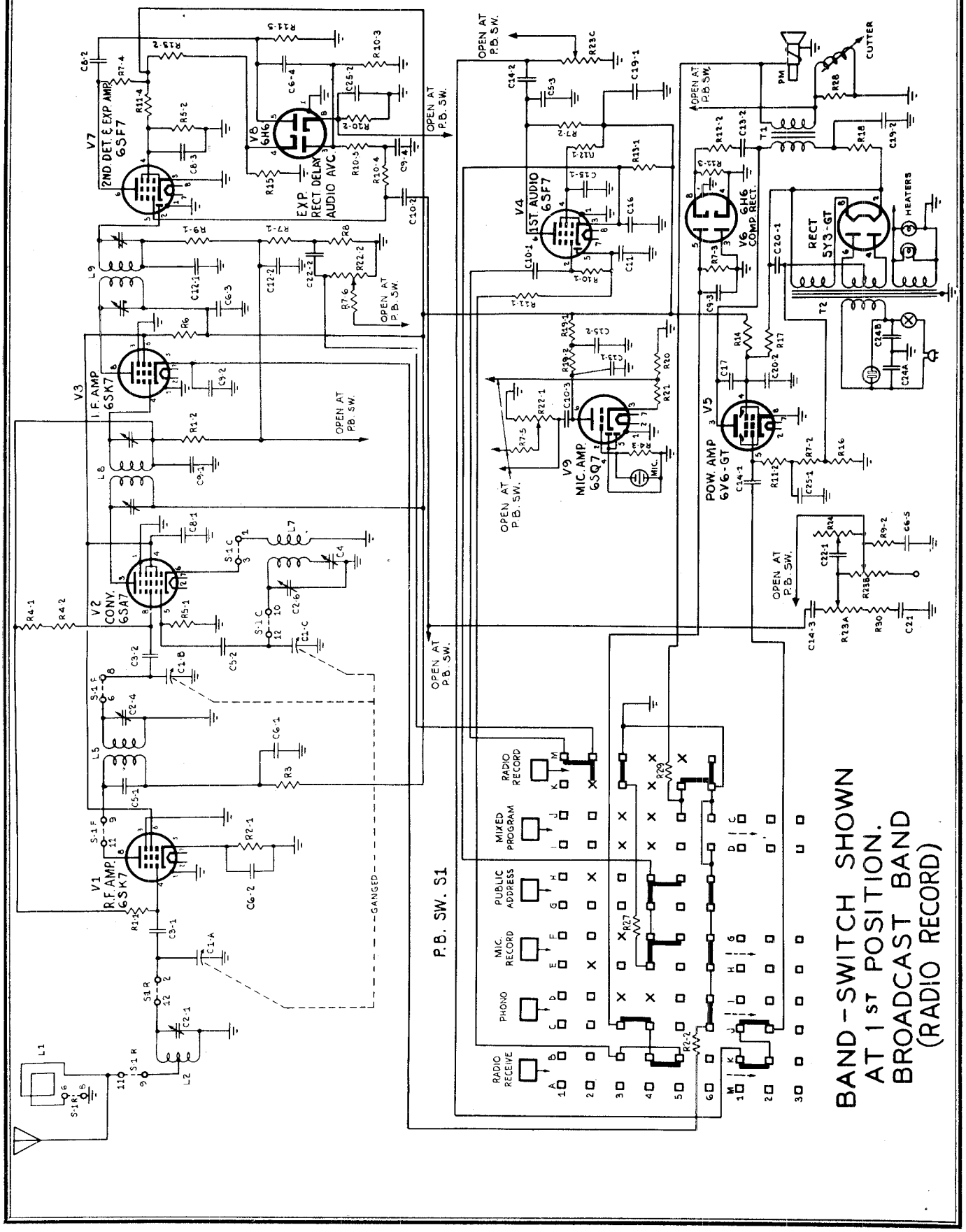

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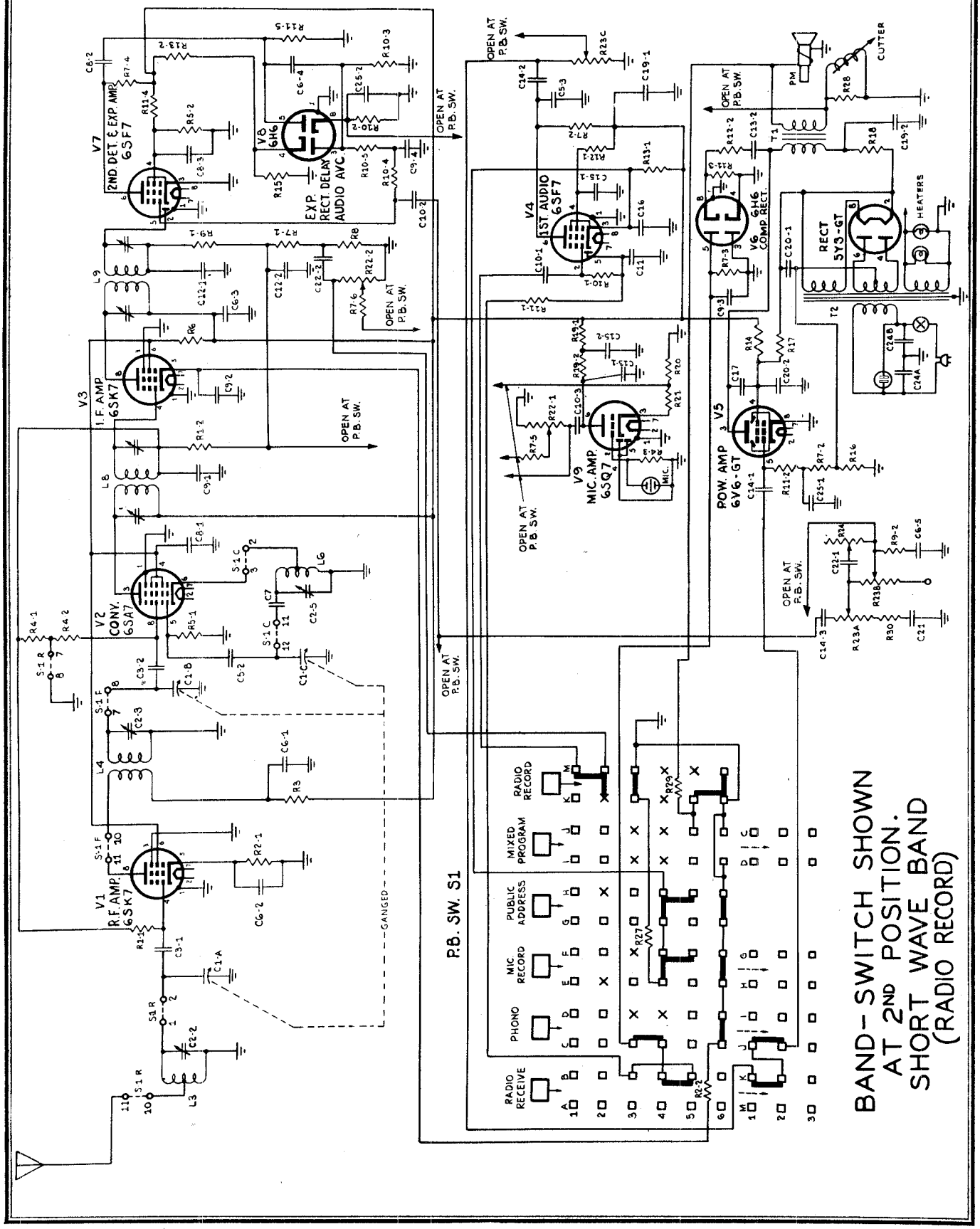

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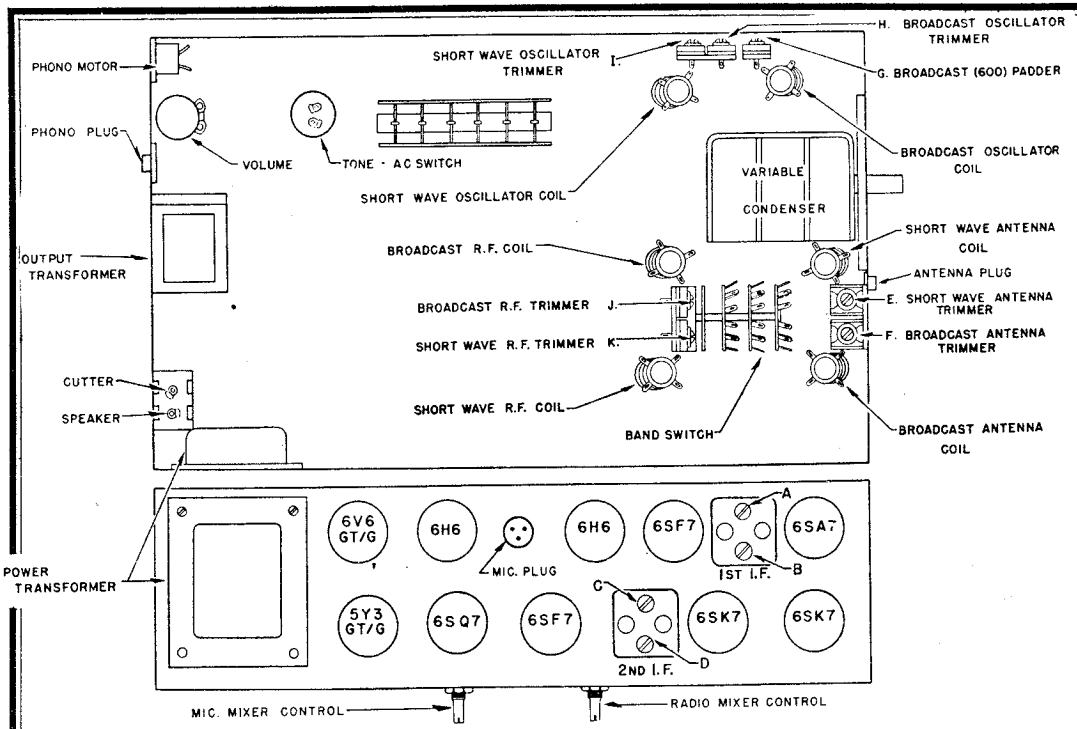

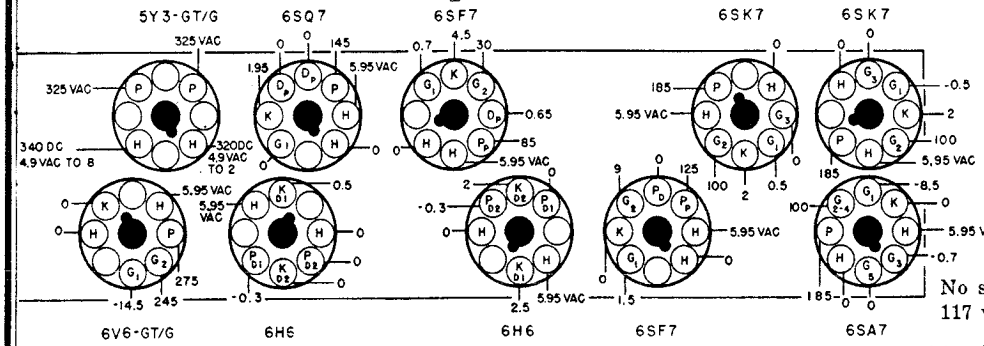

No signal.
117 volts A.C. line voltage.

All voltages measured from socket contacts to chassis. D.C. voltages measured with a vacuum tube voltmeter. A.C. voltages measured with a 1000 ohm per volt A.C. meter.

Volume and tone controls maximum.

Band switch in standard broadcast position.

Compression switched out of Radio Receive by breaking contact from B-4 to B-5.

Compression switched out of Phonograph by breaking contact from C-3 to C-4.

Compression is in circuit on ALL RECORD POSITIONS and PUBLIC ADDRESS.

All voltages shown are positive D.C. unless otherwise noted.

Expanson is switched into grid of 1st audio, (6SF7) when "RADIO RECEIVE" button is depressed by connecting switch contacts B-5 and B-6.

Expansion is switched into grid of 1st audio, (6SF7) when "PHONO" button is depressed by connecting switch contacts C-4 and C-5.

Expansion is in the circuit ONLY when the "RADIO RECEIVE" and "PHONO" buttons are depressed.

ALIGNMENT PROCEDURE

Alignment procedure consists of the 7 steps outlined in the Alignment Procedure Chart.

Connect the test oscillator leads to the mixer grid and ground in series with an .01 Mfd. capacitor (dummy load) for step No. 1, I.F. Alignment. Upon completing this step, "Rock" the variable condenser to assure that the I.F.s have not been aligned to the image frequency.

Use the Hazeltine Standard Test Loop #1150 for the balance of the alignment. Place the test loop about two feet from the receiver loop in a vertical position.

STEP	CONNECT TEST OSC. TO	TEST OSC. SETTING	POINTER SETTING	ADJUST FOR MAX. OUTPUT
1	Mixer Grid & Grd. .01 Mfd. Cap.	455 KC	540 KC	Trimmers A, B, C & D
2	Standard Test Loop*	1750 KC	1750 KC	Trimmer H to 1750 KC
3	Standard Test Loop*	600 KC	600 KC	Trimmer G to 600 KC
4	Standard Test Loop*	1500 KC	1500 KC	Trimmers F & J
5	Repeat Steps	2, 3, & 4		
6	Standard Test Loop*	18 MC	18 MC	Trimmer I to 18 MC
7	Standard Test Loop*	15 MC	15 MC	Trimmers E & K

*NOTE: Hazeltine Test Loop #1150.

BRIEF DESCRIPTION OF EXPANDER AND COMPRESSOR CIRCUITS

V7 6SF7 and V6 6H6 embrace the expansion circuit. Referring to Figure 3, Schematic Diagram, it will be noted that volume expansion is in the circuit at all times when the Phono or Radio receive buttons are depressed. V7, 6SF7 serves as the 2nd detector and expansion amplifier. V6, 6H6 functions as the expansion rectifier in one diode section and furnishes delayed audio AVC in the other diode section. V8, 6H6 functions as the compressor rectifier.

HOW TO CHECK EXPANSION VOLTAGE

Feed a 1 volt (RMS) 400 cycle signal into the Phono input plug. Make certain the Phono button is depressed. Connect the leads of a vacuum tube voltmeter* to the location indicated on Figure 3, Schematic Diagram and ground. The voltage at this point should be between 3 and 4 volts positive D.C. As a cross check measure the cathode voltage of V4, 6SF7, which should read about 5 volts D.C. The expansion voltage should be about 1 volt less.

HOW TO CHECK COMPRESSION VOLTAGE

Depress the Radio Record button. Feed a 1 volt (RMS) 400 cycle signal into the diode return of the 2nd I.F. (brown lead). In the same manner outlined in the preceding paragraph, measure the compression voltage, which should be approximately a minus 2 to 3 volts.

*VTVM: Input loading above 10 megohms.

MODEL 1054

PACKARD BELL CO.

PART NO.	REF. SYMBOL	DESCRIPTION
10505		Assembly, switch arm
10506		Assembly, pointer
11007A		Arm, band switch drive coupling
18037C		Bracket, variable capacitor Mtg.
18038B		Bracket, band switch Mtg.
18039A		Bracket, planetary
18043A		Bracket, dial
18057		Bracket, record changer shipping
21018C		Cabinet, radio
21026		Cabinet, record album
23500C	C1-A, B & C	Capacitor, variable: 3 gang with pulley
23400A	C2-1	Capacitor, trimmer: dual 30 Mmf.
	C2-2	
	C2-3	
	C2-4	
	C2-5	
	C2-6	
23228	C3-1	Capacitor, mica: 220 Mmf. 20%
	C3-2	
23402	C4	Capacitor, padder: 300 to 800 Mmf.
23225	C5-1	Capacitor, mica: 47 Mmf. 20%
	C5-2	
	C5-3	
23006	C6-1	Capacitor, paper: .05 Mfd. 200 volt
	C6-2	
	C6-3	
	C6-4	
	C6-5	
23207A	C7	Capacitor, mica: 4900 Mmf. 5%
23010	C8-1	Capacitor, paper: .05 Mfd. 600 volt
	C8-2	
	C8-3	
23017	C9-1	Capacitor, paper: .05 Mfd. 200 volt
	C9-2	
	C9-3	
	C9-4	
23004	C10-1	Capacitor, paper: .005 Mfd. 600 volt
	C10-2	
	C10-3	
23019	C11	Capacitor, paper: .1 Mfd. 200 volt
23001	C13-1	Capacitor, paper: .001 Mfd. 600 volt
	C13-2	
23007	C14-1	Capacitor, paper: .02 Mfd. 600 volt
	C14-2	
	C14-3	
23020	C15-1	Capacitor, paper: .2 Mfd. 400 volt
	C15-2	
24006	C16	Capacitor, electrolytic: 25 Mfd. 25 WV
23002	C17	Capacitor, paper: .002 Mfd. 600 volt
24002	C19-1	Capacitor, electrolytic: 10 Mfd. 450
	C19-2	WV
24001	C20-1	Capacitor, electrolytic: 20 Mfd. 450
	C20-2	WV
23208	C21	Capacitor, mica: 4000 Mmf. 10%
23016	C22-1	Capacitor, paper: .003 Mfd. 600 volt
	C22-2	
23901	C24A & B	Capacitor, paper: 2 X .006 Mfd. 600 volt (metal case)
23018	C25-1	Capacitor, paper: .2 Mfd. 200 volt
	C25-2	
28005A		Clip ,antenna
29306	L1	Loop, antenna
29400A	L2	Coil, antenna: Std. broadcast
29401A	L3	Coil, antenna: short wave
29101A	L4	Coil, R.F.: short wave
29102A	L5	Coil, R.F.: Std. broadcast
29201A	L6	Coil, oscillator: short wave
29205A	L7	Coil, oscillator: Std. broadcast
29004D	L8	Coil, 1st I.F.: 455 KC
29007	L9	Coil, 2nd I.F.: 455 KC
32003C		Cord, AC: 8'
32015		Cord, AC: 2½'
35002		Conductor, variable capacitor ground
36020		Cutter cartridge
38021A		Dial scale
40101B		Drive, planetary
40111B		Drive, band switch
41005		Escutcheon, dial
50038		Insulator, antenna connector
52019A		Knob, control: bleach (set screw)
52020A		Knob, control: bleach (slip on)
52021A		Knob, control: walnut (set screw)
52022A		Knob, control: walnut (slip on)
52023		Knob, push button: walnut
52024A		Knob, push button: bleach
54001		Lamp, dial: T-44; bayonet base
57001B		Microphone with cable
57002		Microphone handle
57003		Microphone base
58004B		Record changer
59001		Needle, permanent: phono
59002		Needle, cutter: (stylus)
62013A		Panel, cabinet back
63008		Pick-up, crystal: cartridge (phono)
66005		Plug, microphone
68029		Operating instructions
68042		Decal, volume control
68043		Decal, tone control
68044		Decal, push buttons
68045		Decal, tuning

PART NO.	REF. SYMBOL	DESCRIPTION
68048		Decal, band switch
69003A		Pulley, dial
69007		Pulley, drive: 50 cycle operation
69001		Pulley, dial
73055	R1-1	Resistor, carbon: 2.2 megohms, 20%,
	R1-2	½ watt
73017	R2-1	Resistor, carbon: 220 ohms, 10%, ½
	R2-2	watt
73026	R3	Resistor, carbon: 1200 ohms, 10%, ½ watt
73053	R4-1	Resistor, carbon: 1 megohm, 20%, ½
	R4-2	watt
	R4-3	
73041	R5-1	Resistor, carbon: 22,000 ohms, 10%,
	R5-2	½ watt
73127	R6	Resistor, carbon: 5600 ohms, 10%, 2 watt
73049	R7-1	Resistor, carbon: 220,000 ohms, 20%,
	R7-2	½ watt
	R7-3	
	R7-4	
	R7-5	
	R7-6	
	R7-7	
73060	R9-1	Resistor, carbon: 56,000 ohms, 10%, ½
	R9-2	watt
73042	R8	Resistor, carbon: 27,000 ohms, 10%, ½ watt
73057	R10-1	Resistor, carbon: 4.7 megohms, 20%,
	R10-2	½ watt
	R10-3	
	R10-4	
	R10-5	
73051	R11-1	Resistor, carbon, 470,000 ohms, 20%,
	R11-2	½ watt
	R11-3	
	R11-4	
	R11-5	
73054	R12-1	Resistor, carbon: 1.5 meghoms, 20%,
	R12-2	½ watt
73076	R13-1	Resistor, carbon: 56,000 ohms, 10%, 1
	R13-2	watt
73126	R14	Resistor, carbon: 1500 ohms, 10%, 2 watt
73022	R15	Resistor, carbon: 560 ohms, 10%, ½ watt
73077	R16	Resistor, carbon: 180 ohms, 10%, 2 watt
73907	R17	Resistor, wire wound: 2500 ohms, 10%, 5 watt
73120	R18	Resistor, carbon: 1000 ohms, 10%, 2 watt
73047	R19-1	Resistor, carbon: 100,000 ohms, 20%,
	R19-2	½ watt
73037	R20	Resistor, carbon: 10,000 ohms, 10%, ½ watt
73030	R21	Resistor, carbon: 2700 ohms, 10%, ½ watt
25800	R22-1	Control, mixer: 500,000 ohms
	R22-2	
25500A	R23A, B & C	Control, volume: 3 section; section A 1 megohm, section B 2 megohms, section C 500,000 ohms
25002A	R24	Control, tone: 3 megohms, with AC switch
73025	R25	Resistor, carbon: 1000 ohms, 10%, ½ watt
73033	R26	Resistor, carbon: 4700 ohms, 10%, ½ watt
73020	R27	Resistor, carbon: 390 ohms, 10%, ½ watt
73903	R28	Resistor, wire wound: 15 ohms, 10%, 1 watt
73910	R29	Resistor, wire wound: .5 ohm, 10%, 1 watt
73039	R30	Resistor, carbon: 15,000 ohms, 10%, ½ watt
78008		Shield, microphone plug
79002		Socket, tube: 8 prong octal; wafer type
79004		Socket, microphone
79005		Socket, antenna & phono
79007		Socket, phono motor
79009		Socket, dial lamp: bayonet base
79018		Socket, speaker & cutter
79021		Socket, tube: 8 prong octal; black bakelite
83701		Speaker, permanent magnet: 10"
84001B		Spring, dial
84011		Spring, push button knob
86001A	S1	Switch, rotary: 3 gang; wafer type; band switch
86301	S2	Switch, push button
86802		Switch, micro: part of automatic cutter stop
89409B	T1	Transformer, output
89006C	T2	Transformer, power

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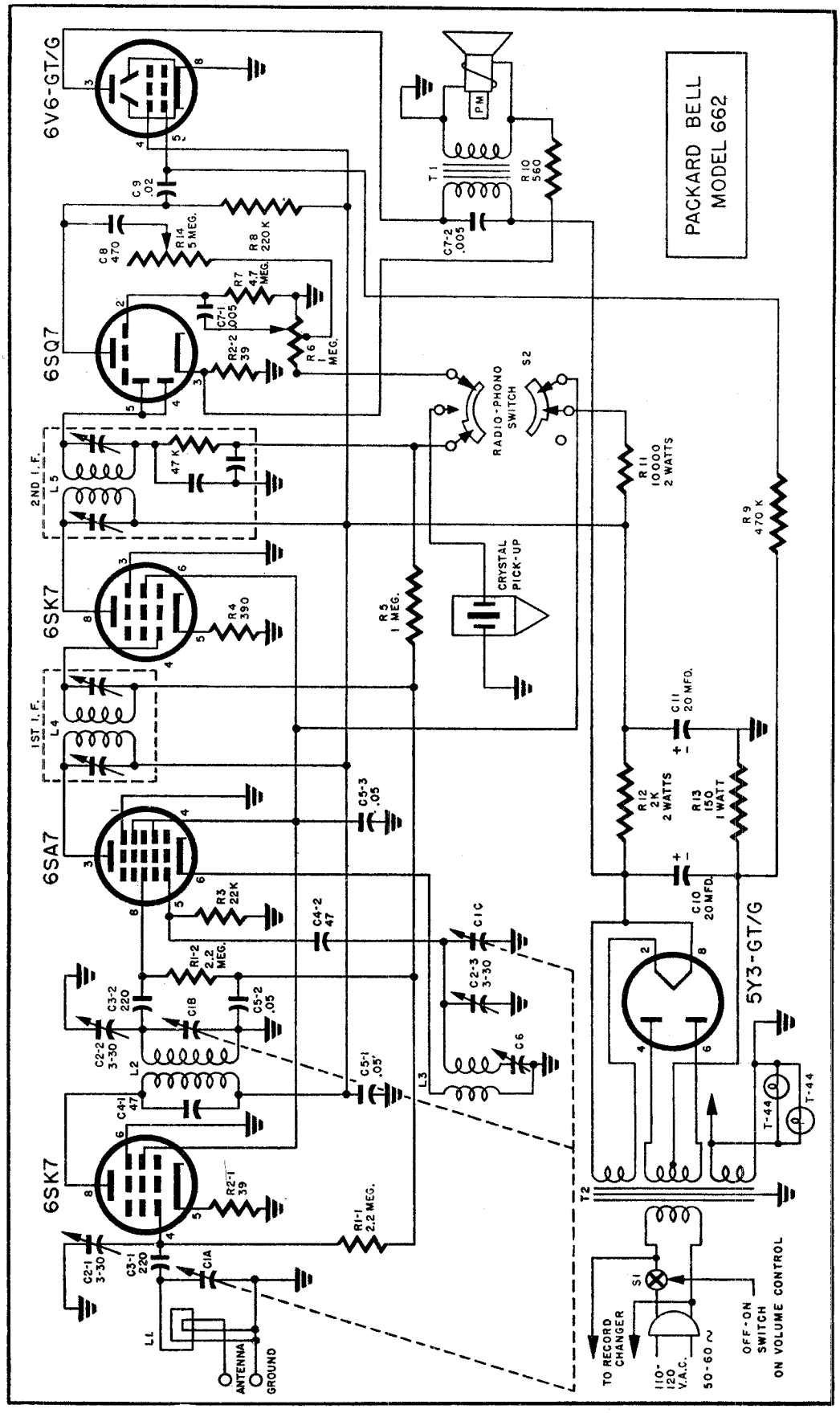

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MODEL 662

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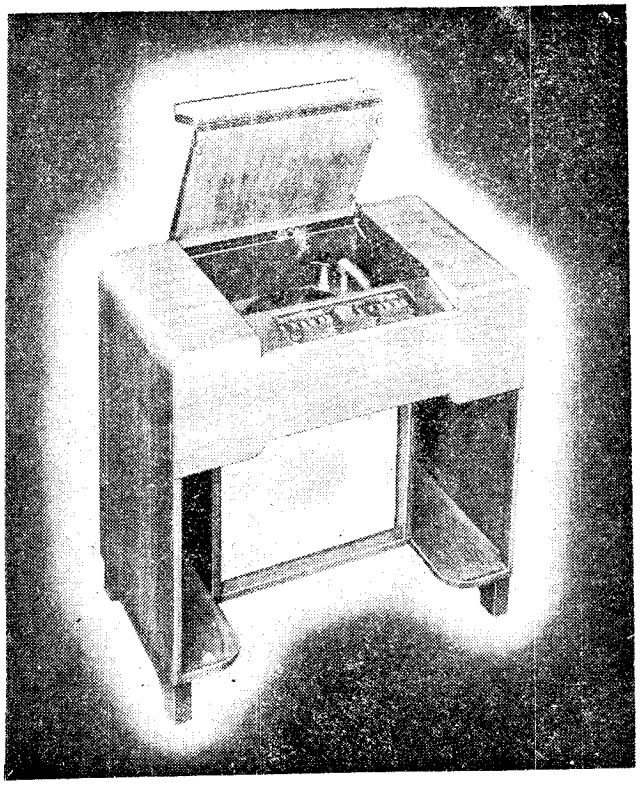

SPECIFICATIONS

Overall Dimensions:
Height . . . . 26⅞" Depth . . . . 18½"
Width . . . . 29⅞" Weight . . . 70 Lbs.

Electrical Rating:
Line Voltage . . . 110-120 volts, 50-60 cycle A.C.
Power Consumption . . . 67 watts

Tuning Frequency Range:
540 to 1740 KC

Intermediate Frequency:
455 KC

Electrical Output:
5 watts maximum

Loudspeaker:
Type . . . Permanent Magnet
Outside Cone Diameter . . . 10"
Voice Coil Impedance . . . 3.5 ohms at 400 cycles
Magnet Rating . . . 4.64 Oz. Alnico 5

Tubes:

Tube	Function
6SK7	R.F. Amplifier
6SA7	Frequency Converter
6SK7	I.F. Amplifier
6SQ7	Detector-Amplifier
6V6-GT/G	Power Amplifier
5Y3-GT/G	Rectifier

GENERAL INFORMATION

Model 662 is a console, radio-phonograph combination with an automatic record changer. This model employs a specially designed high impedance loop antenna and a permanent magnet speaker. It is housed in a wood cabinet of bleach or walnut design.

For service information concerning the record changer, refer to the Model 550 Automatic Record Changer Manual. This record changer is also used on Packard-Bell Model 661.

Chassis mounting procedure will be found on the tube layout-license label.

To Service tubes, remove plate in record changer compartment.

Referring to Figure 4, Record Changer Motor Diagram, a 50 ohm, 10 watt resistor will be noted in series with the motor. This resistor was added after an early run to avoid motor heating on 50 cycle current. The resistor is enclosed in a small metal shield. The addition of this resistor does not, in any manner, detract from the efficiency of the motor on 50 or 60 cycle operation.

ALIGNMENT PROCEDURE

Alignment Procedure consists of the 5 steps outlined in the Alignment Procedure Chart.

Connect the test oscillator leads to the mixer grid and ground in series with an .01 Mfd. capacitor (dummy load) for step No. 1, I.F. Alignment. Upon completion of this step "Rock" the variable condenser to assure that the I.F.s have been aligned to the correct frequency. Output should remain constant for any setting of variable capacitor.

Use the Hazeltine Standard Test Loop No. 1150, or a reasonable substitute, for the balance of the alignment. Place the test loop about two feet from the receiver loop in a vertical position.

It will be noted that all alignment trimmers are accessable without removing the chassis from the cabinet.

IMPORTANT NOTICE: Make certain that each alignment is done with a minimum input signal.

ALIGNMENT CHART

	CONNECT TEST OSC.	TEST OSC. SETTING	POINTER SETTING	ADJUST FOR MAX. OUTPUT
STEP 1	Mixer Grid & Grd. (.01 Mfd. Cap.)	455 KC	540 KC	Trimmers A, B, C & D
2	Standard Test Loop*	1740 KC	1740 KC	Trimmer G to 1740 KC
3	Standard Test Loop*	600 KC	Rock Variable	Padder E
4	Standard Test Loop*	1500 KC	1500 KC	Trimmers F & H
5	Repeat Steps 2, 3, & 4			

NOTE: Hazeltine Test Loop No. 1150 (or a reasonable substitute)

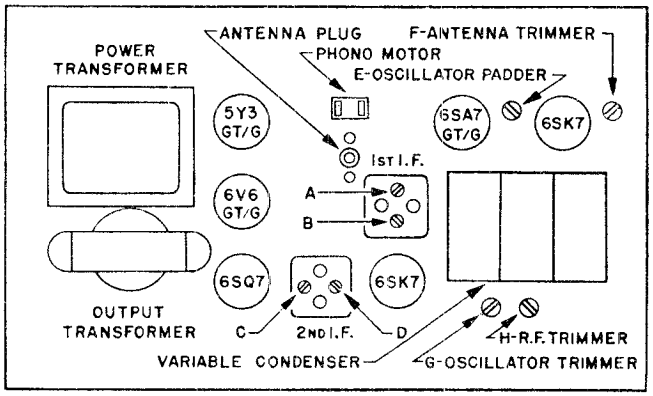

FIGURE 2 TRIMMER LOCATION

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SPECIAL SERVICE INFORMATION

D.C. Resistance Measurements:

1st & 2nd I.F. Coils
Primary . . . 17 ohms
Secondary . . 17 ohms*
Oscillator Coil
Primary . . . . 1 ohm
Secondary . . . 6 ohms
R.F. Coil
Primary . . . 58 ohms
Secondary . . . 4.2 ohms

NOTE: To obtain the true reading of the secondary of the 2nd I.F. Coil, it must be removed from the can. This is so because of the 47K resistor inside the can.

NOTICE: The D.C. Resistance measurements on all coils are subject to a 20% tolerance due to the variation of winding methods.

STAGE GAIN MEASUREMENTS:

Measurements taken with volume and tone controls maximum.
Switch in RADIO position.
AVC shorted out.
Standard Output . . . 50 milliwatts
Dummy Antenna . . . 200 Mmf.

Antenna to R.F. Grid . . . 6X at 1000 KC
R.F. Grid to Converter Grid . . . 7X at 1000 KC
Converter Grid to 1st I.F. Grid . . . 46X at 455 KC
1st I.F. Grid to 2nd Detector . . . 62X at 455 KC
Overall Audio Gain . . . 320X at .5 watts 400 cycles

OSCILLATOR CATHODE VOLTAGES:

Measured at 120 volts AC line voltage with AC vacuum tube voltmeter input loading above 10 megohms.

1500 KC . . . 2.25 volts AC
1000 KC . . . 2.15 volts AC
800 KC . . . 2.3 volts AC
600 KC . . . 2.5 volts AC

All D.C. voltages measured with a vacuum tube voltmeter from socket contacts to chassis. — A.C. voltages measured with a 1000 ohms per volt A.C. meter from socket contacts to chassis. — Volume and tone controls maximum. — Switch in Radio position. — No signal. — All voltages shown are positive D.C. unless otherwise noted.

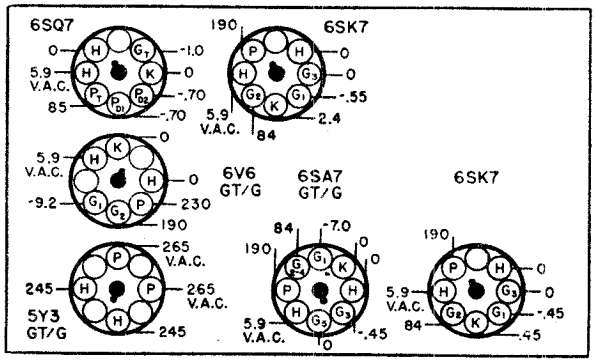

FIGURE 1 SOCKET VOLTAGES

TABLE OF REPLACEABLE PARTS

PART NO.	REF. SYMBOL	DESCRIPTION
19010		Bushing, drive
21036G		Cabinet
23500C	C1A,B&C	Capacitor, variable: 3 gang
23401	C2-1 C2-2	Capacitor, trimmer: 3-30 Mmf.
23406	C2-3	Capacitor, trimmer: 3-30 Mmf.
23228	C3-1 C3-2	Capacitor, mica: 220 Mmf. 20%
23225	C4-1 C4-2	Capacitor, mica: 47 Mmf. 20%
23009	C5-1 C5-2 C5-3	Capacitor, paper: .05 Mfd. 400 volt
23402	C6	Capacitor, padder: 300-800 Mmf.
23004	C7-1 C7-2	Capacitor, paper: .005 Mfd. 600 volt
23229	C8	Capacitor, mica: 470 Mmf. 20%
23007	C9	Capacitor, paper: .02 Mfd. 600 volt
24001-3	C10	Capacitor, electrolytic: 20 Mfd. 450 volt
24003	C11	Capacitor, electrolytic: 20 Mfd. 350 volt
29310A	L1	Loop antenna, high impedance
29102A	L2	Coil, R.F.
29205A	L3	Coil, oscillator
29004D	L4	Coil, 1st I.F.: 455 KC
29007	L5	Coil, 2nd I.F.: 455 KC
32003C		Cord, A.C.: 8'
34002D		Cover, volume control
38034A		Dial scale
40002		Dial drive cord
52001A		Knob. plastic
54001		Dial lamp, bayonet base: 250 M A
58008		Record changer
59001		Needle, phono: permanent
65032		Plate, front
66004		Plug, speaker & phono
66005		Plug, antenna
66008		Plug, A.C.
67004		Pointer slide
67014		Pointer, wire
73055	R1-1 R1-2	Resistor, carbon: 2.2 megohms, 20%, ½ watt
73008	R2-1 R2-2	Resistor, carbon: 39 ohms, 10%, ½ watt
73041	R3	Resistor, carbon: 22,000 ohms, 10%, ½ watt
73020	R4	Resistor, carbon: 390 ohms, 10%, ½ watt
73053	R5	Resistor, carbon: 1 megohm, 20%, ½ watt
25010B	R6 & S1	Control, volume: 1 megohm, tapped at 200,000 ohms; with A.C. switch
73057	R7	Resistor, carbon: 4.7 megohms, 20%, ½ watt
73049	R8	Resistor, carbon: 220,000 ohms, 20%, ½ watt
73051	R9	Resistor, carbon: 470,000 ohms, 20%, ½ watt
73022	R10	Resistor, carbon: 560 ohms, 10%, ½ watt
73125	R11	Resistor, carbon: 10,000 ohms, 10%, 2 watt
73214	R12	Resistor, carbon: 2000 ohms, 10%, 2 watt
73081	R13	Resistor, carbon: 150 ohms, 10%, 1 watt
25506B	R14	Control, tone: 5 megohms
73911	R15	Resistor, wire wound: 50 ohms, 10 watt
77014E		Shaft, dial
78028		Shield, light
79002		Socket, tube: 8 prong octal, wafer type
79004		Socket, antenna
79005		Socket, phono
79007		Socket, A.C.
79010B		Socket, dial lamp: bayonet base
83703		Speaker, permanent magnet: 10"
84001B		Spring, dial cord
84003A		Spring, knob
84015		Spring, conical: changer mounting
86008	S2	Switch, rotary: wafer type, single section, phono-radio
89409C	T1	Transformer, output
89010A	T2	Transformer, power

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MODEL 662

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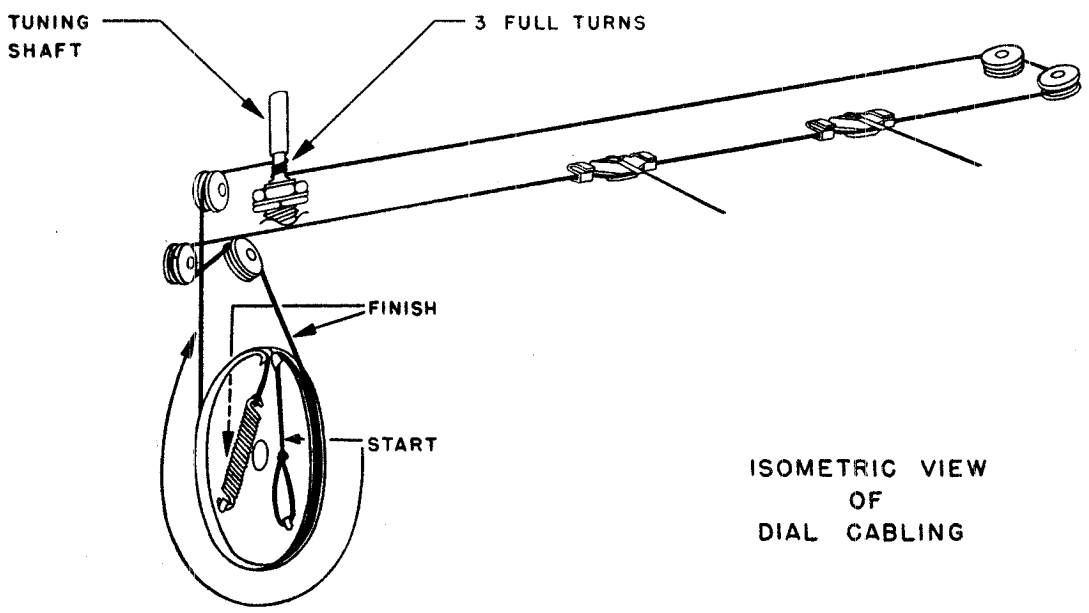

FIGURE 3

Dial Cord Diagram

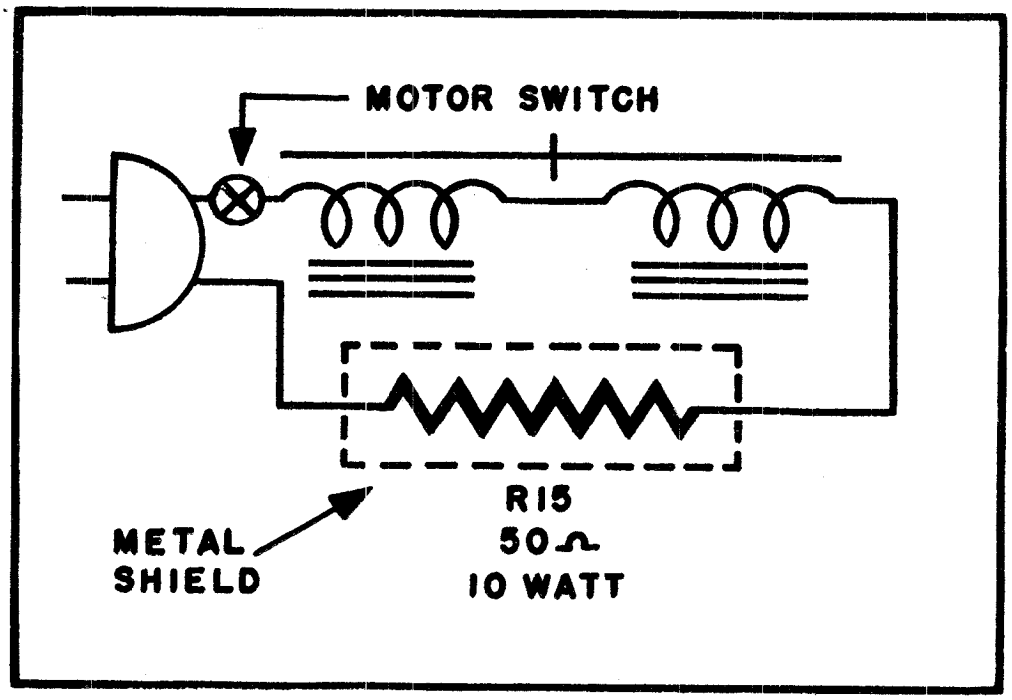

FIGURE 4

Record Changer Motor Diagram

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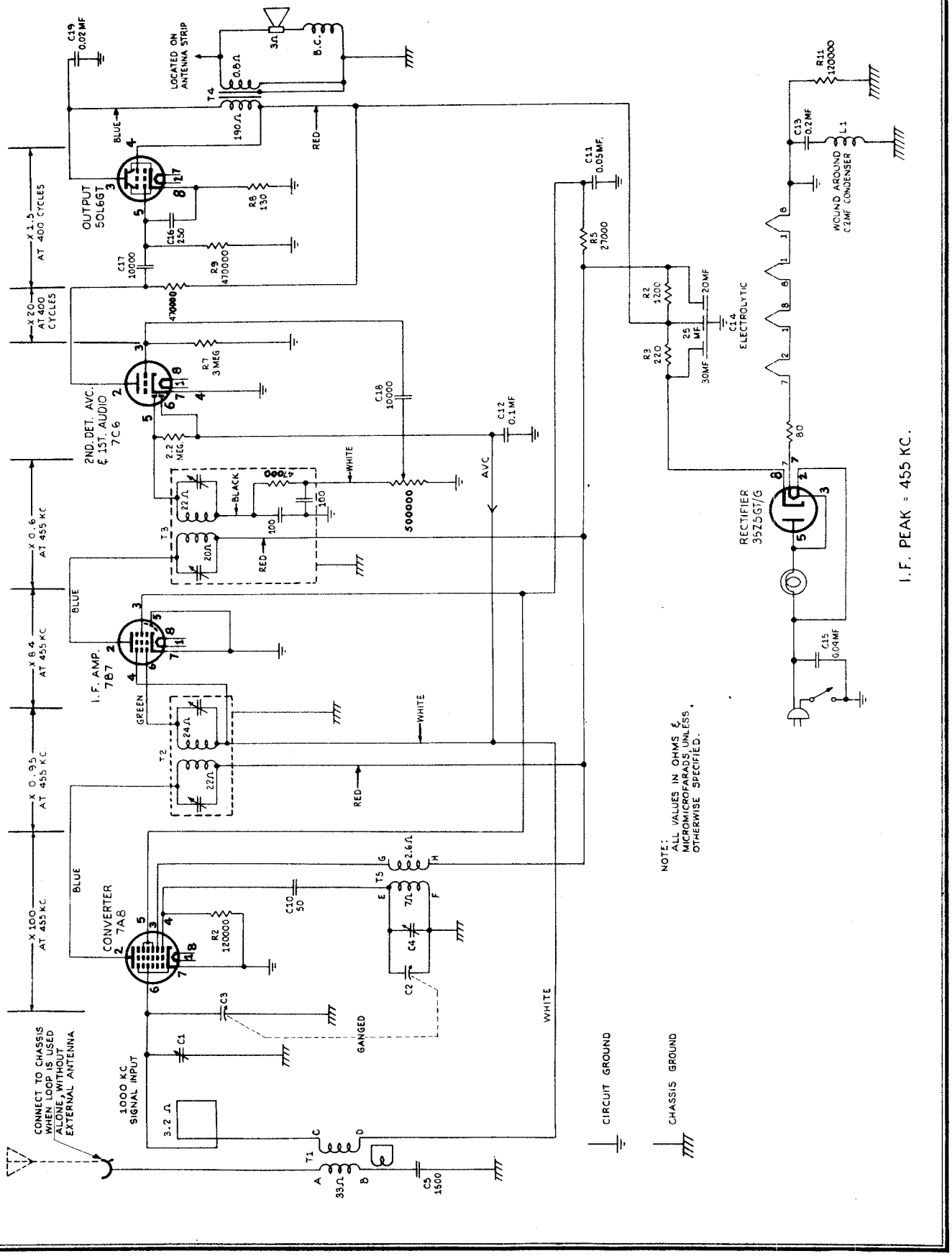
CONVERTER 7A8
I.F. AMP. 7B7
2ND. DET. AVC. & 1ST. AUDIO 7C6
OUTPUT 50L6GT
RECTIFIER 35Z5GT/G
X 100 AT 455 KC.
X 0.95 AT 455 KC.
X 8.4 AT 455 KC.
X 0.6 AT 455 KC.
X 20 AT 400 CYCLES
X 1.5 AT 400 CYCLES
1000 KC SIGNAL INPUT
CONNECT TO CHASSIS WHEN LOOP IS USED ALONE, WITHOUT EXTERNAL ANTENNA
LOCATED ON ANTENNA STRIP
WOUND AROUND C12MF CONDENSER
GANGED
AVC
CIRCUIT GROUND
CHASSIS GROUND
I.F. PEAK = 455 KC.
NOTE: ALL VALUES IN OHMS & MICROMICROFARADS, UNLESS OTHERWISE SPECIFIED.

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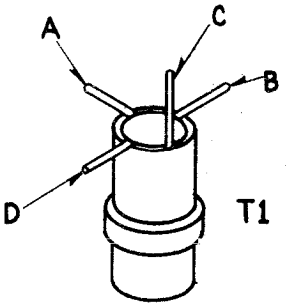
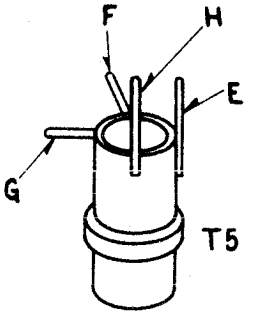
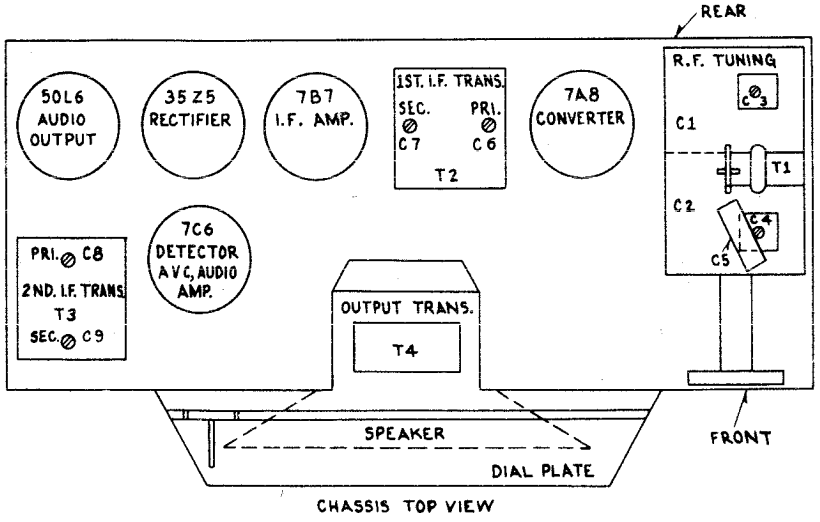
ALIGNMENT

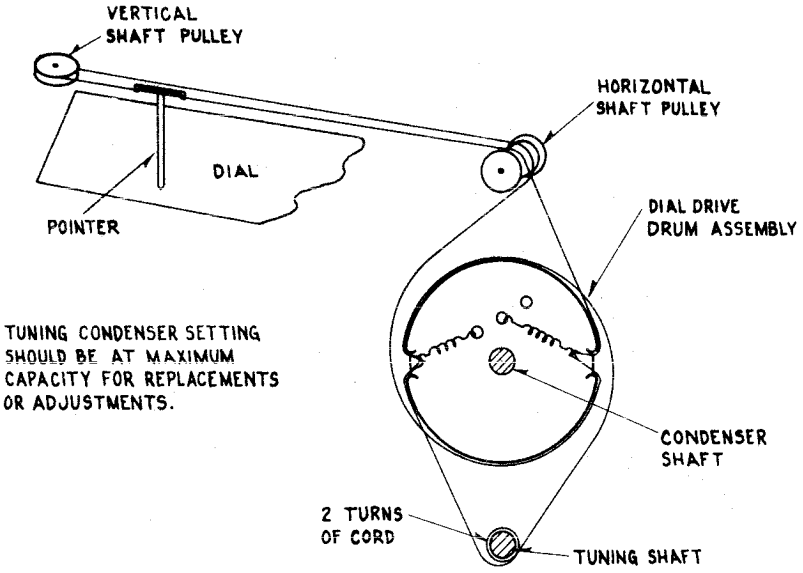
PHILCO 46-250

Alignment may be accomplished with the chassis in the cabinet if a small alignment screwdriver is used. Connect the output meter between the left hand terminal (high) and center terminal (low) of the chassis antenna terminal strip. Connect the signal generator to the standard Hazeltine loop Model 1150 and couple it loosely to the receiver loop. The volume control should be set at maximum. The tuning condenser plates should be fully meshed when the dial pointer is at the index mark at the low frequency end of the dial. The generator output should always be just sufficient to obtain a minimum indication on the output meter. Set the signal generator to 455 kc. and adjust the i-f trimmers for maximum meter deflection in the following sequence: C9, C8, C7, C6. Set the generator and receiver to 1600 kc. and adjust the oscillator trimmer C4 for maximum output. Set the generator and receiver to 1500 kc. and adjust the r-f trimmer C1 for maximum output.









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TUBE	PIN	VTVM	20,000 OHMS VTVM	1,000 OHMS VTVM	RESISTANCE TO CIRCUIT GROUND
7A8	1	0	0	0	20
	2	98	96	96	10,000,000
	3	98	96	96	10,000,000
	4	-10	-9.5	-4	115,000
	5	44	44	44	10,000,000
	6	-1	-0.5	-0.5	INFINITE
	7	0	0	0	0
	8	0	0	0	20
7B7	1	44	42	42	30
	2	-1	-0.5	-0.5	10,000,000
	3	0	0	0	10,000,000
	4	-1	-0.5	-0.5	2,800,000
	5	0	0	0	0
	6	0	0	0	2,800,000
	7	0	0	0	0
	8	96	96	96	26
7C6	1	0	0	0	20
	2	54	50	50	10,000,000
	3	-0.8	-0.4	-0.4	3,500,000
	4	0	0	0	0
	5	-1	-0.2	-0.2	525,000
	6	-1	-0.5	-0.4	3,000,000
	7	0	0	0	0
	8	0	0	0	0
50L6GT	1	0	0	0	INFINITE
	2	0	0	0	30
	3	100	96	96	10,000,000
	4	96	96	96	10,000,000
	5	0	0	0	500,000
	6	0	0	0	0
	7	-0.6	-0.6	-0.6	65
	8	6	6	6	130
35Z5GT/G	1	0	0	0	INFINITE
	2	0	0	0	170
	3	-0.5	-1	-1	168
	4	96	96	96	10,000,000
	5	-0.5	-1	-1	165
	6	96	96	96	10,000,000
	7	-0.5	-1	-1	140
	8	118	118	118	10,000,000

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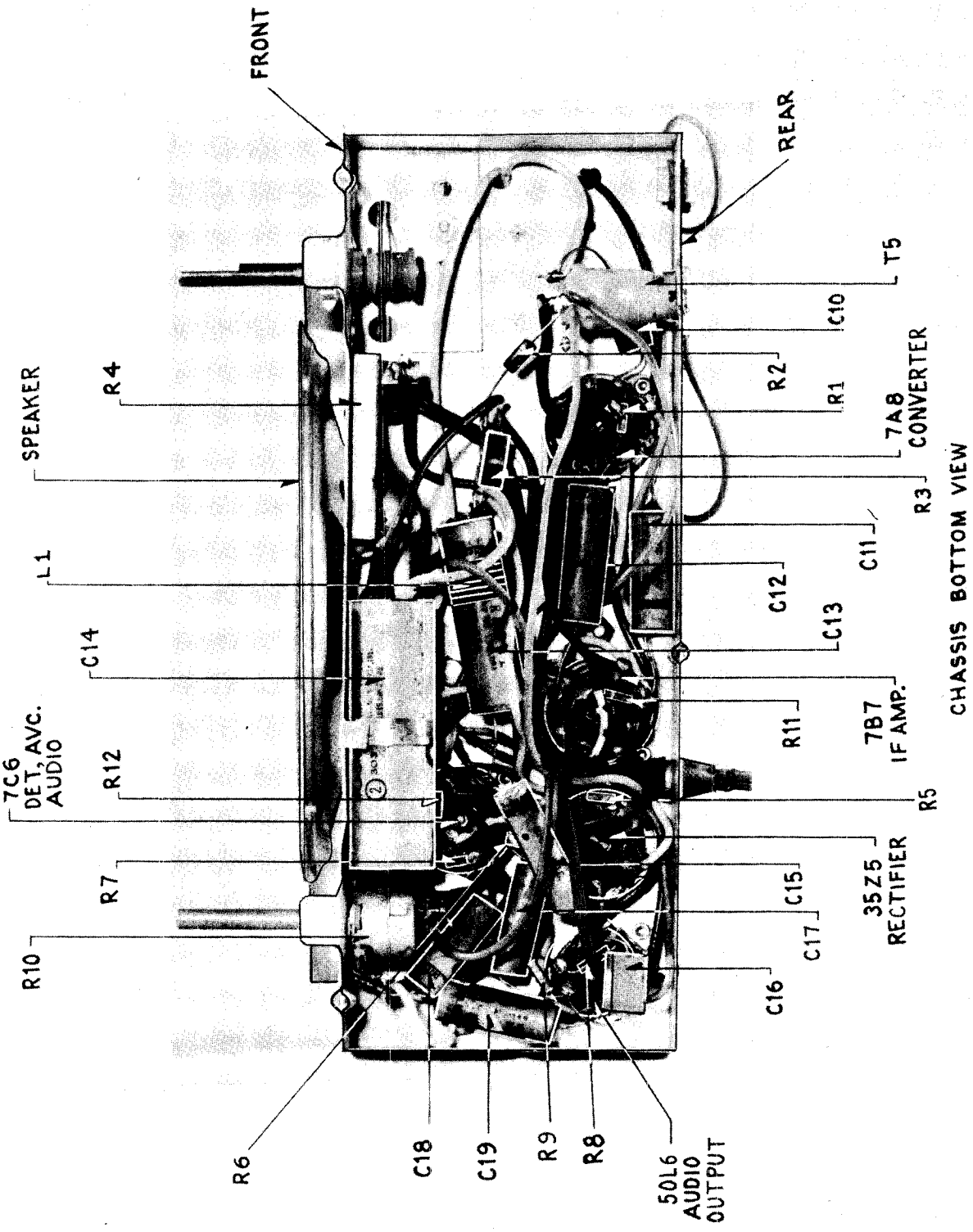

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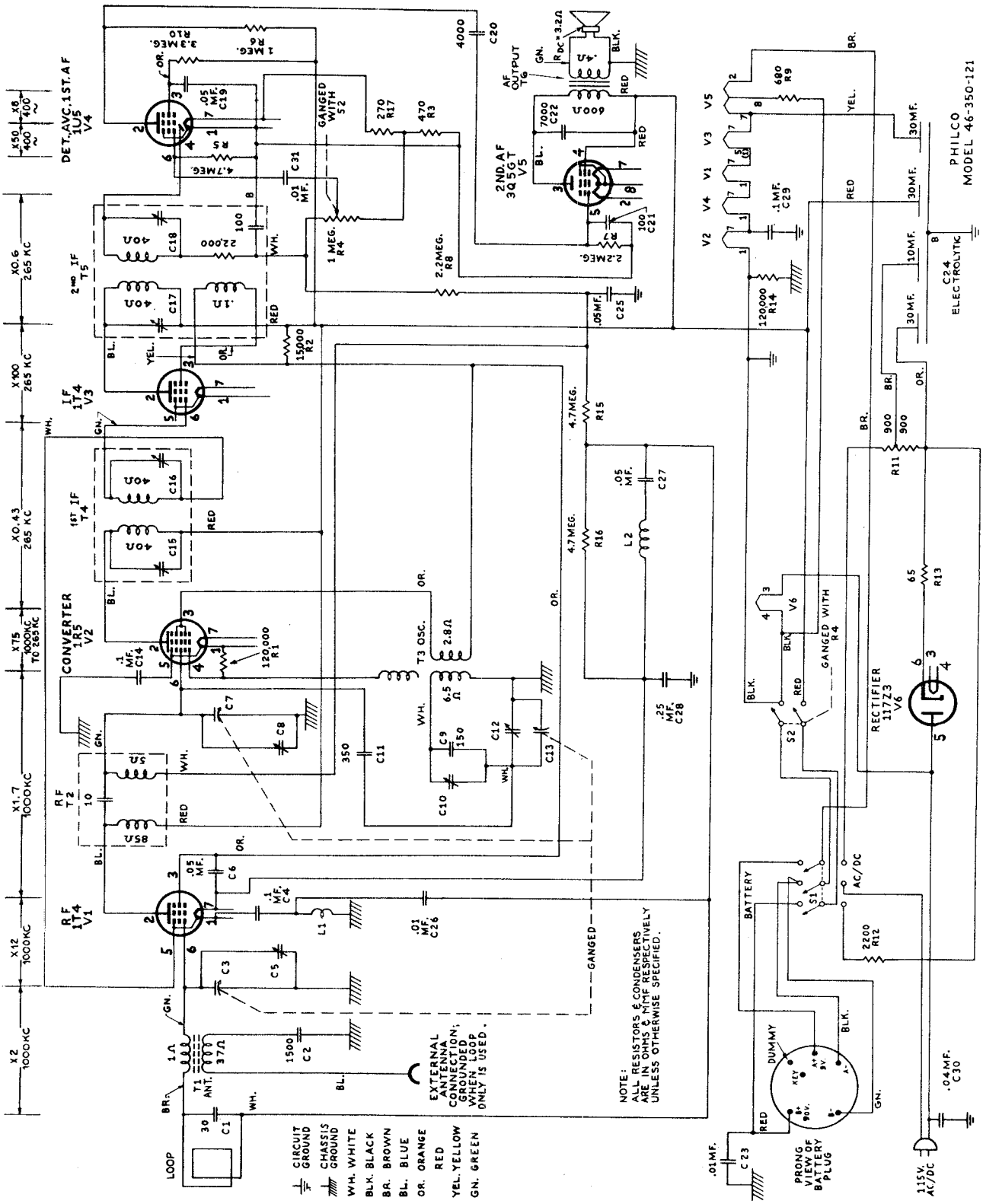

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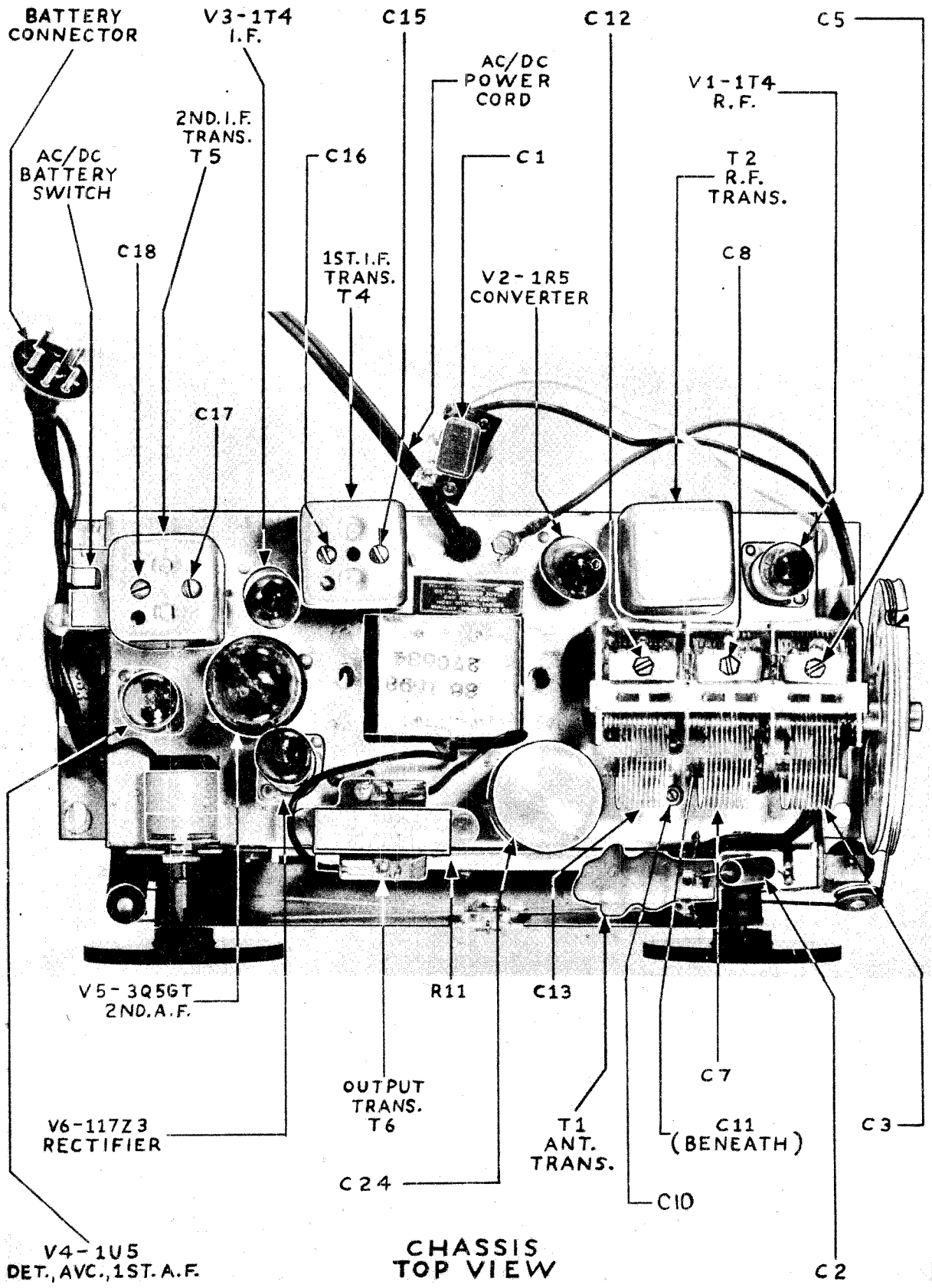

CHASSIS TOP VIEW

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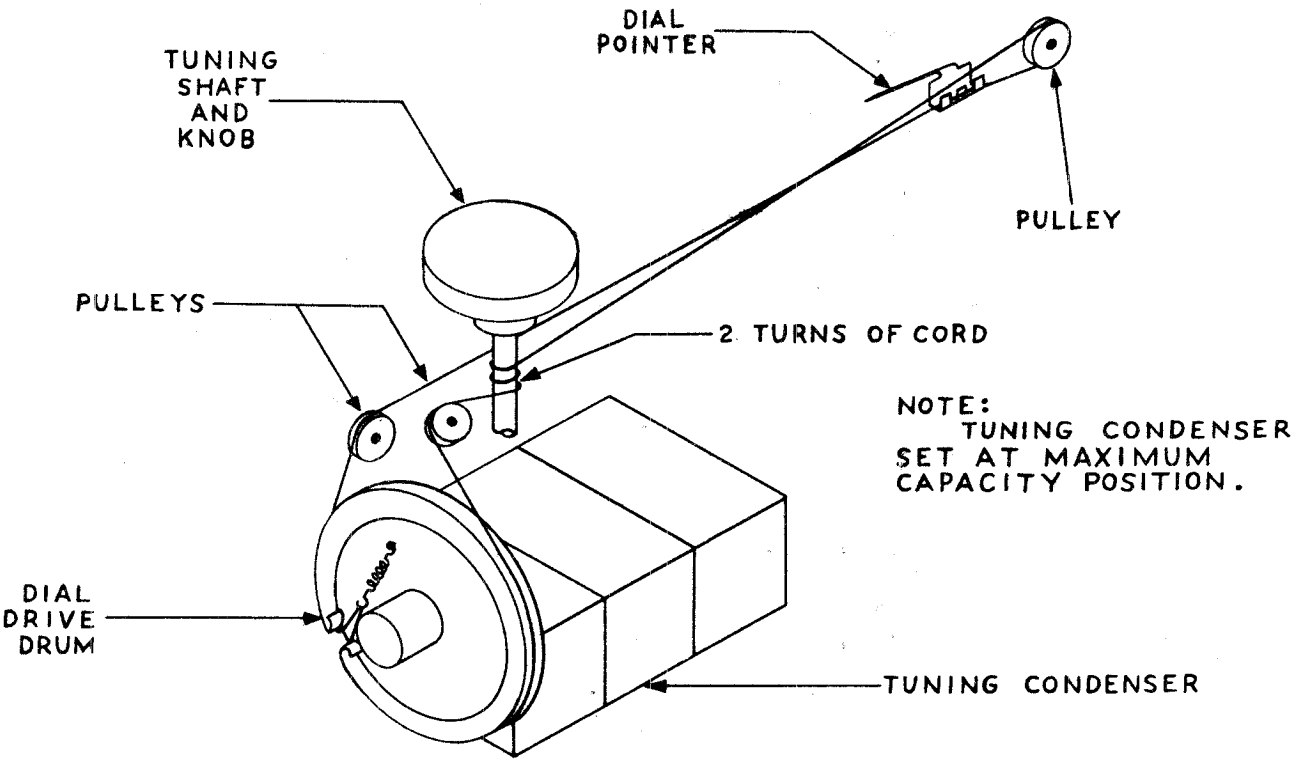
ALIGNMENT

PHILCO 46-350

The receiver should be aligned with the chassis installed in the cabinet. Connect the output meter from the voice coil lug (green wire) on the speaker to ground. Disconnect the blue external antenna lead from ground. Connect the signal generator through a .01 mf condenser to the external antenna lead. Set the receiver volume control at maximum. The tuning condenser should be fully meshed when the dial pointer is at the index mark at the low frequency end of the dial. The signal generator output should at all times be just sufficient to obtain a minimum deflection on the output meter. Set the signal generator to 265 kc. and adjust the intermediate frequency amplifier transformer trimmers for maximum meter deflection in the following sequence: C18, C17, C16, C15. Set the generator and receiver to 1600 kc. and adjust the oscillator shunt trimmer C12 for maximum output. Set the generator and receiver to 580 kc. and adjust the oscillator series padder C10 for maximum output. Proper low frequency adjustment of the oscillator requires rocking the receiver dial slightly while adjusting this trimmer for maximum output. Repeat the adjustment of the oscillator shunt trimmer C12 at 1600 kc. Set the generator and receiver to 1500 kc. and adjust the mixer trimmer C8 and the r-f trimmer C5 for maximum output.



DIAL DRIVE ASSEMBLY
TOP VIEW

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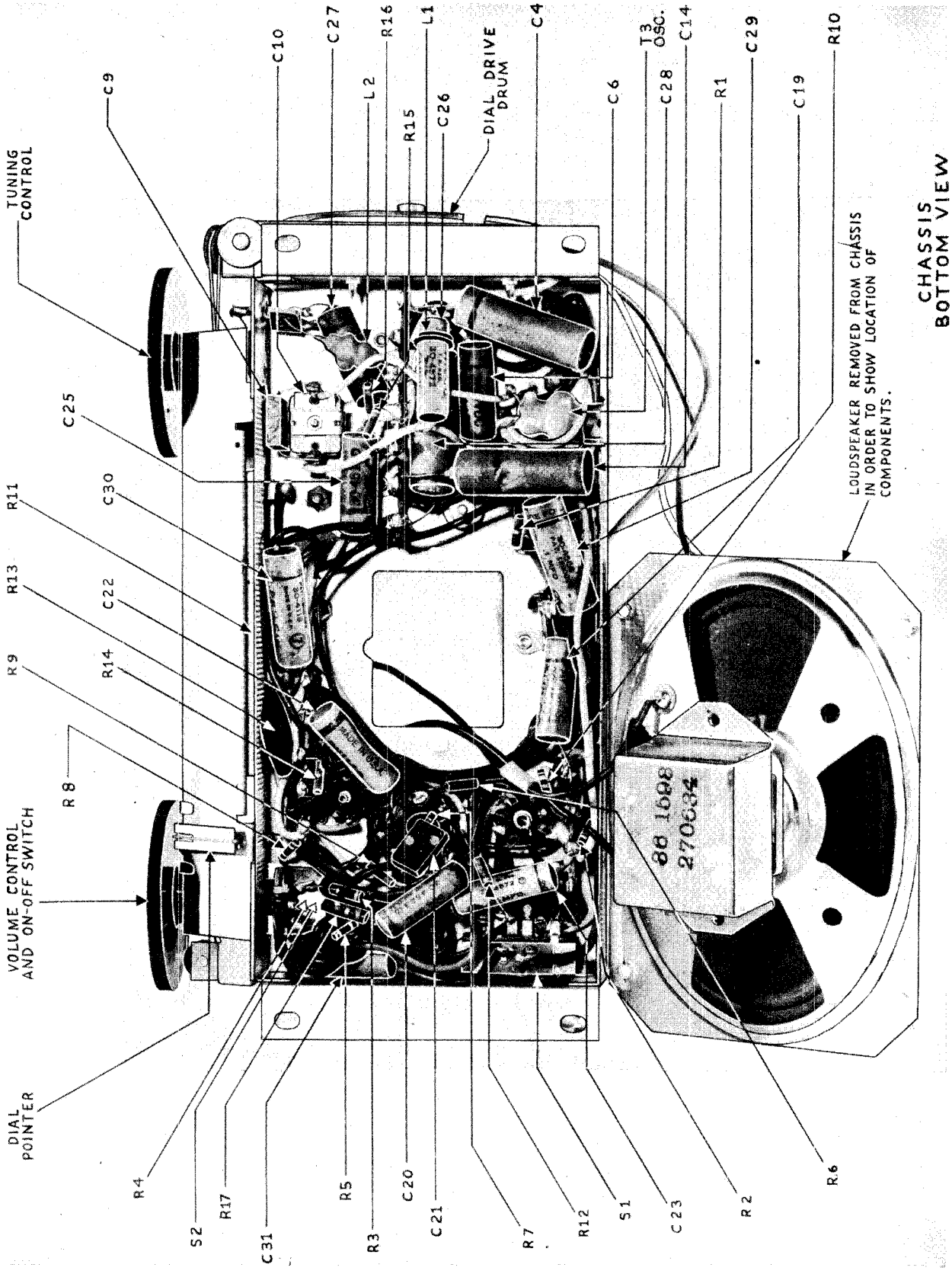

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TUBE	PIN	VTVM	20,000 OHMS PER VOLT	1,000 OHMS PER VOLT	RESISTANCE
RF Amp.					
1T4	1	2.5	2.5	2.5	50
	2	80	80	80	4,000
	3	44	44	44	20,000
	4	0	0	0	INFINITE
	5	3	2.8	2.8	50
	6	2.5	0.1	0	2,750,000
	7	4.2	4	4.2	65
Conv.					
1R5	1	0	0	0	0
	2	80	80	80	4,000
	3	44	44	44	20,000
	4	-3.8	1.4	0	120,000
	5	0	0	0	0
	6	1	0.1	0	2,200,000
	7	1.2	1.2	1.2	30
IF Amp.					
1T4	1	4	4	4	65
	2	80	80	80	4,000
	3	44	44	44	20,000
	4	13	11	4	1,100,000
	5	4	4	4	65
	6	2.8	2.6	2.6	80
	7	5.4	5.4	5.4	80
Det. AVC Audio					
1U5	1	1.3	1.3	1.3	30
	2	13	12	4	1,100,000
	3	20	18	3.5	3,000,000
	4	1.4	0.4	0	850,000
	5	0	0	0	INFINITE
	6	1	0	0	5,000,000
	7	2.8	2.8	2.8	50
3Q5GT	1	1.4	1.4	1.4	30
	2	8	8	8	100
	3	78	78	78	4,600
	4	80	80	80	4,000
	5	1.3	0.2	0	2,200,000
	6	105	105	105	1,800
	7	5.4	5.4	5.4	80
	8	6.6	6.4	6.4	90
117Z3	1	0	0	0	500
	2	0	0	0	INFINITE
	3	0	0	0	500
	4	0	0	0	0
	5	0	0	0	500
	6	105	105	105	1,800
	7	0	0	0	INFINITE

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Code 121

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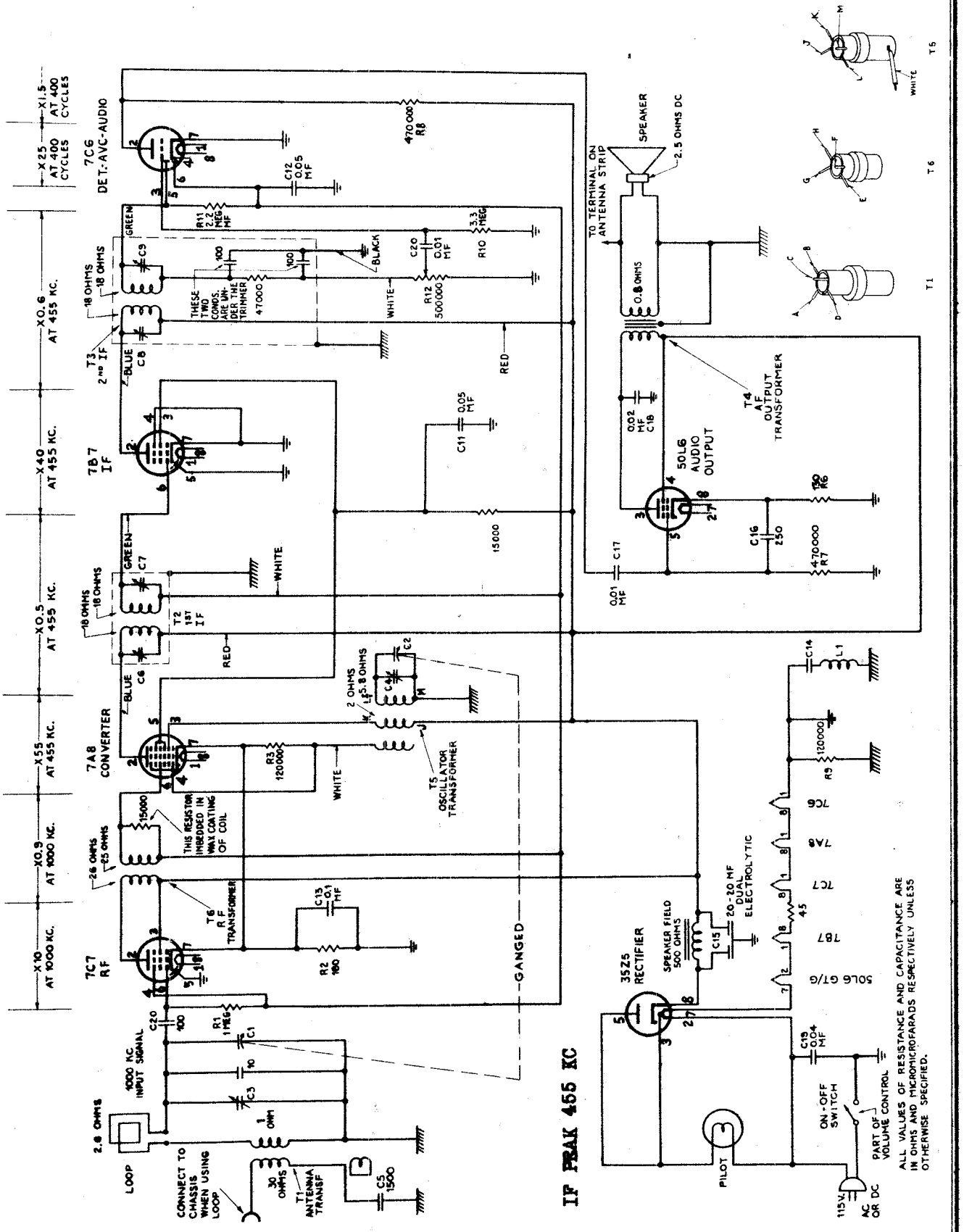

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MODELS 46-420,
46-420-I
Code 121

RESISTANCE VALUES

5R5GT	TERMINAL	VTVM	20,000Ω PER VOLT	PER VOLT	1,000Ω PER VOLT
	1	88	88		80
	2	0	0		0
	3	0	0		0
	4	88	88		80
	5	-0.6	-1.0		-1.0
	6	0	0		0
	7	-0.6	-1.0		-1.0
	8	115	110		110

5Q5GT	TERMINAL	VTVM	20,000Ω PER VOLT	PER VOLT	1,000Ω PER VOLT
	1	0	0		0
	2	0	0		0
	3	78	78		76
	4	88	88		82
	5	0	0		0
	6	0	0		0
	7	-0.6	-1.0		-1.0
	8	5.6	5.4		5.6

PLATE AND SCREEN VOLTAGES TAKEN WITH 1000 OHMS PER VOLT METER WERE TAKEN WITH THE 1000-VOLT RANGE. ALL CATHODE VOLTAGES WERE READ USING THE 10-VOLT SCALE OF THE 1000 OHMS PER VOLT METER.

7C6	TERMINAL	VTVM	20,000Ω PER VOLT	PER VOLT	1,000Ω PER VOLT
	1	0	0		0
	2	50	48		40
	3	-0.8	-0.3		-0.3
	4	0	0		0
	5	-0.8	-0.4		-0.3
	6	-1.0	-0.4		-0.3
	7	0	0		0
	8	0	0		0

ALL VOLTAGE READINGS ARE POSITIVE EXCEPT THOSE MARKED NEGATIVE.

7B7	TERMINAL	VTVM	20,000Ω PER VOLT	PER VOLT	1,000Ω PER VOLT
	1	0	0		0
	2	88	88		82
	3	50	50		50
	4	0	0		0
	5	0	0		0
	6	-1.0	-0.4		-0.3
	7	0	0		0
	8	0	0		0

7A8	TERMINAL	VTVM	20,000Ω PER VOLT	PER VOLT	1,000Ω PER VOLT
	1	0	0		0
	2	88	88		82
	3	88	88		86
	4	-12	-8		-2.6
	5	50	50		48
	6	-1.0	-0.4		-0.4
	7	1.2	1.2		1.2
	8	0	0		0

7C7	TERMINAL	VTVM	20,000Ω PER VOLT	PER VOLT	1,000Ω PER VOLT
	1	0	0		0
	2	86	92		84
	3	86	92		84
	4	-1.0	-0.4		-0.3
	5	0	0		0
	6	-1.0	-.04		0
	7	1.2	1.2		1.2
	8	0	0		0

5R5GT	TERMINAL	RES. TO CIRCUIT GND.
	1	3,500,000
	2	150
	3	145
	4	3,500,000
	5	145
	6	INFINITE
	7	120
	8	INFINITE

5Q5GT	TERMINAL	RES. TO CIRCUIT GND.
	1	INFINITE
	2	75
	3	3,500,000
	4	3,500,000
	5	500,000
	6	0
	7	120
	8	125

7C6	TERMINAL	RES. TO CIRCUIT GND.
	1	0
	2	3,500,000
	3	3,500,000
	4	0
	5	525,000
	6	2,600,000
	7	0
	8	20

7B7	TERMINAL	RES. TO CIRCUIT GND.
	1	75
	2	3,500,000
	3	3,500,000
	4	0 CIRCUIT GND. REFERENCE POINT
	5	0 CIRCUIT GND. REFERENCE POINT
	6	2,600,000
	7	0
	8	70

7A8	TERMINAL	RES. TO CIRCUIT GND.
	1	20
	2	3,500,000
	3	3,500,000
	4	120,000
	5	3,500,000
	6	2,600,000
	7	180
	8	28

7C7	TERMINAL	RES. TO CIRCUIT GND.
	1	28
	2	3,500,000
	3	3,500,000
	4	2,600,000
	5	0
	6	3,500,000
	7	180
	8	30

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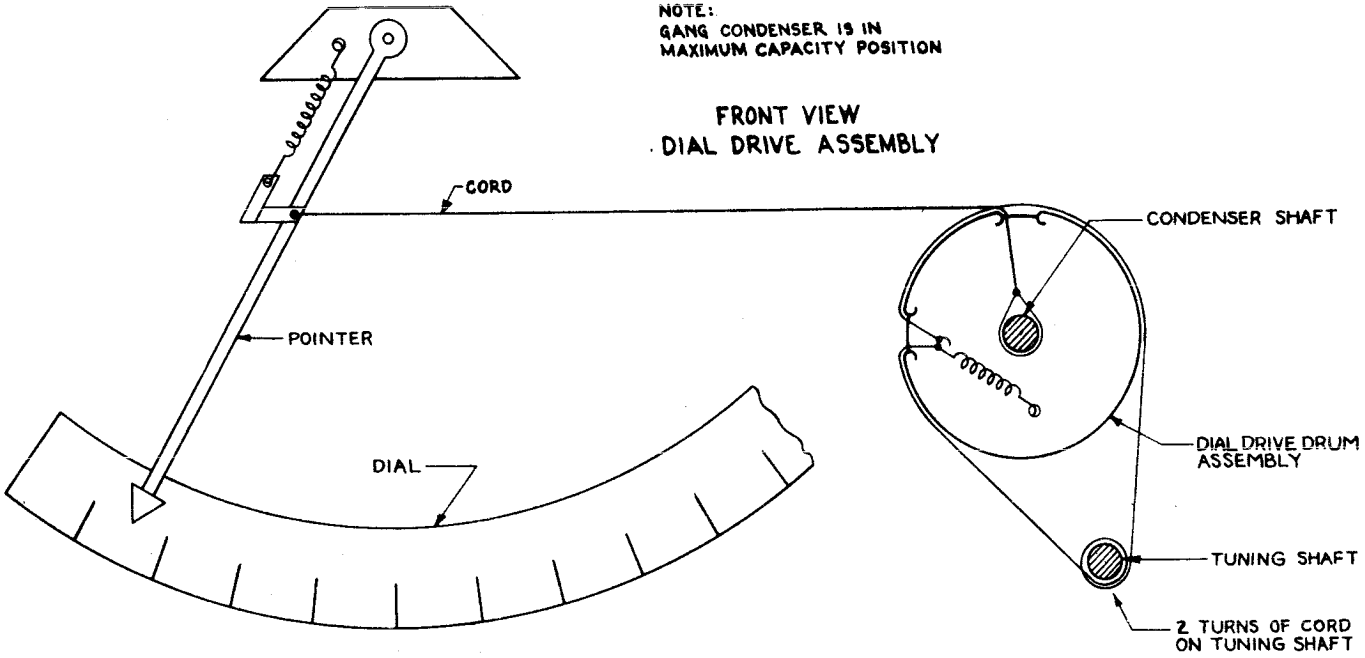
ALIGNMENT

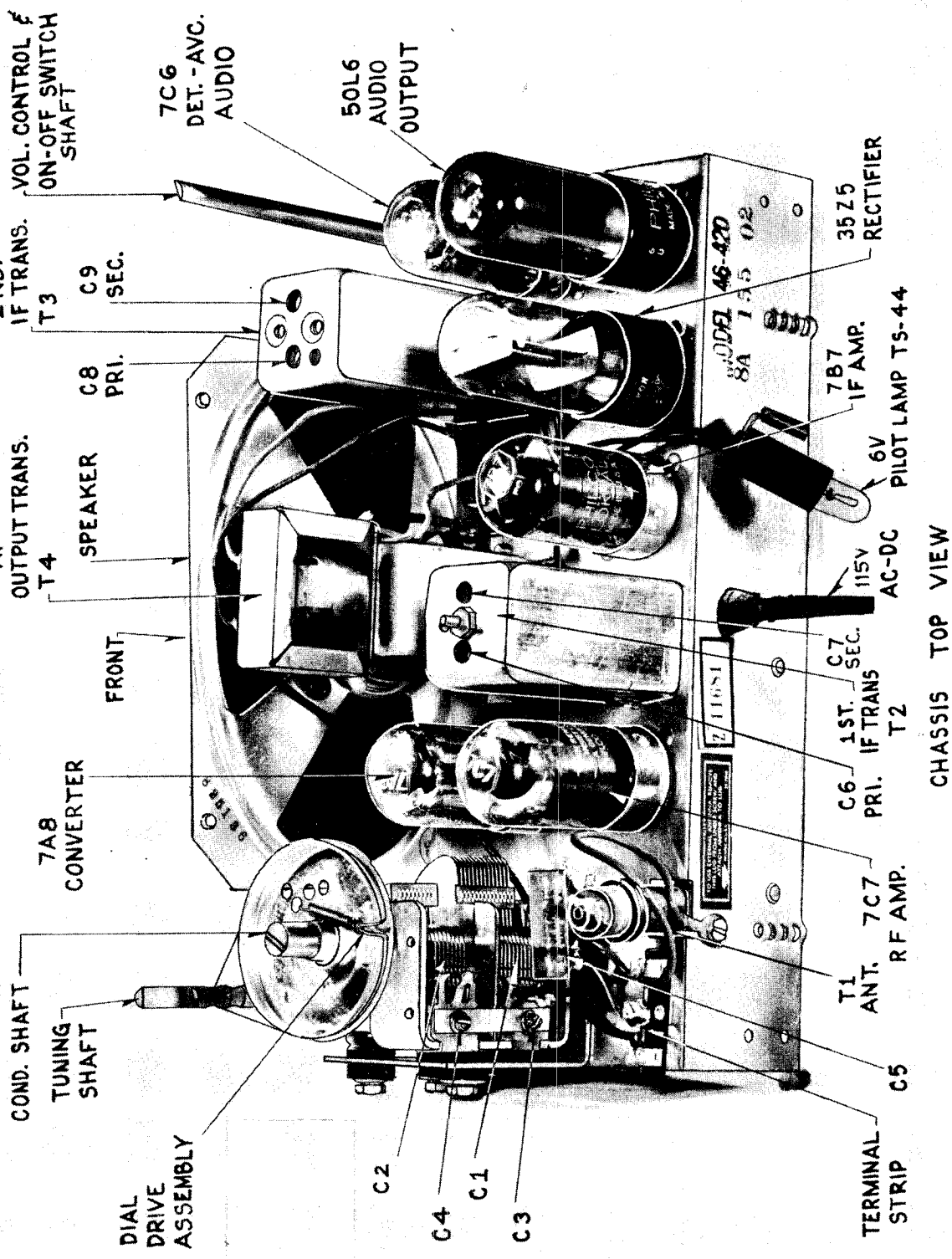
PHILCO 46-420

Alignment may be accomplished with the chassis in the cabinet if a small alignment screwdriver is used. Connect the output meter between the left hand terminal (high) and center terminal (low) of the chassis antenna terminal strip. Connect the signal generator to the standard Hazeltine loop Model 1150 and couple it loosely to the receiver loop. The volume control should be set at maximum. The tuning condenser plates should be fully meshed when the dial pointer is at the index mark at the low frequency end of the dial. The generator output should always be just sufficient to obtain a minimum deflection on the output meter. Set the signal generator to 455 kc. and adjust the i-f trimmers for maximum meter deflection in the following sequence: C9, C8, C7, C6. Set the generator and receiver to 1600 kc. and adjust the oscillator trimmer C4 for maximum output. Set the generator and receiver to 1500 kc. and adjust the r-f trimmer C3 for maximum output.



PHILCO RADIO & TELEV. CORP.

MODELS 46-420
46-420-I
Code 121



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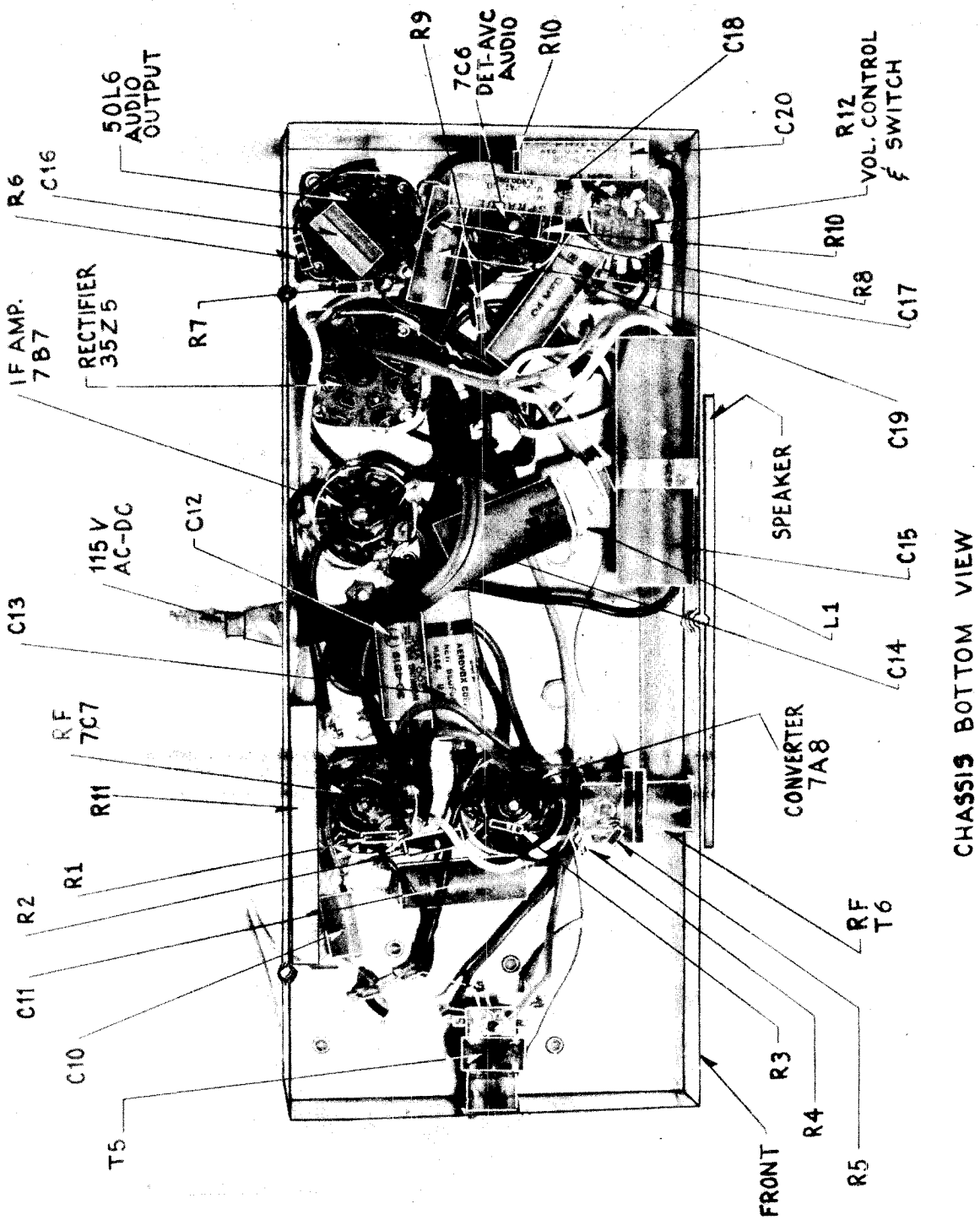

CHASSIS BOTTOM VIEW

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MODEL 46-480
Code 121

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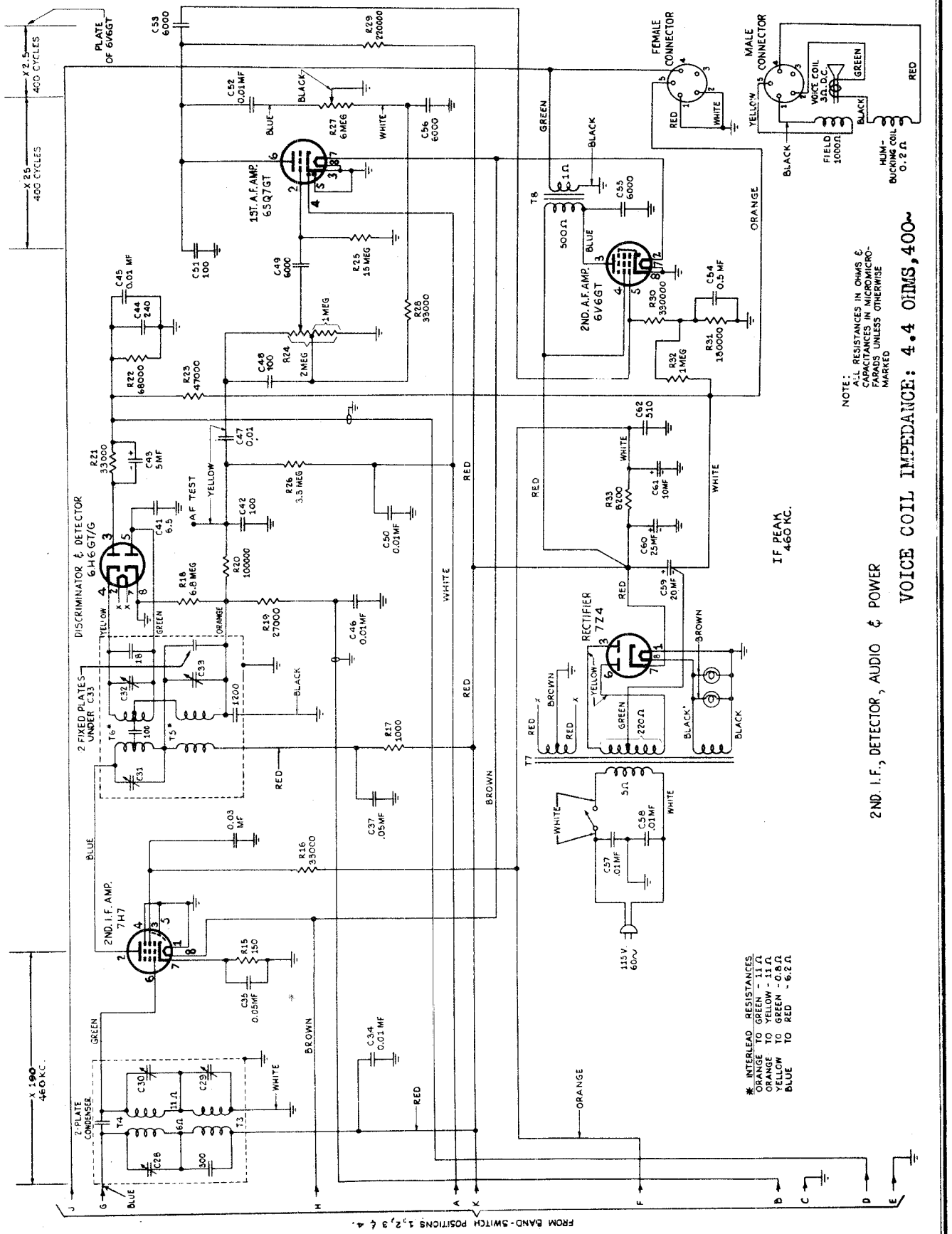
VOICE COIL IMPEDANCE: 4.4 OHMS, 400~
2ND. I.F., DETECTOR, AUDIO & POWER
IF PEAK 460 KC.
NOTE: ALL RESISTANCES IN OHMS & CAPACITANCES IN MICROMICROFARADS UNLESS OTHERWISE MARKED
* INTERLEAD RESISTANCES
ORANGE TO GREEN - 11 Ω
ORANGE TO YELLOW - 11 Ω
YELLOW TO GREEN - 0.8 Ω
BLUE TO RED - 6.2 Ω
1ST. A.F. AMP. 6SQ7GT
2ND. A.F. AMP. 6V6GT
DISCRIMINATOR & DETECTOR 6H6GT/G
2ND. I.F. AMP. 7H7
RECTIFIER 7Z4
MALE CONNECTOR
FEMALE CONNECTOR
VOICE COIL 3Ω D.C.
FIELD 1000Ω
HUM-BUCKING COIL 0.2Ω
115V 60~
2 FIXED PLATES UNDER C33
2-PLATE CONDENSER
AF TEST
FROM BAND-SWITCH POSITIONS 1, 2, 3 & 4.

For Push button data, see P.15-34

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Code 121

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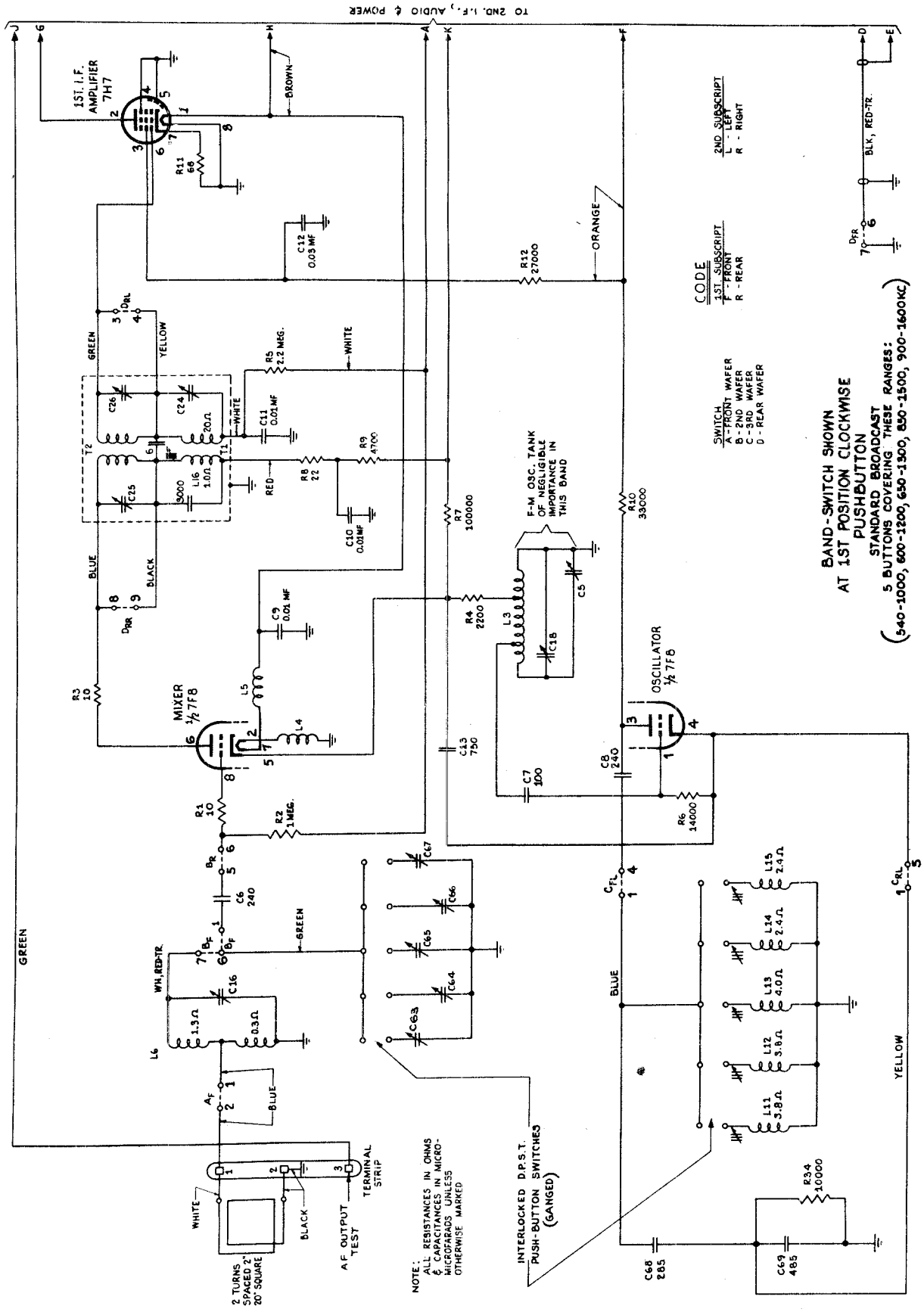

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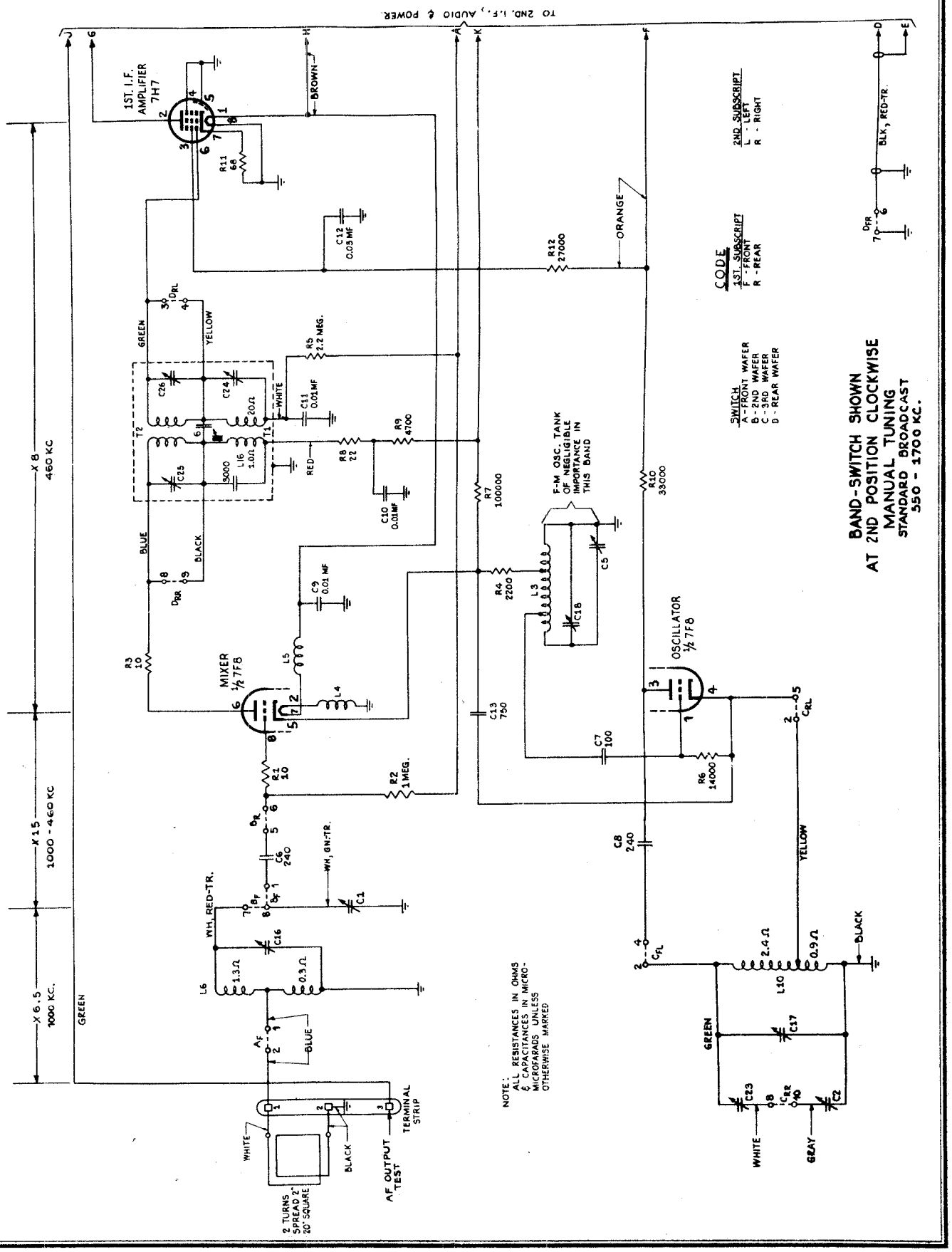

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"clarified schematics"

MODEL 46-480
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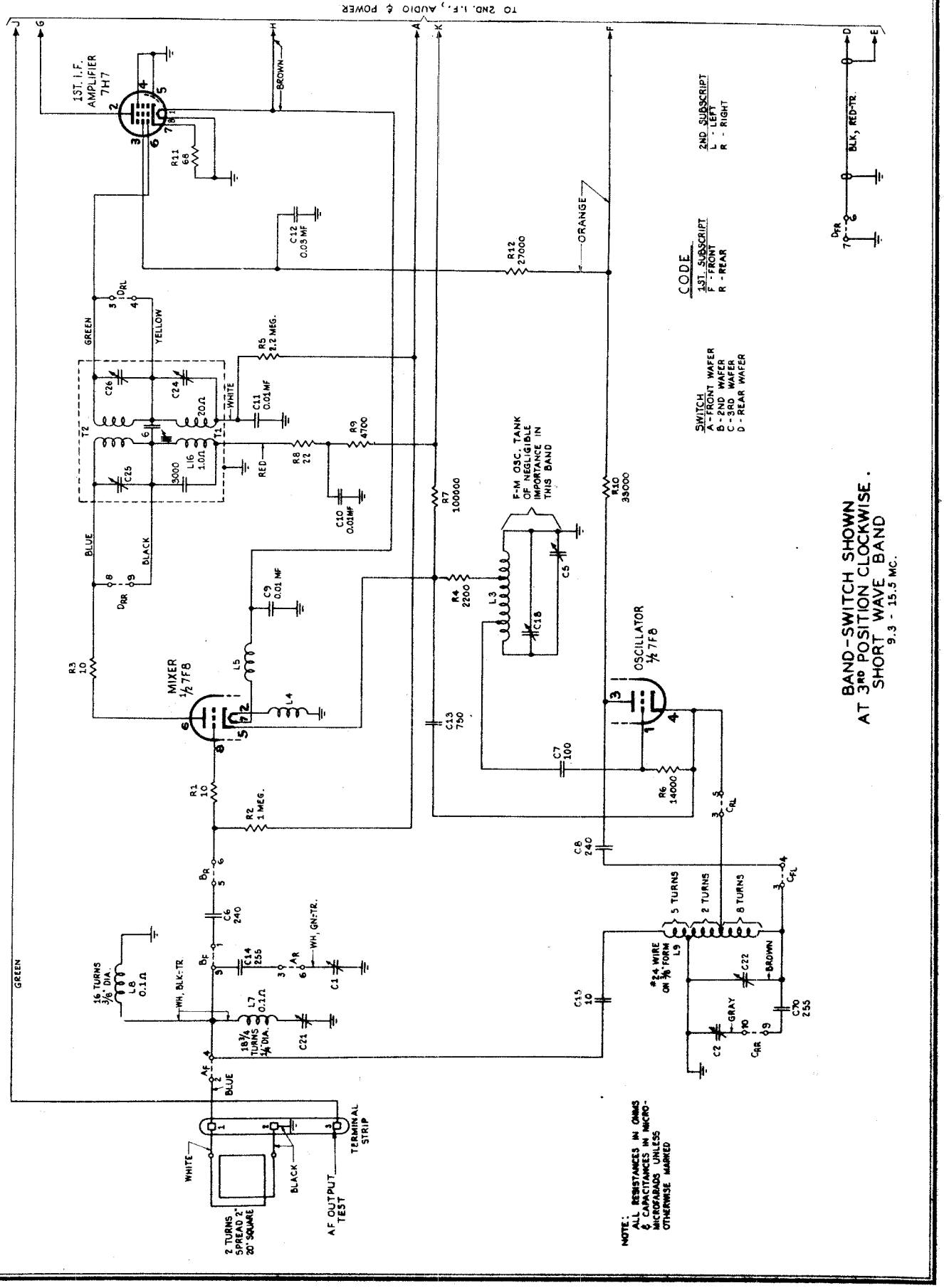

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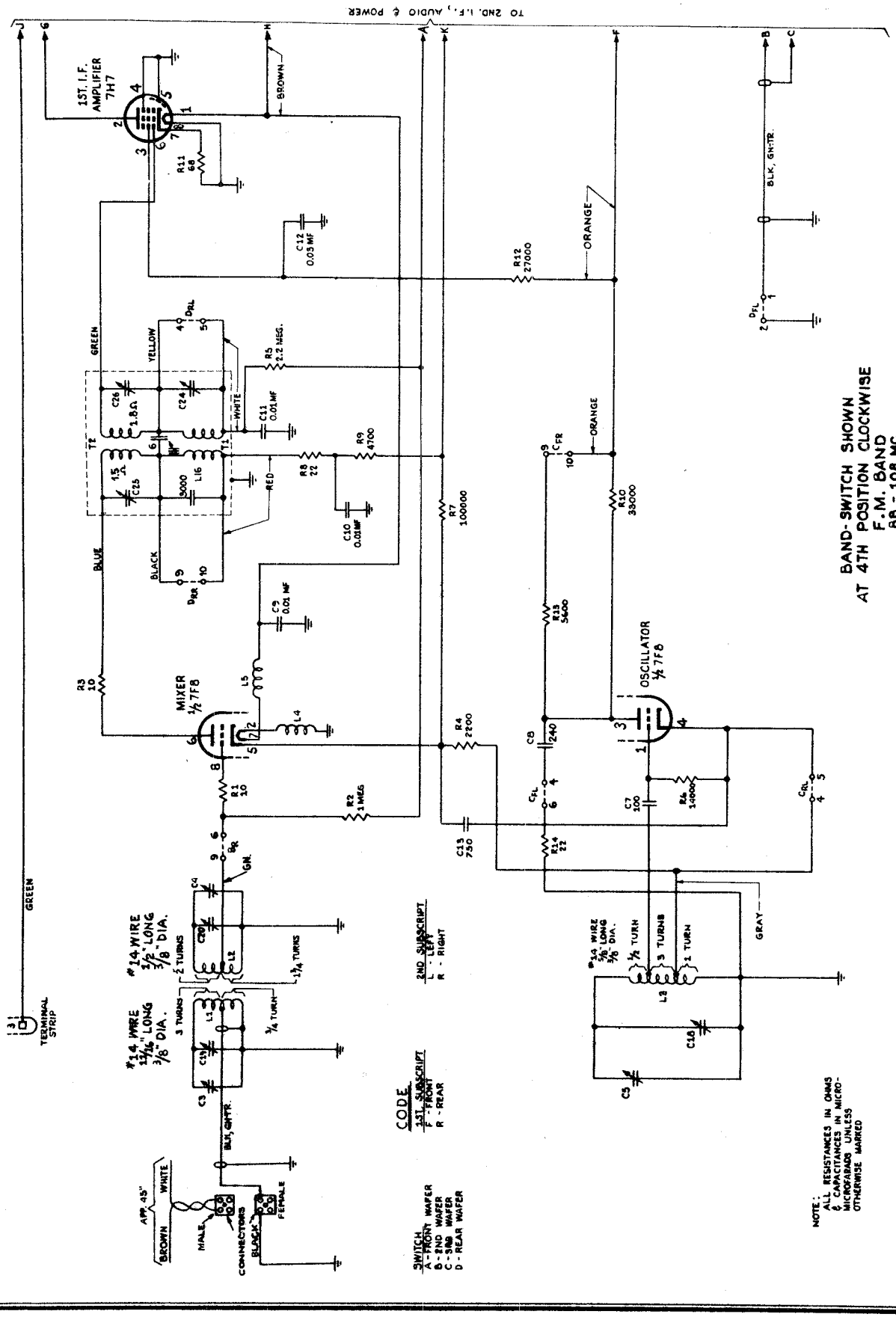

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ALIGNMENT

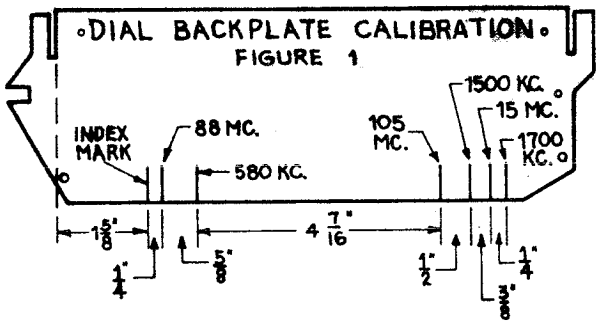
PHILCO 46-480

This chassis must be removed from the cabinet for aligning. Power should not be turned on in this receiver unless the speaker is connected. A-M alignment should be completed before F-M alignment. Alignment of the A-M circuits may not disturb the alignment of the F-M circuits. Calibrate the receiver dial backplate as shown in Figure 1. The receiver dial pointer should coincide with the index mark at the low frequency end of the dial when the gang condenser is fully in mesh.

A-M ALIGNMENT

Connect the output meter between terminals 3 (high) and 2 (ground) of the antenna terminal strip. The receiver loop should be connected between terminals 1 (high) and 2 (ground) of the antenna terminal strip. The signal generator should be connected to the standard Hazeltine loop Model 1150 and should be loosely coupled to the receiver loop. The volume control should be set at maximum and the tone control at maximum high. The generator output should always be just sufficient to obtain a minimum deflection on the output meter.

	Signal Generator Frequency	Receiver Band Switch Position	Receiver Dial Position	Adjust for Maximum
1.	455 kc.	Broadcast	Index Mark (condenser plates fully meshed)	C33 C29 C24 L16
2.	1700 kc.	Broadcast	1700 kc.	C17
3.	1500 kc.	Broadcast	1500 kc.	C16
4.	580 kc.	Broadcast	580 kc.	Adjust C23 for peak while rocking tuning control.
5.	1700 kc.	Broadcast	1700 kc.	Readjust C17
6.	15 mc.	Short Wave	15 mc.	Starting with trimmer C22 screw loosened, slowly tighten for peak on first signal heard. Image should be obtained with receiver tuned to 15.9 mc.
7.	15 mc.	Short Wave	15 mc.	C21



F-M Alignment

Connect a d-c vacuum tube voltmeter across the 5-mf condenser C43 in the ratio detector circuit. The alignment should be carried through without modulation of the generator output. The receiver band switch should be in the F-M position.

	Signal Generator Connection	Signal Generator Frequency	Receiver Dial Position	Adjust as Noted
1.	High side connected to projecting brass screw of L16 coil slug (first i-f transformer T1) through a .01 mf condenser.	9.1 mc.	Index mark (condenser plates fully meshed) Approximately 88 mc.	Fully tighten trimmer C32
2.	Same	9.1 mc.	Index Mark	Adjust for maximum C31 C30 C28 C26 C25
3.	Same	9.1 mc.	Index mark	Input should be adjusted for approximately 25 volts on dc meter. Loosen C32 slowly, recording the minimum and maximum readings. Set trimmer so that average of thexe voltage readings is obtained. Another metho' to obtain correct setting of C32 is to adjust this condenser so that the voltage across the 1200 mmf condenser in the T5 can (obtainable between the R18-R19 junction and chassis) is one-half the voltage obtained across the 5-mf condenser C43.
4.	Through a .01 mf condenser to the left rear terminal of the chassis FM female socket	105 mc.	105 mc.	Adjust for maximum C18 C20 C19

If a maximum voltage indication can not be obtained because either C18, C20, or C19 are completely screwed tight, it may be necessary to slightly compress manually the corresponding coils L3, L2, or L1. Similarly if maximum voltage indication is not obtained because C18, C20 or C19 are almost entirely screwed out, it will be necessary to slightly pull the turns apart of coils L3, L2 or L1. Then realign C18, C20 and C19 at 105 mc.

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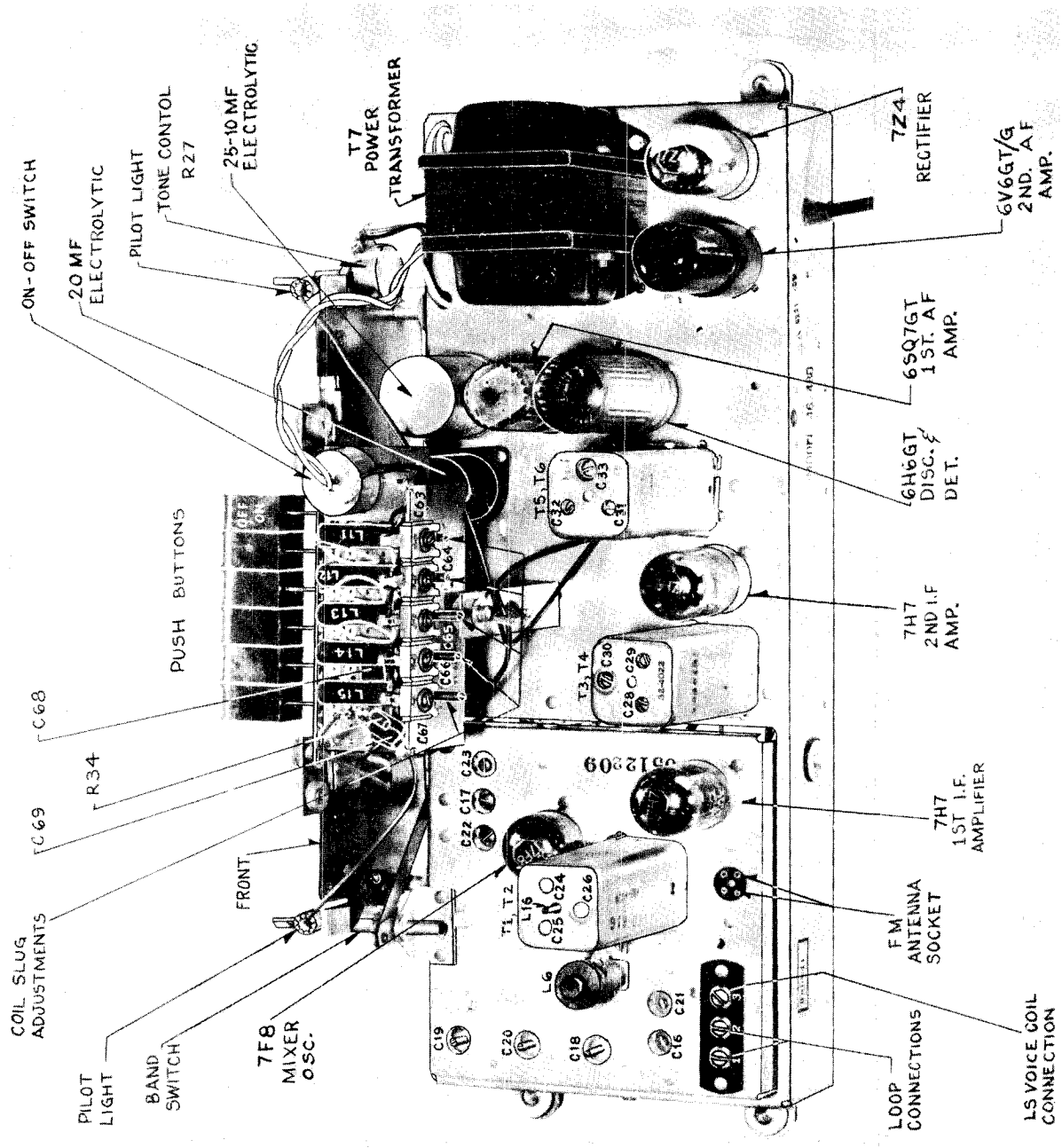

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MODEL 46-480
Code 121
MODEL 46-1226
Code 121

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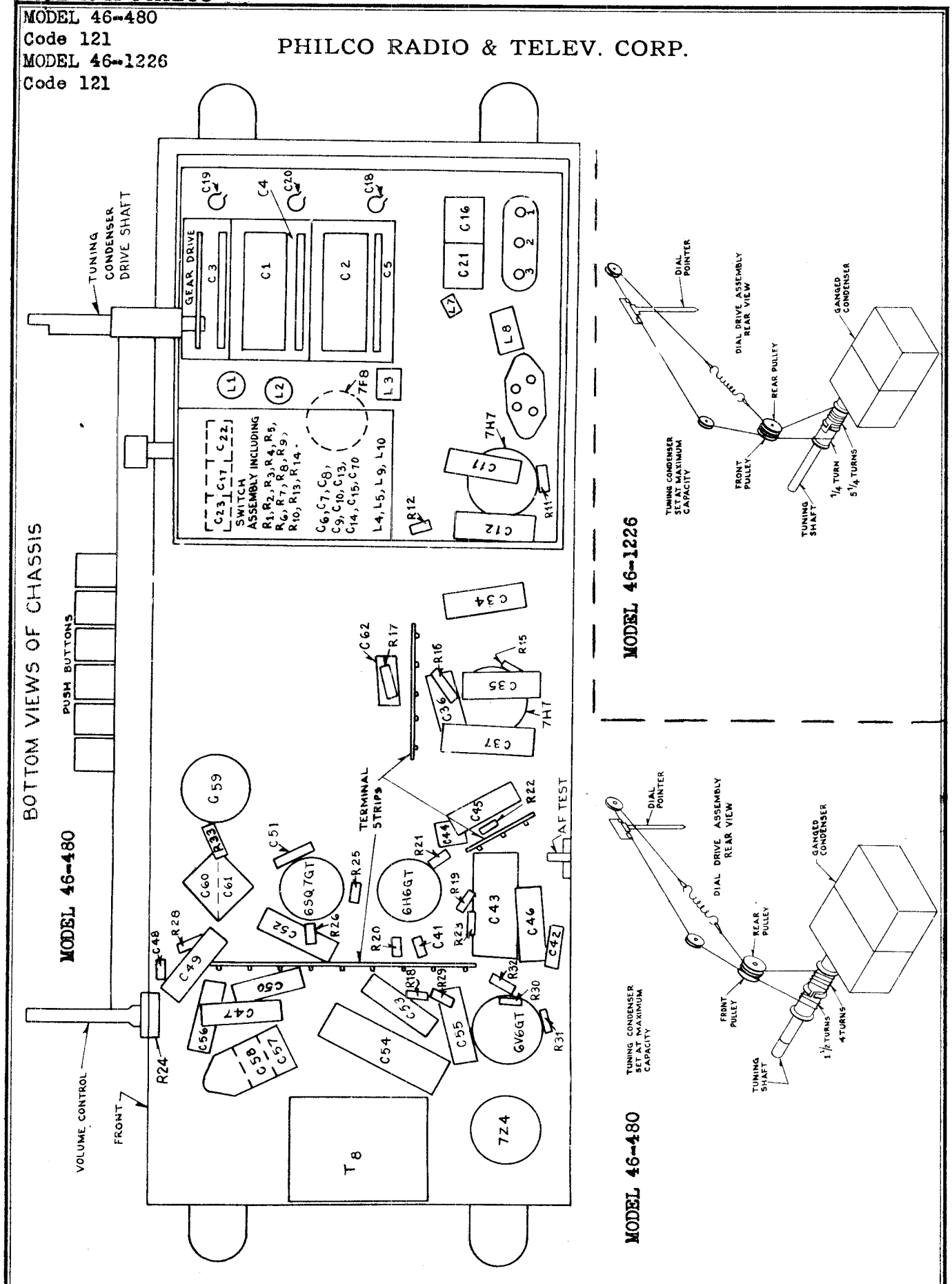

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MODEL 46-480
Code 121

PHILCO RADIO & TELEV. CORP.

PUSH BUTTON 1ST POSITION CLOCKWISE		VOLTAGE 20,000 OHMS		1000 OHMS		BROADCAST (MANUAL TUNING) 2ND POSITION CLOCKWISE		VOLTAGE 20,000 OHMS		1000 OHMS	
TUBE	PIN	VTVM	PER VOLT	PER VOLT	RESISTANCE	TUBE	PIN	VTVM	PER VOLT	PER VOLT	RESISTANCE
7F8	1	+28	+25	+14	24,000	7F8	1	-4.2	-4.2	-3.8	14,000
	2	0	0	0	0		2	0	0	0	0
	3	75	72	64	150,000		3	75	78	68	150,000
	4	30	28	24	10,000		4	0	0	0	0
	5	9	7.8	7.6	2,500		5	10	9.2	9	2500
	6	226	220	220	110,000		6	225	210	210	110,000
	7	0	0	0	0		7	0	0	0	0
	8	1	0.02	0	3.8 meg		8	1	0	0	3.8 meg
7H7	1	0	0	0	0.1	7H7	1	0	0	0	0.1
(1ST IF)	2	235	225	225	110,000	(1ST IF)	2	235	225	225	110,000
	3	97	97	85	145,000		3	97	97	85	145,000
	4	0	0	0	0		4	0	0	0	0
	5	0	0	0	0		5	0	0	0	0
	6	-0.5	-0.02	0	5 meg		6	-0.5	-0.02	0	5 meg
	7	0.7	0.7	0.65	60		7	0.7	0.7	0.65	60
	8	0	0	0	0		8	0	0	0	0
7H7	1	0	0	0	0	7H7	1	0	0	0	0
(2ND IF)	2	230	220	220	110,000	(2ND IF)	2	230	220	220	110,000
	3	110	100	84	150,000		3	110	100	84	150,000
	4	0	0	0	0		4	0	0	0	0
	5	0	0	0	0		5	0	0	0	0
	6	0	0	0	10		6	0	0	0	10
	7	1.4	1.2	1.2	170		7	1.4	1.2	1.2	170
	8	0	0	0	0.1		8	0	0	0	0.1
6H6GT	1	0	0	0	0	6H6GT	1	0	0	0	0
	2	0	0	0	0.6		2	0	0	0	0.6
	3	-44	-41	-28	60,000		3	-44	-41	-28	60,000
	4	-0.25	-0.2	-0.05	27,500		4	-0.4	-0.2	-0.05	27,500
	5	-0.25	-0.2	-0.05	27,500		5	-0.35	-0.2	-0.05	27,500
	6	-0.25	-0.04	0	125,000		6	-0.4	-0.05	0	125,000
	7	0	0	0	0.6		7	0	0	0	0.6
	8	0	0	0	0		8	0	0	0	0
6SQ7GT	1	0	0	0	0	6SQ7GT	1	0	0	0	0
	2	-0.8	-0.3	-0.06	17 meg		2	-0.8	-0.3	-0.06	17 meg
	3	0	0	0	0		3	0	0	0	0
	4	-0.5	-0.20	-0.02	3 meg		4	-0.5	-0.2	-0.02	900,000
	5	0	0	0	0		5	0	0	0	0
	6	105	100	62	350,000		6	105	100	62	350,000
	7	0	0	0	0.1		7	0	0	0	0.1
	8	0	0	0	0		8	0	0	0	0
6V6GT	1	0	0	0	0	6V6GT	1	0	0	0	0
	2	0	0	0	0.1		2	0	0	0	0.1
	3	225	215	215	110,000		3	225	215	215	110,000
	4	235	220	220	110,000		4	235	220	220	110,000
	5	-12	-4.3	0.3	470,000		5	-12	-4.3	0.3	470,000
	6	-12	-7.4	1	16,000		6	-12	-7.4	1.0	16,000
	7	0	0	0	0		7	0	0	0	0
	8	0	0	0	0		8	0	0	0	0
724	1	0	0	0	0	724	1	0	0	0	0
	2	0	0	0	INFINITE		2	0	0	0	INFINITE
	3	-77	-76	-75	1100		3	-77	-76	-75	1100
	4	0	0	0	1.0		4	0	0	0	1
	5	-0.5	0	0	INFINITE		5	-0.5	0	0	INFINITE
	6	-76	-76	-76	1100		6	-76	-76	-76	1100
	7	236	230	230	110,000		7	235	230	230	110,000
	8	0	0	0	0.1		8	0	0	0	0.1

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SHORTWAVE
3RD POSITION
CLOCKWISE

TUBE	PIN	VTVM	VOLTAGE 20,000 OHMS PER VOLT	1000 OHMS PER VOLT	RESISTANCE
7F8	1	-1.6	-1.5	-1.4	14,000
	2	0	0	0	0
	3	75	58	53	150,000
	4	0	0	0	0
	5	8.5	8.4	7.9	2500
	6	225	220	220	110,000
	7	0	0	0	0
	8	1	0.02	0	3.8 meg
7H7 (1ST IF)	1	0	0	0	0.1
	2	235	225	225	110,000
	3	97	97	85	145,000
	4	0	0	0	0
	5	0	0	0	0
	6	-0.5	-0.02	0	5 meg
	7	0.7	0.7	0.65	60
	8	0	0	0	0
7H7 (2ND IF)	1	0	0	0	0
	2	230	220	220	110,000
	3	110	100	84	150,000
	4	0	0	0	0
	5	0	0	0	0
	6	0	0	0	10
	7	1.4	1.2	1.2	170
	8	0	0	0	0.1
6H6GT	1	0	0	0	0
	2	0	0	0	0.6
	3	-44	-41	-28	60,000
	4	-0.3	-0.2	-0.05	27,500
	5	-0.3	-0.2	-0.05	27,500
	6	-0.3	-0.04	0	125,000
	7	0	0	0	0.6
	8	0	0	0	0
6SQ7GT	1	0	0	0	0
	2	-0.8	-0.3	-0.06	17 meg
	3	0	0	0	0
	4	-0.5	-0.2	-0.02	3 meg
	5	0	0	0	0
	6	105	100	62	350,000
	7	0	0	0	0.1
	8	0	0	0	0
6V6GT	1	0	0	0	0
	2	0	0	0	0.1
	3	225	215	215-	110,000
	4	235	220	220	110,000
	5	-12	-4.3	0.3	470,000
	6	-12	-7.4	1.0	16,000
	7	0	0	0	0
	8	0	0	0	0
724	1	0	0	0	0
	2	0	0	0	INFINITE
	3	-77	-76	-75	1100
	4	0	0	0	1
	5	-0.5	0	0	INFINITE
	6	-76	-76	-76	1100
	7	235	230	230	110,000
	8	0	0	0	0.1

FM
4TH POSITION
CLOCKWISE

TUBE	PIN	VTVM	VOLTAGE 20,000 OHMS PER VOLT	1000 OHMS PER VOLT	RESISTANCE
7F8	1	-2.6	-0.3	-0.1	14,000
	2	0	0	0	0
	3	125	110	92	120,000
	4	0	0	0	0
	5	0	7	7	2500
	6	225	220	220	110,000
	7	0	0	0	0
	8	0	0	0	10
7H7 (1ST IF)	1	0	0	0	0.1
	2	235	225	225	110,000
	3	68	69	76	145,000
	4	0	0	0	0
	5	0	0	0	0
	6	-0.5	-0.02	0	3 meg
	7	0.6	0.6	0.6	60
	8	0	0	0	0
7H7 (2ND IF)	1	0	0	0	0
	2	230	220	220	110,000
	3	100	89	76	150,000
	4	0	0	0	0
	5	0	0	0	0
	6	0	0	0	10
	7	1.2	1.1	1.1	170
	8	0	0	0	0.1
6H6GT	1	0	0	0	0
	2	0	0	0	0.6
	3	0	0	0	32,000
	4	-0.2	-0.1	-0.04	2.5 meg
	5	-0.2	-0.2	-0.04	2.5 meg
	6	-0.2	-0.03	0	2.6 meg
	7	0	0	0	0.6
	8	0	0	0	0
6SQ7GT	1	0	0	0	0
	2	-0.8	-0.3	-0.06	17
	3	0	0	0	0
	4	-0.5	-0.2	-0.02	900,000
	5	0	0	0	0
	6	105	100	62	350,000
	7	0	0	0	0.1
	8	0	0	0	0
6V6GT	1	0	0	0	0
	2	0	0	0	0.1
	3	225	215	215	110,000
	4	235	220	220	110,000
	5	-12	-4.3	0.3	470,000
	6	-12	-7.4	1.0	16,000
	7	0	0	0	0
	8	0	0	0	0
724	1	0	0	0	0
	2	0	0	0	INFINITE
	3	-77	-76	-75	1100
	4	0	0	0	1
	5	-0.5	0	0	INFINITE
	6	-76	-76	-76	1100
	7	235	230	230	110,000
	8	0	0	0	0.1

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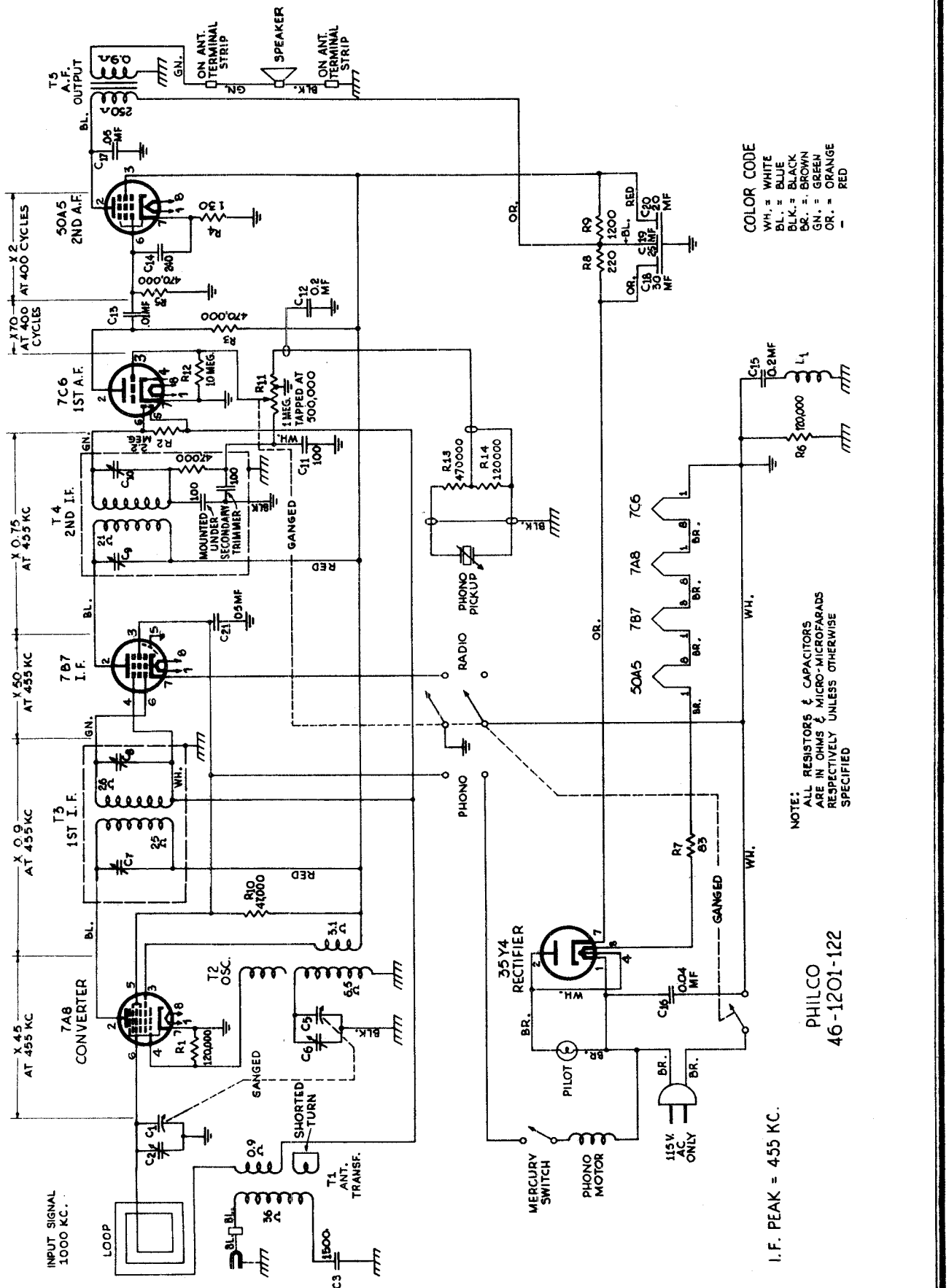
MODEL 46-1201
Code 122

PHILCO RADIO & TELEV. CORP.



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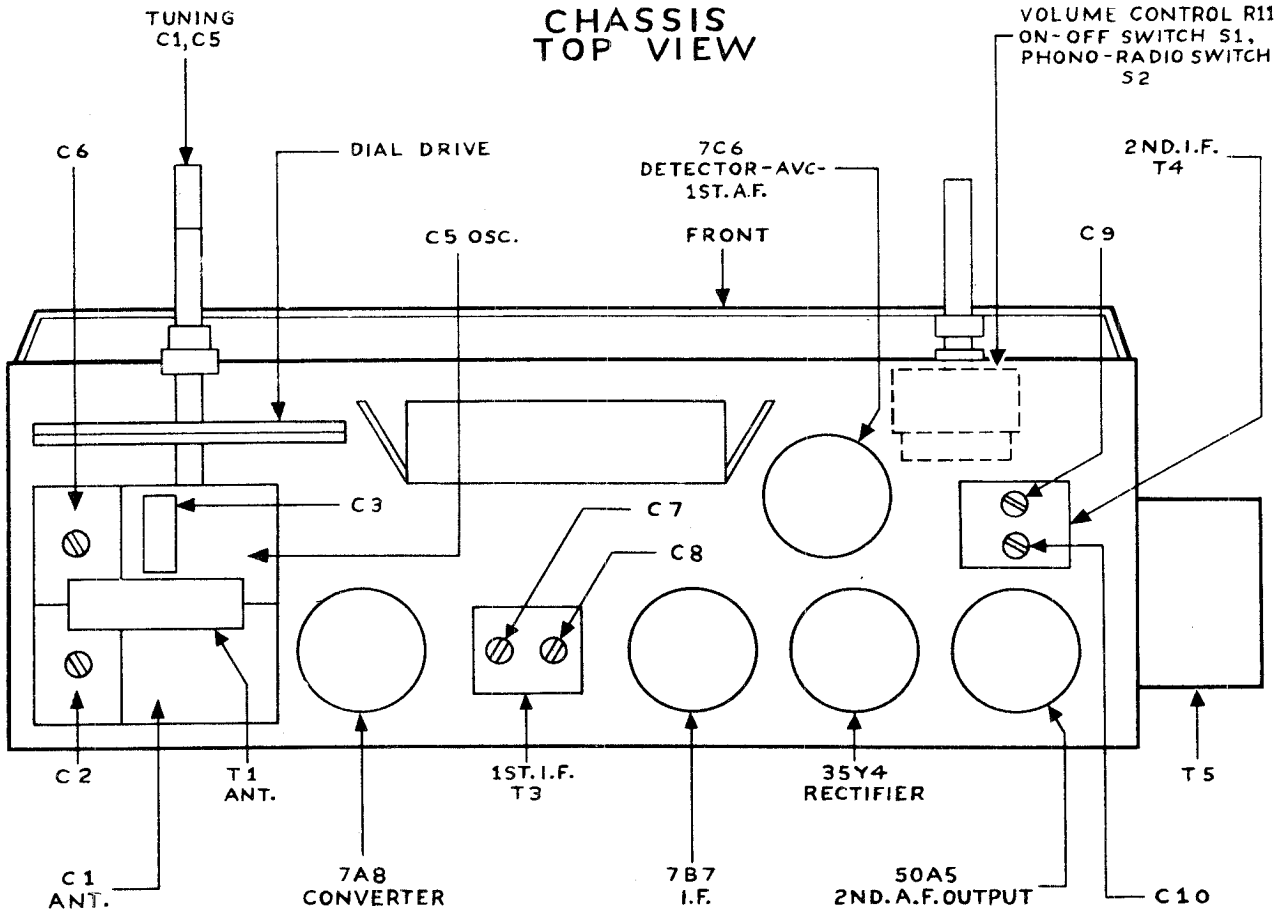
Code 122

PHILCO RADIO & TELEV. CORP.

ALIGNMENT

PHILCO 46-1201

The receiver should be aligned with the chassis installed in the cabinet. Connect the output meter from the voice coil lug (green wire) on the speaker to ground. Disconnect the blue external antenna lead from ground. Connect the signal generator through a .01 mf condenser to the external antenna lead. Set the receiver volume control at maximum. The tuning condenser should be fully meshed when the dial pointer is at the index mark at the low frequency end of the dial. The signal generator output should at all times be just sufficient to obtain a minimum deflection on the output meter. Set the signal generator to 455 kc. and adjust the intermediate frequency amplifier transformer trimmers for maximum meter deflection in the following sequence: C10, C9, C8, C7. Set the generator and receiver to 1600 kc. and adjust the oscillator shunt trimmer C6 for maximum output. Set the generator and receiver to 1500 kc. and adjust the r-f trimmer C2 for maximum output.



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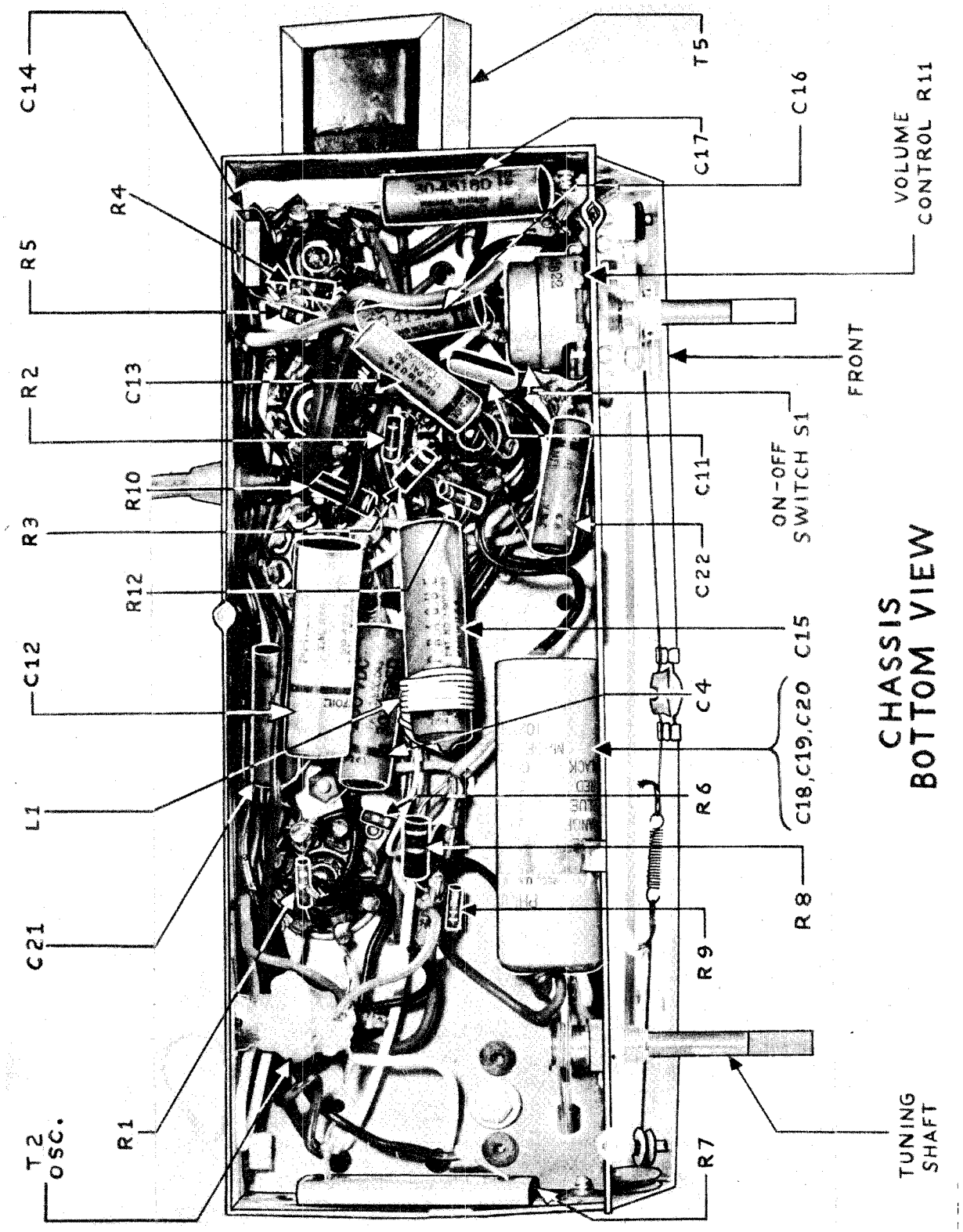
MODEL 46-1201
Code 122



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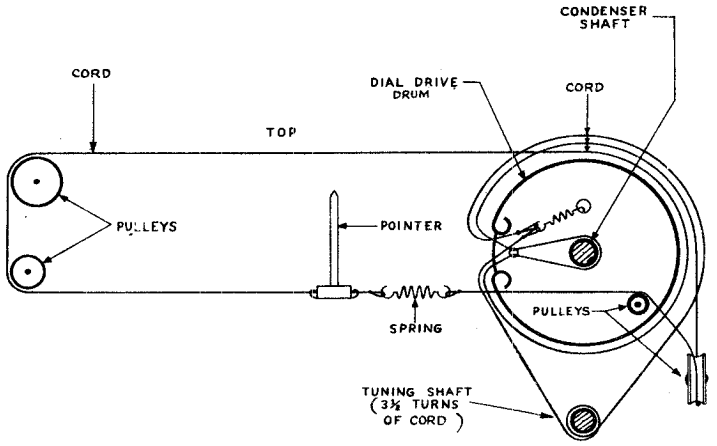
Code 122

PHILCO RADIO & TELEV. CORP.

SWITCH IN RADIO POSITION
VOLUME CONTROL ON FULL

TUBE	PIN	VTVM	VOLTAGE 20,000 OHMS PER VOLT	VOLTAGE 1000 OHMS PER VOLT	RESISTANCE TO CIRCUIT GROUND
7A8	1	0	0	0	11
	2	100	100	100	100 meg
	3	100	100	100	100 meg
	4	-12.5	-6.6	-3.4	130,000
	5	38	36	32	100 meg
	6	0		0	INFINITE
	7	0		0	0
	8	0		0	20
7B7	1	0	0	0	20
	2	100	100	100	100 meg
	3	38	36	34	100 meg
	4	-1	-0.4	-0.3	2.7 meg
	5	0	0	0	0
	6	-1	-0.4	-0.3	2.7 meg
	7	0	0	0	0
	8	0	0	0	13
7C6	1	0	0	0	0
	2	62	56	50	100 meg
	3	-0.9	-0.36	-0.3	10 meg
	4	0	0	0	0
	5	-1	-0.6	-0.3	2.5 meg
	6	-0.6	-0.4	-0.2	500,000
	7	0	0	0	0
	8	0	0	0	7
50A5	1	0	0	0	75
	2	100	100	100	100 meg
	3	100	100	100	100 meg
	4	0	0	0	INFINITE
	5	0	0	0	0
	6	0	0	0	400,000
	7	5.6	5.2	5.4	130
	8	0	0	0	20
35Y4	1	0	0	0	185
	2	0	0	0	180
	3	0	0	0	INFINITE
	4	0	0	0	180
	5	100	100	100	INFINITE
	6	100	100	100	INFINITE
	7	120	120	120	INFINITE
	8	0	0	0	1



FRONT VIEW
DIAL DRIVE ASSEMBLY
(TUNING CONDENSER IN MAX. CAPACITY POSITION.)

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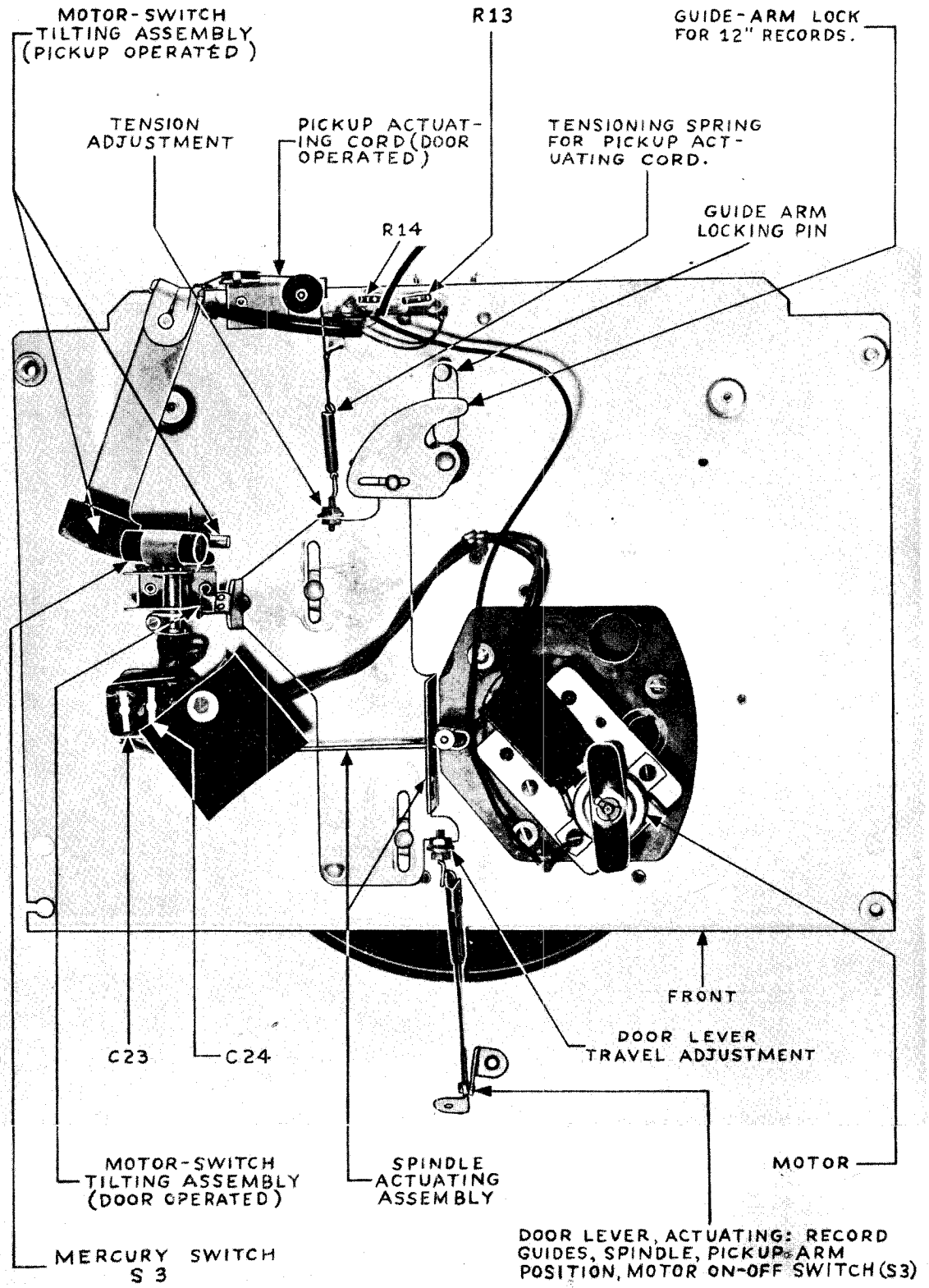

BOTTOM VIEW
RECORD PLAYER

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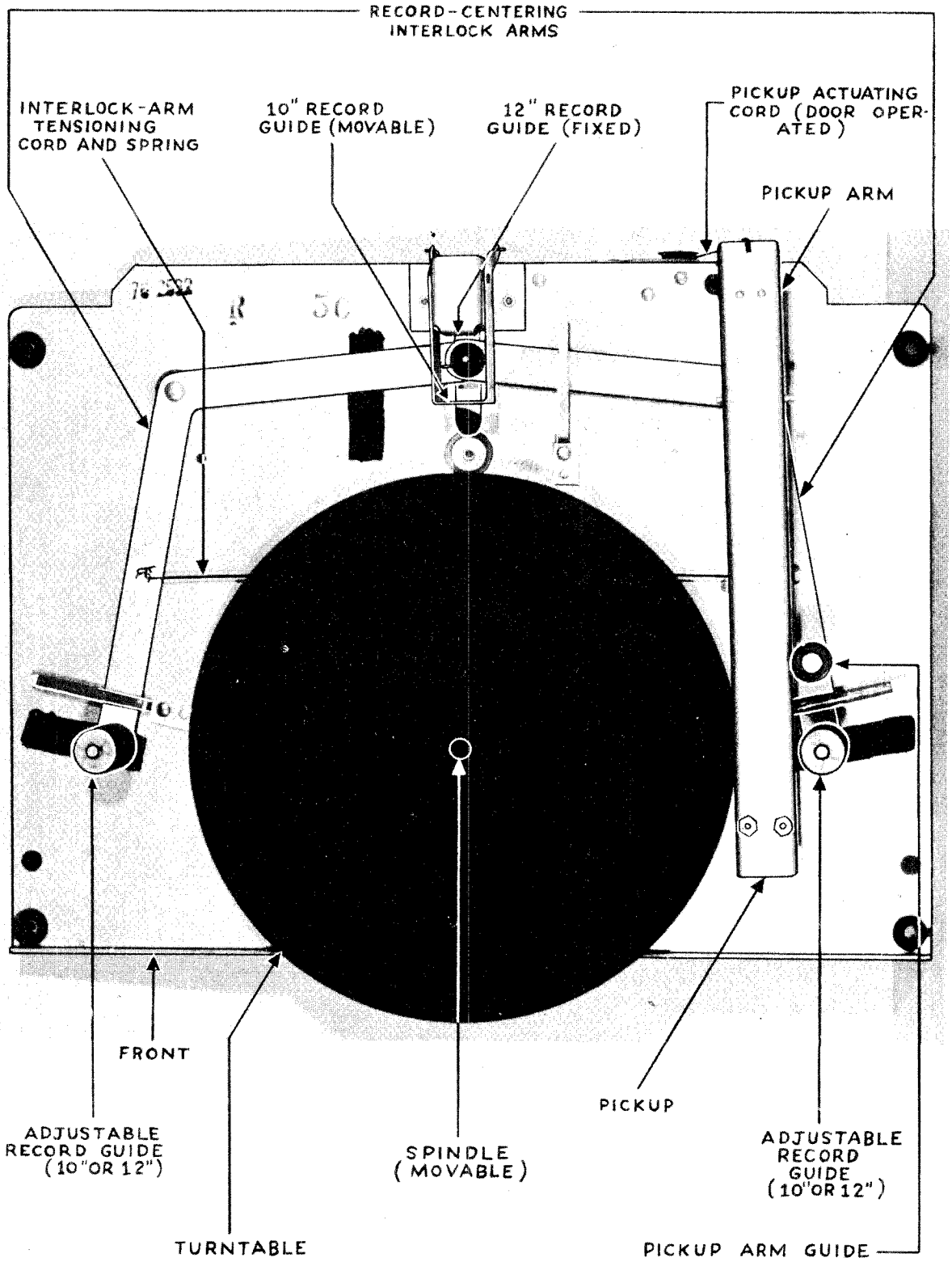
MODEL 46-1201
Code 122

PHILCO RADIO & TELEV. CORP.



TOP VIEW
RECORD PLAYER

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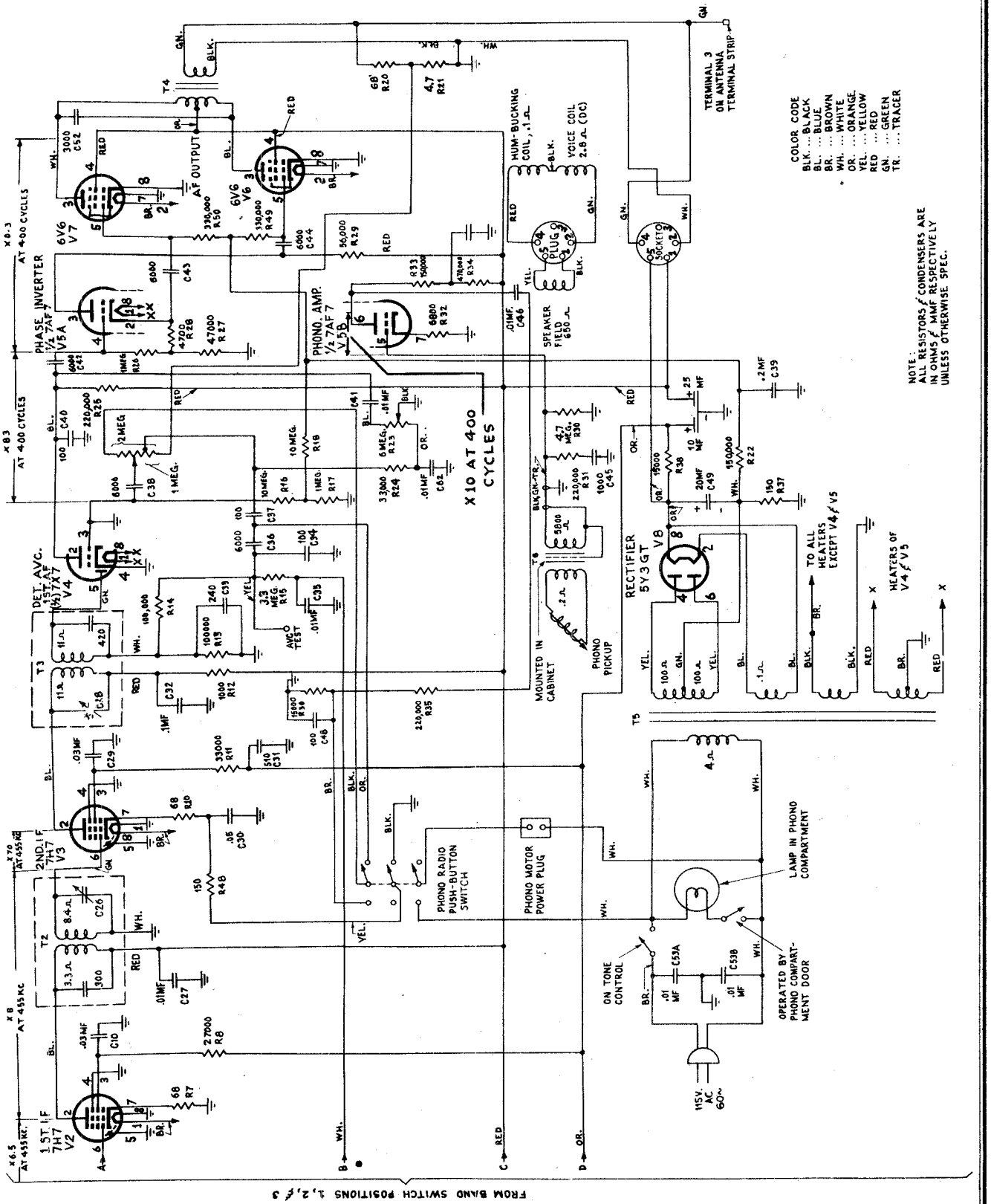
MODEL 46-1209
Code 121

PHILCO RADIO & TELEV. CORP.


X10 AT 400 CYCLES
PHASE INVERTER 1/2 7AF7 V5A
PHONO. AMP. 1/2 7AF7 V5B
DET. AVC. 1ST A.F. 1/2 7X7 V4
2ND I.F 7H7 V3
1ST I.F 7H7 V2
6V6 V7
6V6 V6
RECTIFIER 5Y3GT V8
AF OUTPUT
HUM-BUCKING COIL, 1Ω
VOICE COIL 2.8Ω (DC)
SPEAKER FIELD 650Ω
TERMINAL 3 ON ANTENNA TERMINAL STRIP
COLOR CODE
BLK. ... BLACK
BL. ... BLUE
BR. ... BROWN
WH. ... WHITE
OR. ... ORANGE
YEL. ... YELLOW
RED ... RED
GN. ... GREEN
TR. ... TRACER
NOTE: ALL RESISTORS & CONDENSERS ARE IN OHMS & MMF RESPECTIVELY UNLESS OTHERWISE SPEC.
MOUNTED IN CABINET
PHONO PICKUP
PHONO RADIO PUSH-BUTTON SWITCH
PHONO MOTOR POWER PLUG
LAMP IN PHONO COMPARTMENT
ON TONE CONTROL
OPERATED BY PHONO COMPARTMENT DOOR
115V. AC 60~
TO ALL HEATERS EXCEPT V4 & V5
HEATERS OF V4 & V5
FROM BAND SWITCH POSITIONS 1, 2, & 3

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Code 121

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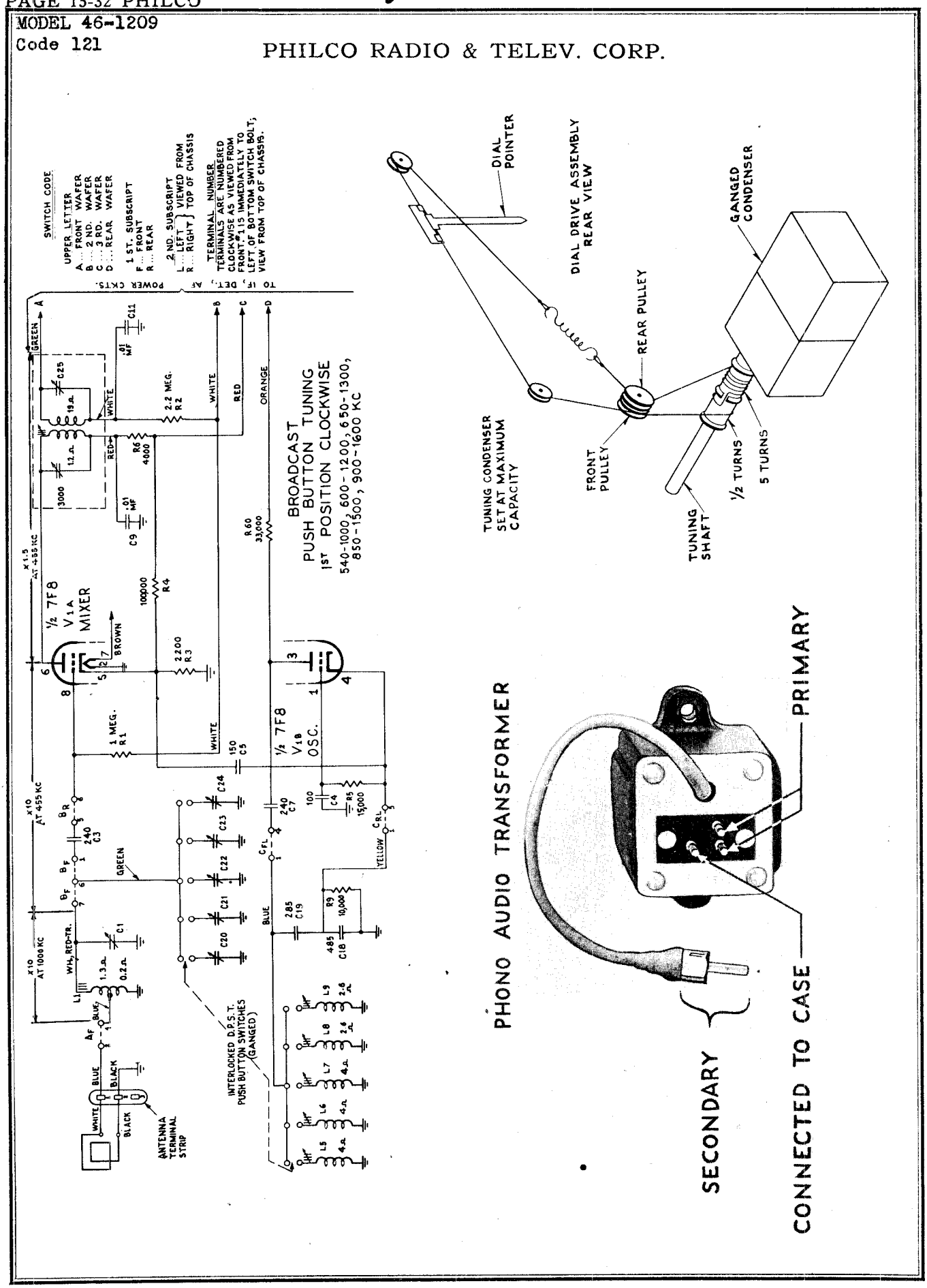

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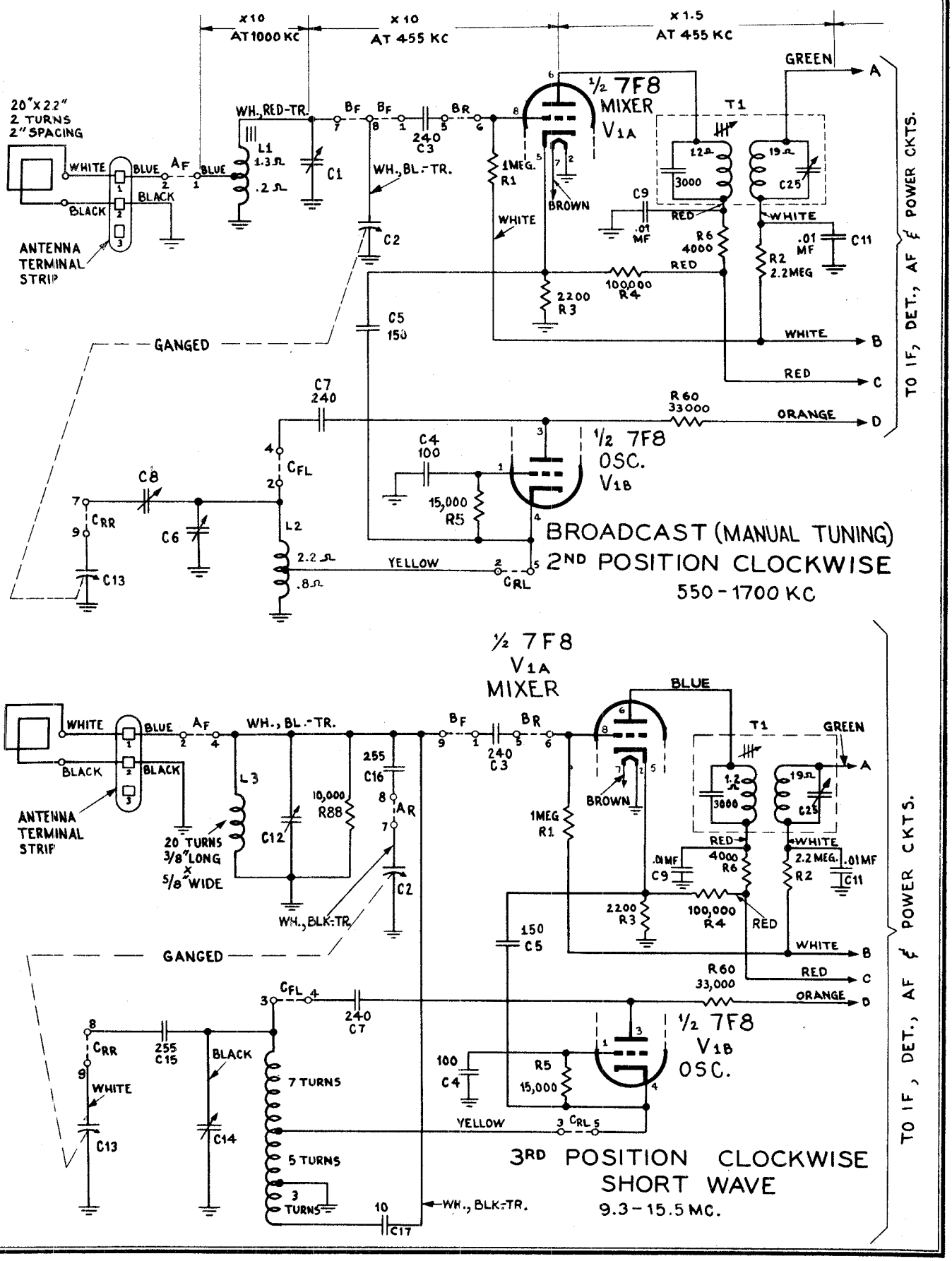

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MODEL 46-480
MODEL 46-1209

PHILCO RADIO & TELEV. CORP.

ALIGNMENT

PHILCO 46-1209

Power should not be turned on in this receiver unless the speaker is connected. The chassis must be removed from the cabinet for alignment. Calibrate the receiver dial backplate as shown in **Fig. 1, Page 15-36** The receiver loop should be connected to terminals 1 (high) and 2 (low) of the antenna terminal strip. The output meter should be connected to terminals 3 (high) and 2 (low) of the antenna terminal strip.

	Signal Generator Frequency	Receiver Band Switch Position	Receiver Dial Position	Adjust for Maximum
1.	455 kc.	Broadcast	Index mark (condenser plates fully meshed)	C28 C26 C25 Coil slug of T1
2.	1700 kc.	Broadcast	1700 kc.	C6
3.	1500 kc.	Broadcast	1500 kc.	C1
4.	580 kc.	Broadcast	580 kc.	Adjust C8 for peak while rocking tuning control.
5.	1700 kc.	Broadcast	1700 kc.	Readjust C6
6.	15 mc.	Short Wave	15 mc.	Starting with trimmer C14 screw loosened, slowly tighten for peak on first signal heard. Image should be obtained with receiver tuned to 15.9 mc.
7.	15 mc.	Short Wave	15 mc.	C12

46-480 PUSH BUTTON ADJUSTMENT 46-1209

Note: Good reception of stations by use of push buttons depends on the accuracy of the manual tuning during the setting-up operation.

1. Allow the receiver to warm up for at least 20 minutes before setting up any stations.
2. The band switch must be in the push-button position.
3. Choose the most powerful local stations, those which are free from excess fading. Setting up weak or distant stations is not recommended.
4. List the desired stations, in order, from the low to the high frequencies. The station on your list that comes in nearest the left-hand end of the dial should be called station No. 1 and should be set up on button No. 1. Do not skip buttons but set up stations in numerical order.
5. Insert the proper station call tabs into the recesses of the respective buttons.
6. Manually tune in the desired station accurately.
7. Set the bandswitch to the push button position.
8. Push in the button to be set up to its depressed position.
9. Adjust its corresponding oscillator trimmer for the station signal which you tuned in manually above. Peak the adjustment for clearest reception.
10. Adjust its corresponding antenna trimmer for clearest reception.
11. Repeat the above procedure from step 6 to 10 for each button to be set up.

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Code 121

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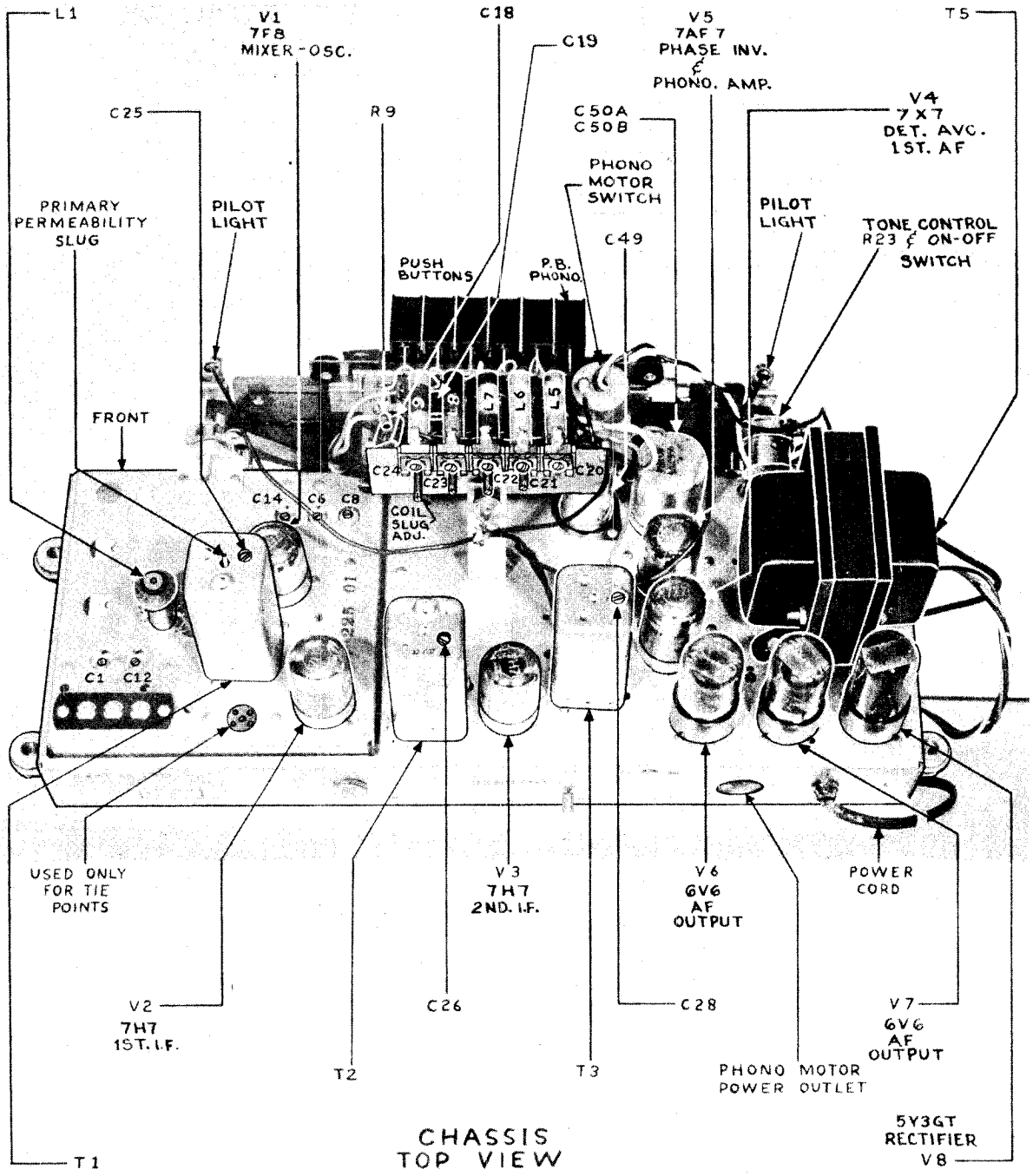

CHASSIS
TOP VIEW

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Code 121

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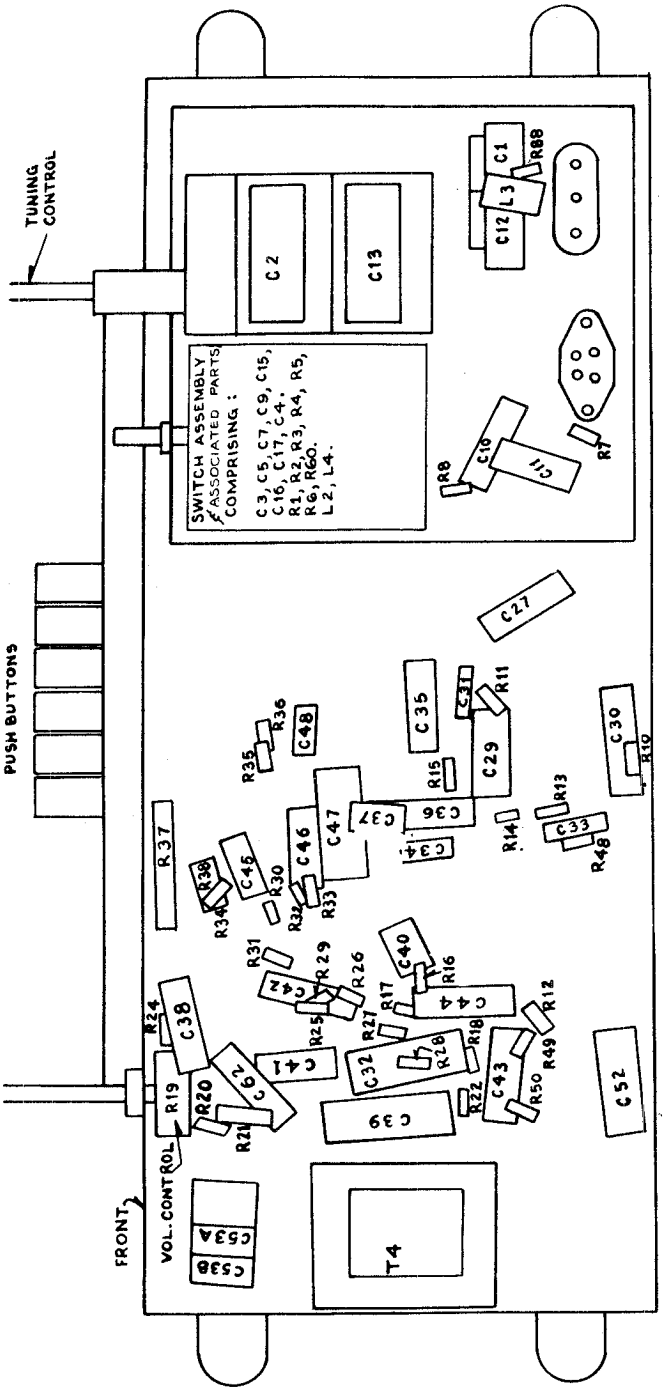
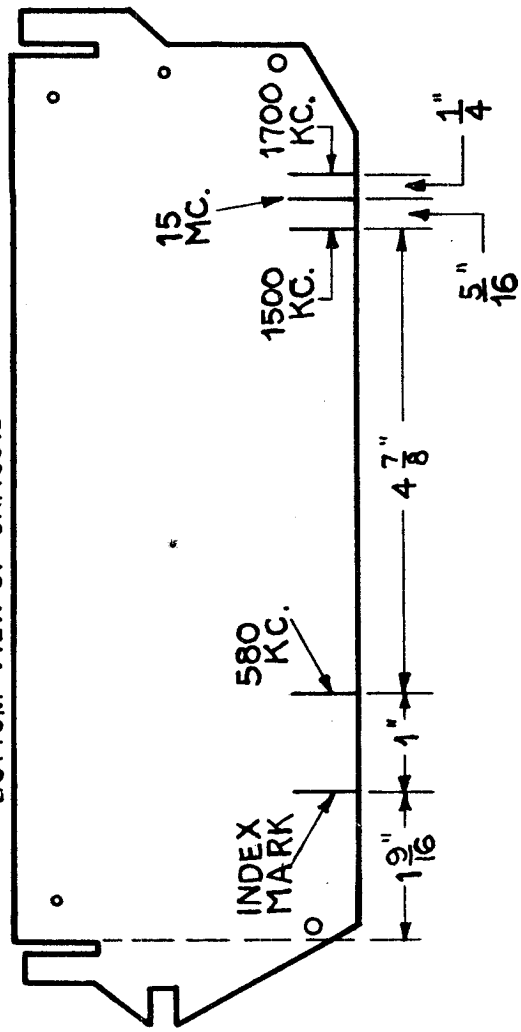


BOTTOM VIEW OF CHASSIS



DIAL BACKPLATE CALIBRATION
FIGURE 1

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Code 121

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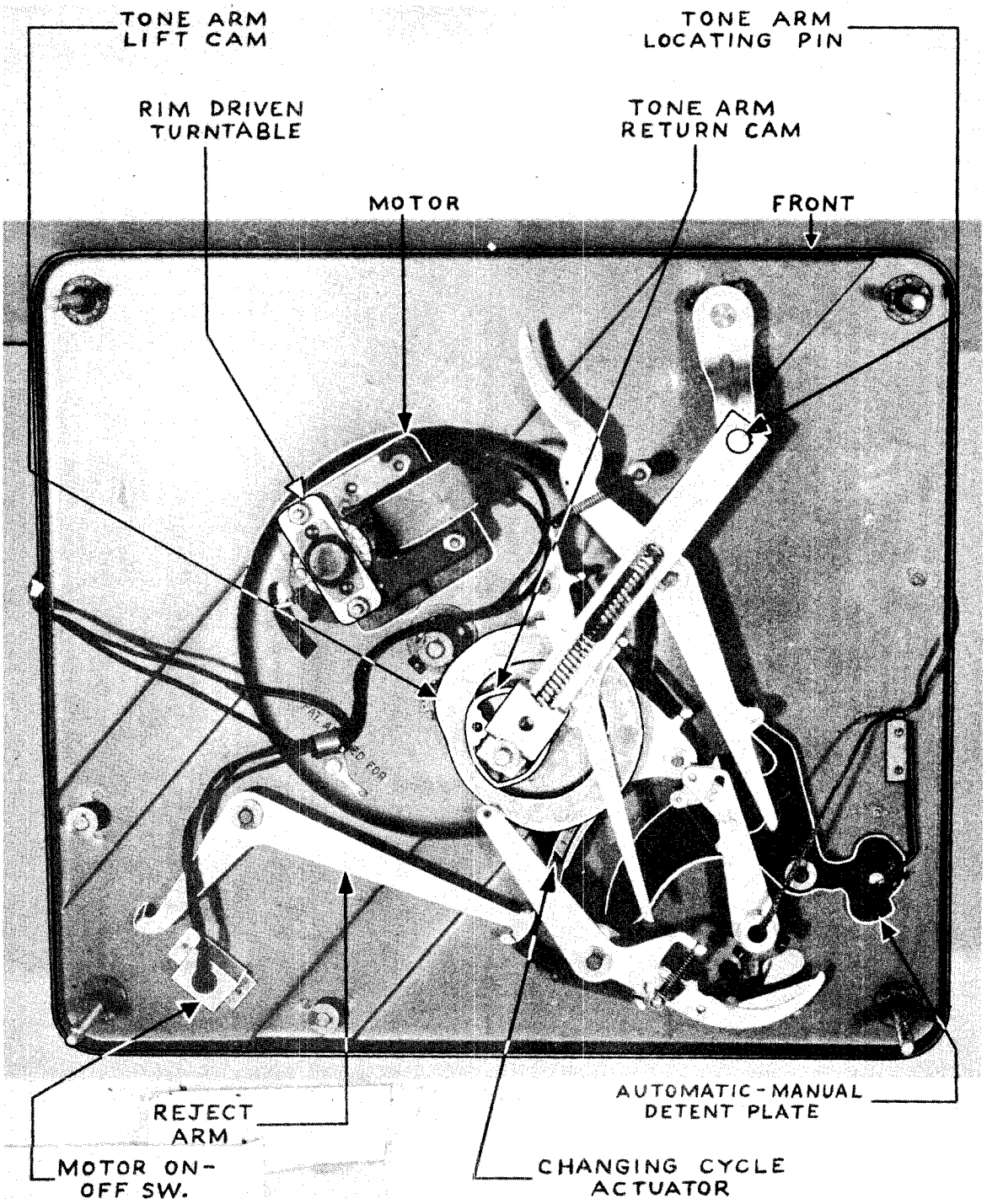

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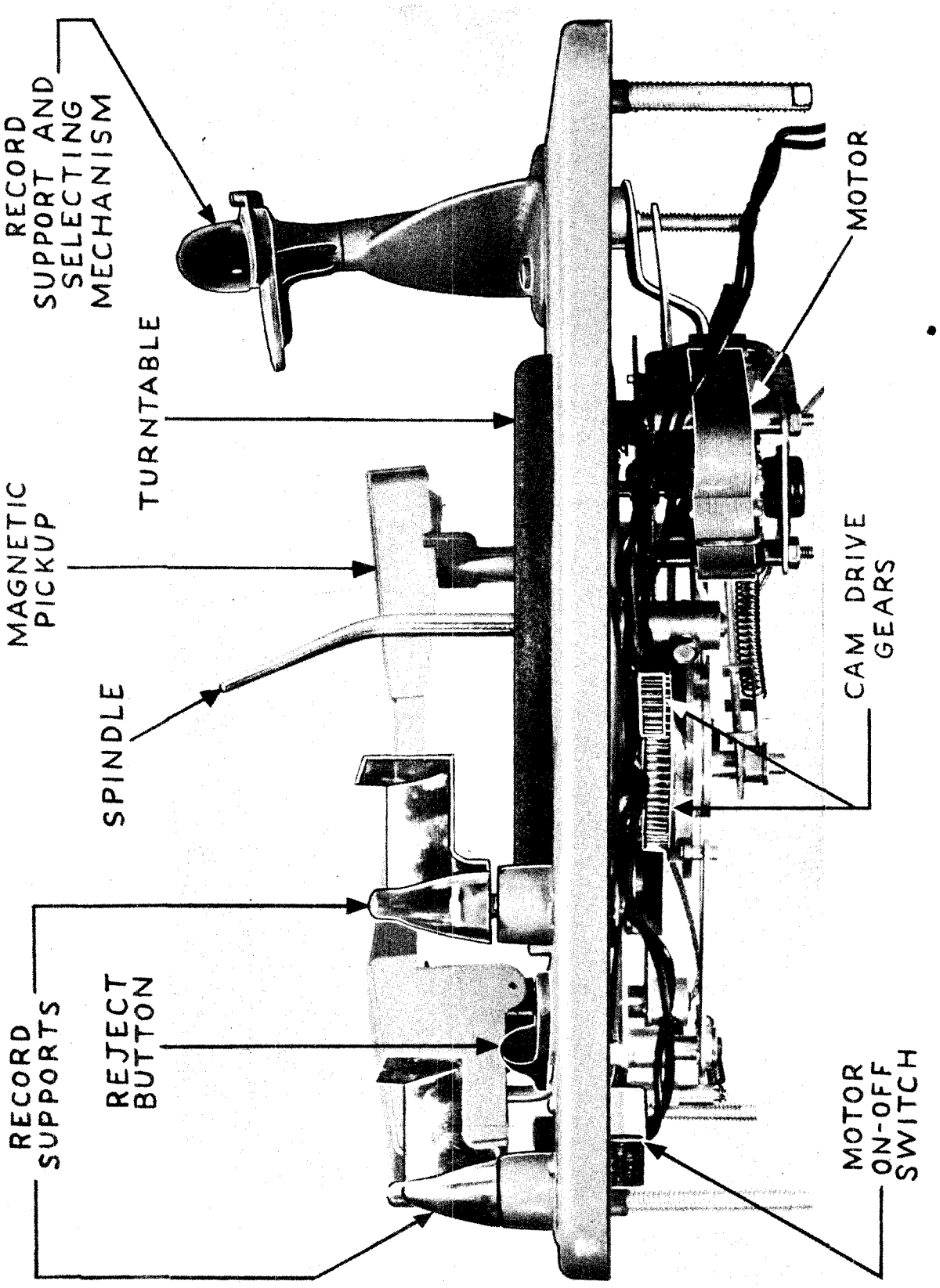

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PHILCO MODEL 46-1209 Code 121

TUBE	PIN #	VTVM	20,000 OHMS PER VOLT	1,000 OHMS PER VOLT	RESISTANCE
7F8	1	-4.7	-4.7	-4.2	16,500
	2	0	0	0	0
	3	110	100	100	150,000
	4	0	0	0	1
	5	8.6	8.6	8	21,000
	6	245	230	240	110,000
	7	0	0	0	0.2
	8	0	0	0	4,400,000
7H7 1st IF	1	0	0	0	0.2
	2	250	240	245	110,000
	3	105	100	105	150,000
	4	0	0	0	0
	5	0	0	0	0
	6	0	0	0	5,400,000
	7	0.7	0.7	0.7	60
	8	0	0	0	0
7H7 2nd IF	1	0	0	0	0
	2	245	240	240	110,000
	3	125	120	120	150,000
	4	0	0	0	0
	5	0	0	0	0
	6	0	0	0	8
	7	2.3	2.1	2.2	250
	8	0	0	0	0.2
7X7 Det AVC Audio	1	0	0	0	0.4
	2	145	140	130	360,000
	3	-1.0	-0.6	-0.3	10,000,000
	4	0	0	0	0
	5	-0.6	-0.6	-0.4	100,000
	6	0	0	0	INFINITE
	7	0	0	0	INFINITE
	8	0	0	0	0.4
7AF7	1	0	0	0	0.4
	2	68	66	68	53,000
	3	180	170	175	160,000
	4	48	18	0.2	1,000,000
	5	0	0	0	5,000,000
	6	36	32	18	700,000
	7	2.2	2	1.4	6,200
	8	0	0	0	0.4
6V6GT	1	0	0	0	INFINITE
	2	0	0	0	0.2
	3	240	230	240	110,000
	4	250	240	250	110,000
	5	-15	-12	-0.6	500,000
	6	240	230	240	110,000
	7	0	0	0	0
	8	0	0	0	0
6V6GT	1	0	0	0	INFINITE
	2	0	0	0	0.2
	3	240	230	240	110,000
	4	250	240	250	110,000
	5	-15	-12	-1.0	500,000
	6	0	0	0	INFINITE
	7	0	0	0	0
	8	0	0	0	0
5Y3GT	1	0	0	0	INFINITE
	2	320	310	320	110,000
	3	0	0	0	INFINITE
	4	0	0	0	230
	5	0	0	0	INFINITE
	6	0	0	0	240
	7	0	0	0	INFINITE
	8	320	310	320	110,000

PHILCO MODEL 46-1226 CODE 121

TUBE	PIN	VTVM	20,000 OHMS PER VOLT	1,000 OHMS PER VOLT	RESISTANCE
7F8 Conv.	1	-3.3	-3.3	-3.2	13,000
	2	0	0	0	0
	3	88	88	76	160,000
	4	0	0	0	0
	5	8.4	8.2	7.6	2,100
	6	230	230	230	110,000
	7	0	0	0	0
	8	0	0	0	0
7H7 1st IF Amp.	1	0	0	0	0
	2	230	230	230	110,000
	3	94	94	94	155,000
	4	0	0	0	0
	6	0	0	0	0
	6	0	0	0	6,000,000
	7	0.7	0.7	0.7	62
	8	0	0	0	0
7H7 2nd IF Amp.	1	0	0	0	0
	2	230	230	230	110,000
	3	105	105	105	150,000
	4	0	0	0	0
	5	0	0	0	0
	6	0	0	0	9
	7	1.5	1.5	1.5	1550
	8	0	0	0	0
7C6 Det.AVC 1st Audio	1	0	0	0	0
	2	130	130	130	325,000
	3	-0.7	-0.4	-0.2	9,000,000
	4	0	0	0	0
	5	0	0	0	350,000
	6	0	0	0	350,000
	7	0	0	0	0
	8	0	0	0	0
6J5 Phase Inv.	1	0	0	0	INFINITE
	2	0	0	0	0
	3	175	175	175	160,000
	4	0	0	0	INFINITE
	5	40	14	5	1,000,000
	6	0	0	0	1,100,000
	7	0	0	0	0
	8	58	56	50	53,000
6V6 Audio Output	1	0	0	0	INFINITE
	2	0	0	0	0
	3	230	230	230	105,000
	4	240	240	240	105,000
	5	-16	-6	-4	420,000
	6	0	0	0	INFINITE
	7	0	0	0	0
	8	0	0	0	0
6V6 Audio Output	1	0	0	0	INFINITE
	2	0	0	0	0
	3	230	230	230	105,000
	4	240	240	240	105,000
	5	-16	-6	-4	420,000
	6	0	0	0	INFINITE
	7	0	0	0	0
	8	0	0	0	0
5Y3GT Rect.	1	0	0	0	INFINITE
	2	300	300	300	105,000
	3	0	0	0	INFINITE
	4	-22	-22	-22	260
	5	0	0	0	0
	6	-22	-22	-22	260
	7	0	0	0	INFINITE
	8	300	300	300	105,000

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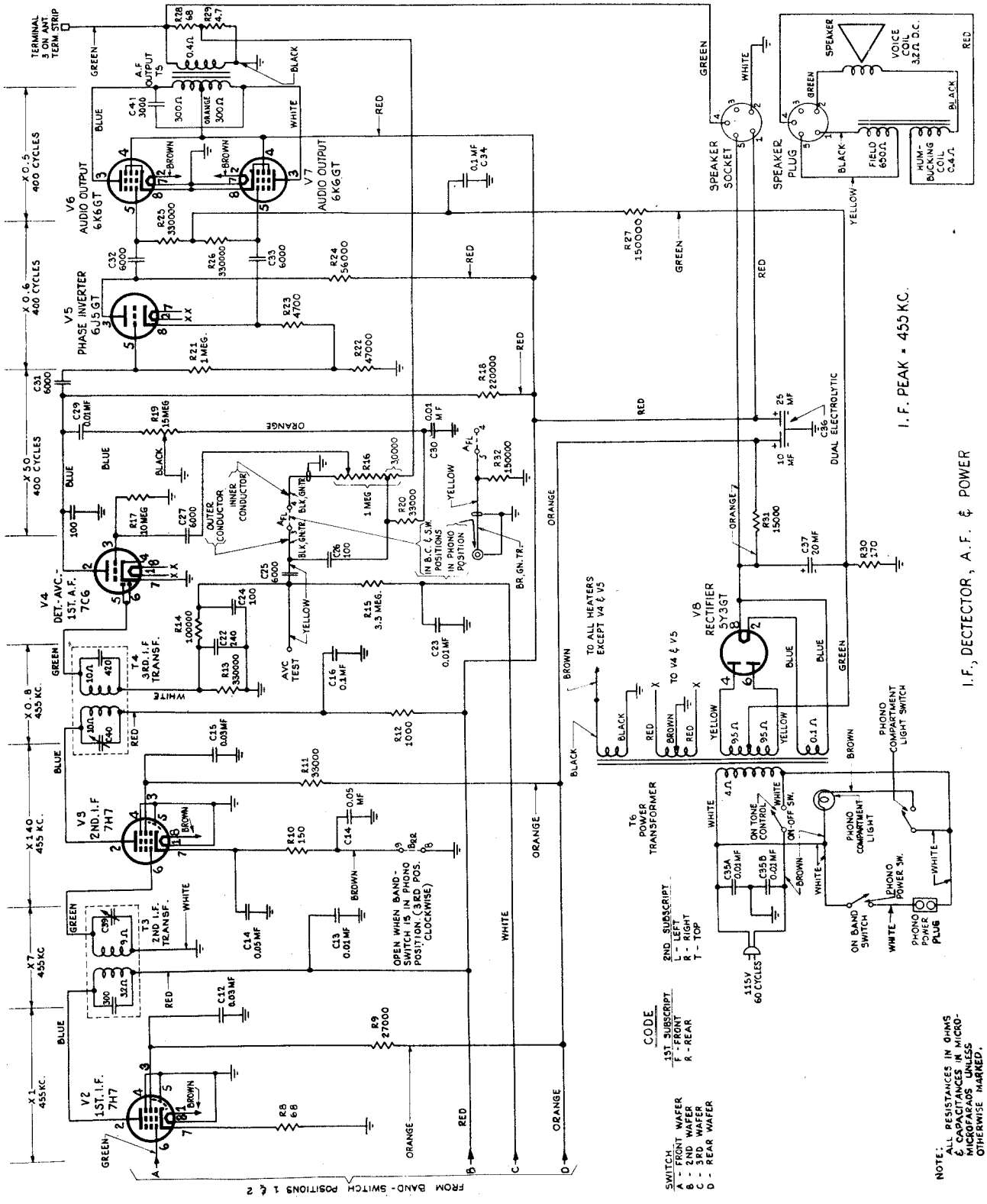
MODEL 46-1226
Code 121

PHILCO RADIO & TELEV. CORP.


I.F., DECTECTOR, A.F. & POWER
I.F. PEAK - 455 K.C.
V1 1ST. I.F. 7H7
V2 2ND. I.F. 7H7
V3 2ND. I.F. 7H7
V4 DET.-AVC.-1ST. A.F. 7C6
V5 PHASE INVERTER 6J5GT
V6 AUDIO OUTPUT 6K6GT
V7 AUDIO OUTPUT 6K6GT
V8 RECTIFIER 5Y3GT
T3 2ND. I.F. TRANSF.
T4 3RD. I.F. TRANSF.
T5 A.F. OUTPUT
T6 POWER TRANSFORMER
SPEAKER SOCKET
SPEAKER PLUG
SPEAKER
VOICE COIL 3.2Ω D.C.
FIELD 600Ω
HUM-BUCKING COIL 0.4Ω
TERMINAL 3 ON ANT. TERM. STRIP
DUAL ELECTROLYTIC
OUTER CONDUCTOR
INNER CONDUCTOR
AVC TEST
TO ALL HEATERS EXCEPT V4 & V5
TO V4 & V5
115V 60 CYCLES
ON TONE CONTROL
ON-OFF SW.
PHONO COMPARTMENT LIGHT
PHONO COMPARTMENT LIGHT SWITCH
PHONO POWER SW.
PHONO POWER PLUG
ON BAND SWITCH
IN B.C. & S.W. POSITIONS
IN PHONO POSITION
OPEN WHEN BAND-SWITCH IS IN PHONO POSITION (3RD POS. CLOCKWISE)
FROM BAND-SWITCH POSITIONS 1 & 2
CODE
1ST SUBSCRIPT F - FRONT R - REAR
2ND SUBSCRIPT L - LEFT R - RIGHT T - TOP
SWITCH A - FRONT WAFER B - 2ND WAFER C - 3RD WAFER D - REAR WAFER
NOTE: ALL RESISTANCES IN OHMS & CAPACITANCES IN MICRO-MICROFARADS UNLESS OTHERWISE MARKED.

For Voltage and resistance data, see P.15-39

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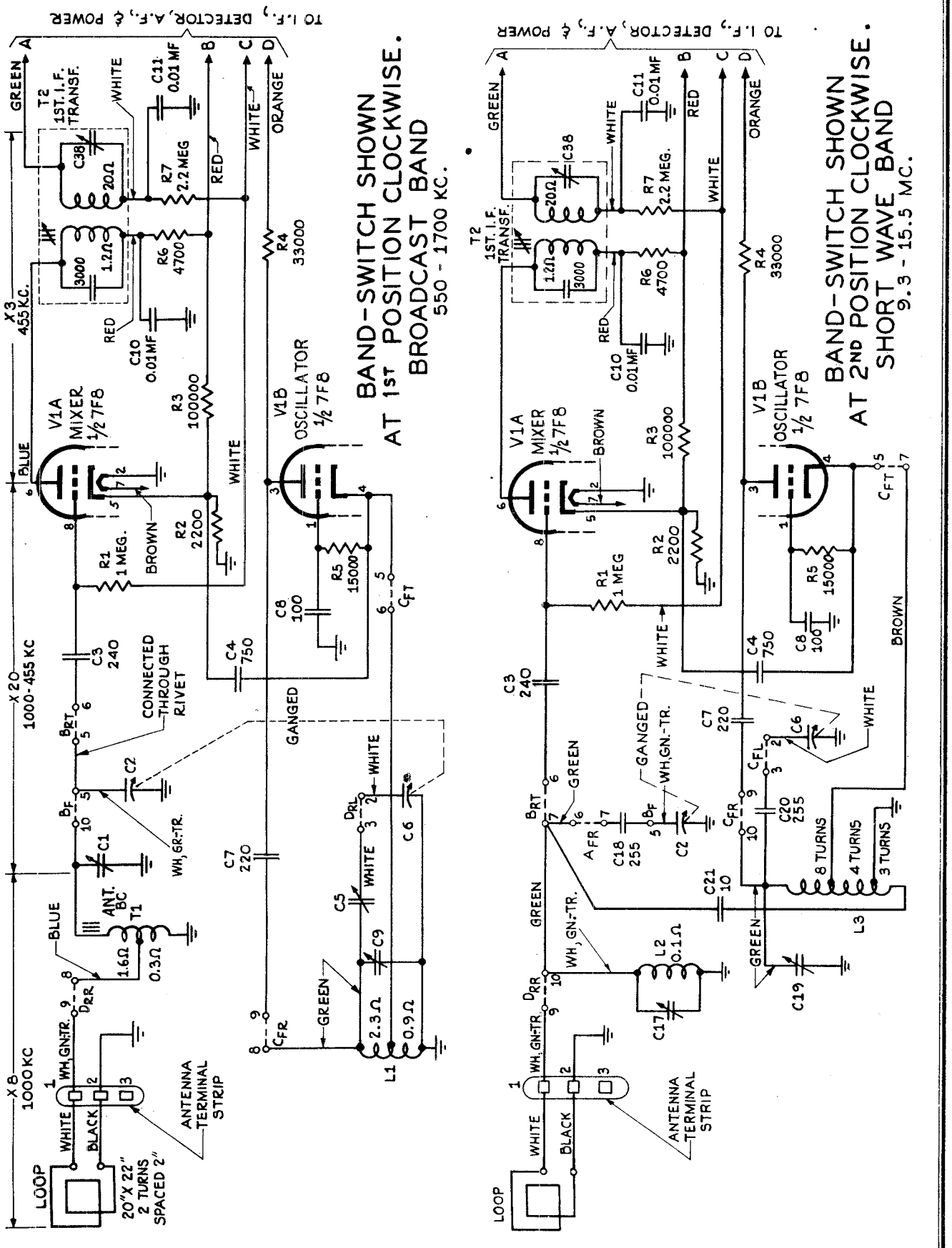

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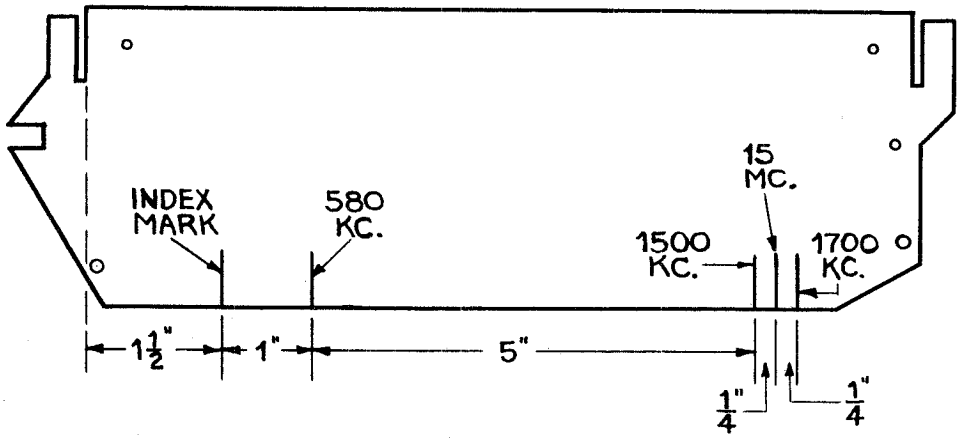
ALIGNMENT

PHILCO 46-1226

Power should not be turned on in this receiver unless the speaker is connected. The chassis should be removed from the cabinet and the dial backplate calibrated as shown in Figure 1. The receiver loop should be connected between terminals 1 (high) and 2 (low) of the antenna terminal strip. The signal generator is connected to the Hazeltine standard loop Model 1150 which is loosely coupled to the receiver loop. The output meter should be connected between terminal 1 (high) and 2 (low) of the antenna terminal strip. The tone control should be in the maximum high position. The volume control should be at maximum. The generator output should at all times be just sufficient to obtain a minimum deflection on the output meter.

	Signal Generator Frequency	Receiver Band Switch Position	Receiver Dial Position	Adjust for Maximum
1.	455 kc.	Broadcast	Index Mark (condenser plates fully meshed)	C40 C39 C38 Primary tuning slug of T2.
2.	1700 kc.	Broadcast	1700 kc.	C9
3.	1500 kc.	Broadcast	1500 kc.	C1
4.	580 kc.	Broadcast	580 kc.	Adjust C5 for peak while rocking tuning control.
5.	1700 kc.	Broadcast	1700 kc.	Readjust C9
6.	15 mc.	Short Wave	15 mc.	Starting with trimmer C19 screw loosened, slowly tighten for peak on first signal heard. Image should be obtained with receiver tuned to 15.9 mc.
7.	15 mc.	Short Wave	15 mc.	C17



DIAL BACKPLATE CALIBRATION
FIGURE 1

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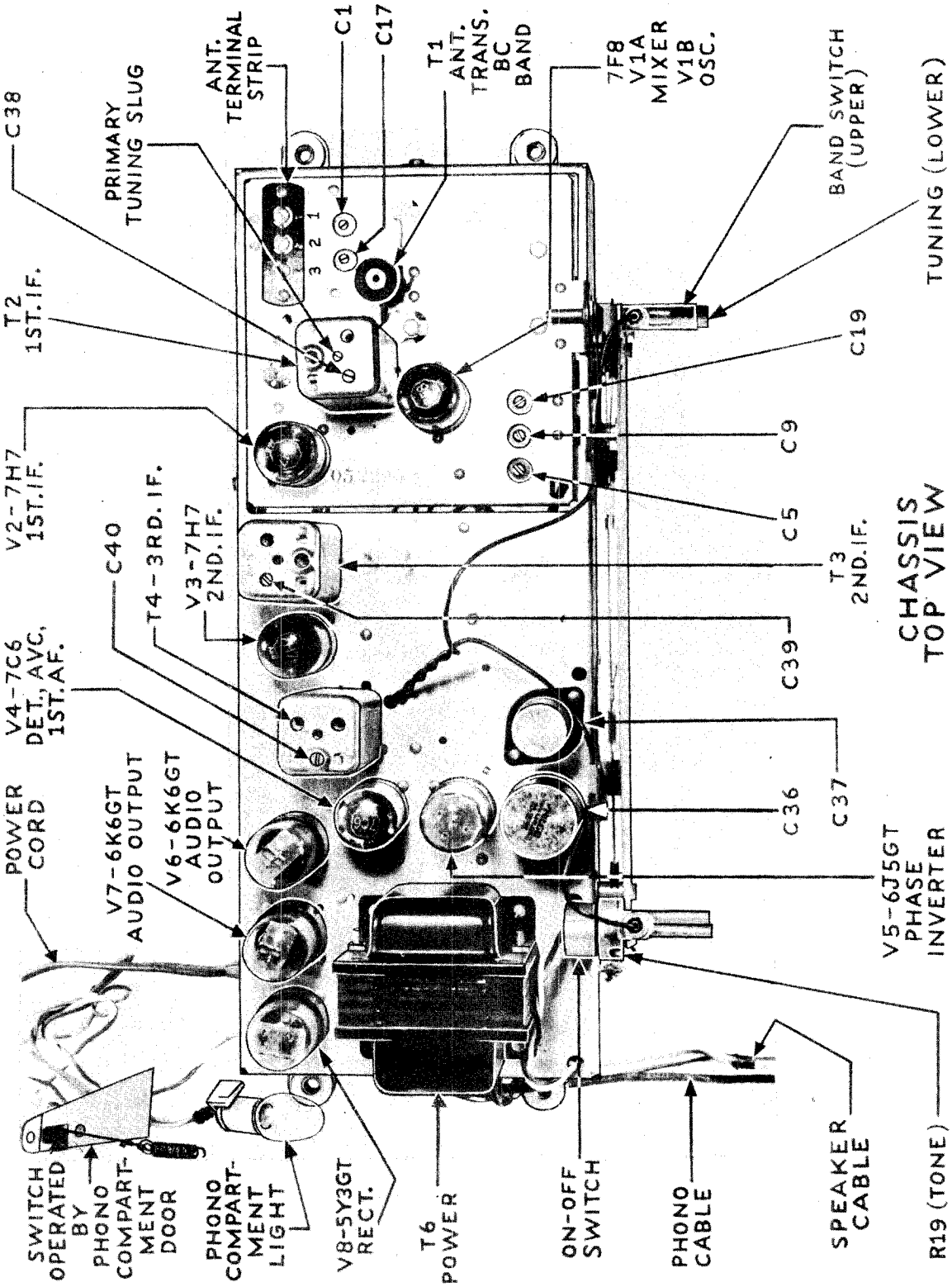
MODEL 46-1226
Code 121

PHILCO RADIO & TELEV. CORP.



CHASSIS TOP VIEW

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MODEL 46-1226
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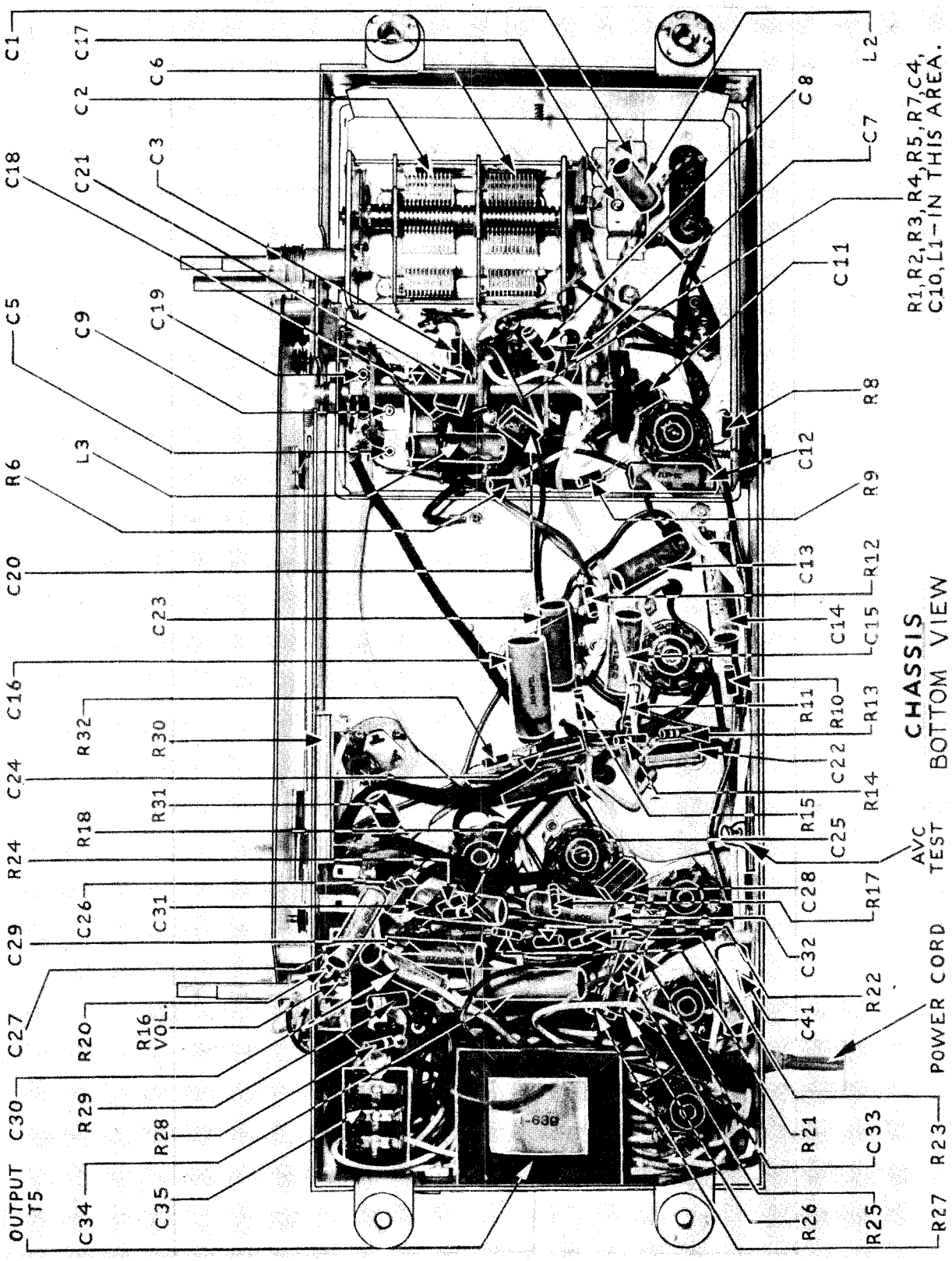

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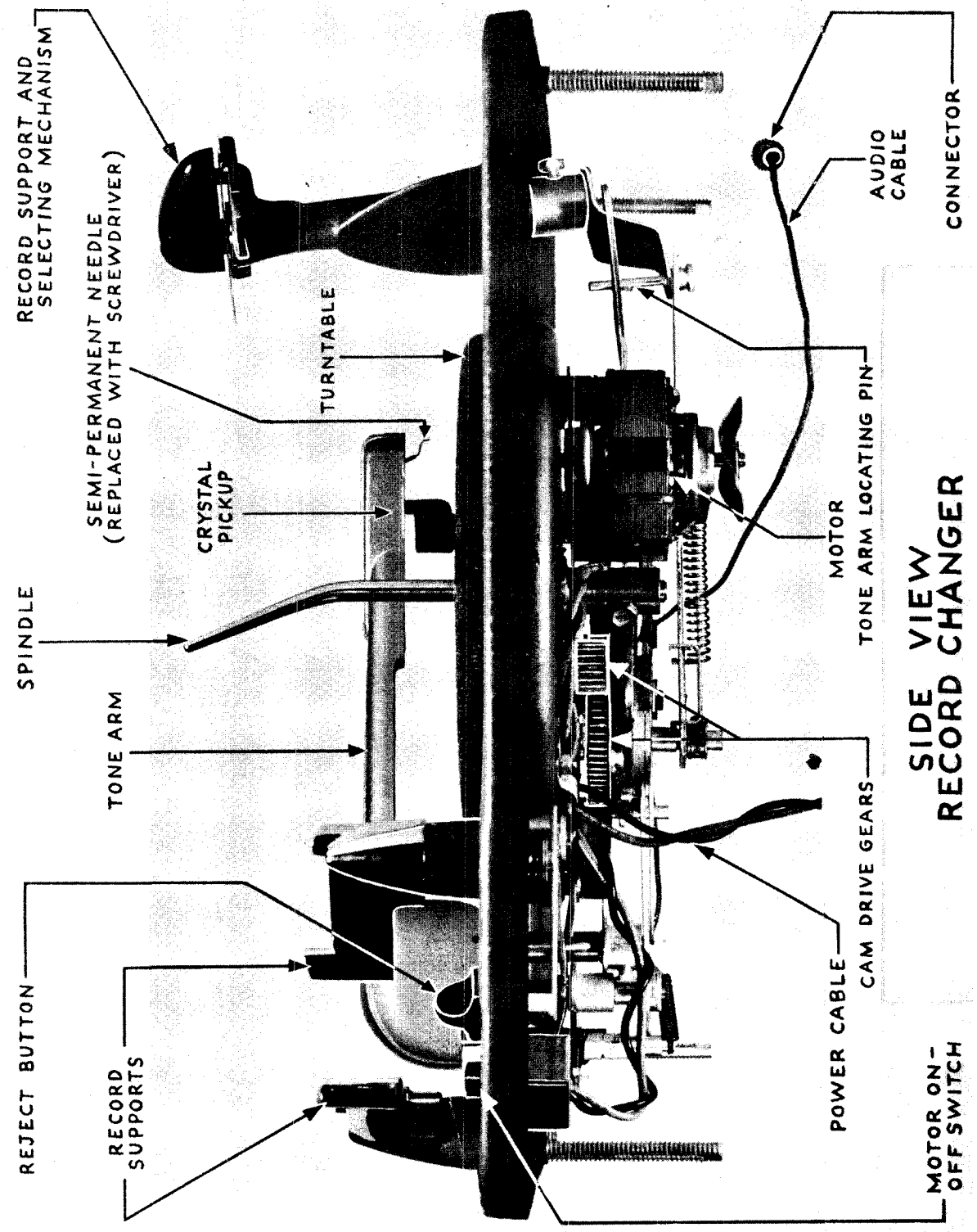
PHILCO RADIO & TELEV. CORP.



SIDE VIEW
RECORD CHANGER

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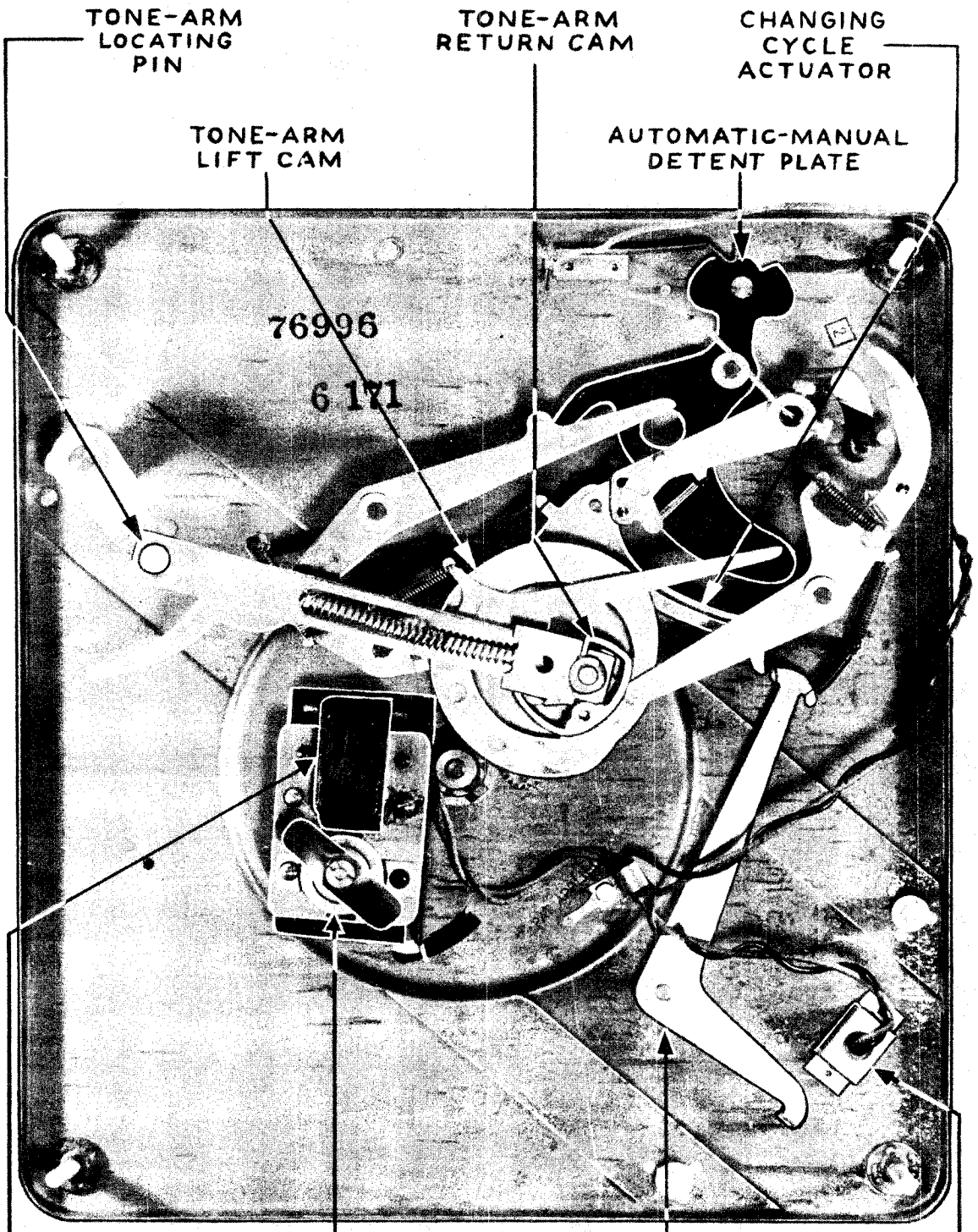
MODEL 46-1226
Code 121

PHILCO RADIO & TELEV. CORP.



RECORD CHANGER
BOTTOM VIEW

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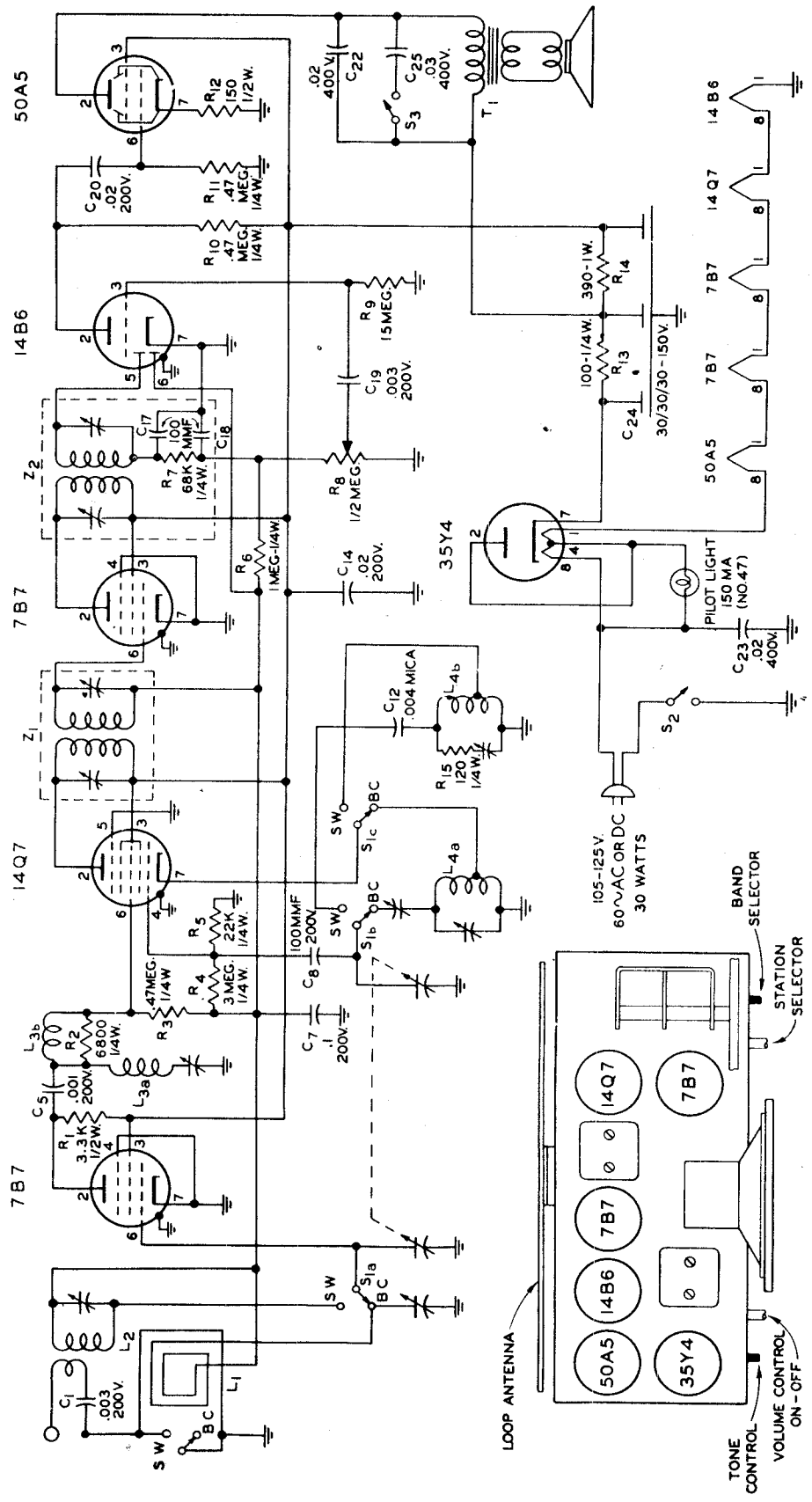
PHILHARMONIC RADIO CORP.


MODEL NO RR-13L
IF PEAK 456 KC
NOTICE: IF SET IS INOPERATIVE ON DC REVERSE LINE PLUG
CAUTION: TO REPLACE TUBES, REMOVE SCREW & WASHER AT CENTER OF LOOP ANTENNA, AFTER FIRST REMOVING PLUG FROM CURRENT OUTLET
THIS APPARATUS IS LICENSED UNDER THE UNITED STATES PATENT RIGHTS OF HAZELTINE CORPORATION
THIS APPARATUS USES INVENTIONS OF UNITED STATES PATENTS LICENSED BY RADIO CORPORATION OF AMERICA
PATENT NUMBERS SUPPLIED UPON REQUEST.
105-125 V. 60~AC OR DC 30 WATTS
PILOT LIGHT 150 MA (NO.47)
BAND SELECTOR
STATION SELECTOR
LOOP ANTENNA
TONE CONTROL
VOLUME CONTROL ON-OFF
50A5
14B6
7B7
14Q7
35Y4
SW
BC

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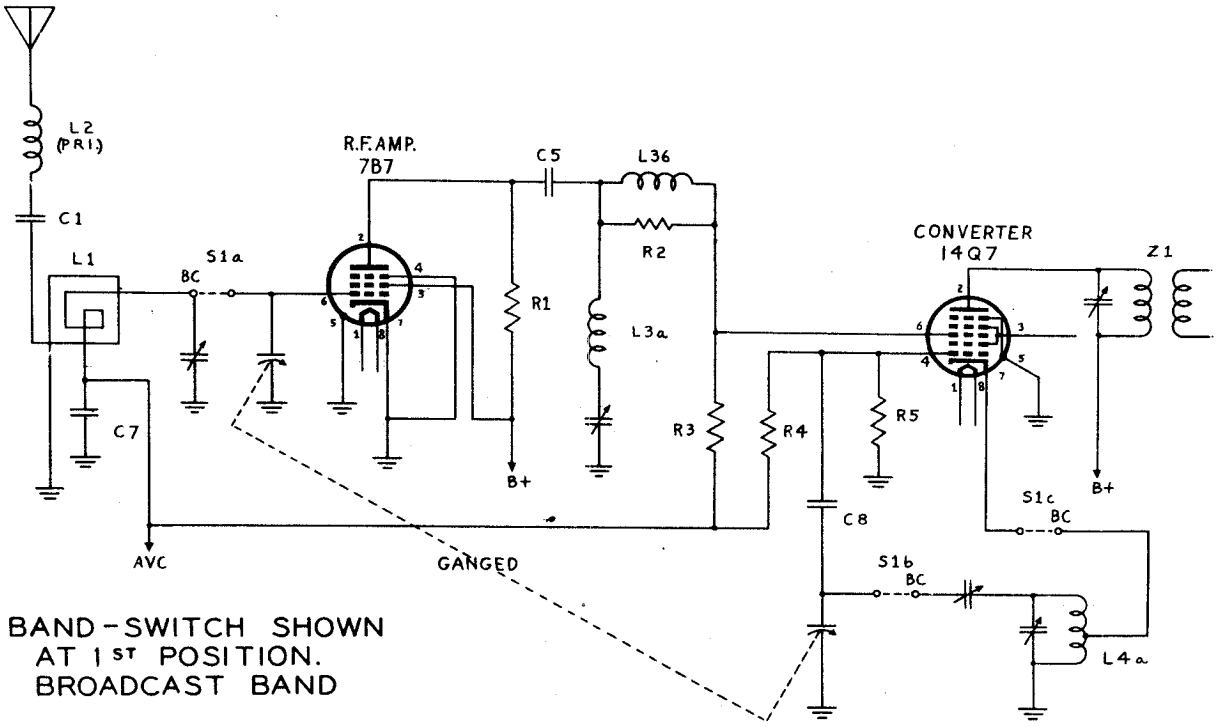
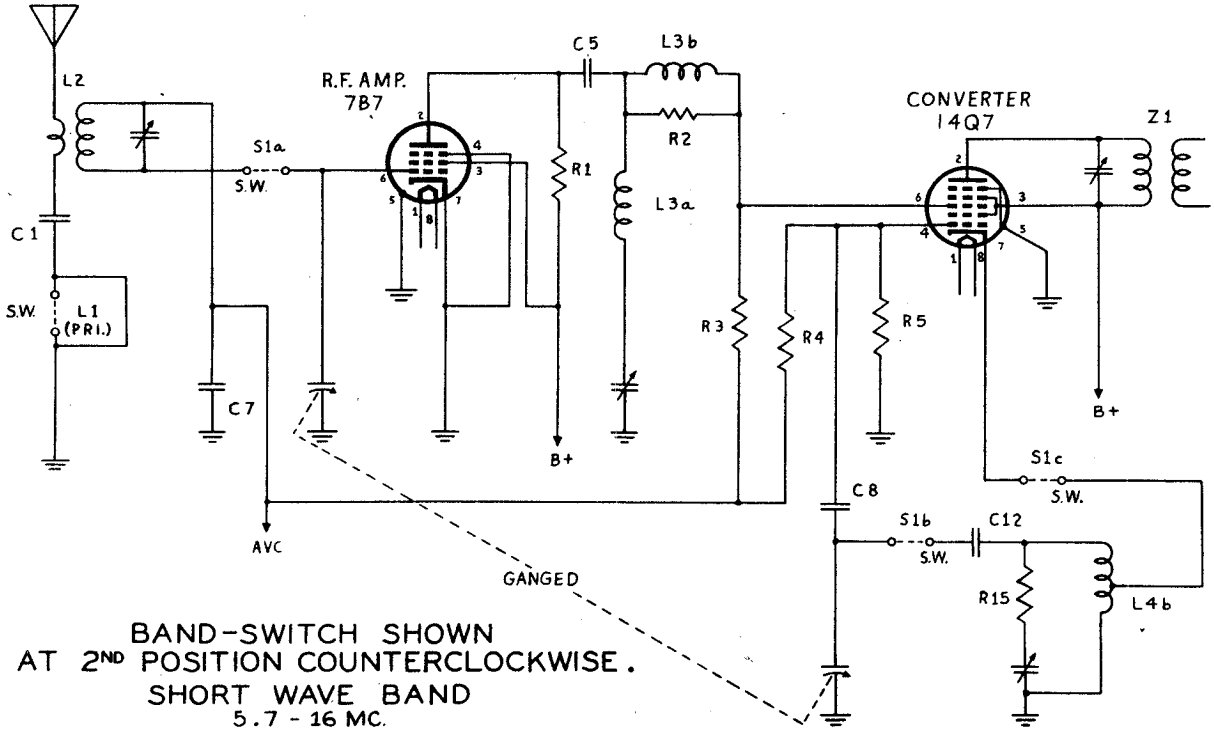
PHILHARMONIC RADIO CORP.



BAND-SWITCH SHOWN
AT 1ST POSITION.
BROADCAST BAND



BAND-SWITCH SHOWN
AT 2ND POSITION COUNTERCLOCKWISE.
SHORT WAVE BAND
5.7 - 16 MC.

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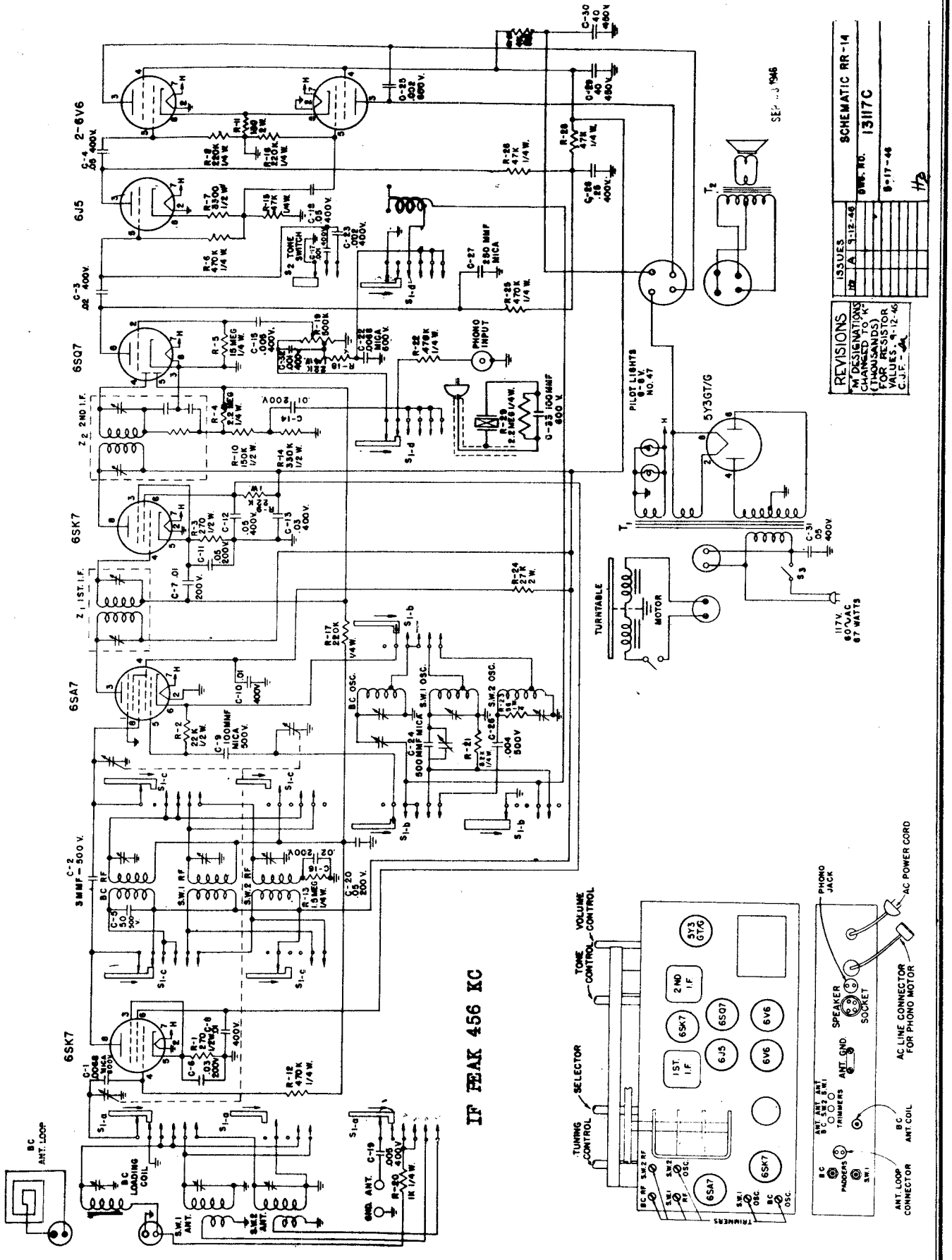
MODEL RR-14

PHILHARMONIC RADIO CORP.



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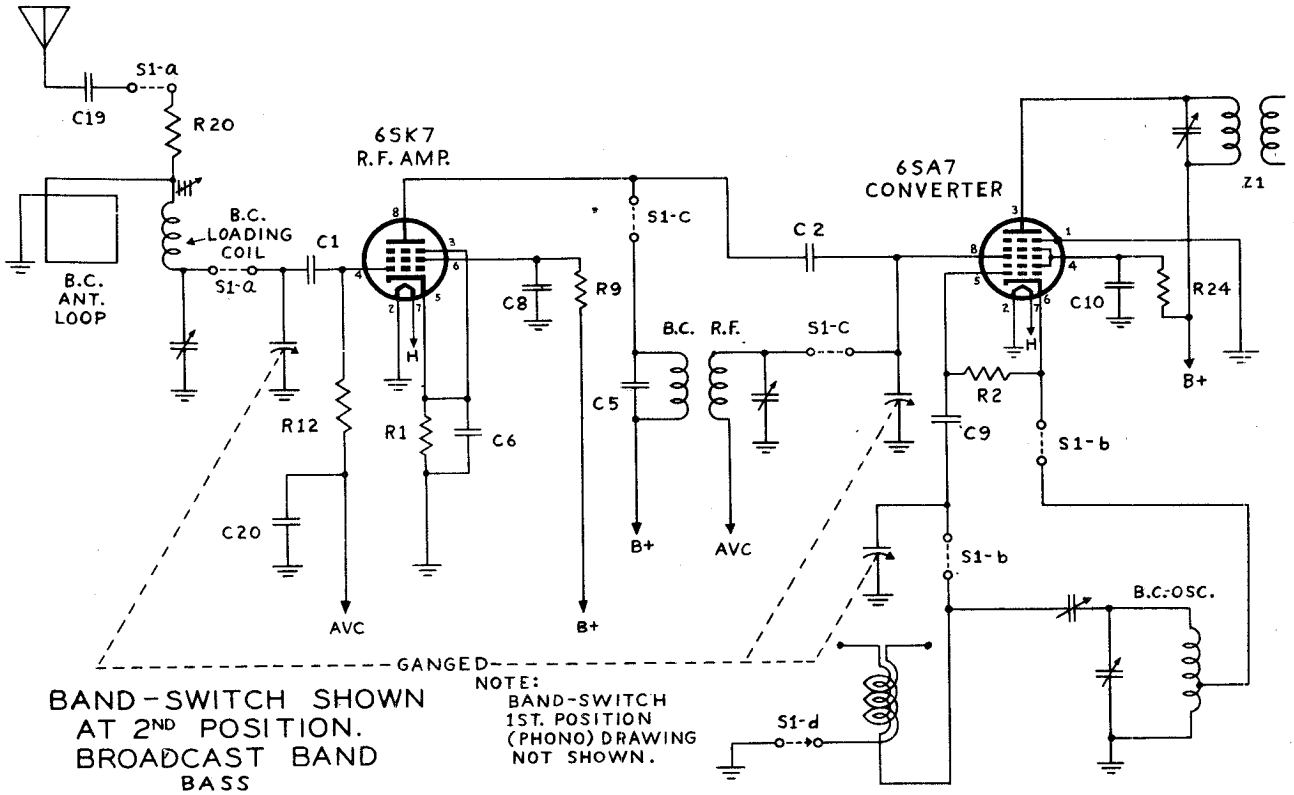
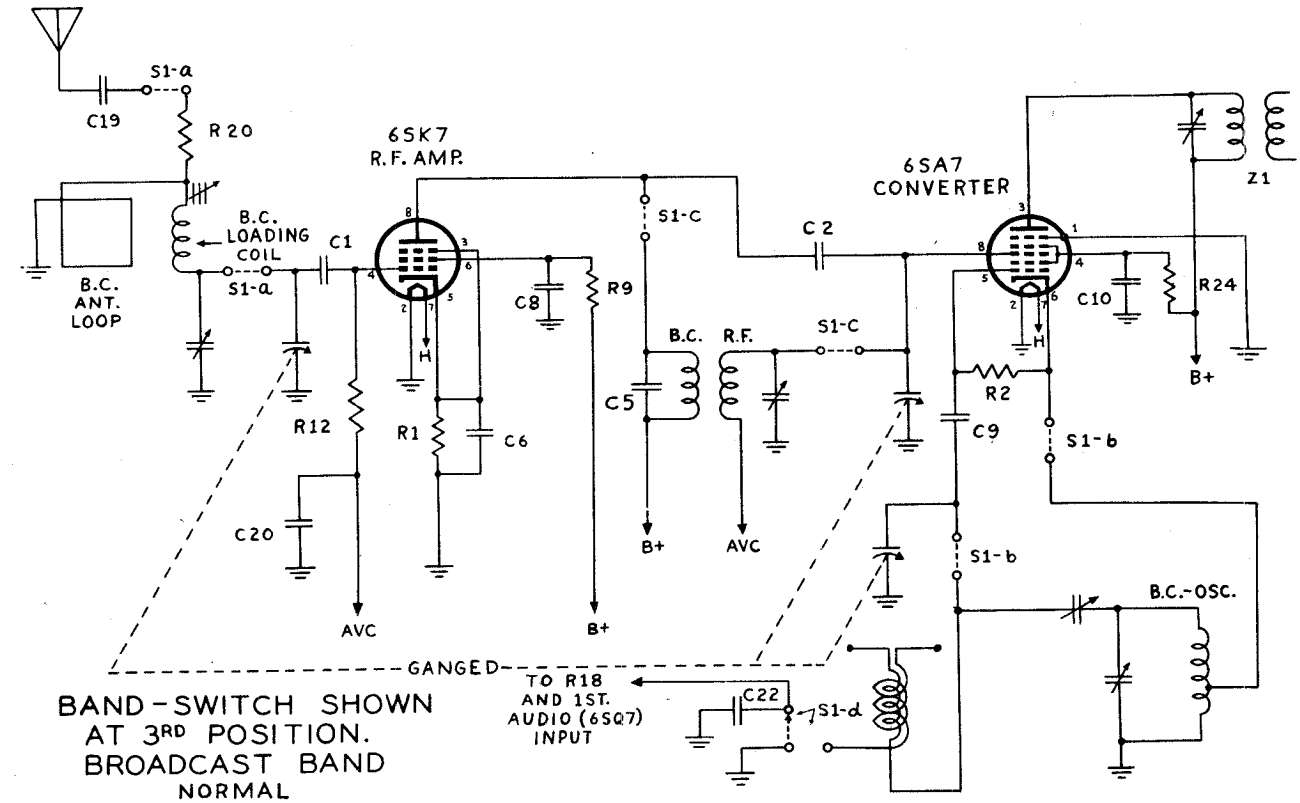
MODEL RR-14

PHILHARMONIC RADIO CORP.





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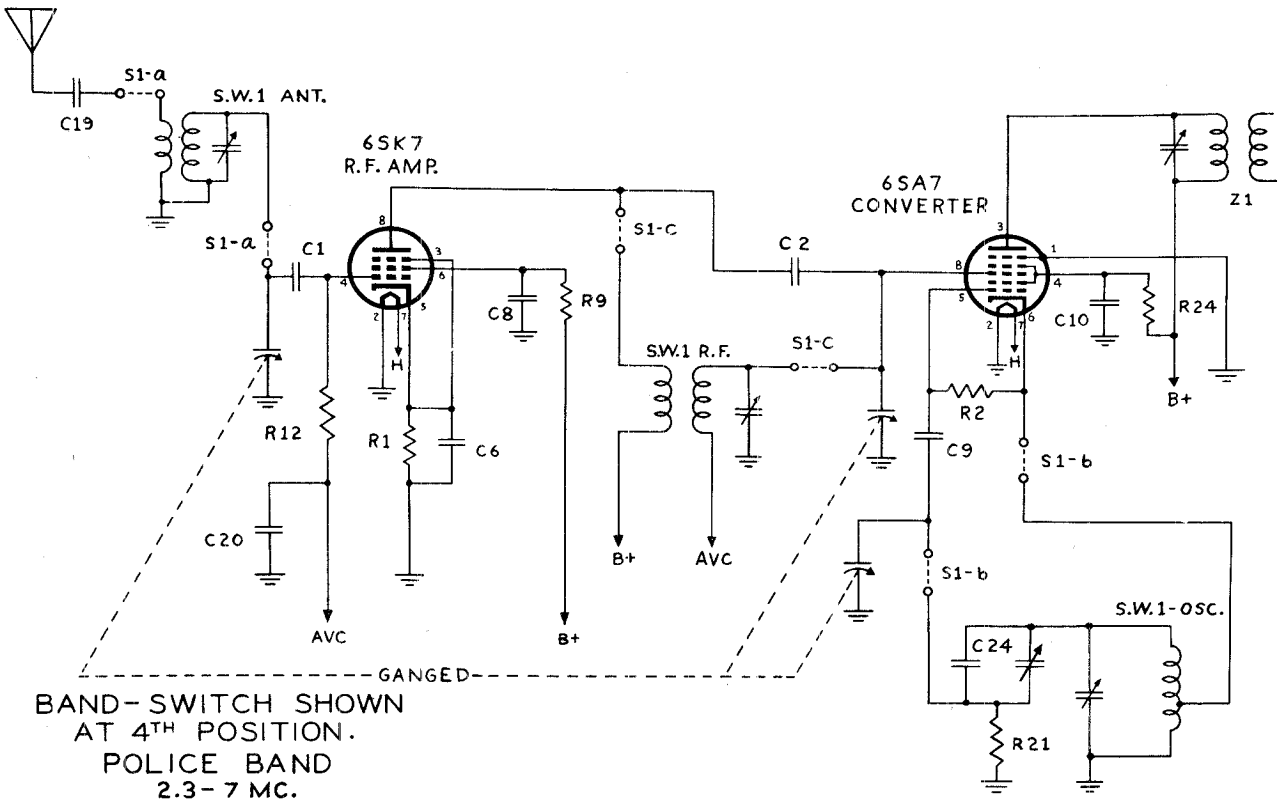
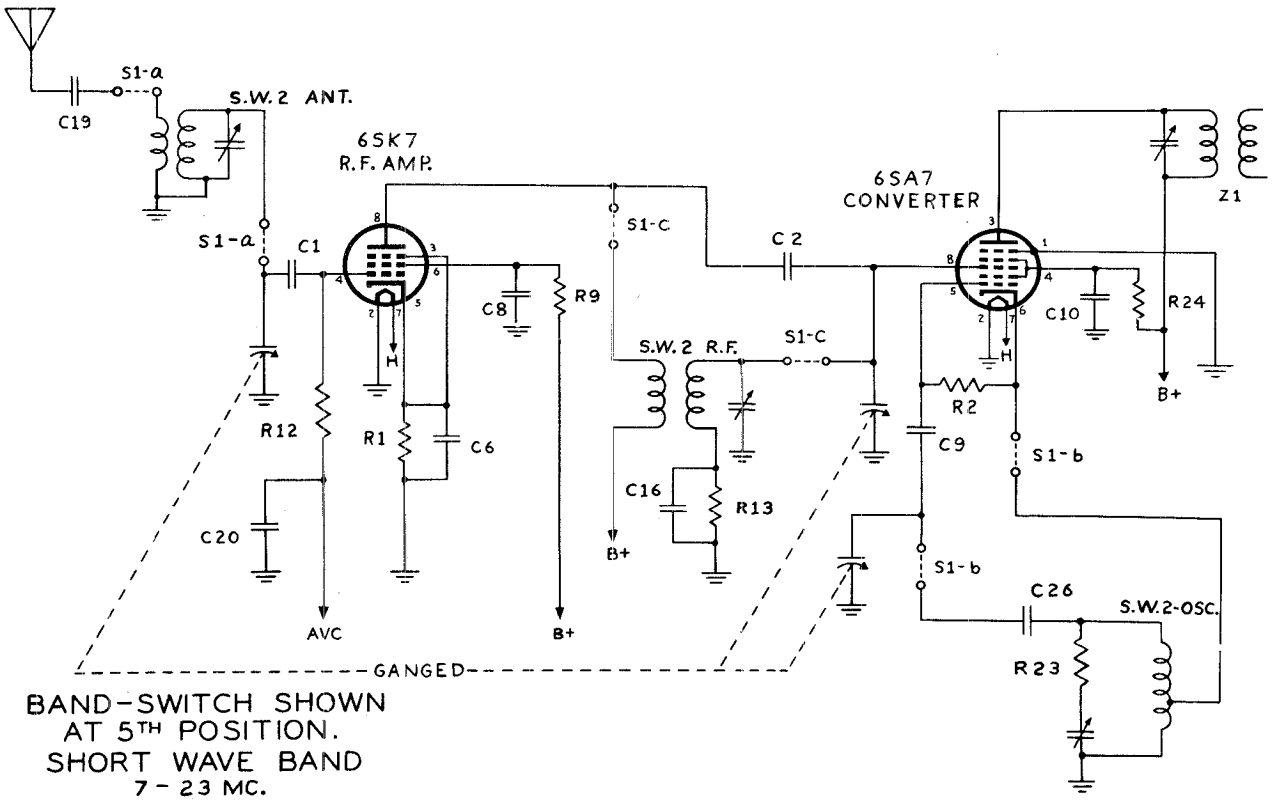
PHILHARMONIC RADIO CORP.



BAND-SWITCH SHOWN
AT 4TH POSITION.
POLICE BAND
2.3-7 MC.



BAND-SWITCH SHOWN
AT 5TH POSITION.
SHORT WAVE BAND
7-23 MC.

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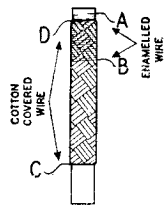
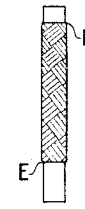
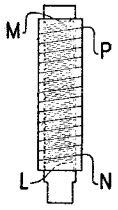


ANTENNA COUPLING COIL
504210



R.F. COIL
504214

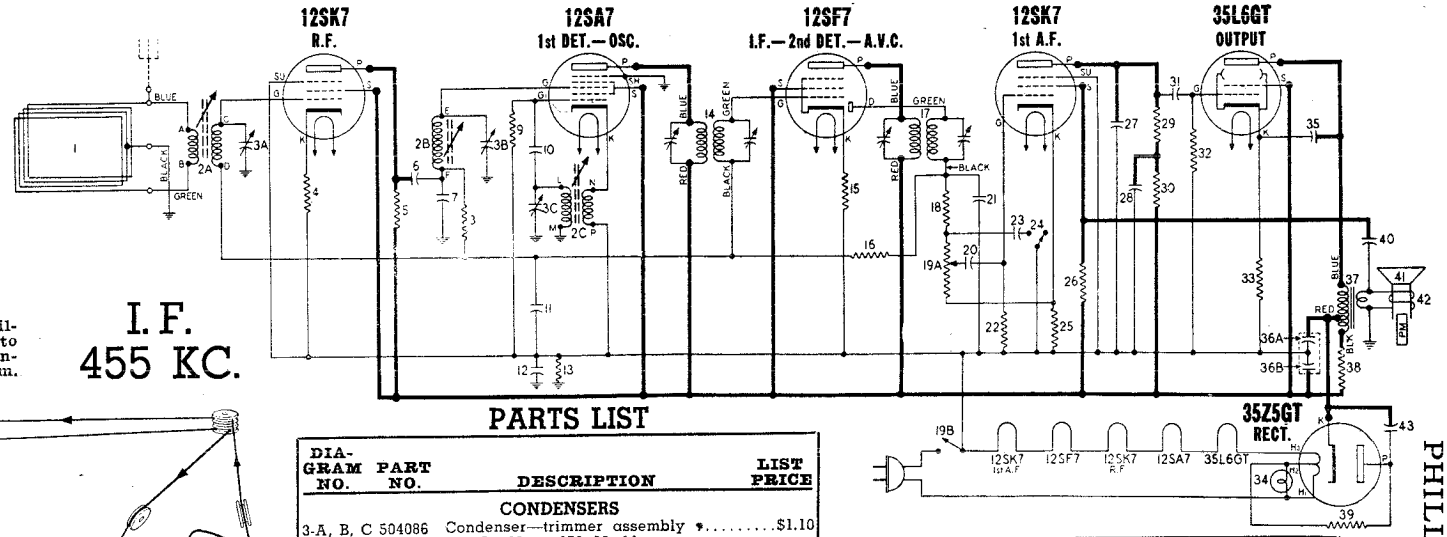


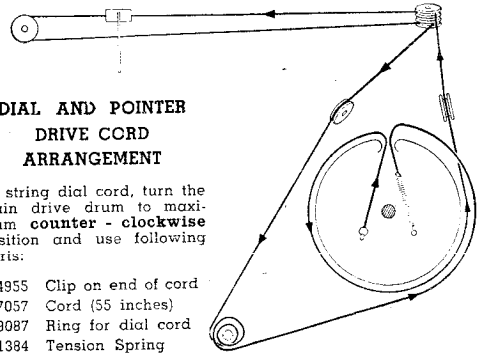
OSCILLATOR COIL
504212

SLUG CORES FOR COILS
ANT.—504211
R.F.—504215
OSC.—504213

Lettered terminals in illustrations correspond to similarly lettered terminals on the circuit diagram.

I.F. 455 KC.





DIAL AND POINTER DRIVE CORD ARRANGEMENT

To string dial cord, turn the main drive drum to maximum **counter - clockwise** position and use following parts:

114955	Clip on end of cord
117057	Cord (55 inches)
119087	Ring for dial cord
161384	Tension Spring

SOCKET VOLTAGES

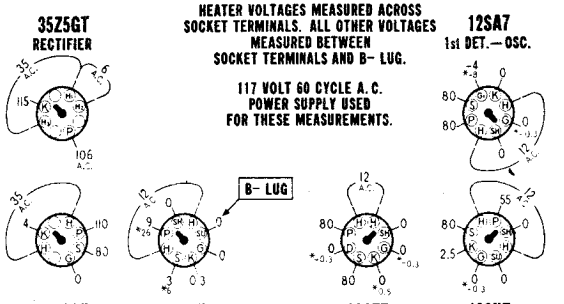
Measured with voltmeter having sensitivity of 1000 ohms per volt except where indicated by (*).

VOLUME ON FULL WITH NO SIGNAL — DIAL TUNED TO 540 KC.

BOTTOM VIEW OF CHASSIS

HEATER VOLTAGES MEASURED ACROSS SOCKET TERMINALS. ALL OTHER VOLTAGES MEASURED BETWEEN SOCKET TERMINALS AND B- LUG.

117 VOLT 60 CYCLE A. C. POWER SUPPLY USED FOR THESE MEASUREMENTS.



REAR OF CHASSIS

*—Measured with vacuum tube voltmeter

PARTS LIST

DIAGRAM NO.	PART NO.	DESCRIPTION	LIST PRICE
		CONDENSERS	
3-A, B, C	504086	Condenser—trimmer assembly * A—20 to 270 Mmfd. B—40 to 370 Mmfd. C—40 to 370 Mmfd.	$1.10
6	502271	Condenser—mica 260 Mmfd. 500 volt	.30
7	502165	Condenser—mica 1,000 Mmfd. 500 volt	.45
10	502159	Condenser—mica 50 Mmfd. 500 volt	.24
11	502155	Condenser—.1 Mfd. 200 volt	.30
12	502158	Condenser—.2 Mfd. 400 volt	.36
20	502453	Condenser—.002 Mfd. 400 volt	.20
21	502160	Condenser—mica 110 Mmfd. 500 volt	.24
23	502470	Condenser—.0008 Mfd. 400 volt	.20
27	502160	Condenser—mica 110 Mmfd. 500 volt	.24
28	502153	Condenser—.05 Mfd. 200 volt	.24
31	502156	Condenser—.004 Mfd. 400 volt	.20
35	502151	Condenser—.01 Mfd. 400 volt	.20
36-A, B	500256	Condenser—electrolytic A—40 Mfd. 150 volt B—20 Mfd. 150 volt	1.50
40	502152	Condenser—.02 Mfd. 400 volt	.24
43	502157	Condenser—.05 Mfd. 400 volt	.24
		RESISTORS	
4	502140	Resistor—carbon 390 ohms ¼ watt	.12
5	502291	Resistor—carbon 4700 ohms ¼ watt	.12
8	502134	Resistor—carbon 470,000 ohms ¼ watt	.12
9	502130	Resistor—carbon 22,000 ohms ¼ watt	.12
13	502133	Resistor—carbon 220,000 ohms ¼ watt	.12
15	502264	Resistor—carbon 47 ohms ¼ watt	.12
16	502269	Resistor—carbon 3.3 Meg. ¼ watt	.12
18	502131	Resistor—carbon 47,000 ohms ¼ watt	.12
19-A, B	502145	Volume control 500,000 ohms (with switch)	1.25
22	502136	Resistor—carbon 10 Meg. ¼ watt	.12
25	502128	Resistor—carbon 2200 ohms ¼ watt	.12
26	502135	Resistor—carbon 2.2 Meg. ¼ watt	.12
29, 30	502133	Resistor—carbon 220,000 ohms ¼ watt	.12
32	502134	Resistor—carbon 470,000 ohms ¼ watt	.12
33	502138	Resistor—carbon 130 ohms ¼ watt	.12
38	502469	Resistor—carbon 1500 ohms 1 watt	.16
39	502574	Resistor—carbon 33 ohms ½ watt	.12
		COILS & TRANSFORMERS	
1	502246	Loop antenna	2.90
2-A, B, C	504096	Tuning unit; complete assembly	10.80
2-A	504210	Coil—antenna (less slug)	1.20
2-B	504214	Coil—R.F. (less slug)	.85
2-C	504212	Coil—oscillator (less slug)	1.05
	504211	Slug core for Ant. coil (yellow end)	.45
	504213	Slug core for Osc. coil (white end)	.45
	504215	Slug core for R.F. coil (purple end)	.45

DIAGRAM NO.	PART NO.	DESCRIPTION	LIST PRICE
14	502102	Transformer—1st I.F.	$2.30
17	502103	Transformer—2nd I.F.	2.30
37	502213	Transformer—output (for R-502998 spkr.)	2.50
	502904	Transformer—output (for A-502998 spkr.)	2.50
	504244	Transformer—output (for W-502998 spkr.)	2.50
		OTHER ELECTRICAL PARTS	
24	500546	Switch—tone control	.84
34	502473	Lamp—dial (Mazda 47) 6-8V. 150 Ma.	.22
41	502214	Cone & voice coil for R-502998 spkr.	2.00
	502903	Cone & voice coil for A-502998 spkr.	2.00
	504245	Cone & voice coil for W-502998 spkr.	2.00
42	502998	Speaker—P.M. dynamic (5 inch)	6.60
		MISCELLANEOUS PARTS	
	502502	Back for cabinet	.30
	116467	Base for mtg. electrolytic condenser	.04
	502476	Cabinet—ivory (Model 3-1A)	5.00
	502477	Cabinet—mahogany (Model 3-2A)	4.60
	502506	Clamp—dial scale mtg.	.04
	500497	Clip—retainer for cabinet back	.02
	114955	Clip—retainer on end of dial cord	.01
	116563	Connector—for antenna leads	.01
	117057	Cord—dial drive (55 in. required) per ft.	.05
	500324	Cover—cardboard, for elect. cond.	.04
	504146	Dial scale—glass	1.40
	501186	Grounding plate (under I.F. trans. can)	.10
	502564	Knob—ivory (Model 3-1A)	.08
	502563	Knob—mahogany (Model 3-2A)	.08
	502367	Pointer	.16
	81145	Retaining ring for tuning shaft	.01
	119087	Ring for dial cord	.01
	85078	Rubber grommet; Ant. & R.F. coil mtg.	.03
	504045	Rubber grommet; Osc. coil mtg.	.04
	17063	Screw—No. 6 x ¼	.01
	114628	Screw—No. 8 x ½ chassis mtg.	.01
	502173	Shaft—tuning control	.15
	116690	Socket—octal base	.12
	160392	Socket—octal (rectifier)	.16
	500499	Socket—dial lamp (with leads)	.44
	504012	Spring for tuning slug drive cord	.05
	161384	Spring—dial cord tension	.06
	111456	Washer—spring washer for tuning shaft	.005

PRICES SUBJECT TO CHANGE WITHOUT NOTICE

PHILLIPS PETROLEUM CO.

PHILLIPS PAGE 15-1
MODELS 3-1A, 3-2A

MODELS 3-1A, 3-2A

PHILLIPS PETROLEUM CO.

Remove chassis and loop from cabinet. Solder approximately 8" of insulated wire to any B — connection (see voltage chart on opposite side for convenient B — location). Then reinstall chassis and loop in cabinet. The B — lead should extend from under the chassis at the back.

Connect ground lead of signal generator to B— lead.

Connect output meter across the speaker voice coil (terminals at back of speaker.)

Turn the tuning control knob clockwise as far as it will go (tuner mechanism is now in maximum open position with tuning slugs almost completely withdrawn from coils). Dial pointer should then point to 1600 Kc mark on scale. If it is set incorrectly, release pointer clip on dial cord and reposition pointer.

Set volume control at maximum volume position and use a weak signal from the signal generator.

DUMMY ANT. IN SERIES WITH SIGNAL GENERATOR	CONNECT HIGH SIDE OF GENERATOR TO	SIGNAL GENERATOR FREQUENCY	RECEIVER DIAL SETTING	TRIMMER NUMBER	TRIMMER DESCRIPTION	TYPE OF ADJUSTMENT

Set tuner mechanism to maximum open position by turning the tuning control knob clockwise as far as it will go (Dial pointer at 1600 Kc). Then check whether the positions of the tuning slugs correspond to the positions shown in Fig. 1 below. If settings are incorrect, rotate the individual core and threaded stem until desired position is reached. Note that threaded stem is prevented from moving by a dab of speaker cement at top.

.1 MFD. Condenser	Ungrounded terminal of trimmer No. 6 (see Fig. 2 below for location of trimmer.)	455 KC	Any point where it does not affect the signal.	1-2	2nd I.F.	Adjust for maximum output. Then repeat adjustment.
				3-4	1st I.F.	
300 MMFD. Mica Condenser	External Antenna Clip on Loop Frame	1600 KC	1600 KC	5	Broadcast Oscillator (Shunt)	Adjust for maximum output.
300 MMFD. Mica Condenser	External Antenna Clip on Loop Frame	1600 KC	Tune to 1600 KC generator signal	6	Broadcast R.F.	Adjust for maximum output.
				7	Broadcast Antenna	Adjust for maximum output.
300 MMFD. Mica Condenser	External Antenna Clip on Loop Frame	1400 KC	Tune to 1400 KC generator signal	Ant. coil tuning slug		Adjust position of slug for maximum output.
				R.F. coil tuning slug		Adjust position of slug for maximum output.
300 MMFD. Mica Condenser	External Antenna Clip on Loop Frame	1600 KC	Tune to 1600 KC generator signal	6	Broadcast R.F.	Recheck adjustment for maximum output.
				7	Broadcast Antenna	Recheck adjustment for maximum output.

Apply a coating of speaker cement at top of each tuning core stem to prevent movement.

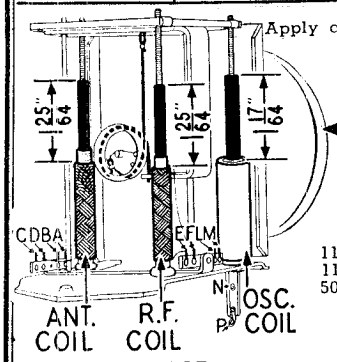


FIG. 1

SLUG TUNER ASSEMBLY

(Drive Parts)

117057 Cord (8")
114955 Clip on cord
504012 Spring

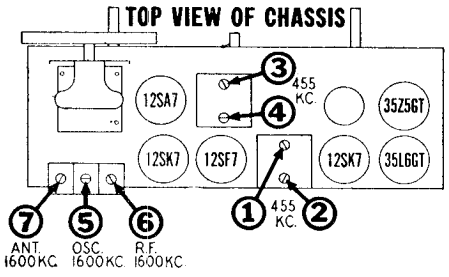


FIG. 2

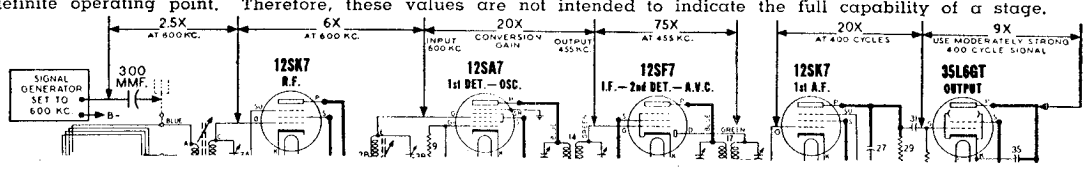
AUDIO OSCILLATION

The audio system of this receiver utilizes a two stage type of inverse feed-back arrangement and, should it ever be necessary to replace the speaker or output transformer, it is important to maintain a definite phase relationship in the feed-back circuit. If the connections to the output transformer are reversed or if the feed-back connection is made to the wrong side of the output transformer secondary, the system will become regenerative instead of degenerative. Under those conditions audio oscillation may result. If that occurs, oscillation may be prevented by reversing the connections to the secondary of the output transformer.

Be sure R.F. and I.F. stages are accurately aligned before measuring gain. R.F. gains can be measured with a "channel" type instrument containing a tuned and calibrated R.F. amplifier. A vacuum tube voltmeter may be used for audio gain measurements. Observe following precautions:

1. For all gain measurements connect signal generator as shown. Use 600 KC. signal with 400 cycle modulation (use nearby frequency if local station interferes.)
2. For R.F. and I.F. measurements connect negative terminal of a 3 volt battery (two 1½ volt cells in series) to A.V.C. lead and positive terminal to B—. This provides a definite operating point. IMPORTANT: Disconnect battery when measuring audio stage gains.
3. Be sure radio is carefully tuned to generator signal (use weak signal for sharp tuning.)
4. When using a "channel" type instrument carefully tune it for maximum output at desired frequency before making measurements.

The R.F. and I.F. stage gains shown below are less than under normal operating conditions due to the use of 3 volts fixed bias in order to establish a definite operating point. Therefore, these values are not intended to indicate the full capability of a stage.


2.5X AT 600 KC.
6X AT 600 KC.
20X INPUT 600 KC. CONVERSION GAIN OUTPUT 455 KC.
75X AT 455 KC.
20X AT 400 CYCLES
9X USE MODERATELY STRONG 400 CYCLE SIGNAL
SIGNAL GENERATOR SET TO 600 KC.
300 MMF.
12SK7 R.F.
12SA7 1st DET.—OSC.
12SF7 I.F.—2nd DET.—A.V.C.
12SK7 1st A.F.
35L6GT OUTPUT

Differences in tube characteristics, tolerance of parts, adjustment of tuned circuits, and variations of line voltage will influence stage gain. Accuracy of measurements is dependent upon careful tuning of receiver to generator signal and experience in using your test equipment. These factors may create considerable variation in gain measurements.

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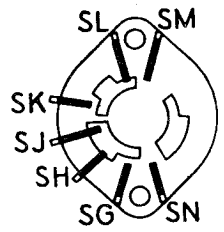
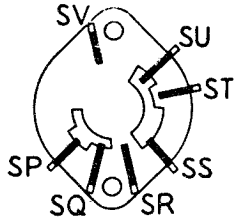
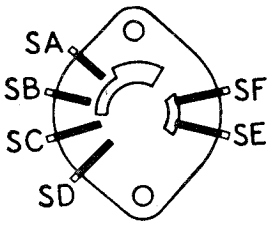
BAND SWITCH 502119



REAR SECTION FRONT VIEW



REAR SECTION REAR VIEW

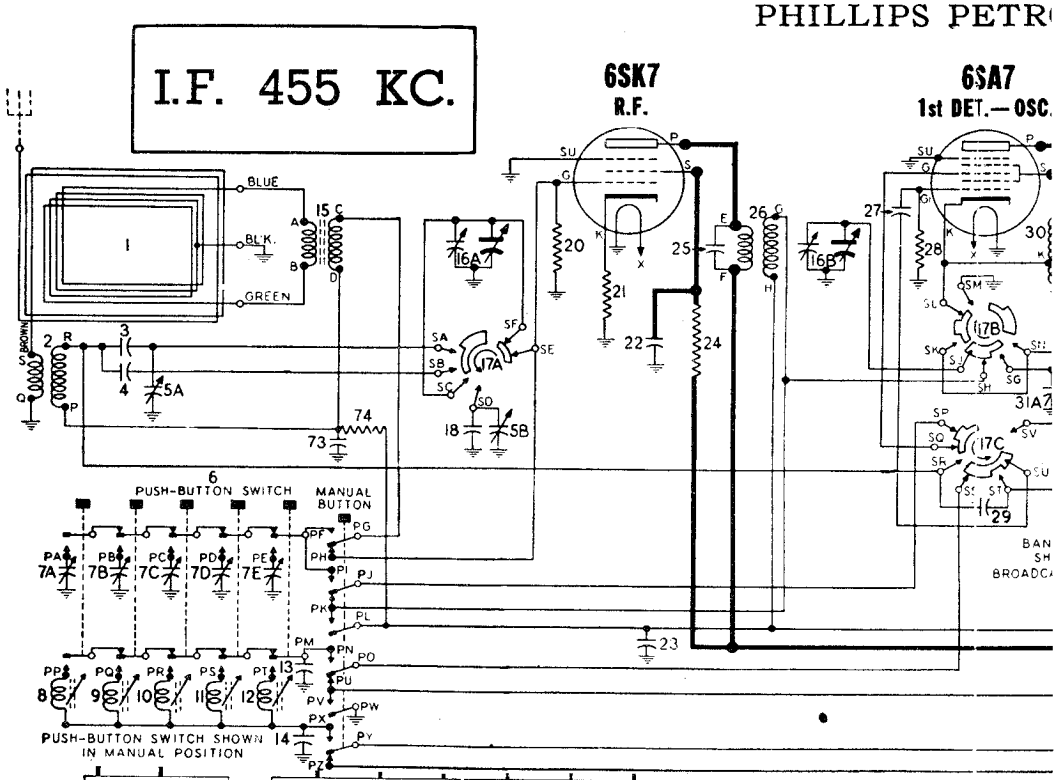


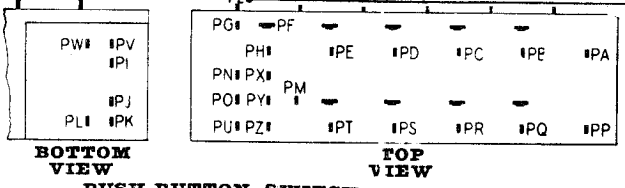
FRONT SECTION REAR VIEW

Lettered terminals in illustrations correspond to similarly lettered terminals on the circuit diagram.

PHILLIPS PETR(

I.F. 455 KC.





PUSH-BUTTON SWITCH

SOCKET VOLTAGES

Measured with voltmeter having sensitivity of 1000 ohms per volt except where indicated by (*).

VOLUME ON FULL WITH NO SIGNAL
RANGE SWITCH IN BROADCAST POSITION

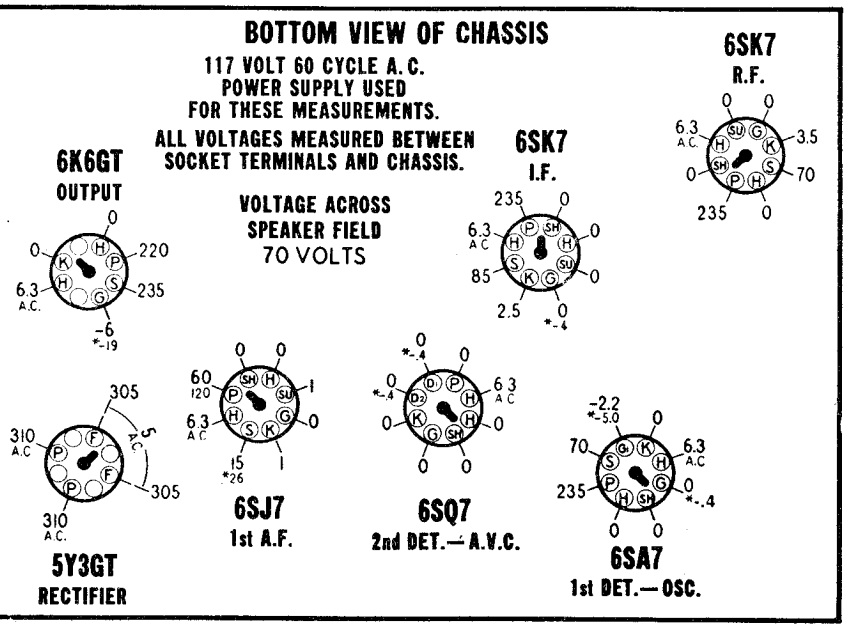
DIAL TUNED TO 540 KC.
MANUAL BUTTON PUSHED IN

BOTTOM VIEW OF CHASSIS

117 VOLT 60 CYCLE A.C. POWER SUPPLY USED FOR THESE MEASUREMENTS.

ALL VOLTAGES MEASURED BETWEEN SOCKET TERMINALS AND CHASSIS.

VOLTAGE ACROSS SPEAKER FIELD 70 VOLTS



REAR OF CHASSIS

*—Measured with vacuum tube voltmeter.

NOTE:—The 6K6GT grid bias of —19 volts can be measured across resistor No. 72.

DIAGRAM NO.	PART NO.	DESCRIPTION
		CONDENSERS
3	502166	Condenser—ceramic 82 Mmfd. 5(
4	502164	Condenser—mica 670 Mmfd. 50(
5A, B	502109	Condenser—trimmer assembly Section A 2 to 15 Mmfd. Section B 10 to 40 Mmfd.
7A to E	502910	Condenser—trimmer assem. for I
13	502161	Condenser—mica 270 Mmfd. 5(
14	502165	Condenser—mica 1,000 Mmfd. 5(
16A, B, C	502122	Condenser—variable gang
18	502182	Condenser—ceramic 39 Mmfd. 5(
22	502157	Condenser—.05 Mfd. 400 volt
23	502155	Condenser—.1 Mfd. 200 volt
25	502295	Condenser—ceramic 10 Mmfd. 5(
27	502159	Condenser—mica 50 Mmfd. 500
29	502411	Condenser—2 Mmfd. 500 volt
31A, B	502108	Condenser—trimmer assem. Section A 2 to 15 Mmfd. Section B 2 to 15 Mmfd.
32	502182	Condenser—ceramic 39 Mmfd. 5(
33	502167	Condenser—ceramic 68 Mmfd. 5(
34	502163	Condenser—mica 430 Mmfd. 500
37	502151	Condenser—.01 Mfd. 400 volt
42	502157	Condenser—.05 Mfd. 400 volt
46	502271	Condenser—mica 260 Mmfd. 500
48	502150	Condenser—.004 Mfd. 600 volt
49	502157	Condenser—.05 Mfd. 400 volt
53	502160	Condenser—mica 110 Mmfd. 500
54	502152	Condenser—.02 Mfd. 400 volt
56	502410	Condenser—.1 Mfd. 400 volt
59	502405	Condenser—.25 Mfd. 400 volt
63	502150	Condenser—.004 Mfd. 600 volt
64	502154	Condenser—.05 Mfd. 600 volt
71A, B, C	502207	Condenser—Electrolytic A—20 Mfd. 25 volt B—20 Mfd. 400 volt C—10 Mfd. 400 volt
73	502153	Condenser—.05 Mfd. 200 volt
		RESISTORS
20	502468	Resistor—carbon 4.7 Meg. 1/4 w
21	502127	Resistor—carbon 560 Ohms 1/4
24	502132	Resistor—carbon 100,000 Ohms
28	502130	Resistor—carbon 22,000 Ohms
38	502466	Resistor—carbon 33,000 Ohms

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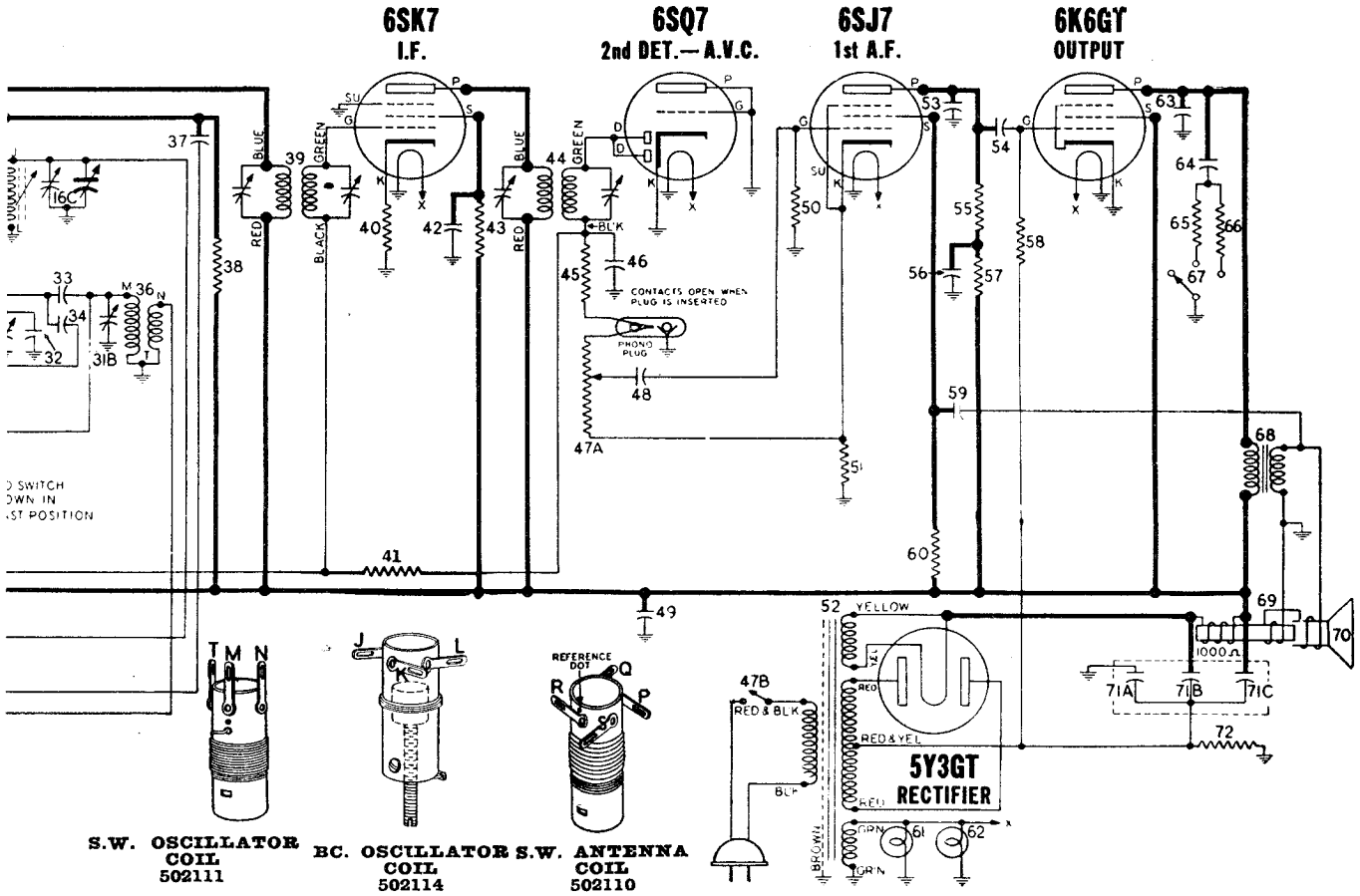

LIST PRICE	DIA-GRAM NO.	PART NO.	DESCRIPTION	LIST PRICE
0 volt..$0.30	40	502125	Resistor—carbon 220 Ohms 1/4 watt	$0.12
volt... .70	41	502135	Resistor—carbon 2.2 Meg., 1/4 watt	.12
..... .65	43	502467	Resistor—carbon 68,000 Ohms 1/2 watt	.12
	45	502131	Resistor—carbon 47,000 Ohms 1/4 watt	.12
-B tuner 3.00	47A, B	502117	Volume control 500,000 ohms (with switch)	1.25
0 volt.. .45	50	502468	Resistor—carbon 4.7 Meg. 1/4 watt	.12
0 volt.. .45	51	502128	Resistor—carbon 2200 Ohms 1/4 watt	.12
..... 6.60	55	502133	Resistor—carbon 220,000 Ohms 1/4 watt	.12
0 volt.. .40	57	502132	Resistor—carbon 100,000 Ohms 1/4 watt	.12
..... .24	58	502134	Resistor—carbon 470,000 Ohms 1/4 watt	.12
..... .30	60	502135	Resistor—carbon 2.2 Meg. 1/4 watt	.12
0 volt.. .30	65	502291	Resistor—carbon 4700 Ohms 1/4 watt	.12
volt.... .24	66	502127	Resistor—carbon 560 Ohms 1/4 watt	.12
..... .10	72	502137	Resistor—wire wound 330 Ohms 2 watt	.25
..... .75	74	502134	Resistor—carbon 470,000 Ohms 1/4 watt	.12
			COILS & TRANSFORMERS	
0 volt.. .40	1	502186	Loop antenna	3.15
0 volt.. .40	2	502110	Coil—S.W. antenna	1.10
volt.... .60		502025	Complete coil—trimmer assem. for P-B tuner	8.80
..... .20	8	502907	Coil less slug (540-1000 Kc.)	1.50
..... .24	9, 10	502908	Coil less slug (650-1300 Kc.)	1.50
volt.... .30	11, 12	502909	Coil less slug (975-1600 Kc.)	1.50
..... .20		502911	Slug for coils 502907, 502908, 502909	.25
..... .24		501151	Clip—for mtg. push button coils	.08
volt.... .24	15	502112	Coil—BC. antenna	1.70
..... .24	26	502113	Coil—BC. R.F.	1.85
..... .30	30	502114	Coil—BC. oscillator	1.45
..... .36	36	502111	Coil—S.W. oscillator	1.10
..... .20	39	502102	Transformer—1st I.F.	2.30
..... .24	44	502103	Transformer—2nd I.F.	2.30
	52	502174	Transformer—power	7.50
	68	504206	Transformer—output for M-504205 speaker	2.00
		504208	Transformer—output for R-504205 speaker	2.00
..... 2.20		504124	Transformer—output for D-504205 speaker	2.00
			OTHER ELECTRICAL PARTS	
..... .24	6	502120	Switch—push-button	4.00
	17A, B, C	502119	Switch—band	2.80
	61, 62	110629	Lamp—dial (Mazda 44) 6.3 V. 250 Ma.	.15
rtt..... .12	67	502118	Switch—tone control	.70
watt.... .12	69	504205	Speaker—Electro-dynamic (6 inch)	9.00
1/4 watt .12	70	504209	Cone & Voice coil for R-504205 speaker	3.00
1/4 watt .12		504207	Cone & Voice coil for M-504205 speaker	3.00
watt.. .16		504125	Cone & Voice coil for D-504205 speaker	3.00

DIA-GRAM NO.	PART NO.	DESCRIPTION	LIST PRICE
		MISCELLANEOUS PARTS	
	502560	Background for dial	$0.16
	116467	Base for mtg. electrolytic condenser	.04
	502046	Back for cabinet	.70
	117315	Call letter tabs for push-button	.55
	500420	Clamp—for dial glass	.15
	112745	Clip—coil mtg.	.01
	114955	Clip—retainer on end of dial cord	.01
	501151	Clip—for mtg. push button coils	.08
	116563	Connector—for antenna leads	.01
	117057	Cord—dial drive (102 in. required), per ft.	.05
	502561	Dial scale—glass	3.85
	113402	Drum—for dial drive	.70
	502699	Escutcheon for push-buttons	1.70
	501449	Knob—volume or tuning	.15
	501458	Knob—tone or band switch	.16
	160620	Pointer	.22
	501495	Push-button	.15
	81145	Retaining ring for tuning shaft	.01
	119087	Ring for dial cord	.01
	116584	Rubber spacer for mtg. dial scale	.02
	502702	Rubber spacer on frame behind escutcheon	.04
	83552	Screw—No. 10x7/8"; for mtg. chassis	.03
	85827	Screw—No. 8-32 for dial drum	.02
	501777	Screw—No. 4x1/2"; for mtg. loop & back	.02
	502116	Shaft—tuning control	.10
	114876	Socket—octal base (rectifier)	.15
	119791	Socket—octal base	.12
	500459	Socket—dial lamp (with mtg. bracket)	.15
	502980	Spacer for leads to push-button switch	.10
	113177	Spring—dial cord tension	.09
	119911	Terminal strip—phono	.16
	111456	Washer—spring washer for tuning shaft	.005
	500487	Washer—felt; for knobs	.01

PRICES SUBJECT TO CHANGE WITHOUT NOTICE

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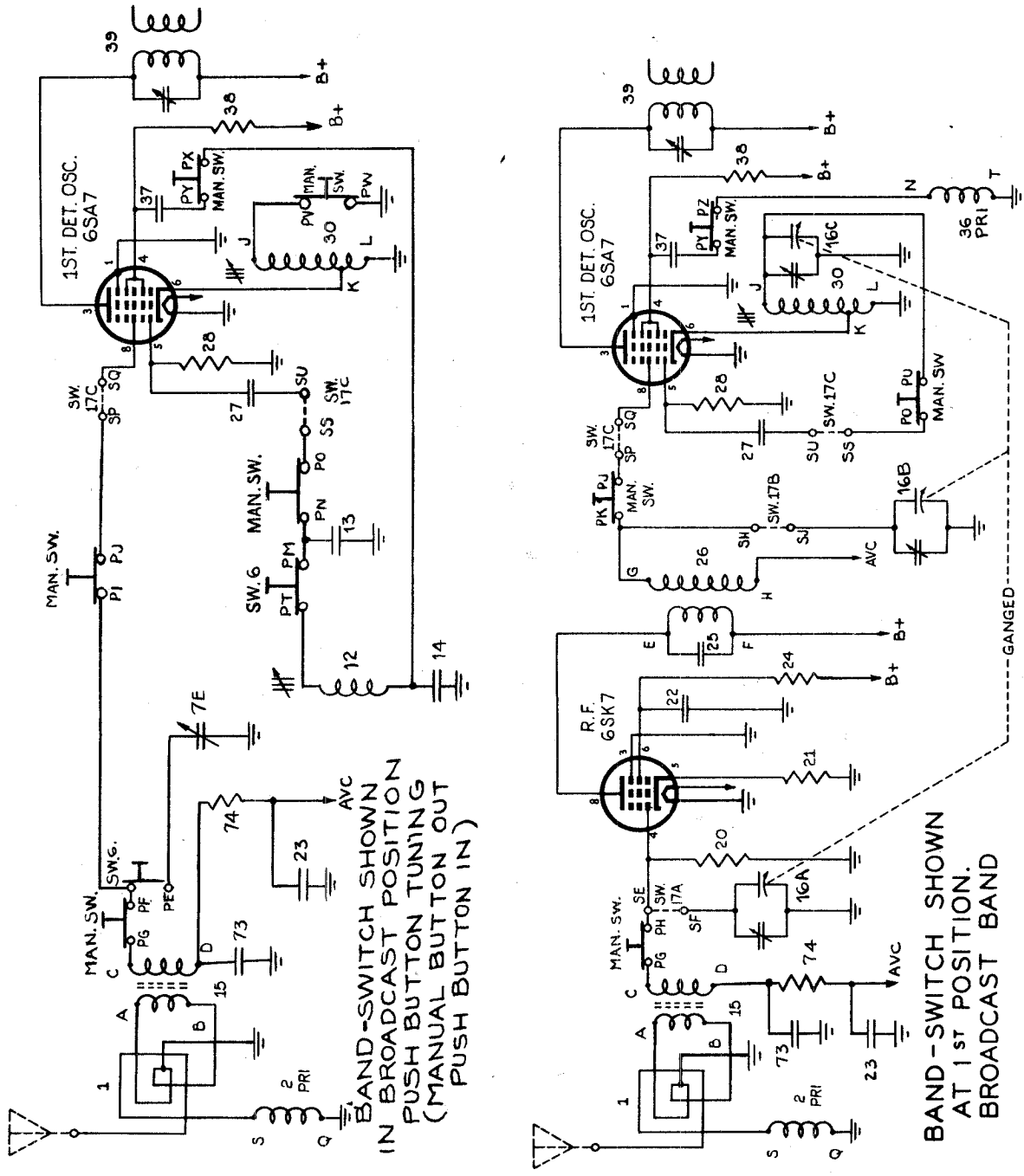

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MODEL 3-3A

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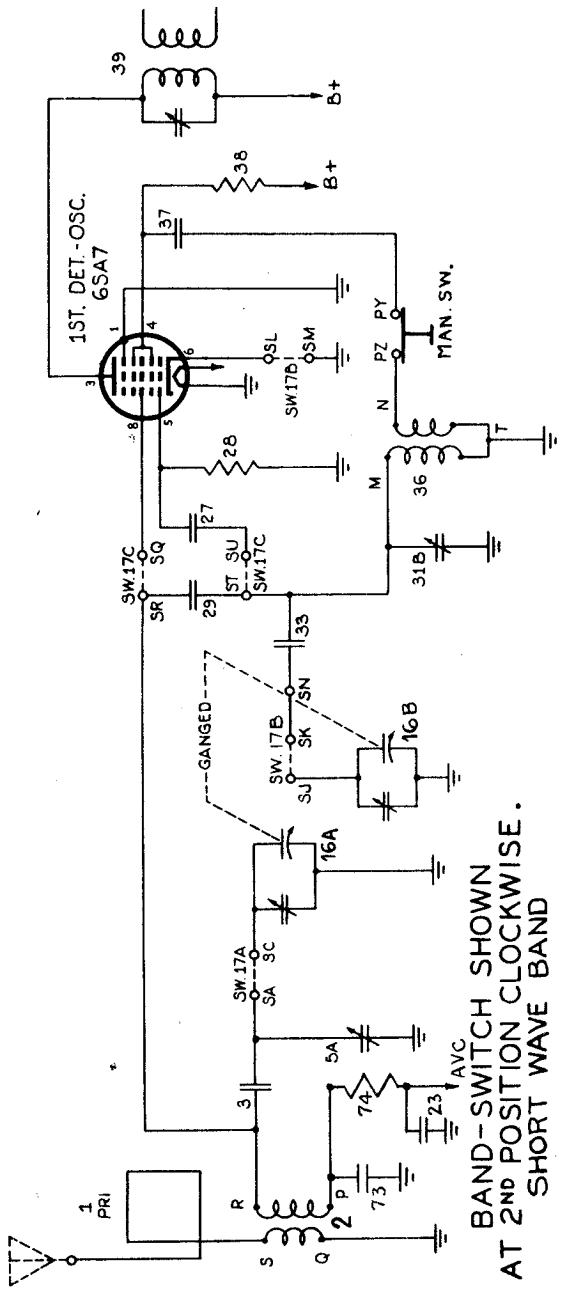

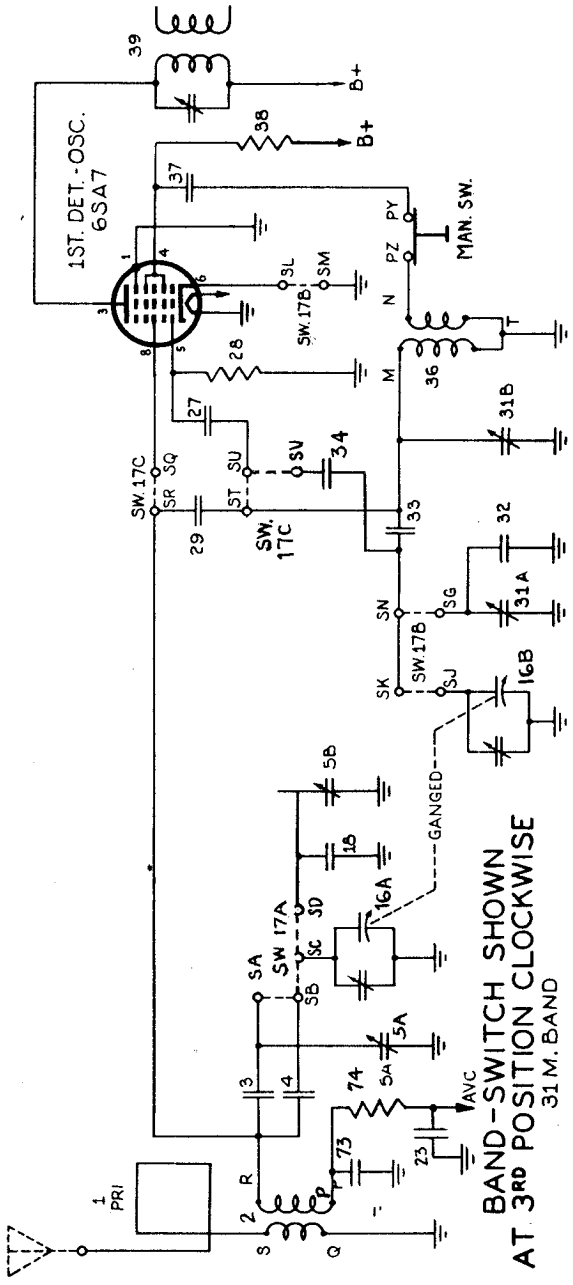

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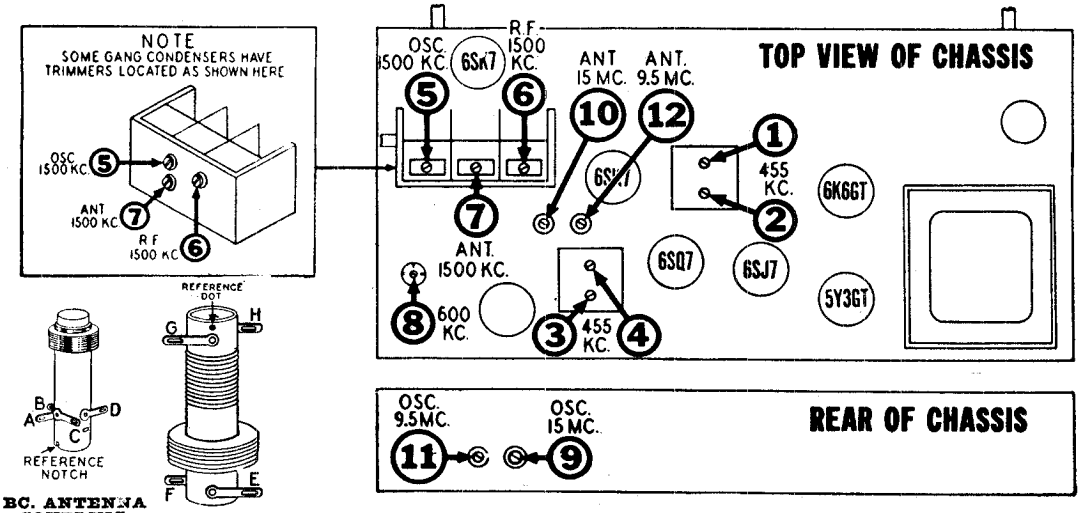
ALIGNMENT PROCEDURE

1. The chassis and loop antenna should remain in their normal position in the cabinet throughout the following procedure.
2. Check arrangement of leads to push-button switch as shown in illustration on following page.
3. With the gang condenser fully meshed, dial pointer should be in the position indicated by the last division below 55 on the dial. If it is set incorrectly, release pointer clip on dial cord and reposition pointer.
4. Connect output meter across speaker voice coil.
5. Connect the ground lead of the signal generator to the receiver chassis.
6. Set volume control at maximum volume position and use a weak signal from the signal generator.
7. Push in the manual button and leave it in that position throughout the alignment procedure.

IMPORTANT:—Align this receiver in exactly the order shown below. Broadcast band must be aligned before short wave bands.

DUMMY ANT. IN SERIES WITH SIGNAL GENERATOR	CONNECT HIGH SIDE OF SIGNAL GENERATOR TO	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POSITION	RECEIVER DIAL SETTING	TRIMMER NUMBER	TRIMMER DESCRIPTION	TYPE OF ADJUSTMENT
.1 MFD. Condenser	Trimmer on rear section of gang	455 KC	Broadcast (counter-clockwise)	Any point where it does not affect the signal.	1-2	2nd I.F.	Adjust for maximum output. Then repeat adjustment.
					3-4	1st I.F.	
.003 MFD. Condenser	External Antenna Clip on Loop Frame	1500 KC	Broadcast (counter-clockwise)	1500 KC	5	Broadcast Oscillator (Shunt)	Adjust for maximum output.
.003 MFD. Condenser	External Antenna Clip on Loop Frame	1500 KC	Broadcast (counter-clockwise)	Tune to 1500 KC Generator Signal	6	Broadcast R.F.	Adjust for maximum output.
.003 MFD. Condenser	External Antenna Clip on Loop Frame	1500 KC	Broadcast (counter-clockwise)	Tune to 1500 KC Generator Signal	7	Broadcast Antenna	Adjust for maximum output.
.003 MFD. Condenser	External Antenna Clip on Loop Frame	600 KC	Broadcast (counter-clockwise)	Tune to 600 KC Generator Signal	8	Adjustable core of Broadcast Oscillator Coil.	Adjust for maximum output. Try to increase output by rotating core in and out and retuning receiver dial until maximum output is obtained.
.003 MFD. Condenser	External Antenna Clip on Loop Frame	Repeat adjustments of trimmers 5, 6 and 7 at 1500 Kc. Then re-check adjustment of trimmer 8 at 600 Kc.					
400 OHM Carbon Resistor	External Antenna Clip on Loop Frame	15 MC	Short wave	15 MC	9	S.W. Oscillator	Adjust for maximum output. Check to see if proper peak was obtained by tuning in image at approx. 14.1 MC. If image does not appear, realign at 15 MC, with trimmer screw farther out. Recheck image.
400 OHM Carbon Resistor	External Antenna Clip on Loop Frame	15 MC	Short wave	Tune to 15 MC Generator Signal	10	S.W. Antenna	Adjust for maximum output. Try to increase output by detuning trimmer and retuning receiver dial until maximum output is obtained.
400 OHM Carbon Resistor	External Antenna Clip on Loop Frame	9.5 MC	31 M (Clockwise)	9.5 MC	11	31 M Oscillator	Adjust for maximum output. Check to see if proper peak was obtained by tuning in image at approx. 8.6 MC. If image does not appear, realign at 9.5 MC. with trimmer screw farther out. Recheck image.
400 OHM Carbon Resistor	External Antenna Clip on Loop Frame	9.5 MC	31 M (Clockwise)	Tune to 9.5 MC Generator Signal	12	31 M Antenna	Adjust for maximum output. Try to increase output by detuning trimmer and retuning receiver dial until maximum output is obtained.



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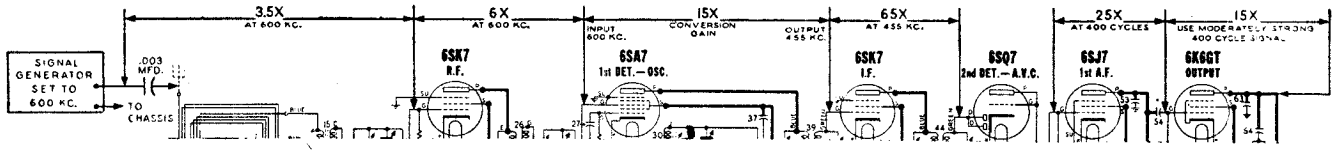
APPROXIMATE STAGE GAIN DATA

Be sure R.F. and I.F. stages are accurately aligned before measuring gain. R.F. gains can be measured with a "channel" type instrument containing a tuned and calibrated R.F. amplifier. A vacuum tube voltmeter may be used for audio gain measurements. Observe following precautions:

1. For all gain measurements connect signal generator as shown. Use 600 KC. signal with 400 cycle modulation (use nearby frequency if local station interferes.)
2. For R.F. and I.F. measurements connect negative terminal of a 3 volt battery (two 1½ volt cells in series) to A.V.C. lead and positive terminal to chassis. This provides a definite operating point. IMPORTANT: Disconnect battery when measuring audio stage gains.
3. Be sure radio is carefully tuned to generator signal (use weak signal for sharp tuning.)
4. When using a "channel" type instrument carefully tune it for maximum output at desired frequency before making measurements.

The R.F. and I.F. stage gains shown below are less than under normal operating conditions due to the use of 3 volts fixed bias in order to establish a definite operating point. Therefore, these values are not intended to indicate the full capability of a stage.

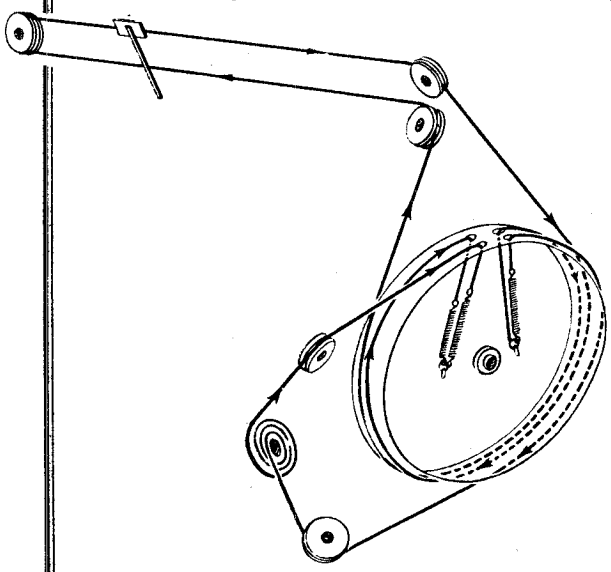


Differences in tube characteristics, tolerance of parts, adjustment of tuned circuits, and variations of line voltage will influence stage gain. Accuracy of measurements is dependent upon careful tuning of receiver to generator signal and experience in using your test equipment. These factors may create considerable variation in gain measurements.

DIAL AND POINTER DRIVE CORD ARRANGEMENT

To string dial cord, set gang condenser to fully meshed position and use following parts:

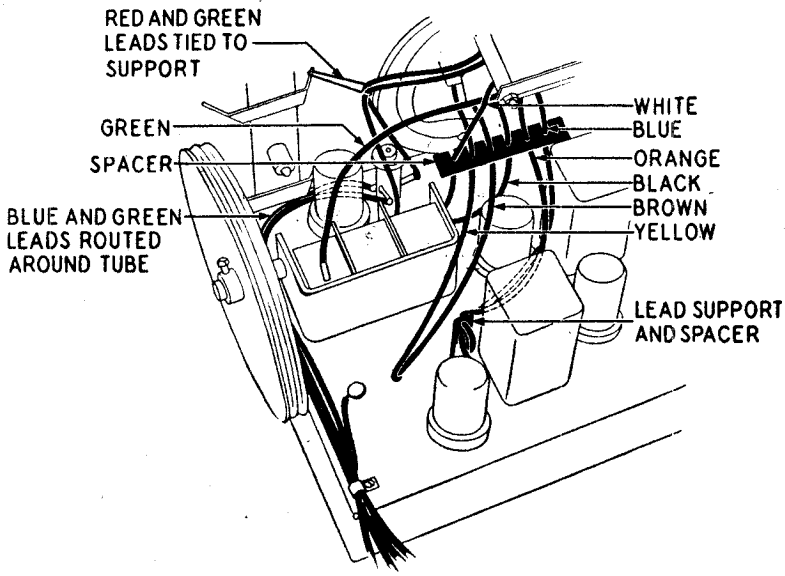
113177 Tension Spring
114955 Clip on end of cord
119087 Ring for dial cord
117057 Cord (102 inches)
Pointer drive 72 inches
Gang drive 30 inches



IMPORTANCE OF MAINTAINING FIXED POSITIONS FOR LEADS AT TOP OF CHASSIS

The wires shown in the above illustration are associated with tuned circuits which carry radio frequency currents. Therefore, care must be exercised to insure that they are properly routed and spaced. Anchoring and fixing spacing of wires minimizes freedom of movement and is utilized to maintain a stable arrangement.

Since the relative positions of these wires may affect tuned circuits it is important to avoid any change in arrangement after the receiver has been aligned. If the position of the wires has been disturbed, it is advisable to re-check alignment



AUDIO OSCILLATION

The audio system of this receiver utilizes a two stage type of inverse feed-back arrangement and should it ever be necessary to replace the speaker or output transformer it is important to maintain a definite phase relationship in the feedback circuit. If the connections to the output transformer are reversed or if the feed-back connection is made to the wrong side of the output transformer secondary, the system will become regenerative instead of degenerative. Under those conditions audio oscillation may result. If that occurs, oscillation may be prevented by reversing the connections to the primary of the output transformer.

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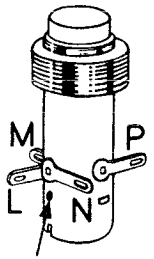
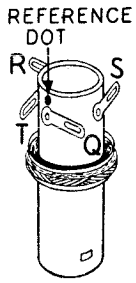
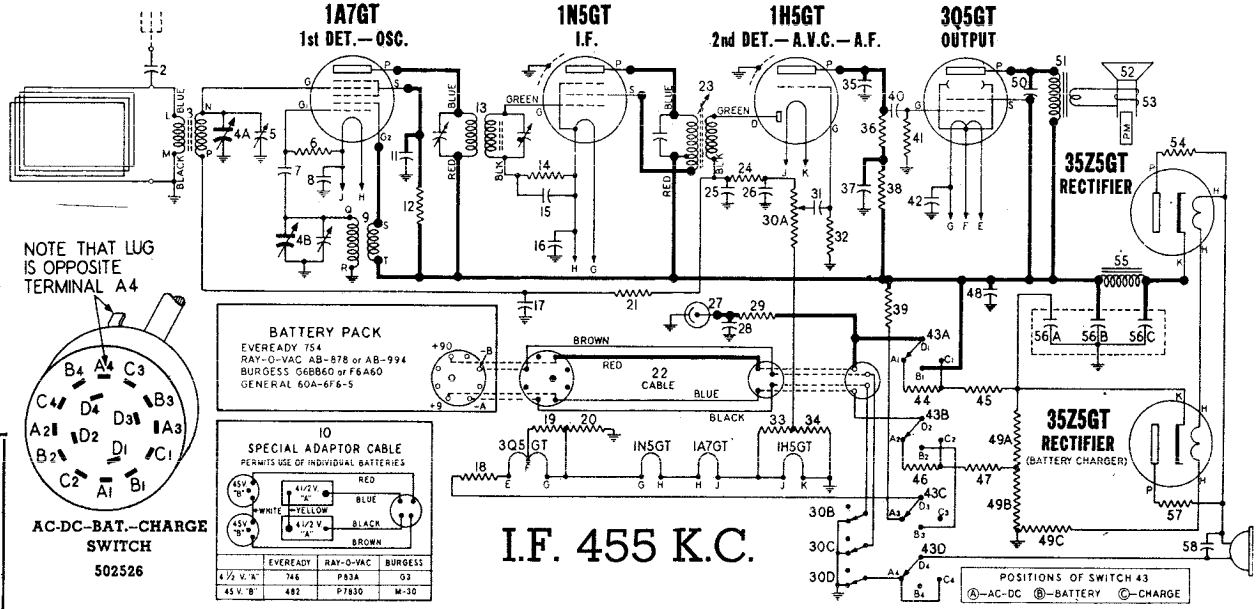


ANTENNA COIL
502499

Lettered terminals in illustrations correspond to similarly lettered terminals on the circuit diagram.



OSC. COIL
502498



NOTE THAT LUG IS OPPOSITE TERMINAL A4

AC-DC—BAT.—CHARGE SWITCH
502526

I.F. 455 K.C.

PHILLIPS PETROLEUM CO.

PHILLIPS PAGE 15-9
MODEL 3-4A

PARTS LIST

DIAGRAM NO.	PART NO.	DESCRIPTION	LIST PRICE
		CONDENSERS	
2	502150	Condenser—.004 Mfd. 600 volt	$0.20
4-A, B	502494	Condenser—variable gang	4.80
5	119132	Condenser—trimmer 2 to 15 Mmfd.	.36
7	502159	Condenser—mica 50 Mmfd. 500 volt	.24
8	502153	Condenser—.05 Mfd. 200 volt	.24
11	502547	Condenser—electrolytic 4 Mfd. 150 volt	.75
15	502153	Condenser—.05 Mfd. 200 volt	.24
16	502155	Condenser—.1 Mfd. 200 volt	.30
17	502153	Condenser—.05 Mfd. 200 volt	.24
25, 26	502159	Condenser—mica 50 Mmfd. 500 volt	.24
28	502155	Condenser—.1 Mfd. 200 volt	.30
31	502156	Condenser—.004 Mfd. 400 volt	.20
35	502160	Condenser—mica 110 Mmfd. 500 volt	.24
37	502155	Condenser—.1 Mfd. 200 volt	.30
40	502151	Condenser—.01 Mfd. 400 volt	.20
42	502527	Condenser—electrolytic 50 Mfd. 25 volt	1.10
48	502155	Condenser—.1 Mfd. 200 volt	.30
50	502453	Condenser—.002 Mfd. 400 volt	.20
56-A,B,C	500714	Condenser—electrolytic A—20 Mfd. 150 volt, B—20 Mfd. 200 volt, C—20 Mfd. 200 volt	1.70
58	502153	Condenser—.05 Mfd. 200 volt	.24
		RESISTORS	
6	502133	Resistor—carbon 220,000 ohms ¼ watt	.12
12	502131	Resistor—carbon 47,000 ohms ¼ watt	.12
14	502136	Resistor—carbon 10 Meg. ¼ watt	.12
18	502455	Resistor—carbon 27 ohms ¼ watt	.12
19	502457	Resistor—carbon 330 ohms ¼ watt	.12
20	502458	Resistor—carbon 430 ohms ¼ watt	.12
21	502269	Resistor—carbon 3.3 Meg. ¼ watt	.12
24	502132	Resistor—carbon 100,000 ohms ¼ watt	.12
29	502269	Resistor—carbon 3.3 Meg. ¼ watt	.12
30-A,B,C,D	502525	Volume control (with switch) 1 Meg.	1.25
32	502269	Resistor—carbon 3.3 Meg. ¼ watt	.12
33, 34	502456	Resistor—carbon 220 ohms ¼ watt	.12
36	502268	Resistor—carbon 1 Meg. ¼ watt	.12
38	502134	Resistor—carbon 470,000 ohms ¼ watt	.12
39	500712	Resistor—wire wound 1830 ohms 5 watt	.55
41	502135	Resistor—carbon 2.2 Meg. ¼ watt	.12
44	502266	Resistor—carbon 15,000 ohms ¼ watt	.12
45	502459	Resistor—carbon 6800 ohms ¼ watt	.12
46	502457	Resistor—carbon 330 ohms ¼ watt	.12
47	502455	Resistor—carbon 27 ohms ¼ watt	.12
49-A,B,C	500715	Resistor—wire wound A—1460 ohms 10 watt, B—155 ohms 1 watt, C—310 ohms 10 watt	1.65
54	502454	Resistor—wire wound 47 ohms 1 watt	.16
57	502454	Resistor—wire wound 47 ohms 1 watt	.16

DIAGRAM NO.	PART NO.	DESCRIPTION	LIST PRICE
		COILS AND TRANSFORMERS	
3	502499	Coil—antenna coupling	$1.70
9	502498	Coil—oscillator	1.05
13	502495	Transformer—1st I.F.	2.30
23	500749	Transformer—2nd I.F.	2.30
51	502902	Trans.—output for A-502491 speaker	2.50
	502492	Trans.—output for R-502491 speaker	2.50
55	502528	Filter choke	2.35
		OTHER ELECTRICAL PARTS	
10	500746	Cable—for use with individ. batteries	1.60
22	502536	Cable—for use with battery pack	.85
27	500713	Neon indicator lamp	.75
43-A,B,C,D	502526	Switch—"AC-DC—BAT.—CHARGE"	1.50
52	502901	Cone & voice coil for A-502491 speaker	2.00
	502493	Cone & voice coil for R-502491 speaker	2.00
53	502491	Speaker—P.M. dynamic (5 inch)	7.70
		MISCELLANEOUS PARTS	
	160026	Base for mtg. electrolytic condenser	.04
	112745	Clip—coil mtg.	.01
	114955	Clip—retainer on end of dial cord	.01
	117057	Cord—dial drive (28" required) per ft.	.05
	502549	Escutcheon plate	2.40
	502544	Knob—volume or tuning	.10
	502545	Knob—"AC-DC—BAT.—CHARGE"	.12
	500747	Plug for battery cable (fits chassis)	.10
	502537	Plug for battery cable (fits batt. pack)	.16
	502546	Pointer	.16
	81145	Retaining ring for tuning shaft	.01
	119087	Ring for dial cord	.01
	79894	Screw—No. 8x5/8"; for mtg. chassis	.01
	502524	Shaft—tuning control	.10
	117716	Shield—tube	.07
	116690	Socket—octal base	.12
	500681	Socket—for battery cable	.10
	161384	Spring—dial cord tension	.06
	502533	Terminal strip for antenna	.20
	111456	Washer—spring washer for tuning shaft	.005
	502534	Washer—felt; for knobs	.01

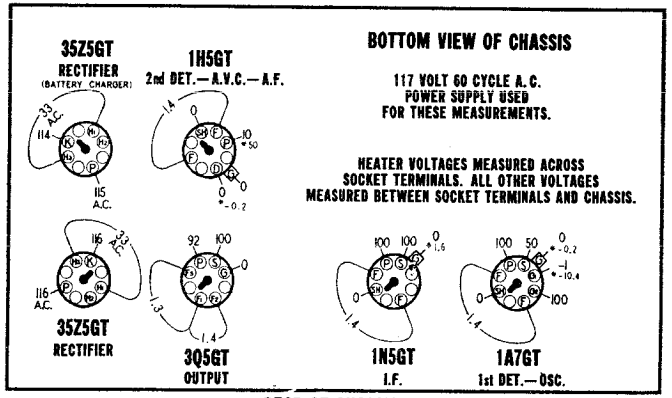
PRICES SUBJECT TO CHANGE WITHOUT NOTICE

SOCKET VOLTAGES

Measured with voltmeter having sensitivity of 1000 ohms per volt except where indicated by (*).

VOLUME ON FULL WITH NO SIGNAL — DIAL TUNED TO 540 KC.

"AC-DC—BAT.—CHARGE" SWITCH IN "AC-DC" POSITION



REAR OF CHASSIS

*—Measured with vacuum tube voltmeter.

MODEL 3-4A

PHILLIPS PETROLEUM CO.

Slide chassis partially out of cabinet by removing staples at each side of wood shelf and pulling entire shelf back about 2 inches. Do not disturb connections to loop antenna.

Connect an output meter across the voice coil of the speaker or between the plate of the 3Q5GT output tube and chassis, through a .1 mfd. condenser.

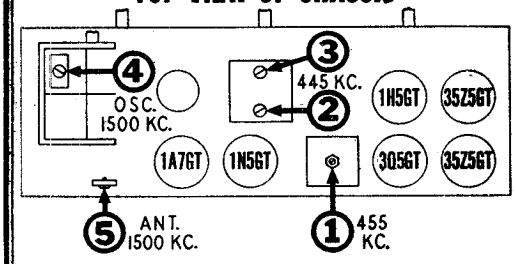
Connect the ground lead of the signal generator to chassis through a .25 mfd. condenser.

Set the volume control in the maximum position and use a weak signal from the generator.

Set "AC-DC—BAT.—CHARGE" Switch in "AC-DC" position.

DUMMY ANT. IN SERIES WITH SIGNAL GENERATOR	CONNECT HIGH SIDE OF SIG. GENERATOR TO	SIGNAL GENERATOR FREQUENCY	RECEIVER DIAL SETTING	TRIMMER NUMBER	TRIMMER DESCRIPTION	TYPE OF ADJUSTMENT
300 MMFD. Condenser	Grid Cap of 1A7GT Tube	**455 KC.**	Any Point Where It Does Not Affect Signal	**1**	2nd I.F.	Loosen lock nut. Adjust screw for maximum output.
				2-3	1st I.F.	Adjust for maximum output. Recheck 1, 2 and 3 for maximum output and tighten lock nut on 1.
300 MMFD. Condenser	Center Terminal on Antenna Terminal Strip at bottom of cabinet.	**1500 KC.**	1500 KC. (Slide set into cabinet and replace pointer to set dial.)	**4**	Broadcast Oscillator (Shunt)	Adjust trimmer for maximum output.
300 MMFD. Condenser	Center Terminal on Antenna Terminal Strip at bottom of cabinet.	**1500 KC.**	Tune to 1500 KC. Generator Signal	**5**	Broadcast Antenna	Adjust for maximum output. Slide chassis all the way into cabinet when making this adjustment.

TOP VIEW OF CHASSIS



INDICATOR LAMP

The flashing neon lamp on the dial face indicates condition of batteries. This lamp is included in an oscillating (R-C) circuit which is designed to oscillate at approximately 3 pulses per second when batteries are in a fully charged condition. As the battery voltage decreases with use, number of pulses per second decreases.

This lamp will only show the true condition of the batteries when the Selector Switch is in the "Battery" position. Lamp flashes more rapidly during charging or "AC-DC" operation.

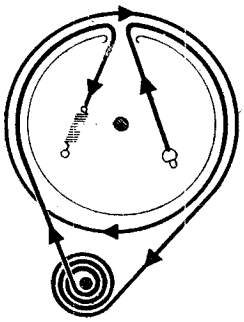
When battery voltage is low (approximately 72 volts) the lamp flashes more slowly (about once per second). The set should not be operated from battery power after this point is reached and batteries should be recharged immediately. Charge for at least twice the time they were used and as soon as possible after they are run down. As batteries age it is necessary to charge for a longer period. For longest battery life, charge immediately after using.

IMPORTANT:

1. Completely dead batteries cannot be recharged.
2. When set is connected to a DC line, check for correct polarity by operating it before attempting to charge the batteries.
3. Batteries will be discharged if ON-OFF switch is left ON when power cord is not connected to wall outlet.

CHARGING CIRCUIT

The battery charging circuit consists of a 35Z5GT rectifier and a suitable resistor voltage dividing network. This circuit provides a very low charging current when the receiver is operated on AC-DC and is just enough to maintain the batteries but will not charge them. A separate charging position is provided for the regular charging operation. A charging rate of approximately ⅓ the discharge rate is used to give best results.



DIAL DRIVE CORD ARRANGEMENT

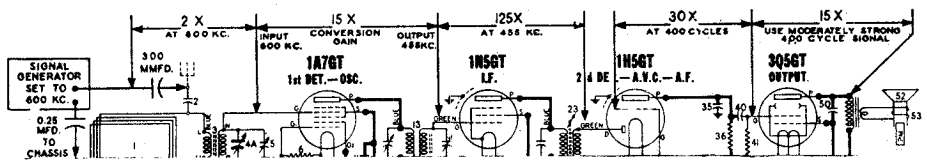
To string dial cord, set gang condenser to fully meshed position and use following parts:

114955	Clip on end of cord
117057	Cord (28 inches)
119087	Ring for dial cord
161384	Tension Spring

Be sure R.F. and I.F. stages are accurately aligned before measuring gain. R.F. gains can be measured with a "channel" type instrument containing a tuned and calibrated R.F. amplifier. A vacuum tube voltmeter may be used for audio gain measurements.

1. For all gain measurements connect signal generator as shown. Use 600 KC. signal with 400 cycle modulation (use nearby frequency if local station interferes).
2. For R.F. and I.F. measurements connect negative terminal of a 1½-volt battery to A.V.C. lead and positive terminal to chassis. This provides a definite operating point.
3. Be sure radio is carefully tuned to generator signal (use weak signal for sharp tuning).
4. When using a "channel" type instrument carefully tune it for maximum output at desired frequency before making measurements.

The R.F. and I.F. stage gains shown below are less than under normal operating conditions due to the use of 1½ volts fixed bias in order to establish a definite operating point. Therefore, these values are not intended to indicate the full capability of a stage.



Differences in tube characteristics, tolerance of parts, adjustment of tuned circuits, and variations of line voltage will influence stage gain. Accuracy of measurements is dependent upon careful tuning of receiver to generator signal and experience in using your test equipment. These factors may create considerable variation in gain measurements.

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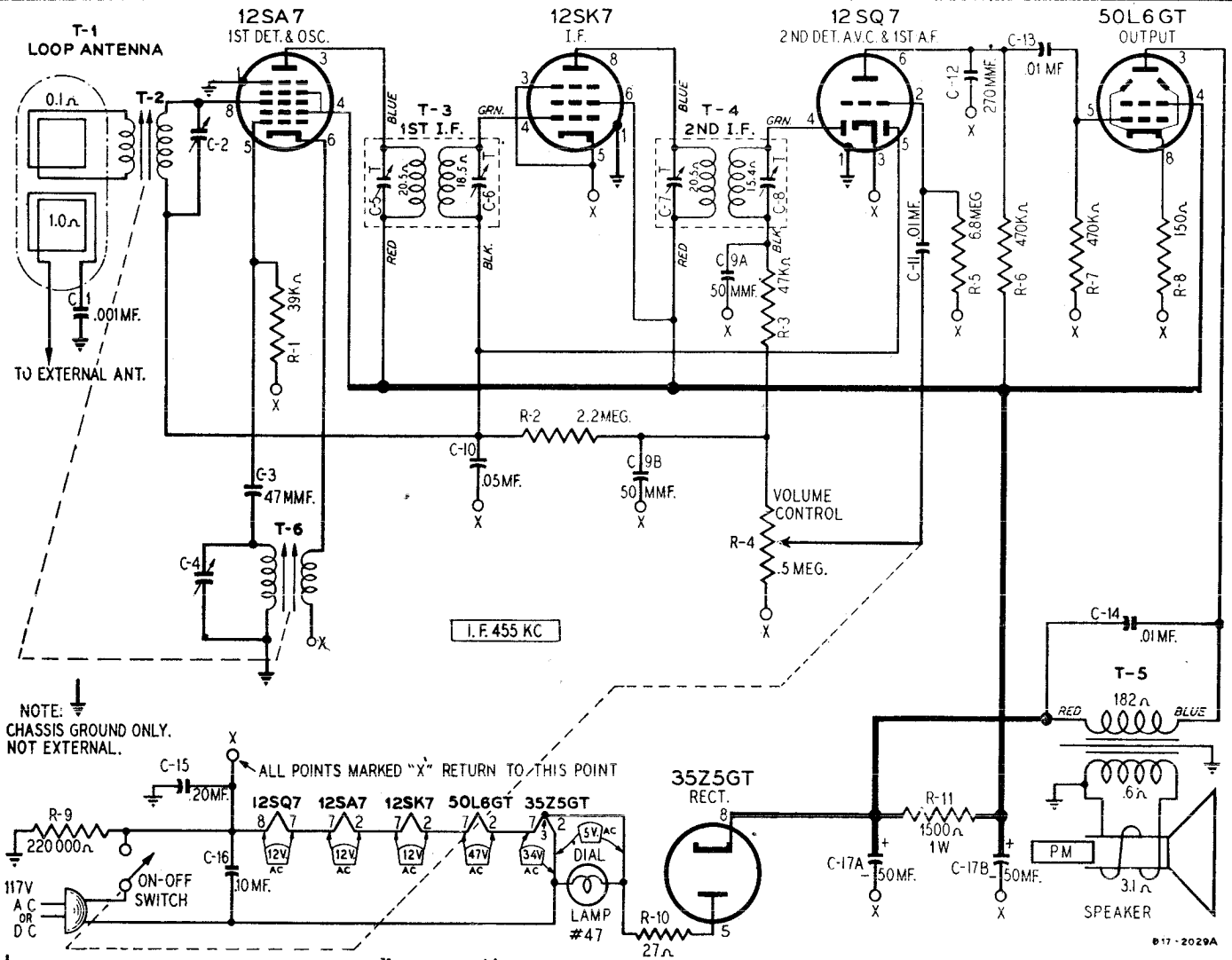

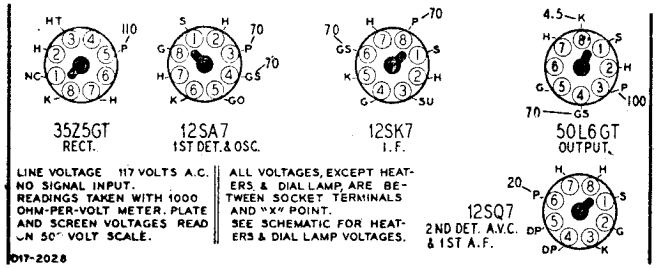

LINE VOLTAGE 117 VOLTS A.C. NO SIGNAL INPUT. READINGS TAKEN WITH 1000 OHM-PER-VOLT METER. PLATE AND SCREEN VOLTAGES READ ON 50" VOLT SCALE.

ALL VOLTAGES, EXCEPT HEATERS & DIAL LAMP, ARE BETWEEN SOCKET TERMINALS AND "X" POINT. SEE SCHEMATIC FOR HEATERS & DIAL LAMP VOLTAGES.

B17-2028

3-46

5 Tube Superheterodyne, including Rectifier Tube.

Tuning Frequency Range	540 to 1600 KC
Power Consumption	30 watts (At 117 volts AC)
Power Output	1.5 watt maximum, .9 watt (10% distortion)
Selectivity	59 KC Broad at 1000 Times Signal
Intermediate Frequency	455 KC
Speaker	5" PM Dynamic
Sensitivity (for .05 watt output)	560 microvolts per meter average

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ALIGNMENT PROCEDURE

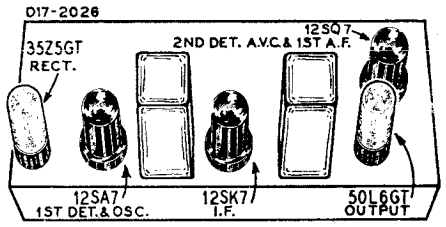
Check dial pointer position, see DIAL CALIBRATION paragraph.
Volume Control—Maximum All Adjustments.
Allow Chassis and Signal Generator to "Heat Up" for several Minutes
The equipment in column at right is required for aligning:

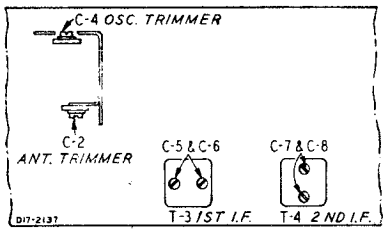
Signal Generator which will provide an accurately calibrated signal at the test frequencies as listed.

Output Indicating Meter: Non-Metallic Screwdriver.

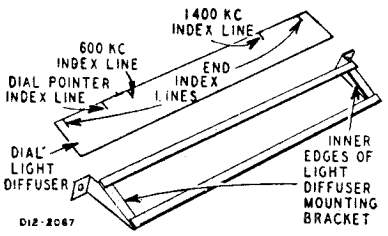
Dummy Antennas—.1mf., 50 mmf.

SIGNAL GENERATOR					
FREQUENCY SETTING	ANTENNA CONNECTION	GROUND CONNECTION	DUMMY ANTENNA	TUNER SETTING	ADJUST TRIMMERS TO MAXIMUM (See Trimmer Illustration)
455 KC	Control Grid 12SK7—I.F.	Point "X" 12SK7—I.F. Prong No. 3	.1 mf.	Turn Drive Pulley to Counterclockwise Position	2nd I.F. (C7) & (C8)
455 KC	Control Grid 12SA7—1st Det.	Same As Above	.1 mf.	Turn Drive Pulley to Counterclockwise Position	1st I.F. (C5) & (C6)
1610 KC	Control Grid 12SA7—1st Det.	Same As Above	.1 mf.	Turn Drive Pulley to Maximum Counterclockwise Position	Oscillator (C4)
1610 KC	External Antenna Clip On Loop	Chassis	50 mmf.	Turn Drive Pulley to Maximum Counterclockwise Position	Antenna (C-2)





DIAL CALIBRATION

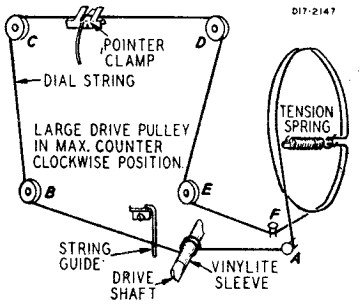


In order to align the receiver, the dial pointer must be positioned on the dial string correctly with reference to the dial. Index lines are provided on the dial light diffuser for this purpose.

Before aligning the receiver (or when replacing the dial light diffuser) check the position of the diffuser strip, making certain that the two extreme index lines are aligned with the inner edges of the diffuser mounting bracket opening. The bracket should be crimped at one point to prevent movement of the diffuser strip. To position the dial pointer, turn the large drive pulley to the maximum clockwise position. The dial pointer should be directly over the dial pointer index line. (See illustration).

TUNING ASSEMBLY SERVICE

Exacting requirements in the tuning assembly make it impractical to replace the drive cord, coils and components in this assembly other than the trimmer condensers. Should the drive cord break, or components other than the trimmer condensers require service, the entire assembly must be ordered and replaced as a unit.



DRIVE CORD REPLACEMENT

Turn the large drive pulley to the maximum counterclockwise position. Use a new 53 inch drive cord, tie one end to the tension spring and fasten the other end of the spring to the drive pulley. Install the cord as shown in the illustration. Wind two turns clockwise around the tuning shaft with the turns progressing away from the chassis. After string is installed, stretch the tension spring and tie free end of cord to spring. Cut off excess string.

NOTICE: There is a power rating label on the chassis. This label specifies the power supply on which the radio may be used, and identifies the radio as to chassis, dial and issue letter. When ordering parts or writing, give ALL information appearing on this label.

MISCELLANEOUS

12A432	5" P.M. speaker	
	Cone and voice coil assembly (specify part number and letters stamped on speaker)	
3A303	Tube socket octal (8 prong) moulded	
10A300	Knob (ivory)	
10A297	Knob (walnut)	
55X255	Cabinet (ivory)	
55X267	Cabinet (walnut)	
28X292	Snap button (mounting loop to chassis)	
	No. 6 x ¼" slotted hex head P.K. Type "Z" screw (mounting loop to cabinet	
14X335	Grille metal	
	Grille, cloth No. 426 Egg Shell (for ivory cabinet)	
	Grille, cloth No. 418 Brown (for walnut cabinet)	
13X328	Line cord and plug assembly	

TRANSFORMERS AND COILS

9A1834	T 1	"B" range loop antenna (for walnut cabinet)
9A1835	T 1	"B" range loop antenna (for ivory cabinet)
	T 2	Part of Tuning Assembly
9A1808	T 3	1st I F coil assembly
9A1809	T 4	2nd I-F coil assembly
51X122	T 5	Outcut transformer
	T 6	Part of Tuning Assembly

CAPACITORS

D66102	C 1	.001 MF	400V	Tubular
17A238	C 2	4-70 mmf		Trimmer
47X446	C 3	47 mmf		Moulded
17A239	C 4	40-370 mmf		Trimmer
	C-5, C 6	Part of T-3, 1st I-F Transformer		
	C-7, C-8	Part of T-4, 2nd I-F Transformer		
47X112	C 9A, C-9B	50 mmf		Dual mica capacitor
B66503	C-10	.05 mf	200	Tubular
B66103	C-11, C-13, C 14	.01 mf	200 V	Tubular
47X468	C 12	220 mmf		Moulded
B66204	C-15	.20 mf	200 V	Tubular
D66104	C 16	.10 mf	400 V	Tubular
45X341	C-17A	50 mf	150 V	
	C-17B	50 mf	150 V	Dry electrolytic capacitor

RESISTORS

B8439	R-1	39,000 ohms	0.5 watt	Carbon
B85225	R-2	2.2 meg.	0.5 watt	Carbon
B85473	R-3	47,000 ohms	0.5 watt	Carbon
36X352	R-4	500,000 ohm		Volume control and line switch
B85685	R 5	6.8 meg	0.5 watt	Carbon
B84474	R 6	470,000 ohms	0.5 watt	Carbon
B85474	R 7	470,000 ohms	0.5 watt	Carbon
B83151	R 8	150 ohms	0.5 watt	Carbon
B85224	R 9	220,000 ohms	0.5 watt	Carbon
B84270	R 10	27 ohms	0.5 watt	Carbon
C85152	R-11	1500 ohms	1.0 watt	Carbon

DIAL AND DRIVE ASSEMBLY

20A96	Tuning Assembly complete with coils, trimmers, etc.
11X119	Fibre shield (Tuner housing)
28X518	Trimount Stud (Mtg. fibre shield)
24X446	Idler pulley
25X1469	Pointer bracket
15X223	Pointer
25X1470	Holder, light diffuser
41X79	Dial light diffuser
26X482	Drive shaft (tuning)
19X192	"C" washer (for drive shaft)
	53" drive cord (18 lb. test)
28X113	Drive cord tension spring
7A194	Pilot light socket assembly
	No 47 pilot light
58X639	Dial (for ivory cabinet)
58X641	Dial (for walnut cabinet)
30X508	Dial clamp (upper)
30X509	Dial clamp (lower)

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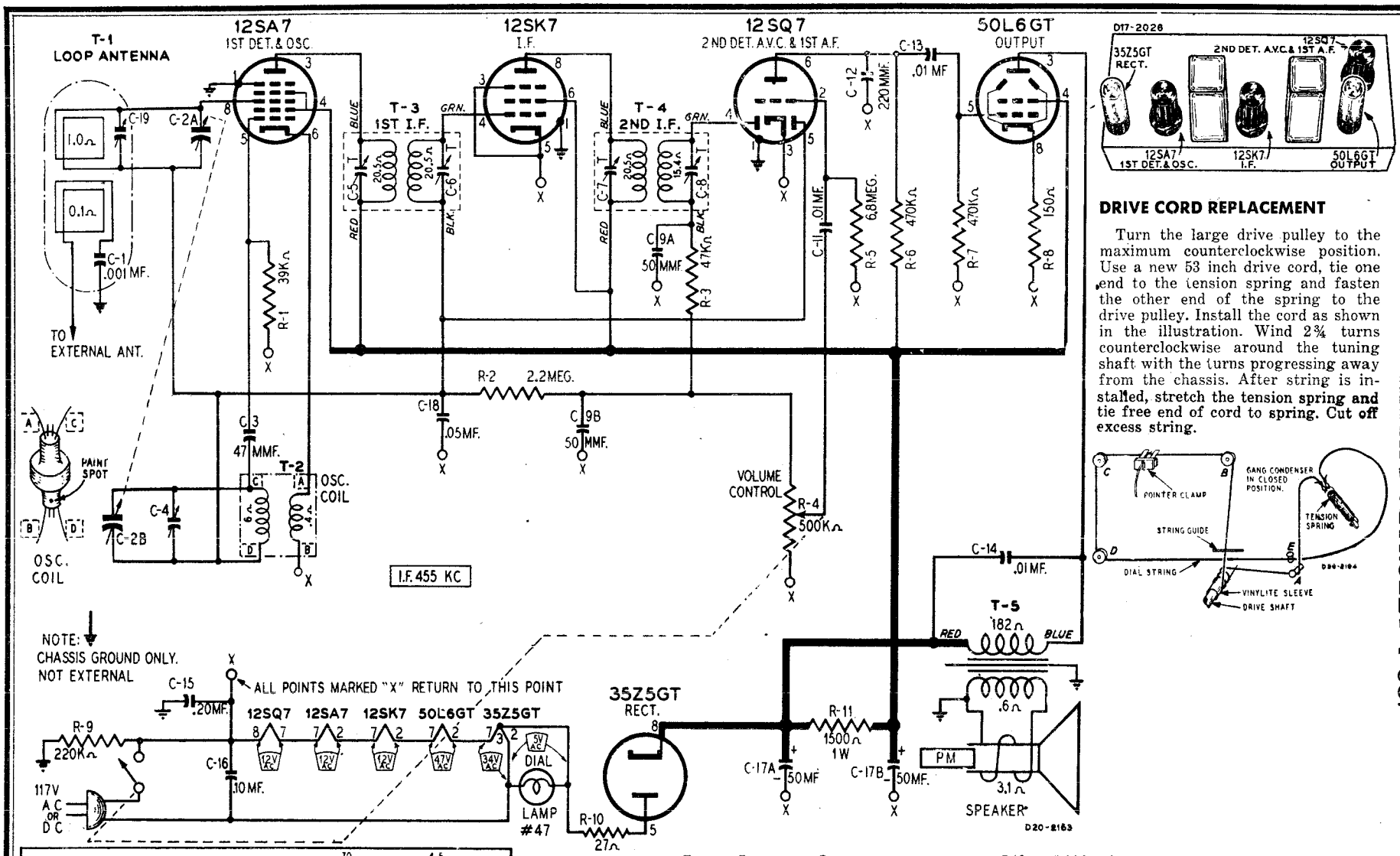

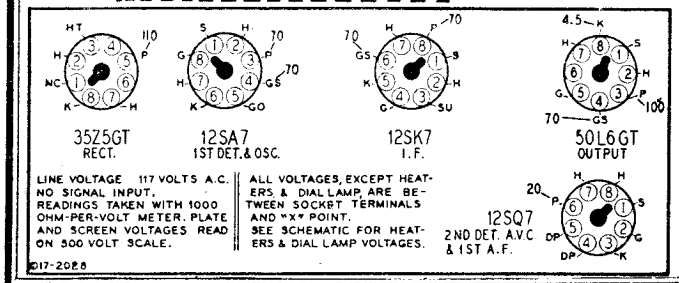

LINE VOLTAGE 117 VOLTS A.C. NO SIGNAL INPUT. READINGS TAKEN WITH 1000 OHM-PER-VOLT METER. PLATE AND SCREEN VOLTAGES READ ON 500 VOLT SCALE.

ALL VOLTAGES, EXCEPT HEATERS & DIAL LAMP, ARE BETWEEN SOCKET TERMINALS AND "X" POINT. SEE SCHEMATIC FOR HEATERS & DIAL LAMP VOLTAGES.

D17-2028

DRIVE CORD REPLACEMENT

Turn the large drive pulley to the maximum counterclockwise position. Use a new 53 inch drive cord, tie one end to the tension spring and fasten the other end of the spring to the drive pulley. Install the cord as shown in the illustration. Wind 2¾ turns counterclockwise around the tuning shaft with the turns progressing away from the chassis. After string is installed, stretch the tension spring and tie free end of cord to spring. Cut off excess string.

Tuning Frequency Range	540 to 1600 KC
Power Consumption	30 watts (At 117 volts AC)
Power Output	1.5 watt maximum, .9 watt (10% harmonics)
Selectivity	55 KC Broad at 1000 Times Signal
Intermediate Frequency	455 KC
Speaker	5" PM Dynamic
Sensitivity (for .05 watt output)	25 microvolts average

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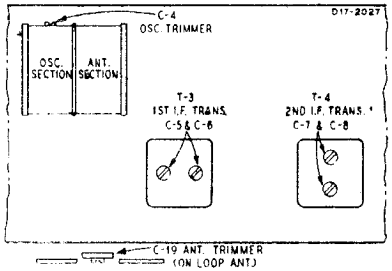
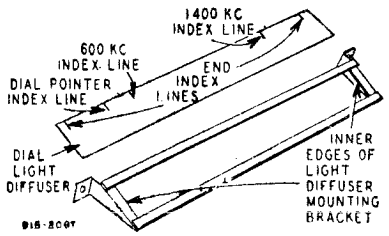


Note A—Set dial pointer to 1400 KC Index line on dial light diffuser.

DIAL CALIBRATION



In order to align the receiver, the dial pointer must be positioned on the dial string correctly with reference to the dial. Index lines are provided on the dial light diffuser for this purpose.

Before aligning the receiver (or when replacing the dial light diffuser) check the position of the diffuser strip, making certain that the two extreme index lines are aligned with the inner edges of the diffuser mounting bracket opening. The bracket should be crimped to prevent movement of the diffuser strip. To position the dial pointer, turn the large drive pulley to the maximum counterclockwise position. The dial pointer should be directly over the dial pointer index line. (See illustration).

ALIGNMENT PROCEDURE

Check dial pointer position, see DIAL CALIBRATION paragraph.

Volume Control—Maximum All Adjustments.

Allow Chassis and Signal Generator to "Heat Up" for several Minutes.

The equipment in column at right is required for aligning:

Signal Generator which will provide an accurately calibrated signal at the test frequencies as listed.

Output Indicating Meter: Non-Metallic Screwdriver.

Dummy Antennas—.1 mf., 50 mmf.

SIGNAL GENERATOR					
FREQUENCY SETTING	ANTENNA CONNECTION	GROUND CONNECTION	DUMMY ANTENNA	GANG CONDENSER SETTING	ADJUST TRIMMERS TO MAXIMUM (See Trimmer Illustration)
455 KC	Control Grid 12SK7—I.F. Prong No. 4	Point "X" 12SK7—I.F. Prong No. 3	.1 mf.	Turn Rotor to full open	2nd I.F. (C7) & (C8)
455 KC	Control Grid 12SA7—1st Det. Prong No. 8	Same As Above	.1 mf.	Turn Rotor to full open	1st I.F. (C5) & (C6)
1620 KC	Control Grid 12SA7—1st Det. Prong No. 8	Same As Above	.1 mf.	Turn Rotor to full open	Oscillator (C4)
1400 KC	External Antenna Clip On Loop	Chassis	50 mmf.	Turn Rotor to maximum output See Note A	Antenna (C-19)

NOTICE: There is a power rating label on the chassis. This label specifies the power supply on which the radio may be used, and identifies the radio as to chassis, dial and issue letter. When ordering parts or writing, give ALL information appearing on this label.

REPLACEMENT PARTS LIST

MISCELLANEOUS

12A432	5" P.M. speaker	
	Cone and voice coil assembly (specify part number and letters stamped on speaker)	
3A303	Tube socket octal (8 prong) moulded	
10A300	Knob (ivory)	
10A297	Knob (walnut)	
55X255	Cabinet (ivory)	
55X267	Cabinet (walnut)	
28X292	Snap button (mounting loop to chassis)	
	No. 6 x ¼" slotted hex head P.K. Type "Z" screw (mounting loop to cabinet)	
14X335	Grille metal	
	Grille, cloth No. 426 Egg Shell (for ivory cab)	
	Grille, cloth No. 418 Brown (for walnut cab)	
13X328	Line cord and plug assembly	

TRANSFORMERS AND COILS

26A405	T-1 "B" Range Loop Antenna Assembly (for ivory cabinet)	
26A406	T-1 "B" Range Loop Antenna Assembly (for walnut cabinet)	
9A1805	T-2 Oscillator Coil Assembly	
9A1808	T-3 1st I-F Coil Assembly	
9A1809	T-4 2nd I-F Coil Assembly	
51X123	T-5 Output Transformer	

CAPACITORS

D67102	C-1 .001 mf 400 V		Tubular
26A402	C-2A, C-2B Gang Capacitor Assembly with Drive Pulley		
47X446	C-3 47 mmf		Moulded
	C-4 Part of C-2 (Gang Capacitor)		
	C-5, C-6 Part of T-3 (1st I-F Transformer)		
	C-7, C-8 Part of T-4 (2nd I-F Transformer)		
47X112	C-9A, C-9B 50 mmf		Dual mica
B66103	C-11, C-13, C-14 .01mf	200 V	Tubular
47X468	C-12 220 mmf		Moulded
B67204	C-15 .20 mf	200 V	Tubular
D67104	C-16 .10 mf	400 V	Tubular
45X341	C-17A, 50 mf	150 V	Dry Electrolytic
	C-17B 50 mf	150 V	
B66503	C-18 .05 mf	200 V	Tubular
17A123	C-19 1.0-12 mmf		Trimmer

RESISTORS

B84393	R-1	39,000 ohms	0.5 watt	Carbon
B85225	R-2	2.2 meg.	0.5 watt	Carbon
B85473	R-3	47,000 ohms	0.5 watt	Carbon
36X352	R-4	500,000 ohms		Volume control and line switch
B85685	R-5	6.8 meg.	0.5 watt	Carbon
B84474	R-6	470,000 ohms	0.5 watt	Carbon
B85474	R-7	470,000 ohms	0.5 watt	Carbon
B83151	R-8	150 ohms	0.5 watt	Carbon
B85224	R-9	220,000 ohms	0.5 watt	Carbon
B84270	R-10	27 ohms	0.5 watt	Carbon
C85152	R-11	1500 ohms	1.0 watt	Carbon

DIAL AND DRIVE ASSEMBLY

26A401	Pointer Bracket Assembly complete with light diffuser holder, string guide and idler pulleys
41X74	Dial light diffuser
15X223	Pointer
6X21	Rubber Grommet } Mtg. gang capacitor
20X329	Cond. Cushion Stud } Mtg. gang capacitor
26X482	Drive shaft
19X192	"C" Washer (for drive shaft)
	53" Drive cord (18 lb. test)
28X95	Drive cord tension spring
7A194	Pilot light socket assembly
	No. 47 Pilot light
58X607	Dial
30X508	Dial clamp (upper)
30X509	Dial clamp (lower)

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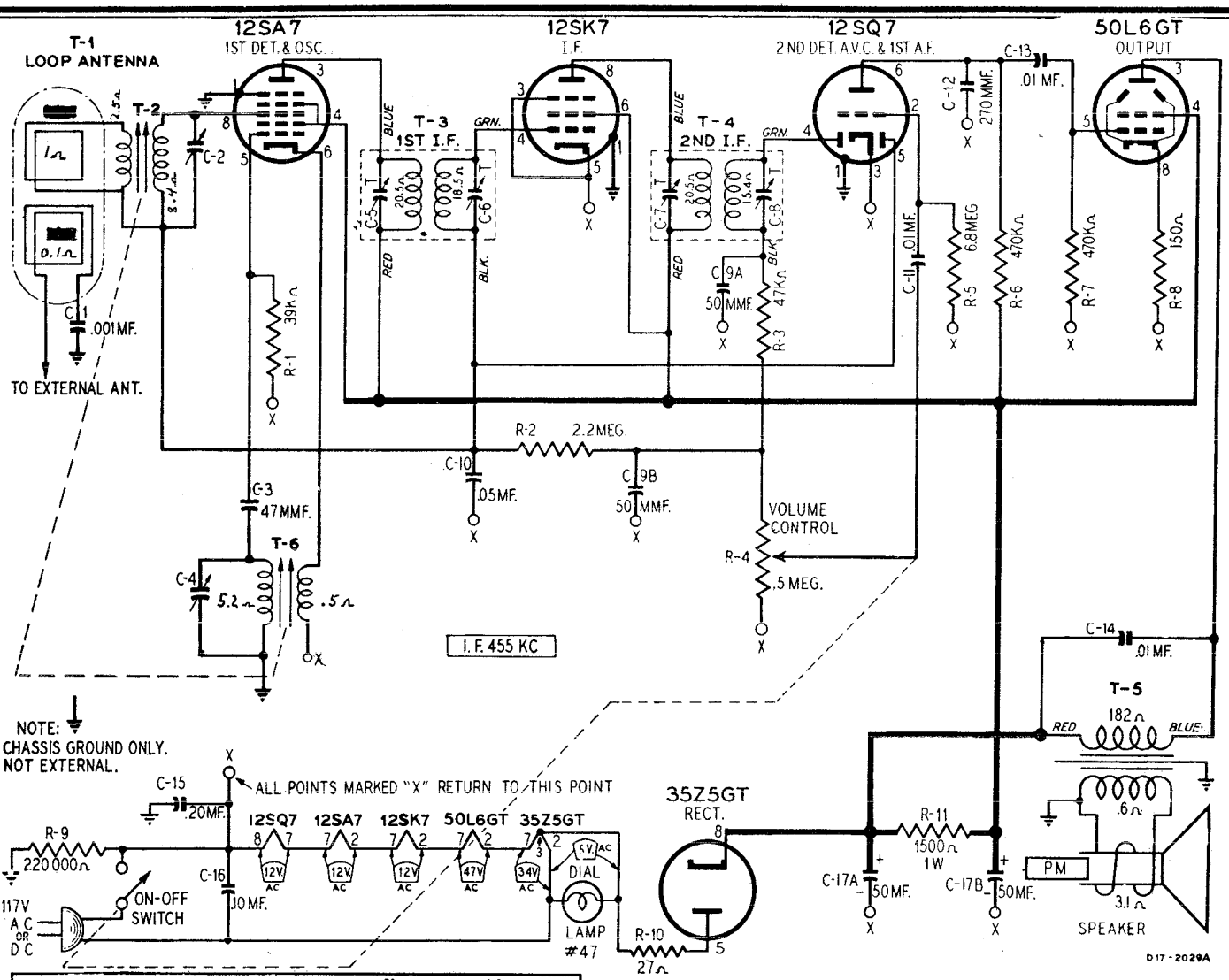
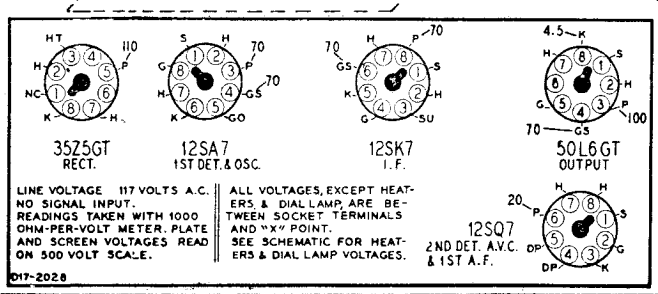
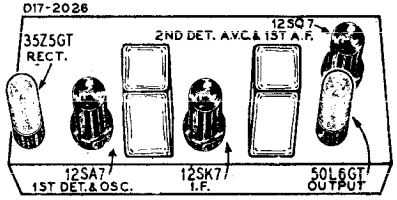



35Z5GT
RECT.
12SA7
1ST DET. & OSC.
12SK7
I.F.
50L6GT
OUTPUT
12SQ7
2ND DET. A.V.C. & 1ST A.F.
LINE VOLTAGE 117 VOLTS A.C. NO SIGNAL INPUT. READINGS TAKEN WITH 1000 OHM-PER-VOLT METER. PLATE AND SCREEN VOLTAGES READ ON 500 VOLT SCALE.
ALL VOLTAGES, EXCEPT HEATERS & DIAL LAMP, ARE BETWEEN SOCKET TERMINALS AND "X" POINT. SEE SCHEMATIC FOR HEATERS & DIAL LAMP VOLTAGES.
D17-2028

Tuning Frequency Range .....540 to 1600 KC
Power Consumption .....30 watts (At 117 volts AC)
Power Output....1.5 watt maximum, .9 watt (10% distortion)

Selectivity.....59 KC Broad at 1000 Times Signal
Intermediate Frequency .....455 KC
Speaker .....5" PM Dynamic
Sensitivity (for .05 watt output).....560 microvolts per meter average



TRANSFORMERS AND COILS

9A1834	T 1	"B" range loop antenna (for walnut cabinet)
9A1835	T 1	"B" range loop antenna (for ivory cabinet)
	T 2	Part of Tuning Assembly
9A1808	T 3	1st I F coil assembly
9A1809	T 4	2nd I-F coil assembly
51X122	T 5	Output transformer
	T 6	Part of Tuning Assembly

CAPACITORS

D66102	C 1	.001 MF 400V	Tubular
17A238	C 2	4 70 mmf	Trimmer
47X446	C 3	47 mmf	Moulded
17A239	C 4	40 370 mmf	Trimmer
	C-5, C 6	Part of T-3, 1st I-F Transformer	
	C-7, C-8	Part of T-4, 2nd I-F Transformer	
47X112	C 9A, C-9B	50 mmf Dual mica capacitor	
B66503	C-10	.05 mf 200	Tubular
B66103	C-11, C-13, C 14	.01 mf 200 V	Tubular
47X468	C 12	220 mmf	Moulded
B66204	C 15	.20 mf 200 V	Tubular
D66104	C 16	.10 mf 400 V	Tubular
45X341	C-17A	50 mf 150 V	
	C 17B	50 mf 150 V	Dry electrolytic capacitor

RESISTORS

B8439	R-1	39,000 ohms	0.5 watt	Carbon
B85225	R-2	2.2 meg	0.5 watt	Carbon
B85473	R-3	47,000 ohms	0.5 watt	Carbon
36X352	R-4	500,000 ohm		Volume control and line switch
B85685	R 5	6.8 meg	0.5 watt	Carbon
B84474	R 6	470,000 ohms	0.5 watt	Carbon
B85474	R 7	470,000 ohms	0.5 watt	Carbon
B83151	R 8	150 ohms	0.5 watt	Carbon
B85224	R 9	220,000 ohms	0.5 watt	Carbon
B84270	R 10	27 ohms	0.5 watt	Carbon
C85152	R-11	1500 ohms	1.0 watt	Carbon

DIAL AND DRIVE ASSEMBLY

20A96	Tuning Assembly complete with coils, trimmers, etc.
11X119	Fibre shield (Tuner housing)
28X518	Trimount Stud (Mtg fibre shield)
24X446	Idler pulley
25X1469	Pointer bracket
15X223	Pointer
25X1470	Holder, light di user
41X79	Dial light di user
26X482	Drive shaft (tuning)
19X192	"C" washer (for drive shaft)
	53" drive cord (18 lb. test)
26X113	Drive cord tension spring
7A194	Pilot light socket assembly
	No 47 Pilot light
58X639	Dial (for ivory cabinet)
58X641	Dial (for walnut cabinet)
30X508	Dial clamp (upper)
30X509	Dial clamp (lower)

MISCELLANEOUS

12A432	5" P.M. speaker
	Cone and voice coil assembly (specify part number and letters stamped on speaker)
3A303	Tube socket octal (8 prong; moulded
10A300	Knob (ivory)
10A297	Knob (walnut)
55X255	Cabinet (ivory)
55X267	Cabinet (walnut)
28X292	Snap button (mounting loop to chassis)
	No. 6 x ¼" slotted hex head P.K. Type "Z" screw (mounting loop to cabinet
14X335	Grille metal
	Grille, cloth No. 426 Egg Shell (for ivory cabinet)
	Grille, cloth No. 418 Brown (for walnut cabinet)
13X328*	Line cord and plug assembly

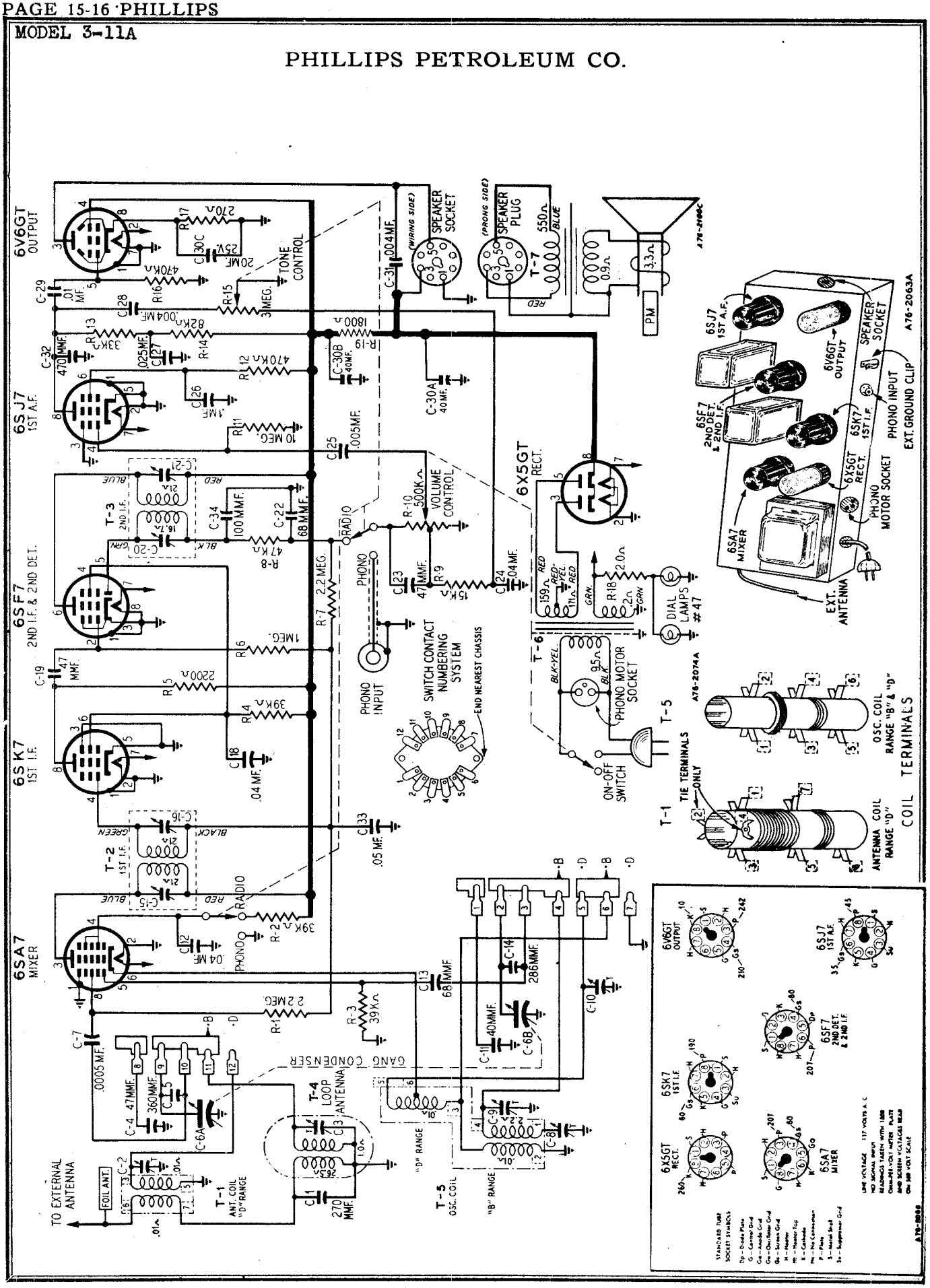
NOTICE: There is a power rating label on the chassis. This label specifies the power supply on which the radio may be used and identifies the radio as to chassis, dial and issue letter. When ordering parts or writing, give ALL information appearing on this label.

PHILLIPS PETROLEUM CO.

PHILLIPS PAGE 15-15
MODELS 3-9AX, 3-10AX

MODEL 3-11A

PHILLIPS PETROLEUM CO.



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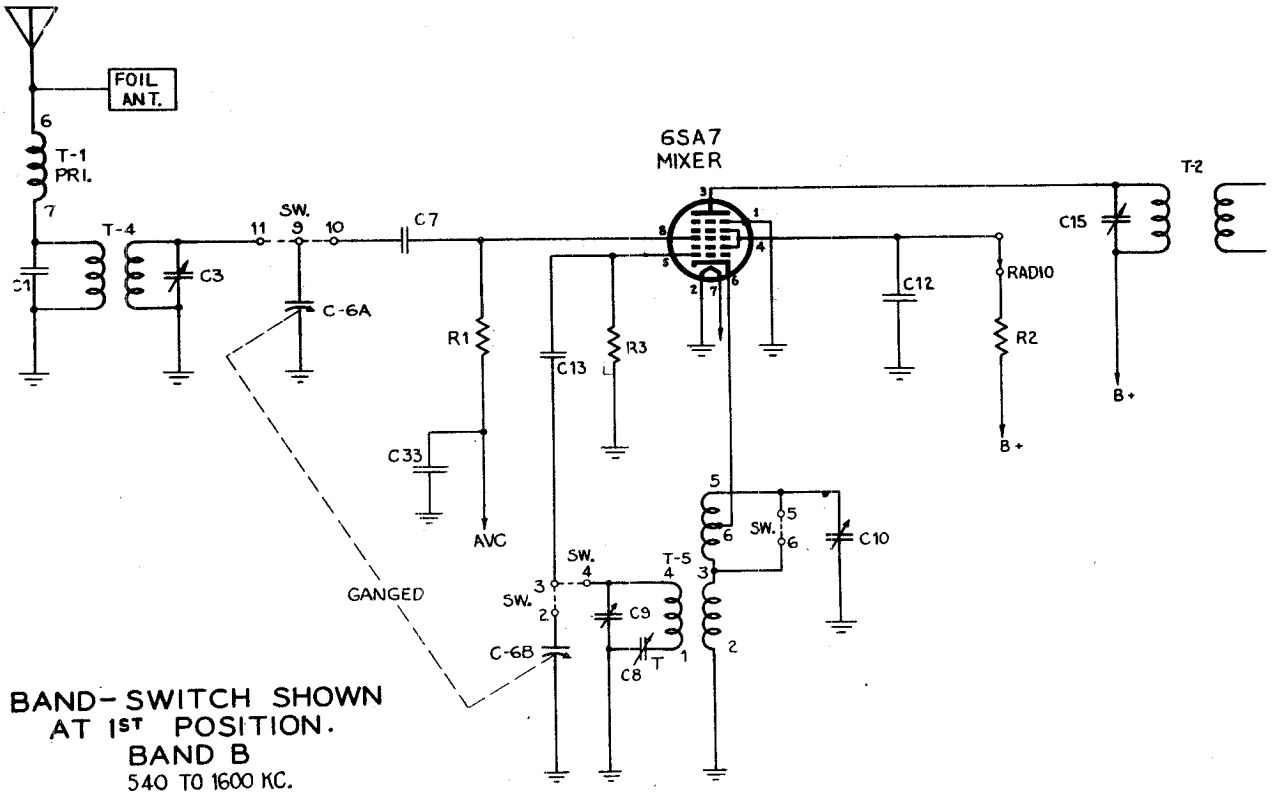
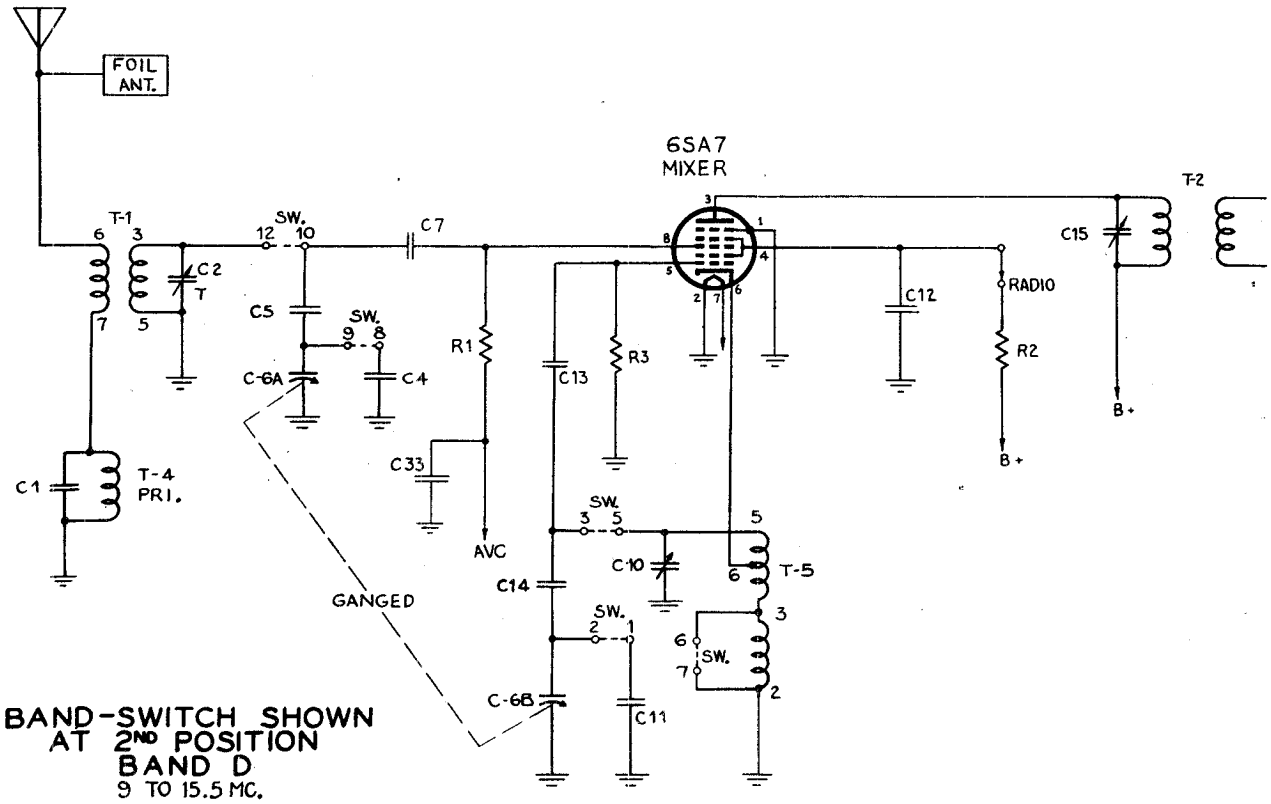
PHILLIPS PETROLEUM CO.





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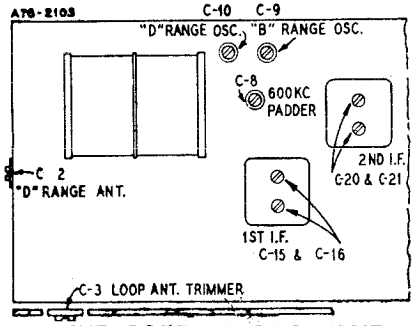
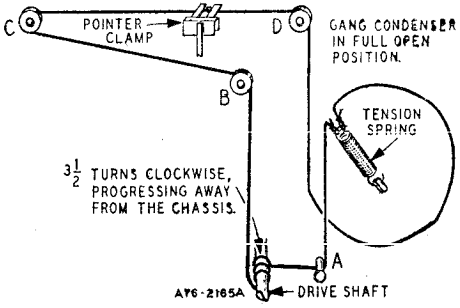
SPECIFICATIONS

Speaker.....6" PM Dynamic
Intermediate Frequency.....455 KC
Selectivity.....40 KC Broad at 1000 Times Signal
Sensitivity (For 0.5 Watt Output, with External Antenna)
B Range..... 9 Microvolts Av.
D Range.....20 Microvolts Av.
Power Consumption (at 117 Volts AC) .....40 Watts (normal)
Power Output.....4 Watts Maximum
2.3 Watts, 10% Harmonics
Tuning Frequency Range
B Range.....540-1600 Kilocycles
D Range.....9-15.5 Megacycles



DRIVE CORD REPLACEMENT

The drive cord may be replaced as shown in the accompanying illustration. For this purpose use a 58" piece of cord. After installing the cord, stretch the tension spring before fastening the free end of the string.



ALIGNMENT PROCEDURE

Volume Control—Maximum All Adjustments.

Connect Radio Chassis to Ground Post of Signal Generator with a Short Heavy Lead.

Allow Chassis and Signal Generator to "Heat Up" for several minutes.

The following equipment is required for aligning:
An All Wave Signal Generator which will provide an accurately calibrated signal at the test frequencies as listed.
Output indicating Meter—Non Metallic Screwdriver.
Dummy Antennas—.1 mf., 100 mmf., and 400 ohms.

	SIGNAL GENERATOR FREQUENCY SETTING	SIGNAL GENERATOR CONNECTION AT RADIO	DUMMY ANTENNA	BAND SWITCH SETTING	CONDENSER SETTING	ADJUST TRIMMERS TO MAXIMUM
I.F.	455 KC	Grid of 6SA7 Pin 8	.1 mf.	B Range	Turn Rotor to Full Open	2nd I.F. (C20) & (C21 1st. I.F. (C15) & (C16
RANGE B	1620 KC	Antenna Lead	100 mmf.	B Range	Turn Rotor to Full Open	Oscillator Range B(C9)
	1400 KC	Antenna Lead	100 mmf.	B Range	Tune Rotor to Max. Output. Set Pointer to 1400 KC (See Note A)	Ant. Range B (C3)
	600 KC	Antenna Lead	100 mmf.	B Range	Tune Rotor to Max. Output	Oscillator (C8) Rock Rotor—See Note B
	Repeat above steps at 1620 and 600 KC until readjusting the oscillator Range B Trimmer (C9) causes no further improvement of output.					
RANGE D	15,600 KC	Antenna Lead	400 Ohm	D Range	Turn Rotor to Full Open	Oscillator Range D (C10)
	14,000 KC	Antenna Lead	400 Ohm	D Range	Tune Rotor to Max. Output	Ant. Range D (C2) Rock Rotor—See Note B
LOOP RANGE B	Reassemble chassis in cabinet.					
	1400 KC	Antenna Lead	100 mmf.	B Range	Tune Rotor to Max. Output	Ant. Range B(C3)

NOTE A—Set pointer at the 1400 KC mark on the dial scale. Attach pointer to drive cord.

NOTE B—Turn Rotor back and forth and adjust the trimmer until the peak of greatest intensity is obtained.

REPLACEMENT PARTS LIST

NOTICE: There is a power rating label on the chassis. This label specifies the power supply on which the radio may be used, and identifies the radio as to chassis, dial and issue letter. When ordering parts or writing, give ALL information appearing on this label.

MISCELLANEOUS

‡12A442	6" P.M. Speaker Complete with Output Transformer	
	Cone and Voice Coil Assembly (Specify part number and letters stamped on speaker)	
	Output Transformer (Specify part number and letters stamped on speaker)	
3A303	Tube Socket—Octal (8 prong)	Moulded
3A304	Phono Motor Socket	
3A305	Phono Socket—Single Pin Tip	
2A345	Band Change Switch	
13X328	Line Cord and Plug Assembly	
28X292	Snap Button (Mtg. loop to cabinet)	
10A578	Knob (Tuning)	
10A579	Knob (Volume)	
10A581	Knob (Tone-H.P.)	
10A580	Knob (SW-BC)	
9A1832	Counterpoise Antenna	

TRANSFORMERS AND COILS

9A1812	T-1	"D" Range Antenna Coil Assembly
9A1814	T-2	1st I-F Coil Assembly
9A1815	T-3	2nd I-F Coil Assembly
26A417	T-4	"B" Range Loop Antenna Assembly
9A1813	T-5	"B" Range and "D" Range Oscillator Coil Assembly
53X282	T-6	117 Volt, 60 Cycle, Standard Power Transformer
53X283	T-6	117 Volt, 25 Cycle, Standard Power Transformer
*53X284	T-6	117-234 Volt, 40-60 Cycle, Universal Power Transformer
	T-7	Output Transformer (See Miscellaneous)

CAPACITORS

47X445	C-1	270 mmf	Moulded
17A164	C-2	5-50 mmf	Trimmer
17A123	C-3	1.0-12 mmf	Trimmer
47X473	C-4	47 mmf	Silvered Mica
47X474	C-5	360 mmf	Silvered Mica
14A184	C-6A, C-6B	Gang Capacitor with Drive Pulley	
B66501	C-7	.0005 mf	200 V Tubular
17A155	C-8	350-430 mmf	Trimmer
17A109	C-9, C-10	2.5-35 mmf	Dual Trimmer
47X472	C-11	40 mmf	Silvered Mica
B66403	C-12, C-18	.04 mf	400 V Tubular
47X466	C-13	68 mmf	Moulded
47X481	C-14	286 mmf	Silvered Mica
	C-15, C-16	Part of T-2 (1st I-F Coil Assembly)	
47X463	C-19, C-23	47 mmf	Moulded
	C-20, C-21	Part of T-3 (2nd I-F Coil Assembly)	
47X471	C-22	68 mmf	Moulded
D64403	C-24	.04 mf	400 V Tubular
D66502	C-25	.005 mf	400 V Tubular
D67104	C-26	.10 mf	400 V Tubular
D64253	C-27	.025 mf	400 V Tubular
D66402	C-28, C-31	.004 mf	400 V Tubular
D66103	C-29	.01 mf	400 V Tubular
45X346	C-30A	40 mf	450 V (3 Section Electrolytic)
	C-30B	40 mf	450 V
	C-30C	20 mf	25 V
47X505	C-32	470 mmf	Moulded
B66503	C-33	.05 mf	200 V Tubular
47X476	C-34	100 mmf	Moulded

RESISTORS

		Ohms	Watts
B85225	R-1, R-7	2.2 meg.	0.5 Carbon
C84393	R-2, R-4	39 K	1.0 Carbon
B84393	R-3	39 K	0.5 Carbon
B84222	R-5	2200	0.5 Carbon
B85105	R-6	1 meg.	0.5 Carbon
B85473	R-8	47 K	0.5 Carbon
B84153	R-9	15 K	0.5 Carbon
36X354	R-10	500 K	Volume Control and line switch
B85106	R-11	10 meg.	0.5 Carbon
B85474	R-12, R-16	470 K	0.5 Carbon
B84333	R-13	33 K	0.5 Carbon
B84823	R-14	82 K	0.5 Carbon
*40X275	R-15	3.0 meg	Tone control and Radio Phono Switch
C84271	R-17	270	1.0 Carbon
43X213	R-18	2.0	0.5 Wire Wound
D84182	R-19	1600	2.0 Carbon

DIAL AND DRIVE ASSEMBLY

26A411	Dial Bracket Assembly Complete with Dial, Background and Spacers
6X21	Rubber Grommet (Mtg. Gang Capacitor)
20X329	Cond. Cushion Stud (Mtg. Gang Capacitor)
26X470	Drive Shaft
19X192	"C" Washer (For Drive Shaft)
15X230	Pointer
	58" Drive Cord (18 lb. test)
28X113	Drive Cord Tension Spring
7A203	Pilot Light Socket Assembly
	No. 47 Pilot Light

SUBSTITUTE REPLACEMENT PARTS

These are used on some receivers only. Check part number on part before ordering and order part originally used in receiver.

*40X280	Tone Control (substitute for 40X275)
*25X1539	Radio-Phono Switch Lever (when 40X280 is used)
*2A161	D.P.D.T. Switch (when 40X280 is used)
‡12A459	6" P.M. Speaker Complete with Output Transformer (substitute for 12A442)

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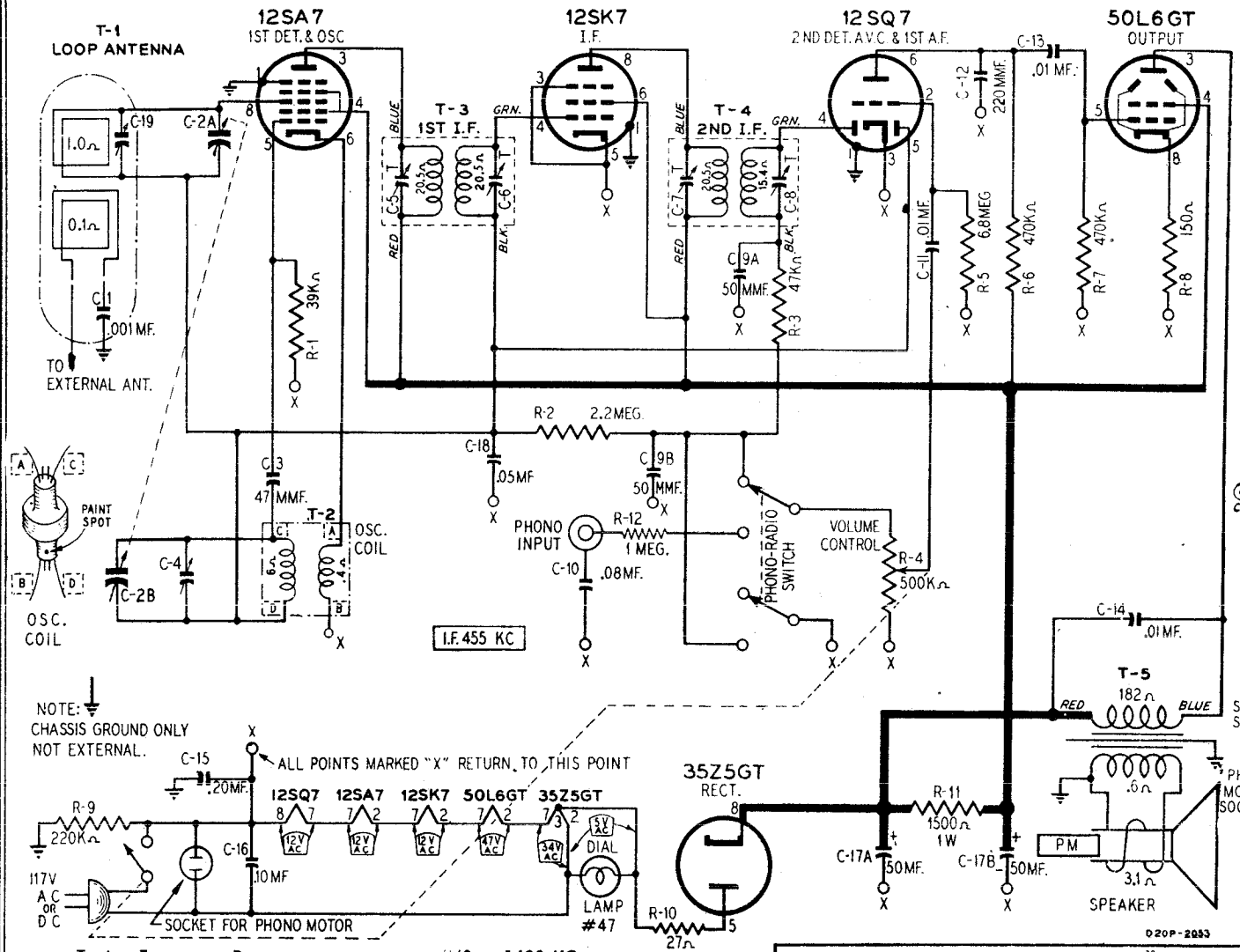
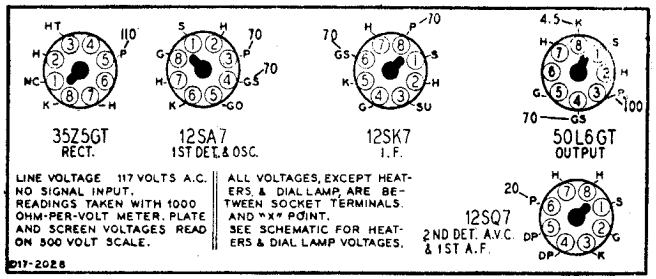
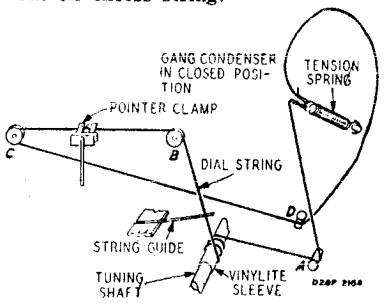


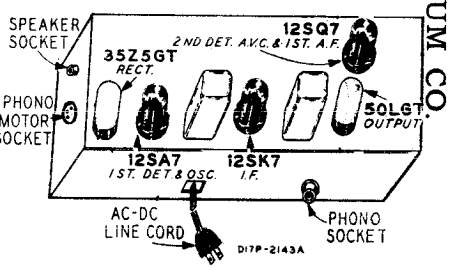
Tuning Frequency Range.....540 to 1600 KC
Power Consumption.....30 watts (At 117 volts AC)
50 watts Phono Operating
Power Output..1.5 watt maximum, .9 watt (10% harmonics)
Selectivity.....55 KC Broad at 1000 Times Signal
Intermediate Frequency.....455 KC
Speaker.....5" PM Dynamic
Sensitivity (for .05 watt output).....25 microvolts average


D20P-2053
35Z5GT
RECT.
12SA7
1ST DET. & OSC.
12SK7
I.F.
50L6GT
OUTPUT
12SQ7
2ND DET. A.V.C. & 1ST A.F.
LINE VOLTAGE 117 VOLTS A.C. NO SIGNAL INPUT. READINGS TAKEN WITH 1000 OHM-PER-VOLT METER. PLATE AND SCREEN VOLTAGES READ ON 500 VOLT SCALE.
ALL VOLTAGES, EXCEPT HEATERS & DIAL LAMP, ARE BETWEEN SOCKET TERMINALS AND "X" POINT. SEE SCHEMATIC FOR HEATERS & DIAL LAMP VOLTAGES.
D17-2028

DRIVE CORD REPLACEMENT

Turn the large drive pulley to the maximum counterclockwise position. Use a new 57 inch drive cord, tie one end to the tension spring and fasten the other end of the spring to the drive pulley. Install the cord as shown in the illustration. Wind 2¾ turns counterclockwise around the tuning shaft with the turns progressing away from the chassis. After string is installed, stretch the tension spring and tie free end of cord to spring. Cut off excess string.





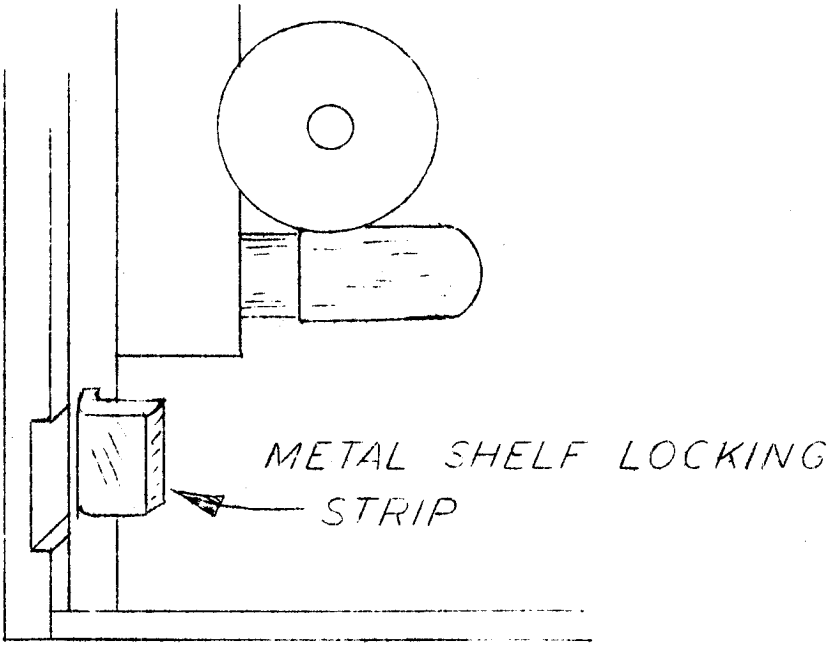
PHILLIPS PETROLEUM CO.
MODEL 3-29A

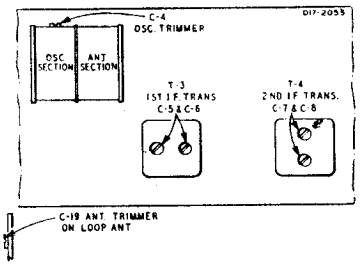
MODEL 3-29A

PHILLIPS PETROLEUM CO.

REMOVAL OF RADIO CHASSIS

To remove the radio chassis for servicing, pull off the three control knobs, disconnect the cables and wires leading to the loud speaker, built-in antenna, etc., then withdraw the metal shelf locking strip from near the lower corner of the chassis. Swing the bottom of the chassis and the mounting shelf out from the cabinet until the top of the shelf is disengaged. The unit may then be withdrawn from the cabinet.





ALIGNMENT PROCEDURE

Volume Control—Maximum All Adjustments.

Allow Chassis and Signal Generator to "Heat Up" for several Minutes.

The equipment in column at right is required for aligning:

Signal Generator which will provide an accurately calibrated signal at the test frequencies as listed.

Output Indicating Meter: Non-Metallic Screwdriver.

Dummy Antennas—.1 mf., 50 mmf.

SIGNAL GENERATOR					
FREQUENCY SETTING	ANTENNA CONNECTION	GROUND CONNECTION	DUMMY ANTENNA	GANG CONDENSER SETTING	ADJUST TRIMMERS TO MAXIMUM (See Trimmer Illustration)
455 KC	Control Grid 12SK7—I.F.	Point "X" 12SK7—I.F. Prong No. 3	.1 mf.	Turn Rotor to Full Open	2nd I.F. (C7) & (C8)
455 KC	Control Grid 12SA7—1st Det.	Same As Above	.1 mf.	Turn Rotor to Full Open	1st I.F. (C5) & (C6)
1620 KC	Control Grid 12SA7—1st Det.	Same As Above	.1 mf.	Turn Rotor to Full Open	Oscillator (C4)
1400 KC	External Antenna Clip on Loop	Chassis	50 mmf.	Turn Dial to 1400 KC	Antenna (C-19)

REPLACEMENT PARTS LIST

NOTICE: There is a power rating label on the chassis. This label specifies the power supply on which the radio may be used, and identifies the radio as to chassis, dial and issue letter. When ordering parts or writing, give ALL information appearing on this label.

MISCELLANEOUS

12A438	5" P.M. Speaker ..... Cone and voice coil assembly (specify part number and letters stamped on speaker) .....
3A303	Tube socket octal (8 prong) moulded .....
3A305	Phono socket .....
3A304	Phono motor socket .....
10A297	Knob (volume control, tuning) .....
10A584	Knob (Radio-Phono) .....
2A358	Radio-Phono switch .....
13X328	Line cord and plug assembly .....

TRANSFORMERS AND COILS

26A413	T-1 "B" Range Loop Antenna Assembly
9A1805	T-2 Oscillator Coil Assembly .....
9A1808	T-3 1st I-F Transformer and Can Assembly .....
9A1809	T-4 2nd I-F Transformer and Can Assembly .....
51X122	T-5 Output Transformer .....

CAPACITORS

D66102	C-1 .001 mf 400 V Tubular .....
26A402	C-2A, C-2B Gang Capacitor assembly .....
47X446	C-3 47 mmf Moulded .....
	C-4 Part of C-2 (Gang Capacitor) .....
	C-5, C-6 Part of T-3 (1st I-F Transformer
	C-7, C-8 Part of T-4 (2nd I-F Transformer
47X112	C-9A, C-9B 50 mmf Dual Mica ...
B66803	C-10, .08 mf 200 V Tubular ...
B66103	C-11, C-13, C-14 .01 mf 200 V Tubular ...
47X468	C-12 220 mmf Moulded ...
B67204	C-15 .20 mf 200 V Tubular ...
D66104	C-16 .10 mf 400 V Tubular ...
45X341	C-17A 50 mf 150 V, C-17B 50 mf 150 V } Dry Electrolytic ..
B66503	C-18 .05 mf 200 V Tubular ...
17A123	C-19 1.0-12 mmf Trimmer ...

RESISTORS

B84393	R-1	39K	0.5	Carbon .....
B85225	R-2	2.2 meg	0.5	Carbon .....
B85473	R-3	47K	0.5	Carbon .....
36X352	R-4	500K		Volume control and switch .....
B85685	R-5	6.8 meg	0.5	Carbon .....
B84474	R-6	470K	0.5	Carbon .....
B85474	R-7	470K	0.5	Carbon .....
B83151	R-8	150	0.5	Carbon .....
B85224	R-9	220K	0.5	Carbon .....
B84270	R-10	27	0.5	Carbon .....
C85152	R-11	1500	1.0	Carbon .....

DIAL AND DRIVE ASSEMBLY

26A399	Dial Bracket Assembly Complete with Dial Background, Diffuser, Dial Clamps, Idler Pulleys and Spacers .....
6X21	Rubber Grommet } Mounting gang .....
20X329	Cond. Cushion Stud } capacitor .....
58X610	Dial .....
26X382	Drive Shaft .....
19X192	"C" Washer (For Drive Shaft) .....
19X62	Flat Washer (For Drive Shaft) .....
7A197	Pilot Light Socket Assembly .....
	No. 47 Pilot Light .....
	57" Drive Cord (18 lb. test) .....
15X150	Pointer .....
28X95	Drive Cord Tension spring .....

TYPE G-28A115 AUTOMATIC RECORD CHANGER PARTS

G-30A71506	Bearing Assembly .....
G-19A71535	Spindle Assembly .....
G-58-71435	Single Button Control Switch .....
G-26-70545	Drive Wheel .....
G-33-A71196	Flexible Coupling Spring Assembly .....
G-65-70566	Feed Cam Roller .....
G-12-71406	Lift Pin .....
G-33-71405	Counter Balance Spring .....
G-33-71388	Finger Spring .....
G-33-70582	Mounting Spring .....
G-33-71316	Stop Lever Spring .....
G-33-71173	Trip Lever Spring .....
G-33-71205	Pull-in Spring .....
G-33-71438	Trip Bar Spring .....
G-33-71341	Record Feed Spring .....
G-33-71342	Carrier Lever Spring .....
G-59-71494	Index Spring .....
G-66A71507	Turntable .....
G-56-72092	Motor .....
	Pickup Arm Assembly (G.I. Model 205)
Astatic L-75	Pickup Cartridge .....
G-55-72021	Record Stabilizer Finger .....
	Needle, Permo No. 100 .....

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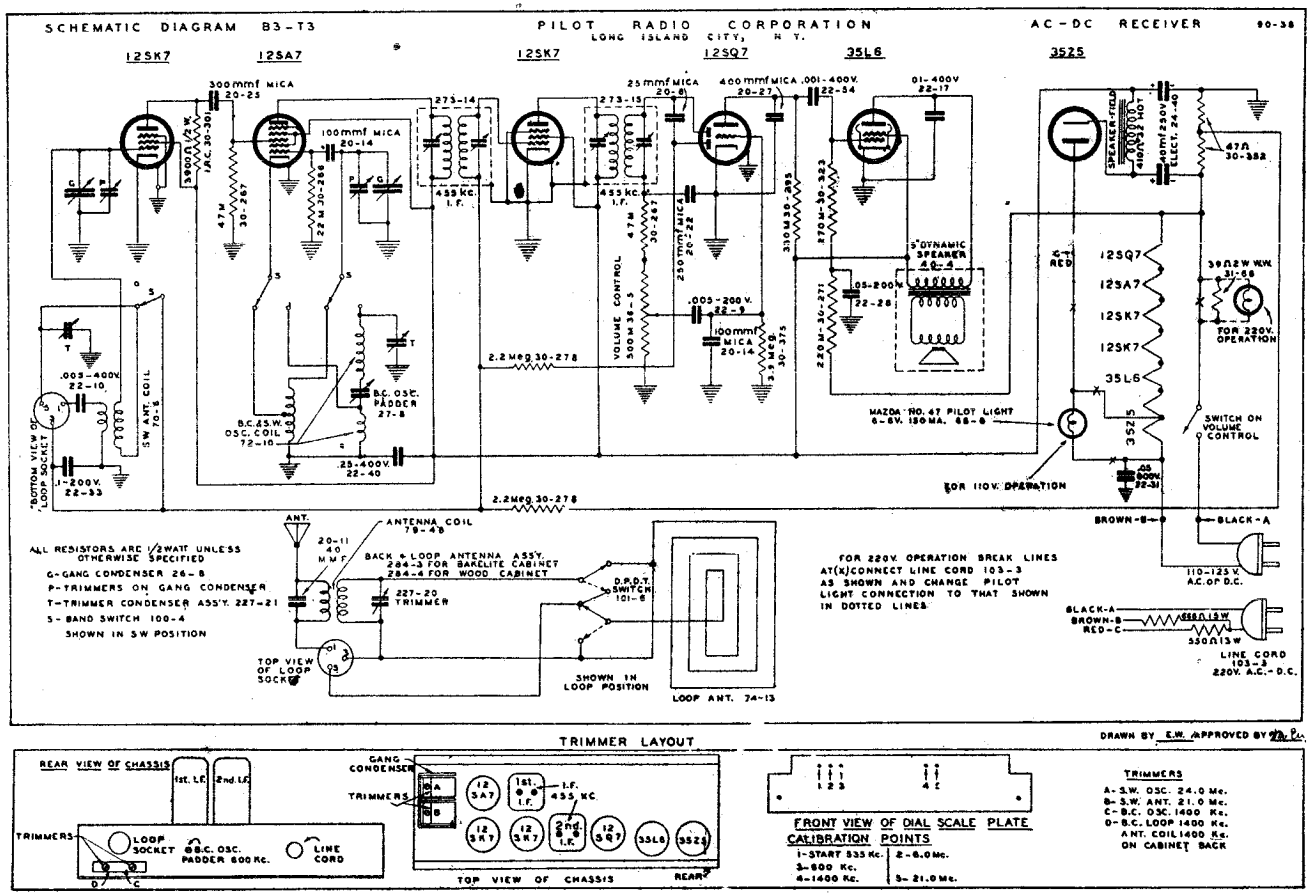
The screws for adjusting both the R.F. and I.F. amplifiers of this receiver, together with the frequencies at which they should be adjusted, are pictured in the diagram. Before aligning the I.F. amplifier, the generator must be connected to the grid of the 12SK7 R.F. tube through a .1 mfd. condenser. Before aligning the short wave band, connect the signal generator to the "OUTSIDE ANTENNA" post through a 400 ohm resistor.

To align the "LOOP" antenna the receiver should be in the cabinet with the back in place and the Antenna Selector Switch set for "LOOP". Through the slot in the lower left-hand side of the cabinet back adjust the trimmer on the extreme left for maximum signal strength at about 1400 kc. Then set the Antenna Selector Switch for "OUTSIDE ANTENNA" and adjust the trimmer located next to the switch for maximum signal strength at 1400 kc.

Broadcast Band—535 to 1720 kc.

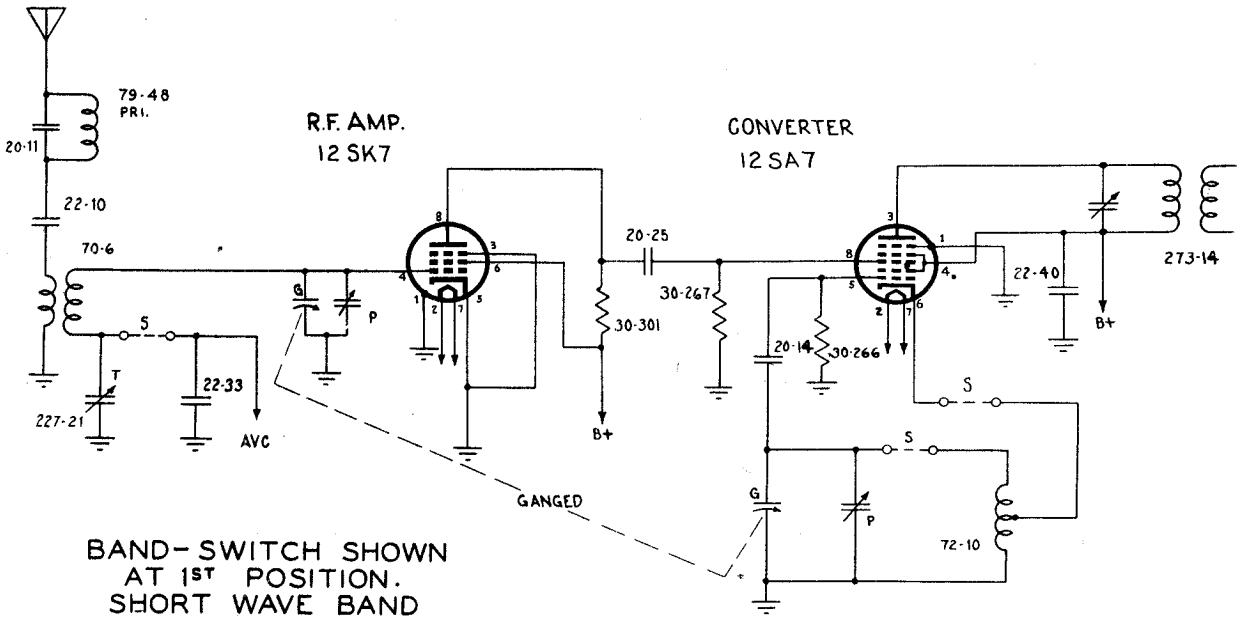
Short Wave Band—5.6 to 24.0 mc.



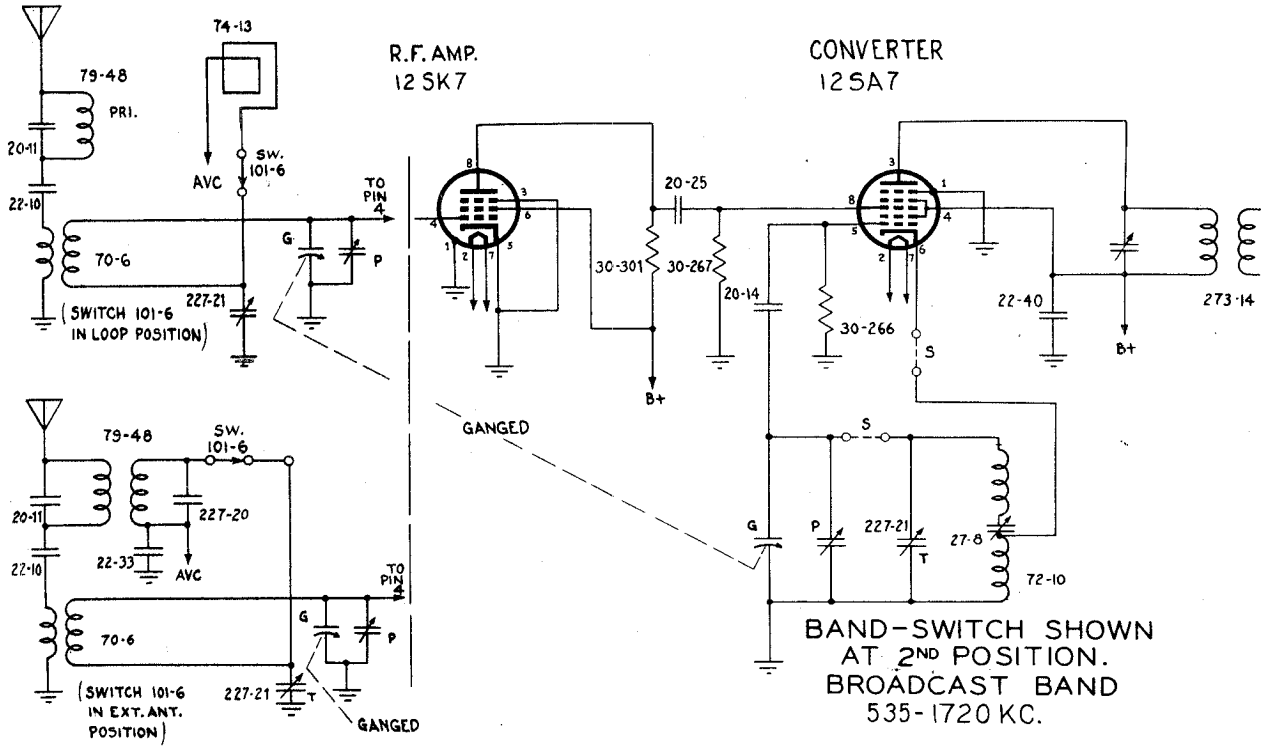
"clarified schematics"

MODELS B-3,T-3,X-3

PILOT RADIO CORP.



BAND-SWITCH SHOWN
AT 1ST POSITION.
SHORT WAVE BAND
5.6 - 24.0 Mc.



BAND-SWITCH SHOWN
AT 2ND POSITION.
BROADCAST BAND
535-1720 KC.

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BATTERY INSTALLATION

Remove the screws from the back and carefully lift off the back.

When removing the batteries, first unscrew clamps, and then remove battery plugs. Be sure not to pull on the cables, but on the plugs themselves.

Place the new "A" and "B" batteries in position shown on diagram below and replace clamps in position shown below.

The blue and white cable, coming from the chassis, has two 2-prong plugs which are then plugged into the "A" batteries. The red and black cable has two 3-prong plugs, both of which are plugged into the "B" batteries. The I.F. amplifier may be aligned with the chassis out of the cabinet but with the loop antenna plugged in. For the I.F. alignment the signal generator must be connected to the grid of the 1A7GT tube through the .1 mfd. condenser. The R.F. trimmers should also be peaked for maximum with the chassis out of the cabinet. When aligning the ANT. trimmers, the "A" and "B" batteries must be in place, the loop antenna and receiver correctly mounted in the cabinet. The receiver may be aligned on either batteries or house current. When the receiver is aligned on the broadcast band, connect the signal generator to the ANT. post at the back through a .0002 mfd. condenser, and on the shortwave band use a 400 ohm carbon resistor.

OPERATION OF PUSHBUTTONS

Four pushbuttons are provided. These pushbuttons operate in pairs, the left two control the choice of either battery or AC-DC power supply. The right two select either the Shortwave or the Broadcast band, as desired.

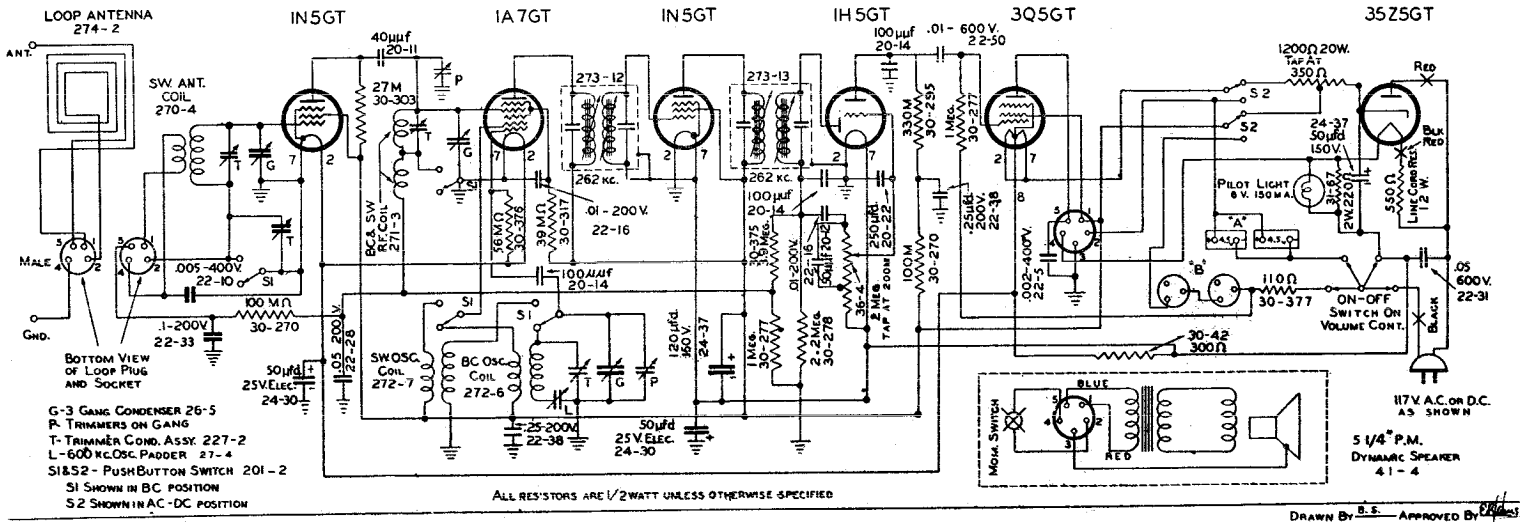
For example, when it is desired to operate the Broadcast band from house current, plug the electric cord into the light socket. Rotate the left-hand knob approximately half way to the right and push the button marked A.C.-D.C, and the button marked B.C. If after a period of one minute the dial light does not light or the electric hum is too apparent, reverse the plug in the light socket. WHEN OPERATING THIS RECEIVER FROM THE HOUSE CURRENT BE ABSOLUTELY SURE THAT THE DIAL LIGHT IS LIT AND THAT THE A.C.-D.C. PUSHBUTTON IS PUSHED.

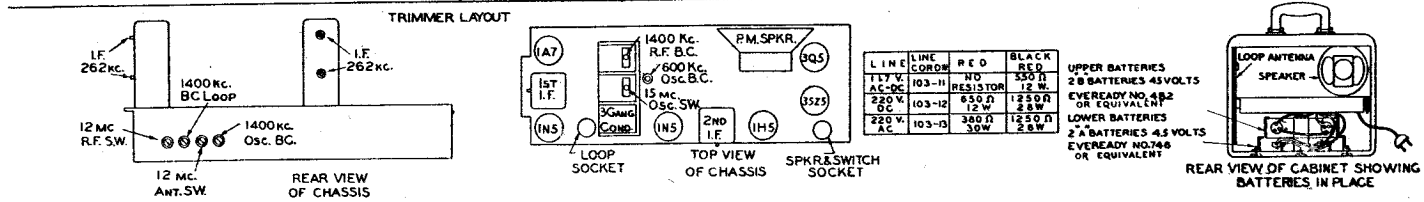
To turn off the receiver it is only necessary to turn the left-hand knob to the left until the red indicator disappears, regardless of the position of the buttons.

In order to light the pilot light for the dial ON BATTERY OPERATION, the switch button on the lower left-hand ledge inside the front door must be pressed down. When the button is released the light is switched off automatically to save the batteries.

Broadcast Band: 187 to 561 meters; or 535 to 1605 kc.

Short Wave Band: 5.63 to 16.56 mc.; or 18.2 to 53.2 meters





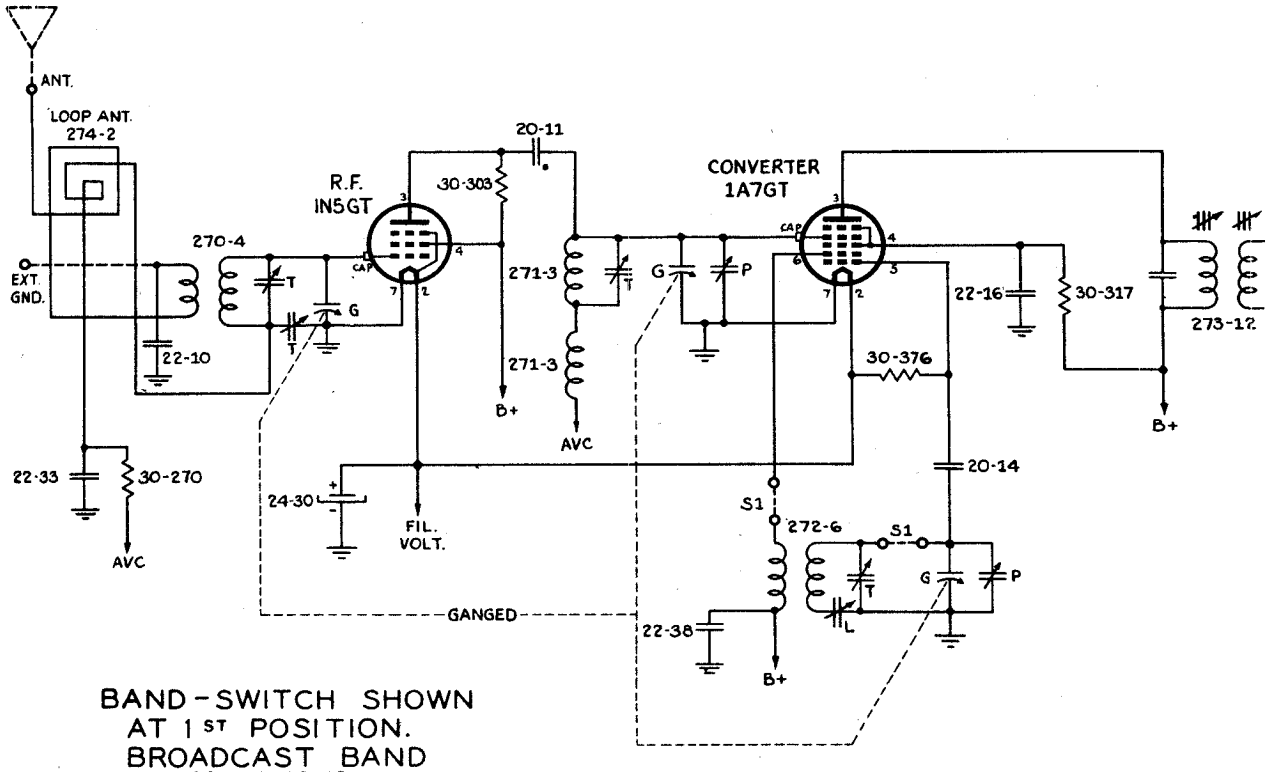
LINE	LINE CORD	RED	BLACK RED
117 V. AC-DC	103-11	NO RESISTOR	350 Ω 12 W.
220 V. DC	103-12	650 Ω 12 W	1250 Ω 25 W
220 V. AC	103-13	380 Ω 30 W	1250 Ω 25 W

UPPER BATTERIES
2 B BATTERIES 45 VOLTS
EVEREADY NO. 482 OR EQUIVALENT
LOWER BATTERIES
2 A BATTERIES 4.5 VOLTS
EVEREADY NO. 746 OR EQUIVALENT

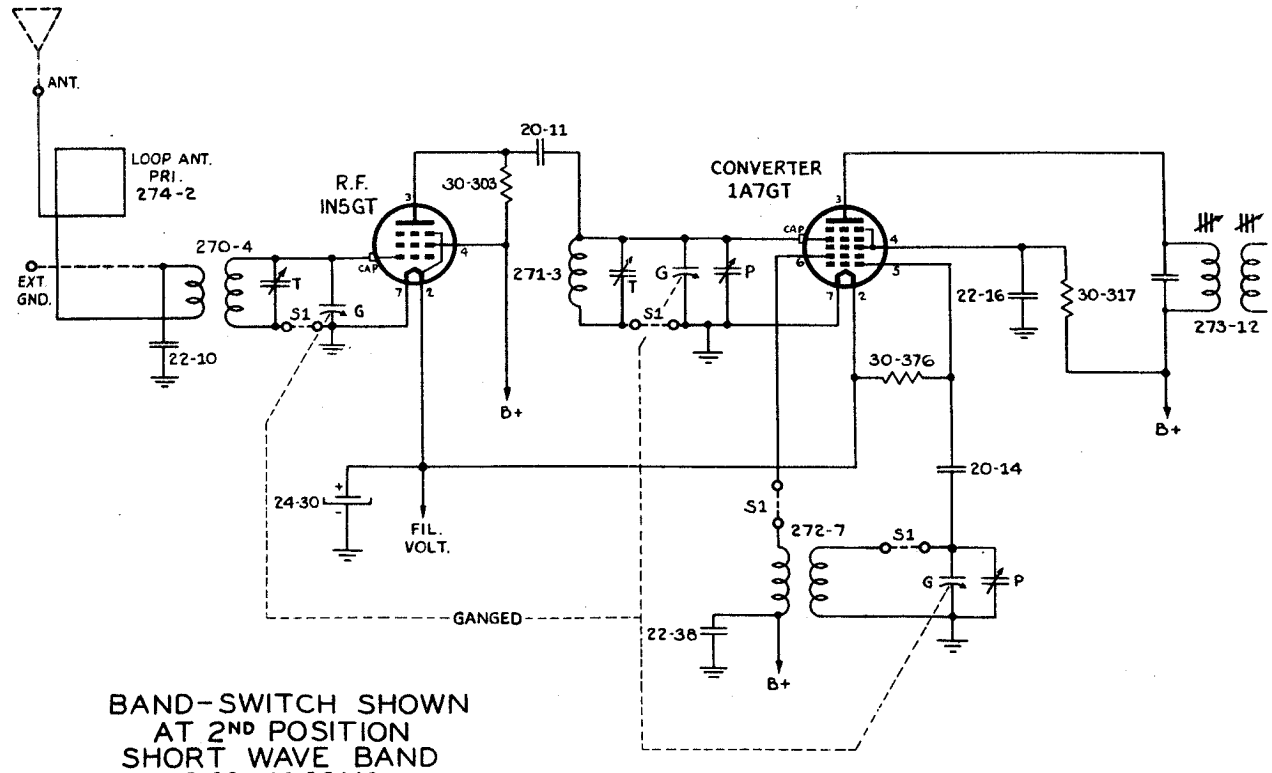
REAR VIEW OF CABINET SHOWING BATTERIES IN PLACE

MODEL T-286

PILOT RADIO CORP.



BAND-SWITCH SHOWN
AT 1ST POSITION.
BROADCAST BAND
535 - 1605 KC.



BAND-SWITCH SHOWN
AT 2ND POSITION
SHORT WAVE BAND
5.63 - 16.56 MC.

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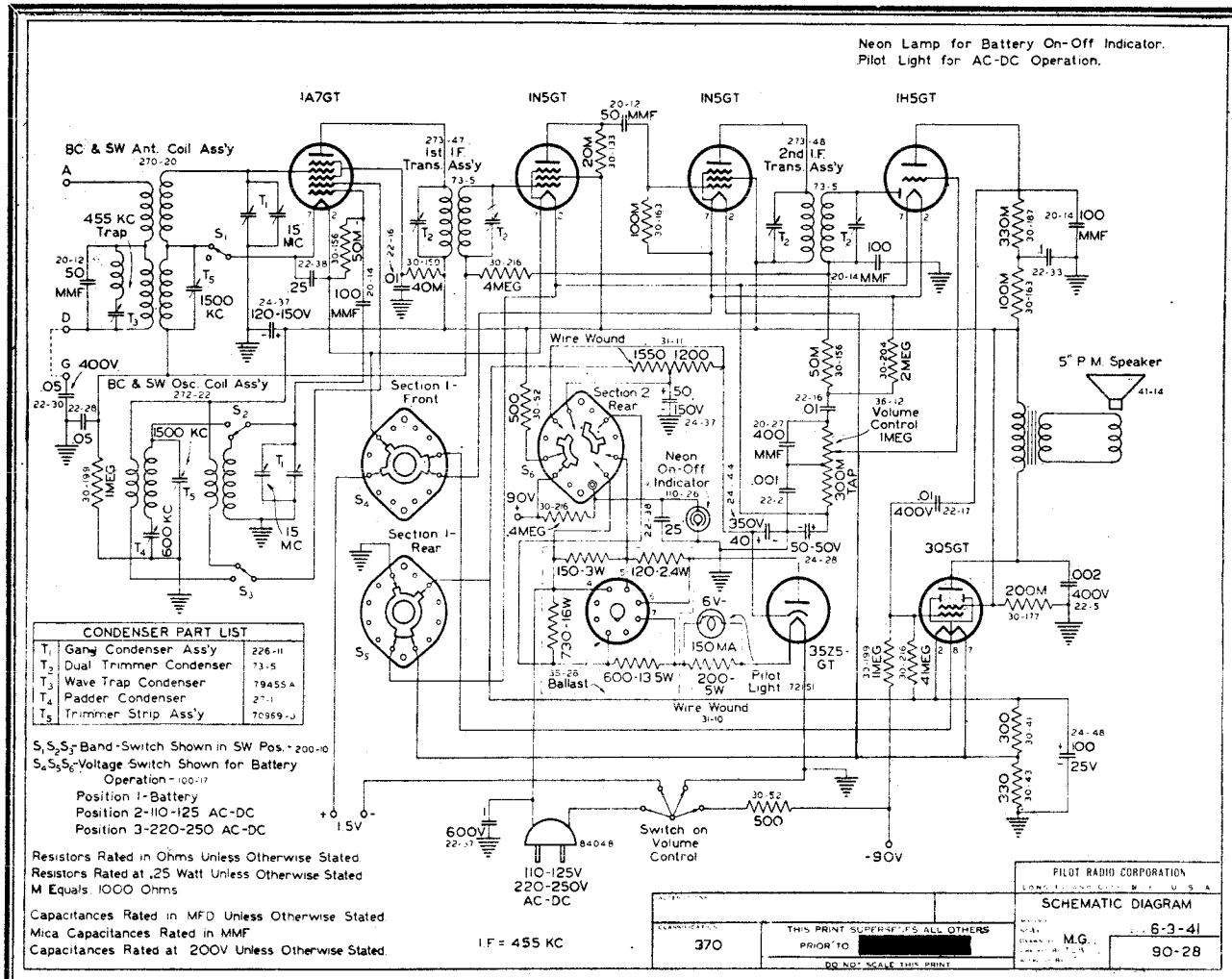


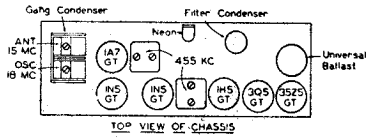
Broadcast Band 535 to 1720 Kc
Short Wave Band 5.7 to 18.7 Mc

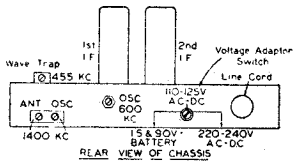
In case battery packs, as listed below, are unavailable, separate batteries may be used by cutting off the plug and connecting the leads as follows:

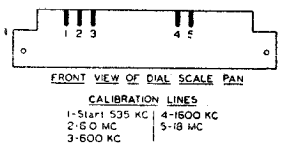
White	1.5 volts	+
Black	1.5 volts	-
Red	90 volts	+
Green	90 volts	-

Battery packs that may be used:

Eveready	#748
Ray-O-Vac	#AB-82
Burgess	#17GD60
Bond	#0528







A battery beacon is provided to serve as a combination "ON" "OFF" and battery life indicator.

The battery beacon will flicker approximately once each second when the batteries are new. With the aging of the batteries, the rate of flickering and the brilliancy will be reduced

End of useful battery life will occur when the battery beacon ceases to operate. Short period operation may be secured if the batteries are permitted long periods of rest after the end of the useful life occurs.

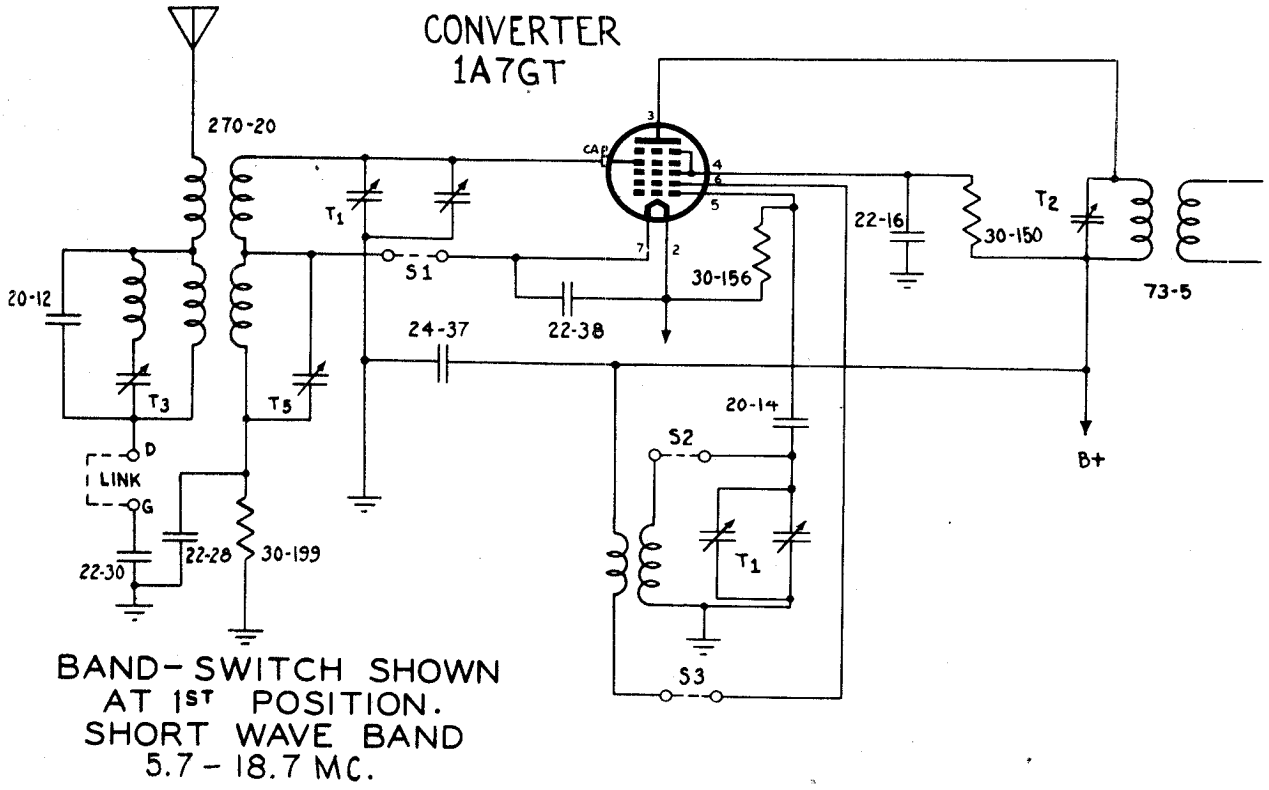
The location of all adjustments used in re-aligning this receiver, and the frequencies at which these adjustments should be made are shown in the accompanying diagram.

When aligning the I. F. amplifier, the generator must be connected to the grid of the 1A7GT tube through a .1 mfd condenser. When aligning the receiver on the Broadcast Band, connect the generator to the Antenna wire through a .0002 mfd condenser, and on the short wave band through a 400 ohm carbon resistor.

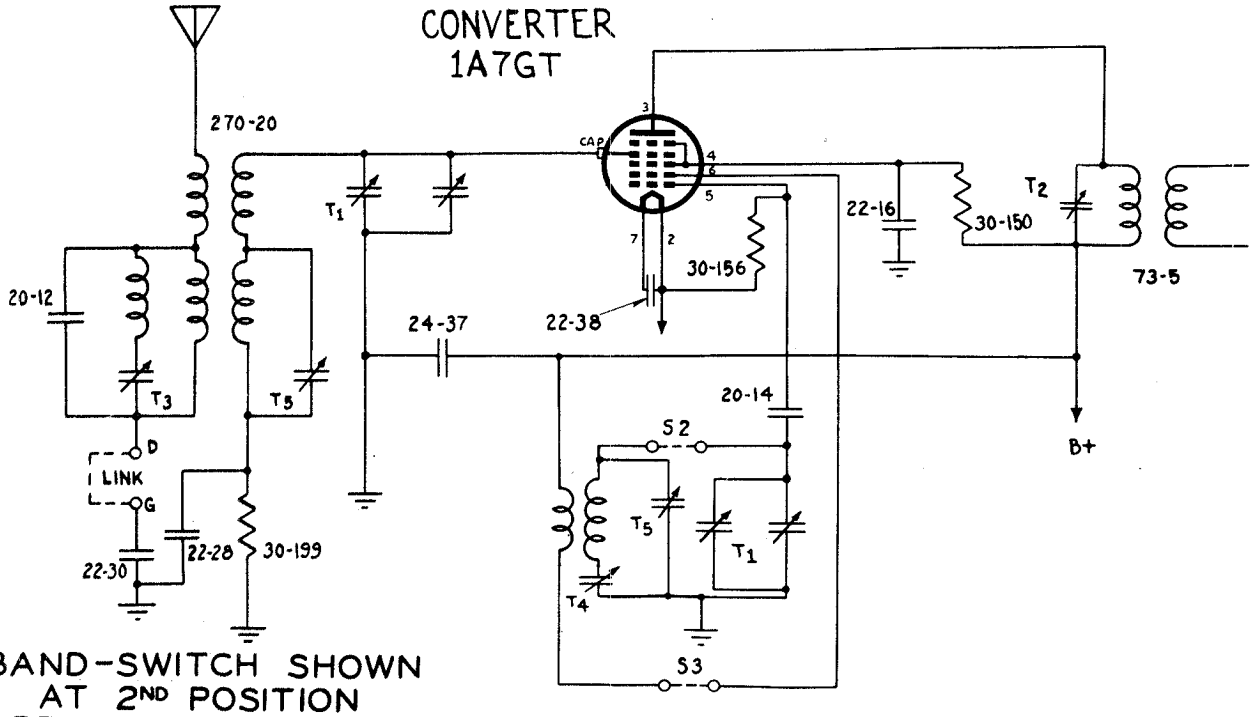
"clarified schematics"

MODEL T-370 Series

PILOT RADIO CORP.



BAND-SWITCH SHOWN AT 1ST POSITION. SHORT WAVE BAND 5.7 - 18.7 MC.



BAND-SWITCH SHOWN AT 2ND POSITION BROADCAST BAND 535 - 1720 KC.

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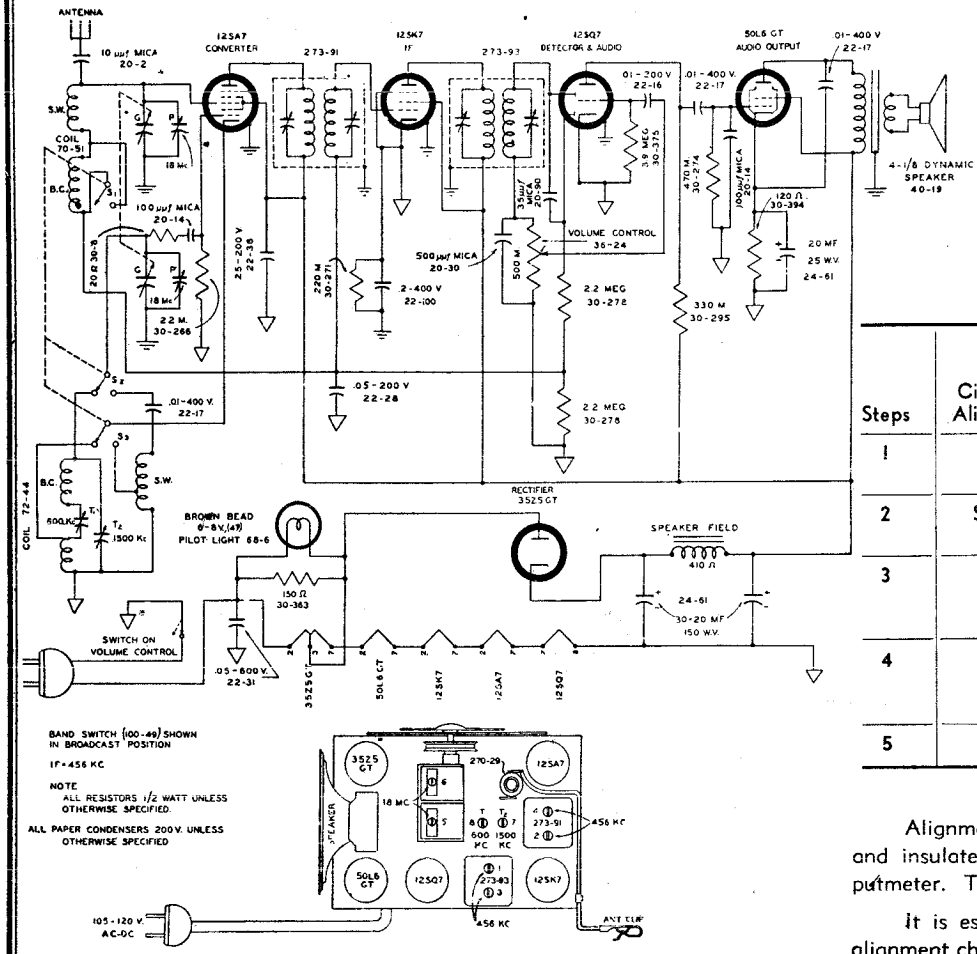


BAND SWITCH (100-49) SHOWN IN BROADCAST POSITION

IF-456 KC

NOTE
ALL RESISTORS 1/2 WATT UNLESS OTHERWISE SPECIFIED.

ALL PAPER CONDENSERS 200 V. UNLESS OTHERWISE SPECIFIED

PILOT RADIO CORPORATION LONG ISLAND CITY, N.Y., U.S.A.	
SCHEMATIC DIAGRAM MODEL 500	
DRAWN BY AL	DATE-7-24-45
CHECKED BY	DRAWING NO. 93-131
APPROVED BY	

SYM.	DESC.
⏚	CHASSIS
▽	B- BUS

PART NO.	SYMBOL	DESCRIPTION
26-28	G	GANG CONDENSER
PART OF 26-28	P	TRIMMERS ON GANG CONDENSER
27-18	T_1-T_2	DUAL TRIMMER
100-49	$S_1 S_2 S_3$	BAND SWITCH
273-91		1ST IF TRANSFORMER & CAN ASSEMBLY
273-93		2ND IF TRANSFORMER & CAN ASSEMBLY
27[illegible]-94		BC & SW ANT. COIL & WIRE ASSY.

Broadcast Band—535 to 1720 kc

Short Wave Band—5.6 to 24.0 mc

ALIGNMENT CHART

Steps	Circuit Aligned	RECEIVER Band Switch	RECEIVER Dial Pointer	SIGNAL GENERATOR Frequency	SIGNAL GENERATOR Connection	Dummy Antenna	Trimmer to be adjusted
1	IF	BC	low end of dial	455 kc	grid of 12SA7	0.1 mfd	#1, 2, 3, 4
2	SW	SW	18 mc	18 mc	antenna clip	400 ohm carbon resistor	first, osc. #5; then, ant. #6
3	BC	BC	1500 kc	1500 kc	antenna clip	200 mmfd mica condenser	osc. #7
4	BC	BC	600 kc	600 kc	antenna clip	200 mmfd mica condenser	rock-in for max. reading with padder #8
5	Repeat Step No. 3						

Alignment should be attempted only if a low range A.C. meter, a signal generator, and insulated alignment tools are at your disposal. The A.C. meter is used as an output meter. The signal generator must cover a frequency range from 450 kc to 24 mc.

It is essential that the signal generator be connected to the points indicated in the alignment chart through the proper dummy antenna.

A good ground connection, secured between the groundpost of the signal generator and the chassis, is necessary.

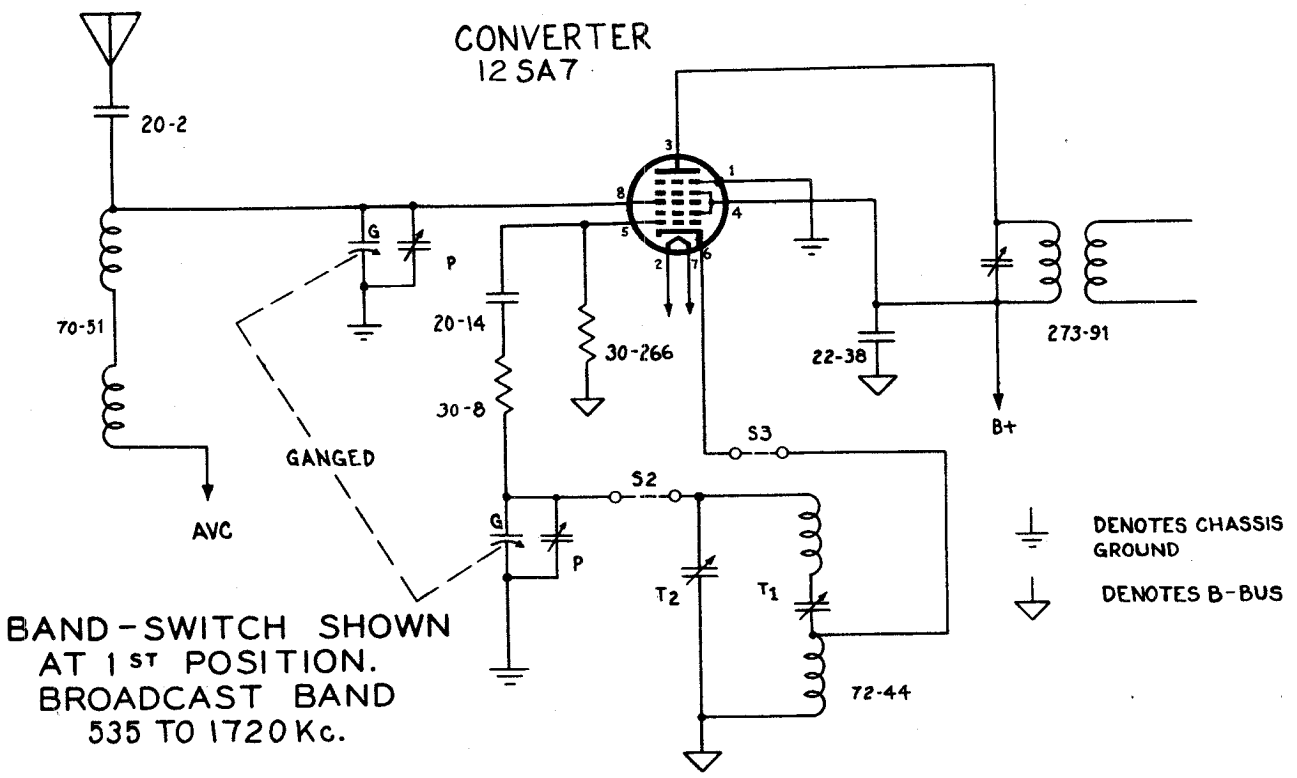
The output of the signal generator must always be kept at its lowest possible value. This is to prevent the automatic volume control of the receiver from interfering with accurate alignment.

During alignment, the line voltage feeding the receiver power supply should be kept at approximately 117 volts.

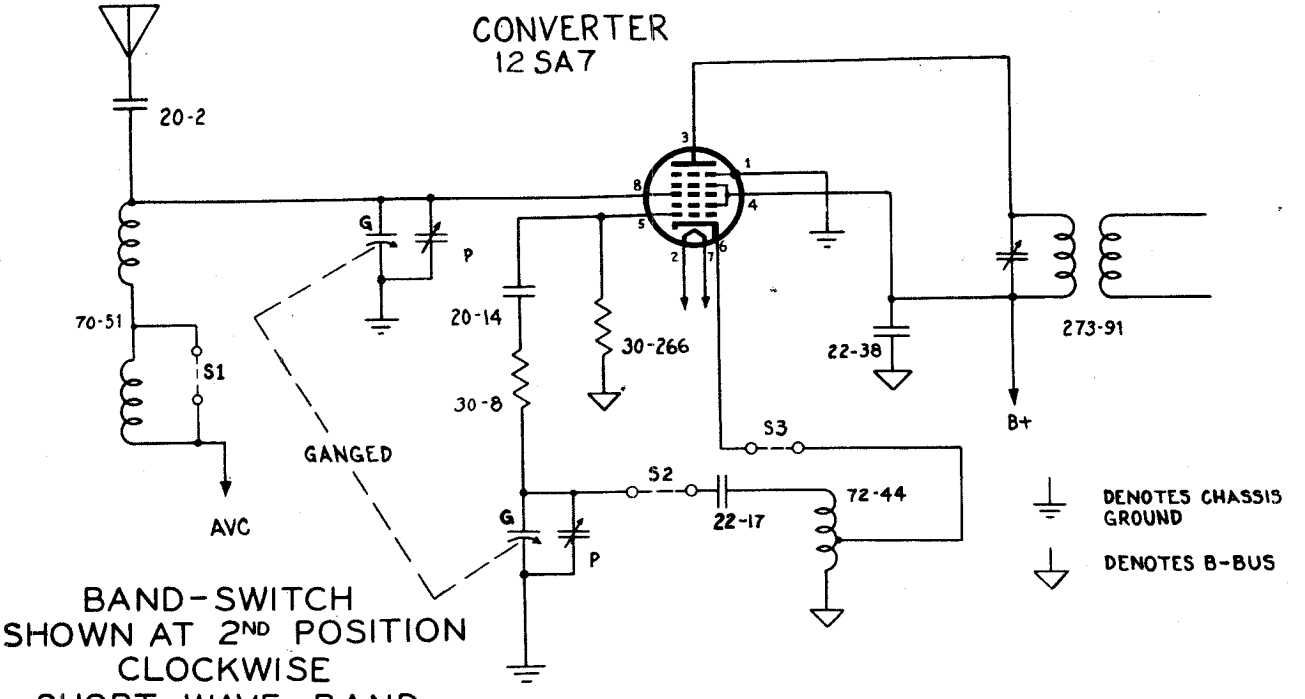
The locations of adjustment screws are indicated clearly on the schematic diagram. Alignment adjustments should be made only in the sequence given in the chart.

For all alignments, connect the outputmeter across the voice coil. With the volume control turned fully clockwise, tune for a maximum reading.

PILOT RADIO CORP.



BAND-SWITCH SHOWN AT 1ST POSITION.
BROADCAST BAND
535 TO 1720 Kc.



BAND-SWITCH SHOWN AT 2ND POSITION CLOCKWISE
SHORT WAVE BAND
5.6 TO 24.0 Mc.

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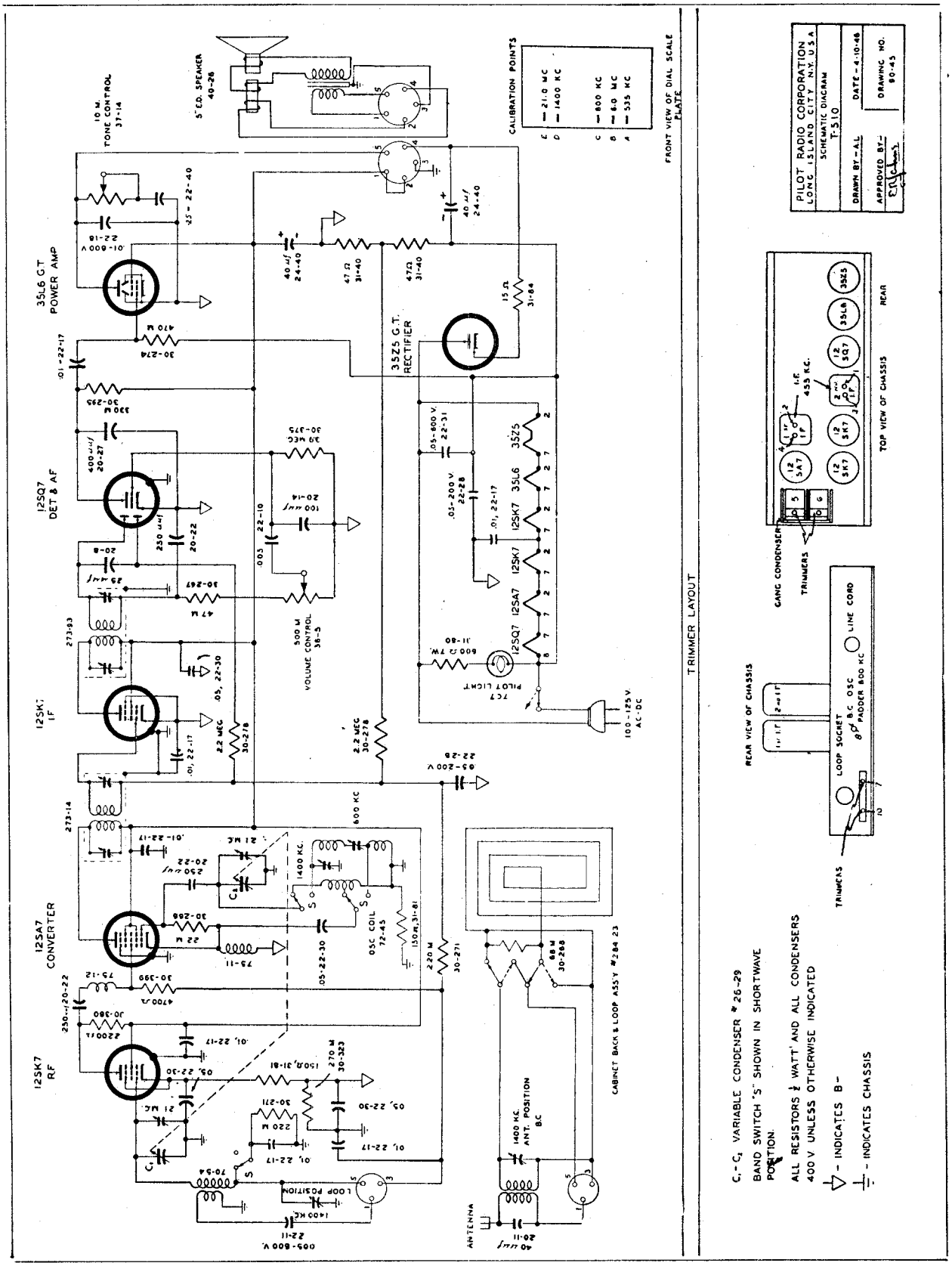
PILOT RADIO CORP.



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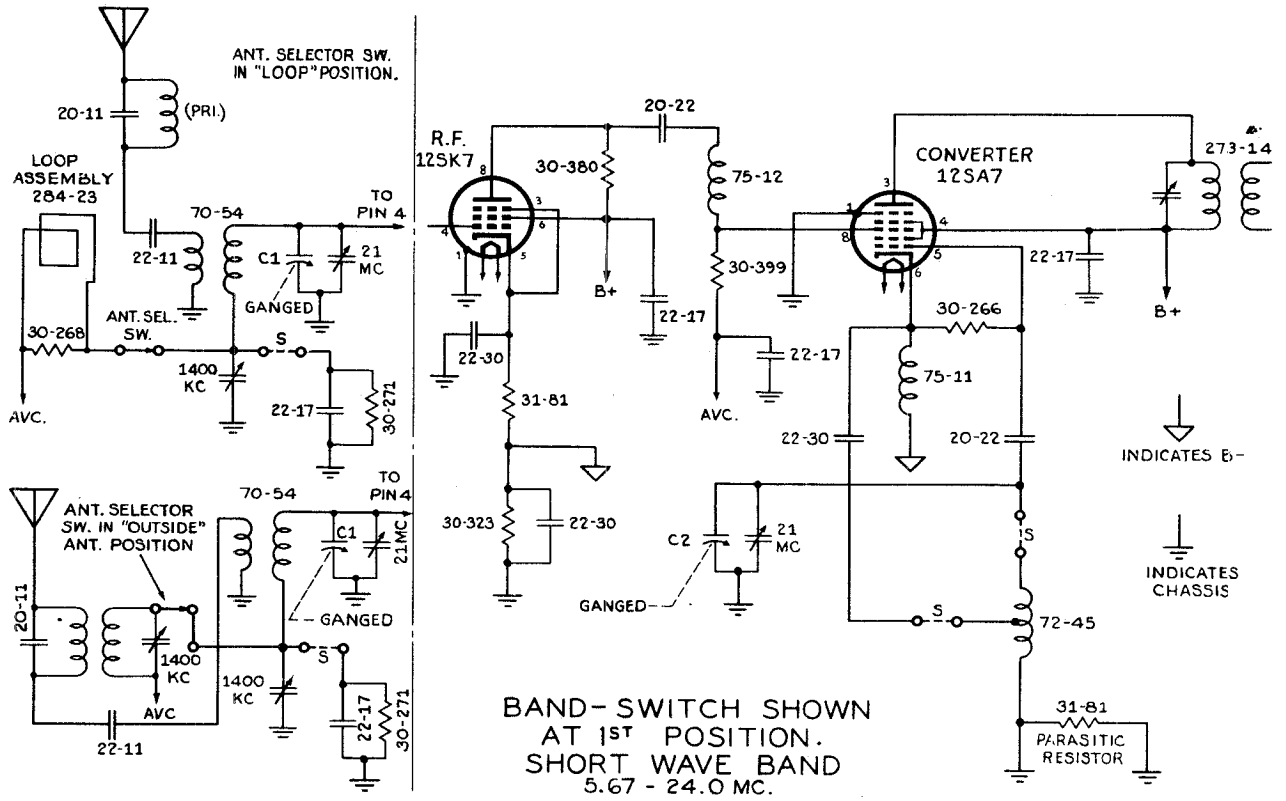
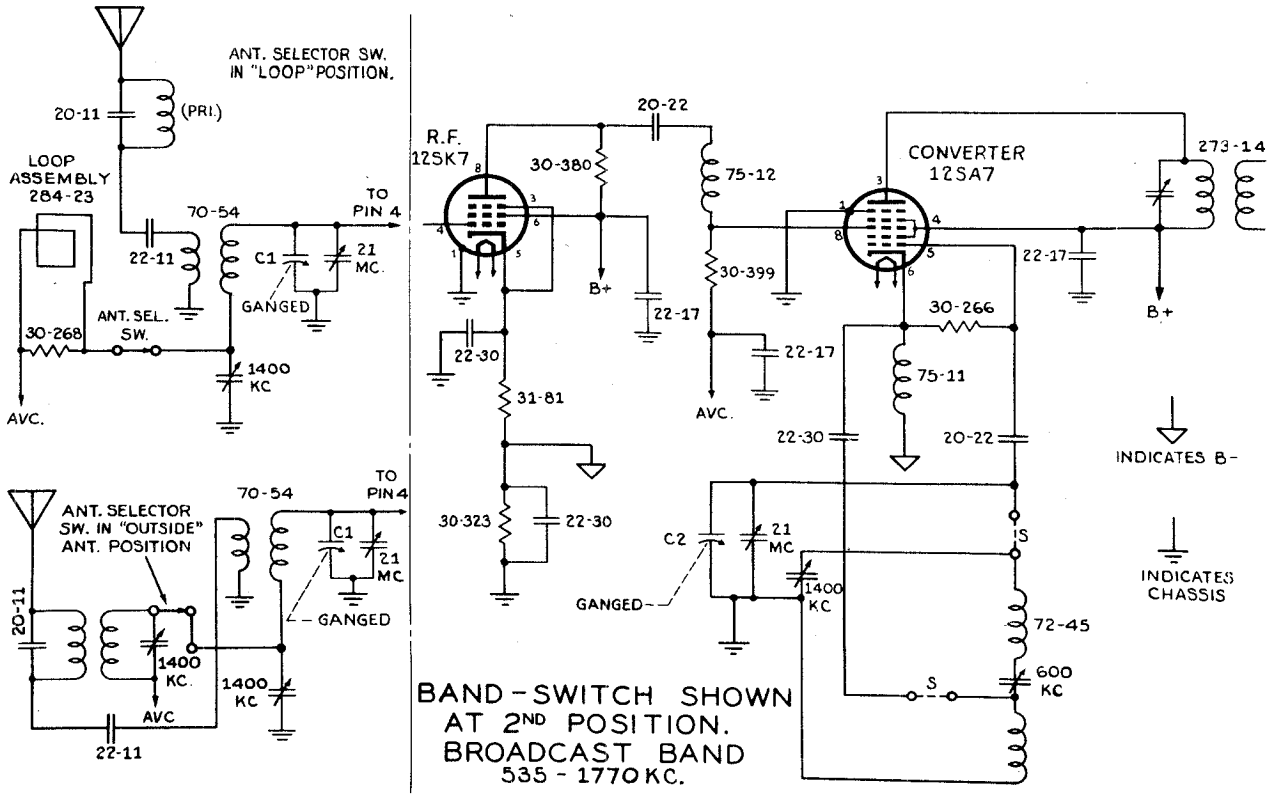
"clarified schematics"

MODEL T-511

PILOT RADIO CORP.



BAND-SWITCH SHOWN AT 1ST POSITION.
SHORT WAVE BAND
5.67 - 24.0 MC.



BAND-SWITCH SHOWN AT 2ND POSITION.
BROADCAST BAND
535 - 1770 KC.

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Alignment should be attempted only if a low range A.C. meter, a signal generator, and insulated alignment tools are at your disposal. The A.C. meter is used as an outputmeter. The signal generator must cover a frequency range from 450 kc to 24 mc.

It is essential that the signal generator be connected to the points indicated in the alignment chart through the proper dummy antenna.

A good ground connection, secured between the groundpost of the signal generator and the chassis, is necessary.

The output of the signal generator must always be kept at its lowest possible value. This is to prevent the automatic volume control of the receiver from interfering with accurate alignment.

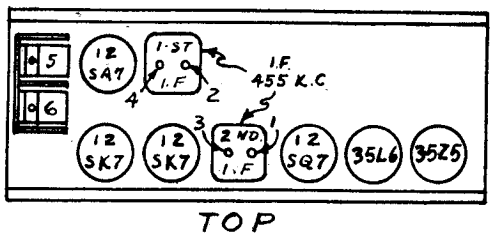
During alignment, the line voltage feeding the receiver power supply should be kept at approximately 117 volts.

The locations of adjustment screws are indicated clearly on the schematic diagram. Alignment adjustments should be made only in the sequence given in the chart.

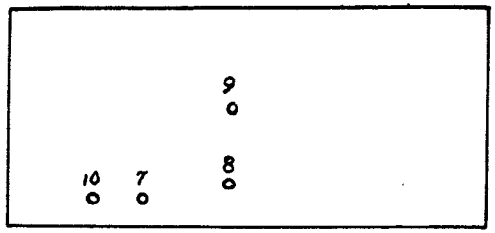
For all alignments, connect the outputmeter across the voice coil. With the volume control turned fully clockwise, tune for a maximum reading.

ALIGNMENT CHART

STEP	CIRCUIT ALIGNED	RECEIVER		SIGNAL GENERATOR		DUMMY ANTENNA	ADJUSTMENTS (All maximum output)
		BAND SWITCH	DIAL POINTER	FREQUENCY	CONNECTION		
1	IF	BC	Low end of dial	455 KC	Grid of 12SK7 RF	0.1 mfd.	#1, 2, 3, 4
2	SW	SW	E	21 MC	Antenna Post	400 ohm carbon resistor	First #5 Then #6
3	BC	BC	D	1400 KC	Antenna Post	200 mmfd. mica capacitor	#7
4	BC	BC	C	600 KC	Antenna Post	200 mmfd. mica capacitor	#8
5	Repeat steps 3 and 4						
6	BC	BC	Set for broadcast station near 1400 KC			———	#9 and #10



TOP

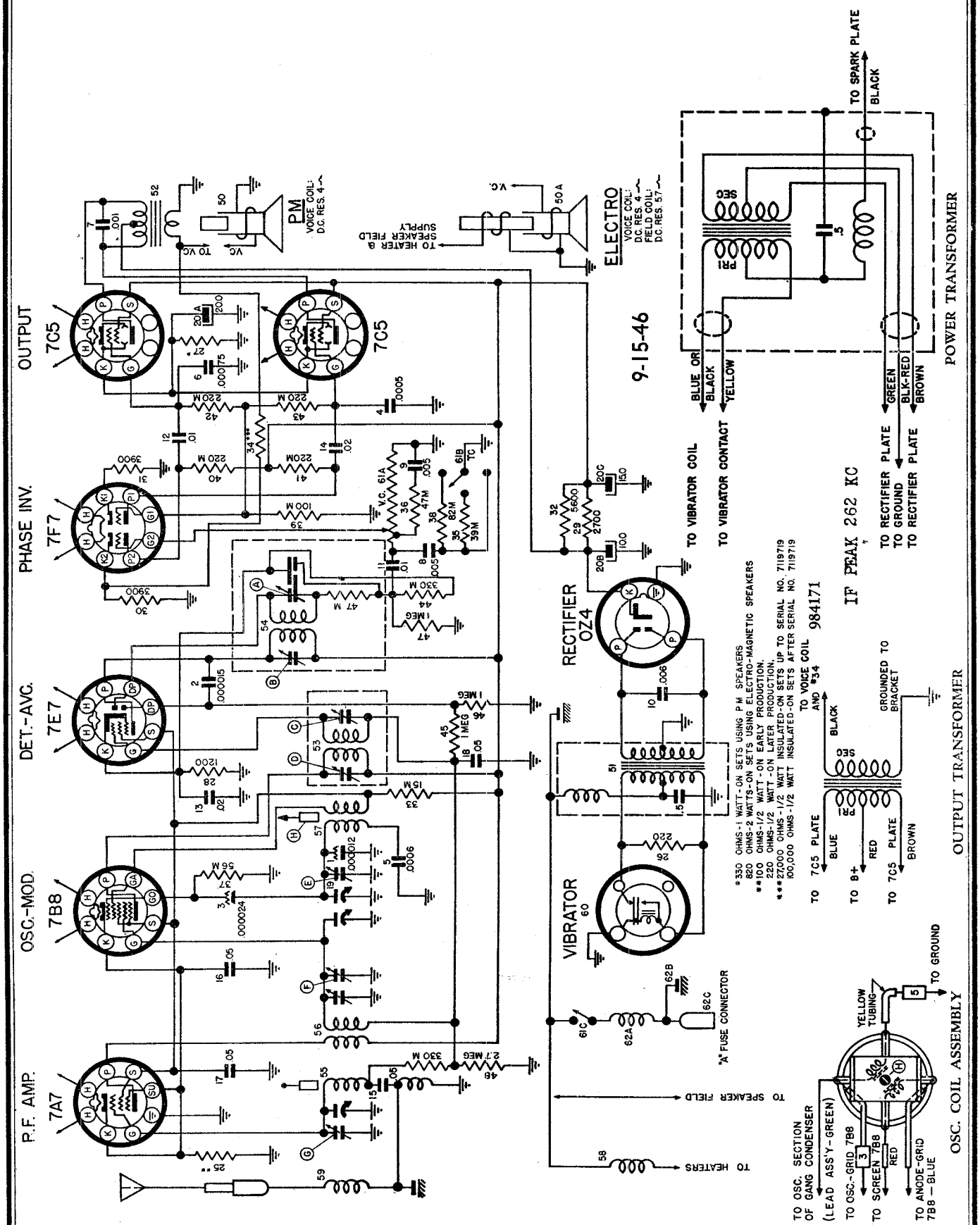


BACK

E — 21.0 MC
D — 1400 KC
C — 600 KC
B — 6.0 MC
A — 535 KC

MODEL 984171

PONTIAC DIV.-GENERAL MOTORS



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ALIGNMENT PROCEDURE

Volume Control Maximum; Tone Control on Treble.

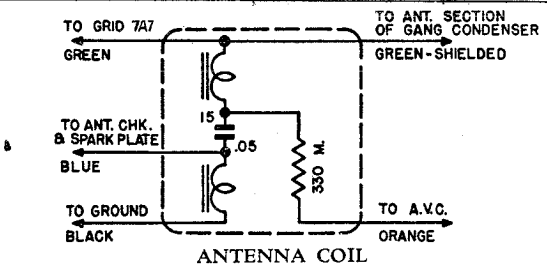
Signal generator output minimum for satisfactory output indication.

Series Condenser Or Dummy-Antenna	Connect To	Signal Generator Frequency	Adjust Screws In Order
0.1 Mfd.	Grid Side of R. F. Trimmer F1	262 K. C.	A B C D
.000070 Mfd.	Antenna Connector	1615 K. C.	E
.000070 Mfd.	Antenna Connector	1430 K. C.	F G
.000070 Mfd.	Antenna Connector	600 K. C.	H
.000070 Mfd.	Antenna Connector	1615 K. C.	E
.000070 Mfd.	Antenna Connector	1430 K. C.	F G

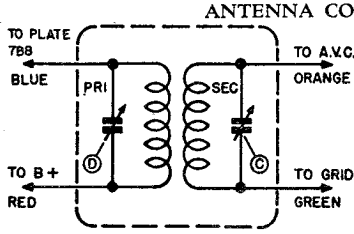
Adjust trimmer G to match car antenna (1430 K. C.) when radio is installed.

SPECIAL INSTRUCTIONS

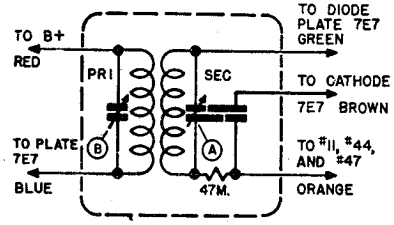
Rock gang condenser back and forth through signal during 600 K. C. adjustment of screw H.



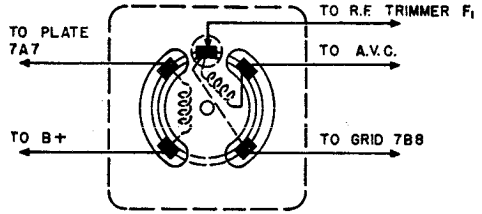
ANTENNA COIL



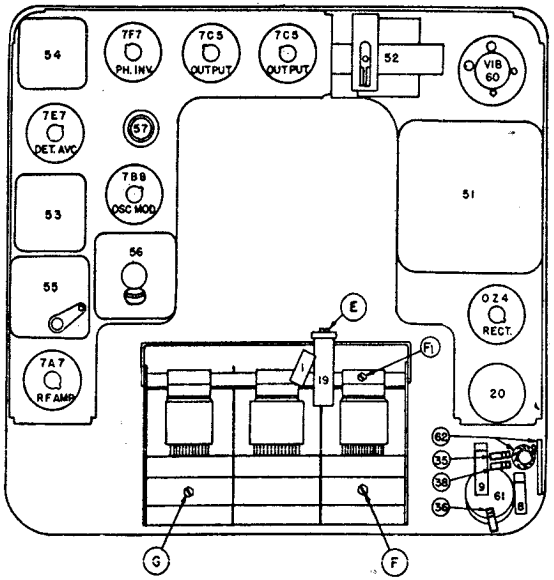
FIRST I. F. TRANSFORMER



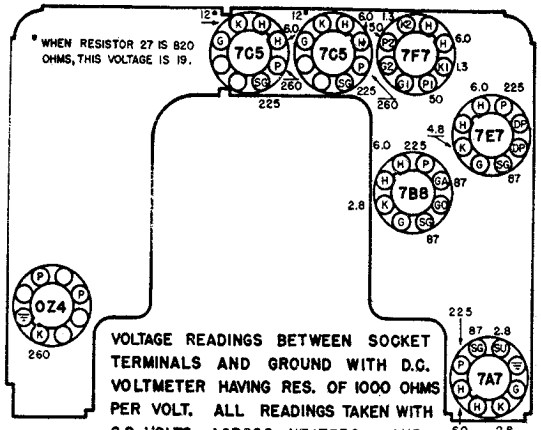
SECOND I. F. TRANSFORMER



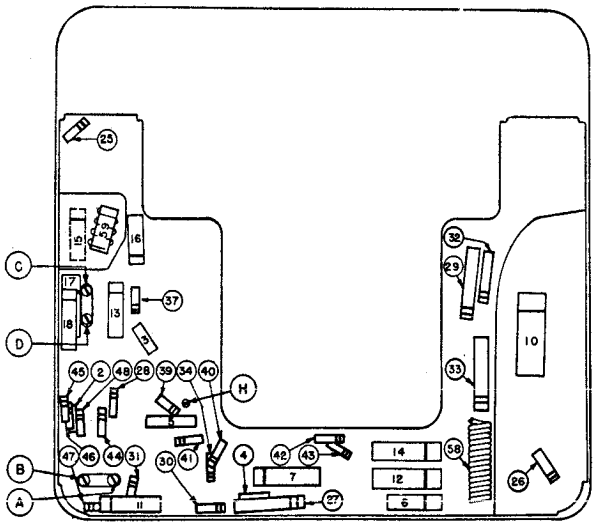
R. F. COIL



PARTS LAYOUT — TUBE VIEW

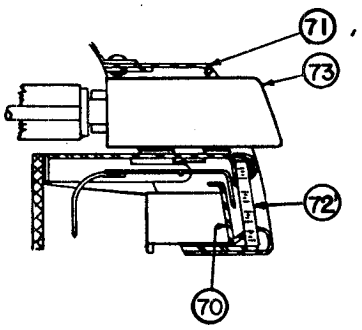

* WHEN RESISTOR 27 IS 820 OHMS, THIS VOLTAGE IS 19.
7C5
7C5
7F7
7E7
7B8
0Z4
7A7
VOLTAGE READINGS BETWEEN SOCKET TERMINALS AND GROUND WITH D.C. VOLTMETER HAVING RES. OF 1000 OHMS PER VOLT. ALL READINGS TAKEN WITH 6.0 VOLTS ACROSS HEATERS. CURRENT DRAIN WITH SPEAKER AND DIAL LIGHT 7.1 AMPERES. "B" SUPPLY DRAIN 55 M.A. TOLERANCE ON VOLTAGES ± 10%.

TUBE SOCKET VOLTAGE CHART

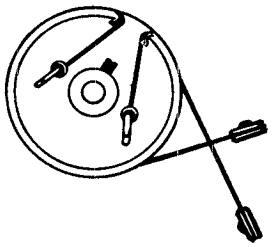


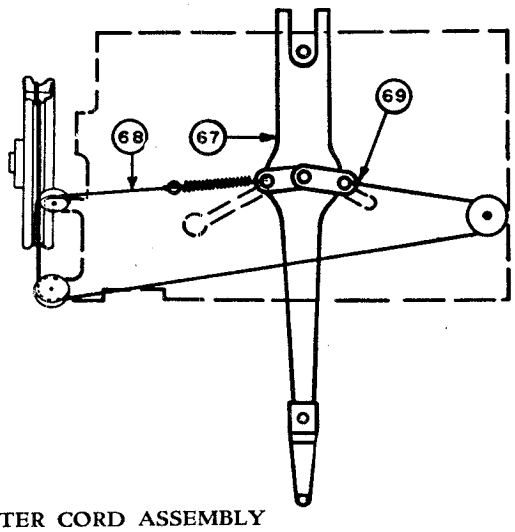
PARTS LAYOUT — CHASSIS VIEW

PONTIAC DIV.-GENERAL MOTORS



ESCUTCHEON CROSS SECTION

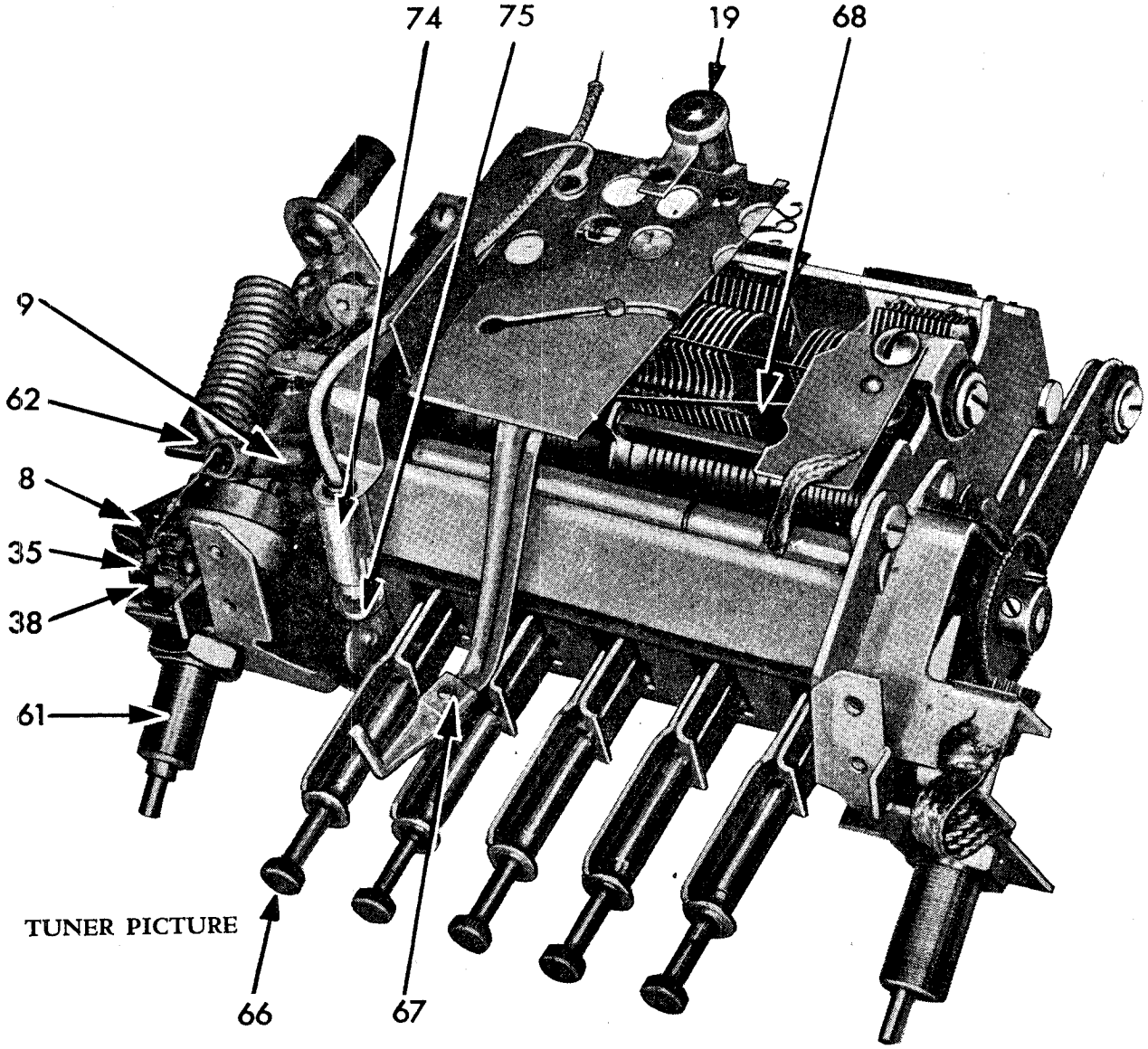




POINTER CORD ASSEMBLY

PUSH BUTTON SET-UP

Release holding spring in bottom of button, pull button off. Loosen reset screw, and tune in desired station while holding reset screw in tight. Release and tighten reset screw. Replace push button.



TUNER PICTURE

©John F. Rider

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Illus. No.	Service Part No.	Description
		CONDENSERS
1	7242450	.000012 Mfd.—Compensating (Included in Tuner Assy. Part #7253169)
2	7238891	.000015 Mfd.—Molded
3	7236178	.000024 Mfd.—Compensating (Included in Osc. Coil Assy. #7242527)
4	1207636	.0005 Mfd.—Molded
5	7236156	.000600 Mfd.—Silver Mica (Included in Osc. Coil Assy. #7242527)
6	7240738	.000750 Mfd.—400 V. Tubular
7	7240905	.001 Mfd. 1600 V. Tubular
8	7230912	.005 Mfd. 600 V. Tubular (Included in Tuner Assy. Part #7253169)
9	7230912	.005 Mfd. 600 V. Tubular (Included in Tuner Assy. Part #7253169)
10	7240906	.006 Mfd. 1600 V. Tubular
11	1208600	.01 Mfd. 600 V. Tubular
12	1208600	.01 Mfd. 600 V. Tubular
13	1212099	.02 Mfd. 600 V. Tubular
14	1212099	.02 Mfd. 600 V. Tubular
15	7236350	.05 Mfd. 200 V. Tubular (Included in Ant. Coil Assy. Part #7242504)
16	7230592	.05 Mfd. 600 V. Tubular
17	7230592	.05 Mfd. 600 V. Tubular
18	7230592	.05 Mfd. 600 V. Tubular
19	7242317	Oscillator Air Trimmer (Included in Tuner Assy. Part #7253169)
20	7238830	Electrolytic—3 Section
20A		20 Mfd. 25 V.
20B		10 Mfd. 400 V.
20C		15 Mfd. 400 V.
		RESISTORS
25	1213217	100 Ohms ½ W. Insulated
25A	7237835	220 Ohms ½ W. Insulated (Used on Later Sets)
26	7237994	220 Ohms 1 W. Insulated
27	7233773	330 Ohms 1 W. Insulated (Utilized in Receivers Using PM Speakers)
27A	7254127	820 Ohms 2 W. Insulated (Utilized in Receivers Using Electro-Magnetic Speakers)
28	1213236	1,200 Ohms ½ W. Insulated
29	7242844	2,700 Ohms 2 W. Insulated
30	1214546	3,900 Ohms ½ W. Insulated
31	1214546	3,900 Ohms ½ W. Insulated
32	7240918	5,600 Ohms 1 W. Insulated
33	7233653	15,000 Ohms 2 W. Insulated
34	1214551	27,000 Ohms ½ W. Insulated (Used on Sets Up To Ser. #7119719)
34A	1213270	100,000 Ohms ½ W. Insulated (Used on Sets After Ser. #7119719)
35	1213480	39,000 Ohms ½ W. Insulated (Included in Tuner Assy. Part #7253169)
36	1214553	47,000 Ohms ½ W. Insulated (Included in Tuner Assy. Part #7253169)
37	1213267	56,000 Ohms ½ W. Insulated
38	1214554	82,000 Ohms ½ W. Insulated (Included in Tuner Assy. Part # 7253169)
39	1213270	100,000 Ohms ½ W. Insulated
40	1214555	220,000 Ohms ½ W. Insulated
41	1214555	220,000 Ohms ½ W. Insulated
42	1214555	220,000 Ohms ½ W. Insulated
43	1214555	220,000 Ohms ½ W. Insulated
44	1214557	330,000 Ohms ½ W. Insulated
45	1213282	1 Megohm ½ W. Insulated
46	1213282	1 Megohm ½ W. Insulated
47	1213282	1 Megohm ½ W. Insulated
48	7241614	2.7 Megohm ½ W. Insulated

TUBE COMPLEMENT

1213562	7A7	R. F. Amplifier
1213567	7B8	Oscillator - Modulator
1213802	7E7	Detector, A. V. C. and I. F. Amplifier
1213979	7F7	Phase Inverter
1213568	7C5	Push-Pull Output
1211924	0Z4	Rectifier

Illus. No.	Service Part No.	Description
		MISCELLANEOUS ELECTRICAL PARTS
50	7241120	8" PM Speaker
50A	7242532	8" Electro-Magnetic Speaker
51	7255881	Power Transformer Assembly Complete
52	7240453	Output Transformer Assembly
53	7242079	First I. F. Transformer Assembly Complete
54	7242533	Second I. F. Transformer Assembly Complete
55	7242504	Antenna Coil Assembly Complete (Includes Illus. #15)
56	7242506	R. F. Coil Assembly Complete
57	7242527	Oscillator Coil Assembly Complete (Includes Illus. #3 and 5)
58	7241708	"A" Filter Choke
59	7255738	Antenna Series Choke Assembly
60	8638	Vibrator—Non-Synchronous
61	7242017	*Volume, Tone Control & Switch
62	7240797	*Spark Plate & "A" Connector Assembly
	7241179	*Volume Control Cable
	7239475	Antenna Connector Socket
	7241356	Loktal Base Tube Socket
	7236279	Octal Base Tube Socket
	7233944	Vibrator Socket
		TUNER UNIT & ESCUTCHEON PARTS
	7253169	Tuner & Dual Control Assembly Complete
66	7240368	Reset Screw Assembly
67	7242090	Pointer, Tip & Guide Pin Assembly
68	7244082	Cord & Spring Assembly
69	7244083	Cord & Rivet Assembly
70	7253147	Backplate Assembly
71	7253151	Escutcheon Assembly Complete (Includes Dial Glass)
72	7253135	Calibrated Dial
73	7242136	Pushbutton with Spring
74	7241216	Dial Light Assembly (Includes Bulb)
75	115273	Dial Light Bulb
61	7242017	Volume, Tone Control & Switch
62	7240797	Spark Plate & "A" Connector
38	1214554	Resistor 82,000 Ohms ½ W. Insulated
36	1214553	Resistor 47,000 Ohms ½ W. Insulated
35	1213480	Resistor 39,000 Ohms ½ W. Insulated
19	7242317	Oscillator Air Trimmer
9	7230912	Condenser .005 Mfd. 600 V. Tubular
8	7230912	Condenser .005 Mfd. 600 V. Tubular
1	7242450	Condenser .000012 Mfd. Compensating
	7241179	Volume Control Cable
		MOUNTING AND INSTALLATION PARTS
	1879777	Generator Condenser
	1207821	Distributor Suppressor
	1853686	Suppressor Adapter
	147685	Fuse
	1882758	Ammeter Condenser
	5273906	"A" Lead Assembly
	508583	Plate - Radio Control
	507505	Knob - Tuning Control
	507511	Knob - Tone Control
	507510	Knob - Dummy

*Included in Tuner Part #7253169)

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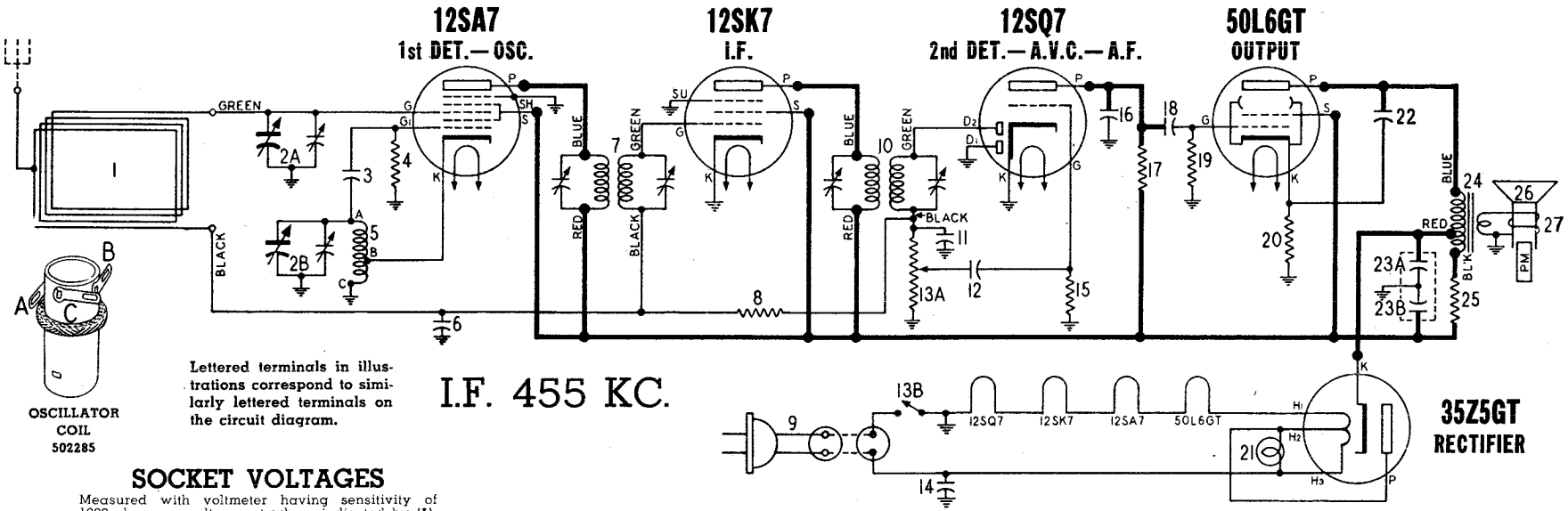


OSCILLATOR COIL 502285

Lettered terminals in illustrations correspond to similarly lettered terminals on the circuit diagram.

I.F. 455 KC.

SOCKET VOLTAGES

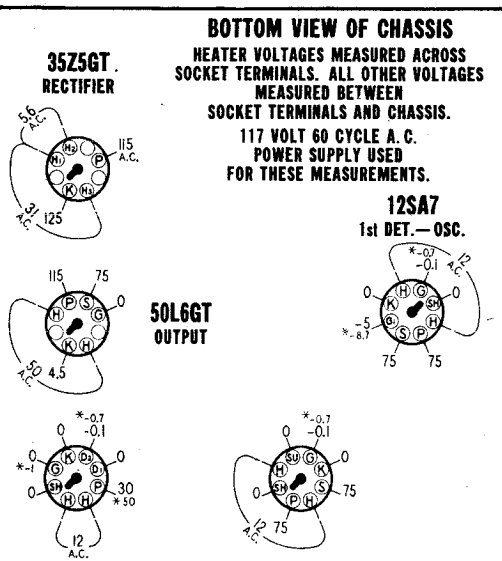
Measured with voltmeter having sensitivity of 1000 ohms per volt except where indicated by (*).

VOLUME ON FULL WITH NO SIGNAL DIAL TUNED TO 540 KC.

BOTTOM VIEW OF CHASSIS

HEATER VOLTAGES MEASURED ACROSS SOCKET TERMINALS. ALL OTHER VOLTAGES MEASURED BETWEEN SOCKET TERMINALS AND CHASSIS.

117 VOLT 60 CYCLE A. C. POWER SUPPLY USED FOR THESE MEASUREMENTS.



REAR OF CHASSIS

—Measured with vacuum tube voltmeter.

PARTS LIST

DIAGRAM NO.	PART NO.	DESCRIPTION	LIST PRICE
		CONDENSERS	
2-A, B	500225	Condenser—variable gang (with drum)	$
3	502159	Condenser—mica 50 Mmfd. 500 volt	
6	502157	Condenser—.05 Mfd. 400 volt	
11	502271	Condenser—mica 260 Mmfd. 500 volt	
12	502260	Condenser—.002 Mfd. 600 volt	
14	502157	Condenser—.05 Mfd. 400 volt	
16	502271	Condenser—mica 260 Mmfd. 500 volt	
18	502261	Condenser—.01 Mfd. 600 volt	
22	502261	Condenser—.01 Mfd. 600 volt	
23-A, B	500256	Condenser—electrolytic A—40 Mfd. 150 volt B—20 Mfd. 150 volt	
		RESISTORS	
4	502130	Resistor—carbon 22,000 ohms ¼ watt	
8	502135	Resistor—carbon 2.2 Meg. ¼ watt	
13-A, B	500223	Volume control—with switch; 1 Meg.	
15	502136	Resistor—carbon 10 Meg. ¼ watt	
17	502133	Resistor—carbon 220,000 ohms ¼ watt	
19	502134	Resistor—carbon 470,000 ohms ¼ watt	
20	502270	Resistor—wire wound 150 ohms 1 watt	
25	502265	Resistor—carbon 2,000 ohms 1 watt	
		COILS AND TRANSFORMERS	
1	500288	Loop antenna	
5	502285	Coil—oscillator	
7	502284	Transformer—1st I.F.	
10	502283	Transformer—2nd I.F.	
24	500360	Transformer—output for C-500257 speaker	
		OTHER ELECTRICAL PARTS	
9	500298	Line cord with plugs	
21	118921	Lamp—dial (Mazda 47) 6-8V. 150 Ma.	
26	500361	Cone and voice coil for C-500257 speaker	
27	500257	Speaker—P.M. dynamic (4 inch)	

DIAGRAM NO.	PART NO.	DESCRIPTION	LIST PRICE
		MISCELLANEOUS PARTS	
	130026	Base for mtg. electrolytic condenser	$
	502486	Cabinet—walnut (Model PB-520)	
	502489	Cabinet—ivory (Model PA-510)	
	112745	Clip—coil mtg.	
	114955	Clip—retainer on end of dial cord	
	502480	Clip—for mtg. handle	
	502481	Clip—for mtg. escutcheon	
	117057	Cord—dial drive (26 in. required)	
	500258	Dial scale	
	502482	Escutcheon—ivory (Model PB-520)	
	502484	Escutcheon—gold (Model PA-510)	
	502483	Handle—ivory (Model PB-520)	
	502485	Handle—gold (Model PA-510)	
	500287	Knob—ivory (Model PB-520)	
	500639	Knob—gold (Model PA-510)	
	500297	Plug button for line cord receptacle	
	500218	Pointer	
	81145	Retaining ring for tuning shaft	
	119087	Ring for dial cord	
	500216	Shaft—tuning control	
	116690	Socket—octal base	
	500291	Socket—for line cord (with leads)	
	500499	Socket—dial lamp (with leads)	
	161384	Spring—dial cord tension	
	111456	Washer—spring washer for tuning shaft	
	500219	Window—dial	

PRICES SUBJECT TO CHANGE WITHOUT NOTICE

MODELS PA-510, Ch. 9008-A, PB-520, Ch. 9008-B

PORTO-SERVER INC.

Remove chassis and loop from cabinet. Reconnect both leads to loop and space it approximately same distance from chassis as when installed in cabinet.

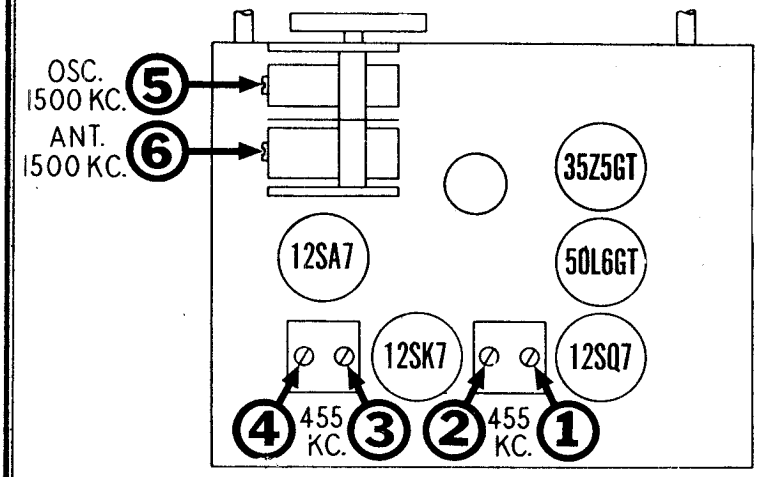
With the gang condenser fully meshed, dial pointer should be in the position indicated by the last division below 55 on the dial. If it is set incorrectly, release pointer clip on dial cord and reposition pointer.

Connect an output meter across the speaker voice coil or from the plate of the 50L6GT tube to chassis through a .1 Mfd. condenser.

Connect the ground lead of the signal generator to the receiver chassis through a .25 Mfd. condenser.

Set volume control at maximum volume position and use a weak signal from the signal generator.

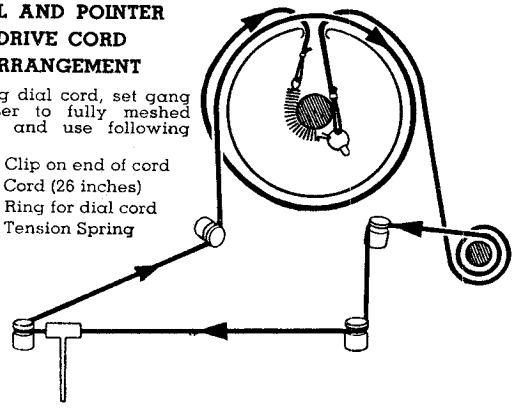
DUMMY ANT. IN SERIES WITH SIGNAL GENERATOR	CONNECT HIGH SIDE OF GENERATOR TO	SIGNAL GENERATOR FREQUENCY	RECEIVER DIAL SETTING	TRIMMER NUMBER	TRIMMER DESCRIPTION	TYPE OF ADJUSTMENT
200 MMFD. Mica Condenser	Lug on trimmer No. 6 on rear section of gang (see figure below for location of trimmer.)	455 KC	Any point where it does not affect the signal.	1 - 2	2nd I.F.	Adjust for maximum output. Then repeat adjustment.
				3 - 4	1st I.F.	
200 MMFD. Mica Condenser	External antenna lead on loop.	1500 KC	1500 KC	5	Broadcast Oscillator	Adjust for maximum output.
200 MMFD. Mica Condenser	External antenna lead on loop.	1500 KC	Tune to 1500 KC generator signal.	6	Broadcast Antenna	Adjust for maximum output.



DIAL AND POINTER DRIVE CORD ARRANGEMENT

To string dial cord, set gang condenser to fully meshed position and use following parts:

114955 Clip on end of cord
117057 Cord (26 inches)
119087 Ring for dial cord
161284 Tension Spring

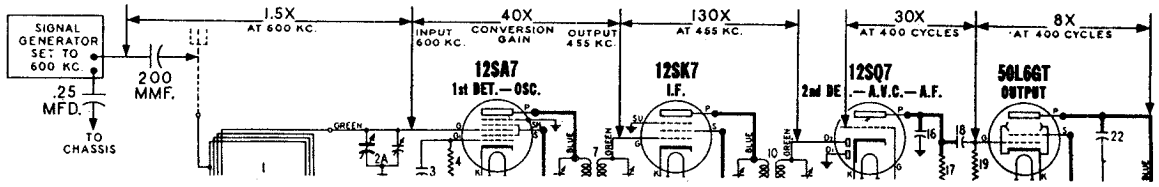


APPROXIMATE STAGE GAIN DATA

Be sure R.F. and I.F. stages are accurately aligned before measuring gain. R.F. gains can be measured with a "channel" type instrument containing a tuned and calibrated R.F. amplifier. A vacuum tube voltmeter may be used for audio gain measurements. Observe following precautions:

1. For all gain measurements connect signal generator as shown. Use 600 KC signal with 400 cycles modulation (use nearby frequency if local station interferes.)
2. For R.F. and I.F. measurements connect negative terminal of a 3-volt battery (two 1½ volt cells in series) to A.V.C. lead and positive terminal to chassis. This provides a definite operating point.
3. Be sure radio is carefully tuned to generator signal (use weak signal for sharp tuning.)
4. When using a "channel" type instrument carefully tune it for maximum output at desired frequency before making measurements.

The R.F. and I.F. stage gains shown below are less than under normal operating conditions due to the use of 3 volts fixed bias in order to establish a definite operating point. Therefore, these values are not intended to indicate the full capability of a stage.



Differences in tube characteristics, tolerance of parts, adjustment of tuned circuits, and variations of line voltage will influence stage gain. Accuracy of measurements is dependent upon careful tuning of receiver to generator signal and experience in using your test equipment. These factors may create considerable variation in gain measurements.

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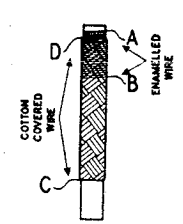
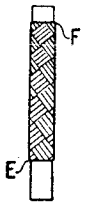
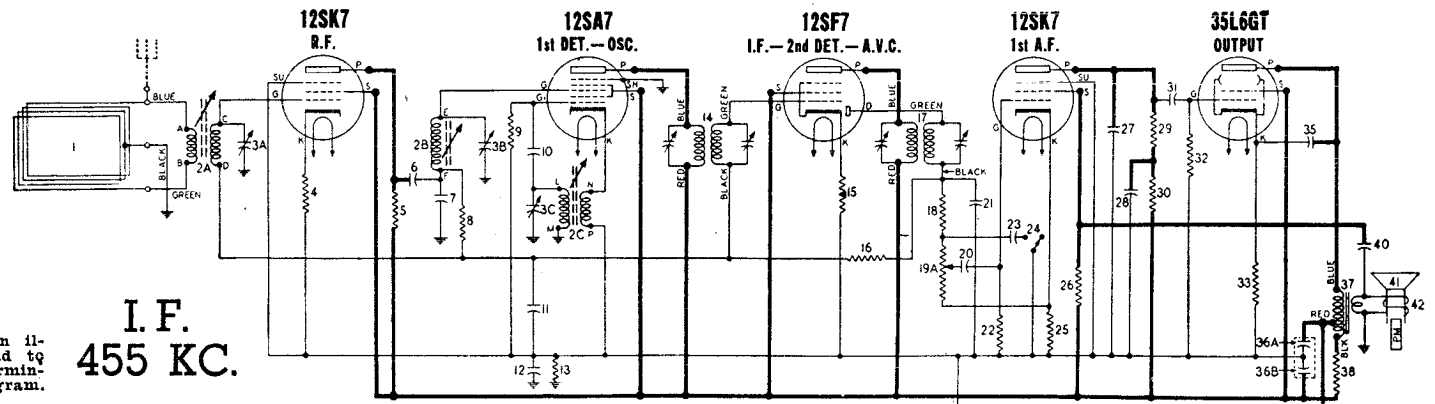


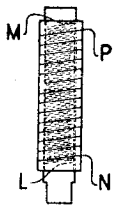
ANTENNA COUPLING COIL
504210



R.F. COIL
504214



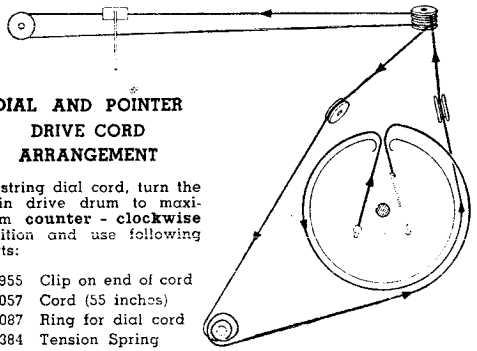
I.F. 455 KC.



OSCILLATOR COIL
504212

SLUG CORES FOR COILS
ANT.—504211
R.F.—504215
OSC.—504213

Lettered terminals in illustrations correspond to similarly lettered terminals on the circuit diagram.



DIAL AND POINTER DRIVE CORD ARRANGEMENT

To string dial cord, turn the main drive drum to maximum **counter - clockwise** position and use following parts:

114955	Clip on end of cord
117057	Cord (55 inches)
119087	Ring for dial cord
161384	Tension Spring

SOCKET VOLTAGES

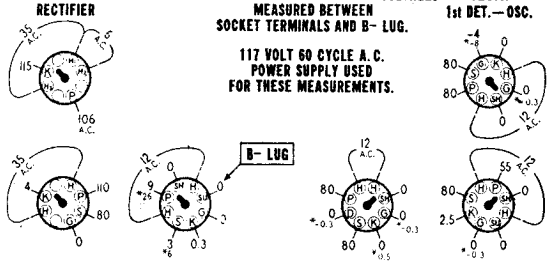
Measured with voltmeter having sensitivity of 1000 ohms per volt except where indicated by (*).

VOLUME ON FULL WITH NO SIGNAL — DIAL TUNED TO 540 KC.

BOTTOM VIEW OF CHASSIS

HEATER VOLTAGES MEASURED ACROSS SOCKET TERMINALS. ALL OTHER VOLTAGES MEASURED BETWEEN SOCKET TERMINALS AND B- LUG.

117 VOLT 60 CYCLE A.C. POWER SUPPLY USED FOR THESE MEASUREMENTS.



REAR OF CHASSIS

Measured with vacuum tube voltmeter

PARTS LIST

DIAGRAM NO.	PART NO.	DESCRIPTION	LIST PRICE
		CONDENSERS	
3-A, B, C	504086	Condenser—trimmer assembly A—20 to 270 Mmfd. B—40 to 370 Mmfd. C—40 to 370 Mmfd.	$1.10
6	502271	Condenser—mica 260 Mmfd. 500 volt	.30
7	502165	Condenser—mica 1,000 Mmfd. 500 volt	.45
10	502159	Condenser—mica 50 Mmfd. 500 volt	.24
11	502155	Condenser—.1 Mfd. 200 volt	.30
12	502158	Condenser—.2 Mfd. 400 volt	.36
20	502453	Condenser—.002 Mfd. 400 volt	.20
21	502160	Condenser—mica 110 Mmfd. 500 volt	.24
23	502470	Condenser—.0008 Mfd. 400 volt	.20
27	502160	Condenser—mica 110 Mmfd. 500 volt	.24
28	502153	Condenser—.05 Mfd. 200 volt	.24
31	502156	Condenser—.004 Mfd. 400 volt	.20
35	502151	Condenser—.01 Mfd. 400 volt	.20
36-A, B	500256	Condenser—electrolytic A—40 Mfd. 150 volt B—20 Mfd. 150 volt	1.50
40	502152	Condenser—.02 Mfd. 400 volt	.24
43	502157	Condenser—.05 Mfd. 400 volt	.24
		RESISTORS	
4	502140	Resistor—carbon 390 ohms ¼ watt	.12
5	502291	Resistor—carbon 4700 ohms ¼ watt	.12
8	502134	Resistor—carbon 470,000 ohms ¼ watt	.12
9	502130	Resistor—carbon 22,000 ohms ¼ watt	.12
13	502133	Resistor—carbon 220,000 ohms ¼ watt	.12
15	502264	Resistor—carbon 47 ohms ¼ watt	.12
16	502269	Resistor—carbon 3.3 Meg. ¼ watt	.12
18	502131	Resistor—carbon 47,000 ohms ¼ watt	.12
19-A, B	502145	Volume control 500,000 ohms (with switch)	1.25
22	502136	Resistor—carbon 10 Meg. ¼ watt	.12
25	502128	Resistor—carbon 2200 ohms ¼ watt	.12
26	502135	Resistor—carbon 2.2 Meg. ¼ watt	.12
29, 30	502133	Resistor—carbon 220,000 ohms ¼ watt	.12
32	502134	Resistor—carbon 470,000 ohms ¼ watt	.12
33	502138	Resistor—carbon 130 ohms ¼ watt	.12
38	502469	Resistor—carbon 1500 ohms 1 watt	.16
39	502574	Resistor—carbon 33 ohms ½ watt	.12
		COIL & TRANSFORMERS	
1	502246	Loop antenna	2.90
2-A, B, C	504096	Tuning unit; complete assembly	10.80
2-A	504210	Coil—antenna (less slug)	1.20
2-B	504214	Coil—R.F. (less slug)	.85
2-C	504212	Coil—oscillator (less slug)	1.05
	504211	Slug core for Ant. coil (yellow end)	.45
	504213	Slug core for Osc. coil (white end)	.45
	504215	Slug core for R.F. coil (purple end)	.45

DIAGRAM NO.	PART NO.	DESCRIPTION	LIST PRICE
14	502102	Transformer—1st I.F.	$2.30
17	502103	Transformer—2nd I.F.	2.30
37	502213	Transformer—output (for R-502998 spkr.)	2.50
	502904	Transformer—output (for A-502998 spkr.)	2.50
	504244	Transformer—output (for W-502998 spkr.)	2.50
		OTHER ELECTRICAL PARTS	
24	500546	Switch—tone control	.84
34	502473	Lamp—dial (Mazda 47) 6-8V. 150 Ma.	.22
41	502214	Cone & voice coil for R-502998 spkr.	2.00
	502903	Cone & voice coil for A-502998 spkr.	2.00
	504245	Cone & voice coil for W-502998 spkr.	2.00
42	502998	Speaker—P.M. dynamic (5 inch)	6.60
		MISCELLANEOUS PARTS	
	502185	Back for cabinet	.30
	116467	Base for mtg. electrolytic condenser	.04
	502232	Cabinet—ivory (Model PF-611)	5.00
	502234	Cabinet—mahogany (Model PE-610)	4.65
	500261	Clamp—dial scale mtg.	.02
	500497	Clip—retainer for cabinet back	.02
	114955	Clip—retainer on end of dial cord	.01
	116563	Connector—for antenna leads	.01
	117057	Cord—dial drive (55 in. required) per ft.	.05
	500324	Cover—cardboard, for elect. cond.	.04
	504143	Dial scale—glass	1.40
	501186	Grounding plate (under I.F. trans. can)	.10
	502553	Knob—ivory (Model PF-611)	.10
	502551	Knob—mahogany (Model PE-610)	.10
	502367	Pointer	.16
	81145	Retaining ring for tuning shaft	.01
	119087	Ring for dial cord	.01
	85078	Rubber grommet; Ant. & R.F. coil mtg.	.03
	504045	Rubber grommet; Osc. coil mtg.	.04
	17064	Screw—No. 4 x 7/32	.02
	114628	Screw—No. 8 x ½ chassis mtg.	.01
	502173	Shaft—tuning control	.15
	116690	Socket—octal base	.12
	160392	Socket—octal (rectifier)	.16
	500499	Socket—dial lamp (with leads)	.44
	504012	Spring for tuning slug drive cord	.05
	161384	Spring—dial cord tension	.06
	111456	Washer—spring washer for tuning shaft	.005

PRICES SUBJECT TO CHANGE WITHOUT NOTICE

MODELS PE-610, Ch. 9022-E,
PF-611, Ch. 9022-F

PORTO-SERVER INC.

ALIGNMENT PROCEDURE

1. Remove chassis and loop from cabinet. Solder approximately 8" of insulated wire to any B— connection (see voltage chart on opposite side for convenient B— location). Then reinstall chassis and loop in cabinet. The B— lead should extend from under the chassis at the back.
2. Connect ground lead of signal generator to B— lead.
3. Connect output meter across the speaker voice coil (terminals at back of speaker.)
4. Turn the tuning control knob clockwise as far as it will go (tuner mechanism is now in maximum open position with tuning slugs almost completely withdrawn from coils). Dial pointer should then point to 1600 Kc mark on scale. If it is set incorrectly, release pointer clip on dial cord and reposition pointer.
5. Set volume control at maximum volume position and use a weak signal from the signal generator.

DUMMY ANT. IN SERIES WITH SIGNAL GENERATOR	CONNECT HIGH SIDE OF GENERATOR TO	SIGNAL GENERATOR FREQUENCY	RECEIVER DIAL SETTING	TRIMMER NUMBER	TRIMMER DESCRIPTION	TYPE OF ADJUSTMENT
Set tuner mechanism to maximum open position by turning the tuning control knob clockwise as far as it will go (Dial pointer at 1600 Kc). Then check whether the positions of the tuning slugs correspond to the positions shown in Fig. 1 below. If settings are incorrect, rotate the individual core and threaded stem until desired position is reached. Note that threaded stem is prevented from moving by a dab of speaker cement at top.						
.1 MFD. Condenser	Ungrounded terminal of trimmer No. 6 (see Fig. 2 below for location of trimmer.)	455 KC	Any point where it does not affect the signal.	1-2	2nd I.F.	Adjust for maximum output. Then repeat adjustment.
				3-4	1st I.F.	
300 MMFD Mica Condenser	External Antenna Clip on Loop Frame	1600 KC	1600 KC	5	Broadcast Oscillator (Shunt)	Adjust for maximum output.
300 MMFD. Mica Condenser	External Antenna Clip on Loop Frame	1600 KC	Tune to 1600 KC generator signal	6	Broadcast R.F.	Adjust for maximum output.
				7	Broadcast Antenna	Adjust for maximum output.
300 MMFD. Mica Condenser	External Antenna Clip on Loop Frame	1400 KC	Tune to 1400 KC generator signal	Ant. coil tuning slug		Adjust position of slug for maximum output.
				R.F. coil tuning slug		Adjust position of slug for maximum output.
300 MMFD. Mica Condenser	External Antenna Clip on Loop Frame	1600 KC	Tune to 1600 KC generator signal	6	Broadcast R.F.	Recheck adjustment for maximum output.
				7	Broadcast Antenna	Recheck adjustment for maximum output.
Apply a coating of speaker cement at top of each tuning core stem to prevent movement.						

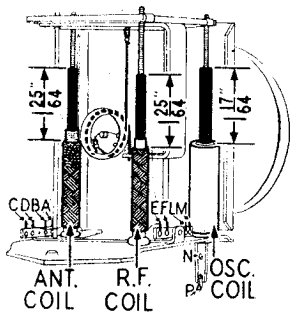


FIG. 1

SLUG TUNER ASSEMBLY
(Drive Parts)

117057 Cord (8")
114955 Clip on cord
504012 Spring

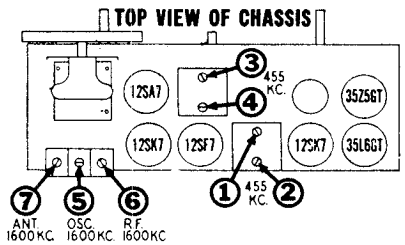


FIG. 2

AUDIO OSCILLATION

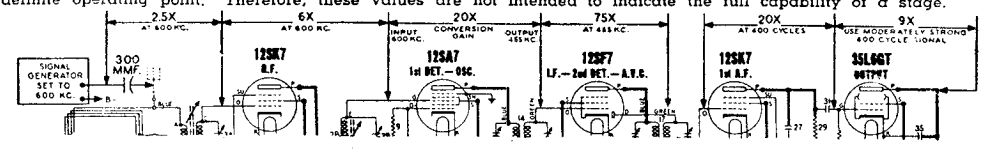
The audio system of this receiver utilizes a two stage type of inverse feed-back arrangement and, should it ever be necessary to replace the speaker or output transformer, it is important to maintain a definite phase relationship in the feed-back circuit. If the connections to the output transformer are reversed or if the feed-back connection is made to the wrong side of the output transformer secondary, the system will become regenerative instead of degenerative. Under those conditions audio oscillation may result. If that occurs, oscillation may be prevented by reversing the connections to the secondary of the output transformer.

APPROXIMATE STAGE GAIN DATA

Be sure R.F. and I.F. stages are accurately aligned before measuring gain. R.F. gains can be measured with a "channel" type instrument containing a tuned and calibrated R.F. amplifier. A vacuum tube voltmeter may be used for audio gain measurements. Observe following precautions:

1. For all gain measurements connect signal generator as shown. Use 600 KC. signal with 400 cycle modulation (use nearby frequency if local station interferes.)
2. For R.F. and I.F. measurements connect negative terminal of a 3 volt battery (two 1½ volt cells in series) to A.V.C. lead and positive terminal to B—. This provides a definite operating point. IMPORTANT: Disconnect battery when measuring audio stage gains.
3. Be sure radio is carefully tuned to generator signal (use weak signal for sharp tuning.)
4. When using a "channel" type instrument carefully tune it for maximum output at desired frequency before making measurements.

The R.F. and I.F. stage gains shown below are less than under normal operating conditions due to the use of 3 volts fixed bias in order to establish a definite operating point. Therefore, these values are not intended to indicate the full capability of a stage.



Differences in tube characteristics, tolerance of parts, adjustment of tuned circuits, and variations of line voltage will influence stage gain. Accuracy of measurements is dependent upon careful tuning of receiver to generator signal and experience in using your test equipment. These factors may create considerable variation in gain measurements.

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MODEL 5A65WG-503

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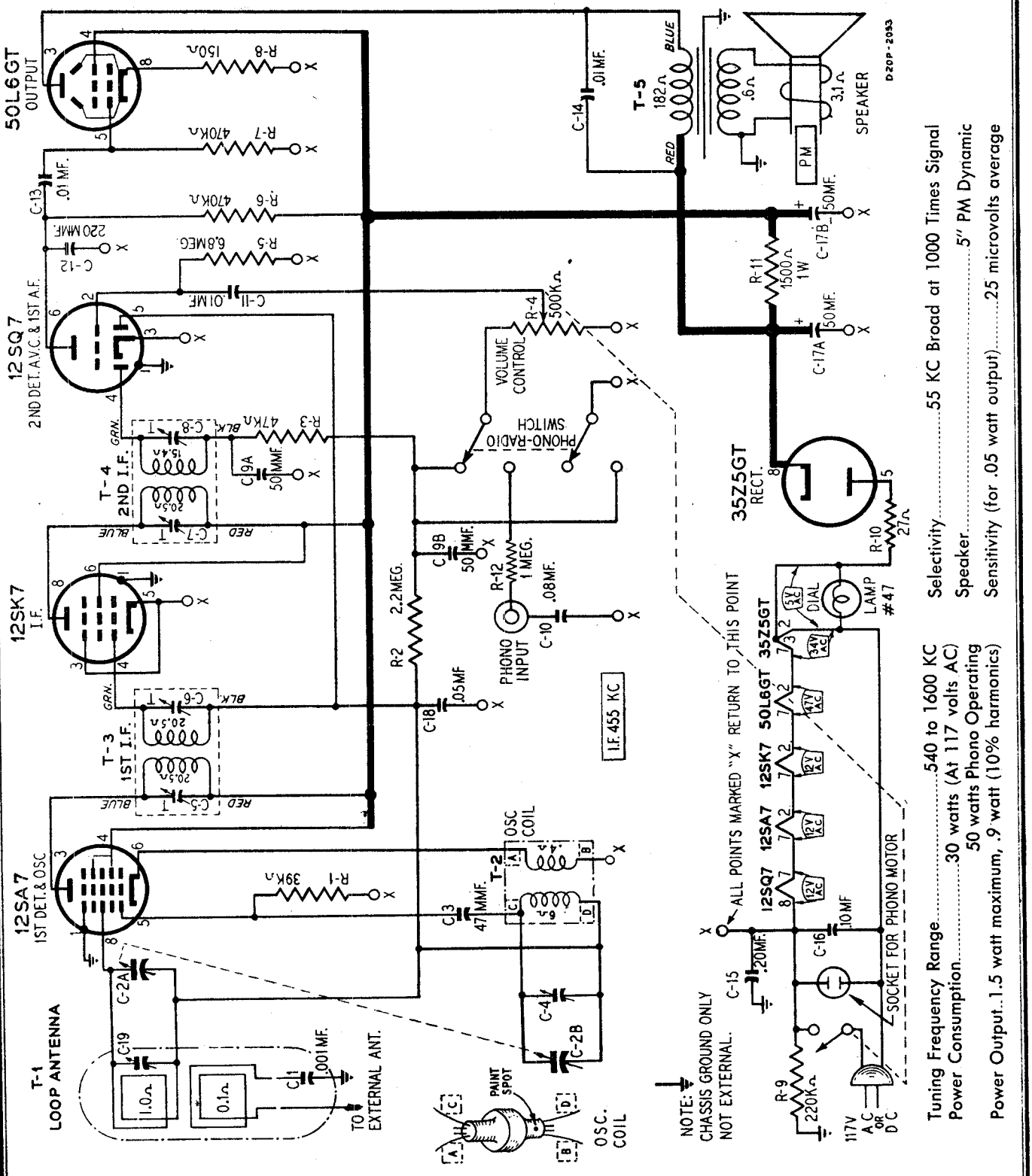

Tuning Frequency Range.....540 to 1600 KC
Power Consumption.....30 watts (At 117 volts AC)
50 watts Phono Operating
Power Output..1.5 watt maximum, .9 watt (10% harmonics)

Selectivity.....55 KC Broad at 1000 Times Signal
Speaker.....5" PM Dynamic
Sensitivity (for .05 watt output).....25 microvolts average

Record Changer: General Instrument Model 205

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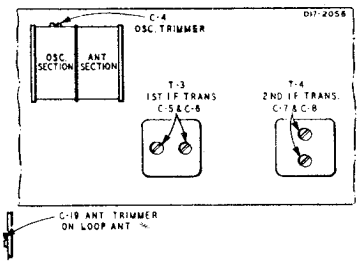
MODEL 5A65WG-503

PURE OIL CORP.



ALIGNMENT PROCEDURE

Volume Control—Maximum All Adjustments.

Allow Chassis and Signal Generator to "Heat Up" for several Minutes.

The equipment in column at right is required for aligning:

Signal Generator which will provide an accurately calibrated signal at the test frequencies as listed.

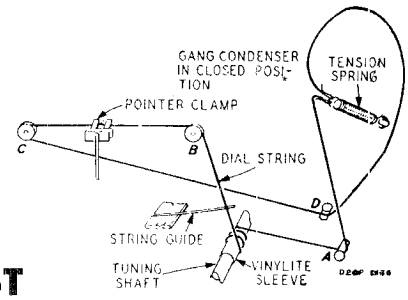
Output Indicating Meter: Non-Metallic Screwdriver.

Dummy Antennas—.1 mf., 50 mmf.

SIGNAL GENERATOR					
FREQUENCY SETTING	ANTENNA CONNECTION	GROUND CONNECTION	DUMMY ANTENNA	GANG CONDENSER SETTING	ADJUST TRIMMERS TO MAXIMUM (See Trimmer Illustration)
455 KC	Control Grid 12SK7—I.F.	Point "X" 12SK7—I.F. Prong No. 3	.1 mf.	Turn Rotor to Full Open	2nd I.F. (C7) & (C8)
455 KC	Control Grid 12SA7—1st Det.	Same As Above	.1 mf.	Turn Rotor to Full Open	1st I.F. (C5) & (C6)
1620 KC	Control Grid 12SA7—1st Det.	Same As Above	.1 mf.	Turn Rotor to Full Open	Oscillator (C4)
1400 KC	External Antenna Clip on Loop	Chassis	50 mmf.	Turn Dial to 1400 KC	Antenna (C-19)

DRIVE CORD REPLACEMENT

Turn the large drive pulley to the maximum counterclockwise position. Use a new 57 inch drive cord, tie one end to the tension spring and fasten the other end of the spring to the drive pulley. Install the cord as shown in the illustration. Wind 2¾ turns counterclockwise around the tuning shaft with the turns progressing away from the chassis. After string is installed, stretch the tension spring and tie free end of cord to spring. Cut off excess string.



REPLACEMENT PARTS LIST

NOTICE: There is a power rating label on the chassis. This label specifies the power supply on which the radio may be used, and identifies the radio as to chassis, dial and issue letter. When ordering parts or writing, give ALL information appearing on this label.

MISCELLANEOUS

12A438	5" P.M. Speaker Cone and voice coil assembly (specify part number and letters stamped on speaker)
3A303	Tube socket octal (8 prong) moulded
3A305	Phono socket
3A304	Phono motor socket
16A297	Knob (volume control, tuning)
10A584	Knob, (Radio-Phono)
2A358	Radio-Phono switch
13X328	Line cord and plug assembly

TRANSFORMERS AND COILS

26A413	T-1 "B" Range Loop Antenna Assembly
9A1805	T-2 Oscillator Coil Assembly
9A1808	T-3 1st I-F Transformer and Can Assembly
9A1809	T-4 2nd I-F Transformer and Can Assembly
51X123	T-5 Output Transformer

CAPACITORS

D67102	C-1 .001 mf 400 V Tubular
26A402	C-2A, C-2B Gang Capacitor assembly
47X446	C-3 47 mmf Moulded C-4 Part of C-2 (Gang Capacitor) C-5, C-6 Part of T-3 (1st I-F Transformer C-7, C-8 Part of T-4 (2nd I-F Transformer
47X112	C-9A, C-9B 50 mmf Dual Mica
B66803	C-10, .08 mf 200 V Tubular
B66103	C-11, C-13, C-14 .01 mf 200 V Tubular
47X468	C-12 220 mmf Moulded
B67204	C-15 .20 mf 200 V Tubular
D67104	C-16 .10 mf 400 V Tubular
45X341	C-17A 50 mf 150 V C-17B 50 mf 150 V } Dry Electrolytic
B66503	C-18 .05 mf 200 V Tubular
17A123	C-19 1.0-12 mmf Trimmer

RESISTORS

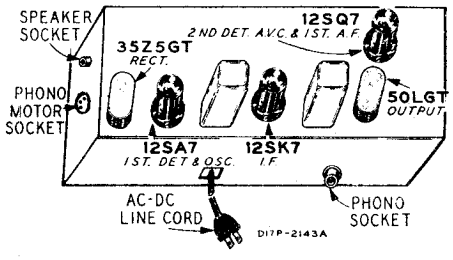
B84393	R-1	39K	0.5	Carbon
B85225	R-2	2.2 meg	0.5	Carbon
B85473	R-3	47K	0.5	Carbon
36X352	R-4	500K		Volume control and switch
B85685	R-5	6.8 meg	0.5	Carbon
B84474	R-6	470K	0.5	Carbon
B85474	R-7	470K	0.5	Carbon
B83151	R-8	150	0.5	Carbon
B85224	R-9	220K	0.5	Carbon
B84270	R-10	27	0.5	Carbon
C85152	R-11	1500	1.0	Carbon
B85105	R-12	1 meg	0.5	Carbon

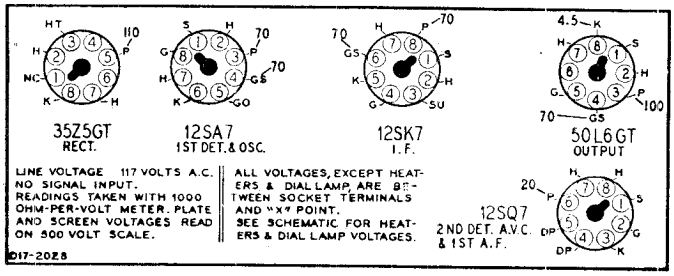
DIAL AND DRIVE ASSEMBLY

26A399	Dial Bracket Assembly Complete with Dial Background, Diffuser, Dial Clamps, Idler Pulleys and Spacers
6X21	Rubber Grommet } Mounting gang
20X329	Cond. Cushion Stud } capacitor
58X609	Dial
26X482	Drive Shaft
19X192	"C" Washer (For Drive Shaft)
19X62	Flat Washer (For Drive Shaft)
7A197	Pilot Light Socket Assembly No. 47 Pilot Light 57" Drive Cord (18 lb. test)
15X150	Pointer
28X95	Drive Cord Tension spring

TYPE G-28A115 AUTOMATIC RECORD CHANGER PARTS

G-30A71506	Bearing Assembly
G-19A71535	Spindle Assembly
G-58-71435	Single Button Control Switch
G-26-70545	Drive Wheel
G-33-A71196	Flexible Coupling Spring Assembly
G-65-70566	Feed Cam Roller
G-12-71406	Lift Pin
G-33-71405	Counter Balance Spring
G-33-71388	Finger Spring
G-33-70582	Mounting Spring
G-33-71316	Stop Lever Spring
G-33-71173	Trip Lever Spring
G-33-71205	Pull-in Spring
G-33-71438	Trip Bar Spring
G-33-71341	Record Feed Spring
G-33-71342	Carrier Lever Spring
G-59-71494	Index Spring
G-66A71507	Turntable
G-56-72092	Motor
	Pickup Arm Assembly (G.I. Model 205)
Astatic L-75	Pickup Cartridge
G-55-72021	Record Stabilizer Finger
	Needle, Permo No. 100




35Z5GT
RECT.
12SA7
1ST DET. & OSC.
12SK7
I.F.
50L6GT
OUTPUT
12SQ7
2ND DET. A.V.C. & 1ST A.F.
LINE VOLTAGE 117 VOLTS A.C. NO SIGNAL INPUT. READINGS TAKEN WITH 1000 OHM-PER-VOLT METER. PLATE AND SCREEN VOLTAGES READ ON 500 VOLT SCALE.
ALL VOLTAGES, EXCEPT HEATERS & DIAL LAMP, ARE BETWEEN SOCKET TERMINALS AND "X" POINT. SEE SCHEMATIC FOR HEATERS & DIAL LAMP VOLTAGES.
D17-2028

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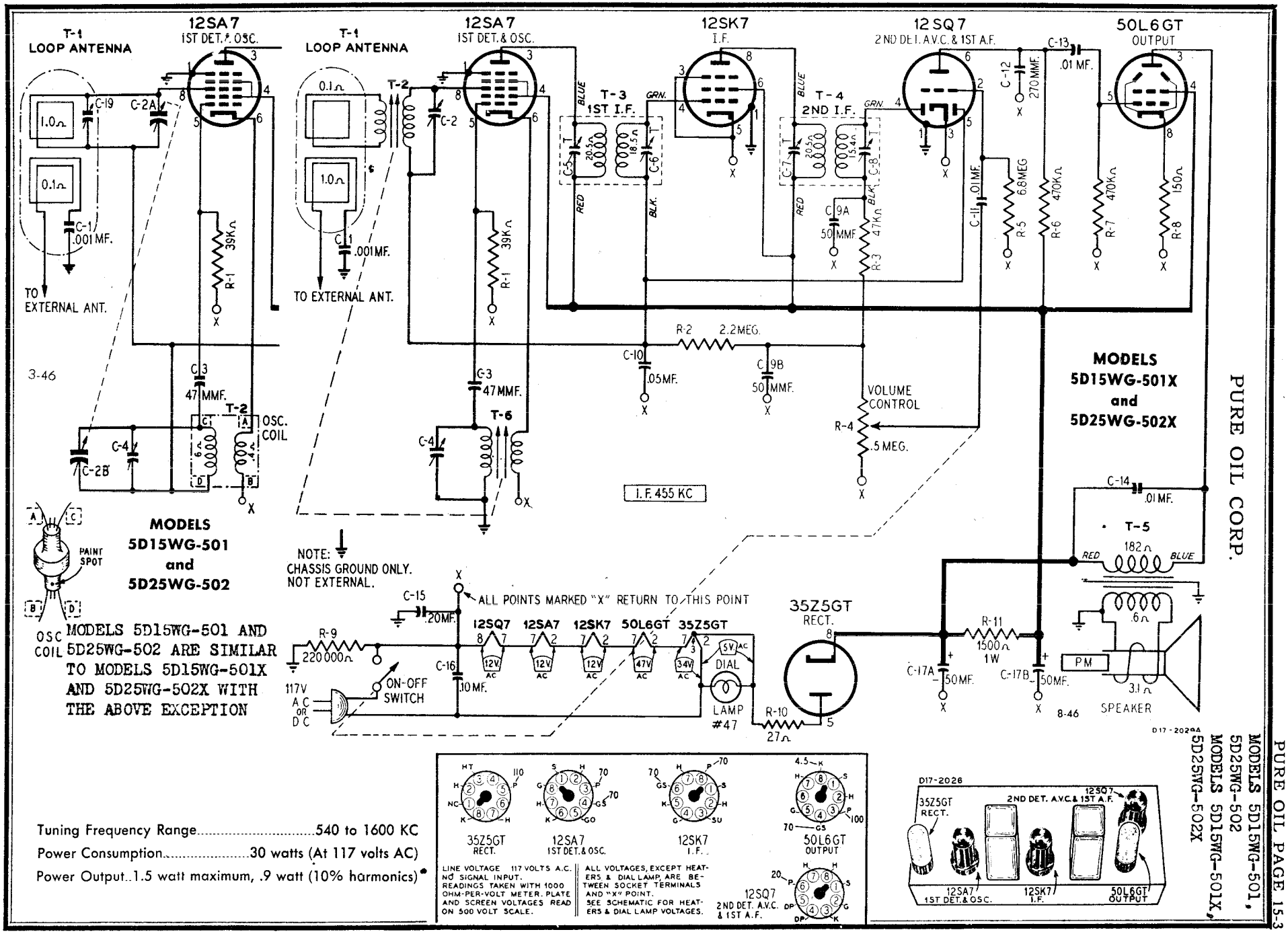

MODELS 5D15WG-501 and 5D25WG-502

MODELS 5D15WG-501X and 5D25WG-502X

MODELS 5D15WG-501 AND 5D25WG-502 ARE SIMILAR TO MODELS 5D15WG-501X AND 5D25WG-502X WITH THE ABOVE EXCEPTION

Tuning Frequency Range.....540 to 1600 KC

Power Consumption.....30 watts (At 117 volts AC)

Power Output..1.5 watt maximum, .9 watt (10% harmonics)

LINE VOLTAGE 117 VOLTS A.C. NO SIGNAL INPUT. READINGS TAKEN WITH 1000 OHM-PER-VOLT METER. PLATE AND SCREEN VOLTAGES READ ON 500 VOLT SCALE.

ALL VOLTAGES, EXCEPT HEATERS & DIAL LAMP, ARE BETWEEN SOCKET TERMINALS AND "X" POINT. SEE SCHEMATIC FOR HEATERS & DIAL LAMP VOLTAGES.

PURE OIL CORP.

MODELS 5D15WG-501, 5D25WG-502
MODELS 5D15WG-501X, 5D25WG-502X

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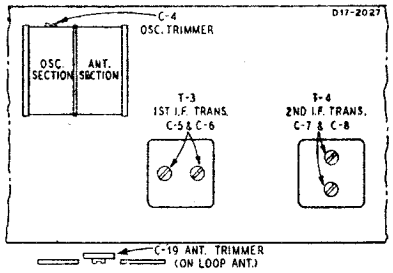
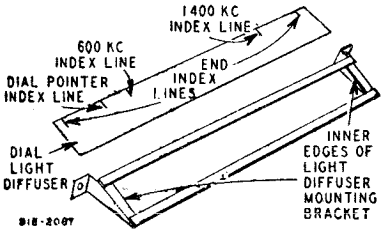


Note A—Set dial pointer to 1400 KC Index line on dial light diffuser.

DIAL CALIBRATION



In order to align the receiver, the dial pointer must be positioned on the dial string correctly with reference to the dial. Index lines are provided on the dial light diffuser for this purpose.

Before aligning the receiver (or when replacing the dial light diffuser) check the position of the diffuser strip, making certain that the two extreme index lines are aligned with the inner edges of the diffuser mounting bracket opening. The bracket should be crimped to prevent movement of the diffuser strip. To position the dial pointer, turn the large drive pulley to the maximum counterclockwise position. The dial pointer should be directly over the dial pointer index line. (See illustration).

ALIGNMENT PROCEDURE

Check dial pointer position, see DIAL CALIBRATION paragraph.

Volume Control—Maximum. All Adjustments.

Allow Chassis and Signal Generator to "Heat Up" for several Minutes.

The equipment in column at right is required for aligning:

Signal Generator which will provide an accurately calibrated signal at the test frequencies as listed.

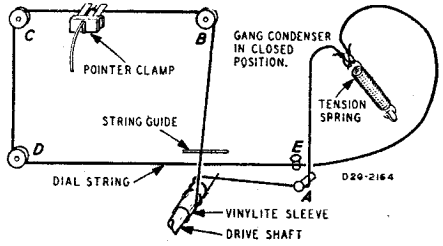
Output Indicating Meter: Non-Metallic Screwdriver.

Dummy Antennas—.1 mf., 50 mmf.

SIGNAL GENERATOR					
FREQUENCY SETTING	ANTENNA CONNECTION	GROUND CONNECTION	DUMMY ANTENNA	GANG CONDENSER SETTING	ADJUST TRIMMERS TO MAXIMUM (See Trimmer Illustration)
455 KC	Control Grid 12SK7—I.F. Prong No. 4	Point "X" 12SK7—I.F. Prong No. 3	.1 mf.	Turn Rotor to full open	2nd I.F. (C7) & (C8)
455 KC	Control Grid 12SA7—1st Det. Prong No. 8	Same As Above	.1 mf.	Turn Rotor to full open	1st I.F. (C5) & (C6)
1620 KC	Control Grid 12SA7—1st Det. Prong No. 8	Same As Above	.1 mf.	Turn Rotor to full open	Oscillator (C4)
1400 KC	External Antenna Clip On Loop	Chassis	50 mmf.	Turn Rotor to maximum output See Note A	Antenna (C-19)

DRIVE CORD REPLACEMENT

Turn the large drive pulley to the maximum counterclockwise position. Use a new 53 inch drive cord, tie one end to the tension spring and fasten the other end of the spring to the drive pulley. Install the cord as shown in the illustration. Wind 2¾ turns counterclockwise around the tuning shaft with the turns progressing away from the chassis. After string is installed, stretch the tension spring and tie free end of cord to spring. Cut off excess string.



Selectivity	55 KC Broad at 1000 Times Signal
Intermediate Frequency	455 KC
Speaker	5" PM Dynamic
Sensitivity (for .05 watt output)	25 microvolts average

NOTICE: There is a power rating label on the chassis. This label specifies the power supply on which the radio may be used, and identifies the radio as to chassis, dial and issue letter. When ordering parts or writing, give ALL information appearing on this label.

PARTS LIST

26A404	T-1	"B" Range Loop Antenna Assembly (for walnut cabinet)	
9A1805	T-2	Oscillator Coil Assembly	
9A1808	T-3	1st I-F Coil Assembly	
9A1809	T-4	2nd I-F Coil Assembly	
51X123	T-5	Output Transformer	

CAPACITORS

D67102	C-1	.001 mf 400 V	Tubular
26A402	C-2A, C-2B	Gang Capacitor with Drive Pulley	Assembly
47X446	C-3	47 mmf	Moulded
	C-4	Part of C-2 (Gang Capacitor)	
	C-5, C-6	Part of T-3 (1st I-F Transformer)	
	C-7, C-8	Part of T-4 (2nd I-F Transformer)	
47X112	C-9A, C-9B	50 mmf	Dual mica
B66103	C-11, C-13, C-14	.01mf 200 V	Tubular
47X468	C-12	220 mmf	Moulded
B67204	C-15	.20 mf 200 V	Tubular
D67104	C-16	.10 mf 400 V	Tubular
45X341	C-17A	50 mf 150 V	Dry Electrolytic
	C-17B	50 mf 150 V	Dry Electrolytic
B66503	C-18	.05 mf 200 V	Tubular
17A123	C-19	1.0-12 mmf	Trimmer

RESISTORS

B84393	R-1	39.000 ohms	0.5 watt	Carbon
B85225	R-2	2.2 meg.	0.5 watt	Carbon
B85473	R-3	47,000 ohms	0.5 watt	Carbon
36X352	R-4	500,000 ohms	Volume control and line switch	
B85685	R-5	6.8 meg.	0.5 watt	Carbon
B84474	R-6	470,000 ohms	0.5 watt	Carbon
B85474	R-7	470,000 ohms	0.5 watt	Carbon
B83151	R-8	150 ohms	0.5 watt	Carbon
B85224	R-9	220,000 ohms	0.5 watt	Carbon
B84270	R-10	27 ohms	0.5 watt	Carbon
C85152	R-11	1500 ohms	1.0 watt	Carbon

DIAL AND DRIVE ASSEMBLY

26A401	Pointer Bracket Assembly complete with light diffuser holder, string guide and idler pulleys	
41X74	Dial light diffuser	
15X223	Pointer	
6X21	Rubber Grommet	Mtg. gang capacitor
20X329	Cond. Cushion Stud	Mtg. gang capacitor
26X482	Drive shaft	
19X192	"C" Washer (for drive shaft)	
	53" Drive cord (18 lb. test)	
28X95	Drive cord tension spring	
7A194	Pilot light socket assembly	
	No. 47 Pilot light	
58X599	Dial	
30X508	Dial clamp (upper)	
30X509	Dial clamp (lower)	

MISCELLANEOUS

12A432	5" P.M. speaker
	Cone and voice coil assembly (specify part number and letters stamped on speaker)
3A303	Tube socket octal (8 prong) moulded
10A300	Knob (ivory)
10A297	Knob (walnut)
55X255	Cabinet (ivory)
55X267	Cabinet (walnut)
28X292	Snap button (mounting loop to chassis)
	No. 6 x ¼" slotted hex head P.K. Type "Z" screw (mounting loop to cabinet)
14X335	Grille metal
	Grille, cloth No. 426 Egg Shell (for ivory cab)
	Grille, cloth No. 418 Brown (for walnut cab)
13X328	Line cord and plug assembly

TRANSFORMERS AND COILS

26A403	T-1 "B" Range Loop Antenna Assembly (for ivory cabinet)

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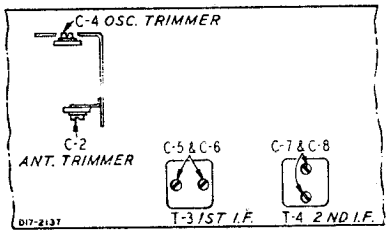


ALIGNMENT PROCEDURE

Check dial pointer position, see DIAL CALIBRATION paragraph.
Volume Control—Maximum All Adjustments.
Allow Chassis and Signal Generator to "Heat Up" for several Minutes
The equipment in column at right is required for alianing:

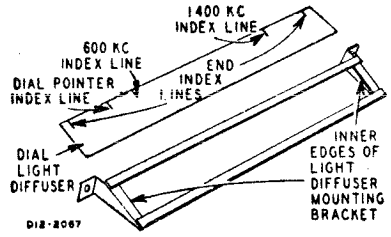
Signal Generator which will provide an accurately calibrated signal at the test frequencies as listed.

Output Indicating Meter: Non-Metallic Screwdriver.

Dummy Antennas—.1mf., 50 mmf.

SIGNAL GENERATOR					
FREQUENCY SETTING	ANTENNA CONNECTION	GROUND CONNECTION	DUMMY ANTENNA	TUNER SETTING	ADJUST TRIMMERS TO MAXIMUM (See Trimmer Illustration)
455 KC	Control Grid 12SK7—I.F.	Point "X" 12SK7—I.F. Prong No. 3	.1 mf.	Turn Drive Pulley to Counterclockwise Position	2nd I.F. (C7) & (C8)
455 KC	Control Grid 12SA7—1st Det.	Same As Above	.1 mf.	Turn Drive Pulley to Counterclockwise Position	1st I.F. (C5) & (C6)
1610 KC	Control Grid 12SA7—1st Det.	Same As Above	.1 mf.	Turn Drive Pulley to Maximum Counterclockwise Position	Oscillator (C4)
1610 KC	External Antenna Clip On Loop	Chassis	50 mmf.	Turn Drive Pulley to Maximum Counterclockwise Position	Antenna (C-2)

DIAL CALIBRATION



In order to align the receiver, the dial pointer must be positioned on the dial string correctly with reference to the dial. Index lines are provided on the dial light diffuser for this purpose.

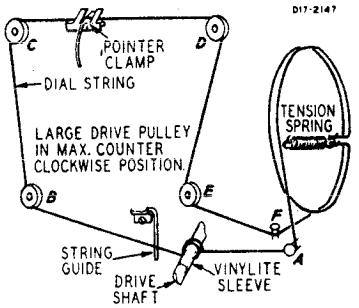
Before aligning the receiver (or when replacing the dial light diffuser) check the position of the diffuser strip, making certain that the two extreme index lines are aligned with the inner edges of the diffuser mounting bracket opening. The bracket should be crimped at one point to prevent movement of the diffuser strip. To position the dial pointer, turn the large drive pulley to the maximum clockwise position. The dial pointer should be directly over the dial pointer index line. (See illustration).

DRIVE CORD REPLACEMENT

Turn the large drive pulley to the maximum counterclockwise position. Use a new 53 inch drive cord, tie one end to the tension spring and fasten the other end of the spring to the drive pulley. Install the cord as shown in the illustration. Wind two turns clockwise around the tuning shaft with the turns progressing away from the chassis. After string is installed, stretch the tension spring and tie free end of cord to spring. Cut off excess string.

TUNING ASSEMBLY SERVICE

Exacting requirements in the tuning assembly make it impractical to replace the drive cord, coils and components in this assembly other than the trimmer condensers. Should the drive cord break, or components other than the trimmer condensers require service, the entire assembly must be ordered and replaced as a unit.



Selectivity	59 KC Broad at 1000 Times Signal
Intermediate Frequency	455 KC
Speaker	5" PM Dynamic
Sensitivity (for .05 watt output)	560 microvolts per meter average

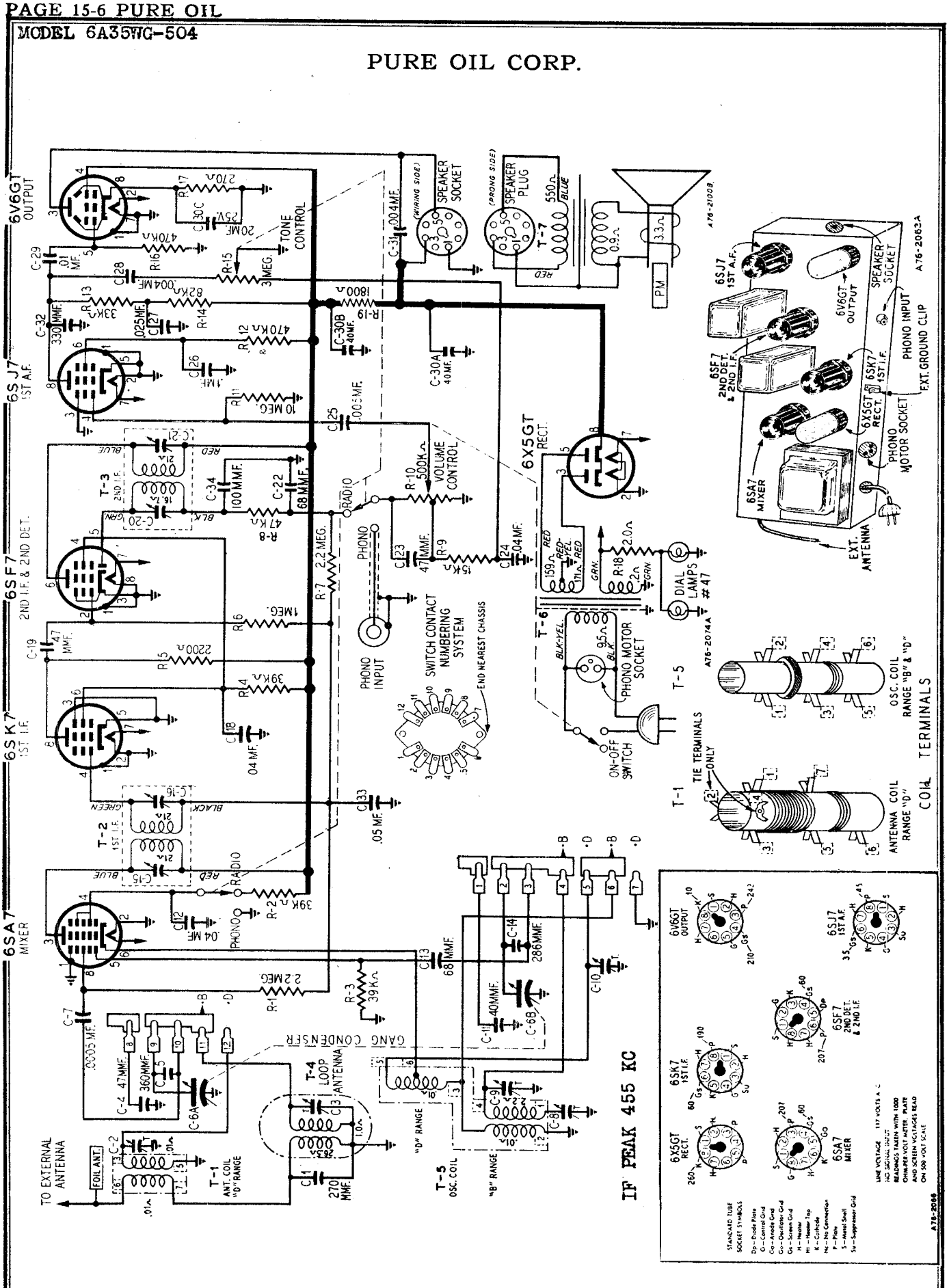
PARTS LIST

		TRANSFORMERS AND COILS		
9A1834	T-1	"B" range loop antenna (for walnut cabinet)		
9A1835	T 1	"B" range loop antenna (for ivory cabinet)		
	T 2	Part of Tuning Assembly		
9A1808	T 3	1st I F coil assembly		
9A1809	T 4	2nd I F coil assembly		
51X122	T 5	Output transformer		
	T 6	Part of Tuning Assembly		
		CAPACITORS		
D66102	C 1	.001 MF 400V		Tubular
17A238	C 2	4 70 mmf		Trimmer
47X446	C 3	47 mmf		Moulded
17A239	C 4	40 370 mmf		Trimmer
	C-5, C 6	Part of T-3, 1st I-F Transformer		
	C-7, C 8	Part of T-4, 2nd I-F Transformer		
47X112	C 9A, C-9B	50 mmf Dual mica capacitor		
B66503	C-10	.05 mf 200		Tubular
B66103	C 11, C 13, C 14	.01 mf 200 V		Tubular
47X468	C-12	220 mmf		Moulded
B66204	C-15	.20 mf 200 V		Tubular
D66104	C 16	.10 mf 400 V		Tubular
45X341	C-17A	50 mf- 150 V		
	C 17B	50 mf 150 V		Dry electrolytic capacitor
		RESISTORS		
B84397	R-1	39,000 ohms	0.5 watt	Carbon
B85225	R-2	2.2 meg.	0.5 watt	Carbon
B85473	R-3	47.000 ohms	0.5 watt	Carbon
36X352	R-4	500,000 ohm		Volume control and line switch
B85685	R 5	6.8 meg	0.5 watt	Carbon
B84474	R 6	470,000 ohms	0.5 watt	Carbon
B85474	R 7	470,000 ohms	0.5 watt	Carbon
B83151	R 8	150 ohms	0.5 watt	Carbon
B85224	R 9	220,000 ohms	0.5 watt	Carbon
B84270	R 10	27 ohms	0.5 watt	Carbon
C85152	R-11	1500 ohms	1.0 watt	Carbon
		DIAL AND DRIVE ASSEMBLY		
20A96	Tuning Assembly complete with coils, trimmers, etc.			
11X119	Fibre shield (Tuner housing)			
28X518	Trimount Stud (Mtg fibre shield)			
24X446	Idler pulley			
25X1469	Pointer bracket			
15X223	Pointer			
25X1470	Holder, light diffuser			
41X79	Dial light diffuser			
26X482	Drive shaft (tuning)			
19X192	"C" washer (for drive shaft)			
	53" drive cord (18 lb. test)			
28X113	Drive cord tension spring			
7A194	Pilot light socket assembly			
	No 47 pilot light			
58X638	Dial (for ivory cabinet)			
58X640	Dial (for walnut cabinet)			
30X508	Dial clamp (upper)			
30X509	Dial clamp (lower)			
		MISCELLANEOUS		
12A432	5" P.M. speaker			
	Cone and voice coil assembly (specify part number and letters stamped on speaker)			
3A303	Tube socket octal (8 prong) moulded			
10A300	Knob (ivory)			
10A297	Knob (walnut)			
55X255	Cabinet (ivory)			
55X267	Cabinet (wainut)			
28X292	Snap button (mounting loop to chassis)			
	No. 6 x ¼" slotted hex head P.K. Type "Z" screw (mounting loop to cabinet			
14X335	Grille metal			
	Grille, cloth No. 426 Egg Shell (for ivory cabinet)			
	Grille, cloth No. 418 Brown (for walnut cabinet)			
13X328	Line cord and plug assembly			

NOTICE: There is a power rating label on the chassis. This label specifies the power supply on which the radio may be used, and identifies the radio as to chassis, dial and issue letter. When ordering parts or writing, give ALL information appearing on this label.

MODEL 6A35WG-504

PURE OIL CORP.



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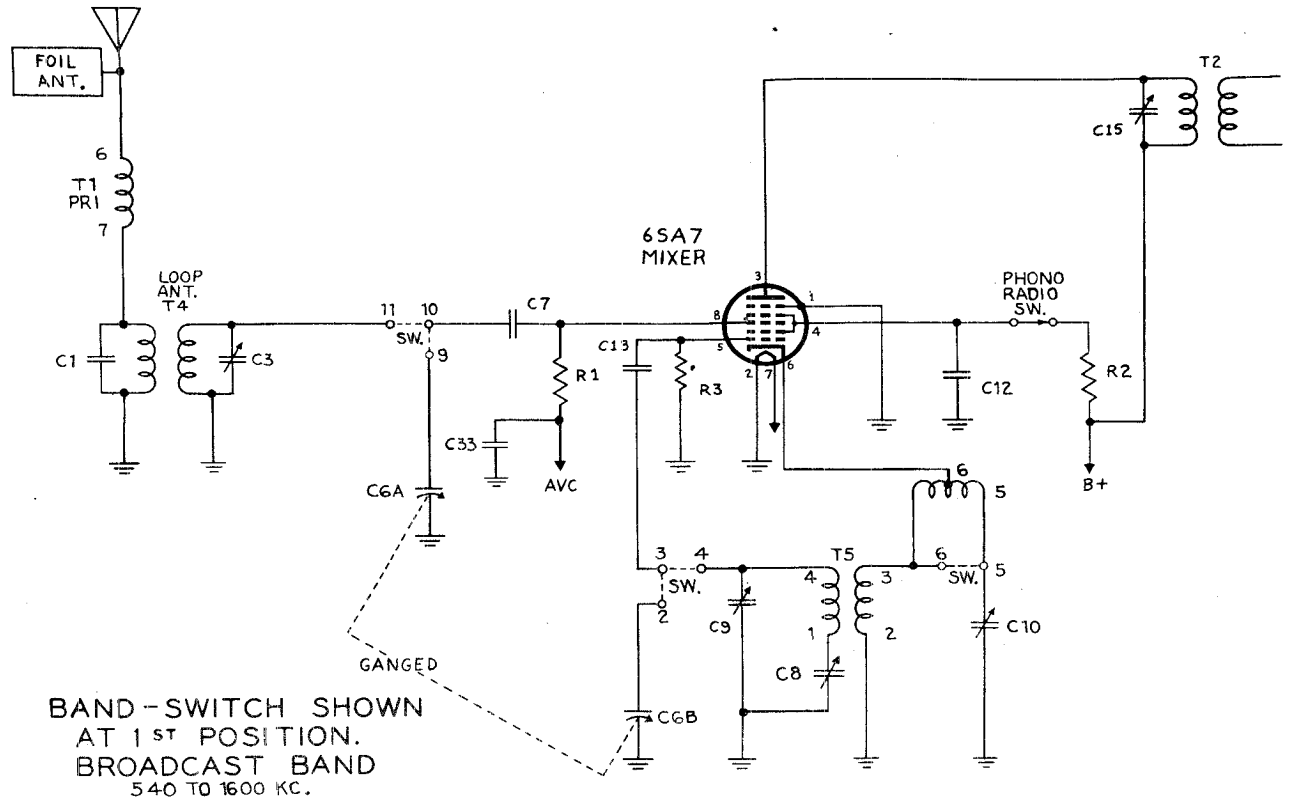
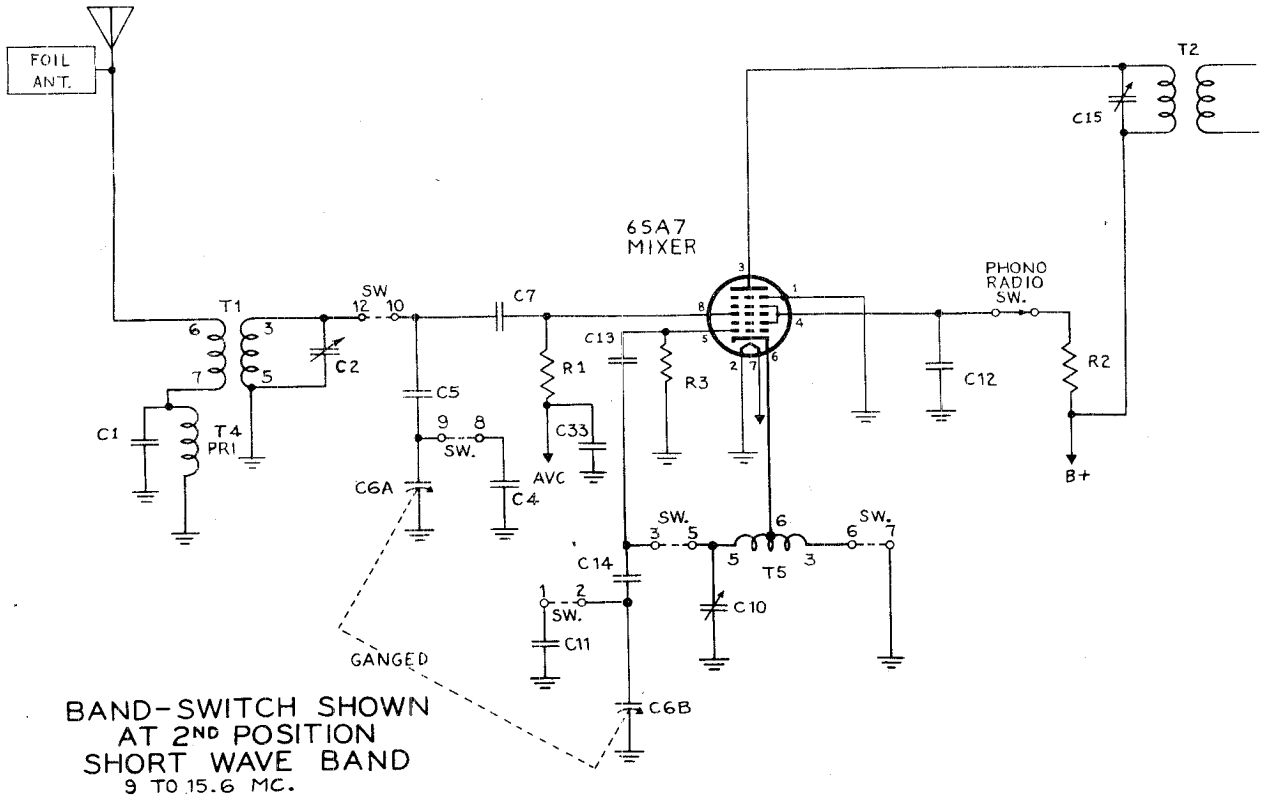
PURE OIL CORP.



BAND-SWITCH SHOWN AT 1ST POSITION. BROADCAST BAND 540 TO 1600 KC.



BAND-SWITCH SHOWN AT 2ND POSITION SHORT WAVE BAND 9 TO 15.6 MC.

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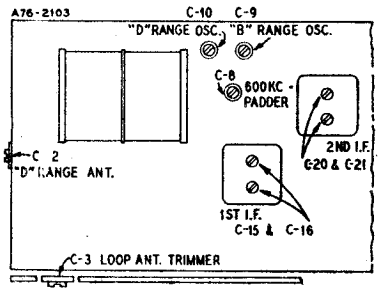
MODEL 6A35WG-504

PURE OIL CORP.

SPECIFICATIONS

Speaker.....6" PM Dynamic
Intermediate Frequency.....455 KC
Selectivity.....40 KC Broad at 1000 Times Signal
Sensitivity (For 0.5 Watt Output, with External Antenna)
B Range..... 9 Microvolts Av.
D Range.....20 Microvolts Av.
Power Consumption (at 117 Volts AC) .....40 Watts (normal)
Power Output.....4 Watts Maximum
2.3 Watts, 10% Harmonics
Tuning Frequency Range
B Range.....540-1600 Kilocycles
D Range.....9-15.5 Megacycles



ALIGNMENT PROCEDURE

Volume Control—Maximum All Adjustments.

Connect Radio Chassis to Ground Post of Signal Generator with a Short Heavy Lead.

Allow Chassis and Signal Generator to "Heat Up" for several minutes.

The following equipment is required for aligning:
An All Wave Signal Generator which will provide an accurately calibrated signal at the test frequencies as listed.
Output indicating Meter—Non Metallic Screwdriver.
Dummy Antennas—.1 mf., 100 mmf., and 400 ohms.

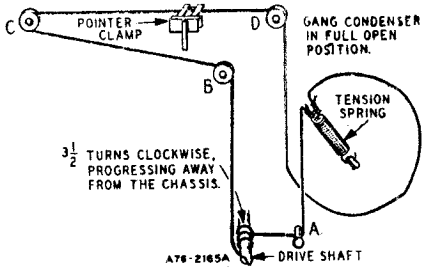
	SIGNAL GENERATOR FREQUENCY SETTING	SIGNAL GENERATOR CONNECTION AT RADIO	DUMMY ANTENNA	BAND SWITCH SETTING	CONDENSER SETTING	ADJUST TRIMMERS TO MAXIMUM
I.F.	455 KC	Grid of 6SA7 Pin 8	.1 mf.	B Range	Turn Rotor to Full Open	2nd I.F. (C20) & (C21) 1st. I.F. (C15) & (C16)
RANGE B	1620 KC	Antenna Lead	100 mmf.	B Range	Turn Rotor to Full Open	Oscillator Range B(C9)
	1400 KC	Antenna Lead	100 mmf.	B Range	Tune Rotor to Max. Output Set Pointer to 1400 KC (See Note A)	Ant. Range B (C3)
	600 KC	Antenna Lead	100 mmf.	B Range	Tune Rotor to Max. Output	Oscillator (C8) Rock Rotor—See Note B
	Repeat above steps at 1620 and 600 KC until readjusting the oscillator Range B Trimmer (C9) causes no further improvement of output.					
RANGE D	15,600 KC	Antenna Lead	400 Ohm	D Range	Turn Rotor to Full Open	Oscillator Range D (C10)
	14,000 KC	Antenna Lead	400 Ohm	D Range	Tune Rotor to Max. Output	Ant. Range D (C2) Rock Rotor—See Note B
LOOP RANGE B	Reassemble chassis in cabinet. 1400 KC	Antenna Lead	100 mmf.	B Range	Tune Rotor to Max. Output	Ant. Range B(C3)

NOTE A—Set pointer at the 1400 KC mark on the dial scale. Attach pointer to drive cord.

NOTE B—Turn Rotor back and forth and adjust the trimmer until the peak of greatest intensity is obtained.

DRIVE CORD REPLACEMENT

The drive cord may be replaced as shown in the accompanying illustration. For this purpose use a 58" piece of cord. After installing the cord, stretch the tension spring before fastening the free end of the string.



REPLACEMENT PARTS LIST

NOTICE: There is a power rating label on the chassis. This label specifies the power supply on which the radio may be used, and identifies the radio as to chassis, dial and issue letter. When ordering parts or writing, give ALL information appearing on this label.

MISCELLANEOUS

‡12A442	6" P.M. Speaker Complete with Output Transformer	
	Cone and Voice Coil Assembly (Specify part number and letters stamped on speaker)	
	Output Transformer (Specify part number and letters stamped on speaker)	
3A303	Tube Socket—Octal (8 prong) Moulded	
3A304	Phono Motor Socket	
3A305	Phono Socket—Single Pin Tip	
2A345	Band Change Switch	
13X328	Line Cord and Plug Assembly	
28X292	Snap Button (Mtg. loop to cabinet)	
10A578	Knob (Tuning)	
10A579	Knob (Volume)	
10A581	Knob (Tone-R.P.)	
10A580	Knob (SW-BC)	
9A1832	Counterpoise Antenna	

TRANSFORMERS AND COILS

9A1812	T-1	"D" Range Antenna Coil Assembly
9A1814	T-2	1st I-F Coil Assembly
9A1815	T-3	2nd I-F Coil Assembly
9A1828‡	T-4	"B" Range Loop Antenna
9A1813	T-5	"B" Range and "D" Range Oscillator Coil Assembly
53X282	T-6	117 Volt, 60 Cycle, Standard Power Transformer
53X283	T-6	117 Volt, 25 Cycle, Standard Power Transformer
53X284	T-6	117-234 Volt, 40-60 Cycle, Universal Power Transformer
	T-7	Output Transformer (See Miscellaneous)

CAPACITORS

47X445	C-1	270 mmf	Moulded
17A164	C-2	5-50 mmf	Trimmer
17A123	C-3	1.0-12 mmf	Trimmer
47X473	C-4	47 mmf	Silvered Mica
47X474	C-5	360 mmf	Silvered Mica
14A184	C-6A, C-6B	Gang Capacitor with Drive Pulley	
B66501	C-7	.0005 mf	200 V Tubular
17A155	C-8	350-430 mmf	Trimmer
17A109	C-9, C-10	2.5-35 mmf	Dual Trimmer
47X472	C-11	40 mmf	Silvered Mica
D66403	C-12, C-18	.04 mf	400 V Tubular
47X466	C-13	68 mmf	Moulded
47X481	C-14	286 mmf	Silvered Mica
	C-15, C-16	Part of T-2 (1st I-F Coil Assembly)	
47X463	C-19, C-23	47 mmf	Moulded
	C-20, C-21	Part of T-3 (2nd I-F Coil Assembly)	
47X471	C-22	68 mmf	Moulded
D64403	C-24	.04 mf	400 V Tubular
D66502	C-25	.005 mf	400 V Tubular
D66104	C-26	.10 mf	400 V Tubular
D64253	C-27	.025 mf	400 V Tubular
D66402	C-28, C-31	.004 mf	400 V Tubular
D66103	C-29	.01 mf	400 V Tubular
45X346	C-30A	40 mf	450 V 3 Section Electrolytic
	C-30B	40 mf	450 V
	C-30C	20 mf	25 V
47X470	C-32	330 mmf	Moulded
D66503	C-33	.05 mf	200 V Tubular
47X476	C-34	100 mmf	Moulded

RESISTORS

		Ohms	Watts
R85225	R-1, R-7	2.2 meg.	0.5 Carbon
C84393	R-2, R-4	39 K	1.0 Carbon
B84393	R-3	39 K	0.5 Carbon
B84222	R-5	2200	0.5 Carbon
B83105	R-6	1 meg.	0.5 Carbon
B85473	R-8	47 K	0.5 Carbon
B84153	R-9	15 K	0.5 Carbon
36X354	R-10	500 K	Volume Control and line switch
B85106	R-11	10 meg.	0.5 Carbon
B84474	R-12, R-16	470 K	0.5 Carbon
B81333	R-13	33 K	0.5 Carbon
B84823	R-14	82 K	0.5 Carbon
*40X275	R-15	3.0 meg	Tone control and Radio Phono Switch
C84271	R-17	270	1.0 Carbon
43X213	R-18	2.0	0.5 Wire Wound
D84182	R-19	1800	2.0 Carbon

DIAL AND DRIVE ASSEMBLY

26A410	Dial Bracket Assembly Complete with Dial, Background and Spacers	
6X21	Rubber Grommet	Mtg. Gang Capacitor
20X329	Cond. Cushion Stud	Mtg. Gang Capacitor
26X470	Drive Shaft	
19X192	"C" Washer (For Drive Shaft)	
15X230	Pointer	
	58" Drive Cord (18 lb. test)	
28X113	Drive Cord Tension Spring	
7A203	Pilot Light Socket Assembly	
	No. 47 Pilot Light	

SUBSTITUTE REPLACEMENT PARTS

These are used on some receivers only. Check part number on part before ordering.

*40X280	Tone Control (substitute for 40X275)
*25X1539	Radio-Phono Switch Lever (when 40X280 is used)
*2A161	D.P.D.T. Switch (when 40X280 is used)
‡12A459	6" P.M. Speaker Complete with Output Transformer

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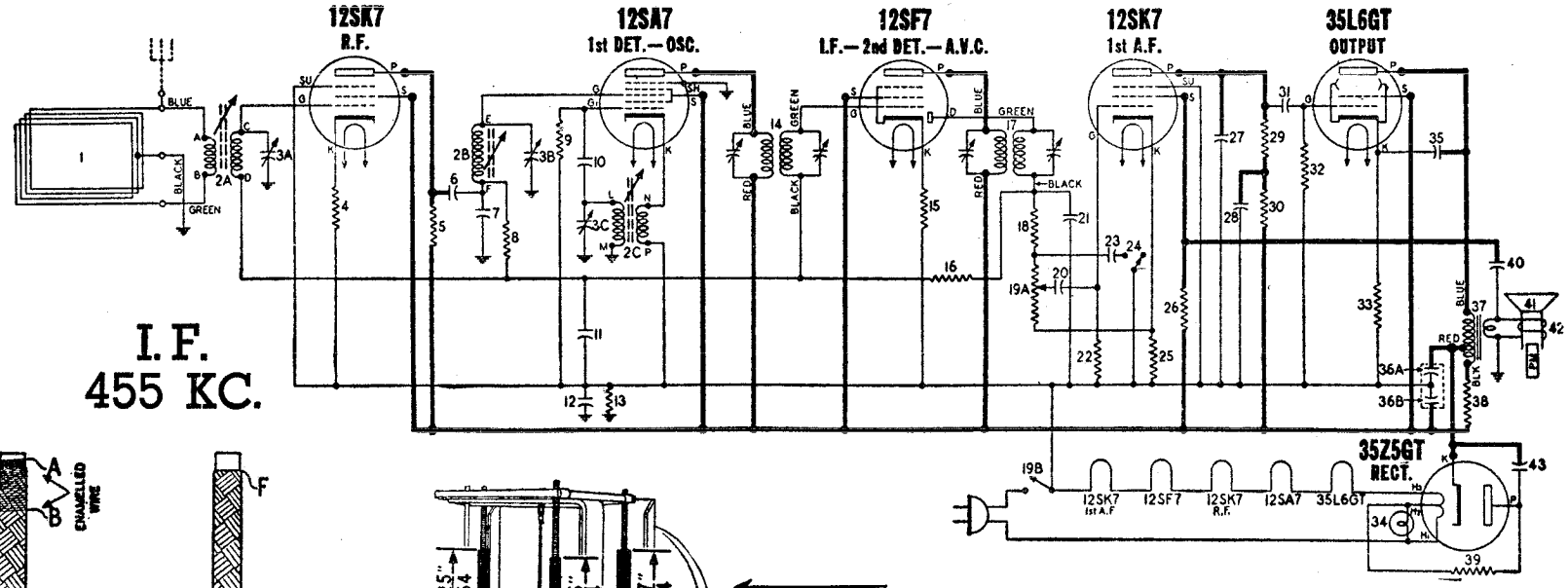
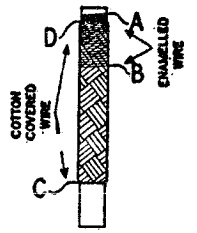
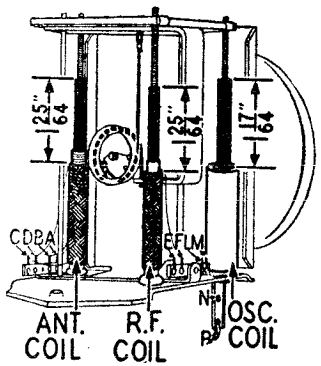




ANTENNA COUPLING COIL
504210

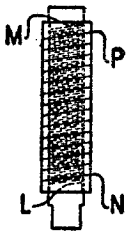
R.F. COIL
504214



SLUG TUNER ASSEMBLY
(Drive Parts)

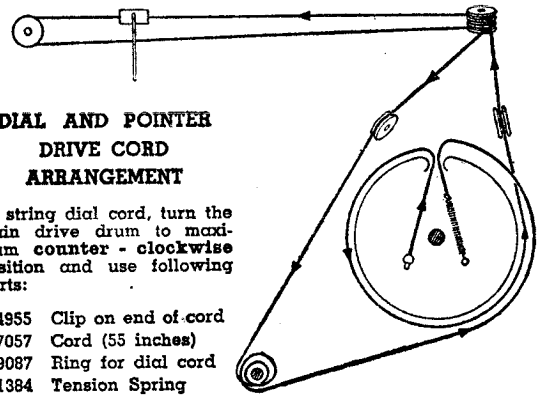
117057 Cord (8")
114955 Clip on cord
504012 Spring

Lettered terminals in illustrations correspond to similarly lettered terminals on the circuit diagram.



OSCILLATOR COIL
504212

SLUG CORES FOR COILS
ANT.—504211
R.F.—504215
OSC.—504213



DIAL AND POINTER DRIVE CORD ARRANGEMENT

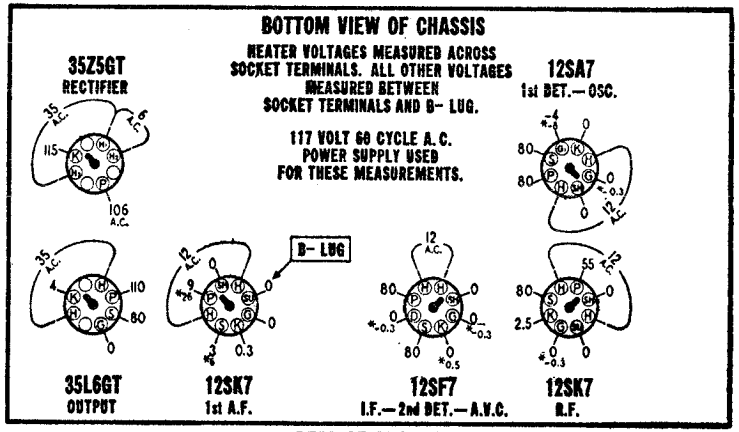
To string dial cord, turn the main drive drum to maximum counter - clockwise position and use following parts:

114955 Clip on end of cord
117057 Cord (55 inches)
119087 Ring for dial cord
161384 Tension Spring

SOCKET VOLTAGES

Measured with voltmeter having sensitivity of 1000 ohms per volt except where indicated by (*).

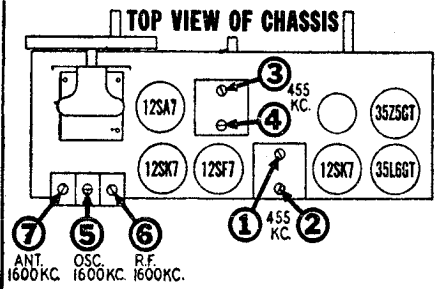
VOLUME ON FULL WITH NO SIGNAL **DIAL TUNED TO 540 KC.**



REAR OF CHASSIS

*—Measured with vacuum tube voltmeter

DUMMY ANT. IN SERIES WITH SIGNAL GENERATOR	CONNECT HIGH SIDE OF GENERATOR TO	SIGNAL GENERATOR FREQUENCY	RECEIVER DIAL SETTING	TRIMMER NUMBER	TRIMMER DESCRIPTION	TYPE OF ADJUSTMENT
Set tuner mechanism to maximum open position by turning the tuning control knob clockwise as far as it will go (Dial pointer at 1600 Kc). Then check whether the positions of the tuning slugs correspond to the positions shown in Fig. 1 below. If settings are incorrect, rotate the individual core and threaded stem until desired position is reached. Note that threaded stem is prevented from moving by a dab of speaker cement at top.						
.1 MFD. Condenser	Ungrounded terminal of trimmer No. 6 (see Fig. 2 below for location of trimmer.)	455 KC	Any point where it does not affect the signal.	1-2	2nd I.F.	Adjust for maximum output. Then repeat adjustment.
				3-4	1st I.F.	
300 MMFD. Mica Condenser	External Antenna Clip on Loop Frame	1600 KC	1600 KC	5	Broadcast Oscillator (Shunt)	Adjust for maximum output.
300 MMFD. Mica Condenser	External Antenna Clip on Loop Frame	1600 KC	Tune to 1600 KC generator signal	6	Broadcast R.F.	Adjust for maximum output.
				7	Broadcast Antenna	Adjust for maximum output.
300 MMFD. Mica Condenser	External Antenna Clip on Loop Frame	1400 KC	Tune to 1400 KC generator signal	Ant. coil tuning slug		Adjust position of slug for maximum output.
				R.F. coil tuning slug		Adjust position of slug for maximum output.
300 MMFD. Mica Condenser	External Antenna Clip on Loop Frame	1600 KC	Tune to 1600 KC generator signal	6	Broadcast R.F.	Recheck adjustment for maximum output.
				7	Broadcast Antenna	Recheck adjustment for maximum output.
Apply a coating of speaker cement at top of each tuning core stem to prevent movement.						



AUDIO OSCILLATION

The audio system of this receiver utilizes a two stage type of inverse feed-back arrangement and, should it ever be necessary to replace the speaker or output transformer, it is important to maintain a definite phase relationship in the feed-back circuit. If the connections to the output transformer are reversed or if the feed-back connection is made to the wrong side of the output transformer secondary, the system will become regenerative instead of degenerative. Under those conditions audio oscillation may result. If that occurs, oscillation may be prevented by reversing the connections to the secondary of the output transformer.

1. Remove chassis and loop from cabinet. Solder approximately 8" of insulated wire to any B— connection (see voltage chart on opposite side of convenient B— location). Then reinstall chassis and loop in cabinet. The B— lead should extend from under the chassis at the back.
2. Connect ground lead of signal generator to B— lead.
3. Connect output meter across the speaker voice coil (terminals at back of speaker.)
4. Turn the tuning control knob clockwise as far as it will go (tuner mechanism is now in maximum open position with tuning slugs almost completely withdrawn from coils). Dial pointer should then point to 1600 Kc mark on scale. If it is set incorrectly, release pointer clip on dial cord and reposition pointer.
5. Set volume control at maximum volume position and use a weak signal from the signal generator.

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PURE OIL CORP.

PARTS LIST

DIAGRAM NO.	PART NO.	DESCRIPTION	LIST PRICE
		CONDENSERS	
3-A, B, C	504086	Condenser—trimmer assembly A—20 to 270 Mmfd. B—40 to 370 Mmfd. C—40 to 370 Mmfd.	$1.10
6	502271	Condenser—mica 260 Mmfd. 500 volt	.30
7	502165	Condenser—mica 1,000 Mmfd. 500 volt	.45
10	502159	Condenser—mica 50 Mmfd. 500 volt	.24
11	502155	Condenser—.1 Mfd. 200 volt	.30
12	502158	Condenser—.2 Mfd. 400 volt	.36
20	502453	Condenser—.002 Mfd. 400 volt	.20
21	502160	Condenser—mica 110 Mmfd. 500 volt	.24
23	502470	Condenser—.0008 Mfd. 400 volt	.20
27	502160	Condenser—mica 110 Mmfd. 500 volt	.24
28	502153	Condenser—.05 Mfd. 200 volt	.24
31	502156	Condenser—.004 Mfd. 400 volt	.20
35	502151	Condenser—.01 Mfd. 400 volt	.20
36-A, B.	500256	Condenser—electrolytic A—40 Mfd. 150 volt B—20 Mfd. 150 volt	1.50
40	502152	Condenser—.02 Mfd. 400 volt	.24
43	502157	Condenser—.05 Mfd. 400 volt	.24
		RESISTORS	
4	502140	Resistor—carbon 390 ohms ¼ watt	.12
5	502291	Resistor—carbon 4700 ohms ¼ watt	.12
8	502134	Resistor—carbon 470,000 ohms ¼ watt	.12
9	502130	Resistor—carbon 22,000 ohms ¼ watt	.12
13	502133	Resistor—carbon 220,000 ohms ¼ watt	.12
15	502264	Resistor—carbon 47 ohms ¼ watt	.12
16	502269	Resistor—carbon 3.3 Meg. ¼ watt	.12
18	502131	Resistor—carbon 47,000 ohms ¼ watt	.12
19-A, B.	502145	Volume control 500,000 ohms (with switch)	1.25
22	502136	Resistor—carbon 10 Meg. ¼ watt	.12
25	502128	Resistor—carbon 2200 ohms ¼ watt	.12
26	502135	Resistor—carbon 2.2 Meg. ¼ watt	.12
29, 30.	502133	Resistor—carbon 220,000 ohms ¼ watt	.12
32	502134	Resistor—carbon 470,000 ohms ¼ watt	.12
33	502138	Resistor—carbon 130 ohms ¼ watt	.12
38	502489	Resistor—carbon 1500 ohms 1 watt	.16
39	502574	Resistor—carbon 33 ohms ½ watt	.12
		COILS & TRANSFORMERS	
1	502246	Loop antenna	2.90
2-A, B, C	504096	Tuning unit; complete assembly	10.80
2-A	504210	Coil—antenna (less slug)	1.20
2-B	504214	Coil—R.F. (less slug)	.85
2-C	504212	Coil—oscillator (less slug)	1.05
	504211	Slug core for Ant. coil (yellow end)	.45
	504213	Slug core for Osc. coil (white end)	.45
	504215	Slug core for R.F. coil (purple end)	.45
14	502102	Transformer—1st I.F.	$2.30
17	502103	Transformer—2nd I.F.	2.30
37	502213	Transformer—output (for R-502998 spkr.)	2.50
	502904	Transformer—output (for A-502998 spkr.)	2.50
	504244	Transformer—output (for W-502998 spkr.)	2.50
		OTHER ELECTRICAL PARTS	
24	500546	Switch—tone control	.84
34	502473	Lamp—dial (Mazda 47) 6-8V. 150 Ma.	.22
41	502214	Cone & voice coil for R-502998 spkr.	2.00
	502903	Cone & voice coil for A-502998 spkr.	2.00
	504245	Cone & voice coil for W-502998 spkr.	2.00
42	502998	Speaker—P.M. dynamic (5 inch)	6.60
		MISCELLANEOUS PARTS	
	502502	Back for cabinet	.30
	116467	Base for mtg. electrolytic condenser	.04
	502476	Cabinet—ivory (Model 506)	5.00
	502477	Cabinet—mahogany (Model 507)	4.60
	502506	Clamp—dial scale mtg.	.04
	500497	Clip—retainer for cabinet back	.02
	114955	Clip—retainer on end of dial cord	.01
	116563	Connector—for antenna leads	.01
	117057	Cord—dial drive (55 in. required) per ft.	.05
	500324	Cover—cardboard, for elect. cond.	.04
	504147	Dial scale—glass	1.40
	501186	Grounding plate (under I.F. trans. can)	.10
	502564	Knob—ivory (Model 506)	.08
	502563	Knob—mahogany (Model 507)	.08
	502367	Pointer	.16
	81145	Retaining ring for tuning shaft	.01
	119087	Ring for dial cord	.01
	85078	Rubber grommet; Ant. & R.F. coil mtg.	.03
	504045	Rubber grommet; Osc. coil mtg.	04
	17063	Screw—No. 6 x ¼	.01
	114628	Screw—No. 8 x ½ chassis mtg.	.01
	502173	Shaft—tuning control	.15
	116890	Socket—octal base	.12
	160392	Socket—octal (rectifier)	.16
	500499	Socket—dial lamp (with leads)	.44
	504012	Spring for tuning slug drive cord	.05
	161384	Spring—dial cord tension	.06
	111456	Washer—spring washer for tuning shaft	.005

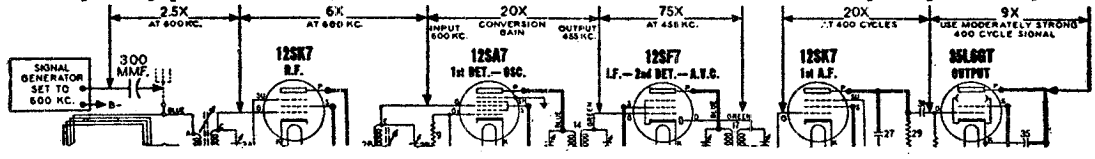
PRICES SUBJECT TO CHANGE WITHOUT NOTICE

APPROXIMATE STAGE GAIN DATA

Be sure R.F. and I.F. stages are accurately aligned before measuring gain. R.F. gains can be measured with a "channel" type instrument containing a tuned and calibrated R.F. amplifier. A vacuum tube voltmeter may be used for audio gain measurements. Observe following precautions:

1. For all gain measurements connect signal generator as shown. Use 600 KC. signal with 400 cycle modulation (use nearby frequency if local station interferes.)
2. For R.F. and I.F. measurements connect negative terminal of a 3 volt battery (two 1½ volt cells in series) to A.V.C. lead and positive terminal to B—. This provides a definite operating point.
   IMPORTANT: Disconnect battery when measuring audio stage gains.
3. Be sure radio is carefully tuned to generator signal (use weak signal for sharp tuning.)
4. When using a "channel" type instrument carefully tune it for maximum output at desired frequency before making measurements.

The R.F. and I.F. stage gains shown below are less than under normal operating conditions due to the use of 3 volts fixed bias in order to establish a definite operating point. Therefore, these values are not intended to indicate the full capability of a stage.



Differences in tube characteristics, tolerance of parts, adjustment of tuned circuits, and variations of line voltage will influence stage gain. Accuracy of measurements is dependent upon careful tuning of receiver to generator signal and experience in using your test equipment. These factors may create considerable variation in gain measurements.

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Be sure R.F. and I.F. stages are accurately aligned before measuring gain. R.F. gains can be measured with a "channel" type instrument containing a tuned and calibrated R.F. amplifier. A vacuum tube voltmeter may be used for audio gain measurements. Observe following precautions:

1. For all gain measurements connect signal generator as shown. Use 600 KC. signal with 400 cycle modulation (use nearby frequency if local station interferes.)
2. For R.F. and I.F. measurements connect negative terminal of a 3 volt battery (two 1½ volt cells in series) to A.V.C. lead and positive terminal to chassis. This provides a definite operating point. IMPORTANT: Disconnect battery when measuring audio stage gains.
3. Be sure radio is carefully tuned to generator signal (use weak signal for sharp tuning.)
4. When using a "channel" type instrument carefully tune it for maximum output at desired frequency before making measurements.

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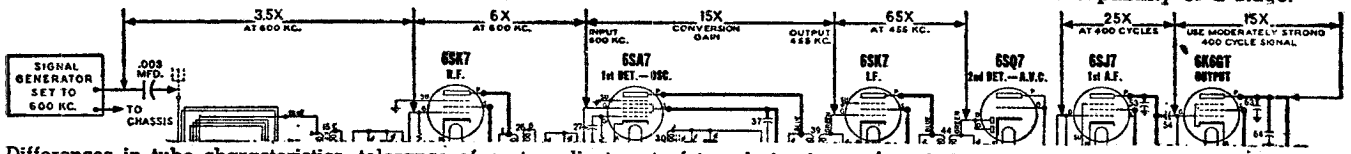

Differences in tube characteristics, tolerance of parts, adjustment of tuned circuits, and variations of line voltage will influence stage gain. Accuracy of measurements is dependent upon careful tuning of receiver to generator signal and experience in using your test equipment. These factors may create considerable variation in gain measurements.

AUDIO OSCILLATION

The audio system of this receiver utilizes a two stage type of inverse feed-back arrangement and should it ever be necessary to replace the speaker or output transformer it is important to maintain a definite phase relationship in the feedback circuit. If the connections to the output transformer are reversed or if the feed-back connection is made to the wrong side of the output transformer secondary, the system will become regenerative instead of degenerative. Under those conditions audio oscillation may result. If that occurs, oscillation may be prevented by reversing the connections to the primary of the output transformer.

DIAGRAM NO.	PART NO.	DESCRIPTION	LIST PRICE
		CONDENSERS	
3	502166	Condenser—ceramic 82 Mmfd. 500 volt.	$0.30
4	502164	Condenser—mica 670 Mmfd. 500 volt...	.70
5A, B	502109	Condenser—trimmer assembly Section A 2 to 15 Mmfd. Section B 10 to 40 Mmfd.	.65
7A to E	502910	Condenser—trimmer assem. for P-B tuner	3.00
13	502161	Condenser—mica 270 Mmfd. 500 volt..	.45
14	502165	Condenser—mica 1,000 Mmfd. 500 volt..	.45
16A, B, C	502122	Condenser—variable gang	6.60
18	502182	Condenser—ceramic 39 Mmfd. 500 volt..	.40
22	502157	Condenser—.05 Mfd. 400 volt	.24
23	502155	Condenser—.1 Mfd. 200 volt	.30
25	502295	Condenser—ceramic 10 Mmfd. 500 volt..	.30
27	502159	Condenser—mica 50 Mmfd. 500 volt....	.24
29	502411	Condenser—2 Mmfd. 500 volt	.10
31A, B	502108	Condenser—trimmer assem. Section A 2 to 15 Mmfd. Section B 2 to 15 Mmfd.	.75
32	502182	Condenser—ceramic 39 Mmfd. 500 volt..	.40
33	502167	Condenser—ceramic 68 Mmfd. 500 volt..	.40
34	502163	Condenser—mica 430 Mmfd. 500 volt....	.60
37	502151	Condenser—.01 Mfd. 400 volt	.20
42	502157	Condenser—.05 Mfd. 400 volt	.24
46	502271	Condenser—mica 260 Mmfd. 500 volt....	.30
48	502150	Condenser—.004 Mfd. 600 volt	.20
49	502157	Condenser—.05 Mfd. 400 volt	.24
53	502160	Condenser—mica 110 Mmfd. 500 volt....	.24
54	502152	Condenser—.02 Mfd. 400 volt	.24
56	502410	Condenser—.1 Mfd. 400 volt	.30
59	502405	Condenser—.25 Mfd. 400 volt	.36
63	502150	Condenser—.004 Mfd. 600 volt	.20
64	502154	Condenser—.05 Mfd. 600 volt	.24
71A, B, C	502207	Condenser—Electrolytic A—20 Mfd. 25 volt B—20 Mfd. 400 volt C—10 Mfd. 400 volt	2.20
73	502153	Condenser—.05 Mfd. 200 volt	.24
		RESISTORS	
20	502468	Resistor—carbon 4.7 Meg. 1/4 watt	.12
21	502127	Resistor—carbon 560 Ohms 1/4 watt....	.12
24	502132	Resistor—carbon 100,000 Ohms 1/4 watt	.12
28	502130	Resistor—carbon 22,000 Ohms 1/4 watt	.12
38	502466	Resistor—carbon 33,000 Ohms 1 watt..	.16
40	502125	Resistor—carbon 220 Ohms 1/4 watt....	$0.12
41	502135	Resistor—carbon 2.2 Meg. 1/4 watt....	.12
43	502467	Resistor—carbon 68,000 Ohms 1/2 watt..	.12
45	502131	Resistor—carbon 47,000 Ohms 1/4 watt..	.12
47A, B	502117	Volume control 500,000 ohms (with switch)	1.25
50	502468	Resistor—carbon 4.7 Meg. 1/4 watt....	.12
51	502128	Resistor—carbon 2200 Ohms 1/4 watt..	.12
55	502133	Resistor—carbon 220,000 Ohms 1/4 watt	.12
57	502132	Resistor—carbon 100,000 Ohms 1/4 watt	.12
58	502134	Resistor—carbon 470,000 Ohms 1/4 watt	.12
60	502135	Resistor—carbon 2.2 Meg. 1/4 watt....	.12
65	502291	Resistor—carbon 4700 Ohms 1/4 watt....	.12
66	502127	Resistor—carbon 560 Ohms 1/4 watt....	.12
72	502137	Resistor—wire wound 330 Ohms 2 watt..	.25
74	502134	Resistor—carbon 470,000 Ohms 1/4 watt	.12
		COILS & TRANSFORMERS	
1	502186	Loop antenna	3.15
2	502110	Coil—S.W. antenna	1.10
	502025	Complete coil—trimmer assem. for P-B tuner	8.80
8	502907	Coil less slug (540-1000 Kc.)	1.50
9, 10	502908	Coil less slug (650-1300 Kc.)	1.50
11, 12	502909	Coil less slug (975-1600 Kc.)	1.50
	502911	Slug for coils 502907, 502908, 502909....	.25
	501151	Clip—for mtg. push button coils	.08
15	502112	Coil—BC. antenna	1.70
26	502113	Coil—BC. R.F.	1.85
30	502114	Coil—BC. oscillator	1.45
36	502111	Coil—S.W. oscillator	1.10
39	502102	Transformer—1st I.F.	2.30
44	502103	Transformer—2nd I.F.	2.30
52	502174	Transformer—power	7.50
68	504206	Transformer—output for M-504205 speaker	2.00
	504208	Transformer—output for R-504205 speaker	2.00
	504124	Transformer—output for D-504205 speaker	2.00
		OTHER ELECTRICAL PARTS	
6	502120	Switch—push-button	4.00
17A, B, C	502119	Switch—band	2.80
61, 62	110629	Lamp—dial (Mazda 44) 6.3 V. 250 Ma...	.15
67	502118	Switch—tone control	.70
69	504205	Speaker—Electro-dynamic (6 inch)	9.00
70	504209	Cone & Voice coil for R-504205 speaker..	3.00
	504207	Cone & Voice coil for M-504205 speaker..	3.00
	504125	Cone & Voice coil for D-504205 speaker..	3.00

	MISCELLANEOUS PARTS	
502560	Background for dial	$0.16
116467	Base for mtg. electrolytic condenser	.04
502046	Back for cabinet	.70
117315	Call letter tabs for push-button	.55
500420	Clamp—for dial glass	.15
117057	Cord—dial drive (102 in. required), per ft.	.05
502562	Dial scale—glass	3.85
113402	Drum—for dial drive	.70
502699	Escutcheon for push-buttons	1.70
501449	Knob—volume or tuning	.15
501458	Knob—tone or band switch	.16

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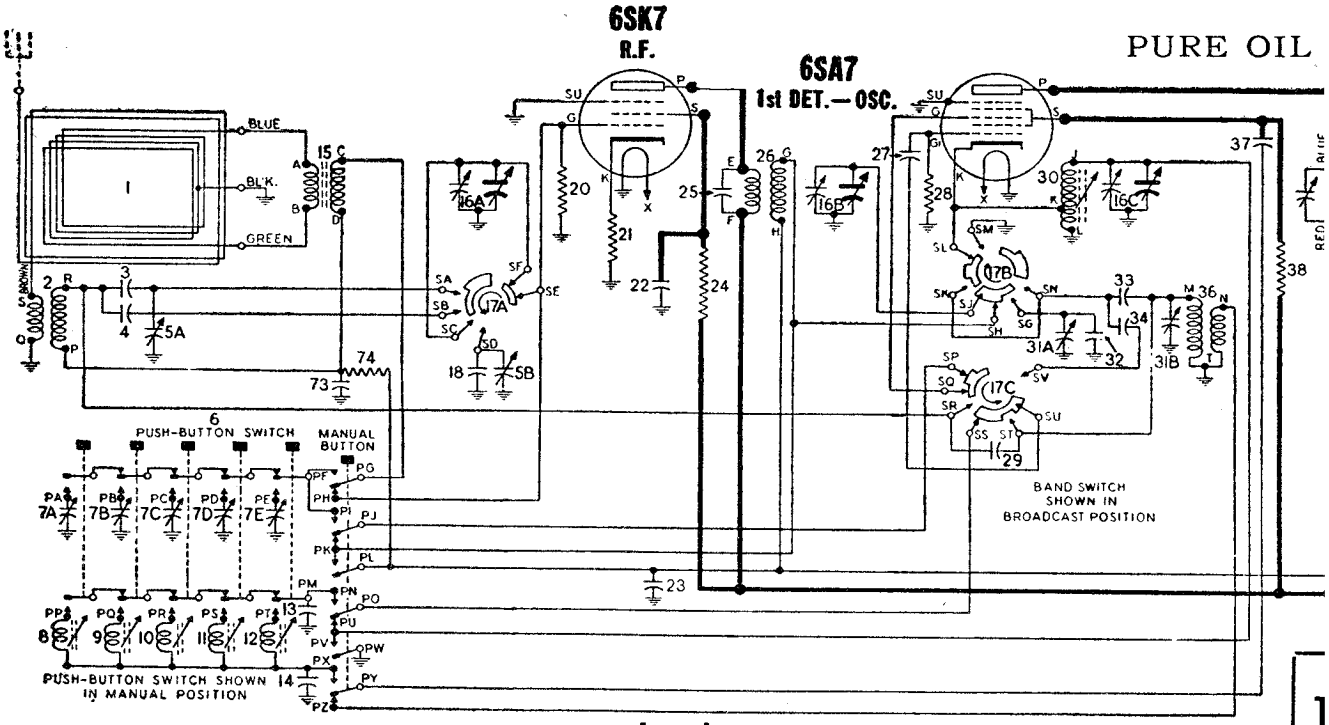
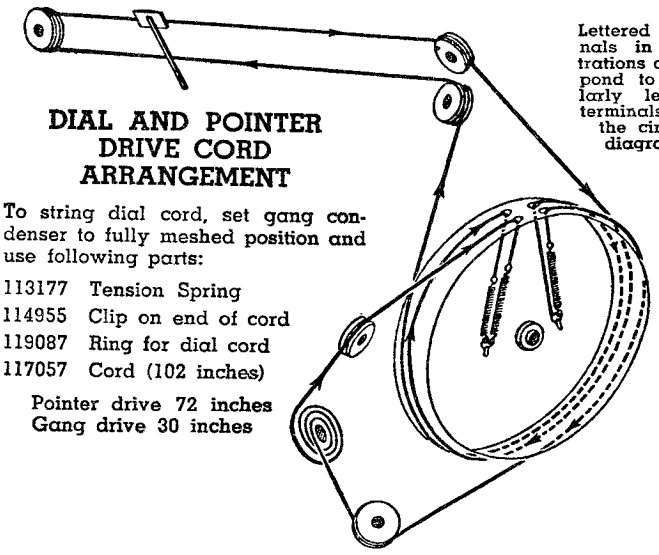




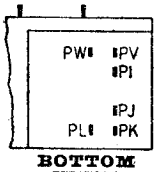
DIAL AND POINTER DRIVE CORD ARRANGEMENT

To string dial cord, set gang condenser to fully meshed position and use following parts:

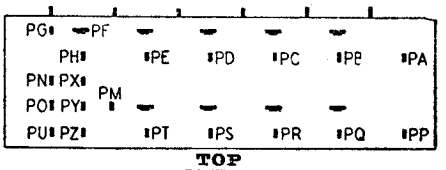
113177 Tension Spring
114955 Clip on end of cord
119087 Ring for dial cord
117057 Cord (102 inches)

Pointer drive 72 inches
Gang drive 30 inches

Lettered terminals in illustrations correspond to similarly lettered terminals on the circuit diagram.

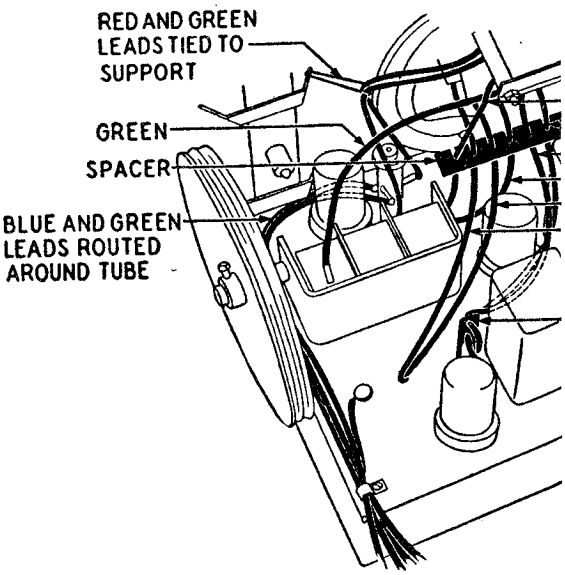


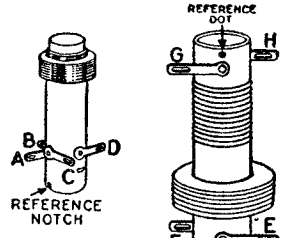
BOTTOM VIEW



TOP VIEW

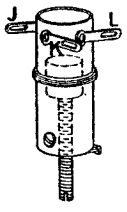
PUSH-BUTTON SWITCH 502120



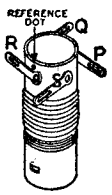


BC. ANTENNA COUPLING COIL 502112

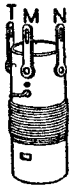
R.F. COIL 502113



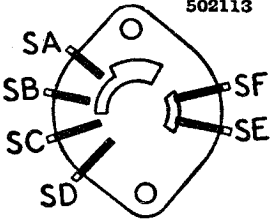
BC. OSCILLATOR COIL 502114



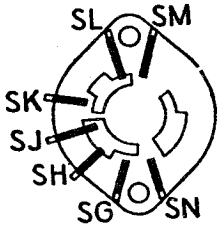
S.W. ANTENNA COIL 502110



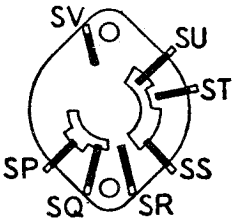
S.W. OSCILLATOR COIL 502111



FRONT SECTION REAR VIEW



REAR SECTION FRONT VIEW



REAR SECTION REAR VIEW

IMPORTANCE OF MAINTAI POSITIONS FOR LEADS AT TO

The wires shown in the above illustration a circuits which carry radio frequency currents. exercised to insure that they are properly rou ing and fixing spacing of wires minimizes free utilized to maintain a stable arrangement.

Since the relative positions of these wires may important to avoid any change in arrangeme been aligned. If the position of the wires has visable to re-check alignment (see previous page

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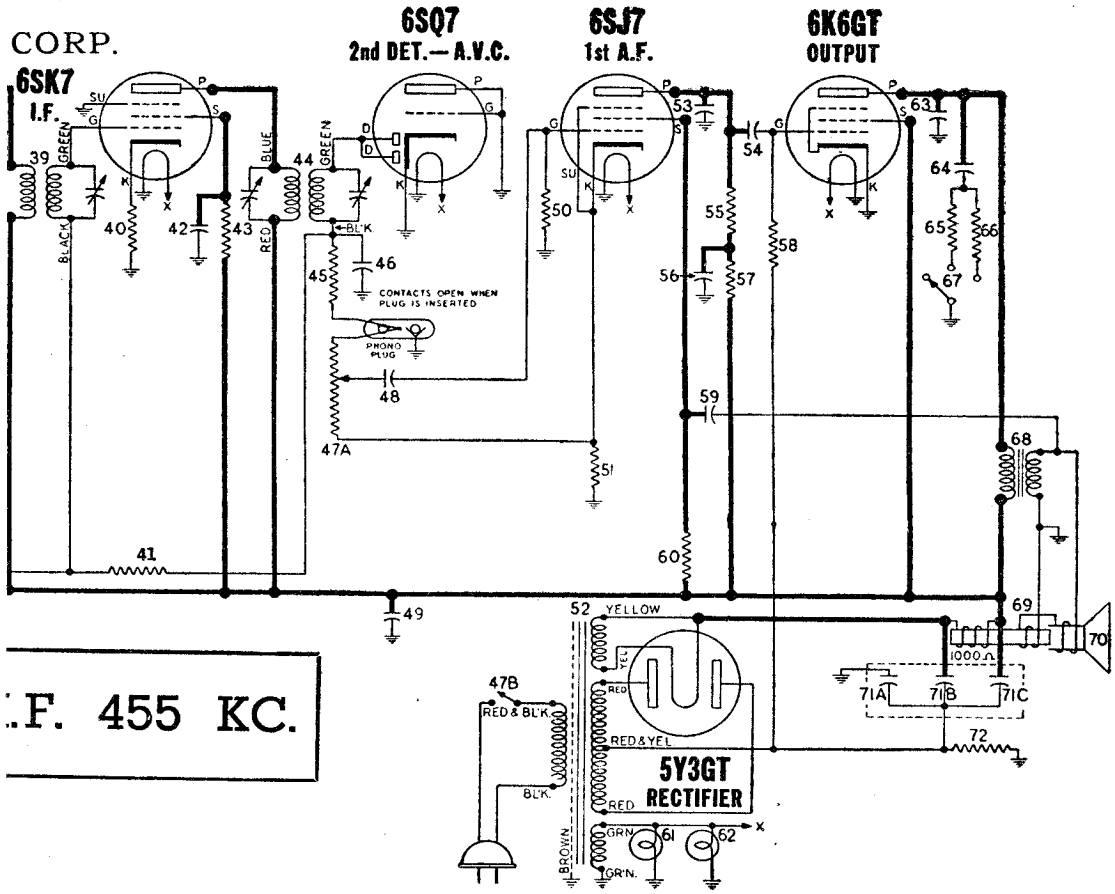
CORP.



.F. 455 KC.

WHITE
BLUE
ORANGE
BLACK
BROWN
YELLOW

LEAD SUPPORT AND SPACER

NING FIXED
P OF CHASSIS

re associated with tuned
Therefore, care must be
ted and spaced. Anchor-
dom of movement and is

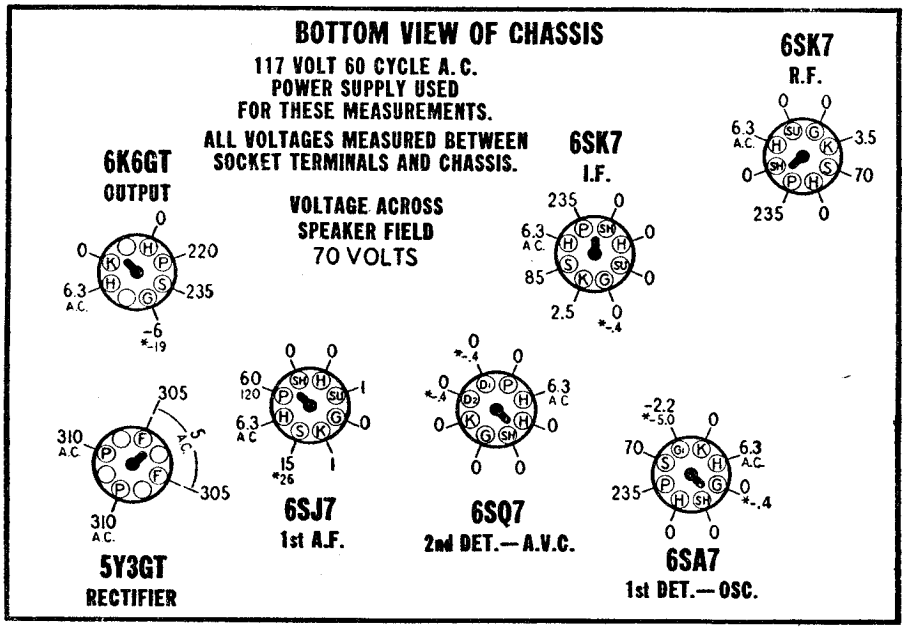
affect tuned circuits it is
nt after the receiver has
been disturbed, it is ad-
for alignment procedure).

SOCKET VOLTAGES

Measured with voltmeter having sensitivity of 1000 ohms per volt except where indicated by (*).

VOLUME ON FULL WITH NO SIGNAL
RANGE SWITCH IN BROADCAST POSITION

DIAL TUNED TO 540 KC.
MANUAL BUTTON PUSHED IN



REAR OF CHASSIS

*—Measured with vacuum tube voltmeter.

NOTE:—The 6K6GT grid bias of —19 volts can be measured across resistor No. 72.

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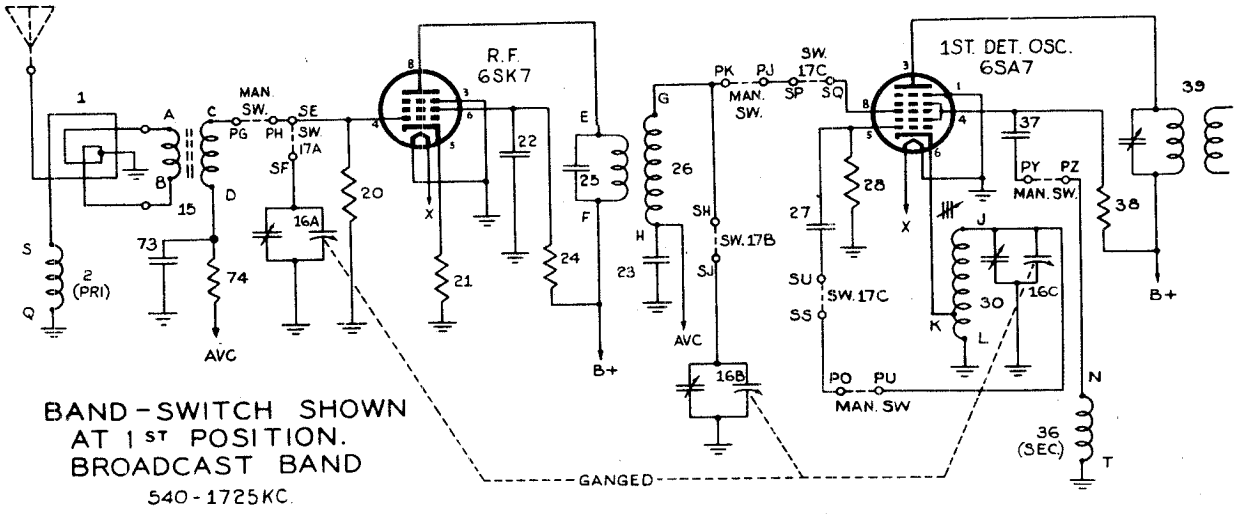

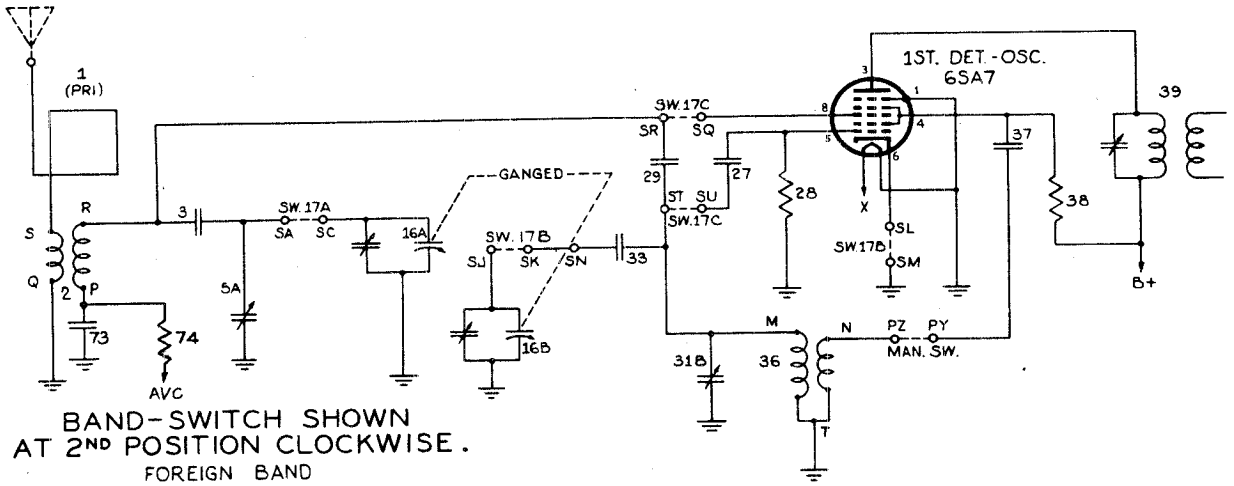

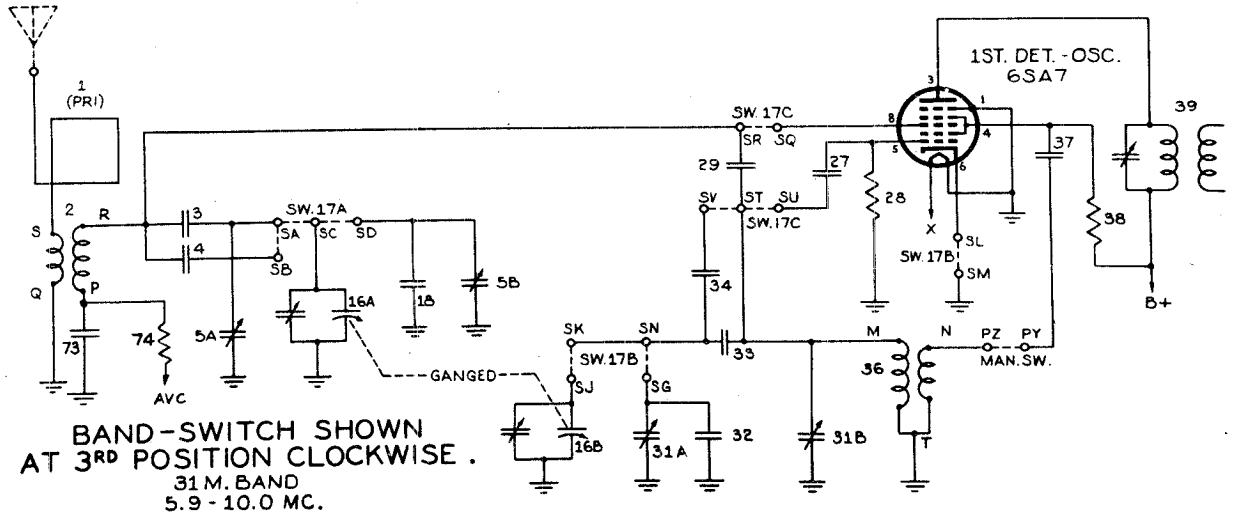

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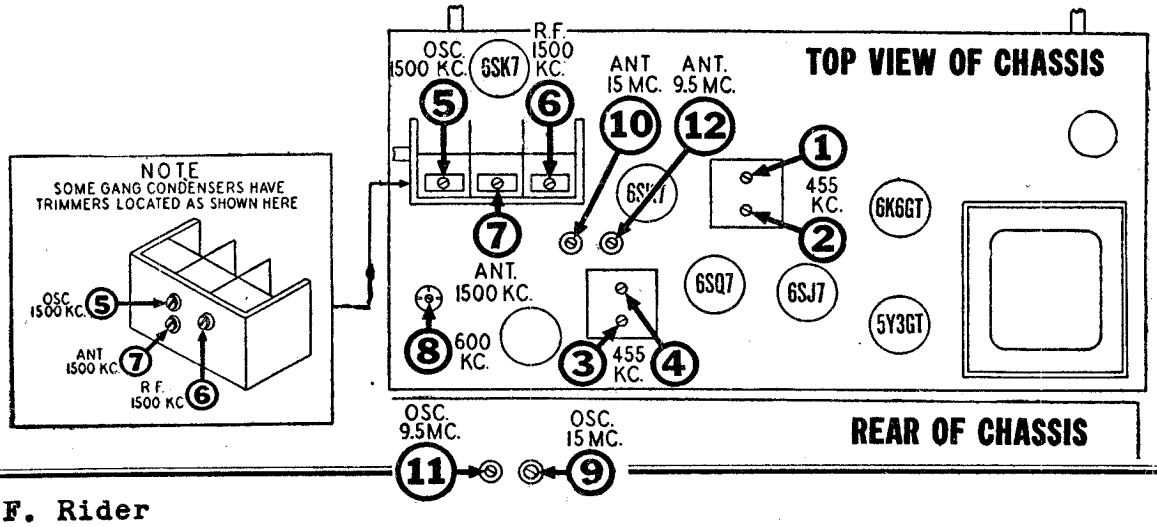
MODEL 508

PURE OIL CORP.

1. The chassis and loop antenna should remain in their normal position in the cabinet throughout the following procedure.
2. Check arrangement of leads to push-button switch as shown in illustration on following page.
3. With the gang condenser fully meshed, dial pointer should be in the position indicated by the last division below 55 on the dial. If it is set incorrectly, release pointer clip on dial cord and reposition pointer.
4. Connect output meter across speaker voice coil.
5. Connect the ground lead of the signal generator to the receiver chassis.
6. Set volume control at maximum volume position and use a weak signal from the signal generator.
7. Push in the manual button and leave it in that position throughout the alignment procedure.

IMPORTANT:—Align this receiver in exactly the order shown below. Broadcast band must be aligned before short wave bands.

DUMMY ANT. IN SERIES WITH SIGNAL GENERATOR	CONNECT HIGH SIDE OF SIGNAL GENERATOR TO	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POSITION	RECEIVER DIAL SETTING	TRIMMER NUMBER	TRIMMER DESCRIPTION	TYPE OF ADJUSTMENT
.1 MFD. Condenser	Trimmer on rear section of gang	455 KC	Broadcast (counter-clockwise)	Any point where it does not affect the signal.	1-2	2nd I.F.	Adjust for maximum output. Then repeat adjustment.
					3-4	1st I.F.	
.003 MFD. Condenser	External Antenna Clip on Loop Frame	1500 KC	Broadcast (counter-clockwise)	1500 KC	5	Broadcast Oscillator (Shunt)	Adjust for maximum output.
.003 MFD. Condenser	External Antenna Clip on Loop Frame	1500 KC	Broadcast (counter-clockwise)	Tune to 1500 KC Generator Signal	6	Broadcast R.F.	Adjust for maximum output.
.003 MFD. Condenser	External Antenna Clip on Loop Frame	1500 KC	Broadcast (counter-clockwise)	Tune to 1500 KC Generator Signal	7	Broadcast Antenna	Adjust for maximum output.
.003 MFD. Condenser	External Antenna Clip on Loop Frame	600 KC	Broadcast (counter-clockwise)	Tune to 600 KC Generator Signal	8	Adjustable core of Broadcast Oscillator Coil.	Adjust for maximum output. Try to increase output by rotating core in and out and retuning receiver dial until maximum output is obtained.
.003 MFD. Condenser	External Antenna Clip on Loop Frame	Repeat adjustments of trimmers 5, 6 and 7 at 1500 Kc. Then re-check adjustment of trimmer 8 at 600 Kc.					
400 OHM Carbon Resistor	External Antenna Clip on Loop Frame	15 MC	Short wave	15 MC	9	S.W. Oscillator	Adjust for maximum output. Check to see if proper peak was obtained by tuning in image at approx. 14.1 MC. If image does not appear, realign at 15 MC, with trimmer screw farther out. Recheck image.
400 OHM Carbon Resistor	External Antenna Clip on Loop Frame	15 MC	Short wave	Tune to 15 MC Generator Signal	10	S.W. Antenna	Adjust for maximum output. Try to increase output by detuning trimmer and retuning receiver dial until maximum output is obtained.
400 OHM Carbon Resistor	External Antenna Clip on Loop Frame	9.5 MC	31 M (Clockwise)	9.5 MC	11	31 M Oscillator	Adjust for maximum output. Check to see if proper peak was obtained by tuning in image at approx. 8.6 MC. If image does not appear, realign at 9.5 MC. with trimmer screw farther out. Recheck image.
400 OHM Carbon Resistor	External Antenna Clip on Loop Frame	9.5 MC	31 M (Clockwise)	Tune to 9.5 MC Generator Signal	12	31 M Antenna	Adjust for maximum output. Try to increase output by detuning trimmer and retuning receiver dial until maximum output is obtained.



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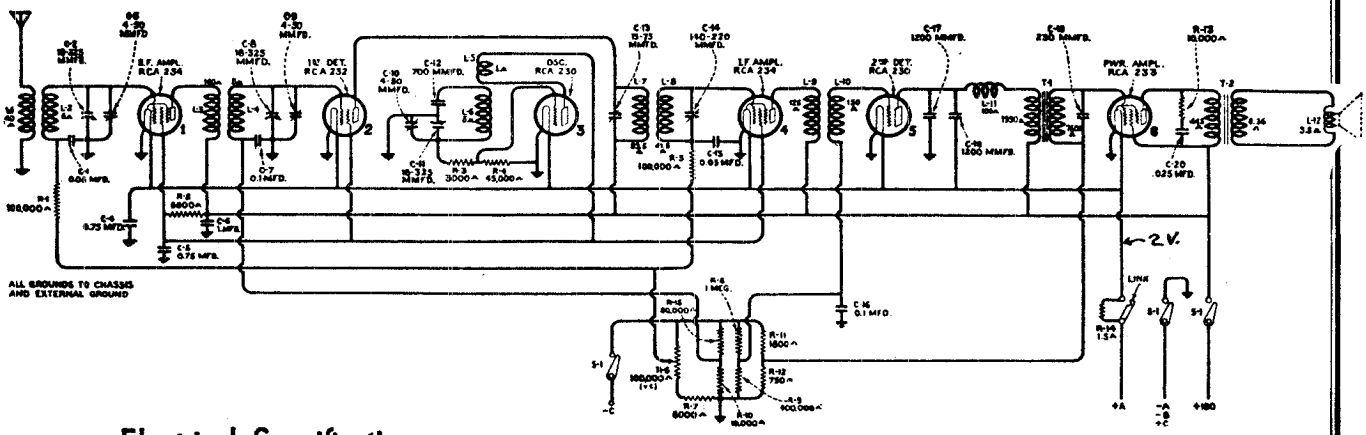


Figure A—Schematic Circuit Diagram

Electrical Specifications

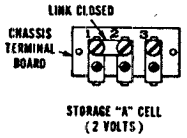
"A" Battery Current.....0.55 Ampere

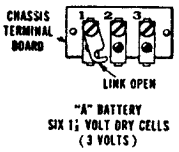
"B" Battery Current (Max. Volume Control)..0.032 Ampere

Type and Number of Radiotrons.....2 RCA-234, 1 RCA-232, 2 RCA-230, 1 RCA-233—Total, 6.

Undistorted Output.....0.4 Watt

Important—When using 3-volt "A" supply as shown in Figure 2 (b), be sure to open the link connecting terminals 1 and 2 on the rear of the chassis. For 2-volt "A" supply as in Figure 2 (a), the link should be closed. The proper link position is shown by the inset in each diagram.





REPLACEMENT PARTS

Stock NO.	DESCRIPTION
	RECEIVER ASSEMBLIES
2012	Capacitor - 1,200 mmfd - (C-17)
2532	Capacitor - 230 mmfd - (C-19)
2747	Cap - Contact cap
2963	Resistor - 8,000 ohms - Carbon, 1 watt (R-2).
2994	Coil (L-11)
3076	Resistor - 1 megohm - Carbon - 1/2 watt (R-8)
3078	Resistor - 10,000 ohms - Carbon - 1/2 watt - (R-13, R-10).
3079	Resistor - 40,000 ohms - Carbon - 1/2 watt - (R-4)
3118	Resistor - 100,000 ohms - Carbon - 1/4 watt - (R-1)
3252	Resistor - 100,000 ohms - Carbon - 1/2 watt - (R-5)
3297	Resistor - 80,000 ohms - Carbon - 1/2 watt - (R-15).
3358	Resistor - 3,000 ohms - Carbon - 1/2 watt - (R-3)
3368	Socket - UX type Radiotron socket
3382	Resistor - 750 ohms - Carbon - 1/2 watt (R-12)
3456	Capacitor - 0.05 mfd (C-1, C-15)
3460	Capacitor - 1,200 mmfd - (C-17)
3471	Capacitor - 0.025 mfd - (C-20)
3509	Socket - Five contact Radiotron socket.
3510	Shaft - Tuning condenser drive shaft.
3511	Scale - Dial scale and drum
3512	Switch - Operating switch (S-1)
3513	Capacitor - 700 mmfd - (C-12)

Stock NO.	DESCRIPTION
	RECEIVER ASSEMBLIES (Continued)
3515	Resistor - 1,800 ohms - Carbon - 1/2 watt - (R-11)
6142	Resistor - 6,000 ohms - Carbon - 1/2 watt - (R-7)
6228	Resistor - 200,000 ohms - Carbon - 1/2 watt
6249	Resistor - 1.5 ohms - Flexible type (R-14).
6280	Resistor - 400,000 ohms - Carbon - 1/2 watt - (R-9)
6315	Resistor - 45,000 ohms - Carbon - 1/2 watt - (R-4)
6333	Cable - Battery cable
6414	Capacitor pack - Comprising one 1.0 mfd., two 0.75 mfd. and two 0.1 mfd. (C-5,C-6,C-7).
6415	Transformer assembly - Comprising interstage and output transformer (T-1, T-2)
6416	Transformer - First I-F transformer
6417	Transformer - Second I-F transformer.
6418	Coil - Detector oscillator coil
6419	Coil - R.F. coil
6463	Volume control,- 100,000 ohms (R-6)
7241	Condenser - 3 gang variable tuning.
	LOUDSPEAKER ASSEMBLY
6166	Board - Terminal board, two terminals
8983	Magnet assembly - Comprising cone bracket core and magnet.
8984	Cone - Speaker paper cone

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MODELS 9X6, 9X11, 9X12, 9X13, 9X14

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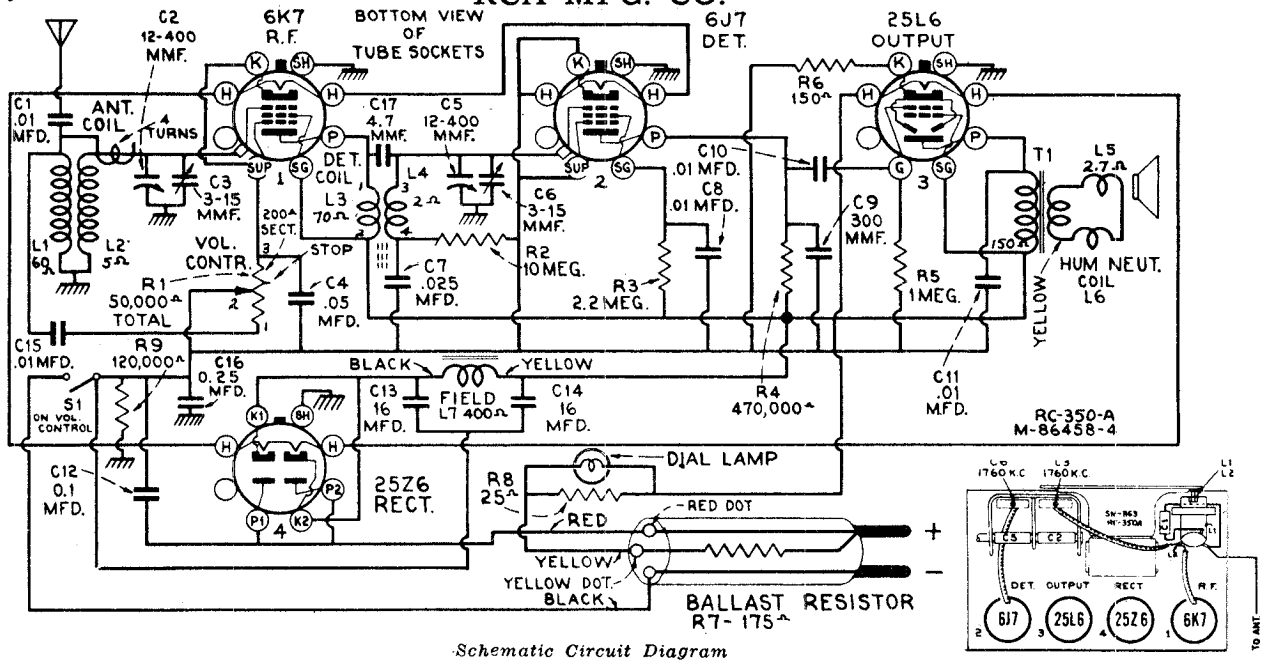
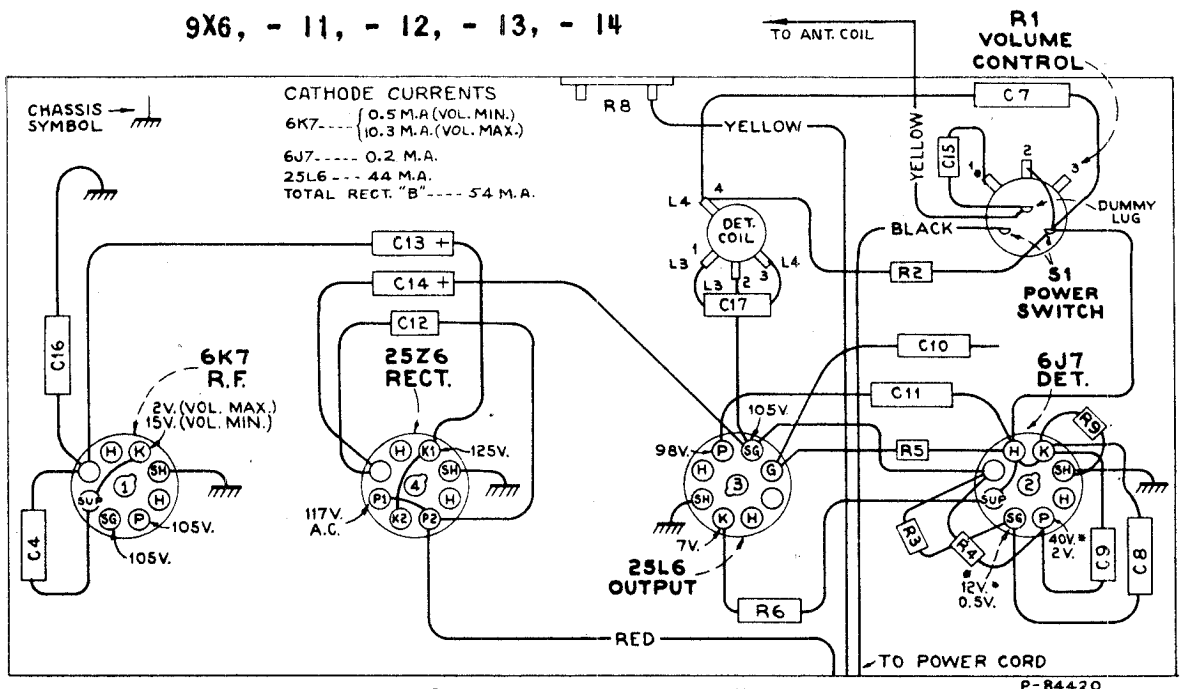


Schematic Circuit Diagram

9X6, - 11, - 12, - 13, - 14



BOTTOM VIEW - REAR OF CHASSIS

R-F Wiring Diagram and Socket Voltages

* Note: Values with (*) are operating voltages. Values not starred are actual measured voltages.

Measurements made to common negative line, unless otherwise specified.

Measurements made with set tuned to quiet point, volume control at minimum, using 1,000-ohm-per-volt meter, having ranges of 10, 50, and 250 volts. (Use nearest range above the specified measured voltage.)

Values should hold within approximately ± 20% for 117-volt 60-cycle a-c supply. On d-c, voltages are approximately 10% lower, except heaters, which remain the same.

Precautionary Lead Dress

1. Dress green lead from antenna coil to gang up from speaker chassis.
2. Green lead from gang to grid of 6J7 must be dressed down and away from top of bracket, and centered in gang section.
3. Green lead from detector coil to gang must be dressed under pilot lamp bracket: Any excess wire should be pulled through to under side of chassis.
4. Pilot lamp leads must be dressed clear of gang rotor.
5. Magnetite core in detector coil must not be in contact with base or mounting screw.

Power-Supply Polarity.—For operation on d-c, the power plug must be inserted in the outlet for correct polarity. If the set does not function, reverse the plug. On a-c, reversal of the plug may reduce hum.

Antenna.—The set is equipped with a 25-foot antenna. Do not connect the antenna to ground. If an outdoor antenna is used, it should not be longer than 100 feet, including lead-in. If it is longer, connect a 100 to 200 mmfd. capacitor in series with the lead-in.

25-Cycle Operation

For 25-cycle operation, connect a 16 mfd., 150-volt dry electrolytic capacitor (Stock No. 31323) in parallel to C13.

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MODELS 9X6, 9X11, 9X12, 9X13, 9X14
MODEL X-55

MODELS 9X6, - 11, - 12, - 13, - 14 (RC-350A) Replacement Parts

STOCK No.	DESCRIPTION
	RECEIVER ASSEMBLIES
14392	Capacitor—4.7 mmfd. (C17)
30883	Capacitor—300 mmfd. (C9)
14393	Capacitor—.01 mfd. (C15)
4870	Capacitor—.025 mfd. (C7)
30882	Capacitor—.05 mfd. (C4)
30899	Capacitor—0.1 mfd. (C12)
12484	Capacitor—0.25 mfd. (C16)
31323	Capacitor—16 mfd. (C13, C14)
30875	Coil—Antenna coil (L1, L2)
32027	Coil—R-f coil (L3, L4)
31321	Condenser—2-gang variable tuning condenser (C2, C3, C5, C6)
32030	Cord—Resistance power cord (R7)
31314	Dial—Station selector dial scale
31315	Drum—Station selector dial scale drum—less scale
4340	Lamp—Dial lamp
31193	Lead—Antenna lead—approximately 25 ft. long.
32028	Resistor—25 ohms, 3 watts, wire wound (R8)
13428	Resistor—150 ohms, ½ watt (R6)
13734	Resistor—120,000 ohms, ½ watt (R9)
12285	Resistor—470,000 ohms, ½ watt (R4)
13730	Resistor—1 meg., ½ watt (R5)
12679	Resistor—2.2 meg., ½ watt (R3)
13601	Resistor—10 meg., ½ watt (R2)
4357	Screw—No. 6-32 headless set screw for drum, Stock No. 31315
31318	Socket—Dial lamp socket
31319	Socket—Tube socket
32029	Transformer—Output transformer (T1)
32026	Volume control and power switch (R1, S1)

Dial Lamp ..... Mazda No. 40, 6.3 volts, .15 amps.

POWER SUPPLY RATINGS

A-C Rating ..... 105-125 volts, 50-60 cycles, 50 watts
D-C Rating ..... 105-125 volts, 50 watts

POWER OUTPUT (125-volt, 60-cycle supply)

Undistorted ..... 1.0 watt
Maximum ..... 1.5 watts

LOUDSPEAKER

Type ..... 3-inch Electrodynamic
Voice-Coil Impedance ..... 3 ohms at 400 cycles

Alignment Procedure

Reel up the antenna wire, and keep it away from chassis during alignment. Connect the high side of test-oscillator through an 80 mmfd. capacitor to the antenna terminal. Connect low side of oscillator to receiver chassis through a 0.1 mfd. capacitor. Turn gang condenser to minimum (full out), tune oscillator to 1,760 kc, connect an output meter across the voice coil, and turn volume control to maximum.

Adjust the two trimmers (C3 and C6) on side of gang condenser for maximum output, using lowest possible output from test-oscillator.

Pre-setting Dial.—With gang condenser rotor plates turned full in for maximum capacity, loosen dial-drum set screw, and turn drum so that the top edge of dial (low-frequency end) is approximately 1/16-in. below level of gang frame, and tighten set-screw.

	SPEAKER ASSEMBLIES (86309-2)
31325	Cone—Speaker cone and voice coil (L5)
32025	Speaker complete
	MISCELLANEOUS ASSEMBLIES
31326	Escutcheon—Station selector dial escutcheon—Model 9X6
31915	Escutcheon—Station selector dial escutcheon—Models 9X11, 9X12, 9X13 and 9X14 only
31914	Knob—Station selector or volume control knob—Models 9X12 and 9X13 only
31204	Knob—Station selector or volume control knob—Models 9X6, 9X11 and 9X14 only
30900	Spring—Retaining spring for knobs

Adjustments for Push-Button Tuning MODEL X-55

The push-buttons should be adjusted for six favorite stations after the receiver has been operating for a brief warm-up period. Each button may be set up to any standard broadcast station. The preferable arrangement is to adjust for stations in the order of frequency, from low to high. Proceed as follows:

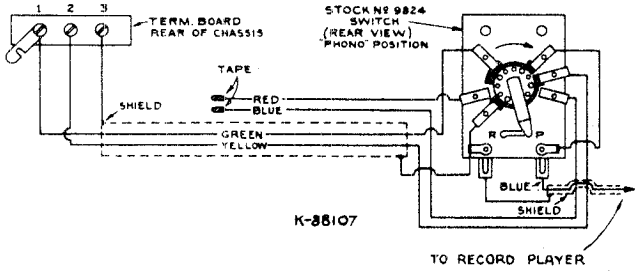
1. Pull off the push-buttons and loosen the push-button rods with a small screwdriver.

2. Turn the accessory switch to "Radio" position and accurately tune in the station for which the first button is to be set.

3. Press in push-button rod No. 1 (left) with the screwdriver, as far as it will go without undue pressure, hold in, retune station with manual control if necessary for best reception, and then carefully tighten up the rod. Do not tighten more than ¼ turn after the rod begins to grip or damage to the mechanism may result.

4. Replace the push-button on its shaft.

5. Proceed in a similar manner for the remainder of the push-buttons.



Record Player Connections, Using a No. 9824 Switch

STOCK No.	DESCRIPTION
	CHASSIS ASSEMBLY (RC-473A)
33719	Belt—Push button arm adjustment belt and rivets
34024	Board—"Antenna-Ground" board
34025	Board—"Radio-Phono" board
33731	Button—Push button
12720	Capacitor—100 mmfd., moulded mica
12725	Capacitor—150 mmfd., moulded mica
34213	Capacitor—430 mmfd., mica
30433	Capacitor—470 mmfd., moulded mica
14393	Capacitor—.01 mfd., 300 volt
11315	Capacitor—.015 mfd., 400 volt
32787	Capacitor—.05 mfd., 400 volt
4839	Capacitor—0.1 mfd., 400 volt
34505	Capacitor—0.2 mfd., 300 volt
34212	Capacitor—Electrolytic comprising 2 sections of 50 mfd. each, 150 volts
33724	Coil—Oscillator coil (L1)
33728	Condenser—Tuning condenser and drum assembly
33631	Control—Volume control and power switch (S1)
32634	Cord—Tuning condenser drive cord
33633	Indicator—Station selector pointer
11765	Lamp—Pilot lamp—Mazda No. 51
33721	Loop—Antenna loop
33727	Plate—Dial plate frame
30880	Resistor—150 ohm, ½ W.
30152	Resistor—1,000 ohms, 1 W.
12454	Resistor—33,000 ohms, ½ W.
12412	Resistor—47,000 ohm, ½ W.
12264	Resistor—220,000 ohms, ½ W.
12285	Resistor—470,000 ohms, ½ W.
30271	Resistor—4.7 megohm, ½ W.
13601	Resistor—10 megohm, ½ W.
33735	Screw—Push arm lock screw
33725	Shaft—Tuning condenser drive shaft and retainer
31365	Socket—Lamp socket
31319	Socket—Tube socket
33720	Spring—Push button arm return spring
31418	Spring—Tuning condenser drive cord spring
33722	Transformer—1st i.f. transformer
34026	Transformer—2nd i.f. transformer
33726	Washer—"C" washer for drive shaft
	SPEAKER ASSEMBLIES (RL 85-2)
32907	Cap—Cone center dust cap
34554	Cone—Speaker cone and voice coil
34802	Speaker—5-inch permanent magnet—less transformer
34803	Transformer—Output transformer
	MISCELLANEOUS ASSEMBLIES
31456	Cover—8 protective covers for push-button markers
33729	Dial—Glass dial scale
33637	Escutcheon—Dial and button escutcheon
30863	Knob—Tuning, volume control, or power switch knob
30900	Spring—Retaining spring for knob or button
33973	Marker—1 set push-button marker

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MODELS Q10,Q10A,
Ch.RC-594C,Early

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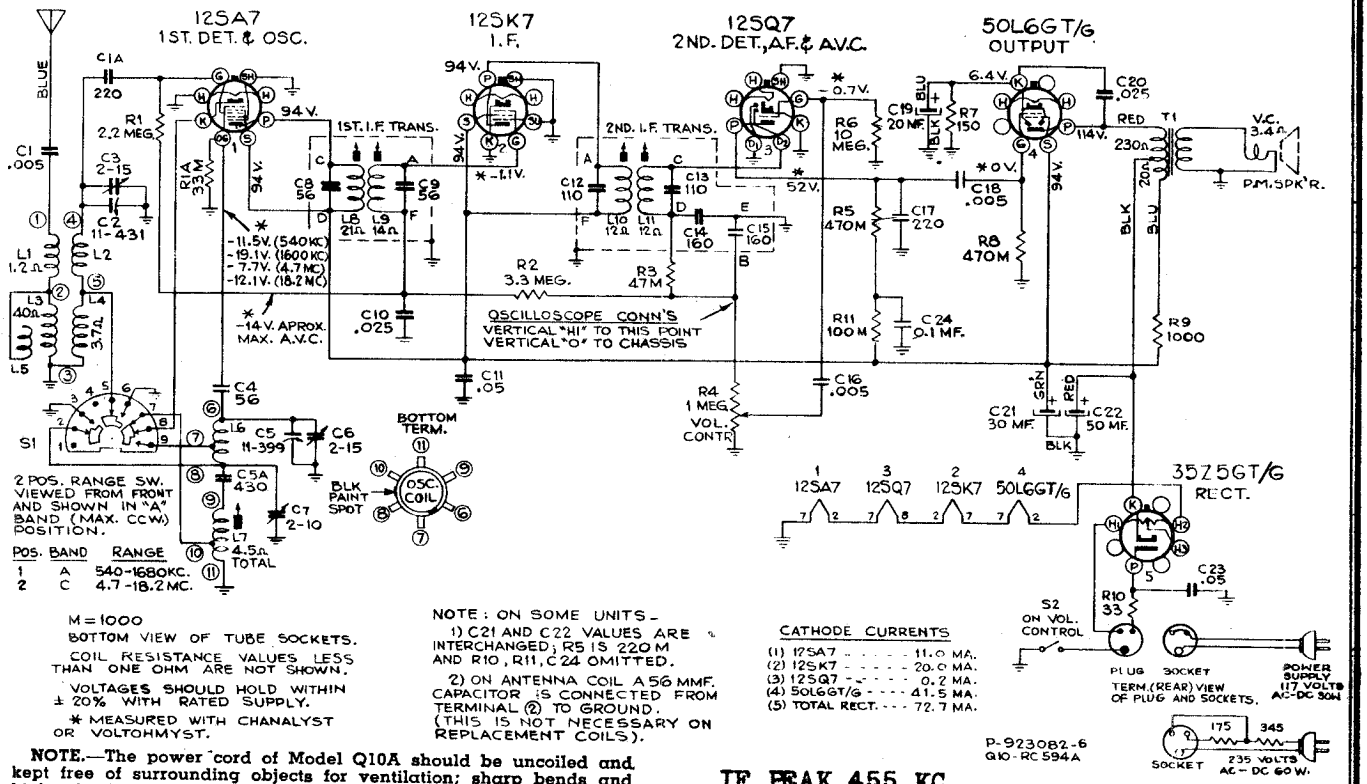

M = 1000

BOTTOM VIEW OF TUBE SOCKETS.

COIL RESISTANCE VALUES LESS THAN ONE OHM ARE NOT SHOWN.

VOLTAGES SHOULD HOLD WITHIN ± 20% WITH RATED SUPPLY.

* MEASURED WITH CHANALYST OR VOLTOHMYST.

NOTE: ON SOME UNITS -
1) C21 AND C22 VALUES ARE INTERCHANGED; R5 IS 220 M AND R10, R11, C24 OMITTED.
2) ON ANTENNA COIL A 56 MMF. CAPACITOR IS CONNECTED FROM TERMINAL ② TO GROUND. (THIS IS NOT NECESSARY ON REPLACEMENT COILS).

CATHODE CURRENTS

(1) 12SA7	11.0 MA.
(2) 12SK7	20.0 MA.
(3) 12SQ7	0.2 MA.
(4) 50L6GT/G	41.5 MA.
(5) TOTAL RECT.	72.7 MA.

NOTE.—The power cord of Model Q10A should be uncoiled and kept free of surrounding objects for ventilation; sharp bends and kinks should also be avoided.

IF PEAK 455 KC

Replacement Parts

STOCK No.	DESCRIPTION
	CHASSIS ASSEMBLIES RC-594C
70367	Capacitor—Mica trimmer, 2-10 mmf. (C7)
39622	Capacitor—Mica, 56 mmf. (C4)
39636	Capacitor—Mica, 220 mmf. (C1A, C17)
39643	Capacitor—Mica, 430 mmf. (C5A)
70627	Capacitor—Tubular, .005 mfd., 600 volts (C1, C16, C18)
70612	Capacitor—Tubular, .025 mfd., 400 volts (C10, C20)
70615	Capacitor—Tubular, .05 mfd., 400 volts (C11, C23)
70617	Capacitor—Tubular, 0.1 mfd., 400 volts (C24)
70371	Capacitor—Electrolytic, comprising 1 section of 50 mfd., 150 volts; 1 section of 30 mfd., 150 volts; and 1 section of 20 mfd., 20 volts (C22, C21, C19)
70360	Coil—Antenna coil (L1, L2, L3, L4, L5)
70359	Coil—Oscillator coil (L6, L7)
70366	Condenser—Variable tuning condenser (C2, C3, C5, C6)
38406	Control—Volume control and power switch (R4, S2)
32634	Cord—Drive cord (approx. 37 inches long)
70365	Core—Adjustable core and stud for oscillator coil
37068	Indicator—Station selector indicator
70364	Nut—Speed nut to mount oscillator coil
70368	Plate—Dial back plate complete with pulleys less dial
36230	Pulley—Drive cord pulley
71290	Resistor—33 ohms, 1 watt (R10)
30880	Resistor—150 ohms, ½ watt (R7)
30152	Resistor—1000 ohms, 1 watt (R9)
30685	Resistor—33,000 ohms, ¼ watt (R1A)
30787	Resistor—47,000 ohms, ¼ watt (R3)
3252	Resistor—100,000 ohms, ¼ watt (R11)
30648	Resistor—470,000 ohms, ¼ watt (R5, R8)
30649	Resistor—2.2 megohms, ¼ watt (R1)
12928	Resistor—3.3 megohms, ¼ watt (R2)
30992	Resistor—10 megohms, ¼ watt (R6)

STOCK No.	DESCRIPTION
70369	Shaft—Tuning knob shaft
70363	Socket—3 pin socket for power cable located on rear apron
37605	Socket—Tube socket, moulded
31418	Spring—Tension spring for drive cord
70358	Switch—Range switch (S1)
70361	Transformer—First I-F transformer (L8, L9, C8, C9)
70362	Transformer—Second I-F transformer (L10, L11, C12, C13, C14, C15)
70370	Transformer—Output transformer (T1)
33726	Washer—Retaining washer for tuning shaft
	SPEAKER ASSEMBLY 92510-2
70372	Speaker—5-inch PM speaker complete NOTE: If stamping on speaker in instrument does not agree with above speaker number, order replacement parts by referring to model number of instrument, number stamped on speaker and full description of part required.
	MISCELLANEOUS ASSEMBLIES
37362	Clamp—Dial clamp (1 set)
70374	Cord—Power cord for 110 v. operation
70375	Cord—Power cord (resistance) for 220 v. operation
70373	Cover—Back cover less power cord
71023	Decal—Trade mark decalcomania
70376	Dial—Dial scale
37831	Fastener—Push fastener for back cover (1 set)
35121	Knob—Range switch knob
36722	Knob—Volume control or tuning knob
35126	Spring—Retaining spring for range switch knob
30900	Spring—Retaining spring for volume control or tuning knob

For other data, see P.15-7

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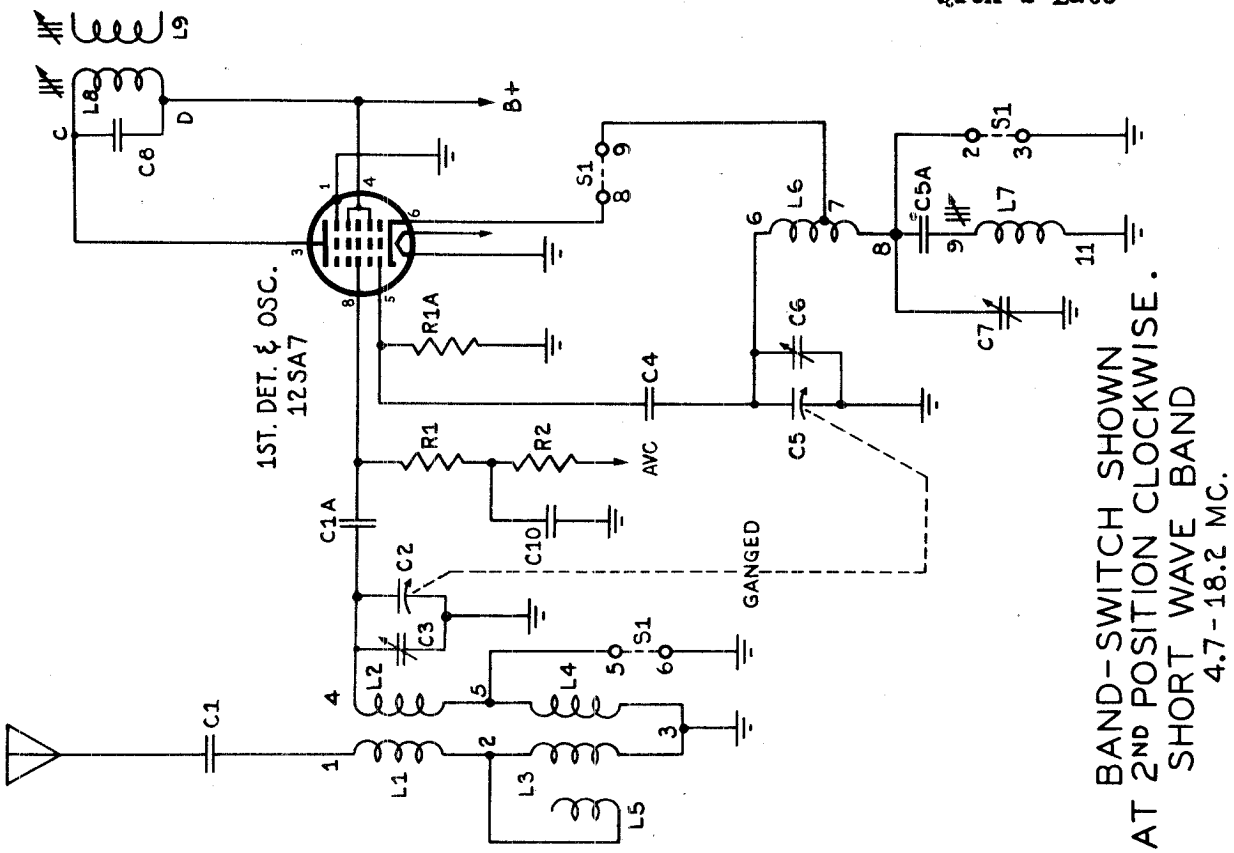
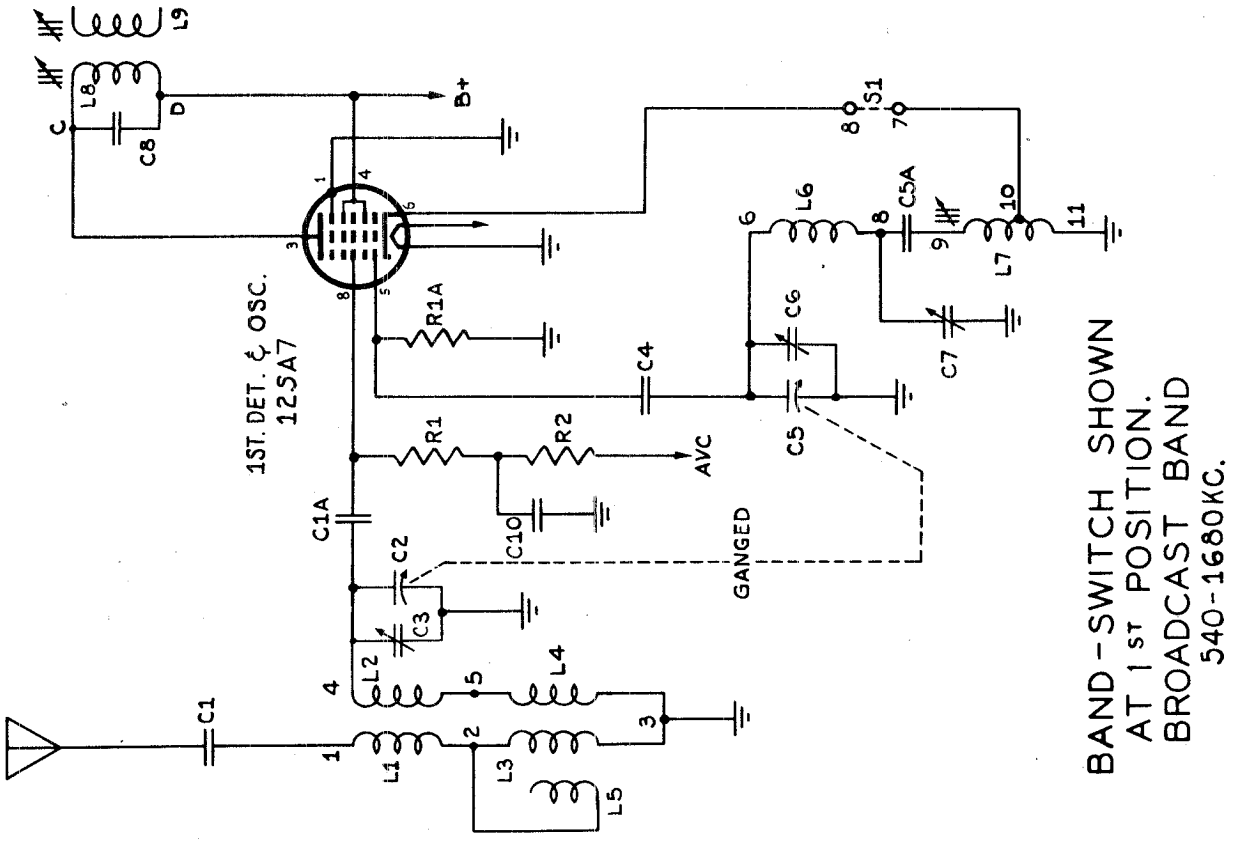
MODELS Q10, Q10A Early
MODELS Q10, Q10-2, Q10A-2 Late





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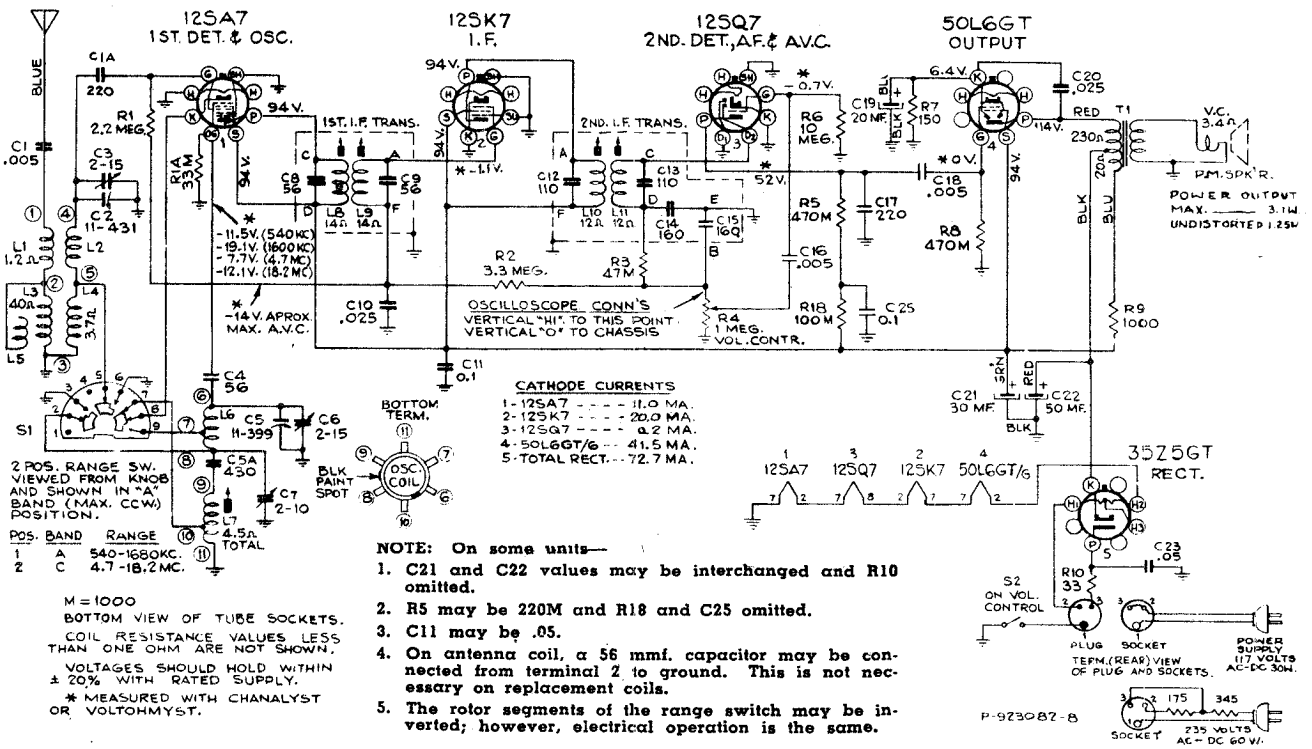
MODELS Q10, Q10A, Q10-2
Q10A-2, Ch. RC-594C Late

RCA MFG. CO.



NOTE: On some units—

1. **C21 and C22 values may be interchanged and R10 omitted.**
2. **R5 may be 220M and R18 and C25 omitted.**
3. **C11 may be .05.**
4. **On antenna coil, a 56 mmf. capacitor may be connected from terminal 2 to ground. This is not necessary on replacement coils.**
5. **The rotor segments of the range switch may be inverted; however, electrical operation is the same.**

NOTE.—The power cord of Models Q10A and Q10A-2 should be uncoiled and kept free of surrounding objects to provide adequate ventilation. Sharp bends and kinks should be avoided.

Schematic Diagram

IF PEAK 455 KC

Replacement Parts

STOCK No.	DESCRIPTION
	CHASSIS ASSEMBLIES RC-594C
70367	Capacitor—Mica trimmer, 2-10 mmf. (C7)
39622	Capacitor, 56 mmf. (C4)
39636	Capacitor—Mica, 220 mmf. (C1A, C17)
39643	Capacitor—Mica, 430 mmf. (C5A)
70627	Capacitor—Tubular, .005 mfd., 600 volts (C1, C16, C18)
70612	Capacitor—Tubular, .025 mfd., 400 volts (C10, C20)
70615	Capacitor—Tubular, .05 mfd. 400 volts (C23)
70617	Capacitor—Tubular, 0.1 mfd., 400 volts (C11, C24)
70371	Capacitor—Electrolytic, comprising 1 section of 50 mfd., 150 volts; 1 section of 30 mfd., 150 volts; and 1 section of 20 mfd., 20 volts (C22, C21, C19)
70360	Coil—Antenna coil (L1, L2, L3, L4, L5)
70359	Coil—Oscillator coil (L6, L7)
70366	Condenser—Variable tuning condenser (C2, C3, C5, C6)
38406	Control—Volume control and power switch (R4, S2)
32634	Cord—Drive cord (approx. 37 inches long)
70365	Core—Adjustable core and stud for oscillator coil
16058	Grommet—Rubber grommet for mounting speaker, 3 required (used only on some units)
37068	Indicator—Station selector indicator
70364	Nut—Speed nut to mount oscillator coil
70368	Plate—Dial back plate complete with pulleys less dial
36230	Pulley—Drive cord pulley
71290	Resistor—33 ohms, 1 watt (R10)
30880	Resistor—150 ohms, ½ watt (R7)
30152	Resistor—1000 ohms, 1 watt (R9)
30685	Resistor—33,000 ohms, ¼ watt (R1A)
30787	Resistor—47,000 ohms, ¼ watt (R3).
3252	Resistor—100,000 ohms, ¼ watt (R11)
30648	Resistor—470,000 ohms, ¼ watt (R5, R8)
30649	Resistor—2.2 megohms, ¼ watt (R1)
12928	Resistor—3.3 megohms, ¼ watt (R2)
30992	Resistor—10 megohms, ¼ watt (R6)

STOCK No.	DESCRIPTION
70369	Shaft—Tuning knob shaft
70363	Socket—3 pin socket for power cable located on rear apron
37605	Socket—Tube socket, moulded
31418	Spring—Tension spring for drive cord
70358	Switch—Range switch (S1)
70361	Transformer—First I-F transformer (L8, L9, C8, C9)
70362	Transformer—Second I-F transformer (L10, L11, C12, C13, C14, C15)
70370	Transformer—Output transformer (T1)
33726	Washer—Retaining washer for tuning shaft
	SPEAKER ASSEMBLY 92510-2
70372	Speaker—5-inch PM speaker complete
	NOTE: If stamping on speaker in instrument does not agree with above speaker number, order replacement parts by referring to model number of instrument, number stamped on speaker and full description of part required.
	MISCELLANEOUS ASSEMBLIES
37362	Clamp—Dial clamp (1 set)
70374	Cord—Power cord for 110 v. operation—Q10, Q10-2
70375	Cord—Power cord (resistance) for 220 v. operation—Q10A, Q10A-2
70373	Cover—Back cover less power cord
71023	Decal—Trade mark decalcomania
70376	Dial—Dial scale
37831	Fastener—Push fastener for back cover (1 set)
35121	Knob—Range switch knob—Q10, Q10A
35123	Knob—Range switch knob—Q10-2, Q10A-2
36722	Knob—Volume control or tuning knob—Q10
70414	Knob—Volume control or tuning knob—Q10-2
35126	Spring—Retaining spring for range switch knob
30900	Spring—Retaining spring for volume control or tuning knob

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RCA MFG. CO.

MODELS Q10, Q10A, Ch. RC-594C Early
MODELS Q10, Q10A, Q10-2, Q10A-2, Ch. RC-594C, Late

Cathode-Ray Alignment is the preferable method. Connections for the oscilloscope are shown in the schematic drawing.

Output Meter Alignment.—If this method is used, connect the meter across the voice coil, and turn the receiver volume control to maximum.

Test-Oscillator.—For all alignment operations, connect the low side of the test-oscillator to the receiver chassis, and keep the oscillator output as low as possible to avoid a-v-c action.

FOR EARLY MODELS

Test-Oscillator.—For all alignment operations, connect the low side of the test-oscillator through a .01 mfd. capacitor to the receiver chassis, and keep the oscillator output low to avoid a-v-c action.

FOR LATE MODELS

Calibration Scale.—The glass tuning dial may be easily removed from the cabinet and mounted above the pointer for reference during alignment. The extreme left hand mark of the Standard Broadcast scale must be in line with the left hand mark on the dial backing plate.

Dial Backing Plate.—In the event that only the chassis is returned for service, the marks on the dial backing plate may be used during alignment; refer to the Dial Indicator and Drive Mechanism drawing for corresponding frequencies.

Dial Pointer.—With the gang condenser in full mesh the dial pointer should be set to the left hand reference mark on the dial backing plate.

Steps	Connect high side of test osc. to—	Tune test osc. to—	Turn radio dial to—	Adjust following for max. output—
1	12SK7 I-F grid through 0.1 mfd. capacitor	455 kc	B. C.; 1600 kc quiet point	L11-L10 (2nd I-F Trans.)
2	Stator of gang cond. C2 through 0.1 mfd.			L9-L8* (1st I-F Trans.)
3	Antenna lead through 300 ohm resistor	18.2 mc	S. W.; gang condenser open	C6 (osc.)**
4		15.2 mc	S. W.; maximum signal rock gang	C3 (ant.)***
5	Antenna lead through 200 mmf. capacitor	600 kc	B. C.; 600 kc (2nd mark from left)	L7 (osc.)
6		1300 kc	B. C.; rock gang at 1300 kc†	C7 (osc.)
7		600 kc	B. C.; rock gang at 600 kc	L7 (osc.)
8	Repeat steps 6 and 7			

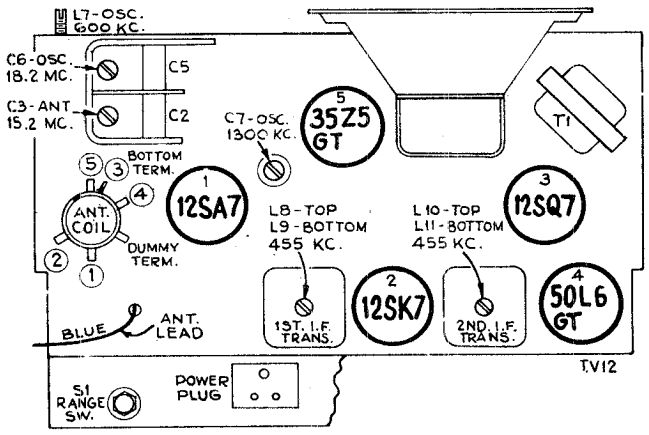
† 1300 kc corresponds to a point ½ inch to the left of the right hand mark on the dial backing plate.

* Do not readjust L10 or L11 when test oscillator is connected to C2.

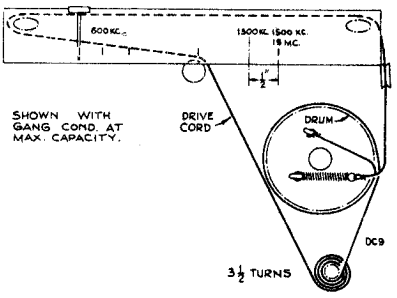
** Use minimum capacity peak if two peaks can be obtained.

*** Image signal of lesser amplitude should occur at 14.3 mc.

NOTE.—Oscillator tracks above signals on both bands.



Tube and Trimmer Locations



Dial Indicator and Drive Mechanism

Frequency Ranges

Standard Broadcast ("A" Band) ..... 540-1,680 kc (555-178 m)
Short Wave ("C" Band) ..... 4.7-18.2 mc (63.8-16.5 m)

Intermediate Frequency ..... 455 kc

RCA Tube Complement

(1) RCA-12SA7 ..... 1st Detector-Oscillator
(2) RCA-12SK7 ..... I-F Amplifier
(3) RCA-12SQ7 ..... 2nd Detector, A.V.C., and A-F Amplifier
(4) RCA-50L6GT/G ..... Power Output
(5) RCA-35Z5GT/G ..... Rectifier

Power Supply Ratings (D-C or 40 to 100 cycles A-C)

Q10 .....105-125 volts..... 30 watts
Q10A .....210-250 volts..... 60 watts

Q10, Q10-2 .....105-125 volts..... 30 watts
Q10A, Q10A-2 .....210-250 volts..... 60 watts

Power Output Rating

Undistorted ..... 1.25 watts
Maximum ..... 3.1 watts

Loudspeaker (92510-2)

Type ..... 5-inch Round Permanent-Magnet Dynamic
Voice Coil Impedance ..... 4 ohms at 400 cycles

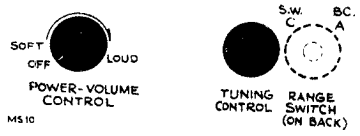
Tuning Drive Ratio ..... 18 to 1

PRECAUTIONARY LEAD DRESS

1. Dress output plate capacitor and output transformer leads down next to chassis.
2. Dress 12SQ7 grid resistor down next to chassis, and away from power ground wire to switch.
3. Dress lead from 2nd I-F transformer to volume control down to chassis and away from adjacent parts.
4. Keep grid end of R1 as short as possible.
5. Keep body of C1A slightly away from chassis.

POWER SUPPLY POLARITY.—For operation on d-c, the power plug must be inserted in the outlet for correct polarity. If the set does not function, reverse the plug. On a-c, reversal of the plug may reduce hum.

CAUTION.—Repair of the power cord furnished with Model Q10A should not be attempted; apply to your RCA Distributor for a replacement.



Location of Controls

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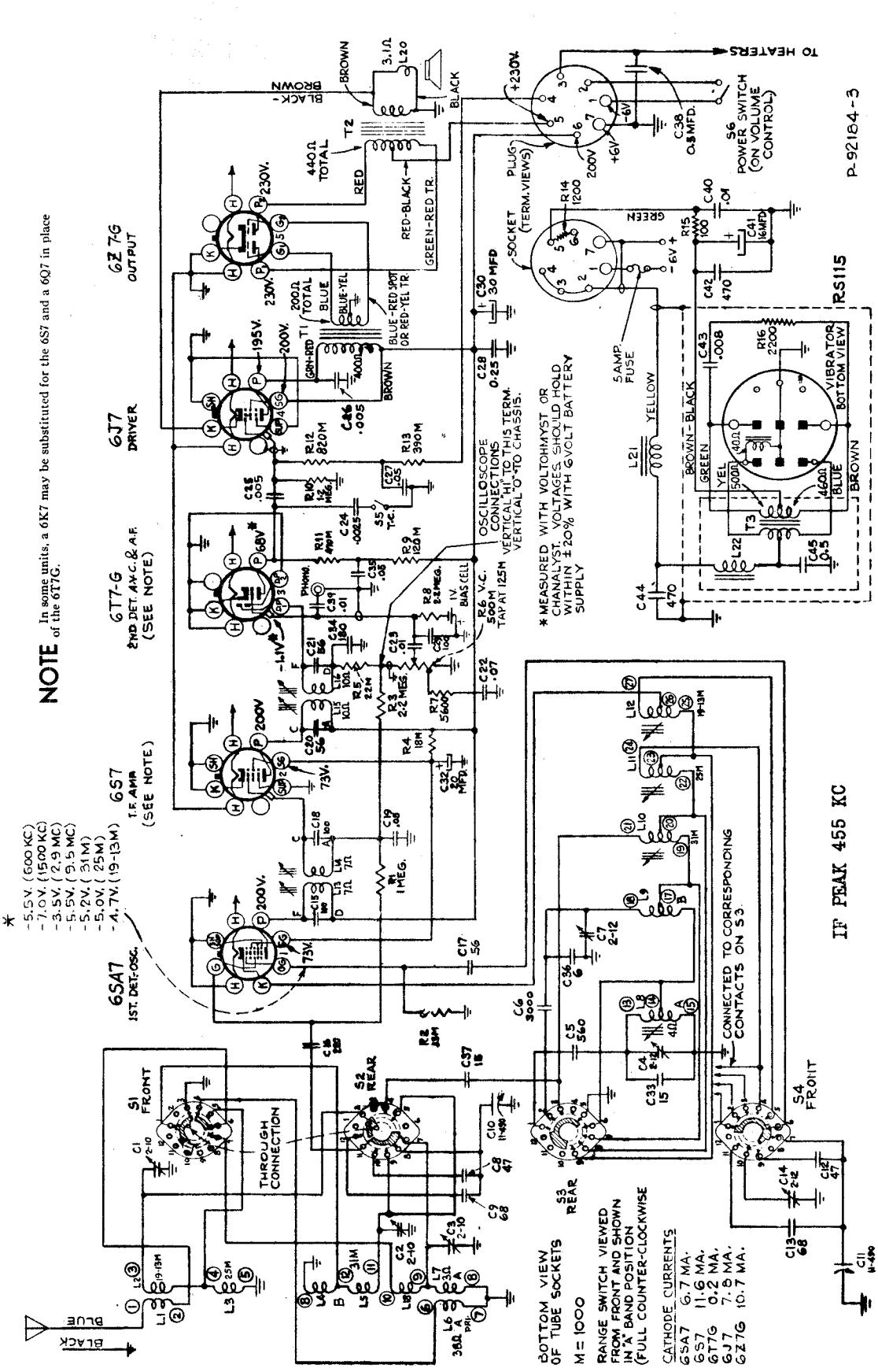
MODEL QB11, Ch. RC-529A

RCA MFG. CO.



Victrola Attachment.

A jack is provided on the rear of chassis for connecting a Victrola attachment to the audio amplifying circuit.

Power Supply Rating:

With vibrator power supply unit (RS-115): 6.3 volts, total current drain.....3.35 amperes

If both tube substitutions are made, the total current consumption will be increased to 3.65 Amperes.

Fuse

3AG.....5 Amp.

Power Output

Undistorted.....3.1 watts

Maximum.....4.5 watts

Loudspeaker (92519-1)

Type.....6½ inch, permanent-magnet dynamic

Voice-coil Impedance at 400 cycles.....3.4 ohms

Frequency Ranges

Standard Broadcast ("A" Band)	540-1,720 kc (555-174 m)
Medium Wave ("B" Band)	2.9-9.5 mc (103-31.6 m)
"31" Meter Spread Band	9.5-12 mc (31.6-25 m)
"25" Meter Spread Band	11.7-15 mc (25.6-20 m)
"19-13" Meter Spread Band	15.1-22 mc (19.9-13.6 m)

Intermediate Frequency.....455 kc

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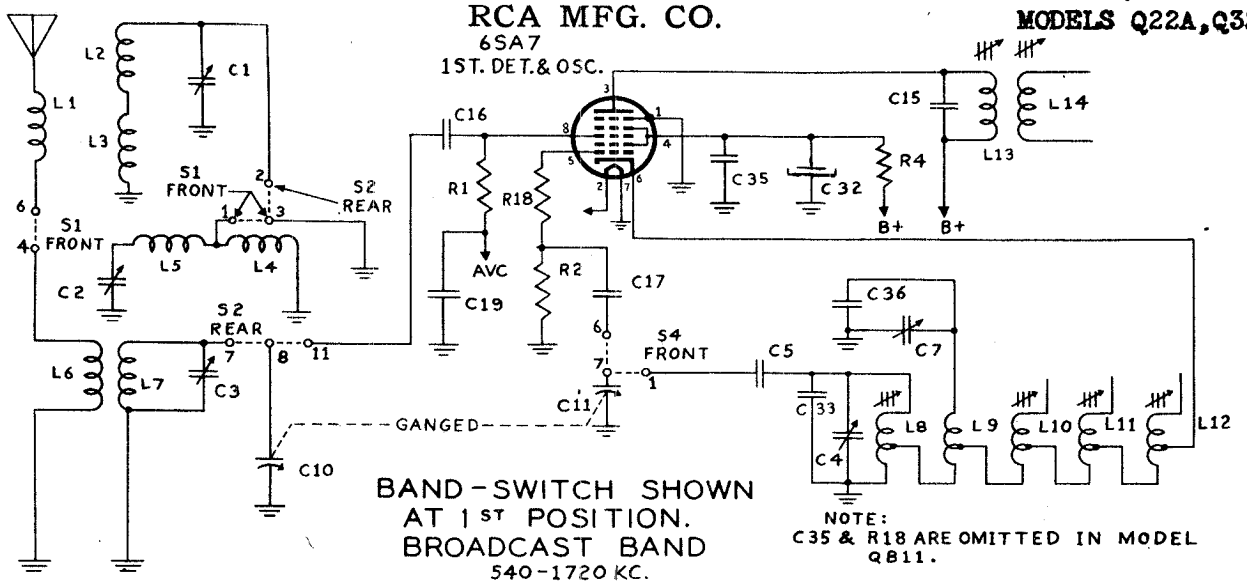
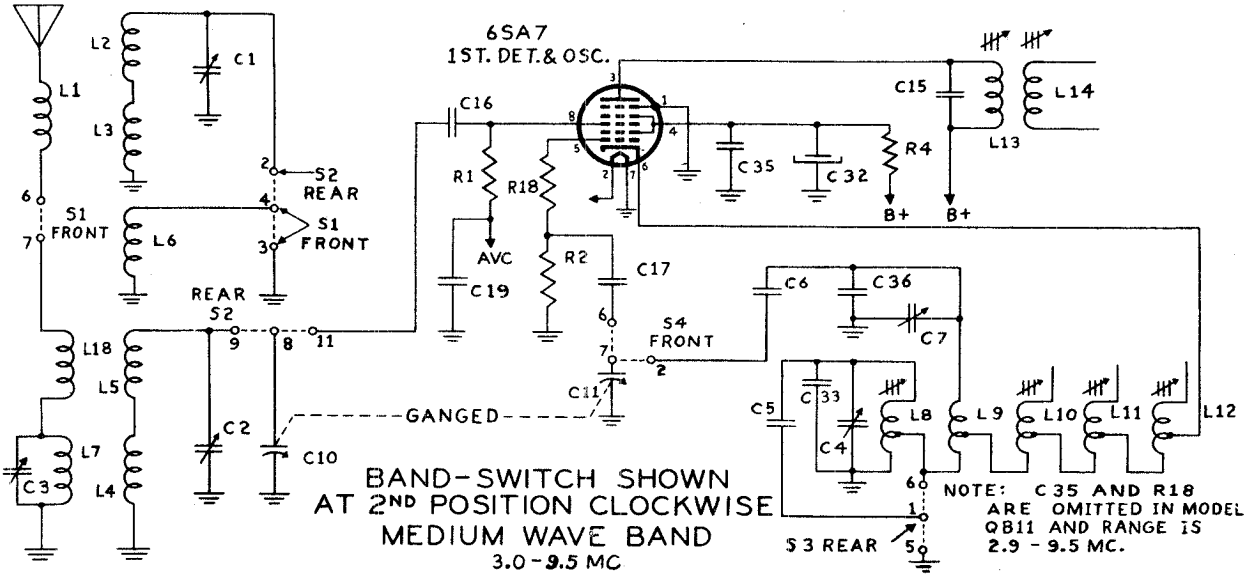
MODEL QB11
MODELS Q22A, Q32

RCA MFG. CO.



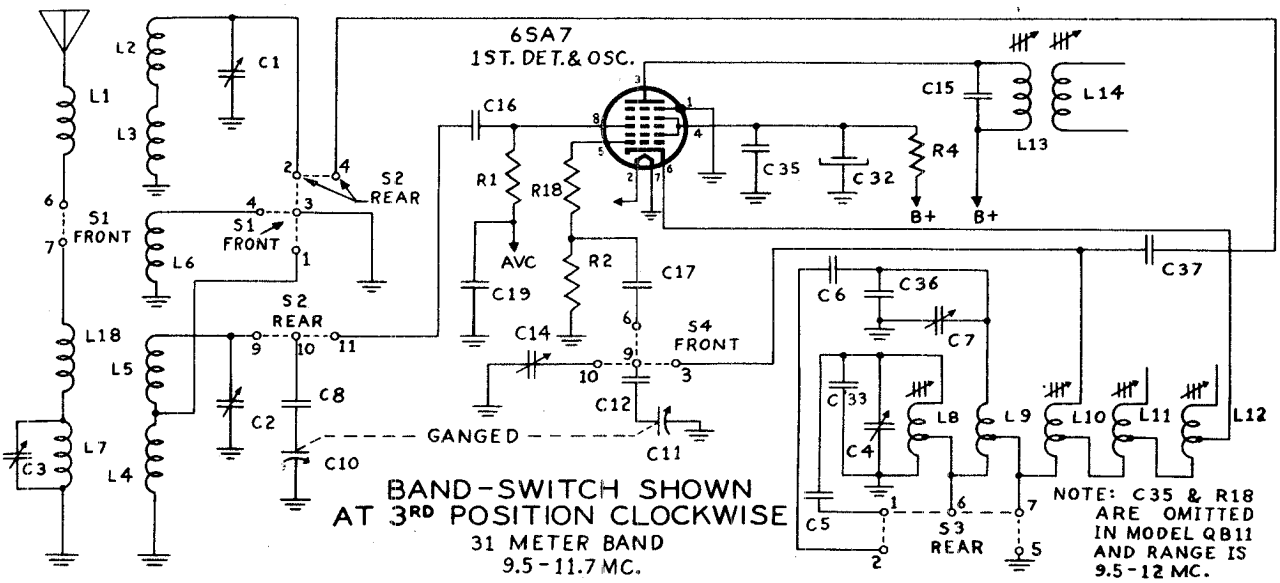
BAND-SWITCH SHOWN AT 1ST POSITION. BROADCAST BAND
540-1720 KC.

NOTE: C35 & R18 ARE OMITTED IN MODEL QB11.



BAND-SWITCH SHOWN AT 2ND POSITION CLOCKWISE
MEDIUM WAVE BAND
3.0-9.5 MC

NOTE: C35 AND R18 ARE OMITTED IN MODEL QB11 AND RANGE IS 2.9-9.5 MC.



BAND-SWITCH SHOWN AT 3RD POSITION CLOCKWISE
31 METER BAND
9.5-11.7 MC.

NOTE: C35 & R18 ARE OMITTED IN MODEL QB11 AND RANGE IS 9.5-12 MC.

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MODEL QB11
MODELS Q22A, Q32

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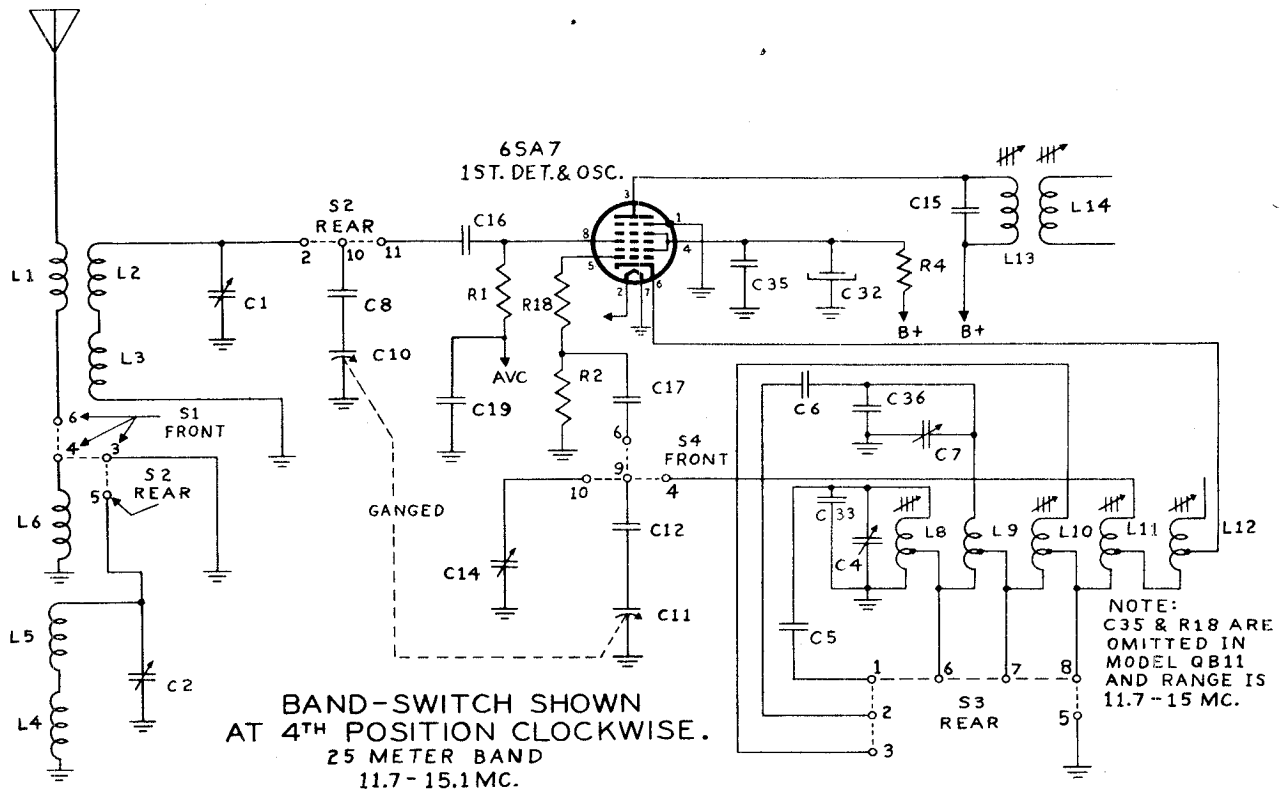

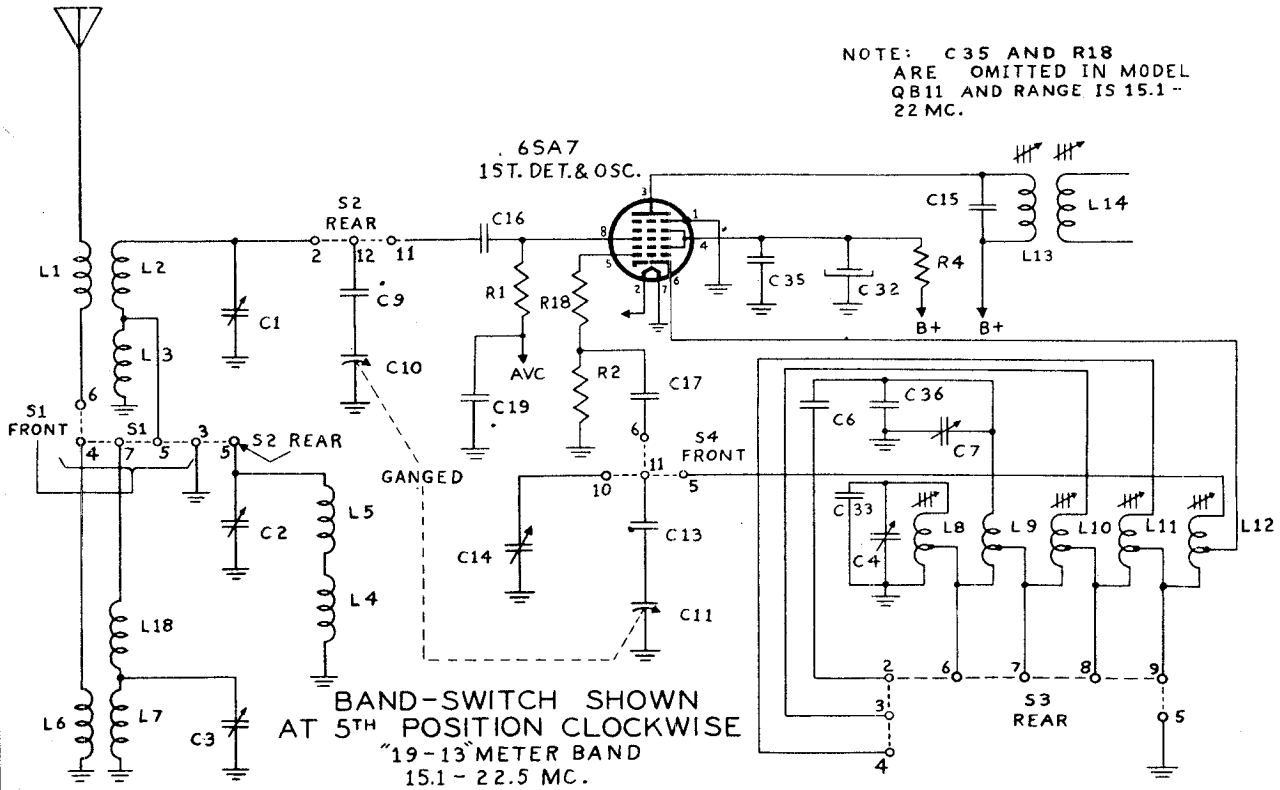

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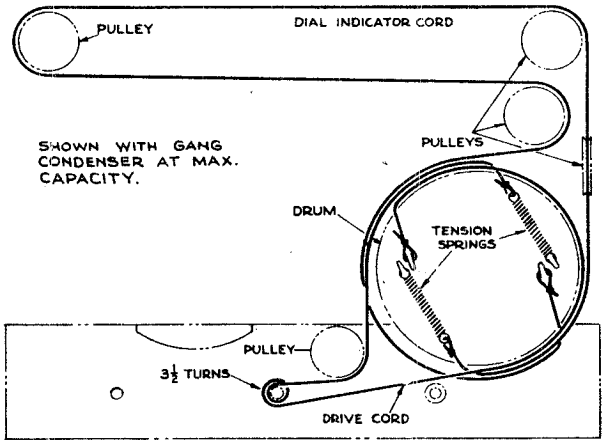
Cathode-Ray Alignment is the preferable method. Connections for the oscilloscope are shown in the diagram.

Output Meter Alignment.—If this method is used, connect the meter across the voice coil, and turn the receiver volume control to maximum.

Test-Oscillator.—For all alignment operations, connect the low side of the test-oscillator to the receiver chassis, and keep the oscillator output as low as possible to avoid a-v-c action.

Calibration Scale on Indicator-Drive-Cord Drum.—The tuning dial is fastened in the cabinet and cannot be used for reference during alignment, therefore a calibration scale is attached to the indicator-drive-cord drum which is mounted on the shaft of the gang condenser. The setting of the gang condenser is read on this scale, which is calibrated in degrees.

As the first step in r-f alignment, check the position of the drum. The "180°" mark on the drum scale must be vertical and directly over the center of the gang-condenser shaft when the plates are fully meshed. The drum is held to the shaft by means of two set screws, which must be tightened securely when the drum is in the correct position.



Victrola Attachment.

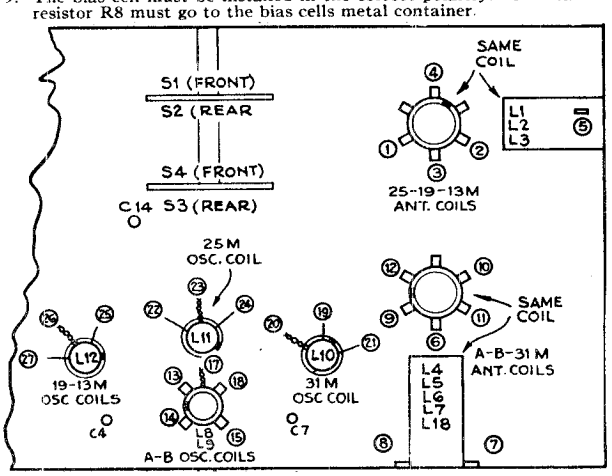
The cable from the Victrola attachment should be terminated with a Stock No. 31048 plug.

When Victrola attachment is in use, the volume control on the radio should be at minimum, and, if necessary, tune set off frequency from any very strong station.

When Victrola attachment is not in use its plug should be disconnected.

Precautionary Lead Dress.

1. Twist yellow lead from terminal 14 of L8 to terminal 6 of S3 with the lead from terminal 27 of L12 to terminal 5 of S4.
2. All other oscillator coil leads must be kept apart from each other as well as from other leads and parts. No two leads may be less than ⅛ inch apart.
3. The lead from the tap on 19-13 oscillator coil to pin number 6 of 6SA7 socket should be dressed up and away from all parts as far as possible.
4. Condensers C8, C9 and C16 must be as far away from all metal parts as possible.
5. All leads from the antenna coil to the range switch should be dressed together.
6. The green lead from pin 4 of 6SA7 socket to pin 4 of the 6S7 socket should be dressed down against the chassis and away from the I. F. terminals.
7. AVC by-pass condenser C19 and the lead from pin number 7 of the 6T7G socket must clear the tuning flywheel by at least ⅛ inch.
8. The leads to the power switch should be twisted and dressed up and away from the bias cell.
9. The bias cell must be installed in the correct polarity. The lead from resistor R8 must go to the bias cells metal container.



Coil and Band Switch Locations (Bottom Chassis View)

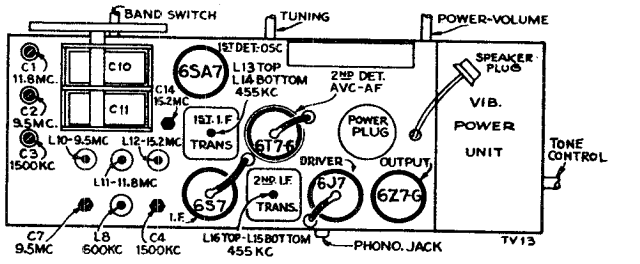
Steps	Connect the high side of the test-osc. to—	Tune test-osc. to—	Range switch	Turn radio dial to—	Adjust the following for max. peak output
1	I-F grid cap, in series with .01 mfd.	455 kc	A	Quiet point near 180°	L16—L15 2nd I-F transformer
2	1st Det. grid, in series with .01 mfd.				L14—L13 1st I-F transformer
3	Ant. lead in series with 300 ohms	11.8 mc	25M	138.5°	L11 (osc.)* C1 (ant.)
4		15.2 mc		17°	C14 (osc.)***
5		Repeat steps 3 and 4.			
6		15.2 mc	19-13M	156°	L12 (osc)*
7		9.5 mc	31M	156°	L10 (osc.)* C2 (ant.)
8		9.5 mc	B	11.5°	C7 (osc.)**
9	Ant. lead in series with 200 mmf.	1,500 kc	A	26°	C4 (osc.)** C3 (ant.)
10		600 kc		150°	L8 (osc.)* (Rock gang.)
11	Repeat steps 9 and 10.				

*If two peaks can be obtained, use the one obtained when the core screw is farthest out (counter-clockwise).

**Use minimum capacity peak if two can be obtained.

***Use minimum capacity peak if two can be obtained. Check image to determine that C14 has been adjusted to the correct peak by tuning receiver to approximately 14.29 mc (29°) where a weaker signal should be received.

NOTE: Oscillator tracks above signal on all bands.



Tube and Trimmer Locations (Top Chassis View)

Pointer for Calibration Scale.—Improvise a pointer for the calibration scale by fastening a piece of wire to the gang-condenser frame, and bend the wire so that it points to the "180°" mark on the calibration scale when the plates are fully meshed. The correct setting of the gang in degrees, for each alignment frequency, is given in the alignment table.

Receiver Dial with Calibration Scale.—To determine the corresponding frequency for any setting of the calibration scales, refer to the dial with calibration scale drawing.

Dial-Indicator Adjustment.—After fastening the chassis in the cabinet, attach the dial indicator to the drive cable with indicator at the 540 kc mark, and gang condenser fully meshed. The indicator has a clip for attachment to the cable.

Spread-Band Alignment.—The most satisfactory method of aligning or checking the spread-band ranges is on actual reception of short-wave stations of known frequency, by adjusting the oscillator coil magnetite-core for each band so that these stations come in at the correct points on the dial.

In exceptional cases, when the set is being serviced in a location where the noise level is high enough to prevent reception of short-wave stations, a test-oscillator may be used for alignment, but an extremely high degree of accuracy is required in the frequency settings of the test-oscillator, as a slight error will produce considerable inaccuracy on the spread-band dials. The frequency settings of the test-oscillator may be checked by one or both of the following methods:

1. Determine the exact dial settings of the test-oscillator (for frequencies at or close to the specified alignment frequencies) by zero-beating the test-oscillator against short-wave stations of known frequency.
2. Use harmonics of the standard-broadcast range of the test-oscillator, first checking the frequency settings on this range by means of a crystal calibrator, or by zero-beating against standard broadcast stations.

When a test oscillator is employed for spread-band alignment, a final check should be made on actual reception of short-wave stations of known frequency, and the oscillator coil magnetite-core for each band should be re-touched so that the stations come in at the correct points on the dial.

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MODEL QB11
Ch.529A

RCA MFG. CO.

STOCK No.	DESCRIPTION
	CHASSIS ASSEMBLIES RC 529A
35640	Bracket—Support bracket complete with one (1) drive cord pulley
35639	Bracket—Support bracket complete with three (3) drive cord pulleys
35622	Bracket—Support bracket for tuning knob shaft
37976	Bracket—Support bracket for tone control
35642	Calibrator—Drive drum calibrator
12714	Capacitor—Air trimmer, 2-12 mmf. (C-4, C-7, C-14)
34654	Capacitor—Mica trimmer, triple, 2.5-10 mmf. (C-1, C-2, C-3)
35646	Capacitor—Ceramic, 6 mmf. (C-36)
36012	Capacitor—Ceramic, 15 mmf. (C-37)
45465	Capacitor—Ceramic, 15 mmf. (C-33)
70582	Capacitor—Ceramic, 47 mmf. (C-8)
35644	Capacitor—Ceramic, 47 mmf. (C-12)
39622	Capacitor—Mica, 56 mmf. (C-17)
39632	Capacitor—Mica, 56 mmf. (C-20, C-21)
35645	Capacitor—Ceramic, 68 mmf. (C-13)
70586	Capacitor—Mica, 68 mmf. (C-9)
39628	Capacitor—Mica, 100 mmf. (C-15, C-18, C-29)
39634	Capacitor—Mica, 180 mmf. (C-34)
39636	Capacitor—Mica, 220 mmf. (C-16)
70667	Capacitor—Mica, 560 mmf. (C-5)
70687	Capacitor—Mica, 3000 mmf. (C-6)
70644	Capacitor—Tubular, .0025 mfd., 1400 volts (C-24)
70627	Capacitor—Tubular, .005 mfd., 500 volts (C-25, C-26)
70652	Capacitor—Tubular, .01 mfd., 1000 volts (C-23, C-39)
70615	Capacitor—Tubular, .05 mfd., 400 volts (C-19, C-27, C-35)
71010	Capacitor—Tubular, .07 mfd., 400 volts (C-22)
70619	Capacitor—Tubular, 0.5 mfd., 150 volts (C-38)
70618	Capacitor—Tubular, 0.25 mfd., 300 volts (C-28)
37250	Capacitor—Electrolytic, 20 mfd., 250 volts (C-32)
37867	Capacitor—Electrolytic, 30 mfd., 250 volts (C-30)
31581	Cell—Bias cell
35632	Coil—Antenna coil, "A", "B" and 31 meter bands (L-4, L-5, L-6, L-7, L-18)
35631	Coil—Antenna coil, 25 meter and 19-13 meter bands (L-1, L-2, L-3)
35624	Coil—Oscillator coil, 19-13 meter band (L-12)
35625	Coil—Oscillator coil, 25 meter band (L-11)
35626	Coil—Oscillator coil, 31 meter band (L-10)
35623	Coil—Oscillator coil, "A" and "B" bands (L-8, L-9)
35619	Condenser—Variable tuning condenser (C-10, C-11)
37833	Control—Volume control and power switch (R-6, S-6)
32634	Cord—Drive cord (approx. 28" overall length)
34662	Cord—Indicator cord (approx. 53" overall length)
35788	Core — Adjustable core and stud for "A" and "B" band oscillator coil
31259	Core—Adjustable core and stud for 19-13 meter, 25 meter and 31 meter bands oscillator coils
12006	Core—Adjustable core and stud for I.F. transformers
35627	Drum—Drive drum less calibrator
35638	Flywheel—Tuning knob shaft flywheel
31580	Holder—Bias cell holder
5119	Plug—3 contact female plug for speaker cable
14404	Plug—7 prong plug for power input cable
35641	Pulley—Drive cord pulley
35630	Pulley—Idler pulley, located between tuning knob and range switch shafts
30734	Resistor—5600 ohms, ¼ watt (R-7)
30151	Resistor—18,000 ohms, 1 watt (R-4)
30492	Resistor—22,000 ohms, ¼ watt (R-5)
30685	Resistor—33,000 ohms, ¼ watt (R-2)
30180	Resistor—120,000 ohms, ¼ watt (R-9)
11988	Resistor—390,000 ohms, ¼ watt (R-13)
30648	Resistor—470,000 ohms, ¼ watt (R-11)
30161	Resistor—820,000 ohms, ¼ watt (R-12)
30652	Resistor—1 megohm, ¼ watt (R-1)
30162	Resistor—1.2 megohm, ¼ watt (R-10)
30649	Resistor—2.2 megohm, ¼ watt (R-3, R-8)
14350	Screw—# 8-32 square head set screw for drive drum
35633	Shaft—Range indicator shaft
35637	Shaft—Tuning knob shaft
35787	Socket—Phono-input socket
31251	Socket—Tube socket
31418	Spring—Indicator cord spring or drive cord spring
12007	Spring—Retaining spring for I.F. transformers' core and stud assemblies
31261	Spring—Retaining spring for oscillator coils core and stud assemblies
35621	Switch—Range switch (S-1, S-2, S-3, S-4)
33397	Switch—Tone control switch (S-5)
37898	Transformer—Driver transformer (T-1)
35636	Transformer—First I.F. transformer (L-13, L-14, C-15, C-18)
35628	Transformer—Second I.F. transformer (L-15, L-16, C-20, C-21)
37924	Transformer—Output transformer (T-2)
33726	Washer—"C" washer for idler pulley
2917	Washer—"C" washer for tuning knob shaft
	VIBRATOR POWER SUPPLY
4289	Body—Fuse connector body
4288	Cap—Fuse connector cap
39644	Capacitor—Mica, 470 mmf. (C-42, C-44)
71008	Capacitor—Paper, .008 mfd., 1200 volts (C-43)
70652	Capacitor—Tubular, .01 mfd., 1000 volts (C-40)
37877	Capacitor—Electrolytic, 16 mfd., 350 volts (C-41)
37834	Case—Power supply case less cover
14289	Clip—Battery clips (1 set)
37925	Coil—Choke coil (L-21)
37836	Cover—Power supply case cover
4286	Ferrule—Fuse connector ferrule and bushing
5140	Fuse—5 ampere
4290	Insulator—Fuse connector insulator
14409	Plug—7 contact female plug for power supply cable
34765	Resistor—100 ohms, ¼ watt (R-15)
6134	Resistor—1200 ohms, 1 watt (R-14)
90382	Resistor—2200 ohms, 1 watt (R-16)
12241	Socket—Vibrator socket
4284	Spring—Fuse connector spring
35544	Transformer—Vibrator transformer (T-3, C-45, L-22)
35543	Vibrator—Plug-in vibrator
4285	Washer—Fuse connector insulating washer
	SPEAKER ASSEMBLIES 92519-1
70578	Cone—Cone and voice coil assembly
5118	Plug—3 prong male plug for speaker cable
70577	Speaker—6½" P.M. speaker complete with cone and voice coil less plug
	NOTE: If stamping on speaker in instrument does not agree with above speaker number, order replacement parts by referring to model number of instrument, number stamped on speaker and full description of part required.
	MISCELLANEOUS ASSEMBLIES
70579	Decal—Trademark decal
35654	Dial—Glass dial scale
36658	Extension—Tone control shaft extension
37838	Frame—Dial frame assembly less indicator and dial
X1611	Grille—Cabinet grille cloth for Model QB11
70580	Indicator—Station selector indicator
35652	Knob—Range indicator knob
35651	Knob—Range switch knob
35650	Knob—Tone control knob
34489	Knob—Tuning or volume control knob
4982	Spring—Retaining spring for range indicator knob
14270	Spring—Retaining spring for tone control knob, tuning or volume control knob, and for range switch knob

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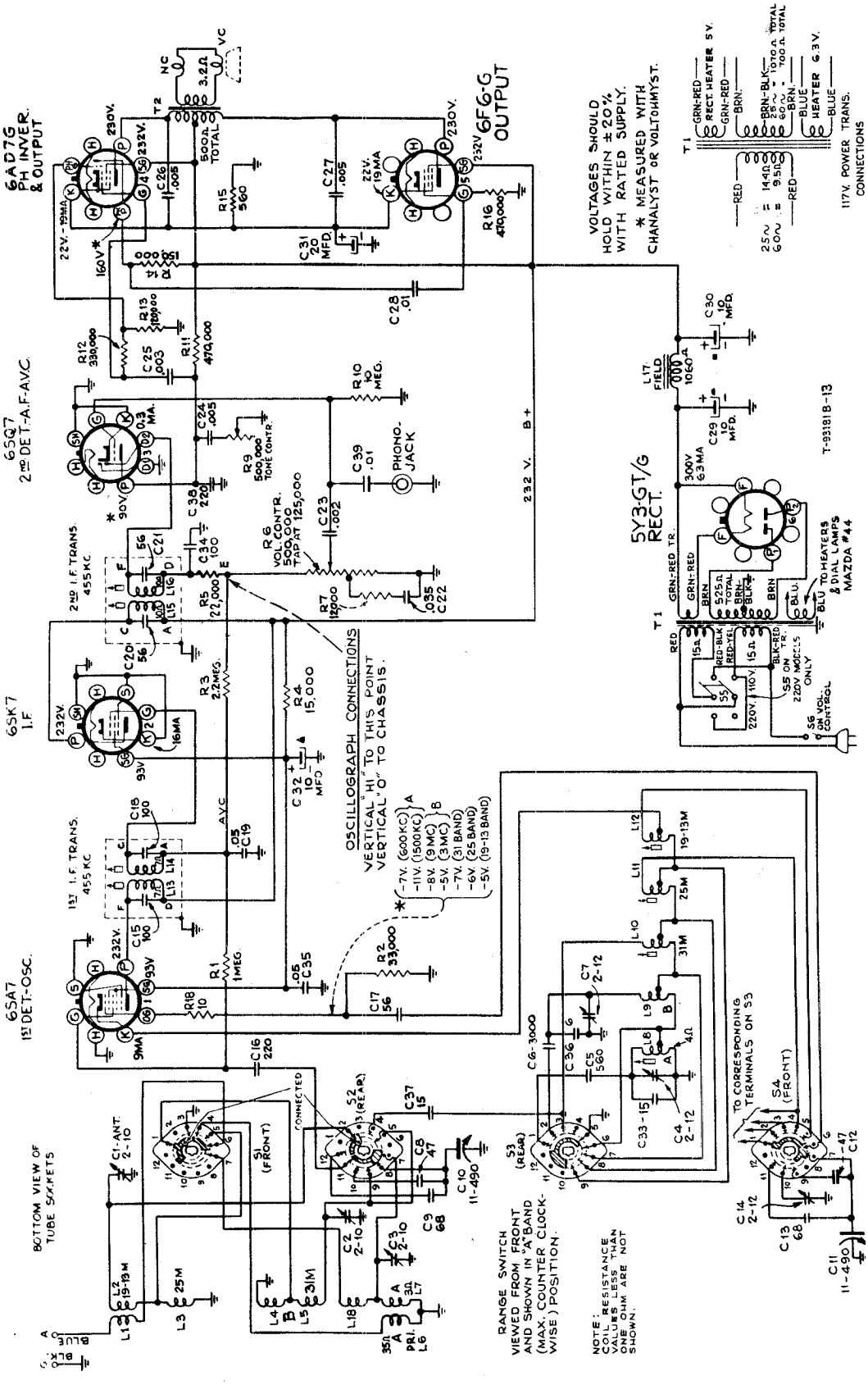
MODELS Q22A, Q32,
Ch. RC-507

RCA MFG. CO.



Loudspeaker.—

To center the loudspeaker voice coil, first remove the dust cover. Then loosen the center suspension by thoroughly soaking the outer edge of this suspension with repeated applications of acetone.

(Caution: Keep acetone from flowing to other parts of the loudspeaker.)

Keep the outer edge of the suspension soaked, and lift the cone, near the voice coil, up and down until the suspension is pulled away from the cone housing.

Insert 3 feelers, equally spaced, between the voice coil and the pole piece, and allow the center suspension to re-cement itself. Additional cement should be applied if necessary. Remove feelers when cement has hardened completely.

Precautionary Lead Dress.—

1. All leads between antenna coils and switch must be as short as possible and kept away from oscillator coil, leads and switches.
2. All oscillator coil leads must be kept apart from each other and other leads and parts.
3. Blue plate lead of 2nd I.F transformer should be dressed under other leads and against chassis.

NOTE.—On some sets C23 may be .0015 mf., C25 may be .0025 mf.

For Clarified schematics see pp. 15-9,-10.

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MODELS Q22A,Q32,
Ch.507

RCA MFG. CO.

Cathode-Ray Alignment is the preferable method. Connections for the oscillograph are shown on the Schematic Circuit Diagram.

Output Meter Alignment.—If this method is used, connect the meter across the voice coil, and turn the receiver volume control to maximum.

Test-Oscillator.—For all alignment operations, connect the low side of the test-oscillator to the receiver chassis, and keep the oscillator output as low as possible to avoid a-v-c action.

Calibration Scale on Indicator-Drive-Cord Drum.—The tuning dial is fastened in the cabinet and cannot be used for reference during alignment, therefore a calibration scale is attached to the indicator-drive-cord drum which is mounted on the shaft of the gang condenser. The setting of the gang condenser is read on this scale, which is calibrated in degrees. The correct setting of the gang in degrees, for each alignment frequency, is given in the alignment table.

As the first step in r-f alignment, check the position of the drum. The "180°" mark on the drum scale must be vertical, and directly over the center of the gang-condenser shaft when the plates are fully meshed. The drum is held to the shaft by means of two set screws, which must be tightened securely when the drum is in the correct position.

To determine the corresponding frequency for any setting of the calibration scales, refer to the calibration scale drawing which shows the dial with 0-180° calibration scales drawn at top and bottom.

Pointer for Calibration Scale.—Improvise a pointer for the calibration scale by fastening a piece of wire to the gang-condenser frame, and bend the wire so that it points to the "180°" mark on the calibration scale when the plates are fully meshed.

Dial-Indicator Adjustment.—After fastening the chassis in the cabinet, attach the dial indicator to the drive cable with indicator at the 540 kc mark (the first mark on "A" band to the left of "550"), and gang condenser fully meshed. The indicator has a spring clip for attachment to the cable.

Spread-Band Alignment.—The most satisfactory method of aligning or checking the spread-band ranges is on actual reception of short-wave stations of known frequency, by adjusting the magnetite-core oscillator coil for each spread-band so that these stations come in at the correct points on the dial.

In exceptional cases, when the set is being serviced in a location where the noise level is high enough to prevent reception of short-wave stations, a test-oscillator may be used for alignment, but an extremely high degree of accuracy is required in the frequency settinas of the test-oscillaor, as a slight error will produce considerable inaccuracy on the spread-band dials. The frequency settings of the test-oscillator may be checked by one or both of the following methods:

1. Determine the exact dial settings of the test-oscillator (for frequencies at or close to the specified alignment frequencies) by zero-beating the test-oscillator against short-wave stations of known frequency.
2. Use harmonics of the standard-broadcast range of a test-oscillator, first checking the frequency settings on this range by means of a crystal-controlled oscillator, or by zero-beating against standard broadcast stations.

When a test oscillator is employed for spread-band alignment, a final check should be made on actual reception of short-wave stations of known frequency, and the magnetite-core oscillator coil for each band should be retouched so that the stations come in at the correct points on the dial.

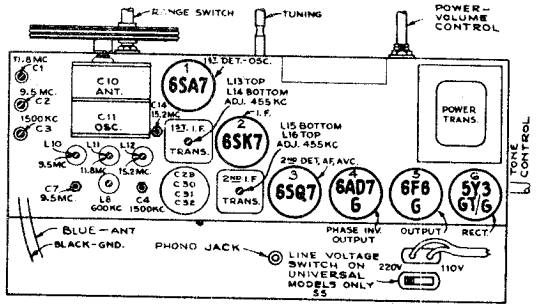
Steps	Connect the high side of the test-osc. to—	Tune test-osc. to—	Range switch	Turn radio dial to—	Adjust the following for max. peak output
1	6SK7 I-F grid in series with .01 mfd.	455 kc	A	Quiet Point near 180°	L15 and L16 2nd I-F Trans.
2	6SA7 1st Det. grid in series with .01 mfd.				L13 and L14 1st I-F Trans.
3	Ant. lead in series with 300 ohms	11.8 mc	25 M	138.5°	L11 (osc.)** C1 (ant.)
4		15.2 mc		17°	C14 (osc.)*
5		Repeat steps 3 and 4			
6		15.2 mc	19-13 M	156°	L12 (osc.)**
7		9.5 mc	31 M	156°	L10 (osc.)** C2 (ant.)
8		9.5 mc	B	11.5°	C7 (osc.)***
9	Ant. lead in series with 200 mmf.	1,500 kc	A	26°	C4 (osc.) C3 (ant.)
10		600 kc		150°	L8 (osc.) (Rock gang)
11		Repeat steps 9 and 10			

* Use minimum capacity peak if two can be obtained. Check image to determine that C14 has been adjusted to the correct peak by tuning receiver to approximately 14.29 mc (29°) where a weaker signal should be received.

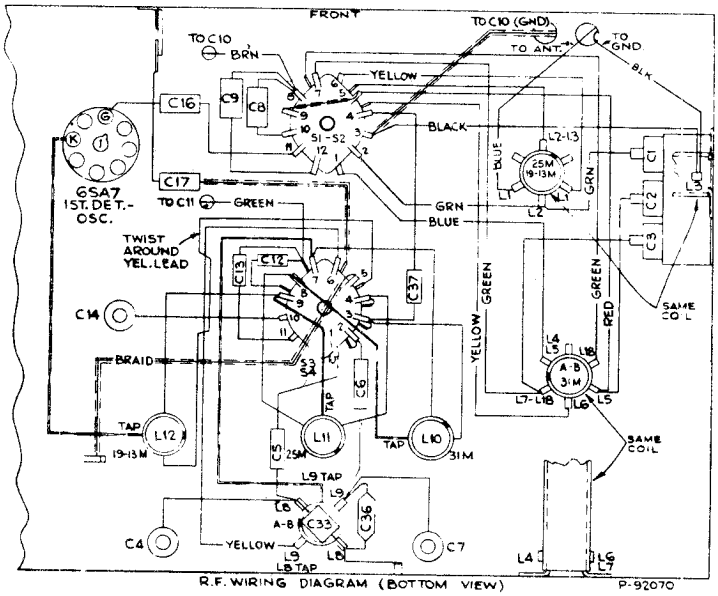
** If two peaks can be obtained use the one obtained when the core screw is farthest out (counter-clockwise).

*** Peak at minimum capacity if two peaks can be obtained.

NOTE: Oscillator tracks above signal on all bands.



Tube and Trimmer Locations



Frequency Ranges

Standard Broadcast ("A" Band)	540-1,720 kc (556-174 m)
Medium Wave ("B" Band)	3.0-9.5 mc (100-31.6 m)
"31" Meter Spread Band	9.5-11.7 mc (31.6-25.6 m)
"25" Meter Spread Band	11.7-15.1 mc (25.6-19.9 m)
"19-13" Meter Spread Band	15.1-22.5 mc (19.9-13.3 m)

Intermediate Frequency ..... 455 kc

Tuning Drive Ratio ..... 25 to 1

Power Supply Ratings

Symbol	Voltages	Frequency (cycles)	Watts
Rating A	105-125	50-60	65
Rating B	105-125	25-60	65
Rating C	105-125, 200-250	50-60	65

(Shipped in 225-250 volt position)

Victrola Attachment.—A jack is provided on the rear of chassis for connection to a Victrola Attachment. The cable from the attachment should be terminated in a Stock No. 31048 plug.

When Victrola is not in use its plug should be removed. When Victrola is in use the volume control on the radio should be at minimum and, if necessary, tune set off frequency from any very strong station.

Power Output Rating

Undistorted	3 watts
Maximum	3.5 watts

Loudspeaker

Model	92517-1
Type (Electrodynamic)	6½ inches
V-C Impedance at 400 c.p.s.	3.4 ohms

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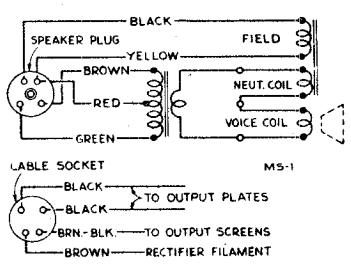
MODELS Q22A, Q32
Ch. RC-507

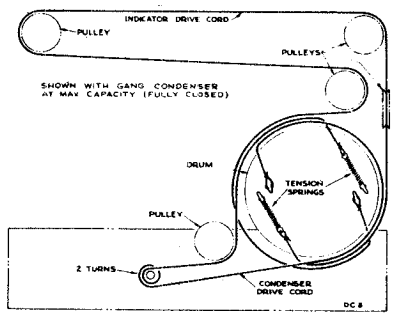
RCA MFG. CO.

Replacement Parts

STOCK No.	DESCRIPTION
	CHASSIS ASSEMBLIES
	RC-507
35640	Bracket—Drive cord pulley bracket complete with one (1) pulley
35639	Bracket—Drive cord pulley bracket complete with three (3) pulleys
35622	Bracket—Flywheel support bracket
37976	Bracket—Tone control support bracket
35642	Calibrator—Drive drum calibrator
12714	Capacitor—Air trimmer (2-12 mmf.) (C4, C7, C14)
33014	Capacitor—Electrolytic, consisting of three (3) sections of 10 mfd., 450 volts, and one (1) section of 20 mfd., 25 volts (C29, C30, C31, C32)
34654	Capacitor—Mica trimmer, triple, 2.5-10 mmf. (C1, C2, C3)
35646	Capacitor—Ceramic, 6 mmf. (C36)
36012	Capacitor—Ceramic, 15 mmf. (C37)
45465	Capacitor—Ceramic, 15 mmf. (C33)
70582	Capacitor—Ceramic, 47 mmf. (C8)
35644	Capacitor—Ceramic, 47 mmf. (C12)
39622	Capacitor—Mica, 56 mmf. (C17)
39632	Capacitor—Mica, 56 mmf. (C20, C21)
70586	Capacitor—Mica, 68 mmf. (C9)
35645	Capacitor—Ceramic, 68 mmf. (C13)
39628	Capacitor—Mica, 100 mmf. (C15, C18, C34)
39636	Capacitor—Mica, 220 mmf. (C16, C38)
70667	Capacitor—Mica, 560 mmf. (C5)
70687	Capacitor—Mica, 3000 mmf. (C6)
70601	Capacitor—Tubular, .002 mfd., 200 volts (C23)
70624	Capacitor—Tubular, .003 mfd., 600 volts (C25)
70627	Capacitor—Tubular, .005 mfd., 600 volts (C24)
70648	Capacitor—Tubular, .005 mfd., 1000 volts (C26, C27)
70610	Capacitor—Tubular, .01 mfd., 200 volts (C39)
70631	Capacitor—Tubular, .01 mfd., 600 volts (C28)
70614	Capacitor—Tubular, .035 mfd., 200 volts (C22)
70615	Capacitor—Tubular, .05 mfd., 200 volts (C19)
70636	Capacitor—Tubular, .05 mfd., 600 volts (C35)
35631	Coil—Antenna coil, 19-13 meter and 25 meter bands (L1, L2, L3)
35632	Coil—Antenna coil, "A," "B" and 31 meter bands (L4, L5, L6, L7, L18)
35623	Coil—Oscillator coil, "A" and "B" bands (L8, L9)
35624	Coil—Oscillator coil, 19-13 meter band (L12)
35625	Coil—Oscillator coil, 25 meter band (L11)
35626	Coil—Oscillator coil, 31 meter band (L10)
35619	Condenser—Variable tuning condenser (C10, C11)
35629	Control—Tone control (R9)
35620	Control—Volume control and power switch (R6, S6)
32634	Cord—Drive cord (approx. 28 inches overall length)
34662	Cord—Indicator cord (approx. 53 inches overall length)
12006	Core—Adjustable core and stud assemblies for I-F transformers
35788	Core—Adjustable core and stud for "A" and "B" band oscillator coil
31259	Core—Adjustable core and stud for 19-13 meter, 25 meter and 31 meter oscillator coil
35627	Drum—Drive drum less calibrator
35638	Flywheel—Tuning knob shaft flywheel
5040	Plug—4 contact female plug for speaker cable
35641	Pulley—Drive cord pulley
35630	Pulley—Idler pulley located between the range switch and tuning knob shafts
34761	Resistor—10 ohms, ¼ watt (R18)
30735	Resistor—560 ohms, 1 watt (R15)
30436	Resistor—12,000 ohms, ¼ watt (R7)
35595	Resistor—15,000 ohms, 3 watt (R4)
30492	Resistor—22,000 ohms, ¼ watt (R5)
30685	Resistor—33,000 ohms, ¼ watt (R2)
30180	Resistor—120,000 ohms, ¼ watt (R13)
30493	Resistor—150,000 ohms, ½ watt (R14)
14983	Resistor—330,000 ohms, ¼ watt (R12)
30648	Resistor—470,000 ohms, ½ watt (R11, R16)
30652	Resistor—1 megohm, ¼ watt (R1)
30649	Resistor—2.2 megohms, ¼ watt (R3)
30992	Resistor—10 megohms, ¼ watt (R10)
14350	Screw—8-32 square head set screw for drive drum
35633	Shaft—Range switch indicator knob shaft
35637	Shaft—Tuning knob shaft
31364	Socket—Lamp socket
14278	Socket—Phono input socket
31251	Socket—Tube socket
31418	Spring—Drive cord or indicator cord spring.
12007	Spring—Retaining spring for I-F transformers' core and stud assemblies
31261	Spring—Retaining spring for oscillator coils' core and stud assemblies
35621	Switch—Range switch (S1, S2, S3, S4)
32827	Switch—Voltage switch (S5)
35636	Transformer—First I-F transformer (L13, L14, C15, C18)
35628	Transformer—Second I-F transformer (L15, L16, C20, C21)
32852	Transformer—Power transformer, 105-125 volts, 50/60 cycle or 105-125/200-250 volts, 50/60 cycle (T1)
35588	Transformer—Power transformer, 105-125 volts, 25/60 cycle (T1)
33726	Washer—"C" washer for idler pulley
2917	Washer—"C" washer for tuning knob shaft
	SPEAKER ASSEMBLY
	STAMPED 92517-1J
70578	Cone—Cone and voice coil assembly
5118	Plug—4-prong male plug for speaker
70583	Speaker—6½-inch E.M. speaker complete with cone and voice coil less plug and output transformer
70584	Transformer—Output transformer (T2)
	Note: If stamping on speaker in instrument does not agree with above speaker number, order replacement parts by referring to model number of instrument, number stamped on speaker and full description of part required.
	MISCELLANEOUS ASSEMBLIES
35649	Back—Cabinet back for Q22A
71038	Back—Cabinet back for Q32
70579	Decal—Trade mark decal
35654	Dial—Glass dial scale
36658	Extension—Tone control shaft extension for Q32
35647	Frame—Dial frame complete less indicator
70581	Grille—Grille cloth for Q22A
X1611	Grille—Grille cloth for Q32
70580	Indicator—Station selector indicator
35652	Knob—Range indicator knob
35651	Knob—Range switch knob
35650	Knob—Tone control knob
34489	Knob—Tuning or volume control knob
11891	Lamp—Dial lamp (Mazda No. 44)
14270	Spring—Retaining spring for tone control, volume control, range switch and tuning knobs
4982	Spring—Retaining spring for range indicator knob



Connections and Colors of Loudspeaker and Cable



Dial-Indicator and Drive Mechanism

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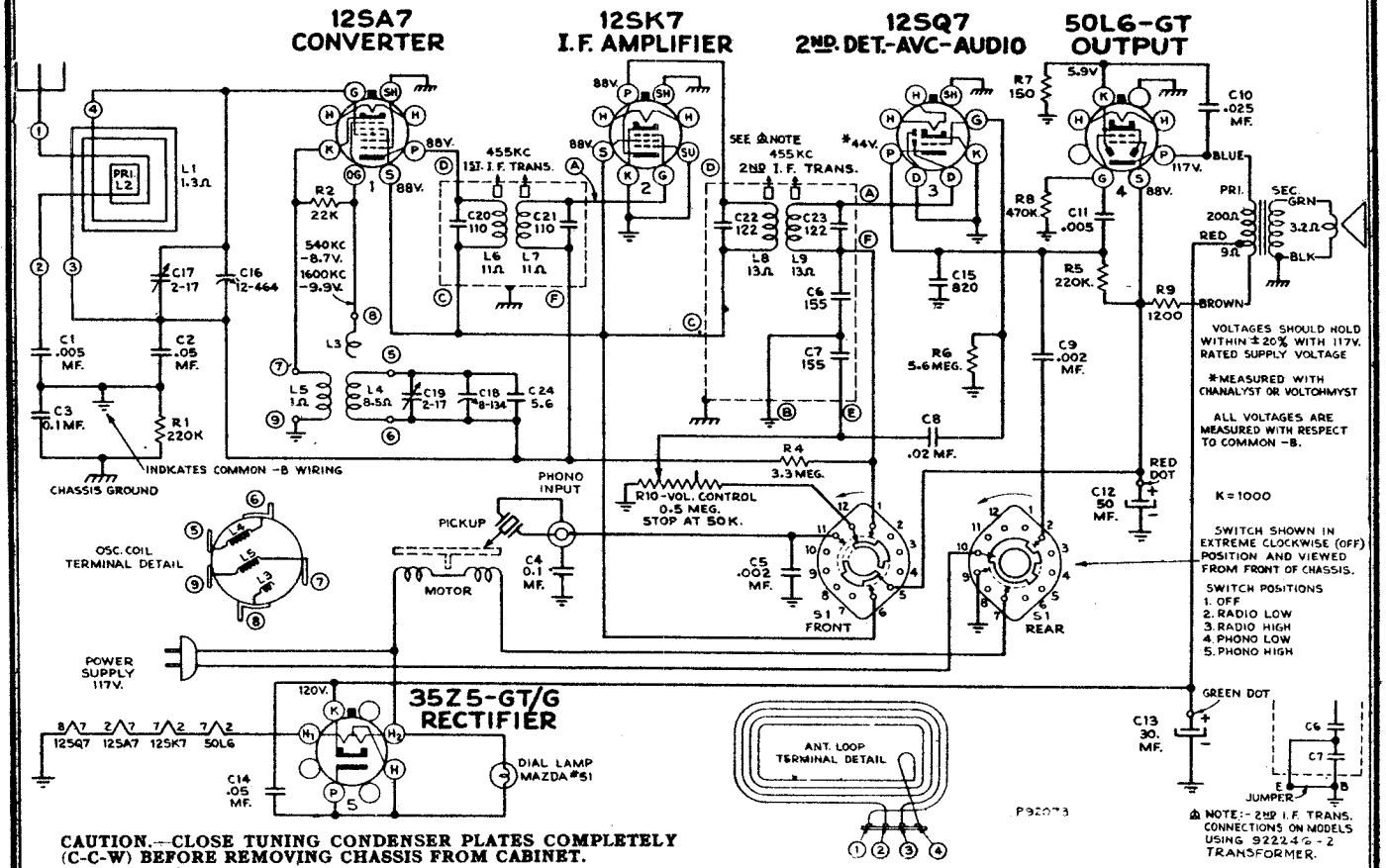
MODELS 55U, 55AU,
Ch. RC-1017

RCA MFG. CO.

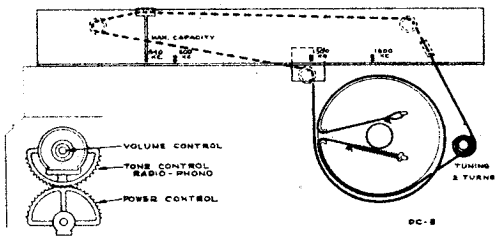


CAUTION.—CLOSE TUNING CONDENSER PLATES COMPLETELY (C-C-W) BEFORE REMOVING CHASSIS FROM CABINET.

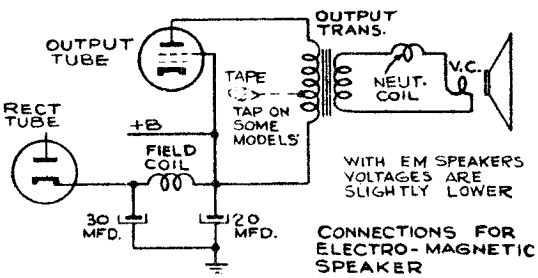
Take off both wooden strips on bottom of cabinet by removing wood screws before loosening chassis bolts.

CRITICAL LEAD DRESS.—

1. All filament wires should be dressed close to chassis.
2. Dress lead from switch to phono jack close to chassis and away from power cord.
3. Dress capacitor between 12SQ7 grid and terminal board away from chassis and away from other parts.
4. Dress all exposed leads away from each other and away from chassis to prevent short circuits.
5. In instrument assembly the lead from the rear section of gang to loop shall be dressed away from chassis and other wires to loop.



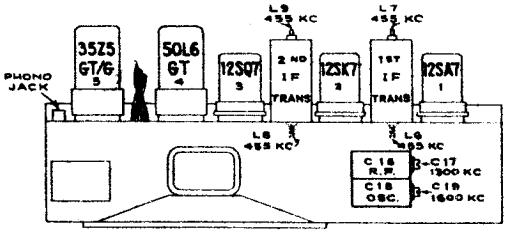
Dial Pointer Adjustment.—Rotate tuning condenser fully counter-clockwise plates (fully meshed). Adjust indicator pointer to left (max. cap.) mark on dial back plate.



Test Oscillator.—Connect high side of test oscillator as shown in chart. Connect low side through a .01 mf capacitor to common "—B". Keep the output signal as low as possible to avoid a.v.c. action.

Output Meter.—Connect meter across speaker voice coil. Turn volume control clockwise to radio maximum high position (3) for alignment.

Steps	Connect the high side of test-oscillator to—	Tune test-osc. to—	Turn radio dial to—	Adjust the following for max. peak output
1	I.F. grid, in series with .01 mfd.	455 kc	Quiet point 1,600 kc end of dial	L8 and L9 2nd I.F. transformer
2	1st Det. grid in series with .01 mfd.			L6 and L7 1st I.F. transformer
	NOTE.—ANTENNA LOOP MUST BE IN CABINET			
3	Antenna terminal in series with 220 mmfd.	1600 kc	Gang at minimum	C19 (osc.)
4	Radiated signal 1300 kc		Signal Frequency	C17 (ant.)
5	Repeat steps 3 and 4.			



FREQUENCY RANGE.....540-1,600 kc

INTERMEDIATE FREQUENCY.....455 kc

POWER SUPPLY RATING

105-125 volts, AC, 60 cycles.....60 watts

IMPORTANT.—Do not plug chassis into a d.c. power supply.

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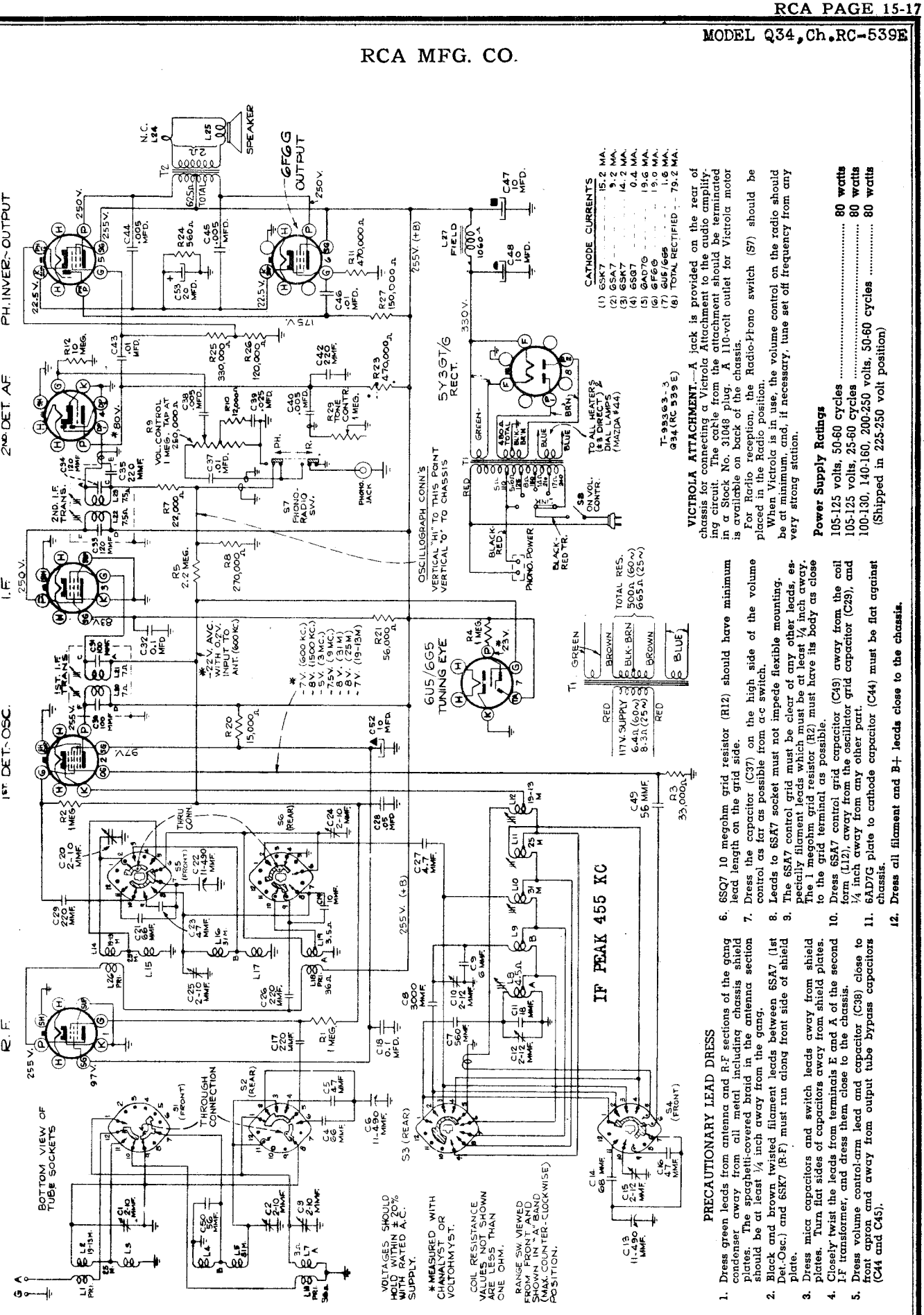
For parts list see p. 15-24. Record Changer: RCA Model 960015

MODEL Q34, Ch. RC-539E

RCA MFG. CO.



PRECAUTIONARY LEAD DRESS

1. Dress green leads from antenna and R-F sections of the gang condenser away from all metal including chassis shield plates. The spaghetti-covered braid in the antenna section should be at least ¼ inch away from the gang.
2. Black and brown twisted filament leads between 6SA7 (1st Det.-Osc.) and 6SK7 (R-F) must run along front side of shield plate.
3. Dress mica capacitors and switch leads away from shield plates. Turn flat sides of capacitors away from shield plates.
4. Closely twist the leads from terminals E and A of the second I.F transformer, and dress them close to the chassis.
5. Dress volume control-arm lead and capacitor (C38) close to front apron and away from output tube bypass capacitors (C44 and C45).
6. 6SQ7 10 megohm grid resistor (R12) should have minimum lead length on the grid side.
7. Dress the capacitor (C37) on the high side of the volume control as far as possible from a-c switch.
8. Leads to 6SA7 socket must not impede flexible mounting.
9. The 6SA7 control grid must be clear of any other leads, especially filament leads which must be at least ¼ inch away. The 1 megohm grid resistor (R2) must have its body as close to the grid terminal as possible.
10. Dress 6SA7 control grid capacitor (C49) away from the coil farm (L12), away from the oscillator grid capacitor (C29), and ¼ inch away from any other part.
11. 6AD7G plate to cathode capacitor (C44) must be flat against chassis.
12. Dress all filament and B+ leads close to the chassis.

VICTROLA ATTACHMENT.—A jack is provided on the rear of chassis for connecting a Victrola Attachment to the audio amplifying circuit. The cable from the attachment should be terminated in a Stock No. 31048 plug. A 110-volt outlet for Victrola motor is available on back of the chassis.

For Radio reception, the Radio-Phono switch (S7) should be placed in the Radio position.

When Victrola is in use, the volume control on the radio should be at minimum, and, if necessary, tune set off frequency from any very strong station.

Power Supply Ratings

105-125 volts, 50-60 cycles ..... 80 watts
105-125 volts, 25-60 cycles ..... 80 watts
100-130, 140-160, 200-250 volts, 50-60 cycles ..... 80 watts
(Shipped in 225-250 volt position)

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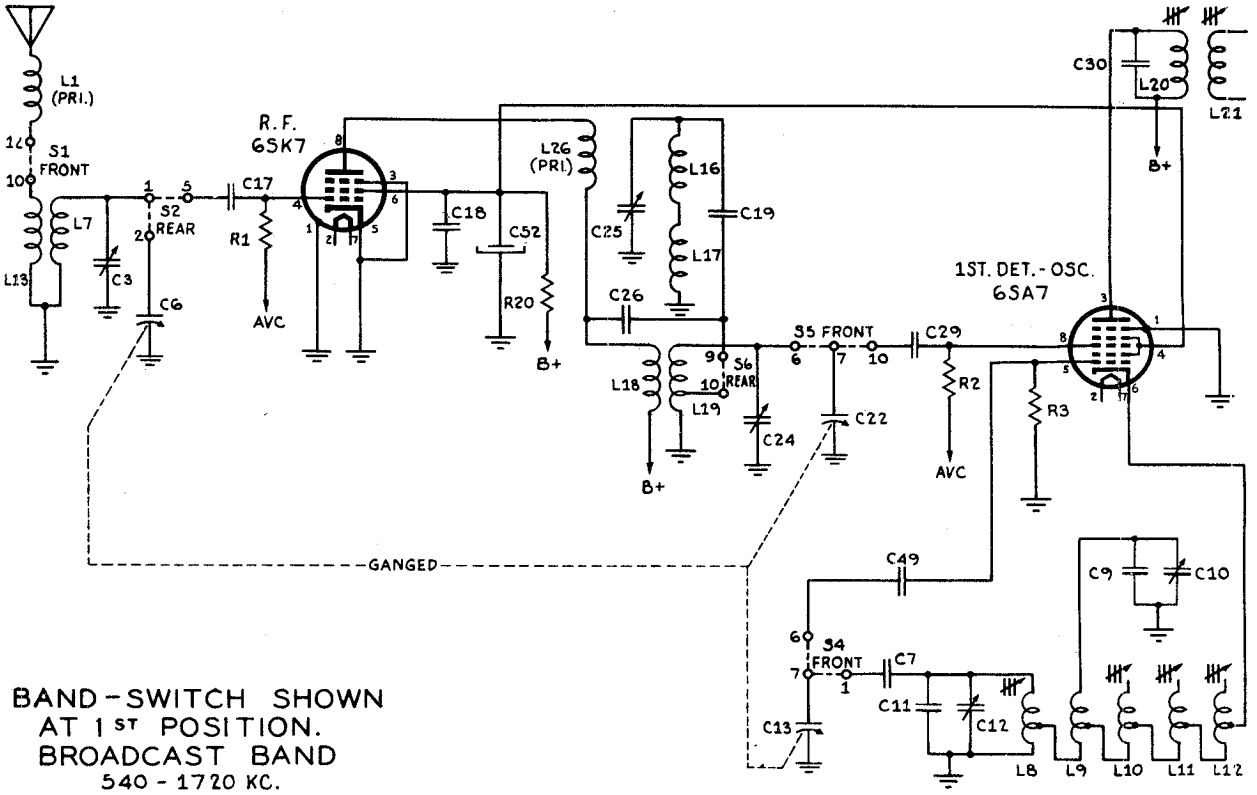
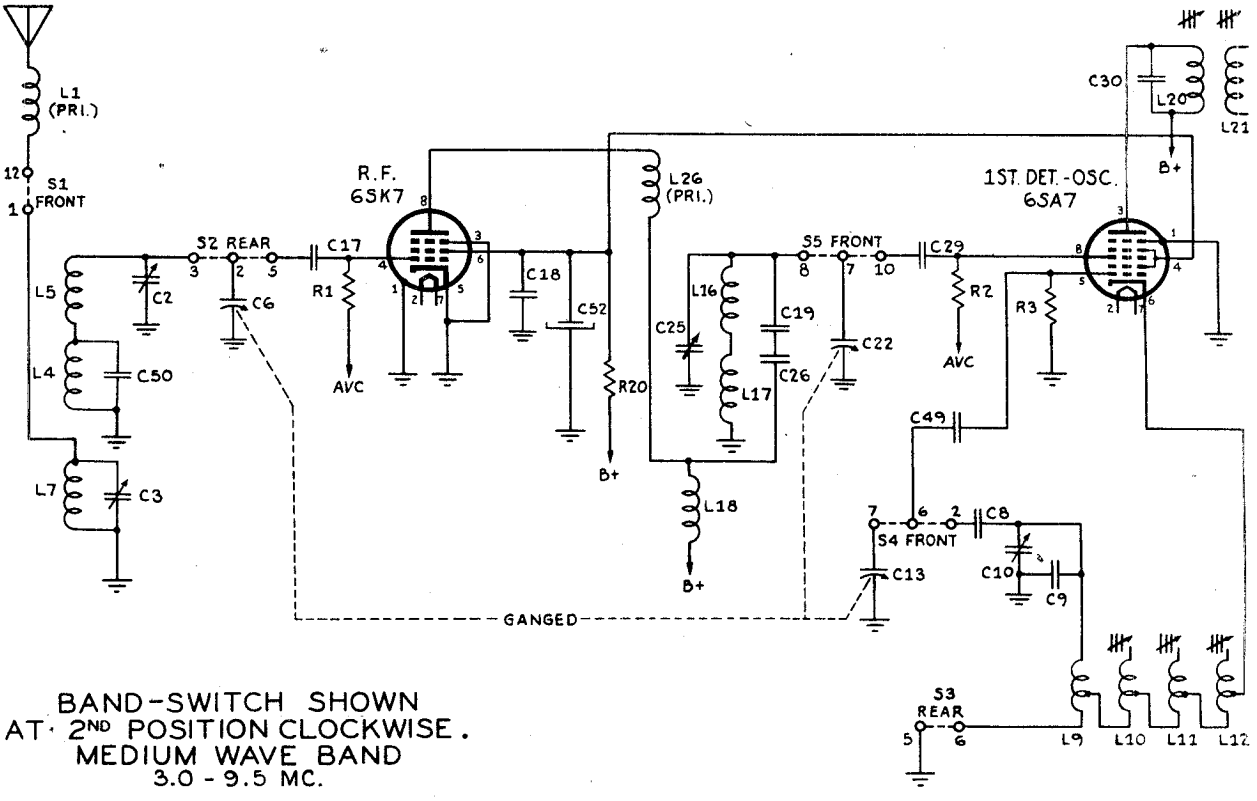
MODEL Q34

RCA MFG. CO.



BAND-SWITCH SHOWN AT 1ST POSITION. BROADCAST BAND 540 - 1720 KC.



BAND-SWITCH SHOWN AT 2ND POSITION CLOCKWISE. MEDIUM WAVE BAND 3.0 - 9.5 MC.

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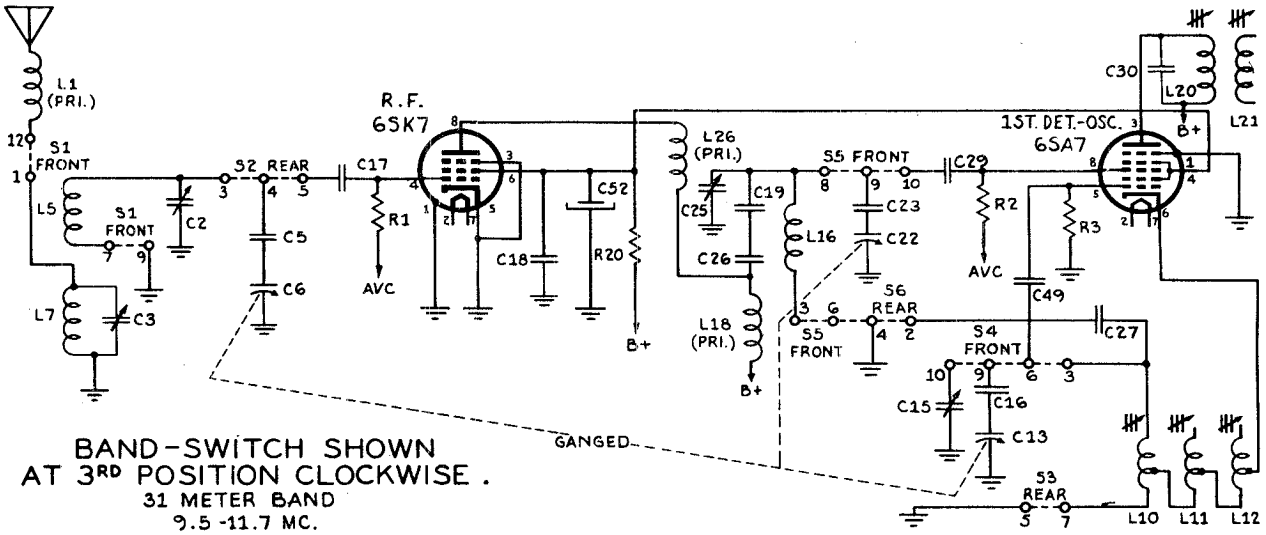
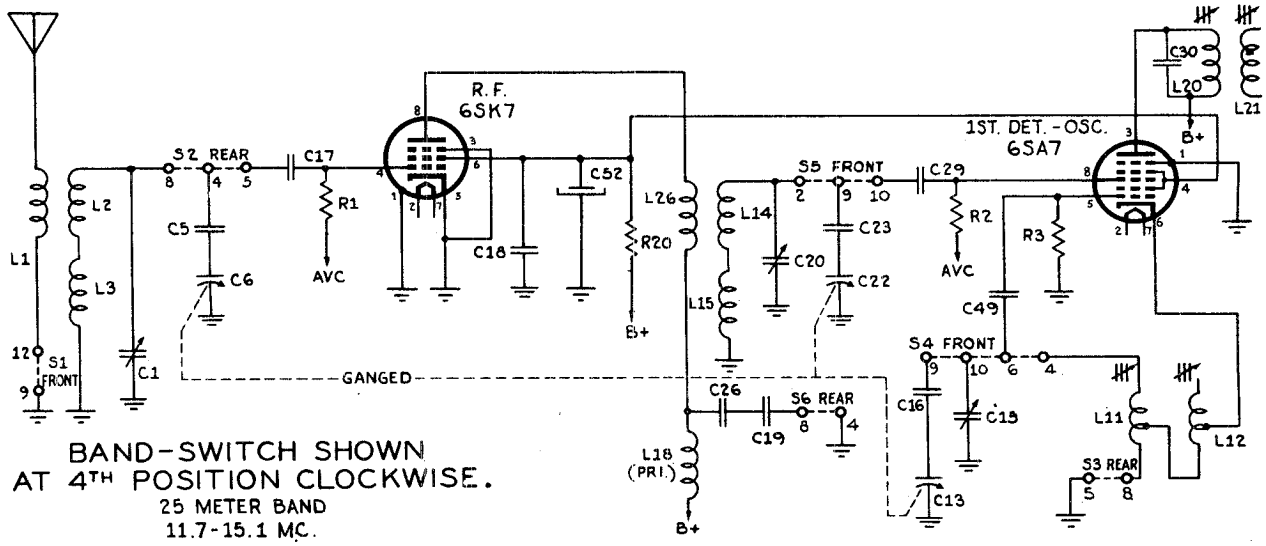
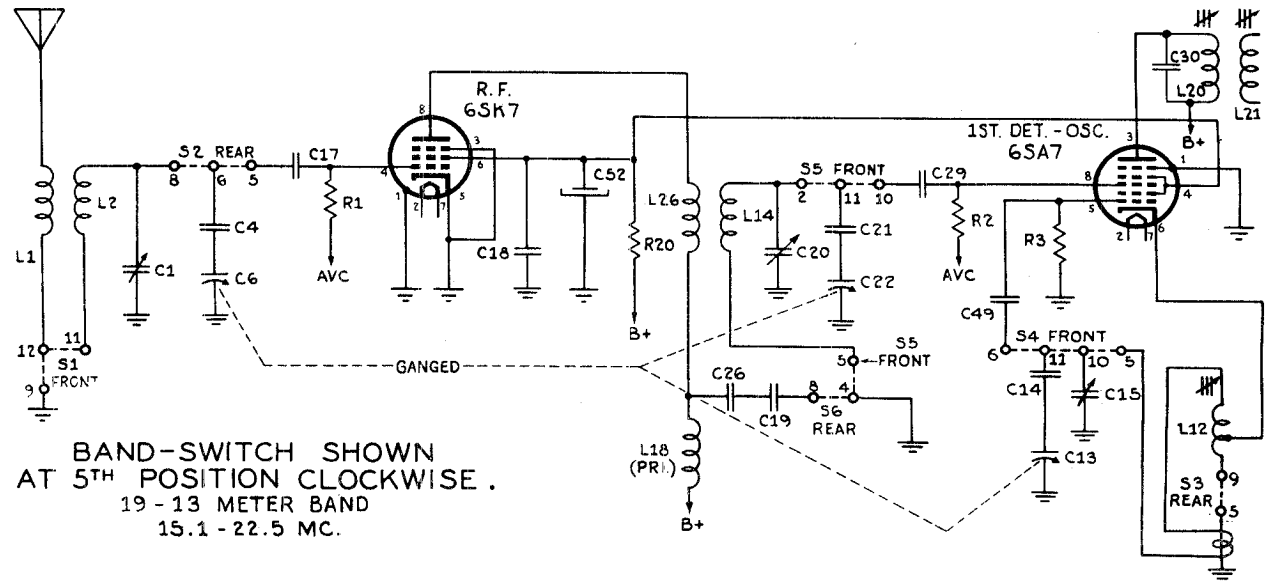


BAND-SWITCH SHOWN
AT 3RD POSITION CLOCKWISE.
31 METER BAND
9.5 -11.7 MC.



BAND-SWITCH SHOWN
AT 4TH POSITION CLOCKWISE.
25 METER BAND
11.7-15.1 MC.



BAND-SWITCH SHOWN
AT 5TH POSITION CLOCKWISE.
19 - 13 METER BAND
15.1 - 22.5 MC.

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MODEL Q34,Ch.539E

RCA MFG. CO.

Cathode-Ray Alignment is the preferable method. Connections for the oscillograph are shown in the chassis drawing.

Output Meter Alignment.—If this method is used, connect the meter across the voice coil, and turn the receiver volume control to maximum.

Steps	Connect the high side of the test-osc. to—	Tune test-osc. to—	Range Switch	Turn Radio Dial to—	Adjust the following for max. peak output
1	6SK7 I-F grid in series with .01 mfd.	455 kc	"A" band	Quiet point 600 kc end of dial	L23-L22 2nd I-F transformer
2	6SA7 1st det. grid in series with .01 mfd.				L21-L20 1st I-F transformer
3	Antenna terminal in series with 300 ohms	11.8 mc	25 meter band	11.8 mc (41.5°)	L11 (osc.) C1 (ant.) C20 (det.)
4		15.2 mc		15.2 mc (161.7°)	C15 (osc.)*† Rock in
5	Repeat steps 3 and 4 until aligned.				
6	Antenna terminal in series with 300 ohms	15.2 mc	19-13 meter band	15.2 mc (24°)	L12 (osc.)**
7		9.5 mc	31 meter band	9.5 mc (23.8°)	L10 (osc.)** C2 (ant.) C25 (det.)***
8		9.5 mc	"B" band	9.5 mc (168.5°)	C10 (osc.)*
9	Antenna terminal in series with 200 mmfd.	1,500 kc	"A" band	1,500 kc (153°)	C12 (osc.) C3 (ant.) C24 (det.)
10		600 kc		600 kc (30.5°)	L8 (osc.) Rock in
11	Repeat steps 9 and 10.				

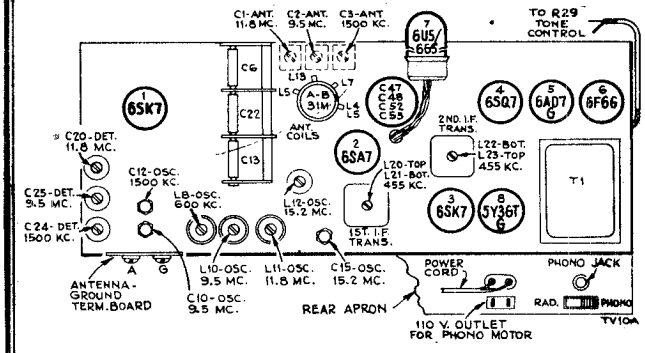
* Use minimum capacity peak if two can be obtained.

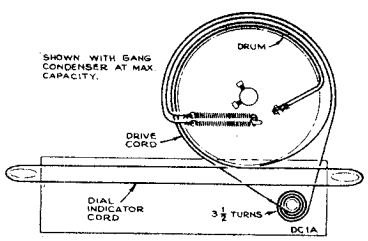
** If two peaks can be obtained, use the one obtained when the core screw is farthest out (counter-clockwise).

*** Use maximum capacity peak if two peaks can be obtained.

† Check image to determine that C15 has been adjusted to correct peak by tuning receiver to approximately 14.29 mc (147°) where a weaker signal should be received.

NOTE: Oscillator tracks above signals on all bands.





Test-Oscillator.—For all alignment operations, connect the low side of the test-oscillator to the receiver chassis, and keep the oscillator output as low as possible to avoid a-v-c action.

Calibration Scale on Indicator-Drive-Cord Drum.—The tuning dial is fastened in the cabinet and cannot be used for reference during alignment, therefore a calibration scale is attached to the rear of the indicator-drive-cord drum which is mounted on the front shaft of the gang condenser.

As the first step in r-f alignment, check the position of the drum, it should correspond to that shown in the Dial Indicator and Drive Mechanism drawing when the gang condenser plates are fully meshed. The drum is held to the shaft by means of two set screws, which must be tightened securely when the drum is in the correct position.

Pointer for Calibration Scale.—Improvise a pointer for the calibration scale by fastening a piece of wire to the gang condenser frame, and bend the wire so that it points to the "0°" mark on the calibration scale when the plates are fully meshed.

The setting of the gang condenser is read on this scale, which is calibrated in degrees. The correct setting of the gang in degrees, for each alignment frequency, is given in the alignment table.

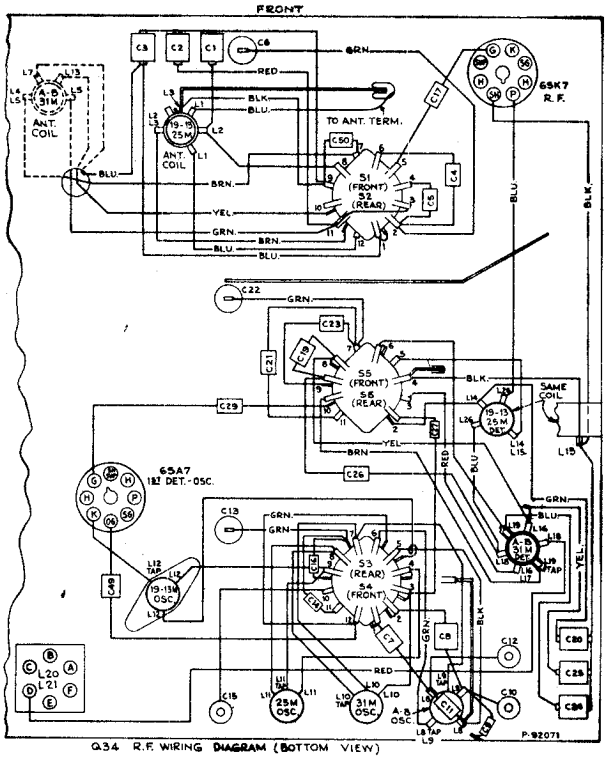
Receiver Dial with Calibration Scale.—To determine the corresponding frequency for any setting of the calibration scales, refer to the drawing.

Spread-Band Alignment.—The most satisfactory method of aligning or checking the spread-band ranges is on actual reception of short-wave stations of known frequency, by adjusting the magnetite-core oscillator coil for each band so that these stations come in at the correct points on the dial.

In exceptional cases, when the set is being serviced in a location where the noise level is high enough to prevent reception of short-wave stations, a test-oscillator may be used for alignment, but an extremely high degree of accuracy is required in the frequency settings of the test-oscillator, as a slight error will produce considerable inaccuracy on the spread-band dials. The frequency settings of the test-oscillator may be checked by one or both of the following methods:

1. Determine the exact dial settings of the test-oscillator (for frequencies at or close to the specified alignment frequencies) by zero-beating the test-oscillator against short-wave stations of known frequency.
2. Use harmonics of the standard-broadcast range of a test-oscillator, first checking the frequency settings on this range by means of a crystal calibrator, or by zero-beating against standard broadcast stations.

When a test oscillator is employed for spread-band alignment, a final check should be made on actual reception of short-wave stations of known frequency, and the magnetite-core oscillator coil for each band should be retouched so that the stations come in at the correct points on the dial.



Q34 R.F. WIRING DIAGRAM (BOTTOM VIEW)

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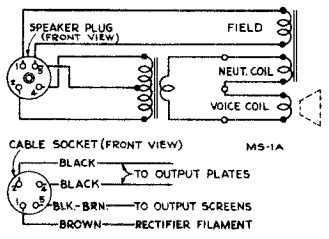
STOCK No.	DESCRIPTION
	CHASSIS ASSEMBLIES (RC 539E)
34502	Arm—Range switch actuating arm
37053	Board—"Antenna-Ground" board
39857	Bracket—L.H. bracket complete with drive cord pulley
39856	Bracket—R.H. bracket complete with drive cord pulley
37092	Calibrator—Drive drum calibrator
33014	Capacitor—Electrolytic, comprising three (3) sections of 10 mfd., 450 volts, and 1 section of 20 mfd., 25 volts (C47, C48, C52, C53)
37059	Capacitor—Mica trimmer, triple 2.5-10 mmf. (C1, C2, C3, C20, C24, C25)
33097	Capacitor—Ceramic, 4.7 mmf. (C27)
12714	Capacitor—Air trimmer, 2-12 mmf. (C10, C12, C15)
35646	Capacitor—Ceramic, 6 mmf. (C9)
39604	Capacitor—Mica, 10 mmf. (C19)
39041	Capacitor—Ceramic, 18 mmf. (C11)
35644	Capacitor—Ceramic, 47 mmf. (C16)
70582	Capacitor—Ceramic, 47 mmf. (C5, C23)
39622	Capacitor—Mica, 56 mmf. (C49, C50)
36072	Capacitor—Mica, 66 mmf. (C4, C21)
35645	Capacitor—Ceramic, 68 mmf. (C14)
39628	Capacitor—Mica, 100 mmf. (C30, C31)
39630	Capacitor—Mica, 120 mmf. (C33, C34)
39636	Capacitor—Mica, 220 mmf. (C17, C26, C29, C35, C42)
39626	Capacitor—Mica, 560 mmf. (C7)
70687	Capacitor—Mica, 3000 mmf. (C8)
70648	Capacitor—Tubular, .005 mfd., 1000 volts (C44, C45)
70606	Capacitor—Tubular, .005 mfd., 200 volts (C38)
70627	Capacitor—Tubular, .005 mfd., 600 volts (C40)
70610	Capacitor—Tubular, .01 mfd., 200 volts (C37)
70631	Capacitor—Tubular, .01 mfd., 600 volts (C43, C46)
70612	Capacitor—Tubular, .025 mfd., 200 volts (C39)
70615	Capacitor—Tubular, .05 mfd., 200 volts (C28)
70638	Capacitor—Tubular, .1 mfd., 600 volts (C18, C32)
37055	Coil—Antenna coil, A, B and 31 meter band (L4, L5, L7, L13)
37056	Coil—Antenna coil, 19-13 meter and 25 meter bands (L1, L2, L3)
37057	Coil—R-F coil, A, B and 31 meter bands (L16, L17, L18, L19)
37058	Coil—R-F coil, 19-13 meter and 25 meter bands (L14, L15, L26)
35624	Coil—Oscillator coil, 19-13 meter (L12)
35625	Coil—Oscillator coil, 25 meter band (L11)
35626	Coil—Oscillator coil, 31 meter band (L10)
37093	Coil—Oscillator coil, A & B band (L8, L9)
37151	Condenser—Variable tuning condenser (C6, C13, C22)
36109	Control—Tone control (R29)
37087	Control—Volume control and power switch (R9, S8)
32634	Cord—Drive cord (approx. 41 inches overall length)
32634	Cord—Indicator cord (approx. 42 inches overall length)
35788	Core—Adjustable core and stud for A & B band oscillator coil
12006	Core—Adjustable core and stud for I-F transformers
31259	Core—Adjustable core and stud for 19-13 meter, 25 meter and 31 meter band oscillator coils
37090	Drum—Drive drum
37094	Link—Link, arm and bushing assembly
5040	Plug—5 contact female plug for speaker cable
35641	Pulley—Drive cord pulley
36637	Receptacle—A-C power receptacle
30735	Resistor—560 ohms, 1 watt (R24)
30436	Resistor—12,000 ohms, ¼ watt (R10)
35595	Resistor—15,000 ohms, 3 watt (R20)
30492	Resistor—22,000 ohms, ¼ watt (R7)
30685	Resistor—33,000 ohms, ¼ watt (R3)
30650	Resistor—56,000 ohms, ½ watt (R21)
13734	Resistor—120,000 ohms, ¼ watt (R26)
30493	Resistor—150,000 ohms, ½ watt (R27)

STOCK No.	DESCRIPTION
30651	Resistor—270,000 ohms, ¼ watt (R8)
14983	Resistor—330,000 ohms, ¼ watt (R25)
30648	Resistor—470,000 ohms, ½ watt (R11, R23)
30652	Resistor—1 megohm, ¼ watt (R1, R2, R4)
30649	Resistor—2.2 megohms, ¼ watt (R5)
30992	Resistor—10 megohms, ¼ watt (R12)
14350	Screw—#8-32 square head set screw for Arm #34502 and link #37094
4669	Screw—#8-32 square head set screw for drive drum
37096	Shaft—Range indicator knob shaft
37095	Shaft—Range switch actuating shaft
37091	Shaft—Tuning knob shaft and flywheel
31364	Socket—Dial lamp socket
35787	Socket—Phono input socket
31251	Socket—Tube socket
34864	Socket—Tuning indicator tube socket
70576	Spring—Drive cord spring
31418	Spring—Indicator cord spring
12007	Spring—Retaining spring for I-F transformers' core and stud assemblies
31261	Spring—Retaining spring for 19-13 meter band and oscillator coil core and stud assemblies
33491	Switch—Radio-phono switch (S7)
37050	Switch—Range switch (S1, S2, S3, S4, S5, S6)
35636	Transformer—First I-F transformer (L20, L21, C30, C31)
36615	Transformer—Second I-F transformer (L22, L23, C33, C34 C35)
31733	Transformer—Power transformer, 105-125 volts, 50/60 cycle (T1)
31734	Transformer—Power transformer, 105-125 volts, 25/60 cycle (T1)
31735	Transformer—Power transformer, 105/130, 140/160, 200/250 volts, 50/60 cycle (T1)
34373	Washer—"C" washer for range switch actuating arm
2917	Washer—"C" washer for tuning knob shaft
	SPEAKER ASSEMBLY Stamped 92562-1J
70972	Cone—Cone and voice coil assembly
5039	Plug—4 prong male plug for speaker cable
70971	Speaker—7" x 9" EM speaker complete with cone and voice coil less output transformer and plug
70973	Transformer—Output transformer (T2)
	NOTE: If stamping on speaker in instrument does not agree with above speaker number, order replacement parts by referring to model number of instrument, number stamped on speaker and full description of part required.
	MISCELLANEOUS ASSEMBLIES
70589	Back—Cabinet back
70591	Board—Baffle board and grille cloth
70590	Bracket—Lamp bracket
30716	Clip—Tuning tube clip
39967	Crystal—Protective crystal for tuning tube
70579	Decal—Trade mark decal
39916	Dial—Glass dial scale
37922	Indicator—Station selector indicator
35652	Knob—Range indicator knob
35651	Knob—Range switch knob
35650	Knob—Tone control knob
34489	Knob—Volume control or tuning knob
11891	Lamp—Dial lamp
39859	Rail—Pointer rail
36641	Retainer—Retainer for tuning tube crystal
33438	Screw—Thumb screw for tube clip
14270	Spring—Retaining spring for tone control knob, volume control or tuning knob and for range switch knob
4982	Spring—Retaining spring for range indicator knob



Loudspeaker Connections

Frequency Ranges

Standard Broadcast ("A" Band)	540-1,720 kc (556-174 m)
Medium Wave ("B" Band)	3.0-9.5 mc (100-31.6 m)
31 Meter Spread Band	9.5-11.7 mc (31.6-25.6 m)
25 Meter Spread Band	11.7-15.1 mc (25.6-19.9 m)
19-13 Meter Spread Band	15.1-22.5 mc (19.9-13.3 m)

Intermediate Frequency ..... 455 kc

Power Output

Undistorted	3.25 watts
Maximum	4.5 watts

Loudspeaker

Type	7" x 9" electrodynamic
V.C. Impedance	2.2 ohms at 400 cycles
Identification Number	92562-1J

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MODELS 54B1,54B1-N, 54B2,54B3,Ch.RC-589

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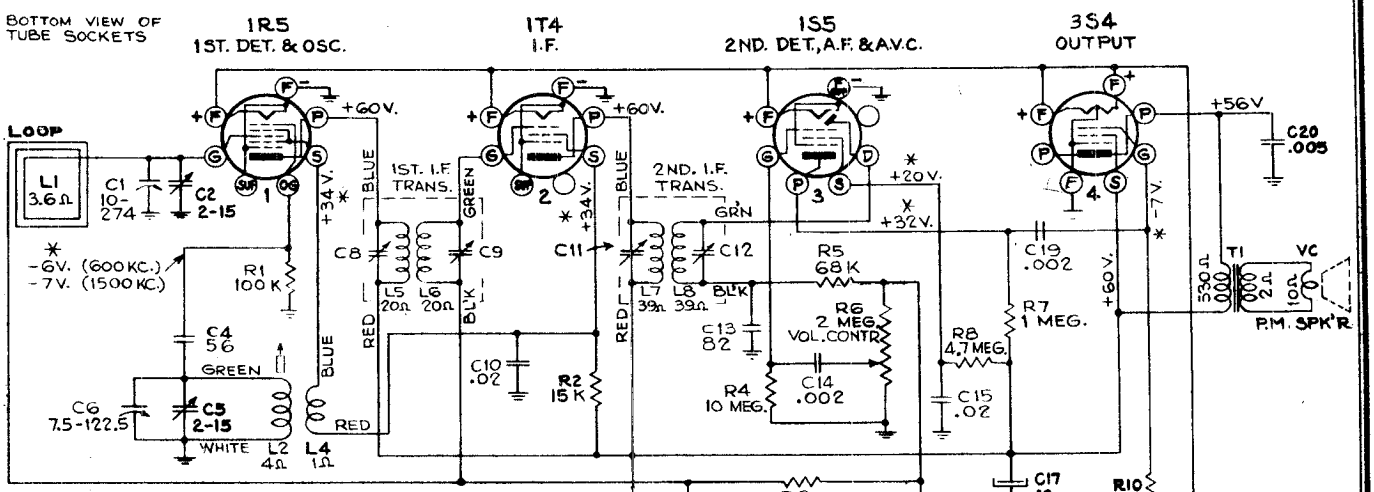


Power Supply

Type Battery	Current Consumption	Approximate Life (Intermittent Duty)
"A"—1.5 volt RCA-VS 036 or VS 001	0.25 amperes	3-5 hours
"B"—67.5 volts RCA-VS 016	8.5 milliamperes	25-40 hours

Power Output..... Undistorted 0.05 watts ..... Maximum 0.12 watts

Loudspeaker

Type Permanent-Magnet Dynamic Elliptical ..... 2 x 3 in.

Voice Coil Impedance ..... 11¾ ohms at 500 cycles

Cabinet Dimensions (inches)..... 3-3/16 x 6½ x 4-3/16
Weight..... 3¼ lbs. (net) Tuning Drive Ratio .....1 to 1

K=1000
VOLTAGES SHOULD HOLD WITHIN ± 20% WITH RATED BATTERY VOLTAGE.
* MEASURED WITH CHANALYST OR VOLTOHMYST.
ALL VOLTAGES ARE MEASURED WITH RESPECT TO CHASSIS GROUND.

P-92241 -1

Frequency Range ..... 550-1,600 kc
Intermediate Frequency ..... 455 kc

Test Oscillator.—Connect test oscillator as indicated in chart keeping the output as low as possible to avoid A V C action.

Output Meter.—Connect meter from top lug of TB1 (plate of 354) to ground. Turn volume control to maximum position.

Fig. 1 shows the modifications necessary to convert the center strip portion of a case into a convenient shield to be used as a substitute for the regular case center strip in the RF, Osc. alignment.

Steps	Connect the high side of test osc. to—	Tune test-osc. to—	Turn radio dial to—	Adjust the following for max. peak output—
1	Connection lug of C2, located on rear of gang in series with .01 mf.	455 kc	Quiet point near 1,600 kc	C11, C12 2nd I-F trans.
2		455 kc	Quiet point near 1,600 kc	C8, C9 1st I-F trans.
3	*Antenna coupling loop thru 200 mmf. capacitor	1,600 kc	1,600 kc	C5 (osc.)
4		1,500 kc	1,500 kc	C2 (ant.)
5		600 kc	600 kc	L2 (osc.)
6	Repeat steps 4 and 5 for final adjustments.			

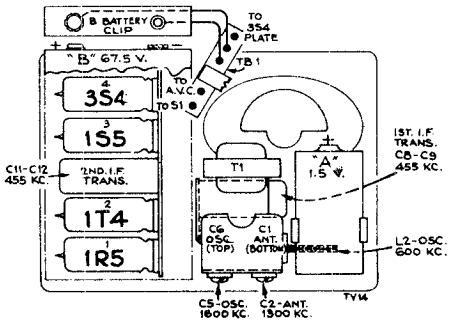
* Steps 3, 4 and 5 require a coupling loop from the signal generator to feed a signal into the receiver loop located in the lid. This loop should be approximately one turn of 6 x 3½ inches coupled to the signal generator through a 200 mmf. capacitor, and loosely coupled to the receiver loop antenna at about 1¾ inches distance, so as not to disturb the receiver loop inductance. Ground test oscillator through .1 mf. capacitor to receiver chassis.

Tools required:

1. One Phillips No. 1 screwdriver.
2. One small neutralizing alignment tool.

CRITICAL LEAD DRESS

1. Dress blue, green and black leads of second I-F transformer as direct as possible. If excess lead exists, dress down side of socket and flat against chassis to transformer opening.
2. Cross the green and the black leads inside the first I-F transformer can, keeping the green lead to the outside. Keep the blue and the green leads separated as far as possible throughout their length.
3. Dress audio coupling capacitor (C14; .002 mf.) and the lead to the volume control up and underneath the shelf supporting the output transformer.
4. Dress the three capacitors pyramided behind the speaker, parallel to the complete assembly and with enough room behind the battery holder to allow the holder to move when a battery is installed or removed.
5. Dress the "B" battery leads behind the gang frame and over the top of the output transformer.
6. Observe the outside foil connections on all paper capacitors, also the polarity of the electrolytic capacitor (C17).
7. Keep blue and red leads of output transformer above the mounting shelf.



Note: DO NOT install "A" battery without cardboard cover.

A rubber band should be placed around each tube for cushioning.

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Replacement of Component Parts

I. **To remove back cover:**

a. Depress locking spring clip through hole in top of case.

b. With spring clip depressed, pull cover carefully out and up off the locking lug in the bottom of the case.

II. **To replace batteries:**

a. Remove back cover.

b. Remove, either or both, the "A" and "B" battery as the case may warrant. The "B" battery snap fasteners can best be removed by inserting a screwdriver under the snap fastener strip and prying upward.

III. **To remove the case center strip:**

a. Remove one screw on the inside near the back cover.

b. Tilt case center strip and lift.

IV. **To replace tubes:**

a. Remove back cover.

b. Remove "B" battery.

c. Remove case center strip.

d. Remove and replace tubes as required.

V. **To remove the escutcheon plate (top cover):**

a. Remove the main dial knob, just pull.

b. Remove the four corner nuts (B), rear.

c. The plate may either be removed from the stay arm or folded into the lid.

VI. **To remove speaker:**

a. Remove escutcheon plate (see item V above).

b. Remove two Phillips screws (C) on chassis front of panel assembly holding speaker.

c. Unsolder voice coil leads.

d. Slide forward away from hinge side.

VII. **To remove output transformer:**

a. Remove speaker (see item VI).

b. Remove rivet (when replacing use small brass bolt).

c. Unsolder mounting lug and leads.

d. Pull out transformer.

VIII. **To remove volume control:**

a. Remove speaker (item VI).

b. Unsolder (disconnect) lead to positive terminal of "A" battery holder.

c. Lift up the "A" battery holder by removing the one screw in its base. This holder has a hinge action and must be lifted up and back to remove.

d. Remove front plate (panel) as follows:

1. Unsolder two copper strips (E) (from end of tube shelf to front plate) located under tubes 1R5 3S4.
2. Remove two screws (F) holding tube shelf to front plate. These screws are located between tubes 1R5 and 1T4, also 3S4 and 1S5. Rubber shock mounts may stick on studs, pry loose.
3. Remove nut (G) beneath tube shelf below second I-F transformer.
4. Remove screw (G) beneath the negative terminal of "A" battery holder, near cover hinge and also screw (G) adjacent to volume control below "A" battery holder near release catch.
5. Unsolder three chassis leads to cover switch assembly or remove the switch assembly from the front cover plate.
6. Lay chassis on board or jig.
7. Remove front plate.
8. Unsolder volume control leads.
9. Remove volume control knob and spider.
10. Remove volume control assembly by bending back four lugs.

Caution: Do not close lid unless center screw of switch assembly is in place.

e. Reassemble in reverse order.

IX. **To remove oscillator coil:**

a. Same procedure and steps as covered in item VIII for removal of volume control plus the following.

b. Unsolder oscillator coil leads.

c. Remove coil by unsnapping spring mounting clips from angle bracket.

X. **To remove 1st I-F transformer:**

a. Remove speaker.

b. Unsolder four leads from 1st I-F transformer.

1. Blue to plate (screen used as plate) of 1R5 tube.
2. Green to grid of 1T4 tube.
3. Red to B+ terminal of 5 lug terminal board adjacent output transformer.
4. Black to AVC terminal of same strip as above.

c. Remove connections as required from two lug terminal board adjacent to 1st I-F transformer to permit this terminal board to be moved to a position free of the 1st I-F transformer.

d. Unsolder and bend mounting lugs straight on the I-F transformer can. These lugs are immediately below the 2nd I-F transformer on tube shelf.

e. Slip 1st I-F transformer forward toward volume control and out.

Note: It is possible to fold the 1st I-F transformer out the front of the chassis if the front plate is removed. This will eliminate the unsoldering of leads from the two lug terminal board.

XI. **To remove 2nd I-F transformer:**

a. Carefully remove the two 0.02 uf C10, C15 capacitors.

b. Carefully depress the two leads (B+ and A+) near the I-F transformer case mounting lugs and unsolder these lugs from the tube mounting shelf and bend out.

c. Unsolder the blue (plate of 1T4), green (grid of 1S5), red (B+ on terminal board), and black leads.

d. Remove 2nd I-F transformer.

XII. **To remove condenser tuning gang:**

a. Loosen oscillator coil.

b. Unsolder leads to tuning gang.

c. Unsolder grounding straps.

d. Remove three screws holding gang assembly to chassis.

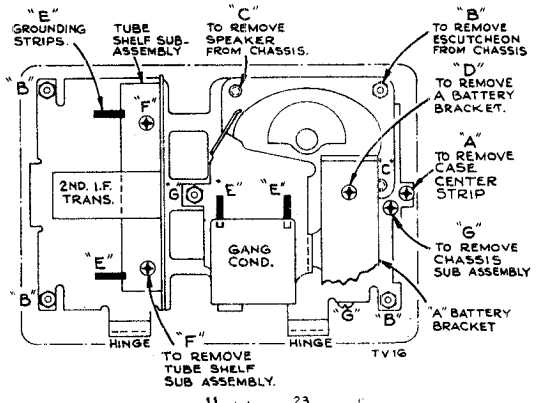
e. Remove gang from rear of chassis.

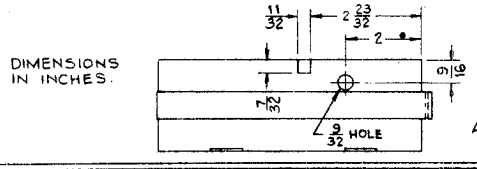
XIII. **To remove loop assembly:**

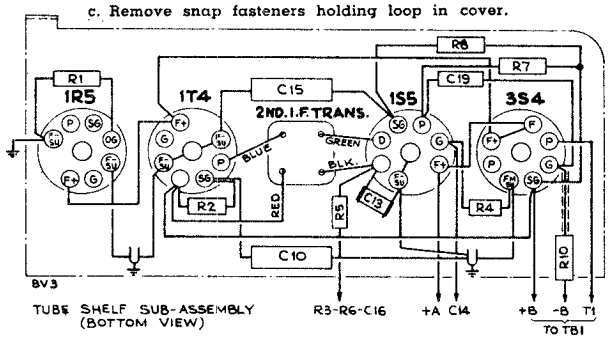
a. Unsolder loop leads in chassis.

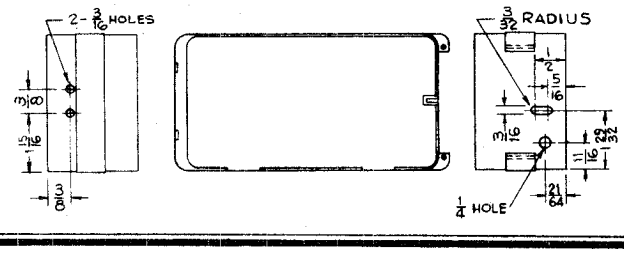
b. Remove screw holding fish paper insulating envelope to chassis switch.

c. Remove snap fasteners holding loop in cover.









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MODELS 54B1,54B1-N,
54B2,54B3,Ch.RC-589
MODELS 55U,55AU,Ch.RC-1017

RCA MFG. CO.

MODELS 54B1, 54B1-N, 54B2, 54B3

STOCK No.	DESCRIPTION
	CHASSIS ASSEMBLIES **RC 589 54B1 BLACK** **RC 589A 54B2 BROWN**
70444	Board—Speaker terminal board (5 contact)
70445	Board—Terminal board (1 contact)
33111	Capacitor—Ceramic, 33 mmf (C16)
60954	Capacitor—Ceramic, 56 mmf. (C4)
65405	Capacitor—Ceramic, 82 mmf. (C13)
70454	Capacitor—Tubular, .002 mfd., 150 volts (C14, C19)
70627	Capacitor—Tubular, .005 mfd., 600 volts (C20)
70453	Capacitor—Tubular, .02 mfd., 100 volts (C10, C15)
71013	Capacitor—Tubular, .05 mfd., 400 volts (C7)
36718	Capacitor—Electrolytic, 10 mfd., 60 volts (C17)
70443	Coil—Oscillator coil (L2, L4)
70438	Condenser—Variable tuning condenser (C1, C2, C5, C6)
70452	Connector—Loop connector (1 set)
70439	Control—Volume control (R6)
70449	Fastener—Push fastener to hold loop—(2 required)
70429	Grommet—Rubber grommet for tube support (2 required), and to mount variable condenser (3 required)
70434	Hinge—Lid hinge—Model 54B1—Black (2 required)
70984	Hinge—Lid hinge—Model 54R2—Brown (2 required)
70441	Holder—Battery holder
70424	Knob—Tuning knob
70432	Knob—Volume control knob
70708	Lead—Battery lead complete
70450	Lid—Case lid complete with lid support less loop—Model 54B1—Black
70986	Lid—Case lid complete with lid support less loop—Model 54B2—Brown
70447	Loop—Antenna loop complete with connectors less lid —Model 54B1—Black
70985	Loop—Antenna loop complete with connectors less lid —Model 54B2—Brown
70449	Nameplate—"RCA" nameplate
70427	Nut—Retaining nut for lid support stud
70420	Panel—Chrome panel
70422	Plate—Backing plate for mounting hinge on lid—Model 54B1—Black (2 required)
70983	Plate—Backing plate for mounting hinge on lid—Model 54B2—Brown (2 required)
14076	Resistor—820 ohms, ¼ watt (R9)
36714	Resistor—15,000 ohms, ¼ watt (R2)
14138	Resistor—68,000 ohms, ¼ watt (R5)
3252	Resistor—100,000 ohms, ¼ watt (R1)
30652	Resistor—1 megohm, ¼ watt (R7)
12928	Resistor—3.3 megohms, ¼ watt (R3, R10)
30931	Resistor—4.7 megohms, ¼ watt (R8)
30992	Resistor—10 megohms, ¼ watt (R4)
70421	Screw—Case cover mounting screw (1 set)—Model 54B1
71150	Screw—Case cover mounting screw—Model 54B2
70446	Screw—#6-32 x ¼" long self-tapping screw to mount battery holder
70436	Socket—Tube socket
70423	Spacer—Rubber shock spacer
70428	Speaker—2" x 3" elliptical P.M. speaker
70425	Spring—Tuning knob spring clip
70426	Stud—Lid support stud
70451	Support—Lid support
70435	Support—Tube support less tube sockets and transformer
70430	Switch—Power switch (S1)
70442	Transformer—First I-F transformer (L5, L6, C8, C9)
70440	Transformer—Output transformer (T1)
70437	Transformer—Second I-F transformer (L7, L8, C11, C12)
70433	Washer—Spring washer for volume control knob
	MISCELLANEOUS ASSEMBLIES
70456	Bottom—Case bottom—54B1—Black
70988	Bottom—Case bottom—54B2—Brown
70457	Catch—Spring catch assembly
70455	Center—Case center—Model 54B1—Black
70987	Center—Case center—Model 54B2—Brown
70459	Handle—Carrying handle—Model 54B1—Black
70989	Handle—Carrying handle—Model 54B2—Brown
70461	Link—Handle link—Model 54B1—Black (2 required)
70990	Link—Handle link—Model 54B2—Brown (2 required)
70458	Nameplate—"His Master's Voice" nameplate
70460	Screw—#4-40 x ⅛" fillister head screw for case center strip

MODELS 55U, 55AU

STOCK No.	DESCRIPTION
	CHASSIS ASSEMBLY **(RC 1017)**
70389	Bearing—Tuning knob shaft bearing
70407	Button—Plug button (2 required)
70997	Capacitor—Ceramic, 5.6 mmf. (C24)
39650	Capacitor—Mica, 820 mmf. (C15)
70601	Capacitor—Tubular, .002 mfd., 400 volts (C5, C9)
70606	Capacitor—Tubular, .005 mfd., 400 volts (C1, C11)
70611	Capacitor—Tubular, .02 mfd., 400 volts (C8)
70612	Capacitor—Tubular, .025 mfd., 400 volts (C10)
70615	Capacitor—Tubular, .05 mfd., 400 volts (C2, C14)
70617	Capacitor—Tubular, 0.1 mfd., 400 volts (C3, C4)
70408	Capacitor—Electrolytic comprising 1 section of 30 mfd., 150 volts and 1 section of 50 mfd., 150 volts (C12, C13)
70403	Coil—Oscillator coil
70383	Condenser—Variable tuning condenser complete with drum (C18, C16)
70322	Control—Volume control, 0.5 megohms (R10)
32634	Cord—Drive cord (approx. 48" overall length)
70392	Cord—Power cord
70384	Drum—Drive drum
70397	Gear—Power or radio-phono switch gear
70395	Gear—Volume control gear and spring assembly
70404	Indicator—Station selector indicator
70391	Insulator—Bakelite insulator for phono input socket
11765	Lamp—Dial lamp
70393	Loop—Antenna Loop (L1, L2)
70382	Plate—Dial back plate complete with pulleys less dial
30868	Plug—2 contact female plug for AC cable
36230	Pulley—Drive cord pulley
30880	Resistor—150 ohms, ¼ watt (R7)
6134	Resistor—1200 ohms, 1 watt (R9)
30492	Resistor—22,000 ohms, ¼ watt (R2)
14583	Resistor—220,000 ohms, ¼ watt (R1, R5)
30648	Resistor—470,000 ohms, ¼ watt (R8)
12928	Resistor—3.3 megohm, ¼ watt (R4)
31455	Resistor—5.6 megohm, ¼ watt (R6)
14974	Screw—#8-32 x 3/16" long set screw for lower gear
70388	Shaft—Tuning knob shaft
34449	Socket—Lamp socket
35787	Socket—Phono input socket
37605	Socket—Tube socket—moulded
70390	Spring—Drive cord tension spring
70396	Spring—Volume control gear tension spring
70394	Switch—Power or radio phono switch (S1)
70386	Transformer—First I.F. transformer (L6, L7; C20, C21)
70387	Transformer—Second I.F. transformer (L8, L9; C22, C23; C6, C7)
70385	Transformer—Output transformer
33726	Washer—"C" washer for tuning knob shaft
70406	Washer—Spring washer for volume control
	SPEAKER ASSEMBLY 922279-1
70405	Speaker—4" x 6" P.M. speaker complete NOTE: If stamping on speaker in instrument does not agree with above speaker number, order replacement parts by referring to model number of instrument, number stamped on speaker and full description of part required.
	MISCELLANEOUS ASSEMBLIES
X1605	Board—Baffle board and grille
70398	Clamp—Dial clamp (1 set)
35392	Decal—Trademark decal (RCA Victor)
70575	Decal—Trademark decal (Dog)
70402	Dial—Dial scale
70707	Hinge—Cabinet lid hinge (2 required)
70401	Knob—Power or radio-phono switch knob
70400	Knob—Tuning knob
70399	Knob—Volume control knob
14270	Spring—Retaining spring for tuning knob and volume control knob
39545	Support—Lid support

POWER OUTPUT

Undistorted	1.5 watts
Maximum	2.4 watts

LOUDSPEAKER (M922279-1) "PM"

Size	4 x 6 inch elliptical
V.C. Impedance	3.4 ohms at 400 cycles
Some models may have	5 inch PM

PHONOGRAPH

Type	Automatic (T960015)
Record Capacity	Twelve 10-in., Ten 12-in.
Turntable Speed	78 r.p.m.
Type Pickup	Crystal
Motor Power Consumption	25 watts

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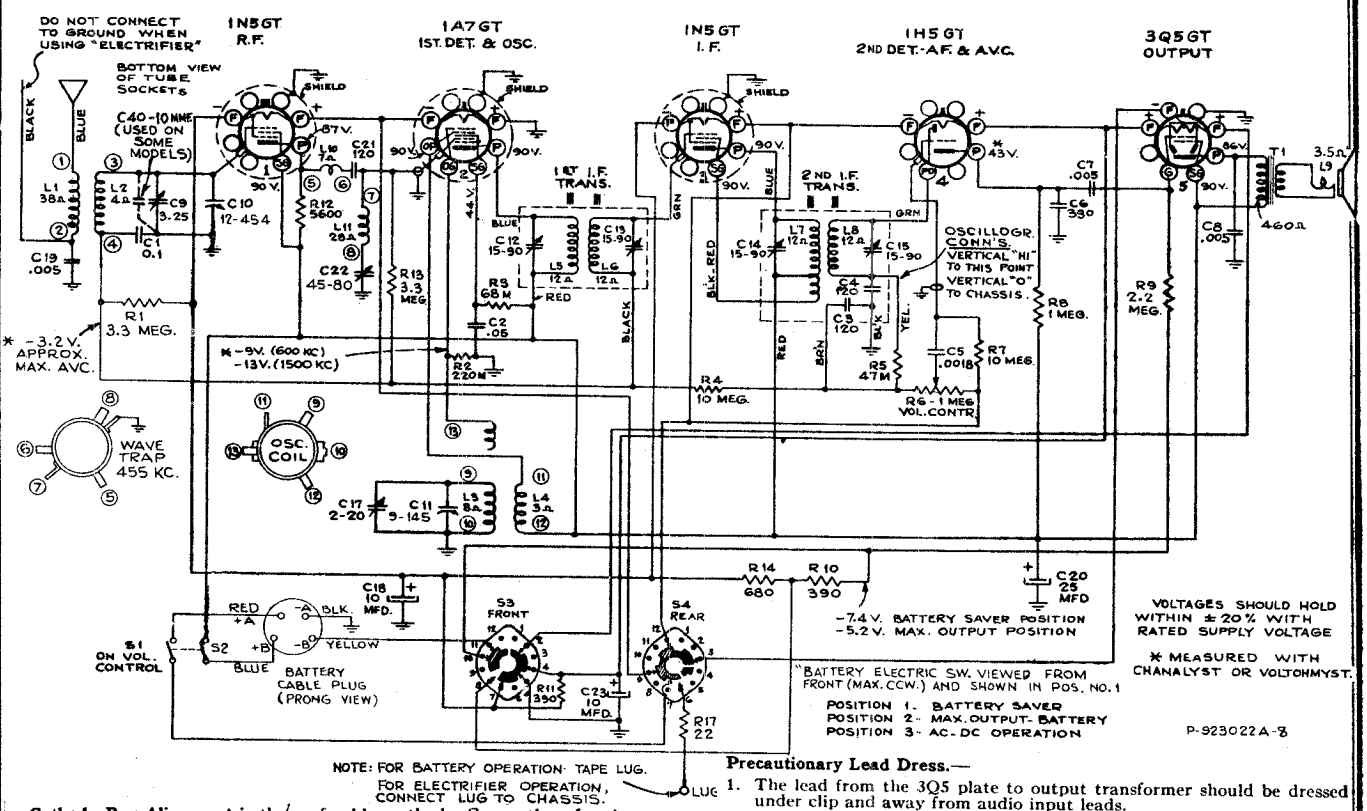
RCA MFG. CO.

MODEL 55F, CV-42
Electrifier
Ch. RC-1004E


DO NOT CONNECT TO GROUND WHEN USING "ELECTRIFIER"
BOTTOM VIEW OF TUBE SOCKETS
1N5GT R.F.
1A7GT 1ST. DET. & OSC.
1N5GT I.F.
1H5GT 2ND DET.-A.F. & A.V.C.
3Q5GT OUTPUT
C40-10 MMF (USED ON SOME MODELS)
1ST I.F. TRANS.
2ND I.F. TRANS.
OSCILLOGR. CONN'S. VERTICAL "HI" TO THIS POINT VERTICAL "O" TO CHASSIS.
WAVE TRAP 455 KC.
OSC. COIL
* -3.2 V. APPROX. MAX. AVC.
** -9 V. (600 KC) -13 V. (1500 KC)
-7.4 V. BATTERY SAVER POSITION
-5.2 V. MAX. OUTPUT POSITION
S1 ON VOL. CONTROL
BATTERY CABLE PLUG (PRONG VIEW)
S3 FRONT
S4 REAR
"BATTERY ELECTRIC SW. VIEWED FROM FRONT (MAX. CCW.) AND SHOWN IN POS. NO. 1
POSITION 1- BATTERY SAVER
POSITION 2- MAX. OUTPUT- BATTERY
POSITION 3- AC-DC OPERATION
VOLTAGES SHOULD HOLD WITHIN ± 20% WITH RATED SUPPLY VOLTAGE
* MEASURED WITH CHANALYST OR VOLTOHMYST.
P-923022A-8
NOTE: FOR BATTERY OPERATION TAPE LUG. FOR ELECTRIFIER OPERATION, CONNECT LUG TO CHASSIS.
LUG

Cathode Ray Alignment is the preferable method. Connections for the oscillograph are shown in the diagram.

Output Meter Alignment.—If this method is used, connect the meter across the voice coil and turn the receiver volume control to maximum.

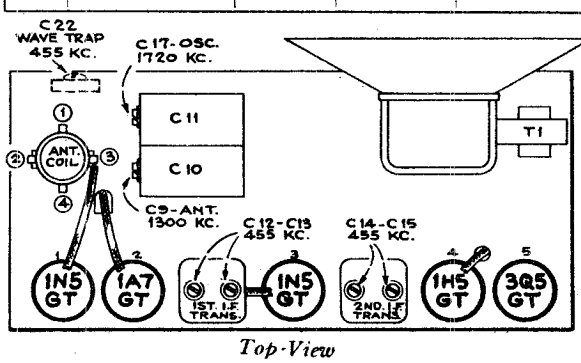
Test Oscillator.—For all alignment operations, connect the low side of the test oscillator to the receiver chassis, and keep the output as low as possible to avoid AVC action.

Pre-Setting Dial.—With gang condenser in full mesh, the pointer should be set at the left-hand end dial calibration mark.

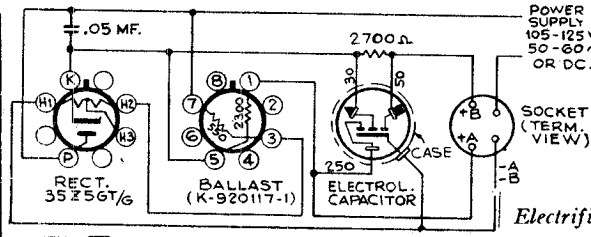
Precautionary Lead Dress.—

1. The lead from the 3Q5 plate to output transformer should be dressed under clip and away from audio input leads.
2. All filament wires should be dressed close to chassis.
3. Keep AVC lead connecting C1, (0.1 mfd. filter) to antenna coil away from the 1A7GT plate.
4. Keep blue plate leads coming from I.F. transformers short and close to chassis.
5. Keep yellow leads connecting to oscillator coil away from trap coil.
6. Keep grid lead of 1N5GT RF tube away from 1A7GT grid.
7. Keep green lead from second I.F. transformer short and close to ground.

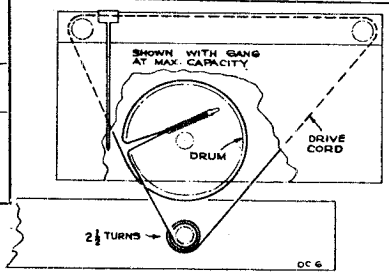
Step	Connect high side of the test oscillator to—	Tune test osc. to—	Turn radio dial to—	Adjust the following for maximum peak output
1	I-F grid in series with .01 mfd.	455 kc	Quiet point between 550 and 750 kc	C14, C15. (2nd I-F Trans.)
2	1A7GT grid in series with .01 mfd.			C12, C13 (1st I-F Trans.)
3	Antenna terminal in series with 200 mmfd.	1,720 kc	Tuning condenser rotor plates all out	C17 (osc.)
4		1,300 kc	1,300 kc signal	C9 (ant.)
5		455 kc	Quiet point between 550 and 750 kc	Adjust C22 for minimum output on strong 455 kc signal



Top View



Electrifier Schematic



FREQUENCY RANGE.... .540-1,720 kc
INTERMEDIATE FREQUENCY.. ..455 kc
MAXIMUM POWER OUTPUT... .3 watt

IMPORTANT

Remove any external ground connections when using the Electrifier.

CAUTION: Turn power switch off (counter-clockwise) when installing or replacing tubes or batteries.

RECEIVER IS SHIPPED READY FOR BATTERY OPERATION. FOR ELECTRIFIER OPERATION, REMOVE TAPE FROM LUG AT REAR OF CHASSIS AND CONNECT LUG TO CHASSIS.

On a DC power supply, if no reception is obtained, reverse the plug in the outlet and retune. On an AC supply, reversal of the plug may reduce hum. CAUTION! Do not touch Radio Chassis unless power plug is removed from socket.

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MODEL 55F, CV-42
Ch. RC-1004E

RCA MFG. CO.

MODELS 56X, 56X2, 56X3, Ch. RC-1011

Model 55F and CV-42 Electrifier

STOCK No.	DESCRIPTION
	CHASSIS ASSEMBLIES RC 1004E
38675	Arm—"On-Off" indicator arm
39604	Capacitor—Mica, 10 mmf. (C40)
38672	Capacitor—Mica trimmer, 1 section 120 mmf. 1 section 45-80 mmf. (C21, C22)
39640	Capacitor—Mica, 330 mmf. (C6)
70627	Capacitor—Paper, .005 mfd., 1200 volts (C7, C8, C19)
70712	Capacitor—Paper, .0018 mfd., 700 volts (C5)
70615	Capacitor—Paper, .05 mfd., 200 volts (C2)
70617	Capacitor—Paper, 0.1 mfd., 400 volts (C1)
36718	Capacitor—Electrolytic, 10 mfd., 10 volts (C18, C23)
38705	Capacitor—Electrolytic, 25 mfd., 90 volts (C20)
38344	Coil—Antenna coil (L1, L2)
38345	Coil—Oscillator coil (L3, L4)
70378	Coil—Wave trap (L10, L11)
38599	Condenser—Variable tuning condenser (C9, C10, C11, C17)
36080	Control—Volume control and power switch (R6, S1, S2)
34662	Cord—Drive cord (approx. 59" overall length)
38821	Dial—Dial scale
35069	Fastener—Push fastener for dial plate
36090	Indicator—Station selector indicator
38350	Lever—Indicator arm actuating lever
38673	Plate—Dial back plate complete with drive cord pulleys and indicator arm
30550	Plug—4 prong male plug for battery cable
32289	Pulley—Drive cord pulley
39930	Resistor—22 ohms, 1 watt (R17)
30498	Resistor—390 ohms, ¼ watt (R10, R11)
12262	Resistor—680 ohms, ¼ watt (R14)
30734	Resistor—5600 ohms, ¼ watt (R12)
30787	Resistor—47,000 ohms, ¼ watt (R5)
14138	Resistor—68,000 ohms, ¼ watt (R3)
14583	Resistor—220,000 ohms, ¼ watt (R2)
30652	Resistor—1 megohm, ¼ watt (R8)
30649	Resistor—2.2 megohm, ¼ watt (R9)
12928	Resistor—3.3 megohm, ¼ watt (R1, R13)
30992	Resistor—10 megohm, ¼ watt (R4, R7)
36897	Shaft—Tuning knob shaft
70377	Shield—Tube shield for IN5GT/G and IH5GT/G tubes
31251	Socket—Tube socket
31418	Spring—Drive cord tension spring
38349	Spring—Indicator arm return spring
38670	Switch—"Battery-Electric" power switch (S3, S4)
70379	Transformer—First I.F. transformer (L5, L6, C12, C13)
70380	Transformer—Second I.F. transformer (L7, L8, C3, C4, C14, C15)
33726	Washer—"C" for tuning knob shaft

STOCK No.	DESCRIPTION
	SPEAKER ASSEMBLIES Stamped 92515-1K
70381	Speaker—5" P.M. speaker less output transformer
70991	Transformer—Output transformer
	SPEAKER ASSEMBLIES Stamped 92515-1P
70381	Speaker—5" P.M. speaker less output transformer
70992	Transformer—Output transformer
	SPEAKER ASSEMBLIES Stamped 92515-1F
70381	Speaker—5" P.M. speaker less output transformer
70993	Transformer—Output transformer
	NOTE: If stamping on speaker in instrument does not agree with above speaker number, order replacement parts by referring to model number of instrument, number stamped on speaker and full description of part required.
	MISCELLANEOUS ASSEMBLIES
X1606	Board—Baffle board and grille cloth
36462	Clamp—Dial clamp
35915	Escutcheon—Dial escutcheon less dial
36886	Knob—Power switch knob
36722	Knob—Tuning knob
71281	Knob—Volume control knob
30900	Spring—Retaining spring for knob
38679	Window—Glass window for dial scale
	CV-42 ELECTRIFIER
38702	Ballast—Plug-in ballast tube resistor
38701	Capacitor—Electrolytic, comprising 1 section of 50 mfd., 150 volts, 1 section of 30 mfd., 150 volts, and 1 section of 250 mfd., 10 volts
30847	Capacitor—.05 mfd., 400 volts
28451	Cover—Insulating cover for electrolytic capacitor
35069	Fastener—Push fastener for bottom cover
28452	Plate—Bakelite mounting plate for electrolytic capacitor
38702	Resistor—Ballast tube resistor
30730	Resistor—2,700 ohms, ½ watt
31027	Socket—Power output socket
31251	Socket—Tube or ballast resistor socket
38702	Tube—Ballast tube resistor

CIRCUIT DESCRIPTION.—Superheterodyne with one stage of radio frequency amplification, automatic volume control and class "A" beam power output. Battery operation, with optional AC-DC socket power attachment available. Model 55F can be operated on 105-125 volts AC, 50-60 cycles, or 105-125 DC, by means of an RCA CV-42 Electrifier.

LOUDSPEAKER (5 inch) 92515-1
Voice coil impedance at 400 cycles.....3.4 ohms

POWER SUPPLY
Battery.....RCA VS022 or equivalent
Battery Drain
"A" 1½ volt section.....3 ampere
"B" 90 volt section.....10 m.a. (Switch in "Battery Saver Position")
14 m.a. (Maximum Output Position)

POWER CONSUMPTION
With CV-42 Electrifier Unit (switch in "Electric" position).....22.5 watts
Cabinet Dimensions (inches).....18 x 9¼ x 10⅝

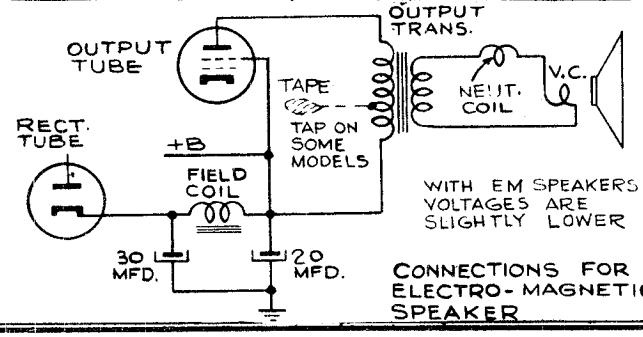
Models 56X, 56X2, 56X3

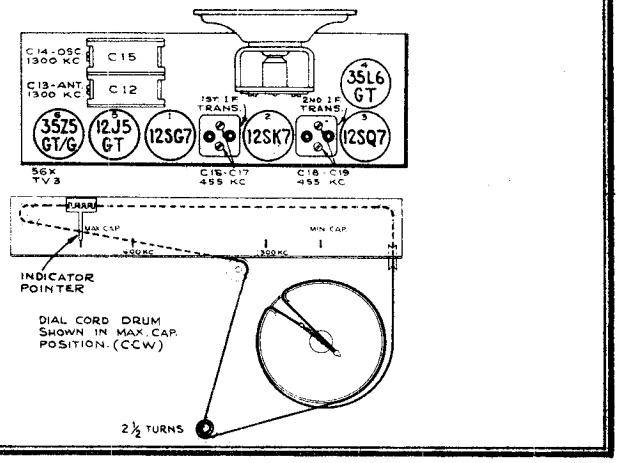
Steps	Connect the high side of test-oscillator to—	Tune test-osc. to—	Turn radio dial to—	Adjust the following for max. peak output
1	Stator of C-12 in series with .01 mfd.	455 kc	Quiet-point 1,600 kc end of dial	C18 and C19 2nd I-F transformer
2				C16 and C17 1st I-F transformer
3	Ant. lead in series with 200 mmfd.	1,300 kc	1,300 kc	C14 (osc.) C13 (ant.)
4	Repeat step 3.			

Test Oscillator. Connect high side of test oscillator as shown in chart. Connect low side through a .01 mf capacitor to common "-B." Keep the output signal as low as possible to avoid AVC action.

Output Meter. Connect leads between speaker voice coil and chassis. Turn volume control to maximum clockwise, tone control to maximum highs (clockwise).

Dial Pointer Adjustment. Rotate tuning condenser fully counter-clockwise (plates closed). Adjust indicator pointer to left (max. Cap.) mark on dial back plate.





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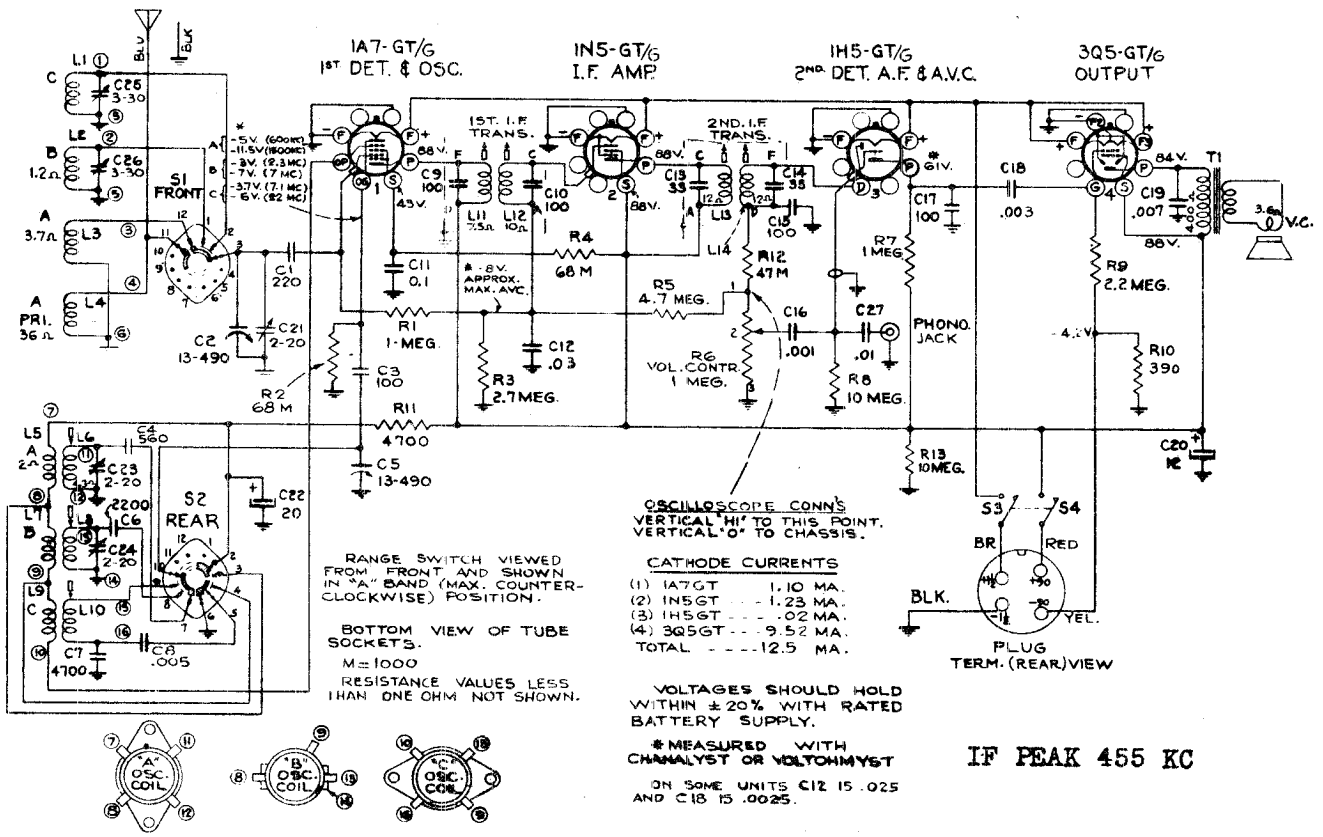

STOCK No.	DESCRIPTION
	CHASSIS ASSEMBLIES (RC-563A)
32548	Capacitor—Electrolytic, comprising 1 section of 12 mfd., 150 volts, and 1 section of 20 mfd., 150 volts (C20, C22)
32830	Capacitor—Mica trimmer, dual, 2-20 mmf. (C23, C24)
31292	Capacitor—Mica trimmer, dual, 3-30 mmf. (C25, C26)
39616	Capacitor—Mica, 33 mmf. (C13, C14)
39628	Capacitor—Mica, 100 mmf. (C3, C9, C10, C15, C17)
39636	Capacitor—Mica, 220 mmf. (C1)
70667	Capacitor—Mica, 560 mmf. (C4)
39660	Capacitor—Mica, 2200 mmf. (C6)
39668	Capacitor—Mica, 4700 mmf. (C7)
70600	Capacitor—Tubular, .001 mfd., 200 volts (C16)
70603	Capacitor—Tubular, .003 mfd., 200 volts (C18)
70606	Capacitor—Tubular, .005 mfd., 200 volts (C8)
70608	Capacitor—Tubular, .007 mfd., 400 volts (C19)
70610	Capacitor—Tubular, .01 mfd., 200 volts (C27)
70613	Capacitor—Tubular, .03 mfd., 200 volts (C12)
70617	Capacitor—Tubular 0.1 mfd., 200 volts (C11)
32821	Coil—Antenna coil, "A," "B" and "C" bands (L1, L2, L3, L4)
32148	Coil—Oscillator coil, "A" band (L5, L6)
33784	Coil—Oscillator coil, "B" band (L7, L8)
38295	Coil—Oscillator coil, "C" band (L9, L10)
38287	Condenser—Variable tuning condenser (C2, C5, C21)
36080	Control—Volume control and power switch (R6, S3, S4)
32634	Cord—Drive cord (approx. 48 inches overall length)
36093	Core—Adjustable core and stud for "A" band oscillator coil
35788	Core—Adjustable core and stud for "B" band oscillator coil
38296	Core—Adjustable core and stud for "C" band oscillator coil
12006	Core—Adjustable core and stud for I-F transformers
36237	Drum—Drive drum
37068	Indicator—Station selector indicator
38288	Plate—Dial back plate complete with drive cord pulleys
30568	Plug—4 prong male plug for battery cable
36230	Pulley—Drive cord pulley
30652	Resistor—1 megohm, ¼ watt (R1, R7)
14752	Resistor—2.7 megohms, ¼ watt (R3)

STOCK No.	DESCRIPTION
30649	Resistor—2.2 megohms, ¼ watt (R9)
30931	Resistor—4.7 megohms, ¼ watt (R5)
30992	Resistor—10 megohms, ¼ watt (R8, R13)
30498	Resistor—390 ohms, ¼ watt (R10)
30494	Resistor—4700 ohms, ¼ watt (R11)
30787	Resistor—47,000 ohms, ¼ watt (R12)
14138	Resistor—68,000 ohms, ½ watt (R2, R4)
36897	Shaft—Tuning knob shaft
70377	Shield—Tube shield for IN5GT tube
33742	Socket—Phono input socket
31319	Socket—Tube socket, moulded
31251	Socket—Tube socket, wafer
31418	Spring—Drive cord spring
31261	Spring—Retaining spring for "A" and "C" band oscillator coil core and stud
12007	Spring—Retaining spring for "B" band oscillator coil core and stud and retaining spring for I-F transformers' core and stud assemblies
38297	Switch—Range switch (S1, S2)
35636	Transformer—First I-F transformer (L11, L12, C9, C10)
36122	Transformer—Second I-F transformer (L13, L14, C13, C14)
38300	Transformer—Output transformer (T1)
33726	Washer—"C" washer for tuning knob shaft
	SPEAKER ASSEMBLIES (92510-1)
70413	Speaker—5-inch P.M. speaker complete
	Note: If stamping on speaker in instrument does not agree with above speaker number, order replacement parts by referring to model number of instrument, number stamped on speaker and full description of part required.
	MISCELLANEOUS ASSEMBLIES
36890	Clamp—Dial clamp, left hand
36891	Clamp—Dial clamp, right hand
35480	Decal—Range switch decal
36103	Decal—Volume control and power switch decal
38328	Dial—Glass dial scale
36886	Knob—Range switch or volume control knob
36722	Knob—Tuning knob
30900	Spring—Retaining spring for control knob

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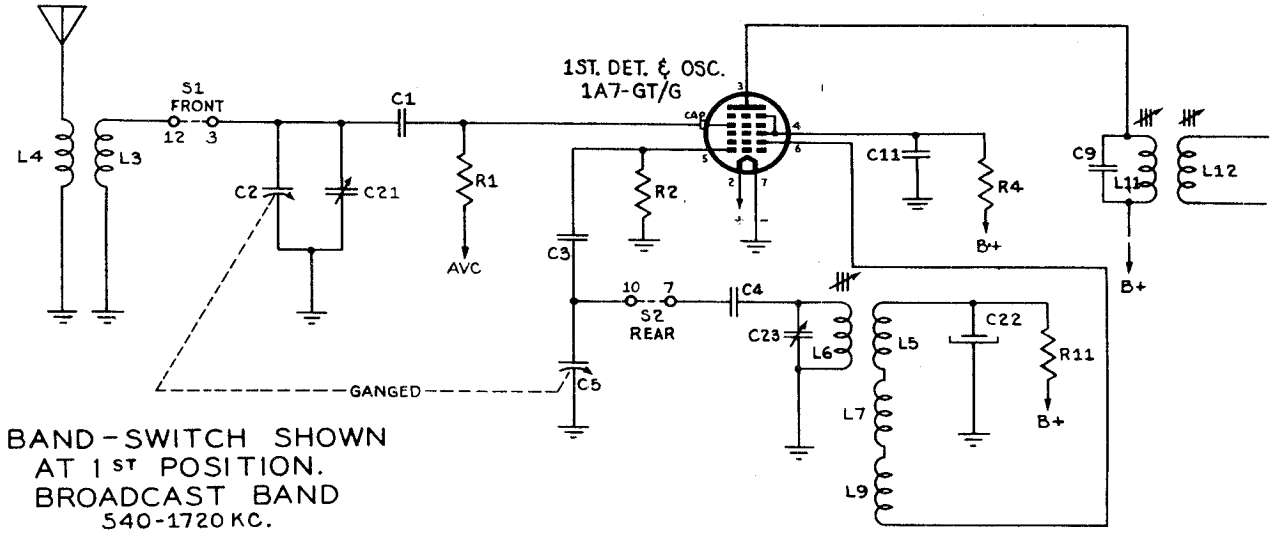
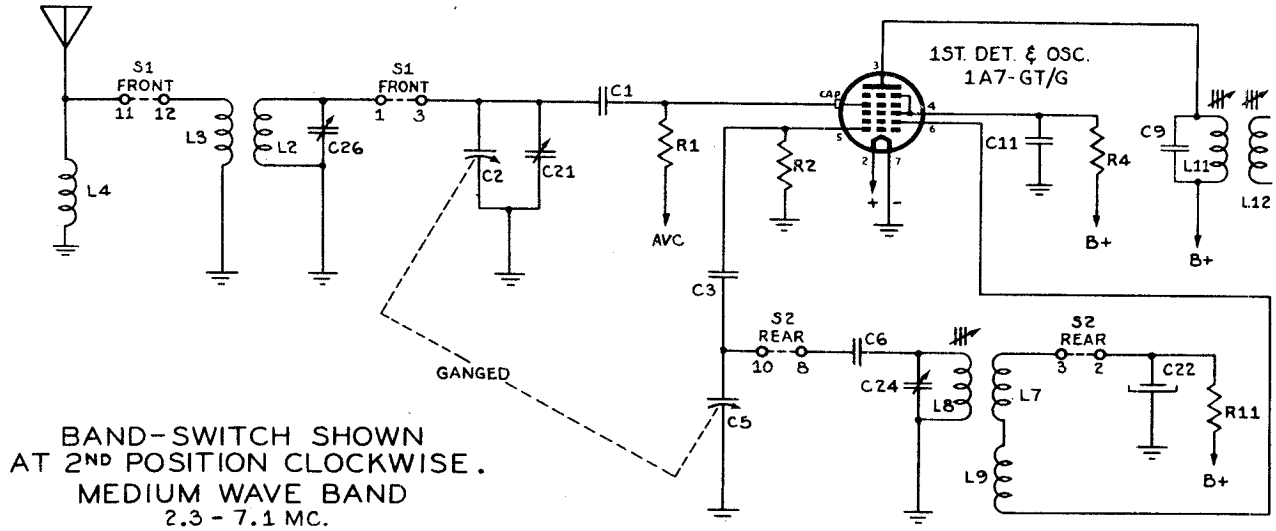
MODEL QB55,
Ch.RC-563A

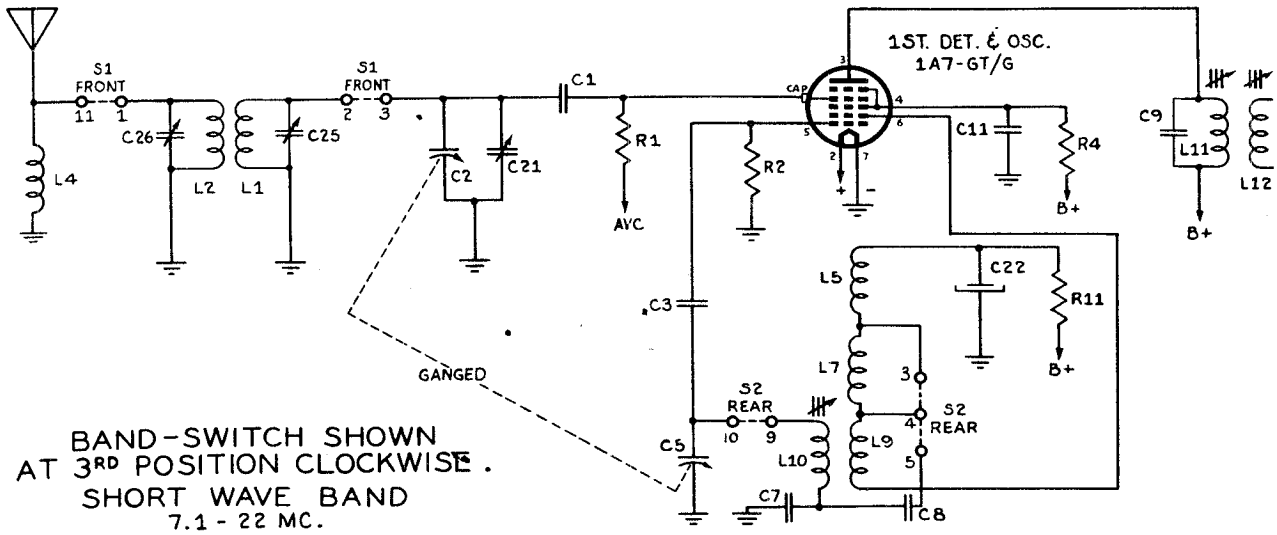
RCA MFG. CO.



BAND-SWITCH SHOWN
AT 1ST POSITION.
BROADCAST BAND
540-1720 KC.



BAND-SWITCH SHOWN
AT 2ND POSITION CLOCKWISE.
MEDIUM WAVE BAND
2.3 - 7.1 MC.



BAND-SWITCH SHOWN
AT 3RD POSITION CLOCKWISE.
SHORT WAVE BAND
7.1 - 22 MC.

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RCA MFG. CO.

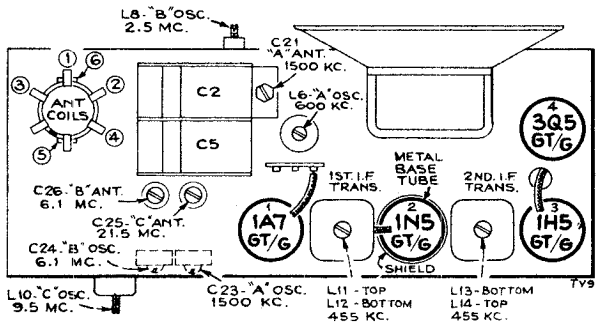
Cathode Ray Alignment is the preferable method. Connections for the oscilloscope are shown on the schematic diagram.

Output Meter Alignment.—If this method is used, connect the meter across the voice coil and turn the receiver volume control to maximum.

Test Oscillator.—For all alignment operations, connect the low side of the test oscillator to the receiver chassis and keep the oscillator output as low as possible to avoid AVC action.

Calibration Scale.—The dial backing plate has 6 marks which correspond to the frequencies indicated on the "Dial Indicator and Drive Mechanism" drawing. These marks are used during alignment.

Before alignment, set the dial pointer so that, with the tuning condenser gang in full mesh, the pointer is 1/16 inch to the left of the left hand mark on the dial backing plate.



PRECAUTIONARY LEAD DRESS

1. The 220 mmf. condenser (C1) from the gang to the wiring panel on top of chassis to be dressed away from the chassis.
2. All oscillator plate leads to coils and switch to be as short and direct as possible.
3. The green lead from r-f section of the tuning condenser gang to terminal No. 3 on switch S1 to be dressed as near as possible to terminal No. 10 on switch S2 and to the green lead from oscillator section of the tuning condenser gang.
4. The black lead from terminal No. 9 on switch S2 to L10 to be dressed below and touching the black lead from terminal No. 2 on switch S1 to the C-band antenna trimmer (C25).
5. The red lead from the B-band oscillator trimmer (C24) to the B-band oscillator coil (L8) to be dressed above and touching the yellow lead from terminal No. 1 on switch S1 to the B-band antenna trimmer (C26).
6. The 100 mmf. mica capacitor (C3) from oscillator section of the condenser gang to terminal 5 of IA7GT/G socket dressed away from the chassis.

Steps	Connect high side of test osc. to—	Tune test osc. to—	Turn radio dial to—	Adjust following for max. peak output—
1	1N5GT/G IF grid cap in series with .01 mfd.	455 kc	"A" Band Quiet Point at High Freq. End	L14 and L13 (2nd I-F Trans.)
2	1A7GT/G 1st det. grid cap in series with .01 mfd.			L12 and L11† (1st I-F Trans.)
3	Antenna Lead in series with 200 mmf.	1,500 kc	1,500 kc mark	Peak C23 (osc.) and C21 (ant.)
4		600 kc	600 kc mark	L6 (osc.)**
5		Repeat steps 3 and 4.		
6	Antenna Lead in series with 300 ohms	6.1 mc	6.1 mc mark	Peak C24 (osc.)* and C26 (ant.)
7		2.5 mc	2.5 mc mark	L8 (osc.)**
8		Repeat steps 6 and 7.		
9		9.5 mc	9.5 mc mark	L10 (osc.)**
10		21.5 mc	21.5 mc mark	C25 (ant.)**

* Use minimum capacity peak if two peaks can be obtained.

** Rock gang slightly for peak output.

† Do not readjust L14 or L13 when test oscillator is applied to IA7-GT/G grid.

VICTROLA ATTACHMENT

A jack is provided on the rear of chassis for connecting a Victrola Attachment to the audio amplifying circuit. The cable from the attachment should be terminated in a Stock No. 31048 plug.

When Victrola is not in use its plug should be disconnected.

When Victrola is in use, the volume control on the radio should be at minimum, and, if necessary, tune set off frequency from any very strong station.

Frequency Ranges

Standard Broadcast ("A" Band) ...540-1,720 kc (555-174m)
Medium Wave ("B" Band) .....2.3-7.1 mc (130-42.2 m)
Short Wave ("C" Band) .....7.1-22 mc (42.2-13.6 m)

Intermediate Frequency .....455 kc

Batteries Required

1—RCA-VSO22 Battery Pack or equivalent
Or: 1—1½ Volt "A" Battery and 2—45 Volt "B" Batteries

Battery Drain

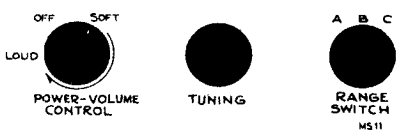
"A" ..... 0.25 amp.
"B" ..... 12.5 ma.

Power Output

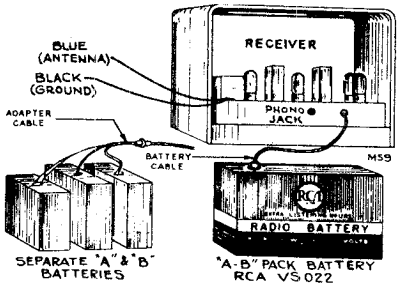
Undistorted ..... 0.20 watt
Maximum ..... 0.26 watt

Loudspeaker (92510-1)

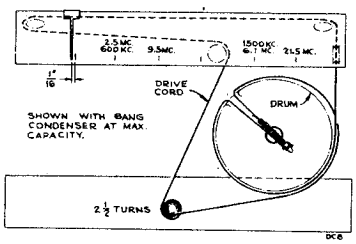
Type .....5-inch permanent-magnet dynamic
Voice-coil impedance .....4 ohms at 400 cycles



Dial Controls



Power Connections



Dial Indicator and Drive Mechanism

NOTES:

1. A four wire cable with plug is provided for making connection to the RCA-VSO22 battery pack or equivalent.
2. When separate batteries are used, an adapter extension cable is necessary.
3. A good ground connection is essential for best results.

Cabinet Dimensions (inches)

Height ..... 7⅝ inches
Width ..... 12⅛ inches
Depth ..... 6¾ inches

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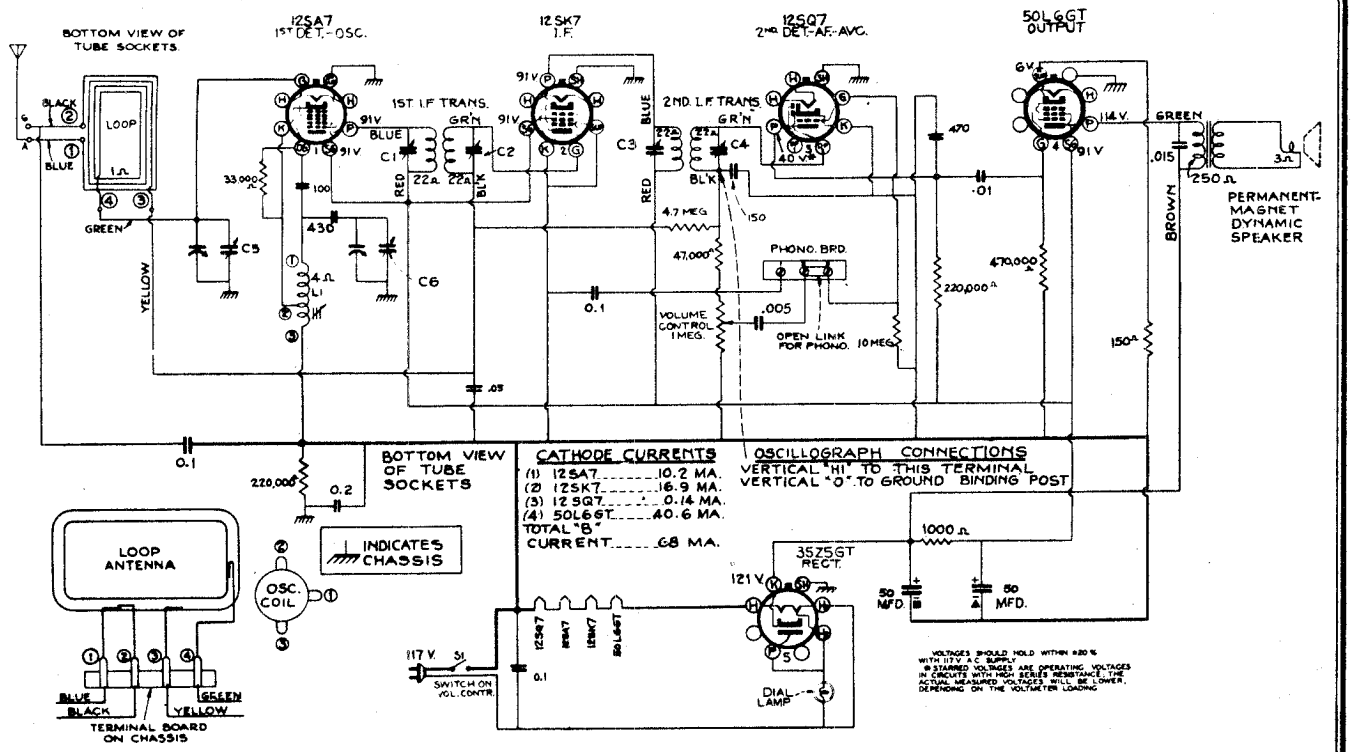
MODEL X-55, Ch. RC-473A

RCA MFG. CO.



Schematic Circuit Diagram

FREQUENCY RANGE ..... 540-1,720 kc
INTERMEDIATE FREQUENCY ..... 455 kc
Number of Push Buttons ..... Six

DIAL LAMP (1) ..... Mazda No. 51, 7.5 volt, 0.2 amp.

POWER OUTPUT (125 volts, 60 cycle supply)
Undistorted ..... 0.8 watts
Maximum ..... 1.4 watts

POWER SUPPLY RATINGS
A-C Rating ..... 105-125 volts, 50-60 cycles, 35 watts
D-C Rating ..... 105-125 volts, direct current, 35 watts

LOUDSPEAKER (RL 85-2)
Type ..... 5-inch permanent magnet dynamic
Voice Coil Impedance ..... 4.5 ohms at 400 cycles

Alignment Procedure

Cathode-Ray Alignment is the preferable method. Connections for the oscillograph are shown on the schematic drawing.

Output Meter Alignment.—If this method is used, connect the output meter across the voice coil, and turn the receiver volume control to maximum.

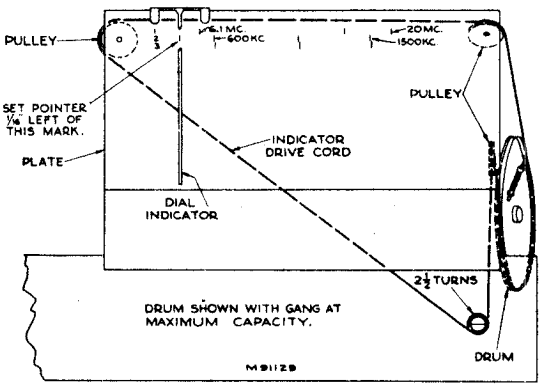
Test Oscillator.—For all alignment operations, connect the low side of the test oscillator to the receiver ground binding post, and keep the oscillator output as low as possible to avoid a-v-c action.

Calibration Marks.—The tuning dial is fastened in the cabinet and can not be used for reference during alignment. Therefore calibration marks have been stamped in the plate on the front of the chassis as shown in the accompanying drawing. These marks are used for reference during alignment.

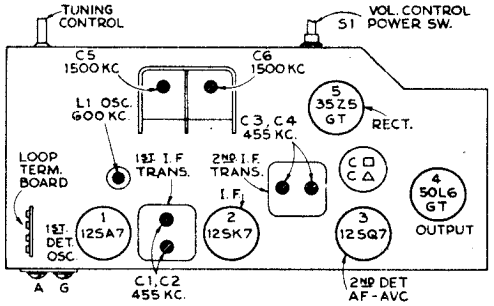
Dial Indicator Adjustment.—With the gang condenser in full mesh, the indicator should be set to the extreme left (low frequency) mark on the dial scale.

Steps	Connect the high side of the test-osc. to—	Tune test osc. to—	Turn radio dial to	Adjust the following for maximum peak output
1	Ant. terminal	455 kc	Quiet Point between 1,720-1,500 kc	C3 and C4 (2nd I-F trans.)
2	Ant. terminal			C1 and C2 (1st I-F trans.)
3	Ant. terminal in series with 200 mmfd.	1,500 kc	1,500 kc calibration mark	C8 (osc.) C5 (ant.)
4		600 kc	600 kc calibration mark	L1 (osc.) (Rock in)
5	Repeat step 3.			

After mounting chassis in cabinet, check the dial calibration on stations of known frequency. If calibration is not correct, move pointer to agree with dial calibration. **Note.**—Oscillator tracks above signal.



Dial-Indicator and Drive Mechanism



Tube and Trimmer Locations

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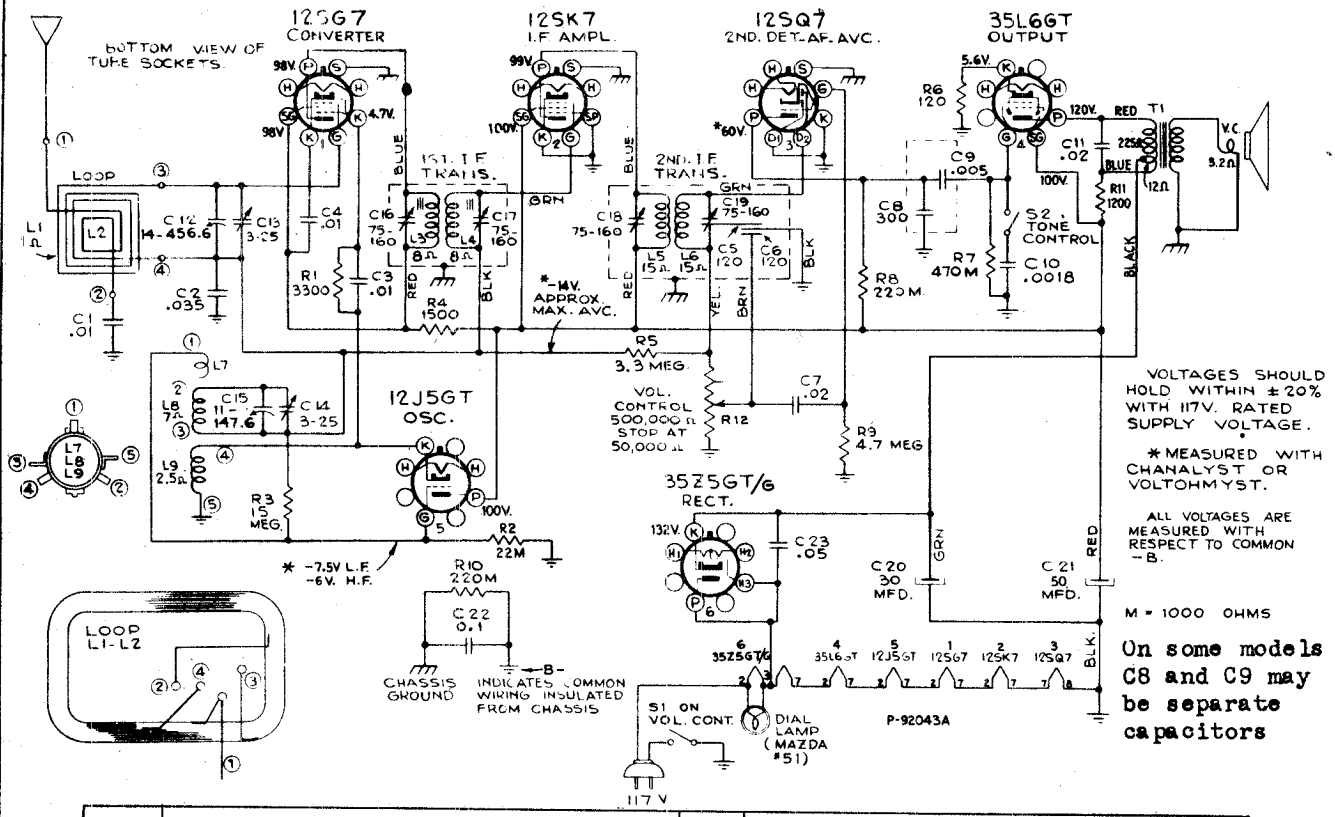
For other data, see P.15-3

RCA MFG. CO.

MODELS 56X, 56X2, 56X3, Ch. RC-1011


12SG7 CONVERTER
12SK7 I.F. AMPL.
12SQ7 2ND. DET.-AF.-AVC.
35L6GT OUTPUT
BOTTOM VIEW OF TUBE SOCKETS
1ST. I.F. TRANS.
2ND. I.F. TRANS.
LOOP
12J5GT OSC.
35Z5GT/G RECT.
*-14V. APPROX. MAX. AVC.
VOL. CONTROL 500,000Ω STOP AT 50,000Ω
TONE CONTROL
* -7.5V L.F. -6V. H.F.
CHASSIS GROUND
INDICATES COMMON WIRING INSULATED FROM CHASSIS
S1 ON VOL. CONT.
DIAL LAMP (MAZDA #51)
117 V
P-92043A
VOLTAGES SHOULD HOLD WITHIN ±20% WITH 117V. RATED SUPPLY VOLTAGE.
*MEASURED WITH CHANALYST OR VOLTOHMYST.
ALL VOLTAGES ARE MEASURED WITH RESPECT TO COMMON -B.
M = 1000 OHMS
On some models C8 and C9 may be separate capacitors

STOCK No.	DESCRIPTION
	CHASSIS ASSEMBLIES
	RC 1011
37359	Capacitor—Comprising 1 section of .0003 mfd. and 1 section of .005 mfd. (C-8, C-9)
70712	Capacitor—Paper .0018 mfd., 800 volts (C-10)
70652	Capacitor—Paper .01 mfd., 800 volts (C-1, C-3, C-4)
70711	Capacitor—Paper .02 mfd., 700 volts (C-7, C-11)
70635	Capacitor—Paper .035 mfd., 500 volts (C-2)
70615	Capacitor—Paper .05 mfd., 400 volts (C-23)
70617	Capacitor—Paper 0.1 mfd., 400 volts (C-22)
39152	Capacitor—Electrolytic, comprising 1 section of 30 mfd., 150 volts, and 1 section of 50 mfd., 150 volts (C-20, C-21)
39824	Coil—Oscillator coil (L-7, L-8, L-9)
36226	Condenser—Variable tuning condenser (C-12, C-13, C-14, C-15)
36242	Control—Volume control and power switch (R-12, S-1)
32634	Cord—Drive cord (approx. 49" long)
70392	Cord—Power cord
36237	Drum—Drive drum
36236	Indicator—Station selector indicator for 56X and 56X2
37068	Indicator—Station selector indicator for 56X3
39821	Loop—Antenna loop (L-1)
11765	Lamp—Dial lamp
36229	Plate—Dial back plate complete with pulleys less dial
36230	Pulley—Drive cord pulley
30189	Resistor—120 ohms, ¼ watt (R-6)
6134	Resistor—1200 ohms, 1 watt (R-11)
30654	Resistor—1500 ohms, ¼ watt (R-4)
30733	Resistor—3300 ohms, ¼ watt (R-1)
30492	Resistor—22,000 ohms, ¼ watt (R-2)
14583	Resistor—220,000 ohms, ¼ watt (R-8, R-10)
30648	Resistor—470,000 ohms, ¼ watt (R-7)
38785	Resistor—15 megohms, ¼ watt (R-3)
12928	Resistor—3.3 megohms, ¼ watt (R-5)
30931	Resistor—4.7 megohms, ¼ watt (R-9)
36897	Shaft—Tuning knob shaft

STOCK No.	DESCRIPTION
34449	Socket—Lamp socket
37605	Socket—Tube socket, moulded
31418	Spring—Drive cord tension spring
36228	Switch—Tone switch (S-2)
70411	Transformer—First I.F. transformer (L-3, L-4, C-16, C-17)
70412	Transformer—Second I.F. transformer (L-5, L-6, C-5, C-6, C-18, C-19)
36800	Transformer—Output transformer (T-1)
33726	Washer—"C" washer for tuning knob shaft
	SPEAKER ASSEMBLY
	92510-1
70413	Speaker—5-inch PM speaker, complete
	NOTE: If stamping on speaker in instrument does not agree with above speaker number, order replacement parts by referring to model number of instrument, number stamped on speaker and full description of part required.
	MISCELLANEOUS ASSEMBLIES
39953	Back—Cabinet back for 56X
70409	Back—Cabinet back for 56X2
70415	Back—Cabinet back for 56X3
X1604	Board—Baffle board and grille cloth
36890	Clamp—Dial clamp, left hand, for 56X and 56X2
36891	Clamp—Dial clamp, right hand, for 56X and 56X2
39954	Dial—Glass dial scale for 56X and 56X2
70410	Dial—Glass dial scale for 56X3
37831	Fastener—Push fastener (1 set) for cabinet backs on 56X and 56X2
33006	Feet—Rubber feet for cabinet (4 required)
70414	Knob—Control knob (ivory) for 56X2
36722	Knob—Control knob (walnut) for 56X and 56X3
30900	Spring—Retaining spring for knob

Critical Lead Dress

1. Dress output plate bypass capacitor (C-11 .02 mf) against chassis.
2. Dress 35L6GT plate lead (red) against chassis and away from volume control, leads and terminals.
3. Dress audio coupling capacitor (C-7 .02 mf) away from 35L6GT heater leads.
4. Dress tone control lead against front apron.
5. Dress 2nd I-F yellow and brown leads away from output plate bypass capacitor (C-11, .02 mf.) and away from all heater leads.
6. Dress lead to speaker voice coil away from tuning shaft "C" washer.
7. Dress tone control capacitor (C-10, .0018 mf.) away from oscillator coil.
8. Dress all uninsulated leads away from each other and away from chassis to prevent short circuits.
9. Dress blue and green leads of both IF transformers back in shields leaving exposed lengths as short as possible.

Frequency Range	540-1600 kc
Intermediate Frequency	455 kc
Power Output	
Undistorted	1.0 watt
Maximum	1.5 watts
Power Supply Rating	
105-125 volts, AC, 50 or 60 cycles, or DC	30 watts
Pilot Lamp	Mazda No. 51, 6-8 volts, 0.2 amp.
Tuning Drive Ratio	20:1
Loudspeaker (92510-1)	
Type	5-inch PM
V. C. Impedance	3.4 ohms at 400 cycles

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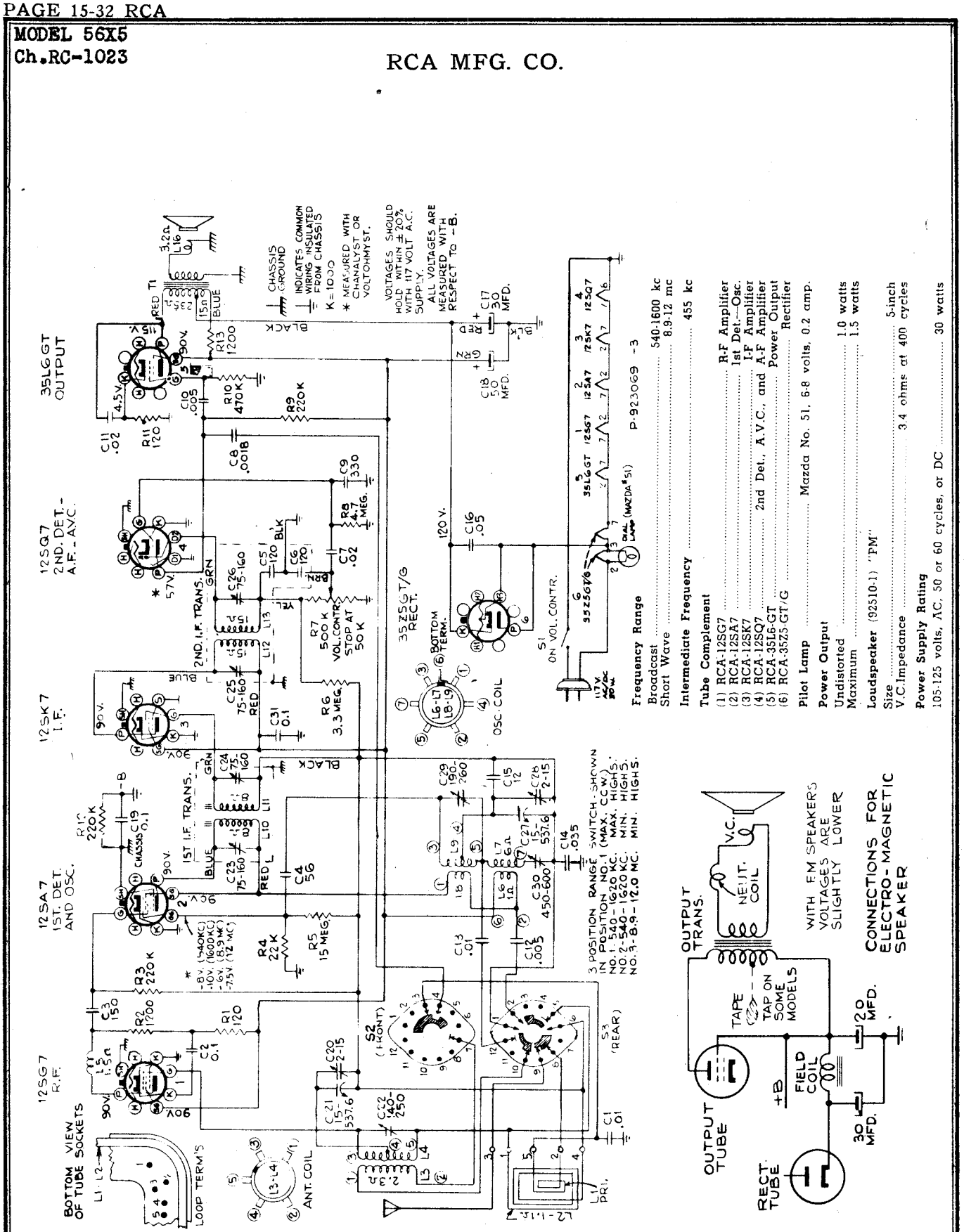
For alignment and other data, see P.15-26

MODEL 56X5
Ch.RC-1023

RCA MFG. CO.



Frequency Range

Broadcast	540-1600 kc
Short Wave	8.9-12 mc

Intermediate Frequency ..... 455 kc

Tube Complement

(1) RCA-12SG7	R-F Amplifier
(2) RCA-12SA7	1st Det.-Osc.
(3) RCA-12SK7	I-F Amplifier
(4) RCA-12SQ7	2nd Det., A.V.C., and A-F Amplifier
(5) RCA-35L6-GT	Power Output
(6) RCA-35Z5-GT/G	Rectifier

Pilot Lamp ..... Mazda No. 51, 6-8 volts, 0.2 amp.

Power Output

Undistorted	1.0 watts
Maximum	1.5 watts

Loudspeaker (92510-1) "PM"

Size	5-inch
V.C.Impedance	3.4 ohms at 400 cycles

Power Supply Rating
105-125 volts, AC, 50 or 60 cycles, or DC ..... 30 watts

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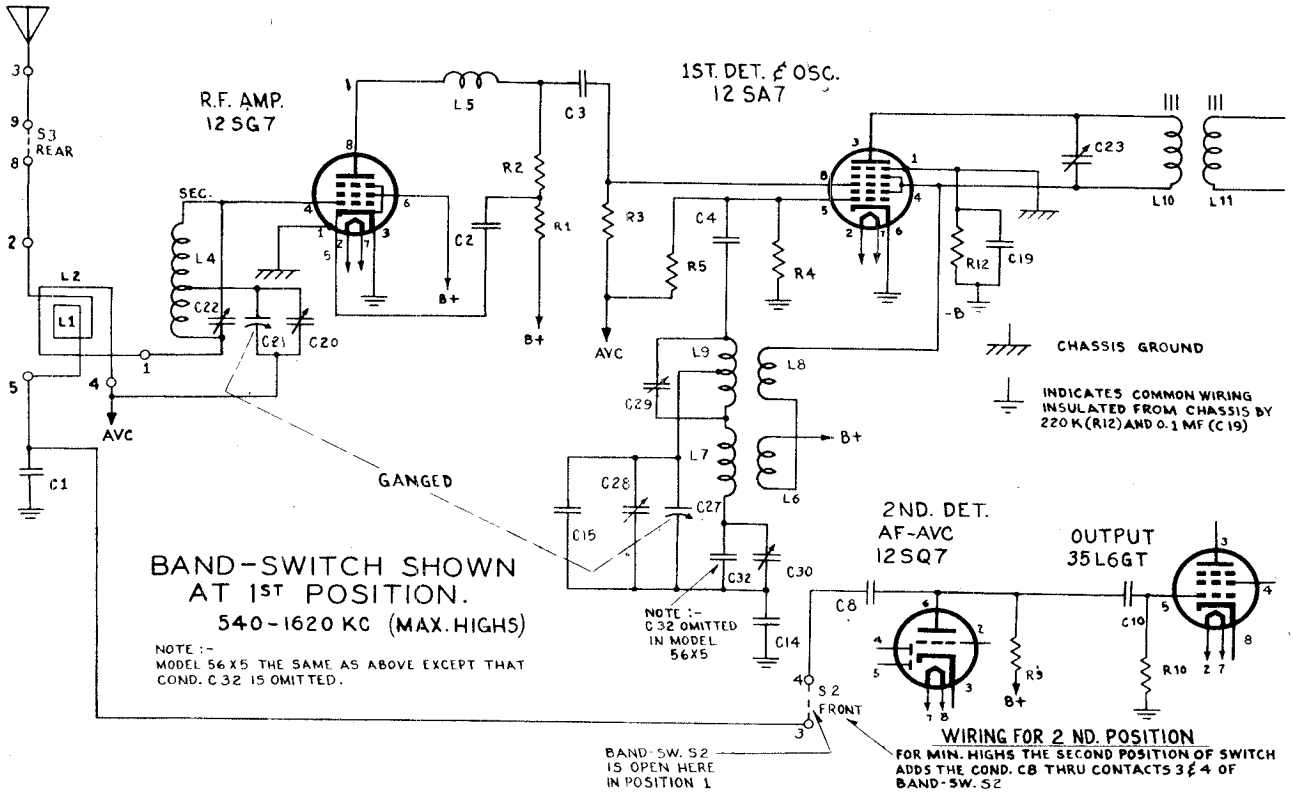
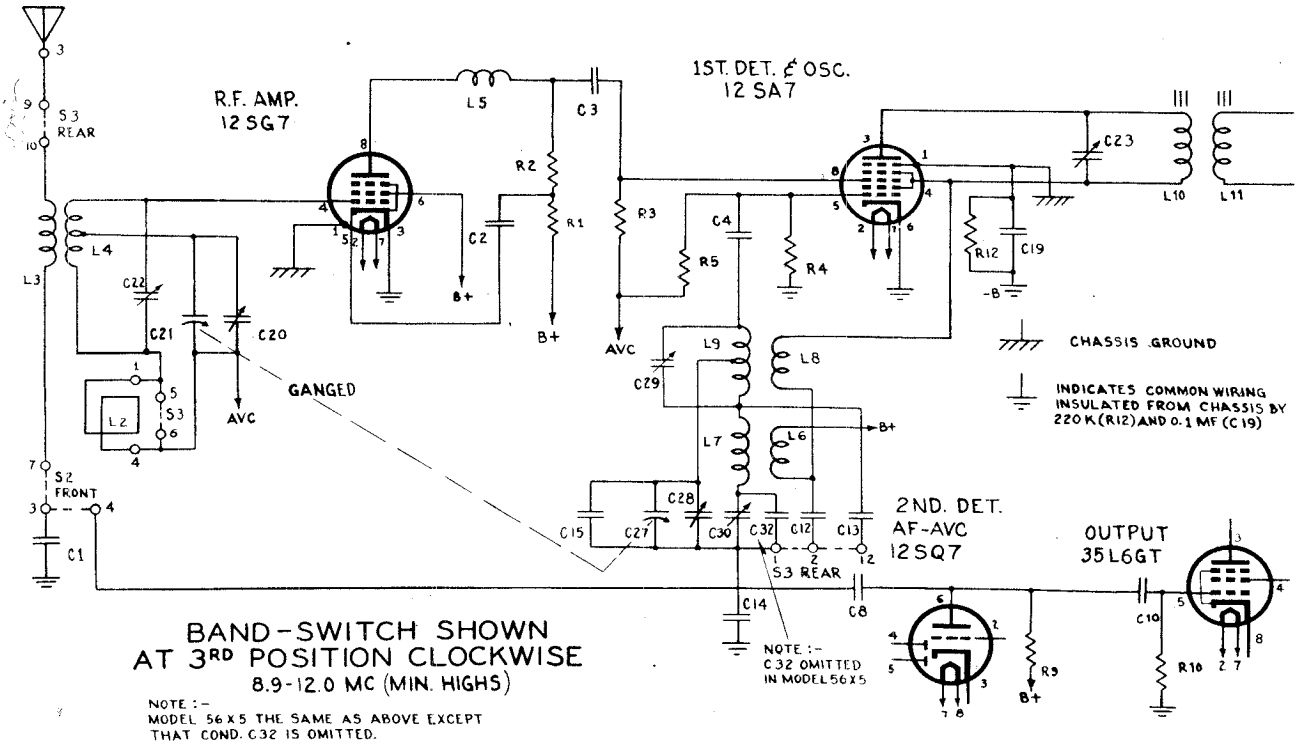
MODEL 56X5
MODELS 61-5, 61-10





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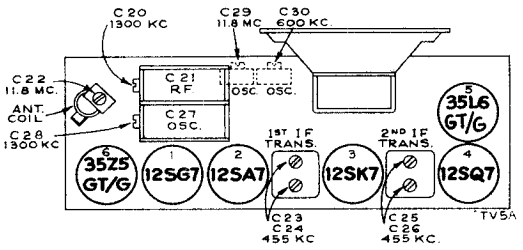
MODEL 56X5, Ch. RC-1023
MODEL 56X10, Ch. RC-1023B

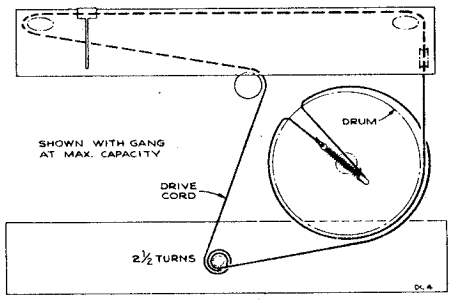
RCA MFG. CO.

Models 56X5 and 56X10

Critical Lead Dress

1. Dress blue and green leads of both I-F transformers back in shield cans, leaving them as short as possible
2. Dress R-F plate filter capacitor (C2, 0.1 mf.) back against rear chassis apron.
3. Dress yellow and brown leads from 2nd I-F away from all other leads.
4. Dress all heater leads next to chassis.
5. Dress capacitor (C13, .01 mf.) parallel to osc. coil and approximately 3/16 inch from coil.
6. Dress tone control lead and speaker field leads next to chassis and front apron.
7. Dress pilot lamp leads away from ant. coil.
8. Dress leads from loop ant. coil around rectifier tube towards end of chassis.
9. Dress output plate lead against chassis.





Test Oscillator.—Connect high side of test oscillator as shown in chart. Connect low side through a .01 mf. capacitor to common "—B." Keep the output signal as low as possible to avoid A.V.C. action.

Output Meter.—Connect meter across speaker voice coil. Turn volume control to maximum clockwise position, station selector switch to broadcast maximum high position (pos. 1), for broadcast alignment and to position 3 for high frequency band.

Dial Pointer Adjustment.—Rotate tuning condenser fully counter-clockwise (plates fully meshed). Adjust indicator pointer to left (max. cap.) mark on dial back plate.

Calibration Scale.—The glass tuning dial may be easily removed from the cabinet and temporarily attached to the dial backing plate.

Power Supply Polarity.—For operation on d-c, the power plug must be inserted in the outlet for correct polarity. If the set does not function, reverse the plug. On a-c, reversal of the plug may reduce hum.

Steps	Connect high side of the test oscillator to—	Tune test osc. to—	Turn radio dial to—	Adjust the following for maximum peak output
1	Pin #8 of 12SA7 in series with 0.1 mfd.	455 kc	Quiet Point at 1,600 kc end of dial	C25, C26 2nd I-F trans.
2				C23, C24† 1st I-F trans.
3	Ant. terminal in series with 220 mmf.	600 kc	600 kc "A" Band	C30 (osc.) Rock gang
4		1300 kc	1300 kc "A" Band	C28 (osc.) C20 (R-F)
5		Repeat 3 Rocking gang		
6		Repeat 3, 4 and 5 for exact cal.		
7	Ant. terminal in series with 0.1 mfd.	11.8 mc	11.8 mc	C29 (osc.)* Rock gang
8	Ant. terminal in series with 47 mmf.	11.8 mc	11.8 mc	C22 (R-F) Rock gang
9	Repeat steps 7 and 8			

* Use minimum capacity peak if two can be obtained. Check for selection of correct peak by tuning receiver to approximately 10.9 mc where a weaker signal should be received.

† Do not readjust C25 or C26

Model 56X5

STOCK No.	DESCRIPTION
	CHASSIS ASSEMBLIES
	RC 1023
39606	Capacitor—Mica, 12 mmf. (C15)
39622	Capacitor—Mica, 56 mmf. (C4)
39632	Capacitor—Mica, 150 mmf. (C3)
70417	Capacitor—Mica trimmer, 140-250 mmf., mounted on antenna coil (C22)
39839	Capacitor—Adjustable mica, comprising 1 section of 190-260 mmf. and 1 section of 450-600 mmf. (C29, C30)
39640	Capacitor—Mica, 330 mmf. (C9)
70627	Capacitor—Paper, .005 mfd. (C10, C12)
70712	Capacitor—Paper, .0018 mfd. (C8)
70652	Capacitor—Paper, .01 mfd. (C1, C13)
70711	Capacitor—Paper, .02 mfd. (C7, C11)
70635	Capacitor—Paper, .035 mfd. (C14)
70615	Capacitor—Paper, .05 mfd. (C16)
70617	Capacitor—Paper, 0.1 mfd. (C2, C19, C31)
39152	Capacitor—Electrolytic, comprising 1 section of 30 mfd., 150 volts, and 1 section of 50 mfd., 150 volts (C17, C18)
70416	Coil—Antenna coil (L3, L4, C22)
39892	Coil—Oscillator coil (L6, L7, L8, L9)
70418	Coil—Peaking coil (L5)
39838	Condenser—Variable tuning condenser (C20, C21, C27, C28)
36242	Control—Volume control and power switch (R7, S1)
32634	Cord—Drive cord (approx. 49 inches overall length)
70392	Cord—Power cord
36237	Drum—Drive drum
37068	Indicator—Station selector indicator
11765	Lamp—Dial lamp
70980	Lead—Antenna lead
39841	Loop—Antenna loop (L1, L2)
36229	Plate—Dial back plate complete with drive cord pulleys less dial
36230	Pulley—Drive cord pulley
30189	Resistor—120 ohms, ¼ watt (R1, R11)
30731	Resistor—1200 ohms, ¼ watt (R2)
6134	Resistor—1200 ohms, 1 watt (R13)
30492	Resistor—22,000 ohms, ¼ watt (R4)
14583	Resistor—220,000 ohms, ¼ watt (R3, R9, R12)
30648	Resistor—470,000 ohms, ¼ watt (R10)
12928	Resistor—3.3 megohms, ¼ watt (R6)
30931	Resistor—4.7 megohms, ¼ watt (R8)
38785	Resistor—15 megohms, ¼ watt (R5)
36897	Shaft—Tuning knob shaft
34449	Socket—Lamp socket
37605	Socket—Tube socket, moulded
31251	Socket—Tube socket, wafer
31418	Spring—Drive cord tension spring
39837	Switch—Range switch (S2, S3)
36800	Transformer—Output transformer (T1)
70411	Transformer—First I-F transformer (L10, L11, C23, C24)
70412	Transformer—Second I-F transformer (L12, L13, C5, C6, C25, C26)
33726	Washer—"C" washer for tuning knob shaft
	SPEAKER ASSEMBLY
	92510-1
70413	Speaker—5-inch P.M. speaker complete with cone and voice coil
	NOTE: If stamping on speaker in instrument does not agree with above speaker number, order replacement parts by referring to model number of instrument, number stamped on speaker and full description of part required.
	MISCELLANEOUS ASSEMBLIES
39777	Back—Cabinet back
70419	Dial—Glass dial scale
33006	Feet—Rubber feet for cabinet (4 required)
X1337	Grille—Cabinet grille cloth
36886	Knob—Range switch knob
36722	Knob—Volume control or tuning knob
30900	Spring—Retaining spring for knob

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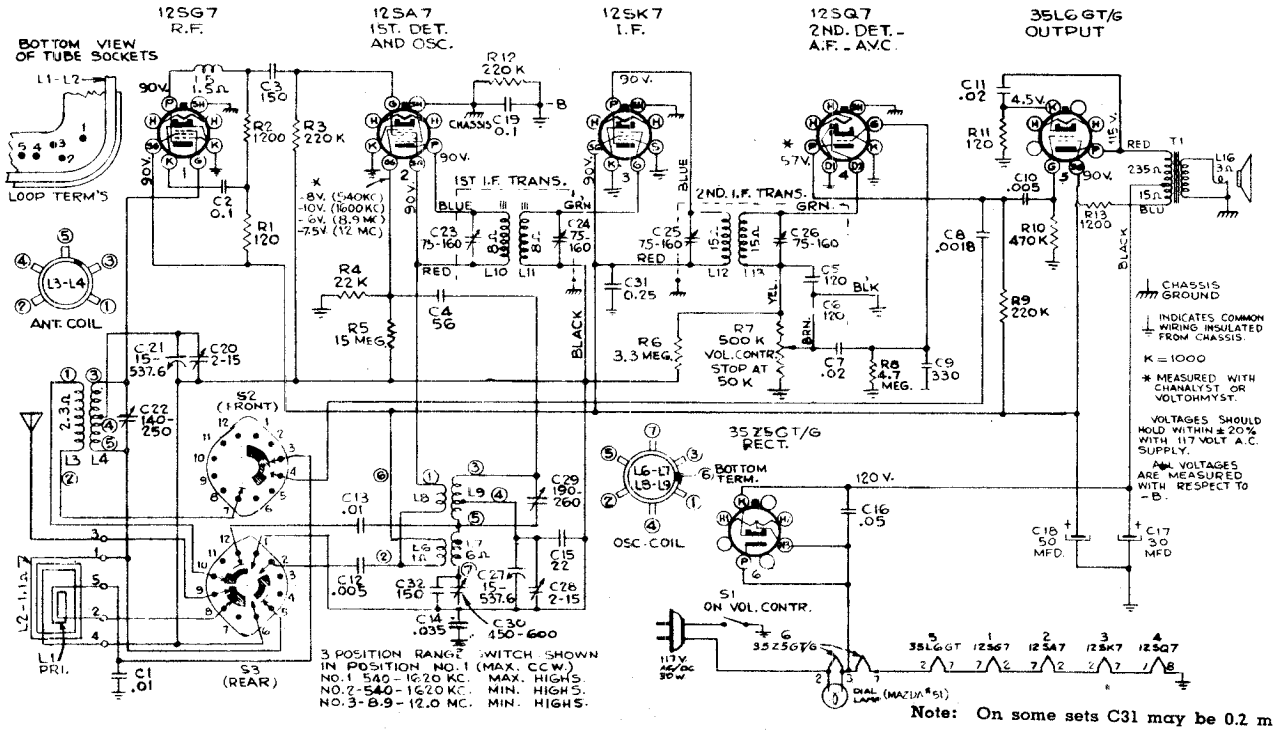
MODEL 56X10
Ch.RC-1023B

RCA MFG. CO.


12SG7 R.F.
12SA7 1ST. DET. AND OSC.
12SK7 I.F.
12SQ7 2ND. DET. - A.F. - A.V.C.
35L6GT/G OUTPUT
BOTTOM VIEW OF TUBE SOCKETS
LOOP TERM'S
ANT. COIL
1ST I.F. TRANS.
2ND. I.F. TRANS.
35Z5GT/G RECT.
OSC. COIL
S1 ON VOL. CONTR.
S2 (FRONT)
S3 (REAR)
CHASSIS GROUND
INDICATES COMMON WIRING INSULATED FROM CHASSIS.
K = 1000
* MEASURED WITH CHANALYST OR VOLTOHMYST.
VOLTAGES SHOULD HOLD WITHIN ± 20% WITH 117 VOLT A.C. SUPPLY.
ALL VOLTAGES ARE MEASURED WITH RESPECT TO -B.
3 POSITION RANGE SWITCH SHOWN IN POSITION NO. 1 (MAX. CCW.)
NO. 1 540 - 1620 KC. MAX. HIGHS.
NO. 2 - 540 - 1620 KC. MIN. HIGHS.
NO. 3 - 8.9 - 12.0 MC. MIN. HIGHS.

Note: On some sets C31 may be 0.2 mfd.

IF PEAK 455 KC

STOCK No.	DESCRIPTION
	CHASSIS ASSEMBLIES
	RC 1023B
39612	Capacitor—Mica, 22 mmf. (C15)
39622	Capacitor—Mica, 56 mmf. (C4)
39632	Capacitor—Mica, 150 mmf. (C3, C32)
70417	Capacitor—Mica trimmer, 140-250 mmf., mounted on antenna coil (C22)
39839	Capacitor—Adjustable mica, comprising 1 section of 190-260 mmf. and 1 section of 450-600 mmf. (C29, C30)
39640	Capacitor—Mica, 330 mmf, (C9)
70712	Capacitor—Tubular, .0018 mfd. 800 volts (C8)
70627	Capacitor—Tubular, .005 mfd. 600 volts, (C10, C12)
70652	Capacitor—Tubular, .01 mfd. 1000 volts (C1, C13)
70711	Capacitor—Tubular, .02 mfd. 700 volts (C7, C11)
70635	Capacitor—Tubular, .035 mfd. 600 volts (C14)
70615	Capacitor—Tubular, .05 mfd. 400 volts (C16)
70617	Capacitor—Tubular, 0.1 mfd., 400 volts (C2, C19)
70618	Capacitor—Tubular, 0.25 mfd. 400 volts (C31)
39152	Capacitor—Electrolytic, comprising 1 section of 30 mfd., 150 volts, and 1 section of 50 mfd., 150 volts (C17, C18)
70416	Coil—Antenna coil (L3, L4, C22)
39892	Coil—Oscillator coil (L6, L7, L8, L9)
70418	Coil—Peaking coil (L5)
70700	Condenser—Variable tuning condenser (C20, C21, C27, C28)
36242	Control—Volume control and power switch (R7, S1)
32634	Cord—Drive cord (approx. 49 inches overall length)
70392	Cord—Power cord
36237	Drum—Drive drum
37068	Indicator—Station selector indicator
11765	Lamp—Dial lamp (Mazda 51)
70980	Lead—Antenna lead
39841	Loop—Antenna loop (L1, L2)
36229	Plate—Dial back plate complete with drive cord pulleys less dial
36230	Pulley—Drive cord pulley
30189	Resistor—120 ohms, ¼ watt (R1, R11)
30731	Resistor—1200 ohms ¼ watt (R2)
6134	Resistor—1200 ohms, 1 watt (R13)
30492	Resistor—22,000 ohms, ¼ watt (R4)
14583	Resistor—220,000 ohms, ¼ watt (R3, R9, R12)
30648	Resistor—470,000 ohms, ¼ watt (R10)
12928	Resistor—3.3 megohms, ¼ watt (R6)
30931	Resistor—4.7 megohms, ¼ watt (R8)
38785	Resistor—15 megohms, ¼ watt (R5)
36897	Shaft—Tuning knob shaft
34449	Socket—Lamp socket
37605	Socket—Tube socket, moulded
31251	Socket—Tube socket, wafer
31418	Spring—Drive cord tension spring
39837	Switch—Range switch (S2, S3)
36800	Transformer—Output transformer (T1)
70411	Transformer—First I-F transformer (L10, L11, C23, C24)
70412	Transformer—Second I-F transformer (L12, L13, C5, C6, C25, C26)
33726	Washer—"C" washer for tuning knob shaft
	SPEAKER ASSEMBLY
	92510-1
70413	Speaker—5-inch P.M. speaker complete with cone and voice coil
	NOTE: If stamping on speaker in instrument does not agree with above speaker number, order replacement parts by referring to model number of instrument, number stamped on speaker and full description of part required.
	MISCELLANEOUS ASSEMBLIES
39953	Back—Cabinet back
36890	Clamp—Dial clamp—left hand
36891	Clamp—Dial clamp—right hand
71323	Decal—Trade mark decal
71310	Dial—Glass dial scale
37831	Fastener—Push fastener for cabinet back (1 set)
36886	Knob—Range switch knob
36722	Knob—Tuning knob
71281	Knob—Volume control knob
30900	Spring—Retaining spring for knobs

Frequency Range
Broadcast ..... 540-1600 kc
Short Wave ..... 8.9-12 mc
Intermediate Frequency ..... 455 kc

Loudspeaker (92510-1) "PM"
Size 5-inch
V.C.Impedance ..... 3.4 ohms at 400 cycles

Power Output
Undistorted ..... 1.0 watts
Maximum ..... 1.5 watts

Power Supply Rating
105-125 volts, AC, 50 or 60 cycles, or DC ..... 30 watts

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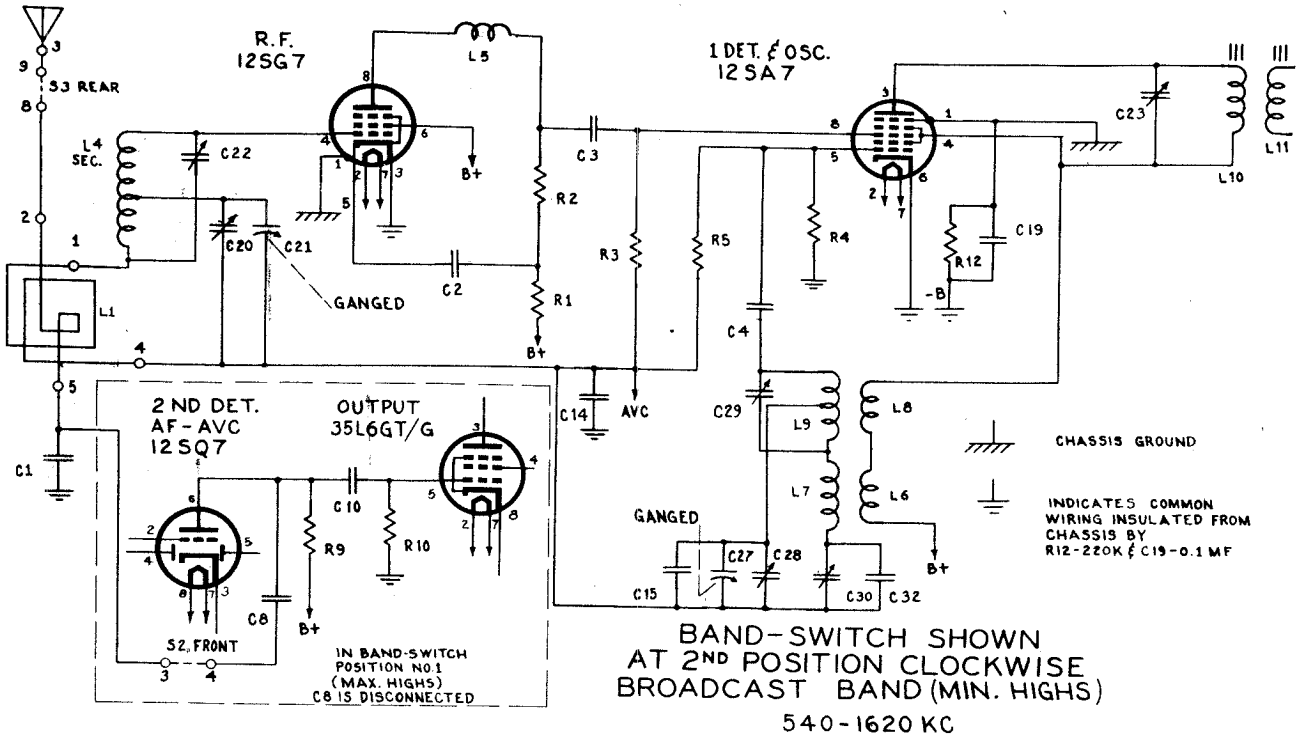
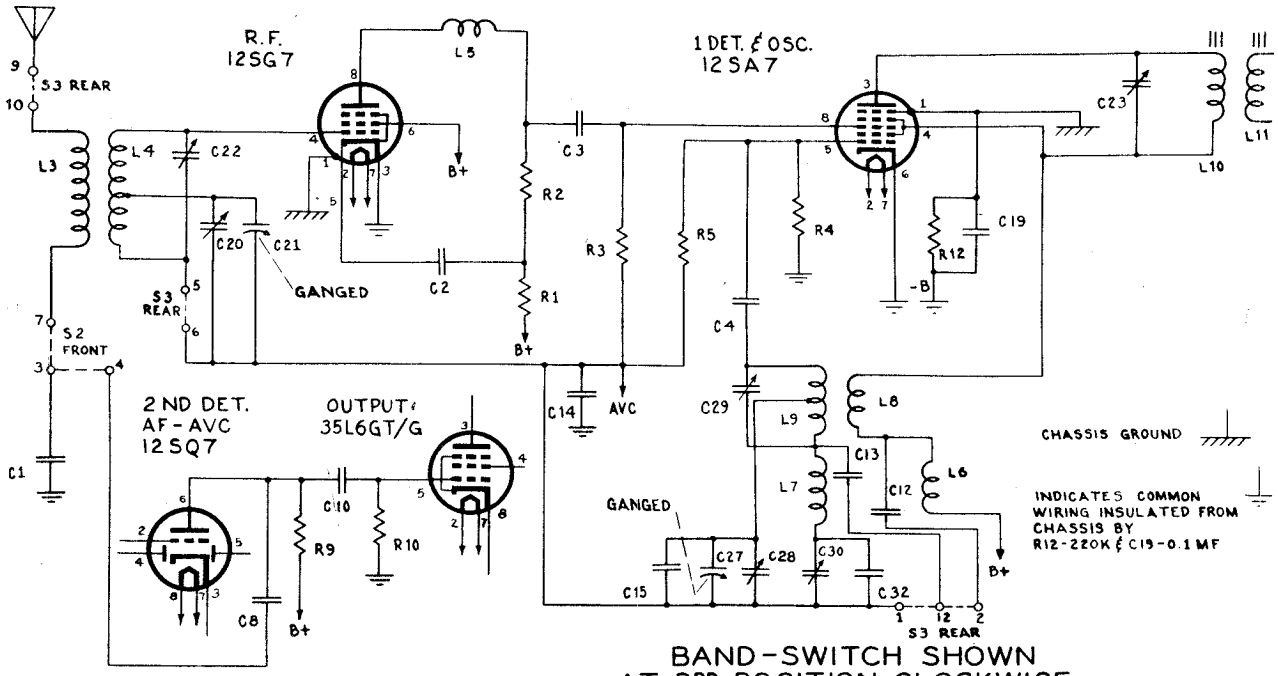
"clarified schematics"

MODEL 56X10
Ch.RC-1023B

RCA MFG. CO.



BAND-SWITCH SHOWN
AT 2ND POSITION CLOCKWISE
BROADCAST BAND (MIN. HIGHS)
540-1620 KC



BAND-SWITCH SHOWN
AT 3RD POSITION CLOCKWISE
SHORT WAVE BAND (MIN. HIGHS)
8.9-12.0 M.C.

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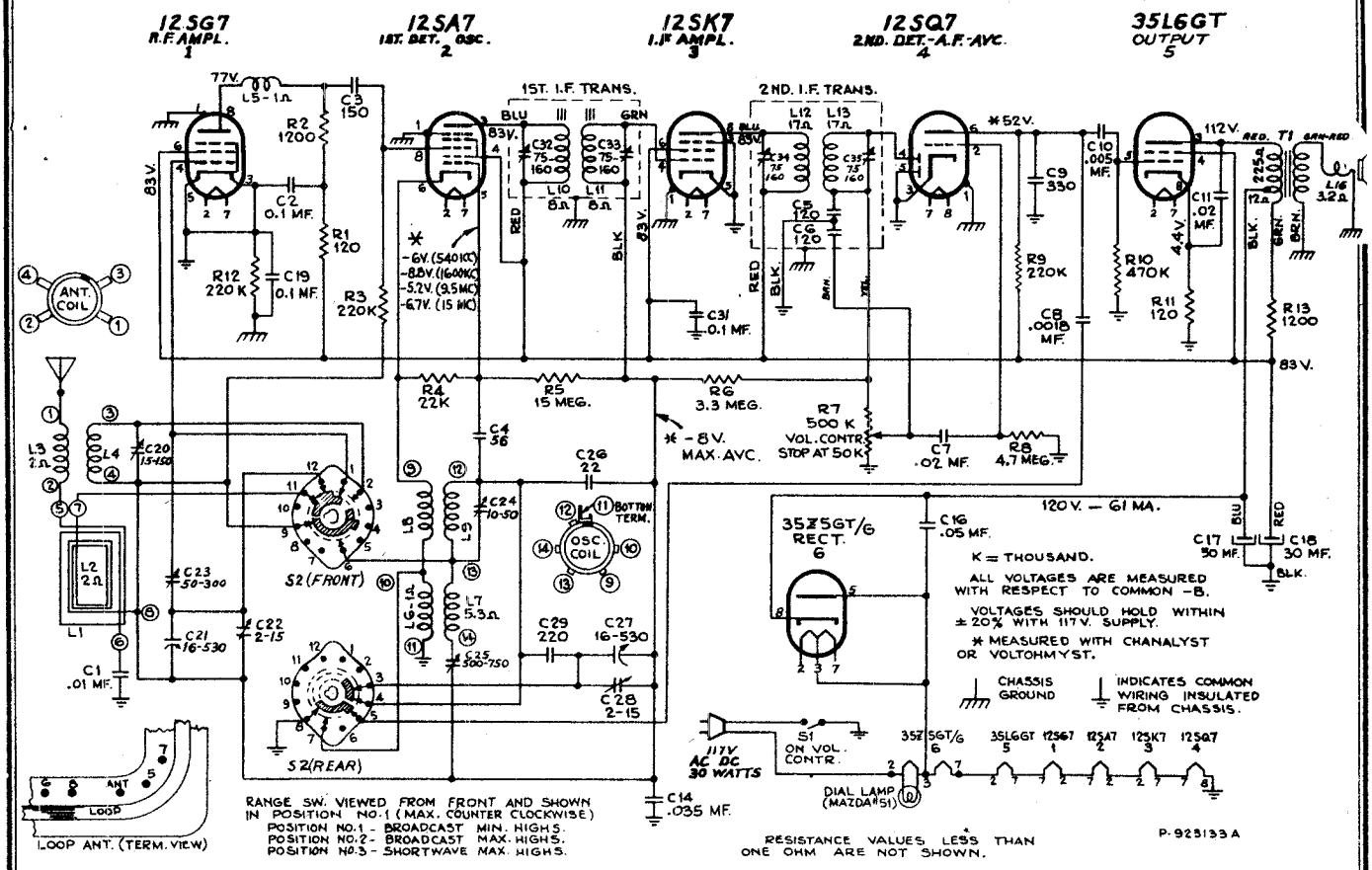
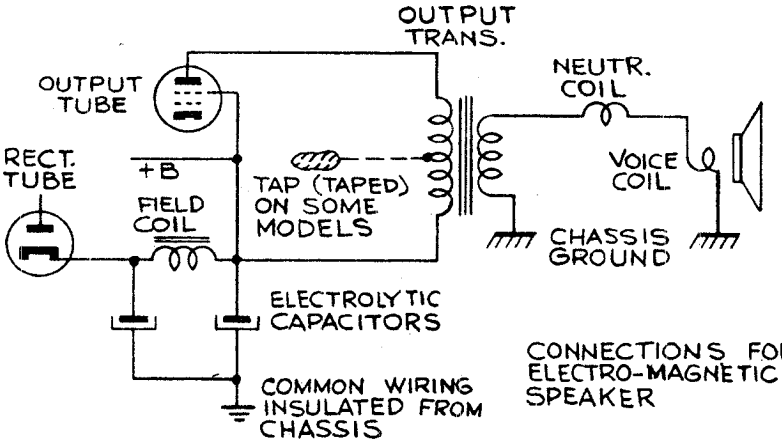
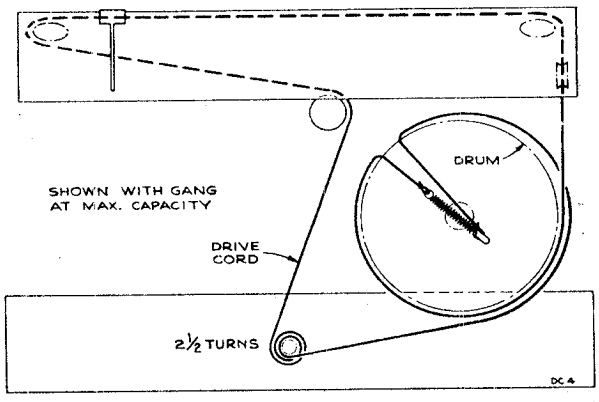

12SG7 R.F. AMPL. 1
12SA7 1ST. DET. OSC. 2
12SK7 I.F. AMPL. 3
12SQ7 2ND. DET.-A.F.-AVC. 4
35L6GT OUTPUT 5
1ST. I.F. TRANS.
2ND. I.F. TRANS.
ANT. COIL
S2 (FRONT)
S2 (REAR)
OSC. COIL
BOTTOM TERM.
35Z5GT/G RECT. 6
120 V. — 61 MA.
K = THOUSAND.
ALL VOLTAGES ARE MEASURED WITH RESPECT TO COMMON -B.
VOLTAGES SHOULD HOLD WITHIN ± 20% WITH 117 V. SUPPLY.
* MEASURED WITH CHANALYST OR VOLTOHMYST.
CHASSIS GROUND
INDICATES COMMON WIRING INSULATED FROM CHASSIS.
117 V AC DC 30 WATTS
S1 ON VOL. CONTR.
DIAL LAMP (MAZDA #51)
LOOP ANT. (TERM. VIEW)
RANGE SW. VIEWED FROM FRONT AND SHOWN IN POSITION NO. 1 (MAX. COUNTER CLOCKWISE)
POSITION NO. 1 - BROADCAST MIN. HIGHS.
POSITION NO. 2 - BROADCAST MAX. HIGHS.
POSITION NO. 3 - SHORTWAVE MAX. HIGHS.
RESISTANCE VALUES LESS THAN ONE OHM ARE NOT SHOWN.
P-923133A

Note: On some models, electrolytic capacitor (C17, C18) may be 20 Mfd./30 Mfd. The AVC bypass capacitor, (C14) may be .030 Mf.



CONNECTIONS FOR ELECTRO-MAGNETIC SPEAKER

IF PEAK 455 KC



FREQUENCY RANGE

Broadcast	540-1,600 kc
Short Wave	9.4-15.5 mc
Intermediate Frequency	455 kc

TUBE COMPLEMENT

(1) RCA-12SG7	R-F Amplifier
(2) RCA-12SA7	1st Det.—Osc.
(3) RCA-12SK7	I-F Amplifier
(4) RCA-12SQ7	2nd Det., A.V.C., and A-F Amplifier
(5) RCA-35L6-GT	Power Output
(6) RCA-35Z5-GT	Rectifier

PILOT LAMP ..... Mazda No. 51, 6-8 volts, 0.2 amp

POWER OUTPUT

Undistorted	1.0 watts
Maximum	1.5 watts

LOUDSPEAKER 92510-1

Size	5-inch PM
V.C. Impedance	3.4 ohms at 400 cycles

POWER SUPPLY RATING

105-125 volts, AC, 50 or 60 cycles, or DC ..... 30 watts

CABINET DIMENSIONS

Width 12 3/16" ..... Height 7 5/8" ..... Depth 7 1/4"

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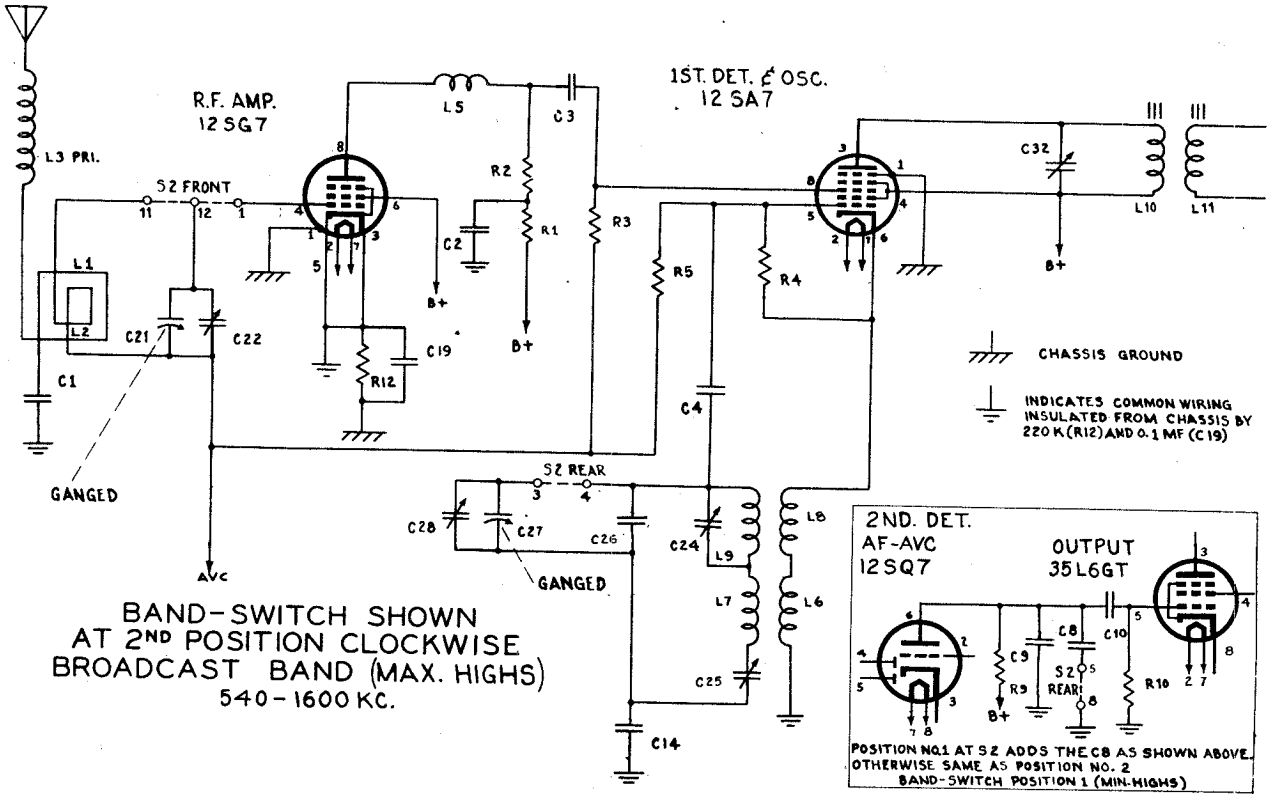
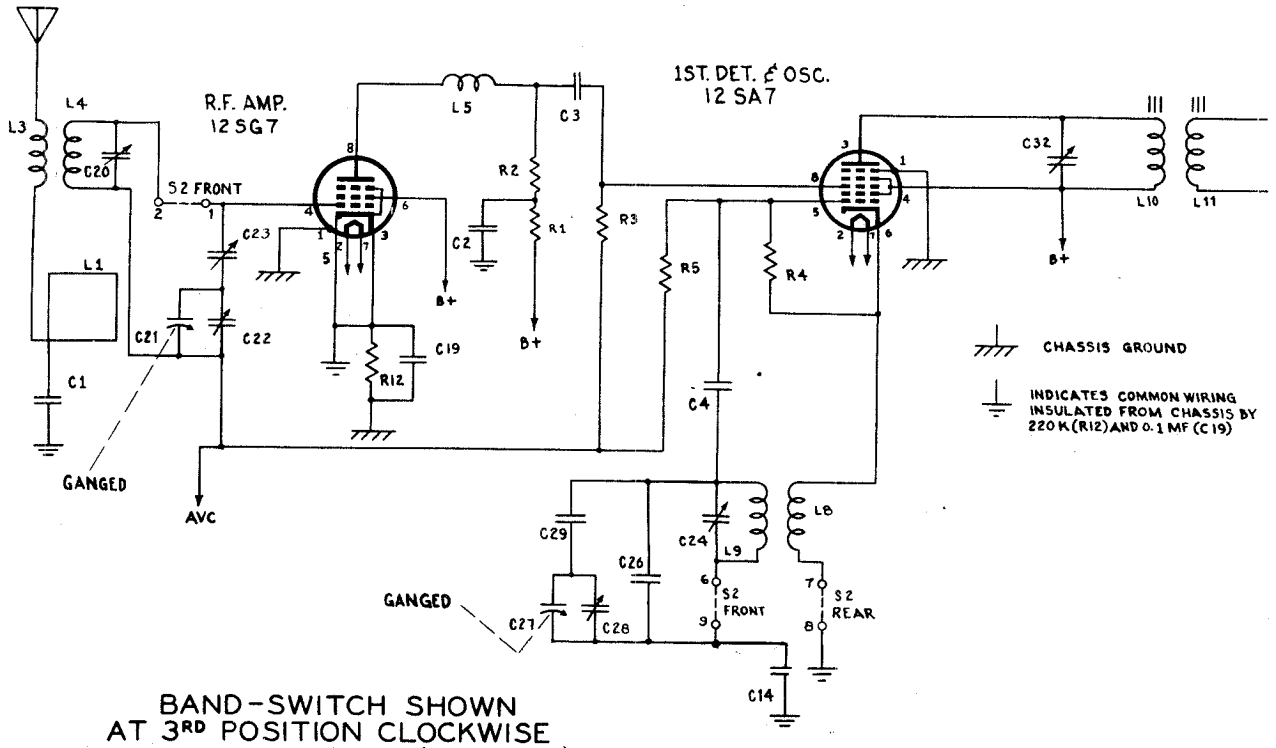
MODEL 56X11
Ch.RC-1023A

RCA MFG. CO.



BAND-SWITCH SHOWN
AT 2ND POSITION CLOCKWISE
BROADCAST BAND (MAX. HIGHS)
540-1600 KC.



BAND-SWITCH SHOWN
AT 3RD POSITION CLOCKWISE
SHORT WAVE BAND (MAX. HIGHS)
9.4-15.5 MC.

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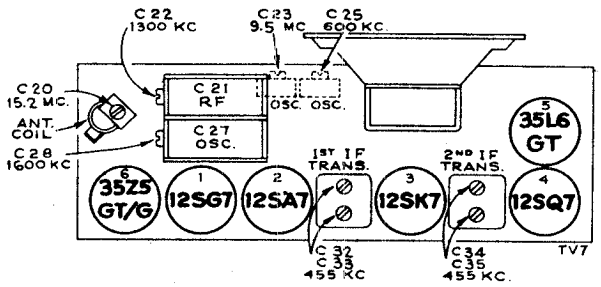
RCA MFG. CO.



Critical Lead Dress

1. Dress all heater leads down to chassis.
2. Dress excess leads from I.F. transformers back into cans, also blue and green leads should be dressed near to chassis.
3. Lead from band switch, terminal four, to C-24, should be dressed toward front apron and just clear of oscillator coil.
4. C-29, on band switch, connected from terminal three to terminal four, should be dressed toward rear of switch assembly.
5. Excess dial lamp leads should be dressed on top of chassis.
6. C-11, output tone control condenser, should be dressed close to chassis to clear when entering cabinet.
7. Power cord should be dressed free, and not under any other leads.
8. C-4 should be dressed clear of any other components or wiring and away from chassis.
9. Lead from tone control condenser, C-8, to band switch-terminal five, should be dressed over oscillator coil and oscillator padders C-24, C-25.
10. Lead from short-wave antenna coil to loop antenna should be to the right (outside) of 35Z5GT/G.
11. Leads to loop antenna should be dressed between I.F. transformer and 12SA7.
12. Yellow and brown leads from second I.F. transformer to volume control should be dressed up and away from chassis.

Alignment Procedure

Test Oscillator.—For all alignment operations, keep the output as low as possible to avoid a.v.c. action.

Output Meter Alignment.—If this method is used, connect the meter across the voice coil, and turn the receiver volume control to maximum.

Calibration Scale.—The glass tuning dial may be easily removed from the cabinet and temporarily attached to the dial backing plate for quick reference during alignment.

Power Supply Polarity.—For operation on d-c, the power plug must be inserted in the outlet for correct polarity. If the set does not function, reverse the plug. On a-c, reversal of the plug may reduce hum.

Steps	Connect high side of the test oscillator to—	Tune test osc. to—	Turn radio dial to—	Adjust the following for maximum peak output
1	I.F. grid in series with .01 mfd.	455 kc	'A' Band Quiet point at 1600 kc end of dial	C34, C35 2nd I-F trans.
2	12SA7 grid in series with .01 mfd.			C32, C33 1st I-F trans.
3	Antenna terminal on loop in series with 220 mmf.	600 kc	'A' Band rock gang near 600 kc	C25 (BC trimmer)
4		1600 kc	1600 kc	C28 (Osc.)
5		600 kc	Rock gang near 600 kc	Recheck C25
6		1300 kc	1300 kc	C22 (r.f.)
7	Antenna terminal on loop in series with 22 mmf.	15.2 mc.	'C' Band rock gang near 15.2 mc.	C20 (ant.) on top of S.W. ant. coil
8			15.2 mc. center of "M"—"19M"	C24 (Osc.)*
9		9.5 mc.	9.5 mc.	C23 (r.f.)
10		15.2 mc.	15.2 mc.	Recheck C20

*Use minimum capacity peak, if two peaks can be obtained.

Note.—Oscillator tracks 455 kc above signal on both bands.

STOCK No.	DESCRIPTION
	CHASSIS ASSEMBLIES RC 1023A
32979	Capacitor—Mica trimmer, 15-150 mmf. (C20)
37388	Capacitor—Mica trimmer, 50-300 mmf. (C23)
70701	Capacitor—Mica trimmer, 1 section 500-750 mmf. and 1 section 10-50 mmf. (C24, C25)
39612	Capacitor—Mica, 22 mmf. (C26)
39622	Capacitor—Mica, 56 mmf. (C4)
39632	Capacitor—Mica, 150 mmf. (C3)
39640	Capacitor—Mica, 330 mmf. (C9)
71014	Capacitor—Silver mica, 220 mmf. (C29)
70712	Capacitor—Tubular, .0018 mfd., 800 volts (C8)
70627	Capacitor—Tubular, .005 mfd., 600 volts (C10)
70652	Capacitor—Tubular, .01 mfd., 800 volts (C1)
70711	Capacitor—Tubular, .02 mfd., 700 volts (C7, C11)
70635	Capacitor—Tubular, .035 mfd., 500 volts (C14)
70615	Capacitor—Tubular, .05 mfd., 400 volts (C16)
70617	Capacitor—Tubular, 0.1 mfd., 400 volts (C2, C19, C31)
36301	Capacitor—Electrolytic comprising 1 section of 30 mfd., 150 volts and 1 section of 50 mfd., 150 volts (C17, C18)
70842	Coil—Antenna coil (L3, L4)
70843	Coil—Oscillator coil (L6, L7, L8, L9)
39894	Coil—Peaking coil(L5)
70700	Condenser—Variable tuning condenser (C21, C22, C27, C28)
36242	Control—Volume control and power switch (R7, S1)
70392	Cord—Power cord
32634	Cord—Drive cord (approx. 49" overall length)
36237	Drum—Drive drum
37068	Indicator—Station selector indicator
11765	Lamp—Dial lamp
31193	Lead—Antenna lead
70841	Loop—Antenna loop (L1, L2)
36229	Plate—Dial back plate complete with pulleys
36230	Pulley—Drive cord pulley
30189	Resistor—120 ohms, ¼ watt (R1, R11)
12267	Resistor—1200 ohms, ¼ watt (R2)
6134	Resistor—1200 ohms, 1 watt (R13)
30492	Resistor—22,000 ohms, ¼ watt (R4)
14583	Resistor—220,000 ohms, ¼ watt (R3, R9)
30648	Resistor—470,000 ohms, ¼ watt (R10)
12928	Resistor—3.3 megohms, ¼ watt (R6)
30271	Resistor—4.7 megohms, ¼ watt (R8)
38785	Resistor—15 megohms, ¼ watt (R5)
36897	Shaft—Tuning knob shaft
34449	Socket—Dial lamp socket
37605	Socket—Tube socket—moulded
31418	Spring—Drive cord spring
70696	Switch—Range switch (S2)
70697	Transformer—Audio transformer (T1)
70698	Transformer—First I.F. transformer (L10, L11, C32, C33)
70699	Transformer—Second I.F. transformer (C34, C35, L12, L13)
33726	Washer—"C" washer for tuning knob shaft
	SPEAKER ASSEMBLIES
	92510-1T 92510-1L 92510-1P 92510-1M
70413	Speaker—5" P.M. speaker complete with cone and voice coil
	NOTE: If stamping on speaker in instrument does not agree with above speaker number, order replacement parts by referring to model number of instrument, number stamped on speaker and full description of part required.
	MISCELLANEOUS ASSEMBLIES
39953	Back—Cabinet back
70702	Dial—Glass dial scale
36890	Clamp—Dial clamp—left hand
36891	Clamp—Dial clamp—right hand
37831	Fastener—Push fastener for cabinet back
36722	Knob—Control knob
30900	Spring—Retaining spring for knobs

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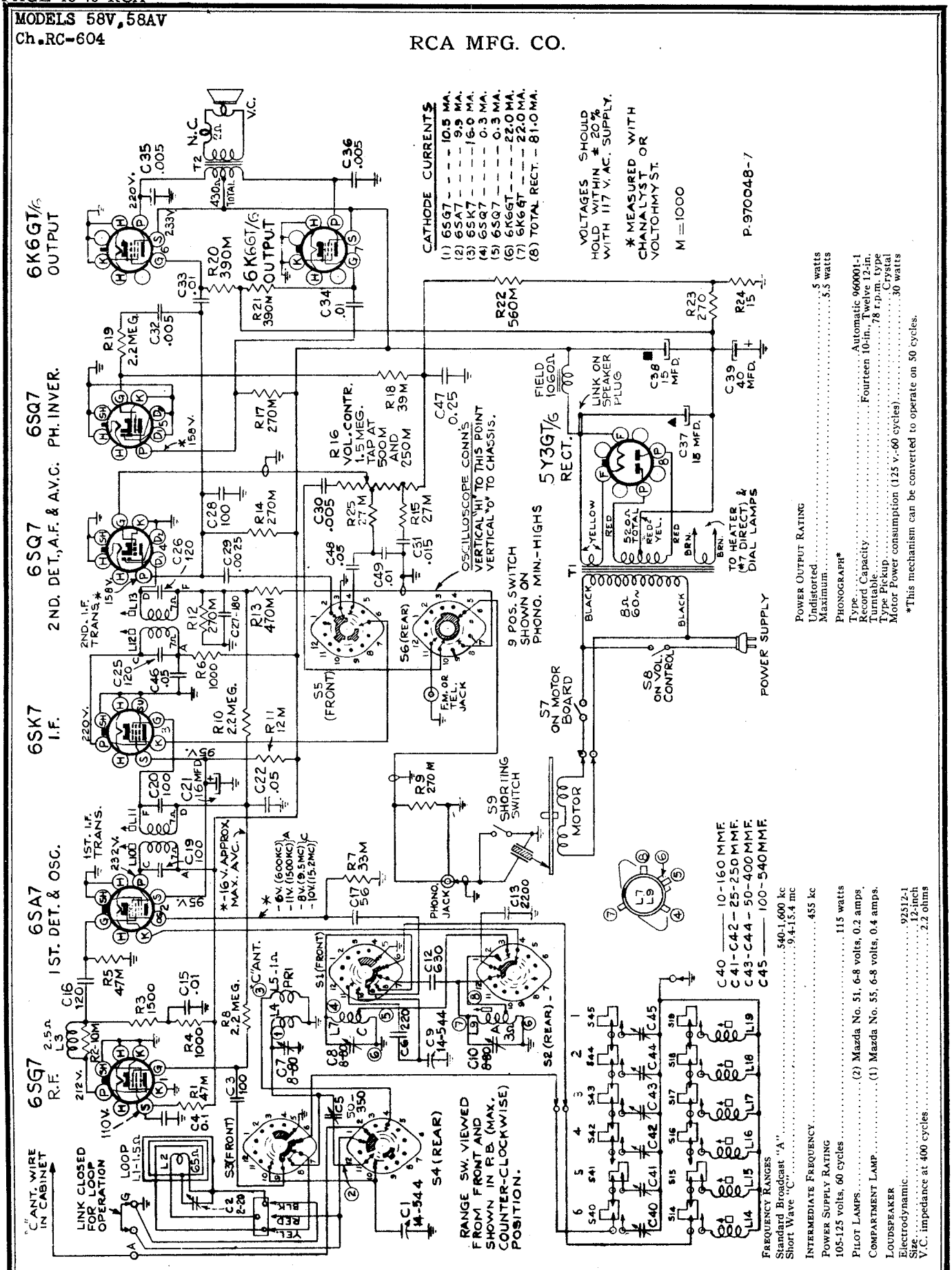
MODELS 58V, 58AV
Ch. RC-604

RCA MFG. CO.



Power Output Rating
Undistorted ..... 5 watts
Maximum ..... 5.5 watts

Phonograph*
Type ..... Automatic 960001-1
Record Capacity ..... Fourteen 10-in., Twelve 12-in.
Turntable ..... 78 r.p.m. type
Type Pickup ..... Crystal
Motor Power consumption (125 v.-60 cycles) ..... 30 watts

*This mechanism can be converted to operate on 50 cycles.

Frequency Ranges
Standard Broadcast "A" ..... 540-1,600 kc
Short Wave "C" ..... 9.4-15.4 mc

Intermediate Frequency ..... 455 kc

Power Supply Rating
105-125 volts, 60 cycles ..... 115 watts

Pilot Lamps ..... (2) Mazda No. 51, 6-8 volts, 0.2 amps.

Compartment Lamp ..... (1) Mazda No. 55, 6-8 volts, 0.4 amps.

Loudspeaker
Electrodynamic 92512-1
Size 12-inch
V.C. impedance at 400 cycles ..... 2.2 ohms

Record Changer: RCA Model 960001-1

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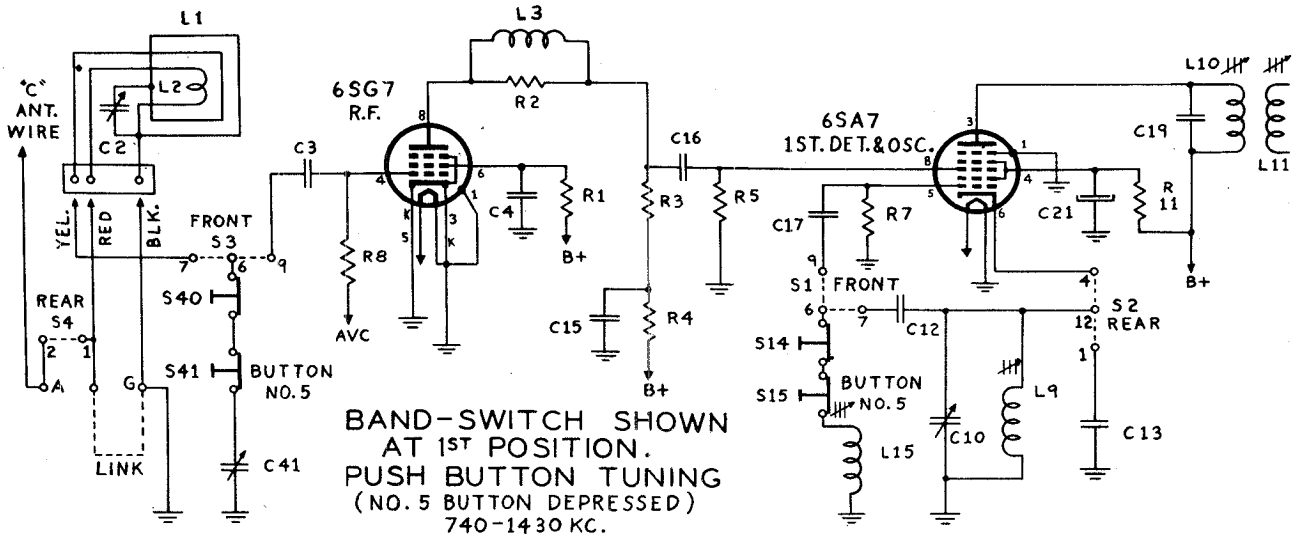
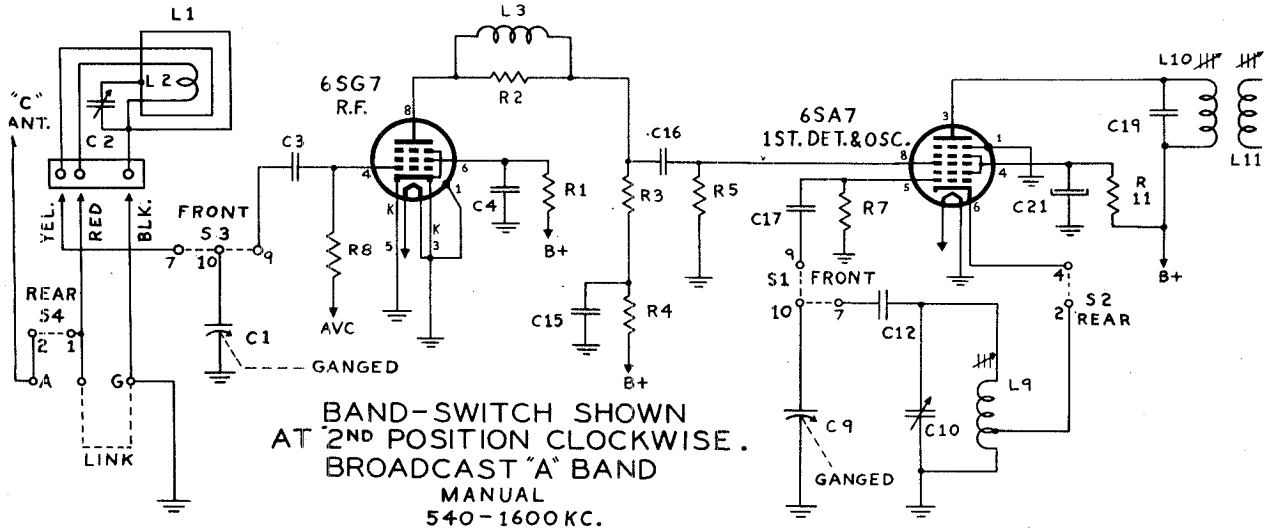
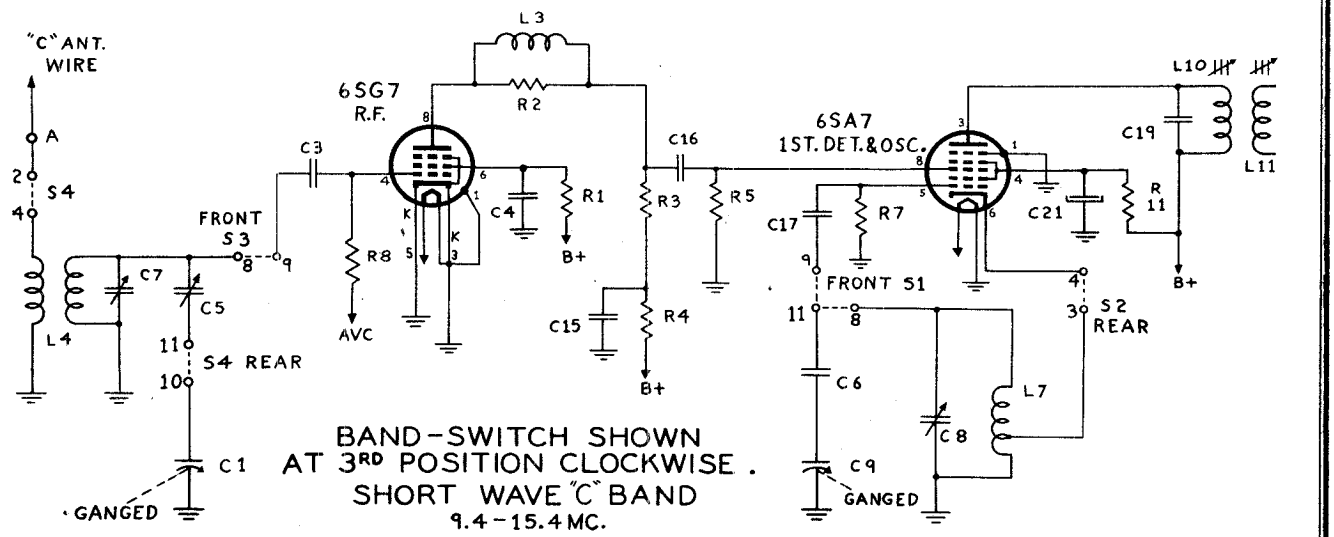


BAND-SWITCH SHOWN AT 1ST POSITION.
PUSH BUTTON TUNING
(NO. 5 BUTTON DEPRESSED)
740-1430 KC.



BAND-SWITCH SHOWN AT 2ND POSITION CLOCKWISE.
BROADCAST "A" BAND
MANUAL
540-1600 KC.



BAND-SWITCH SHOWN AT 3RD POSITION CLOCKWISE.
SHORT WAVE "C" BAND
9.4-15.4 MC.

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MODELS 58V, 58AV
Ch. RC-604

RCA MFG. CO.

Cathode-Ray Alignment is the preferable method. Connections for the oscilloscope are shown in the schematic diagram.

Output Meter Alignment.—If this method is used, connect the meter across the voice coil, and turn the receiver volume control to maximum.

Test-Oscillator.—For all alignment operations, connect the low side of the test-oscillator to the receiver chassis, and keep the oscillator output as low as possible to avoid a-v-c action.

Calibration Scale.—The glass tuning dial may be easily removed from the cabinet and temporarily attached to the chassis for quick reference during alignment. In the event that only the chassis is returned for service, and the cabinet with its tuning dial is left in the customer's home, the full size scale printed in this service note can be used for reference.

Using Tuning Dial.—

1. Remove glass dial from the cabinet.
2. With gang in full mesh, the dial pointer should be set to a point 1/16 inch to left of reference mark at left hand end of the dial backing plate.
3. Support the glass dial over the pointer with spacers so that the extreme left scale graduation coincides with the pointer. Use scotch tape to hold the glass dial in place.

"C" Band Reception.—For best reception on "C" band with an outside antenna, adjust the trimmer screw of C5 on the antenna coil. Turn screw carefully with an insulated screwdriver (RCA Stock No. 31031) while the receiver is tuned to a station in the 31-meter band. If returning to internal antenna at any time, close the link on the center terminal and readjust "C" band antenna trimmer (C5) for best reception on 31-meter band.

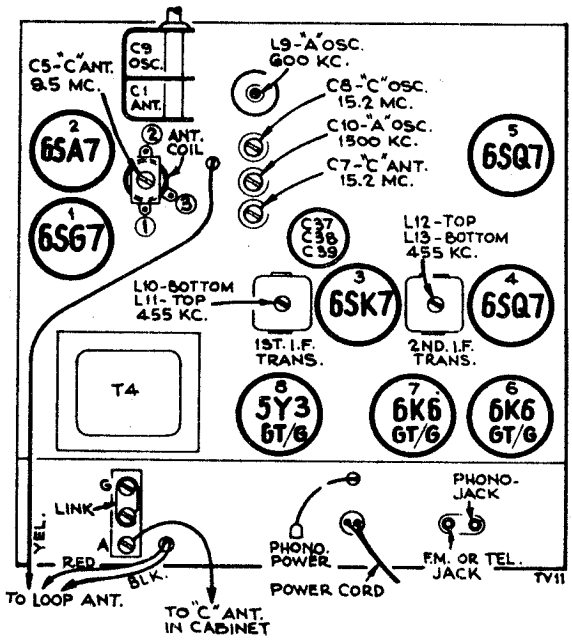
For additional information, refer to booklet "RCA Victor Receiver Alignment."

Steps	Connect test-osc. output to—	Tune test osc. to—	Turn radio dial to—	Adjust the following for maximum peak output—
1	I-F grid in series with .01 mfd.	455 kc	"A" band 540 kc	L13-L12 (2nd I-F trans.)
2	1st Det. grid in series with .01 mfd.			L11-L10 (1st I-F trans.)
3	A-Terminal in series with 47 mmfd. (link closed)	15.2 mc	"C" band 15.2 mc	C8 (osc.)* C7 (ant.)
4		9.5 mc	"C" band 9.5 mc	C5 (ant.) (Rock gang)
5		Repeat steps 3 and 4		
6	Yellow loop lead in series with 200 mmfd. (link closed)	1,500 kc	"A" band 1,500 kc	C10 (osc.)
7		600 kc	"A" band 600 kc	L9 (osc.)
8		Repeat steps 6 and 7		
9	Install and connect chassis in cabinet with antenna link closed. Tune in a radiated oscillator signal at 1,500 kc. and peak the "A" band trimmer C2 (on loop). Rock in L9 for peak output at 600 kc.			

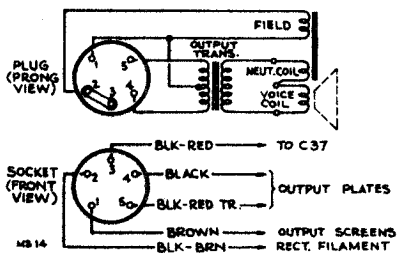
*Use minimum capacity peak if two peaks can be obtained. Oscillator tracks 455 kc. above signal on all bands.

Critical Lead Dress:

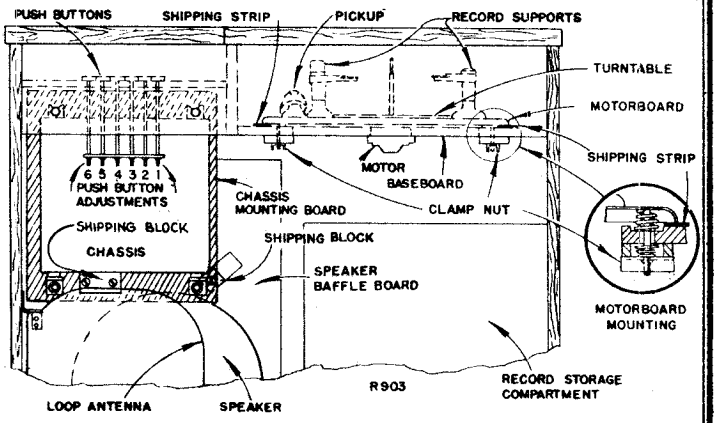
1. Bus from "C" oscillator coil to range switch must be held to length and dressed close to coil.
2. C30 (audio coupling capacitor to volume control) should be dressed close to front apron.
3. A.C. cord and motor leads must be dressed away from phono and F.M. jack.
4. Excess trans. leads to be dressed between trans. and rectifier socket.
5. Keep R5, C16 bus (in grid circuit of 6SA7 tube) as short as possible.
6. Dress C28 (in plate circuit of 1st A.F.) close to socket.
7. Keep R21 (grid resistor) and C34 (coupling capacitor of output tube) close to socket.
8. Keep R25, C48 (in tone compensating circuit) close to front apron.
9. Dress green lead from osc. coil to trimmer close to oscillator coil.
10. Dress red A.C. leads away from I.F. trans. and 6SQ7 socket.
11. RF choke in plate of 6SG7 must be dressed toward back apron.



TUBE AND TRIMMER LOCATIONS



SPEAKER CONNECTIONS



BACK VIEW

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PUSH BUTTON ADJUSTMENT.—

The push buttons connect to separate magnetite-core oscillator coils and separate ant. circuit trimmers which must be adjusted for the desired stations. Use an insulated screwdriver or alignment tool such as RCA Stock No. 31031. Allow about five minutes warm-up period before making adjustments.

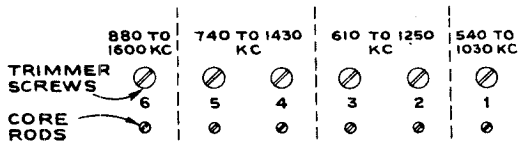
The procedure is as follows:

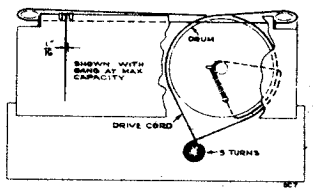
1. Make a list of the desired stations, arranged in order from low to high frequencies.
2. Turn the range switch to the broadcast position and manually tune in the first station on the list.
3. Turn range switch to push-button position and press in the left-hand button.
4. Adjust No. 1 oscillator core to receive the first station. To secure the best adjustment, rotate the antenna for least pickup, and adjust core for peak output.
5. Adjust No. 1 antenna trimmer capacitor for peak output on the first station.
6. Proceed in the same manner to adjust for the remaining stations.

On the 880 to 1,600 kc push-button, the higher frequency stations may be received with osc. core either in or out (oscillator frequency either 455 kc below or 455 kc above the station frequency). The adjustment with this core in its out position (oscillator frequency 455 kc above the station frequency) is the correct one.

NOTE: Clockwise adjustment of cores and trimmers tunes the circuits to lower frequencies.

SERVICE HINT:—If unable to reach 550-540 KC on No. 1 push button—Connect a Stock No. 33111 Capacitor-Ceramic-33 mmf across L19 (between switch contact which connects to high side of L19, and switch frame).





STOCK No.	DESCRIPTION
	CHASSIS ASSEMBLIES RC-604
36342	Board—"Antenna-Ground" board
38368	Capacitor—Adjustable, 50-350 mmfd. (C5)
60954	Capacitor—Ceramic, 56 mmfd. (C17)
38801	Capacitor—Mica trimmer, comprising 3 sections of 8-80 mmfd. (C7, C8, C10)
39628	Capacitor—Mica, 100 mmfd. (C3, C19, C20, C28)
39630	Capacitor—Mica, 120 mmfd. (C16, C25, C26)
39634	Capacitor—Mica, 180 mmfd. (C27)
38858	Capacitor—Silver mica, 220 mmfd. (C6)
38831	Capacitor—Silver mica, 630 mmfd. (C12)
39660	Capacitor—Mica, 2200 mmfd. (C13)
70623	Capacitor—Tubular, .0025 mfd., 600 volts (C29)
70627	Capacitor—Tubular, .005 mfd., 600 volts (C30, C32)
70648	Capacitor—Tubular, .005 mfd., 1000 volts (C35, C36)
70631	Capacitor—Tubular, .01 mfd., 600 volts (C15, C33, C34, C49)
70572	Capacitor—Tubular, .015 mfd., 400 volts (C31)
70615	Capacitor—Tubular, .05 mfd., 400 volts (C22, C48)
70636	Capacitor—Tubular, .05 mfd., 600 volts (C-46)
70617	Capacitor—Tubular, 0.1 mfd., 400 volts (C4)
70618	Capacitor—Tubular, 0.25 mfd., 200 volts (C47)
37888	Capacitor—Electrolytic comprising 2 sections of 20 mfd., 450 volts and 1 section of 20 mfd., 25 volts replacement for (C37, C38, C39)
37877	Capacitor—Electrolytic, 16 mfd., 450 volts (C21)
38788	Coil—Antenna coil, "C" band (L4, L5)
38787	Coil—Oscillator coil (L7, L9)
38800	Condenser—Variable tuning condenser (C1, C9)
70342	Control—Volume control and power switch (R16, S8)
32634	Cord—Drive cord (approx. 43" overall length)
12006	Core—Adjustable core and stud assembly for I.F. transformer
35788	Core—Adjustable core and stud for oscillator coil
38359	Cup—Oscillator coil mounting cup
38790	Drum—Drive drum
35870	Indicator—Station selector pointer
28452	Plate—Bakelite mounting plate for electrolytic capacitor
36333	Plate—Dial back plate complete with pulleys
38832	Plug—Pin plug for loop lead
30868	Plug—2 contact female plug for motor cable
12493	Plug—5 contact female plug for speaker cable
32641	Plug—3 prong male plug for selector switch cable
32289	Pulley—Drive cord pulley
11565	Resistor—15 ohms, ½ watt (R24)
70542	Resistor—270 ohms, 4 watt (R23)
34766	Resistor—1000 ohms, ½ watt (R4, R6)
30654	Resistor—1500 ohms, ½ watt (R3)
38829	Resistor—Resistor and coil assembly, 10,000 ohms (R2, L3)
70541	Resistor—12,000 ohms, 4 watt (R11)
30409	Resistor—27,000 ohms, ½ watt (R15, R25)
30685	Resistor—33,000 ohms, ½ watt (R7)
30147	Resistor—39,000 ohms, ½ watt (R18)
30787	Resistor—47,000 ohms, ½ watt (R1, R5)
30651	Resistor—270,000 ohms, ½ watt (R9, R12, R14, R17)
11988	Resistor—390,000 ohms, ½ watt (R20, R21)
30648	Resistor—470,000 ohms, ½ watt (R13)
30653	Resistor—560,000 ohms, ½ watt (R22)
30649	Resistor—2.2 megohm, ½ watt (R8, R10, R19)
38803	Shaft—Tuning knob shaft
31364	Socket—Lamp socket
33514	Socket—Phono input socket
31251	Socket—Tube socket
31418	Spring—Drive cord tension spring
12007	Spring—Retaining spring for adjustable core and studs
38802	Switch—Radio-phono and tone control switch (S5, S6)
38805	Switch—Range switch (S1, S2, S3, S4)
31380	Transformer—Power transformer—105-125 volts, 50/60 cycle (T1)
35636	Transformer—First I.F. transformer (L10, L11, C19, C20)
35790	Transformer—Second I.F. transformer (L12, L13, C25, C26)
35969	Washer—"C" washer for tuning knob shaft
	SPEAKER ASSEMBLIES Stamped 92512-1K
70574	Cone—Cone and voice coil assembly
31539	Plug—5 prong male plug for speaker cable
70573	Speaker—12" E.M. speaker complete with cone and voice coil less plug and output transformer
37899	Transformer—Output transformer (T2)
	NOTE: If stamping on speaker in instruments does not agree with above speaker number, order replacement parts by referring to Model number of instrument, number stamped on speaker and full description of part required.
	MISCELLANEOUS ASSEMBLIES
36461	Button—Plug button
38375	Button—Push button
38684	Capacitor—Trimmer, 2-20 mmfd. (C2)
36424	Capacitor—Mica trimmer comprising 1 section of 10-160 mmfd., 2 sections of 25-250 mmfd., 2 sections of 50-400 mmfd., and 1 section of 100-540 mmfd. (C40, C41, C42, C43, C44, C45)
36462	Clamp—Dial clamp
X1609	Cloth—Grille cloth for Mahogany cabinet
X1610	Cloth—Grille cloth for Walnut cabinet
38579	Coil—Loop primary coil (L2)
38315	Coil—P.B. oscillator coil—high frequency side (L14, L15, L16)
37638	Coil—P.B. oscillator coil—low frequency side (L17, L18, L19)
35871	Core—Adjustable core and stud for P.B. oscillator coil
70547	Cover—Compartment lamp lead cover
39013	Decal—Control panel decal
35392	Decal—Trade mark decal (RCA Victor)
70575	Decal—Trade mark decal (Dog)
39011	Dial—Glass dial scale
36327	Escutcheon—Dial escutcheon—less dial
38376	Escutcheon—Push button escutcheon—less buttons
71003	Grille—Metal grille
39352	Hinge—Cabinet door hinge
30698	Hinge—Cabinet lid hinge
13103	Jewel—Pilot lamp cap
71002	Knob—Cabinet door knob
35814	Knob—Tone control, range switch, volume control, or tuning knob
5117	Lamp—Compartment lamp
11765	Lamp—Dial lamp
70544	Loop—Antenna loop complete (L1, L2, C2)
34317	Marker—Station marker
70546	Mounting—One (1) set of hardware for mounting record changer consisting of four (4) upper and four (4) lower springs and four (4) clamp nuts
37800	Shade—Lamp shade
36422	Socket—3 contact female for selector switch cable and loop leads
30900	Spring—Retaining spring for control knobs
34053	Spring—Retaining spring for push button
71001	Spring—Spring for L.H. cabinet lid support
70999	Spring—Spring for R.H. cabinet lid support
71000	Support—Cabinet lid support—L.H.
70998	Support—Cabinet lid support—R.H.
70545	Support—Loop support complete with mounting brackets and spring
38575	Switch—Selector switch (S14, S15, S16, S17, S18, S19, S40, S41, S42, S43, S44, S45)

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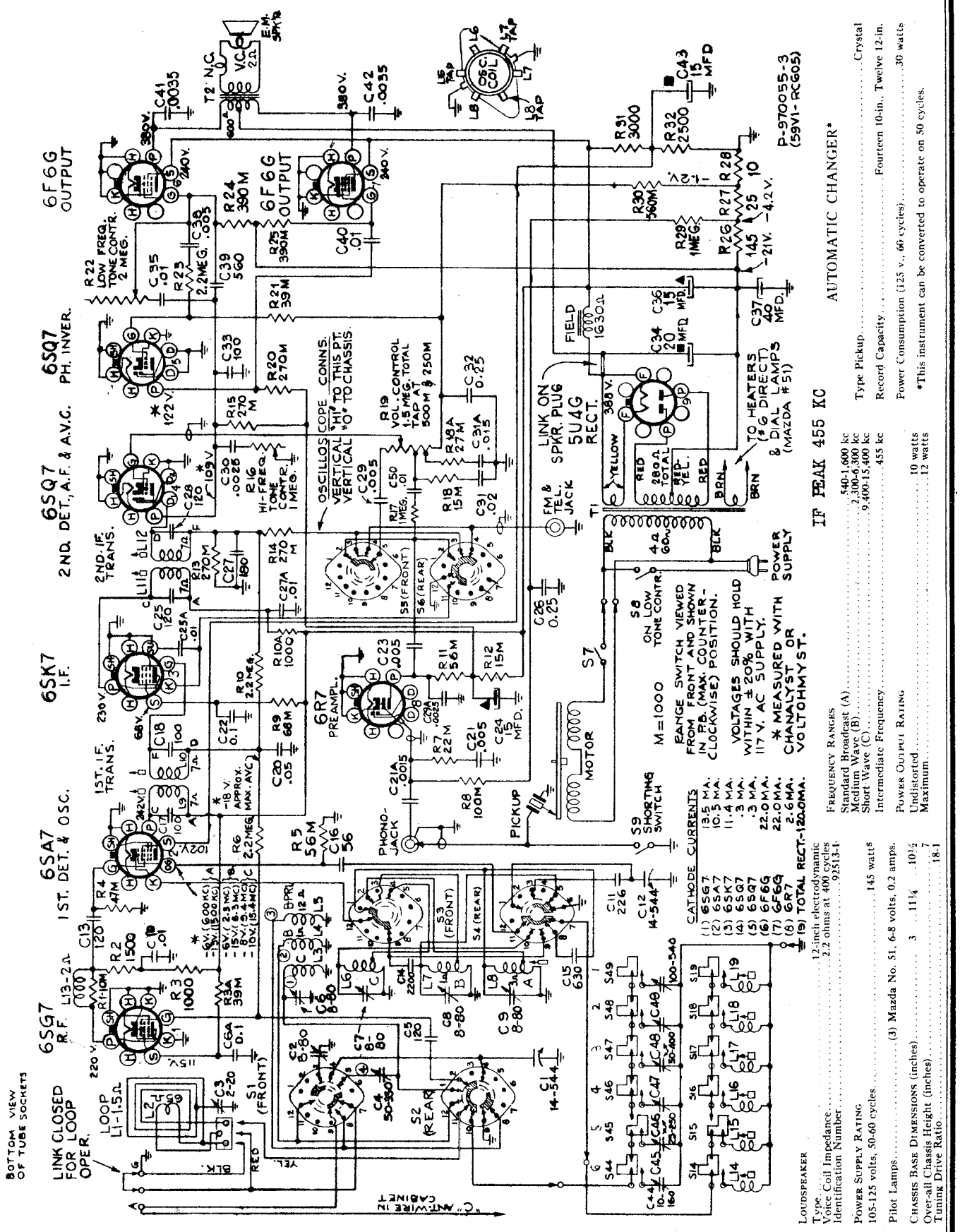
MODELS 59V1, 59AV1*
Ch. RC-605

RCA MFG. CO.



Loudspeaker	
Type	12-inch electrodynamic
Voice Coil Impedance	2.2 ohms at 400 cycles
Identification Number	92513-1
Power Supply Rating	
105-125 volts, 50-60 cycles	145 watts
Pilot Lamps	(3) Mazda No. 51, 6-8 volts, 0.2 amps.
Chassis Base Dimensions (inches)	3 . . . 11¼ . . . 10½
Over-all Chassis Height (inches)	7
Tuning Drive Ratio	18-1

Frequency Ranges	
Standard Broadcast (A)	540-1,600 kc
Medium Wave (B)	2,300-6,300 kc
Short Wave (C)	9,400-15,400 kc
Intermediate Frequency	455 kc
Power Output Rating	
Undistorted	10 watts
Maximum	12 watts
Type Pickup	Crystal
Record Capacity	Fourteen 10-in., Twelve 12-in.
Power Consumption (125 v., 60 cycles)	30 watts

*This instrument can be converted to operate on 50 cycles.

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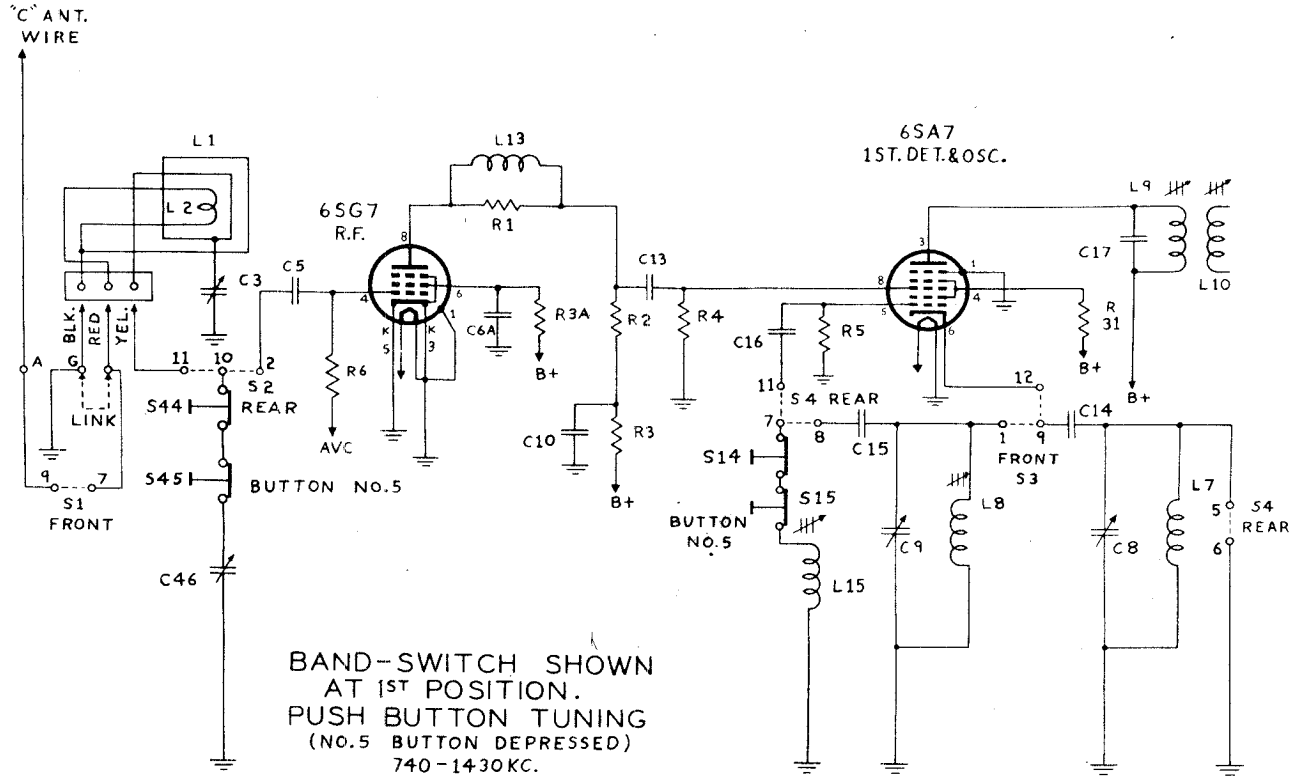
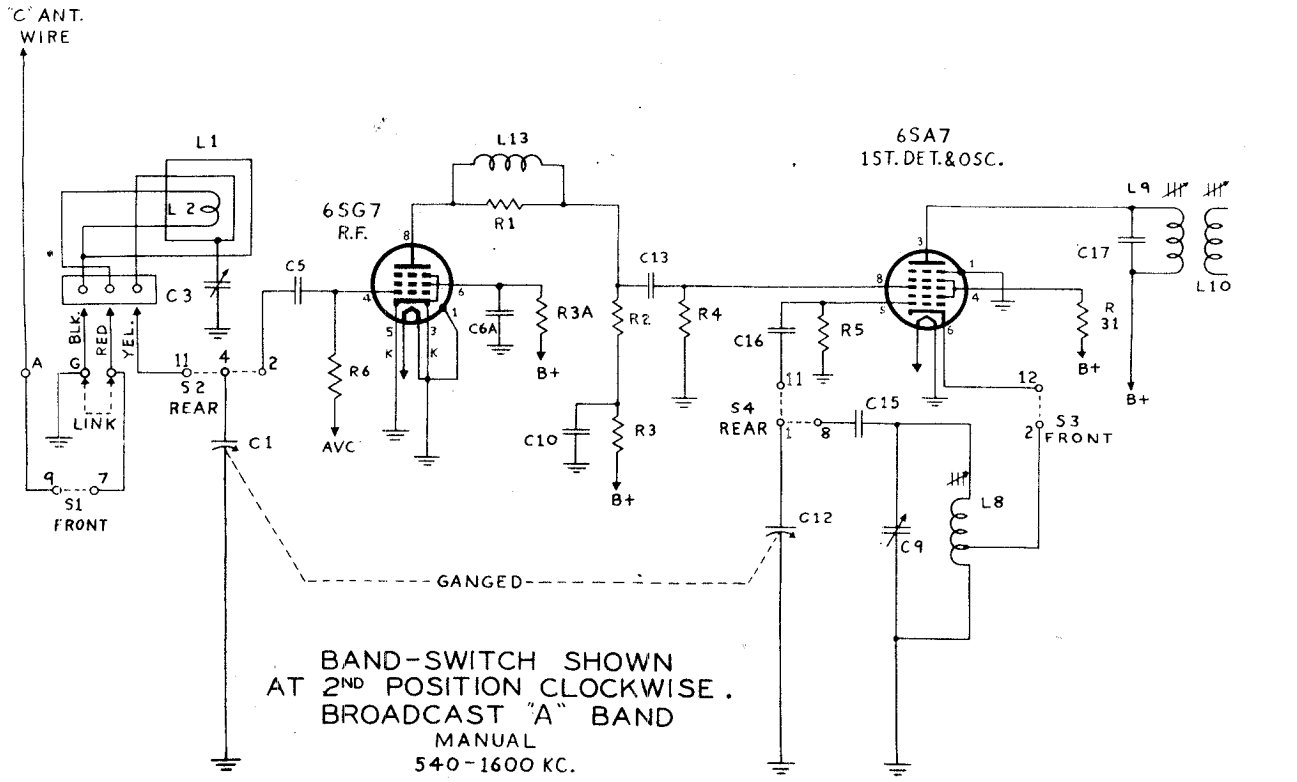
MODELS 59V1, 59AV1
Ch. RC-605

RCA MFG. CO.





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Ch. RC-605

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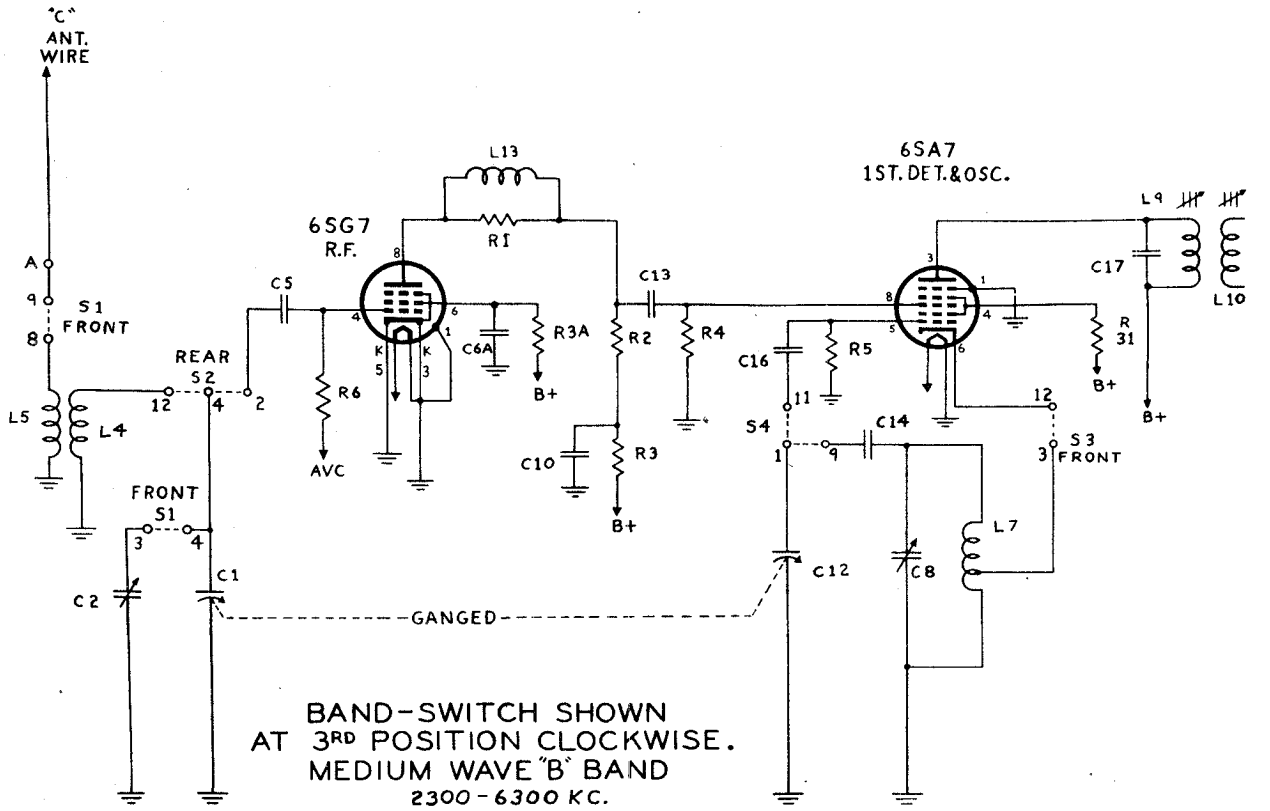
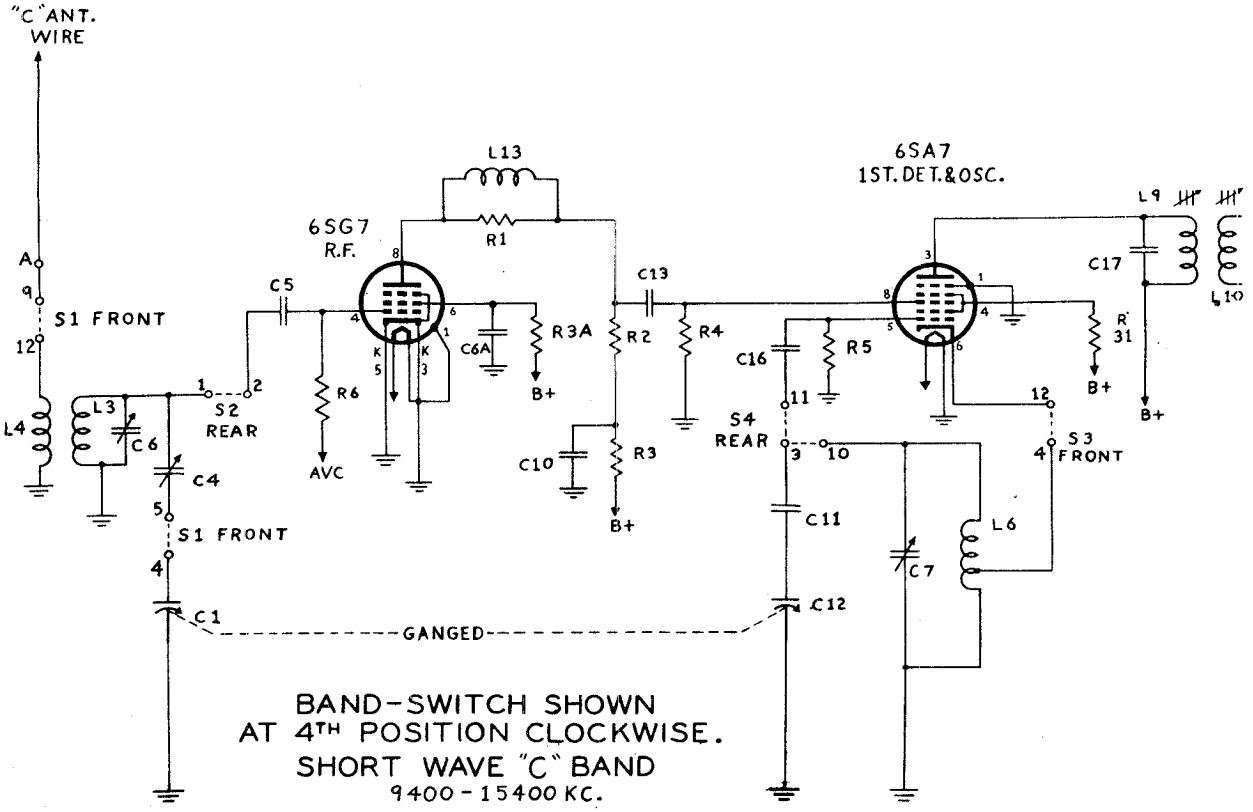


BAND-SWITCH SHOWN
AT 3RD POSITION CLOCKWISE.
MEDIUM WAVE "B" BAND
2300 - 6300 KC.



BAND-SWITCH SHOWN
AT 4TH POSITION CLOCKWISE.
SHORT WAVE "C" BAND
9400 - 15400 KC.

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MODELS 59V1,59AV1
Ch.RC-605

RCA MFG. CO.

Cathode-Ray Alignment is the preferable method. Connections for the oscillograph are shown in the schematic diagram.

Output Meter Alignment.—If this method is used, connect the meter across the voice coil, and turn the receiver volume control to maximum.

Test-Oscillator.—For all alignment operations, connect the low side of the test-oscillator to the receiver chassis, and keep the oscillator output as low as possible to avoid a-v-c action.

Calibration Scale.—The glass tuning dial may be easily removed from the cabinet and temporarily attached to the chassis for quick reference during alignment. In the event that only the chassis is returned for service, and the cabinet with its tuning dial is left in the customer's home, the full size calibration scale printed in this service note can be used for reference.

Using Tuning Dial.—

1. Remove the dial glass from the cabinet.
2. With gang at full mesh the pointer should be set to a point (1/16) inch to the left of the reference mark at the left hand end of the dial backing plate.
3. Place the glass dial under the pointer so that the extreme left scale graduations coincide with the pointer. Use scotch tape to hold the glass dial in place.

Using Dial Scale Printed In This Service Note.—

Follow the procedure above, substituting the dial scale printed in this service note for the glass dial in the cabinet.

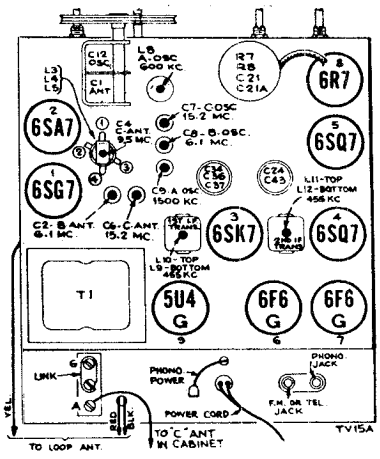
"C" Band Reception.—For best reception on "C" band with an outside antenna, adjust the trimmer screw of C4 on the antenna coil. Turn screw carefully with an insulated screwdriver (RCA Stock No. 31031) while the receiver is tuned to a station in the 31-meter band. If returning to internal antenna at any time, close the link on the center terminal and readjust "C" band antenna trimmer (C4) for best reception on 31-meter band.

For additional information, refer to booklet, "RCA Victor Receiver Alignment."

Steps	Connect high side of test osc. to—	Tune test osc. to—	Turn radio dial to—	Adjust the following for maximum peak output—
1	I-F grid in series with .01 mfd.	455 kc	"A" Band 540 kc	L12, L11 (2nd I-F Trans.)
2	1st Det. grid in series with .01 mfd.			L10, L9 (1st I-F Trans.)
3	Yellow loop lead in series with 200 mmf. (link closed)	1,500 kc	"A" Band 1,500 kc	C9 (osc.)
4		600 kc	"A" Band 600 kc	L8 (osc.)
5		Repeat steps 3 and 4		
6	Ant. terminal in series with 47 mmf. (link closed)	6.1 mc	"B" Band 6.1 mc	C8 (osc.)* C2 (ant.)
7		15.2 mc	"C" Band 15.2 mc	C7 (osc.)* C6 (ant.)
8		9.5 mc	"C" Band 9.5 mc	C4 (ant.)
9		Repeat steps 7 and 8		
10	Install and connect chassis in cabinet, with link closed. Tune in a radiated oscillator signal at 1,500 kc and peak the "A" band ant. trimmer C3 (on loop). Rock in L8 for peak output at 600 kc.			

*Use minimum capacity peak if two peaks can be obtained.

Oscillator tracks 455 kc above signal on all bands.

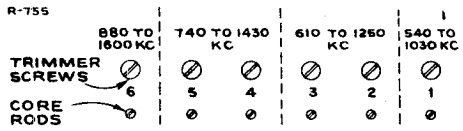


Top View Chassis

Critical Lead Dress

1. Push button, R.F. and oscillator leads should be separated as much as possible to reduce degeneration on push button reception.
2. R.F. choke in plate circuit of 6SG7 should be dressed towards the back apron.
3. Dress green push button lead under clamp and away from "C" band series capacitor.
4. Dress heater leads away from grids and diodes.
5. Dress phono. cables up and away from all wiring.
6. Dress all excess leads from transformer back towards transformer.
7. Keep output plate leads short and dressed close to chassis.
8. Dress green lead from 6SA7 screen to electrolytic down close to chassis.
9. Dress "C" band coil lead from oscillator coil to range switch down toward green lead.
10. Keep yellow loop lead clear of all wiring.
11. Dress ground bus of large electrolytic away from mounting lug.
12. Remove all excess slack from pilot light assembly and dress it close to chassis base away from volume control.
13. Dress oscillator grid capacitor (56 mmfd.) up and away from the screen and plate of 6SA7 socket.
14. A-C leads to "off-on" switch should be kept away from tone control cable to reduce hum.
15. Peaking coil should be dressed away from R-F grid resistor to reduce degeneration in R-F stage.
16. Dress oscillator push button lead in weld clamp on front apron away from 220 mmf. series condenser.
17. Keep all leads away from Phono.-FM jack to prevent audio oscillation and hum. Dress underneath the shield provided.

Push Button Adjustment



The push buttons connect to separate magnetite-core oscillator coils and separate loop circuit trimmers which must be adjusted for the desired stations. Use an insulated screwdriver or alignment tool such as RCA Stock No. 31031. Allow about five minutes warm-up period before making adjustments.

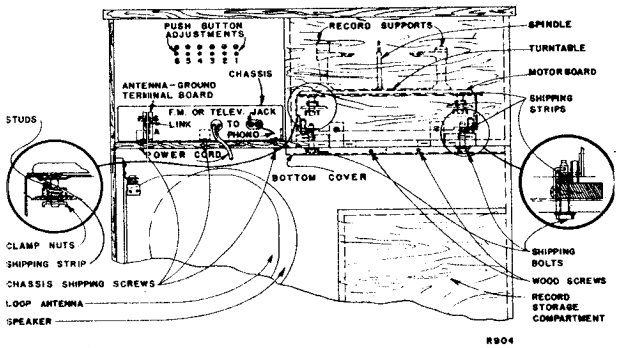
The procedure is as follows:

1. Make a list of the desired stations, arranged in order from low to high frequencies.
2. Turn the range switch to the broadcast position and manually tune in the first station on the list.
3. Turn range switch to push-button position and press in the left-hand button.
4. Adjust core rod No. 1 to receive the first station. To secure the best adjustment, rotate the loop for least pickup, and adjust core rod No. 1 for peak output.
5. Adjust trimmer screw No. 1 for peak output on the first station.
6. Proceed in the same manner to adjust for the remaining stations.
7. Repeat adjustments for best results.

On the 880 to 1,600 kc push-button, the higher frequency stations may be received with core rod No. 6 either in or out (oscillator frequency either 455 kc below or 455 kc above the station frequency). The adjustment with this core in its out position (oscillator frequency 455 kc above the station frequency) is the correct one.

NOTE: Clockwise adjustment of cores and trimmers tunes the circuits to lower frequencies.

SERVICE HINT:—If unable to reach 550-540 KC on No. 1 push button —Connect a Stock No. 33111 Capacitor-Ceramic-33 mmf across L19 (between switch contact which connects to high side of L19, and switch frame).



Back View

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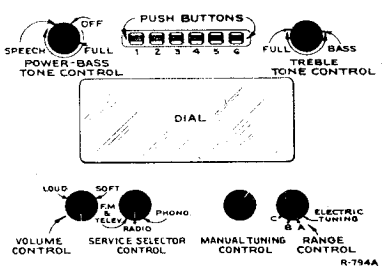
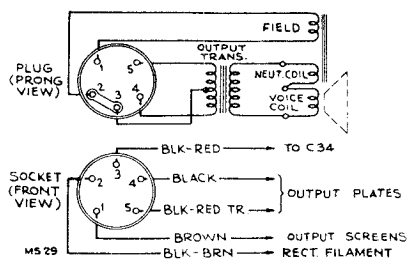
MODELS 59V1, 59AV1
Ch. RC-605

RCA MFG. CO.

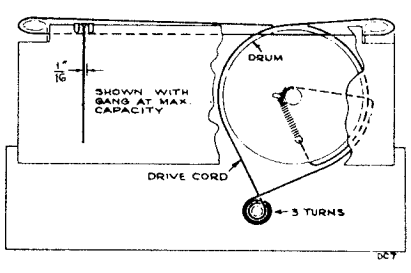
STOCK No.	DESCRIPTION
	CHASSIS ASSEMBLIES RC 605
36342	Board—"Antenna-Ground" board
60954	Capacitor—Ceramic, 56 mmf. (C16)
38852	Capacitor—Mica trimmer comprising two (2) sections of 8-80 mmf. (C2, C6)
38801	Capacitor—Mica trimmer comprising three (3) sections of 8-80 mmf. (C7, C8, C9)
39628	Capacitor—Mica, 100 mmf. (C17, C18, C33)
39630	Capacitor—Mica, 120 mmf. (C5, C13, C25, C28)
39634	Capacitor—Mica, 180 mmf. (C27)
38830	Capacitor—Silver mica, 226 mmf. (C11)
38638	Capacitor—Mica trimmer, 50-350 mmf. (C4)
39646	Capacitor—Mica, 560 mmf. (C39)
38831	Capacitor—Mica, 630 mmf. (C15)
39660	Capacitor—Mica, 2200 mmf. (C14)
71394	Capacitor—Paper, .0015 mfd., 600 volts (C21A)
70623	Capacitor—Paper, .0025 mfd., 600 volts (C30, C29A)
70646	Capacitor—Paper, .0035 mfd. (C41, C42)
70606	Capacitor—Paper, .005 mfd., 400 volts (C21, C38)
70627	Capacitor—Paper, .005 mfd., 600 volts (C23, C29)
70610	Capacitor—Paper, .01 mfd., 400 volts (C50)
70631	Capacitor—Paper, .01 mfd., 600 volts (C10, C35, C40, C25A, C27A)
70611	Capacitor—Paper, .02 mfd., 400 volts (C31)
70615	Capacitor—Paper, .05 mfd., 400 volts (C20)
70617	Capacitor—Paper, 0.1 mfd., 400 volts (C22, C6A)
70618	Capacitor—Paper, 0.25 mfd., 200 volts (C26, C32)
34889	Capacitor—Electrolytic, comprising two (2) sections of 15 mfd., 450 volts (C24, C43)
34533	Capacitor—Electrolytic, comprising one (1) section of 20 mfd., 450 volts; one (1) section of 15 mfd., 350 volts; and one (1) section of 40 mfd., 25 volts (C34, C36, C37)
38367	Coil—Antenna coil, "B" and "C" band (L3, L4, L5)
38358	Coil—Oscillator coil (L6, L7, L8)
38800	Condenser—Variable tuning condenser (C1, C12)
36447	Control—Volume control (R19)
32634	Cord—Drive cord
12006	Core—Adjustable core and stud for first and second I.F. transformers
35788	Core—Adjustable core and stud for oscillator coil
38359	Cup—Mounting cup for oscillator coil
38790	Drum—Drive drum
35870	Indicator—Station selector indicator
28452	Plate—Bakelite mounting plate for capacitor #34533
36333	Plate—Dial back plate complete with pulleys less dial
30868	Plug—Two (2) contact female plug for motor cable
31572	Plug—Three (3) contact female plug for power cable
12493	Plug—Five (5) contact female plug speaker cable
38832	Plug—Pin plug for loop lead
32641	Plug—Three (3) prong male plug for selector cable
39153	Plug—Four (4) prong male plug for tone control cable
32289	Pulley—Drive cord pulley
34766	Resistor—1000 ohms, ½ watt (R3, R10A)
30654	Resistor—1500 ohms, ½ watt (R2)
38808	Resistor—Voltage divider comprising one (1) section of 3000 ohms, 9 watt; one (1) section of 2500 ohms, 4.2 watt; one (1) section of 10 ohms, 0.2 watt; one (1) section of 25 ohms, 0.5 watt; and one (1) section of 145 ohms, 3 watt (R26, R27, R28, R31, R32)
35876	Resistor—Resistor and coil assembly, 10,000 ohms (R1, L13)
36714	Resistor—15,000 ohms, ½ watt (R12, R18)
30492	Resistor—22,000 ohms, ½ watt (R7)
30409	Resistor—27,000 ohms, ½ watt (R18A)
30147	Resistor—39,000 ohms, ½ watt (R21, R3A)
30787	Resistor—47,000 ohms, ½ watt (R4)
30650	Resistor—56,000 ohms, ½ watt (R5, R11)
14138	Resistor—68,000 ohms, ½ watt (R9)
3252	Resistor—100,000 ohms, ½ watt (R8)
30651	Resistor—270,000 ohms, ½ watt (R13, R14, R15, R20)
11988	Resistor—390,000 ohms, ½ watt (R24, R25)
30653	Resistor—560,000 ohms, ½ watt (R30)
30652	Resistor—1 megohm, ½ watt (R17, R29)
30649	Resistor—2.2 megohm, ½ watt (R6, R10, R23)
38803	Shaft—Tuning knob shaft
31364	Socket—Lamp socket
33514	Socket—Phone input socket
31251	Socket—Tube socket
31418	Spring—Drive cord tension spring
12007	Spring—Retaining spring for first I.F. and second I.F. transformers' core and stud and for oscillator's core, coil, and stud
38809	Switch—Radio-phono switch (S5, S6)
38807	Switch—Range switch (S1, S2, S3, S4)
35636	Transformer—First I.F. transformer (L9, L10, C17, C18)
35790	Transformer—Second I.F. transformer (L11, L12, C25, C28)
34539	Transformer—Power transformer 105-115 volts 50-60 cycles (T1)
33726	Washer—"C" washer for tuning knob shaft
	SPEAKER ASSEMBLIES 92513-1K
70574	Cone—Cone and voice coil assembly
31539	Plug—Five (5) prong male plug for speaker
70548	Speaker—12" EM speaker complete with cone and voice coil less output transformer and plugs
37899	Transformer—Output transformer (T2)
	NOTE: If stamping on speaker in instrument does not agree with above speaker number, order replacement parts by referring to model number of instrument, number stamped on speaker and full description of part required.
	MISCELLANEOUS ASSEMBLIES
36327	Bezel—Dial bezel less dial scale
38376	Bezel—P.B. bezel less push buttons
36639	Bracket—Pilot lamp bracket
38375	Button—Push button
70556	Bumper—Rubber bumper for record changer tray (2 req'd)
38684	Capacitor—Trimmer, 2-20 mmf. (C3)
36424	Capacitor—Mica trimmer, comprising one (1) section of 10-160 mmf.; two (2) sections of 25-250 mmf.; two (2) sections of 50-400 mmf.; and one (1) section of 100-540 mmf. (C44, C45, C46, C47, C48, C49)
36462	Clamp—Dial clamp
31382	Clip—Mounting clip for P.B. coils
38579	Coil—Loop primary coil (L2)
38315	Coil—P.B. oscillator coil—high frequency (L14, L15, L16)
37638	Coil—P.B. oscillator coil—low frequency (L17, L18, L19)
38405	Control—H.F. tone control (R16)
38402	Control—L.F. tone control and power switch (R22, S-8)
35871	Core—Adjustable core and stud for P.B. oscillator coils
70550	Cushion—Shock absorbing cushion
39015	Decal—Control panel decal
37147	Decal—H.F. tone control decal
37148	Decal—L.F. tone control decal
35392	Decal—Trade mark decal (RCA Victor)
70575	Decal—Trade mark decal (Dog)
39014	Dial—Glass dial scale
X1607	Grille—Grille cloth for Mahogany cabinet
70996	Grille—Metal grille
X1608	Grille—Grille cloth for Walnut cabinet
39368	Guide—Carriage guide—L.H.
39367	Guide—Carriage guide—R.H.
39352	Hinge—Cabinet door hinge
13103	Jewel—Pilot lamp cap
70995	Knob—Record storage compartment door knob
35814	Knob—Tone control, radio-phono switch, range switch, tuning knob, or volume control
11765	Lamp—Dial lamp
70544	Loop—Antenna loop (L1, L2, C3)
34317	Marker—Station marker
70546	Mounting—One set of hardware to mount record changer consisting of four (4) upper and four (4) lower springs and four (4) clamp nuts
30868	Plug—Two (2) contact female plug for motor cable extension
30870	Plug—Two (2) prong male plug for motor cable extension
36422	Plug—Three (3) contact female plug for selector cable and loop leads
31572	Plug—Three (3) contact female plug for power switch cable
38853	Plug—Four (4) contact female plug for tone control cable
70994	Pull—Record changer compartment door pull
70551	Retainer—Tray roller retaining strip—L.H.
70552	Retainer—Tray roller retaining strip—R.H.
70554	Roller—Record changer tray roller
30900	Spring—Retaining spring for control knob
34053	Spring—Retaining spring for push button
70549	Stop—Mechanism tray stop
38575	Switch—Selector switch (S14, S15, S16, S17, S18, S19, S44, S45, S46, S47, S48, S49)
39360	Support—Door support for record changer compartment
70545	Support—Loop support complete with mounting brackets and spring
70555	Tire—Rubber tire for tray roller
70553	Tray—Record changer carrying tray less rollers
2917	Washer—Spring washer to hold roller



Front Panel Controls



Speaker Connections



Dial Cord Drive

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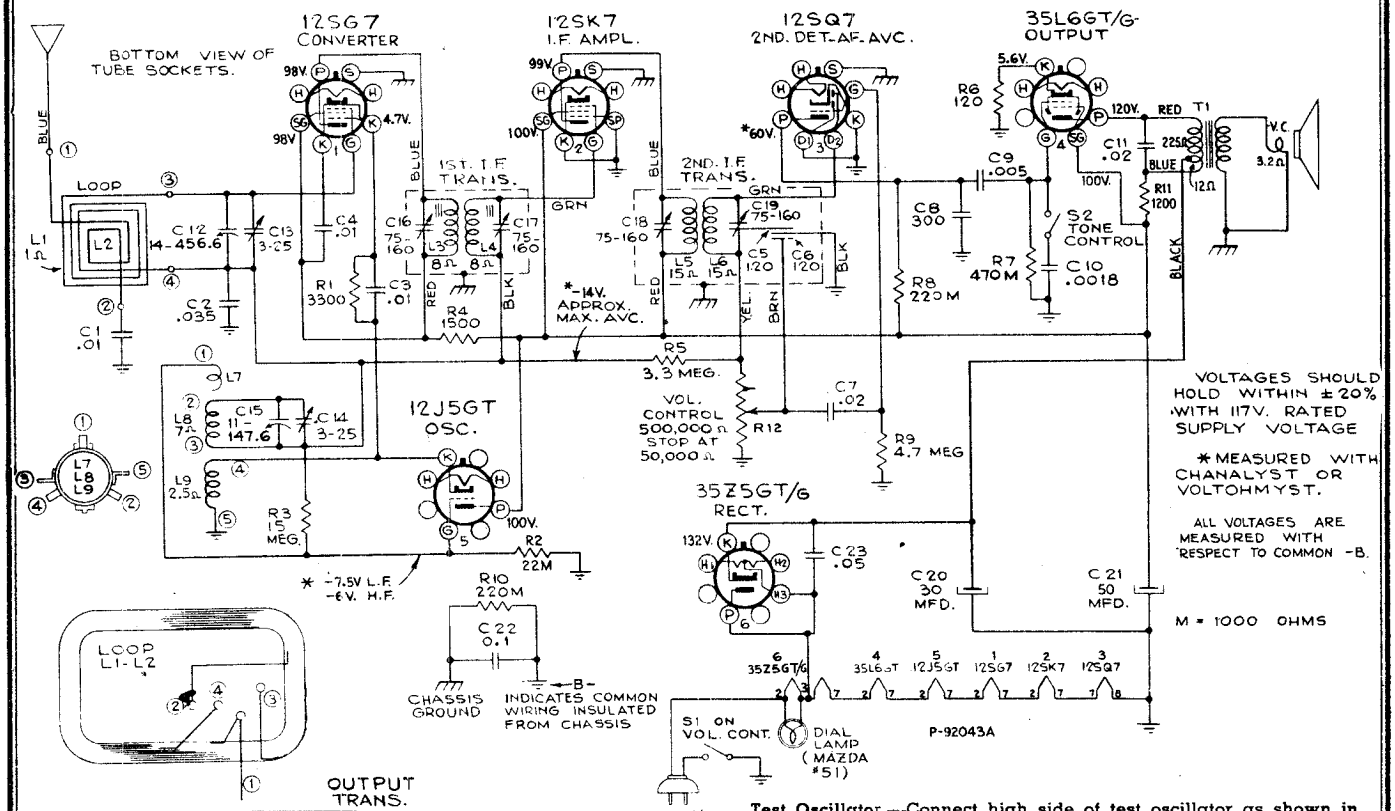
MODELS 61-1,61-2,61-3
Ch.RC-1011

RCA MFG. CO.



Critical Lead Dress

1. Dress output plate bypass capacitor (C-11 .02 mfd.) against chassis.
2. Dress 35L6GT/G plate lead (red) against chassis and away from volume control, leads and terminals.
3. Dress audio coupling capacitor (C-7 .02 mfd.) away from 35L6GT/G heater leads.
4. Dress tone control lead against front apron.
5. Dress 2nd I-F yellow and brown leads away from output plate bypass capacitor (C-11, .02 mfd.) and away from all heater leads.
6. Dress lead to speaker voice coil away from tuning shaft "C" washer.
7. Dress tone control capacitor (C-10, .0018 mfd.) away from oscillator coil.
8. Dress all uninsulated leads away from each other and away from chassis to prevent short circuits.
9. Dress blue and green leads of both IF transformers back in shields leaving exposed lengths as short as possible.

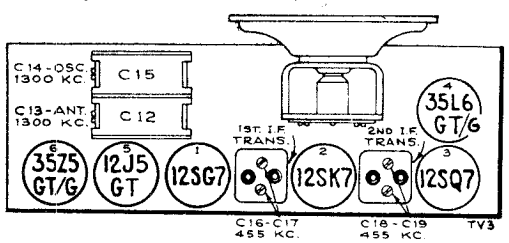
Test Oscillator.—Connect high side of test oscillator as shown in chart. Connect low side through a .01 mfd. capacitor to common "-B." Keep the oscillator output signal as low as possible to avoid AVC action.

Output Meter.—Connect leads across speaker voice coil. Turn volume control to maximum clockwise, tone control to maximum highs (clockwise).

Dial Pointer Adjustment.—Rotate tuning condenser fully counter-clockwise (plates closed). Adjust indicator pointer to left (max. cap.) mark on dial backing plate.

Steps	Connect the high side of test-oscillator to—	Tune test-osc. to—	Turn radio dial to—	Adjust the following for max. peak output
1	Stator of C-12 in series with .01 mfd.	455 kc	Quiet-point 1,600 kc end of dial	C18 and C19 2nd I-F transformer
2				* C16 and C17 1st I-F transformer
3	Ant. lead in series with 200 mmfd.	1,300 kc	1,300 kc	C14 (osc.) C13 (ant.)
4	Repeat step 3.			

* Do not readjust C18 or C19.



Frequency Range ..... 540-1600 kc
Intermediate Frequency ..... 455 kc
Power Output
Undistorted ..... 1.0 watt
Maximum ..... 1.5 watts

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MODELS 61-1,61-2.61-3
MODEL QU61

RCA MFG. CO.

Models 61-1, 61-2, 61-3

STOCK No.	DESCRIPTION
	CHASSIS ASSEMBLIES
	RC 1011
39640	Capacitor—Mica, 330 mmf. (C-8)
70712	Capacitor—Tubular, .0018 mfd., 800 volts (C-10)
70627	Capacitor—Tubular, .005 mfd. (C-9)
70652	Capacitor—Tubular, .01 mfd., 800 volts (C-1, C-3, C-4)
70711	Capacitor—Tubular, .02 mfd., 700 volts (C-7, C-11)
70635	Capacitor—Tubular, .035 mfd., 500 volts (C-2)
70615	Capacitor—Tubular, .05 mfd., 400 volts (C-23)
70617	Capacitor—Tubular, 0.1 mfd., 400 volts (C-22)
39152	Capacitor—Electrolytic, comprising 1 section of 30 mfd., 150 volts, and 1 section of 50 mfd., 150 volts (C-20, C-21)
39824	Coil—Oscillator coil (L-7, L-8, L-9)
36226	Condenser—Variable tuning condenser (C-12, C-13, C-14, C-15)
36242	Control—Volume control and power switch (R-12, S-1)
32634	Cord—Drive cord (approx. 49" long)
70392	Cord—Power cord
36237	Drum—Drive drum
36236	Indicator—Station selector indicator for 61-1 and 61-2
37068	Indicator—Station selector indicator for 61-3
11765	Lamp—Dial lamp
39821	Loop—Antenna loop (L-1, L-2)
36229	Plate—Dial back plate complete with pulleys less dial
36230	Pulley—Drive cord pulley
30189	Resistor—120 ohms, ¼ watt (R-6)
6134	Resistor—1200 ohms, 1 watt (R-11)
30654	Resistor—1500 ohms, ¼ watt (R-4)
30733	Resistor—3300 ohms, ¼ watt (R-1)
30492	Resistor—22,000 ohms, ¼ watt (R-2)
14583	Resistor—220,000 ohms, ¼ watt (R-8, R-10)
30648	Resistor—470,000 ohms, ¼ watt (R-7)
12928	Resistor—3.3 megohms, ¼ watt (R-5)
30931	Resistor—4.7 megohms, ¼ watt (R-9)
38785	Resistor—15 megohms, ¼ watt (R-3)
36897	Shaft—Tuning knob shaft

STOCK No.	DESCRIPTION
34449	Socket—Lamp socket
37605	Socket—Tube socket, moulded
31418	Spring—Drive cord tension spring
36228	Switch—Tone switch (S-2)
70411	Transformer—First I.F. transformer (L-3, L-4, C-16, C-17)
70412	Transformer—Second I.F. transformer (L-5, L-6, C-5, C-6, C-18, C-19)
36800	Transformer—Output transformer (T-1)
33726	Washer—"C" washer for tuning knob shaft
	SPEAKER ASSEMBLY
	92510-1
70413	Speaker—5-inch PM speaker, complete
•	NOTE: If stamping on speaker in instrument does not agree with above speaker number, order replacement parts by referring to model number of instrument, number stamped on speaker and full description of part required.
	MISCELLANEOUS ASSEMBLIES
39953	Back—Cabinet back for Radiola 61-1
70409	Back—Cabinet back for Radiola 61-2
70415	Back—Cabinet back for Radiola 61-3
36890	Clamp—Dial clamp, left hand, for Radiola 61-1 and 61-2
36891	Clamp—Dial clamp, right hand, for Radiola 61-1 and 61-2
X1602	Cloth—Grille cloth for Radiola 61-3
71017	Decal—Control panel decal for Radiola 61-3
70704	Dial—Glass dial scale for Radiola 61-1 and 61-2
70705	Dial—Glass dial scale for Radiola 61-3
37831	Fastener—Push fastener (1 set) for cabinet backs on Radiola 61-1 and 61-2
33006	Feet—Rubber feet for cabinet (4 required)
71016	Knob—Control knob (walnut) for Radiola 61-1
70414	Knob—Control knob (ivory) for Radiola 61-2
36722	Knob—Control knob (walnut) for Radiola 61-3
30900	Spring—Retaining spring for knob

Power Supply Rating
105-125 volts, AC, 50 or 60 cycles, or DC ..... 30 watts

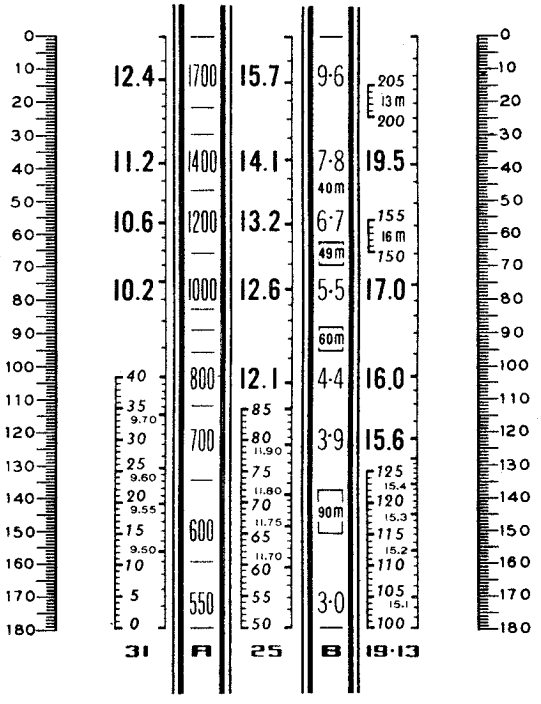
Pilot Lamp ..... Mazda No. 51, 6-8 volts, 0.2 amp.

Tuning Drive Ratio 20:1

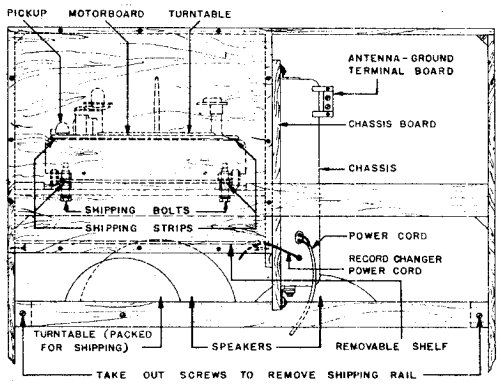
Loudspeaker (92510-1)

Type ..... 5-inch PM
V. C. Impedance ..... 3.4 ohms at 400 cycles

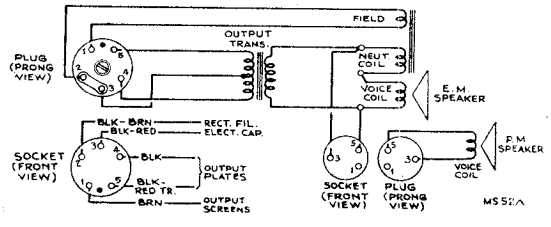
Model QU61



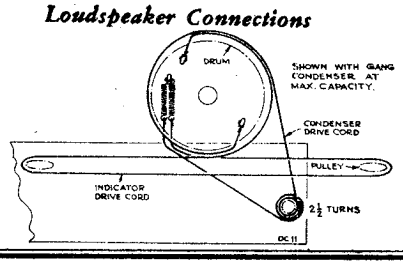
Receiver Dial with Calibration Scale



Cabinet Rear View



Loudspeaker Connections



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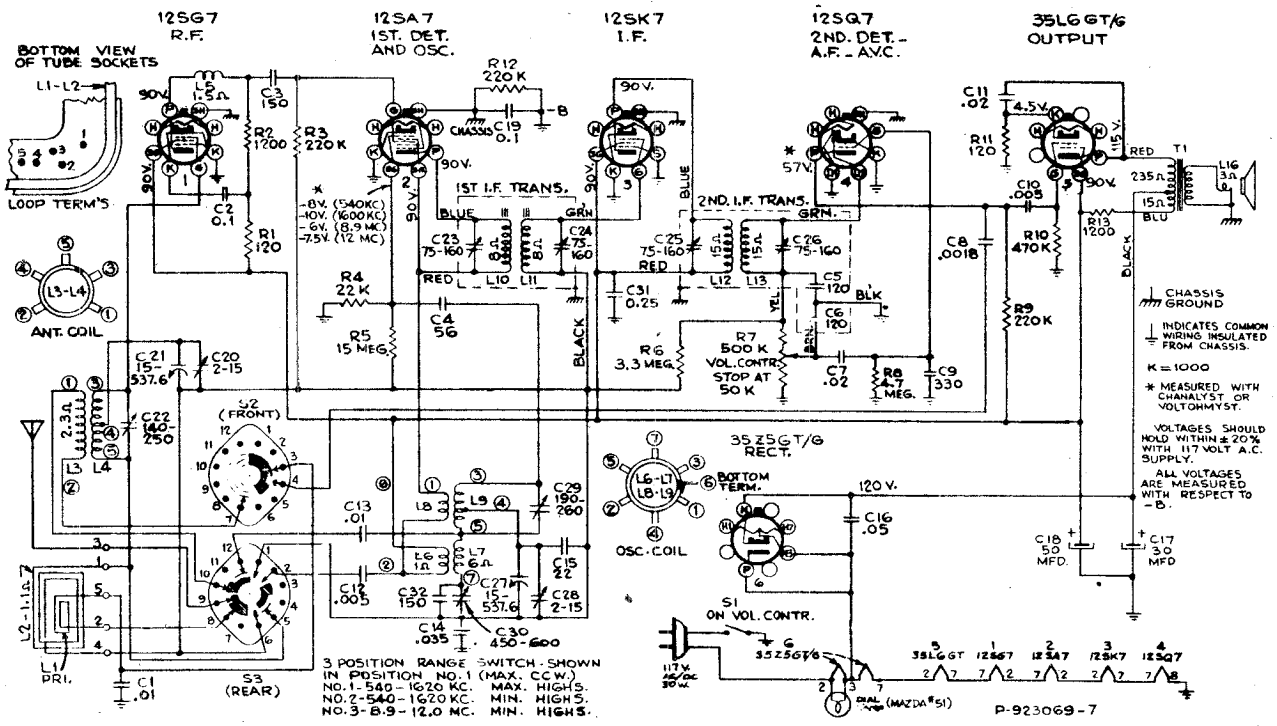
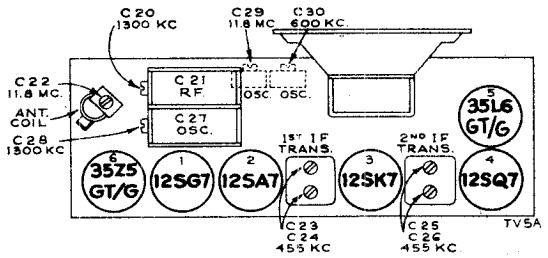
MODELS 61-5, Ch. RC-1023,
61-10, Ch. 1023B

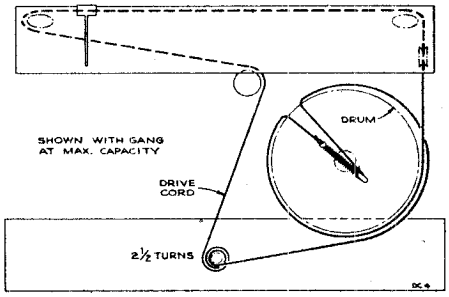

12SG7 R.F.
12SA7 1ST. DET. AND OSC.
12SK7 I.F.
12SQ7 2ND. DET.-A.F.-A.V.C.
35L6GT/G OUTPUT
BOTTOM VIEW OF TUBE SOCKETS
LOOP TERM'S
ANT. COIL
1ST I.F. TRANS.
2ND. I.F. TRANS.
OSC. COIL
35Z5GT/G RECT.
CHASSIS GROUND
INDICATES COMMON WIRING INSULATED FROM CHASSIS.
K = 1000
* MEASURED WITH CHANALYST OR VOLTOHMYST.
VOLTAGES SHOULD HOLD WITHIN ± 20% WITH 117 VOLT A.C. SUPPLY.
ALL VOLTAGES ARE MEASURED WITH RESPECT TO -B.
3 POSITION RANGE SWITCH - SHOWN IN POSITION NO. 1 (MAX. CCW.)
NO. 1 - 540 - 1620 KC. MAX. HIGHS.
NO. 2 - 540 - 1620 KC. MIN. HIGHS.
NO. 3 - 8.9 - 12.0 MC. MIN. HIGHS.
P-923069-7

Note: On some sets C31 may be 0.1 mfd. or 0.2 mfd.



Dial Pointer Adjustment.—Rotate tuning condenser fully counter-clockwise (plates fully meshed). Adjust indicator pointer to left (max. cap.) mark on dial backing plate.

Calibration Scale.—The glass tuning dial may be removed from the cabinet and temporarily attached to the dial backing plate.



Critical Lead Dress

1. Dress blue and green leads of both I-F transformers back in shield cans, leaving them as short as possible.
2. Dress R-F plate filter capacitor (C2, 0.1 mfd.) back against rear chassis apron.
3. Dress yellow and brown leads from 2nd I-F away from all other leads.
4. Dress all heater leads next to chassis.
5. Dress capacitor (C13, .01 mfd.) parallel to osc. coil and approximately 3/16 inch from coil.
6. Dress tone control lead and speaker field leads next to chassis and front apron.
7. Dress pilot lamp leads away from ant. coil.
8. Dress leads from loop to ant. coil around rectifier tube towards end of chassis.
9. Dress output plate lead against chassis.

Test Oscillator.—Connect high side of test oscillator as shown in chart. Connect low side through a .01 mfd. capacitor to common "-B." Keep the oscillator output signal as low as possible to avoid A.V.C. action.

Output Meter.—Connect meter across speaker voice coil. Turn volume control to maximum clockwise position, station selector switch to broadcast maximum high position (pos. 1), for broadcast alignment and to position 3 for high frequency band.

Steps	Connect high side of the test oscillator to—	Tune test osc. to—	Turn radio dial to—	Adjust the following for maximum peak output
1	Pin #8 of 12SA7 in series with 0.1 mfd.	455 kc	Quiet Point at 1,600 kc end of dial	C25, C26 2nd I-F trans.
2				*C23, C24 1st I-F trans.
3	Ant. terminal in series with 220 mmf	600 kc	600 kc "A" Band	C30 (osc.) Rock gang
4		1300 kc	1300 kc "A" Band	C28 (osc.) C20 R-F)
5		Repeat 3 Rocking gang		
6		Repeat 3, 4 and 5 for exact cal.		
7	Ant. terminal in series with 0.1 mfd.	11.8 mc	11.8 mc	C29 (osc.)† Rock gang
8	Ant. terminal in series with 47 mmf.	11.8 mc	11.8 mc	C22 (R-F) Rock gang
9	Repeat steps 7 and 8			

† Use minimum capacity peak if two can be obtained. Check for selection of correct peak by tuning receiver to approximately 10.9 mc where a weaker signal should be received.

* Do not readjust C25 or C26.

Frequency Range

Broadcast ..... 540-1600 kc
Short Wave ..... 8.9-12 mc
Intermediate Frequency ..... 455 kc

Power Output

Undistorted ..... 1.0 watts
Maximum ..... 1.5 watts

Loudspeaker (92510-1) "PM"

Size 5-inch
V.C.Impedance ..... 3.4 ohms at 400 cycles

Power Supply Rating

105-125 volts, AC, 50 or 60 cycles, or DC ..... 30 watts

For Clarified schematics, see P.15

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MODELS 61-5,61-10
MODELS 61-6,61-7

RCA MFG. CO.

MODELS 61-6,61-7

STOCK No.	DESCRIPTION
	CHASSIS ASSEMBLIES RC-594D
71387	Capacitor—Adjustable, 1.6-18 mmf. (C37)
70367	Capacitor—Mica trimmer, 2-10 mmf. (C7)
39622	Capacitor—Mica, 56 mmf. (C4)
39636	Capacitor—Mica, 220 mmf. (C1A, C17)
71392	Capacitor—Mica, 450 mmf. (C5B)
70627	Capacitor—Tubular, .005 mfd., 600 volts (C1, C16, C18)
70612	Capacitor—Tubular, .025 mfd., 400 volts (C10, C20)
70615	Capacitor—Tubular, .05 mfd., 400 volts (C23)
70617	Capacitor—Tubular, 0.1 mfd., 400 volts (C11)
39152	Capacitor—Electrolytic, comprising 1 section of 50 mfd., 150 volts and 1 section of 30 mfd., 150 volts (C30, C30A)
71396	Coil—Antenna coil (L1, L2)
37962	Coil—Antenna loop coupling coil (L3, L5, R20)
70359	Coil—Oscillator coil (L6, L7)
70366	Condenser—Variable tuning condenser (C2, C3, C5, C6)
38406	Control—Volume control and power switch (R4, S2)
32634	Cord—Drive cord (approx. 37 inches long)
70392	Cord—Power cord
70365	Core—Adjustable core and stud for oscillator coil
16058	Grommet—Rubber grommet for mounting speaker—3 required
37068	Indicator—Station selector indicator
71397	Loop—Antenna loop (L4)
70364	Nut—Speed nut to mount oscillator coil
70368	Plate—Dial back plate complete with pulleys less dial
36230	Pulley—Drive cord pulley
30880	Resistor—150 ohms, ½ watt (R7)
30152	Resistor—1,000 ohms, 1 watt (R9)
30685	Resistor—33,000 ohms, ¼ watt (R1A)
30787	Resistor—47,000 ohms, ¼ watt (R3)
14583	Resistor—220,000 ohms, ¼ watt (R19)
30648	Resistor—470,000 ohms, ¼ watt (R8)
30649	Resistor—2.2 megohms, ¼ watt (R1)
12928	Resistor—3.3 megohms, ¼ watt (R2)
30992	Resistor—10 megohms, ¼ watt (R6)
70369	Shaft—Tuning knob shaft
37605	Socket—Tube socket, moulded
31418	Spring—Tension spring for drive cord
71384	Switch—Range switch (S1)
70361	Transformer—First I-F transformer (L8, L9, C8, C9)
70362	Transformer—Second I-F transformer (L10, L11, C12, C13, C14, C15)
71398	Transformer—Output transformer (T1)
33726	Washer—Retaining washer for tuning shaft
	SPEAKER ASSEMBLY 92510-2
70372	Speaker—5-inch PM speaker complete NOTE: If stamping on speaker in instrument does not agree with above speaker number, order replacement parts by referring to model number of instrument, number stamped on speaker and full description of part required.
	MISCELLANEOUS ASSEMBLIES
37362	Clamp—Dial clamp (1 set)
71324	Decal—Trade mark decalcomania
71389	Dial—Dial scale
37831	Fastener—Push fastener for back cover (1 set)
35121	Knob—Range switch knob for Radiola 61-6
35123	Knob—Range switch knob for Radiola 61-7
36722	Knob—Volume control or tuning knob for Radiola 61-6
70414	Knob—Tuning or volume control knob for Radiola 61-7
35126	Spring—Retaining spring for range switch knob
30900	Spring—Retaining spring for volume control or tuning knob

PRECAUTIONARY LEAD DRESS

1. Dress output plate capacitor and output transformer leads down next to chassis.
2. Dress 12SQ7 grid resistor down next to chassis, and away from power ground wire to switch.
3. Dress lead from 2nd I-F transformer to volume control down to chassis and away from adjacent parts.
4. Keep grid end of R1 as short as possible.
5. Keep body of C1A slightly away from chassis.

POWER SUPPLY POLARITY.—For operation on d-c, the power plug must be inserted in the outlet for correct polarity. If the set does not function, reverse the plug. On a-c, reversal of the plug may reduce hum.

Tuning Drive Ratio ..... **18 to 1**

Power Supply Rating

105-125 volts ..... D.C. or 50-60 cycles A.C. ..... **30 watts**

Power Output Rating

Undistorted ..... **1 watt**
Maximum ..... **1.5 watts**

Loudspeaker (92510-2)

Type ..... 5-inch Round Permanent-Magnet Dynamic
Voice Coil Impedance ..... **4 ohms at 400 cycles**

Frequency Ranges

Standard Broadcast ("A" Band) ..... 540-1,680 kc (555-178 m)
Short Wave ("C" Band) ..... 4.7-18.2 mc (63.8-16.5 m)

Intermediate Frequency ..... **455 kc**

MODELS 61-5,61-10

STOCK No.	DESCRIPTION
	CHASSIS ASSEMBLIES RC-1023 and RC-1023B
39612	Capacitor—Mica, 22 mmf. (C15)
39622	Capacitor—Mica, 56 mmf. (C4)
39632	Capacitor—Mica, 150 mmf. (C3, C32)
70417	Capacitor—Mica trimmer, 140-250 mmf., mounted on antenna coil (C22)
39839	Capacitor—Adjustable mica, comprising 1 section of 190-260 mmf. and 1 section of 450-600 mmf. (C29, C30)
39640	Capacitor—Mica, 330 mmf. (C9)
70712	Capacitor—Tubular, .0018 mfd., 600 volts (C8)
70627	Capacitor—Tubular, .005 mfd., 800 volts (C10, C12)
70652	Capacitor—Tubular, .01 mfd., 1000 volts (C1, C13)
70711	Capacitor—Tubular, .02 mfd., 700 volts (C7, C11)
70635	Capacitor—Tubular, .035 mfd., 600 volts (C14)
70615	Capacitor—Tubular, .05 mfd., 400 volts (C16)
70617	Capacitor—Tubular, 0.1 mfd., 400 volts (C2, C19)
70618	Capacitor—Tubular, 0.25 mfd., 400 volts (C31)
39152	Capacitor—Electrolytic, comprising 1 section of 30 mfd., 150 volts, and 1 section of 50 mfd., 150 volts (C17, C18)
70416	Coil—Antenna coil (L3, L4, C22)
39892	Coil—Oscillator coil (L6, L7, L8, L9)
70418	Coil—Peaking coil (L5)
70700	Condenser—Variable tuning condenser (C20, C21, C27, C28)
36242	Control—Volume control and power switch (R7, S1)
32634	Cord—Drive cord (approx. 49 inches overall length)
70392	Cord—Power cord
36237	Drum—Drive drum
37068	Indicator—Station selector indicator
11765	Lamp—Dial lamp (Mazda 51)
70980	Lead—Antenna lead
39841	Loop—Antenna loop (L1, L2)
36229	Plate—Dial back plate complete with drive cord pulleys less dial
36230	Pulley—Drive cord pulley
30189	Resistor—120 ohms, ¼ watt (R1, R11)
30731	Resistor—1200 ohms, ¼ watt (R2)
6134	Resistor—1200 ohms, 1 watt (R13)
30492	Resistor—22,000 ohms, ¼ watt (R4)
14583	Resistor—220,000 ohms, ¼ watt (R3, R9, R12)
30648	Resistor—470,000 ohms, ¼ watt (R10)
12928	Resistor—3.3 megohms, ¼ watt (R6)
30931	Resistor—4.7 megohms, ¼ watt (R8)
38785	Resistor—15 megohms, ¼ watt (R5)
36897	Shaft—Tuning knob shaft
34449	Socket—Lamp socket
37605	Socket—Tube socket, moulded
31251	Socket—Tube socket, wafer
31418	Spring—Drive cord tension spring
39837	Switch—Range switch (S2, S3)
36800	Transformer—Output transformer (T1)
70411	Transformer—First I-F transformer (L10, L11, C23, C24)
70412	Transformer—Second I-F transformer (L12, L13, C5, C6, C25, C26)
33726	Washer—"C" washer for tuning knob shaft
	SPEAKER ASSEMBLY 92510-1
70413	Speaker—5-inch P.M. speaker complete with cone and voice coil NOTE: If stamping on speaker in instrument does not agree with above speaker number, order replacement parts by referring to model number of instrument, number stamped on speaker and full description of part required.
	MISCELLANEOUS ASSEMBLIES RC-1023 (61-5)
39777	Back—Cabinet back
X1603	Cloth—Grille cloth
70706	Dial—Glass dial scale
33006	Feet—Rubber feet for cabinet (4 required)
36886	Knob—Range switch knob
36722	Knob—Tuning or volume control knob
30900	Spring—Retaining spring for knobs
	RC-1023B (61-10)
39953	Back—Cabinet back
36890	Clamp—Dial clamp—left hand
36891	Clamp—Dial clamp—right hand
71324	Dial—Glass dial scale
37831	Fastener—Push fastener (1 set) for cabinet back
71016	Knob—Control knob
30900	Spring—Retaining spring for knobs

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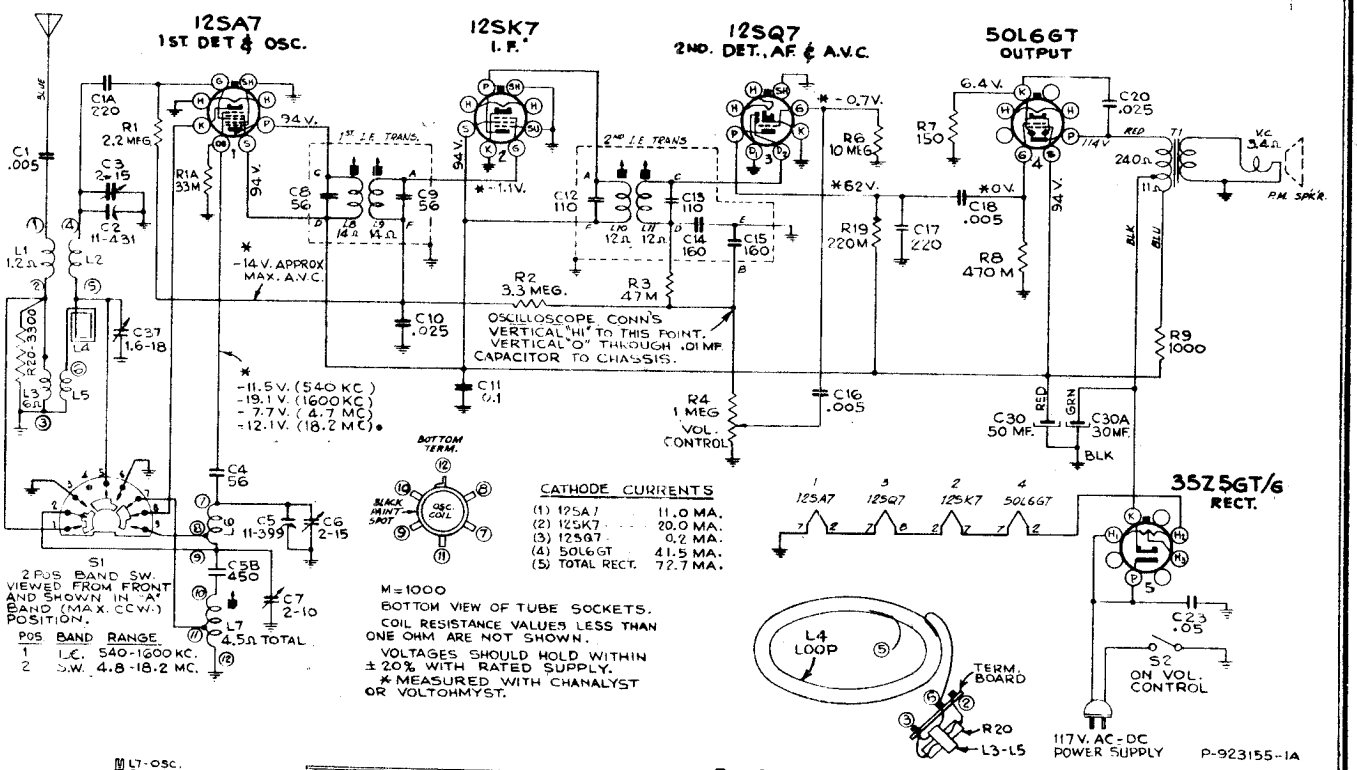
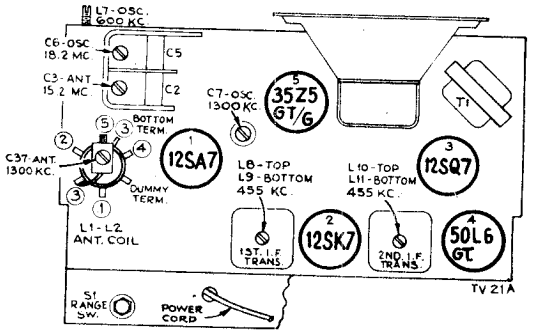
MODELS 61-6, 61-7
Ch. RC-594D

RCA MFG. CO.



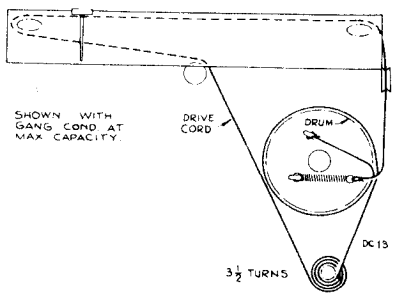


Cathode-Ray Alignment is the preferable method. Connections for the oscilloscope are shown in the schematic drawing.

Output Meter Alignment.—If this method is used, connect the meter across the voice coil, and turn the receiver volume control to maximum.

Calibration Scale.—The glass tuning dial may be removed from the cabinet and mounted above the pointer for easy reference during alignment. The extreme left hand mark of the Standard Broadcast scale must be in line with the left hand mark on the dial backing plate.

Dial Pointer.—With the gang condenser in full mesh the dial pointer should be set to the left hand mark of the Standard Broadcast scale.



Dial Indicator and Drive Mechanism

Test-Oscillator.—For all alignment operations, connect the low side of the test-oscillator through a .01 mfd. capacitor to the receiver chassis, and keep the oscillator output as low as possible to avoid a-v-c action.

Steps	Connect high side of test osc. to—	Tune test osc. to—	Turn radio dial to—	Adjust following for max. output—
1	12SK7 I-F grid through 0.1 mfd. capacitor	455 kc	B. C.; 1600 kc quiet point	L11-L10 (2nd I-F Trans.)
2	Stator of gang cond. C2 (rear) through 0.1 mfd.			L9-L8* (1st I-F Trans.)
3	Antenna lead through 300 ohm resistor	18.2 mc	S. W.; gang condenser open	C6 (osc.)**
4		15.2 mc	S. W.; maximum signal rock gang	C3 (ant.)***
5	Antenna lead through 200 mmf. capacitor	600 kc	B. C.; 600 kc	L7 (osc.)
6		1300 kc	B. C.; rock gang at 1300 kc	C37 (ant.) C7 (osc.)
7		600 kc	B. C.; rock gang at 600 kc	L7 (osc.)
8	Repeat steps 6 and 7			

* Do not readjust L10 or L11 when test oscillator is connected to C2.

** Use minimum capacity peak if two peaks can be obtained.

*** Image signal of lesser amplitude should occur at 14.3 mc.

NOTE.—Oscillator tracks above signals on both bands.

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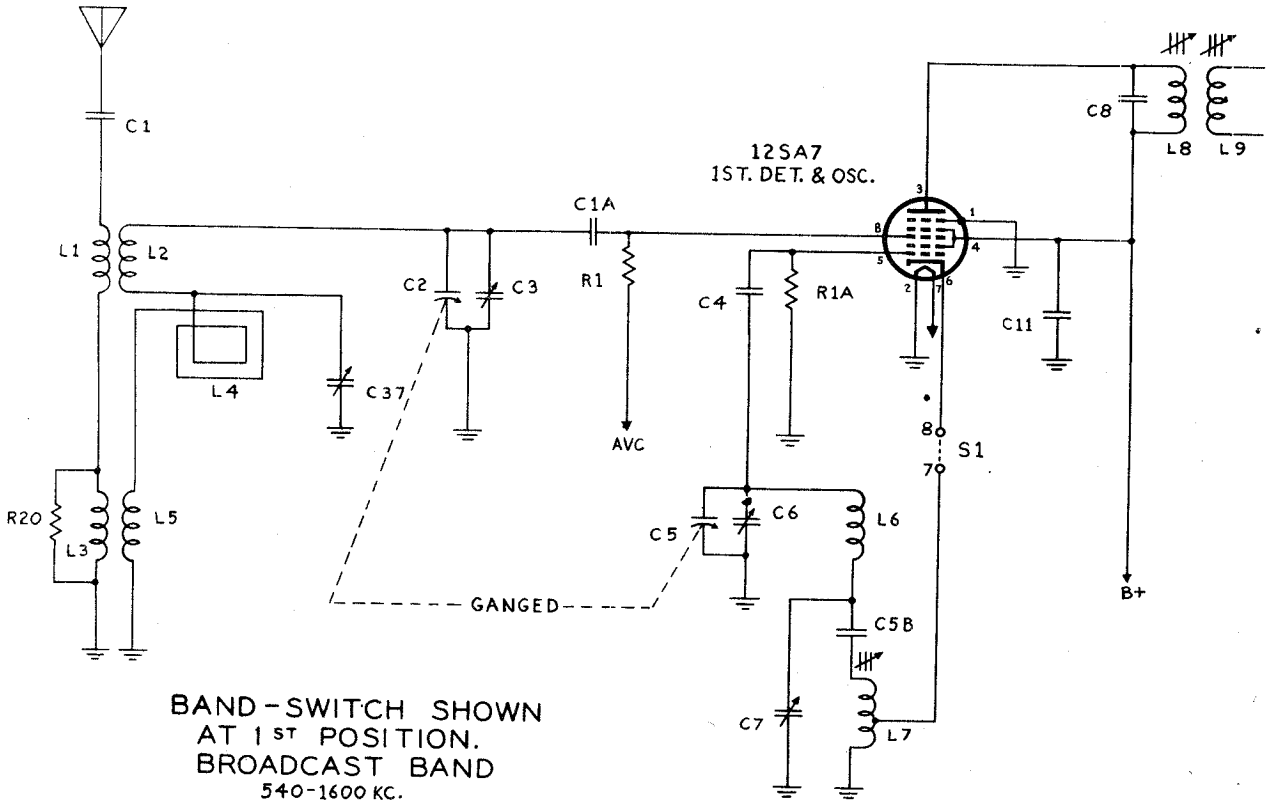
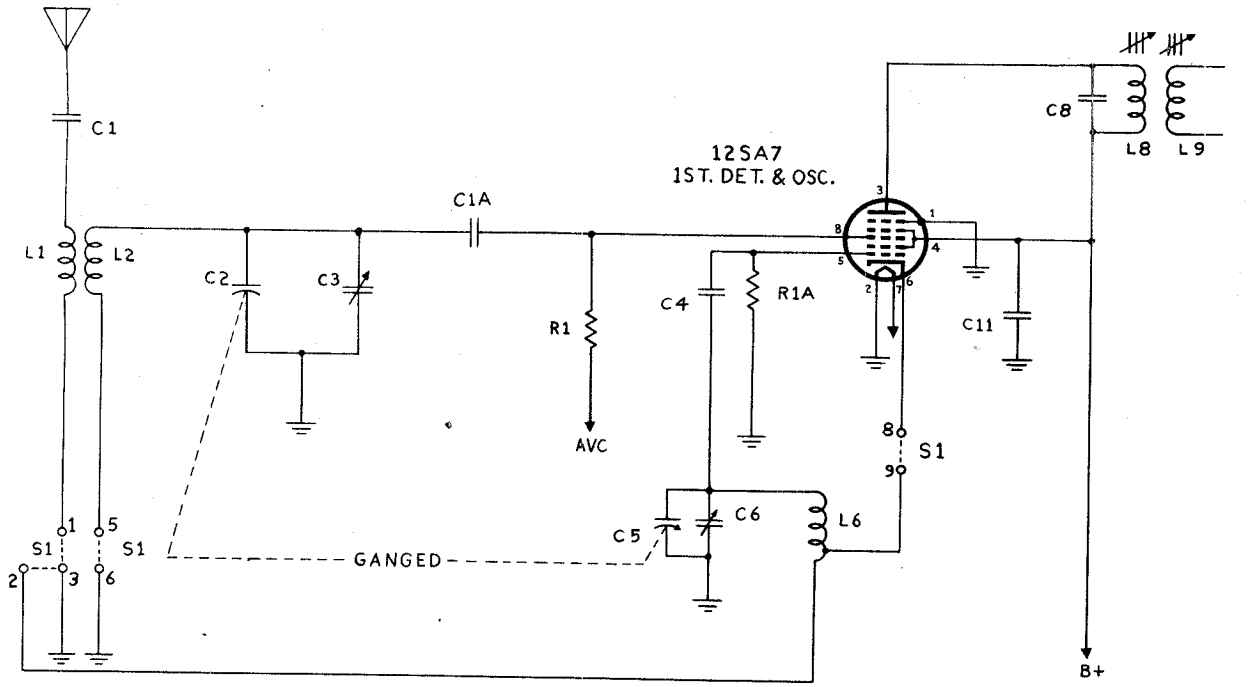
MODELS 61-6,61-7
Ch.RC-594D

RCA MFG. CO.



BAND-SWITCH SHOWN
AT 1ST POSITION.
BROADCAST BAND
540-1600 KC.



BAND-SWITCH SHOWN
AT 2ND POSITION CLOCKWISE.
SHORT WAVE BAND
4.8-18.2 MC.

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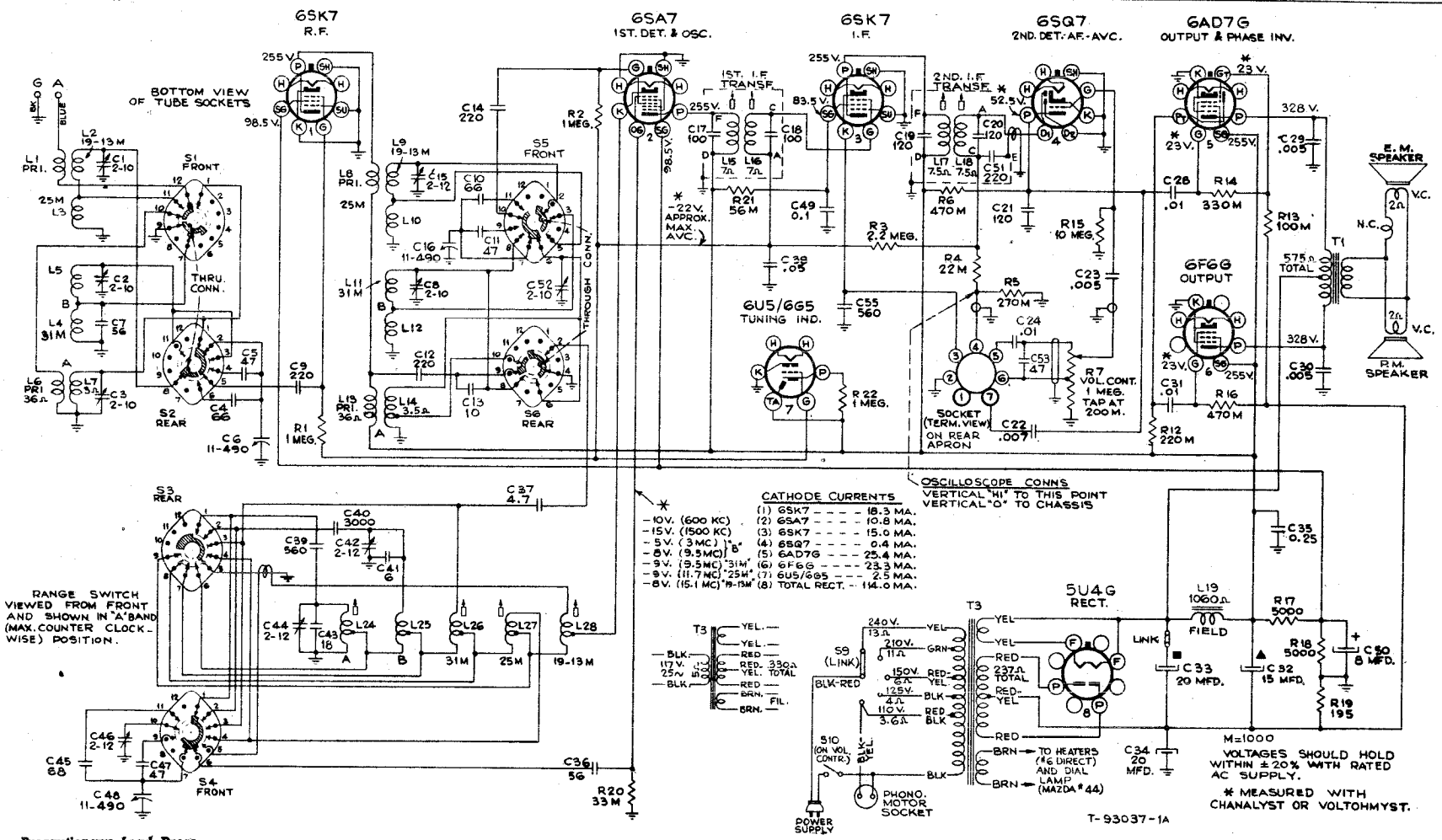


Precautionary Lead Dress.—

(1) Dress all spread band oscillator coil leads to clear each other by at least ¼ inch.

(2) Dress toothpick capacitors and range switch leads away from shield plates.

(3) Twist leads from A and E of 2nd I-F transformer and dress close to chassis.

(4) Dress leads to converter socket so that they do not impair flexible mounting.

(5) Dress oscillator grid capacitor C36 and 1st det. grid capacitor C14 apart.

(6) Dress capacitor C23 away from front apron; dress capacitor C24 as close to rear apron as possible.

(7) Dress twisted a-c wiring to power switch away from volume control wiring and components.

(8) Dress excess power transformer leads between transformer bell and back apron.

Frequency Ranges

Standard Broadcast ("A" Band)	540-1,720 kc (556-174 m)
Medium Wave ("B" Band)	3.0-9.5 mc (100-31.6 m)
31 Meter Spread Band	9.5-11.7 mc (31.6-25.6 m)
25 Meter Spread Band	11.7-15.1 mc (25.6-19.9 m)
19-13 Meter Spread Band	15.1-22.5 mc (199-133 m)

Intermediate Frequency ..... 455 kc

Tube Complement

(1) RCA-6SK7	R-F Amplifier
(2) RCA-6SA7	1st Detector-Oscillator
(3) RCA-6SK7	I-F Amplifier
(4) RCA-6SQ7	2nd Det. A-F Amplifier A.V.C.
(5) RCA-6AD7G	Phase Inverter and Power Output
(6) RCA-6F6G	Power Output
(7) RCA-6U5/6G5	Tuning Indicator
(8) RCA-5U4G	Rectifier
Pilot Lamps	2—Type 44, 6.3 volts, 0.25 amps.

Power Supply Ratings (including phonograph motor)

Symbol	Voltages	Frequency (cycles)	Watts
Rating A	105-125	50-60	130
Rating B	105-125	25-60	130
Rating C	105-125, 200-250	50-60	130

(Shipped in 225-250 volt position)

Power Output

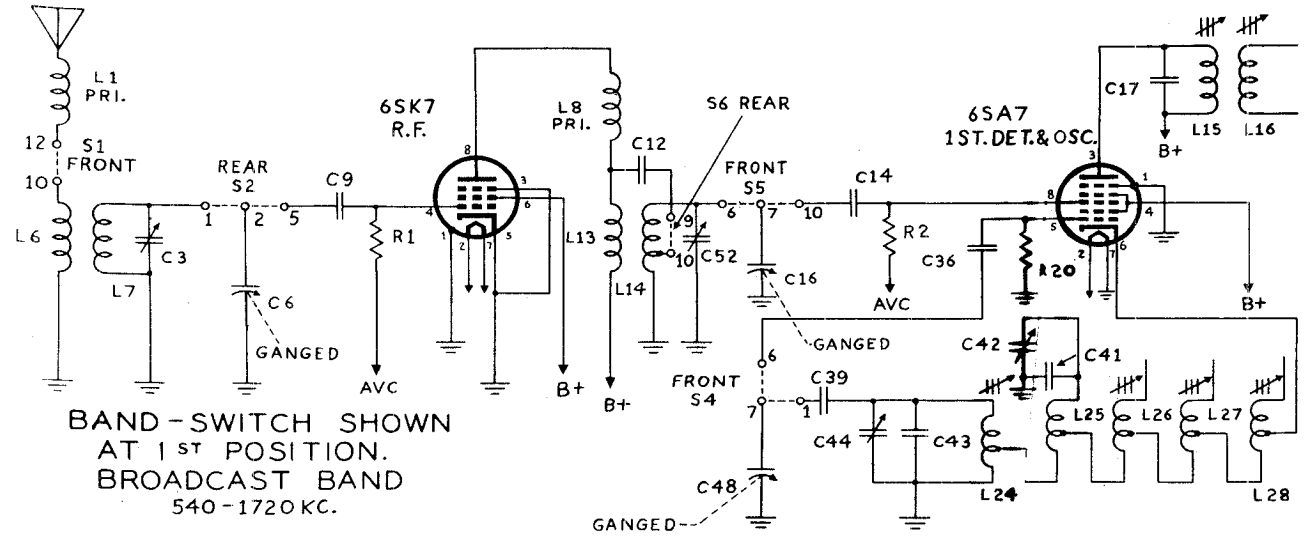
Undistorted	9.5 watts
Maximum	11 watts

Loudspeakers—12-inch

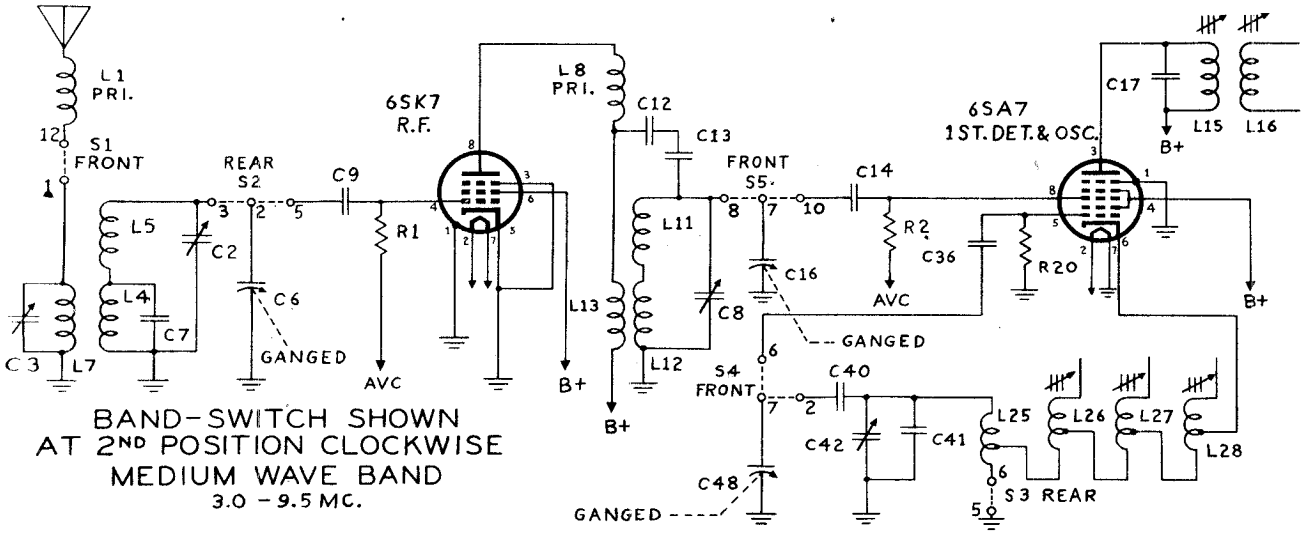
Type	One Electromagnetic and One Permanent Magnet
Identification Numbers	92516-2 and 92520-1
V.C. Impedance	2.2 ohms at 400 cycles

MODEL QU61

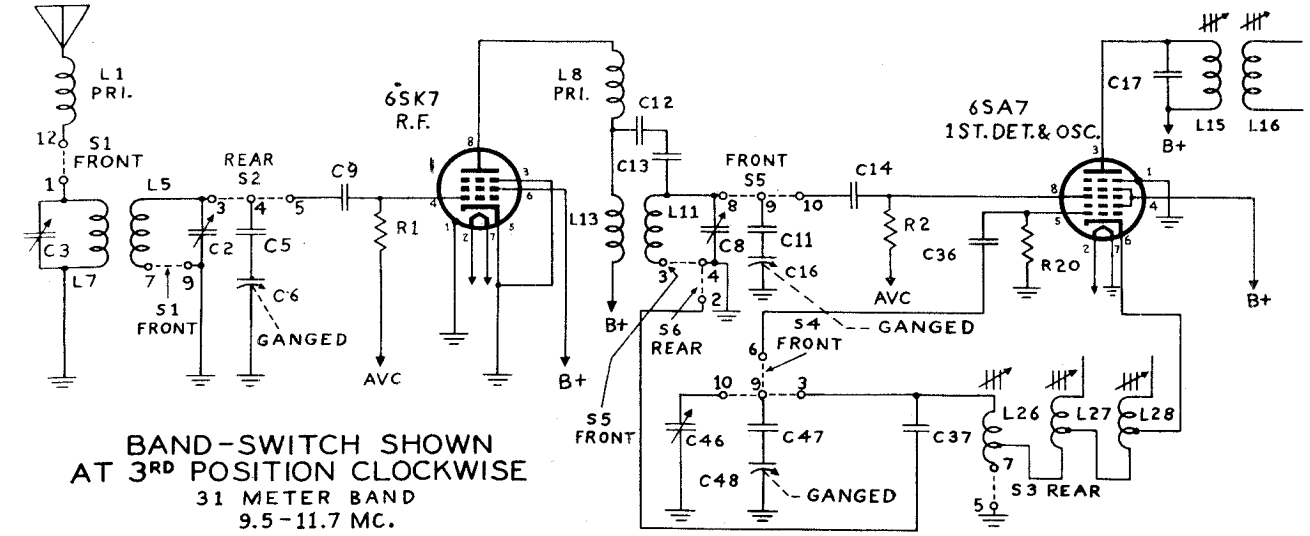
RCA MFG. CO.



BAND-SWITCH SHOWN AT 1ST POSITION. BROADCAST BAND 540-1720 KC.



BAND-SWITCH SHOWN AT 2ND POSITION CLOCKWISE MEDIUM WAVE BAND 3.0 - 9.5 MC.



BAND-SWITCH SHOWN AT 3RD POSITION CLOCKWISE 31 METER BAND 9.5-11.7 MC.

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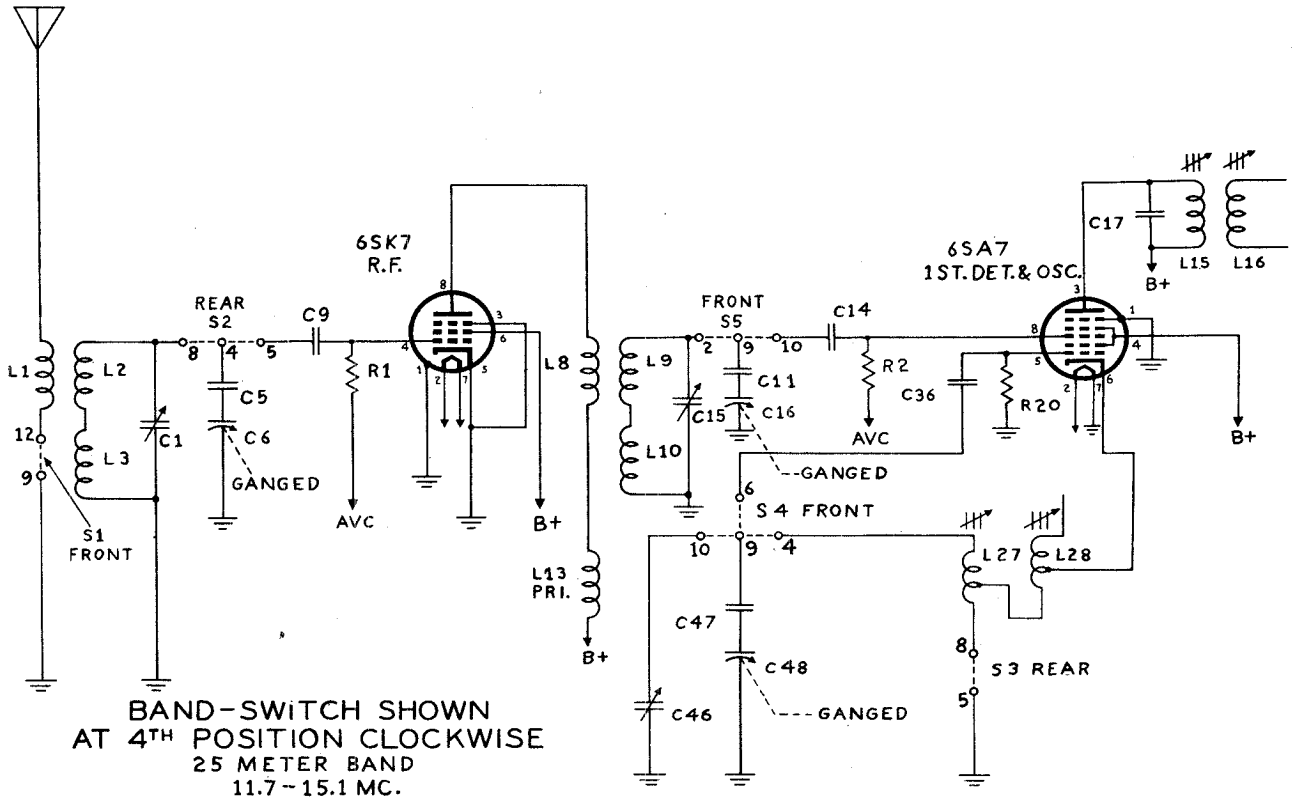
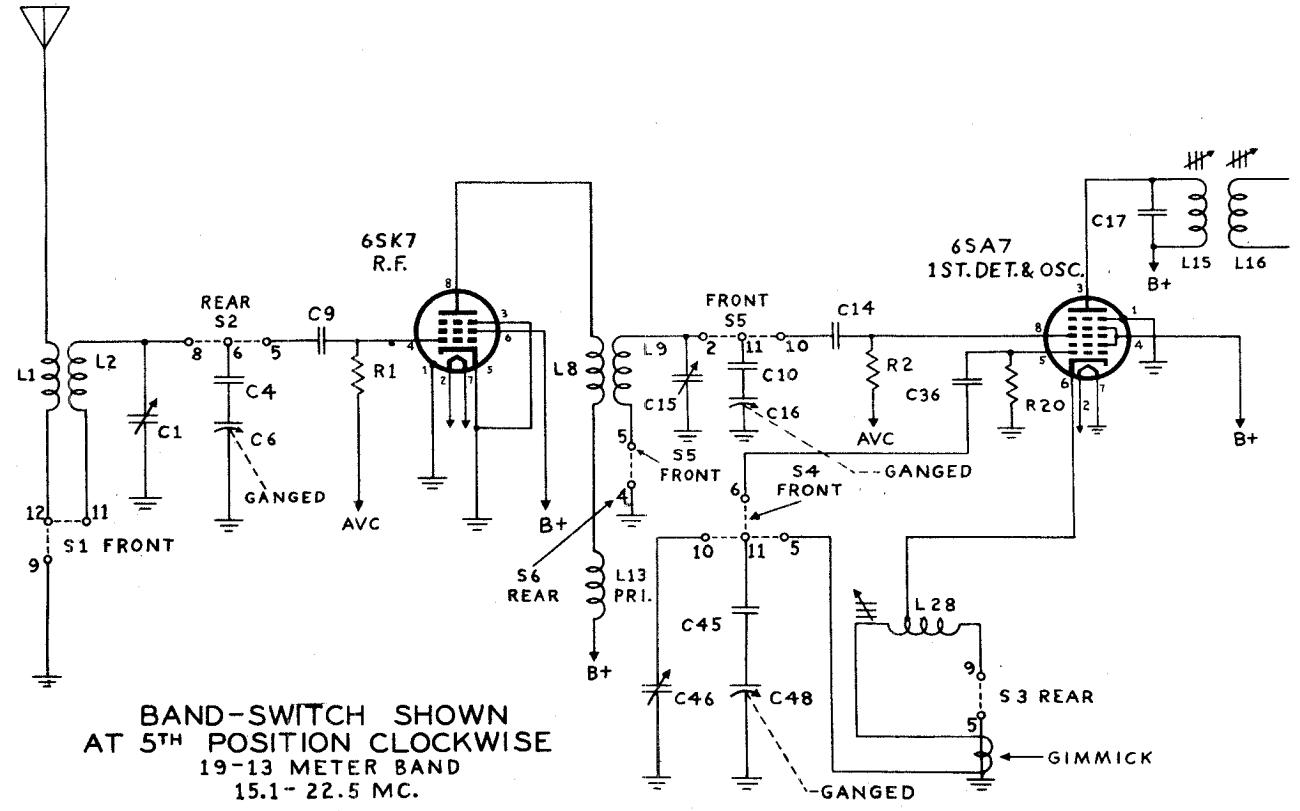


BAND-SWITCH SHOWN
AT 4TH POSITION CLOCKWISE
25 METER BAND
11.7 - 15.1 MC.



BAND-SWITCH SHOWN
AT 5TH POSITION CLOCKWISE
19-13 METER BAND
15.1 - 22.5 MC.

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MODEL QU61
Ch.RC-568B

RCA MFG. CO.

Cathode-Ray Alignment is the preferable method. Connections for the oscilloscope are shown on the schematic circuit diagram.

Output Meter Alignment.—If this method is used, connect the meter across either voice coil, and turn the receiver volume control to maximum.

Test-Oscillator.—For all alignment operations, connect the low side of the test-oscillator to the receiver chassis, and keep the oscillator output as low as possible to avoid a-v-c action.

Calibration Scale on Indicator-Drive-Cord Drum.—The tuning dial is fastened in the cabinet and cannot be used for reference during alignment, therefore a calibration scale is attached to the rear of the indicator-drive-cord drum which is mounted on the front shaft of the gang condenser.

As the first step in r-f alignment, check the position of the drum, it should correspond to that shown in the Dial Indicator and Drive Mechanism drawing when the gang condenser plates are fully meshed. The drum is held to the shaft by means of two set screws, which must be tightened securely when the drum is in the correct position.

Pointer for Calibration Scale.—Improvise a pointer for the calibration scale by fastening a piece of wire to the gang condenser frame, and bend the wire so that it points to the "180°" mark on the calibration scale when the plates are fully meshed.

The setting of the gang condenser is read on this scale, which is calibrated in degrees. The correct setting of the gang in degrees, for each alignment frequency, is given in the alignment table.

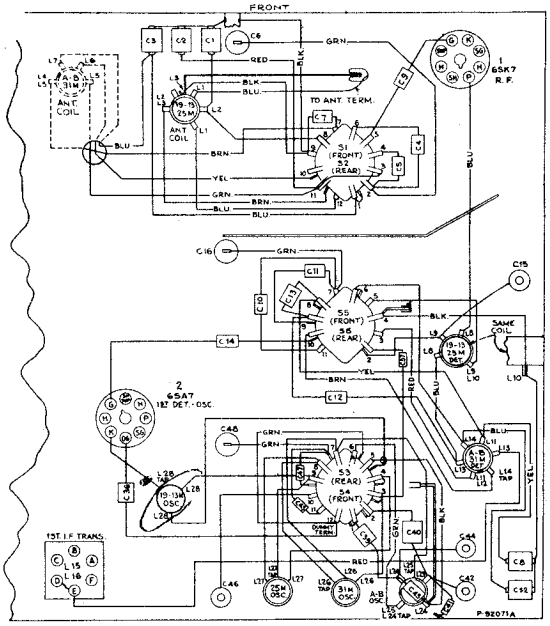
Receiver Dial with Calibration Scale.—To determine the corresponding frequency for any setting of the calibration scale, refer to the drawing.

Spread-Band Alignment.—The most satisfactory method of aligning or checking the spread-band ranges is on actual reception of short-wave stations of known frequency, by retouching the magnetite-core oscillator coil for each band so that these stations come in at the correct points on the dial.

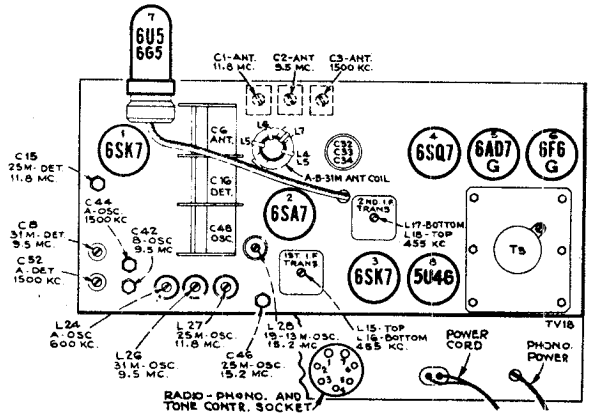
In exceptional cases, when the set is being serviced in a location where the noise level is high enough to prevent reception of short-wave stations, a test-oscillator may be used for alignment, but an extremely high degree of accuracy is required in the frequency settings of the test-oscillator, as a slight error will produce considerable inaccuracy on the spread-band dials. The frequency settings of the test-oscillator may be checked by one or both of the following methods:

1. Determine the exact dial settings of the test-oscillator (for frequencies at or close to the specified alignment frequencies) by zero-beating the test-oscillator against short-wave stations of known frequency.
2. Use harmonics of the standard-broadcast range of a test-oscillator, first checking the frequency settings on this range by means of a crystal calibrator, or by zero-beating against standard broadcast stations.

When a test oscillator is employed for spread-band alignment, a final check should be made on actual reception of short-wave stations of known frequency, and the magnetite-core oscillator coil for each band should be retouched so that the stations come in at the correct points on the dial.



R. F. Wiring Diagram (Bottom View)



Steps	Connect the high side of the test-osc. to—	Tune test-osc. to—	Range Switch	Turn Radio Dial to—	Adjust the following for max. peak output
1	6SK7 I-F grid in series with .01 mfd.	455 kc	"A" band	Quiet point 600 kc end of dial	L18-L17 2nd I-F transformer
2	6SA7 1st det. grid in series with .01 mfd.				L16-L15 1st I-F transformer
3	Antenna terminal in series with 300 ohms	11.8 mc	25 meter band	11.8 mc (138.5°)	L27 (osc.)** C1 (ant.) C15 (det.)***
4		15.2 mc		15.2 mc (18.5°)	C46 (osc.)*† Rock in
5	Repeat steps 3 and 4 until aligned.				
6	Antenna terminal in series with 300 ohms	15.2 mc	19-13 meter band	15.2 mc (156°)	L28 (osc.)**
7		9.5 mc	31 meter band	9.5 mc (156°)	L26 (osc.)** C2 (ant.) C8 (det.)***
8		9.5 mc	"B" band	9.5 mc (11.5°)	C42 (osc.)*
9	Antenna terminal in series with 200 mmfd.	1,500 kc	"A" band	1,500 kc (27°)	C44 (osc.) C3 (ant.) C52 (det.)
10		600 kc		600 kc (149.5°)	L24 (osc.) Rock in
11	Repeat steps 9 and 10.				

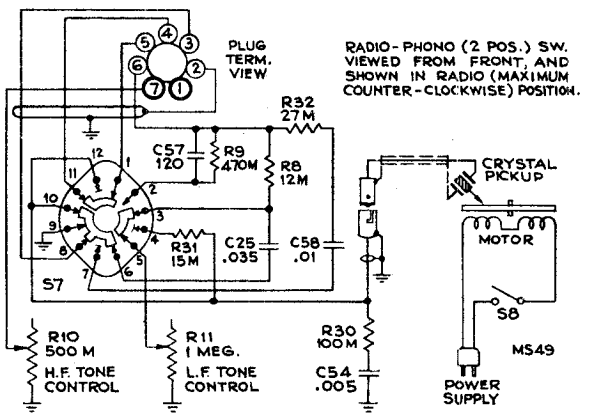
* Use minimum capacity peak if two can be obtained.

** If two peaks can be obtained, use the one obtained when the core screw is farthest out (counter-clockwise).

*** Use maximum capacity peak if two peaks can be obtained.

† Check image to determine that C46 has been adjusted to correct peak by tuning receiver to approximately 14.29 mc (29°) where a weaker signal should be received.

NOTE: Oscillator tracks above signals on all bands.



Radio-Phono. Switch and Tone Control Strip

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MODEL QU61
Ch. RC-568B

RCA MFG. CO.

STOCK No.	DESCRIPTION
	CHASSIS ASSEMBLIES RC-568B
37053	Board—"Antenna-Ground" board
37994	Bracket—Bracket (long) complete with drive cord pulley
37995	Bracket—Bracket (short) complete with drive cord pulley
35642	Calibrator—Drive drum calibrator
37996	Capacitor—Mica trimmer, dual, 2.5-10 mmf. (C8, C52)
37059	Capacitor—Mica trimmer, triple, 2.5-10 mmf. (C1, C2, C3)
12714	Capacitor—Air trimmer, 2-12 mmf. (C15, C42, C44, C46)
33097	Capacitor—Ceramic, 4.7 mmf. (C37)
35646	Capacitor—Ceramic, 6 mmf. (C41)
39604	Capacitor—Mica, 10 mmf. (C13)
39041	Capacitor—Ceramic, 18 mmf. (C43)
70582	Capacitor—Ceramic, 47 mmf. (C5, C11)
39620	Capacitor—Mica, 47 mmf. (C53)
35644	Capacitor—Ceramic, 47 mmf. (C47)
39622	Capacitor—Mica, 56 mmf. (C7, C36)
71291	Capacitor—Mica, 66 mmf. (C4, C10)
35645	Capacitor—Ceramic, 68 mmf. (C45)
39628	Capacitor—Mica, 100 mmf. (C17, C18)
39630	Capacitor—Mica, 120 mmf. (C19, C20, C21)
39636	Capacitor—Mica, 220 mmf. (C9, C12, C14, C51)
70667	Capacitor—Mica, 560 mmf. (C39)
39646	Capacitor—Mica, 560 mmf. (C55)
70687	Capacitor—Mica, 3,000 mmf. (C40)
71007	Capacitor—Tubular, .005 mfd., 1,600 volts (C29, C30)
70606	Capacitor—Tubular, .005 mfd., 200 volts (C23)
70629	Capacitor—Tubular, .007 mfd., 600 volts (C22)
70610	Capacitor—Tubular, .01 mfd., 200 volts (C24)
70631	Capacitor—Tubular, .01 mfd., 600 volts (C28, C31)
70615	Capacitor—Tubular, .05 mfd., 200 volts (C38)
70638	Capacitor—Tubular, 0.1 mfd., 600 volts (C49)
70639	Capacitor—Tubular, 0.25 mfd., 600 volts (C35)
32187	Capacitor—Electrolytic, 8 mfd., 150 volts (C50)
37888	Capacitor—Electrolytic, comprising 1 section of 20 mfd., 450 volts; 1 section of 15 mfd., 450 volts; and 1 section of 20 mfd., 25 volts (C33, C32, C34) (See Note)
37055	Coil—Antenna coil, "A", "B" and 31 meter bands (L4, L5, L6, L7)
37056	Coil—Antenna coil, 25 meter and 19-13 meter bands (L1, L2, L3)
37093	Coil—Oscillator coil, "A", "B" bands (L24, L25)
35624	Coil—Oscillator coil, 19-13 meter band (L28)
35625	Coil—Oscillator coil, 25 meter band (L27)
35626	Coil—Oscillator coil, 31 meter band (L26)
37058	Coil—R-F coil, 25 meter and 19-13 meter bands (L8, L9, L10)
37057	Coil—R-F coil, "A", "B" and 31 meter bands (L11, L12, L13, L14)
37992	Control—Volume control and power switch (R7, S10)
37151	Condenser—Variable tuning condenser (C6, C16, C48)
32634	Cord—Drive cord (approx. 24" overall length)
12006	Core—Adjustable core and stud for I-F transformers
32634	Cord—Indicator cord (approx. 41" overall length)
31259	Core—Adjustable core and stud for 25 meter and 31 meter band oscillator coils and for 19-13 meter band osc. coil
35788	Core—Adjustable core and stud for ABC band oscillator coil
35768	Drum—Drive drum less calibrator
28452	Plate—Bakelite mounting plate for capacitor #37888
30868	Plug—2 contact female plug for motor cable
12493	Plug—5 contact female plug for speaker cable
39858	Pulley—Drive cord pulley
34189	Resistor—Voltage divider, consisting of 1 section of 5,000 ohms, 6 watt; 1 section of 5,000 ohms, 2.5 watt; and 1 section of 195 ohms, 3 watt (R17, R18, R19)
30492	Resistor, 22,000 ohms, 1/4 watt (R4)
30685	Resistor—33,000 ohms, 1/4 watt (R20)
30650	Resistor—56,000 ohms, 1/2 watt (R21)
3252	Resistor—100,000 ohms, 1/4 watt (R13)
14583	Resistor—220,000 ohms, 1/2 watt (R12)
30651	Resistor—270,000 ohms, 1/4 watt (R5)
14983	Resistor—330,000 ohms, 1/4 watt (R14)
30648	Resistor—470,000 ohms, 1/2 watt (R6, R16)
30652	Resistor—1 megohm, 1/4 watt (R1, R2, R22)
30649	Resistor—2.2 megohms, 1/4 watt (R3)
30992	Resistor—10 megohms, 1/4 watt (R15)
14350	Screw—#8-32 square head set screw for drive drum
38842	Shaft—Tuning knob shaft and flywheel
36107	Socket—7 contact socket located on rear apron of chassis
31364	Socket—Dial lamp socket
31251	Socket—Tube socket
34864	Socket—Tuning tube socket
31261	Spring—Retaining spring for 19-13 meter band oscillator coil core and stud and for oscillator coils' core and stud assemblies
31418	Spring—Drive or indicator cord spring
12007	Spring—Retaining spring for I-F transformers' core and stud assemblies
37993	Switch—Range switch (S1, S2, S3, S4, S5, S6)
35636	Transformer—First I-F transformer (L15, L16, C17, C18)
36615	Transformer—Second I-F transformer (L17, L18, C19, C20, C51)
34183	Transformer—Power transformer, 110/125/150/210/240 volts, 50-60 cycle (T3) (For Specification Ratings A and C)
39786	Transformer—Power transformer, 105/120 volts, 25-60 cycle (T3) (For Specification Rating B)
2917	Washer—"C" washer for tuning knob shaft
	SPEAKER ASSEMBLIES 92520-1K
70574	Cone—Cone and voice coil assembly
5118	Plug—3 prong male plug for speaker
70686	Speaker—12" PM speaker complete with cone and voice coil less plug **NOTE:** If stamping on speaker in instrument does not agree with above speaker number, order replacement parts by referring to model number of instrument, number stamped on speaker and full description of part required.
	SPEAKER ASSEMBLIES 92516-2K
70574	Cone—Cone and voice coil assembly
5119	Plug—3 contact female plug for speaker
31539	Plug—5 prong male plug for speaker
70573	Speaker—12" E.M. speaker complete with cone and voice coil less output transformer and plugs
70688	Transformer—Output transformer (T1) NOTE: If stamping on speaker in instrument does not agree with above speaker number, order replacement parts by referring to model number of instrument, number stamped on speaker and full description of part required.
	MISCELLANEOUS ASSEMBLIES
X1601	Baffle—Baffle board and grille cloth
4287	Body—Phono-input cable connector body
36639	Bracket—Lamp bracket
70556	Bumper—Rubber bumper for tray
39630	Capacitor—Mica, 120 mmf. (C57)
70606	Capacitor—Tubular, .005 mfd., 200 volts (C54)
70610	Capacitor—Tubular, .01 mfd., 200 volts (C58)
70614	Capacitor—Tubular, .035 mfd., 200 volts (C25)
30716	Clip—Tuning tube clip
36109	Control—L.F. tone control (R11)
35629	Control—H.F. tone control (R10)
70694	Cushion—Rubber cushion
36156	Decal—HF. tone control decal
36155	Decal—L.F. tone control decal
36074	Decal—Radio-phono switch decal
37839	Decal—Range switch decal
70669	Decal—Triode mark decal
35387	Decal—Volume control and power switch decal
39923	Dial—Glass dial scale
4286	Ferrule—Phono-input cable ferrule and bushing
37998	Frame—Dial frame assembly less tube clip, indicator and dial
70691	Guide—Guide rail—L.H.
70692	Guide—Guide rail—R.H.
70690	Hinge—L.H. cabinet door hinge
70693	Hinge—R.H. cabinet door hinge
36593	Indicator—Station selector indicator
13103	Jewel—Pilot lamp cap
36038	Knob—Radio-phono or range switch knob
35814	Knob—Volume control, tone control or tuning knob
11891	Lamp—Dial lamp
70546	Mounting—One set of record changer mounting hardware consisting of four (4) upper and four (4) lower springs and four (4) clamp nuts.
30868	Plug—2 contact female plug for motor cable extension
30870	Plug—2 prong male plug for motor cable extension
36395	Plug—7 prong male plug for radio-phono cable
30436	Resistor—12,000 ohms, 1/4 watt (R8)
36714	Resistor—15,000 ohms, 1/4 watt (R31)
30409	Resistor—27,000 ohms, 1/4 watt (R32)
3252	Resistor—100,000 ohms, 1/4 watt (R30)
30648	Resistor—470,000 ohms, 1/4 watt (R9)
71151	Retainer—Tray roller retaining strip
71152	Retainer—Tray roller retaining strip
70554	Roller—Changer tray roller
4284	Spring—Phono-input cable connector spring
30900	Spring—Retaining spring for knob
70689	Stop—Mechanism tray stop
39360	Support—Drop support for record changer compartment door
39875	Switch—Radio-phono switch (S7)
70555	Tire—Rubber tire for tray roller
70553	Tray—Record changer carrying tray less rollers
4285	Washer—Phono-input cable insulating washer
2917	Washer—Retaining washer for tray roller

NOTE: #37888 rating is 20-20-20 mfd., 450-450-25 volts.

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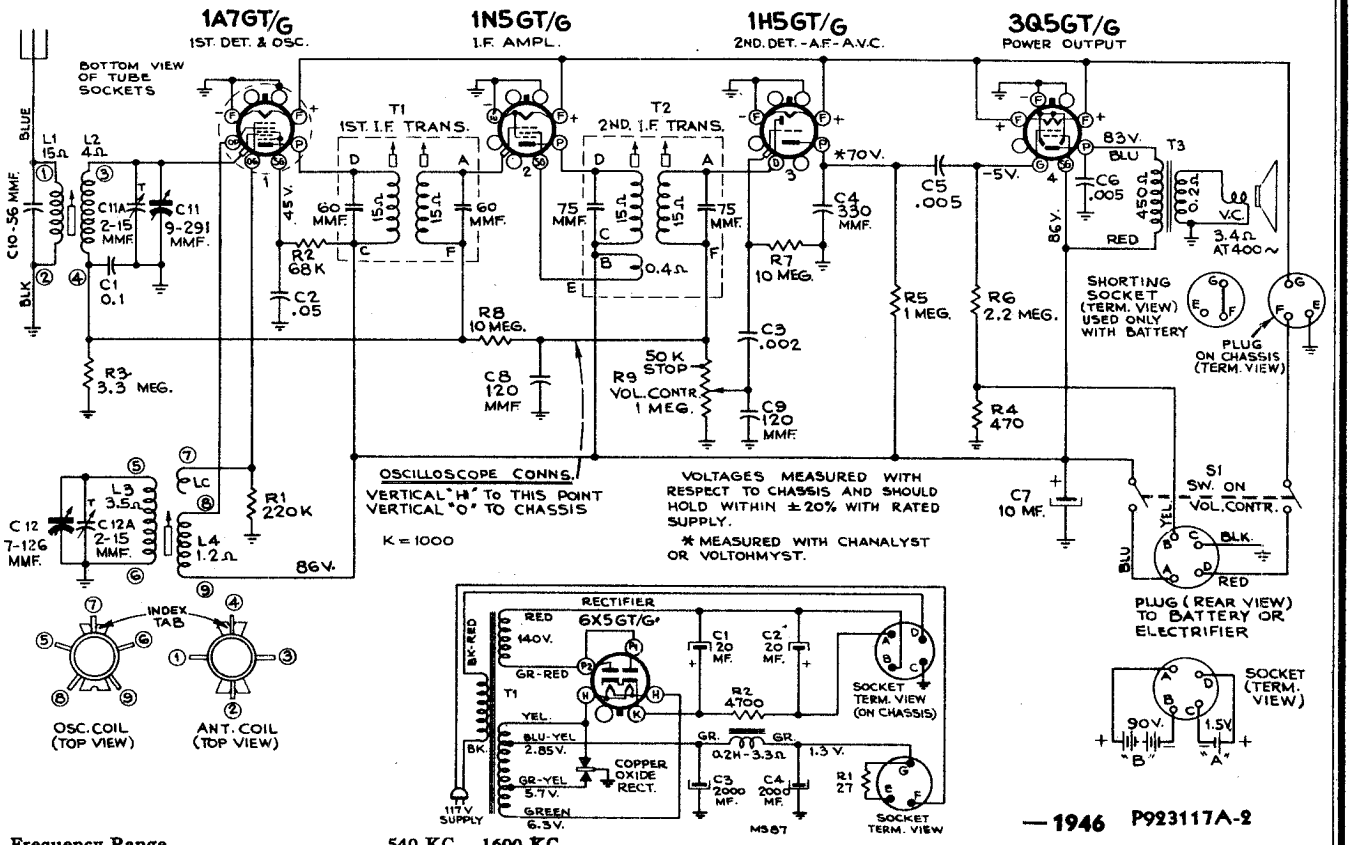
MODELS 64F1, 64F2, Ch. RC-1037; 64F3, Ch. RC-1037A

RCA MFG. CO.

CV45, Ch. RS-1001



—1946 P923117A-2

Frequency Range.....540 KC.—1600 KC.
Intermediate Frequency.....455 KC.

Tube Complement

(1) RCA—1A7 GT/G.....1st Det. Oscillator
(2) RCA—1N5 GT/G.....IF Amplifier
(3) RCA—1H5 GT/G...2nd Det., A.V.C., and A-F Amplifier
(4) RCA—3Q5 GT/G.....Power Output

Power Output Rating

Undistorted.....160 MW.
Maximum.....270 MW.

Loudspeaker (922258-2)

Size.....4 x 6 inch PM
V.C. impedance at 400 cycles.....3.4 ohms

Power Supply Rating

(1) RCA Farm Battery Pack—VS022 or equivalent. "A" Battery 1½ volts, Drain—0.24 amperes, "B" Battery 90 volts, Drain—10.5 MA.
(2) Electrifier—(CV-45) 105 to 125 volts AC, 50-60 cycles only.

STOCK No.	DESCRIPTION
	CHASSIS ASSEMBLIES RC 1037—64F1, 64F2 RC 1037A—64F3
71924	Capacitor—Ceramic, 56 mmf. (C10)
39640	Capacitor—Mica, 330 mmf. (C4)
39630	Capacitor—Mica, 120 mmf. (C8, C9)
70622	Capacitor—Tubular, .002 mfd., 600 volts (C3)
70606	Capacitor—Tubular, .005 mfd., 400 volts (C5, C6)
70611	Capacitor—Tubular, .05 mfd., 400 volts (C2)
70617	Capacitor—Tubular, 0.1 mfd., 200 volts (C1)
38593	Capacitor—Electrolytic, 10 mfd., 90 volts (C7)
*71404	Coil—Antenna coil (L1, L2)
*71401	Coil—Oscillator coil (L3, L4)
*71160	Condenser—Variable tuning condenser (C11, C11a, C12, C12a)
*71168	Control—Volume control and power switch (R9, S1)
32634	Cord—Drive cord (approx. 41" long for 64F1 and 64F2 and approx. 43" long for 64F3) (R9, S1)
70464	Drum—Drive drum
70469	Indicator—Station selector indicator
*71161	Plate—Dial back plate complete with four pulleys less dial—for 64F3
70462	Plate—Dial back plate complete with four pulleys less dial—for 64F1 and 64F2
30550	Plug—4 prong male plug for battery cable
*71162	Plug—Battery shorting plug—3 pronged male
36230	Pulley—Drive cord pulley
30499	Resistor—470 ohms, ¼ watt (R4)
14138	Resistor—68,000 ohms, ¼ watt (R2)
14583	Resistor—220,000 ohms, ¼ watt (R1)
30652	Resistor—1 megohm, ¼ watt (R5)
30649	Resistor—2.2 megohms, ¼ watt (R6)
31417	Resistor—3.3 megohms, ¼ watt (R3)
30992	Resistor—10 megohms, ¼ watt (R7, R8)
70467	Shaft—Tuning knob shaft
70377	Shield—Shield for 1A7GT/G tube
*71163	Socket—Battery shorting socket—3 contact female
37605	Socket—Tube socket
70390	Spring—Drive cord spring
*71403	Transformer—First I.F. transformer (T1)
*71400	Transformer—Second I.F. transformer (T2)
*71159	Transformer—Output transformer (T3)
33726	Washer—"C" washer for tuning knob shaft

STOCK No.	DESCRIPTION
	SPEAKER ASSEMBLY 922258-2
71058	Speaker—4" x 6" elliptical P.M. speaker complete with cone and voice coil
	NOTE: If stamping on speaker in instrument does not agree with above speaker number, order replacement parts by referring to model number of instrument, number stamped on speaker and full description of part required.
	MISCELLANEOUS
70471	Back—Cabinet back for 64F1
70472	Back—Cabinet back for 64F2
70475	Clamp—Dial clamps (1 set) for 64F1 and 64F2
70398	Clamp—Dial clamp for 64F3 (2 required)
70476	Dial—Glass dial scale for 64F1 and 64F2
*71166	Dial—Glass dial scale for 64F3
37831	Fastener—Push fastener for cabinet back (1 set)
70474	Knob—Tuning control knob—ivory—for 64F2
70473	Knob—Tuning knob—mottled walnut—for 64F1 and 64F3
*71165	Knob—Volume control knob—ivory—for 64F2
*71164	Knob—Volume control knob—mottled walnut—for 64F1 and 64F3
30900	Spring—Retaining spring for knobs
	POWER SUPPLY RS 1001
*71840	Capacitor—Electrolytic, 2000 mmf., 6 volts (C3, C4)
*71844	Capacitor—Electrolytic dual, 20 mfd., 150 volts (C1, C2)
35069	Fastener—Push fastener for bottom cover
*71838	Reactor—Filter Reactor
*71839	Rectifier—Rectifier complete with mounting bracket
12453	Resistor—27 ohms, ¼ watt (R1)
30788	Resistor—4700 ohms, 1 watt (R2)
*71841	Socket—3 contact female socket
31027	Socket—4 contact female socket for battery cable
37605	Socket—Tube socket
*71837	Transformer—Power transformer, 117 volt, 60 cycle (T1)

*This is the first time this Stock No. has appeared in Service Data.

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MODELS 64F1,64F2,
Ch.RC-1037;64F3,
Ch.RC-1037A
MODELS 65X1,65X2,
Ch.RC-1034

64F1, 64F2, 64F3

Alignment Procedure

Cathode Ray Alignment is the preferable method. Connections for the oscillograph are shown in the diagram.

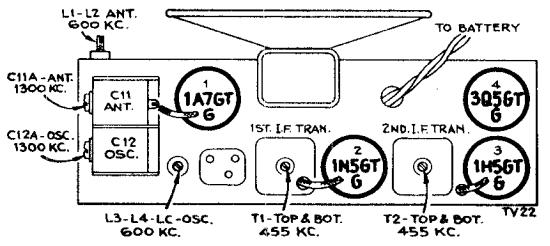
Output Meter Alignment.—If this method is used, connect the meter across the voice coil and turn the receiver volume control to maximum.

Test Oscillator.—For all alignment operations, connect the low side of the test oscillator to the receiver chassis, and keep the output as low as possible to avoid AVC action.

Pre-Setting Dial.—With gang condenser in full mesh, the pointer should be set at the left-hand end dial calibration mark.

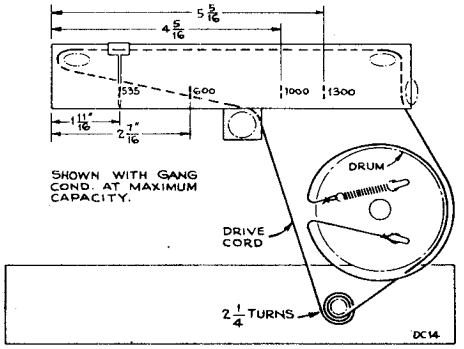
Steps	Connect high side of the test oscillator to—	Tune test osc. to—	Turn radio dial to—	Adjust following for maximum peak output
1	I.F. (1N5) grid in series with .1 mfd.	455 kc	Quiet point at the low freq. end of the dial	2nd I.F. trans.*
2	1A7 grid in series with .1 mfd.			1st I.F. trans.
3	Antenna lead (blue) in series with 200 mmf.	1300 kc	1300 kc	C12A (osc.) C11A (ant.)
4		600 kc	600 kc	(Osc.) and (ant.) slugs
5	Repeat steps 3 and 4 for exact alignment.			

*Do not repeat step 1.



Critical Lead Dress

1. Keep output plate capacitor dressed close to the chassis.
2. Keep lead from lug A of second IF transformer down and dressed close around the 1H5 tube socket.
3. Dress 1N5 plate lead close to chassis.
4. Dress C1 down and away from the antenna coil.
5. Dress C3 and C5 away from each other.
6. Dress the lead from 2nd IF transformer to the volume control in the open.



NOTE:—

When using the electrifier, remove the shorting plug on the chassis adjacent to the 1A7GT/G tube and replace it with a similar plug, attached to the electrifier. Also connect the remaining plug attached to the electrifier, in place of the normal battery plug. The receiver will operate in the normal manner, using the same control for turning the set on and off.

NOTE:—

Do not plug electrifier into a DC outlet.

65X1, 65X2

Output Meter Alignment.—If this method is used, connect the meter across the voice coil, and turn the receiver colume control to maximum.

Test-Oscillator.—For all alignment operations, connect the low side of the test-oscillator to the receiver chassis, and keep the oscillator output as low as possible to avoid a-v-c action.

Calibration Scale.—The glass tuning dial may be removed from the cabinet and mounted above the pointer for reference during alignment. The extreme left hand mark of the Standard Broadcast scale must be in line with the left hand mark on the dial backing plate.

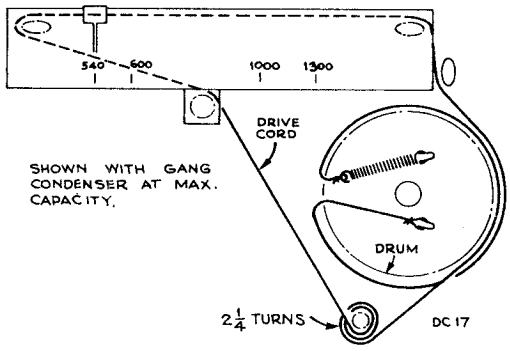
Dial Backing Plate.—In the event that only the chassis is returned for service, the marks on the dial backing plate may be used during alignment; refer to the Dial Indicator and Drive Mechanism drawing for corresponding frequencies.

Dial Pointer.—With the gang condenser in full mesh the dial pointer should be set to the left hand reference mark on the dial backing plate.

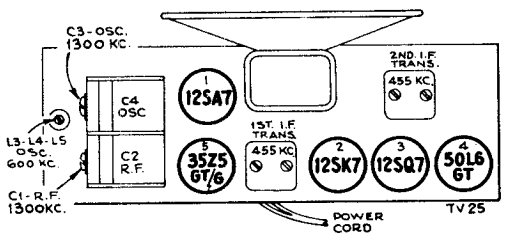
For additional information refer to booklet "RCA Victor Receiver Alignment."

Steps	Connect the high side of test-oscillator to—	Tune test-osc. to—	Turn radio dial to—	Adjust the following for max. peak output
1	12SK7 I-F grid through 0.1 mfd. capacitor	455 kc	Quiet-point 1,600 kc end of dial	C8 and C9 2nd I-F transformer
2	Stator of C2 through 0.1 mfd.			*C6 and C7 1st I-F transformer
3	Ant. lead in series with 200 mmfd.	1,300 kc	1,300 kc	C3 (osc.) C1 (ant.)
4		600 kc	600 kc "A" Band	L5 (osc.) Rock gang
5	Repeat steps 3 and 4			

* Do not readjust C8 or C9 when test oscillator is connected to C2.



Dial-Indicator and Drive Mechanism



Tube and Trimmer Locations

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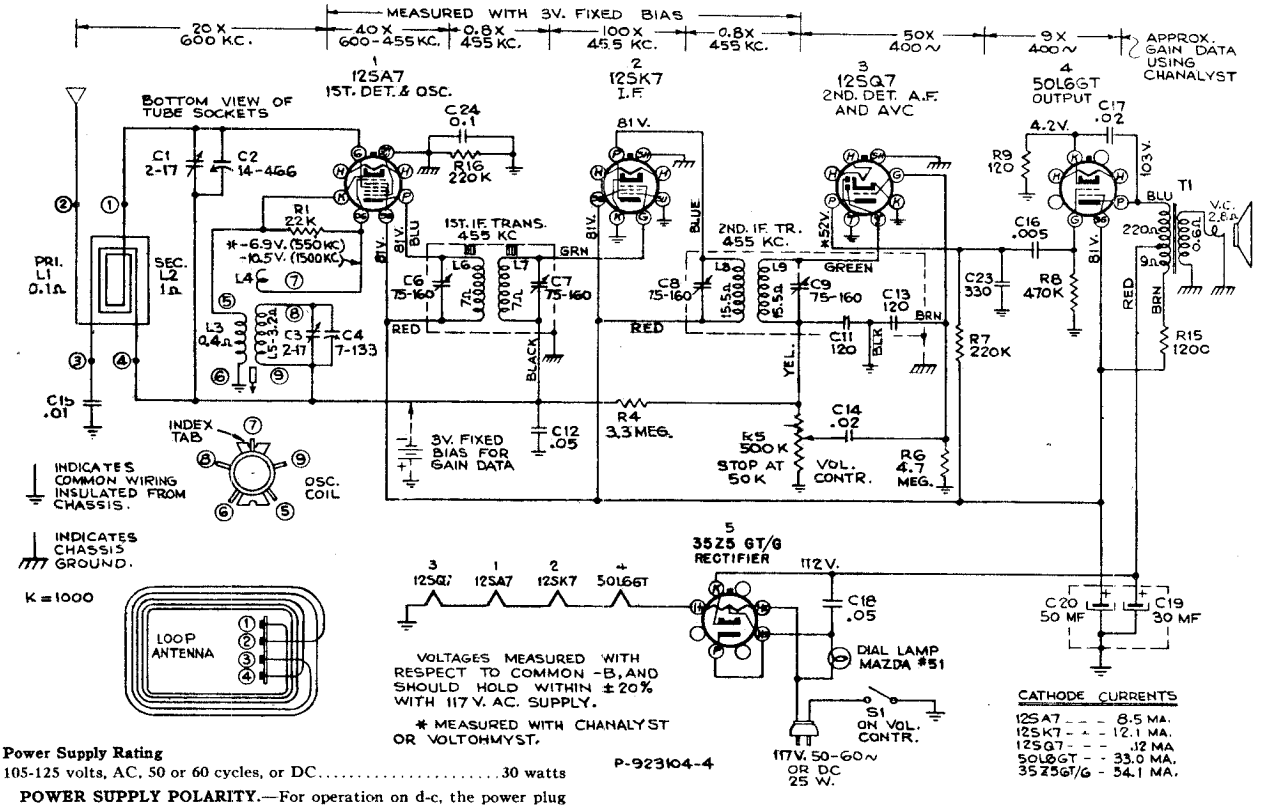
MODELS 65X1, 65X2
Ch. RC-1034

RCA MFG. CO.



Power Supply Rating

105-125 volts, AC, 50 or 60 cycles, or DC.....30 watts

POWER SUPPLY POLARITY.—For operation on d-c, the power plug must be inserted in the outlet for correct polarity. If the set does not function, reverse the plug. On a-c, reversal of the plug may reduce hum.

Critical Lead Dress

1. Dress blue and green leads of both I-F transformers back in shield cans, leaving them as short as possible.
2. Dress all heater leads next to chassis.
3. Dress power cord toward output transformer away from volume control and audio circuits.
4. Dress capacitor (C14) toward switch and parallel to chassis length.
5. Dress capacitor (C16) back against rear chassis apron.
6. Dress capacitor (C17) over and towards 50L6 socket perpendicular to capacitor (C14) and (C16).
7. Dress pilot lamp leads over second I-F transformer and away from tubes.

Frequency Range .....540-1600 kc

Intermediate Frequency.....455 kc

Power Output

Undistorted.....1.0 watt
Maximum.....1.5 watts

Tube Complement

(1) RCA-12SA7.....Converter
(2) RCA-12SK7.....I.F. Amplifier
(3) RCA-12SQ7.....2nd Det., A.V.C., and A.F. Amplifier
(4) RCA-50L6GT.....Power Output
(5) RCA-35Z5GT.....Rectifier

Pilot Lamp.....Mazda No. 51, 6-8 volts, 0.2 amp.

Loudspeaker (922258-1)

Type.....4" x 6" PM
V. C. Impedance.....3.4 ohms at 400 cycles

STOCK No.	DESCRIPTION
	CHASSIS ASSEMBLIES RC 1034
70389	Bearing—Tuning knob shaft bearing
39640	Capacitor—Mica, 330 mmf. (C23)
70606	Capacitor—Tubular, .005 mfd., 400 volts (C16)
70610	Capacitor—Tubular, .01 mfd., 200 volts (C15)
70611	Capacitor—Tubular, .02 mfd., 400 volts (C14, C17)
70615	Capacitor—Tubular, .05 mfd., 400 volts (C12, C18)
70617	Capacitor—Tubular, 0.1 mfd., 400 volts (C24)
70408	Capacitor—Electrolytic, comprising 1 section of 30 mfd., 150 volts and 1 section of 50 mfd., 150 volts (C19, C20)
*70477	Coil—Oscillator coil (L3, L4, L5)
*70463	Condenser—Variable tuning condenser complete with drum (C1, C2, C3, C4)
70322	Control—Volume control and power switch (R5, S1)
32634	Cord—Drive cord (approximately 38")
*70464	Drum—Drive drum
*70469	Indicator—Station selector indicator
11765	Lamp—Dial lamp—Mazda 51
*70468	Loop—Antenna loop (L1, L2)
*70462	Plate—Dial back plate complete with drive cord pulleys less dial
36230	Pulley—Drive cord pulley
30189	Resistor—120 ohms, ¼ watt (R9)
6134	Resistor—1200 ohms, 1 watt (R15)
30492	Resistor—22,000 ohms, ¼ watt (R1)
14583	Resistor—220,000 ohms, ¼ watt (R7, R16)
30648	Resistor—470,000 ohms, ¼ watt (R8)
31417	Resistor—3.3 megohms, ¼ watt (R4)
30931	Resistor—4.7 megohms, ¼ watt (R6)

STOCK No.	DESCRIPTION
*70467	Shaft—Tuning knob shaft
34449	Socket—Lamp socket
37605	Socket—Tube socket—moulded
70390	Spring—Drive cord tension spring
*70465	Transformer—First I.F. transformer (L6, L7, C6, C7)
*70466	Transformer—Second I.F. transformer (L8, L9, C8, C9, C11, C13)
70385	Transformer—Output transformer (T1)
33726	Washer—"C" washer for tuning knob shaft
	SPEAKER ASSEMBLY 922258-1
*70470	Speaker— NOTE: If stamping on speaker in instrument does not agree with above speaker number, order replacement parts by referring to model number of instrument, number stamped on speaker and full description of part required.
	MISCELLANEOUS ASSEMBLIES
*70471	Back—Cabinet back for 65X1
*70472	Back—Cabinet back for 65X2
*70475	Clamp—Dial clamps (1 set)
*70476	Dial—Glass dial scale
37831	Fastener—Push fastener (1 set) for cabinet back
*70474	Knob—Control knob—ivory—for 65X2
*70473	Knob—Control knob—mottled walnut—for 65X1
*71821	Knob—Control knob—maroon—for 65X1
30900	Spring—Retaining spring for knob

*THIS IS THE FIRST TIME THIS STOCK NUMBER HAS APPEARED IN PRINT.

1946

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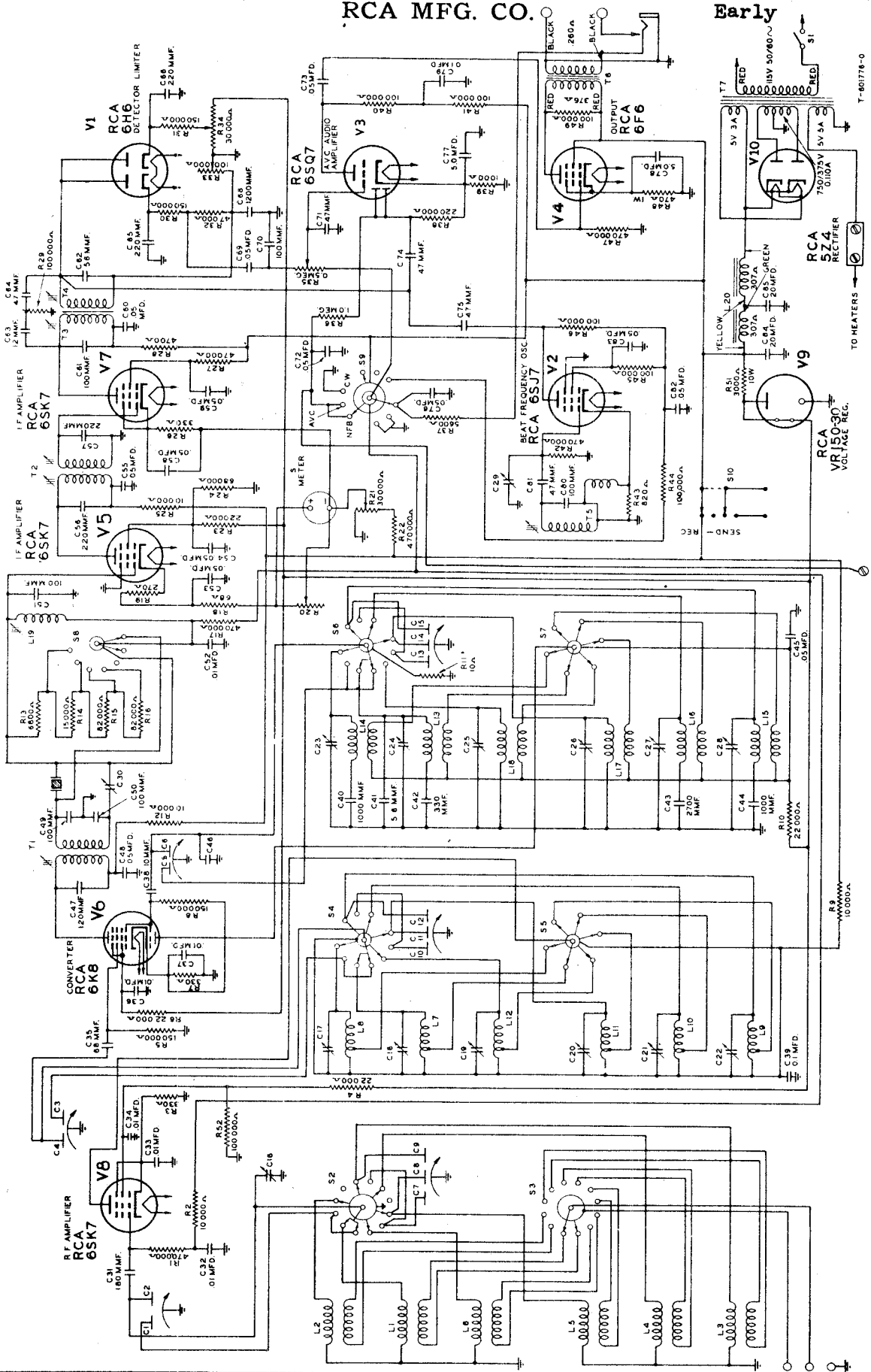
For Alignment and other data, see P.15-61

MODELS AR-77, AR-77E,
Early


RCA MFG. CO.
V1 RCA 6H6 DETECTOR LIMITER
V2 BEAT FREQUENCY OSC RCA 6SJ7
V3 RCA 6SQ7 AVC, AUDIO AMPLIFIER
V4 OUTPUT RCA 6F6
V5 IF AMPLIFIER RCA 6SK7
V6 CONVERTER RCA 6K8
V7 IF AMPLIFIER RCA 6SK7
V8 R.F. AMPLIFIER RCA 6SK7
V9 RCA VR150-30 VOLTAGE REG.
V10 RCA 5Z4 RECTIFIER
IF PEAK 455 KC
TO HEATERS
METER
SEND-REC

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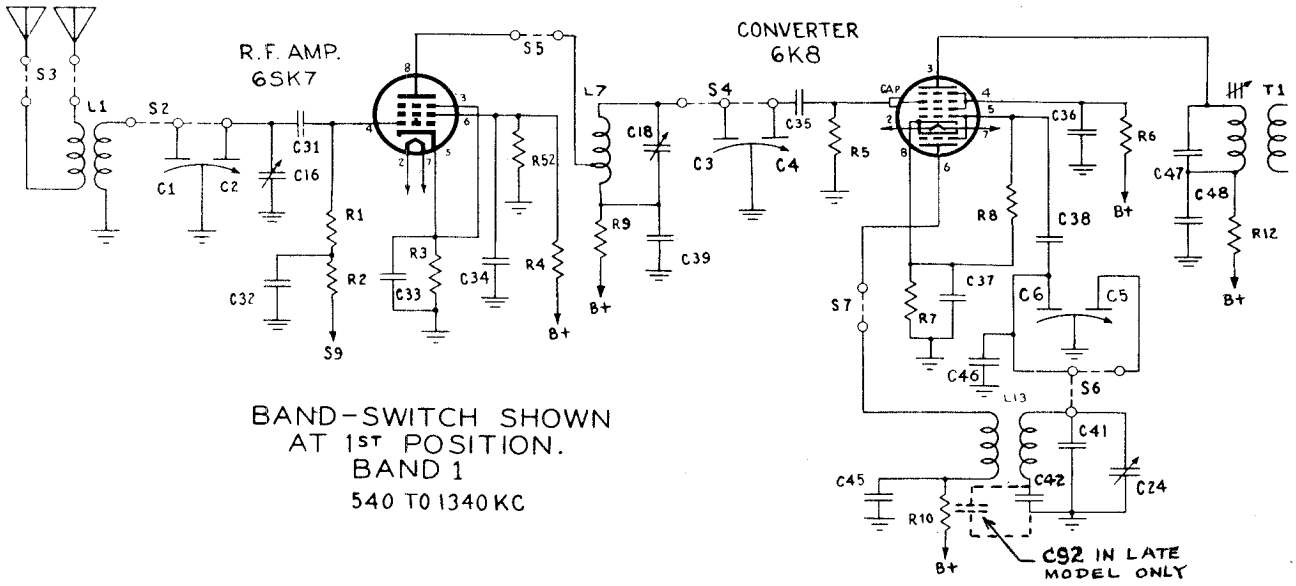
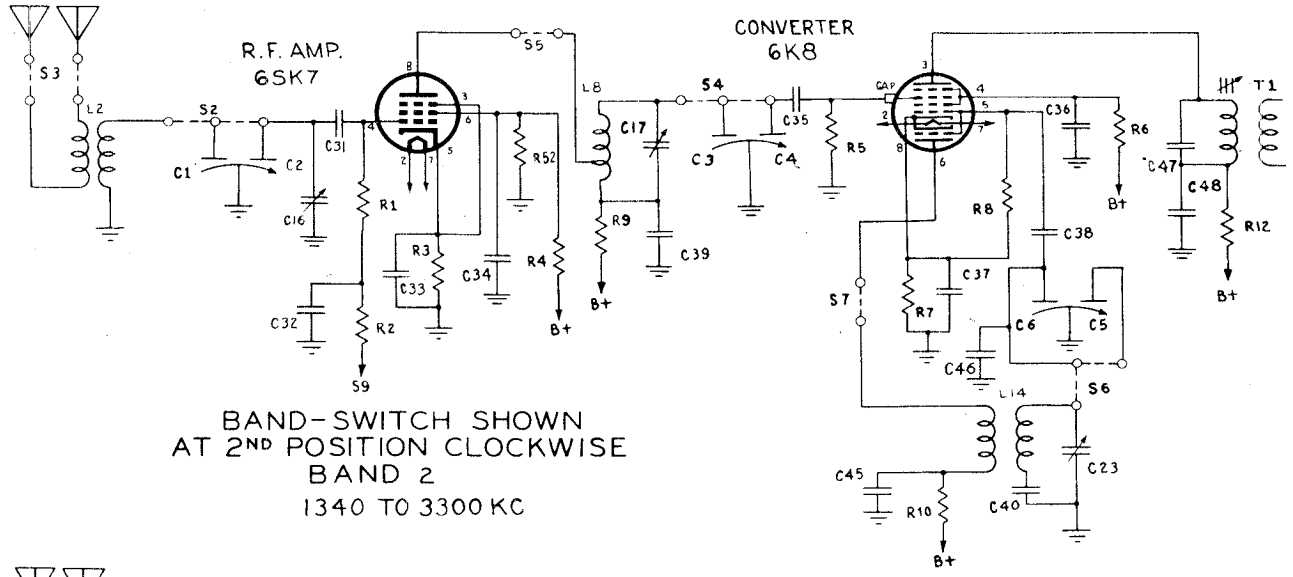
MODELS AR-77, AR-77E,
Early, Late, Revised

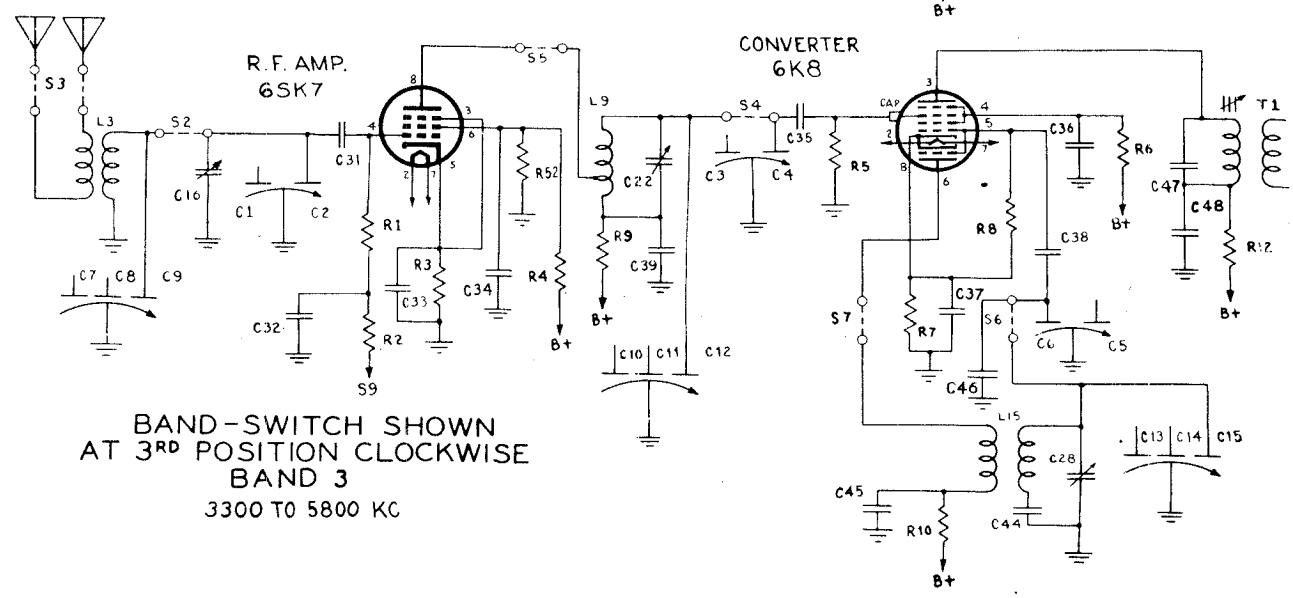
RCA MFG. CO.



BAND-SWITCH SHOWN
AT 1ST POSITION.
BAND 1
540 TO 1340 KC



BAND-SWITCH SHOWN
AT 2ND POSITION CLOCKWISE
BAND 2
1340 TO 3300 KC



BAND-SWITCH SHOWN
AT 3RD POSITION CLOCKWISE
BAND 3
3300 TO 5800 KC

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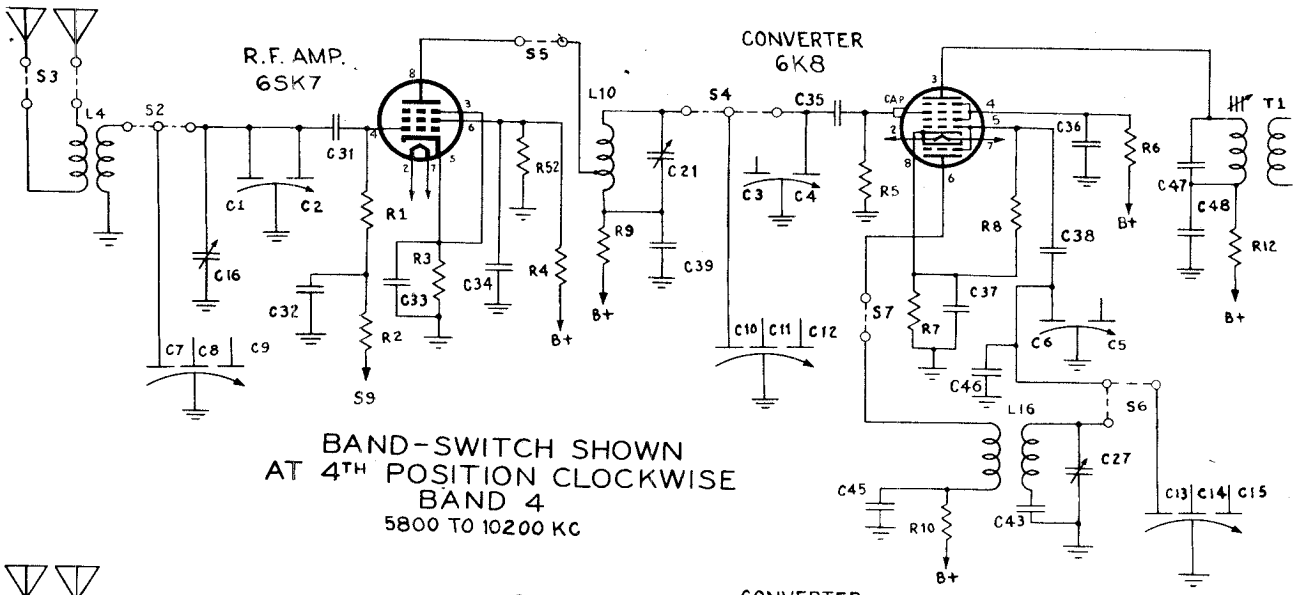
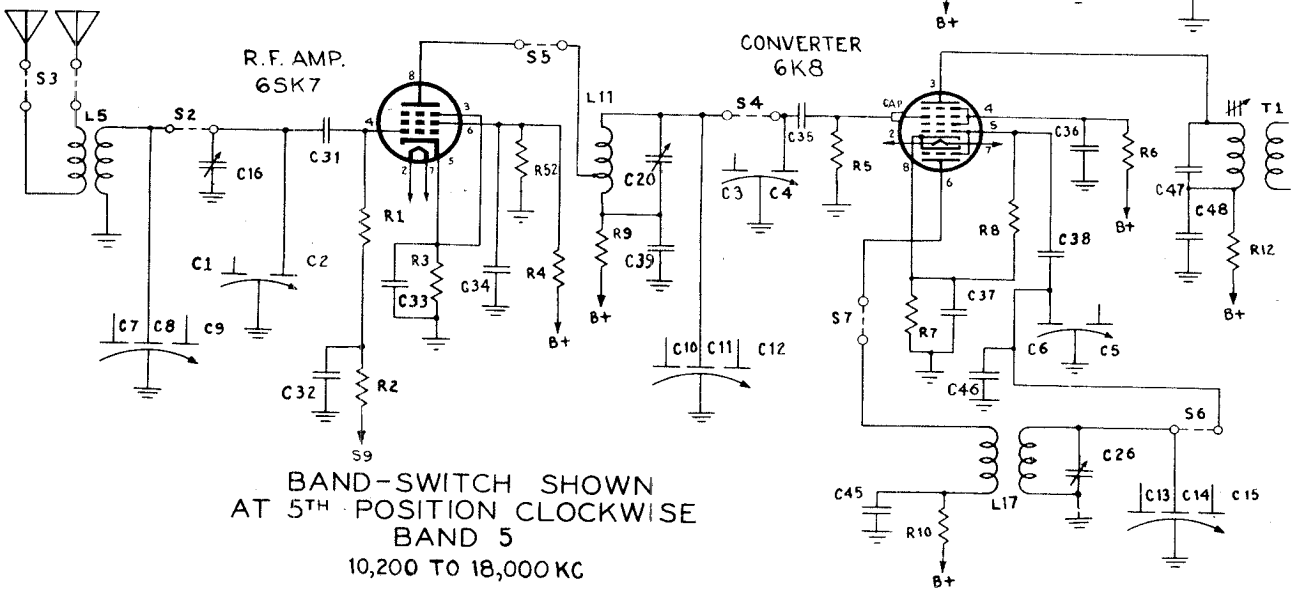
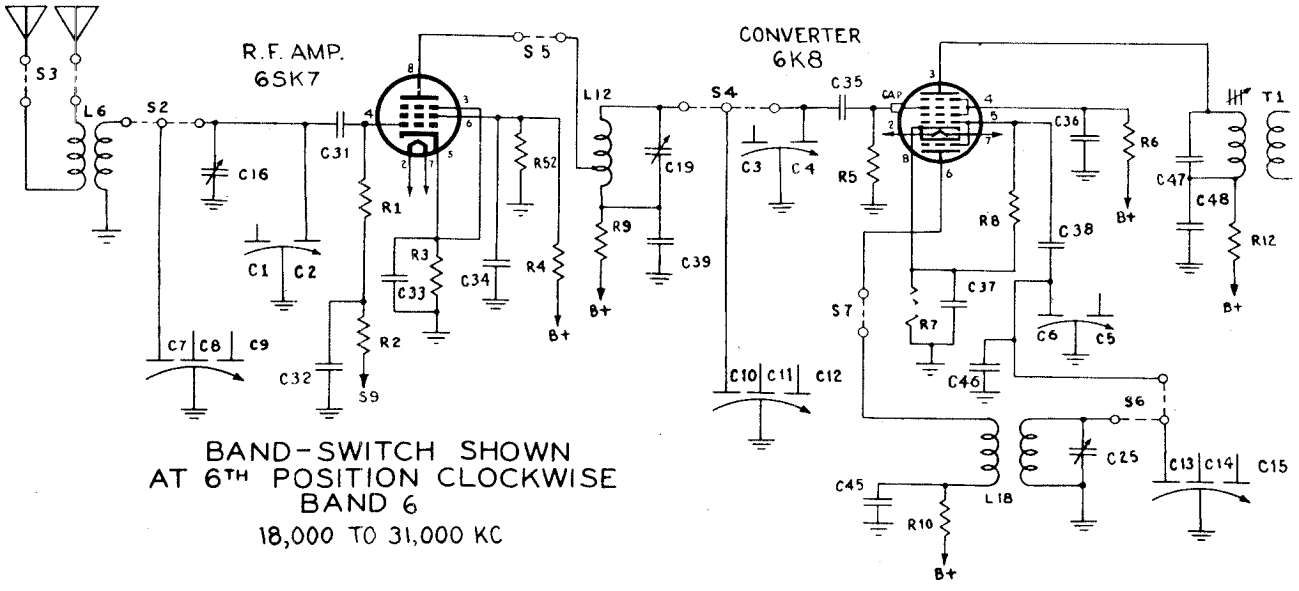
MODELS AR-77, AR-77E,
Early, Late, Revised



BAND-SWITCH SHOWN
AT 4TH POSITION CLOCKWISE
BAND 4
5800 TO 10200 KC



BAND-SWITCH SHOWN
AT 5TH POSITION CLOCKWISE
BAND 5
10,200 TO 18,000 KC



BAND-SWITCH SHOWN
AT 6TH POSITION CLOCKWISE
BAND 6
18,000 TO 31,000 KC

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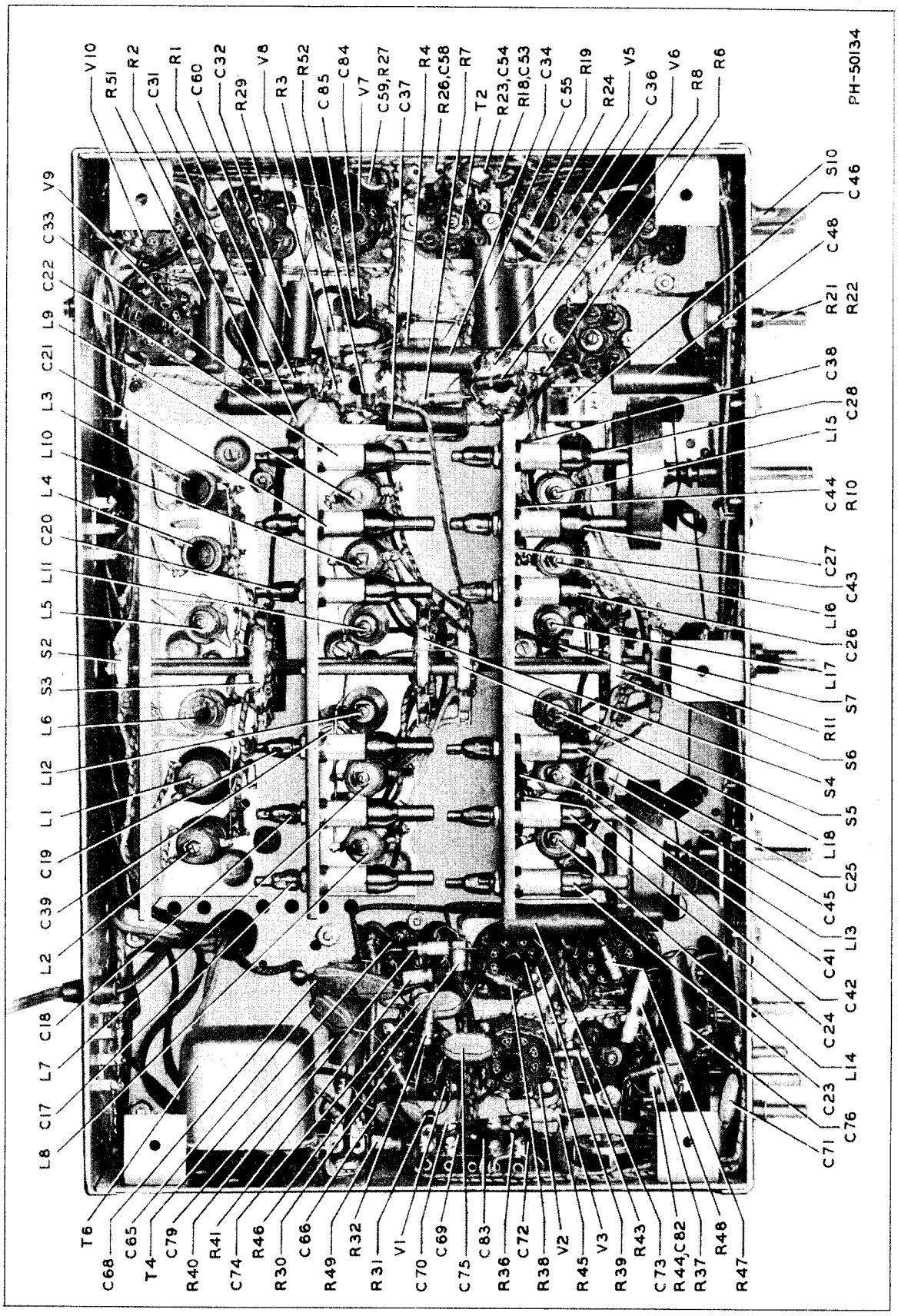
MODELS AR-77,AR-77E,
Early

RCA MFG. CO.



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RCA MFG. CO.

MODELS AR-77, AR-77E, Early

TUBE SOCKET VOLTAGES

	Tube	Cathode to Ground	Screen Grid to Ground	Plate to Ground	Suppressor Grid to Ground	Oscillator Plate to Ground	Heater (A.C.) Pin No. 2 to Pin No. 7
V8	RCA - 6SK7 (R-F Amplifier)	3.0 (Pin No. 5)	90 (Pin No. 6)	180 (Pin No. 8)	3.0 (Pin No. 3)		6.1
V6	RCA-6K8 (Det. Osc.)	2.6 (Pin No. 8)	75 (Pin No. 4)	240 (Pin No. 3)		60 (Pin No. 6)	6.1
V5	RCA - 6SK7 (1st I-F Amp.)	3.0 (Pin No. 5)	82 (Pin No. 6)	200 (Pin No. 8)	0 (Pin No. 3)		6.1
V7	RCA - 6SK7 (2nd I-F Amp.)	4.5 (Pin No. 5)	115 (Pin No. 6)	220 (Pin No. 8)	4.5 (Pin No. 3)		6.1
V1	RCA-6H6 (2nd Det.)						6.1
V3	RCA - 6SQ7 (A-F Amp. A.V.C.)	0.7 (Pin No. 3)		85 (Pin No. 6)			6.1 (Pin No.7 to Pin No. 8)
V4	RCA-6F6 (Output)	16.0 (Pin No. 8)	260 (Pin No. 4)	250 (Pin No. 3)			6.1
V9	RCA-VR- 150 (Voltage Regulator)			150 (Pin No. 5)			
V2	RCA - 6SJ7	0 (Pin No. 5)	50 (Pin No. 6)	15 (Pin No. 8)			6.1
V10	RCA-5Z4	300.0 (Pin No. 8)		375 a.c. (Pin No. 4 & 6)			5.0 *(CAUTION - 300 v d.c., voltage to ground)*

EQUIPMENT

Model AR-77: Domestic Model in Cabinet (see "Line Rating") MI-8302

Model AR-77E: Export Model in Cabinet (see "Line Rating") MI-8302A

Model AR-77E: Export Model on Rack Panel (105-125 V, 50/60 cycles) MI-8302B

Model AR-77E: Export Model on Rack Panel (105-250 V, 50/60 cycles) MI-8302C

Optional Equipment:

Loudspeaker in Cabinet MI-8303

*Loudspeaker on Rack Panel MI-8303A

Panel Kit for Rack Mounting of Model AR-77 ..... MI-8304

Panel Kit for Rack Mounting of Loudspeaker MI-8305

Power Pack for Model AR-77E (117 volts d-c) MI-8307-2

Power Pack for Model AR-77E (234 volts d-c) MI-8307-3

Phone Plug MI-6216

Headphones MI-5803

A-F Coupling Transformer for 500-ohm line MI-4904

* Export sale only.

Signal-to-Noise and Image Ratios:

Band	Frequency KC	Microvolts Input for 2:1 Signal-to-Noise Ratio	Image Ratio
1	540	1.6	50,000
	1,340	2.8	3,900
2	1,340	2.0	5,000
	3,300	2.3	910
3	3,300	1.9	1,000
	5,800	1.7	320
4	5,800	2.0	550
	10,200	1.8	100
5	10,200	2.3	380
	18,000	2.5	88
6	18,000	2.2	60
	31,000	1.5	25

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PARTS LIST, Type AR-77 Receiver MI-8302

Item	DESCRIPTION	Stock No.
C-1, C-2, C-3, C-4, C-5, C-6	Condenser — 3-gang, 6-section main tuning—less split gear, brass pinion, gear, and bearing assembly	34879
C-7, C-8, C-9, C-10, C-11, C-12, C-13, C-14, C-15	Capacitor — 3-gang, 9-section band-spread—less split gear, brass pinion gear, and bearing assembly	34880
C-16	Condenser—3.6 to 35 mmfd., 10-plate antenna adjuster	34892
C-17, C-18 C-19, C-20, C-21, C-22, C-23, C-24, C-25, C-26	Condenser — Air trimmer (medium)	12714
C-27, C-28	Condenser — Air trimmer (small)	12807
C-29	Condenser—3 to 25 mmfd., 7-plate beat-frequency oscillator control	34893
C-30	Condenser—2.5 to 12 mmfd., 3-plate crystal phase adjusting condenser	34894
C-31	Capacitor—180 mmfd., 400 volts	13003
C-32, C-33, C-34	Capacitor—0.01 mfd., 400 volts	4858
C-35	Capacitor—68 mmfd., 400 volts	13057
C-36, C-37	Capacitor—Same as C-32	
C-38	Capacitor—10 mmfd., 400 volts	13200
C-39	Capacitor—0.1 mfd., 400 volts	4839
C-40	Capacitor — 1000 mmfd., 400 volts	12635
C-41	Capacitor—5.6 mmfd., 400 volts	12814
C-42	Capacitor—330 mmfd., 400 volts	12952
C-43	Capacitor—2700 mmfd., 400 volts	30057
C-44	Capacitor—Same as C-40	
C-45	Capacitor—0.05 mfd., 400 volts	4886
C-46	Condenser — Stabilizing condenser	34895
C-47	Capacitor — 120 mmfd., 400 volts	12724
C-48	Capacitor—Same as C-45	
C-49, C-50, C-51	Capacitor — 100 mmfd., 400 volts	12720
C-52	Capacitor—Same as C-32	
C-53, C-54, C-55	Capacitor—Same as C-45	
C-56, C-57	Capacitor — 220 mmfd., 400 volts	12694
C-58, C-59, C-60	Capacitor—Same as C-45	
C-61	Capacitor—Same as C-49	
C-62	Capacitor—56 mmfd., 400 volts	12723
C-63	Capacitor—12 mmfd., 400 volts	13002
C-64	Capacitor—47 mmfd., 400 volts	13141
C-65, C-66	Capacitor—Same as C-56	
C-67		
C-68	Capacitor — 1200 mmfd. 400 volts	13054
C-69	Capacitor—Same as C-45	
C-70	Capacitor—Same as C-49	
C-71	Capacitor—Same as C-64	
C-72, C-73	Capacitor—Same as C-45	
C-74, C-75	Capacitor—Same as C-64	
C-76	Capacitor—Same as C-45	
C-77, C-78	Capacitor—5-5-5 mfd., 350 volts	34890
C-79	Capacitor—Same as C-39	
C-80	Capacitor—Same as C-49 (contained in T-5)	
C-81	Capacitor—Same as C-64 (contained in T-5)	
C-82, C-83	Capacitor—Same as C-45	
C-84, C-85	Capacitor — 20-20 mfd., 450 volts	34889
J-1	Jack—Headphone jack	7903
J-2, J-3	Jack—Phone tip jack for transmitter relay connections	33891
L-1	Coil—Antenna 540-1340 kc	34929
L-2	Coil—Antenna 1340-3300 kc	34930
L-3	Coil—Antenna 3.3-5.8 mc	34931
L-4	Coil—Antenna 5.8-10.2 mc	34932
L-5	Coil—Antenna 10.2-18.0 mc	34933
L-6	Coil—Antenna 18.0-31.0 mc	34934
L-7	Coil—Detector 540-1340 kc	34923
L-8	Coil—Detector 1340-3300 kc	34924
L-9	Coil—Detector 3.3-5.8 mc	34925
L-10	Coil—Detector 5.8-10.2 mc	34926
L-11	Coil—Detector 10.2-18.0 mc	34927
L-12	Coil—Detector 18.0-31.0 mc	34928
L-13	Coil—Oscillator 540-1340 kc	34917
L-14	Coil—Oscillator 1340-3300 kc	34918
L-15	Coil—Oscillator 3.3-5.8 mc	34919
L-16	Coil—Oscillator 5.8-10.2 mc	34920
L-17	Coil—Oscillator 10.2-18.0 mc	34921
L-18	Coil—Oscillator 18.0-31.0 mc	34922
L-19	Crystal Filter Assembly—Coil core, capacitor and form—less shield can—includes C-51	34891
L-20	Reactor—Filter reactor	35327
R-1	Resistor—470,000 ohms, ½ watt	30648
R-2	Resistor—10,000 ohms, ½ watt	3078
R-3	Resistor—330 ohms, ½ watt	8063
R-4	Resistor—22,000 ohms, ½ watt	30492
R-5	Resistor—150,000 ohms, ½ watt	30493
R-6	Resistor—Same as R-4	
R-7	Resistor—Same as R-3	
R-8	Resistor—Same as R-5	
R-9	Resistor—Same as R-2	
R-10	Resistor—Same as R-4	
R-11	Resistor—10 ohms, ½ watt	32184
R-12	Resistor—Same as R-2	
R-13	Resistor—6800 ohms, ½ watt	14659
R-14	Resistor—15,000 ohms, ½ watt	12759
R-15, R-16	Resistor—82,000 ohms, ½ watt	8064
R-17	Resistor—Same as R-1	
R-18	Resistor—68 ohms, ½ watt	32808
R-19	Resistor—270 ohms, ½ watt	30929
R-20	Control—80-ohm tuning meter zero adjustment	34910
R-21	Control—30,000-ohm sensitivity control	34920
R-22	Resistor—Same as R-1	
R-23	Resistor—Same as R-4	
R-24	Resistor—68,000 ohms, ½ watt	14138
R-25	Resistor—Same as R-2	
R-26	Resistor—Same as R-3	
R-27	Resistor—47,000 ohms, ½ watt	30787
R-28	Resistor—4700 ohms, ½ watt	30494
R-29	Resistor—100,000 ohms, ½ watt	3252
R-30, R-31	Resistor—Same as R-5	
R-32	Resistor—Same as R-27	
R-33	Control—100,000-ohm noise balance adjustment	34941
R-34	Control — 30,000-ohm limiter control	34938
R-35	Control—500,000-ohm volume control and power switch (S-1)	34939
R-36	Resistor—1 megohm, ½ watt	30652
R-37	Resistor—5600 ohms, ½ watt	30734
R-38	Resistor—220,000 ohms, ½ watt	14583
R-39	Resistor—1000 ohms, ½ watt	4687
R-40	Resistor—Same as R-29	
R-41	Resistor—Same as R-29	
R-42	Resistor—Same as R-1	

PARTS LIST (Continued)

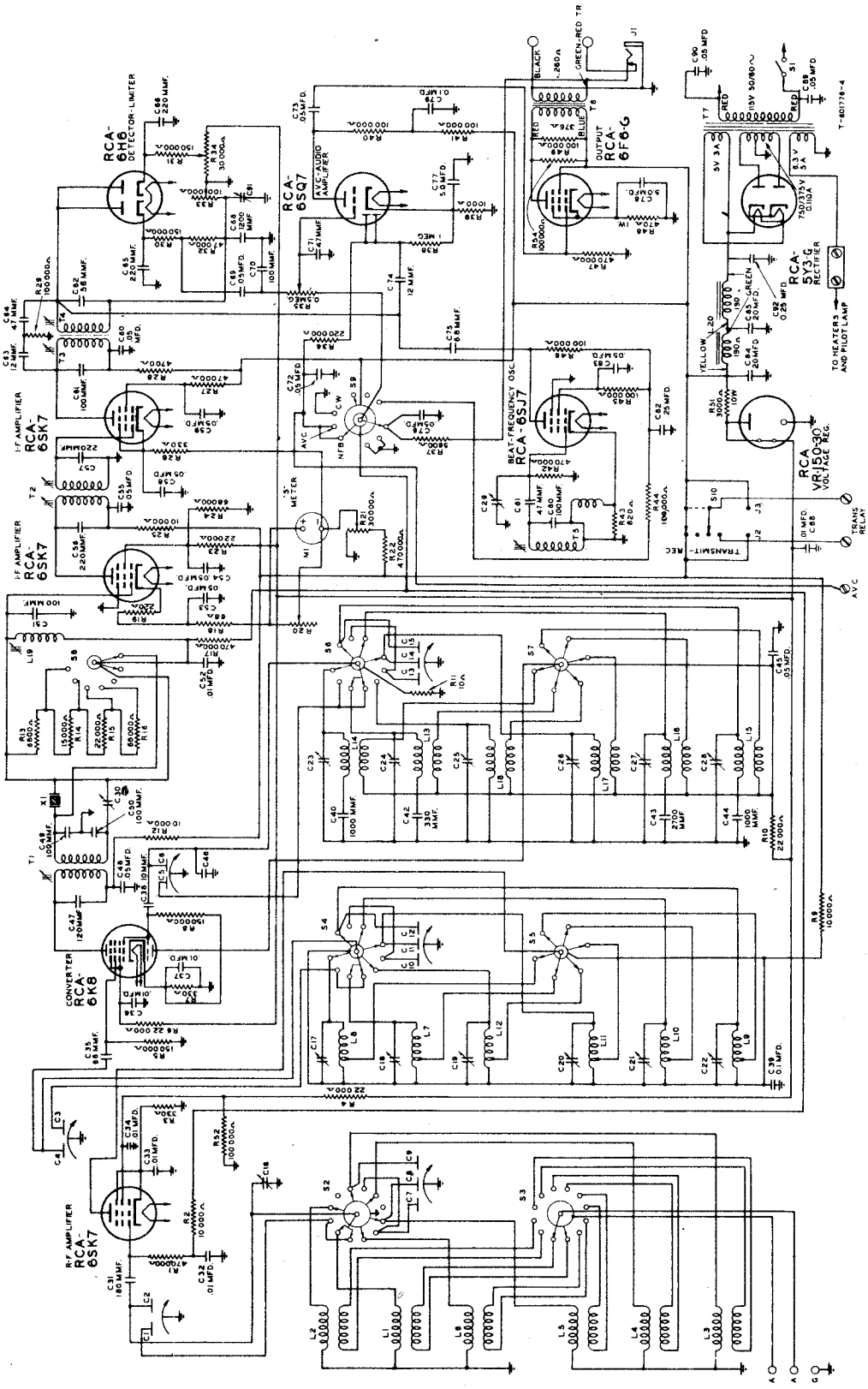
Item	DESCRIPTION	Stock No.
R-43	Resistor—820 ohms, ½ watt	30158
R-44, R-45, R-46	Resistor—Same as R-29	
R-47	Resistor—Same as R-1	
R-48	Resistor—470 ohms, 1 watt	30681
R-49	Resistor—Same as R-29	
R-50		
R-51	Resistor—3000 ohms, 10 watts	34943
R-52	Resistor—Same as R-29	
S-1	Power Switch—Combined with R-35	
S-2	Switch—Range switch wafer section 2	34915
S-3	Switch—Range switch wafer section 6	34916
S-4	Switch—Range switch wafer section 4, Same as S-2	
S-5	Switch—Range switch wafer section 1	34914
S-6	Switch—Range switch wafer section 5, Same as S-2	
S-7	Switch—Range switch wafer section 3, Same as S-5	
S-8	Switch — Crystal selectivity switch	34912
S-9	Switch—A.V.C. switch	34911
S-10	Switch — Transmit-receive switch	34913
T-1	Transformer — First detector plate I-F transformer complete—includes C-47, R-12	34885
T-2	Transformer—I-F transformer complete — includes C-56, C-57, R-25	34887
T-3	Transformer—I-F link transformer complete — includes C-61, C-63, R-28	34884
T-4	Transformer—Diode I-F transformer complete — includes C-62, C-64	34888
T-5	Transformer — CW oscillator transformer complete — includes C-80, C-81, R-42	34886
T-6	Transformer — Output transformer	14355
T-7 (Export)	Transformer—105-130, 140-160, 200-250 volts, 50/60-cycle power transformer (for AR-77E only)	31735
T-7 (Domestic	Transformer — 105-125 volts, 50/60-cycle power transformer (for AR-77 only)	9551
	MISCELLANEOUS	
	Bracket — Flywheel mounting bracket	34903
	Board—3-contact terminal board	12716
	Board—5-contact terminal board	34896
	Cord—Dial drive or range shutter control cord	32634
	Coupling—Range switch coupling with set screws	34937
	Detent—Range switch detent plate assembly	34936
	Dial—Transluscent band spread dial complete with hub and set screws	34900
	Dial—Transluscent main tuning dial complete with hub and set screws	34901
	Drum—Large dial drive drum complete	34908
X-1	Crystal—455-kc crystal filter and case	MI-7953
	Flywheel — Tuning flywheel with set screws	34902
	Gear—Brass pinion gear and bearing assembly	34882
	Gear — Split main or band spread condenser drive gear	34881
	Guide, Band indicator shutter guide rods and strap assembly	34899
	Lamp — 6.3 volt dial lamp, Mazda No. 44	11891
	Pulley—Band indicator idler pulley and bracket	34907
	Pulley—Small dial drive pulley and hub with set screws	31271
	Scale — Calibrated stationary vernier scale—less support	34905
	Screw—No. 8-32 set screw for dial drive drum	4669
	Shaft—Dial drive flywheel shaft	34904
	Shaft—Range switch shaft—10¼ inches long	34935
	Shutter—Finished band indicator shutter plate with indicating wire and pilot lamp bracket	34897
	Socket—8-contact phenolic socket	18007
	Socket—8-contact wafer socket	18467
	Spring—Band indicator shutter lift spring	34898
	Spring—Dial drive cord tension spring	32481
	Spring—Triple loop spring used on rear end of band switch shaft	34944
	Support—Vernier scale support and hub assembly	34906
	Knob—Antenna adjuster control knob	34949
	Knob—Bar type control knob (8 used)	34950
	Knob—Main tuning or band spread control knob	34947
	Knob—Range switch control knob	34948
	Mask—Metal window mask plate	34953
M-1	Meter — Carrier level meter complete	34946
	Socket—Pilot lamp socket	34951
	Socket—Pilt lamp socket and clip	34909
	Window—Clear dial window sheet	34952

SPEAKER PARTS, MI-8303 and MI-8303-A (RL-73-1)

	Cone—Speaker cone and voice coil	31310		Socket—3-contact female socket for speaker cable	5119
	Escutcheon—"RCA" escutcheon	13059			
	Plug—3-contact male plug for speaker	5118		Speaker—Speaker unit only less panel	9712

MODELS AR-77, AR-77E,
Late

RCA MFG. CO.



IF PEAK 455 KC

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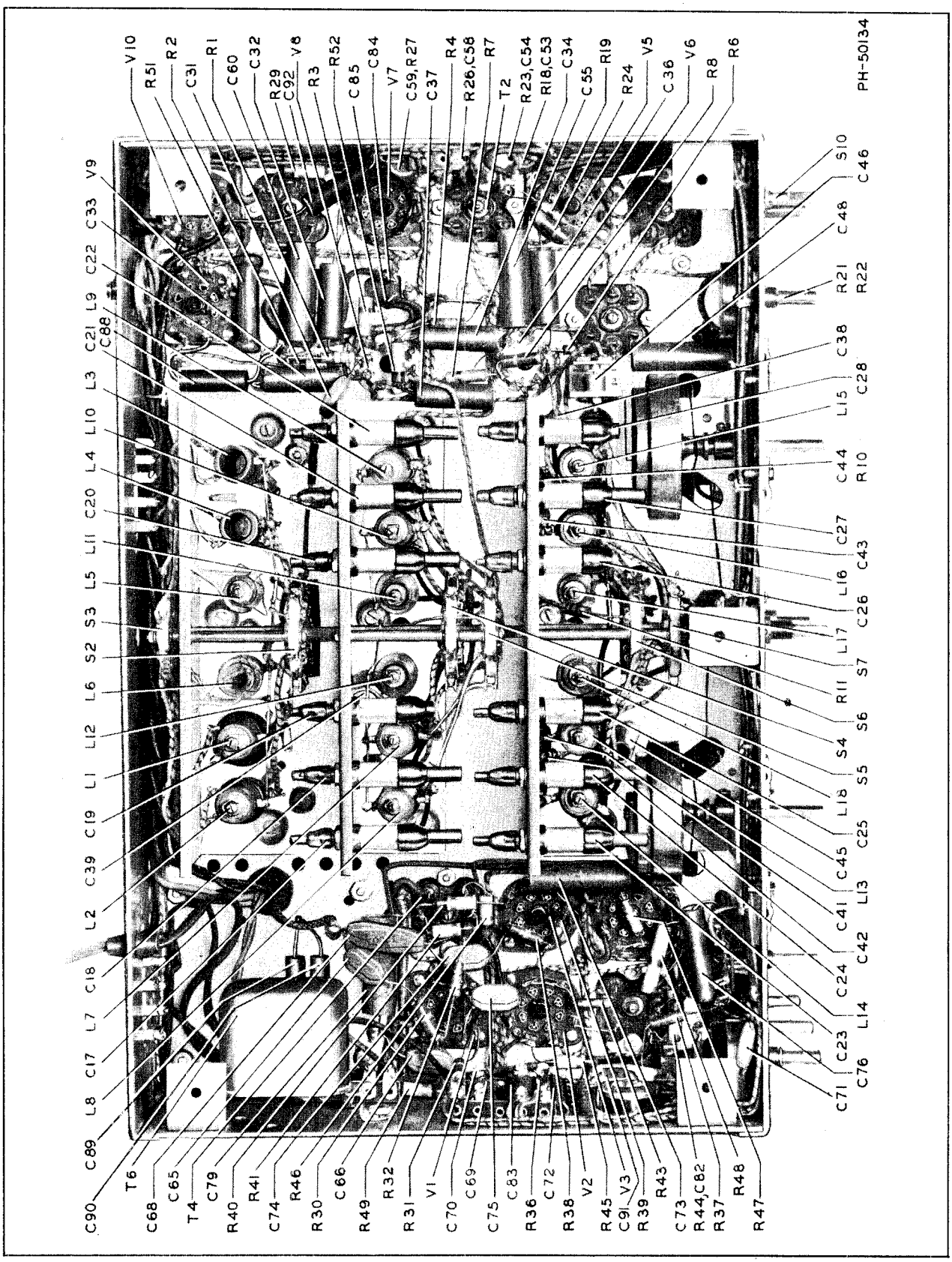
MODELS AR-77,AR-77E,
Late

RCA MFG. CO.



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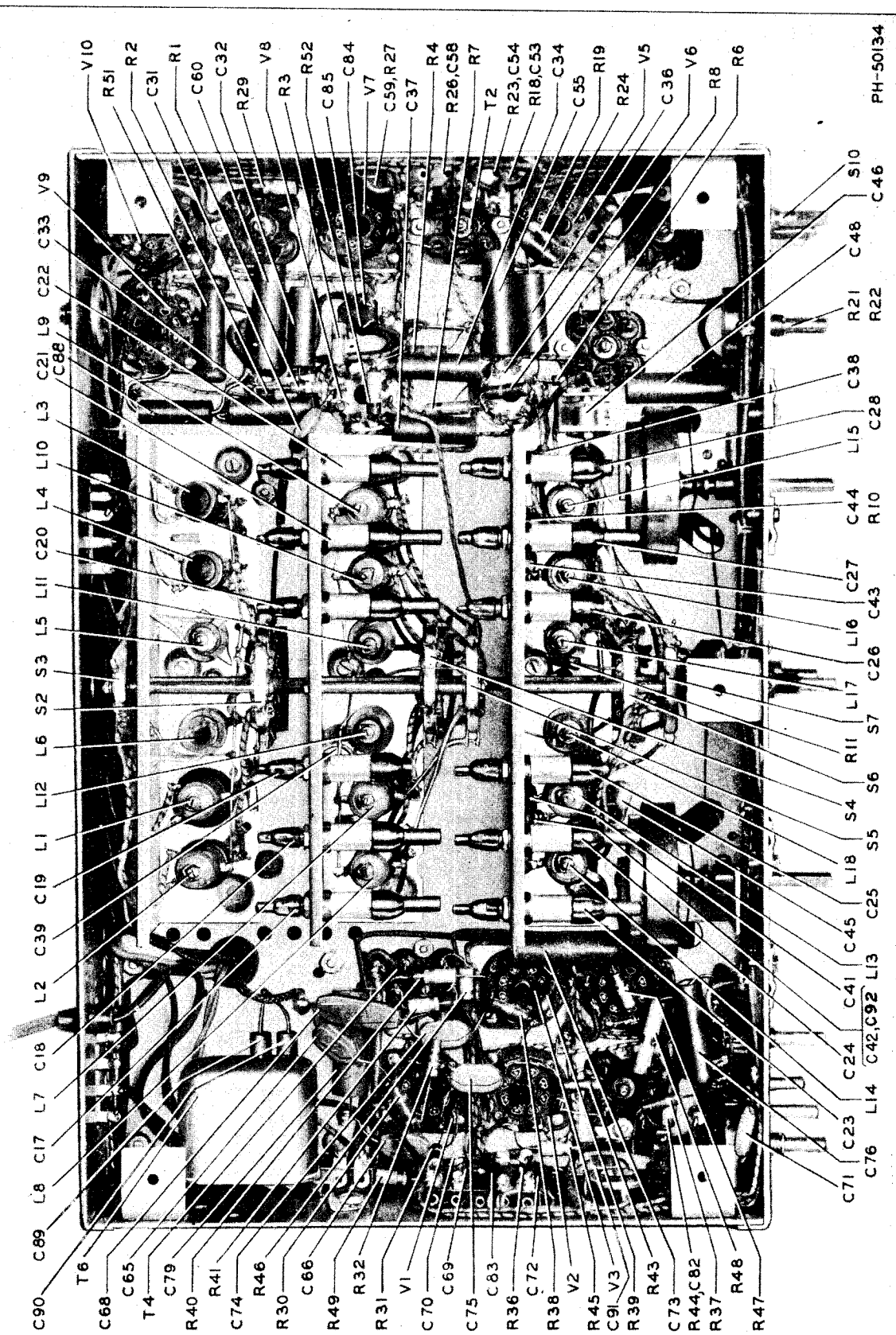

Figure 4—General Purpose Communication Receiver (Chassis Bottom View)

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MODELS AR-77, AR-77E,
Revised

RCA MFG. CO.

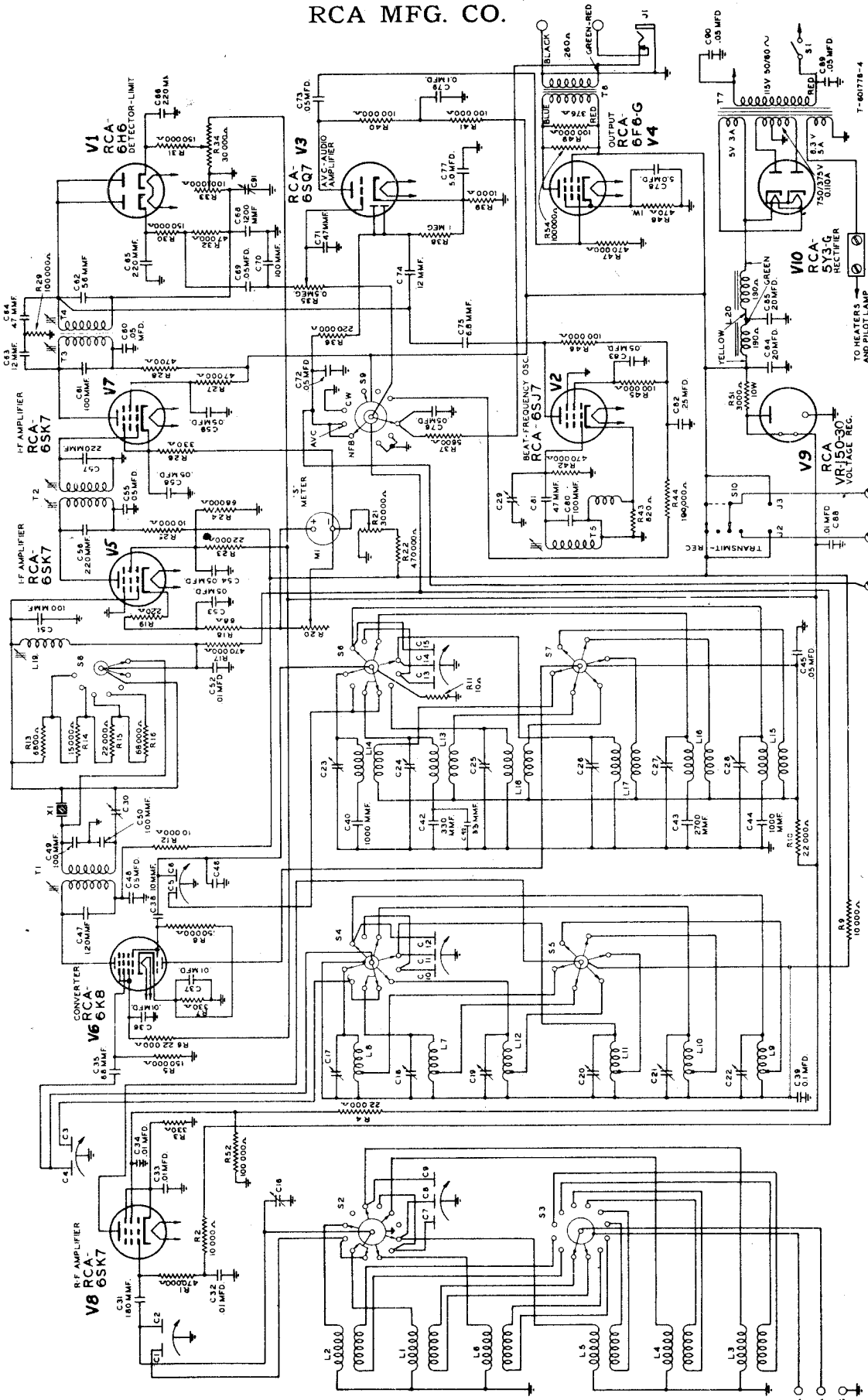

Figure 5—General Purpose Communication Receiver (Schematic T-601776)

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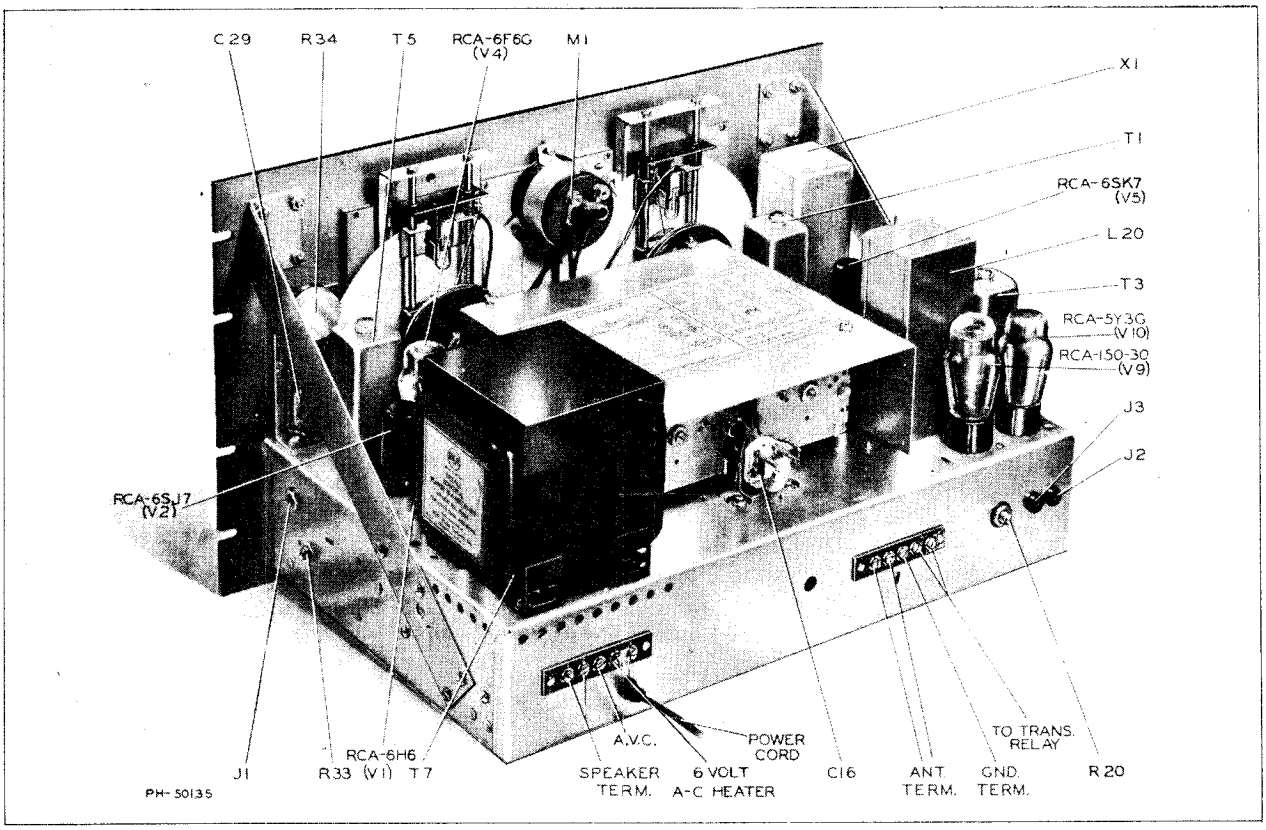

A. Rack-Type Chassis

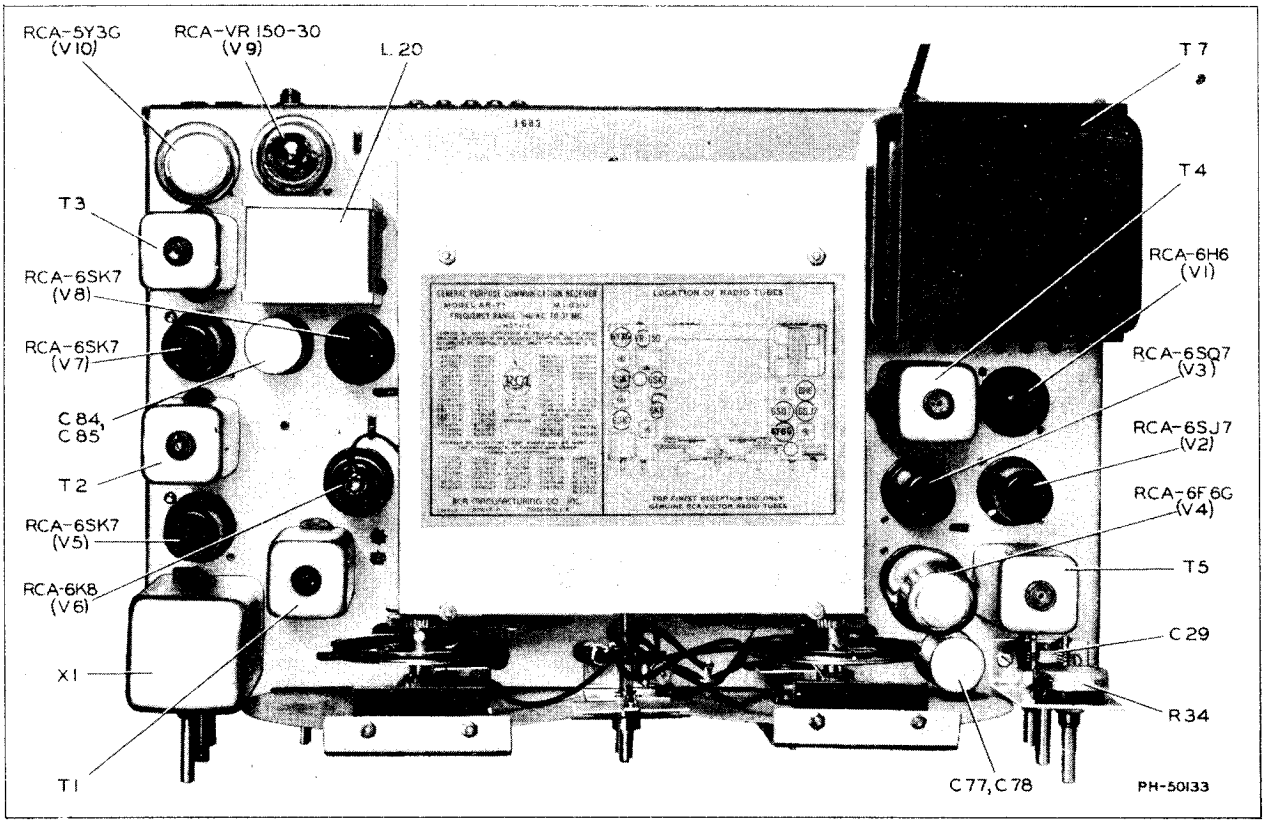

Figure 3—General Purpose Communication Receiver (Chassis Top Views)

B. Cabinet-Type Chassis

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MODELS AR-77,AR-77E,
Late, Revised

RCA MFG. CO.

TECHNICAL SUMMARY

All performance data were obtained on an average receiver. Slight variations above or below these values may be encountered due to practical manufacturing tolerances. A 300-ohm dummy antenna was used in series with the receiver input in making all measurements.

ELECTRICAL CHARACTERISTICS—

Frequency Range (total, 6 bands) ..... 540 to 31,000 kc
- Band 1 ..... 540 to 1,340 kc
- Band 2 ..... 1,340 to 3,300 kc
- Band 3 ..... 3,300 to 5,800 kc
- Band 4 ..... 5,800 to 10,200 kc
- Band 5 ..... 10,200 to 18,000 kc
- Band 6 ..... 18,000 to 31,000 kc

Frequency Stability:

Warm-up Shift, 1 minute to 1 hour, 68° F. Ambient (Average Humidity Conditions) ..... Less than 3.5 kc at 30 mc

Shift with Line Voltage Variation, 105 to 125 volts ..... Less than 1,300 cycles at 29 mc
Shift is proportionally less at lower frequencies

Sensitivity: Input (30% mod.) required for 0.05 watt output ..... Less than 2 microvolts

Signal-to-Noise and Image Ratios:

Band	Frequency KC	Microvolts Input for 2:1 Signal-to-Noise Ratio	Image Ratio
1	540	0.9	50,000
	1,340	1.7	3,900
2	1,340	1.7	5,000
	3,300	1.9	910
3	3,300	1.4	1,000
	5,800	1.2	320
4	5,800	1.4	550
	10,200	1.2	100
5	10,200	1.8	380
	18,000	1.6	88
6	18,000	1.7	60
	31,000	1.0	25

Maximum Undistorted Output (approximate) ..... 3 watts

Power Supply Requirements:

Line Rating—
- Model AR-77 ..... 105-125 volts, 50/60 cycles
- Model AR-77E* ..... 105-130/140-160/195-250 volts, 50/60 cycles

* See "EQUIPMENT" list below for special rack models and optional power packs available.

Power Consumption ..... 70 watts

MECHANICAL SPECIFICATIONS—

Dimensions ..... 20⅛ inches (width) x 10½ inches (height) x 11⅝ inches (depth)

Weight (net) ..... 48½ pounds

EQUIPMENT

Model AR-77: Domestic Model in Cabinet (see "Line Rating") MI-8302D
Model AR-77E: Export Model in Cabinet (see "Line Rating") MI-8302E
Model AR-77: Domestic Model in Cabinet (105-125 v., 25 cycles) MI-8302F
Model AR-77: Domestic Model on Standard 10-15/32-inch Panel (see "Line Rating") MI-8302G
Model AR-77E: Export Model on Standard 10-15/32-inch Panel (see "Line Rating") MI-8302H

Optional Equipment:

- Loudspeaker in Styled Cabinet to match Receiver MI-8303
- Loudspeaker on Standard 10-15/32-inch Panel MI-8303A
- Extended Range Loudspeaker in Console Cabinet MI-8314
- Extended Range Loudspeaker in Wall Type Cabinet MI-8314A
- Panel Kit for Rack Mounting of Model AR-77 (12-7/32-inch Panel) MI-8304
- Panel Kit for Rack Mounting of Loudspeaker (10-15/32-inch Panel) MI-8305
- Power Pack for Model AR-77 or AR-77E (105-125 volts d-c) MI-8307-2
- Power Pack for Model AR-77 or AR-77E (210-250 volts d-c) MI-8307-3
- Power Pack for Model AR-77 or AR-77E (6-volt battery) MI-8308
- Phone Plug MI-6216
- Headphones MI-5803
- A-F Coupling Transformer for 500-ohm line MI-4904

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INSTALLATION

POWER SUPPLY—The power supply circuit is integral with the receiver in both the Model AR-77 and the Model AR-77E. At installation, the line voltage and frequency should be determined and checked for conformance to the nominal rating of the receiver. Reference should be made from the MI number on the instrument label on the top of the chassis to the corresponding rating shown in the "Equipment" list. Three power packs are available as accessory items to permit operation on special power supplies.

For connection of an external power pack, there are two terminals on the rear of the chassis connected by a link as shown in Figure 3A. This link should not be disturbed, except for the purpose intended. It is connected in the tube heater supply circuit.

In the Model AR-77E, MI-8302E and -8302H, the power transformer primary may be connected in any of three arrangements to accommodate a wide range of line voltages. Remove the small metal cap from the top of the power transformer and place the "U" shaped connector between the center terminal and that outside terminal marked with a value nearest to the actual line voltage. Thus, if the line voltage were 130 volts, the connector should be placed in the "125 V." position.

If the receiver is to be used for continuous service, especially when unattended, a 3-ampere fuse should be installed in series with the power source.

TUBES—Inspect the chassis before applying power to make certain that all tubes are firmly seated in their sockets and that the grid lead to the RCA-6K8 tube is in place.

ANTENNA—For general use it is recommended that an antenna of the doublet type, either single or double, be used. Connections to either type are shown in the accompanying diagram. Both types will give very good performance in any two amateur bands.

Any of the directive type antennas used for transmission may be satisfactorily employed for reception with this receiver. It will be found that very good results also may be obtained with a single wire antenna from 25 to 75 feet long.

In locations where the antenna transmission line is near power wiring or other sources of noise interference, it is recommended that a coupling transformer such as RCA Stock No. 9813 be connected between the receiver and the antenna transmission line. This transformer, however, is satisfactory only for the 160-, 40- and 20-meter bands. Transmission line such as RCA Stock No. 12430 or Stock No. 9882 is recommended for use with the doublet antennas, the latter being recommended for lengths in excess of 100 feet. The characteristics of these lines are:

Stock No. 12430 (90-foot length) or Stock No. 12429 (45-foot length)

Impedance 100 ohms

DB loss per 100 feet at 10 mc ..... 2 db dry
DB loss per 100 feet at 30 mc ..... 5 db dry
DB loss per 100 feet at 10 mc . 4 db 90% humidity
DB loss per 100 feet at 30 mc . 8 db 90% humidity

Stock No. 9882

Impedance 100 ohms

DB loss per 100 feet at 10 mc ..... 1 db dry
DB loss per 100 feet at 30 mc ..... 2.5 db dry
DB loss per 100 feet at 10 mc. 1.5 db 90% humidity
DB loss per 100 feet at 30 mc. 3.5 db 90% humidity

This transmission line, as well as other RCA antenna materials, may be purchased through RCA Parts Distributors.

The terminal board at the back of the chassis, near the center, contains the connecting terminals for the transmission line (or for the antenna lead-in) and ground. If an ordinary antenna is used, the adjacent transmission-line terminal should be connected to the ground terminal, and the antenna to the other transmission-line terminal.

SPEAKER OR PHONES—This receiver is designed for use with a permanent-magnet dynamic type speaker, having a voice-coil impedance of from 2 to 3 ohms. The RCA Stock No. MI-8303 speaker (see Figure 2) is designed and recommended for the purpose. The terminals for connection to the speaker are shown in Figure 3A.

The RCA Manufacturing Company also produces two deluxe extended range speakers. One, MI-8314, is housed in a walnut cabinet; the other, MI-8314A, is contained in a walnut cabinet for wall mounting.

A jack is provided on the right-hand side of the cabinet, near the front, for plugging in a pair of 600-ohm headphones. The speaker is automatically disconnected when the phones are plugged in.

INSTALLING SHOCK MOUNTS—The following series of operations should be adhered to when installing shock mounts on Communication Receiver, Model AR-77:

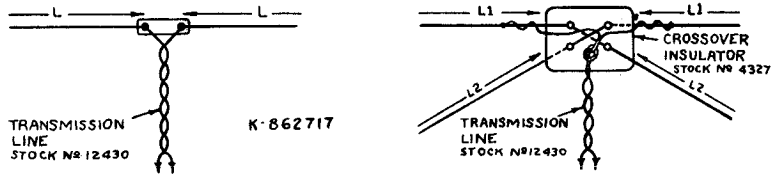
a. Remove all control knobs from the receiver panel.

b. Remove the rear cover grille from the receiver panel.

c. Take out the five screws and washers which are used to attach the receiver to the bottom of the case and withdraw the receiver from the case.

d. Remove the four rubber feet from the bottom of the cabinet by taking out the nuts and screws with which they are attached, enlarge (drill out) the four holes with a 7/64 inch drill.

e. Attach the shock mounts to the bottom of the receiver case using the four ½ inch screws with nuts and lock washers. These screws should be passed through the holes which were drilled out in the preceding operation. Four 1/32 inch spacers are provided, one of which should be placed on each mounting screw between the bottom of the case and the channel brackets of the shock mounts.



SINGLE-DOUBLET ANTENNA

L = 130 feet for 160-Meter (1,900 kc) Band
L = 65 " " 80- " (3,800 kc) "
L = 33 " " 40- " (7,150 kc) "
L = 16 " " 20- " (14,200 kc) "
L = 8 " " 10- " (28,000 kc) "

DOUBLE-DOUBLET ANTENNA

L_1 = 130 feet for 160-Meter Band
L_1 = 65 " " 80- " "
L_1 = 33 " " 40- " "
L_1 = 16 " " 20- " "
L_2 = 65 " " 80- " "
L_2 = 33 " " 40- " "
L_2 = 16 " " 20- " "
L_2 = 8 " " 10- " "

Doublet Antenna Connections

NOTE—In order to facilitate the replacement of these shock mounts, should it become necessary to remove them for receiver servicing at some future date, it is suggested that the position of the mounts be marked on the bottom of the cabinet by drawing the point of a scriber or other pointed implement along the edge of the channel bracket.

f. Replace the receiver in the case and mount it therein, using the five (new) 7/16 inch screws provided for this purpose.

g. Replace the back cover (grille) and the receiver control knob.

RACK PANEL MOUNTING OF RECEIVER—If it is desired to mount the receiver on a rack panel, the necessary panel and supports (MI-8304) are available for this type of mounting. This set of parts includes everything necessary to mount the standard receiver chassis to the rack panel.

The receiver chassis is first removed from the cabinet. For this purpose first remove all knobs from the control shafts. Next remove the perforated metal screen on the back of the cabinet by taking out the five self-tapping screws. Remove the five ¼ inch machine screws underneath the cabinet. Next disconnect the tuning meter on the front panel. The chassis is now ready to be removed from the cabinet. The chassis should be tipped up at the rear just before entirely removing to prevent hitting the two front brackets against the upper angle at the rear of the cabinet.

With the chassis removed, the dial window mask and window should then be assembled to the rack panel. The panel is fastened to the chassis by means of six machine screws. Spacers are placed between the panel and the chassis. The side brackets should then be attached.

One of the headphone jacks should be wired directly to the receiver output terminals. This jack will then allow the receiver output to be monitored in installations where the output of the receiver is connected to a line.

The other headphone jack should be connected exactly like the one on the side of the receiver chassis. This may be simplified in the following manner: It will be observed that the ground and output terminal connections are already connected to the first jack. Jumpers may then be placed between the two jacks for these connections. The remaining connection is to the output transformer primary. This lead should be removed from the jack on the side of the receiver and connected to the jack on the panel. The purpose of this second jack is to connect a pair of headphones and at the same time remove the receiver output from the line. Thus, in a diversity system, one receiver may be easily removed from the combined output and tuned or adjusted without disturbing the others.

A receiver, mounted on a 10 15/32 inch x 19 inch panel, ready to be installed on a rack, is also available. The Model AR-77, MI-8302G, is for use with a power supply of 105-125 volts, 50/60 cycles; and the Model AR-77E, MI-8302H, is for use with 105-130; 140-160; 195-250 volts, 50/60 cycles.

RACK PANEL MOUNTING OF LOUDSPEAKER—The loudspeaker, Stock No. MI-8303, may be converted for rack mounting by purchasing the panel kit, MI-8305, available for this purpose.

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OPERATION

Before attempting to operate the receiver, this entire section should be carefully studied so that the operator may obtain a general understanding of the various controls and their functions and adjustment. The symbols on the panel used to designate the various controls should be learned with respect to function as shown on Figure 1.

TUNING—In tuning this receiver, the various controls should be approximately set for the class of signal it is desired to receive. Select the frequency band desired by rotating control knob "R" until the proper scale appears in the slot at the upper left of the panel. Before proceeding, adjust the antenna trimmer to maximum for this band (see next paragraph—"Antenna Trimmer"). The frequency calibrations on the main dial scales are correct for tuning, when the bandspread dial is turned to its maximum frequency position only.

The bandspread dial is calibrated for the amateur bands of 10, 20, 40 and 80 meters only. To use the bandspread on these bands, set the main tuning dial at the highest frequency on that band, then tune with the bandspread dial. On the 160-meter band, the calibrations on the main dial are spread sufficiently so that it is not necessary to use the bandspread tuning. For an extremely accurate calibration, set the bandspread dial for a signal of known frequency, and then adjust the main dial until the station is tuned in. When this position has been obtained, note the setting of the arbitrary scale with its vernier index, on the main dial.

For commercial operation, or bands other than Amateur, the arbitrary scales should be used on the main tuning and bandspread dial. If the bandspread is not used, it should be left at the high frequency end of its range and then the main dial calibration is correct.

Curves may be plotted, giving arbitrary scale readings versus frequencies, on any band, by observing the readings on the arbitrary scales for a number of stations of known frequency on the same band, and working them on a suitable graph or chart.

ANTENNA TRIMMER—Before tuning on any frequency range, the antenna trimmer should be adjusted for maximum performance on that band. This control may be adjusted by tuning for maximum background noise. Occasionally it is desired to test a signal that seems out of place, to see whether or not it is a fundamental signal or an "image."

When adjusting the antenna trimmer, if the maximum signal point coincides with the point of maximum background noise, the signal is a fundamental. If the control does not affect the signal strength, or if it is maximum at some other point, the signal heard is an "image."

CRYSTAL SELECTIVITY SWITCH—For general operation while tuning, it is recommended that the crystal switch be in the "OFF" position. After the main tuning dial has been set at the desired point, the crystal may be placed in the circuit while tuning over the bandspread range. Crystal selectivity positions 1 and 2 should be used for phone or modulated signal reception and 3, 4 and 5 for CW telegraph reception.

It will be noticed that when tuning in a modulated signal with the crystal in, the speaker volume is greater on either side of the point which gives the maximum tuning meter indication. The reason for this is that the carrier voltage controls the gain of the receiver by means of the A.V.C. circuit, and if the carrier frequency is detuned slightly from resonance, the gain of the receiver increases so that part of the side band frequencies are amplified very much more than they are when the carrier is tuned to exact resonance. This is characteristic and normal for receivers with this degree of selectivity and provided with A.V.C. Care should be taken to tune the receiver for a maximum meter indication. Very much better results will be obtained. The background noise and adjacent channel interference will be materially reduced.

This receiver has been designed to have a selectivity characteristic which is slightly flat at resonance when the crystal is out, so that better fidelity of reception may be enjoyed when interference conditions permit. It is therefore likely that when the crystal is placed in the circuit, slight retuning may be necessary. This is due to the fact that exact tuning is much more necessary when using a sharp I-F circuit than when using a broad circuit.

CRYSTAL PHASING CONTROL—There is a normal or "neutral" position for this control, in which position it should be set for all normal reception. To locate this position, set the Crystal Selectivity Switch on position 3 or 4, and, using high gain with no incoming signal, adjust the phasing control for minimum noise. This control should be changed from this position only when a strong signal is producing a heterodyne action with the desired signal. In this case, the control should be adjusted for a minimum heterodyne effect.

VOLUME AND SENSITIVITY CONTROLS—For phone reception the sensitivity control should be set at maximum and the audio volume control used to obtain the desired volume. For CW telegraph reception the audio volume control should be set at three-fourths to maximum position and the desired volume obtained by adjustment of the sensitivity control.

NFB-AVC-BFO SWITCH—These letters stand for "NEGATIVE FEED-BACK," "AUTOMATIC VOLUME CONTROL," "BEAT FREQUENCY OSCILLATOR." The "NFB" position places the compensated negative feedback in the audio circuits, resulting in an increase in fidelity. This is useful for tests in voice transmissions and for entertainment use such as on broadcast reception. When using this position the volume control must be advanced slightly. This position is not recommended for other forms of reception.

The A.V.C. is in operation on both the "NFB" and "AVC" positions of this switch.

The A.V.C. is "OFF" when the switch is in the "BFO" position. This position connects the beat-frequency oscillator.

BFO FREQUENCY CONTROL—This control is provided to secure any desired audio beat frequency, for the reception of CW code signals. It should be set slightly off the central position, in normal use. The exact position may be found by experiment. With the crystal switch "OFF," the desired beat note may be obtained by tuning the receiver. However, in conditions of interference, when the crystal filter is used, the receiver must first be tuned to the desired signal, regardless of the beat frequency produced. If the beat note is not satisfactory, it may be changed with the BFO control. In other words, first tune for maximum signal strength, then adjust for the desired audio pitch.

When tuning in the same direction (that is, going from the high frequency to the low frequency end of the band, or vice versa), ALL signals will be changing in pitch in the same direction when resonance is reached. That is, the pitch will either be increasing or decreasing, depending on whether the BFO control is on one side or the other side of I-F resonance. It does not matter on which side the BFO control is placed, the CHANGE OF PITCH should be noted when tuning. If the change of pitch is opposite to that known to exist when passing through resonance, the signal is an audio image. Never try to receive an audio image. The signal can be made much stronger by tuning to the other side of zero beat.

NOISE LIMITER LEVEL CONTROL—When starting to tune the receiver, this control should be set in the "OUT" position, or advanced about one-quarter to three-quarters of the way in the counter-clockwise direction. Should external noise conditions interfere with reception, this control may be advanced as necessary, avoiding distortion of the signal. This control may be found especially helpful for reducing certain types of interference encountered on the 10-meter band. For CW reception with the noise-limiter, the sensitivity control should be advanced, and the volume control reduced until limiting action occurs.

TRANSMIT-RECEIVE SWITCH—This switch opens the plate circuits of the receiver on the transmit position and shorts the two terminals on the antenna terminal strip (shown in photograph Figure 3A), which may be connected to a relay for operation of the transmitter.

In addition, terminals J2 and J3 are provided so that, if desired, the plate circuit of the receiver may be opened by a transmitter switch. Note that these terminals are at plate potential.

TUNING OR "S" METER ADJUSTMENT—The "S" meter should normally give a low scale reading when no signal is being received. To adjust this meter, tune the receiver to a point free of signals, turn the sensitivity control to maximum, switch in A.V.C. switch crystal "OUT," have antenna trimmer turned off resonance, and then adjust the potentiometer R20 at the back of the receiver as shown in Figure 3A until the meter pointer just coincides with the mark at the low end of the scale. The meter will usually rise slightly when the antenna trimmer is tuned to resonance.

The calibration of this meter is arbitrary, since no standard has been set for conversion of the "S" units to microvolts. However, in this receiver, "S1" is equivalent to approximately 0.5 microvolt input to the receiver. Each unit above this is 6 db up to "S9" Thus, "S2" is equivalent to 1 microvolt, "S3" to 2 microvolts. Above "S9" the meter is calibrated to 40 db, which would be equivalent to 12,800 microvolts.

For CW telegraph reception, the "S" meter provides a visual indication of the position of the sensitivity control.

BREAK-IN OPERATION—Break-in operation may be obtained on CW telegraph operation by connecting a separate antenna to the receiver. A single wire antenna or a doublet tuned to a different band than that on which the transmitter is working is recommended. If a doublet antenna tuned to the transmitter frequency is used, sufficient voltage may be induced in the receiving antenna to damage the receiver.

DIVERSITY RECEPTION—Two or three of these receivers may be connected together for diversity reception of modulated signals, with no additional equipment necessary. Each receiver must be provided with a separate antenna in the usual manner. The A.V.C. terminal on the back of the receiver, shown in Figure 3, is connected inside the receiver to the A.V.C. circuits. This terminal must be connected to the corresponding terminals of the No. 2 and No. 3 receivers. The receiver outputs should all be connected in parallel. Note that one of the output terminals of this receiver is at ground potential.

FOR CONNECTION TO A TELEPHONE LINE—It is recommended that a transformer such as RCA type MI-4904 be used. The connections to the type MI-4904 transformer should be made as follows:

1. Connect the output terminals of one or more Model AR-77 receivers in parallel to terminals No. 4 and No. 41 of the transformer.
2. Connect the 500-ohm line to transformer terminals 1A and 3B.
3. Connect a jumper between transformer terminals 1B and 3A.
4. Connect a 500 to 600 ohm, ½ to 1-watt resistor across the 500-ohm line, or across terminals 1A and 3B.

Connecting a pair of headphones in the jack on each receiver will disconnect it from the combined output so that the tuning or other adjustments may be checked. Obviously, the audio volume control on each receiver should be set to approximately the same level. For CW telegraph diversity reception, it is recommended that a combining and tone-keyer unit be used.

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MAINTENANCE

CIRCUIT DETAILS AND FEATURES—In reading the following discussion of the electrical circuit, reference should be made to the schematic diagram, Figure 5.

INPUT COUPLING—The antenna coupling system is designed to provide optimum coupling from transmission lines of 50 to 500 ohms, or from conventional antenna and ground systems. The coupling coils are balanced to ground and may be connected directly to a balanced transmission line. An antenna trimmer capacitor adjustment is provided on the front panel to insure first circuit resonance with any antenna system.

RADIO-FREQUENCY AMPLIFIER—The r-f amplifier is designed to provide as much selectivity as possible ahead of the first detector. The amplification is adjusted to provide optimum signal to noise ratio by making noise contributions of circuits following the first tube negligible in comparison with the noise contributed by the first r-f grid circuit. A uniform amplification is obtained over all frequency ranges. On the two highest frequency ranges the oscillator frequency is placed below the signal frequency. This gives better freedom from image signals in the higher frequency amateur bands.

BAND SPREAD—Band spreading is accomplished by means of a capacitor gang having sections of capacity suitable for each amateur band. The sections of this capacitor are connected by the band switch so that on each amateur band, proper size of capacitor is used to spread the band over the entire tuning dial. The dials are directly calibrated in frequency.

R-F HETERODYNE OSCILLATOR—The r-f oscillator circuit is of the tuned-grid type with plate circuit feedback. A voltage regulator is used to stabilize the plate voltage. Temperature changes are compensated for by a special capacitor. This capacitor is composed of a small bi-metal plate, which is adjusted to have a temperature coefficient which will compensate for all other circuit changes. This type of temperature compensation was found to be quite satisfactory since the circuit minimum and maximum capacities are the same on the higher frequency ranges. That is, the temperature coefficient of this compensating capacitor is adjusted at the factory for best results on the high frequency end of the highest frequency range. The compensation is then near optimum on the high frequency end of each band. As the receiver is tuned from the high frequency end to the low frequency end of each band more tuning capacity is added and less compensation is needed. Since the capacity of the compensating capacitor is small compared to the tuning capacitor, less compensation results. Thus, a fairly uniform temperature characteristic is obtained over a very wide frequency range.

INTERMEDIATE-FREQUENCY AMPLIFIER—As may be seen from the schematic diagram, two stages of i-f amplification are used. A crystal filter is placed between the first detector and the first intermediate amplifier. This filter is adjustable by means of a control on the front panel and provides five positions of selectivity. A crystal phasing control of the usual type is also provided on the front panel. The intermediate frequency is 455 kc.

BEAT-FREQUENCY OSCILLATOR—The BFO second heterodyne oscillator used for CW reception is a separate pentode. The coupling to the second detector is just sufficient to provide suitable heterodyne action. A panel control is provided for changing the frequency a small amount so that any desired audio beat-frequency may be obtained.

AUTOMATIC VOLUME CONTROL AND "S" METER—The A.V.C. circuit is a simple diode rectifier. Referring to the schematic diagram, Figure 5, the received signal carrier produces a voltage across R-38 which is filtered by R-36 and C-72 and applied to the control grids of the r-f and i-f amplifiers. The "S" meter is connected in the cathode circuit of the first i-f tube and thus records changes in plate current caused by changes of A.V.C. voltage applied to the grid. This type of "S" meter circuit provides the desired wide range and the greater portion of the scale is approximately linear with respect to db input.

NOISE LIMITER—A noise limiter is provided in the second detector circuit. The limiter is manually adjusted. This provides best limiter action since noise voltages cannot increase the limiter bias.

It has been found that noise such as that produced by the ignition systems of automobiles may have an effective value in excess of that of a weak signal. This is particularly true on the 10-meter band. In order to be effective, the limiter must have a bias or "gate opening" of not more than twice the signal carrier amplitude. If this "gate opening" is provided by the signal such as is done in present automatic noise circuits, the noise voltage, if it has a higher effective value than the signal, will open the "gate" to such a high value that the limiter circuit is ineffective. The action of the noise circuit in this receiver is such as to make signals readable which are below the effective noise voltage.

Referring to the schematic diagram, Figure 5, the signal and noise voltages appear across R-32 and the noise peaks alone appear across R-33, since the bias applied to R-31 by the potentiometer R-34 prevents this diode from operating with the signal voltage. The sum of these voltages (across R-32 and R-33) are applied to the audio amplifier. It is apparent that the noise peak voltage across R-32 is out of phase or opposed to that across R-33. The "balance" of this circuit is adjusted by potentiometer R-33. The potentiometer R-34 is the front panel bias control.

SERVICE—This receiver has been carefully adjusted and aligned by the manufacturer before shipment, and should maintain its adjustments over a considerable period of time. It is recommended that any major adjustments or repairs be made by a competent service man.

TUBES—In a receiver which is used quite consistently, the first trouble which is likely to occur is that of deficient vacuum tubes. Usually the symptom of deficient tubes is a noticeable decrease in the sensitivity of the receiver. If the receiver will operate on all bands, but with low sensitivity, the tubes should be removed and checked. The tube locations are shown on the label on the large metal shield on top of the chassis.

BAND CHANGE SWITCH—After a long period without being operated, the band change switch may become noisy or inoperative because of dust or oxide film on contacting surfaces. In some cases, normal operation may be restored by rotating the switch a number of times. If it is found impossible to clean the switch sufficiently by rotation, the defective switch section must be located and replaced. The receiver should be removed from the cabinet and operated in a position such that the switch sections are accessible.

With the switch in the defective position, a slight movement of each section with an insulated screwdriver will usually determine the defective section.

To remove a switch section it will first be necessary to remove the switch shaft. The antenna trimmer control shaft must also be removed in order to unsolder the leads on the tuning capacitor. After all leads are disconnected the entire coil and switch assembly may be removed by taking out the three screws holding the assembly to the chassis.

TEST OF CIRCUIT ALIGNMENT—Under normal operating conditions the r-f amplifier and oscillator circuits should remain in line. If, however, it is found desirable to check the alignment of these circuits, the following test should first be made. Disconnect the antenna or transmission line and connect a 50- to 300-ohm carbon resistor across the two antenna terminal posts. Connect an output voltmeter to the output of the receiver and connect a 20-ohm resistor across the meter. Turn the sensitivity and volume controls to maximum. The A.V.C. switch should be on the A.V.C. position. The output noise voltage should be at least 0.1 volt, with the antenna trimmer tuned to resonance. The maximum noise voltage is a direct measurement of the sensitivity of the receiver. If the test shows that this voltage is less than 0.1 volt, the circuits should be realigned. First be sure that the decreased sensitivity is not caused by poor tubes. It probably will not be necessary to align all bands; however, the correct procedure for all bands is given below.

ALIGNMENT OF I-F CIRCUITS—Remove the bottom cover plate of the receiver cabinet, tune in a steady outside signal on one of the lower frequency bands with the A.V.C. switch on the BFO position and the crystal filter switch in position 2 or 3. The signal should be tuned for a peak response at the crystal frequency. Do not use too strong a signal. The sensitivity control should be adjusted for approximately 1 volt output. Referring to Figure 5 adjust T-1, L-19, T-2, T-3 and T-4 for a maximum output voltage. The signal should now be detuned approximately 1,000 cycles and adjustments T-1, L-19 and T-2 retuned for a maximum output.

The T-2 adjustment on top of the chassis is sealed with polystyrene cement. Applying a soldering iron to the adjusting screw for a few seconds will soften the cement. The intermediate frequency is 455 kc.

ALIGNMENT OF R-F AND OSCILLATOR CIRCUITS—Under usual conditions, the oscillator frequency will not shift far enough to throw the frequency calibration off, therefore, unless it is found that the frequency calibration is incorrect, the oscillator adjustments should not be changed. In any case, the oscillator circuit should not be changed unless a frequency calibrated test oscillator is available. The following procedure is for the r-f alignment of band No. 1 (540 to 1,300 kc). Tune in a signal near the high-frequency end of the band. (Do not use too strong a signal.) Reduce the sensitivity control until the output is approximately 1 volt. Referring to Figure 6, adjust C-18 and the antenna trimmer control on the front panel for maximum output. Next, tune in a signal near the low frequency end of the band. Adjust L-1 and L-7 for a maximum signal output. The same procedure may be followed for all bands. Make sure that the bandspread tuning is at the high-frequency end of the scale. The bottom cover should be held over the oscillator trimmer capacitors while adjusting the high frequency end of each band, so that when the cover is replaced, the frequency will not shift. The adjustments for each particular band are shown in the table herewith.

Band	R-F Ind.	Det. Ind.	Det. Cap.	Osc. Ind.	Osc. Cap.
540- 1,340 ..	L-1	L-7	C-18	L-13	C-24
1,340- 3,300 ..	L-2	L-8	C-17	L-14	C-23
3,300- 5,800 ..	L-3	L-9	C-22	L-15	C-28
5,800-10,200 ..	L-4	L-10	C-21	L-16	C-27
10,200-18,000 ..	L-5	L-11	C-20	L-17	C-26
18,000-31,000 ..	L-6	L-12	C-19	L-18	C-25

DIAL SHUTTER ADJUSTMENT—If the dial shutters do not line up with the dial calibration, they may be adjusted by means of an idler pulley bracket which adjusts the tension of the cord. By loosening the two screws which clamp the idler pulley bracket to the chassis the bracket may be shifted until the shutter opening lines up with the dial scale.

Another adjustment may be made by loosening the two nuts on adjusting screw fastened to back of shutter. To raise or lower the shutter, adjust the nuts accordingly.

DIAL ADJUSTMENT—Should it become necessary to replace or to tighten the main dial, the reference line at the high-frequency end should be disregarded. The dial should be set so that a reading of 54 is obtained on the arbitrary scale. This should be read through the dial shutter opening, with the range switch on the highest frequency position and the tuning capacitor set at the low frequency end.

NOISE BALANCE ADJUSTMENT—This adjustment is the potentiometer mounted on the right flange of the chassis (R-33). The correct adjustment has been carefully made at the factory and should ordinarily require no further attention. However, in servicing the receiver, in the event that the adjustment is accidentally moved, it may be reset as follows: First tune in a strong modulated signal such as a broadcast station. Next turn the noise control on the front panel all the way clockwise. Now adjust the potentiometer for a minimum signal output. This point will be found to be very sharp. When properly

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adjusted, the signal output will be quite low until the noise control on the front panel is turned back counterclockwise.

TUBE SOCKET VOLTAGES—If the receiver is found to be completely inoperative, it is likely that a resistor is open-circuited or a capacitor is short-circuited. The bottom cover plate of the receiver cabinet should be removed. The tube socket terminal voltages should be measured and should be approximately the values given in the table below. The tubes should remain in the sockets for this test. A voltmeter having a resistance of at least 50,000 ohms should be used. Place switch on BFO and turn Sensitivity Control to maximum.

TUBE SOCKET VOLTAGES

Tube	Symbol	Cathode to Ground	Screen Grid to Ground	Plate to Ground	Suppressor Grid to Ground	Oscillator Plate to Ground	Heater (A-C) Pin No. 2 to Pin No. 7
RCA-6SK7 (R-F Amplifier)	V8	3.0 (Pin No. 5)	90 (Pin No. 6)	180 (Pin No. 8)	3.0 (Pin No. 3)	—	6.1
RCA-6K8 (Det. Osc.)	V6	2.6 (Pin No. 8)	75 (Pin No. 4)	240 (Pin No. 3)	—	60 (Pin No. 6)	6.1
RCA-6K7 (1st I-F Amp.)	V5	3.0 (Pin No. 5)	82 (Pin No. 6)	200 (Pin No. 8)	0 (Pin No. 3)	—	6.1
RCA-6SJ7 (Beat Freq. Osc.)	V2	0 (Pin No. 5)	50 (Pin No. 6)	15 (Pin No. 8)	—	—	6.1
RCA-6SK7 (2nd I-F Amp.)	V7	4.5 (Pin No. 5)	115 (Pin No. 6)	220 (Pin No. 8)	4.5 (Pin No. 3)	—	6.1
RCA-6H6 (2nd Det.)	V1	—	—	—	—	—	6.1
RCA-6SQ7 (A-F Amp.-A.V.C.)	V3	0.7 (Pin No. 3)	—	85 (Pin No. 6)	—	—	6.1 (Pin No. 7 to Pin No. 8)
RCA-6F6G (Output)	V4	16 (Pin No. 8)	260 (Pin No. 4)	250 (Pin No. 3)	—	—	6.1 5.1 (Pin No. 2 to Pin No. 8)
RCA-5Y3G (Rectifier)	V10	300.0 (Pin No. 8)	—	375 a.c. (Pins Nos. 4 & 6)	—	—	(Caution—300 v. d.c., voltage to ground)
RCA-VR-150 (Voltage Regulator)	V9	—	—	150 (Pin No. 5)	—	—	—

PARTS LIST

RECEIVER PARTS

Item	DESCRIPTION	Stock No.	Item	DESCRIPTION	Stock No.
C-1, C-2, C-3, C-4, C-5, C-6	Condenser — 3-gang, 6-section main tuning—less split gear, brass pinion, gear, and bearing assembly	34879	C-29	Condenser—3 to 25 mmfd., 7-plate beat-frequency oscillator control	34893
C-7, C-8, C-9, C-10, C-11, C-12, C-13, C-14, C-15	Capacitor — 3-gang, 9-section band-spread—less split gear, brass pinion gear, and bearing assembly	34880	C-30	Condenser—2.5 to 17.9 mmfd., 5-plate crystal phase adjusting condenser	37238
C-16	Condenser—3.6 to 35 mmfd., 10-plate antenna adjuster	34892	C-31	Capacitor—180 mmfd., 400 volts	13003
C-17, C-18	Condenser—Air trimmer	12714	C-32, C-33, C-34	Capacitor—0.01 mfd., 1000 volts	43764
C-19, C-20, C21, C-22	Condenser—Air trimmer	12807	C-35	Capacitor—68 mmfd., 400 volts	13057
C-23, C-24, C-25, C-26	Condenser—Same as C-17		C-36, C-37	Capacitor—Same as C-32	
C-27, C-28	Condenser—Same as C-21		C-38	Capacitor—10 mmfd., 400 volts	13200
			C-39	Capacitor—0.1 mfd., 400 volts	37327
			C-40	Capacitor — 1000 mmfd., 400 volts	12635
			C-41	Capacitor—5.6 mmfd., 400 volts	12814

PARTS LIST (Continued)

Item	DESCRIPTION	Stock No.	Item	DESCRIPTION	Stock No.
C-42	Capacitor—330 mmfd., 400 volts	39640	M-1	Meter—Carrier level meter complete	34946
C-43	Capacitor—2700 mmfd., 400 volts	30057	R-1	Resistor—470,000 ohms, ½ watt	35524
C-44	Capacitor—Same as C-40		R-2	Resistor—10,000 ohms, ½ watt	37137
C-45	Capacitor—0.05 mfd., 400 volts	37328	R-3	Resistor—330 ohms, ½ watt	18039
C-46	Condenser — Stabilizing condenser	34895	R-4	Resistor—22,000 ohms, ½ watt	37136
C-47	Capacitor — 120 mmfd., 400 volts	12724	R-5	Resistor—150,000 ohms, ½ watt	37271
C-48	Capacitor—Same as C-45		R-6	Resistor—Same as R-4	
C-49, C-50, C-51	Capacitor — 100 mmfd., 400 volts	12720	R-7	Resistor—Same as R-3	
C-52	Capacitor—Same as C-32		R-8	Resistor—Same as R-5	
C-53, C-54, C-55	Capacitor—Same as C-45		R-9	Resistor—Same as R-2	
C-56, C-57	Capacitor — 220 mmfd., 400 volts	12694	R-10	Resistor—Same as R-4	
C-58, C-59, C-60	Capacitor—Same as C-45		R-11	Resistor—10 ohms, ½ watt	18471
C-61	Capacitor—Same as C-49		R-12	Resistor—Same as R-2	
C-62	Capacitor—56 mmfd., 400 volts	12723	R-13	Resistor—6800 ohms, ½ watt	37273
C-63	Capacitor—12 mmfd., 400 volts	13002	R-14	Resistor—15,000 ohms, ½ watt	12759
C-64	Capacitor—47 mmfd., 400 volts	13141	R-15	Resistor—Same as R-4	
C-65, C-66	Capacitor—Same as C-56		R-16	Resistor—68,000 ohms, ½ watt	37274
C-67			R-17	Resistor—Same as R-1	
C-68	Capacitor — 1200 mmfd. 400 volts	13054	R-18	Resistor—68 ohms, ½ watt	37275
C-69	Capacitor—Same as C-45		R-19	Resistor—220 ohms, ½ watt	37276
C-70	Capacitor—Same as C-49		R-20	Control—80-ohm tuning meter zero adjustment	34910
C-71	Capacitor—Same as C-64		R-21	Control—30,000-ohm sensitivity control	34940
C-72, C-73	Capacitor—Same as C-45		R-22	Resistor—Same as R-1	
C-74	Capacitor—Same as C-63		R-23	Resistor—Same as R-4	
C-75	Capacitor—6.8 mmfd.	14079	R-24	Resistor—Same as R-16	
C-76	Capacitor—Same as C-45		R-25	Resistor—Same as R-2	
C-77, C-78	Capacitor—5-5-5 mfd., 350 volts	34890	R-26	Resistor—Same as R-3	
C-79	Capacitor—Same as C-39		R-27	Resistor—47,000 ohms, ½ watt	37139
C-80	Capacitor—Same as C-49 (contained in T-5)		R-28	Resistor—4700 ohms, ½ watt	30494
C-81	Capacitor—Same as C-64 (contained in T-5)		R-29	Resistor—100,000 ohms, ½ watt	19736
C-82, C-83	Capacitor—Same as C-45		R-30, R-31	Resistor—Same as R-5	
C-84, C-85	Capacitor — 20-20 mfd., 450 volts	34889	R-32	Resistor—Same as R-27	
C-88	Capacitor—Same as C-32		R-33	Control—100,000-ohm noise balance adjustment	34941
C-89, C-90	Capacitor—Same as C-45		R-34	Control — 30,000-ohm limiter control	34938
C-91	Capacitor—4 to 100 mmfd., mica trimmer	37219	R-35	Control—500,000-ohm volume control and power switch (S-1)	34939
C-92	Capacitor—33 mmfd.	39616	R-36	Resistor—220,000 ohms, ½ watt	35510
J-1	Jack—Headphone jack	7903	R-37	Resistor—5600 ohms, ½ watt	37277
J-2, J-3	Jack—Phone tip jack for transmitter relay connections	33891	R-38	Resistor—1 megohm, ½ watt	35521
L-1	Coil—Antenna 540-1340 kc	37232	R-39	Resistor—1000 ohms, ½ watt	19739
L-2	Coil—Antenna 1340-3300 kc	37233	R-40	Resistor—Same as R-29	
L-3	Coil—Antenna 3.3-5.8 mc	37234	R-41	Resistor—Same as R-29	
L-4	Coil—Antenna 5.8-10.2 mc	37235	R-42	Resistor—Same as R-1	
L-5	Coil—Antenna 10.2-18.0 mc	37236	R-43	Resistor—820 ohms, ½ watt	35513
L-6	Coil—Antenna 18.0-31.0 mc	37237	R-44, R-45, R-46	Resistor—Same as R-29	
L-7	Coil—Detector 540-1340 kc	37226	R-47	Resistor—Same as R-1	
L-8	Coil—Detector 1340-3300 kc	37227	R-48	Resistor—470 ohms, 1 watt	37278
L-9	Coil—Detector 3.3-5.8 mc	37228	R-49	Resistor—Same as R-29	
L-10	Coil—Detector 5.8-10.2 mc	37229	R-51	Resistor—3000 ohms, 10 watts	34943
L-11	Coil—Detector 10.2-18.0 mc	37230	R-52, R-54	Resistor—Same as R-29	
L-12	Coil—Detector 18.0-31.0 mc	37231	S-1	Power Switch—Combined with R-35	
L-13	Coil—Oscillator 540-1340 kc	37220	S-2	Switch—Range switch wafer	34915
L-14	Coil—Oscillator 1340-3300 kc	37221	S-3	Switch—Range switch wafer	34916
L-15	Coil—Oscillator 3.3-5.8 mc	37222	S-4	Switch—Range switch wafer—Same as S-2	
L-16	Coil—Oscillator 5.8-10.2 mc	37223	S-5	Switch—Range switch wafer	34914
L-17	Coil—Oscillator 10.2-18.0 mc	37224	S-6	Switch—Range switch wafer—Same as S-2	
L-18	Coil—Oscillator 18.0-31.0 mc	37225	S-7	Switch—Range switch wafer—Same as S-5	
L-19	Crystal Filter Assembly—Coil core, capacitor and form—less shield can—includes C-51	34891	S-8	Switch — Crystal selectivity switch	34912
L-20	Reactor—Filter reactor	35327	S-9	Switch—A.V.C. switch	34911
			S-10	Switch — Transmit-receive switch	34913

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PARTS LIST (Continued)

Item	DESCRIPTION	Stock No.
T-1	Transformer — First detector plate I-F transformer complete—includes C-47, R-12	34885
T-2	Transformer—I-F transformer complete — includes C-56, C-57, R-25	34887
T-3	Transformer—I-F link transformer complete — includes C-61, C-63, R-28	34884
T-4	Transformer—Diode I-F transformer complete — includes C-62, C-64	34888
T-5	Transformer — CW oscillator transformer complete — includes C-80, C-81, R-42	34886
T-6	Transformer — Output transformer	14355
T-7	Transformer—105-115 volts, 25-cycle power transformer (Used in MI-8302F only)	34693
T-7	Transformer — 110 - 125 - 150 - 210-240 volts, 50/60 cycle power transformer (Used in MI-8302E only)	37243
T-7	Transformer—105-125 volts, 50/60 cycle power transformer (Used in MI-8302D and MI-8302G only)	9551
X-1	Crystal—455 kc crystal filter and case	MI-7593
	MISCELLANEOUS	
	Bracket — Flywheel mounting bracket	34903
	Board—3-contact terminal board	12716
	Board—5-contact terminal board	34896
	Cord—Dial drive or range shutter control cord	32634
	Coupling—Range switch coupling with set screws	34937
	Detent—Range switch detent plate assembly	34936
	Dial—Transluscent band spread dial complete with hub and set screws	34900
	Dial—Transluscent main tuning dial complete with hub and set screws	34901
	Drum—Large dial drive drum complete	34908
	Flywheel — Tuning flywheel with set screws	34902
	Gear—Brass pinion gear and bearing assembly	34882
	Gear — Split main or band spread condenser drive gear	34881
	Guide, Band indicator shutter guide rods and strap assembly	34899
	Lamp — 6.3 volt dial lamp, Mazda No. 44	11891
	Pulley—Left-hand band indicator idler pulley and bracket	37241
	Pulley—Right-hand band indicator idler pulley and bracket	37242
	Pulley—Small dial drive pulley and hub with set screws	31271
	Scale — Calibrated stationary vernier scale—less support	34905
	Screw—No. 8-32 set screw for dial drive drum	14350
	Shaft—Dial drive flywheel shaft	34904
	Shaft—Range switch shaft—10¼ inches long	34935
	Shutter—Left-hand band indicating shutter and pilot lamp bracket assembly	37239
	Shutter—Right-hand band indicating shutter and pilot lamp bracket assembly	37240
	Socket—8-contact phenolic socket	18007
	Socket—8-contact wafer socket	33084
	Spring—Band indicator shutter lift spring	34898
	Spring—Dial drive cord tension spring	32481
	Spring—Triple loop spring used on rear end of band switch shaft	34944
	Support—Vernier scale support and hub assembly	34906
	Knob—Antenna adjuster control knob	34949
	Knob—Bar type control knob (8 used)	34950
	Knob—Main tuning or band spread control knob	34947
	Knob—Range switch control knob	34948
	Mask—Metal window mask plate	34953
	Nut—Clamping nut for air trimmers	14028
	Socket—Pilot lamp socket	34951
	Socket—Pilot lamp socket and clip	34909
	Window—Clear dial window sheet	34952

SPEAKER PARTS

Item	DESCRIPTION	Stock No.
	Cone—Speaker cone and voice coil	31310
	Escutcheon—"RCA" escutcheon	13059
	Plug—3-contact male plug for speaker	5118
	Socket—3-contact female socket for speaker cable	5119
	Speaker—Speaker unit only less panel	9712

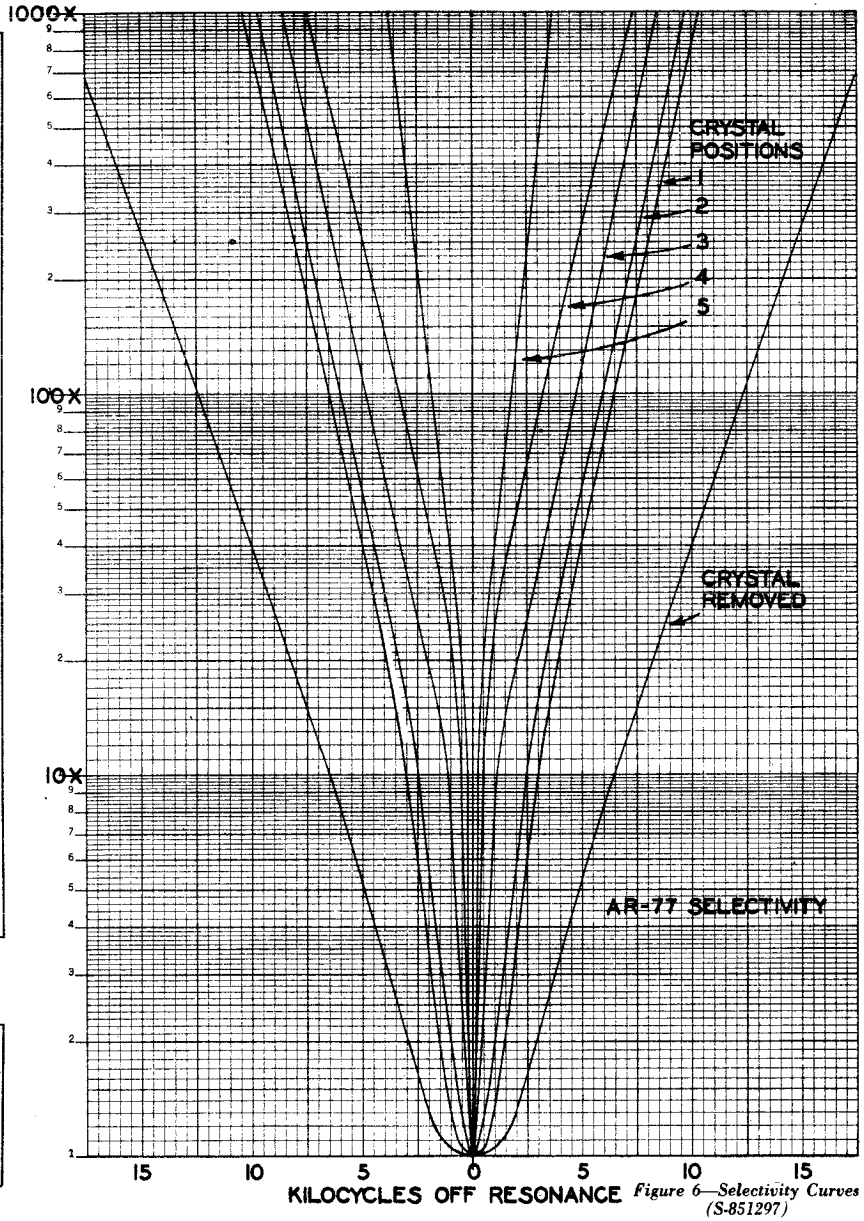


Figure 6—Selectivity Curves (S-851297)

MODELS AR-77, AR-77E,
Early, Late, Revised

RCA MFG. CO.

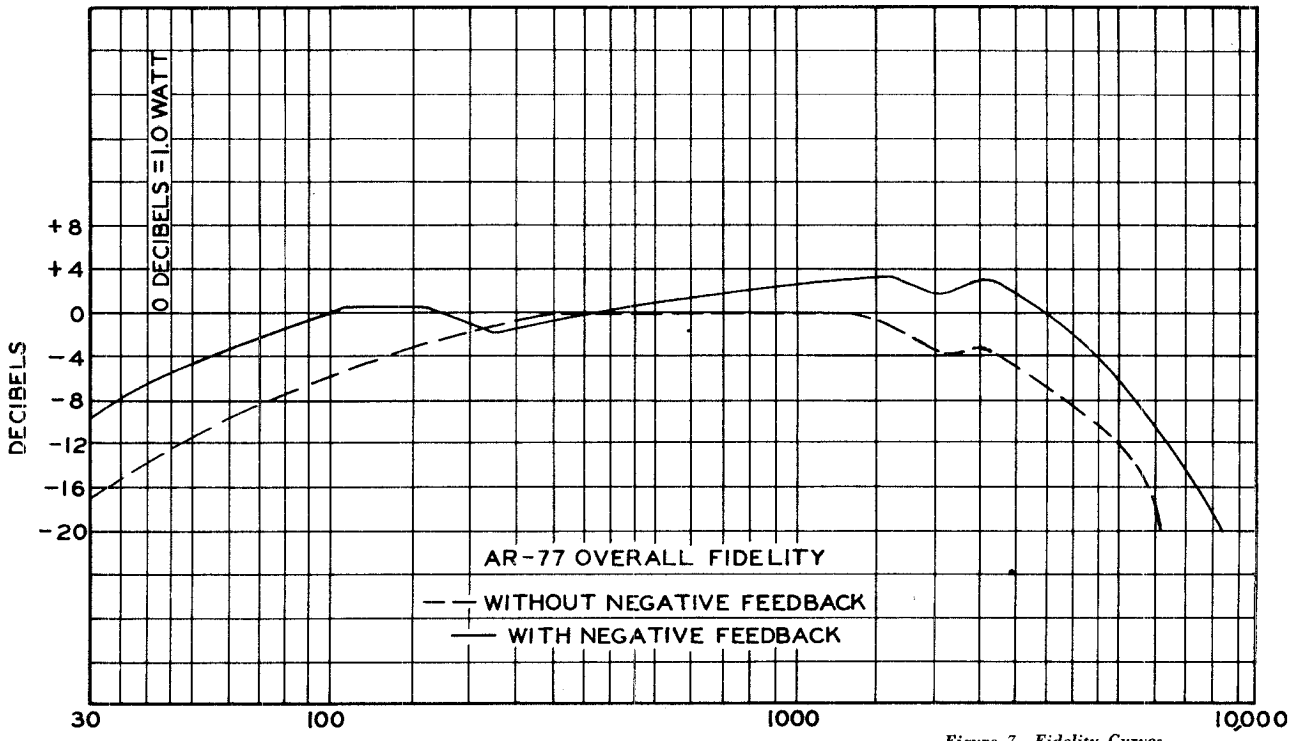
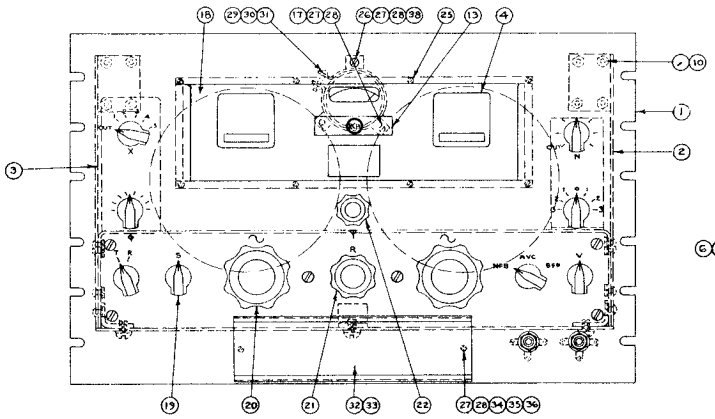
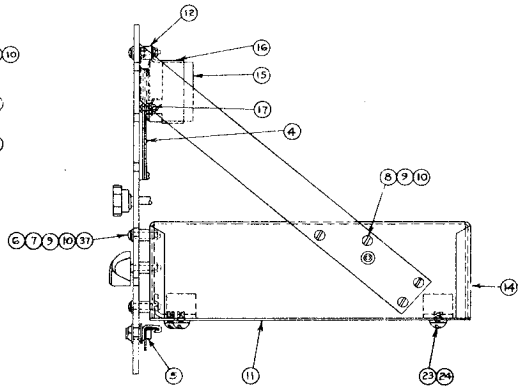


Figure 7—Fidelity Curves (S-851298)





ITEM	DESCRIPTION	ITEM	DESCRIPTION
1	PANEL ASSEMBLY	20	KNOB
2	STRAP ASSEMBLY	21	KNOB
3	STRAP ASSEMBLY	22	KNOB
4	WINDOW MASK	23	MACH. SCR. R.H. 1/4-20 × 5/16 LG.
5	JACK	24	LOCKWASHER 1/4
6	SPACER	25	MACH. SCR. BINDER HD. #4-40 × 1/4 LG.
7	MACH. SCR. BINDER HD. #8-32 × 7/8 LG.	26	MACH. SCR. BINDER HD. #4-40 × 3/4 LG.
8	MACH. SCR. BINDER HD. #8-32 × 5/16 LG.	27	LOCKWASHER #4
9	NUT HEX. #8-32	28	NUT HEX #4-40
10	LOCKWASHER #8	29	MACH. SCR. RH. #6-32 × 3/8 LG.
11	BOTTOM PLATE	30	LOCKWASHER #6
12	SPACER	31	NUT HEX. #6-32
13	MONOGRAM PLATE	32	CARD HOLDER
14	CHASSIS ASSEMBLY	33	WINDOW
15	METER	34	SCREW BINDER HD. #4-40 × 3/8 LG.
16	CLAMP	35	NUT HEX #4-40
17	SPACER	36	LOCKWASHER #4
18	WINDOW	37	WASHER
19	KNOB	38	WASHER

NOTE:- REMOVE ITEM 12 TO 31 INCL. COMPRISING THE FOLLOWING:- 1 SPACER ITEM 12, 1 MONOGRAM PLATE ITEM 13, 1 CHASSIS ASSEMBLY ITEM 14, 1 METER ITEM 15, 1 CLAMP ITEM 16, 2 SPACERS ITEM 17, 1 WINDOW ITEM 18, 8 KNOBS ITEM 19, 2 KNOBS ITEM 20, 1 KNOB ITEM 21, 1 KNOB ITEM 22, 5 MACH. SCREWS ITEM 23, 5 LOCKWASHERS ITEM 24, 8 MACH. SCREWS ITEM 25, 1 MACH. SCREW ITEM 26, 3 LOCKWASHERS ITEM 27, 3 NUTS ITEM 28, 1 MACH. SCREW ITEM 29, 1 LOCKWASHER ITEM 30, 1 NUT ITEM 31, FROM CABINET & REPLACE ON PANEL AS SHOWN. ITEM 15, 16, 29, 30, 31 TO BE REMOVED AS A UNIT AND REPLACED ON PANEL AS SHOWN.

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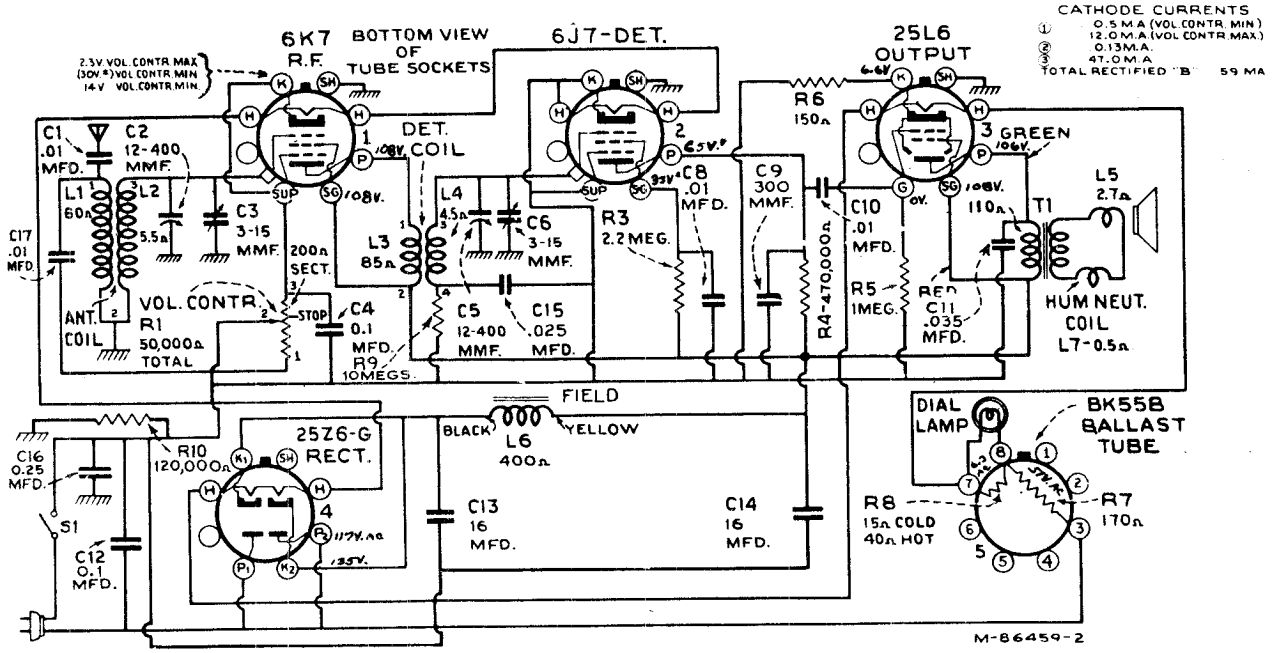

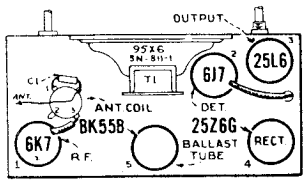

Frequency Range ..... 540-1,760 kc
Alignment Frequency ..... 1,760 kc (ant., det.)

POWER SUPPLY RATINGS

A-C Rating ..... 105-125 volts, 50-60 cycles, 50 watts
D-C Rating ..... 105-125 volts, 50 watts

POWER OUTPUT (125-volt, 60-cycle supply)

Undistorted ..... 1.0 watt
Maximum ..... 1.5 watts

LOUDSPEAKER

Type ..... 5-inch Electrodynamic
Voice-Coil Impedance ..... 3 ohms at 400 cycles

Alignment Procedure

Reel up the antenna wire, and connect the high side of test-oscillator through an 80 mmfd. capacitor to the antenna terminal on the antenna transformer. Connect low side of oscillator to receiver chassis through a 0.1 mfd. capacitor. Turn gang condenser to minimum (full out), tune oscillator to 1,760 kc, connect an output meter across the voice coil, and turn volume control to maximum.

Keep antenna roll and lead clear of chassis during alignment.

Adjust the two trimmers (C3 and C6) on side of gang condenser for maximum output, using lowest possible output from test-oscillator.

Turn pointer, while holding tuning knob, so that the pointer is horizontal and pointing to low-frequency end when the gang condenser is at maximum. Check pointer adjustment on a station.

25-Cycle Operation

For 25-cycle operation, connect a 16 mfd., 150-volt dry electrolytic capacitor (Stock No. 31323) in parallel to C13.

Antenna.—The set is equipped with a 25-foot antenna. Do not connect the antenna to ground. If an outdoor antenna is used, it should not be longer than 100 feet, including lead-in. If it is longer, connect a 100 to 200 mmfd. capacitor in series with the lead-in.

Power-Supply Polarity.—For operation on d-c, the power plug must be inserted in the outlet for correct polarity. If the set does not function, reverse the plug. On a-c, reversal of the plug may reduce hum.

	RECEIVER ASSEMBLIES
31198	Ballast—Ballast resistor tube type BK55B (R7, R8)
30883	Capacitor—300 mmf. (C9)
14393	Capacitor—.01 mfd. (C1, C8, C10)
4858	Capacitor—.01 mfd. (C17)
30938	Capacitor—.025 mfd. (C15)
5198	Capacitor—.035 mfd. (C11)
30899	Capacitor—0.1 mfd. (C4)
4839	Capacitor—0.1 mfd. (C12)
12484	Capacitor—0.25 mfd. (C16)
31323	Capacitor—16 mfd (C13, C14)
30875	Coil—Antenna coil (L1, L2)
30876	Coil—Det. coil (L3, L4)
31195	Condenser—2-gang variable tuning condenser—(C2, C3, C5, C6)
30877	Cord—Indicator drive cord
31200	Dial—Station selector dial scale and plate assembly
31196	Indicator—Station selector indicator pointer
4340	Lamp—Dial lamp
31193	Lead—Antenna lead—approximately 25 ft. long
31198	Resistor—Ballast resistor tube type BK55B (R7, R8)
30880	Resistor—150 ohms, ½ watt (R6)
13734	Resistor—120,000 ohms, ½ watt (R10)
12285	Resistor—470,000 ohms, ½ watt (R4)
13730	Resistor—1 meg., ½ watt (R5)
12679	Resistor—2.2 meg., ½ watt (R3)
13601	Resistor—10 meg., ½ watt (R9)
31197	Shaft—Indicator pointer shaft and pulley
31199	Shield—Dial lamp shield
14171	Socket—Dial lamp socket
31251	Socket—Tube and ballast resistor socket
30631	Spring—Indicator drive cord tension spring
31198	Tube—Ballast resistor tube type BK55B (R7, R8)
31966	Volume control and power switch (R1, S1)
	SPEAKER ASSEMBLIES (84202-4)
31202	Cone—Speake cone and voice coil (L5)
31201	Speaker—Complete
31203	Transformer—Output transformer (T1)
	MISCELLANEOUS ASSEMBLIES
31205	Crystal—Station selector dial crystal
30863	Knob—Tuning or volume control knob
31079	Screw—Chassis mounting screws and washers
30900	Spring—Retaining spring for knob

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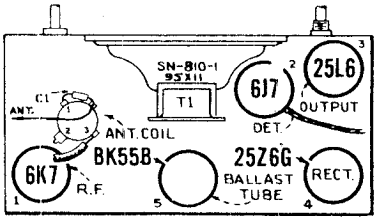
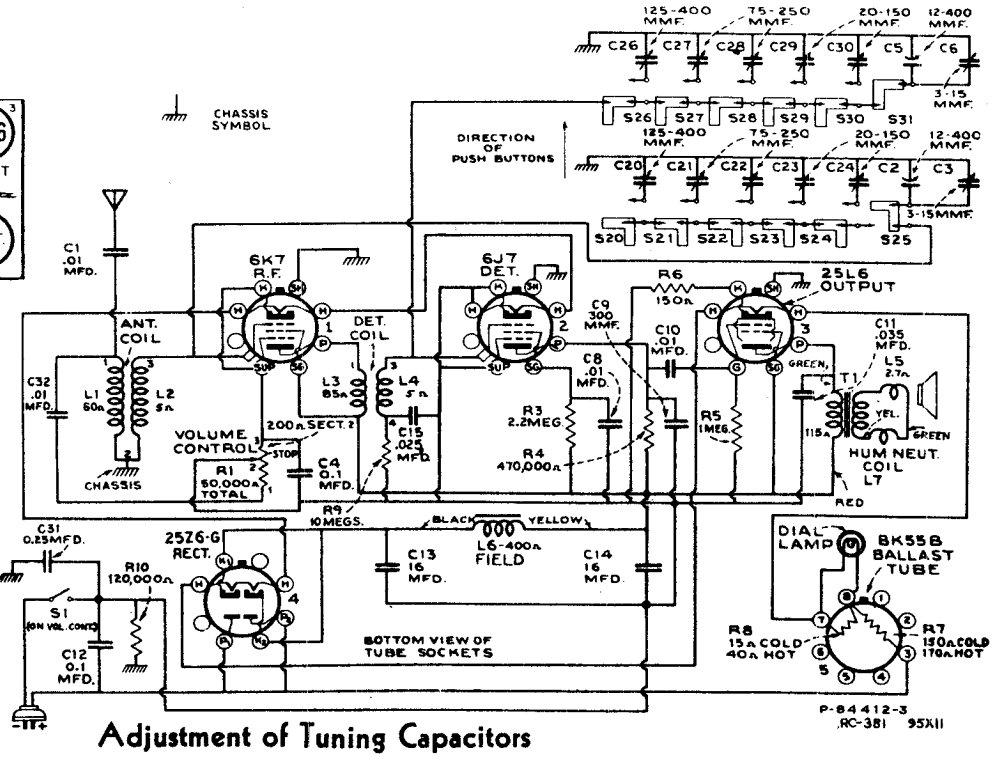
MODEL 95X11

RCA MFG. CO.





Alignment Procedure

Remove chassis from cabinet.

Reel up the antenna wire, and connect the high side of test-oscillator through an 80-mmfd. capacitor to the antenna terminal on the antenna transformer. Connect low side of oscillator to receiver chassis through an .01-mfd. capacitor. Turn gang condenser to minimum (full out), push in the manual-tuning (right-hand) button, tune oscillator to 1,560 kc, connect an output meter across the voice coil, and turn volume control to maximum.

Keep antenna roll and lead clear of chassis during all adjustments.

Adjust the two trimmers (C3 and C6) on side of gang condenser for maximum output, using lowest possible output from test-oscillator.

Turn pointer, so that it is horizontal and pointing to low-frequency end when the gang condenser is at maximum. Check pointer adjustment on a station.

Adjustment of Tuning Capacitors

The preferable and quickest method of adjusting the tuning capacitors for five different stations, is to employ a test-oscillator, as described below:

1. Make a list of the desired five stations, arranged in order from low to high frequencies.
2. Determine the correct settings of the test-oscillator for these five frequencies. This is accomplished as follows: Tune in each of the five stations on any standard receiver; zero-beat the test-oscillator against each station, and note the exact setting of the oscillator in each case.
3. Reel up the antenna wire. Connect the high side of test-oscillator through an 80-mmfd. fixed capacitor to the end of the antenna wire. Clip the low side of the oscillator through a 0.1-mfd. capacitor to one of the chassis-mounting screws on the bottom of the cabinet. Tune the oscillator to the previously-determined point for the lowest-frequency station, and adjust for a strong output.
4. Turn the volume control of the push-button receiver full clockwise, and push in the left-hand end button. Using an insulated screwdriver, peak capacitors C20 and C26, at the same time reducing the output of the oscillator in order to secure a sharp peak. (Clockwise adjustment of the capacitors tunes the circuits to lower frequencies, and counter-clockwise adjustment tunes the circuits to higher frequencies. The range of each trimmer is three full counter-clockwise turns from the tight position. Do not unscrew more than three turns.)
5. Push in the second button from left, and adjust C21 and C27 for peak output with the oscillator tuned to the frequency of the second station.
6. Proceed in this manner to adjust each pair of capacitors for the desired frequencies.
7. Final adjustment may be made in actual reception of the stations.

Precautionary Lead Dress

1. Dress Power cord away from detector coil, heater leads close to base, leads from electrolytic close to base and free of grid leads.
2. Dress blue lead from r-f plate to detector coil along front edge of push-button shaft holes. Dress all leads to prevent rubbing against push button shafts.

25-Cycle Operation

For 25-cycle operation, connect a 16 mfd., 150-volt dry electrolytic capacitor (Stock No. 31323) from the cathode of the rectifier tube to chassis. (Positive to contact K1 of 25Z6-G, and negative to shell contact of 6K7 r-f socket.)

STOCK No.	DESCRIPTION
	RECEIVER ASSEMBLIES
31198	Ballast—Ballast resistor-tube type BK55B (R7, R8)
31208	Capacitor—Antenna tuning capacitor bank (C20, C21, C22, C23, C24)
31209	Capacitor—Detector tuning capacitor bank (C26, C27, C28, C29, C30)
30883	Capacitor—300 mmf. (C9)
14393	Capacitor—.01 mfd. (C1, C8, C10)
4858	Capacitor—.01 mfd. (C32)
30938	Capacitor—.025 mfd. (C15)
5196	Capacitor—.035 mfd. (C11)
30899	Capacitor—0.1 mfd. (C4)
4839	Capacitor—0.1 mfd. (C12)
12484	Capacitor—0.25 mfd. (C31)
31323	Capacitor—16 mfd. (C13, C14)
30875	Coil—Antenna coil (L1, L2)
30876	Coil—Det. coil (L3, L4)
31195	Condenser—2-gang variable tuning condenser (C2, C3, C5, C6)
32634	Cord—Indicator drive cord
31206	Dial—Station selector dial and dial plate assembly
31196	Indicator—Station selector indicator pointer
4340	Lamp—Dial lamp
31193	Lead—Antenna lead—approximately 25 ft. long.
31198	Resistor—Ballast resistor tube type BK55B (R7, R8)
30880	Resistor—150 ohms, ½ watt (R6)
13734	Resistor—120,000 ohms, ½ watt (R10)
12285	Resistor—470,000 ohms, ½ watt (R4)
13730	Resistor—1 meg., ½ watt (R5)
12679	Resistor—2.2 meg., ½ watt (R3)
13601	Resistor—10 meg., ½ watt (R9)
31197	Shaft—Indicator pointer shaft and pulley
31199	Shield—Dial lamp shield
14171	Socket—Dial lamp socket
31251	Socket—Tube and ballast resistor socket
30631	Spring—Indicator drive cord tension spring
31207	Switch—Station selector switch (S20, S21, S22, S23, S24, S25, S26, S27, S28, S29, S30, S31)
31198	Tube—Ballast resistor tube type BK55B (R7, R8)
31966	Volume control and power switch (R1, S1)
	SPEAKER ASSEMBLIES (Speaker 84202-4)
31202	Cone—Speaker cone and voice coil (L5)
31201	Speaker—Complete
31203	Transformer—Output transformer (T1)
	MISCELLANEOUS ASSEMBLIES
31210	Button—Station selector push button
31205	Crystal—Station selector dial crystal
31095	Disc—10 celluloid protector discs for call letter markers
30863	Knob—Tuning or volume control knob
30991	Markers—Station selector button call letter markers
31079	Screw—Chassis mounting screws and washers
30900	Spring—Retaining spring for knob

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RCA MFG. CO.

MODELS VA-22, VA-24
MODELS UY-122E,
UY-124

Specifications MODEL VA-22

Record Capacity..... Eight 10-inch or Seven 12-inch
MOTOR..... Constant-speed, self-starting
PICKUP..... Crystal
Pickup Impedance..... 0.1 meg., at 1,000 cycles
Average Output..... 1½ volts across 0.5 meg.

POWER SUPPLY RATINGS

A6..... 105-125 volts, 60 cycles, 25 watts
A5..... 105-125 volts, 50 cycles, 25 watts
B2..... 105-125 volts, 25 cycles, 25 watts

2nd Production:

The 2nd production of Model VA-22 uses mechanism similar to RP-139A and RP-145.* For replacement parts, refer to the Service Data on RP-139A and RP-145 as specified below:

Stock No.

PICKUP AND ARM ASSEMBLIES

Same as RP-145, except add:

33905 Crystal—Pickup crystal cartridge and needle screw for 25-cycle only....

OPERATING MECHANISM, MOTOR ASSEMBLIES, MOTORBOARD ASSEMBLIES

For 110-volt, 60-cycles, same as RP-145.
For 110-volt, 25-cycles, same as RP-139A.

MISCELLANEOUS ASSEMBLIES

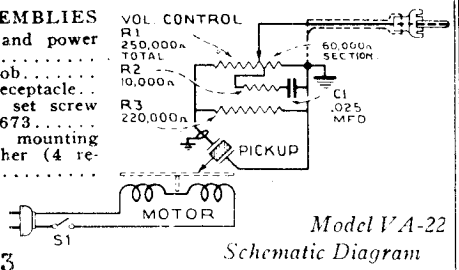
31108 Control—Volume control and power switch.....
12673 Knob—Volume control knob.....
31564 Receptacle—Needle card receptacle..
4119 Screw—No. 8-32 headless set screw for knob, Stock No. 12673.....
31470 Springs—Motorboard mounting springs, screw and washer (4 required).....

MODEL VA-24 IS A COMBINATION OF MODEL VA-22 AND OSC.22 WIRELESS OSCILLATOR, DATA FOR WHICH WILL BE FOUND ON RCA P.11-61 IN RIDER'S VOL.XI

Replacement Parts Model VA-22

STOCK No.	DESCRIPTION
	For Automatic Record Changer Parts, See Service Notes on RP 145*
	MISCELLANEOUS ASSEMBLIES
33595	Cable—Shielded output cable with male plug..
4870	Capacitor—.025 mfd. (C1).....
30698	Hinge—Cabinet lid hinge.....
31564	Holder—Needle card holder.....
12673	Knob—Volume control knob.....
14559	Resistor—10,000 ohms, ½ watt (R2).....
12264	Resistor—220,000 ohms, ½ watt (R3).....
4119	Screw—Headless set screw for knob, No. 12673
31470	Springs—Motorboard mounting springs, screw, and washers (4 req'd).....
33594	Support—Cabinet lid support.....
31108	Volume control (R1).....

*See Rider's "Automatic Record Changers" P.463



Model VA-22 Schematic Diagram

General Description

The circuit of Models UY-122E and UY-124 is the same as Model 97Y, except for the phonograph circuit which is shown at right. For other circuit details, refer to Service Data for Model 97Y, RCA P.9-109, RIDER'S VOL.IX

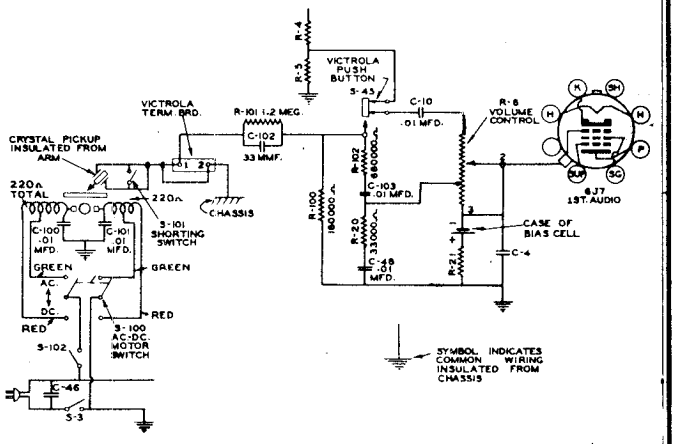
Alignment procedure, adjustments for electric tuning, voltages, and general service data, are the same as for Model 97Y.

Replacement parts for Models UY-122E and UY-124 are listed on the following page.

The phonograph motor has a switch to permit operation on 105-125 volts d.c., or 105-125 volts, 50-60 cycles a.c. The speed regulator screw should be adjusted for 78 r.p.m.

Lubrication should be maintained every six months, applying a few drops of light oil in each oil hole and at the spindle bearing.

The turntable switch should trip to the "off" position when the needle is 1¾ inches from the centerline of the turntable spindle.



Phonograph Circuit, Models UY-122E, UY-124.

STOCK No.	DESCRIPTION
	RECEIVER ASSEMBLIES
30284	Ballast—Ballast resistor tube (R22, R23).....
31767	Board—Antenna-ground terminal board.....
31579	Board—Phonograph terminal board.....
14338	Bushing—Variable condenser mounting bushing and screws.....
31400	Capacitor—Adjustable trimmer capacitor, two sections 2-10 mmfd. and one section 3-30 mmfd. (C21, C23, C25).....
14079	Capacitor—6.8 mmfd. (C1).....
31387	Capacitor—Antenna coil trimmer capacitor bank —20-470 mmfd. (C31, C32, C33, C34, C35, C36).....
12948	Capacitor—33 mmfd. (C3, C102).....
12725	Capacitor—150 mmfd. (C49).....
13003	Capacitor—180 mmfd. (C37).....
30433	Capacitor—470 mmfd. (C2).....
31381	Capacitor—620 mmfd. (C24).....
31435	Capacitor—750 mmfd. (C26).....
4881	Capacitor—3,300 mmfd. (C22).....
12897	Capacitor—4,700 mmfd. (C47).....
31405	Capacitor—6,000 mmfd. (C27).....
4838	Capacitor—.005 mfd. (C14, C43).....
14393	Capacitor—.01 mfd. (C10, C48, C103).....
11315	Capacitor—.015 mfd. (C12, C17).....
4886	Capacitor—.05 mfd. (C13, C20, C44).....
4839	Capacitor—0.1 mfd. (C38, C46).....
12484	Capacitor—0.25 mfd. (C4, C45).....
31576	Capacitor—Comprising one 32 mfd., one 20 mfd., and one 16 mfd. section (C15, C18, C19)...
31584	Capacitor—40 mfd. (C16).....
30904	Capacitor—100 mfd. (C5, C6, C7, C8).....
31581	Cell—Bias cell.....
31382	Clip—Mounting clip for coils and cores on oscillator bank.....
31402	Coil—Antenna coil (L1, L2, L3).....

Cont'd on next page

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MODELS UY-122, UY-124

RCA MFG. CO.

UY-122E, UY-124 Replacement Parts (Continued)

STOCK No.	DESCRIPTION
31401	Coil—Oscillator coil (L4, L5, L6, L7, L8, L9, C24)
31385	Coil—Push button oscillator coil (L37, L38)
31384	Coil—Push button oscillator coil (L39, L40)
31383	Coil—Push button oscillator coil (L41, L42)
31369	Condenser—2-gang variable tuning condenser (C28, C29, C30)
5119	Connector—3-contact female connector plug for speaker cable
31366	Control—Volume control, tone control, and on-off switch (R6, R13, S3)
31374	Cord—Drum drive cord
31375	Cord—Indicator pointer drive cord
30905	Core—Adjustable core for I.F. transformer
31386	Core—Adjustable core and stud assembly for oscillator bank
31372	Drum—Variable condenser drive cord drum and calibrator
31580	Holder—Bias cell holder
31480	Lamp—Dial lamp
30868	Plug—2-contact female for motor power cable
31373	Pulley—Drive cord pulley
5066	Reactor—(L16)
30284	Resistor—Ballast resistor (R22, R23)
30880	Resistor—150 ohms, ½ watt (R12)
30694	Resistor—3,900 ohms, ½ watt (R15)
14284	Resistor—22,000 ohms, 1/10 watt (R4)
12738	Resistor—27,000 ohms, ½ watt (R18)
12454	Resistor—33,000 ohms, ½ watt (R2, R20)
14560	Resistor—100,000 ohms, ½ watt (R9, R14)
13698	Resistor—180,000 ohms, ½ watt (R100)
12264	Resistor—220,000 ohms, ½ watt (R5)
12199	Resistor—270,000 ohms, ½ watt (R19)
14983	Resistor—330,000 ohms, ½ watt (R8)
12285	Resistor—470,000 ohms, ½ watt (R1, R21)
12413	Resistor—680,000 ohms, ½ watt (R102)
30208	Resistor—1.2 meg., ½ watt (R101)
12679	Resistor—2.2 meg., ½ watt (R3)
14343	Retainer—Drive cord pulley retainer
14887	Retainer—Retainer for drive cord pulley
4669	Screw—No. 8-32 square-head set screw for drum, Stock No. 31372
31368	Shaft—Station selector knob shaft and pulley
31199	Shield—Dial lamp shield
12110	Shield—Radiotron shield cap
31365	Socket—Dial lamp socket
31251	Socket—Tube socket
31313	Spring—Tension spring for station selector push button switch latch bar
31418	Spring—Indicator or drum drive cord tension spring
31370	Switch—Push button selector switch (S4, S5, S31, S32, S33, S34, S35, S36, S37, S38, S39, S40, S41, S42, S43, S44, S45)
31398	Switch—Range switch (S1, S2)
30902	Transformer—First i-f transformer (L10, L11, C5, C6)
30903	Transformer—Second i-f transformer (L12, L13, C7, C8)
30284	Tube—Ballast resistor tube (R22, R23)
	MOTOR ASSEMBLIES
32007	Escutcheon—Motor changeover switch escutcheon
32033	Field—Motor field coils and laminations
32034	Governor—Motor governor complete
32006	Motor—105-125 volts, 60 cycles A.C. and 105-125 volts, D.C., complete with switch (M1)
31616	Screw—Motor rotor bearing screw and nut
31620	Screw—Motor speed regulator screw and nut
32035	Shaft—Motor turntable spindle shaft and gear
31823	Switch — D.P.S.T. motor changeover switch (S100)
31622	Washer—Motor spindle shaft thrust bearing washers (1 metal, 1 felt)
	MOTOR BOARD ASSEMBLIES
9848	Cup—Used needle cup and lid complete
31464	Damper—One rubber spindle cap and one metal damper plate
31465	Mounting—Pickup arm base mounting — one rubber washer, one lockwasher, one nut
30870	Plug—2-contact male plug for motor and switch leads
31158	Screw—Motor mounting screws, washers, and spacers (sufficient for one motor)
31155	Spring—Used needle cup lid spring
30100	Spring—Automatic switch springs — one long spring and one short spring
31466	Switch—Automatic motor switch and switch lever
31467	Switch—Switch only — for automatic switch (S102)
31463	Turntable

STOCK No.	DESCRIPTION
	PICKUP AND ARM ASSEMBLIES
32134	Bushing—Pickup needle insertion guide—mounts on top of crystal cartridge
31156	Crystal—Pickup crystal cartridge, needle screw and shorting switch, less bushing, Stock No. 32134 (S101)
32016	Pickup and arm complete
31160	Screw—Needle screw
31469	Shaft—Pickup pivot arm and shaft assembly complete with base
	SPEAKER ASSEMBLIES Model UY124 (Speaker RL 71 A-1)
31275	Cone—Speaker cone and voice coil (L14)
5118	Plug—3-contact male plug for speaker
31798	Speaker—Less output transformer
14628	Transformer—Output transformer (T1)
	SPEAKER ASSEMBLIES Model UY122E (Speaker RL 73-5)
31310	Cone—Speaker cone and voice coil (L14)
5118	Plug—3-contact male plug for speaker
31997	Speaker complete
14628	Transformer—Output transformer (T1)
	MISCELLANEOUS ASSEMBLIES
31397	Button—Station selector push button
31456	Cover—8 protective covers for push button markers
31591	Dial—Station selector dial scale—Model UY124
31406	Dial—Station selector dial scale—Model UY122E
31395	Escutcheon—Tuning dial escutcheon only less push buttons and dial scale
30698	Hinge—Cabinet lid hinge—Model UY124
31103	Hinge—Cabinet lid hinge—Model UY122E
31392	Indicator—Indicator pointer, carriage, and clip
31355	Knob—Range switch knob
14359	Knob—Station selector knob
31391	Knob—Tone control knob
30773	Knob—Volume control knob
31458	Marker—"Dial Tuning" marker for push button—Model UY122E
31460	Marker—"Dial Tuning" marker for push button—Model UY124
31457	Marker—"Record Player" marker for push button—Model UY122E
31459	Marker—"Record Player" marker for push button—Model UY124
31589	Marker—Station call letter markers — Model UY122E
31590	Marker—Station call letter markers — Model UY124
31393	Screen—Dial color screen
11210	Screw—Chassis mounting screws, washers, and lockwashers—Model UY124
31471	Screw—Chassis mounting screws, washers, and lockwashers—Model UY122E
31470	Springs—Motorboard suspension top spring, bottom spring, screw, and lockwasher (4 required)
4982	Spring—Retaining spring for knob, Stock No. 14359
14270	Spring—Retaining spring for knob, Stock Nos. 30773 and 31355
30330	Spring—Retaining spring for knob, Stock No. 31391
30946	Support—Cabinet lid support—Model UY122E
11831	Support—Cabinet lid support—Model UY124

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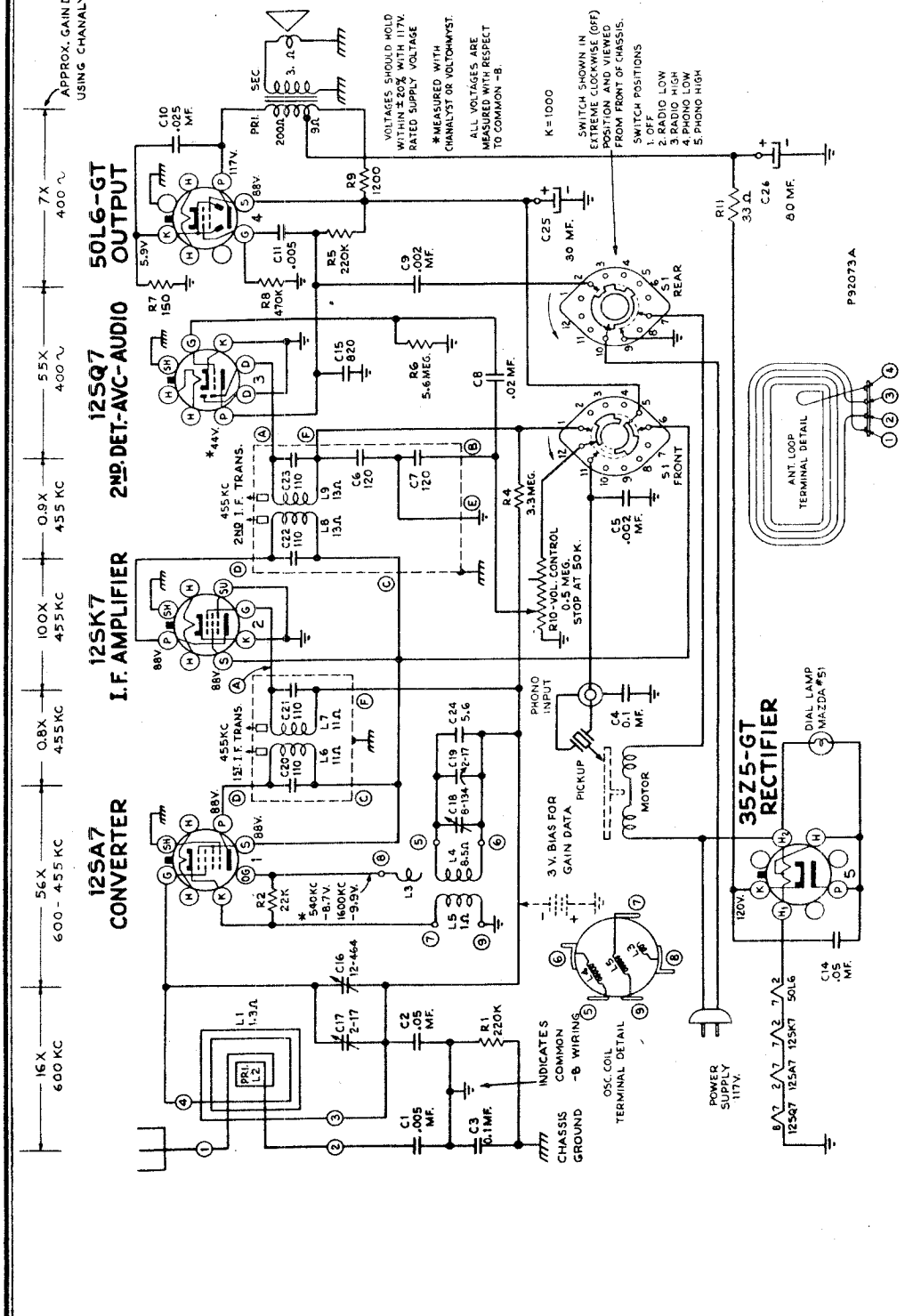
MODELS 65U, 65AU
Chassis RC-1017A, 1017B



Frequency Range.....540-1,600 kc
Intermediate Frequency.....455 kc

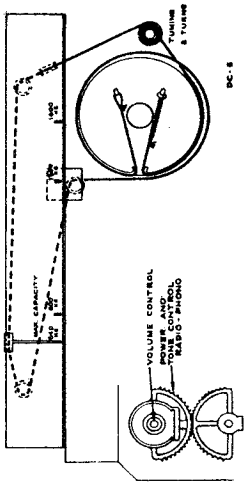
Power Output
Undistorted.....1.5 watts
Maximum.....2.4 watts

Loudspeaker (922279-1) "PM"
Size.....4 x 6 inch elliptical
V.C. Impedance.....3.4 ohms at 400 cycles

Power Supply Rating
105-125 volts, AC, 60 cycles.....60 watts

IMPORTANT—Do not plug chassis into a d-c power supply.

REFER TO SERVICE DATA FOR MODEL 960260-2 FOR INFORMATION AND PARTS ON RECORD CHANGER



Dial Pointer Adjustment.—Rotate tuning condenser fully counter-clockwise(plates fully meshed). Adjust indicator pointer to left (max. cap.) mark on dial back plate.

Record Changer:RCA Model 960260-2

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MODELS 65U, 65AU,
Chassis RC-1017A,
RC-1017B

RCA MFG. CO.

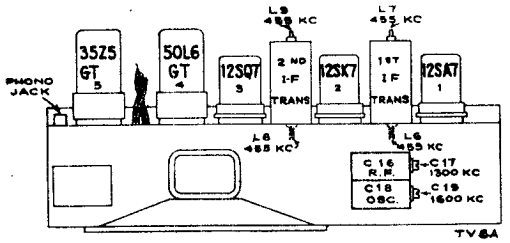
Alignment Procedure

CAUTION.—CLOSE TUNING CONDENSER PLATES COMPLETELY (C-C-W) BEFORE REMOVING CHASSIS FROM CABINET.

Take off both wooden strips on bottom of cabinet by removing woodscrews before loosening chassis bolts.

CRITICAL LEAD DRESS.—

1. All filament wires should be dressed close to chassis.
2. Dress lead from switch to phono jack close to chassis and away from power cord.
3. Dress capacitor between 12SQ7 grid and terminal board away from chassis and away from other parts.
4. Dress all exposed leads away from each other and away from chassis to prevent short circuits.
5. In instrument assembly the lead from the rear section of gang to loop shall be dressed away from chassis and other wires to loop.



Power Supply.—Although this model employs an ac-dc chassis, it is not suitable for use on d-c, as this would damage the motor.

Reversal of plug in outlet receptacle may reduce hum.

Test Oscillator.—Connect high side of test oscillator as shown in chart Connect low side through a .01 mf capacitor to common "—B". Keep the output signal as low as possible to avoid a-v-c action.

Output Meter.—Connect meter across speaker voice coil. Turn volume control clockwise to radio maximum high position (3) for alignment.

Steps	Connect the high side of test-oscillator to—	Tune test-osc. to—	Turn radio dial to—	Adjust the following for max. peak output
1	I.F. grid, in series with .01 mfd.	455 kc	Quiet point 1,600 kc end of dial	L8 and L9 2nd I.F. transformer
2	1st Det. grid in series with .01 mfd.			L6 and L7 1st I.F. transformer *
	NOTE.—ANTENNA LOOP AND RECORD CHANGER MUST BE IN CABINET			
3	Antenna terminal in series with 220 mmfd.	1600 kc	Gang at minimum	C19 (osc.)
4	Radiated signal 1300 kc		Signal Frequency	C17 (ant.)
5	Repeat steps 3 and 4.			

*Do not readjust L8 or L9 when test oscillator is connected to 1st Det.

Replacement Parts

STOCK No.	DESCRIPTION
	CHASSIS ASSEMBLIES RC 1017A RC 1017B
70389	Bearing—Tuning knob shaft bearing
70407	Button—Plug button (2 required)
70997	Capacitor—Mica, 5.6 mmf. (C24)
39650	Capacitor—Mica, 820 mmf. (C15)
70601	Capacitor—Tubular, .002 mfd., 400 volts (C5, C9)
70606	Capacitor—Tubular, .005 mfd., 400 volts (C1, C11)
70611	Capacitor—Tubular, .02 mfd., 400 volts (C8)
70612	Capacitor—Tubular, .025 mfd., 400 volts (C10)
70615	Capacitor—Tubular, .05 mfd., 400 volts (C2, C14)
70617	Capacitor—Tubular, 0.1 mfd., 400 volts (C3, C4)
*72312	Capacitor—Electrolytic, comprising 1 section of 30 mfd., 150 volts and 1 section of 80 mfd., 150 volts (C25, C26)
70403	Coil—Oscillator coil
70383	Condenser—Variable tuning condenser complete with drum
70322	Control—Volume control
32634	Cord—Drive cord (approx. 48" overall length)
70392	Cord—Power cord
70384	Drum—Drive drum
70397	Gear—Power or radio-phono switch gear
70395	Gear—Volume control gear and spring assembly
70404	Indicator—Station selector indicator
70391	Insulator—Bakelite insulator for phono input socket
11765	Lamp—Dial lamp
*72311	Loop—Antenna loop
70382	Plate—Dial back plate complete with pulleys less dial
30868	Plug—2 contact female plug for "AC" cable
36230	Pulley—Drive cord pulley
*72313	Resistor—33 ohms, 1 watt (R11)
30880	Resistor—150 ohms, ¼ watt (R7)
6134	Resistor—1200 ohms, 1 watt (R9)
30492	Resistor—22,000 ohms, ¼ watt (R2)
14583	Resistor—220,000 ohms, ¼ watt (R1, R5)
30648	Resistor—470,000 ohms, ¼ watt (R8)
12928	Resistor—3.3 megohms, ¼ watt (R4)
31455	Resistor—5.6 megohms, ¼ watt (R6)
14974	Screw—#8-32 x 3/16" long set screw for lower gear
70388	Shaft—Tuning knob shaft
34449	Socket—Lamp socket
35787	Socket—Phono input socket
37605	Socket—Tube socket—moulded
70390	Spring—Drive cord tension spring
70396	Spring—Volume control gear tension spring
70394	Switch—Power or radio phono switch
70386	Transformer—First I.F. transformer
70387	Transformer—Second I.F. transformer
70385	Transformer—Output transformer
33726	Washer—"C" washer for tuning knob shaft
70406	Washer—Spring washer for volume control
	SPEAKER ASSEMBLY 922279-1
70405	Speaker—4" x 6" P.M. speaker complete
	SPEAKER ASSEMBLY 922258-2
71058	Speaker—4" x 6" P.M. speaker complete
	SPEAKER ASSEMBLY 922258-1
70470	Speaker—4" x 6" P.M. elliptical speaker complete
	NOTE: If stamping on speaker in instrument does not agree with above speaker number, order replacement parts by referring to model number of instrument, number stamped on speaker and full description of part required.
	MISCELLANEOUS
70398	Clamp—Dial clamps (1 set)
71984	Decal—Trade mark decal (RCA Victor)
71966	Decal—Trade mark decal (Victrola)
70402	Dial—Glass dial
71595	Feet—Rubber feet (4 required)
X1630	Grille—Baffle board and grille cloth
70707	Hinge—Lid hinge (2 required)
70401	Knob—Power switch and radio-phono switch knob
70400	Knob—Tuning knob
70399	Knob—Volume control knob
71815	Mounting—One set of hardware consisting of four springs, two spring washers and two rubber washers to mount record changer.
14270	Spring—Retaining spring for knobs
71824	Stud—Stud and screw to mount lid hinge (1 set)
39545	Support—Lid support
X1386	Cabinet—Cabinet for Model 65U

*THIS IS THE FIRST TIME THIS STOCK NUMBER HAS APPEARED IN PRINT.

APPLY TO YOUR RCA DISTRIBUTOR FOR PRICES OF REPLACEMENT PARTS

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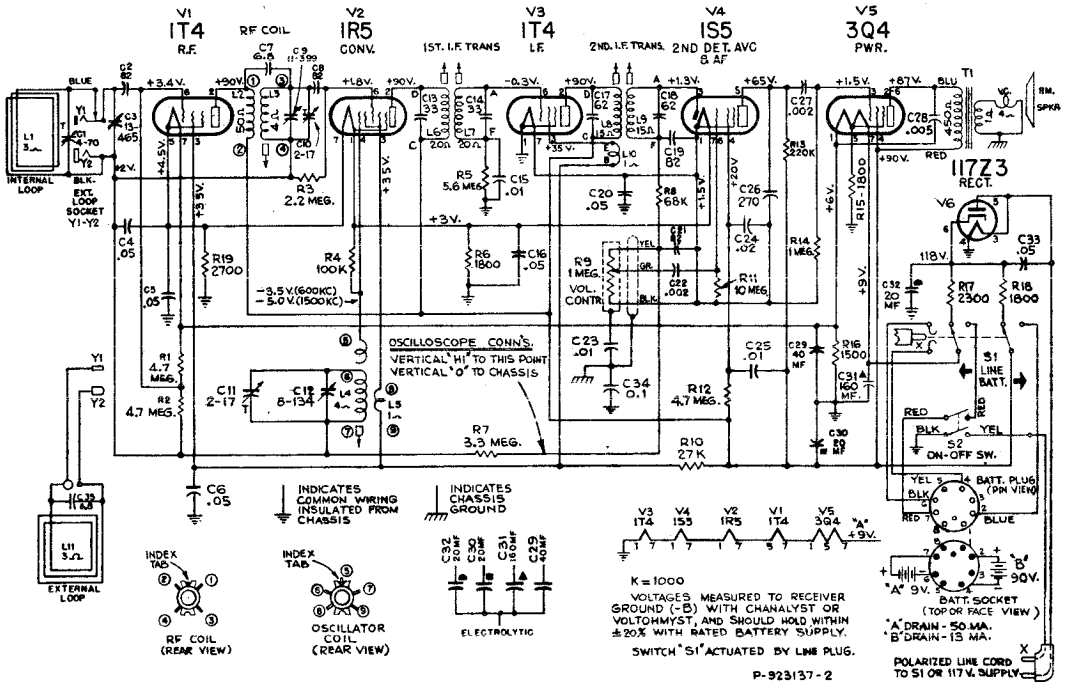
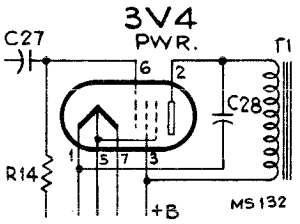
MODEL 66BX
Chassis RC-1040,
RC-1040A

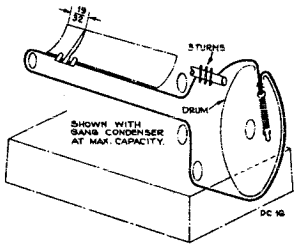


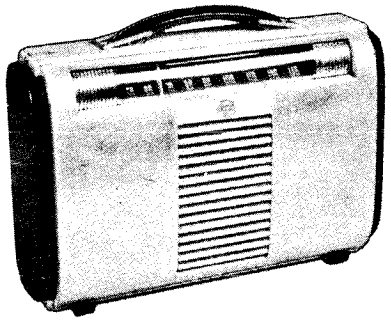
CAUTION.—

1. **Do not remove any tubes from the chassis with the set operating and the plug connected to the power line. Damage to tubes may result.**
2. **When cleaning the aluminum portion of the case use soap and water or cleaning fluid. Do not use abrasive cleansers.**



RC-1040A





NOTE—The Chassis marked RC-1040A have R-3 and C-8 omitted and have the power tube socket connected for a 3V4 tube.

Frequency Range ..... 540-1,600 kc

Intermediate Frequency ..... 455 kc

110 to 125 volts, AC 50 or 60 cycles, or DC ..... 14 watts

Batteries required ..... One RCA Battery Pack VS019 or equivalent

Tube Complement

(1) RCA—1T4 ..... R.F.
(2) RCA—1R5 ..... Converter
(3) RCA—1T4 ..... I.F.-Amplifier
(4) RCA—1S5 ..... 2nd Det. AVC. & A.F.-Amplifier
(5) RCA—3Q4—RC-1040 ..... Power Output
RCA—3V4—RC-1040A ..... Power Output
(6) RCA—117Z3 ..... Rectifier

Using External Loop.—

A loop antenna is housed inside the cabinet. Under normal conditions this will give satisfactory reception. If however the receiver is used in a location remote from broadcasting stations where signals are weak, or where interference is excessive, or in a shielded compartment such as an automobile, airplane or railroad train, an RCA external loop can be used.

This loop antenna has a strap connector cord with indentical two prong plugs on either end, this makes it convenient in connecting it to the circuit through the receptacle located in the left hand side of the chassis.

Open the case, plug the antenna cord into the socket (it will only go in one way), bring the strap out through the slot in the case and attach the Loop Antenna by means of the suction cup to any convenient vertical surface.

This loop antenna can be stored in the cabinet, in the compartment below the battery pack, and the cord in the small compartment in the lower right hand corner of the cabinet.

Current Consumption

Battery Operation ..... "A" 50 milliamperes, "B" 13 milliamperes
Total Rect. Current (117 volt, 60 cycle) ..... 61 mils.

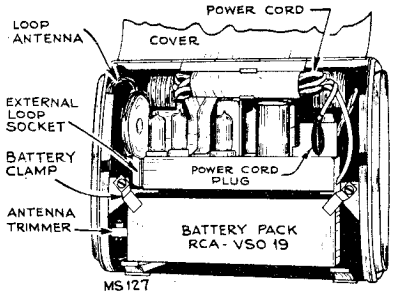
Power Output

Maximum ..... .23 watt

Loudspeaker ..... 4 x 6 in. elliptical P.M. 3.4 ohms at 400 cycles

CRITICAL LEAD DRESS

1. Dress all filament leads next to chassis.
2. Keep the leads short on the ends of the three components which connect to the grid terminal (#6) of the r.f. socket. (R-1, R-2, C-2).
3. Separate leads to front and center sections of gang as far as possible and away from tubes.
4. Dress loop leads away from tuning drum and battery.
5. Dress output transformer leads away from rear section of gang.
6. Dress r.f. plate lead away from r.f. grid circuit.
7. Dress components and wiring near external loop socket to clear external loop pins.
8. Dress avc lead away from 2nd IF transformer and associated components.
9. Dress converter plate lead away from chassis and away from output twisted leads.
10. Dress twisted output leads up and away from other wiring.
11. Dress volume control cable, switch cable, and line receptacle leads away from rectifier tube and resistor case.
12. Dress 1st audio plate lead up and away from other wiring.
13. Do not restrict floating action of sockets by tight wiring.



—1946

MODEL 66BX
Chassis RC-1040,
RC-1040A

RCA MFG. CO.

Alignment Procedure

Cathode Ray Alignment is the preferable method. Connections for the oscilloscope are shown on the schematic diagram.

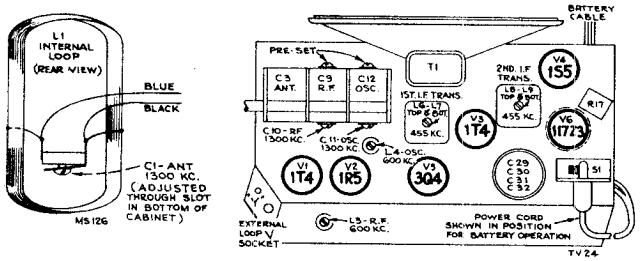
Output Meter Alignment.—If this method is used, connect the meter across the voice coil and turn the receiver volume control to maximum.

Test Oscillator.—For all alignment operations, connect the low side of the test oscillator to the receiver chassis and keep the oscillator output as low as possible to avoid AVC action.

Calibration Scale.—The calibrated dial scale is permanently connected to chassis. It can therefore be used directly as a reference for alignment.

With the gang at full mesh set the dial pointer so that the left hand edge of the pointer is 19/64 inches to the right of the point indicated in the dial cord drawing.

Steps	Connect the high side of test-oscillator to—	Tune test-osc. to—	Turn radio dial to—	Adjust the following for max. peak output
1	High side of loop (Blue lead) in series with 0.1 mfd.	455 kc	Gang at max. cap.	L8, L9 (2nd I.F. Trans.)* L6, L7 (1st I.F. Trans.)
2	High side of loop (Blue lead) in series with 0.1 mfd. (Bottom shield cover in place and chassis out of cabinet)	1300 kc	1300 kc	C11—(osc.) C10—(R.F.)
3		600 kc	600 kc	L4 (osc.) L3 (R.F.)
** 4	220 mmf. in series with a single turn loop 4x8 in., approx. 3 in. from receiver loop. (Chassis in cabinet C-1 connected and rear lid of cabinet closed)	1300 kc	1300 kc	C1 (loop)



*If two peaks are found with top slugs use the one with stud in the outer position.
**Adjust C-1 loop cap with back cover of case closed. Access to trimmer is made through small slot in case provided for cable of external loop.

AC-DC Operation.—

This receiver will operate on 105 to 125 volts, AC 50 or 60 cycles, or DC.

A power cord is stored in the fiber tube which is clamped above the chassis inside the cabinet. To open the cabinet, slide the two plastic feet in the rear of the cabinet toward each other, and raise the back cover upward on its hinges. Then pull the power cord plug out of the socket on the top of the chassis as shown, and take out and unroll the power cord. A slot in the bottom of the cabinet allows the closing of the cabinet with the power cord passing through. Close the cabinet with the cord extending through the slot and insert the plug into a convenient electrical outlet.

When returning to battery operation, be sure to replace the power plug in its socket inside the case with the cord stored in the fiber tube.

NOTE.—If reception is not obtained on DC, reverse plug in outlet receptacle. This may also reduce hum on AC operation.

STOCK No.	DESCRIPTION
	CHASSIS ASSEMBLIES RC 1040
*71056	Bracket—Drive cord pulley bracket complete with one (1) pulley
*71054	Bracket—Drive cord pulley bracket complete with two (2) pulleys
*71044	Bracket—Power switch bracket complete with actuating lever less power switch
*71042	Button—Plug button
31709	Capacitor—Ceramic, 6.8 mmf. (C7)
*71514	Capacitor—Ceramic, 82 mmf. (C2, C8, C19, C21)
*71540	Capacitor—Ceramic, 270 mmf. (C26)
*71552	Capacitor—Tubular, .002 mfd., 400 volts (C22, C27)
*71553	Capacitor—Tubular, .005 mfd., 400 volts (C28)
70610	Capacitor—Tubular, .01 mfd., 400 volts (C15, C23, C25)
70611	Capacitor—Tubular, .02 mfd., 400 volts (C24)
70615	Capacitor—Tubular, .05 mfd., 400 volts (C4, C6, C33)
71551	Capacitor—Tubular, .05 mfd., 200 volts (C5, C16, C20)
70617	Capacitor—Tubular, 0.1 mfd., 400 volts (C34)
*71043	Capacitor—Electrolytic comprising 2 sections of 20 mfd., 150 volts, 1 section of 160 mfd., 25 volts and 1 section of 40 mfd., 25 volts (C29, C30, C31, C32)
*71053	Clip—Spring clip for knob
*71401	Coil—Oscillator coil (L4, L5)
*71402	Coil—R.F. Coil (L2, L3)
*71035	Condenser—Variable tuning condenser (C3, C9, C10, C11, C12)
*71057	Control—Volume control (R9)
32634	Cord—Drive cord (approx. 37" overall length)
70392	Cord—Power cord
*71048	Dial—Dial scale and window assembly
*71036	Drum—Drive drum
*71031	Holder—Power cord holder
*71030	Indicator—Station selector indicator
*71032	Insulator—Rectangular bakelite insulator—between chassis base and dial support bracket (2 required)
*71052	Knob—Tuning knob and volume control knob
18469	Plate—Electrolytic capacitor mounting plate
*71041	Plug—4 prong male plug for battery cable
36230	Pulley—Drive cord pulley
30654	Resistor—1500 ohms, ¼ watt (R16)
12194	Resistor—1800 ohms, ¼ watt (R6, R15)
38875	Resistor—1800 ohms, 1 watt (R18)
*71038	Resistor—Ballast resistor, 2300 ohms, 6 watt (R17)
30730	Resistor—2700 ohms, ¼ watt (R19)
30409	Resistor—27,000 ohms, ¼ watt (R10)
14138	Resistor—68,000 ohms, ¼ watt (R8)
3252	Resistor—100,000 ohms, ¼ watt (R4)
14583	Resistor—220,000 ohms, ¼ watt (R13)
30652	Resistor—1 megohm, ¼ watt (R14)
30649	Resistor—2.2 megohms, ¼ watt (R3)
31417	Resistor—3.3 megohms, ¼ watt (R7)
30931	Resistor—4.7 megohms, ¼ watt (R1, R2, R12)
31455	Resistor—5.6 megohms, ¼ watt (R5)
30992	Resistor—10 megohms, ¼ watt (R11)
*71055	Shaft—Tuning knob shaft
*71050	Shield—L.H. end shield for dial
*71051	Shield—R.H. end shield for dial

STOCK No.	DESCRIPTION
*71040	Socket—2 contact female socket for external loop
*71037	Socket—Tube socket—miniature—7 prong—floating
*71827	Socket—Tube socket—miniature—7 prong—bottom mounted
70390	Spring—Drive cord spring
*71053	Spring—Retaining spring for knob
*71039	Switch—Line—battery change switch (S1)
*71045	Switch—Power switch (S2)
*71299	Transformer—First I.F. transformer (L6, L7, C13, C14)
*71400	Transformer—Second I.F. transformer (L8, L9, L10, C17, C18)
*71047	Transformer—Output transformer (T1)
*71081	Washer—"C" washer for tuning knob shaft
*71033	Washer—Insulating washer, extruded, for mounting dial support to chassis base (4 req'd.) and to mount base holder bracket
*71034	Washer—Insulating washer—flat, to mount base holder bracket
*71049	Window—Dial window
	SPEAKER ASSEMBLY 922258-2
*71059	Gasket—Speaker gasket (black tubing)
71058	Speaker—4" x 6" P.M. speaker complete with cone and voice coil
	NOTE: If stamping on speaker in instrument does not agree with above speaker number, order replacement parts by referring to model number of instrument, number stamped on speaker and full description of part required.
	MISCELLANEOUS
*71074	Arm—Shutter arm lever
*71617	Cable—Connecting cable for external loop
*71069	Capacitor—Adjustable trimmer, 3-35 mmf. (C1)
*71080	Clip—Case side spring clip and screw (2 req'd.)
*71619	Cup—Suction cup for mounting external loop
*71060	Back—Case back complete with center strip
*71061	Foot—Case foot (moulded) (2 req'd.)
*71068	Foot—Case foot (wood) (2 req'd.)
*71067	Front—Case front complete less shutter
*71618	Gasket—Gasket seal to hold loop together
*71063	Handle—Carrying handle
*71062	Latch—Case latch (2 req'd.)
*71065	Link—Carrying handle link (2 req'd.)
*71616	Loop—External antenna loop (L11, C35)
*71079	Loop—Antenna loop—internal (L1)
*71064	Retainer—Battery retainer spring bracket (2 required)
*71066	Screw—#8-32 x 5/16" long screw to fasten case together (2 required) for battery holders (2 required)
*71077	Screw—Screw complete with washer and nut to secure one side to case front or case latch
*71071	Shutter—Case shutter
*71076	Side—Case side—L.H.
*71075	Side—Case side—R.H. (loop side)—less capacitor assembly
*71072	Spring—Case shutter compression spring
31608	Washer—"C" washer for case shutter's shafts
*71078	Washer—Dampening washer for shutter shafts

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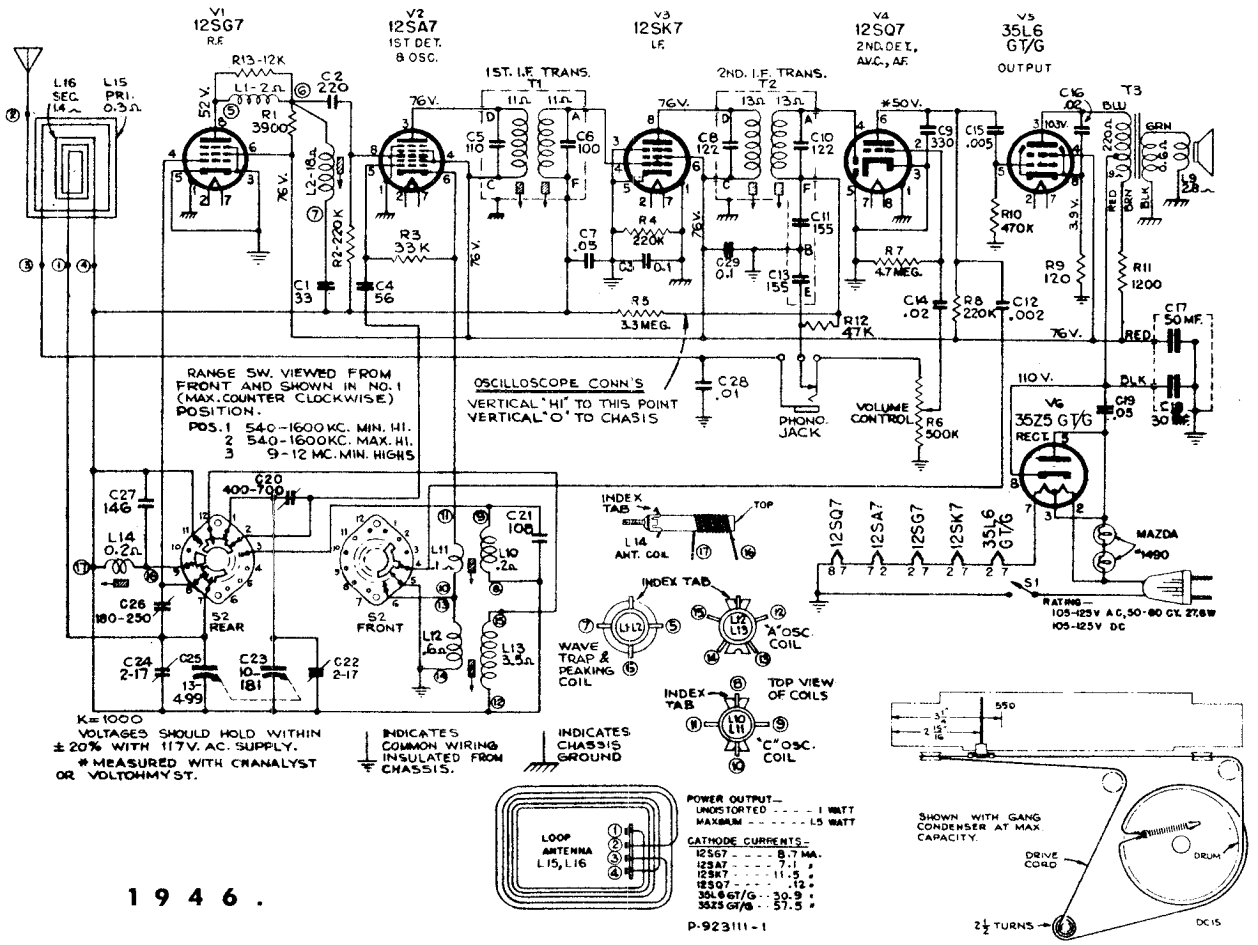
MODELS 66X1, 66X2, 66X3, 66X4, 66X9, Chassis RC-1038


V1 12SG7 R.F.
V2 12SA7 1ST DET. & OSC.
V3 12SK7 I.F.
V4 12SQ7 2ND. DET., A.V.C., A.F.
V5 35L6 GT/G OUTPUT
1ST. I.F. TRANS. T1
2ND. I.F. TRANS. T2
T3
V6 35Z5 GT/G RECT.
RANGE SW. VIEWED FROM FRONT AND SHOWN IN NO. 1 (MAX. COUNTER CLOCKWISE) POSITION.
POS. 1 540-1600 KC. MIN. HI.
2 540-1600 KC. MAX. HI.
3 9-12 MC. MIN. HIGHS
OSCILLOSCOPE CONN'S
VERTICAL "HI" TO THIS POINT
VERTICAL "O" TO CHASIS
PHONO. JACK
VOLUME CONTROL
INDEX TAB
L14 ANT. COIL
WAVE TRAP & PEAKING COIL
"A" OSC. COIL
"C" OSC. COIL
TOP VIEW OF COILS
S1
S2 REAR
S2 FRONT
MAZDA 1490
RATING— 105-125 V A.C., 50-60 CY. 27.6 W 105-125 V D.C.
K=1000
VOLTAGES SHOULD HOLD WITHIN ± 20% WITH 117 V. AC. SUPPLY.
* MEASURED WITH CRANALYST OR VOLTOHMYST.
INDICATES COMMON WIRING INSULATED FROM CHASSIS.
INDICATES CHASSIS GROUND
LOOP ANTENNA L15, L16
POWER OUTPUT— UNDISTORTED - - - - 1 WATT MAXIMUM - - - - - - 1.5 WATT
CATHODE CURRENTS— 12SG7 - - - - 8.7 MA. 12SA7 - - - - 7.1 " 12SK7 - - - - 11.5 " 12SQ7 - - - - 12 " 35L6GT/G - - 30.9 " 35Z5 GT/G - - 57.5 "
SHOWN WITH GANG CONDENSER AT MAX. CAPACITY.
DRIVE CORD
DRUM
2½ TURNS
P-923111-1

1946.

STOCK No.	DESCRIPTION
	CHASSIS ASSEMBLIES RC 1038
39616	Capacitor—Mica, 33 mmf. (C1)
39622	Capacitor—Mica, 56 mmf. (C4)
*71156	Capacitor—Ceramic, 108 mmf. (C21)
*71157	Capacitor—Ceramic, 146 mmf. (C27)
*71121	Capacitor—Mica trimmer, 180-250 mmf. (C26)
39636	Capacitor—Mica, 220 mmf. (C2)
39640	Capacitor—Mica, 330 mmf. (C9)
*71113	Capacitor—Mica trimmer, 400-700 mmf. (C20)
70601	Capacitor—Tubular, .002 mfd., 400 volts (C12)
70606	Capacitor—Tubular, .005 mfd., 400 volts (C15)
70610	Capacitor—Tubular, .01 mfd., 400 volts (C28)
70611	Capacitor—Tubular, .02 mfd., 400 volts (C14, C16)
70615	Capacitor—Tubular, .05 mfd., 400 volts (C7, C19)
70617	Capacitor—Tubular, 0.1 mfd., 400 volts (C3, C29)
70408	Capacitor—Electrolytic, comprising 1 section of 50 mfd., 150 volts and 1 section of 30 mfd., 150 volts (C17, C18)
*71405	Coil—Antenna coil (L14)
*71406	Coil—Oscillator coil—"A" band (L12, L13)
*71408	Coil—Oscillator coil—"C" band (L10, L11)
*71407	Coil—Wave trap (L1, L2)
*71110	Condenser—Variable tuning condenser (C22, C23, C24, C25).
38410	Control—Volume control and power switch (R6, S1)
34662	Cord—Drive cord (approx. 51" overall length)
70384	Drum—Drive drum
70391	Insulator—Insulator for phono jack
*71114	Indicator—Station selector indicator
*71116	Lamp—Dial lamp—Mazda 1490
*71117	Loop—Antenna loop (L15, L16)
*71108	Plate—Dial back plate complete with four (4) pulleys less dial
36230	Pulley—Drive cord pulley
30189	Resistor—120 ohms, ½ watt (R9)
30731	Resistor—1200 ohms, ½ watt (R11)
30694	Resistor—3900 ohms, ¼ watt (R1)
30436	Resistor—12,000 ohms, ¼ watt (R13)
30685	Resistor—33,000 ohms, ¼ watt (R3)
30787	Resistor—47,000 ohms, ¼ watt (R12)
14583	Resistor—220,000 ohms, ¼ watt (R2, R4, R8)
30648	Resistor—470,000 ohms, ¼ watt (R10)
31417	Resistor—3.3 megohms, ¼ watt (R5)
30931	Resistor—4.7 megohms, ¼ watt (R7)
*70467	Shaft—Tuning knob shaft
*71118	Shell—Protecting shell for loop spacing spring (2 required)
*71115	Socket—Lamp socket
37605	Socket—Tube socket
*71120	Spacer—Tubular spacer to mount antenna loop (2 required)
70390	Spring—Drive cord spring
*71119	Spring—Loop assembly spacing spring (2 required)
*71112	Switch—Range and tone switch (S2)
*71111	Transformer—Output transformer (L7, L8)
71558	Transformer—First I.F. transformer (L3, L4, C5, C6)
70387	Transformer—Second I.F. transformer (L5, L6, C8, C10, C11, C13)
33726	Washer—"C" washer for tuning knob shaft
	SPEAKER ASSEMBLY 922258-2
71058	Speaker—4" x 6" elliptical P.M. speaker complete with cone and voice coil NOTE: If stamping on speaker in instrument does not agree with above speaker number, order replacement parts by referring to model number of instrument, number stamped on speaker and full description of part required.
	MISCELLANEOUS
*71835	Back—Cabinet back for Model 66X3
*71122	Baffle—Speaker baffle assembly for 66X1 and 66X2
*71124	Clamp—Dial clamp for 66X1 and 66X2 (2 required)
*71131	Clamp—Dial clamp for 66X3 and 66X4
*71132	Dial—Glass dial scale
*71127	Foot—Cabinet foot—walnut—for 66X1 (4 required)
*71128	Foot—Cabinet foot—ivory—for 66X2 (4 required)
70473	Knob—Control knob (mottled walnut) for 66X1, 66X3, 66X4
70474	Knob—Control knob (ivory) for 66X2
*71126	Nut—Speed nut to fasten screen (4 required)
*71125	Screen—Protective screen for hand grip for 66X1 and 66X2
30900	Spring—Retaining spring for control knobs
*71130	Spring—Retaining spring for front strip for 66X1 and 66X2
*71129	Strip—Finished strip for cabinet front for 66X1 and 66X2

*This is the first time this stock No. has appeared in service data.

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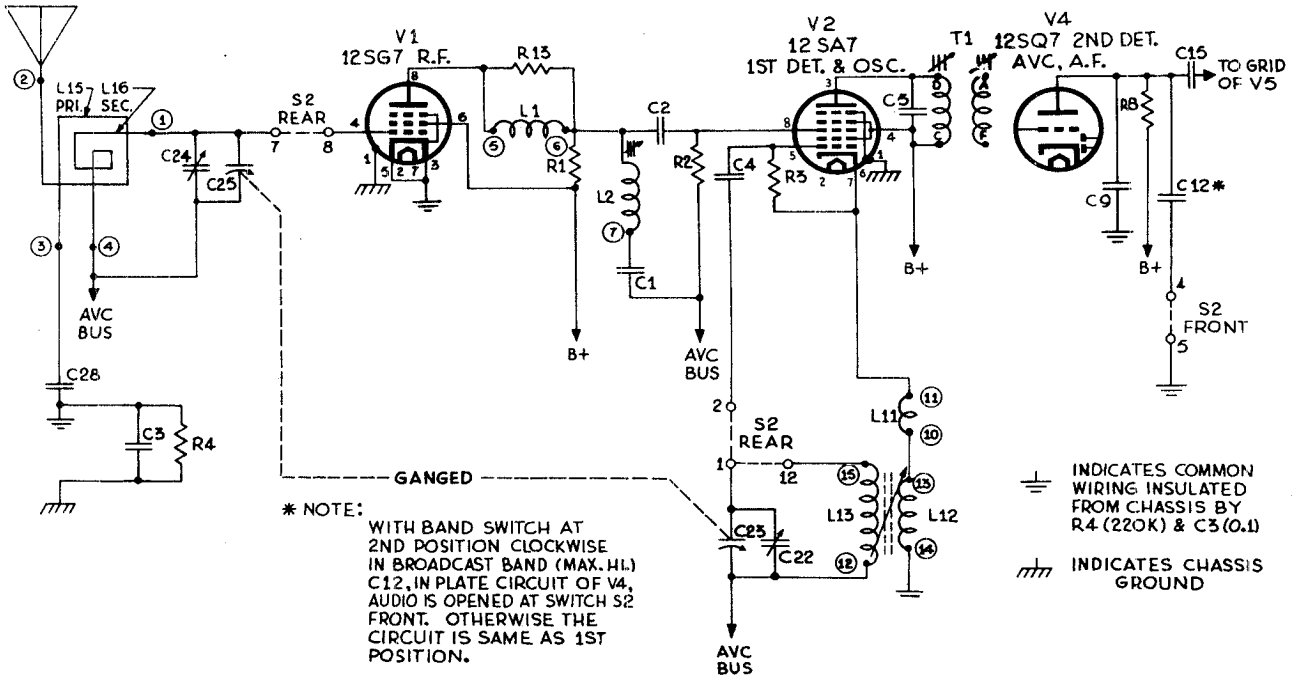
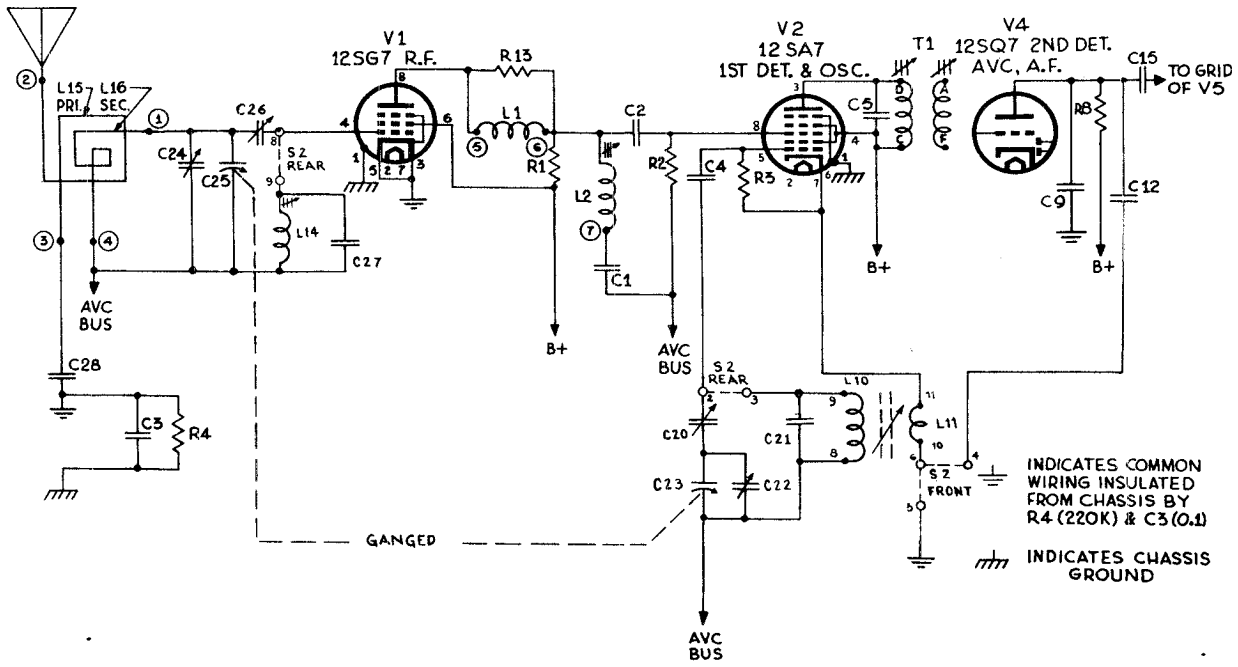
MODELS 66X1, 66X2, 66X3, 66X4, 66X9, Chassis RC-1038

RCA MFG. CO.



BAND-SWITCH SHOWN AT 1ST POSITION.
BROADCAST BAND (MIN. HI.)
540 - 1600 KC.



BAND-SWITCH SHOWN AT 3RD POSITION CLOCKWISE
SHORT WAVE BAND (MIN. HI.)
9 - 12 MC.

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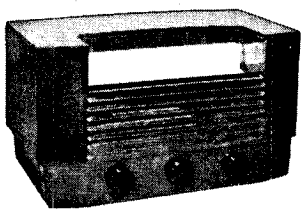
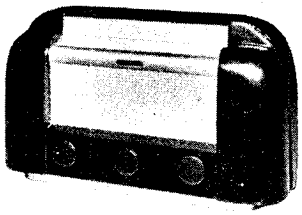
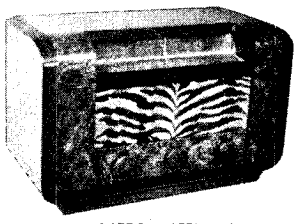
MODELS 66X1, 66X2, 66X3, 66X4, 66X9, Chassis RC-1038



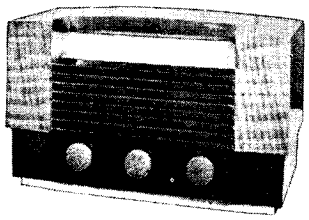
66X9—(Plastic)



66X1—(Brown Plastic)
66X2—(Ivory Plastic)



66X3—(Wood)



66X4—(Wood)

Specifications

Frequency Range

Broadcast ..... 540-1600 kc
Short Wave ..... 9-12 mc

Intermediate Frequency ..... 455 kc

Tube Complement

(1) RCA-12SG7 ..... R-F Amplifier
(2) RCA-12SA7 ..... 1st Det.—Osc.
(3) RCA-12SK7 ..... I-F Amplifier
(4) RCA-12SQ7 ..... 2nd Det., A.V.C., and A-F Amplifier
(5) RCA-35L6-GT/G ..... Power Output
(6) RCA-35Z5-GT/G ..... Rectifier

Pilot Lamps ..... Mazda No. 1490, 3.2 volts

Power Output

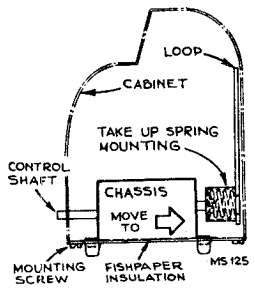
Undistorted ..... 1.0 watts
Maximum ..... 1.5 watts

Loudspeaker (922258-2)

Size ..... 4 x 6" elliptical P.M.
V.C. Impedance ..... 3.4 ohms at 400 cycles

Power Supply Rating

105-125 volts, AC, 50 or 60 cycles, or DC ..... 27.6 watts



The construction of the cabinets for Models 66X1 and 2 makes it necessary to remove the chassis for replacing tubes. To do this, proceed as follows:

1. Remove the power plug from the service receptacle.
2. Remove control knobs.
3. Remove the six slotted screws around the edge of the metal base plate. (**Do not remove the four feet from the base plate as this will separate the base plate from the chassis.**)
4. Tilt the cabinet forward so that the bottom rear edge of the cabinet raises above base plate.
5. Hold the chassis with one hand while pushing the cabinet forward and upward to clear the control shafts.

Lead Dress

1. Dress all filament and power leads down to chassis and as far as possible from all audio grid and plate wiring.
2. Dress power cord back and away from C-14 (1st audio coupling condenser).
3. Dress C-14 toward 12SQ7 socket and away from the switch.
4. Dress C-16 (output by-pass condenser) down to chassis.
5. Dress blue lead from phono jack to volume control in air and away from output transformer.
7. Dress all leads and parts away from oscillator coils.
8. Dress C-2 (R.F. coupling condenser) back to chassis.
9. Avoid excessive lead lengths in C-27 (short wave fixed . imer) and short wave antenna coil.
10. Dress pilot light leads (above chassis) toward dial support and away from the 35Z5 tube.

Alignment Procedure

Test Oscillator.—Connect high side of test oscillator as shown in chart. Connect low side through a 0.1 mf. capacitor to common "—B." Keep the output signal as low as possible to avoid A.V.C. action.

Output Meter.—Connect meter across speaker voice coil. Turn volume control to maximum clockwise position, station selector switch to broadcast maximum high position (pos. 2), for broadcast alignment and to position 3 for high frequency band.

Dial Pointer Adjustment.—Rotate tuning condenser fully counter-clockwise (plates fully meshed). Adjust indicator to $2^{15}/_{16}$ in. from end of backplate as indicated in drawing.

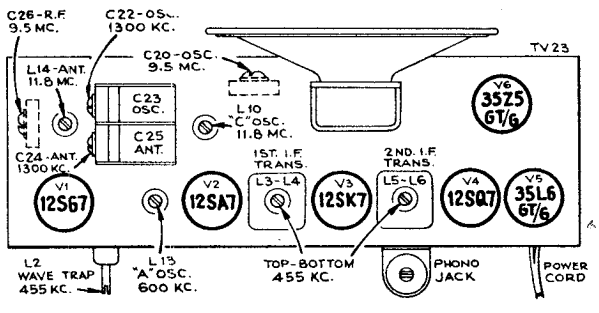
On models 66X1 and 2 the dial indicator is accessible for adjustment by removing the metal strip below the dial glass. (Lift and swing the top forward).

Calibration Scale.—The glass tuning dial may be easily removed from the cabinet and temporarily attached to the dial back plate.

Power Supply Polarity.—For operation on d-c, the power plug must be inserted in the outlet for correct polarity. If the set does not function, reverse the plug. On a-c, reversal of the plug may reduce hum.

Steps	Connect high side of the rest oscillator to—	Tune test osc. to—	Turn radio dial to—	Adjust the following for maximum peak output
1	Pin #4 (signal grid) 12SK7 IF tube in series with 0.1 mfd.	455 kc	Quiet point at 1600 kc end of the dial	T2† 2nd I-F trans.
2	Pin #8 (signal grid) 12SA7 1st det. in series with 0.1 mfd.			T1 1st I-F trans.
3	Antenna in series with 200 mmf.			L2 for minimum output (Wave trap)
4		1300 kc	1300 kc	C22 (osc.) C24 (ant.)
5		600 kc	600 kc	L13 While rocking gang
6	Repeat steps 4 and 5.			
7	Antenna in series with 50 mmf.	9.5 mc.	9.5 mc.	C20 (Osc.)*
8		9.5 mc.	9.5 mc.	C26 Ant. while rocking gang
9		11.8 mc.	11.8 mc.	L10 (Osc.)**
10				L14 while rocking gang
11	Repeat steps 9 and 10.			

*If two peaks are obtained use minimum cap peak.
**If two peaks are obtained use minimum inductance peak.
†Do not repeat step No. 1.



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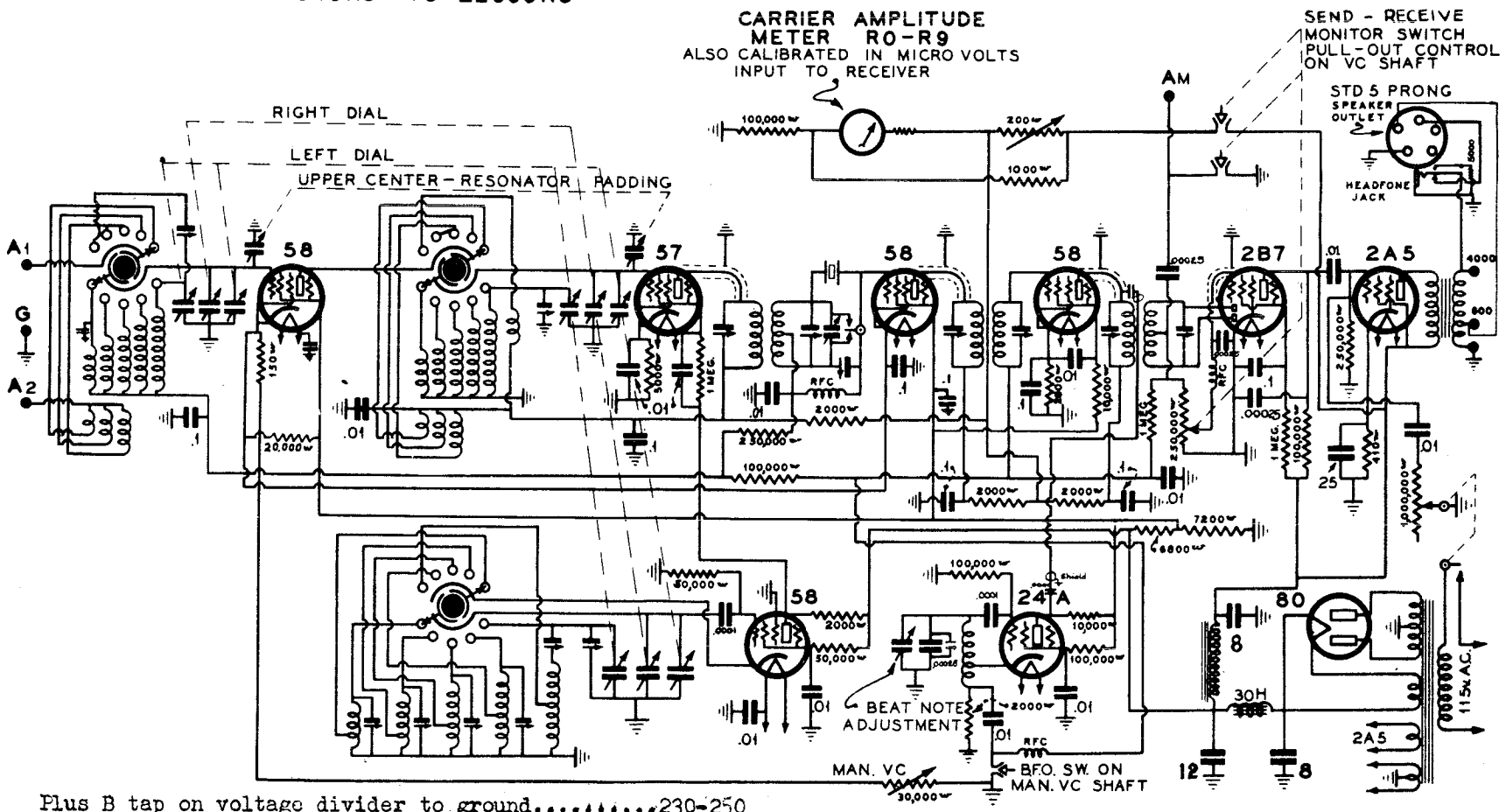
MODEL RME – 9D SINGLE SIGNAL
540KC TO 22000KC



Plus B tap on voltage divider to ground	230-250
Plates of 58s and 57 to ground	210-250
Voltage divider tap to ground	90-110
Plate of 2A5 to ground	220-250
Cathode of 2A5 to ground	17- 19
Cathode of RF and IF amplifiers to ground	2.5- 3
Screens of RF and IF amplifiers to ground	90- 110
Screens of 57 first detector to ground	90-110
Screen of 24A to ground	70-120
Plate of 24A to ground	230-250
Plate of 2B7 to ground	80-110
Screen of 2B7 to ground	15- 30

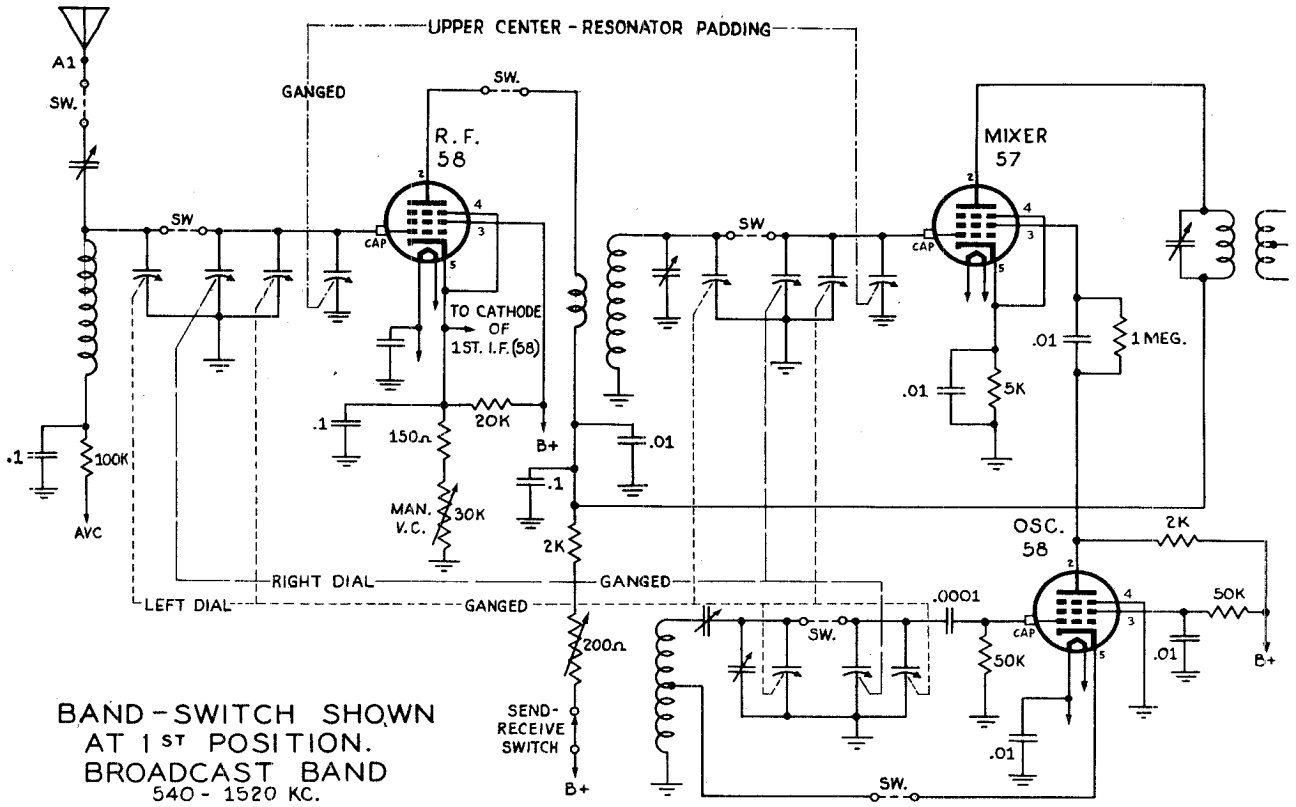
Range of Each Position of Band Selector Knob

Position 1	540 KC	to	1520 KC
" 2	1500 KC	to	3200 KC
" 3	3100 KC	to	6500 KC
" 4	6300 KC	to	13000 KC
" 5	12000 KC	to	22000 KC

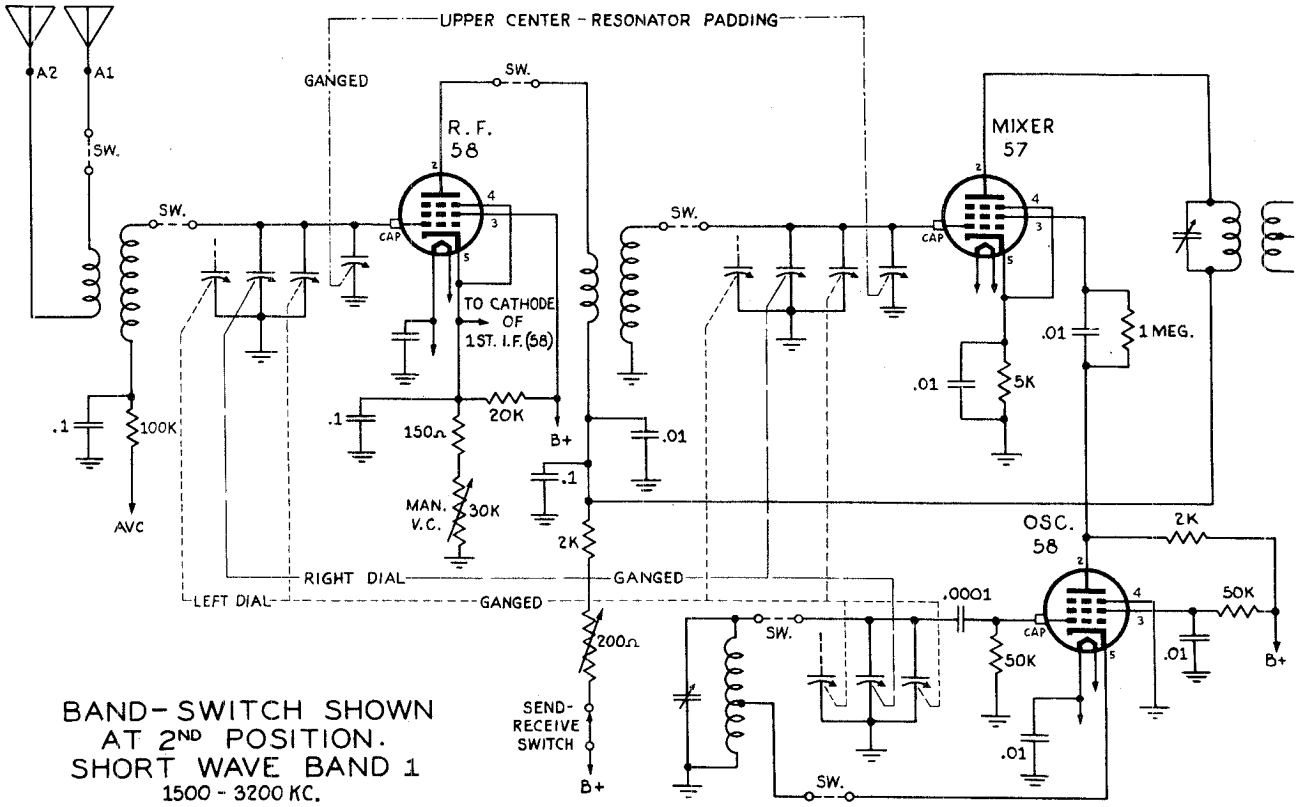
"clarified schematics"

MODEL 9D

RADIO MFG. ENG. INC.



BAND-SWITCH SHOWN AT 1ST POSITION. BROADCAST BAND 540 - 1520 KC.



BAND-SWITCH SHOWN AT 2ND POSITION. SHORT WAVE BAND 1 1500 - 3200 KC.

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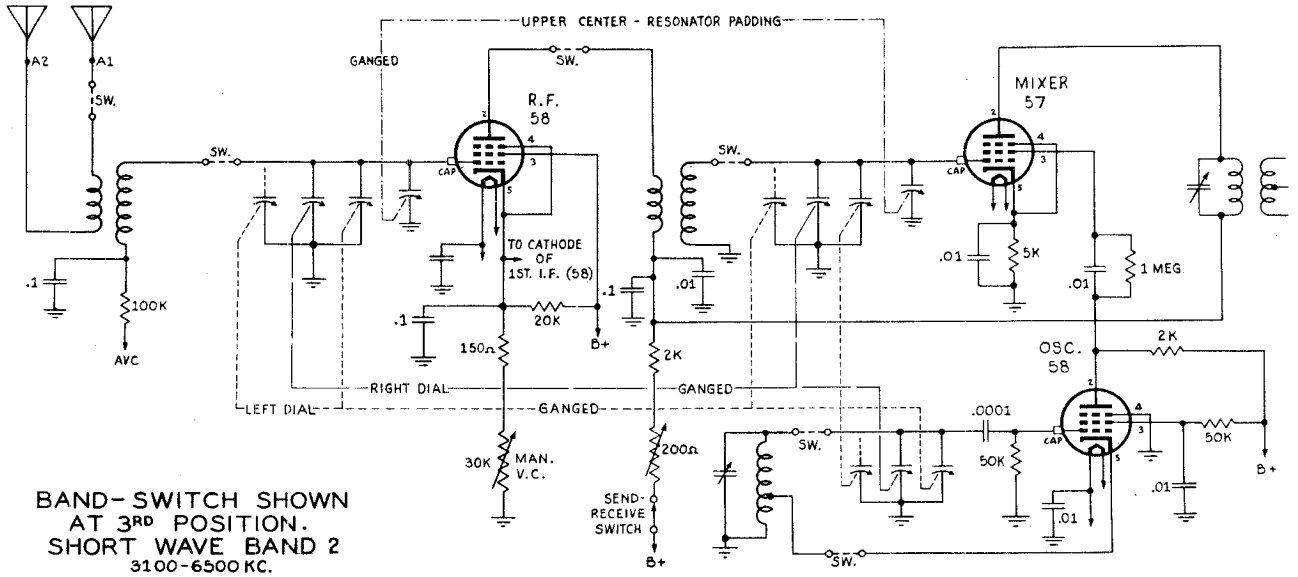
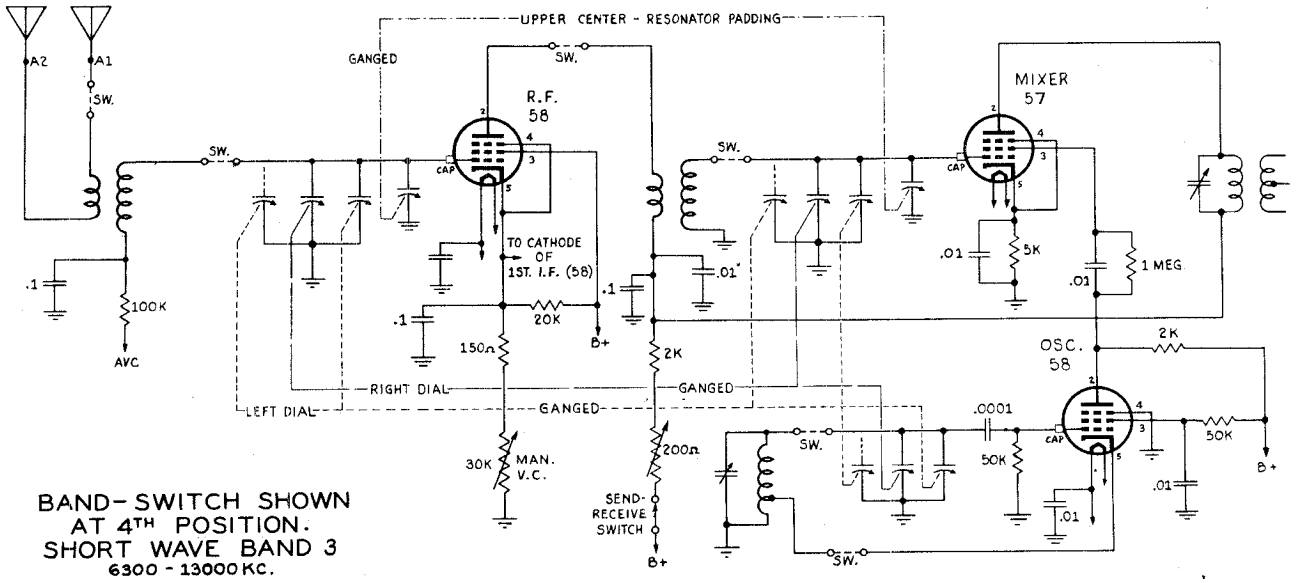
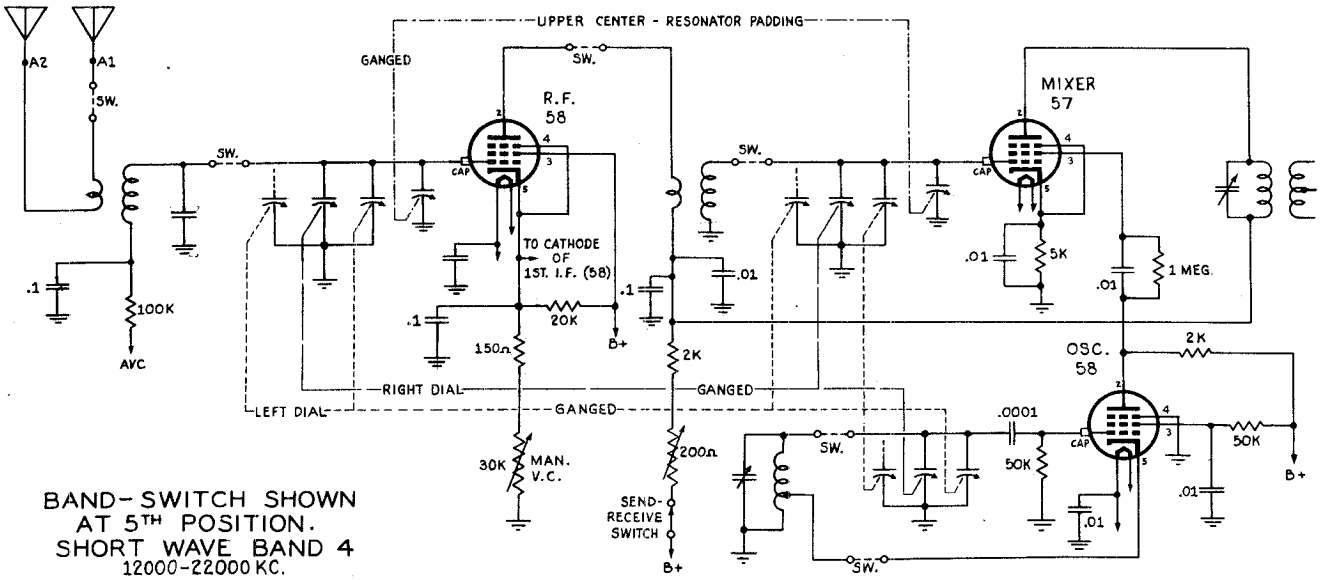


BAND-SWITCH SHOWN
AT 3RD POSITION.
SHORT WAVE BAND 2
3100-6500 KC.



BAND-SWITCH SHOWN
AT 4TH POSITION.
SHORT WAVE BAND 3
6300 - 13000 KC.



BAND-SWITCH SHOWN
AT 5TH POSITION.
SHORT WAVE BAND 4
12000-22000 KC.

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MODEL 9D

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OPERATION OF THE CRYSTAL FILTER

To operate the crystal filter for single signal reception, the white dot on the knob "D" should be set to the position corresponding to "S" and the knob "C" adjusted slightly to a position where background response is a minimum. When tuning for CW signals using the crystal filter the tuning should be done with dial number 2, and rotation should be slow due to the sharp resonance characteristic of the filter. In case comparative elimination of noises does not occur when the selectivity control "C" is adjusted from side to side, it is possible that the balancing condenser has become misaligned. In order to adjust this alignment to the null point, use an insulated trimmer screw driver and adjust the pressure screw on the small mica trimmer condenser located just behind and below the crystal filter compartment. This is accessible by raising the receiver cabinet cover and removing the shield box cover of the crystal filter compartment. With the receiver merely on the air or turned to station reception, this balance can be made by slightly turning the screw either way until minimum receiver response is obtained.

When phone stations are to be received the carrier may be tuned in and the selectivity control "C" adjusted to broaden the crystal response. Although the result will be mostly a low frequency audio output, sufficient articulation frequencies are passed to make phone reception intelligible. Of course, when the crystal is used for phone reception the apparent strength of the speaker output is reduced due to the fact that the crystal has eliminated most of the side bands of the modulated carrier and since these eliminated higher side band frequencies contain some of the sound energy going to the speaker, the net effect is a reduction in sound output. However, with CW reception, when the carrier to be received, is exactly tuned there is no reduction in the signal beat when the crystal is being used.

When the crystal is placed parallel in the filter circuit (knob "D" set to position B, diagram 40A) it tends to short circuit (series resonance) at its resonant frequency. This function is valuable for eliminating interfering heterodynes and its effect may be sharpened and broadened slightly in exactly the same way as the series operation of the filter. Its use in this manner is many times of invaluable service in connection with radio telephone reception.

THE MONITOR FOR MODULATION

On the rear of the chassis (Figure C) is a terminal marked "monitor feed wire terminal", which is used to connect a pick-up wire to the monitor curcuit. By pulling out the knob "B" the monitor circuit is connected and the radio amplifier circuits disconnected. The monitor is intended for the checking of modulation quality of a transmitter in the proximity of the receiver. For this purpose 10 feet or so, of wire lying on the floor, may be connected to the monitor terminal post. If more or less is needed that fact can be determined by noting the magnitude of the audio output. When using the monitor it is recommended that listening be done with headphones to prevent audio feed-back, especially when the transmitter modulation originates at a nearby microphone. If transcription equipment is used the receiver loud speaker may be used. Volume may be controlled by the rotation of knob "B" in the same manner asthe radio volume of the receiver is controlled.

The monitor switch is operated by pulling on the knob "B" and thus also becomes the SNED-RECEIVE switch, since it opens the plate supply to the radio and IF amplifiers. The monitoring of CW signals can be accomplished by leaving the knob "B" pushed in toward the panel in the regular radio receiving position and the manual volume control and beat oscillator knob "F" turned considerably toward the maximum clockwise position. The frequency of the transmitter must then be tuned to by the regular tuning controls and the beat note will be heard in the same manner as that of any received signal. It may be necessary in this connection to remove the regular antenna and substitute a shorter length in case the received signal is too strong. However, the manual volume control knob "F", when in the maximum clockwise position, reduces the receiver's sensitivity to a point which will accomodate most amateur transmitters.

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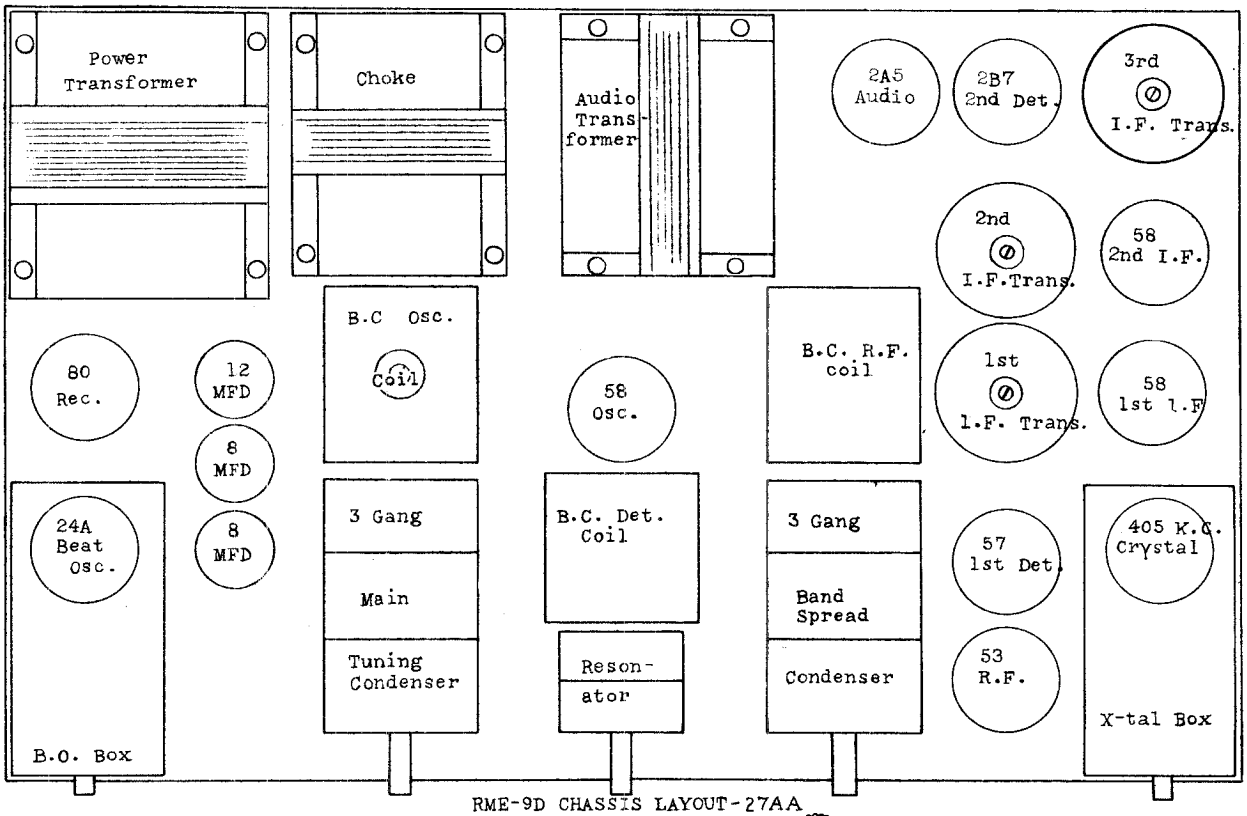

RME-9D CHASSIS LAYOUT-27AA

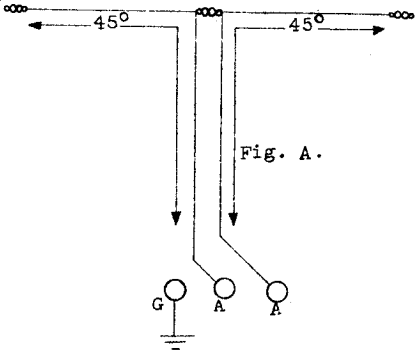

Fig. A.

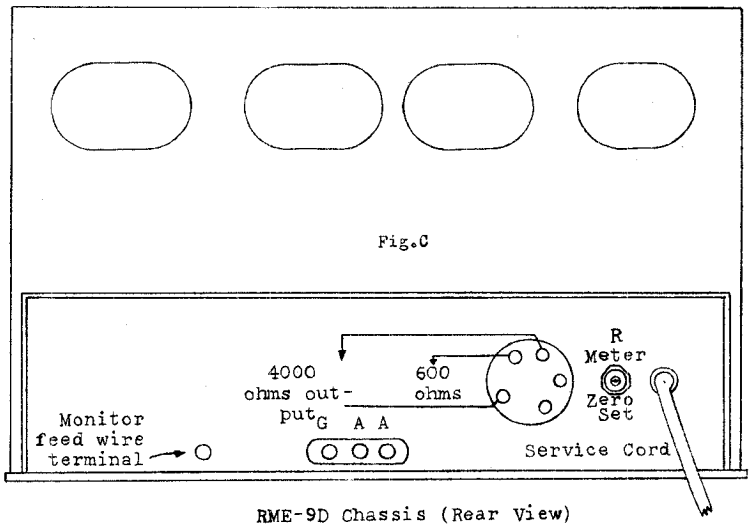

Fig.C

RME-9D Chassis (Rear View)

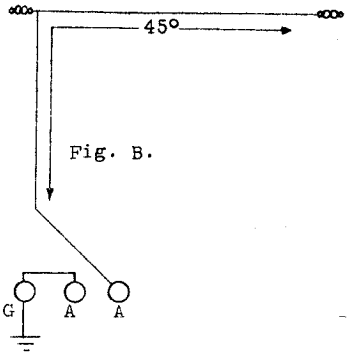

Fig. B.

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MODEL 45 Early

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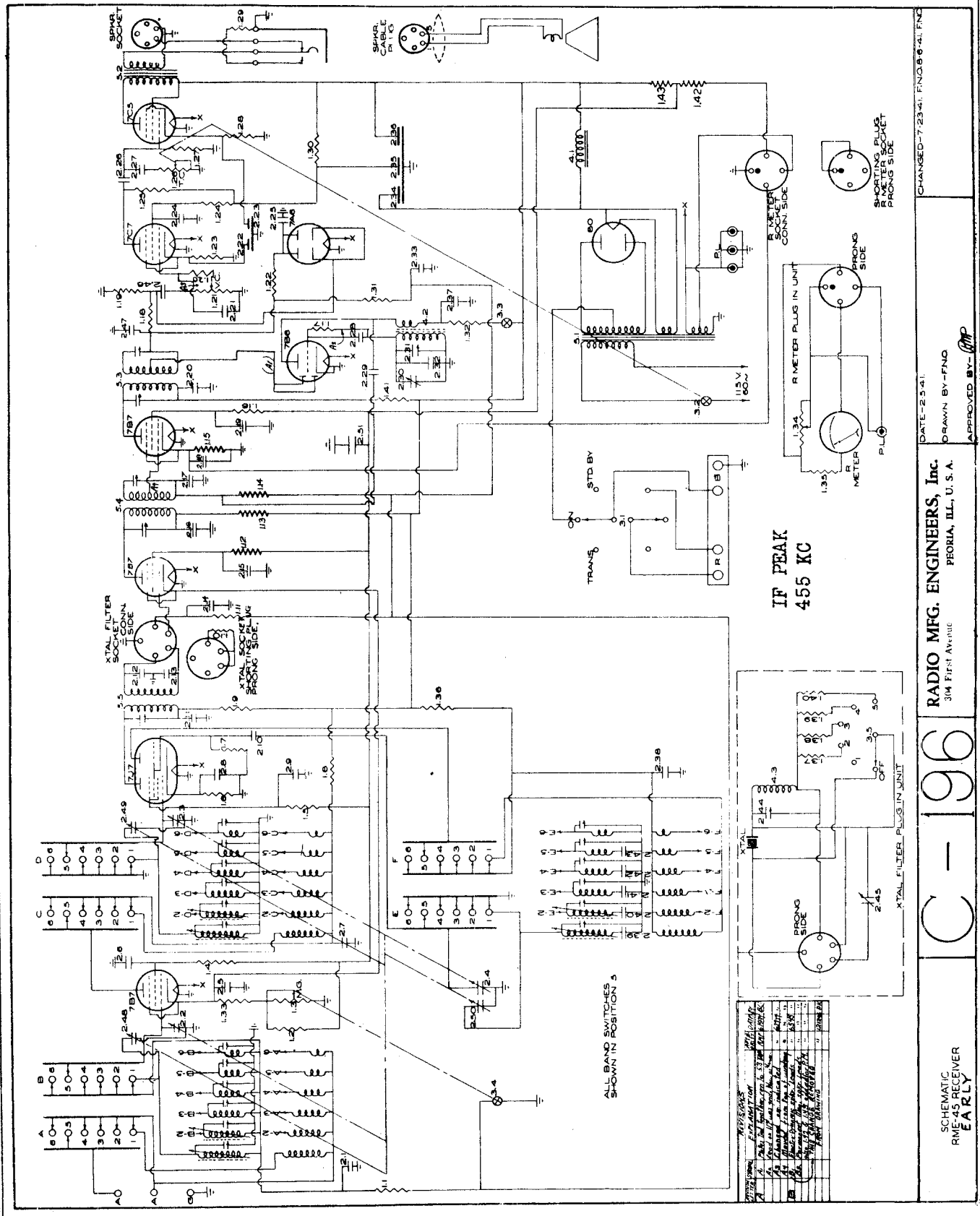

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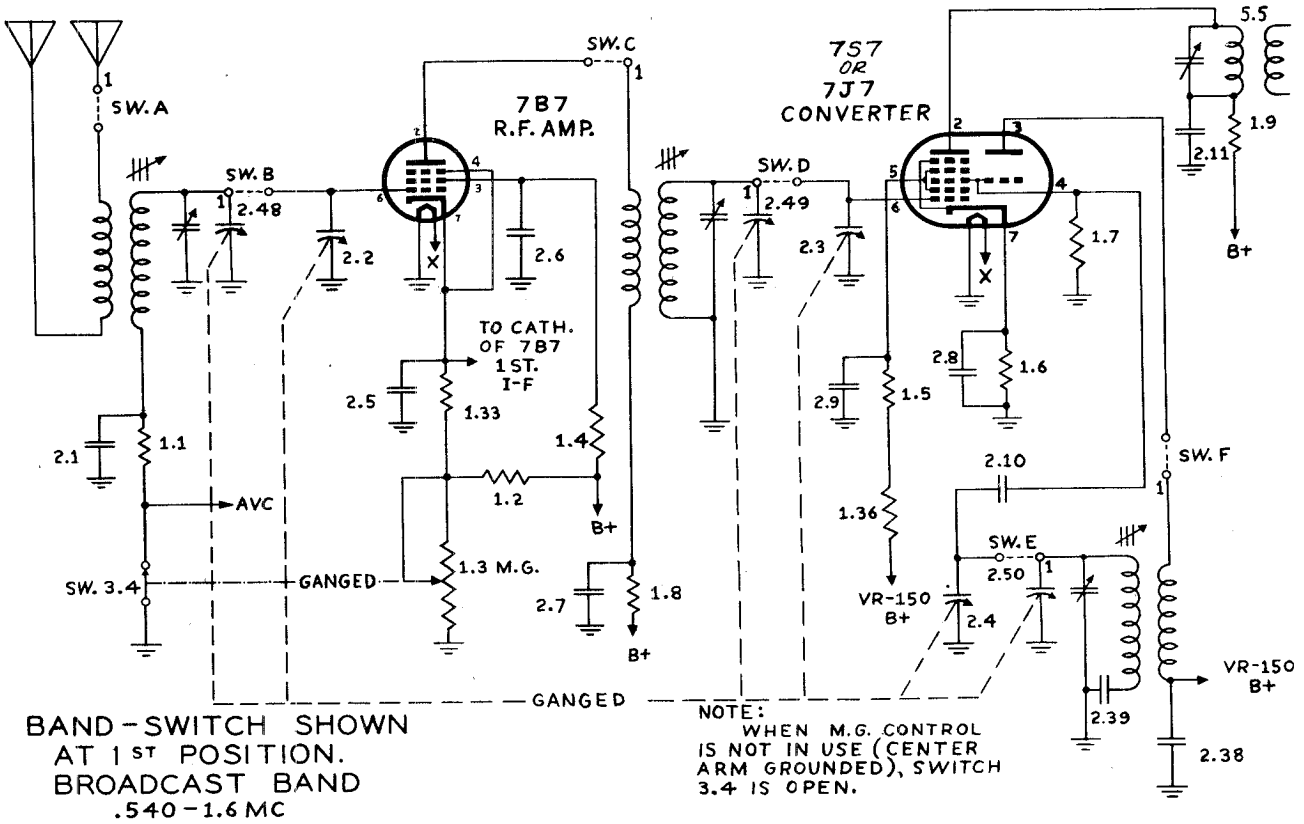
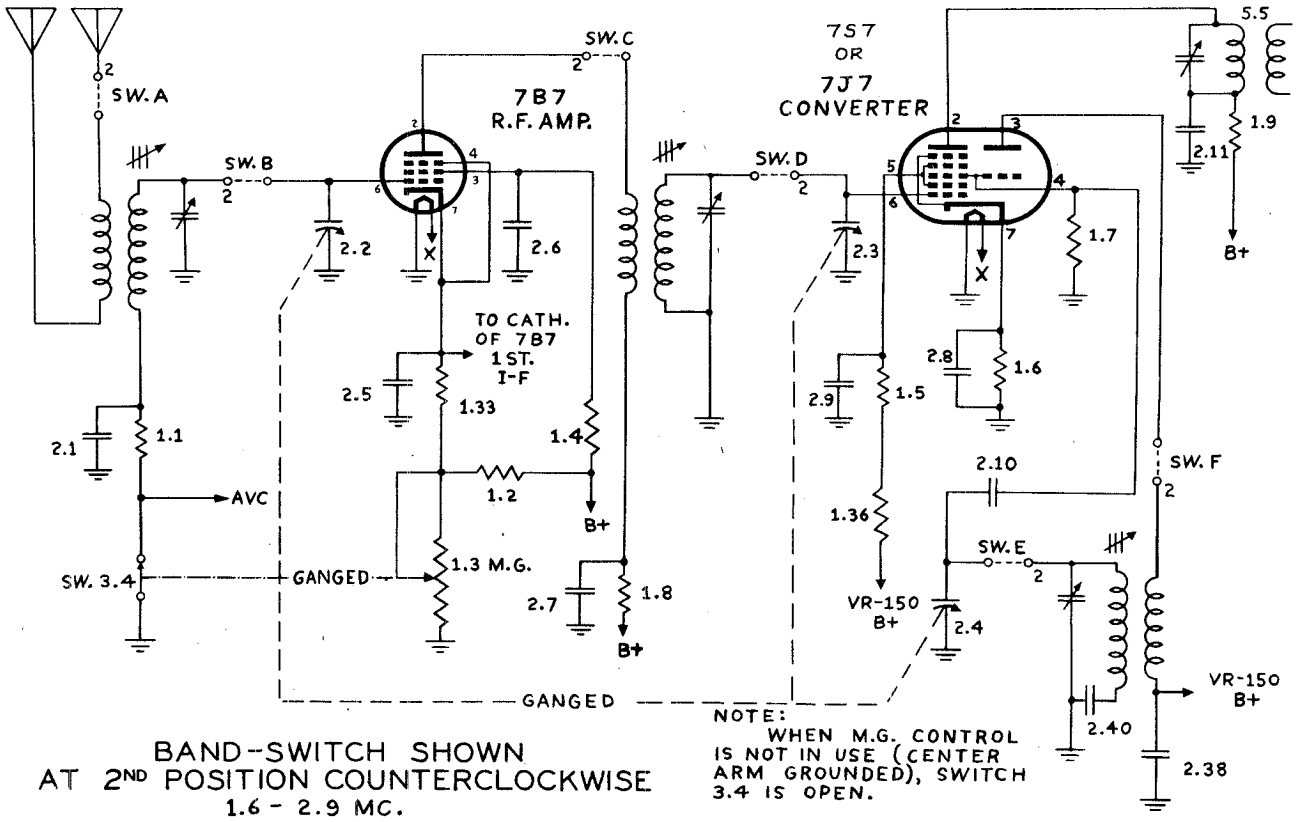


BAND-SWITCH SHOWN AT 1ST POSITION. BROADCAST BAND .540-1.6 MC

NOTE: WHEN M.G. CONTROL IS NOT IN USE (CENTER ARM GROUNDED), SWITCH 3.4 IS OPEN.



BAND-SWITCH SHOWN AT 2ND POSITION COUNTERCLOCKWISE 1.6 - 2.9 MC.

NOTE: WHEN M.G. CONTROL IS NOT IN USE (CENTER ARM GROUNDED), SWITCH 3.4 IS OPEN.

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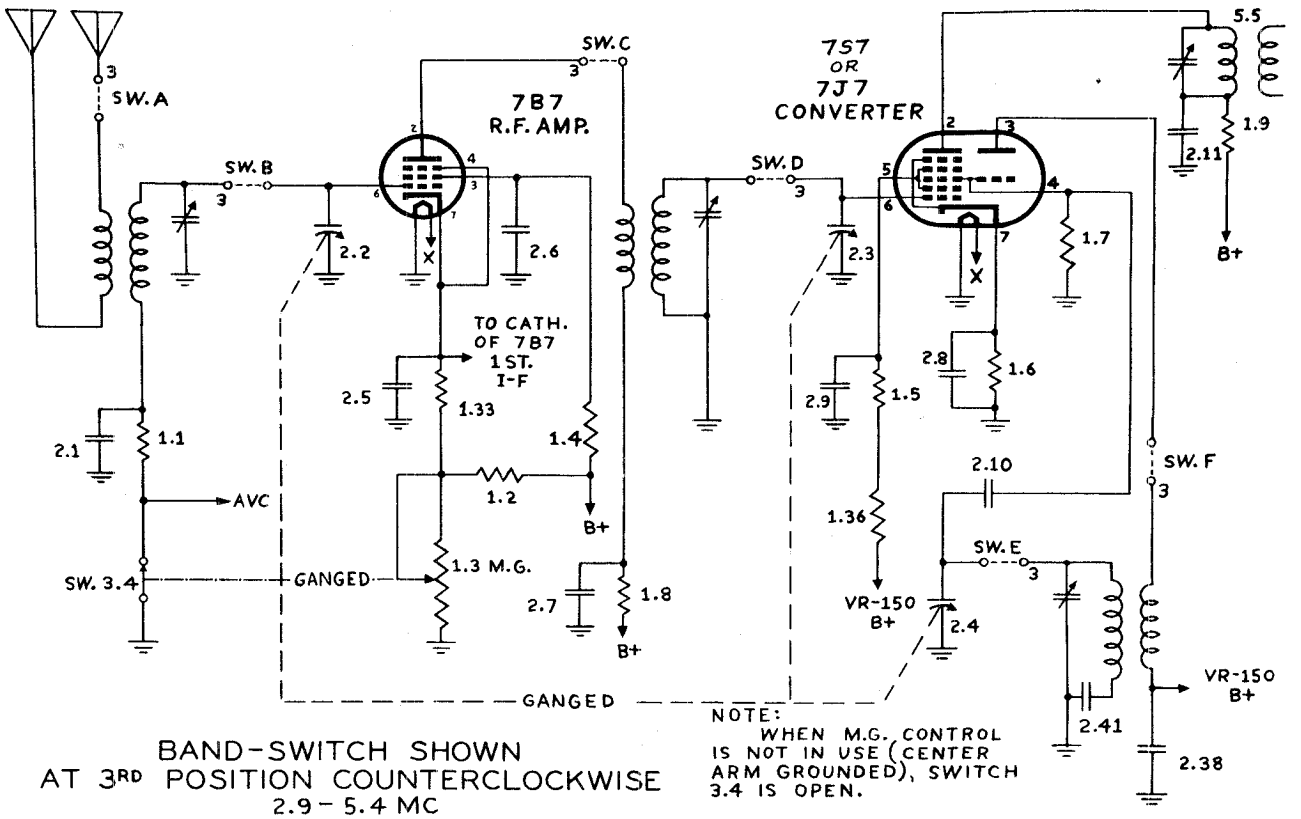
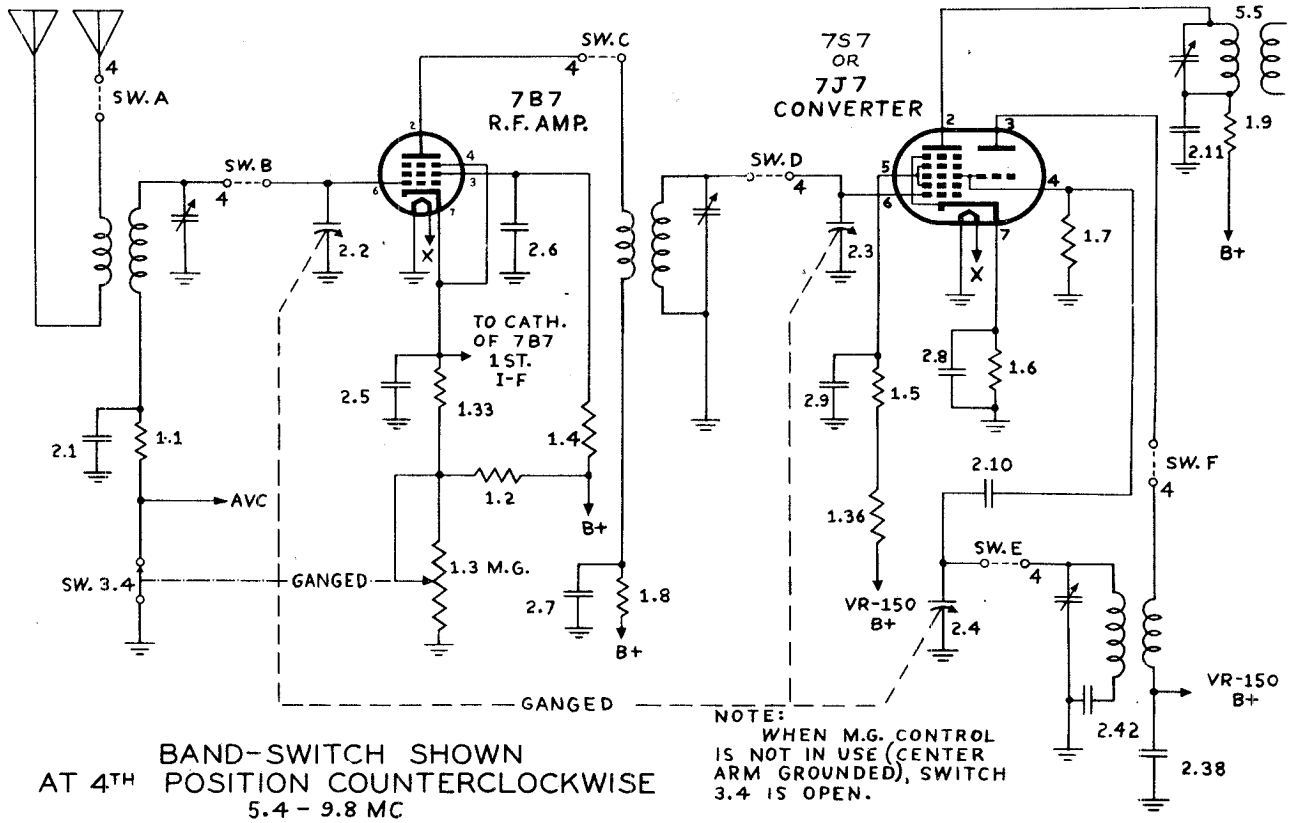


BAND-SWITCH SHOWN
AT 3RD POSITION COUNTERCLOCKWISE
2.9 - 5.4 MC

NOTE:
WHEN M.G. CONTROL IS NOT IN USE (CENTER ARM GROUNDED), SWITCH 3.4 IS OPEN.



BAND-SWITCH SHOWN
AT 4TH POSITION COUNTERCLOCKWISE
5.4 - 9.8 MC

NOTE:
WHEN M.G. CONTROL IS NOT IN USE (CENTER ARM GROUNDED), SWITCH 3.4 IS OPEN.

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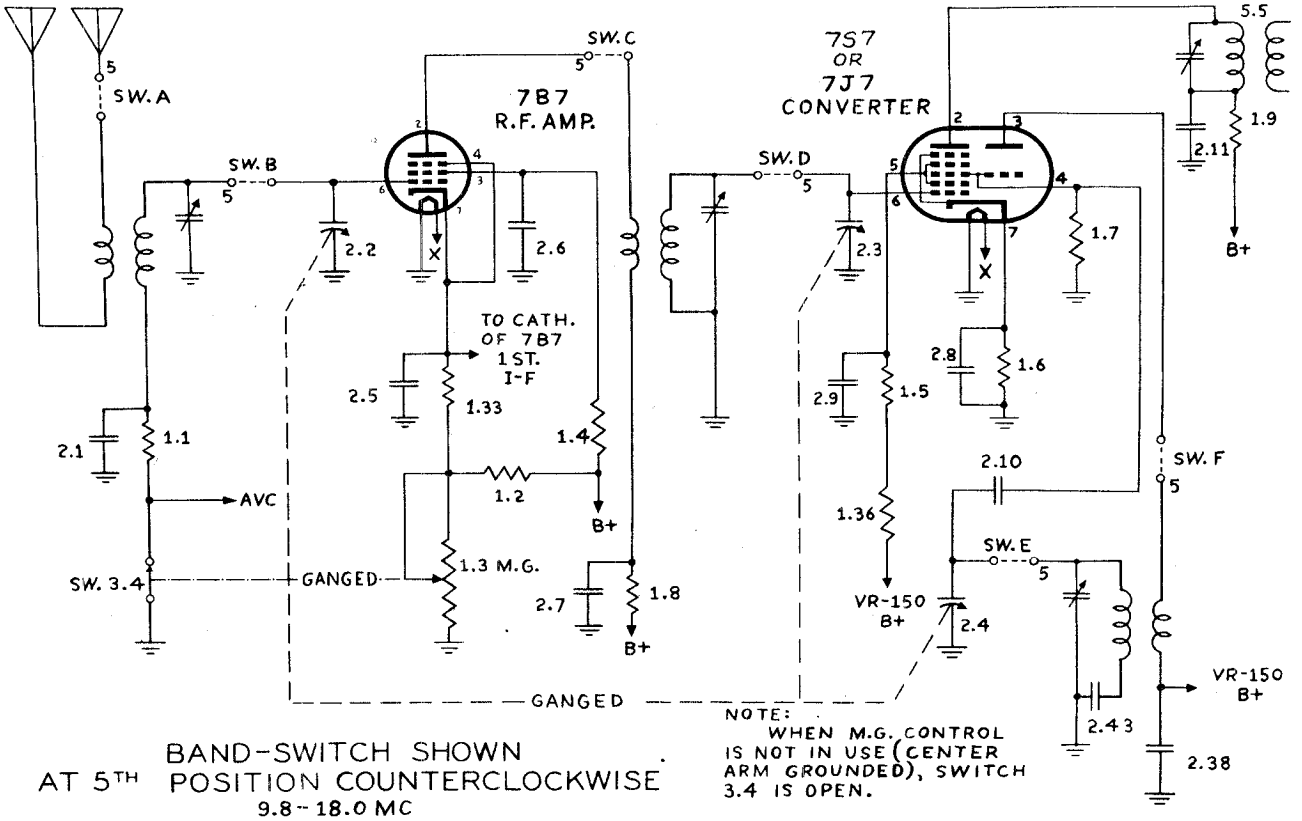
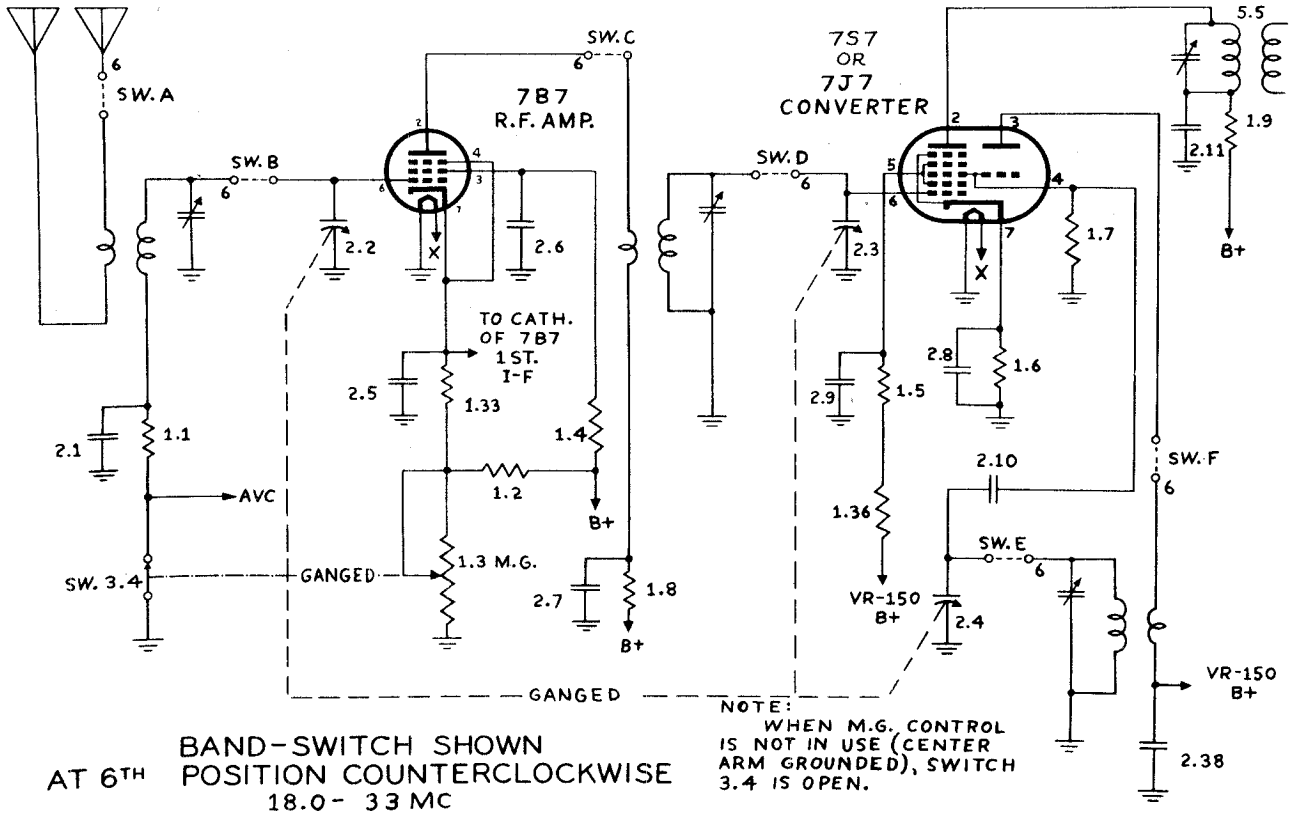
MODEL 45 Early, Late, Revised, 45B



BAND-SWITCH SHOWN AT 5TH POSITION COUNTERCLOCKWISE
9.8 - 18.0 MC

NOTE: WHEN M.G. CONTROL IS NOT IN USE (CENTER ARM GROUNDED), SWITCH 3.4 IS OPEN.



BAND-SWITCH SHOWN AT 6TH POSITION COUNTERCLOCKWISE
18.0 - 33 MC

NOTE: WHEN M.G. CONTROL IS NOT IN USE (CENTER ARM GROUNDED), SWITCH 3.4 IS OPEN.

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MODEL 45 Late

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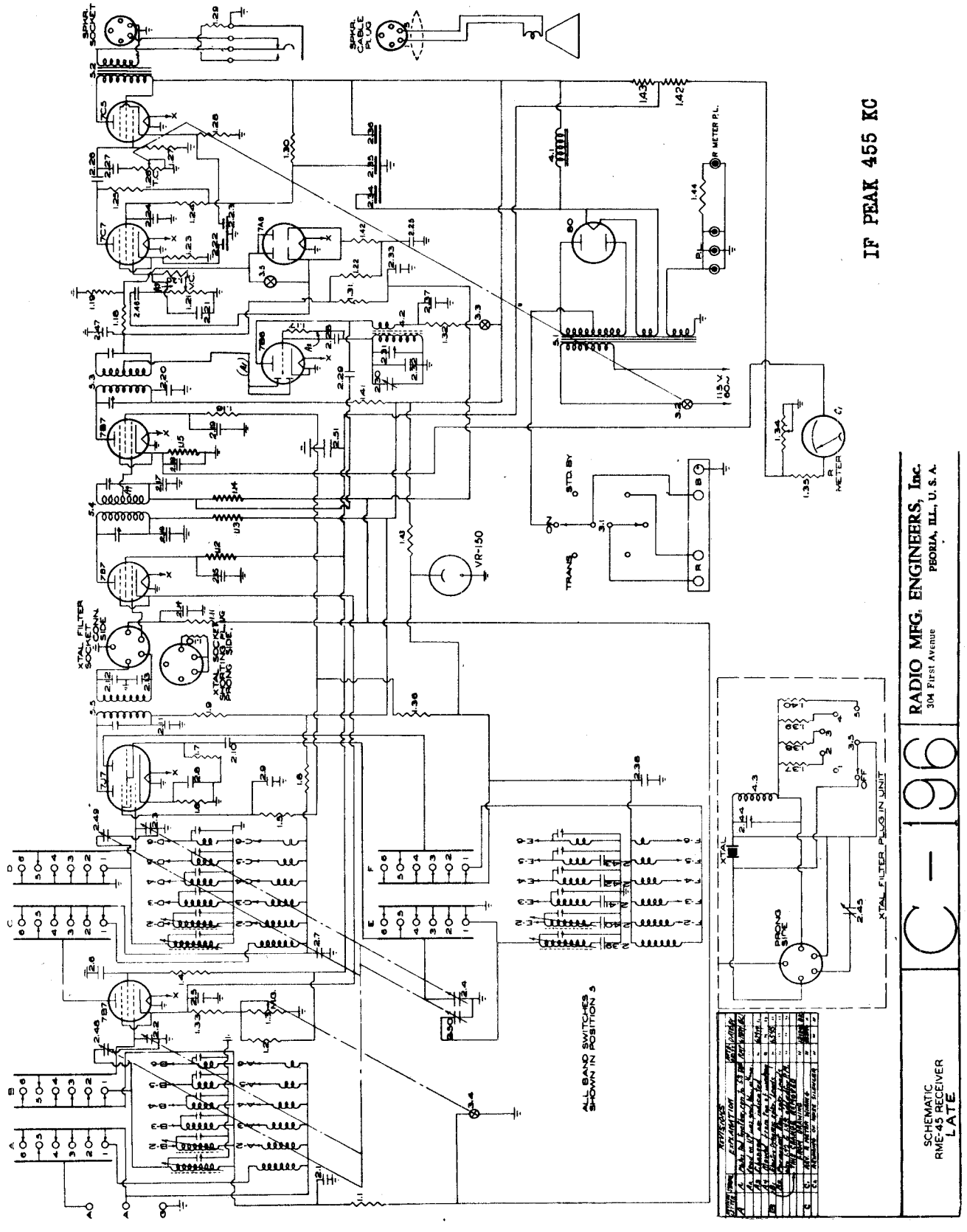

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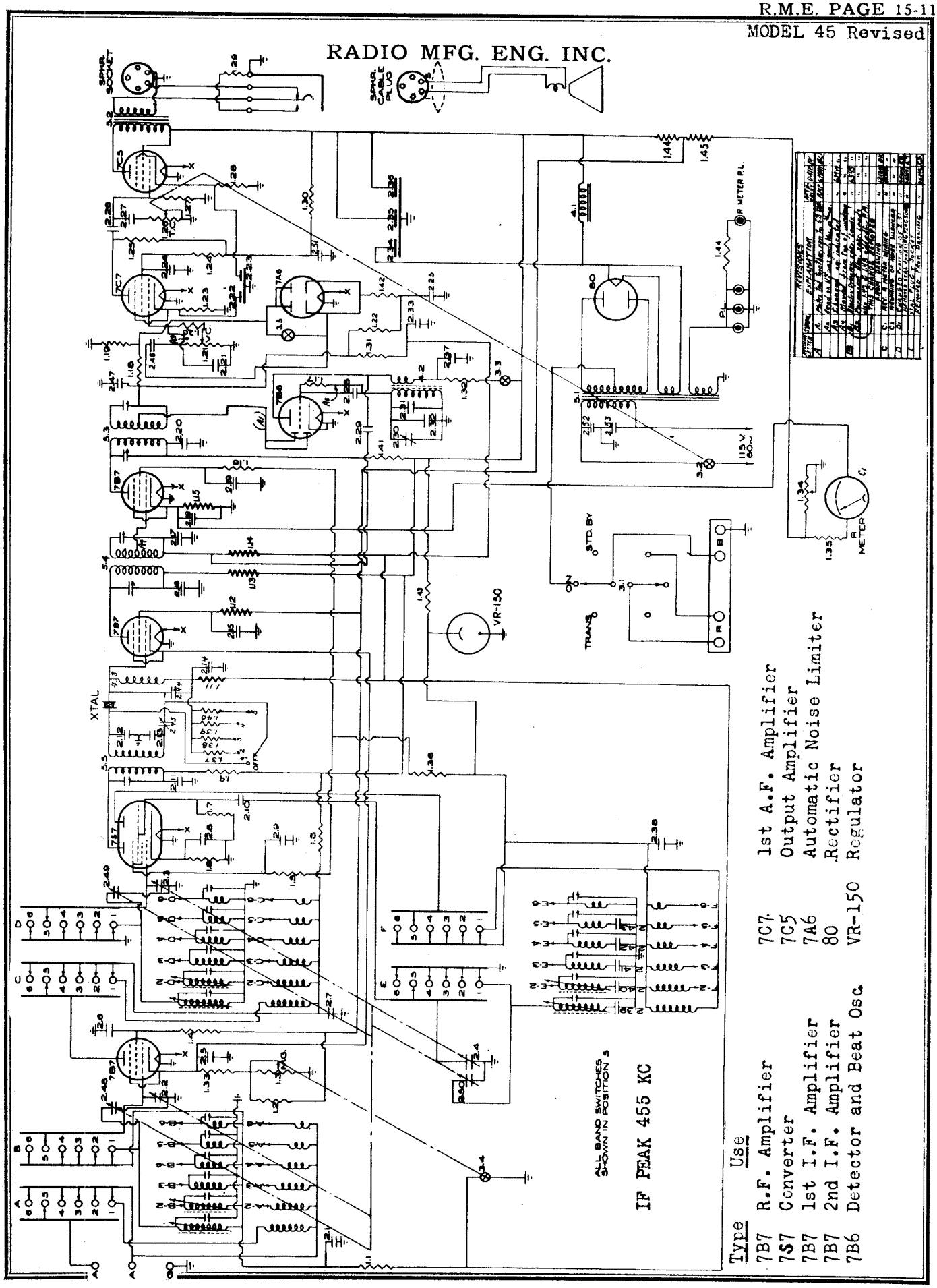

Type	Use
7B7	R.F. Amplifier
7S7	Converter
7B7	1st I.F. Amplifier
7B7	2nd I.F. Amplifier
7B6	Detector and Beat Osc.
7C7	1st A.F. Amplifier
7C5	Output Amplifier
7A6	Automatic Noise Limiter
80	Rectifier
VR-150	Regulator

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SERVICE NOTES FOR THE RME-45 RECEIVER

If the owner has available an accurate signal generator he may, by following the steps outlined in succeeding paragraphs, realign and recalibrate the receiver. If a signal generator is not available he may take the receiver to a reputable service man to have the work done. In addition to the signal generator an insulated screw driver will be required.

NOTE: The "R" meter makes an excellent resonance indicating device. All adjustments are made with the AVC on.

I. F. ALIGNMENT

The I.F. frequency of the RME-45 is 455 KC. The bandswitch should be turned to Band I. The tuning dial should be turned to the low frequency end (.55Mc). The hot lead from the signal generator is clipped to the lug on the detector section (middle) of the tuning condenser. With the signal generator set to 455 KC., each padder on the 1st, 2nd and 3rd I.F. transformers (see Fig. 1) are carefully adjusted for maximum response as indicated on the meter.

NOTE: The frequency of the signal generator must be set accurately to that of the crystal. This is done in the following manner:

Turn the crystal selectivity switch to Position 5. Carefully adjust the signal generator frequency until the carrier meter rises sharply. The signal generator is now accurately on the crystal frequency. The crystal selectivity switch is turned to "OFF" and the three I.F. transformers are aligned as before.

BEAT OSCILLATOR ADJUSTMENT

With the signal generator connected as for aligning I.F. circuits, turn "B.O. SWITCH" on and set "B.O. PITCH" control pointer vertical. With an insulated screw driver adjust B.O. padder (See Fig. 1) until zero beat is obtained.

ALIGNMENT OF THE RADIO FREQUENCY SECTION

Alignment of the radio frequency section of the receiver will affect, principally, the calibration of the receiver. Within certain limits this, of course, will also affect the sensitivity. Small variations in frequency (up to 2%) will not materially reduce the sensitivity of the receiver, although they will, of course, show up as variations in the calibration as indicated by the setting of the MAIN TUNING DIAL. Correction of any variation of calibration can be made by following the suggestions outlined in the following paragraphs.

Band I includes frequencies between 540 and 1600 KC. For Band I there are two frequency adjustments for adjusting the dial to the proper calibration. The adjustments are made on the top of the chassis through the dust cover over the Band I and II coils. The proper holes for making the adjustments are indicated on the top sketch on Fig. 3. There are 6 sets of large and small holes each. The two sets toward the rear of the chassis are the oscillator adjustments. The set toward the front are the RF stage adjustments; and the center set are for the detector. Under the large hole is a padder for adjusting the high frequency coil and adjusts the low frequency end.

The next step is to choose a station or a signal of accurately known frequency on the low frequency end of the range (for example 600KC.) and set the main tuning scale to read this frequency. If the station is not tuned in which the scale indicates its frequency it may be brought in by adjusting the oscillator coil core. This may be done with a small screw driver through the small hole marked "BAND I OSC" on Fig. 3. Another station or signal is now selected near the high frequency end of the range (for example 1400 KC). If this signal is not heard when the dial is accurately set to its frequency it may be brought in by adjusting the padder under the large hole marked "BAND I OSC" by means of an insulated trimmer tool. When this signal is accurately brought in as indicated by a maximum reading on the carrier meter one should go back to the low frequency test point and readjust it if it has changed. It may be necessary to go back and forth several times until both frequencies are accurately calibrated.

The procedure in calibrating and aligning Band II is the same for Band I. On this band two frequencies, such as 1800 and 2800 KC may be used.

The four high frequency bands are calibrated and aligned by removing the bottom plate from the receiver. The screws holding the four rubber feet and the four small screws between them are removed. This allows the bottom plate to be removed. It will be found that an aluminum plate covers the coils. This plate has holes over the 12 padders and all adjustments should be made with this plate in position.

Since the inductance of the coils are accurately adjusted and set at the factory it is necessary only to calibrate one frequency on each band. The same applies to the alignment of the RF and detector padders. Suggested calibration points for each band are as follows:

Band III	5 MC.
Band IV	9 MC.
Band V	16 MC.
Band VI	30 MC.

From the bottom sketch on Fig. 3 the location of each of the 3 padders for each band may be readily located. Note in particular the location of Band V and VI padders. Adjustments should be made with insulated screw driver type of trimmer tool.

High frequency beat is used on all bands. That is to say, that the oscillator is 455 KC higher in frequency than the signal received.

If sufficient input is used each signal can be received at two points, differing by 910 kilocycles. The other signal is the image or "low beat" signal. The higher frequency signal received, according to the receiver dial, is the proper one and the circuits should be aligned to it.

When using a signal generator or test oscillator to align the set a resistor of about 300 ohms should be inserted between the signal generator and the antenna connection. This will prevent misaligning of the RF stage caused by the connection of the low impedance of the signal generators output circuit across the receiver input.

In order that the full capabilities of the crystal filter in the Model 45 be realized the following procedure in tuning it is recommended:

On the top of the crystal filter box is a trimmer (Fig. 1). The easiest way to adjust this trimmer is to tune in a station in the broadcast band that is broadcasting music, preferably an orchestra. The XTAL SELECTIVITY switch should be turned to Position 5 and the signal tuned in accurately on the crystal. The XTAL PHASING control should be adjusted to give minimum background noise. The SELECTIVITY control is then turned to Position 1. The trimmer should then be carefully adjusted. As the trimmer is turned it will be found that the character of the music changes. The trimmer should be set to a point that sounds the most natural. If the adjustment is made carefully there will be a regular sharpening of the receiver as the SELECTIVITY switch is turned from "OFF" to Position 5.

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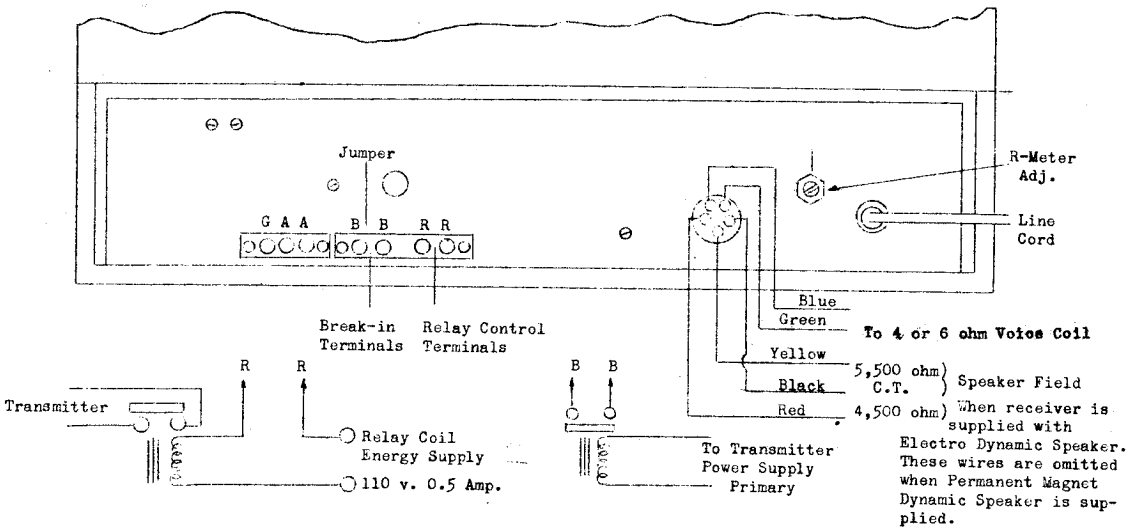


Relay to Control transmitter typical circuit diagram for connecting of relay control. Connect to terminal pair marked "R" on receiver. Relay closes when Stand-by Switch is turned to "Trans".

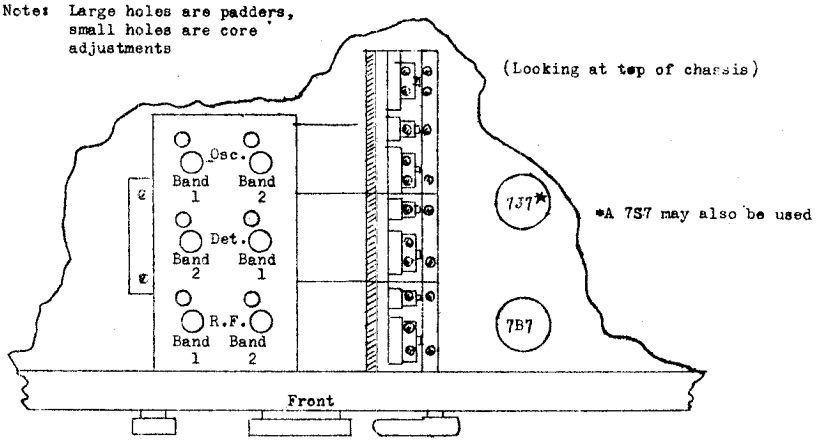
Typical circuit for remote break-in control of receiver. Terminal pair marked "B" on receiver connect to "B - B". Circuit between "B" pair is closed when relay or remote switch is closed during transmitter stand-by periods. Break-in terminals must be shorted if above circuit is not used.

FIGURE 2

ALIGNING ADJUSTMENTS

Low Frequency (Bands 1 & 2)

Note: Large holes are padders, small holes are core adjustments



High Frequency (Bands 3, 4, 5 & 6)

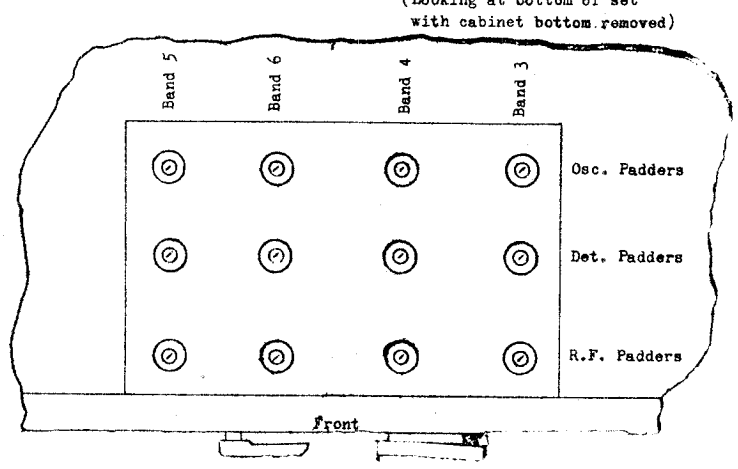


FIGURE 3

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TEST VOLTAGES OBTAINED AT VARIOUS POINTS IN RECEIVER CIRCUIT

Measurements made with a voltmeter having internal resistance of 1000 ohms per volt. Instruments with lower internal resistance may give entirely different readings.
NOTE: Line voltage should be 115 volts, Stand-by switch on.

PLACE TEST PRODS BETWEEN	CORRECT VOLTAGE
Radio frequency amplifier plate and ground	290 volts
Radio frequency amplifier screen and ground	107.5 volts
Radio frequency amplifier cathode and ground	3 volts
Converter plate (pentode section) and ground	310 volts
Converter screen (pentode section) and ground	107.5 volts
Oscillator supply and ground	150 volts *(168V.)
First I.F. amplifier plate and ground	290 volts
First I.F. amplifier screen and ground	107.5 volts
First I.F. amplifier cathode and ground	3 volts
(The same voltages apply to the 2nd I.F. stage)	
7C7 plate and ground	43 volts
7C7 screen and ground	112.5 volts
7C7 cathode and ground	3.1 volts
7C5 plate and ground	290 volts
7C5 screen and ground	305 volts
7C5 cathode and ground	13.5 volts
VR-150 plate to ground	150 volts
80 rectifier filament and ground	325 volts
B.O. plate supply and ground (B.O. turned on)	125 volts

These voltages are subject to a fluctuation of ±15% without indication of material difficulties.

CONTINUITY CHECKS

Receiver turned off. No jumper between "A" and "G" on antenna terminal strip.

PLACE TEST PRODS BETWEEN		RESISTANCE
A-1 and ground		Infinite
A-2 and ground		Infinite
"G" and ground		Short
RF amp. grid and ground		1.6 meg. ±20% *(1.1 meg.)
Converter grid and ground	Band 1	3.5 ohms
	Band 2	1.5 ohms
	Band 3	.3 ohm
	Band 4	.2 ohm
	Band 5	.1 ohm
	Band 6	.1 ohm
First I.F. Grid and ground		1.6 meg. ±20% *(1.5meg)
Second I.F. Grid and ground		1.6 meg. ±20% *(1.5meg)
Oscillator grid and ground		50,000 ohms ±20%
B.O. Grid and ground		100,000 ohms ±20%
7C7 Grid and ground		250,000 ohms to 0 ohm as audio gain control is rotated.
7C5 Grid and ground		250,000 ohms ±20%
Oscillator section of tuning condenser and ground		Bands 1,2,3,4,5 Infinite
		Band 6 .1 ohm

I.F. Frequency: 455 Kilocycles
Power Consumption at 115 volts, 90 watts
Audio Output: 3 watts
Audio Frequency Response: 100 to 5,000 cycles per second ±2.5 db.
Voice Coil Impedance: 4 ohms. *(6 ohms)
When supplied with an Electro Dynamic Speaker Field Coil Resistance: 10,000 ohms
Tapped at: 4,500 ohms

*In Early model

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RME-45 PARTS LIST

RESISTORS

1.1	100,000 ohms, 1/2 watt	
1.2	50,000 ohms, 1 watt	
1.3	30,000 ohms, Variable	
1.4	2,000 ohms, 1/2 watt	
1.5	2,000 ohms, 1/2 watt	
1.6	300 ohms, 1/2 watt	
1.7	50,000 ohms, 1/2 watt	
1.8	2,000 ohms, 1/2 watt	
1.9	2,000 ohms, 1/2 watt	
1.10	100,000 ohms, 1/2 watt	
1.11	100,000 ohms, 1/2 watt	
1.12	2,000 ohms, 1/2 watt	
1.13	2,000 ohms, 1/2 watt	
1.14	100,000 ohms, 1/2 watt	
1.15	300 ohms, 1/2 watt	
1.16	2,000 ohms, 1/2 watt	
1.17	100,000 ohms, 1/2 watt	
1.18	50,000 ohms, 1/2 watt	
1.19	50,000 ohms, 1/2 watt	
1.20	50,000 ohms, 1/2 watt	
1.21	250,000 ohms, Variable	
1.22	250,000 ohms, 1/2 watt	
1.23	1,000 ohms, 1/2 watt	
1.24	1 Megohm, 1/2 watt	
1.25	100,000 ohms, 1/2 watt	
1.26	1 Megohm, Variable	
1.27	250,000 ohms, 1/2 watt	
1.28	240 ohms, 1 watt	
1.29	35 ohms, 1/2 watt	
1.30	20,000 ohms, 1/2 watt	
1.31	1 Megohm, 1/2 watt	
1.32	250,000 ohms, 1/2 watt	
1.33	150 ohms, 1/2 watt	
1.34	200 ohms, Variable	
1.35	1,500 ohms, 1/2 watt	
1.36	10,000 ohms, 1 watt	
1.37	250,000 ohms, 1/2 watt	
1.38	100,000 ohms, 1/2 watt	
1.39	50,000 ohms, 1/2 watt	
1.40	5,000 ohms, 1/2 watt	
1.41	2,000 ohms, 1/2 watt	
1.42	680,000 ohms, 1/2 watt	20%
1.43	6,800 ohms, 2 watt	10%

CONDENSERS

2.1	.1 μfd. 400 volt paper
2.2	R.F. Section Tuning Condenser
2.3	Det. Section Tuning Condenser
2.4	Osc. Section Tuning Condenser
2.5	.01 μfd. 400 volt paper
2.6	.01 μfd. 400 volt paper
2.7	.01 μfd. 400 volt paper
2.8	.01 μfd. 400 volt paper
2.9	.01 μfd. 400 volt paper
2.10	100 μμfd. Mica
2.11	.01 μfd. 400 volt paper
2.12	50 μμfd. Mica
2.13	50 μμfd. Mica
2.14	.01 μfd. 400 volt paper
2.15	.01 μfd. 400 volt paper
2.16	.01 μfd. 400 volt paper
2.17	.01 μfd. 400 volt paper
2.18	.01 μfd. 400 volt paper
2.19	.01 μfd. 400 volt paper
2.20	.01 μfd. 400 volt paper
2.21	250 μμfd. Mica
2.22	20 μfd. 25 v. electrolytic
2.23	20μfd 25 v. electrolytic
2.24	.1 μfd. 400 volt paper
2.25	.01 μfd. 200 volt paper
2.26	.1 μfd. 400 volt paper
2.27	.01 μfd. 400 volt paper
2.28	100 μμfd. Mica
2.29	100 μμfd. Mica
2.30	50 μμfd. Variable
2.31	100 μμfd. Mica Padder
2.32	100 μμfd. Mica Padder
2.33	.01 μfd. 400 volt Paper
2.34	10 μfd.)
2.35	15 μfd.) 3 Section Filter Condenser
2.36	15 μfd.)
2.37	.01 μfd. 400 volt Paper
2.38	.01 μfd. 400 volt Paper
2.39	550 μμfd. Mica
2.40	600 μμfd. Mica
2.41	1300 μμfd. Mica
2.42	1700 μμfd. Mica
2.43	3900 μμfd. Mica
2.44	100 μμfd. Mica Padder
2.45	10 μμfd. Variable
2.46	.1 μfd. 400 volt Paper
2.47	100 μμfd. Mica - 500 W.V.
2.48)	
2.49)	L.F. Sections of Tuning Condenser
2.50)	
2.51	1 μfd. 400 volt Paper

INDUCTANCES

4.1 Filter Choke
4.2 B.O.Coil
4.3 Xtal Filter Coil

TRANSFORMERS

5.1 Power Trans,
5.2 Output Trans.
5.3 #3 I.F.Trans.
5.4 #2 I.F. Trans.
5.5 #1 I.F. Trans.

NOTE: In Early models all resistors are 1/3 watt. Resistor 1.36 is 2000 ohms; condenser 2.25 is 1.0 μfd. In Late and Revised models, resistor 1.44 is 5500 ohms, 10 watts

SWITCHES

3.1	3 Position, 2 Pole, Stand-by Switch
3.2	S.P.S.T. Line Switch on Tone Control
3.3	S.P.S.T. Beat Oscillator Switch
3.4	S.P.S.T. AVC Switch on Manual Gain Control
3.5	5 Position, 1 Pole Xtal Switch

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MODEL 45 Early, Late, Revised, 45B

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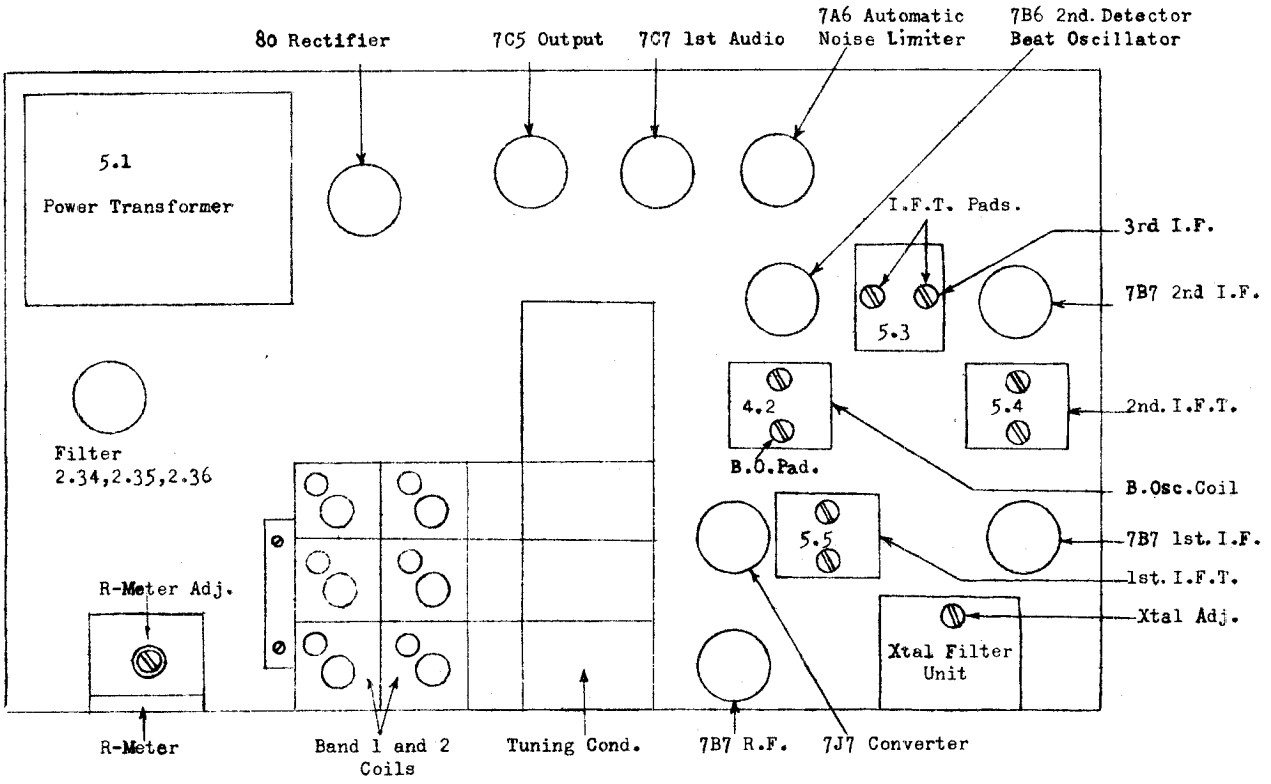
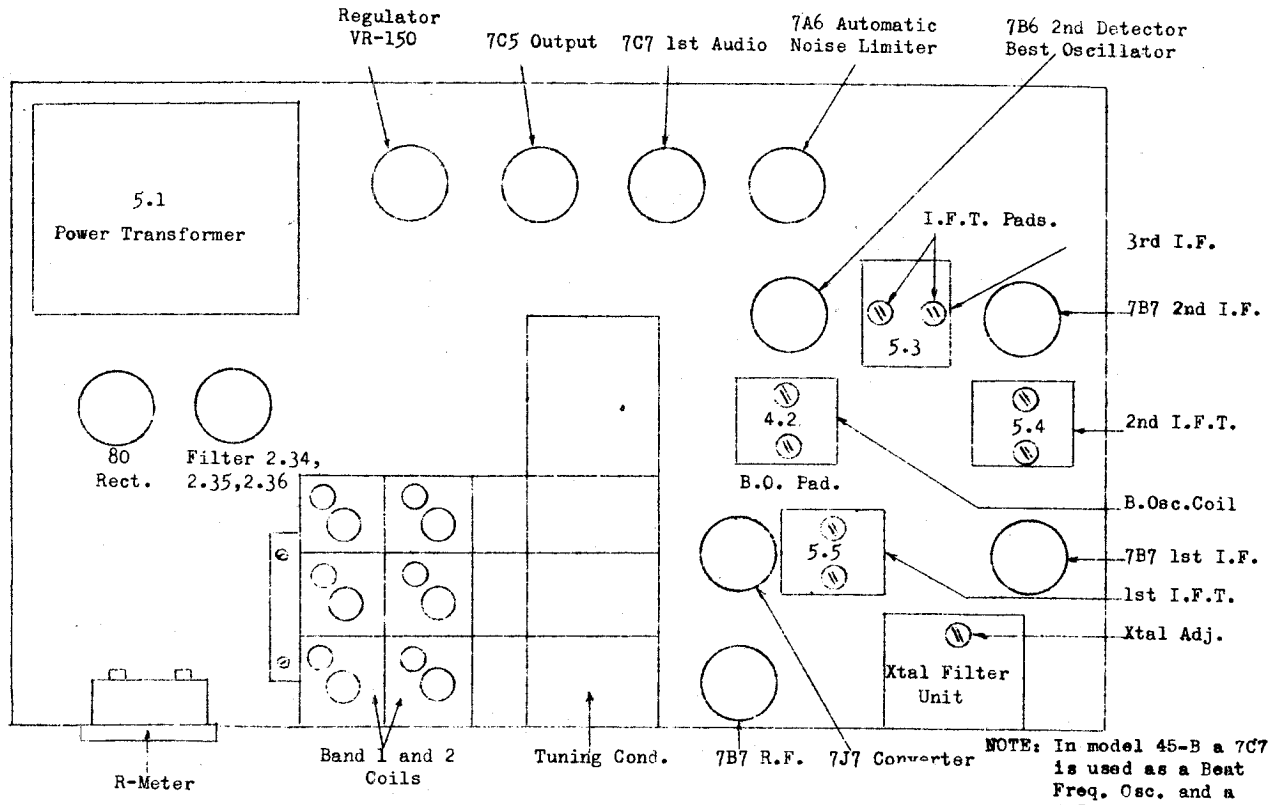


RME-45 EARLY

FIGURE I



RME-45 LATE, REVISED, and 45-B

FIGURE 1

NOTE: In model 45-B a 7C7 is used as a Beat Freq. Osc. and a 5Y3G is used as the rectifier tube.

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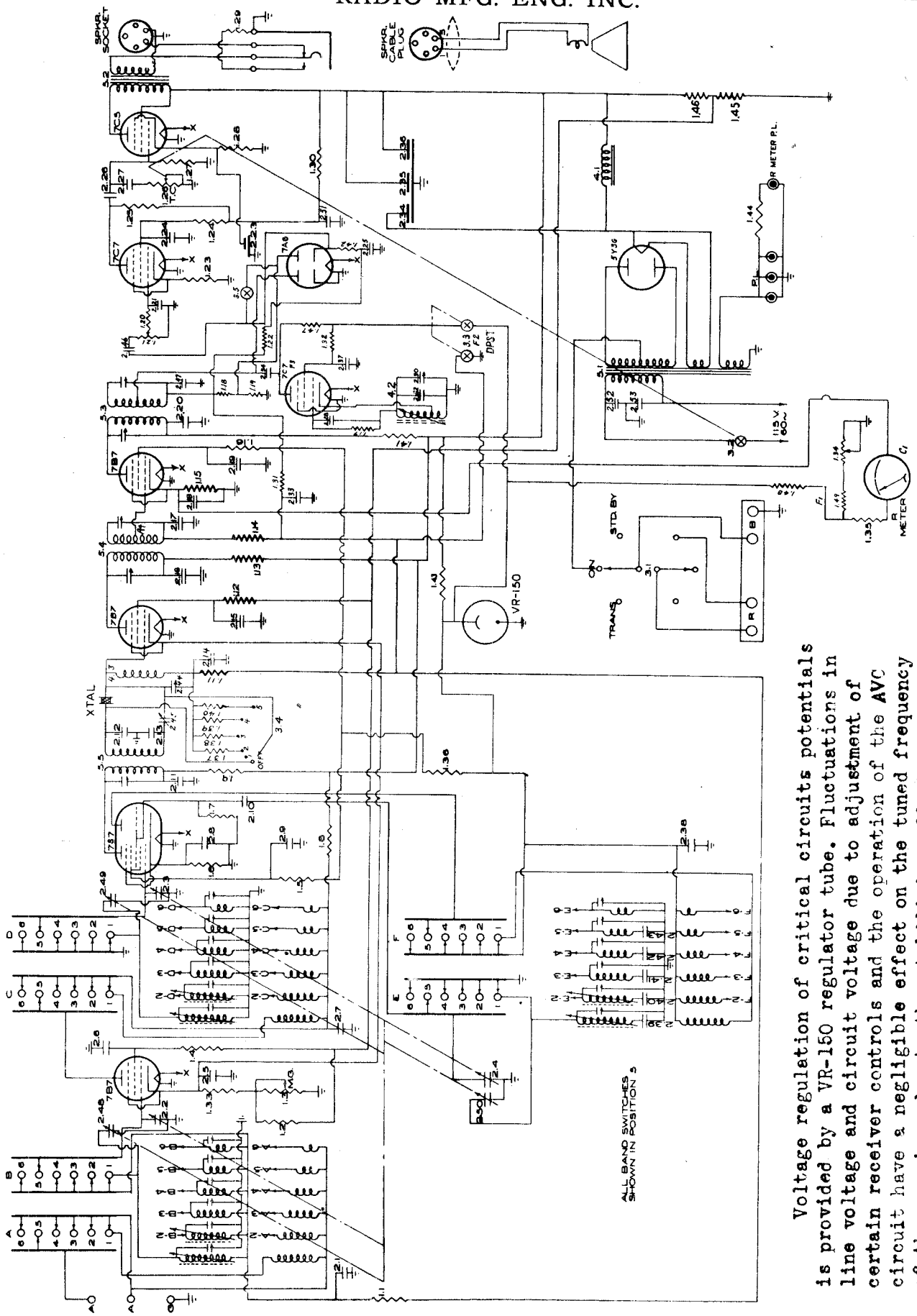
MODEL 45B



Voltage regulation of critical circuits potentials is provided by a VR-150 regulator tube. Fluctuations in line voltage and circuit voltage due to adjustment of certain receiver controls and the operation of the AVC circuit have a negligible effect on the tuned frequency of the receiver due to the stabilizing effects provided by this regulator.

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For Clarified schematics, see Pp.15-7 to 15-9; for Alignment, see P.15-12; for Voltage and Parts list, see P.15-19

OPERATION

Each control on the RME-45 receiver has a definite function and the operator should familiarize himself with their purpose and operation in order to obtain the best results.

The Cal-O-Matic two speed tuning system is one of the important features of the RME-45.

The tuning mechanism uses a preloaded gear train which is entirely free from backlash. The smaller tuning knob rotates approximately five times while the larger one is turning once. This two speed tuning control enables the operator to cover a frequency band at the correct rate with the larger knob and to tune in a weak signal or one partially covered by other signals with the smaller one.

Elimination of the bandspread condenser lowers the losses in the RF circuit and therefor gives great gain and greater stability.

Five Amateur bands are directly calibrated on the bandspread dial, but the Cal-O-Matic tuning system also includes an easy and accurate method of logging any frequency between 550 kc and 33,000 kc.

The inner half circle on the megacycle scale is divided into five sections, 0 through 4, and the inner circumference of the bandspread dial is marked off in 100 equal divisions. While the red pointer is covering one of the megacycle scale sections the bandspread dial makes one complete revolution. After a station has been heard it can be logged accurately by using the two sets of figures.

For example, if a station is heard on band 5 with the pointer in section 3 of the megacycle scale and with the bandspread dial at 28, that station is definitely logged at 328 because it will always be found at 328 on band 5. Or, if a station is logged at 173 on band 3, it is always tuned in on band 3 by turning the knob until the red pointer is in section 1 of the megacycle scale and until 73 comes up on the bandspread dial.

This method of logging enables the operator to return to a station very quickly and since there is no other dial to pre-set the station is always found at the same place.

In order to receive a frequency in one of the Amateur bands it is necessary only to set the band-change switch on the proper band and to tune the receiver until the red pointer is opposite the approximate frequency on the megacycle scale. The Amateur frequency may then be read directly from the calibrated bandspread dial.

The BAND SELECTOR SWITCH selects the frequency range desired. The range of the receiver is divided into 6 bands. The range covered by each band is as follows:

Band I	.540	to	1.6 MC	American Broadcast
Band II	1.6	to	2.9 MC	
Band III	2.9	to	5.4 MC	
Band IV	5.4	to	9.8 MC	
Band V	9.8	to	18.0 MC	
Band VI	18.0	to	33.0 MC	

Actually these figures do not represent the full range of each band since there is considerable overlap between the end of one band and the start of the next.

The LINE TONE control turns the receiver on and off. As the control is turned clockwise the line switch will close. Continued turning of the knob controls the audio response.

The STAND-BY SWITCH on the extreme right end of the control panel is used to make the receiver inoperative without turning off the line switch. When the control is in the center at "on" the receiver will operate, when it is turned to the right to "Standby" it will be dead. The third position labeled "Trans" also makes the receiver inoperative and, in addition, closes the relay circuit as mentioned previously.

The AUDIO GAIN Control to the left of the stand-by switch is used to adjust the audio volume to the desired level.

Below the control panel is a toggle switch labeled B.O. SWITCH turning on the beat oscillator. The beat oscillator is indispensible in the reception of CW signals and is an aid in locating weak phone carriers.

The pitch of the beat frequency may be varied by means of the control labeled B.O. Pitch.

The beat oscillator may be used either with or without the automatic volume control (AVC). It is usually more satisfactory to receive CW signals with the AVC less effective. This may be accomplished by turning the control labeled R.F. GAIN slightly counter clockwise. Continued counter clockwise rotation of this control reduces the gain of the receiver manually. Automatic control of the receiver gain is fully effective only when the R.F. GAIN control knob is rotated to and set at its maximum clockwise position (position approximately marked AVC). The position of this control is also intimately related to the proper operation of the CARRIER LEVEL or "R" meter. (See paragraph on CARRIER LEVEL meter).

Below the control panel on the left is a jack marked "PHONES". Any pair of good headphones may be plugged into this jack for headphone reception. When the phones are plugged in the speaker is automatically cut out.

The CARRIER LEVEL meter is supplied with the Model 45. This meter indicates the average value of the carrier being received. The meter is calibrated in db as well as in conventional numbers. As in previous RME models a signal difference of 1-R is equivalent to 6 db., and R-9 is equivalent to 100 microvolts input to the receiver. A signal should always be tuned so as to give a maximum reading on the meter. The meter should be adjusted to zero with the antenna disconnected by means of the screw on the rear of the chassis (See Fig. 2). It should be noted here that the accurate functioning of the CARRIER LEVEL meter depends on the setting of the R.F. GAIN control. The R.F. GAIN control should always be rotated to the maximum clockwise position and left there when it is desired to use the CARRIER LEVEL meter (this position is marked approximately by the designation AVC).

The CRYSTAL FILTER has two controls. The top control marked "XTAL SELECTIVITY" makes it possible to select the desired amount of selectivity for best results. Turning the control to "OFF" removes the crystal from the circuit. Rotating the control to the right changes the selectivity from a broad crystal characteristic at "1" suitable for phone reception to a razor-sharp characteristic at "5" for CW reception.

The CRYSTAL PHASING control should be adjusted to give minimum background noise. This setting will depend somewhat on particular conditions. This control may also be used to wipe out an interfering signal. Expert manipulation of the crystal filter usually comes only after a certain amount of practice.

An AUTOMATIC NOISE LIMITER is incorporated in the receiver circuit. No adjustment is required. The circuit is of a type that automatically adjusts itself to maximum effectiveness.

The action of the noise limiter is such that a slight amount of distortion is introduced on the signal. Therefore when it is desired to do so the noise limiter may be switched out of the circuit. This is accomplished by pulling "OUT" on the audio gain control. The shaft of this control floats and can be moved in and out with respect to the panel. When the knob is IN toward the panel the noise limiter is IN the circuit; when it is OUT from the panel the noise limiter is OUT of the circuit.

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TEST VOLTAGES OBTAINED AT VARIOUS POINTS IN RECEIVER CIRCUIT

Measurements made with a voltmeter having internal resistance of 1000 ohms per volt. Instruments with lower internal resistance may give entirely different readings.
NOTE: Line voltage should be 115 volts. Stand-by switch on.

PLACE TEST PRODS BETWEEN	CORRECT VOLTAGE
Radio frequency amplifier plate and ground	290 volts
Radio frequency amplifier screen and ground	107.5 volts
Radio frequency amplifier cathode and ground	3 Volts
Converter plate (pentode section) and ground	310 volts
Converter screen (pentode section) and ground	107.5 volts
Oscillator supply and ground	150 volts
First I.F. amplifier plate and ground	290 volts
First I.F. amplifier screen and ground	107.5 volts
First I.F. amplifier cathode and ground	3 volts
(The same voltages apply to the 2nd I.F. stage)	
7C7 plate and ground	43 volts
7C7 screen and ground	112.5 volts
7C7 cathode and ground	3.1 volts
7C5 plate and ground	290 volts
7C5 screen and ground	305 volts
7C5 cathode and ground	13.5 volts
VR-150 plate to ground	150 volts
5Y3G rectifier filament and ground (B.O. turned On)	125 volts

These voltages are subject to a fluctuation of ±15% without indication of material difficulties

CONTINUITY CHECKS

Receiver turned off. No jumper between "A" and "G" on antenna terminal strip.

PLACE TEST PRODS BETWEEN		RESISTANCE
A-1 and ground		Infinite
A-2 and ground		Infinite
"G" and ground		Short
RF amp. grid and ground		1 meg. ±20%
Converter grid and ground	Band 1	3.5 ohms
	Band 2	1.5 ohms
	Band 3	.3 ohm
	Band 4	.2 ohm
	Band 5	.1 ohm
	Band 6	.1 ohm
First I.F. Grid and ground		1 meg. ±20%
Second I.F. Grid and ground		1 meg. ±20%
Oscillator grid and ground		50,000 ohms±20%
B.O. Grid and ground		100,000 ohms±20%
7C7 Grid and ground		250,000 ohms to 0 ohm as audio gain control is rotated.
7C5 Grid and ground		250,000 ohms±20%
Oscillator section of tuning condenser and ground		Bands 1,2,3,4,5 Infinite Band 6 .1 ohm

TUBES:

	TYPE	USE
1.	7B7	R.F. Amplifier
2.	7S7	Converter
3.	7B7	1st I.F. Amplifier
4.	7B7	2nd I.F. Amplifier
5.	7C7	Beat Frequency Oscillator
6.	7A6	2nd Detector & Automatic Noise Limiter
7.	7C7	1st A.F. Amplifier
8.	7C5	Output Amplifier
9.	5Y3G	Rectifier
10.	VR-150	Regulator

RME-45 PARTS LIST

Dwg. C-196
Rev. 090646 - B

RESISTORS

1.1	10,000 ohms, 1/2 watt
1.2	50,000 ohms, 1 watt
1.3	30,000 ohms, Variable
1.4	2,000 ohms, 1/2 watt
1.5	2,000 ohms, 1/2 watt
1.6	300 ohms, 1/2 watt
1.7	50,000 ohms, 1/2 watt
1.8	2,000 ohms, 1/2 watt
1.9	2,000 ohms, 1/2 watt
1.10	100,000 ohms, 1/2 watt
1.11	10,000 ohms, 1/2 watt
1.12	2,000 ohms, 1/2 watt
1.13	2,000 ohms, 1/2 watt
1.14	10,000 ohms, 1/2 watt
1.15	300 ohms, 1/2 watt
1.16	2,000 ohms, 1/2 watt
1.17	100,000 ohms, 1/2 watt
1.18	250,000 ohms, 1/2 watt
1.19	250,000 ohms, 1/2 watt
1.20	50,000 ohms, 1/2 watt
1.21	250,000 ohms, Variable
1.22	1 Megohm, 1/2 watt
1.23	1,000 ohms, 1/2 watt
1.24	1 megohm, 1/2 watt

CONDENSERS

2.1	.1 μfd. 400 volt paper
2.2	R.F. Section Tuning Condenser
2.3	Det. Section Tuning Condenser
2.4	Osc. Section Tuning Condenser
2.5	.01 μfd. 400 volt paper
2.6	.01 μfd. 400 volt paper
2.7	.01 μfd. 400 volt paper
2.8	.01 μfd. 400 volt paper
2.9	.01 μfd. 400 volt paper
2.10	100 μμfd. Ceramic
2.11	.01 μfd. 400 volt paper
2.12	50 μμfd. Mica
2.13	50 μμfd. Mica
2.14	.01 μfd. 400 volt paper
2.15	.01 μfd. 400 volt paper
2.16	.01 μfd. 400 volt paper
2.17	.01 μfd. 400 volt paper
2.18	.01 μfd. 400 volt paper
2.19	.01 μfd. 400 volt paper
2.20	.01 μfd. 400 volt paper
2.21	250 μμfd. Mica
2.23	20 μfd. 25 v. electrolytic
2.24	.1 μfd. 400 volt paper
2.25	.01 μfd. 200 volt paper
2.26	.1 μfd. 400 volt paper
2.27	.01 μfd. 400 volt paper
2.28	100 μμfd. Mica

TRANSFORMERS

5.1	Power Transformer
5.2	Output Transformer
5.3	#3 I.F. Transformer
5.4	#2 I.F. Transformer
5.5	#1 I.F. Transformer

RESISTORS CONTINUED

1.25	100,000 ohms, 1/2 watt
1.26	1 megohm, Variable
1.27	250,000 ohms, 1/2 watt
1.28	240 ohms, 1 watt
1.29	35 ohms, 1/2 watt
1.30	20,000 ohms, 1/2 watt
1.31	1 megohm, 1/2 watt
1.32	100,000 ohms, 1/2 watt
1.33	150 ohm, 1/2 watt
1.34	200 ohm, Variable
1.35	1,500 ohms, 1/2 watt
1.36	10,000 ohms, 1 watt
1.37	250,000 ohms, 1/2 watt
1.38	100,000 ohms, 1/2 watt
1.39	50,000 ohms, 1/2 watt
1.40	5,000 ohms, 1/2 watt
1.41	2,000 ohms, 1/2 watt
1.42	680,000 ohms, 1/2 watt 20%
1.43	5,000 ohms, 5 watt 10%
1.44	20 ohms, 1/2 watt
1.45	4,500 ohms, 10 watt Bleeder
1.46	5,500 ohms, 10 watt Bleeder
1.47	10,000 ohms, 1/2 watt
1.48	50,000 ohms, 1 watt
1.49	500 ohms, 1/2 watt

CONDENSERS CONTINUED

2.29	5 μμf. Mica
2.30	25 μμf. Variable
2.32	200 μμfd. Mica Padder
2.33	.01 μfd. 400 volt Paper
2.34	10 μfd.)
2.35	15 μfd.) 3 Section Filter Condenser
2.36	15 μfd.)
2.37	.01 μfd. 400 volt Paper
2.38	.01 μfd. 400 volt Paper
2.39	550 μμfd. Mica
2.40	600 μμfd. Mica
2.41	1300 μμfd. Mica
2.42	1700 μμfd. Mica
2.43	3900 μμfd. Mica
2.44	100 μμfd. Mica Padder
2.45	2-6 μμfd. Variable
2.46	.1 μfd. 400 volt Paper
2.47	100 μμfd. Mica - 500 W.V.
2.48)	
2.49)	I.F. Sections of Tuning Condenser
2.50)	
2.51	1 μfd. 400 volt Paper
2.52	.002 μμfd. Mica
2.53	.002 μμfd. Mica

SWITCHES

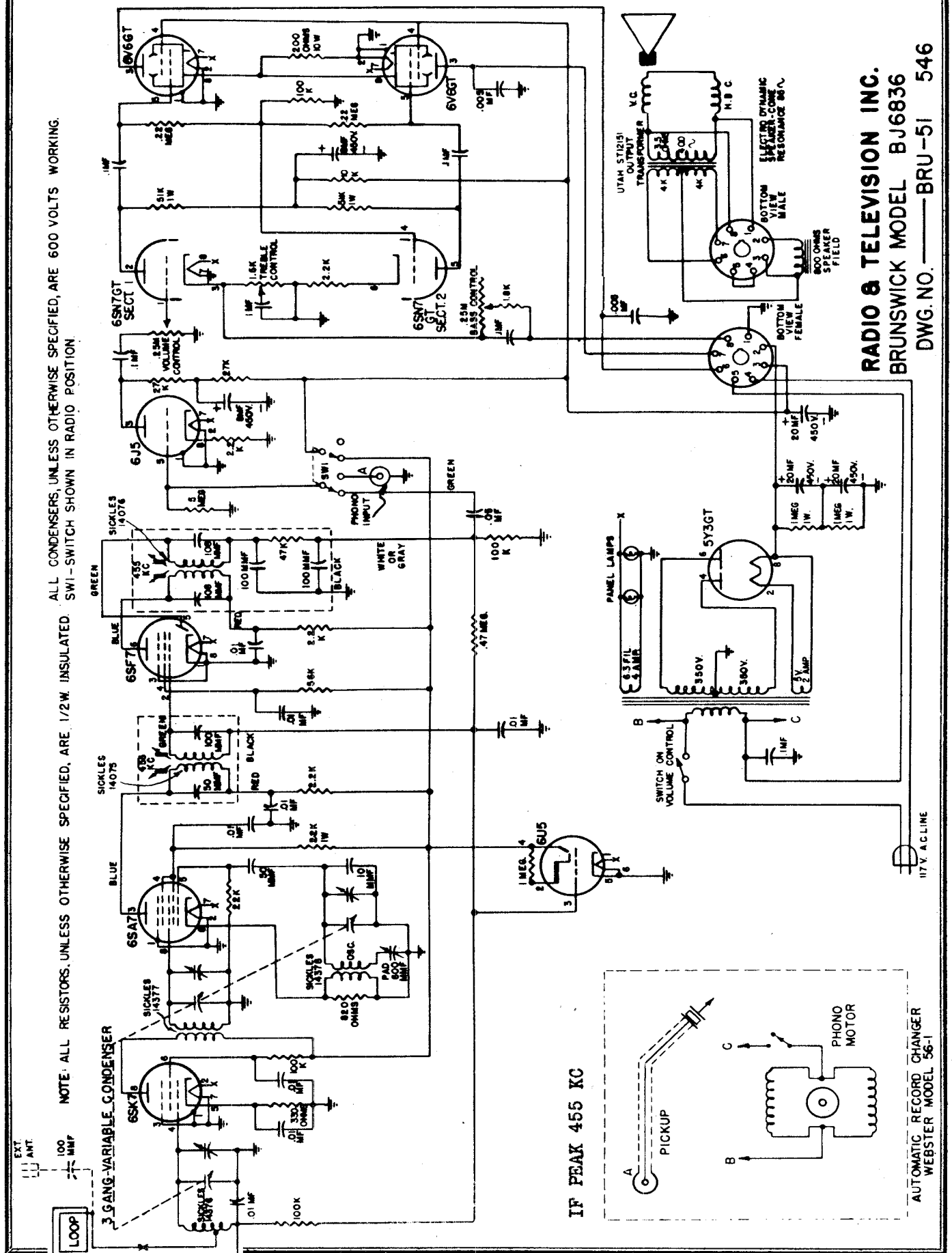
3.1	3 Position, 2 Pole, Stand-by Switch
3.2	S.P.S.T. Line Switch on Tone Control
3.3	D.P.S.T. Beat Oscillator and AVC Shorting Switch
3.4	5 Position, 1 Pole Xtal Switch
3.5	S.P.S.T. Noise Limiter Switch on Volume Control Knob

INDUCTANCES

4.1	Filter Choke
4.2	B.O. Coil
4.3	Xtal Filter Coil

RADIO & TELEV. INC.

MODEL BJ-6836



Record Changer: Webster Model 56

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POWER SUPPLY: 110 to 115 volts, 60 cycle A.C. only.
POWER OUTPUT: 14 watts.
POWER CONSUMPTION: 105-140 watts.

Amplifier output: 10 watts undistorted, 14 watts peak.

Amplifier gain: 72 db from phono input jack.

Frequency range: 530 KC to 1750 KC (566 to 171.4 meters).

Amplifier frequency range: 30 to 11,000 cycles.

Bass and treble controls are provided in the inverse feedback network.

A Webster Type 56-8 automatic record changer using a crystal pickup is built into the cabinet.

Alignment: The intermediate frequency used in this receiver is 455 kilocycles Connect Vacuum Tube Voltmeter capable of reading 20 volts negative DC to the AVC bus. This connection may be made at the black lead coming from the input IF transformer (#14075). The ground side of the meter will connect to the chassis. Connect output of Signal Generator to grid of converter tube (Pin #8). Adjust Signal Generator to 455 kilocycles. Increase output of generator until some deflection is noted on the Vacuum Tube Voltmeter. Carefully adjust IF transformer tuning slugs (screws in sides of cans) starting at output transformer for maximum reading on voltmeter. Repeat this process for best alignment. Remove Signal Generator allowing Vacuum Tube Voltmeter to remain connected. Connect output of Signal Generator to receiver loop in the following manner: Connect ground side of Signal Generator to receiver chassis. Connect live side of generator output to the loop lead which is knotted through a condenser of 100 to 500mmf.

Set receiver dial and Signal Generator to 600 kilocycles. Adjust oscillator padder for maximum reading on the Vacuum Tube Voltmeter. The oscillator padder is situated on the side of the RF tuner chassis beneath the amplifier chassis and is reached with a screwdriver having a shank at least 9" long. Care should be used in making this adjustment not to short circuit amplifier wiring beneath the chassis.

Turn the receiver dial to 1500 kilocycles and reset the Signal Generator to the same frequency. Adjust the oscillator trimmer (mounted on the rear section of the variable condenser) for maximum AVC voltage as read on the Vacuum Tube Voltmeter.

Proceed without readjusting receiver tuning or Signal Generator frequency to trim the RF coil and antenna coil by adjusting trimmers mounted on front two sections of the variable condenser. Adjust these trimmers for maximum AVC voltage.

Instructions for Removing Radio Chassis, Record Changer and Speaker

To remove radio set from cabinet proceed as follows:

1. Unscrew and remove back of radio compartment.
2. Pull out speaker plug from back of chassis.
3. Pull out Phono pickup lead at rear of chassis.
4. Remove the four screws from underneath bottom of radio compartment.
5. Disconnect Phono motor plug located underneath chassis compartment.
6. Disconnect aerial from loop.
7. Remove all knobs in front of chassis.

To remove record changer (only after chassis has been removed), unscrew the three bolts holding changer on motor board, lift out and pull gently the motor and pick up lead lines through rear cut out in Phono compartment.

Caution: When making these adjustments, the voltage output of the Signal Generator should be reduced to the point where the AVC voltage generated does not exceed 5 or 6 volts. Using larger AVC voltages may result in inaccurate alignment due to saturation and consequent broad tuning.

Service Notes: If replacement of components becomes necessary, lead dress may be disturbed and oscillation may result. The following lead dress should be observed:

1. Green wire on second IF transformer. Dress any slack toward chassis side away from oscillator coil and as close to chassis as possible.
2. 50 mmf. in oscillator grid circuit. Dress away from shield partition as far as possible.

In case of failure of input electrolytic condensers in filter, equalizing resistors (1 meg.) should be checked for value and replaced if more than 20% from coded value. Faulty resistors will result in improper voltage distribution across the condensers.

Powdered iron core in antenna coil is preset at laboratory for proper inductance and should not be readjusted. This core may not be present in all production runs.

The following is a table of operating voltages taken with 1000 and 20,000 ohms per volt meters. The receiver should be tuned between stations so no signal is being received during measurement.

Tube	Pin #	1000 ohm volt	20,000 ohm volt
6SK7	6(S)	70.0	80
	8(P)	220	225
	5(K)	2.0	2.25
6SA7	4(S)	70	75
	3(P)	205	215
6SF7	4(S)	70	75
	6(P)	200	200
6J5	3(P)	100	110
	8(K)	4.0	4.3
6SN7	2(P)	70	80
	3(K)	1.9	2.5
	5(P)	80	90
	6(K)	3.4	4.0
6V6	4(S)	210	215
	3(P)	190	200
	8(K)	14	14
6V6	4(S)	210	215
	3(P)	200	210
	8(K)	13.8	14.0
5Y3	2(F)	300	305
	8(F)	300	305
	4(P)	305 AC	
	6(P)	305 AC	
6U5	4(?)	200	205
	3(G)	0.25	0.6

To remove speaker (only after radio chassis and phonograph have been removed):

1. Remove phono motor board.
2. Unscrew rear panel of speaker compartment.
3. Remove four speaker nuts.

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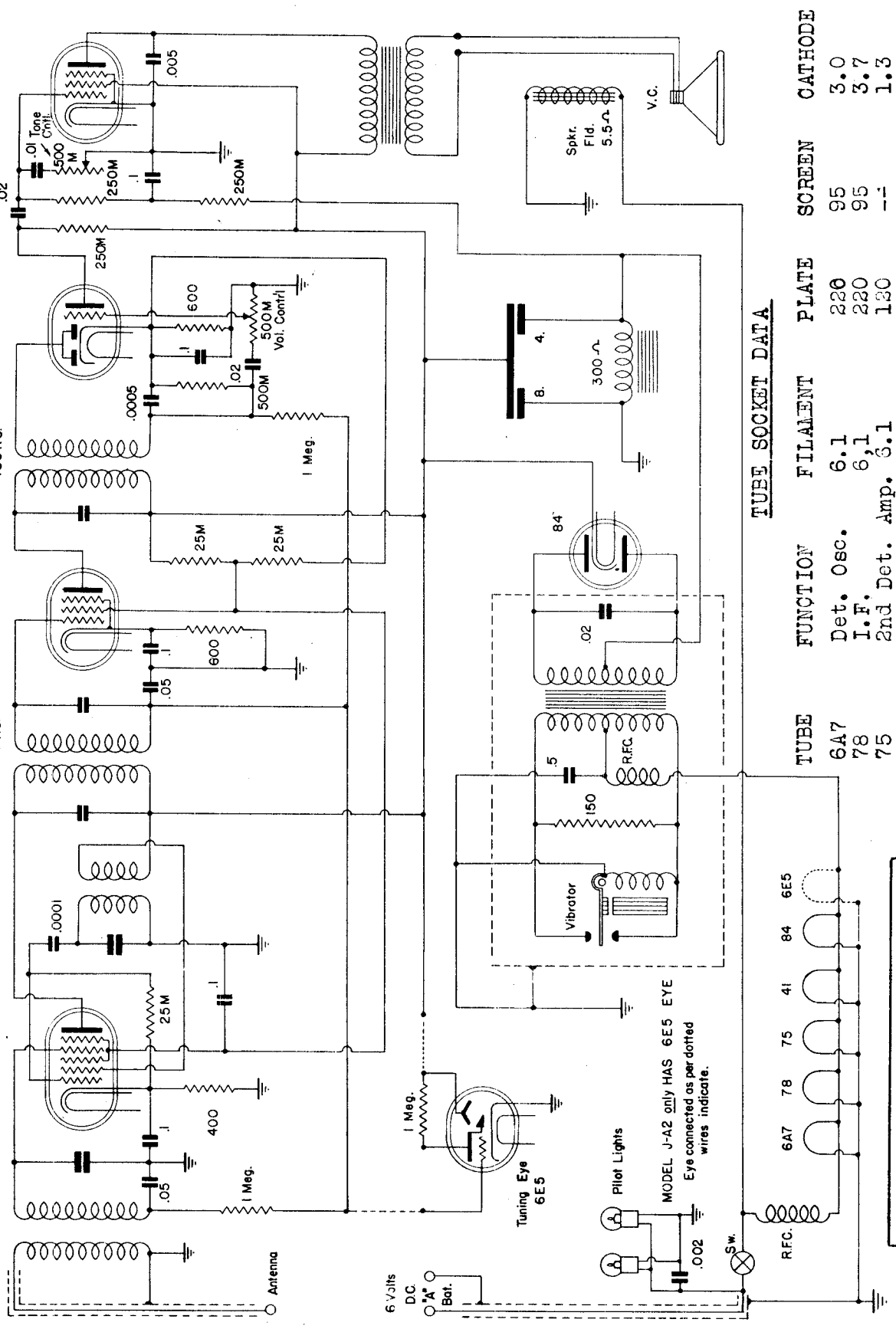
MODELS JA1, JA2

RADIO WIRE TELEVISION



TUBE SOCKET DATA

TUBE	FUNCTION	FILAMENT	PLATE	SCREEN	CATHODE
6A7	Det. Osc.	6.1	220	95	3.0
78	I.F.	6,1	220	95	3.7
75	2nd Det. Amp.	3.1	130	-1	1.3
41	Pwr. Amp.	6.1	300	220	---
84	Rectifier	6.1	---	---	220

Note: All voltages are D.C. to ground (Chassis)
6A7 Osc. Plate --200 Volts
41 Bias -- 14 Volts (drop across B choke)

MODELS J-A1, A2
5 & 6 TUBE · SUPERHET · AUTO RADIO RECEIVER

DATED:	Drawn:	Approved:	Service Dept.
Aug. 15, '36	8-14,15 by	8-20 by	Print No. 53295

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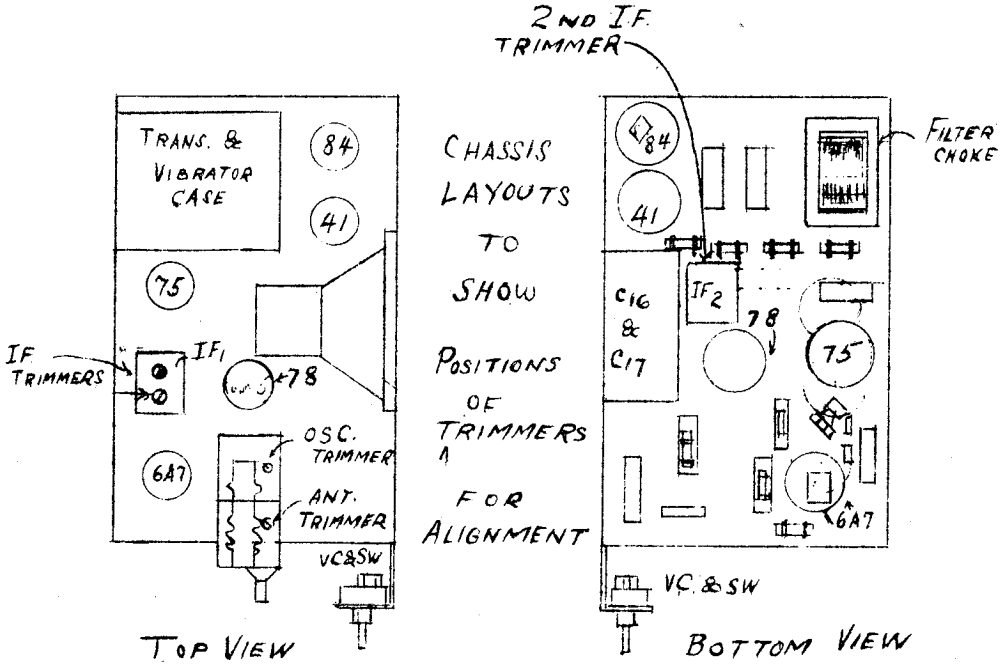
ALIGNMENT PROCEDURE

I.F. Alignment:- Connect a signal generator to the 6A7 input, and connect an output meter to the speaker output. Using a weak 480 Kc. signal tune the two I.F. condensers on the composite coil and the single I.F.condenser on the output I.F. coil for maximum response.

Antenna and Oscillator Alignment:- Connect the signal generator set at 1400 Kc. to the antenna lead using a dummy antenna of 150 mmfd. Tune the set by means of the dial to 1400 Kc. position. Adjust oscillator trimmer for this frequency. Then trim antenna stage for maximum response. Repeat the align-ment to insure accuracy and increased sensitivity.

LOCATION OF TRIMMERS



REPLACEMENT PARTS AND PRICE LIST

PART NO.	DESCRIPTION	LIST PRICE EACH
AK500	Speaker	$2.50
AV501	Variable Condenser	1.30
AL502	Antenna Coil	.36
AL503	Composite I.F. and Osc Coil	.90
AL504	Output I.F.	.90
AT505	Vibrator Transformer	.85
AV506	Vibrator	2.50
AL507	Vibrator R.F. Choke	.15
AS508	Volume Control and Switch	.65
AL509	A Choke	.15
AL510	B Choke	.70
AC511	Electrolytic Condenser	1.45
AC512	Condenser .5 mfd. 200V	.20
AC513	" .1 " 200V	.12
AC514	" .05 " 200V	.12
AC515	" .02 " 200V	.12
AC516	" .005 600V	.15
AC517	" .02 " 1000V	.25
AC518	Condenser .0001 Mica	.10
AC519	" .0005 "	.12
AC520	" .002 "	.14
AR521	Resistors 1,000,000 ½watt	.07
AR522	" 500,000 " "	.07
AR523	" 250,000 " "	.07
AR524	" 100,000 " "	.07
AR525	" 50,000 " "	.07
AR526	" 30,000 " "	.07
AR527	" 600 " "	.07
AR528	" 400 " "	.07
AR529	" 150 " "	.07
AX530	Shielded Antenna Lead	.15
AX531	"A" Battery Shielded Lead	.15
AX532	Dial Assembly	1.35
AX533	Pilot Light	.12
AX534	Pilot Socket	.12
	FOR MODEL JA-2 ONLY	
6E5	Visual Tuning Indicator Tube	1.25
	" # " Assemly	1.25

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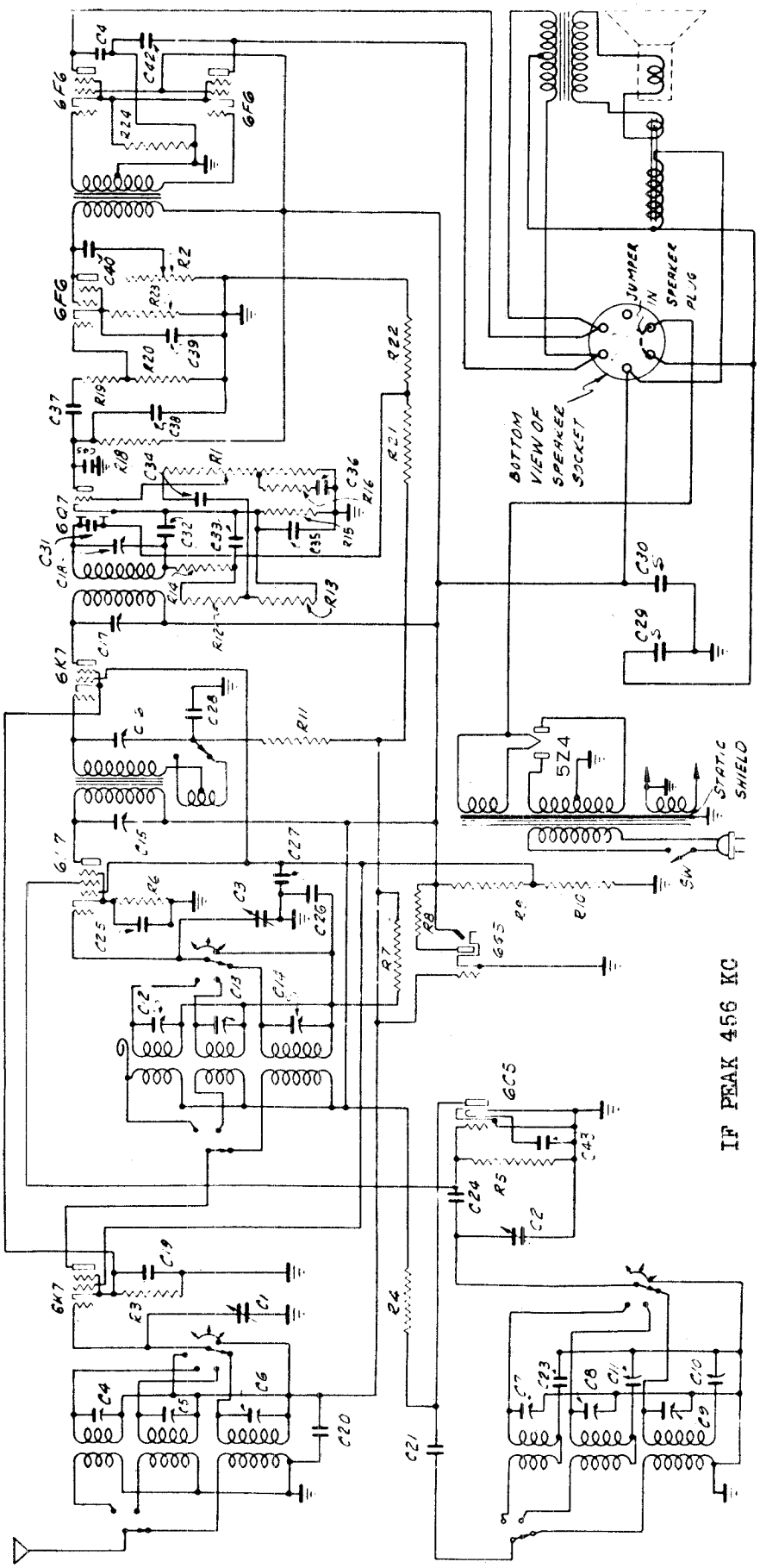
RADIO WIRE TELEVISION

MODELS MB5, MB5A



VOLTAGE CHART

Position	Tube	Ef	Ek	Eg Screen	Ep Suppressor	Ep Triode	Ep Pentode
R. F. Amplifier	6 K7	6.3	4	90.0	Connected to Cathode		235
Converter	6 L7	6.3	4	90.0	Connected to Cathode		235
Oscillator	6 C5	6.3				110	
I. F. Amplifier	6 K7	6.3	4	90.0	Connected to Cathode		235
Detector A.V.C.	6 Q7	6.3	1.1			105	
Driver	6 F6	6.3	16.5	connected to plate	Connected to Cathode in tube	212	
Power Output	6 F6	6.3	18.5	235	Connected to Cathode in tube		335
Power Output	6 F6	6.3	18.5	235	Connected to Cathode in tube		335
Rectifier	5 Z4	5.0	340				

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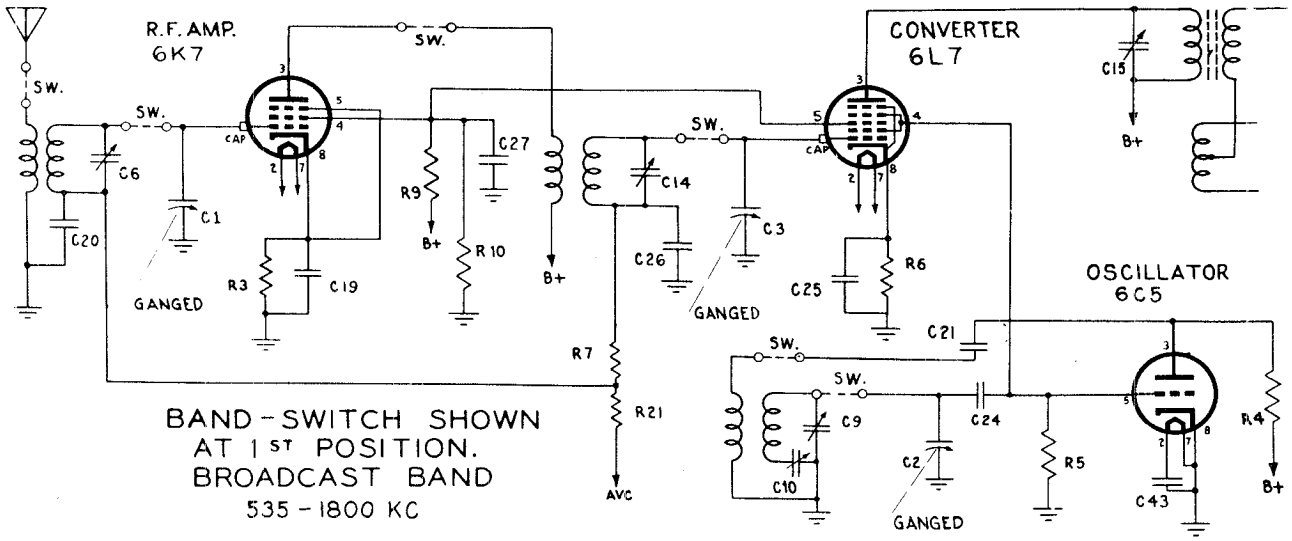
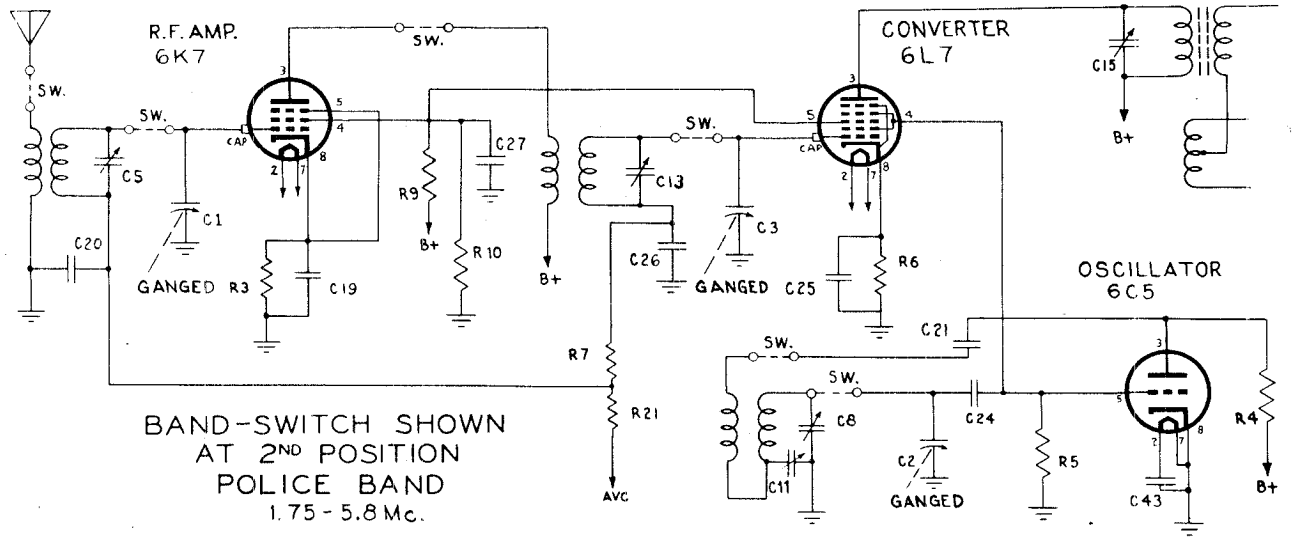
"clarified schematics"

MODELS MB5, MB5A

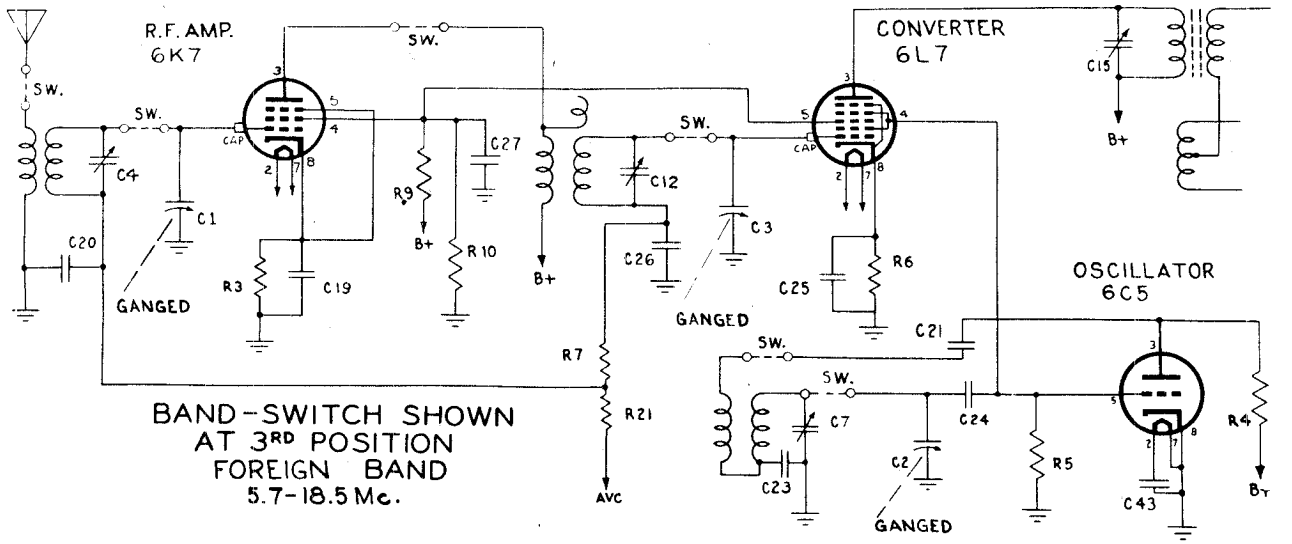
RADIO WIRE TELEVISION



BAND-SWITCH SHOWN
AT 1ST POSITION.
BROADCAST BAND
535 - 1800 KC



BAND-SWITCH SHOWN
AT 2ND POSITION
POLICE BAND
1.75 - 5.8 Mc.



BAND-SWITCH SHOWN
AT 3RD POSITION
FOREIGN BAND
5.7 - 18.5 Mc.

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RADIO WIRE TELEVISION

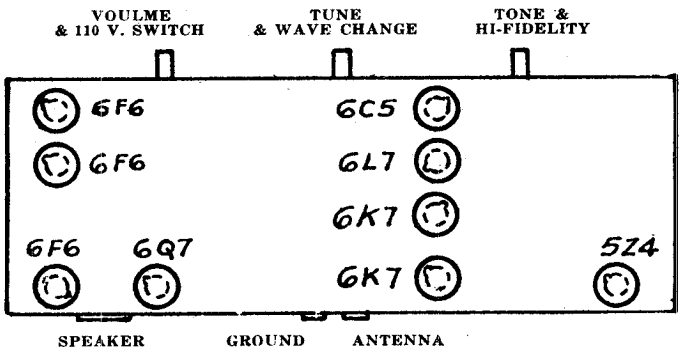

Fig. 1 Tuning Controls and Tube Position

ALIGNMENT PROCEDURE

. Correct alignment is of extreme importance in all-wave receivers. The receivers are properly aligned at the factory with precision equipment and realignment should not be attempted by the service technician until all other causes of faulty operation are corrected.

In order to properly realign the receiver the following equipment is necessary:

1. A signal generator which will provide an accurately calibrated signal at any frequency from 456 kilocycles to 18 megacycles. The generator should have adjustable signal output.
2. An output audio voltmeter of the low voltage type to be connected across the moving coil of the speaker. This should be capable of providing a readable deflection for relatively low output levels to avoid the effects of overload.
3. An insulated or non-metallic screw driver for the adjustment of trimmers.

I F ALIGNMENT 456 KC

1. Connect the output meter (low scale) across the loud speaker voice coil. Turn the wave band switch to broadcast position. Turn the volume control to its maximum position.
2. Connect the test oscillator ground to chassis and the "hot" lead from the test oscillator to the grid of the 6L7 converter tube through a series .1 Mfd. condenser. Set test oscillator to 456 KC.
3. Turn selectivity control (second from the left) to its high selectivity position. This is the left hand or counter-clockwise position.
4. Adjust I. F. alignment screws C17 and C18 of the output transformer to maximum output reducing output of test oscillator to keep meter reading on scale as alignment proceeds.
5. Adjust alignment screws, C15 and C16, of input transformer to maximum output as described above.
6. Readjust all four alignment screws to insure accurate alignment. Always use the lowest possible output from the test oscillator to preclude the possibility of automatic volume control action confusing proper adjustment.

R. F. ALIGNMENT BROADCAST BAND

1. With test oscillator connected to the antenna post through .00025 Mfd., set signal generator to 1600 KC.
2. Set travelite indicator to end of scale (beyond 550 KC calibration) with gang condenser fully meshed at maximum capacitance.
3. Set dial to 1600 KC. Adjust broadcast oscillator trimming condenser, C9, for maximum output meter reading.
4. Adjust detector input trimmer, C14, to a maximum.
5. Adjust antenna stage trimmer, C6, to a maximum.
6. Set test oscillator to 600 KC and tune in the signal, then adjust broadcast oscillator padder, C10, for maximum output. Rock the main tuning adjustment back and forth a degree or two in order to obtain proper maximum.
7. Repeat adjustments described under 3, 4, and 5 for greater accuracy.

POLICE OR SECOND BAND

1. Turn the wave switch to second or police band. Leave oscillator connected as above but with the output set to 5000 KC and the .00025 Mfd. condenser replaced by a 400 ohm resistor. Set dial scale to 5 MC on the second band. Adjust oscillator trimming condenser C8 for maximum output, observing as before that the proper point occurs at the minimum or counter-clockwise position of the screw as two points are found.
2. Adjust detector input trimming condenser. C13, to maximum, while rocking the tuning condenser slightly for maximum response.
3. Adjust antenna stage trimmer, C5, for maximum output.
4. Set test oscillator to 2000 KC and tune in the signal. Adjust oscillator padding condenser, C11, for maximum output, while rocking the tuning condenser as described above.
5. Repeat operations 1, 2 and 3 to assure precise alignment.

FOREIGN OR THIRD BAND

1. With the test oscillator connected the same as above and set to 16000 KC (16MC) set the dial to 16MC on the third band.
2. Adjust oscillator trimming condenser, C7, for maximum response. Use lower capacity or counter-clockwise response point.
3. Adjust detector input trimmer, C12, to maximum, rocking tuning adjustment.
4. Adjust antenna trimmer, C4, for maximum response.

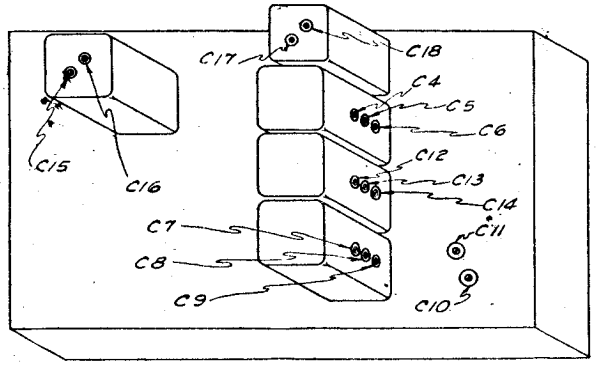

Fig. 2 Location of Trimmers

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MODELS MB5, MB5A

RADIO WIRE TELEVISION

Model MB5 is designed to operate on 105 to 125 volts, 50-60 cycles a. c. supply only.
Model MB5-A is designed to operate on 115, 220 or 250 volts, 40-60 cycles a. c. supply.

Prices subject to change without notice.

REPLACEMENT PARTS MODELS MB5–MB5A

SCHEMATIC LOCATION	PART No.	DESCRIPTION	PRICE
	15089	Bulb Pilot Light (edgelight)	$ .13
	B-15045	Bezel	.94
C1 C2 C3	A-16718	Condenser Variable Gang	2.55
C4 C5 C6	A-16552	Condenser Trimmer 3-30 MMF. triple strip	.23
C7 C8 C9	A-16552	Condenser Trimmer 3-30 MMF. triple strip	.23
C12 C13 C14	A-16552	Condenser Trimmer 3-30 MMF. triple strip	.23
C15 C16	B-16559-4	Condenser Trimmer 1st I. F. (part of I. F. assembly)	
C17 C18	B-16560-4	Condenser Trimmer 2nd I. F. (part of I. F. assembly)	
C10 C11	B-16550	Condenser Dual Padding	.55
C29	B-16554-2	Condenser Wet Electrolytic 30 MFD. 450 volts	.97
C30	B-15427	Condenser Wet Electrolytic 16 MFD. 350 volts	.61
C35 C39	B-16551-3	Condenser Dry Electrolytic Dual 12-12 MFD. 18-25 volts	.65
C23	15936	Condenser Mica 3000 MMF. 5%	.20
C24 C31	15929	Condenser Mica 50 MMF. 20%	.09
C32 C33 C43 C45	15918	Condenser Mica 100 MMF. 20%	.07
C19	15770	Condenser Tubular .2 MFD. 200 volts	.11
C20	15761	Condenser Tubular .1 MFD. 200 volts	.10
C21 C41 C42	15753	Condenser Tubular .002 MFD. 600 volts	.08
C25 C26 C28	15752	Condenser Tubular .05 MFD. 200 volts	.09
C27	15757	Condenser Tubular .1 MFD. 400 volts	.11
C34	15763	Condenser Tubular .01 MFD. 200 volts	.07
C40	15756	Condenser Tubular .05 MFD. 400 volts	.09
R2	B-16539-2	Control Tone with High Fidelity Switch	.70
R1	B-16843	Control Volume with switch	.70
	16914	Coil Antenna and shield	2.25
	16915	Coil Detector and shield	2.25
	16916	Coil Oscillator and shield	2.00
	16919	Dial and Paper Strip	1.55
	B-15044	Glass Convex	.25
	A-15037	Knob (tune)	.14
	A-15039	Knob (volume and tone)	.15
	A-15098	Knob (band switch)	.13
	B-16813	Paper Dial Backing	.05
	A-15023	Pointer (minute)	.04
	A-15024	Pointer (tuning)	.04
R9 R10	A-16615	Resistor Candohm wire wound 6500 ohms and 5300 ohms	.47
R3	15609	Resistor Carbon 300+—10% ¼ watt	.05
R4	15513	Resistor Carbon 20,000 +—20% ½ watt	.05
R5	15552	Resistor Carbon 30,000 +—20% ¼ watt	.05
R6	15610	Resistor Carbon 900 +—10% ¼ watt	.05
R7 R11	15515	Resistor Carbon 100,000 +—20% ¼ watt	.05
R8 R21 R22	15517	Resistor Carbon 1 meg. +—20% ¼ watt	.05
R12 R13	15512	Resistor Carbon 250,000 +—20% ¼ watt	.05
R14	15510	Resistor Carbon 20,000 +—20% ¼ watt	.05
R15	15611	Resistor Carbon 3,000 +—10% ¼ watt	.05
R16	15511	Resistor Carbon 50,000 +—20% ¼ watt	.05
R18	15523	Resistor Carbon 200,000 +—20% ¼ watt	.05
R19	15549	Resistor Carbon 300,000 +—20% ¼ watt	.05
R20	15520	Resistor Carbon 500,000 +—20% ¼ watt	.05
R23	15563	Resistor Carbon 500 +—10% ½ watt	.16
R24	15562	Resistor Carbon 325 +—10% 2 watt	.16
	B-15041	Retaining Spring for Bezel	.18
	B-15043	Retaining Ring for Glass	.16
	A-16828	Socket Speaker	.10
	15066	Socket 6 K7	.11
	15083	Socket 6 C5	.11
	16842	Socket 5 Z4	.07
	16469	Socket 6 Q7	.11
	15084	Socket 6 F6	.11
	15087	Socket 6 L7	.11
	B-16637	Socket 6 G5 with leads	.45
	A-15054	Socket Pilot light R. H.	.11
	A-15053	Socket Pilot light L. H.	.11
	C-16582	Speaker 12"	6.65
	A-16820	Transformer 1st I. F.	1.70
	A-16821	Transformer 2nd I. F.	1.55
	C-16573-5	Transformer Power	3.50
	C-16807	Transformer Universal Tap	6.60
	B-16555-2	Transformer Audio Driver	1.26
	A-1950	Washer Felt	.01

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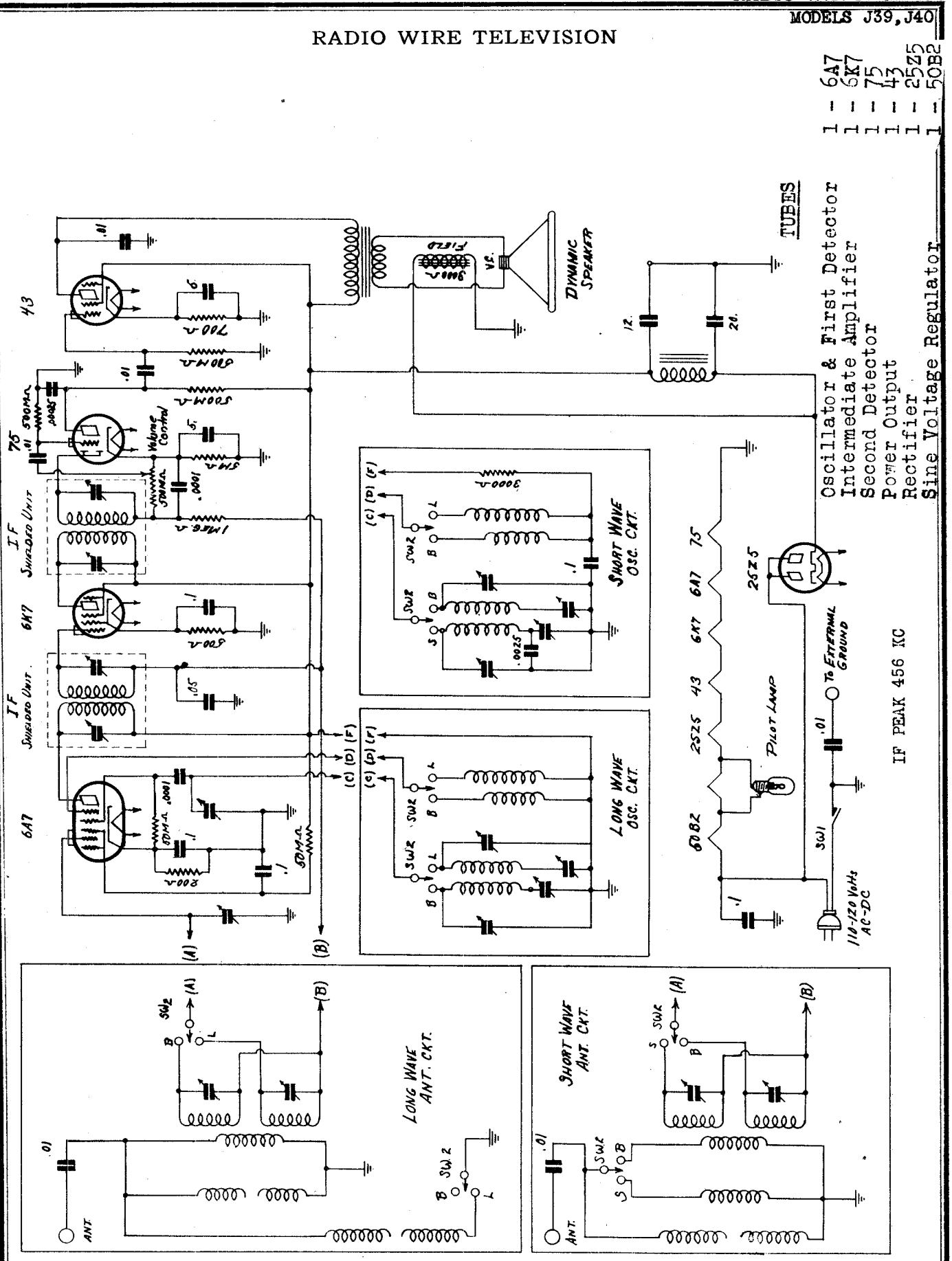
MODELS J39, J40

RADIO WIRE TELEVISION



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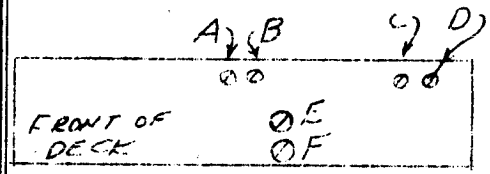
CODE	PART NO.	CONDENSERS
C1	112	.01 Mfd. Ant.
C2	113	30 Mmf. Trimmer
C3	"	" " "
C4	"	" " "
C5	"	" " "
C6	117	360 " Var.
C7	118	.1 Mfd. 6A7 Cath.
C8	"	.1 " " Screen
C9	"	.1 " 6K7 Cath.
C10	121	.05 " AVC
C11	112	.01 " Audio Coupling
C12	123	.0001 Mfd. I.F. Bypass
C13	142	5 Mfd. 75 Cathode
C14	112	.01 " Audio Coupling
C15	142	5 " 43 Cathode
C16	118	.1 " line
C17	128	.00025 Mfd. 75 Plate
C18	112	.01 " 43 "
C19	112	.01 " Ground
C20	133	500 Mmf. Var. Pad.
C21	117	360 " Osc. Sect.Var.
C22	133	150 " Var. Pad.
C25	113	30 " Trimmer
C26	131	500 " Var. Pad.
C27	138	.0025 Mfd. Pad.
C28	131	500 Mmf. Var. Pad.
C29	113	30 " Trimmer
C30	118	.1 Mfd. Osc. Filter
C31	142	20 " Electrolytic
C32	142	12 " "
C33	144	.0001 " Osc.
C34	145	30 Mmf. Trimmer
C35	145	60 " "
C36	112	.01 Ant. Condenser

R1	100	200 Ohm 6A7 Cathode Resis.
R2	101	50,000 Ohm 6A7 Screen "
R3	101	" " Osc. Grid Leak
R4	103	500 Ohm 6K7 Cathode Resis.
R5	104	50,000 Ohm 75 Grid "
R6	105	½ meg Ohm Volume Control
R7	106	1. " " A.V.C. Resistor
R8	107	5,000 " 75 Cathode "
R9	104	500,000 Ohm 75 Plate"
R10	104	" " 43 Grid "
R11	110	700 Ohm 43 Cathode "
R12	111	3,000 Ohm Osc. Filter Resis.
CH1	148	456 KC Choke
CH2	149	1200 KC Long Wave Choke
CH3	150	250 Ohm Filter Choke
IF1	151	456 KC D.T. I.F. Transformer 1st I.F.
IF2	152	" " " " " 2nd "
PL1	153	6.3 Volt Pilot Lamp
S1	105	Line Switch on Volume Control
L1	155	Broadcast Grid Coil on L.W.-B.C. Set
L2	155	Long Wave " " " " " "
L3	155	Ant. Coil Primary " " " "
L4	158	Short Wave Ant. Primary on L.W.-B.C. Set
L5	"	Broadcast " " " " " "
L6	"	Short Wave grid Coil " S.W.- " "
L7	"	Broadcast " " " " " "
L8	162	" Osc. Sec. " L.W.- " "
L9	"	Long Wave " " " " " "
L10	"	Broadcast " Pri " " " "
L11	"	Long Wave " " " " " "
L12	166	Short Wave Osc. Sec. " S.W. " "
L13	"	Broadcast " " " " " "
L14	"	Short Wave " Pri. " " " "
L15	"	Broadcast " " " " " "
L16	170	Single 43 Output Transformer
L17	171	" " Voice Coil
L18	172	3000 Ohm Speaker Field
S2	115	Wave Switch



	J-40	J-39
A	S.W. Osc. Grid Trimmer	B.C. Osc. Grid Trimmers
B	B.C. " " "	L.W. " " "
C	S.W. ANT. " "	B.C. Ant. " "
D	B.C. " " "	L.W. " " "
E	B.C. Osc. Series Pad.	L.W. Osc. Series Pad.
F	S.W. " " "	B.C. " " "

ADJ. FREQ.
B.C. 600 kc. and 1450 kc.
L.W. 165 kc. and 350 kc.
S.W. 7 mc. and 16 mc.
I.F. 456 kc.

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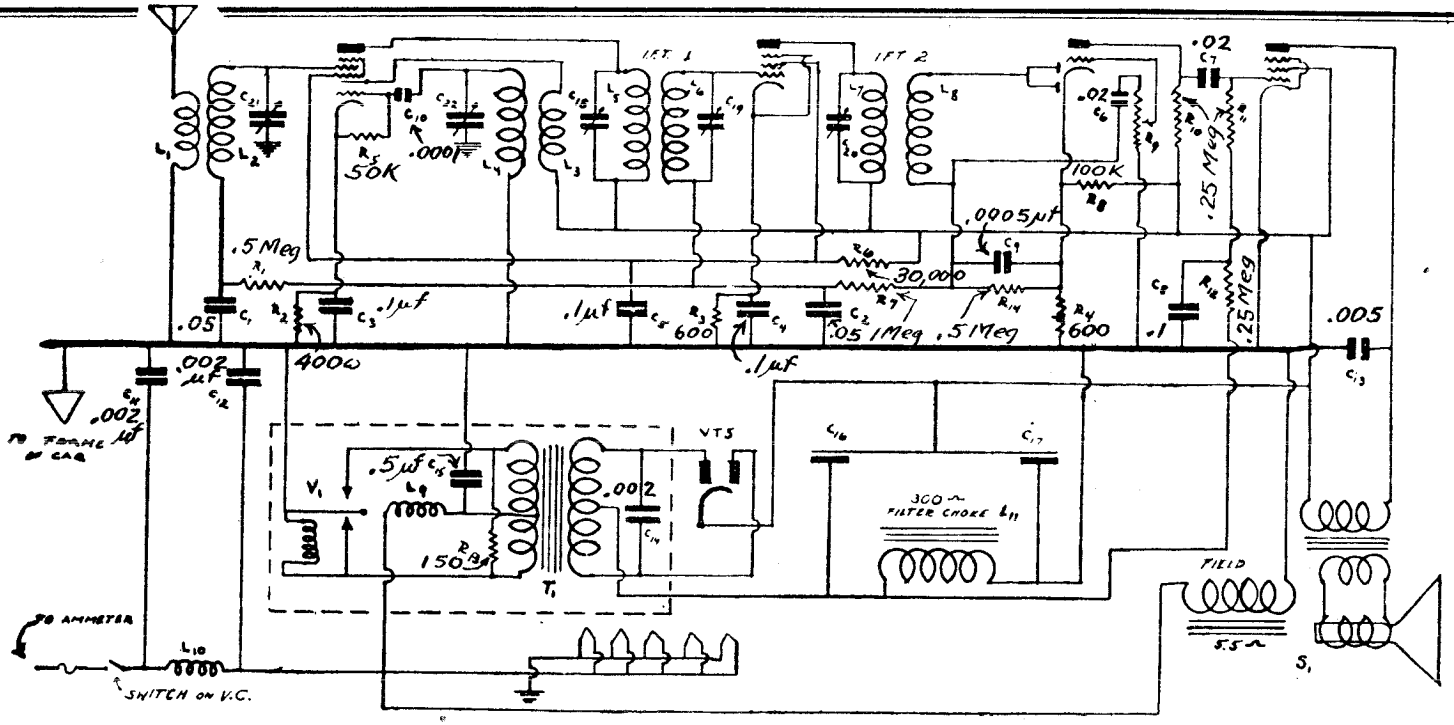
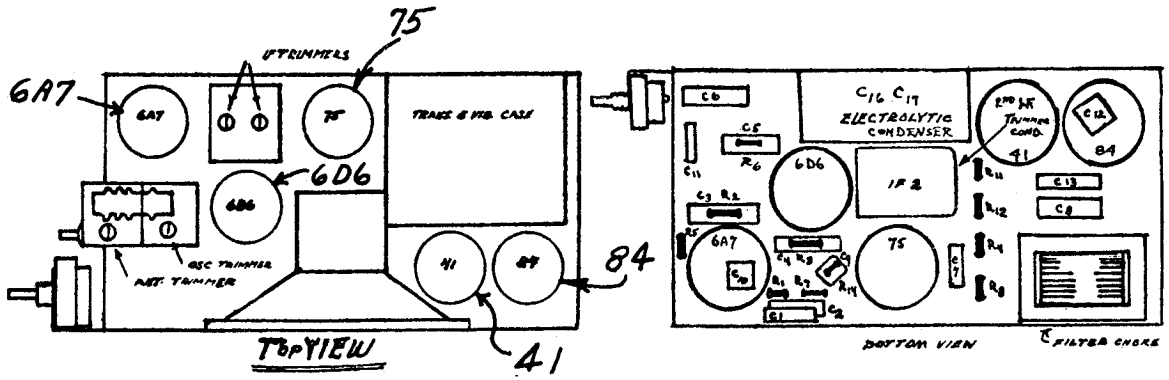


I. F. Alignment. Connect a signal generator set at 480kc to the 6A7 input and connect an output meter to the speaker output. Using a weak signal tune the two I. F. condensers on the composite coil and the single I. F. condenser on the output I. F. coil for maximum response.

Connect the signal generator set at 1400kc to the antenna lead using a dummy antenna of 150 mmf. Tune the set by means of the dial to 1400kc position. Adjust oscillator trimmer for this frequency. Then trim antenna stage for maximum response. Repeating the alignment may result in improved sensitivity.



Fall Series 1935

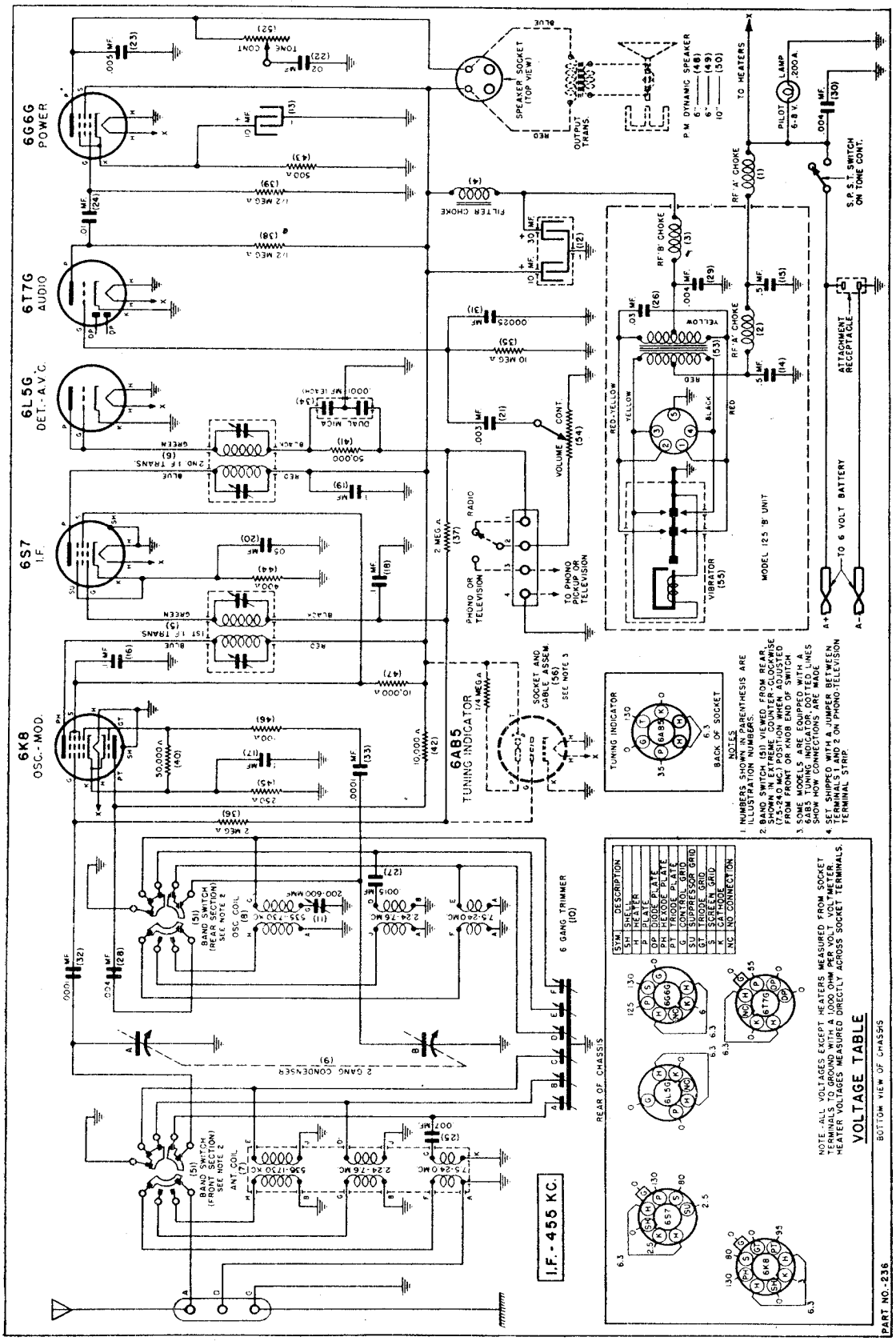
TUBE SOCKET DATA (Voltages to Ground)

Tube	Filament	Plate	Cathode	Screen
6A7 Det. Osc.	6.1	220	3	95
6D6 I. F.	6.1	220	3.7	95
75 2nd Det. Amp.	6.1	120	1.3	.....
41 Output	6.1	200	.....	220
84 Rectifier	6.1	.....	220	.....

Note: 6A7 Osc. Plate—200 Volts
41 Bias—14 Volts (Drop across B choke)

MODEL E190

RADIO WIRE TELEVISION


6G6G POWER
6T7G AUDIO
6L5G DET.-A.V.C.
6S7 I.F.
6K8 OSC.-MOD.
6A8 TUNING INDICATOR
SPEAKER SOCKET (TOP VIEW)
OUTPUT TRANS.
P.M. DYNAMIC SPEAKER
FILTER CHOKE
RF 'A' CHOKE
RF 'B' CHOKE
TO HEATERS
PILOT LAMP 6-8 V. .200 A.
S.P.S.T. SWITCH ON TONE CONT.
ATTACHMENT RECEPTACLE
TO 6 VOLT BATTERY
MODEL 125 'B' UNIT
VIBRATOR (55)
VOLUME CONT. (54)
TONE CONT.
PHONO OR TELEVISION
RADIO
TO PHONO PICKUP OR TELEVISION
2 GANG CONDENSER (9)
6 GANG TRIMMER (10)
BAND SWITCH (FRONT SECTION) SEE NOTE 2
ANT. COIL (7)
OSC. COIL (8)
BAND SWITCH (REAR SECTION) SEE NOTE 2
I.F. - 455 KC.
REAR OF CHASSIS
BOTTOM VIEW OF CHASSIS
TUNING INDICATOR
SOCKET AND CABLE ASSEM. (36) SEE NOTE 3
BACK OF SOCKET
SYM. DESCRIPTION
H HEATER
P PLATE
DP DIODE PLATE
PH HEXODE PLATE
G CONTROL GRID
SU SUPPRESSOR GRID
GT TRIODE GRID
S SCREEN GRID
K CATHODE
NC NO CONNECTION
NOTES
1. NUMBERS SHOWN IN PARENTHESIS ARE ILLUSTRATION NUMBERS.
2. BAND SWITCH (51) VIEWED FROM REAR. SHOWN IN EXTREME COUNTER-CLOCKWISE (75-24.0 MC.) POSITION WHEN ADJUSTED FROM FRONT OR KNOB END OF SWITCH
3. SOME MODELS ARE EQUIPPED WITH A 6A8 TUNING INDICATOR. DOTTED LINES SHOW HOW CONNECTIONS ARE MADE.
4. SET SHIPPED WITH A JUMPER BETWEEN TERMINALS 1 AND 2 ON PHONO-TELEVISION TERMINAL STRIP.
NOTE:-ALL VOLTAGES EXCEPT HEATERS MEASURED FROM SOCKET TERMINALS TO GROUND WITH A 1,000 OHM PER VOLT METER. HEATER VOLTAGES MEASURED DIRECTLY ACROSS SOCKET TERMINALS.
VOLTAGE TABLE
PART NO.-236

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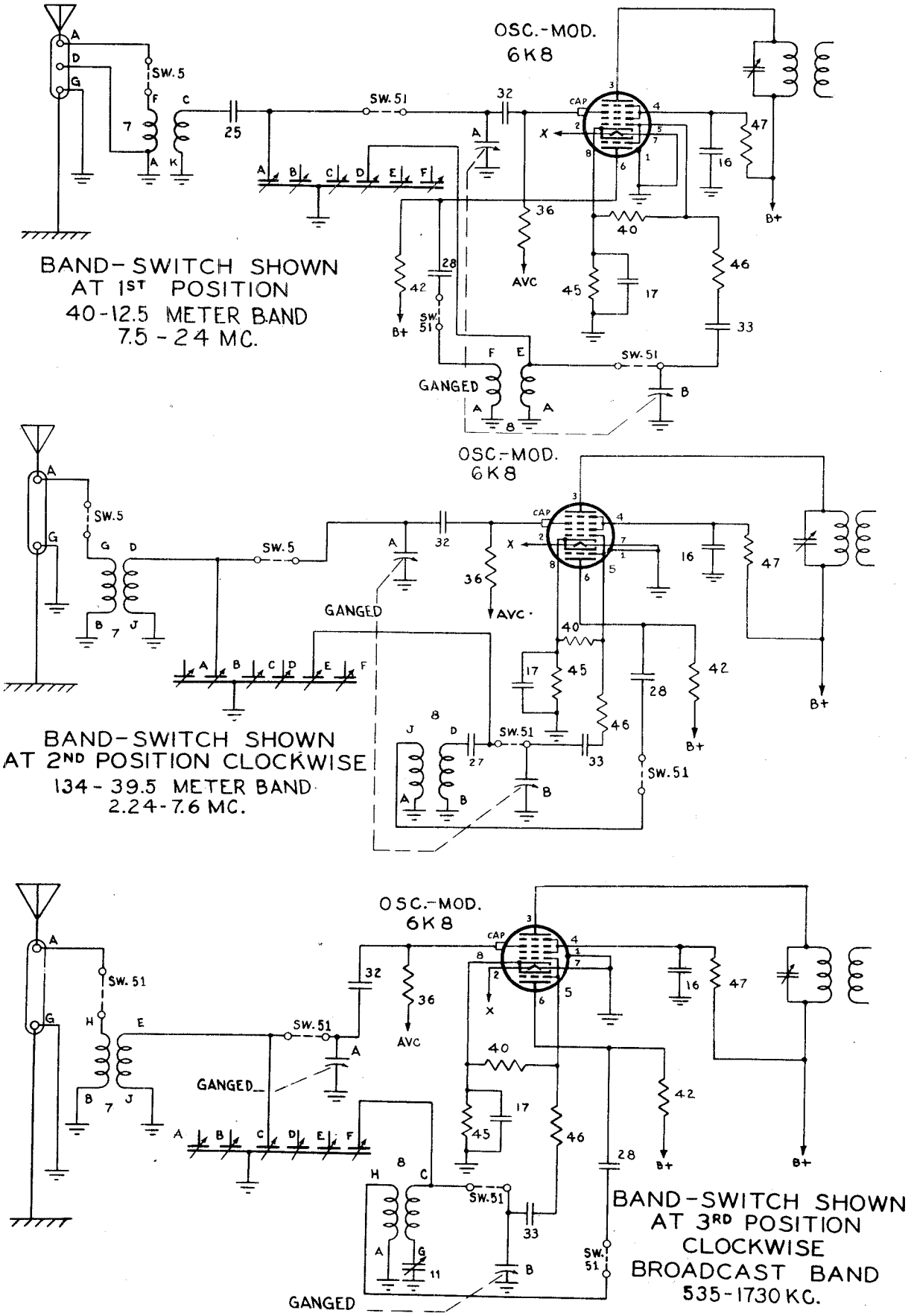
RADIO WIRE TELEVISION



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ALIGNMENT PROCEDURE

Be sure to follow procedure carefully and in the order given—otherwise the receiver will be insensitive and the dial calibration incorrect. For alignment procedure read tabulations from left to right. If more than one adjustment is required on any one band, make the adjustment marked (1) first, (2) next, (3) third.

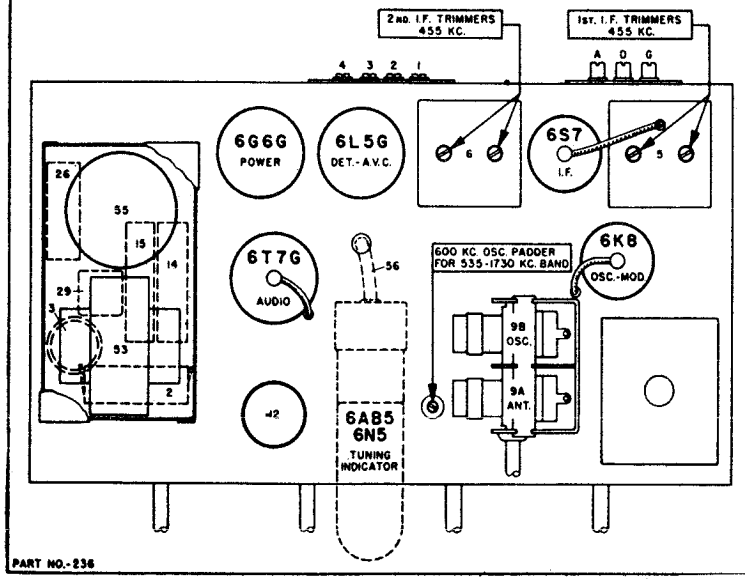
Before starting alignment:

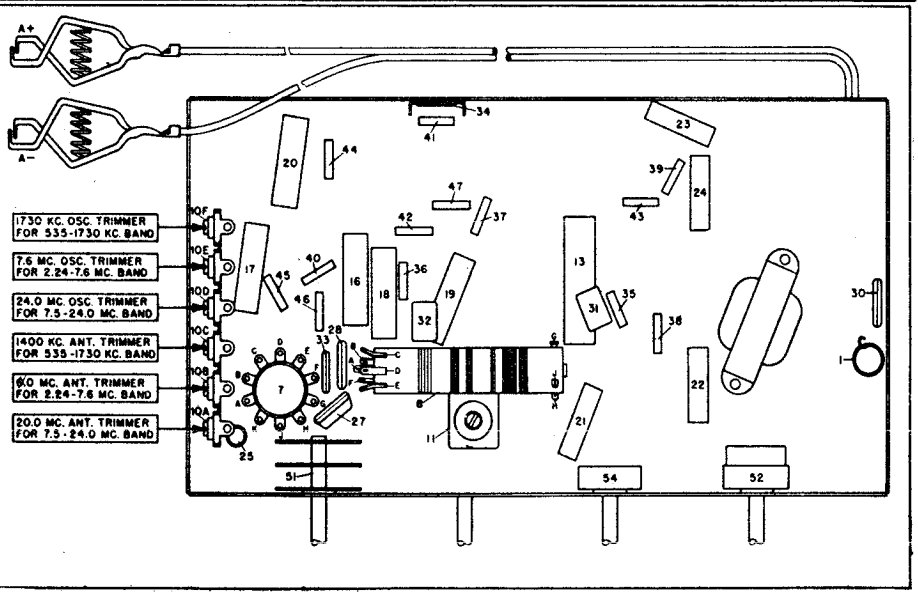
(a) Check tuning dial adjustment by turning gang condenser until plates touch maximum capacity stop (completely in mesh) at which point the dial needle must be exactly even with the last line at the low frequency end of the dial calibration. If dial needle does not point exactly to last line move needle to correct position.

(b) Use an accurately calibrated test oscillator with some type of output measuring device.

(c) Have ground lead of test oscillator attached to chassis.

Place band switch for operation on:	Set receiver dial to:	TEST OSCILLATOR: Adjust test oscillator frequency to:	TEST OSCILLATOR: Use dummy antenna in series with output of test oscillator: consisting of:	TEST OSCILLATOR: Attach output of test oscillator to:	Refer to parts layout diagram for location of trimmers mentioned below:
I. F. alignment use any band position.	Any point where no interfering signal is received.	Exactly 455 K.C.	.02 Mfd. condenser	High side to grid cap of 6K8 tube. Do not remove cap.	Adjust each of the second I.F. transformer trimmers for maximum output—then adjust each of the first I.F. transformer trimmers for maximum output.
1730 to 540 K.C. Band	1 Exactly 1730 K.C.	Exactly 1730 K.C.	.00025 Mfd. condenser	Receiver antenna "A" post	Adjust 1730 K.C. oscillator trimmer for maximum output.
	2 Approx. 1400 K.C.	Approx. 1400 K.C.	.00025 Mfd. condenser	Receiver antenna "A" post	While rocking gang condenser adjust 1400 K.C. antenna trimmer for maximum output.
	3 Approx. 600 K.C.	Approx. 600 K.C.	.00025 Mfd. condenser	Receiver antenna "A" post	While rocking gang condenser adjust 600 K.C. oscillator padder for maximum output.
2.24 to 7.6 M.C. Band	1 Exactly 7.6 M.C.	Exactly 7.6 M.C.	400 Ohm carbon resistor	Receiver antenna "A" post	Adjust 7.6 M.C. oscillator trimmer for maximum output.
	2 Approx. 6. M.C.	Exactly 6. M.C.	400 Ohm carbon resistor	Receiver antenna "A" post	While rocking gang condenser adjust 6 M.C. antenna trimmer for maximum output.
7.5 to 24 M.C. Band	1 Exactly 24 M.C.	Exactly 24 M.C.	400 Ohm carbon resistor	Receiver antenna "A" post	Adjust 24 M.C. oscillator trimmer for maximum output—be sure to use proper peak. If more than one peak is noticed, back off trimmer to minimum capacity, then screw down trimmer (add capacity) until the second peak—which is the proper one to use is tuned in.
	2 Approx. 20 M.C.	Approx. 20 M.C.	400 Ohm carbon resistor	Receiver antenna "A" post	While rocking gang condenser adjust 20 M.C. antenna trimmer for maximum output.




1730 KC. OSC. TRIMMER FOR 535-1730 KC. BAND
7.6 MC. OSC. TRIMMER FOR 2.24-7.6 MC. BAND
24.0 MC. OSC. TRIMMER FOR 7.5-24.0 MC. BAND
1400 KC. ANT. TRIMMER FOR 535-1730 KC. BAND
6.0 MC. ANT. TRIMMER FOR 2.24-7.6 MC. BAND
20.0 MC. ANT. TRIMMER FOR 7.5-24.0 MC. BAND

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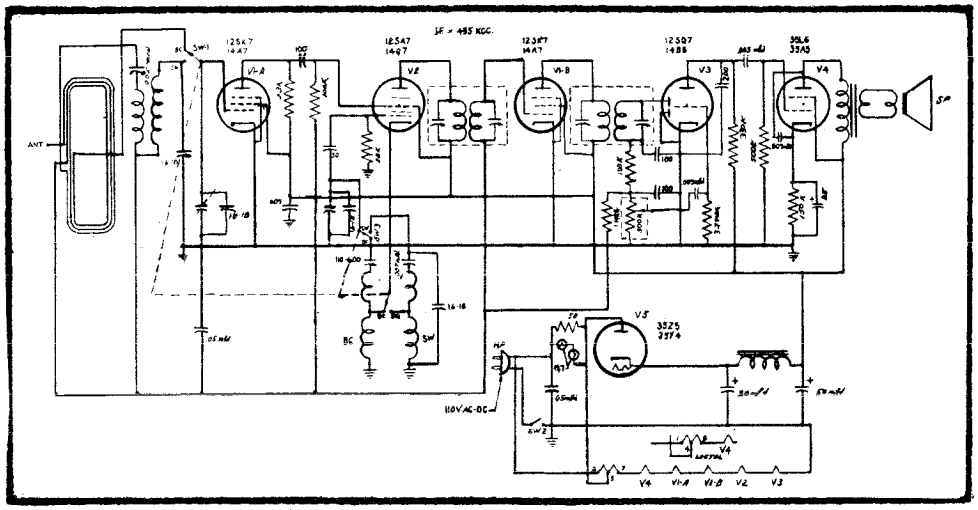


This 6-tube superheterodyne is designed to operate on 115 volts, 40 to 60 cycles, alternating current (AC) or 115 volts direct current (DC).

The tuning ranges, 533 to 1660 kilocycles (KC) and 5.3 to 18.3 megacycles (MC), cover all major Domestic and Foreign Short Wave Broadcast, Police, Aircraft and Amateur Bands.

For portable use, or where it is desirable to move the receiver from place to place frequently, the Built-in Loop Antenna furnishes excellent noise-free reception. This applies to the Broadcast Band Only. Where a permanent installation is made and it is desired to take full advantage of the performance capabilities built into this receiver, with particular reference to Short Wave reception, the use of a separate, outside Antenna is recommended. An antenna connection for this purpose is at the rear of the receiver.

The two control knobs are: Left, Volume Control and ON-Off Switch — Right, Vernier Tuning for both bands. The short wave band switch is located on the back of the receiver.

DIRECTIONS: Turn the receiver on and wait for tubes to reach operating heat. Adjust wave-band switch at the rear of the receiver to desired band. The upper half of the dial scale covers the Broadcast-Band — the Short Wave Band is on the lower half. Turn the vernier tuning knob until the desired station (see dial pointer) is heard. Adjust volume to a satisfactory level, first making sure that the station is tuned in correctly. Tuning on the Short Wave is critical; use greater care or many worthwhile programs might be passed over unnoticed.

If the receiver fails to operate on DC current, reverse the power cord plug. On AC a hum may be heard in the background of the program. This may, in some cases, be eliminated or reduced by reversing the power cord plug.

One 6-8 volt 150 MA lamp is used to illuminate the dial. A similar lamp should be used for replacement or damage may result.

MODEL U-88

Illus. No.	Part No.	Part Name	Description	List Price
1	4840	Choke	R. F. "A"	$0.18
2	4840	Choke	R. F. "A"	.18
3	4199	Choke	R. F. "B"	.40
4	4198	Choke	Filter	.95
5	11007	Coil	1st I. F. Transformer	1.25
6	11008	Coil	2nd I. F. Transformer	1.25
7	12451	Coil	Antenna	.80
8	12452	Coil	Oscillator	.70
9	12454	Condenser	Tuning Two Gang with 3-11/32" Dia. Pulley	1.75
10	12453	Condenser	Trimmer Six Gang	.85
11	3287	Condenser	Padder 340-460 Mmf.	.45
12	11150	Condenser	Dry Electrolytic 10-30 Mfd. 250 Volt	1.00
13	1693	Condenser	Tubular Dry Electrolytic 10 Mfd. 25 Volt	.75
14	10092	Condenser	Tubular .5 Mfd. 100 Volt	.25
15	10092	Condenser	Tubular .5 Mfd. 100 Volt	.25
16	10076	Condenser	Tubular .1 Mfd. 200 Volt	.19
17	10076	Condenser	Tubular .1 Mfd. 200 Volt	.19
18	10076	Condenser	Tubular .1 Mfd. 200 Volt	.19
19	10076	Condenser	Tubular .1 Mfd. 200 Volt	.19
20	10077	Condenser	Tubular .05 Mfd. 200 Volt	.19
21	10084	Condenser	Tubular .003 Mfd. 400 Volt	.17
22	10090	Condenser	Tubular .02 Mfd. 400 Volt	.19
23	10080	Condenser	Tubular .005 Mfd. 400 Volt	.17
24	10088	Condenser	Tubular .01 Mfd. 400 Volt	.19
25	10078	Condenser	Tubular .007 Mfd. 200 Volt	.19
26	10094	Condenser	Tubular .03 Mfd. 800 Volt	.22
27	1629	Condenser	Mica .0015 Mfd.	.21
28	1441	Condenser	Mica .004 Mfd.	.21
29	1441	Condenser	Mica .004 Mfd.	.21
30	1441	Condenser	Mica .004 Mfd.	.21
31	9458	Condenser	Mica .00025 Mfd.	.21
32	7934	Condenser	Mica .0001 Mfd.	.21
33	7934	Condenser	Mica .0001 Mfd.	.21
34	10217	Condenser	Mica Dual .0001 Mfd.	.21
35	4804	Resistor	10 Megohm 1/3 Watt	.19
36	2705	Resistor	2 Megohm 1/3 Watt	.19
37	2705	Resistor	2 Megohm 1/3 Watt	.19
38	6984	Resistor	500,000 Ohm 1/3 Watt	.19
39	6984	Resistor	500,000 Ohm 1/3 Watt	.19
40	6879	Resistor	50,000 Ohm 1/3 Watt	.19
41	6879	Resistor	50,000 Ohm 1/3 Watt	.19
42	6786	Resistor	10,000 Ohm 1/3 Watt	.19
43	9089	Resistor	500 Ohm 1/3 Watt	.19
44	1152	Resistor	400 Ohm 1/3 Watt	.19
45	6875	Resistor	250 Ohm 1/3 Watt	.19
46	2431	Resistor	100 Ohm 1/3 Watt	.19
47	1176	Resistor	10,000 Ohm 1/2 Watt	.19
48	12711	Speaker	P. M. 6" for upright cab.	5.00
49	10149	Speaker	P. M. 6" for lay down cab.	5.00
50	11243	Speaker	P. M. 10"	7.00
51	12463	Switch	Wave	1.00
52	12461	Tone Control	With S.P.S.T. Switch	.85
53	4848	Transformer	Power	2.25
54	12462	Vol. Control		.60
55	3698	Vibrator		3.50
56	12488	Socket Assem.	Cable Assem. for 6AB5 Tuning Eye Including Socket & Resistor Assem.	.60

MISCELLANEOUS PARTS

4167	Bulb	6-8 Volt .200 Amp. Dial Light Type G 3-1/2 No. 51	$ .10
12471	Back	Cabinet Back for Laydown Table Cabinet	.40
12472	Back	Cabinet Back for Upright Cabinet	.40
12473	Back	Cabinet Back for Console Cabinet	.40
12455	Dial Shaft	Dial Drive Shaft	.15
8184	Dial Cord	37" of 18 Lb. Drive Cord	.20
11693	Dial Spring	Dial Cord Tension Spring	.04
12459	Dial Pointer	Dial Indicator	.20
12469	Dial Scale	Calibrated Glass Scale	.60
12474	Escutcheon	For Dial	1.25
12154	Knob	Marked "Tuning"	.15
12155	Knob	Marked "Volume"	.15
12157	Knob	Marked "Off-On-Tone"	.15
12496	Knob	Marked 1, 2, 3	.15

When ordering parts be sure to mention part number.

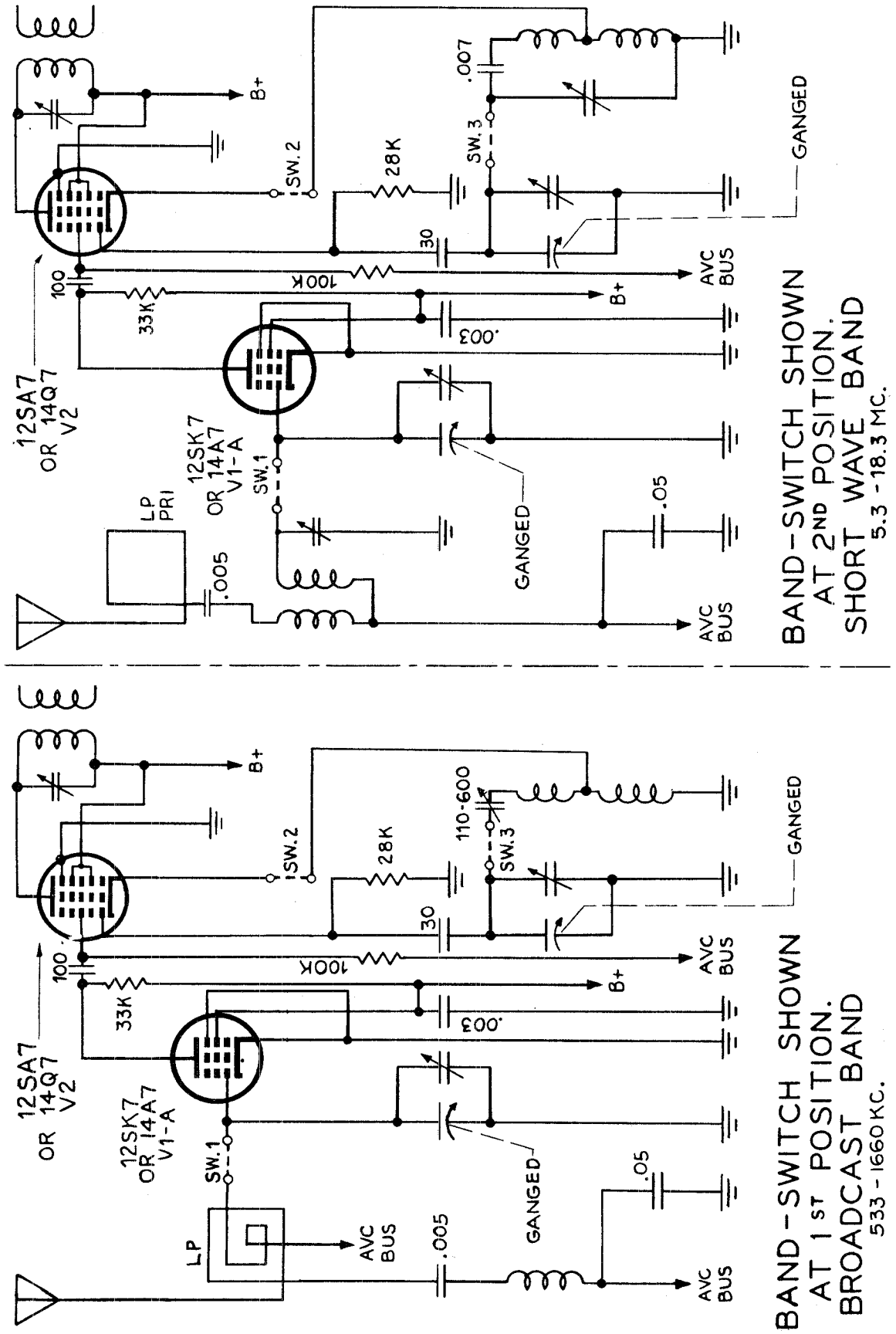
PRICES SUBJECT TO CHANGE WITHOUT NOTICE.

MODEL E190

"clarified schematics"

MODEL U-88

RADIO WIRE TELEVISION



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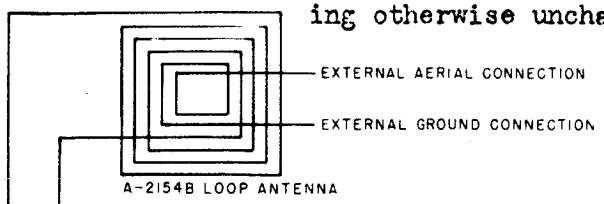
When a 50L6 output tube is used in place of a 35L6, the 50-ohm resistor is not used. Wiring otherwise unchanged.



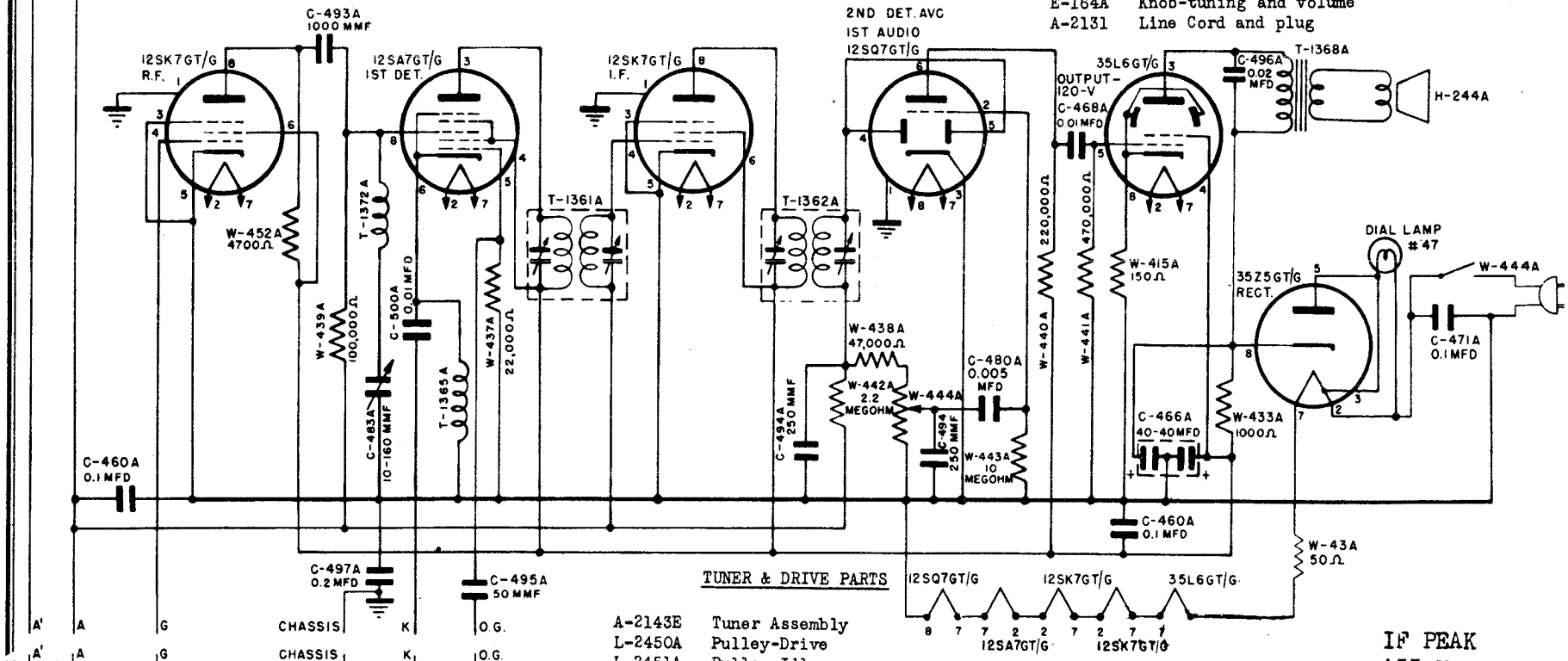
RESISTORS

W-43A	50 ohm, 10 Watt	Wire wound
W-415A	150 ohm, 0.5 Watt	Carbon
W-452A	4700 ohm, 0.5 Watt	Carbon
W-433A	1000 ohm, 1.0 Watt	Carbon
W-437A	22,000 ohm, 0.25 Watt	Carbon
W-438A	47,000 ohm, 0.25 Watt	Carbon
W-439A	100,000 ohm, 0.25 Watt	Carbon
W-440A	220,000 ohm, 0.25 Watt	Carbon
W-441A	470 ohm, 0.25 Watt	Carbon
W-442A	2.2 megohm, 0.25 Watt	Carbon
W-443A	10 megohm, 0.25 Watt	Carbon
W-444A	Switch & Pot, 500,000 ohm,	Carbon

CAPACITORS

C-471A	0.1 mfd, 400 V	Tubular
C-493A	1000 mmf, 350 V	Ceramic
C-494A	250 mmf, 350 V	Ceramic
C-495A	50 mmf, 500 V	Ceramic
C-480A	0.005 mfd, 400 V	Tubular
C-466A	40-40 mfd, 150 V	Electrolytic
C-483A	10-160 mmf	Trimmer
C-496A	0.02 mfd, 200 V	Tubular
C-460A	0.1 mfd, 200 V	Tubular
C-497A	0.2 mfd, 400 V	Tubular
C-500A	0.01 mfd, 400 V,	Molded

H-244A	Speaker 5" PM
S-608A	Tube Socket Octal (8 prong)
E-164A	Knob-tuning and volume
A-2131	Line Cord and plug



TUNER & DRIVE PARTS

A-2143E	Tuner Assembly
L-2450A	Pulley-Drive
L-2451A	Pulley-Idler
U-1442A	Shoulder Rivet
H-247B	Glass Dial
H-246A	Translucent Screen
U-1445A	Snaps for Screen
U-1461A	Pointer
U-1444A	Spring
S-599A	Pilot Light Socket Assembly
A-2155A	Dial Drive Assembly

IF PEAK
455 KC

COILS

A-2154B	Antenna & Back Cover Assembly	
T-1361A	1st I.F. Transformer	455 KC
T-1362A	2nd I.F. Transformer	455 KC
T-1365A	R. F. Choke Coil	1.4 MH
T-1368A	Audio Transformer	
T-1372A	R.F. Choke Coil	3.0 MH

RADIONIC EQUIPMENT CO.

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ALIGNMENT PROCEDURE

Volume Control-Maximum All Adjustments.

Allow Chassis and Signal Generator to "Heat Up" for several minutes.

The equipment in column at right is required for Aligning:

Signal Generator which will provide an accurately calibrated signal at test frequencies as listed.

Output Indicating Meter; Non-Metallic Screwdriver.

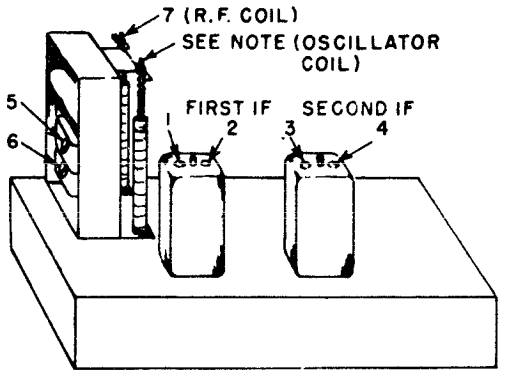
Dummy Antennas-.01 mf., and 400 ohms.

SIGNAL GENERATOR FREQUENCY SETTING	ANTENNA CONNECTION	COUPLING	DUMMY ANTENNA	TUNER SETTING	TRIMMER ADJUSTMENT (SEE DIAGRAM)	NOTES
I.F. 455 KC	Grid of RF tube 12SK7	Ground generator to chassis	0.01 mfd	Out	Adjust for Max. 1, 2, 3 and 4	No signal will be heard unless trimmer condenser under chassis is unscrewed and reduced from original setting
I.F. 455 KC	Grid of RF tube 12SK7	Ground generator to chassis	0.01 mfd	Out	Trim condenser under chassis for Min. output.	If it is found that regeneration prevails when the loop antenna is put in its normal position close to the tubes, then the under chassis trimmer is incorrectly set, and should be adjusted to prevent the regenerative condition.
1620 KC	Inductive Coupling to Loop	Loop coupling with leads brought out	400 ohms in series with Antenna & Gnd.leads	Out	Adjust Osc. #5 per Max. signal	
1400 KC	Inductive Coupling to Loop	Loop coupling with leads brought out	400 ohms in series with Antenna & Gnd.leads	Dial set for 1400KC	Adjust RF trimmer #6 per Max. Signal.	
700 KC	Inductive Coupling to Loop	Loop Coupling with leads brought out	400 ohms in series with Antenna & Gnd.leads	Dial set for 700KC	Adjust RF tuning core #7 for Max. (care should be taken not to disturb carriage position of tuner)	If more than one turn is required, the trimming 1400 KC should be repeated and the 700 KC padding of the tuning core also repeated until correct alignment has been reached

SPECIFICATIONS

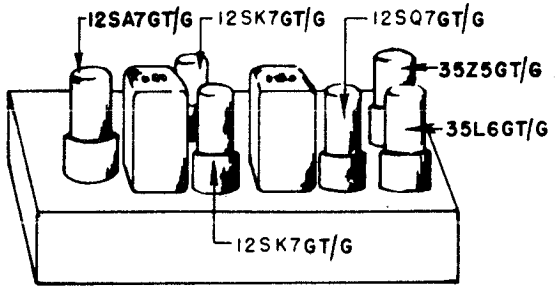
Power consumption..... 35 Watts
(At 117 volts AC Supply)
Power Output- 1.1 Watts 10% Distortion

Selectivity----49 KC Broad at
1000 times Signal
Intermediate Frequency..... 455 KC
Speaker..... 5" PM Dynamic
Tuning Frequency Range..540 to 1620 KC
Sensitivity (For .05 Watt output-external Antenna) 20 microvolts average



CAUTION - If a dial lamp burns out, it should be replaced at once.

Use ONLY a No. 47 dial lamp. Replace through bottom of cabinet.



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ALIGNMENT NOTES

A. MECHANICAL ALIGNMENT:- The following mechanical adjustments should be made before alignment:

1. Rotate shaft of tuning unit until carriage is against top stop position.
2. Space oscillator coil slug 1-5/32" out from top of oscillator coil form.
3. Space R.F. coil slug 1-29/64" out from top end of R.F.coil winding. (Note:-The distance 1 and 2 should be measured from mounted end of the slug)
4. Adjust screw on trimmer of wave trap towards open position so that condenser plates are open at least 1/32".

B. I.F. ALIGNMENT PROCEDURE

1. Feed I.F. frequency from the signal generator through a 0.01 mfd condenser to the control grid of the R. F. tube.
2. No signal will be heard unless trimmer condenser under chassis is unscrewed and reduced from original setting.
3. Turn volume control full on.
4. Make preliminary I.F.adjustment with signal level approximately 50 Mv.
5. Tune I.F. trimmers for maximum signal, reducing I.F. signal input to coupling loop to keep output voltage less than 0.5 V.
6. When maximum output has been secured, adjust trimmer condenser in the I.F. trap (under chassis) by turning clockwise to the minimum signal.

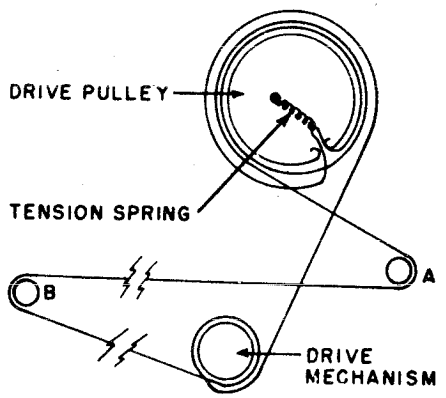
C. R.F. ALIGNMENT PROCEDURE

1. Volume control full on.
2. Adjust tuning unit to top stop position.
3. Feed 1620 kc signal into external loop. Hold audio output below 0.5 V. Adjust the oscillator trimmer condenser to maximum output.
4. Move slugs in by means of tuning dial so that pointer is approximately 1" from the stop end, and a signal received from the external loop on a frequency of 1400 kc. Adjust lower trimmer (R.F. trimmer) to maximum output. Reduce R.F.input to keep signal output voltage below 0.5 V.
5. Rotate tuning shaft until pointer is approximately 1" from the other end of the scale. Feed to the external loop a test signal at 700 kc. Adjust the R. F. coil slug by rotation to maximum output.

NOTE: If more than one complete turn of the slug is required to obtain maximum signal, return tuner to 1400 kc. position and repeat steps 4 and 5.

If less than one turn is required to obtain the maximum 700 kc. audio output, the R.F. alignment may be considered complete.

CAUTION: Extreme care should be taken in the 700 kc. position to make sure that the tuner carriage is not moved by the adjusting tools or hand pressure on the slug screw. Carriage should not be held against the frame, but should be allowed to assume its normal position when adjusting the R.F. coil slug.

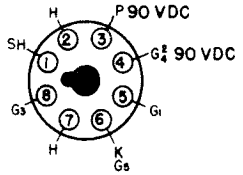


DRIVE CORD REPLACEMENT

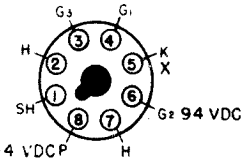
Turn the tuner to the fully open position. Use a new cord 50" long and tie one end to the tension spring. Fasten the other end of the tension spring to the drive pulley. Pass cord through slot in pulley ring; add spring tension and continue one and one-half turns counterclockwise over top of pulley Then pass cord around idler pulley A, starting over top and going around clockwise. Pass cord over idler pulley B, starting over top and going around counter clockwise. Wind one full turn counterclockwise around drive mechanism. Then wind one full turn counterclockwise around drive pulley, pass through slot in pulley and tie string to tension spring. Cut off excess string.

Attach dial pointer to cord.

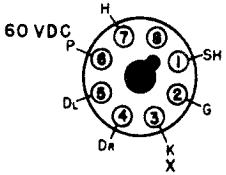
12SA7GT/G
1ST DET & OSCILLATOR



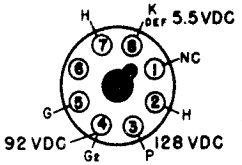
12SK7 GT/G
I.F.



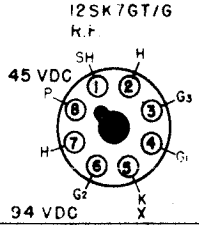
12 SQ7GT/G
2ND DET AVC & AUDIO



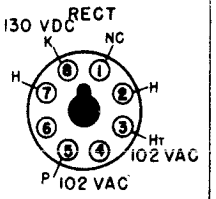
35L6GT/G
OUTPUT



12SK7GT/G
R.F.



35Z5GT/G
RECT



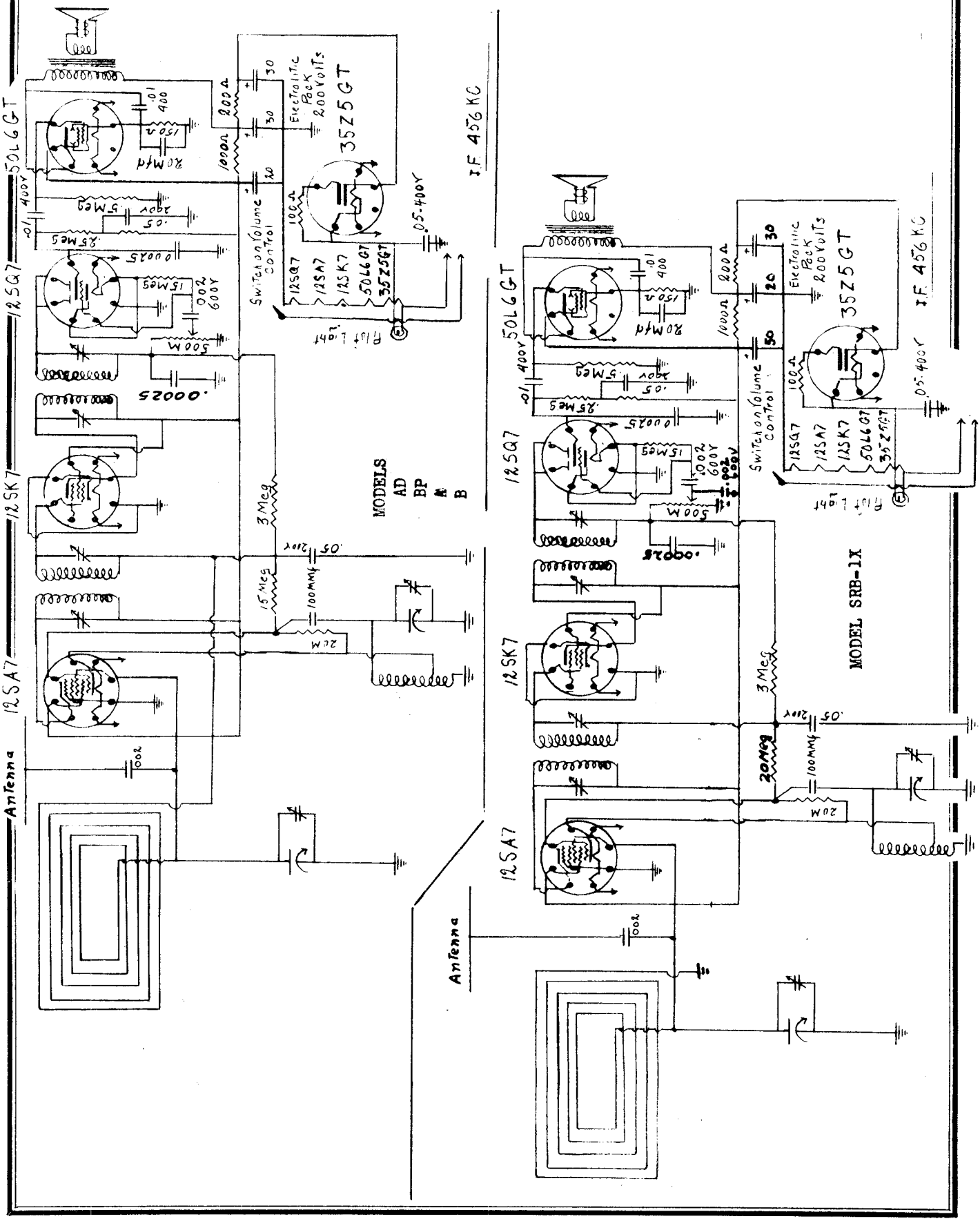
MEASUREMENTS TAKEN WITH AC LINE VOLTAGE OF 117 VOLTS.— READINGS TAKEN WITH NO SIGNAL INPUT.— USE 1000Ω PER VOLT METER BETWEEN INDICATED POINTS & ELECTRICAL GND., INDICATED BY "X" ON SOCKET LAYOUT. NO MEASUREMENTS MADE TO CHASSIS GROUND.

STANDARD TUBE SOCKET SYMBOLS

DEF	DEFLECTOR PLATES	G5	GRID NO.5
DL	DIODE PLATE-LEFT	H	HEATER
DR	DIODE PLATE-RIGHT	HT	HEATER TAP
G	GRID	K	CATHODE
G1	GRID NO.1	NC	NO CONNECTION
G2	GRID NO.2	P	PLATE
G3	GRID NO 3	SH	SHELL
G4	GRID NO.4		

RAY-ENERGY RADIO & TELEV CORP. OF AMERICA

MODELS A, AD, B, BP
MODEL SRB-1X



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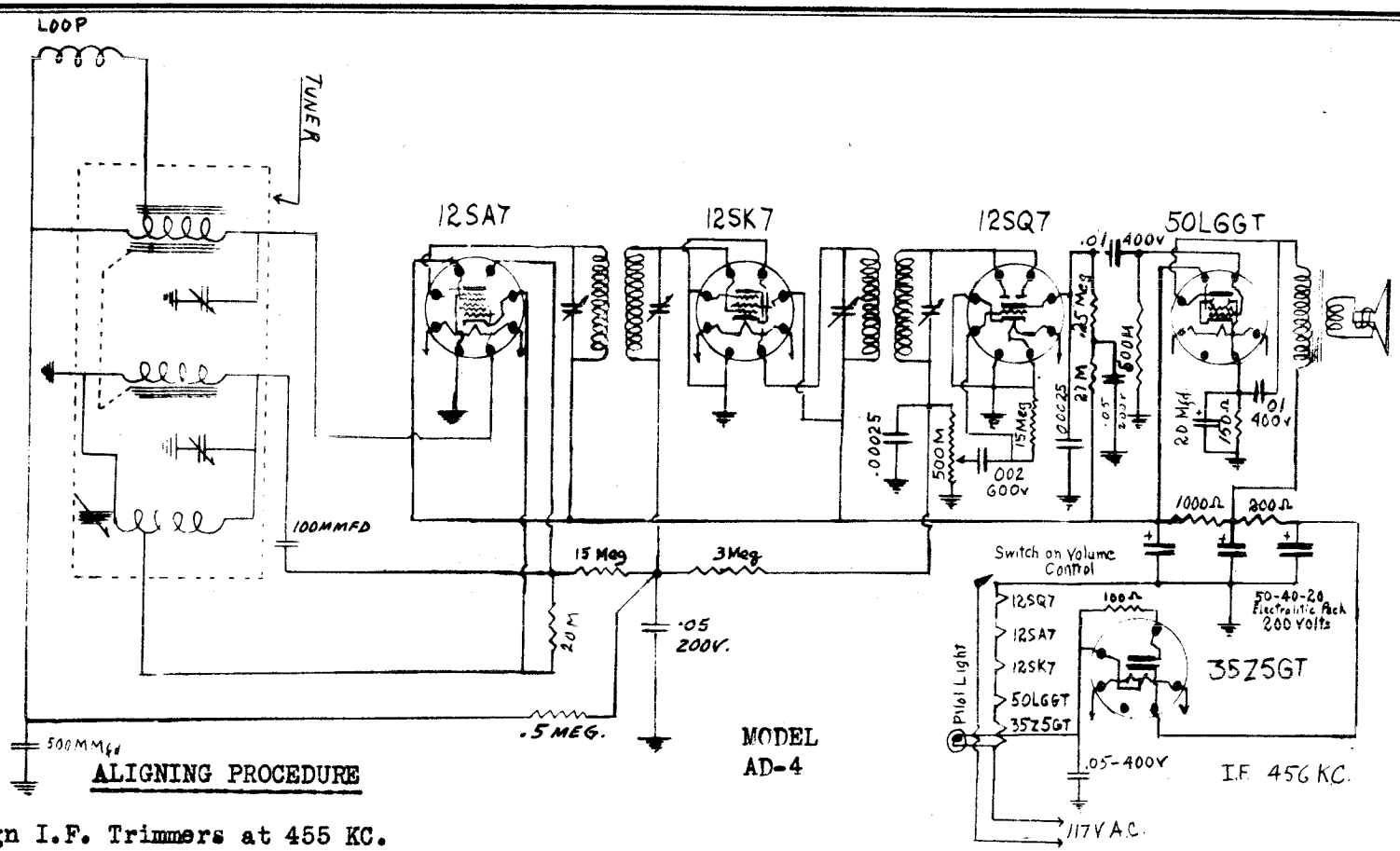


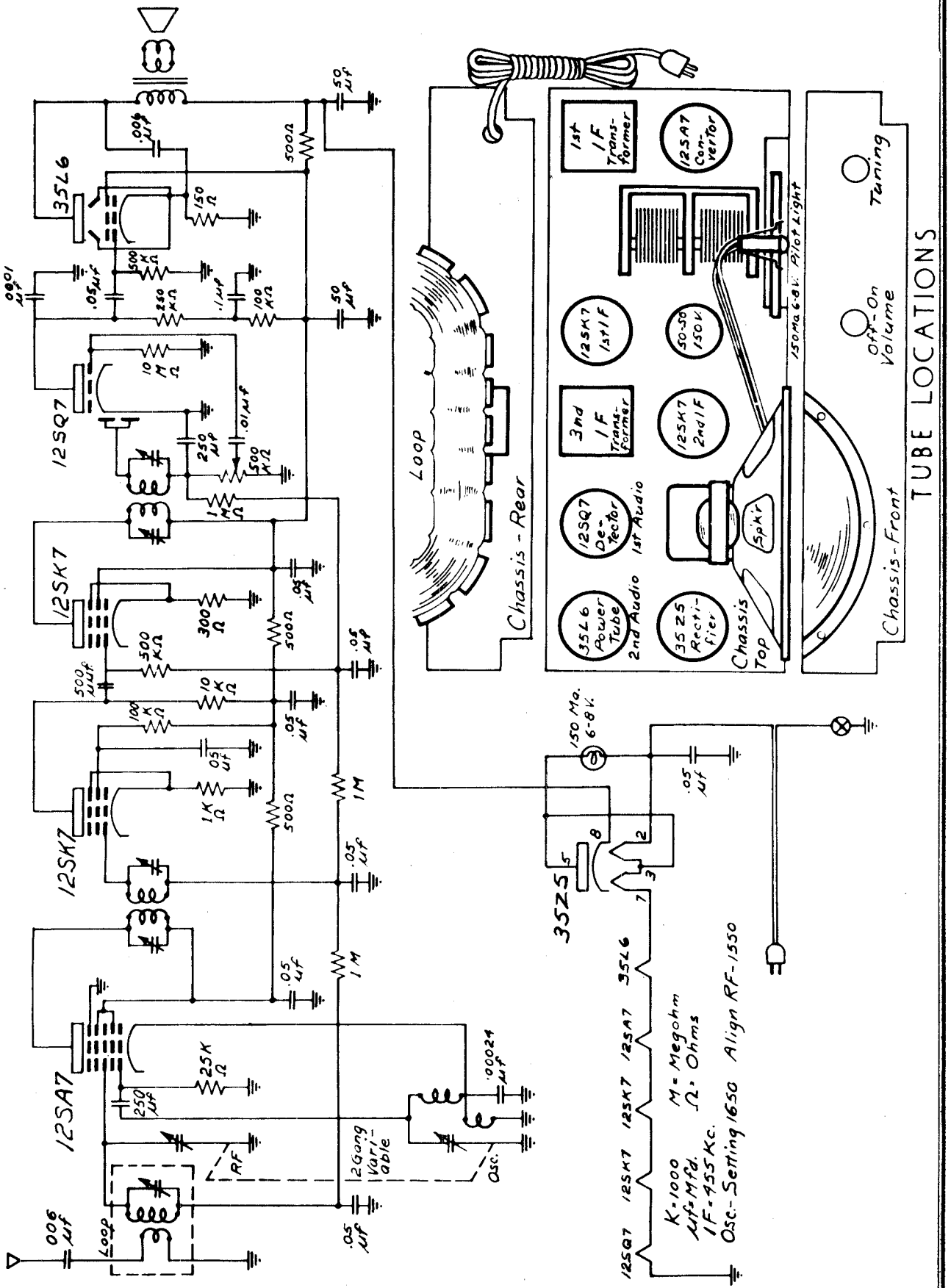
ALIGNING PROCEDURE

Align I.F. Trimmers at 455 KC.

1. Turn dial to extreme high frequency end.
2. Set signal generator to 1650 kc.
3. Adjust osc. trim. to secure signal.
4. Adjust R.F. trim. to secure maximum sig.
5. Set signal generator to 1400 kc.
6. Turn dial to secure signal.
7. Check R.F. saddle to see output at maximum.
8. Adjust saddle to secure max. output, if necessary.
9. Recheck alignment at 1650, re-adjust R.F. trim.if necessary.
10. Set signal generator to 600 kc.
11. Adjust dial to secure signal.
12. Rock dial while adj. shunt pad for max signal.
13. Realign osc. and R.F. trimmers at 1650.
14. Recheck 1400 kc to 600 kc points for alignment.
15. Repeat procedure from step 5 on if 1400 and 600 are out much.
16. Set signal generator to 1000 kc.
17. Tune in signal.
18. Install pointer "Set to 100" on dial.

REGAL ELECTRONICS CORP.

MODEL L-46



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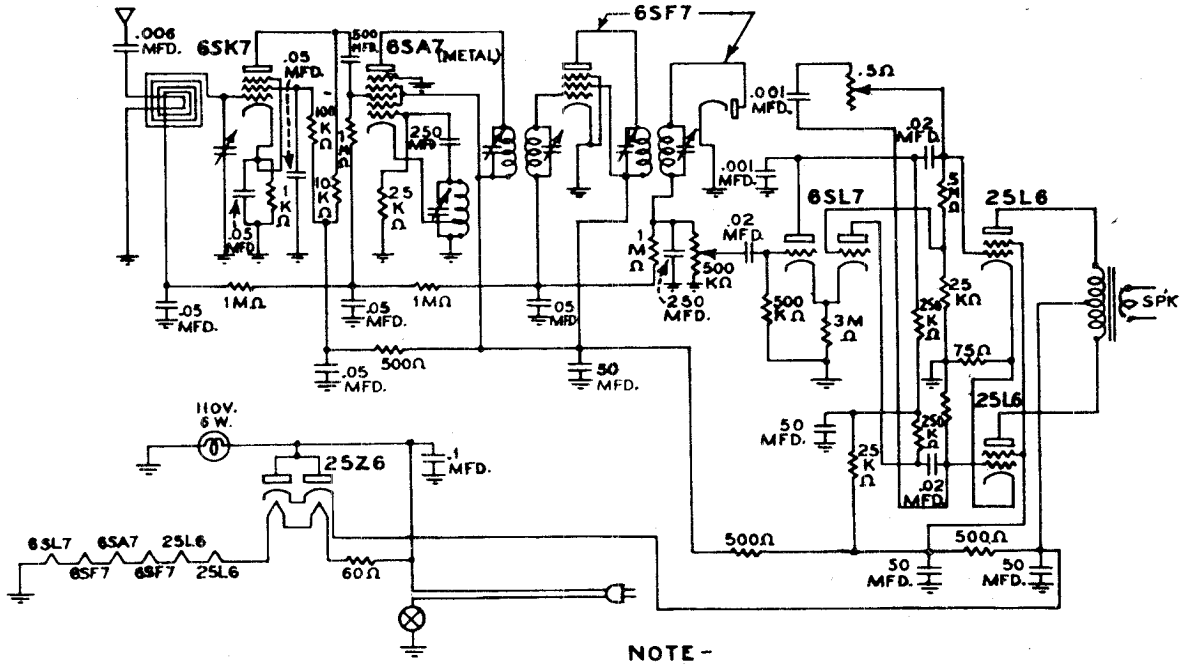
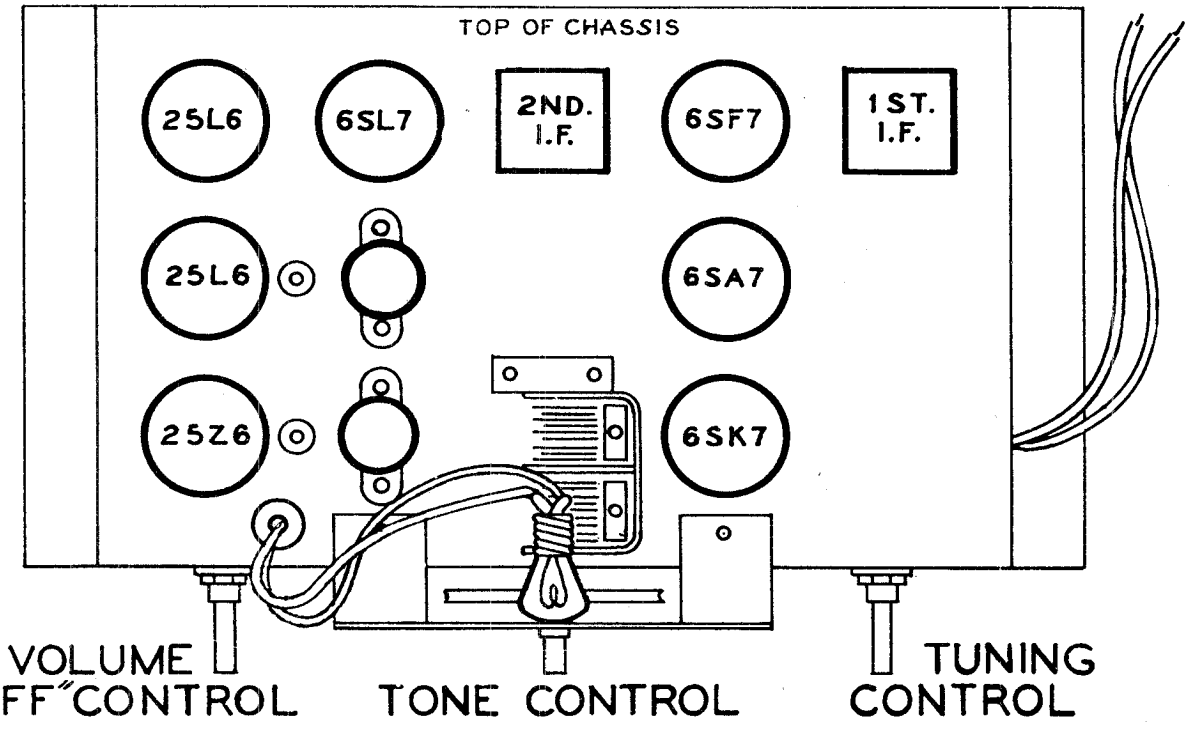
MODEL L-47

REGAL ELECTRONICS CORP.



NOTE -
1.- I.F. - 455 Kc.
2.- OSC. SET 1650 Kc.
3.- R.F. - ALIGN 1550 Kc.



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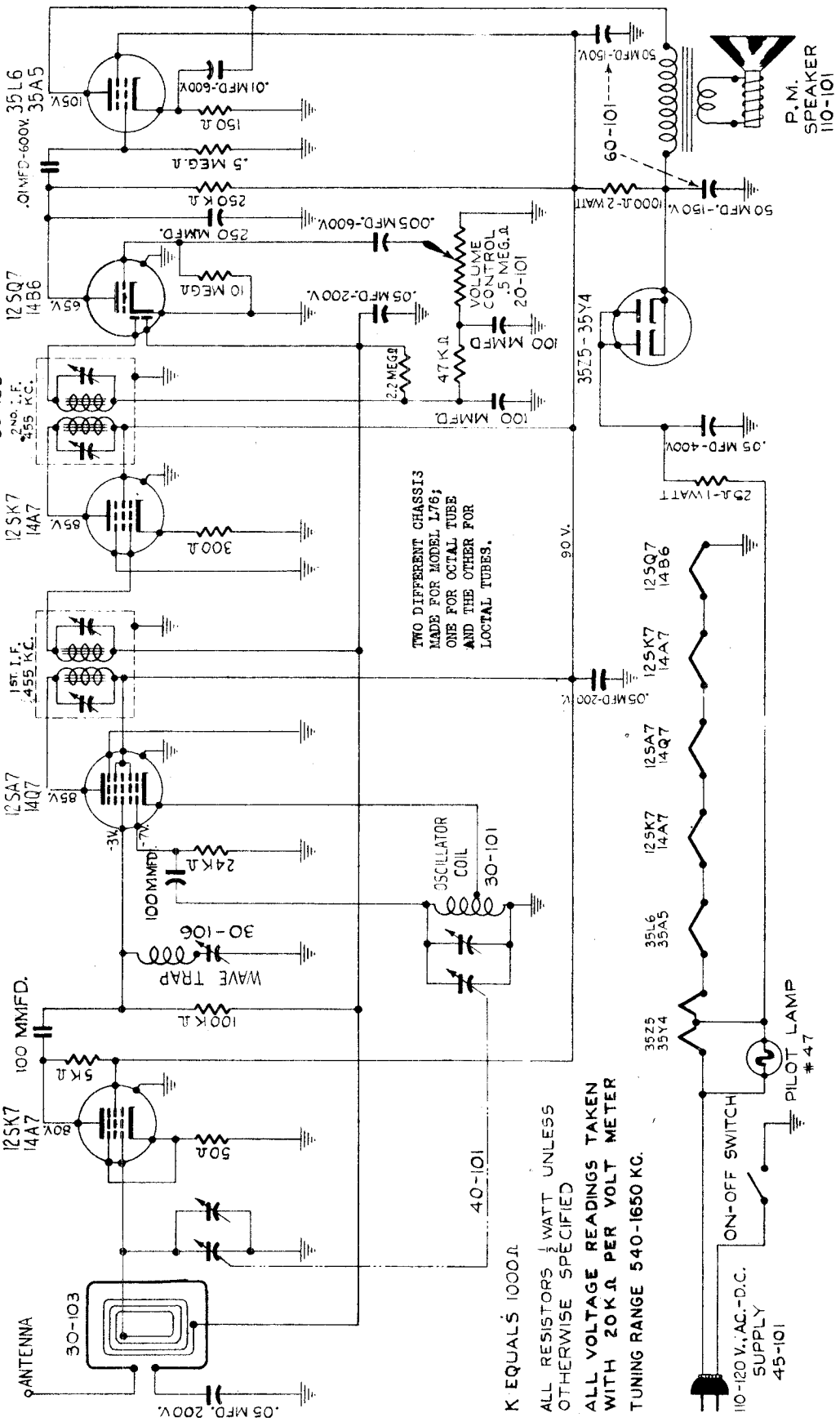
MODEL L-76

REGAL ELECTRONICS CORP.



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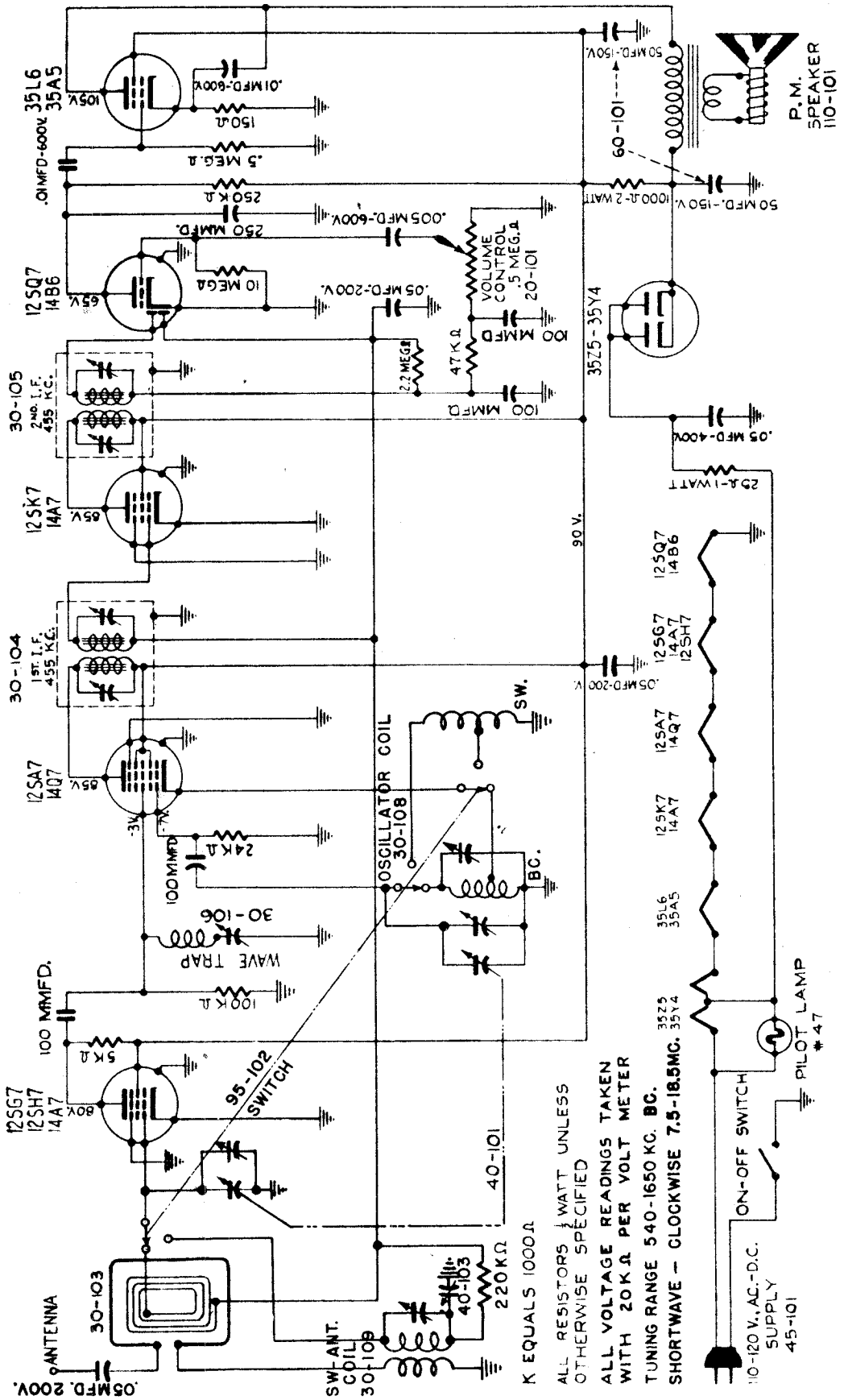
MODEL 762

REGAL ELECTRONICS CORP.



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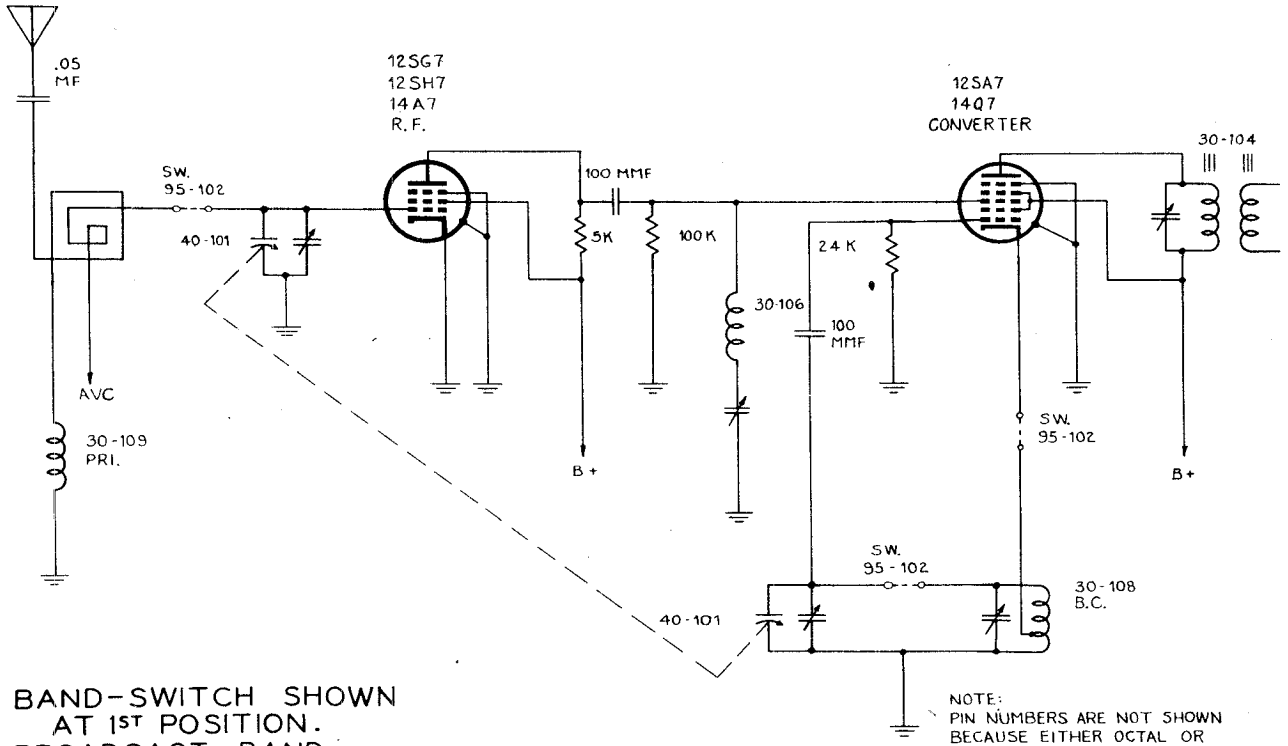
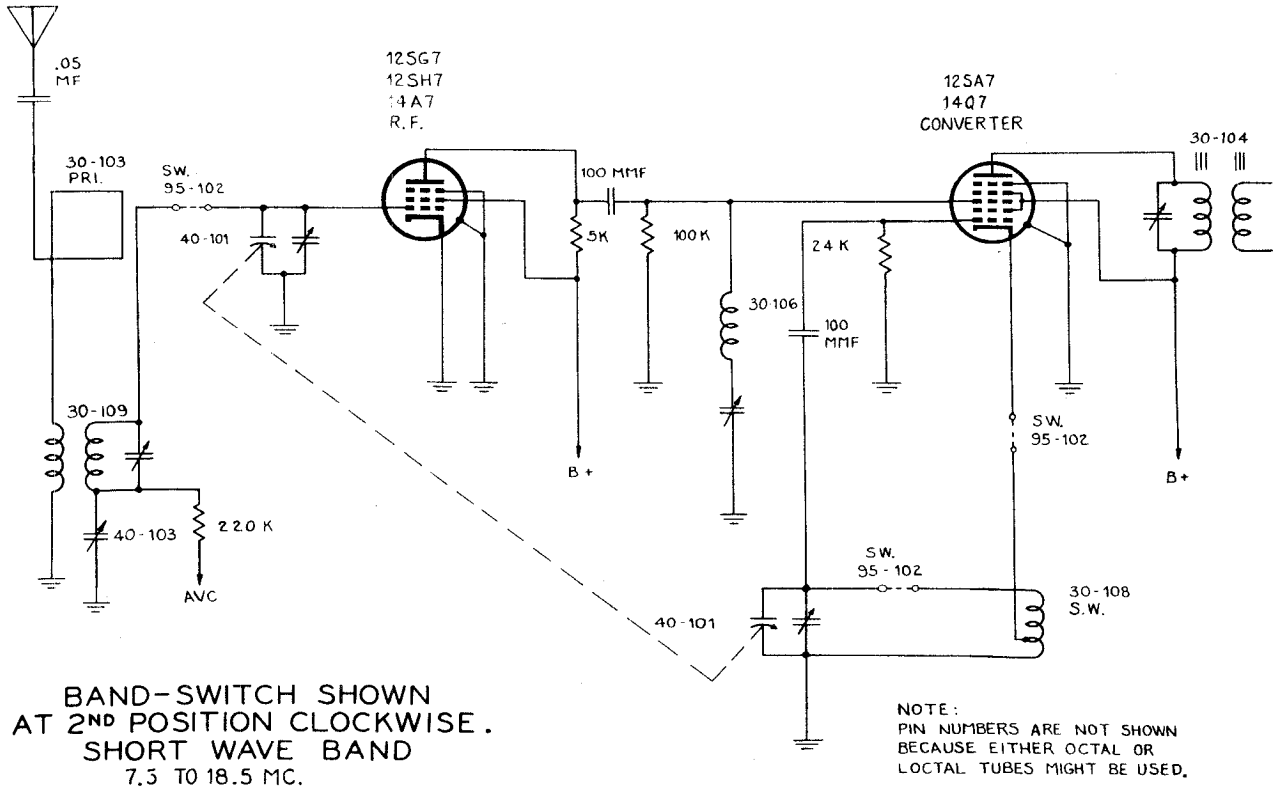
REGAL ELECTRONICS CORP.



BAND-SWITCH SHOWN AT 1ST POSITION.
BROADCAST BAND
540 TO 1650 KC.

NOTE:
PIN NUMBERS ARE NOT SHOWN BECAUSE EITHER OCTAL OR LOCTAL TUBES MIGHT BE USED.



BAND-SWITCH SHOWN AT 2ND POSITION CLOCKWISE.
SHORT WAVE BAND
7.3 TO 18.5 MC.

NOTE:
PIN NUMBERS ARE NOT SHOWN BECAUSE EITHER OCTAL OR LOCTAL TUBES MIGHT BE USED.

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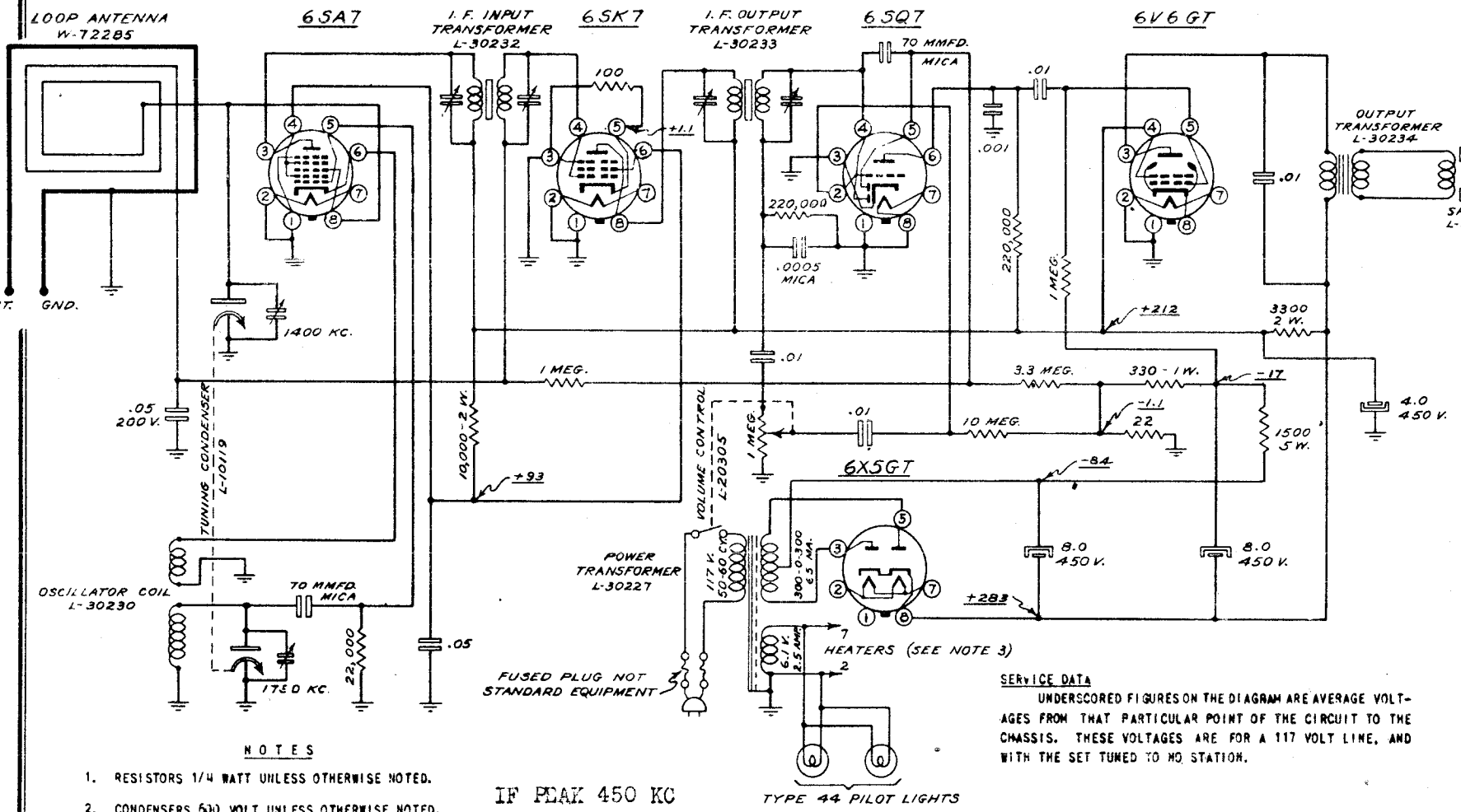


SERVICE DATA

UNDERSCORED FIGURES ON THE DIAGRAM ARE AVERAGE VOLTAGES FROM THAT PARTICULAR POINT OF THE CIRCUIT TO THE CHASSIS. THESE VOLTAGES ARE FOR A 117 VOLT LINE, AND WITH THE SET TUNED TO NO STATION.

NOTES

1. RESISTORS 1/4 WATT UNLESS OTHERWISE NOTED.
2. CONDENSERS 600 VOLT UNLESS OTHERWISE NOTED.
3. HEATER CONNECTIONS OF TUBE 6SQ7 ARE 8 AND 7.

REMLER
CO. LTD.

MODEL MP5-5-3
RADIO RECEIVER
110-120 VOLTS 50-60 CYCLES
50 WATTS

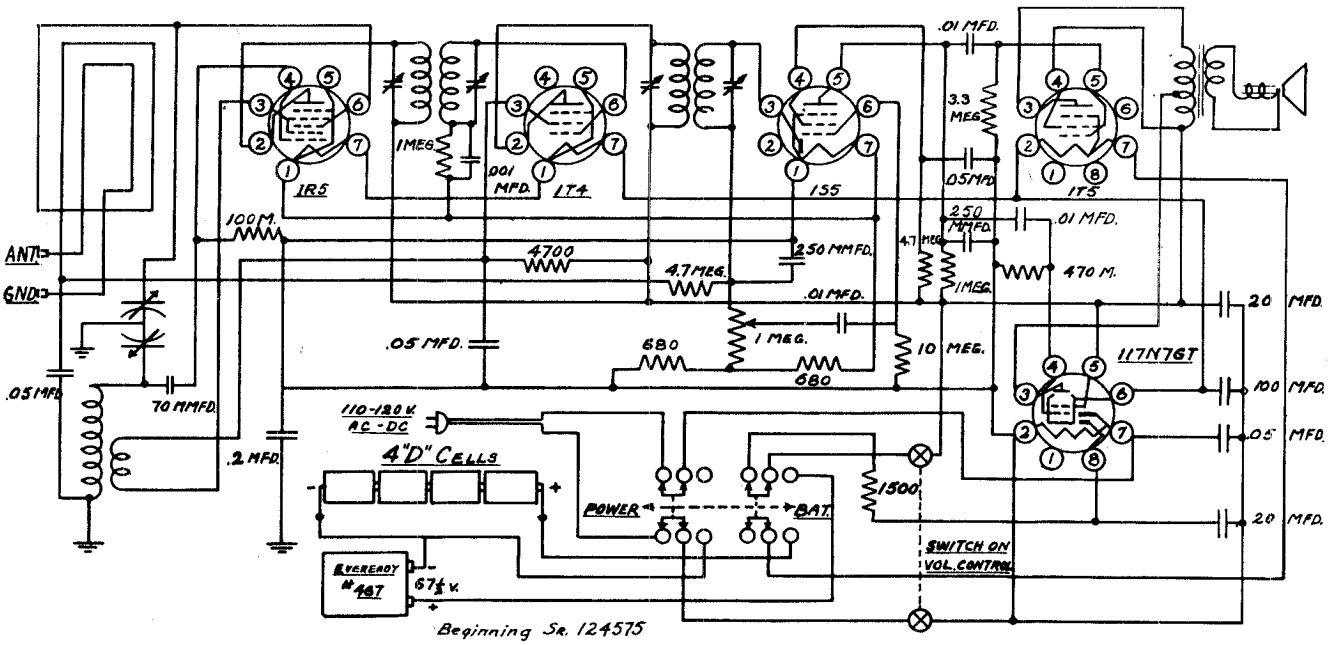
IF PEAK 450 KC

THE INTERMEDIATE FREQUENCY IS 450 KC. OTHER ALIGNMENT FREQUENCIES ARE INDICATED ON THE DIAGRAM. THE FREQUENCY RANGE OF THE RADIO IS 540-1730 KILOCYCLES.

A FUSED PLUG IS ATTACHED TO THE POWER CORD OF SOME SETS. FUSES MAY BE REMOVED BY INSERTING A SMALL DIAMETER INSTRUMENT (PENCIL, STIFF WIRE, ETC.) IN THE PRONG END OF THE PLUG. IN NO CASE SHOULD A FUSE OF GREATER CAPACITY THAN 3 AMPERE BE USED. LOWER CAPACITY FUSES SUCH AS 1 AMPERE MAY BE USED. LOWER CAPACITY FUSES SUCH AS 1 AMPERE MAY BE USED, BUT LOWER CAPACITY TYPES MAY BURN OUT MORE FREQUENTLY ON CURRENT SURGES NORMALLY ENCOUNTERED WHEN THE SET IS TURNED ON.

MODEL 440

REMLER CO. LTD.



The chassis may be removed from the cabinet by removing the knobs and taking out the three binding head screws in the bottom of the cabinet. The oscillator trimmer is located on the front section of the variable condenser, while the converter, or loop, trimmer is on the rear section. I. F. trimmers are accessible in the tops of the I. F. transformers. The I. F. frequency is 455 KC. Standard alignment procedure is applicable.

TUBES

A combination of battery-type and power tubes is used. The battery type output tube is not in use when the set is operated from a power source.

The receiver is equipped with:

1S5-diode detector and A. F. amplifier
1R5-converter
1T5Gt-output tube for battery operation
1T4-I. F. amplifier
117N7GT-output and rectifier for power operation

The following voltage readings are taken with a 1000 ohm per volt meter.

BATTERY OPERATION

Fresh batteries-no signal
From negative bus to:

1R5	Plate	67.5V
1R5	Screen	50
1T4	Plate	67.5
1T4	Screen	50
1S5	Plate	15
1S5	Screen	5
1T5GT	Plate	62
1T5GT	Screen	67.5

POWER OPERATION

115 volts AC. No signal
From negative bus to:

1R5	Plate	65
1R5	Screen	49
1T4	Plate	65
1T4	Screen	49
1S5	Plate	14
1S5	Screen	5
117N7GT	Power Amp. screen	65
117N7GT	Power Amp. cathode	3.5
117N7GT	Rectifier cathode	125
117N7GT	Power Amp. plate	55

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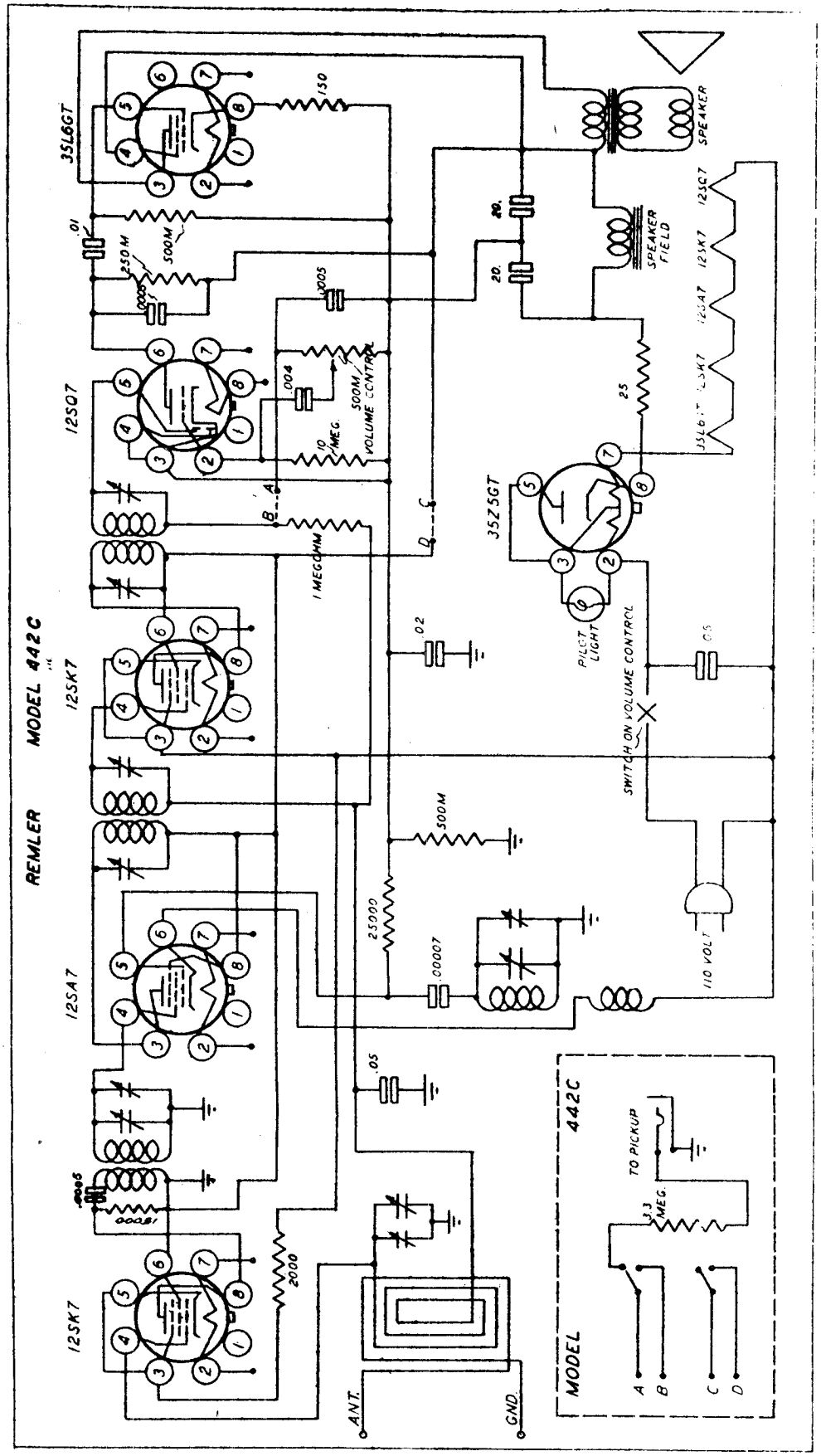
REMLER CO. LTD.

MODEL 442C



IF PEAK 455 KC

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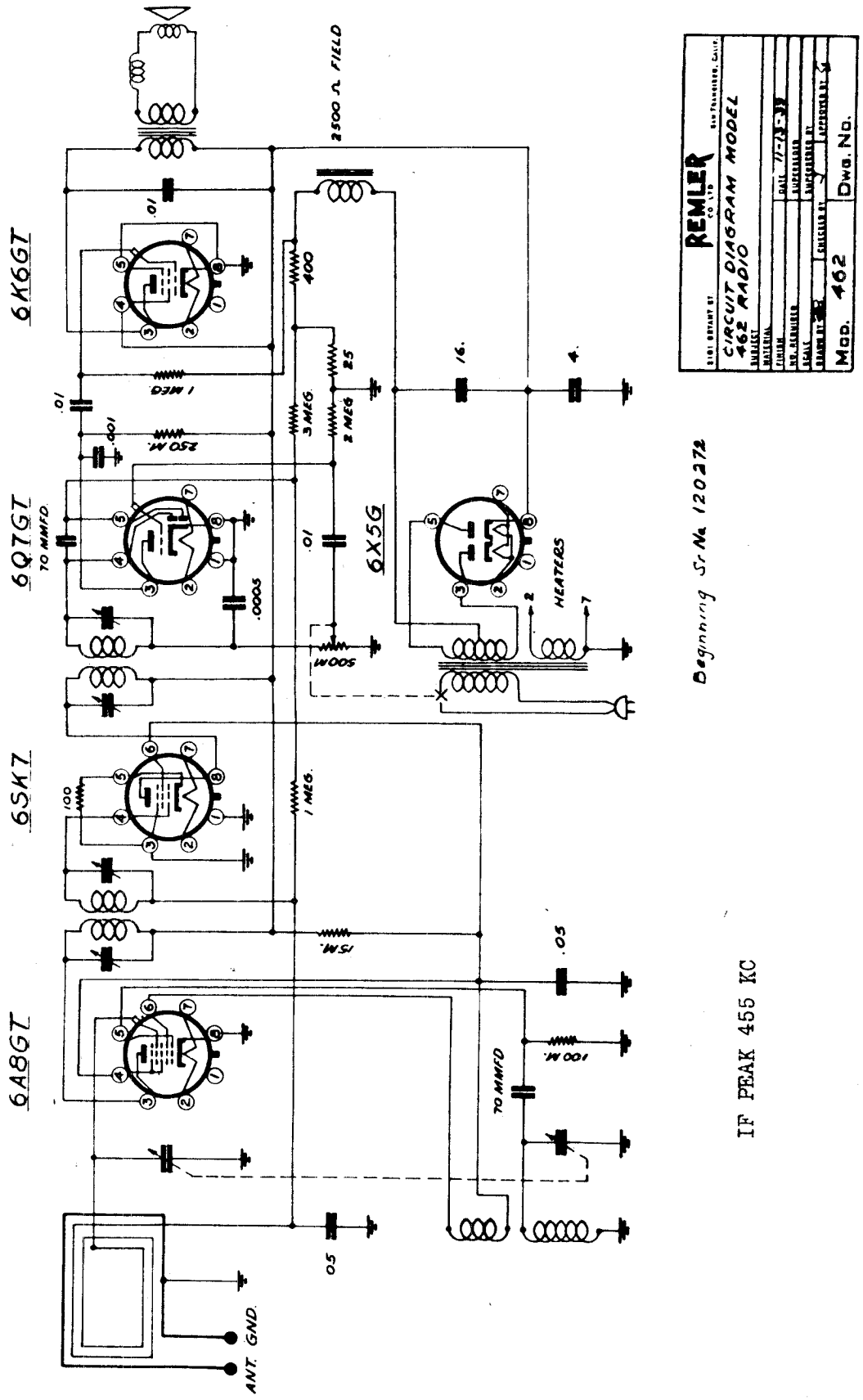
MODEL 462

REMLER CO. LTD.



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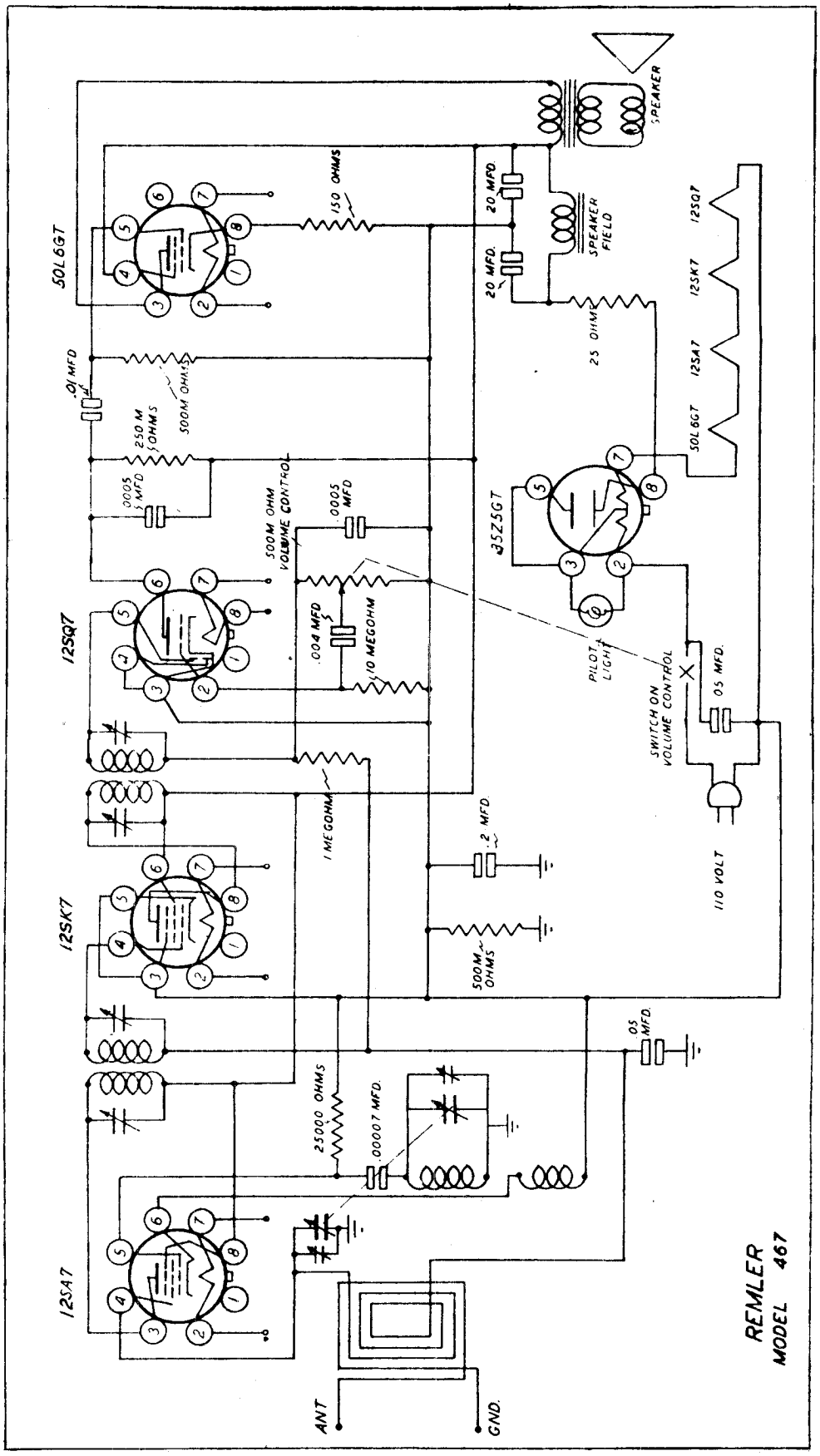
MODEL 467

REMLER CO. LTD.



IF PEAK 455 KC

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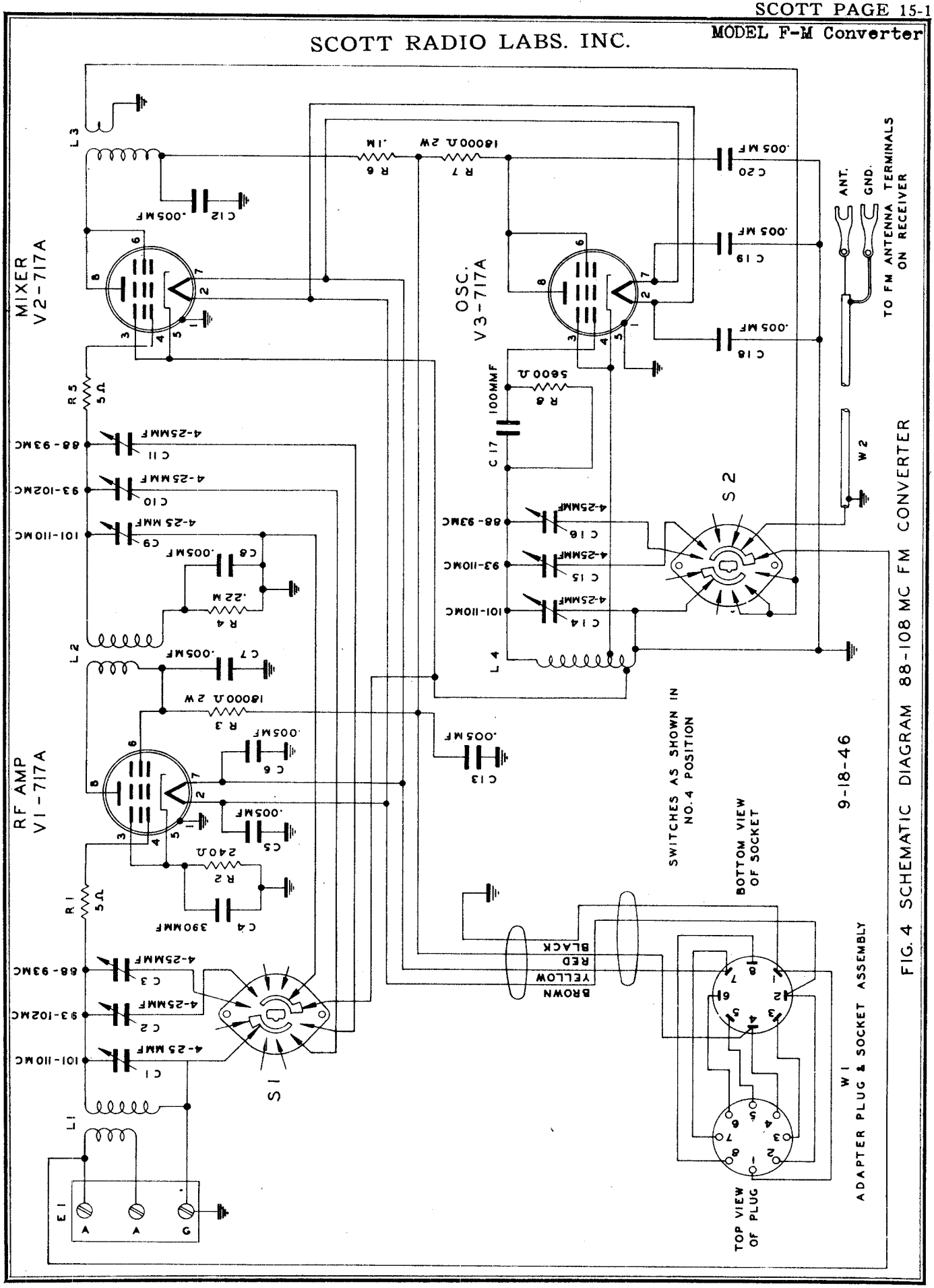
MODEL F-M Converter



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MODEL F-M Converter

SCOTT RADIO LABS. INC.

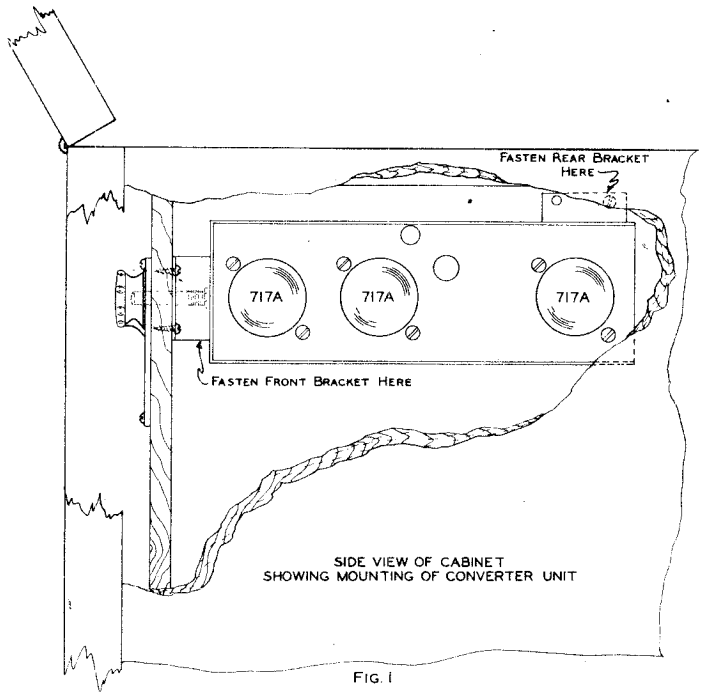


FIG. 1

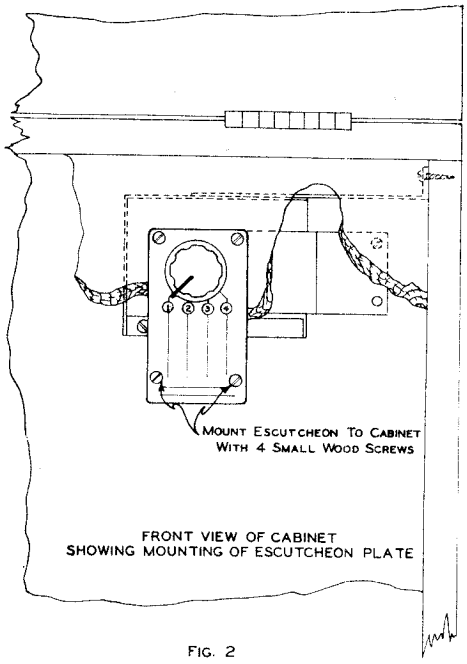
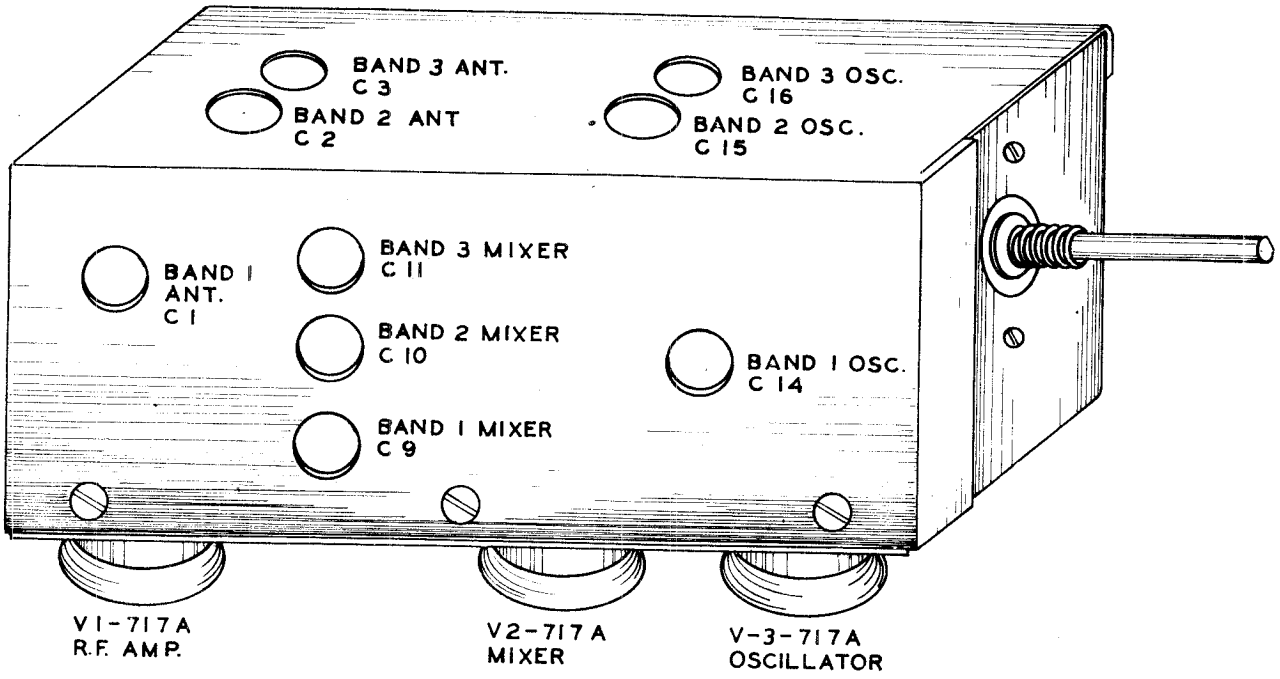


FIG. 2


BAND 3 ANT. C 3
BAND 2 ANT C 2
BAND 3 OSC. C 16
BAND 2 OSC. C 15
BAND 1 ANT. C 1
BAND 3 MIXER C 11
BAND 2 MIXER C 10
BAND 1 MIXER C 9
BAND 1 OSC. C 14
V1-717A R.F. AMP.
V2-717A MIXER
V-3-717A OSCILLATOR

TRIMMER LOCATIONS. F M CONVERTER

FIG. 3

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SCOTT FM CONVERTER

Description

The Scott FM Converter is provided to enable the listener, with an FM Receiver having the old FM band of 41-50 megacycles, to tune in stations on the new FM band of 88-108 megacycles. The FM Converter is provided with a single control consisting of a four position switch which should be located on the front of the cabinet as outlined under INSTALLATION. The first three positions of this control are used for tuning in FM stations on the 88-108 megacycle band while the fourth position is used for tuning on the 41-50 megacycle band.

The FM Converter utilizes three type 717A high frequency pentode vacuum tubes in a circuit which consists of a tuned RF amplifier, mixer and H.F. oscillator.

An adapter plug is provided with the converter in order that power for the tubes can be obtained without having to make connections inside the receiver. One of the power output tubes of the receiver is removed and the adapter plugged into this socket, the tube is then inserted into the adapter.

Terminals are provided on the FM Converter for connection of an antenna, and a shielded high frequency cable is provided for connection of the converter to the FM antenna terminals of the receiver.

The FM Converter unit is 7 3/4 inches long with a 1/4 inch diameter shaft extending 2 inches at the front end. The unit is 4 3/4 inches wide and 2 3/4 inches deep. The power adapter cable extends approximately 4 1/2 feet from the unit while the antenna cable extends 3 feet from the unit.

Installation

The FM Converter Kit contains all the items necessary for complete installation of the converter in the cabinet housing the radio receiver. The installation should be made as follows:

1. Select the location in which the converter is to be mounted, in most cabinets the upper right hand corner will be found most convenient, but any location which is accessible will do. Any number of mounting arrangements can be worked out with the two brackets furnished using the two sets of mounting holes and the switch shaft bushing. The arrangement shown in Figures 1 & 2 can be used in most installations. Screws are furnished, in the kit, for fastening the brackets to the converter and wood screws are furnished to fasten the brackets to the cabinet.

2. After selecting the position in which the converter is to be mounted, mark the location of the hole for the switch shaft and carefully drill a 1/2 inch clearance hole. Then fasten the brackets to the cabinet letting the switch shaft extend approximately 1/2 inch out of the front of the cabinet.

3. Fasten the escutcheon plate to the front of the cabinet using the four small block screws provided and fasten the knob on the switch shaft so that the pointer is set at No. 4 position when the switch is set in the extreme counter-clockwise position.

4. Remove one of the power output tubes (6V6G or 6L6G) and insert this tube into the converter adapter socket. Then insert the adapter plug into the socket of the receiver from which this tube was removed.

5. Remove the antenna lead-in from the FM antenna terminal strip of the receiver, connect the center terminal of this strip to the ground terminal with a short piece of wire and then connect the insulated center wire of the converter antenna cable to the open antenna terminal and the shield braid of this cable to the ground terminal of the receiver FM antenna strip.

Antenna Installation

In order to obtain the best results when using this converter on the 88-108 megacycle band, a dipole antenna cut to the proper length with a 300 ohm low-loss lead-in should be used. This antenna may be one of several designs as follows:

a. When the receiver is located 30 or more miles from the transmitter it is recommended that a dipole antenna with reflector be installed outside and as high as possible. The Scott Type 1B887 FM Dipole Antenna Kit will fulfill all requirements for such an installation. It is supplied with antenna and reflector elements cut to the proper length for the 88-108 megacycle band, a molded bakelite block for mounting these elements, a steel support mast with universal mounting bracket and 75 feet of 300 ohm high frequency lead-in cable. This antenna should be installed with the elements broadside to the transmitter with the reflector element in back of the dipole elements.

b. For installations within a 30 mile radius of the transmitter a straight dipole antenna without the reflector can be used, however if an outside dipole antenna is to be used the dipole antenna with reflector will give best reception.

c. For installations where an outside antenna cannot be installed a very simple antenna, that will give good results when the receiver is located within a 30 mile radius of the transmitter, can be constructed from 300 ohm twin-lead. This antenna can be mounted on the rafters of the attic or fastened around the back of the receiver cabinet. This antenna is constructed as follows:

   1. Cut a piece of 300 ohm twin-lead 59 inches long, skin back the wires at both ends approximately 3/8 inch and solder the two wires together at each end. You will then have a flat piece of cable approximately 58¼ inches long shorted at both ends.

   2. Measure off the exact center of the cable and cut through one of the wires only. Skin back the two wires approximately 1/4 inch, then solder on a length of 300 ohm twin-lead long enough to reach from the antenna to the receiver. This lead-in may be any length depending upon where the antenna proper is to be installed.

SCOTT RADIO LABS. INC.

3. After the antenna has been installed the two wires of the lead-in should be connected to the two terminals of the strip at the rear of the converter marked "ANT.". The ground terminal need not be used.

Operation

Since power will be applied to the converter at all times when the receiver is turned ON, all that is necessary to put the converter in operation is to set the receiver controls for FM reception. With the converter control set at Position 4 the receiver will tune in FM stations between 41-50 megacycles as it normally would. To tune in any FM station on the 88-108 megacycle band, set the converter control to the position under which the frequency of the station is listed and then tune the dial of the receiver to the frequencies listed under column 4. For example: If it is desired to tune in a station at 98.9 megacycles the converter control should be set at position 2 since this frequency lies between 98 and 99 megacycles, the receiver dial should then be tuned between 46 and 47 megacycles as indicated in column 4. If the station desired operates on 102.5 megacycles the converter control should be set at position 1 and the receiver dial tuned between 42 and 43 megacycles as indicated in column 4. It will be found very helpful if a chart is made listing the reading on the dial logging scale for each FM station in the location where the converter is being operated.

Maintenance and Repairs

Since there are no moving parts in the FM Converter outside of the switch control, it will require little maintenance. Tube replacement is minimized by using the same type of tube in all three positions.

The schematic circuit diagram, Figure 4 and the list of replaceable parts, Table 1 will help in making any repairs necessary.

Alignment

The following alignment instructions are provided in order that the FM Converter may be correctly realigned in case it is necessary to replace any part that will affect alignment.

Before realigning the FM Converter the calibration of the 41-50 megacycle band on the receiver must be checked since the accuracy of this calibration will affect the calibration of the FM Converter as listed on the converter control escutcheon.

Align the FM Converter as follows:

Connect a signal generator, capable of covering the 88-108 megacycle band, to the antenna and ground terminals of the FM Converter using a 50 ohm composition resistor in series with the high potential lead of the signal generator and connect an output meter across the voice coil of the speaker to be used as an indicator.

CAUTION: The trimmer adjustments must be aligned in the sequence outlined below as trimmer capacitors C1, C9 and C14 are used as part of the capacity required for alignment on positions 2 and 3.

1. Set the controls on the receiver for FM reception with the tuning dial set at 47 megacycles.

2. With the signal generator adjusted to 107 megacycles, set the switch control of the FM Converter to position No. 1 and adjust trimmer capacitor C14 until the signal is tuned to resonance, then adjust trimmer capacitor C9 and C1 for maximum indication on the output meter.

3. Set the signal generator to 99 megacycles and the converter control to position No. 2. Adjust trimmer capacitor C15 for resonance; then adjust trimmer capacitors C10 and C2 for maximum indication on the output meter.

4. Set the signal generator to 90 megacycles and the converter control to position No. 3. Adjust trimmer capacitor C16 for resonance; then adjust trimmer capacitors C11 and C3 for maximum indication on the output meter.

NOTE: When making the above adjustments the receiver dial must be set at 47 megacycles at all times.

Do not readjust trimmer capacitors C1, C9 and C14 after positions No. 2 and 3 have been aligned as the initial setting of these trimmers will affect the alignment of these two positions.

Table 1
Parts List By Symbol Designation

Symbol Desig.	Function	Description	Part Number
C1	Band 1 Antenna trimmer 101-110 Mc.	Capacitor, silver ceramic, 4-25 MMF, screwdriver adj.	15A21
C2	Band 2 Antenna trimmer 93-102 Mc.	Same as C1	
C3	Band 3 Antenna trimmer 88-93 Mc.	Same as C1	
C4	V1-RF amp. cathode bypass	Capacitor, mica, 390 MMF, 10% 500 V DC wkg., CM20 case	15B799
C5	V1 heater bypass #2 contact	Capacitor, mica, 5000 MMF, 10%, 500 V DC wkg., CM35 case	15E1263
C6	V1 heater bypass #7 contact	Same as C5	
C7	V1 plate and screen bypass	Same as C5	
C8	V2 mixer grid return	Same as C5	
C9	Band 1 mixer trimmer	Same as C1	
C10	Band 2 mixer trimmer	Same as C1	
C11	Band 3 mixer trimmer	Same as C1	
C12	V2 mixer plate bypass	Same as C5	
C13	+B bypass	Same as C5	
C14	Band 1 oscillator trimmer	Same as C1	
C15	Band 2 oscillator trimmer	Same as C1	
C16	Band 3 oscillator trimmer	Same as C1	
C17	V3 oscillator grid coupling	Capacitor, silver mica, 100 MMF, 5%, 500 V DC wkg., CM20 case	15A428
C18	V3 heater bypass contact #2	Same as C5	
C19	V3 heater bypass contact #7	Same as C5	
C20	V3 oscillator plate bypass	Same as C5	
E1	Antenna terminal strip	Terminal strip, 3 terminals mounted on 3/4" W x 2" L bakelite strip marked ANT-GND.	87E1411
L1	FM converter antenna coil	RF coil, Pri: 5½T, 3 strands #28 DSC wire interwound with secondary Sec: 3T #16 E wire spacewound Form: ½" dia. x 2 1/8" long	20F2280
L2	FM converter mixer coil	RF coil, Pri: 5½T #28 DSC wire interwound with secondary Sec: 2T #16 E wire spacewound Form: ½" dia. x 2 1/8" long	20F2281
L3	FM converter output coil	RF coil, Pri: 15T #24 E wire closewound Sec: 2½T #28 DSC wire Form: ½" dia. x 2 1/8" long	20F2283

Table 1 (Continued)
Parts List By Symbol Designation

Symbol Desig.	Function	Description	Part Number
L4	FM converter oscillator coil	RF coil, 7T #24 E wire space-wound tapped at 1¼T and ½T from bottom Form: ½" dia. x 2 1/8" long	20F2282
R1	V1 grid series resistor	Resistor, composition, 5 ohms 10%, ½ watt, wire leads	70B860
R2	V1 cathode bias	Resistor, composition, 240 ohms, 5%, ½ watt, wire leads	70A45
R3	V1 screen filter	Resistor, composition, 18000 ohms, 10%, 2 watt, wire leads	70A68
R4	V2 grid leak	Resistor, composition, .22 megs, 10%, ½ watt, wire leads	70A59
R5	V2 grid series	Same as R1	
R6	V2 plate filter	Resistor, composition, 0.1 meg, 10%, ½ watt, wire leads	70A65
R7	V3 plate load	Same as R3	
R8	V3 grid leak	Resistor, composition, 5600 ohms, 10%, ½ watt, wire leads	70A50
S1	Antenna and mixer band selector switch section	Switch section, 2 pole, 4 position, rotary type, wafer section	89E1292-1
S2	Oscillator and output selector switch section	Same as S1	
V1	RF amplifier tube	Vacuum tube, 717A, high frequency pentode, octal base. Heater: 6.3 V @ .15 amp.	92E1420
V2	Mixer tube	Same as V1	
V3	Oscillator tube	Same as V1	
W1	Adapter plug and cable assembly	Cable, 4 wire, 5 ft. long, attached to octal socket and octal plug adapter	96F2286
W2	Antenna output cable	Cable, single conductor, shielded, type RG58/u - 3 feet long	96F2357
X1	Socket for V1	Socket, 8 contact octal, ceramic, tapped mounting plate, key 45° left of mounting centers	82E1721
X2	Socket for V2	Same as X1	
X3	Socket for V3	Socket, 8 contact octal, ceramic, tapped mounting plate, key 90° off mounting center	82E1708

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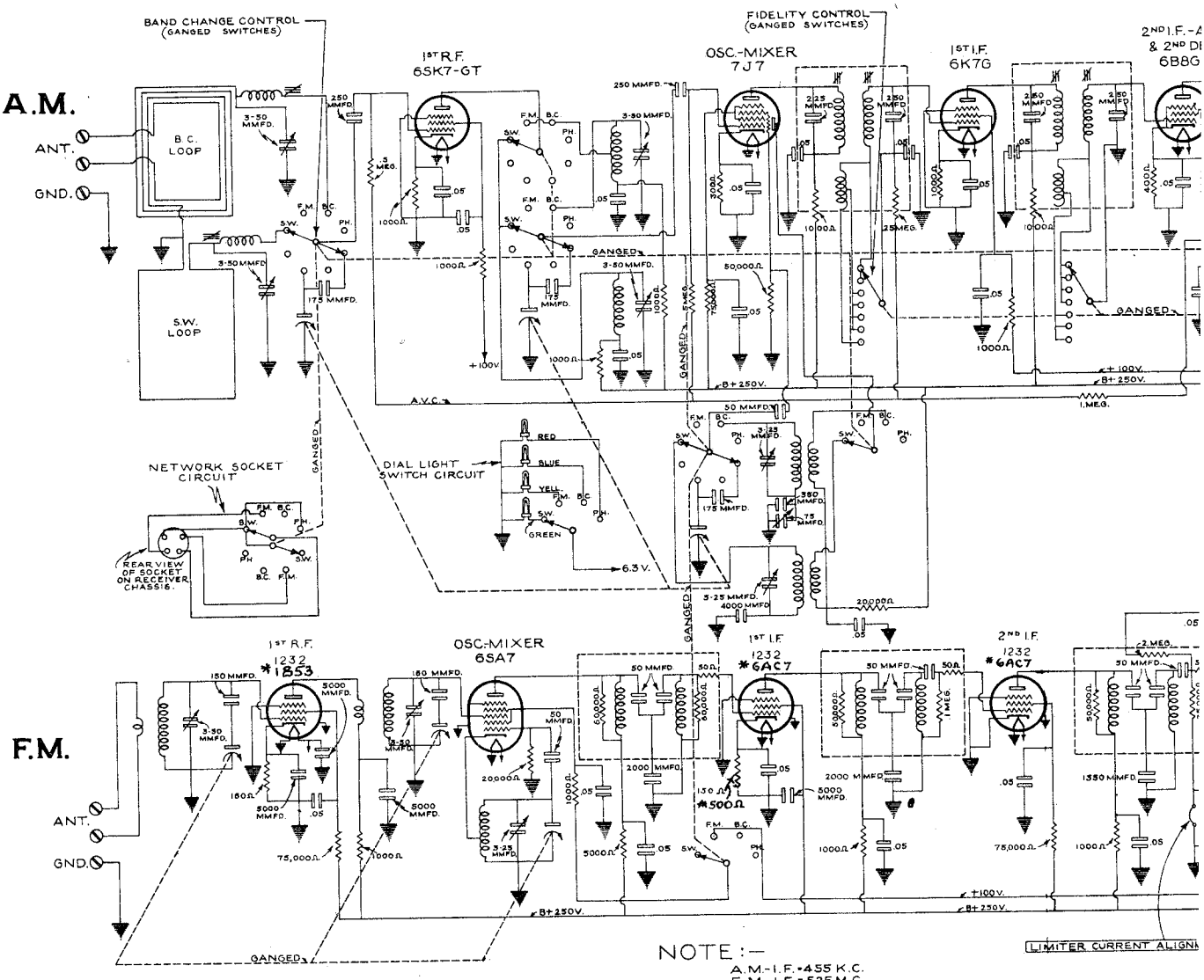
A.M.
ANT.
GND.
B.C. LOOP
S.W. LOOP
BAND CHANGE CONTROL (GANGED SWITCHES)
FIDELITY CONTROL (GANGED SWITCHES)
1ST R.F. 6SK7-GT
OSC.-MIXER 7J7
1ST I.F. 6K7G
2ND I.F.-A & 2ND DI 6B8G
GANGED
A.V.C.
+100V.
B+250V.
1 MEG.
NETWORK SOCKET CIRCUIT
REAR VIEW OF SOCKET ON RECEIVER CHASSIS.
DIAL LIGHT SWITCH CIRCUIT
RED
BLUE
YELL.
GREEN
6.3 V.
F.M.
ANT.
GND.
1ST R.F. 1232 *1853
OSC.-MIXER 6SA7
1ST I.F. 1232 *6AC7
2ND I.F. 1232 *6AC7
*500Ω
GANGED
B+250V.
NOTE:—
A.M.-I.F.-455 K.C.
F.M.-I.F.-5.25 M.C.
* IN RECEIVERS HAVING 185
FIRST I-F TUBE IS CHANGED
LIMITER CURRENT ALIGNA

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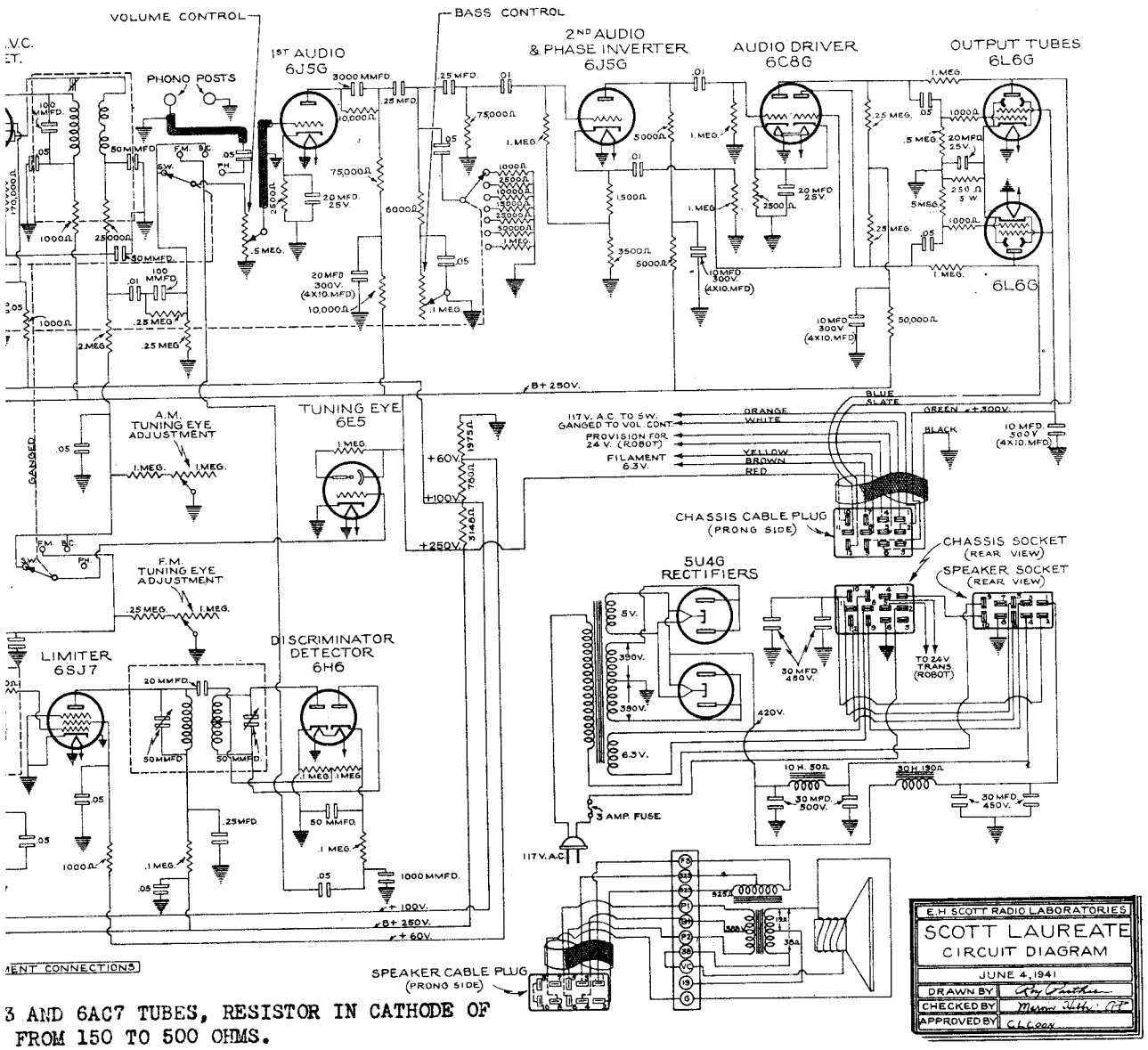
MODEL Laureate
Revised



IENT CONNECTIONS

3 AND 6AC7 TUBES, RESISTOR IN CATHODE OF
FROM 150 TO 500 OHMS.

C30,RC50; Seeburg Models B, BR.See Rider's "Automatic Record Changers and Recorders"

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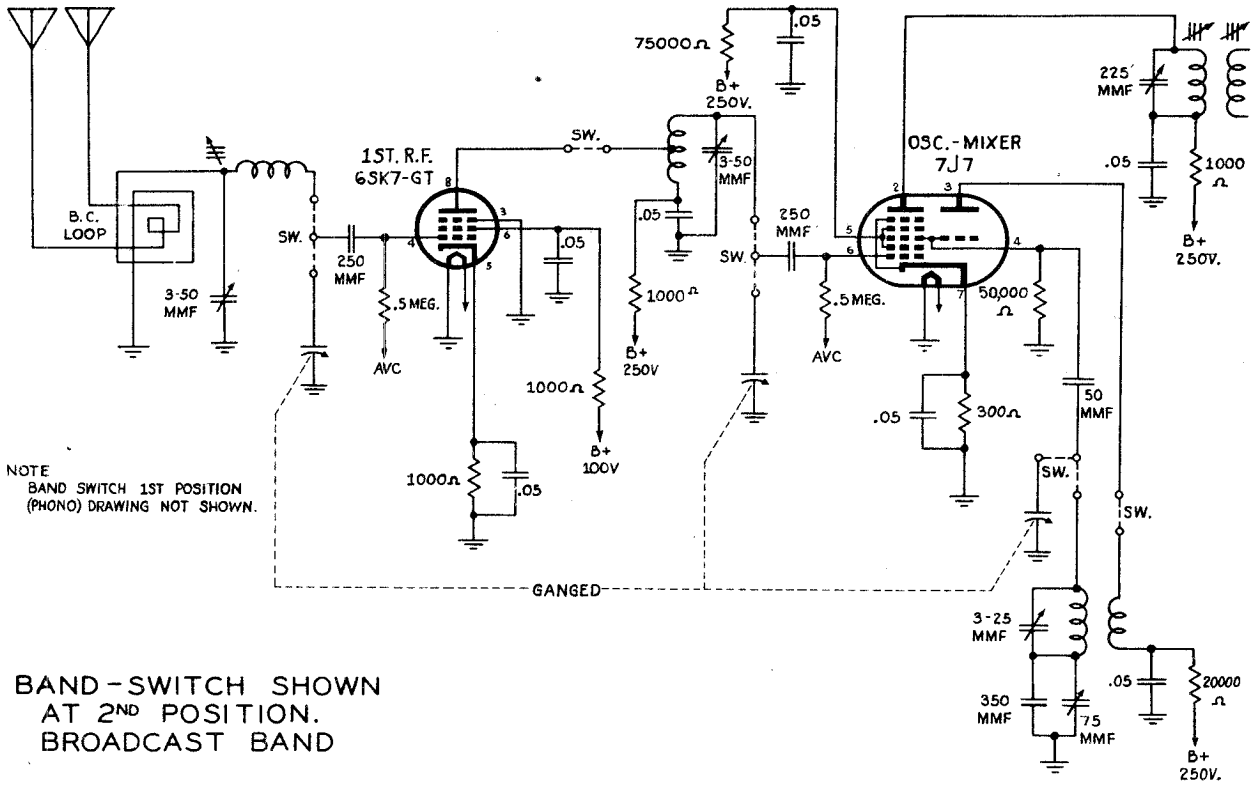
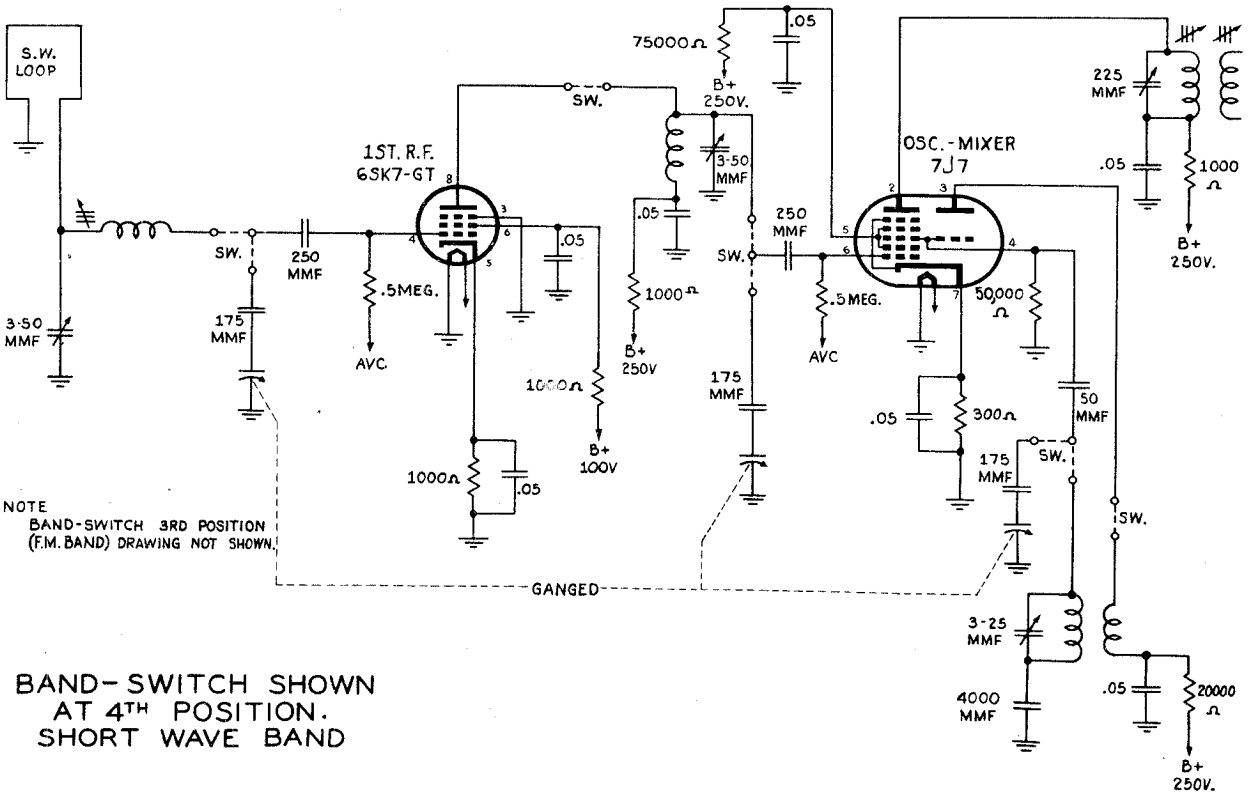
MODEL Laureate
Revised



NOTE
BAND SWITCH 1ST POSITION
(PHONO) DRAWING NOT SHOWN.

BAND-SWITCH SHOWN
AT 2ND POSITION.
BROADCAST BAND



NOTE
BAND-SWITCH 3RD POSITION
(F.M. BAND) DRAWING NOT SHOWN.

BAND-SWITCH SHOWN
AT 4TH POSITION.
SHORT WAVE BAND

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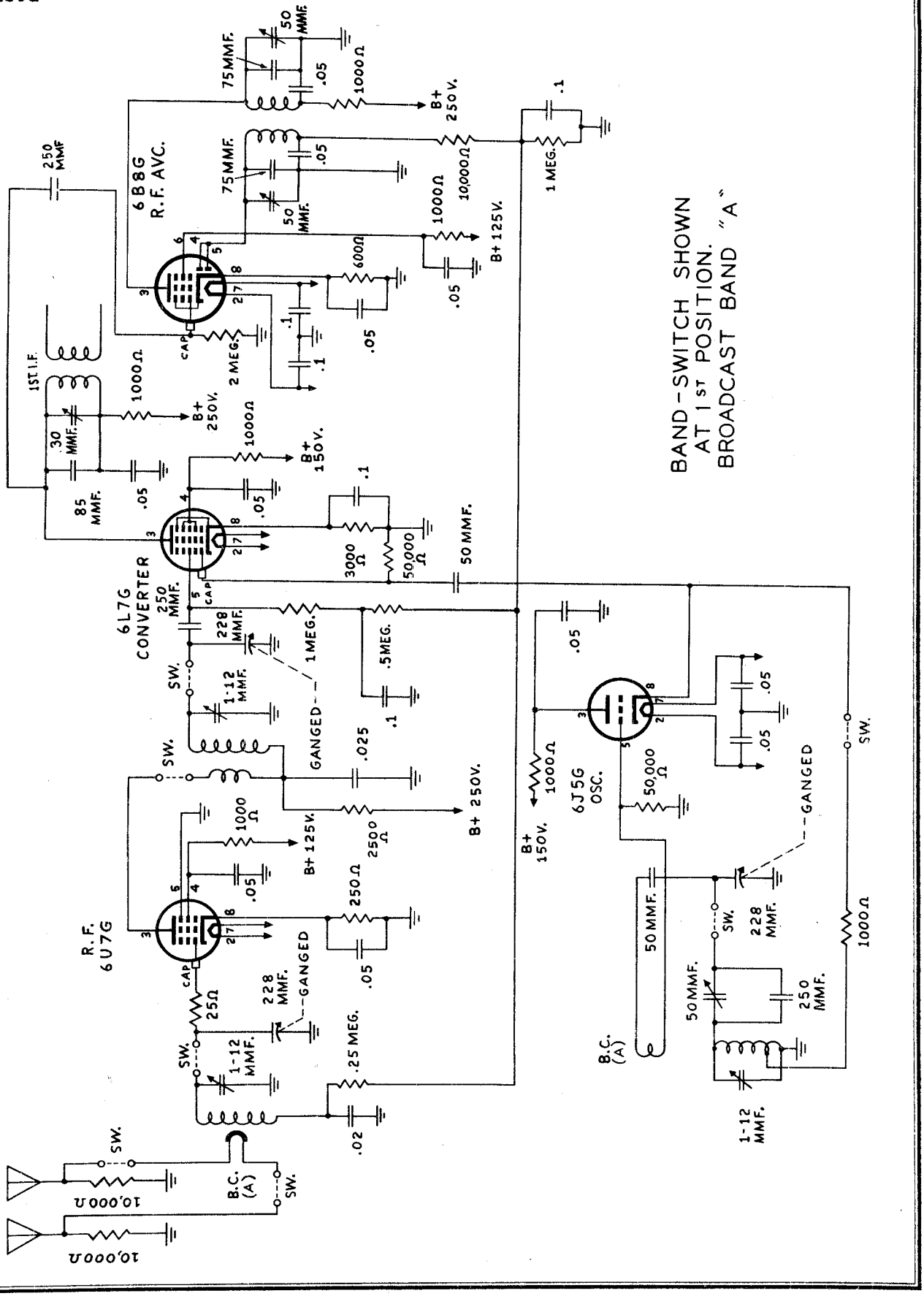
"clarified schematics"

MODEL Phantom
Revised

SCOTT RADIO LABS. INC.



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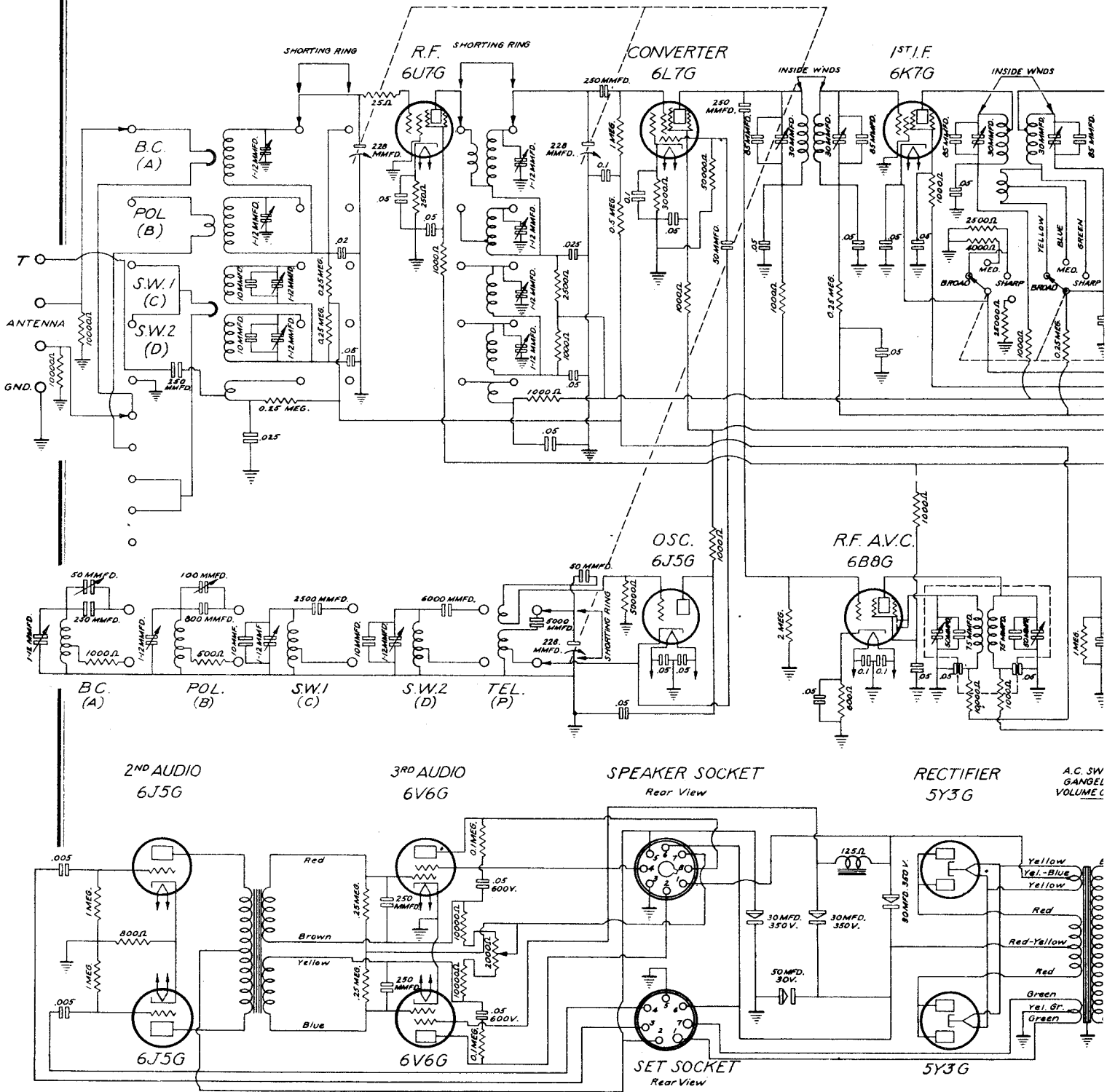
R.F.
6U7G
CONVERTER
6L7G
1ST I.F.
6K7G
SHORTING RING
SHORTING RING
INSIDE WNDS
INSIDE WNDS
B.C.
(A)
POL.
(B)
S.W.1
(C)
S.W.2
(D)
ANTENNA
GND.
T
OSC.
6J5G
R.F. A.V.C.
6B8G
B.C.
(A)
POL.
(B)
S.W.1
(C)
S.W.2
(D)
TEL.
(P)
2ND AUDIO
6J5G
3RD AUDIO
6V6G
SPEAKER SOCKET
Rear View
RECTIFIER
5Y3G
Red
Brown
Yellow
Blue
Yellow
Yel.-Blue
Yellow
Red
Red-Yellow
Red
Green
Yel. Gr.
Green
6J5G
6V6G
SET SOCKET
Rear View
5Y3G

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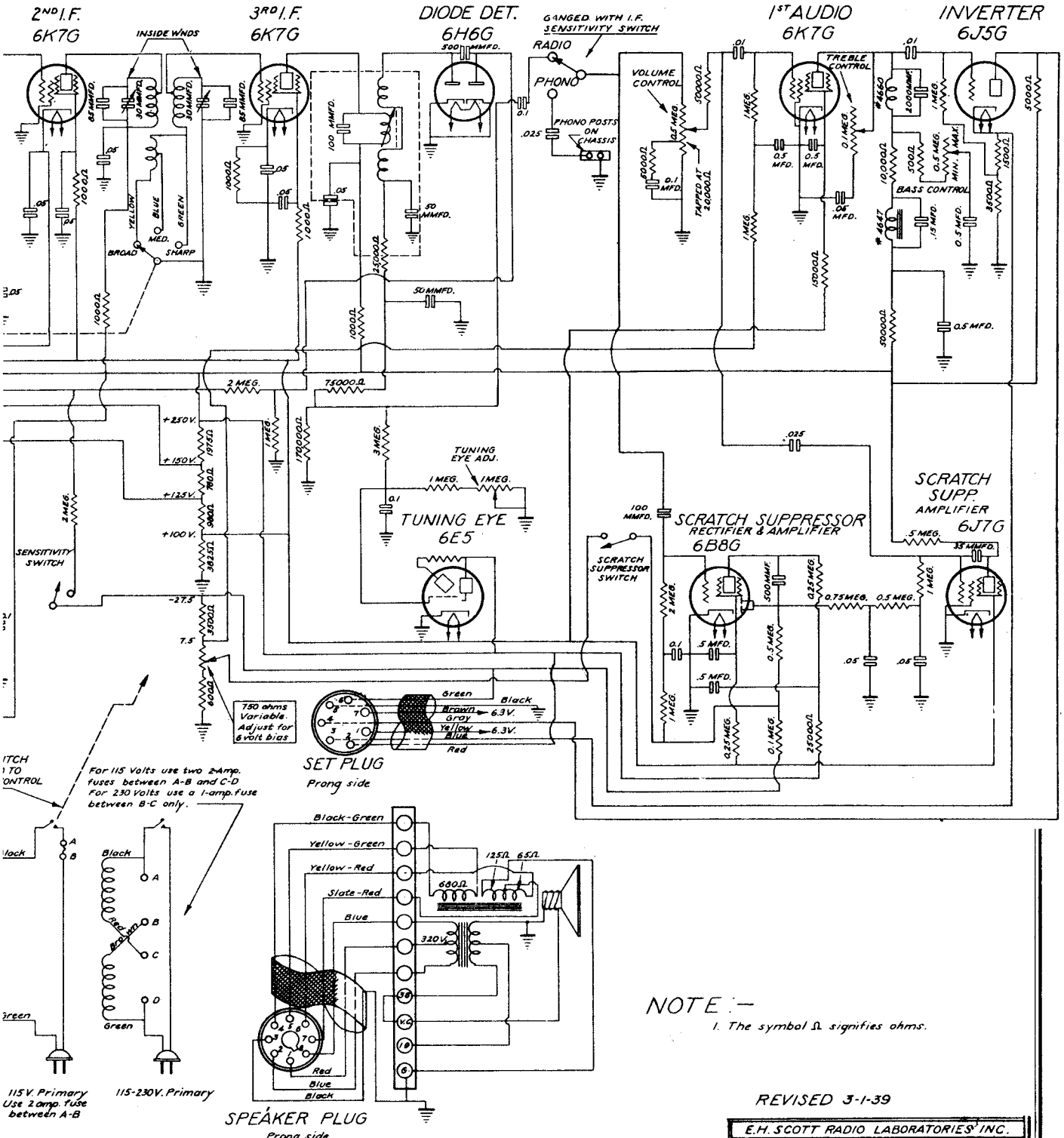
MODEL Phantom
Revised



NOTE :—

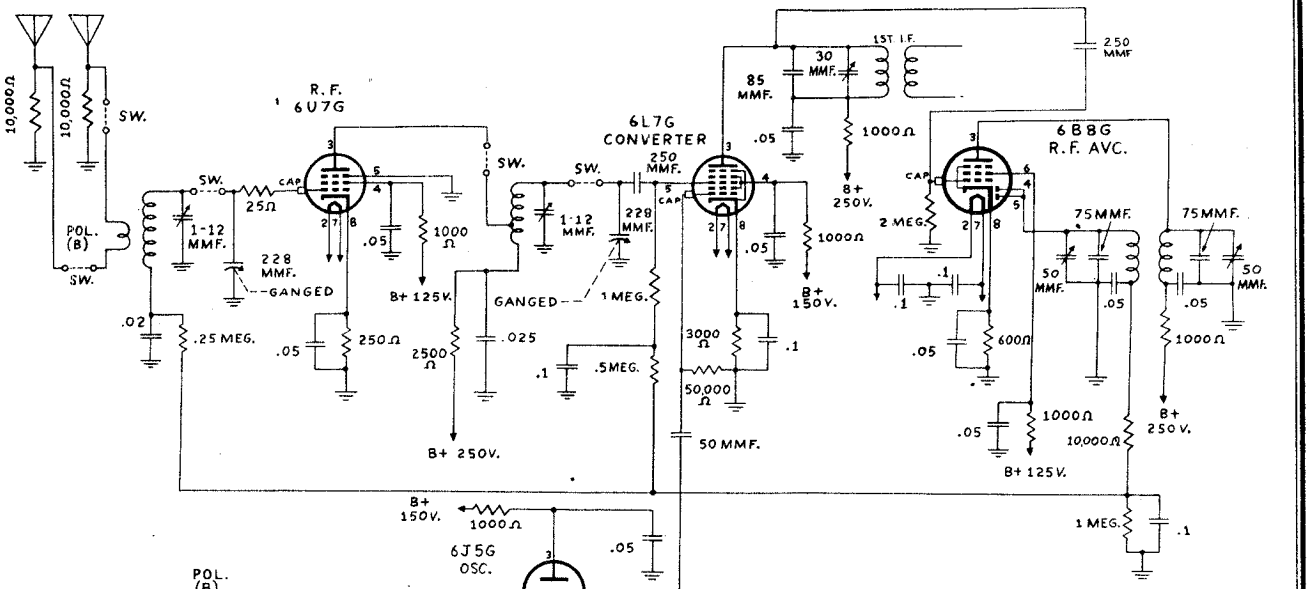
1. The symbol Ω signifies ohms.

REVISED 3-1-39

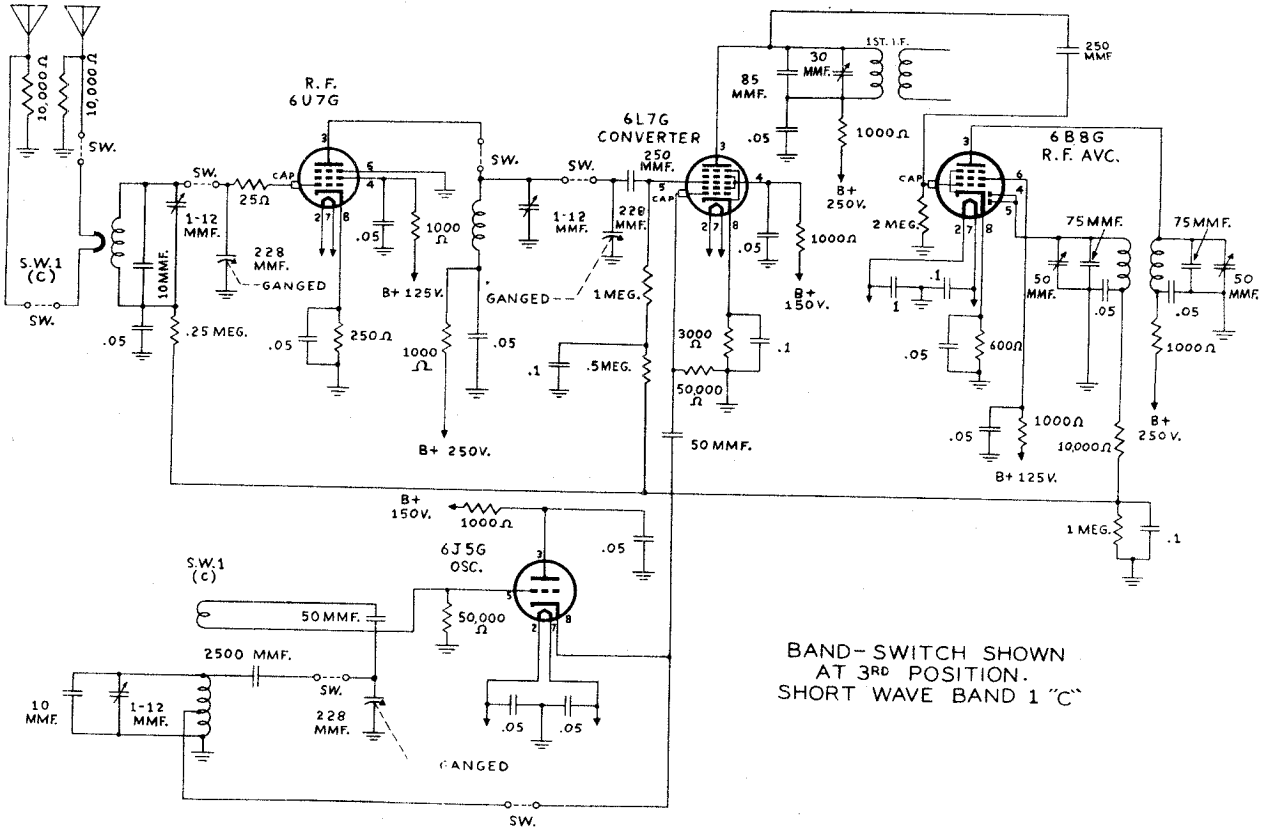
E.H. SCOTT RADIO LABORATORIES INC.	
SCOTT PHANTOM CIRCUIT DIAGRAM	
October 21, 1938	
Drawn by	R.G. Parthie
Checked by	
Approved by	

SCOTT RADIO LABS. INC.

MODEL Phantom
Revised



BAND-SWITCH SHOWN AT 2ND POSITION. POLICE BAND "B"



BAND-SWITCH SHOWN AT 3RD POSITION. SHORT WAVE BAND 1 "C"

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MODEL Phantom
Revised

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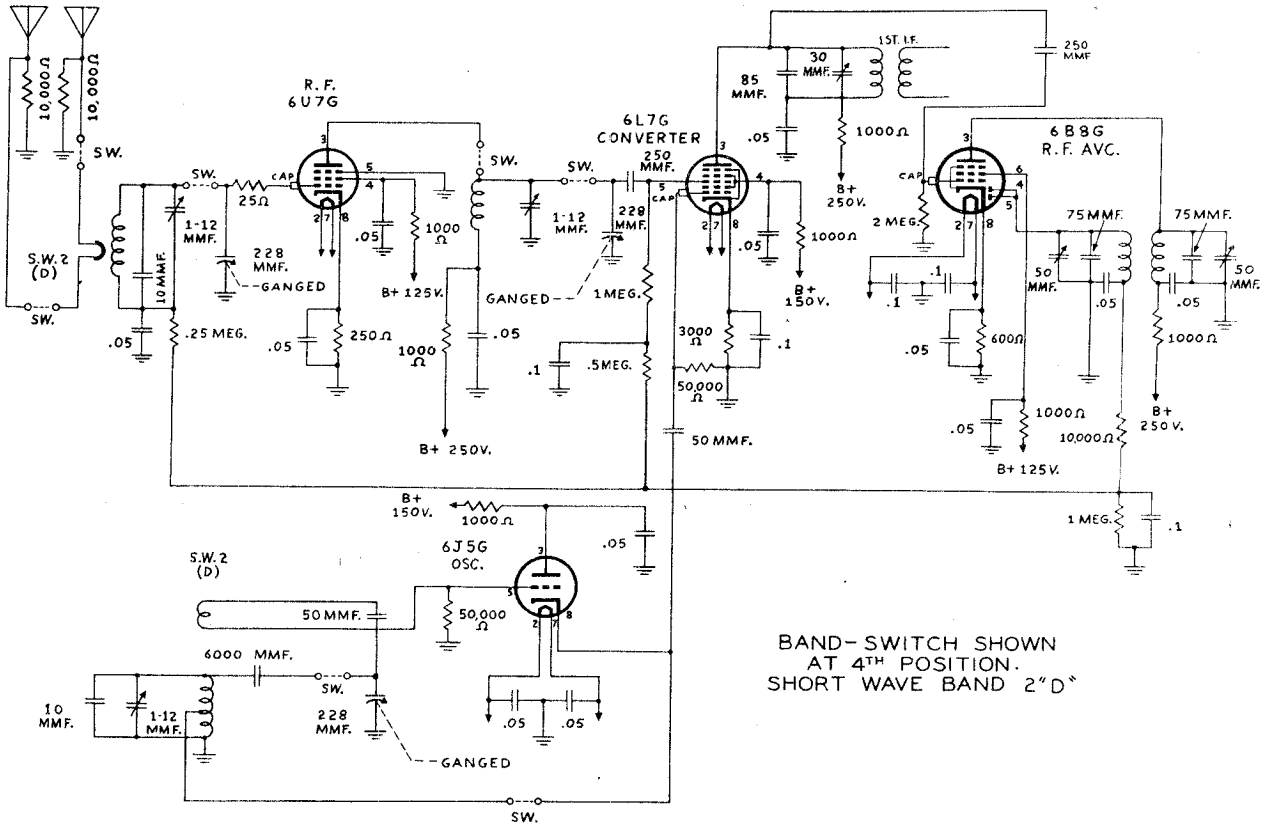

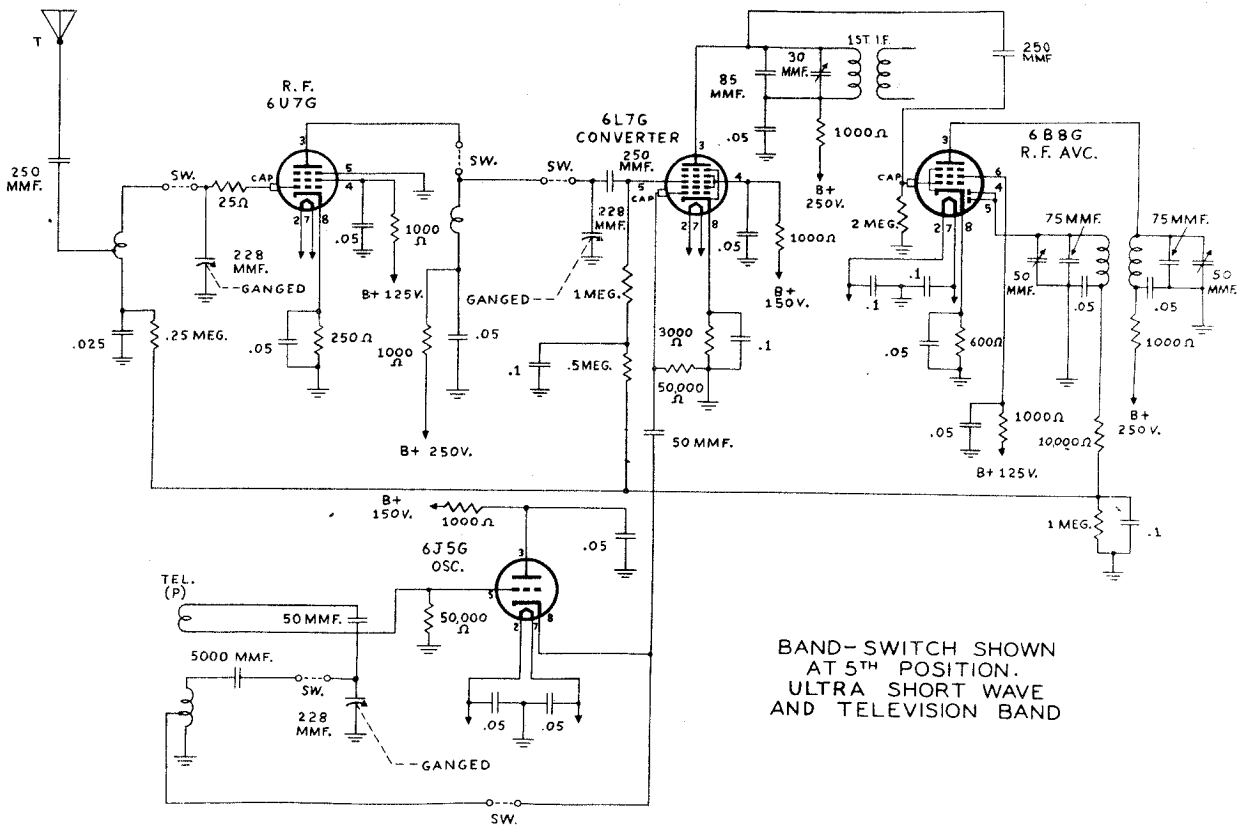

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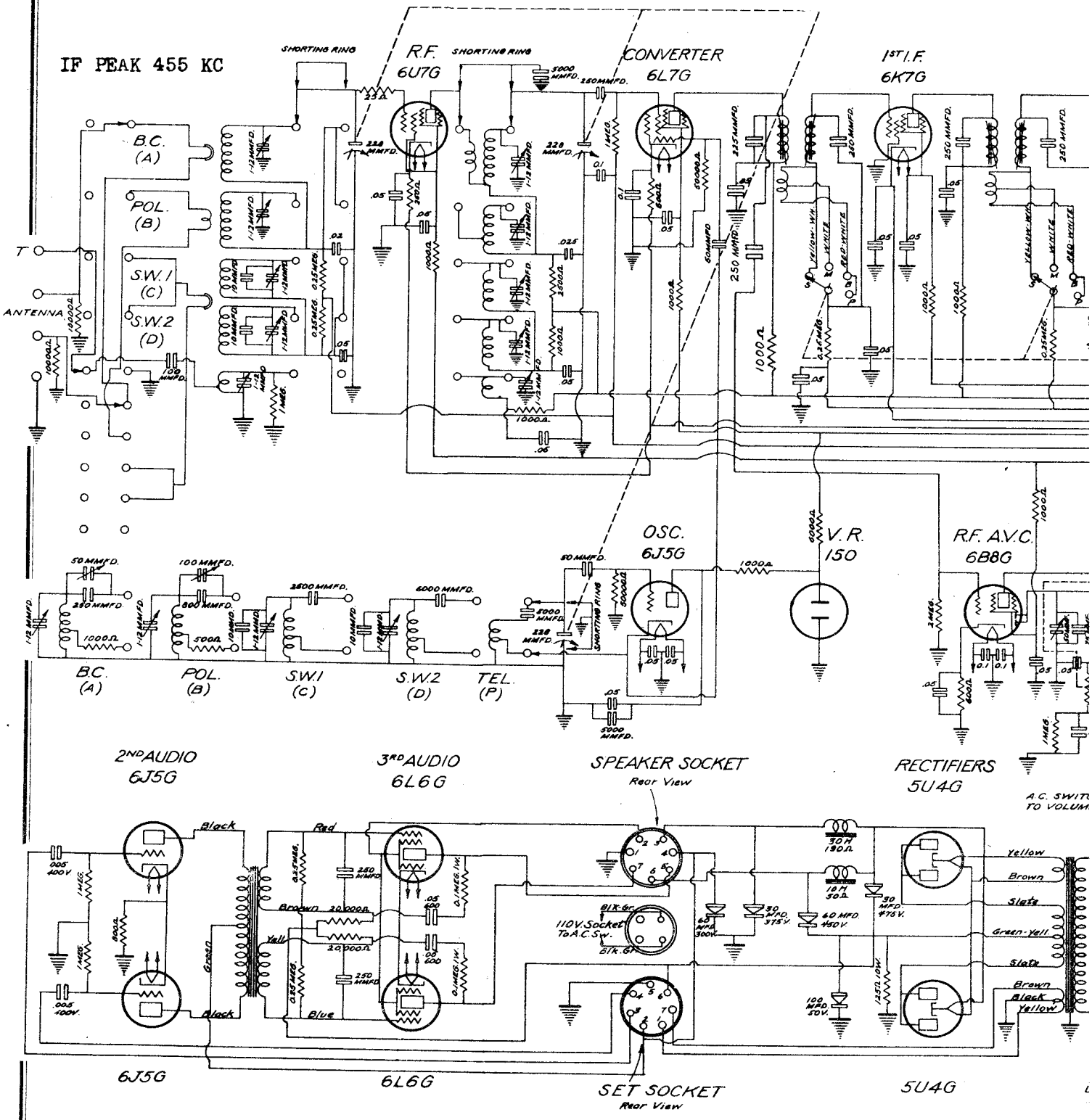

Voltage Rating ..... 117 volts
Frequency Rating ..... 60 cycles

NOTE: Power transformers can be furnished for any special frequency or voltage range.

Power Consumption ..... 200 watts

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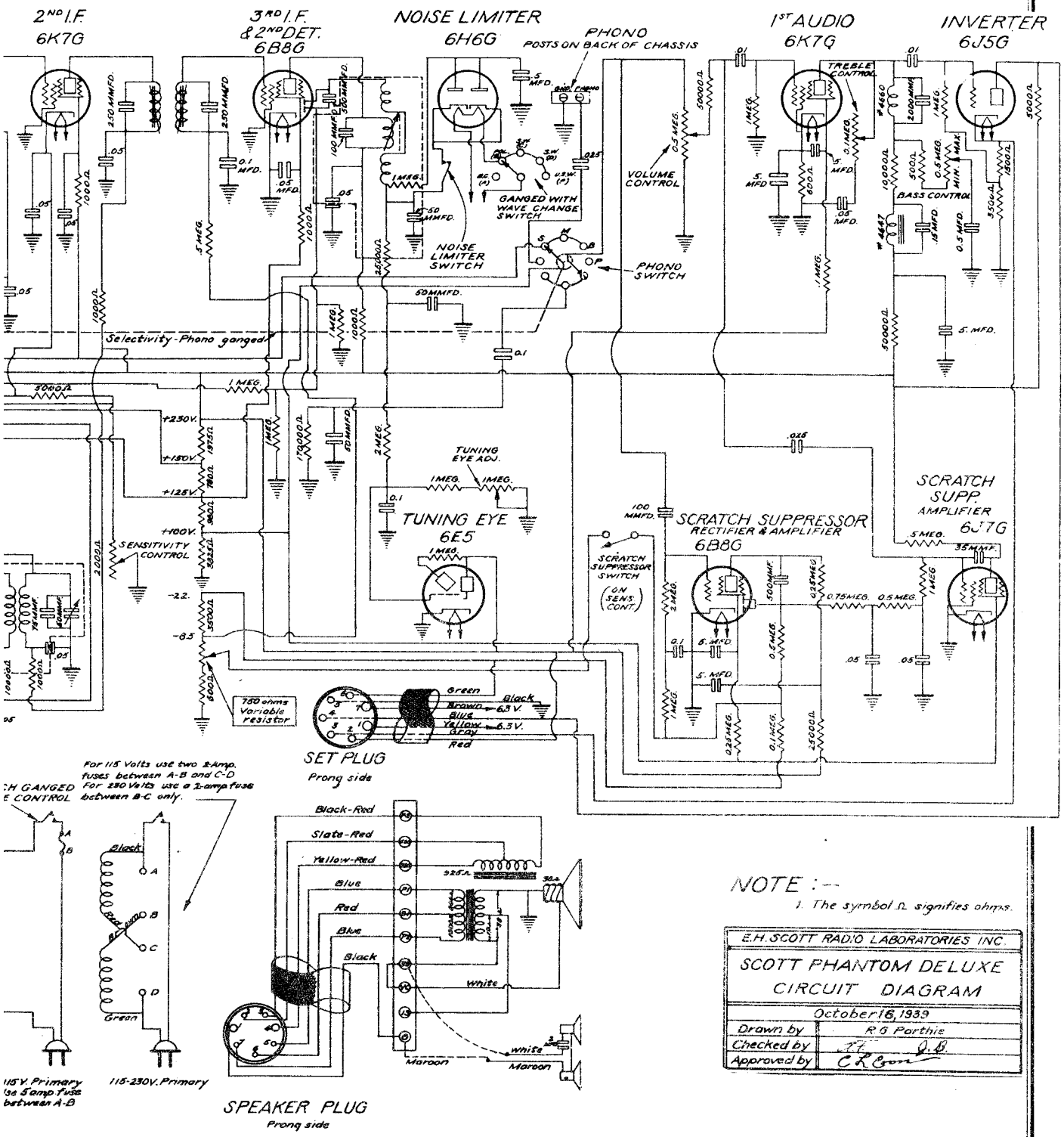
MODEL Phantom
Deluxe Revised

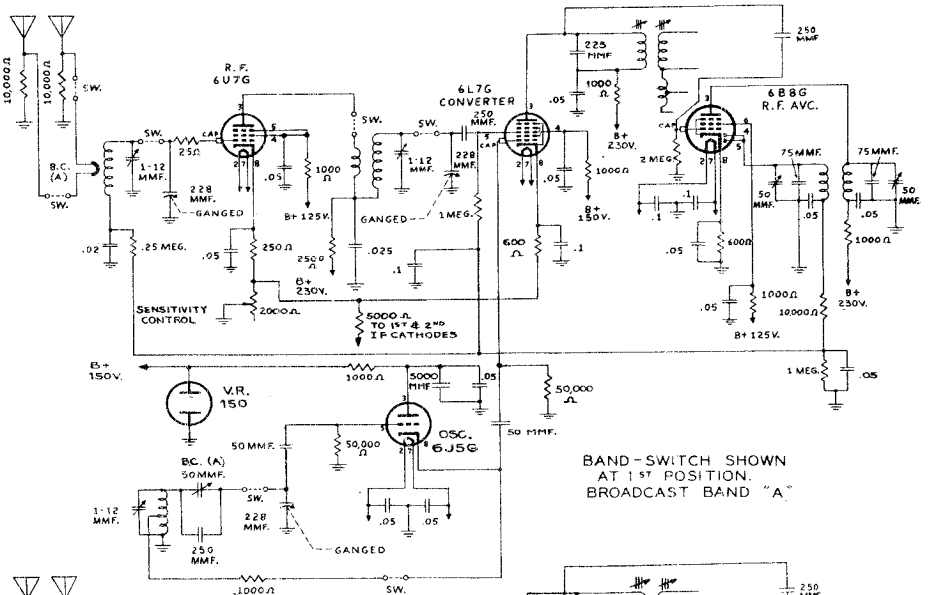


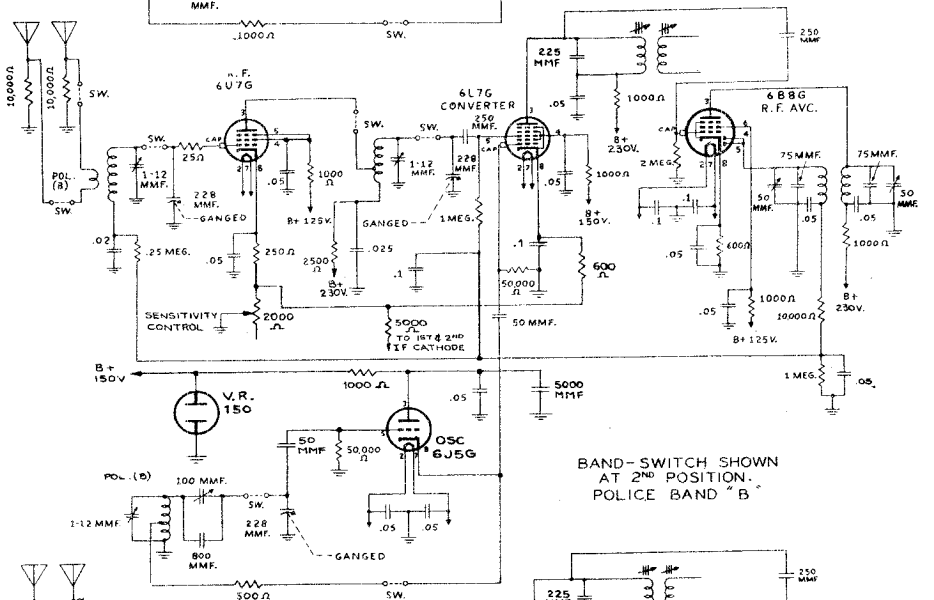
NOTE :—
1. The symbol Ω signifies ohms.

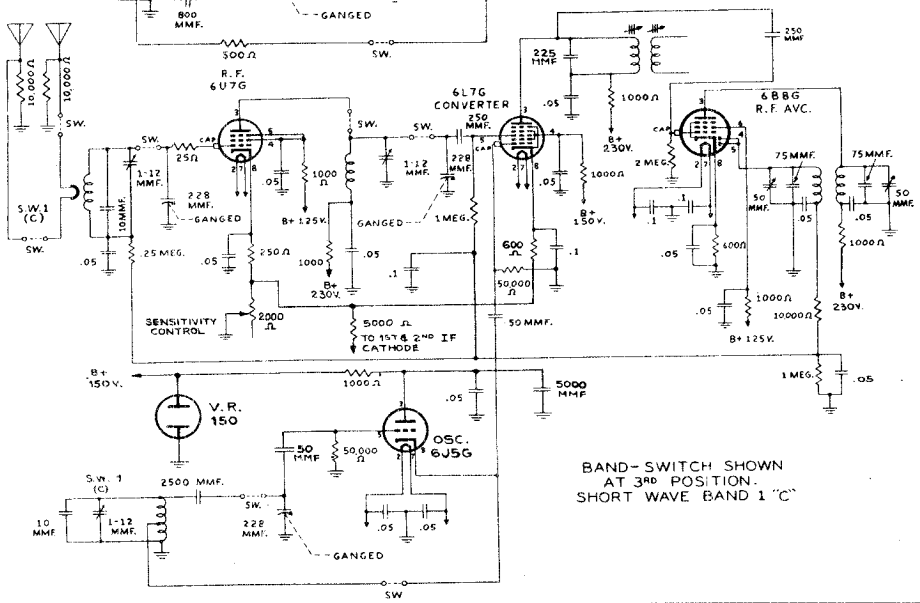
E.H. SCOTT RADIO LABORATORIES INC.	
SCOTT PHANTOM DELUXE CIRCUIT DIAGRAM	
October 16, 1939	
Drawn by	R.G. Porthie
Checked by	J.B.
Approved by	C.R. Cox

Audio Power Output	35 watts undistorted 40 watts peak
Audio Frequency Range	30 - 8,500 cycles
Radio Frequency Coverage	550 Kc. to 60 megacycles

SCOTT RADIO LABS. INC.







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MODEL Phantom
Deluxe Revised

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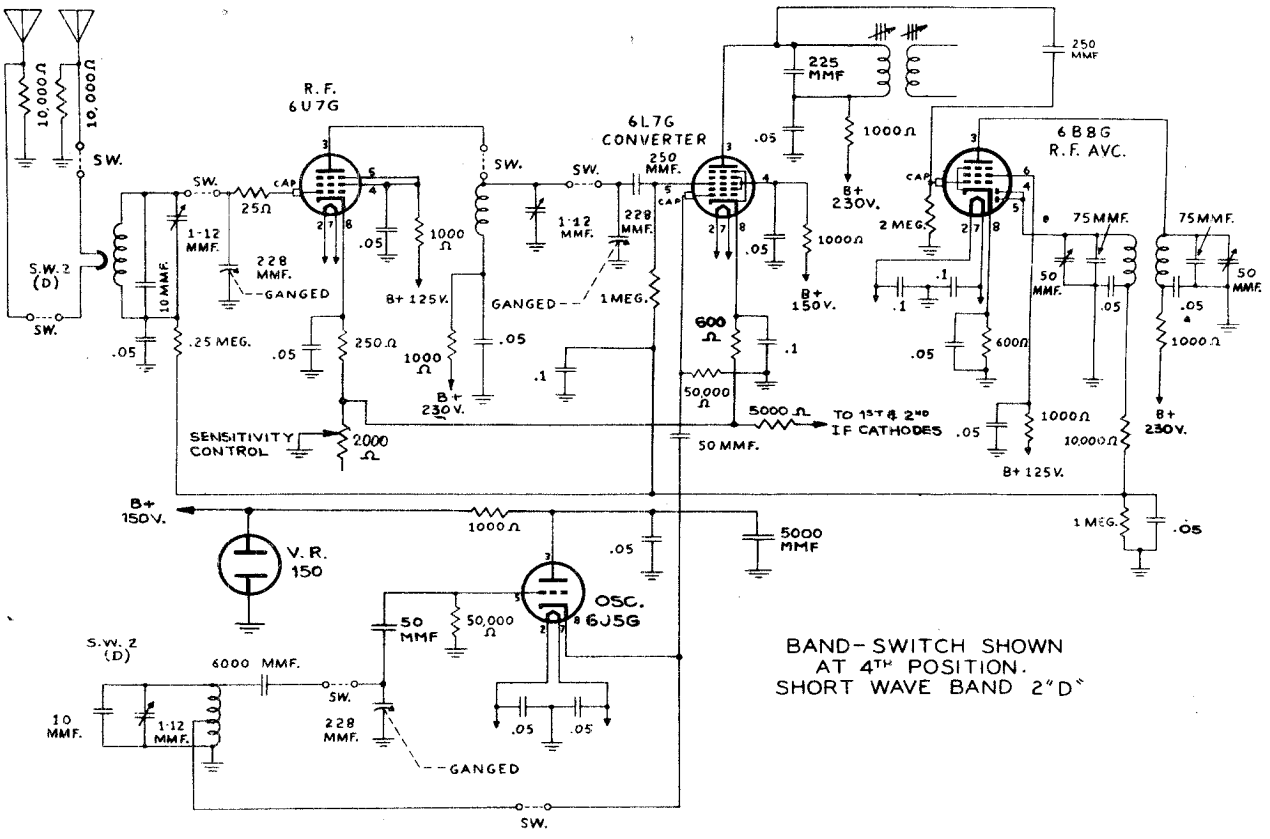

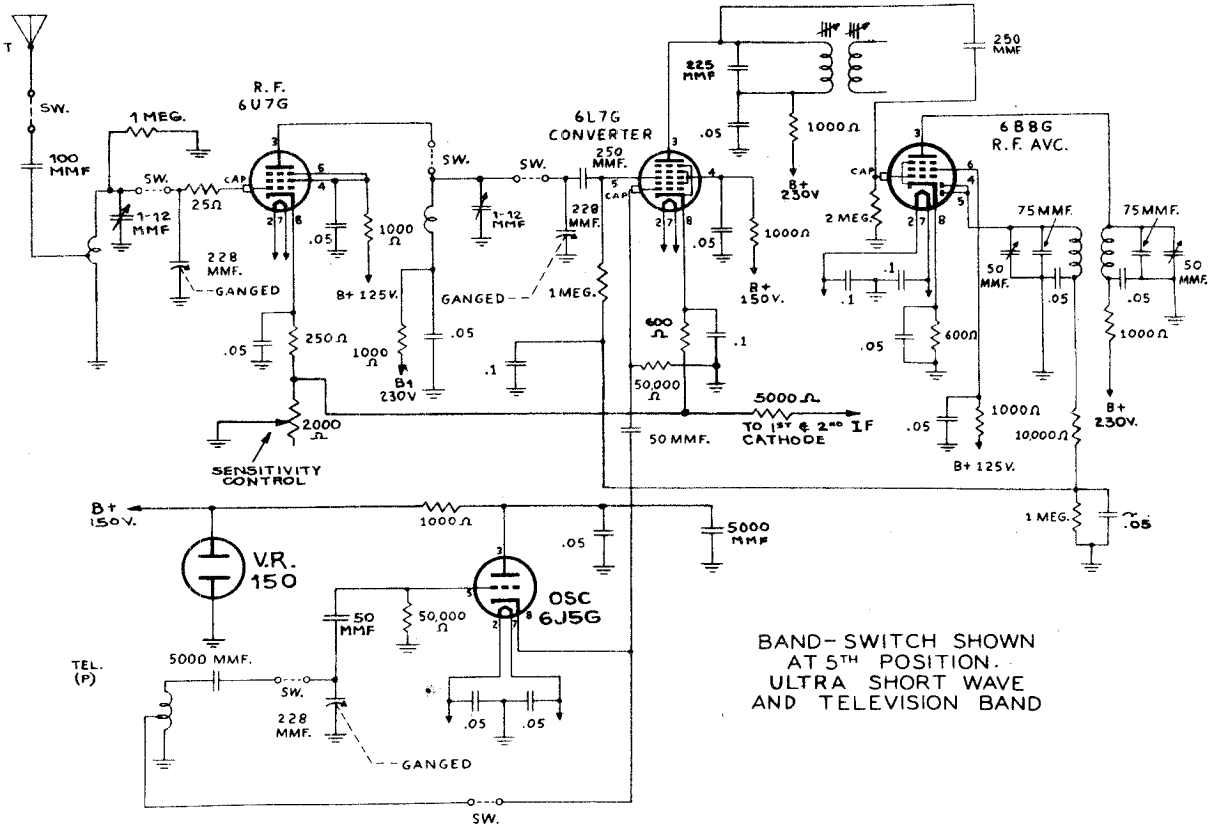

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ELECTRICAL DESCRIPTION OF THE CIRCUIT

R.F. SECTION

The antenna input circuit is arranged so that when operating on the two shortwave bands and broadcast band, the signal picked up on the flat top portion of the doublet antenna is transferred to the R.F. tube grid by means of the special shielded ring coupling system, achieving a high degree of noise reduction. Noise reduction is also achieved on all bands due to the use of a special filter at the antenna. On the police band the signal is fed directly into the primary coil to minimize circuit loss. The first tuned circuit resonates and amplifies the desired signal. On shortwave and police the second tuned circuit operates directly from the plate of the R.F. tube and feeds directly into the converter grid reducing losses to a minimum. A 6U7G tube, having high mutual conductance is used in the R.F. stage which gives high sensitivity on all bands.

CONVERTER SECTION

The amplified signal from the R.F. amplifier is applied to the 6L7G converter control grid and the oscillator output is coupled to grid No. 3 These two input signals now both modulate the converter cathode emission and the result will be a difference in frequency component in the plate circuit of the converter which represents the I.F. frequency.

OSCILLATOR SECTION

The proper combination of series padders, shunt trimmers, and coils in the oscillator circuit provide a signal frequency 455 Kc. higher than that to which the R.F. section is tuned. (in special cases individual I.F. frequencies are used.) The efficient 6J5G type oscillator tube is used in an electron coupled circuit. Oscillator potentials are carefully by-passed and filtered, and the circuit is made extremely stable by the use of Silver Cap condensers and a special metalized resistor.

I.F. SECTION

The I.F. amplifier consists of three stages employing two 6K7G tubes and one 6B8G tube. the I.F. transformers are wound in single pi sections in both primary and secondary coils, and are permanently tuned by a combination Silver cap fixed condenser and an iron core giving a micrometer adjustment. In addition, each stage is arranged with resistance capacity filters for each circuit. The I.F. system is arranged for three degrees of selectivity by means of a small tapped coil connected to the grid return of the I.F. secondary and closely coupled to the primary in the 2nd and 3rd stage. The degree of coupling is then controlled by varying the selectivity switch. The signal developed in the converter plate circuit is highly amplified in the I.F. amplifier at 455 Kc. and is passed to the second detector.

R.F. and I.F. AVC SYSTEMS

The Scott Phantom Deluxe employs two separate AVC systems. In the R.F AVC circuit the control grid of the 6B8G tube is capacitively coupled to the plate of the 6L7G converter tube I.F. and signal frequency are amplified and rectified by this tube and applied as control on the 1st R.F. grid and converter tube. This prevents overload in the R.F. stage and helps to reduce the effects of noise and distortion when tuned to powerful locals and also protects the first tube from these effects when the set is tuned to a weak distant station that is near in frequency to a powerful local. This AVC action operates only when the input signals exceeds about 1,000 microvolts.

In the I.F. AVC circuit the 6B8G tube acts as I.F. amplifier and diode detector and supplies AVC voltage for control on the 1st and 2nd I.F. tube grids and prevents overload and distortion in this part of the circiut.

Just below the Selectivity Control is the sensitivity Control which will decrease the maximum sensitivity of the receiver, when to extreme left, by increasing the minimum bias of the I.F. tubes. This provides silent tuning between stations but in no way effects the normel AVC action on the stations which are well above the noise level.

DETECTOR

As mentioned above, the 6B8G tube acts as a second detector in addition to its other functions, and handles high percentage modulation signals with a minimum of distortion

RECORD SCRATCH SUPPRESSION

The Scott Phantom DeLuxe employs the feature of automatic scratch suppression using a 6B8G and a 6J7G in a special circuit which attenuates the higher audio frequencies (corresponding to record scratvh) when they are very weak, but passes unattenuated the stronger high frequencies (corresponding to useful high fidelity reproduction).

The 6B8G tube operates as an amplifier and diode to supply rectified bias voltages (proportional to input signal amplitude for frequencies above 1,500 cycles) to the control grid of a 6J7G tube The circuit is arranged so that the effective capacity of a 35 mmd. condenser, amplified to a maximum of approximately 3,000 mmf. by the gain of the 6J7G tube, is in shunt with the first A.F. 6K7G tube grid at audio frequencies.

When the highew audio frequencies are weak no rectified bias is developed by the 6B8G tube allowing the 6J7G tube to operate at maximum gain, shunting a high capacity from the grid of the first AF tube to ground, thus practically eliminating record scratch. However, when the higher audio frequencies are strong, considerable rectified bias is developed in the 6B8G tube and applied to greatly reduce the gain of the 6J7G tube, thus reducing the effective capacity, shunting the input to the first A.F. tube and allowing all frequencies to pass unattenuated.

AUDIO AMPLIFIER

When the selectivity switch is set to position "P" the input to the three stage audio system is automatically connected to the phonograph input terminals on the rear of the chassis. The volume control regulates the input to the 6K7G first audio tube and in the plate circuit of this tube the variable bass and treble control circuits are connected. The bass circuit utilizes a high "Q" resonator choke system and provides a boost of about 15 db. at 75 cycles in the maximum position.

The first audio tube is followed by the 6J5G phase inverter tube. This circuit is self balancing and couples into the grids of the 6J5G pushpull 2nd audio tubes which operates into the balanced primary of a special driver transformer, the secondaries of which in turn apply the signal to the 6L6G beam power output stage.

The power output stage incorporates inverse feed backwhich helps to flatten loudspeaker response and improves reproduction.

NOISE LIMITER CIRCUIT

A 6H6G tube is utilized as a noise limiter device so that peaks of local electrical interference may be "chopped" off resulting in reduction of peak noises of continuous amplitude. You will find this especially effective when the receiver is tuned to a weak signal on shortwaves.

POWER SUPPLY

The power supply used is of the heavy duty type employing two of the new 5U4G rectifier tubes. The primary of the power transformer is arranged for standard 117 volts on the domestic model. On the foreign model it is designed to accomodate either 117 volts or 230 volts AC by proper placement of the fuses. This is clearly shown on the schematic diagram. The rectified plate voltages are filtered by the use of three high capacity electrolytics, a choke and the speaker field employed as another choke. In addition, the bias voltage is further filtered by the use of a 100 mfd. condenser at 50 volts.

LOUD SPEAKER

The loud speaker employed is arranged to provide connections for an external speaker. It is necessary to disconnect the jumper wire between terminals V.C. and 38, and connect it between V.C. and 19 instead Now connect a 38 ohm speaker to the terminals marked 19 and G. "T" pads may be added by reference to the diagram showing these connections.

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TESTING THE SCOTT PHANTOM DELUXE

In order to properly align and service the Scott Phantom DeLuxe receiver, the serviceman must have the following equipment.

Signal Generator (90 Kc. to 60 Megacycles)
Output Meter (such as Weston or Triplett)
Voltmeter and Ohmmeter (Sensitivity 1,000 ohms per volt or better.)
Microammeter (Weston model 600)
Tuning Wand (Alladdin)
Audio Oscillator (30 to 10,000 cycles)

HUM TESTS ON RECEIVER

Make certain that there are no soldering irons near the chassis and that the power transformer end of the amplifier is as far away as possible. Connect a good output meter, having a resistance of 3,000 ohms or more to the 6L6 plates (No. 3 prong) and have a 1 to 2 mfd. condenser in series with one lead to another.

With bass full on, treble full, and volume off, the hum should not exceed .1 of a volt. To make overall tests, remove the 2nd audio 6J5G tubes. The hum should now drop to less than 0.1 volt. If it does not, the amount of hum read on the meter is the hum in the amplifier itself. Leave the tubes just removed out and change the 6L6 tubes in the amplifier, at the same time adjusting the hum control on the amplifier until the hum is reduced to a minimum. There may be a filament short also. Check the circuit and connections to get the hum out of the amplifier before proceeding with the rest of the test.

NOTE: It is highly important, in minimizing hum to use the Spiral Heater type 6K7G and 6J5G tubes in the audio system since while considerable bass boost is available, tubes are the sole source of hum, there being no hum pickup whatsoever in chokes, transformers, etc.

After the amplifier is found to be OK replace the 2nd audio tubes and remove the inverter and 1st audio, substituting a new tube for the 2nd audio tube to heat up properly. Next try the inverter tube in the same manner and follow with the 1st audio 6K7J; also, the dial light circuit may be shorted against the dial frame. All these points should be checked along with the trying of new tubes.

AUDIO GAIN TESTS

With an audio input signal of 0.5 volt at 400 cycles an output reading of between 22-24 volts should be obtained on the output meter which is connected across the voice coil. Make this test with volume full, bass control full, selectivity in phono position. If this gain is low it may be due to defective tubes, wrong voltages, shorts or open circuits, either in the set or power amplifier. Both should be checked.

AUDIO FIDELITY TESTS

For correct high fidelity reproduction it is important that the electrical frequency response of the audio system, from the phono posts to a 38 or 40 ohm dummy voice coil resistor approximate 2 2.4 volts at 75 cycles and a 3-3.5 volts at 6,250 cycles with the bass and fidelity controls on full, after the output has been carefully adjusted, by means of the volume control, to 1 volt at 400 cycles with an input of 1 volt at each frequency. Failure of the system to approximate this response (if you are certain that your meters are accurate and that no series meter condenser which would "cut" low frequencies, is being used) should lead to analysis of the low or high frequency circuit involved to determine and eliminate the trouble.

HOW TO ADJUST THE AUTOMATIC RECORD SCRATCH SUPPRESSION CIRCUIT ON THE SCOTT PHANTOM DELUXE

Connect an output meter across the voice coil circuit (V.C. to G.) Connect an audio oscillator and a sensitive output meter to the phono posts, and turn the selectivity to position "P" (all way to right). With the bass control set to minimum treble control full on, and scratch suppressor switch off, apply 0.2 volt at 3,500 cycles to the phono posts. The scratch suppressor switch is ganged with the sensitivity control. Set the volume control so that 1 volt is obtained on the output meter across the voice coil. Turn on (to right) the suppressor switch and the 1 volt reading should just start to drop (say to .9v.). Now turn the suppressor switch off and reduce the audio oscillator input to 0.05 volts, reset the volume control to obtain a 1 volt reading again on the voice coil output meter and now turn on the suppressor switch. The 1 volt reading should now drop to a level of 0.3 of a volt or slightly under. This gives a reduction ratio of 5 to 1 and this is the proper ratio to mamtam. If this 5 to 1 reduction is not obtained the 6 volt bias should be reduced slightly by varying the small slider arm in the C divider network. If too much control is obtained, the 6 volt bias may be raised by adjusting the slider arm.

The 6B8G tube determines the level at which the circuit starts to cut high frequencies and the 6J7G tube determines the amount of this out.

ALIGNMENT OF I.F. SECTION

Connect a good signal generator to the input of the I.F. system. Turn the wave band switch to the broadcast band; have sensitivity control to maximum position (to right); turn tuning dial pointer to hi-freq. end of dial. Ground the I.F. AVC line by connecting a jumper wire from it to Gnd. Now set the the selectivity switch in the sharp position (all the way to the left).

Connect the negative terminal of a 20,000 ohm per volt DC voltmeter using the 25 volt scale, (or a sensitive microammeter with a 0.5 meg. resistor connected in series with its negative terminal) to the "I.F. Diode Output Point", and connect the positive terminal to the chassis.

Apply an unmodulated 455 Kc. signal of sufficient strength to produce a diode output voltage reading of approximately 10 v. (or 20 microamperes for the microammeter) and very carefully adjust the 1st, 2nd, 3rd, I.F. transformer and I.F. diode trimmers for maximum meter reading, reducing the input, if necessary, to avoid exceeding the above figures.

Adjust the R.F. diode transformer for maximum output after the I.F. stages are aligned. Remove the 1 meg. resistor from ground that is connected to the R.F. diode output point (10,000 Ohm) and put the high resistance DC meter in series with the 1 meg resistor to groond, the positive side of the meter going to ground. If there is sufficient signal from the generator it will be OK to merely connect the negative terminal of the microammeter to the R.F. diode output point. Put in a strong signal until a variation is noticed and adjust the R.F. diode for maximum output. Adjust the diode trimmers very carefully. Also shunt out the coil you are not adjusting, with a 10,000 ohm resistor while trimming the other circuit; namely, put 10,000 ohms from B. to the 6B8G plate then trim the secondary. Shift the resistor to diode plates and 10,000 ohm diode output point and trim the primaries.

ALIGNMENT OF R.F. SECTIONS

Before starting on this portion of the set, it is important to understand how the tuning wand works. One end of this device has a core of material such as polyiron while the other end is brass. When the inductance of a coil is high, insertion of the brass end will decrease it to the proper resonant value; whereas, insertion of the other end will increase the effective inductance.

This gives a very conveinient means of determining whether or not it is necessary to add or remove turns from the coil. In the following instructions only a slight adjustment of trimmers and padders should be necessary where original coils are used. Full instructions however, are given to cover the case where new coils are to be used

BROADCAST BAND ALIGNMENT

First turn the dial pointer completely to the low frequency dial stop and see that the pointer reaches 1/16" beyond the lowest frequency mark. Turn the wave band switch to the broadcast "A" position, set the bass control to minimum, treble control to maximum and sensitivity control to minimum and connect an output meter across the voice

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coil. Adjust oscillator trimmer C1, until a 1,400 Kc. signal is set on the dial is tuned in from the generator. Rotate the dial to 600 Kc. and tune in a 600 Kc. signal from the generator by adjusting the padding condenser C3. Check the dial at 950 Kc. and if it tunes high in frequecny spread turns on the oscillator secondary, if it is low in frequency push the turns together **and then readjust trimmer condenser C1, and** padder condenser C3 as before.

With the oscillator circuit correctly spotted, tune in a signal from the generator at 1,400 Kc. and use the output meter as indicated.

Have as weak a signal as possible and adjust trimmers C4 and C6 for maximum output Turn the dial to 600 Kc. and check the alignment of the R.F. antenna and preselector stages with a tuning wand, spreading turns on the coil where less inductance is needed and pushing turns together if more inductance is required. Readjust the trimmer condenser C4 and C6 for maximum at 1,400 Kc. Turn the dial to 950 Kc. and check the alignment of the R.F. and antenna stages.

POLICE BAND

Set the wave band switch to the police "B" band position and turn the dial to 3.7 megacycles. Tune in a signal from the generator by adjusting trimmer C2, then turn the dial to 1.8 megacycles and tune in a signal from the generator by adjusting the padder C10. Check the alignment at 2.5 megacycles and if off, either push together or spread turns on the oscillator secondary as described under "Broadcast Band Alignment". Readjust trimmer C2 and padder C10 until correctly aligned. Tune in a signal at 3.7 megacycles and adjust trimmers C5 and C7 to maximum output. Now check the alignment on 1.8 megacycles with a tuning wand and make any necessary corrections by pushing or spreading turns on the coils and readjusting trimmers C5 and C7. Re check the alignment at 2.5 megacycles.

FOREIGN S.W. C (SW 1)

Set the wave band switch to the "C" position and tune in a signal at **9 megacycles** by adjusting trimmer condenser C9. Turn the dial to 5 megacycles and if necessary to correct the calibration do so by spreading or pushing turns on the coil and readjusting the trimmer condenser C9. Check the calibration at 6.0 megacycles.

With the oscillator calibrated, tune in a signal at 9 megacycles and adjust trimmer condensers C12 and C14 for maximum output. Check the alignment at 5 and 9 megacycles and make any necessary corrections by pushing or spreading turns on the coils and readjusting trimmers C12 and C14.

FOREIGN S.W. -D- (SW 2)

Set the wave band switch to "D" position and tune in a signal at 20 megacycles by adjusting trimmers C8. Check and if necessary correct the calibration at 12 megacycles by pushing or spreading the turns on the oscillator coil. Check the calibration at 15 megacycles.

With the oscillator correctly aligned tune in a signal at 20 megacycles and adjust trimmers C1 and C13 for maximum output. Check the alignment at 12 and 15 megacycles and make necessary corrections by pushing or spreading turns on the coils. Now, re adjust trimmers C11 and C13.

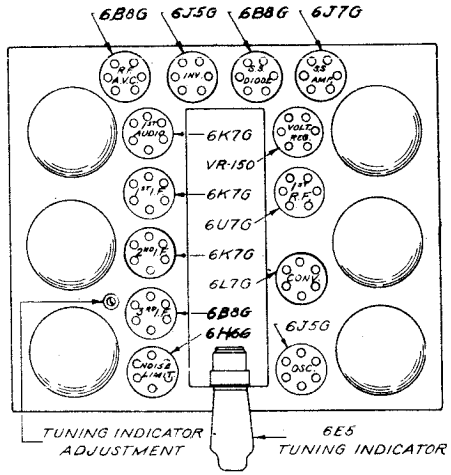
FOREIGN S.W. D- (SW 2)

ULTRA SHORT WAVE AND TELEVISION BAND

Set the wave band switch to "P" position and tune in a signal at 48 megacycles by adjusting trimmers C15 Check and if necessary correct the calibration at 32 megacycles by pushing or spreading the turns on the oscillator coil. Check the calibration at 32 and 48 megacycles.

With the oscillator correctly aligned tune in a signal at 32 and 48 megacycles and adjust trimmers C16 and C17 for maximum output. Check the alignment at 32 and 48 megacycles and make necessary corrections by pushing or spreading turns on the coils. Now, readjust trimmers C16 and C17.

The trimmer is used at the high frequency side of the band at 48 megacycles. The coil is pushed or spread for 32 megacycles for the low frequency side of the band.



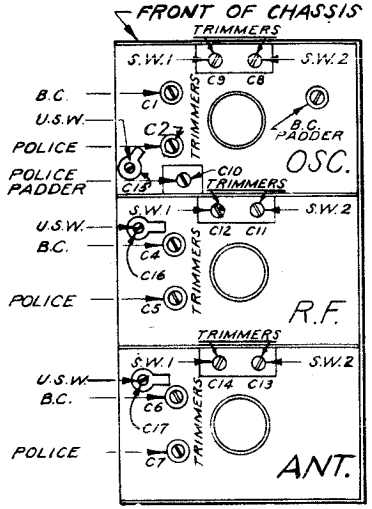
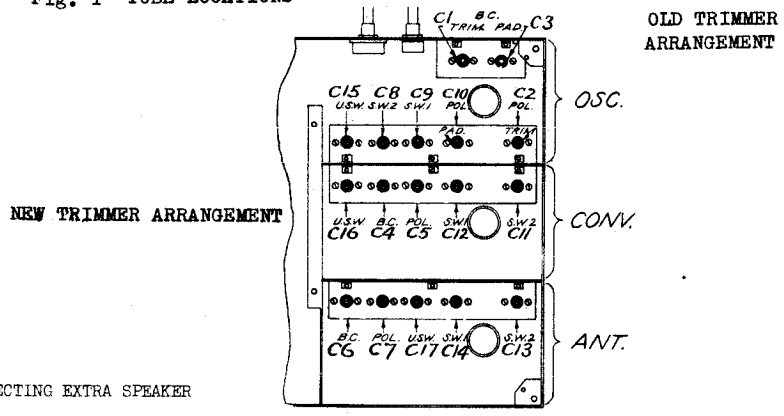


Fig. 1 TUBE LOCATIONS



CONNECTING EXTRA SPEAKER

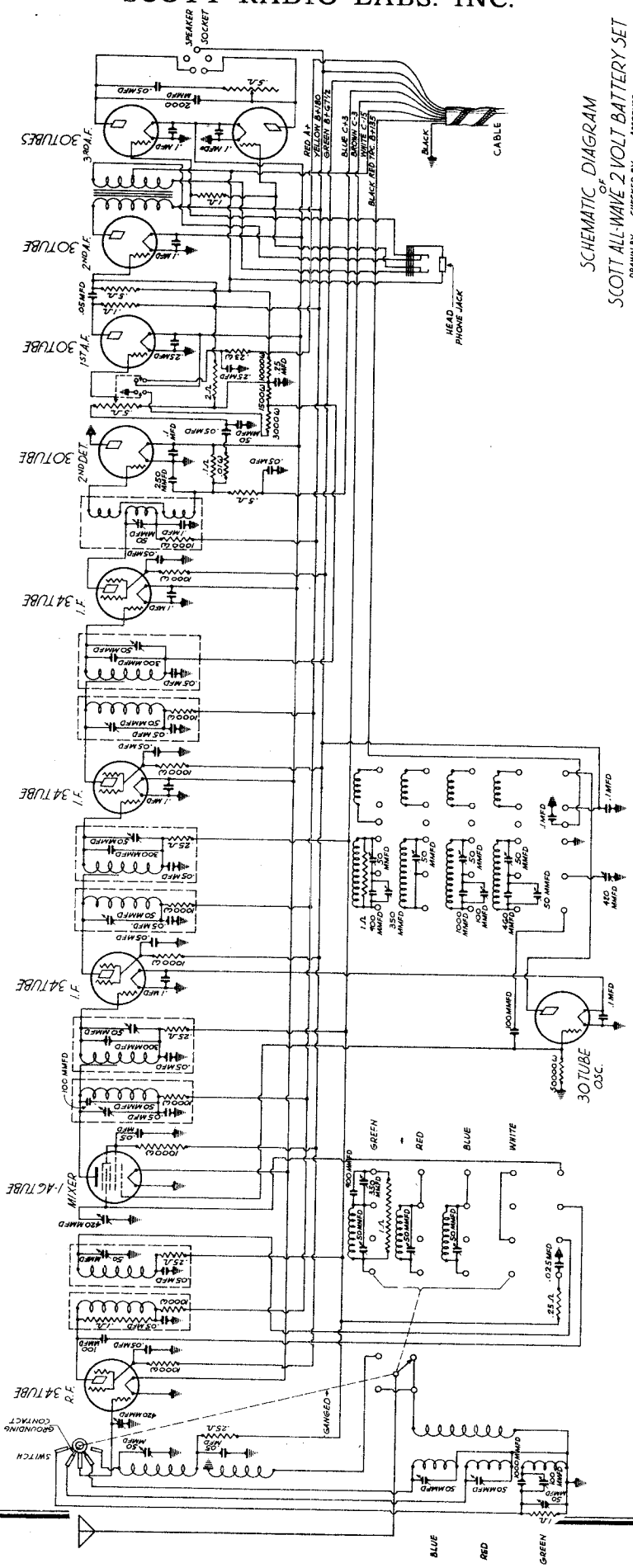
The new type high fidelity Scott permanent magnet 38 ohm voice coil speaker maybe readily connected to a Scott Receiver with the optional "T" pad inserted in the voice coil leads where separate control of the extension speaker volume is desired. In case the extension speaker is disconnected the jumper **might** be changed to connect terminals "V.C" and "38" together.

WAVE CHANGE SWITCH TROUBLE

Poor contact in the wave change switch can generally be corrected by slightly bending the contacts involved. However, in case a switch section is accidentally damaged beyond repair, this section can be replaced by removing the two screws which support the wave change detent plate and very carefully pulling out the wave change switch shaft. The damaged section can then be unsoldered, removed, and replaced with a new unit which should be obtained from the Scott Laboratories in Chicago before the change is made in order to assure exact duplication of switch position and connections. Note particularly that the small notch near the center of the switch rotor must be in the same position in each switch section.

MODEL All-Wave
2-Volt Battery

SCOTT RADIO LABS. INC.



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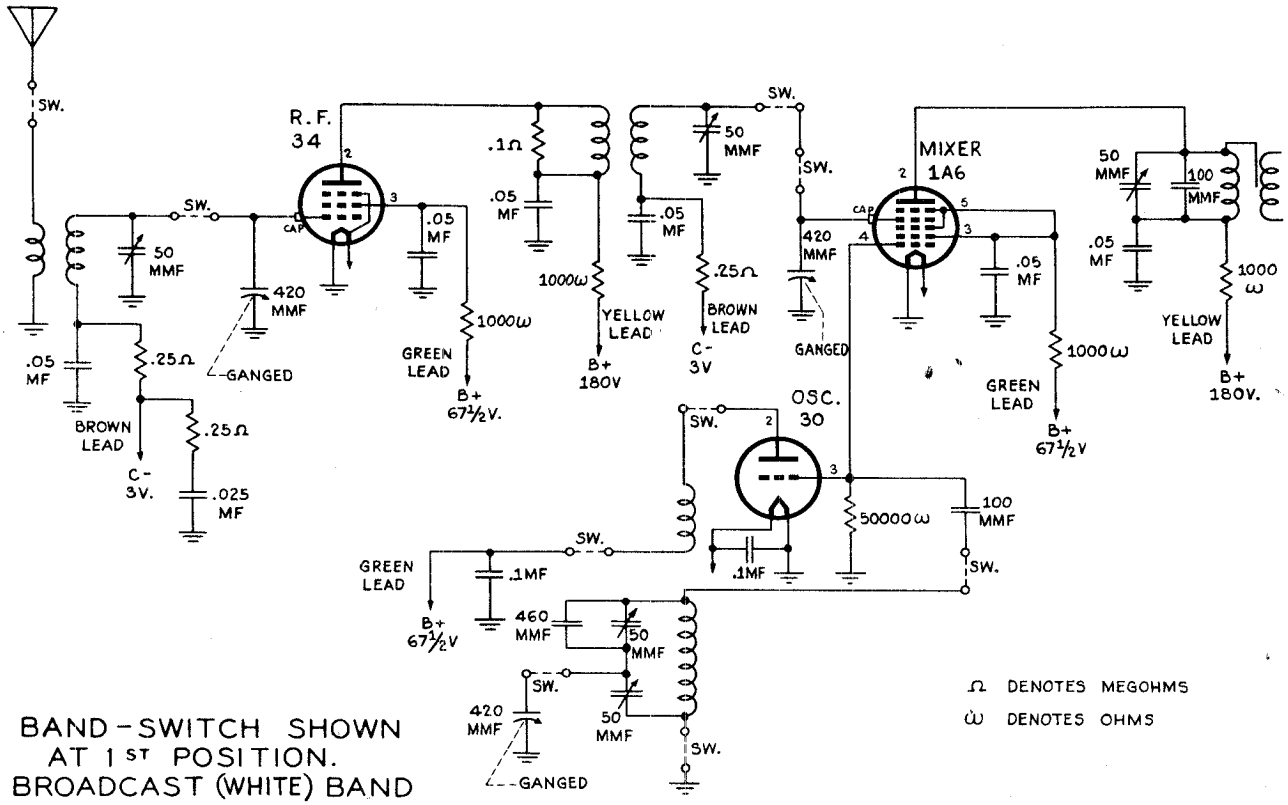
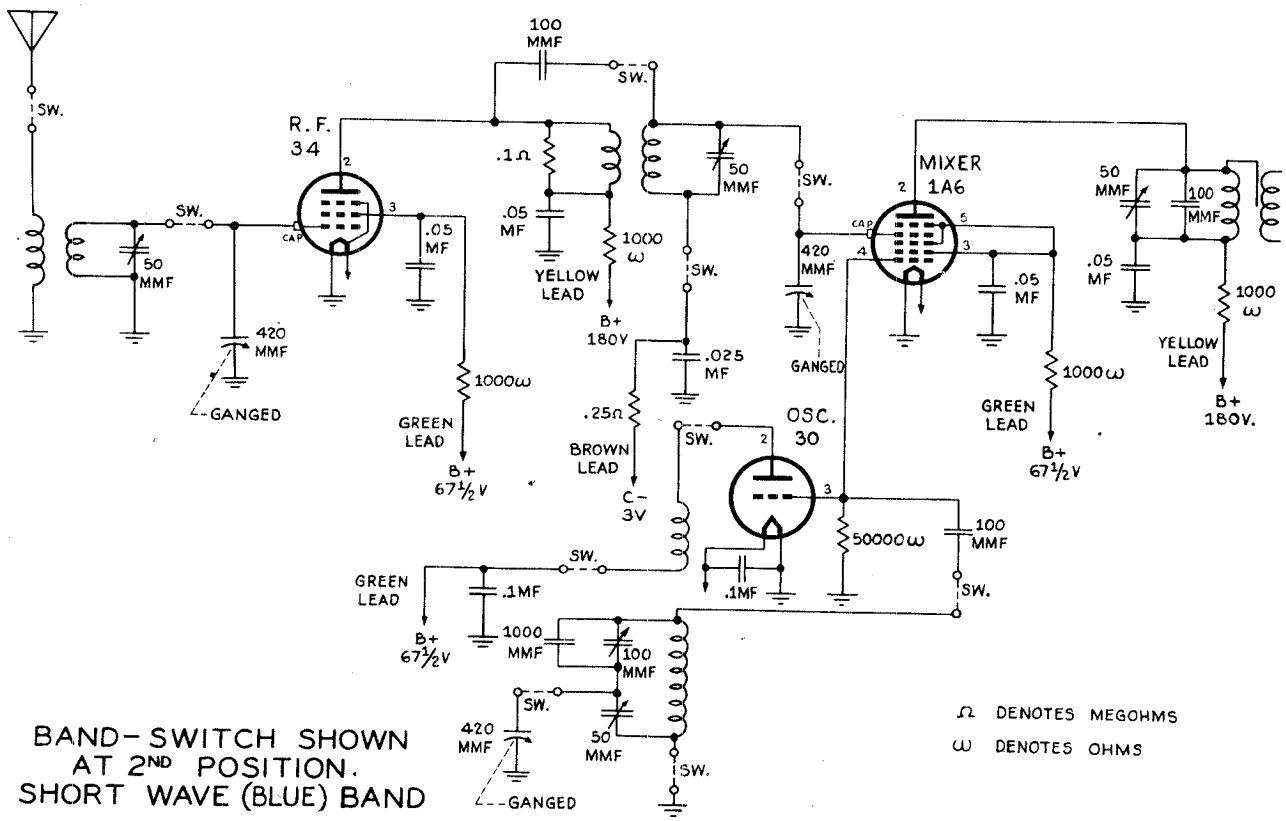
MODEL All-Wave
2-Volt Battery





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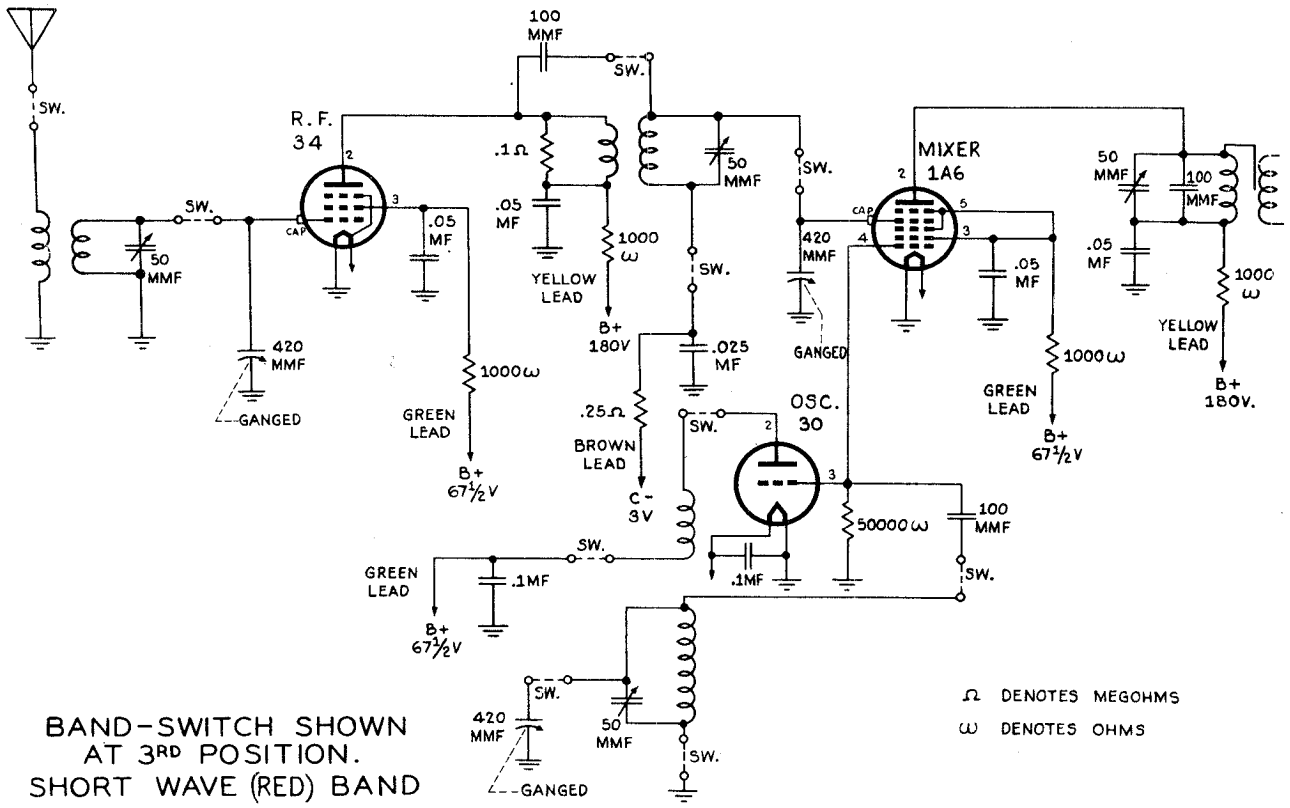
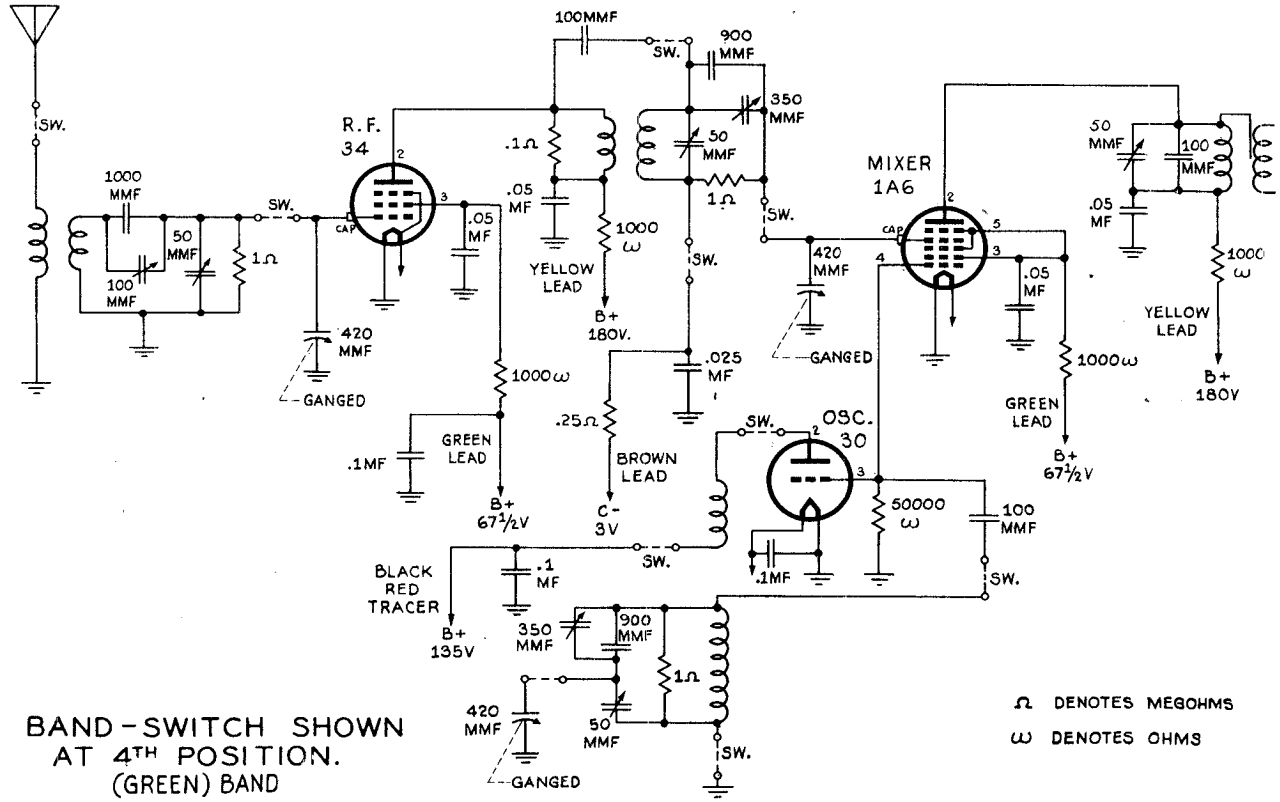
MODEL All-Wave
2-Volt Battery

SCOTT RADIO LABS. INC.



BAND-SWITCH SHOWN AT 3RD POSITION. SHORT WAVE (RED) BAND



BAND-SWITCH SHOWN AT 4TH POSITION. (GREEN) BAND

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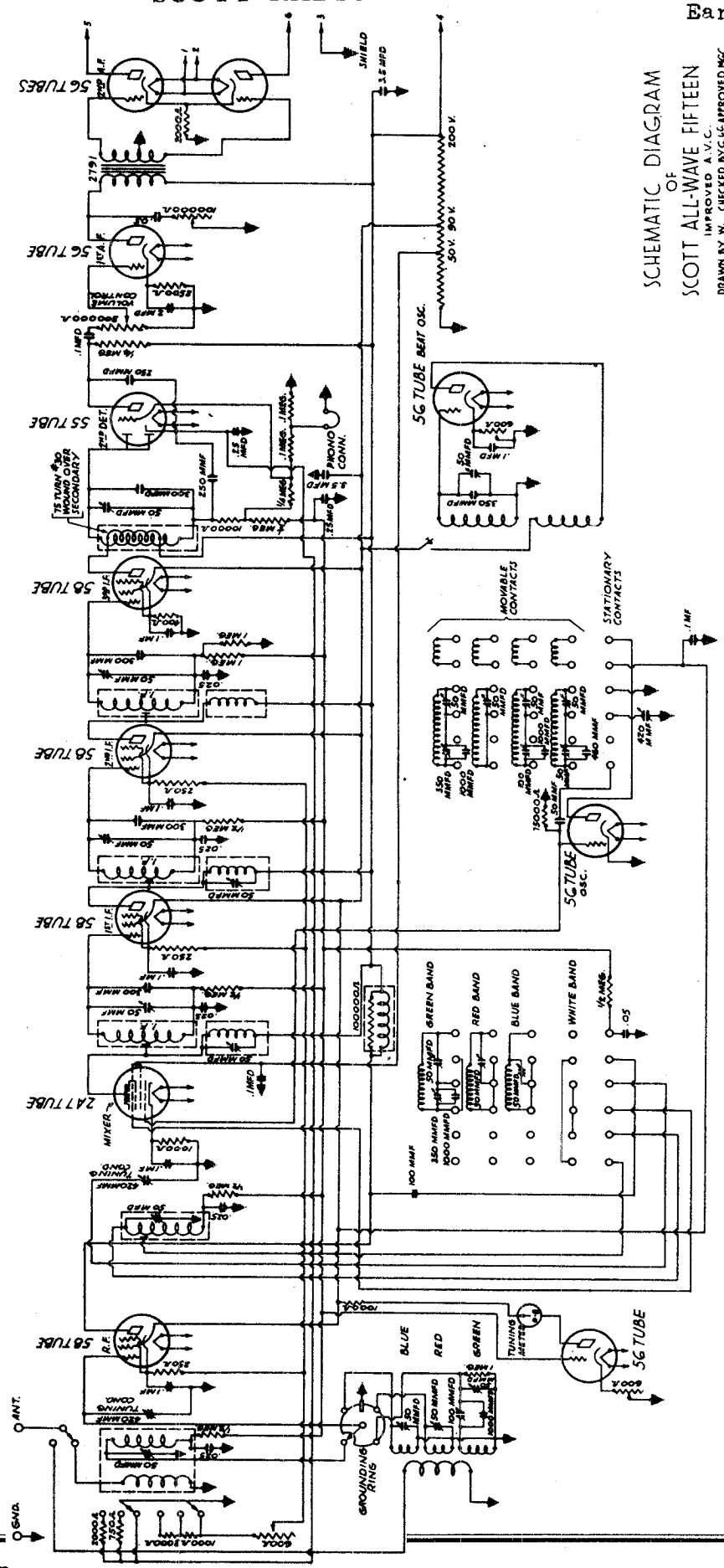
MODEL All-Wave 15
Early



Record Changers:Garrard Models RC6,RC10,RM10,RC30,RC50;Seeburg Models B,ER. See Rider's "Automatic Record Changers and Recorders".

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MODEL All-Wave 15
Late

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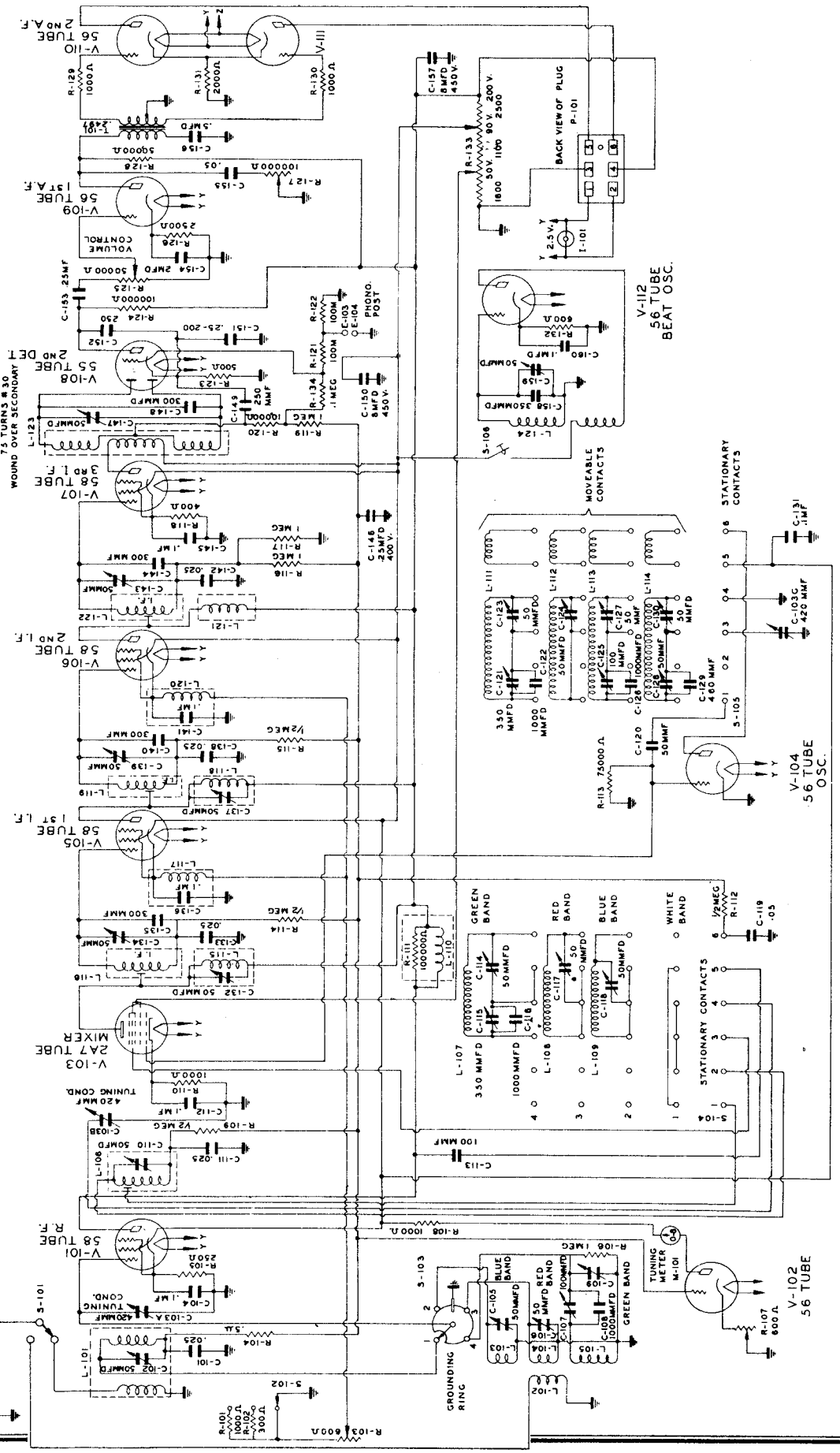

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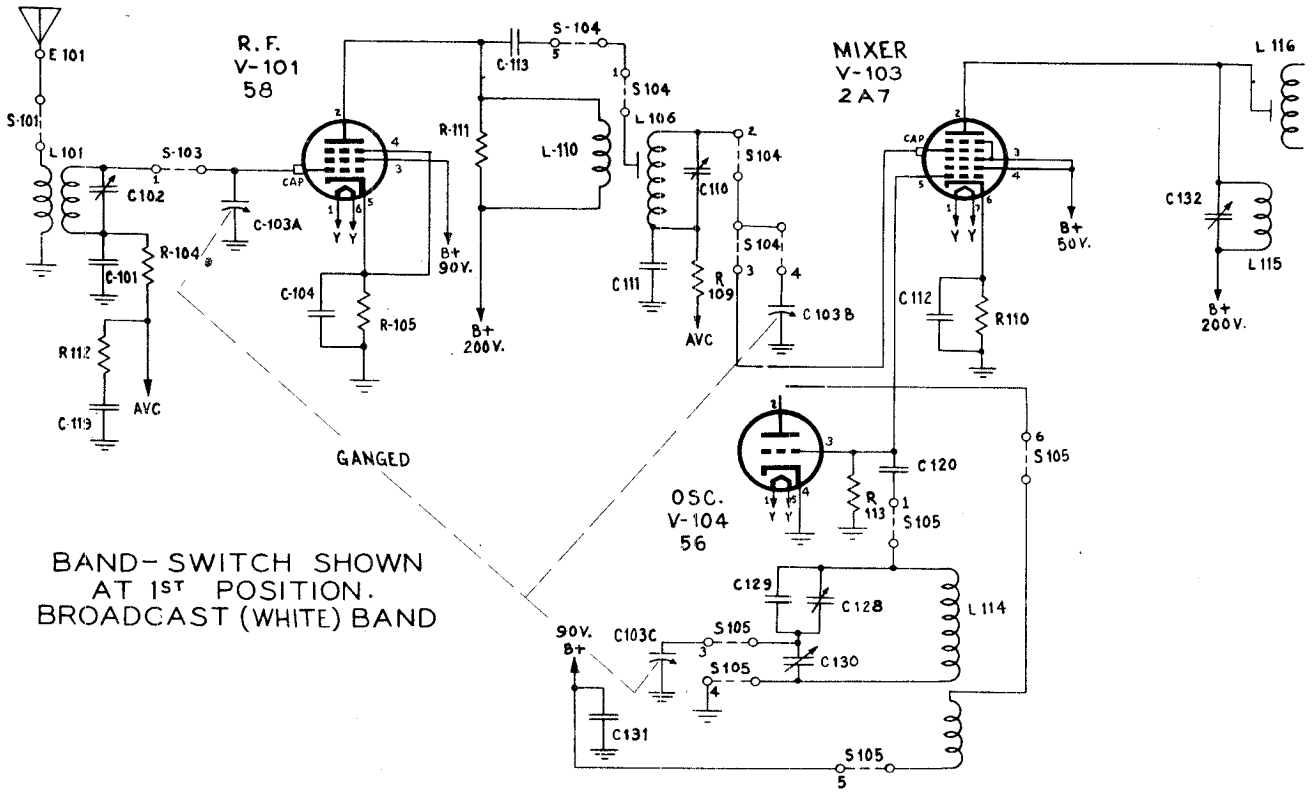
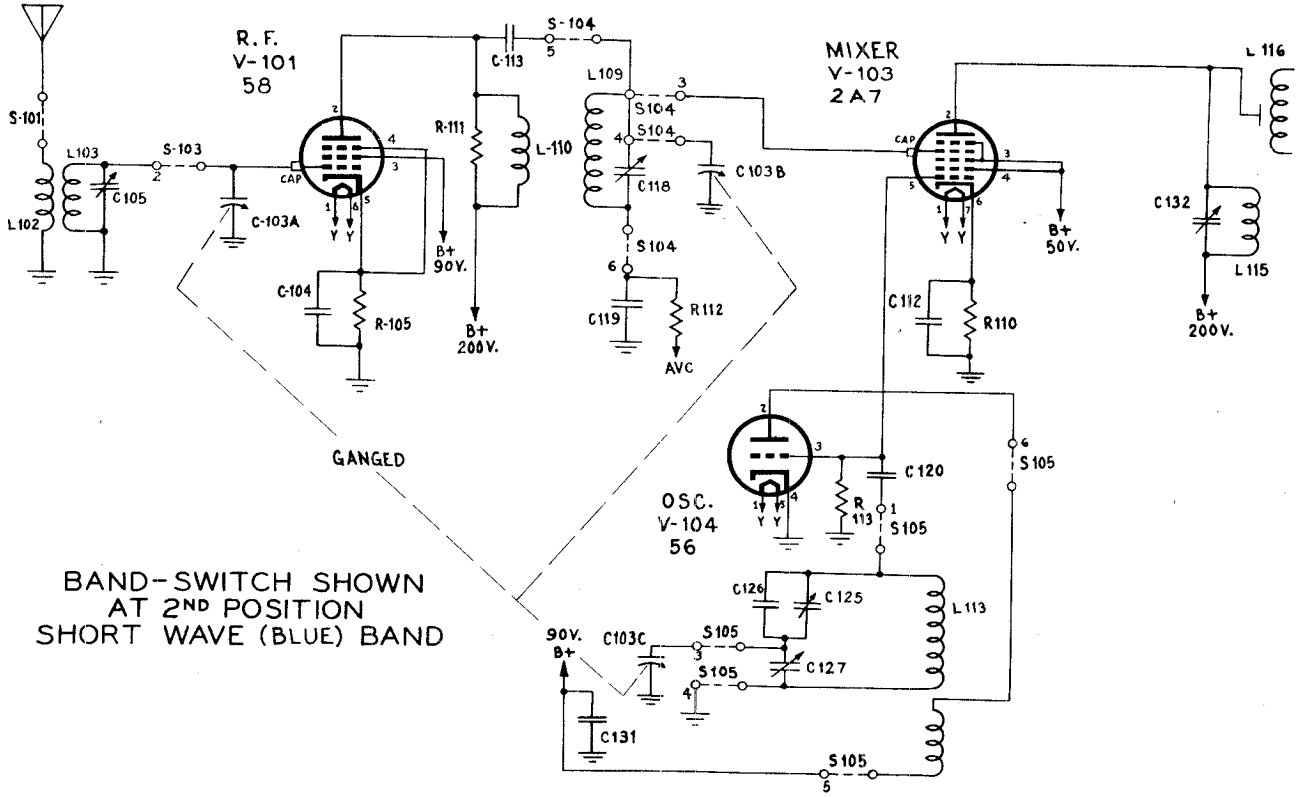


BAND-SWITCH SHOWN
AT 1ST POSITION.
BROADCAST (WHITE) BAND



BAND-SWITCH SHOWN
AT 2ND POSITION
SHORT WAVE (BLUE) BAND

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"clarified schematics"

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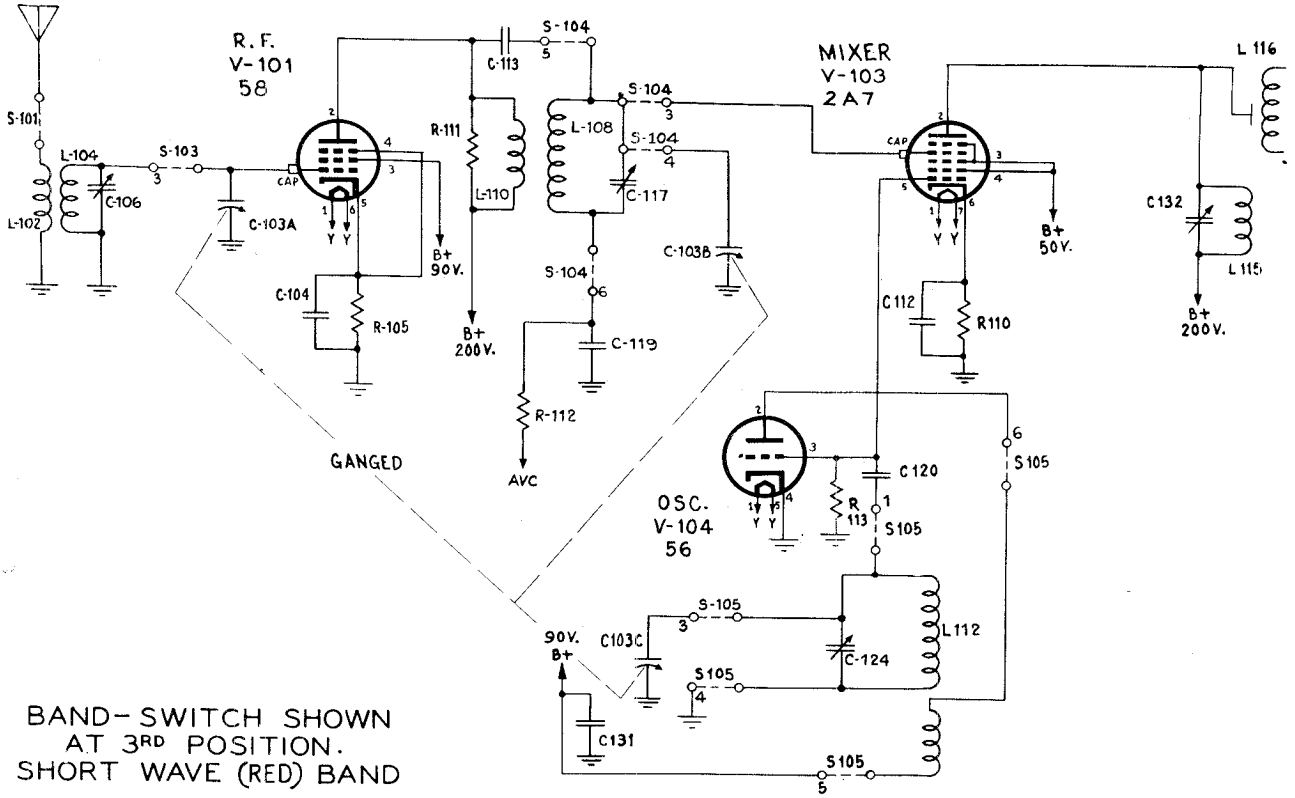

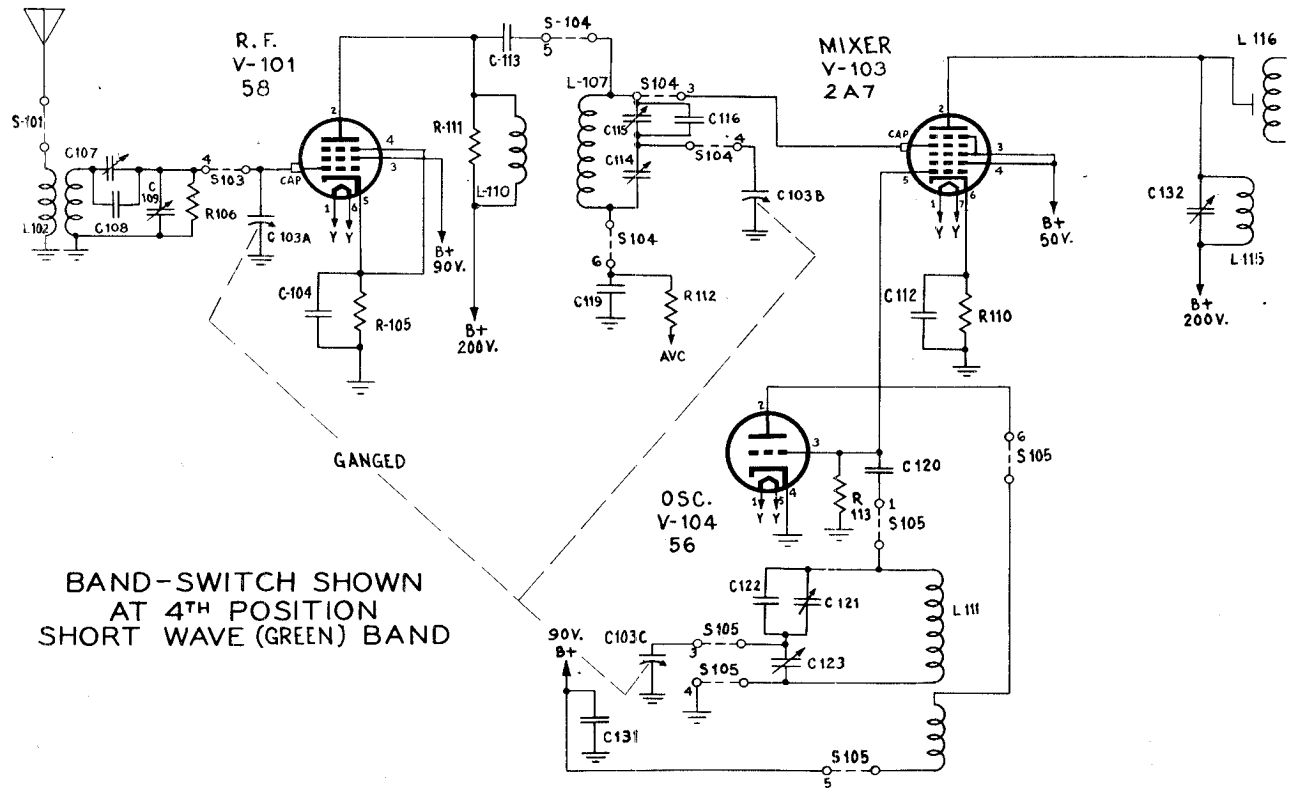

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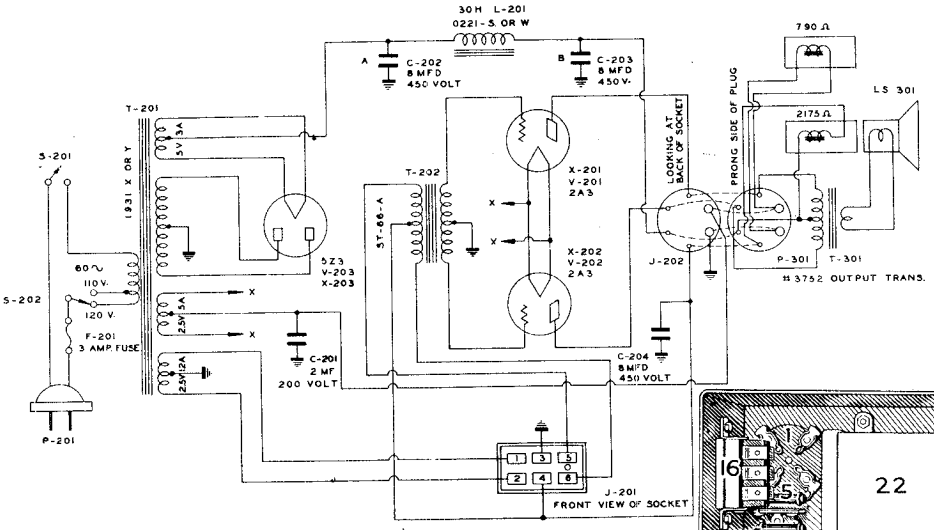
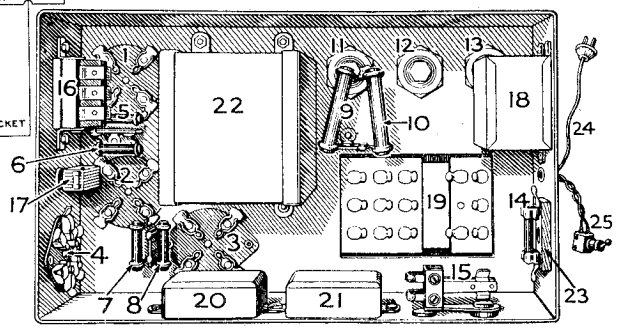
SCOTT RADIO LABS. INC.

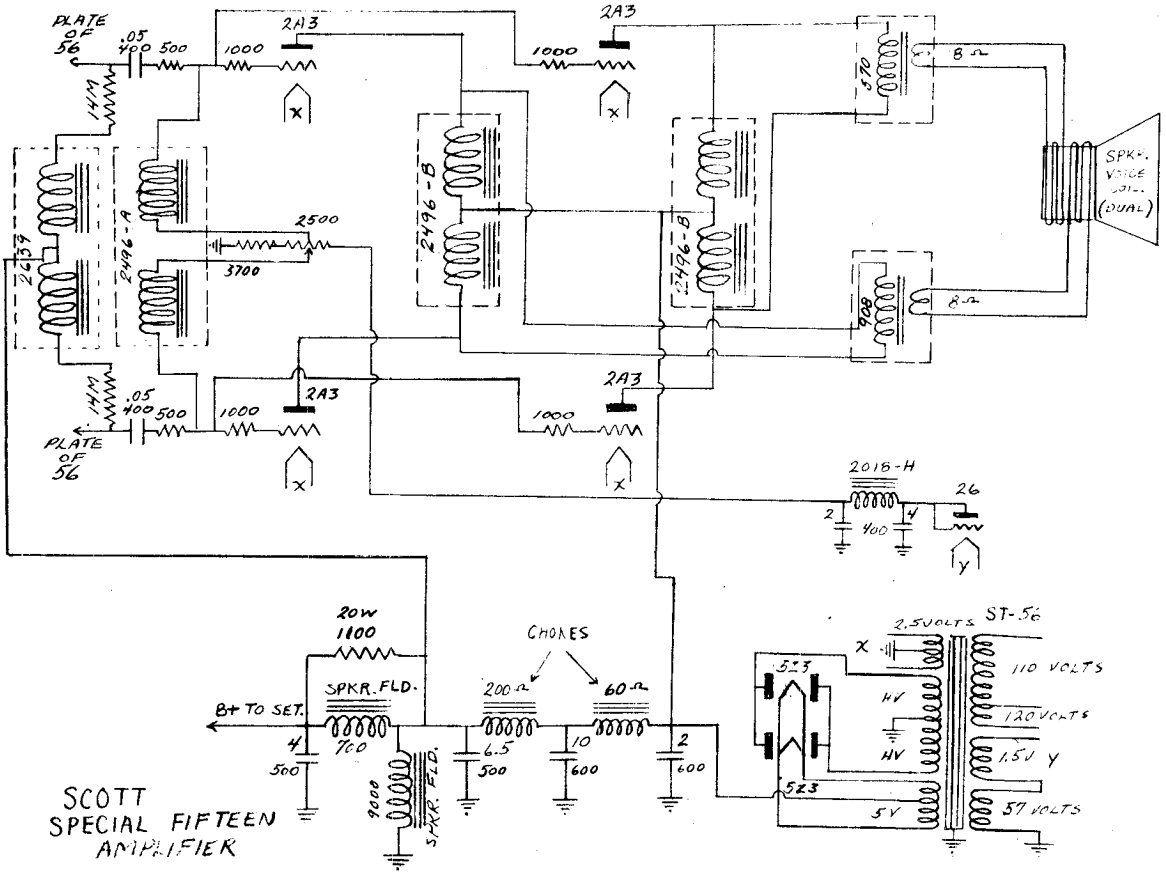


1. 2A3 Socket
2. 2A3 Socket
3. 5Z3 Socket
4. Speaker Socket
5. 1000 Ohm Resistor ½ Watt
6. 500 Ohm Resistor ½ Watt
7. 1000 Ohm Resistor ½ Watt
8. 500 Ohm Resistor ½ Watt
9. 28,000 Ohm Resistor 2 Watt
10. 28,000 Ohm Resistor 2 Watt
11. }
12. } 8 Mfd. Electrolytic
13. } Condenser
14. 3 Amp Fuse
15. Phone Jack
16. Cable Plug Receptacle
17. Hi-Lo Switch
18. 2 Mfd. Condenser
19. Power Transformer
20. .5 Mfd. Condenser
21. .5 Mfd. Condensor
22. No. 2496 Audio Choke
23. Fuse Retainer
24. A.C. Cord
25. Off and On Switch
26. Filter Choke No. 0221S located on top of the amplifier base directly above No. 22



SCOTT ALLWAVE FIFTEEN AMPLIFIER

4-3-46
M.L.C.



SCOTT SPECIAL FIFTEEN AMPLIFIER

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Adjustment of Beat Frequency Oscillator

You will find on the back of the chassis at the right hand end looking at it from the rear, a small hole thru which can be seen a hexagon shaped nut. See Fig. 22. This can be adjusted either with a screw driver or a No. 6 spintite wrench.

To adjust, tune in a short wave station, then press in the small black button on the front of the panel just below the Wave Change Switch, and hold it in this position. Now adjust the small nut in the rear of the chassis by turning to the right or left until a whistle is heard with the station to which you have the receiver tuned. After you hear the whistle turn the nut slightly first one way then the other until the pitch of the note suits your ear.

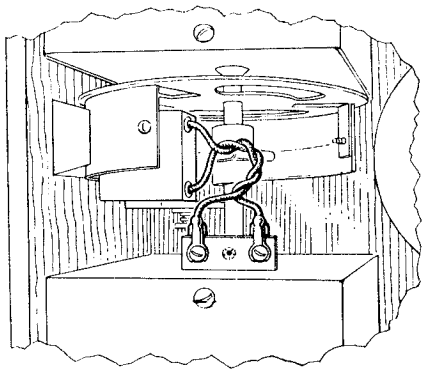

Fig. 19

How to Change Visual Tuning Meter

If the visual tuning meter stops indicating on the face of dial, lightly tap the top of meter noting if the needle releases and comes into view. If it does not, or if needle simply stays in one position on dial and does not move when tuning in stations, follow instructions given on Page 14, under heading "Tuning Meter Sticks Or Indicator Fails To Show On Dial." If these instructions have been followed with no result, the tuning meter is possibly defective.

Figure 19 shows tuning meter connected to terminal block on end of small shield can. Disconnect meter wires by loosening the two screws holding the lugs on the wires leading to meter. Now connect a short piece of wire between the two screws, as shown in Fig. 19. This will remove the visual tuner from the circuit and receiver can now be operated. *Leave tuning meter in place* and advise us at once, and a new tuning meter will be sent to replace the defective one. To remove the old meter, loosen screw holding tuning meter bracket to base of chassis, then it can be lifted out.

To install new meter, first fasten tuning meter bracket to base, making sure that it is centrally located in front of the dial strip, then replace dial light.

The connecting wire should now be removed and the two lugs on wires from tuning meter should be fastened to the terminal strip, making sure that red wire is connected to the red wire leading up from chassis, and black wire to the black wire.

Switch on receiver and with no signal tuned in, the shadow from the needle should just appear on white side of dial. If needle does not show, slide tuning meter bracket over until needle shows. Be careful not to push it over so far that it hits dial.

Final adjustment can be made by moving dial light to left or right in rubber socket.

How to Change Fuse in Power Amplifier

Your receiver is protected from serious damage by a 4 amp. automobile type fuse which is located under the base of the amplifier. This fuse should last indefinitely. However, if the fuse should burn out and the tubes refuse to light, the trouble will probably be due to a defective 5Z3 tube. In this case, of course, it will be necessary to put a new 5Z3 tube and a new fuse in your receiver and it will then be ready to operate again.

If your fuse should burn out from any other reason it will undoubtedly be due to one of the other tubes being defective or short circuited, a defective filter or bypass condenser or a broken wire or short circuit in some part of the set. In a case like this the condensers should all be checked for short circuits. After this any other trouble will be found by inspecting the wiring of the receiver.

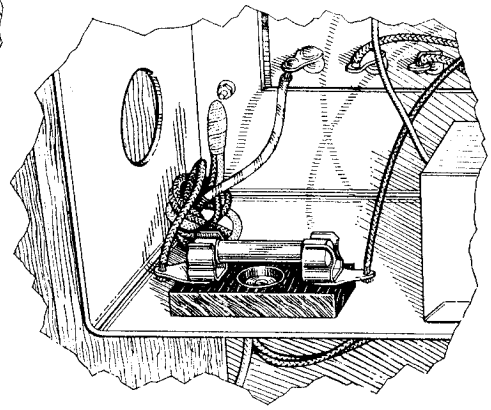

Fig. 20. Fuse Block Located Under Amplifier.

Do not, on any account, replace this fuse with a solid connection such as a piece of tin foil or the various expedients tried by amateur electricians to get things going again, for if you do, serious damage will be caused and if repairs are necessary you will be charged for them under these circumstances. If you do not have a spare fuse exactly like the one supplied, then you can temporarily use one of 3 amps. but we will be glad if you will write us immediately, to send you some additional fuses, free of charge.

How to Change Dial Light

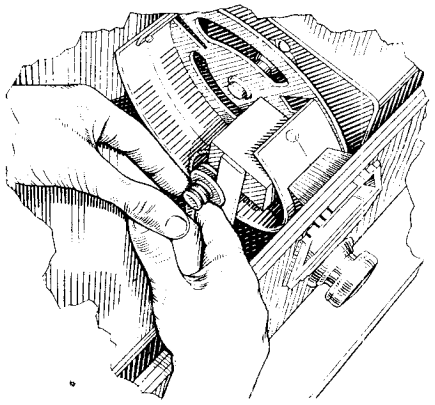

Fig. 21. Changing Dial Light.

When changing the dial light, first turn the tuning dial to meg-kil, slip dial light socket and rubber bushing out of notch in tuning meter bracket. See Fig. 21.

NOTE: When removing the dial light you first slip down the spring clip that holds it in place. The clip is used principally to keep dial light in place during shipment, and need not be replaced, as rubber socket has sufficient grip.

Bring the dial light socket under the shaft of the tuning condenser and up in back of the shaft. The dial light bulb can then be easily screwed out of the socket and another replaced. The entire socket assembly can then be placed back under the tuning condenser shaft and slipped back into place.

After changing the dial light the pointer of the visual tuning meter may be too far to the right so that it cannot be seen unless a station is tuned in. In this case, the dial light socket should be slipped back and forth in the rubber bushing until the shadow of the tuning meter just shows on the right hand side of the dial when no station is tuned in.

Phonograph Pick-Up

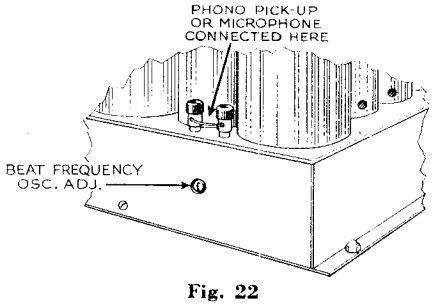

Fig. 22

The SCOTT ALLWAVE FIFTEEN RECEIVER is equipped with two binding posts on the rear of the chassis located on the right end, looking at the chassis from the rear. See Fig. 22. When shipped these two posts are connected together with a short piece of wire. When it is desired to hook up the receiver to a phonograph, remove this wire and connect the two wires from the phonograph pick-up

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Early, Late

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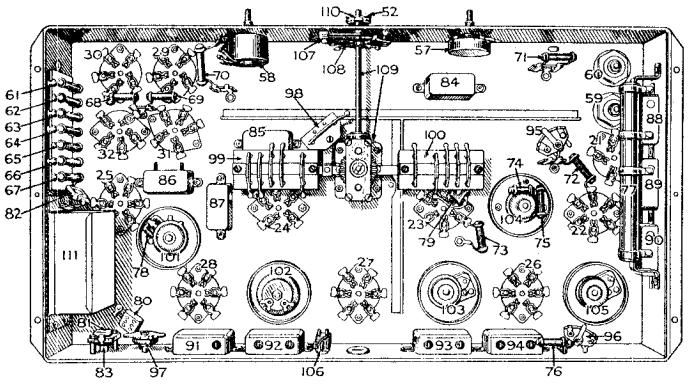
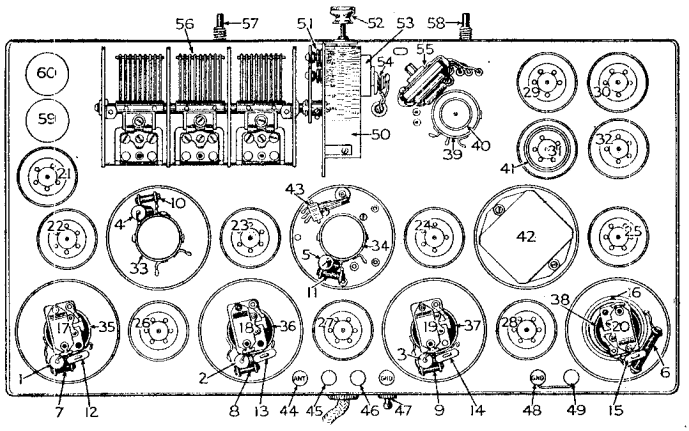
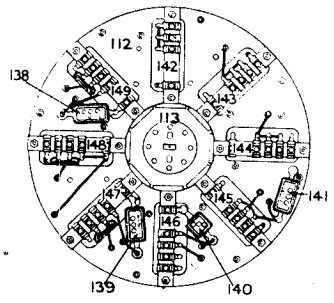


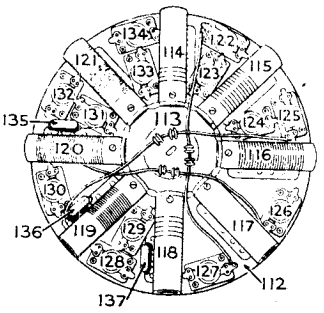
SCOTT ALLWAVE FIFTEEN

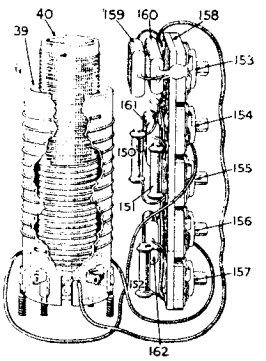
IF NECESSARY TO WRITE FOR REPLACEMENT OF ANY PART, GIVE SERIAL NUMBER _____ TOGETHER WITH THE NO. SHOWN ON PART.



TOP VIEW OF CHASSIS WITH SHIELD CANS REMOVED







PARTS LIST

SCOTT ALLWAVE FIFTEEN

1. .025 Mfd. Condenser
2. .025 Mfd. Condenser
3. .025 Mfd. Condenser
4. .025 Mfd. Condenser
5. .025 Mfd. Condenser
6. 250,000 Ohm Resistor
7. 500,000 Ohm Resistor
8. 500,000 Ohm Resistor
9. 500,000 Ohm Resistor
10. 500,000 Ohm Resistor
11. 500,000 Ohm Resistor
12. 300 Mmfd. Condenser
13. 300 Mmfd. Condenser
14. 300 Mmfd. Condenser
15. 300 Mmfd. Condenser
16. Last I.F. Transformer Primary Coil
17. 50 Mmfd. Balancing Condenser
18. 50 Mmfd. Balancing Condenser
19. 50 Mmfd. Balancing Condenser
20. 50 Mmfd. Balancing Condenser
21. 56 Tube Socket
22. 58 Tube Socket
23. 58 Tube Socket
24. 56 Tube Socket
25. Wunderlich Socket
26. 58 Tube Socket
27. 58 Tube Socket
28. 58 Tube Socket
29. 56 Tube Socket
30. 56 Tube Socket
31. 56 Tube Socket
32. 56 Tube Socket
33. Broadcast Mixer Coil
34. Broadcast Antenna Coil
35. I.F. Coils
36. I.F. Coils
37. I.F. Coils
38. I.F. Coils
39. S.W. Antenna Primary Coil
40. S.W. Preselector Coil
41. Beat Oscillator Coil
42. Audio Transformer No. 2497
43. B.C.-S.W. Antenna Changing Switch
44. Antenna Binding Post (Black)
45. S.W. Doublet Binding Post (Red)
46. S.W. Doublet Binding Post (Red)
47. Antenna Toggle Switch Mounting Nut
48. GND Binding Posts (Black)
49. Plain Binding Post (Black)
50. Dial Strip
51. Dial Assembly
52. Dial Knob
53. Tuning Meter
54. Dial Light Socket
55. S.W. Preselector Pad Assembly
56. 3 Gang Condenser
57. Static Control
58. Volume Control
59. 3½ Mfd. Condenser
60. 3½ Mfd. Condenser
61. 2000 Ohm Resistor
62. 50,000 Ohm Resistor
63. 400 Ohm Resistor
64. 2500 Ohm Resistor
65. 75,000 Ohm Resistor
66. 250 Ohm Resistor
67. 1 Megohm Resistor
68. 1000 Ohm Resistor
69. 1000 Ohm Resistor
70. 50,000 Ohm Resistor
71. 1000 Ohm Resistor
72. 1000 Ohm Resistor
73. 750 Ohm Resistor
74. 100,000 Ohm Resistor
75. 500 Ohm Resistor
76. 500 Ohm Resistor
77. 5500 Ohm Voltage Divider
78. 500 Mmfd. Condenser
79. 100 Mmfd. Condenser
80. 2000 Mmfd. Condenser
81. 350 Mmfd. Condenser
82. 10 Mmfd. Condenser
83. 50 Mmfd. Balancing Condenser
84. .05 Mfd. Condenser
85. .1 Mfd. Condenser
86. ½ Mfd. Condenser
87. .1 Mfd. Condenser
88. .1 Mfd. Condenser
89. .1 Mfd. Condenser
90. .1 Mfd. Condenser
91. ½ Mfd. Condenser
92. Choke and Condenser Assembly
93. Choke and Condenser Assembly
94. Choke and Condenser Assembly
95. 600 Ohm Adjustable Resistor
96. 600 Ohm Adjustable Resistor
97. 4½ M.H. R.F. Filter Choke
98. Coil Switch Grounding Contact
99. Oscillator Switch Contact Assembly
100. Mixer Switch Contact Assembly
101. 4½ M.H. Choke
102. 13 M.H. Choke
103. 1st I.F. Stage Tuned 1½ M.H. Choke
104. 2½ M.H. Choke
105. Mixer Stage Tuned 1½ M.H. Choke
106. Antenna Toggle Switch
107. Beat Oscillator Switch
108. 4 Pole S.W. Preselector Coil Switch
109. Wave Change Switch Gear Assembly
110. Push Button
111. Double 2 Mfd. Condenser
112. Bakelite Vanes
113. Coil Mounting Spider
114. Green Band Mixer Coil
115. Red Band Mixer Coil
116. Blue Band Mixer Coil
117. Blank Coil Form
118. Green Band Oscillator Coil
119. Red Band Oscillator Coil
120. Blue Band Oscillator Coil
121. White Band Oscillator Coil
122. 350 Mmfd. Balancing Condenser
123. 50 Mmfd. Balancing Condenser
124. 50 Mmfd. Balancing Condenser
125. 50 Mmfd. Balancing Condenser
126. 50 Mmfd. Balancing Condenser
127. 50 Mmfd. Balancing Condenser
128. 50 Mmfd. Balancing Condenser
129. 350 Mmfd. Balancing Condenser
130. 50 Mmfd. Balancing Condenser
131. 350 Mmfd. Balancing Condenser
132. 50 Mmfd. Balancing Condenser
133. 50 Mmfd. Balancing Condenser
134. 50 Mmfd. Balancing Condenser
135. 2000 Mmfd. Condenser
136. 2000 Mmfd. Condenser
137. 2000 Mmfd. Condenser
138. 1200 Mmfd. Condenser
139. 1000 Mmfd. Condenser
140. 460 Mmfd. Condenser
141. 800 Mmfd. Condenser
142. Coil Contact Assembly
143. Coil Contact Assembly
144. Coil Contact Assembly
145. Coil Contact Assembly
146. Coil Contact Assembly
147. Coil Contact Assembly
148. Coil Contact Assembly
149. Coil Contact Assembly
150. 1 Megohm Resistor
151. 1 Megohm Resistor
152. 1 Megohm Resistor
153. 350 Mmf. Balancing Condenser
154. 350 Mmf. Balancing Condenser
155. 50 Mmf. Balancing Condenser
156. 100 Mmf. Balancing Condenser
157. 50 Mmf. Balancing Condenser
158. Preselector Pad Assembly Panel
159. 4000 Mmfd. Total (May Be Single Condenser)
160. 4000 Mmfd. Total (May Be Single Condenser)
161. 1800 Mmfd. Condenser
162. 600 Mmf. Condenser

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Section IV CIRCUIT DESCRIPTION

4.1 General

The schematic diagram of the receiver chassis is shown in Figures 25 and 26 and the schematic diagram of the power supply chassis is shown in Figures 27 and 28. For purposes of illustration it will be assumed that the circuits are set up for reception on the Broadcast (BC) Band for AM reception.

4.2 AM-RF and Mixer Circuits

Signal input to the receiver through AM antenna connector strip E1 is connected to the primary winding of BC band antenna primary coil L1 through switch SW2A. An electrostatic shield, at ground potential, separates the secondary winding from the primary. The secondary coil L2, together with variable air capacitor C5A1 constitutes the first tuned circuit. Transfer of RF signal at the resonant frequency of this tuned circuit, from the antenna to the control grid of RF amplifier tube V1, is accomplished by inductive coupling through the antenna transformer L1, L2. Variable capacitor C5 is a three unit capacitor, each unit being split into two sections. The larger sections C5A1, C5B1 and C5C1 being used for tuning the AM-RF and oscillator circuits and the small sections C5A2, C5B2 and C5C2 being used for tuning the FM-RF and oscillator circuits. The secondary winding L2 is provided with an adjustable powdered iron core E3 for inductance trimming and a shunt connected variable capacity trimmer C1. These trimmers allow accurate alignment of the tuned circuit at both ends of the frequency band and are accessible for adjustment at the bottom of the receiver as shown in Figure 14. The high potential end of the tuned circuit is connected to the control grid of RF amplifier tube V1 through switch SW2A, switch SW1 and through coupling capacitor C3. The low potential end of the circuit is returned to chassis ground. The DC bias return from the control grid of RF amplifier tube V1 to the AVC line is closed through resistor R1. Switch SW1 located at the rear of the receiver chassis is provided so that a loop antenna, connected through loop receptacle J7, may be used in place of an outside antenna as outlined under Antenna Requirements, Paragraph 1.5.

Plate potential from the high voltage DC line is applied to the plate of RF amplifier tube V1 through filter resistor R11, bypassed to ground by capacitor C18A. One section of switch SW3A is used to cut off DC voltage from the plate and screen of RF amplifier tube V1 and the screen of mixer tube V3 when the Selectivity control is set at PHONO or TELEVISION positions in order to keep any RF signal from leaking through when using the audio amplifier of the receiver for record player reproduction or television sound broadcasts.

Screen potential is applied to RF amplifier tube V1 through filter resistor R4 bypassed to ground by capacitor C4B. Resistor R3 is connected from screen to ground to provide more stable screen potential with fluctuations in AVC voltage, this providing better AVC characteristics on strong signals. The suppressor of V1 is connected to ground. Initial grid bias is obtained by means of cathode resistor R2 bypassed by capacitor C4A. Grid bias on V1 can be increased when full sensitivity is not required, by means of Sensitivity control R5 which also controls the bias on first IF amplifier tube V4. One side of the heater circuit of V1 is grounded at the socket.

The amplified signal from the plate of RF amplifier tube V1, is transferred to the signal grid of mixer tube V3 through RF transformer L7. The primary of L7 is untuned. The secondary winding together with variable capacitor C5C1 constitutes the second and final tuned circuit operating at signal frequency. The high potential end of the tuned circuit is connected to the signal grid of mixer tube V3 by switch SW2C, through coupling capacitor C17. The low potential end of the tuned circuit connects to ground. Adjustable iron core E7 and parallel connected trimmer capacitor C15 are provided for circuit alignment. The DC bias return from the control grid of mixer tube V3 to the AVC line is closed through resistor R8. Screen potential from the high voltage DC line is applied through resistor R12 bypassed to ground by capacitor C18B. The suppressor is internally connected to the shell of the tube. Initial bias is obtained by cathode resistor R10 bypassed by C18C.

4.3 AM-Oscillator Circuit

The AM-oscillator circuit is of the electron coupled type. The tuned circuit consists of tapped inductor L5 shunted with variable trimmer capacitor C6 and is tuned by variable capacitor C5B1 which is shunted by fixed capacitor C13 provided to increase the fixed minimum capacity of the circuit. The inductor L5 is provided with a variable iron core for inductance adjustment. Fixed capacitor C7 shunted by variable padder capacitor C8 is provided to modify the tuning of the oscillator circuit so that it will maintain a fixed frequency difference of 455 kilocycles with respect to the signal frequency circuits when the main tuning capacitor C5A1, C5B1 and C5C1 are varied from minimum to maximum capacity. On both the BC and SW-AM bands the oscillator frequency is maintained 455 kilocycles higher in frequency than the signal frequency.

The high potential end of the tuned circuit is connected to the control grid of AM oscillator tube V2, through switch SW6B mounted on the FM-AM relay K1, and through switch SW2B and fixed capacity C11. The low potential end of the coil returns to ground. The grid of V2 is returned to ground through resistor R6. The cathode of V2 is connected to the tap on inductor L5 through switch SW2B and through capacitor C14 to oscillator injector grid (Pin #5) of mixer tube V3. This grid is returned to ground through resistor R9. The plate of the oscillator tube V2 is connected to the 150 volt regulated high voltage DC line through resistor R7, bypassed by capacitor C12, and through switch SW6A on the FM-AM relay K1. This switch removes voltage from the plate of oscillator tube V2 when the receiver is adjusted for FM reception. One side of the heater of V2 is grounded at the socket.

4.4 AM-IF Amplifier Circuits - 455 Kilocycles

The signal frequency arriving at the control grid of mixer tube V3 and the oscillator frequency fed to the injector grid of this tube or mixed (or heterodyned) and the resultant difference frequency (455 kilocycles) is fed to the input of the IF amplifier.

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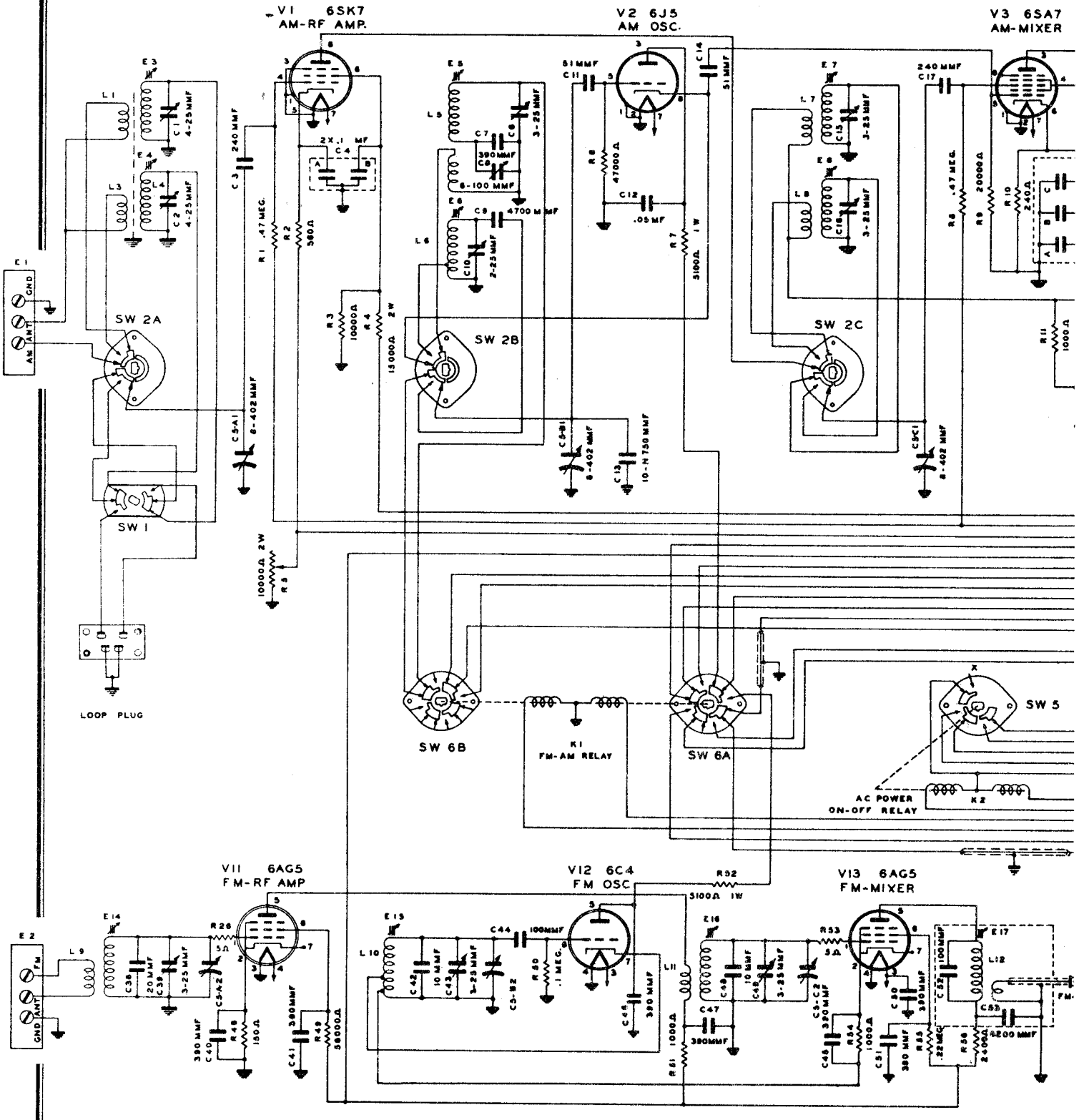

Tuning Range - AM	540 KC to 1600 KC 5.9 MC to 18.2 MC
Tuning Range - FM	88 to 108 MC

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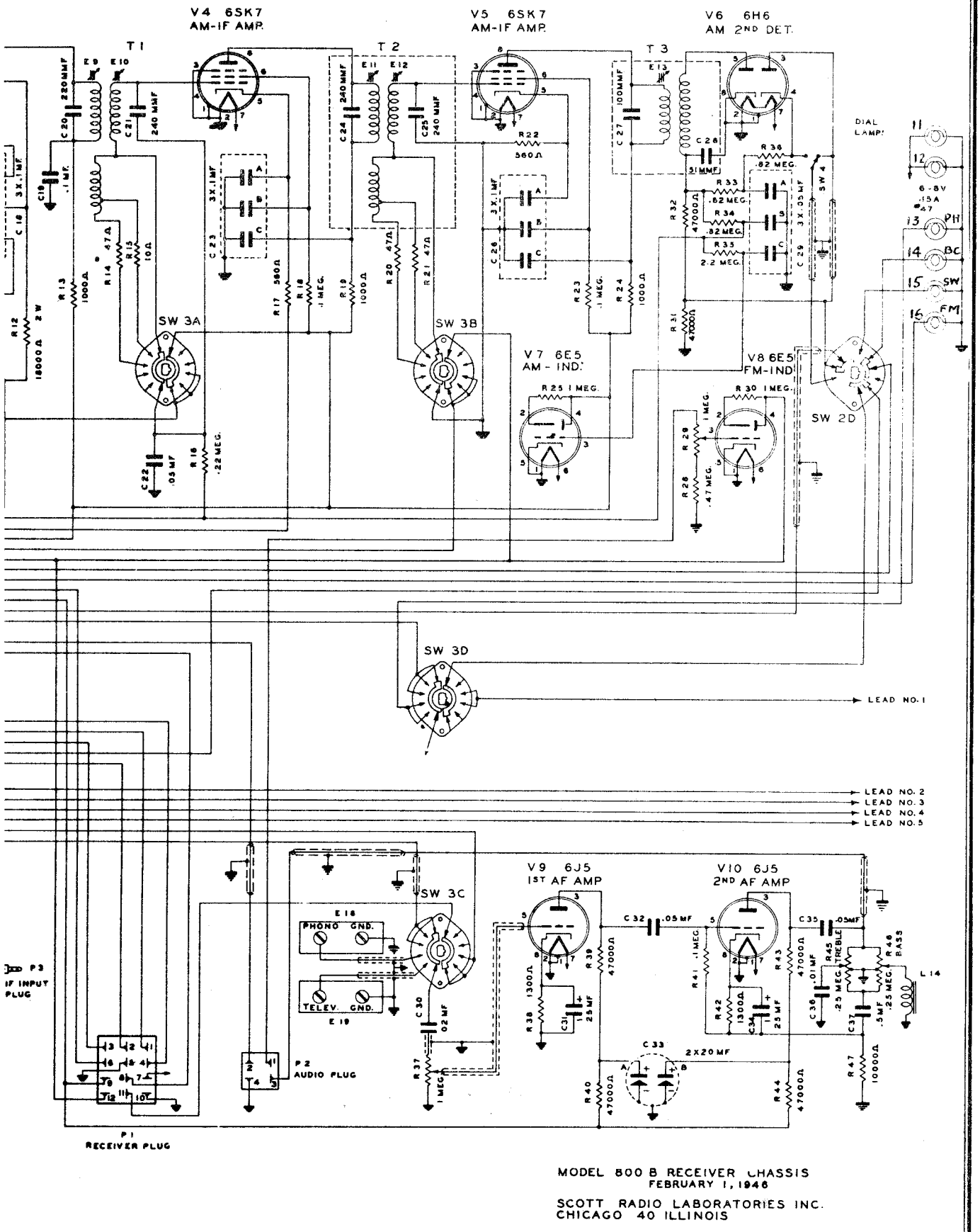
MODEL 800-B Early
Below Serial No.2000



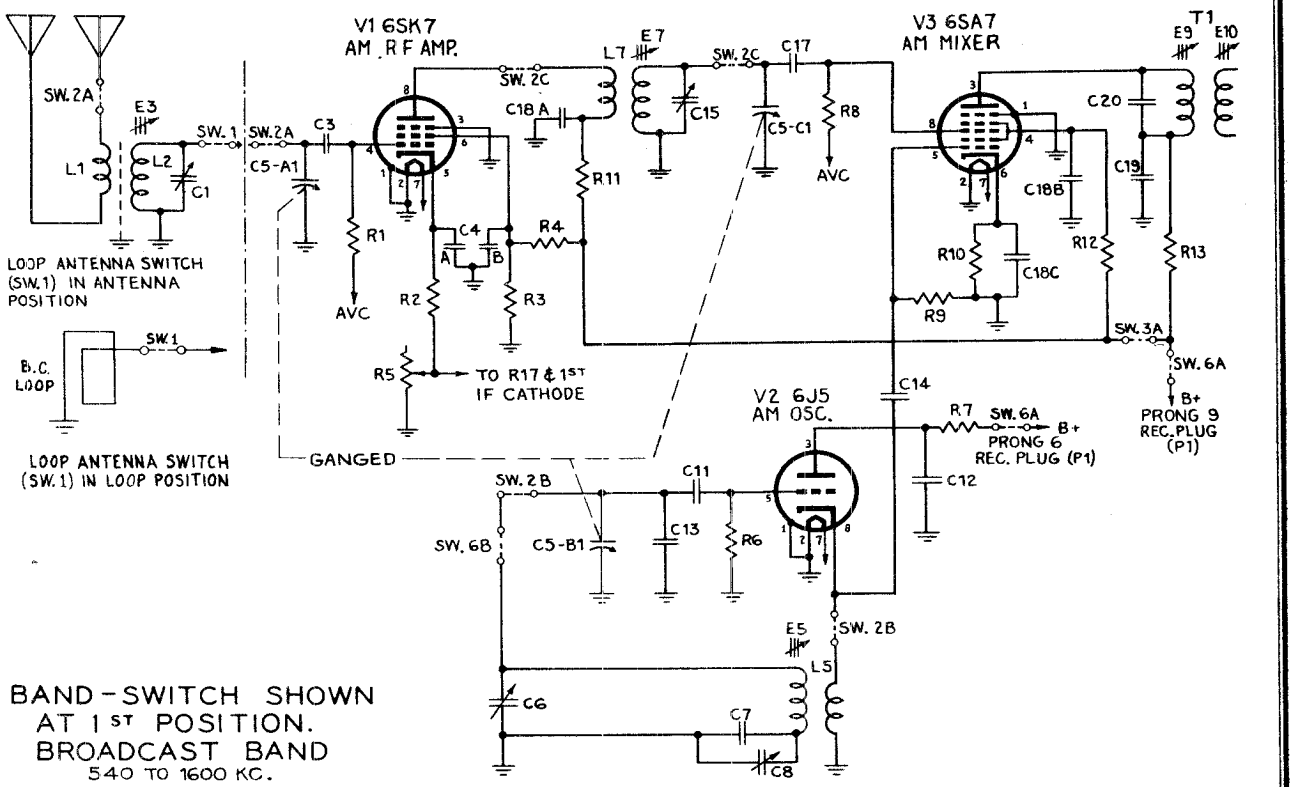
MODEL 800 B RECEIVER CHASSIS
FEBRUARY 1, 1946

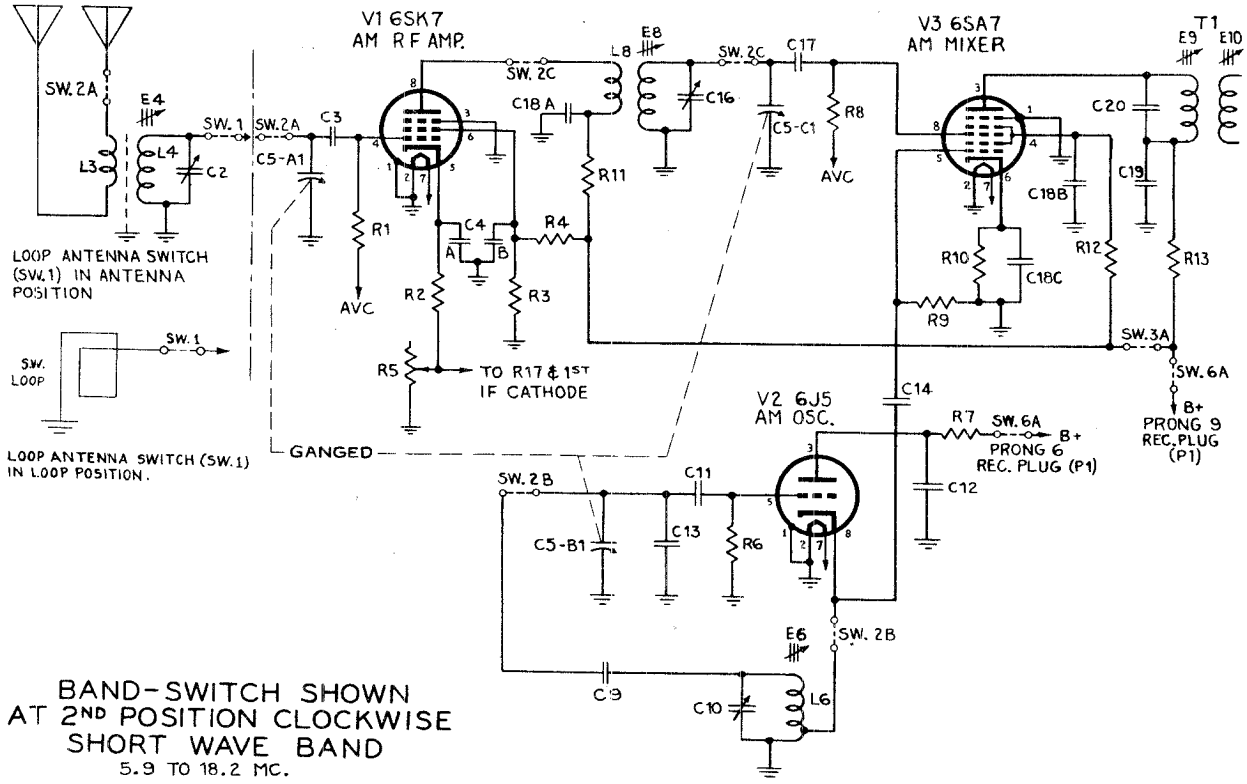
SCOTT RADIO LABORATORIES INC.
CHICAGO 40 ILLINOIS

Figure 25 Schematic Diagram Model 800-B Receiver Chassis

SCOTT RADIO LABS. INC.

MODEL 800-B Early





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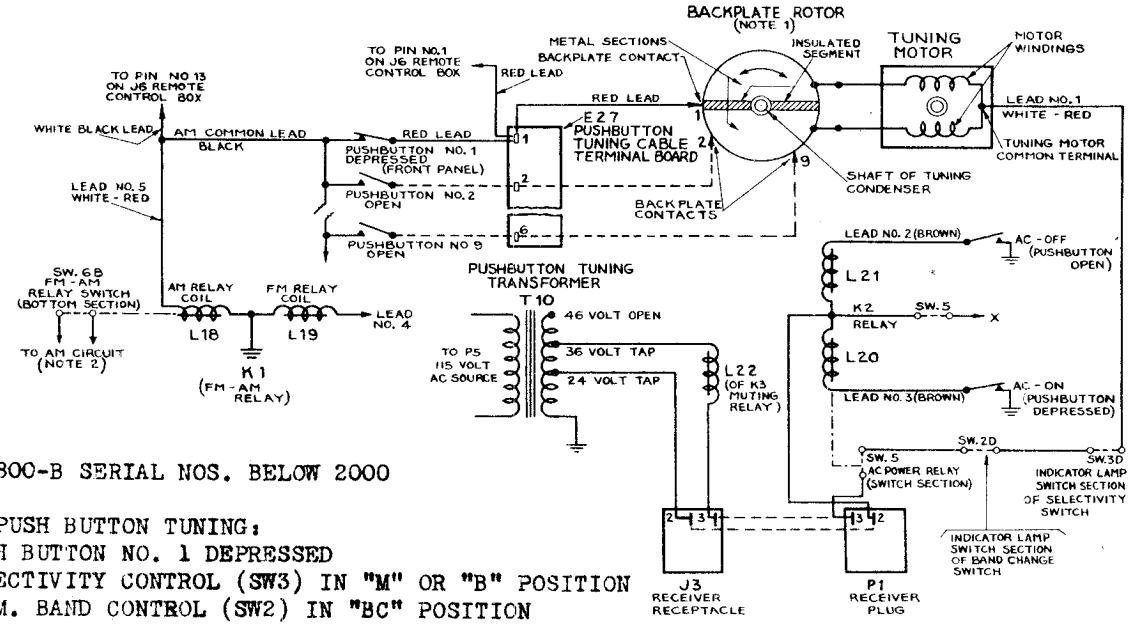
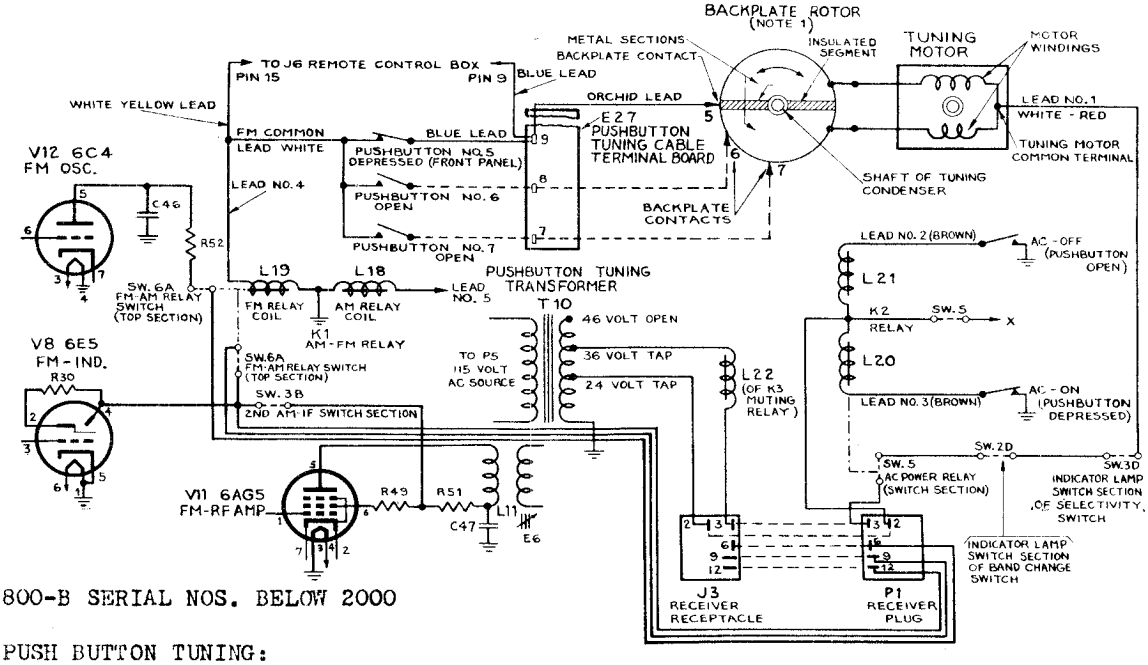
MODEL 800-B Early

SCOTT RADIO LABS. INC.



MODEL 800-B SERIAL NOS. BELOW 2000

A. M. PUSH BUTTON TUNING:
1. PUSH BUTTON NO. 1 DEPRESSED
2. SELECTIVITY CONTROL (SW3) IN "M" OR "B" POSITION
3. A. M. BAND CONTROL (SW2) IN "BC" POSITION



MODEL 800-B SERIAL NOS. BELOW 2000

F. M. PUSH BUTTON TUNING:
1. PUSH BUTTON NO. 5 DEPRESSED
2. SELECTIVITY CONTROL (SW3) IN "M" OR "B" POSITION
3. A. M. HAND CONTROL (SW2) IN "BC" POSITION

Note 1: When a station push button is depressed, current flows through the circuit to the common terminal of the tuning motor. The current will then flow through that winding of the motor which connects that half of the back plate rotor to which the depressed push button makes contact. The current flowing through the motor winding causes the motor to rotate, activating the dial mechanism and turning the back plate rotor, until the insulated segment rides under the active contact, opening the circuit and stopping the motor. The tuning condenser is thus automatically rotated to the desired point previously set up by the depressed push button.

Note 2: SW.6B shown in oscillator circuit on simplified drawing (P.15-33) is driven by K1 to close A. M. circuits.

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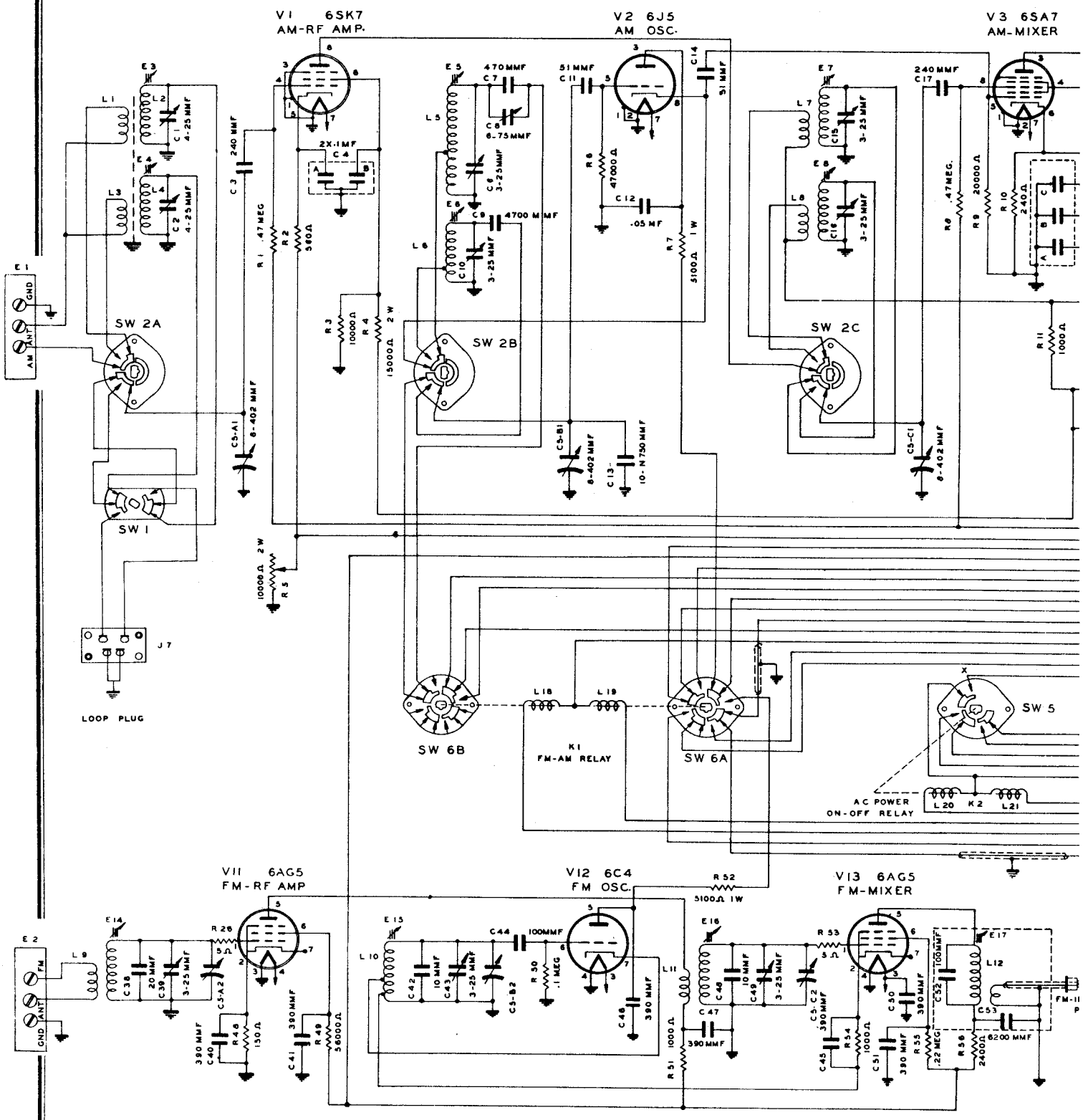
V1 6SK7
AM-RF AMP.
V2 6J5
AM OSC.
V3 6SA7
AM-MIXER
SW 2A
SW 2B
SW 2C
SW 1
SW 6B
SW 6A
SW 5
K1
FM-AM RELAY
AC POWER
ON-OFF RELAY
L20 K2 L21
LOOP PLUG
J7
V11 6AG5
FM-RF AMP
V12 6C4
FM OSC.
V13 6AG5
FM-MIXER

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MODEL 800-B Revised
Above Serial No. 2000

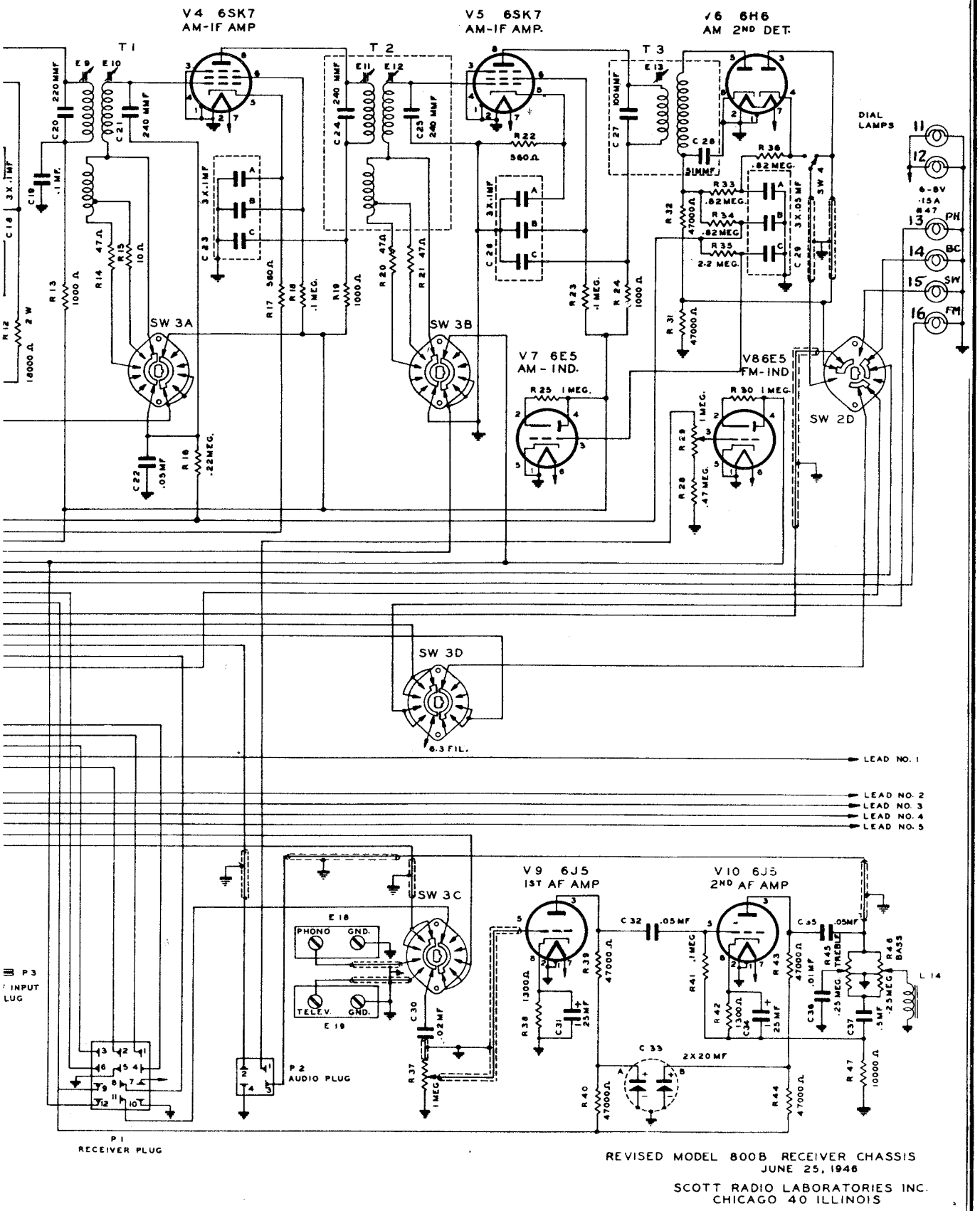
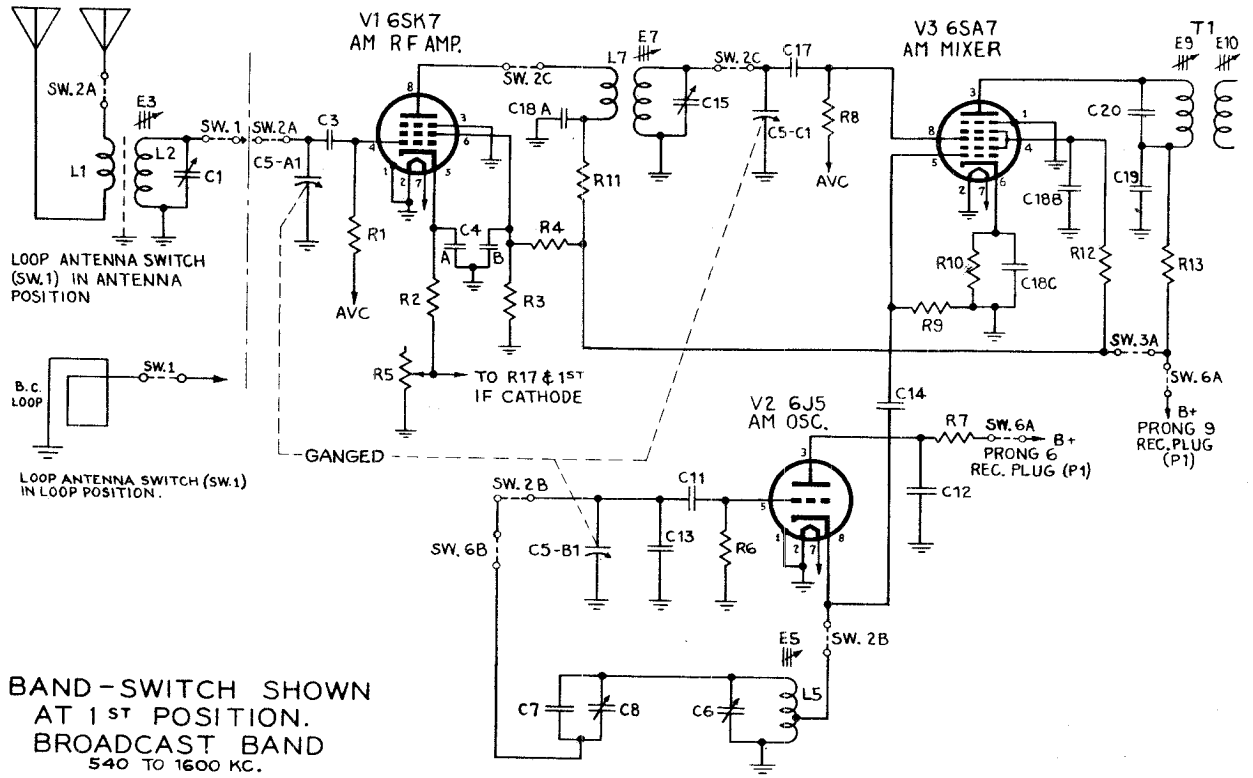


Figure 26 Revised Schematic Diagram Model 800-B Receiver Chassis

SCOTT RADIO LABS. INC.

MODEL 800-B Revised



BAND-SWITCH SHOWN
AT 1ST POSITION.
BROADCAST BAND
540 TO 1600 KC.

BAND-SWITCH SHOWN
AT 2ND POSITION CLOCKWISE
SHORT WAVE BAND
5.9 TO 18.2 MC.

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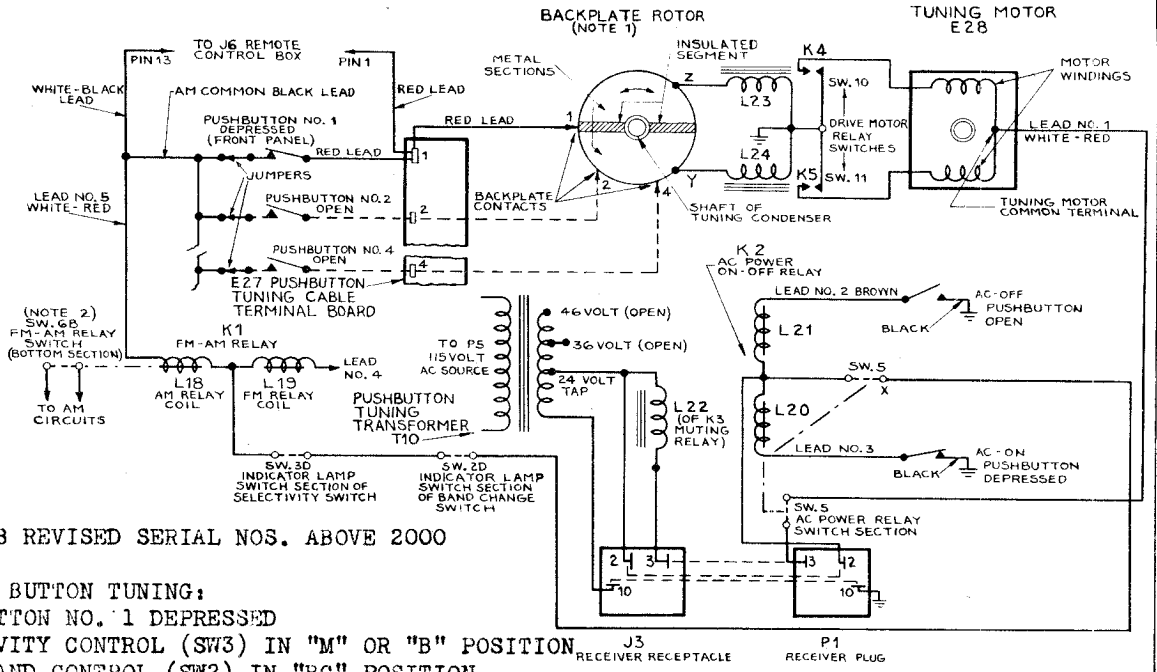
"clarified schematics"

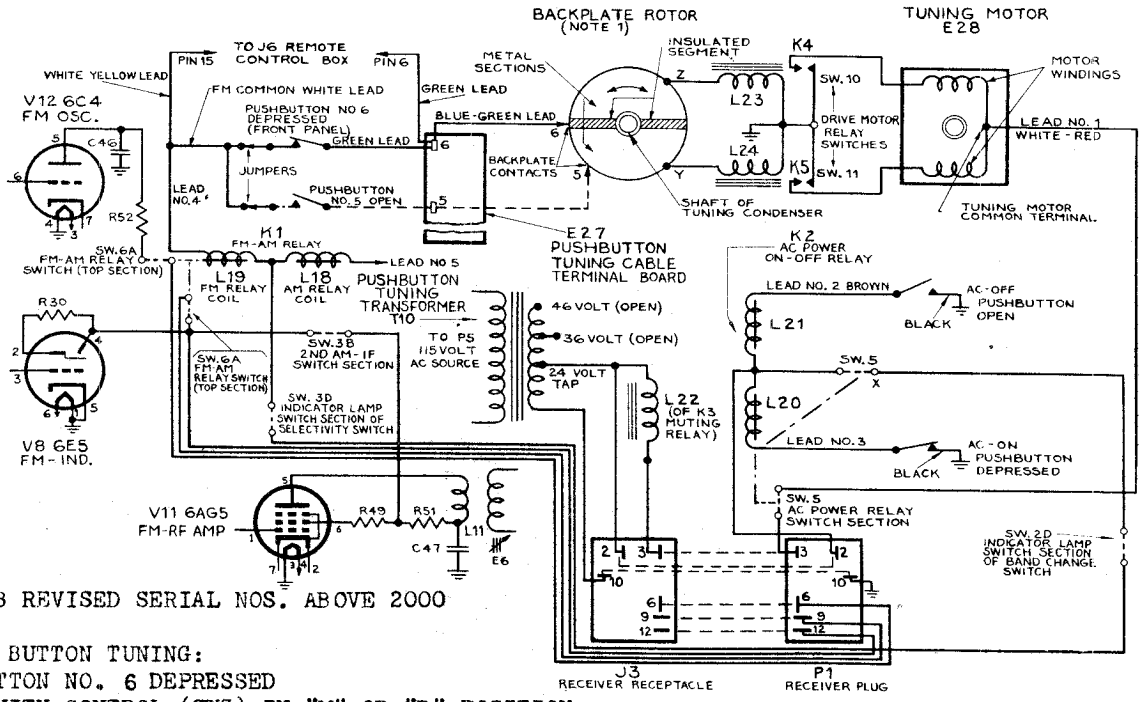
MODEL 800-B Revised

SCOTT RADIO LABS. INC.



MODEL 800-B REVISED SERIAL NOS. ABOVE 2000

A. M. PUSH BUTTON TUNING:
1. PUSH BUTTON NO. 1 DEPRESSED
2. SELECTIVITY CONTROL (SW3) IN "M" OR "B" POSITION
3. A. M. BAND CONTROL (SW2) IN "BC" POSITION



MODEL 800-B REVISED SERIAL NOS. ABOVE 2000

F. M. PUSH BUTTON TUNING:
1. PUSH BUTTON NO. 6 DEPRESSED
2. SELECTIVITY CONTROL (SW3) IN "M" OR "B" POSITION
3. A. M. BAND CONTROL (SW2) IN "BC" POSITION

Note 1. When a station push button is depressed, current flows through the circuit to the common terminal of the tuning motor. The current will then flow through that winding of the motor which connects that half of the back plate rotor to which the depressed push button makes contact. The current flowing through the motor winding causes the motor to rotate, activating the dial mechanism and turning the back plate rotor, until the insulated segment rides under the active contact, opening the circuit and stopping the motor. The tuning condenser is thus automatically rotated to the desired point previously set up by the depressed push button.

Note. 2. SW.6B shown in oscillator circuit on simplified drawing (P.15-37) is driven by K1 to close A. M. circuits.

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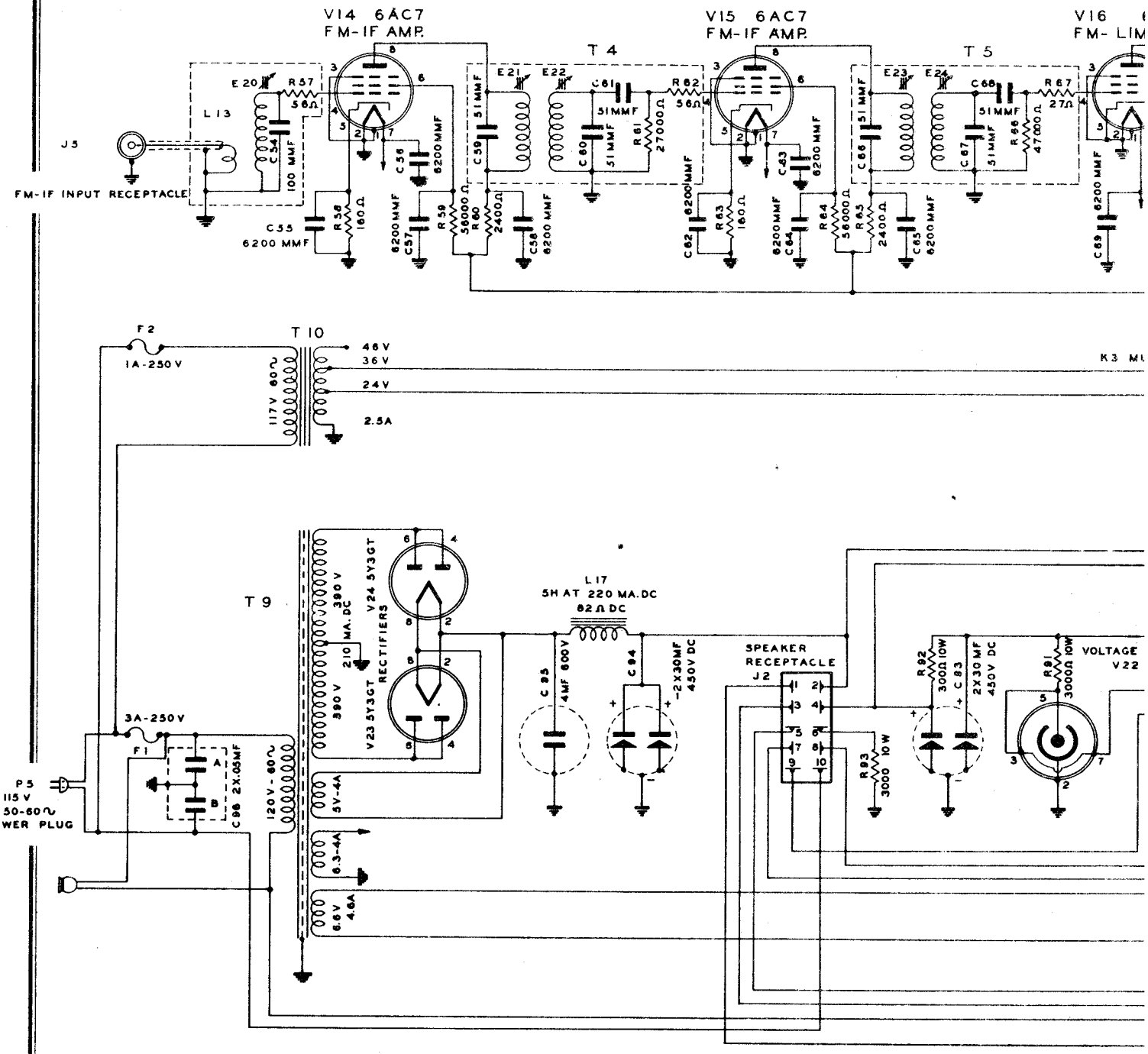

Power Requirements ...	117 volts AC 60 Cycles Current Consumption 197 Watts Normal-310 Watts Maximum
Audio Power Output	25 watts undistorted 40 watts maximum
Audio Frequency Range .	35 to 20,000 cycles
Overall Frequency Range - AM	35 to 8,500 cycles
Overall Frequency Range - FM	35 to 15,000 cycles

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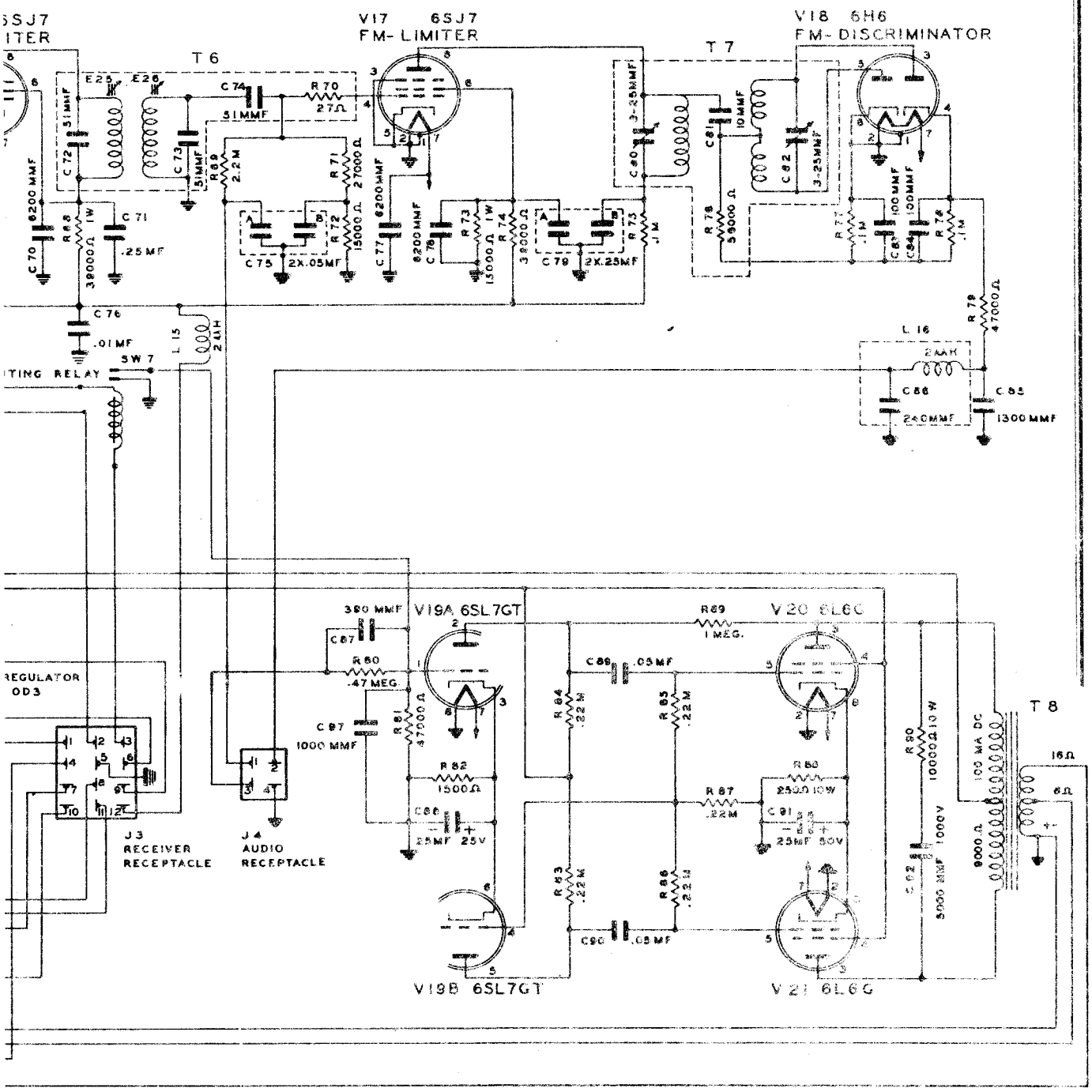
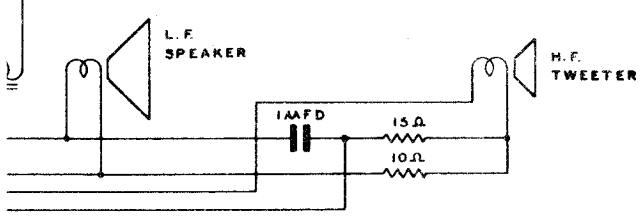
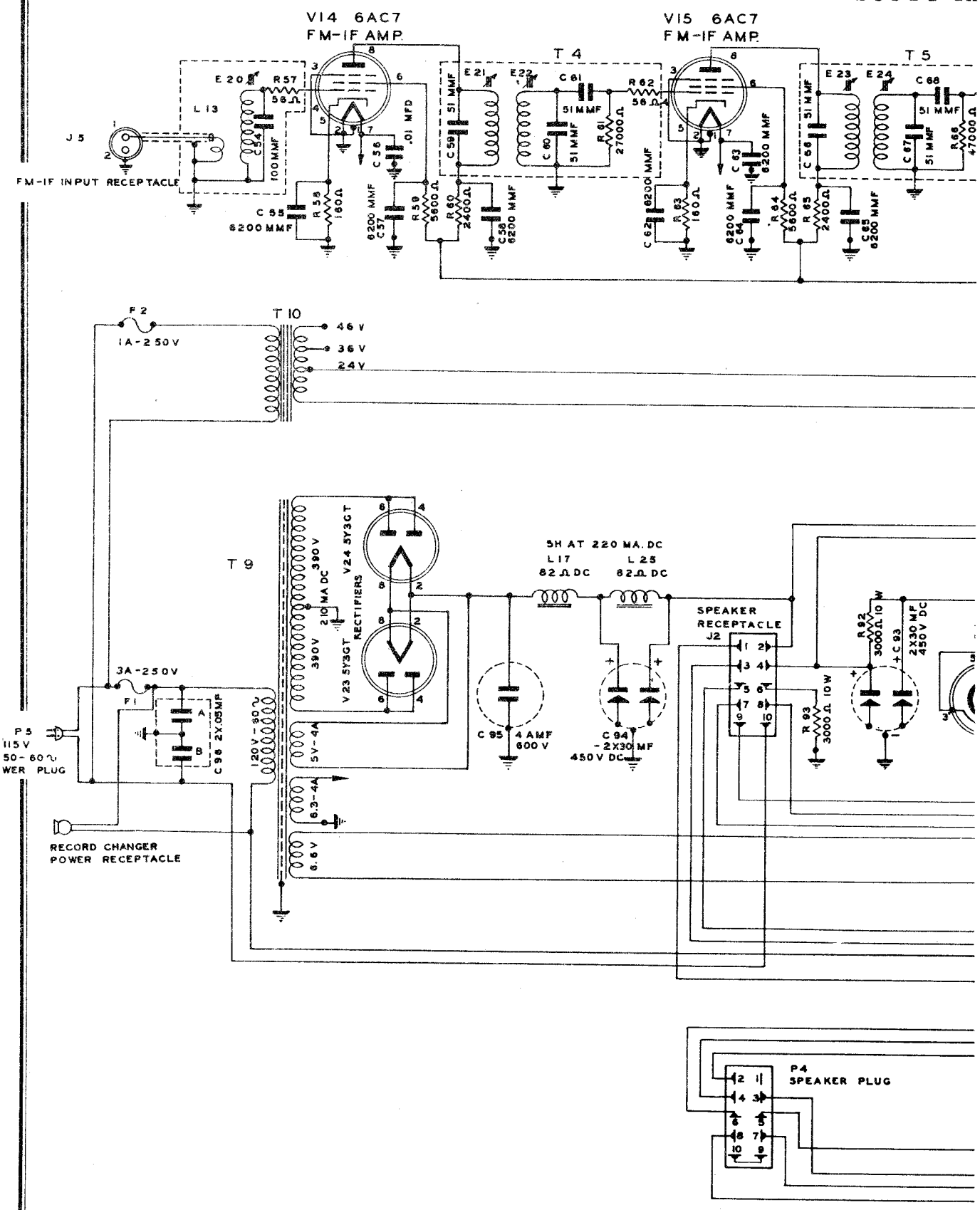


MODEL 800B POWER SUPPLY
FEBRUARY 1, 1948



SCOTT RADIO LABORATORIES INC.
CHICAGO 40 ILLINOIS

Figure 27 Schematic Diagram Model 800-B Power Supply


SCOTT R
V14 6AC7
FM-IF AMP.
V15 6AC7
FM-IF AMP.
T 4
T 5
FM-IF INPUT RECEPTACLE
J 5
L 13
E 20
R 57
56 Ω
C 54
100 MMF
C 55
6200 MMF
R 58
180 Ω
C 56
.01 MFD
C 57
6200 MMF
E 21
C 59
51 MMF
R 59
5600 Ω
R 60
2400 Ω
C 58
6200 MMF
E 22
C 60
C 61
51 MMF
R 61
27000 Ω
C 62
6200 MMF
R 63
160 Ω
R 62
56 Ω
C 63
6200 MMF
C 64
6200 MMF
R 64
5600 Ω
R 65
2400 Ω
C 65
6200 MMF
E 23
C 66
51 MMF
E 24
C 67
51 MMF
C 68
51 MMF
R 66
47000 Ω
F 2
1A-250V
T 10
46 V
36 V
24 V
T 9
V 24 5Y3GT
V 23 5Y3GT
RECTIFIERS
390 V
390 V
210 MA. DC
5H AT 220 MA. DC
L 17
82 Ω DC
L 25
82 Ω DC
C 95
4 AMF
600 V
C 94
-2X30 MF
450 V DC
SPEAKER
RECEPTACLE
J2
R 92
3000 Ω 10 W
C 93
2X30 MF
450 V DC
R 93
3000 Ω 10 W
3A-250V
F1
C 96 2X.05MF
A
B
120V-60~
5V-4A
6.3-4A
6.6 V
P 5
115 V
50-60~
WER PLUG
RECORD CHANGER
POWER RECEPTACLE
P4
SPEAKER PLUG

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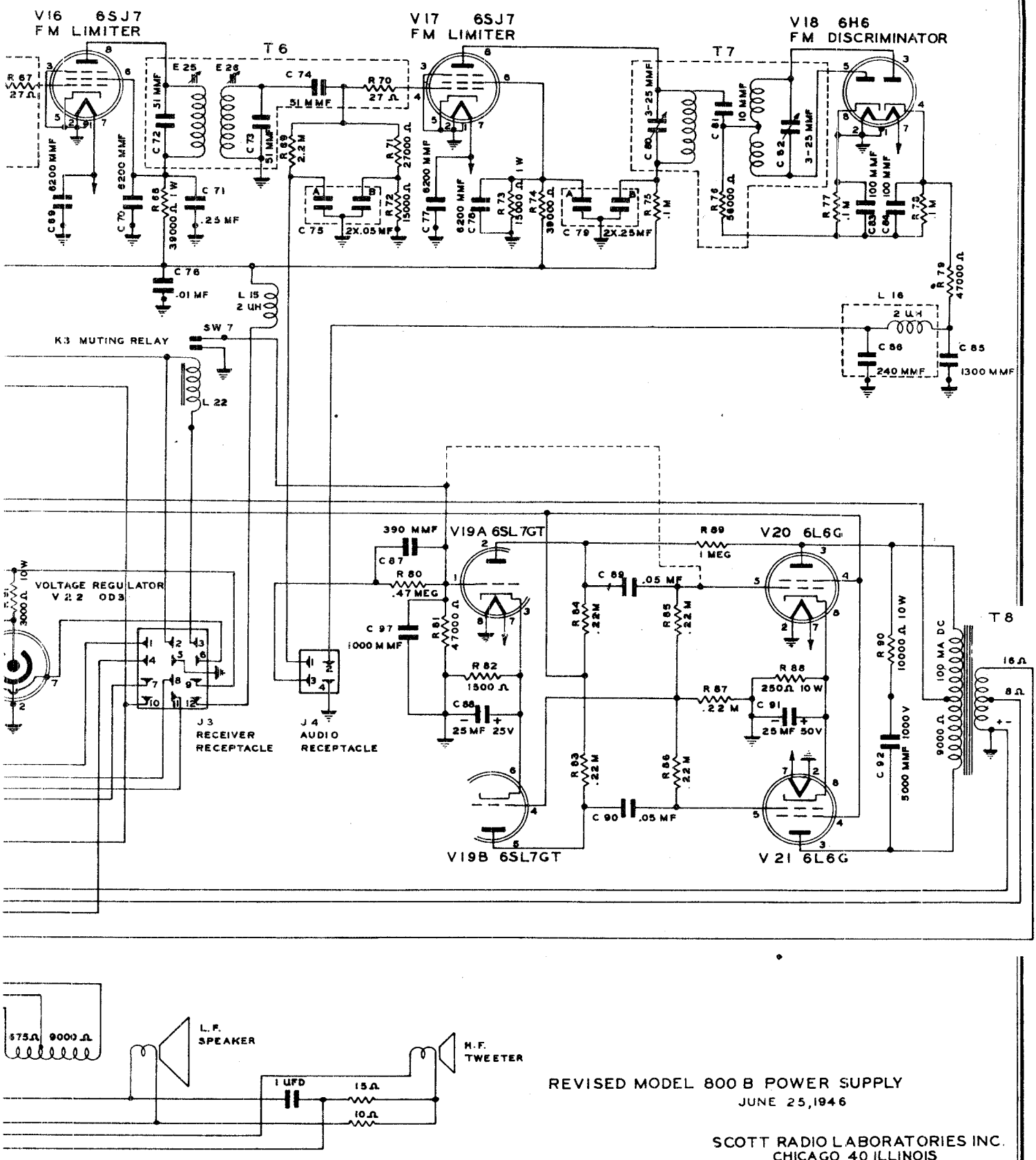

Figure 28 Revised Schematic Diagram Model 800-B Power Supply

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Transfer of IF signal from the plate of the mixer tube V3 to second detector tube V9 is accomplished by inductive coupling through IF transformers T1, T2 and T3 and amplified by tube V4 and V5. The first IF transformer T1 consists of two tuned circuits, primary and secondary with the secondary circuit operating in conjunction with switch SW3A and a tapped tertiary winding to provide three degrees of selectivity by changing the co-efficient of coupling with the primary circuit. The primary and secondary windings are each tuned to 455 kilocycles by fixed capacitors C20 and C21 and adjustable iron cores E9 and E10. These iron cores are accessible for adjustment through the top of the shield can for E10 and at the bottom of the receiver for E9. The high potential end of the primary tuned circuit connects to the plate of mixer tube V3 through a shielded conductor while the low potential end connects to the high voltage DC line through resistor R13 bypassed to ground by C19. The high potential end of the secondary tuned circuit is connected to the grid of first IF amplifier tube V4 while the low potential end is connected to the AVC line through switch SW3A and resistor R16, bypassed to ground by C22. DC potential from the high voltage DC line is applied to the screen of V4 through resistor R18 bypassed to ground by C23B. Plate potential is applied through the primary tuned circuit of second IF transformer T2 and through resistor R19 bypassed to ground by C23C. Initial grid bias is obtained through resistor R17, bypassed to ground by capacitor C23A. Resistor R17 is returned to ground through sensitivity control R5 so that the bias on V4 may be increased when maximum sensitivity is not desired.

Second IF transformer T2 is similar to first IF transformer T1 in respect to design, construction and operating characteristics. Therefore except for differences in symbol designations the circuit description of first IF transformer T1 is applicable to this transformer. The low potential end of the secondary tuned circuit of T1 is returned to ground through switch SW3B. Grid bias for second IF amplifier tube V5 is obtained through resistor R22, bypassed to ground by C26A. Screen potential is applied through resistor R23, bypassed by C26B. Plate potential is applied through the primary winding of third IF transformer T3 and resistor R24, bypassed to ground by C26C.

Third IF transformer T3 consists of a tuned primary circuit and an untuned secondary. The primary circuit consists of the primary winding shunted by fixed capacitor C27 and adjustable iron core E13 which is accessible for adjustment at the bottom of the receiver. The high potential end of the secondary winding feeds the second detector diode, while the low potential end returns to ground through diode load resistors R31 and R32.

4.5 AM Second Detector Circuits

The second detector tube V6 is a twin diode tube, one section being used as a second detector diode the plate of which is connected to the high potential end of the secondary winding of T3. The cathode is connected to ground, thus the tube acts as a half wave rectifier. The voltage developed across diode load resistors R31 and R32 is filtered by resistor R34 and capacitor C29B to remove all audio components, and the resultant direct current AVC voltage is used to control the gain of amplifier tube V1, V3 and V4; the degree of control being dependent on the strength of the incoming signal.

The second section of the twin diode tube V6 is utilized as a peak noise limiter which is effective only on the AM shortwave band where interference from ignition or similar peak noise may be encountered. The audio voltage appearing at the junction of R31 and R32 as a result of the demodulating action of the second detector diode, is normally coupled to the input of the audio amplifier. When the Sensitivity control is advanced to maximum rotation, switch SW4 connects the audio input to the cathode of V6 and the noise limiter circuit is in operation.

DC potential from the AVC line is further filtered by resistor R35 and capacitor C29C and applied to the control grid of tuning eye tube V7-6E5. This DC voltage regulates the shadow angle of the tube to indicate when the receiver is tuned to resonance with the received signal.

4.6 Audio Amplifier Circuits

The 1st and 2nd audio amplifier circuits are located on the receiver chassis while the phase inverter and output amplifier are on the power supply chassis. The audio voltage developed across the diode load resistors R31 and R32 is applied to the control grid of first AF amplifier tube V9-6J5, through capacitor C30 and volume control R37.

Switch section SW6A on the FM-AM relay actuates to connect the output of either the AM detector or the FM discriminator to the audio input switch section SW3C. This switch connects the input circuit of 1st audio amplifier V9-6J5 to radio input. Phono input or television sound input, depending on the setting of the Selectivity control.

Initial bias for 1st audio amplifier V9-6J5 is obtained through resistor R38 bypassed by C31. Plate potential is applied through filter resistor R40, bypassed by 1 section of dual capacitor C33, and through load resistor R39.

Audio signal from the plate of V9 is fed through capacitor C32 to the grid of 2nd audio amplifier tube V10-6J5. The grid of V10 is returned to ground through resistor R41 and R47. Initial bias is obtained through resistor R42 bypassed by C34. Plate potential is applied through filter resistor R44, bypassed by the second section of C33; and through load resistor R43.

Signal from the plate of V10 is coupled to the grid of 3rd audio amplifier tube V19-6SL7GT, located on the power supply chassis, through capacitor C35, to terminal #3 of audio plug P2, through terminal 3 of audio receptacle J4 and through audio compensating network R80, C87.

The tone control circuit consisting of treble control R45 and associated capacitor C36; bass control R46 and associated audio choke L14, and capacitor C37. Both R45 and R46 are centertapped controls and when the controls are both set at the position of the tap the audio response curve is flat. By tuning the treble control clockwise the high frequency response is boosted and when turned counterclockwise the high frequency response is cut. When the bass control is turned clockwise the low frequency response is boosted and when turned counter clockwise it is cut; thus the frequency response of the audio amplifier can be controlled over a wide range.

The grid of 3rd audio amplifier V19A which is one section of a dual triode tube 6SL7GT, is returned to ground through R81. Capacitor C97 is used in conjunction with audio compensating network R80, C87 which is provided to compensate for loss of high frequency response in the long connecting lead from the plate of V10 to the grid of V19A. Initial bias for both sections of V19 is obtained through resistor R82 bypassed by capacitor C88. Plate potential is applied to V19A through R84 and to V19B through R83.

Audio signal from the plate of V19A is fed to the grid of audio output amplifier V20, through capacitor C89; this grid is returned to ground through R85 and R87.

Audio signal from the plate of V19B is fed to the grid of audio output amplifier V21 through capacitor C90; this grid is returned to ground through R86 and R87.

Audio voltage appearing at the junction of resistors R85, R86 and R87 is fed to the grid of V19B. Since this voltage is 180 degrees out of phase with that appearing at the grid of V19A the audio voltages appearing at the plates of V19A and V19B will be 180 degrees out of phase, thus providing push pull amplification.

Initial grid bias for V20 and V21 is obtained through resistor R88 bypassed by C91. Screen potential for V20 and V21 is applied direct from the power supply. Plate potential is applied through the centertapped primary of output transformer T8. Capacitor C92 and resistor R90 are connected in series across the plates of V20 and V21 to prevent parasitic oscillation in the output amplifier circuit.

4.7 FM-RF Oscillator and Mixer Circuits

The FM-RF amplifier, mixer and oscillator circuits are located on the receiver chassis, the FM-IF amplifier and discriminator circuits are located on the power supply chassis. Input signal from the antenna is fed through FM-antenna terminal strip E2, located at the rear of the receiver, through antenna coil L9 to the grid of FM-RF amplifier V11-6AG5 which is a miniature type tube. The secondary of antenna coil L9 is connected to the grid of V11 through a parasitic suppressor R26, the low potential end of the coil being grounded. It is tuned by variable air capacitor C5-A2. Variable trimmer capacitor C39 and adjustable iron core E14 are provided as trimmer adjustments. Shunt connected capacitor C38 is provided to increase the minimum capacity of the tuned circuit. Initial grid bias is obtained through R48 bypassed by C40. Screen potential is applied through resistor R49 bypassed by C41. Plate potential is applied through the primary of mixer coil L11 and resistor R51 which is bypassed by C47.

Signal from the plate of V11 is fed to the grid of FM-mixer tube V13-6AG5, through mixer coil L11 and parasitic suppressor R53. The secondary tuned circuit of L11 is tuned by variable air capacitor C5 and C2. Air trimmer C49 and adjustable iron core E16 are provided as trimmer adjustments while fixed capacitor C48 is provided to increase the minimum capacity of the tuned circuit. Initial bias for V13 is obtained through R54 bypassed by C45. This circuit is returned to ground through a small portion of the secondary winding of FM oscillator coil L10. This impressing a voltage on the cathode of V13 at the frequency to which the oscillator circuit is tuned. This signal which is always 10.7 megacycles lower in frequency than the signal frequency, is heterodyned or mixed with the signal frequency appearing on the grid of mixer tube V13 and the resultant frequency 10.7 megacycles appears at the plate of FM mixer tube V13.

Screen potential is applied to V13 through R55 bypassed by C51. Plate potential is applied through IF primary coil L12 and resistor R56 bypassed by C53. One side of the heater of V13 is bypassed to ground by C50.

FM oscillator tube V12-6C4 is a miniature type triode. The tuned circuit consists of FM oscillator coil L10 and variable air capacitor C5B2; variable trimmer capacitor C43 and adjustable iron core E15 are provided as trimmer adjustments. Fixed capacitor C42 is provided to increase the minimum capacity of the tuned circuit. The high potential end of L10 connects to the grid of V12 through coupling capacitor C44. The grid is returned to ground through R50. The cathode of V12 is connected to a tap on coil L10. Plate potential is applied through R52 bypassed by C46.

4.8 FM-IF Circuits

The IF signal appearing at the plate of FM mixer tube V12 is fed to the primary of 1st FM-IF transformer L12. This coil is tuned to 10.7 megacycles by capacitor C52 and adjustable iron core E17. The primary winding is then link coupled to the secondary winding, located on the power supply chassis, through FM-IF input plug P3 and jack J5 and through another small winding coupled to the secondary coil L13. The 1st FM-IF secondary coil L13 is tuned to 10.7 megacycles by capacitor C54 and adjustable iron core E20 and is connected to the grid of 1st FM-IF amplifier V14-6AC7 through parasitic suppressor R57.

Bias is obtained through R58, bypassed by C55. Screen potential is applied through R59 bypassed by C57. Plate potential is applied through the primary winding of 2nd FM-IF transformer T4 and resistor R60 bypassed by C58. One side of the heater of V14 is bypassed to ground by C56.

The primary of T4 is tuned to 10.7 megacycles by capacitor C59 and adjustable iron core E21. The primary is inductively coupled to the secondary which is tuned by capacitor C60 and iron core E22. The high potential end of the secondary connects to grid of 2nd FM-IF amplifier V15-6AC7 through capacitor C61 and parasitic suppressor R62. The low potential end returns to ground. The grid of V15 returns to ground through R61. Through the use of coupling capacitor C61 and grid leak R61 second FM-IF amplifier tube V15 will act as a limiter on extremely strong signals.

Second FM-IF amplifier V15-6AC7 is identical to first FM-IF amplifier tube; therefore except for symbol designations the circuit description is the same.

Third and fourth FM-IF transformer T5 and T6 are similar to second FM-IF transformer T4 and except for symbol designations the circuit description is the same.

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The third and fourth FM-IF tubes are used as limiter amplifiers. By employing the proper plate and screen voltages and correct values of grid leak and coupling capacitors these tubes will reach full limiting action with approximately 10 microvolts input signal, effectively shunting any amplitude signals such as ignition noise or impulse interference signals. The values of grid leak and coupling capacitor used were chosen to insure fast limiting action on noises possessing a steep wave front.

4.9 FM Discriminator Circuit

The fifth FM-IF transformer or discriminator transformer is provided to couple the second limiter tube V17 to the discriminator diode V18. A phase bridge type of discriminator circuit is used with both primary and secondary circuits being tuned by air dielectric trimmers C80 and C82. The primary and secondary windings are inductively coupled so that the peaks of the discriminator are approximately 300 kilocycles apart. The discriminator is linear up to plus or minus 100 kilocycles from the IF frequency of 10.7 megacycles, in order that over-modulation beyond plus or minus 75 KC at the transmitter will not cause distortion in the receiver.

The balanced detector action of the discriminator tube diode acts to cancel any amplitude modulation present on weak signals. Signal voltage appearing across the primary of T7 is induced into the secondary of this transformer which reacts with the voltage coupled from the primary through capacitor C81 to produce frequency discriminating action. When the frequency of the signal flowing through T7 is exactly 10.7 megacycles the voltage across resistors R77 and R78 are equal and opposite. A change in the frequency in one direction produces a positive difference between the voltages across R77 and R78; a frequency change in the opposite direction produces a negative voltage difference. In this way frequency modulation of the carrier signal produces a similar audio frequency voltage across resistors R77 and R78. This audio voltage is fed to the audio amplifier input through a de-emphasis network consisting of resistor R7 and capacitor C85. RF choke L16 and capacitor C86 are provided to filter out any RF components which may be picked up in the audio input lead.

4.10 Rectifier Power Supply Circuits

The rectifier power supply of the Model 800-B Radio-Phonograph is designed to operate from a 115-120 volt 50-60 cycle AC source. The power supply chassis is provided with a 6 foot two conductor cord with plug for connection to the AC source.

One side of the primary circuit of power transformer T9 is fused with a 3 amp fuse and one side of the primary circuit of the pushbutton tuning transformer T10 is fused with a 1 amp fuse. The primary of T10 is connected across the AC line at all times so that voltage is always available to operate the AC-ON-OFF relay.

The primary circuit of the power transformer T9 is closed when the power ON-OFF relay K2 is thrown to the ON position by pushing the ON button at the front panel. One side of this primary circuit connects to terminal 10 of speaker receptacle J2. When the speaker plug P4 is inserted into the receptacle, the jumper wire between terminals 9 and 10 of the speaker plug completes the AC circuit to terminal 1 of the receiver receptacle J3 through the switch on relay K2 then back through terminal 4 of receiver receptacle J3 to the power transformer. The AC power circuit is fed through the speaker receptacle J2 so that if the speaker plug is removed when the power is on, the primary circuit is automatically broken and no damage can be done to the high voltage rectifiers. Capacitor C96 is provided to filter out any noise entering through the primary circuit of the power transformer. Receptacle J1 is provided for connection of the AC plug on the record changer. This receptacle is connected across the primary circuit of the power transformer and is active only when the receiver is turned ON.

One secondary of the power transformer furnishes high voltage for the full wave rectifier plates. Another winding furnishes filament voltage for the rectifier tubes V23 and V24. A third winding furnishes heater voltage for all tubes in the power supply chassis except the rectifiers. A fourth winding furnishes heater voltage for all tubes on the receiver chassis.

The rectified voltage from the rectifier tubes V23 and V24 is filtered by a two section filter and fed to the plate of the power output tubes V20 and V21 through the primary of output transformer T8. This voltage is also fed through terminal 2 of speaker receptacle J2 and plug P4 to the 675 ohm field of the loudspeaker; from the field it feeds back through the speaker plug and receptacle terminal 4 and fed to the plates of V19A and V19B and the screens of V20 and V21. From this point a dropping resistor R92 reduces the voltage to the proper potential for all other tubes in the receiver.

The voltage regulator tube V22-OD3 (VR-150) is included in the power supply circuit to provide stabalized voltage for the AM and FM oscillator tubes so that variations in line voltage will not affect the frequency setting of the oscillator circuits.

4.11 Loudspeaker Circuits

The loudspeaker used with the Model 800-B Radio-Phonograph may be either a coaxial type or an extended range single speaker. Both speakers have the same field characteristics. A 675 ohm series field connected to terminals 2 and 4 of speaker plug P4 and a 9000 ohm shunt field connected to terminals 4 and 6. The coaxial speaker consists of a 15 inch low frequency speaker with a 5 inch FM tweeter mounted in the center. A network is used with the high frequency tweeter so that it will reproduce only the higher frequencies. The voice coil impedance of the coaxial speaker is 8 ohms and is connected to terminals 3 and 5 of speaker plug P4. One side of the tweeter circuit is connected to terminals 7 and 8 of the speaker plug which feed through the speaker receptacle J2 to terminals 8 and 11 of the receiver power receptacle J3; then through the cable to switch SW6A on the FM-AM relay. When the switch is thrown to FM position this circuit is closed and the tweeter is effective but when the relay is thrown to AM position the tweeter circuit is open and only the 15 inch low frequency is effective. Since the low frequency speaker will reproduce all frequencies desired for AM broadcasts or record reproduction the tweeter is not used to prevent reproduction of undesirable back ground noise. The 15 inch extended range single speaker has a voice coil impedance of 16 ohms and is connected to terminals 1 and 5 of speaker plug P4, since no tweeter is used, terminals 7 and 8 are open.

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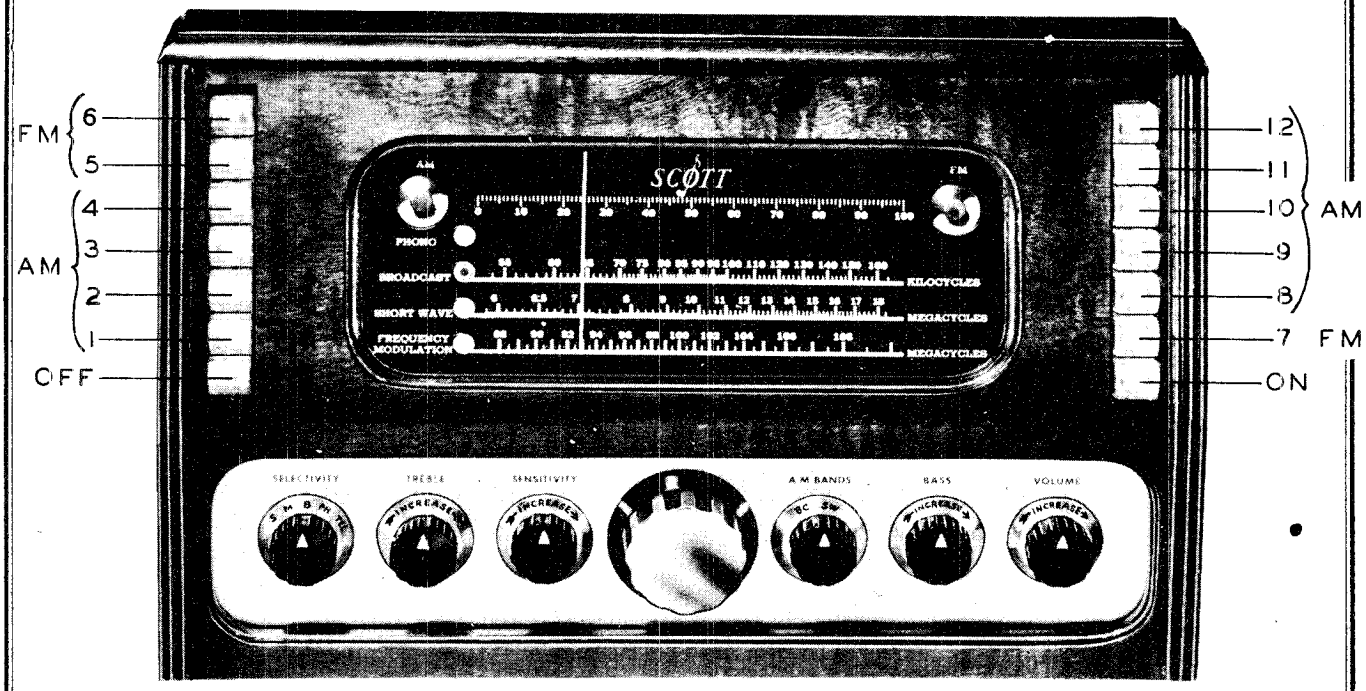

Figure 9 Front View 800-B Receiver Showing Pushbutton Sequence

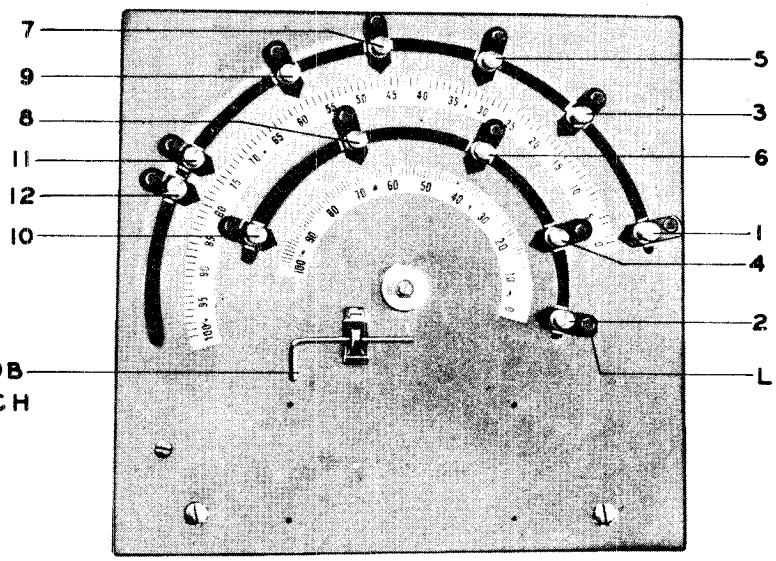

Figure 10 Back View of Pushbutton Tuning System Backplate

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4.12 Pushbutton Tuning System Circuits

The pushbutton tuning system in the Model 800-B Radio-Phonograph utilizes 14 pushbuttons, 12 of which are used for station selection and 2 being used to turn the receiver ON and OFF. Figures 29 and 30 depict the circuit diagrams of the systems used in the early models and the present models. The switches used are all single pole single throw, momentary contact pushbutton type. Seven switches are used in each gang located at the right and left side of the panel. Details on setting up and adjusting the pushbutton system are explained in Section V - Adjustments.

Each of the twelve pushbutton switches is connected by a color-coded lead to a terminal board E27 mounted on the under side of the receiver chassis. This terminal board is used as a common tie-point for wires leading to the switches, the backplate contacts and the remote box receptacle.

The backplate is the nerve center of the pushbutton tuning system. It consists of two semi-circular disks insulated from each other by a bakelite strip which has a narrow protrusion rising above the contact surfaces of the disks. The two disks are connected to the two windings of a reversible type motor which is coupled directly to the tuning shaft of the dial. The two disks which form the backplate rotor are coupled directly to the shaft of the main tuning capacitor. On the stator of the backplate are mounted twelve contact fingers with numbered, adjustable knobs. Each of these contacts are connected to a switch on the front panel as shown in Figure 9. On the early Model 800-B Receiver the backplate operates as follows, taking contact No.1 as an example. When pushbutton No. 1 is pushed the switch contacts close and potential from the 36 volt tap of pushbutton tuning transformer T10 is fed through the coil of muting relay K3 to terminal 3 of receiver power receptacle J3, then through receiver plug P1, terminal 3 to switch SW5 on the power ON-OFF relay, then to switch section SW2D of the band change control, to switch section SW3D of the selectivity control, then through lead No. 1 to the common terminal of the tuning motor. The voltage could then flow through either winding of the motor but since contact No. 1 is on the left side of the backplate rotor the voltage will be applied only to that side of the rotor through contact No. 1 to switch No. 1 then through lead No.5 and through coil L18 of the FM-AM relay to chassis ground. It is then returned to the other side of the 36 volt winding of the transformer through chassis ground. When the circuit is energized by closing a pushbutton switch as above the voltage across the coil L22 of muting relay K3 will energize the relay, closing the contacts and muting the audio circuit so that signals are not audible as the dial tunes across them. The voltage flowing through the motor winding causes it to rotate, actuating the dial mechanism and turning the backplate rotor, until the insulated segment rides under the active contact, at this instant the voltage in the circuit is interrupted and the motor stops running releasing the contacts on the muting relay. Since pushbutton No. 1 is connected to the AM common lead, the AM coil of the FM-AM relay would be energized when the circuit was closed thereby switching the AM circuits ON and making the FM circuits ineffective. If pushbutton switches 5, 6 or 7 or any switch which may be connected to the FM common lead were energized, the relay would automatically switch over as the FM coil of the relay would then be energized.

Figure 30 depicts the pushbutton tuning system used in the later model 800-B Receivers. The pushbutton switches are provided with two rows of dummy lugs, one row connected to the AM common lead, the other row connected to the FM common lead, and all that is necessary to use any pushbutton for FM or AM is to connect that switch to the corresponding common lead. It will be observed that the numbers opposite the pushbuttons have been rearranged so that they are in sequence - 1 to 12. Pushbuttons 5, 6 and 7 are still wired for FM when the receivers leave the factory as most of the FM stations are located in the center of the tuning scale but in locations where a frequency at some other part of the dial has been allocated, another pushbutton may be used by disconnecting the jumper wire of that particular switch from the AM common lead and connecting it to the FM common lead. The next item to be observed is the addition of two relays in series with the backplate rotor disk. When either of these relays are energized by voltage applied through the rotor disk, switches SW10 or SW11 are closed completing the motor circuit and turning the dial mechanism. By means of this arrangement very little current is required to pass through the backplate movable contacts thus prolonging their life. It will be noted also that the 36 volt tap of the pushbutton tuning transformer T10 is no longer required, all necessary potential being supplied from the 24 volt tap.

The pushbutton system drive motor is a 24 volt reversible type motor geared directly to the dial drive mechanism.

The power ON-OFF relay is a double solenoid relay with 1 rotary type switch section. When one of the solenoid coils is energized by pushing the ON pushbutton the relay actuates the switch to close the AC primary circuit of the power transformer and also closes the 24 volt circuit to the drive motor. When the other solenoid coil is energized by closing the OFF pushbutton, both of the above circuits are opened. Both solenoid coils operate at 24 volts AC.

The FM-AM relay is a double solenoid relay with 2 rotary type switch sections that operate 6 circuits. When one coil is energized by closing any AM pushbutton switch all circuits close to operate for AM reception, when the other solenoid coil is energized by closing any FM pushbutton switch, the circuits close to operate for FM reception. Both solenoid coils operate at 10 volts AC on the early model receivers and on all late model receivers with the relays in the drive motor circuit. The solenoid coils of the FM-AM relay operate at 22 volts AC.

The muting relay used in the 800-B Receiver is actuated by the voltage used to run the drive motor. The switch is a S.P.S.T. with contacts normally open. The coil operates on 2.4 volts AC.

The drive motor relays are identical in electrical characteristics to the muting relay although in some receivers the mechanical construction will be different.

The remote keyboard receptacle J6 is a 21 contact receptacle provided for the connection of a remote keyboard when it is desired to tune the receiver from a remote position. By means of this remote keyboard it is possible to tune in up to 12 stations, control the volume and turn the receiver ON and OFF. When the remote keyboard is to be used, a motorized volume control with the necessary connections is installed in the 800-B Receiver.

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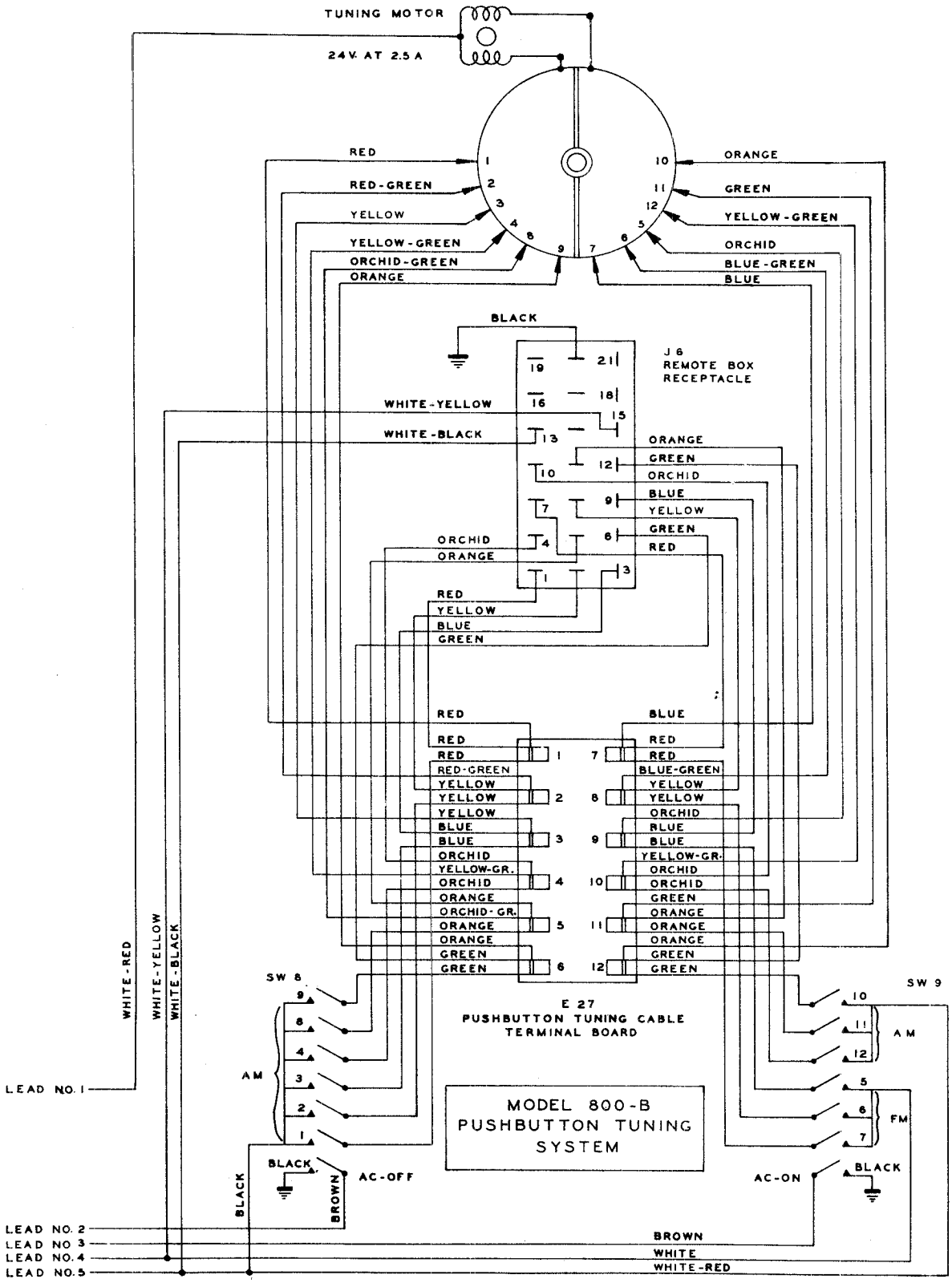

Figure 29 Schematic Diagram Pushbutton Tuning System

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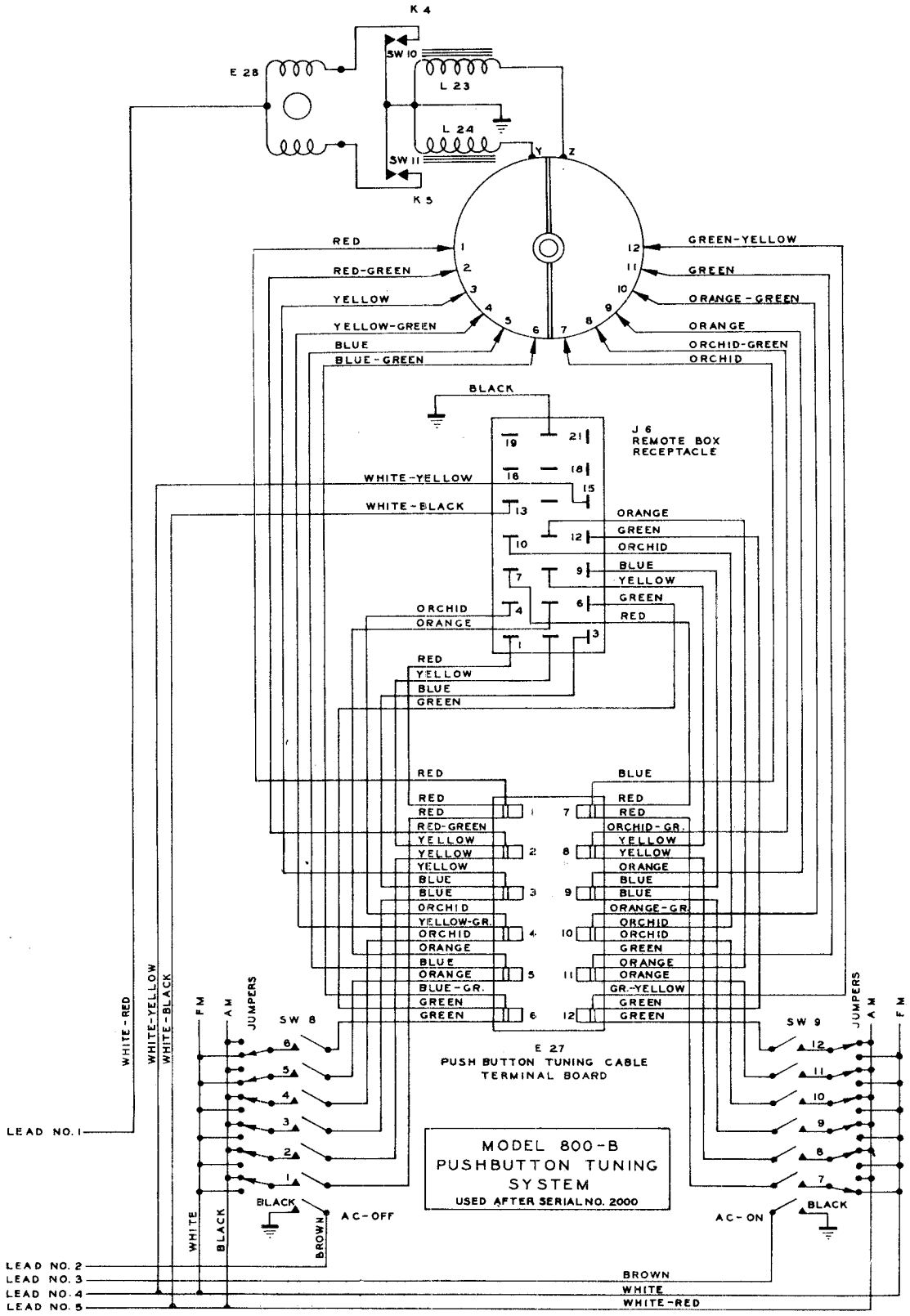

Figure 30 Revised Schematic Diagram Pushbutton Tuning System

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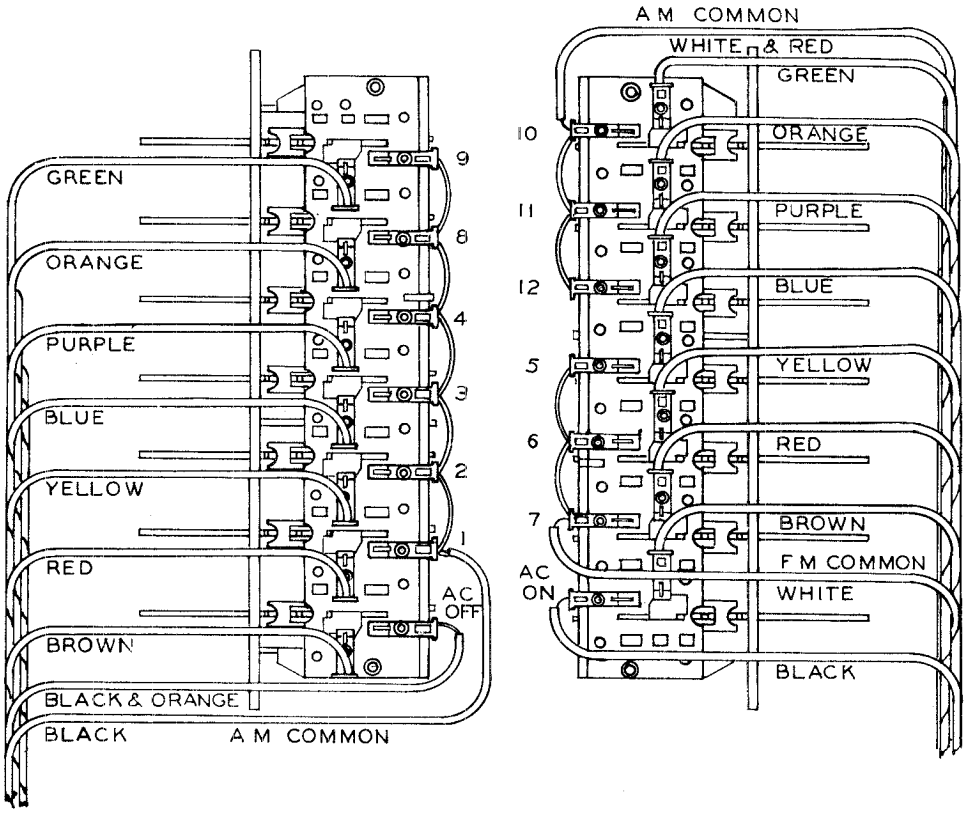

Figure 11 Pushbutton Switch Detail

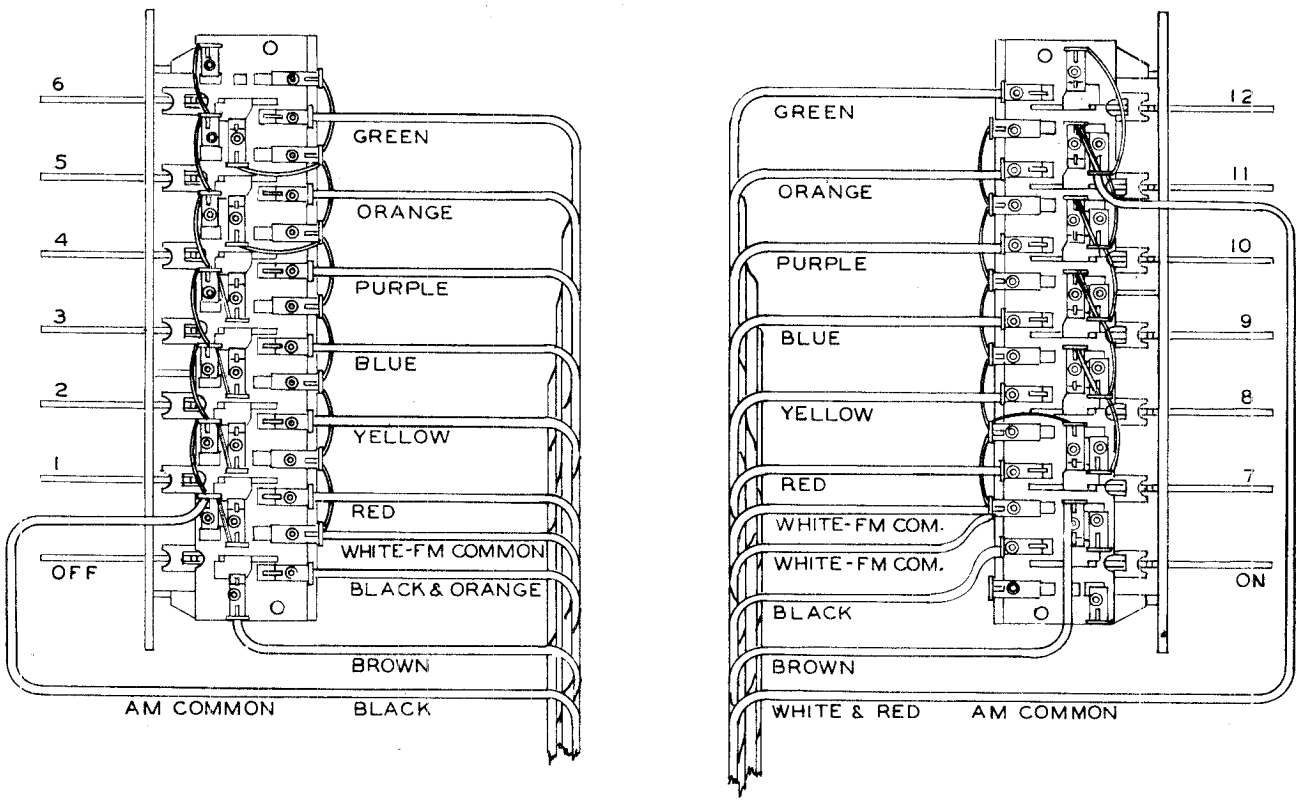

Figure 12 Pushbutton Switch Detail Modified

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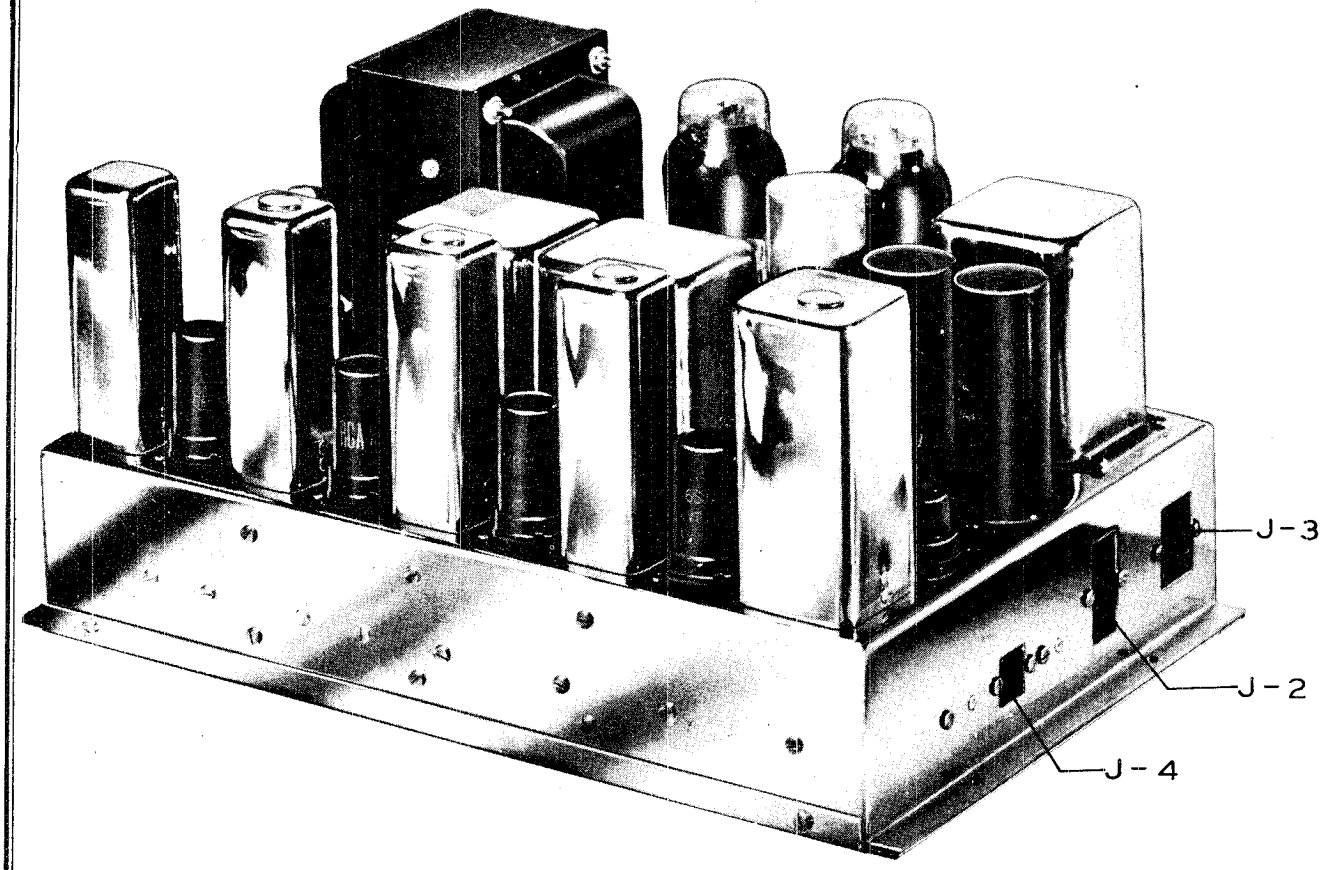

Figure 20 End View Model 800-B Power Supply Chassis

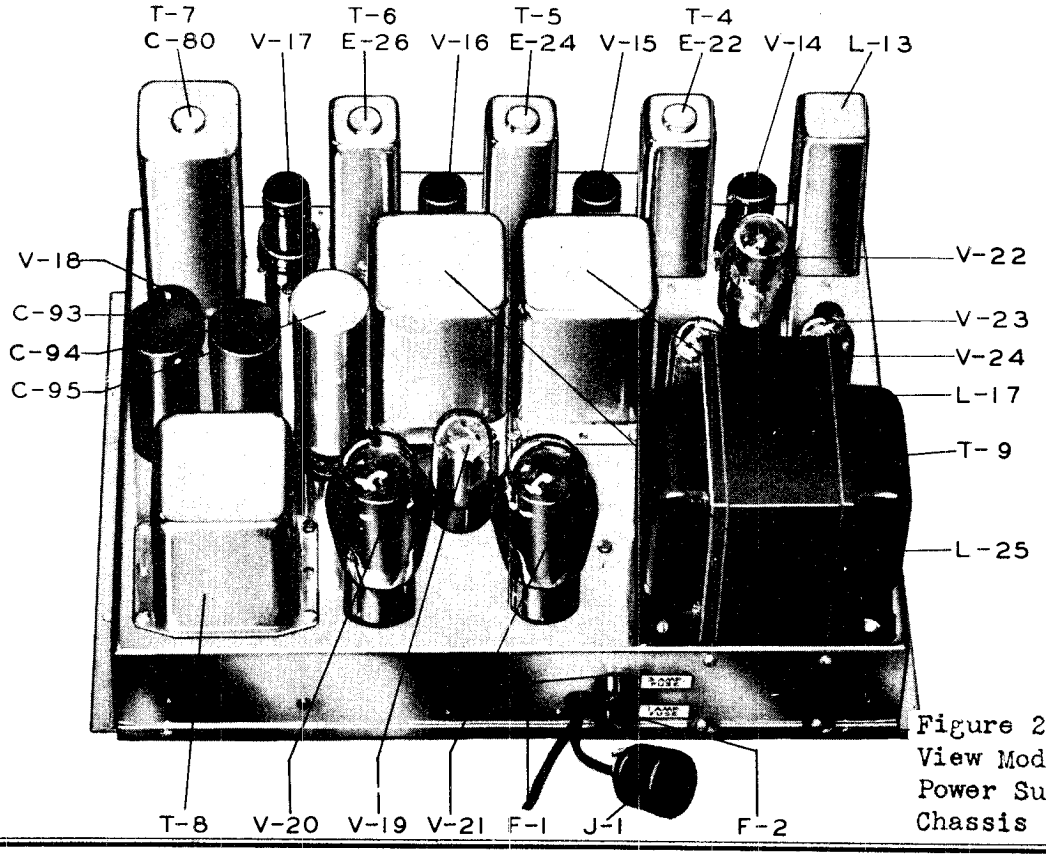

Figure 21. Top View Model 800-B Power Supply Chassis

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Section V ADJUSTMENTS

5.1 Setting up Pushbutton Tuning System

The pushbutton tuning system in the 800-B Receiver has been designed to provide maximum flexibility in order to permit setting up for 6 or more AM stations and 1 to 6 FM stations, the only limitations being the spacing of the stations on the tuning dial or the setting for an AM station falling on the same spot as that for an FM station. At the factory the receivers are wired so that 4 buttons on the left side of the panel and the 5 top buttons on the right side are wired for AM stations and the lower button on the right side with the two top buttons on the left side are wired for FM stations as shown in Figure 9. No attempt should be made to set up the pushbutton tuning system for weak distant stations as poor results will be obtained because of background noise.

The switch over from AM to FM reception is done automatically in the receiver, that is, with the receiver adjusted for pushbutton tuning, when any AM button is pushed the receiver is automatically set for AM reception and when any FM button is pushed the receiver is automatically switched for FM reception.

The pushbutton tuning drive unit is located at the rear of the receiver chassis. This unit has 12 adjustable knobs which are numbered 1 to 12. These knobs are set to the desired position by turning them clockwise or counter-clockwise with a rotary motion. They are locked in position by means of a small screw, adjacent to the knob. These small lock screws should never be tightened more than one turn past the point where the screw touches the backplate. If tightened more the setting of the knob will be changed. Two calibrated scales located below the two rows of knobs, are provided to enable setting the knobs in conjunction with the logging scale at the top of the front dial scale. Each of the pushbuttons on the front panel is wired to the corresponding knob on the backplate in the sequence shown in Figure 9. The following procedure should be followed in setting up the pushbutton tuning system.

1. Set the Selectivity control to "M" position and the AM-Band control to "BC" position.

2. Select the lowest frequency AM station to be set up and insert the tab for this station in pushbutton No. 1.

3. Tune in the desired station manually and note the setting of the dial pointer on the logging scale at the top of the dial.

4. Set knob No. 1 on the backplate to the corresponding number noted on the logging scale, and lock the knob in place by means of the small screw directly above it. CAUTION: Never tighten the small locking screw more than one turn past the point where it touches the backplate; if tightened more the setting of the knob will be changed.

5. As a check to ascertain that the knob is set correctly, manually set the dial pointer to a higher frequency, then push button No. 1 until the pointer stops and check this setting against the original reading on the log scale. Repeat this operation after setting the dial to a lower frequency. If the both readings are higher or both readings lower than the original log scale reading for this station then the No. 1 knob must be moved slightly to correct for the error in reading. If the two readings are spaced equally one-half a division or less on both sides of the original station setting, as read on the log scale, the adjustment has been correctly made.

6. The above operation should be repeated for each pushbutton to be set up, starting with button No. 1 for the lowest frequency station and working up consecutively to button No. 12 for the highest frequency station. Pushbuttons 5, 6 and 7 can be used only for FM reception and when any of these buttons are pushed the receiver will automatically switch over to FM reception.

NOTE: The pushbutton tuning system will work only when the Selectivity control is set at "M" or "B" positions and the AM-Band control is set at "BC" position. If the pushbutton system does not work when the controls are set as above, replace the 1 amp fuse in the power supply. Refer to Figure 21 for location.

5.2 Connecting Pushbutton Switches for AM or FM Operation

When more than 3 FM stations or more than 9 AM stations are desired, by connecting the pushbutton switches as outlined below, any of the 12 pushbuttons may be set up for either an AM or FM station.

On the first Model 800-B Radio-Phonographs produced, the pushbutton switches were connected as shown in Figure 11. It will be noted that on the left hand switch gang, one side of switches 1-2-3-4-8-9 are all connected to the black AM common lead, therefore, all these switches will operate on AM stations. If it is desired to connect one or more of the switches on the left hand side for FM stations, it will be necessary to disconnect the switch or switches required from the black AM common lead and connect them over to the white FM common lead on the right hand switch.

On the right hand switch gang, one side of switches 5-6-7 are connected to the white FM common lead, therefore, these three switches are used to set up FM stations. One side of switches 10-11-12 are connected to the white-red dot AM common lead and are used to set up AM stations. In order to use anyone of these switches for an FM station, disconnect that switch from the AM common lead and connect it to the FM common lead. In this manner any one of the twelve pushbutton switches may be connected for operation on either AM or FM.

On the later Model 800-B Radio-Phonograph, the switch gangs have been provided with 2 dummy lugs on each section; one row of dummy lugs are connected to the AM common lead, the other row of dummy lugs are connected to the FM common lead and all that is necessary to connect any pushbutton for operation on AM, is to connect that switch to the AM common lug and for FM operation connect it to the FM lug. It will be noted by observing Figure 12 that the pushbuttons are now numbered in sequence 1 to 12 starting at the bottom pushbutton on the left side of the panel.

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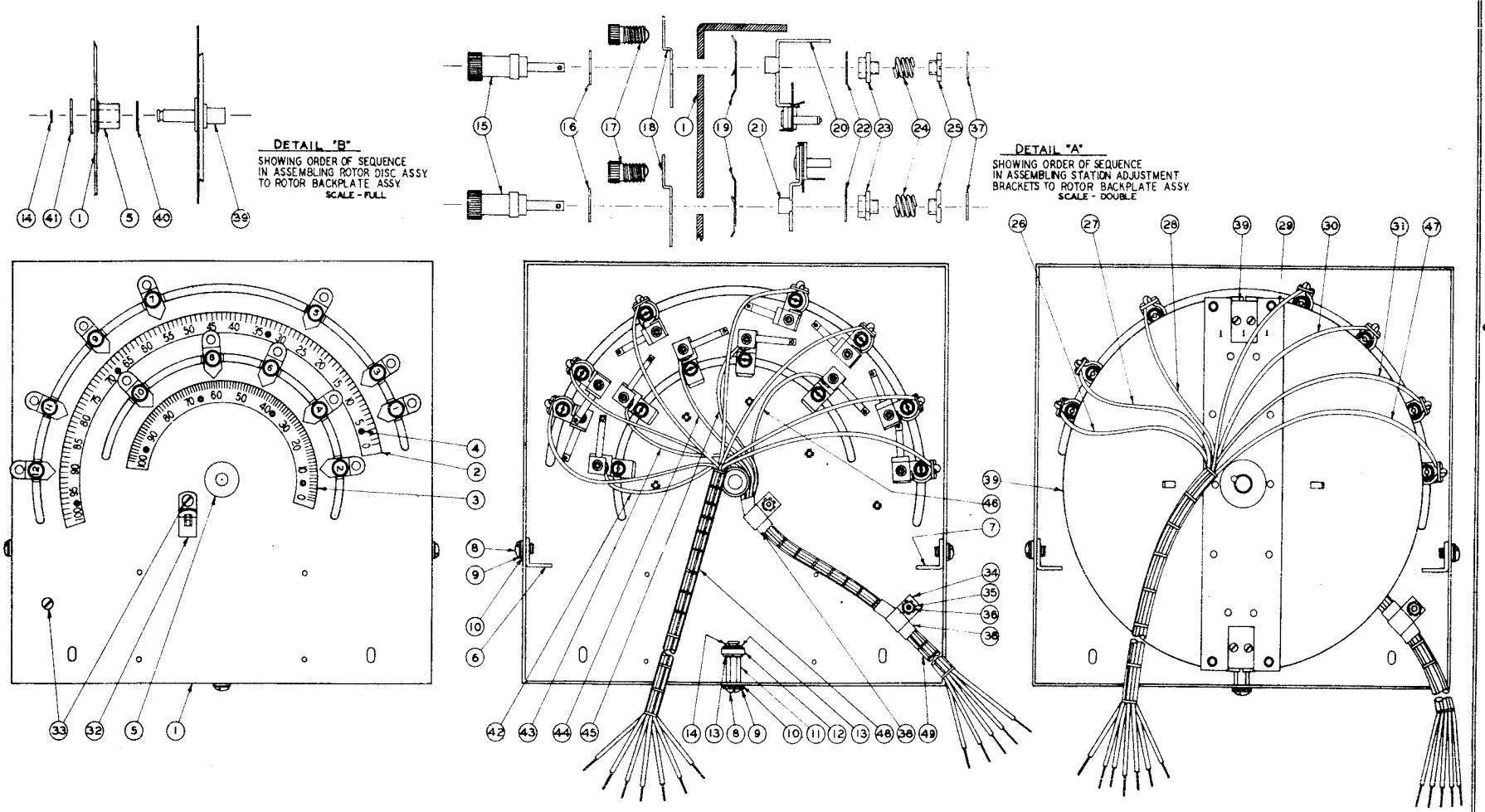
Table 1 Trouble Location Chart

Symptom	Cause	Remedy
Set fails to switch ON or OFF	Blown 1 amp or 3 amp fuse	Replace defective fuse
	Defective switch contacts on ON-OFF relay	Adjust contacts on switch or replace switch section
	AC ON-OFF relay inoperative	Check relay connections
		Put drop of light oil on rotor shaft bearing
Set operates but pushbutton system fails to operate	Blown 1 amp fuse	Replace defective fuse
	Defective switch contacts on ON-OFF relay	Adjust contacts on switch or replace switch section
Set weak or dead on all bands	Blown 3 amp fuse	Replace defective fuse
	Defective tube in audio amplifier or rectifier	Replace with good tube
	Defective speaker	Check continuity of voice coil
		Check continuity of field coils
		Check components and connections of network on coaxial speakers
	Socket voltages wrong	Check associated bypass capacitors
		Check associated resistors
		Check continuity of associated wiring
	Defective switch contact	Clean and adjust defective switch or replace switch section
Set weak or dead on one band only	No signal	Check all coils on specific band
		Check switch contacts on specific band
		Check all tubes used for specific band
		Check FM-AM relay

Table 1 Trouble Location Chart (Continued)

Symptom	Cause	Remedy
Noisy reception	Defective tube	Tap all tubes lightly and replace any that are noisy
	Defective component	Tap all components lightly with insulated rod. Check carefully suspected parts
	Defective antenna	Check antenna installation, lead-in and connections
Oscillation	Defective tube	Replace tubes one at a time
	Open bypass capacitor	Connect good capacitor across suspected unit temporarily Replace defective unit
Hum	Defective tube	Replace tubes one at a time
	Defective electrolytic filter capacitor	Replace defective unit
	Defective bypass capacitor	
	Transformer lamination buzz	Tighten screws on power transformer and 46 volt transformer
		Insulate 46 volt transformer from bottom cover plate with tape
		Mount power supply on rubber or felt


DETAIL "B"
SHOWING ORDER OF SEQUENCE IN ASSEMBLING ROTOR DISC ASSY TO ROTOR BACKPLATE ASSY
SCALE - FULL
DETAIL "A"
SHOWING ORDER OF SEQUENCE IN ASSEMBLING STATION ADJUSTMENT BRACKETS TO ROTOR BACKPLATE ASSY
SCALE - DOUBLE

BILL OF MATERIAL

No.	Part No.	No. Req'd	Description
1	64-B-482	1	PLATE-REMOTE TUNING BACK
2	76-B-629	1	SCALE, ROBOT (LARGE)
3	76-B-630	1	SCALE, ROBOT (SMALL)
4	33-B-662	8	EYELET (.085 DIA. X .119 X .153)
5	5-B-676	1	BEARING-BACK PLATE ROTOR
6	8-B-529	1	BRACKET-LEFT BACKPLATE MTG.
7	8-B-530	1	BRACKET-RIGHT BACKPLATE MTG.
8	77-A-450	5	SCREW 8-32 X 1/4 B.H.
9	95-A-251	5	LOCKWASHER #8 EXT. TOOTH
10	95-A-395	4	WASHER #8 FLAT
11	66-B-882	1	STUD - BACKPLATE ROLLER
12	9-B-663	1	ROLLER BACKPLATE BUSHING
13	29-A-142	2	WASHER .015"
14	95-A-261	2	WASHER - CLAMP
15	10-B-577-A	12	BUTTON-STATION LOCATING
16	93-B-563-A	12	WASHER - SPRING
17	77-B-579	12	SCREW-REMOTE LOCK
18	66-B-505	12	POINTER - STATION INDICATING
19	93-B-565-A	12	WASHER STABILIZING
20	8-B-503-A	7	BRACKET ASSY. STAT'N ADJ. (LONG)
21	8-B-504-A	5	BRACKET ASSY. STAT'N ADJ. (SMALL)
22	93-B-563	12	WASHER - SPRING
23	9-B-578	12	BUSHING-BUTTON CLUTCH
24	66-B-562	12	SPRING
25	93-B-566	12	WASHER - SLOTTED
26	CABLE	1	RED WIRE
		1	BLUE WIRE
		1	PURPLE WIRE
30		1	ORANGE WIRE
31	CABLE	1	GREEN WIRE
32	119-B-809	1	CLIP
33	77-A-374	2	SCREW 6-32 X 5/16"
34	18-A-312	2	CLAMP
35	95-A-255	2	#6 LOCKWASHER EXT. TOOTH
36	59-A-177	2	NUT 6-32 X 1/4" HEX.
37	96-B-574	3"	WIRE .025 MUSIC
38	87-B-688	3"	TAPE 1 INCH SCOTCH MASK. TAPE
39	2-B-690	1	ROTOR DISC ASSY.
40	95-B-754	1	WASHER, PHOS. BRONZE
41	95-B-555	1	WASHER 3/4" DIA. X .250 X .050
42	CABLE	1	RED WIRE WITH GREEN MARKER
43		1	YELLOW WIRE WITH GREEN MARKER
44		1	BLUE WIRE WITH GREEN MARKER
45		1	PURPLE WIRE WITH GREEN MARKER
46		1	ORANGE WIRE WITH GREEN MARKER
47		1	GREEN WIRE WITH YELLOW MARKER
48	98-B-838	1	CABLE - 7 WIRES PC 26-31 & 47
49	98-B-839	1	CABLE - 5 WIRES PC 42-46
50	83-B-833	1-OZ	SOLDER - .062 - 50 CORE 50-50

SCOTT RADIO LABORATORIES INC. CHICAGO ILL.

REMOTE TUNING BACKPLATE ASSY.

MATERIAL		SCALE	FULL
DATE 4-22-48	CHECKED BY	ISSUE NO.	1
DRAWN BY	APPROVED BY	PART NO.	2-B-750

Figure 24 Pushbutton Tuning Backplate Detail Drawing

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Section VI MAINTENANCE AND REPAIRS

Lubrication

There are very few moving parts on the Model 800-B Radio-Phonograph that will require lubrication more often than once a year with the possible exception of the record changer and this will depend on the amount of use the record changer receives. The manufacturers recommendations on lubrication as outlined in the instruction book packed with each record changer should be followed. A drop or two of #10 oil on the receiver slide rails and record changer compartment once a year will keep these parts working smoothly. In addition a drop of #10 oil should be applied to the dial tuning shaft bearing and the FM-AM relay and power ON-OFF relay bearings.

6.4 Pushbutton Tuning System Maintenance

Although there are very few moving parts in the pushbutton tuning system which will require frequent adjustment or maintenance the following information is outlined to assist in keeping the system in good working condition.

1. Pushbutton switches

A little carbon-tetrachloride, applied with a clean cloth or a small brush while the switch is worked back and forth, will keep the contacts clean.

2. Drive motor and remote volume motor

The clutch release spring on the back of these motors at the end of the rotor shaft may need adjusting to keep the clutch from chattering. A pair of long nose pliers should be used for this adjustment. If the clutch chatters when the motor is driving the dial, apply more pressure by bending the spring in toward the motor frame. If the clutch fails to release soon enough when the backplate insulator segment reaches the contact, the disk may override the contact and start to reverse. To remedy this fault pressure on the clutch release spring should be loosened by bending the spring out slightly. These same adjustments apply to the remote volume control motor on receivers which have this motor installed.

3. FM-AM relay and power ON-OFF relay

The switch contacts on these relays should be cleaned by applying carbon-tetrachloride with a clean cloth or small brush. The contacts may need slight adjustment at times for if they are too loose, poor contact will result and some of the circuits will not work or if they are too tight the relay may stick and refuse to throw to the proper position. Caution should be exercised when adjusting these contacts in order to maintain proper contact.

4. Muting relay and motor control relays

Since these relays are of very simple construction no adjustment should ever be necessary on them, however the switch contacts may need cleaning at times and the best method of doing this is to use a narrow strip of clean cloth with a little carbon-tetrachloride, burnishing the contacts with a back and forth motion.

5. Backplate contacts and rotor disk

The backplate contacts and rotor disk will be subjected to more wear than any other part of the tuning system. Maintenance will consist essentially in keeping the contacts and rotor disk surfaces clean and maintaining proper contact between the rotor disk and the movable contacts.

In order to clean or adjust the backplate contacts it is necessary to remove the backplate and the rotor disk from the receiver as follows:

1. Remove the horseshoe clamp washer from the end of the rotor disk shaft.

2. Remove the two screws holding the bottom of the backplate to the chassis and the two screws holding the brackets of the backplate to the top of the chassis base.

3. Loosen the two set screws which hold the rotor disk to the flexible coupling.

4. Pull the backplate away from the receiver chassis and remove the rotor disk.

5. The contacts and rotor disk can be cleaned by wiping them with a clean cloth using carbon-tetrachloride. The contacts should then be adjusted so that the tip of the contact is 11/16" from the inside surface of the backplate.

   If the insulating segment is badly worn it can be easily replaced by removing the segment at the end of the insulating strip marked with the Figure 1 and replacing with a new segment.

6. The rotor disk can now be reinserted into the backplate bearing and the flexible coupling, and the backplate fastened back onto the receiver chassis. Then insert the clamp washer back onto the rotor shaft.

7. In order to properly position the rotor disk so that the original setting of the contact knobs will still be the same, proceed as follows:

   1. Set the No. 1 contact knob at the extreme end of the top slot in the backplate.

   2. Set the dial at approximately 600 kilocycles or 20 on the logging scale.

   3. Set the rotor disk so that the end with the insulated segment marked 1 is slightly above center and tighten down one of the set screws in the flexible coupling.

   4. With the receiver turned ON, press pushbutton No. 1 and run until the backplate rotor disk stops.

   5. Loosen up the set screw in the coupling being careful not to change the position of the rotor disk, then while holding the rotor disk firmly so that it will not move, turn the dial tuning knob until the dial pointer is at the extreme left side of the scale.

   6. Tighten down both set screws in the flexible coupling. The backplate will now be in the original position as set at the factory and if the contacts have not been moved all the previous contact knob settings should remain the same.

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6.5 Record Changer Maintenance

For information on adjustments and lubrication the instruction manual furnished with the record changer should be consulted.

On most of the pickup cartridges furnished with the record changers, the needle is held in place by means of a set screw. If this set screw becomes loose the needle may turn sideways in the cartridge and will not seat properly in the needle groove or will sound distorted. The needle furnished is of the precious metal, long life type and if it is found necessary to replace it or if it becomes loose in the cartridge, remove the two screws holding the cartridge in the pickup arm and drop the cartridge out of the arm. The set screw can be loosened and the needle either replaced or set at the proper position again. The bent shank portion of the needle should face straight out from the pickup cartridge. Caution should be used in replacing the needle not to apply too much pressure on the set screw as this may cut through the plastic shank of the needle and ruin the reproduction.

6.6 Voltage and resistance tests

Table 2 lists the tube socket voltages for various settings of the controls. All voltages are measured between the chassis and socket terminals. Voltage measurements listed are made with a DC voltmeter of 1000 ohms per volt using the highest range scale that can be easily read. The receiver should be connected for normal operation and the controls adjusted as listed in Table 2. Line voltage should be 115 volts 50-60 cycles. Resistance measurements are listed in Table 3. All resistance measurements are made between chassis and terminals listed. The most suitable scale for the measurement being taken should be used. The receiver should be disconnected from the power source with controls adjusted as follows: Selectivity - sharp, Treble - max., Sensitivity - as listed, AM Band-as listed, Bass - max., Volume - as listed.

Table 2 Tube Socket Voltages

Terminal	Pin	Variable		Voltage DC Volts
		Symbol	Setting	
V1 Grid	4			0
Cathode	5	R5	Max.	3
	5	R5	Min.	21
Screen	6	SW6A	AM Position	85
Plate	8	SW6A	AM Position	240
V2 Grid	5			0
Cathode	8			0
Plate	3	SW6A	AM Position	130
V3 Grid #1	5			0
Cathode	6			2.5
Grid #3	8			0
Grid 2 & 4	4	SW6A	AM Position	100
Plate	3	SW6A	AM Position	240
V4 Grid	4			0
Cathode	5	R5	Max.	3.5
	5	R5	Min.	21
Screen	6	SW6A	AM Position	80
Plate	8	SW6A	AM Position	240

Table 2 Tube Socket Voltages (Continued)

Terminal	Pin	Variable		Voltage DC Volts
		Symbol	Setting	
V5 Grid	4			
Cathode	5			3.5
Screen	6	SW6A	AM Position	75
Plate	8	SW6A	AM Position	240
V6 Cathode #1	8			0
Plate #1	5			0
Cathode #2	4			0
Plate #2	3			0
V7 Grid	3			0
Cathode	5			0
Target	4	SW6A	AM Position	240
Plate	2	SW6A	AM Position	20 *
V8 Grid	3			0
Cathode	5			0
Target	4	SW6A	FM Position	240
Plate	2	SW6A	FM Position	10 *
V9 Grid	5			0
Cathode	8			2.5
Plate	3			58
			* Measured on 500 volt scale	
V10 Grid	5			0
Cathode	8			18
Plate	3			64
V11 Grid	1			0
Cathode	2-7			1.5
Screen	6	SW6A	FM Position	125
Plate	5	SW6A	FM Position	235
V12 Grid	6			0
Cathode	7			0
Plate	5	SW6A	FM Position	120
V13 Grid	1			0
Cathode	2-7			2.5
Screen	6	SW6A	FM Position	90
Plate	5	SW6A	FM Position	235
V14 Grid	4			0
Cathode	5			1.5
Screen	6	SW6A	FM Position	110
Plate	8	SW6A	FM Position	220
V15 Grid	4			0
Cathode	5			1.5
Screen	6	SW6A	FM Position	120
Plate	8	SW6A	FM Position	220
V16 Grid	4			0
Cathode	5			0
Screen	6	SW6A	FM Position	55
Plate	8	SW6A	FM Position	60

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Table 2 Tube Socket Voltages (Continued)

Terminal	Pin	Variable		Voltage DC Volts
		Symbol	Setting	
V17 Grid	4			0
Cathode	5			0
Screen	6	SW6A	FM Position	52
Plate	8	SW6A	FM Position	45
V18 Cathode#1	8			0
Plate #1	5			0
Cathode #2	4			0
Plate #2	3			0
V19A Grid	1			0
Cathode	3			2
Plate	2			130
V19B Grid	4			0
Cathode	6			2
Plate	5			105
V20 Grid	5			0
Cathode	8			20
Screen	4			270
Plate	3			340
V21 Grid	5			0
Cathode	8			20
Screen	4			270
Plate	3			340
V22 Cathode	2			0
Anode	5			150
V23 Filament	2-8			370
Plate	4-6			370 AC
V24 Filament	2-8			370
Plate	4-6			370 AC

Table 3 Point to Point Resistance
Terminal to Chassis

Terminal	Pin	Variable		Resistance Ohms Plus or Minus 10%
		Symbol	Setting	
V1 Grid	4			1.39 megohms
Cathode	5	R5	Min.	10,560 ohms
		R5	Max.	560 ohms
Suppressor	3			0.0 ohms
Screen	6	SW6A	AM Position	7,300 ohms
	6	SW6A	FM Position	10,000 ohms
Plate	8	SW6A	AM Position	9,250 ohms
	8	SW3A	PH or Tel.	26,000 ohms
V2 Grid	5			47,000 ohms
Cathode	8	SW2B	BC Band	1 ohm
	8	SW2B	SW Band	.4 ohm
Plate	3	SW6A	AM Position	17,400 ohms
	3	SW6A	FM Position	Infinite

Table 3 Point to Point Resistance (Continued)
Terminal to Chassis

Terminal	Pin	Variable		Resistance Ohms Plus or Minus 10%
		Symbol	Setting	
V3 Grid #1	5			20,000 ohms
Cathode	6			240 ohms
Grid #3	8			1.39 megohms
Grid 2 & 4	4	SW6A	AM Position	26,250 ohms
	4	SW6A	FM Position	43,000 ohms
Plate	3	SW6A	AM Position	9,250 ohms
		SW6A	FM Position	26,000 ohms
V4 Grid	4			1.134 megohms
Cathode	5	R5	Min.	10,560 ohms
	5	R5	Max.	560 ohms
Suppressor	3			0.0 ohms
Screen	6	SW6A	AM Position	108,250 ohms
	6	SW6A	FM Position	125,000 ohms
Plate	8	SW6A	AM Position	9,250 ohms
	8	SW6A	FM Position	26,000 ohms
V5 Grid	4	SW3B	Sharp (S)	0.0 ohms
		SW3B	Medium (M)	47 ohms
		SW3B	Broad (B)	47 ohms
		SW3B	PH or Tel.	Infinite
Cathode	5			560 ohms
Suppressor	3			0.0 ohms
Screen	6	SW6A	AM Position	108,250 ohms
	6	SW6A	FM Position	125,000 ohms
Plate	8	SW6A	AM Position	9,250 ohms
	8	SW6A	FM Position	26,000 ohms
V6 Cathode #1	8			0.0 ohms
Plate #1	5			9,400 ohms
Cathode #2	4			1.734 megohms
Plate #2	3			47,000 ohms
V7 Grid	3			3.114 megohms
Cathode	5			0.0 ohms
Target	4	SW6A	AM Position	8,250 ohms
	4	SW6A	FM Position	25,000 ohms
Plate	2	SW6A	AM Position	1 megohm
	2	SW6A	FM Position	1 megohm
V8 Grid	3	R29	Min.	.47 megohms
	3	R29	Max.	.88 megohms
Cathode	5			0.0 ohms
Target	4	SW6A	AM Position	54,000 ohms
	4	SW6A	FM Position	10,000 ohms
Plate	2	SW6A	AM Position	1.054 megohms
	2	SW6A	FM Position	1.010 megohms
V9 Grid	5	R37	Min.	0.0 ohms
	5	R37	Max.	1 megohm
Cathode	8			1,300 ohms
Plate	3	SW6A	AM Position	102,250 ohms
	3	SW6A	FM Position	104,000 ohms
V10 Grid	5			110,000 ohms
Cathode	8			11,300 ohms
Plate	3	SW6A	AM Position	102,250 ohms
	3	SW6A	FM Position	104,000 ohms

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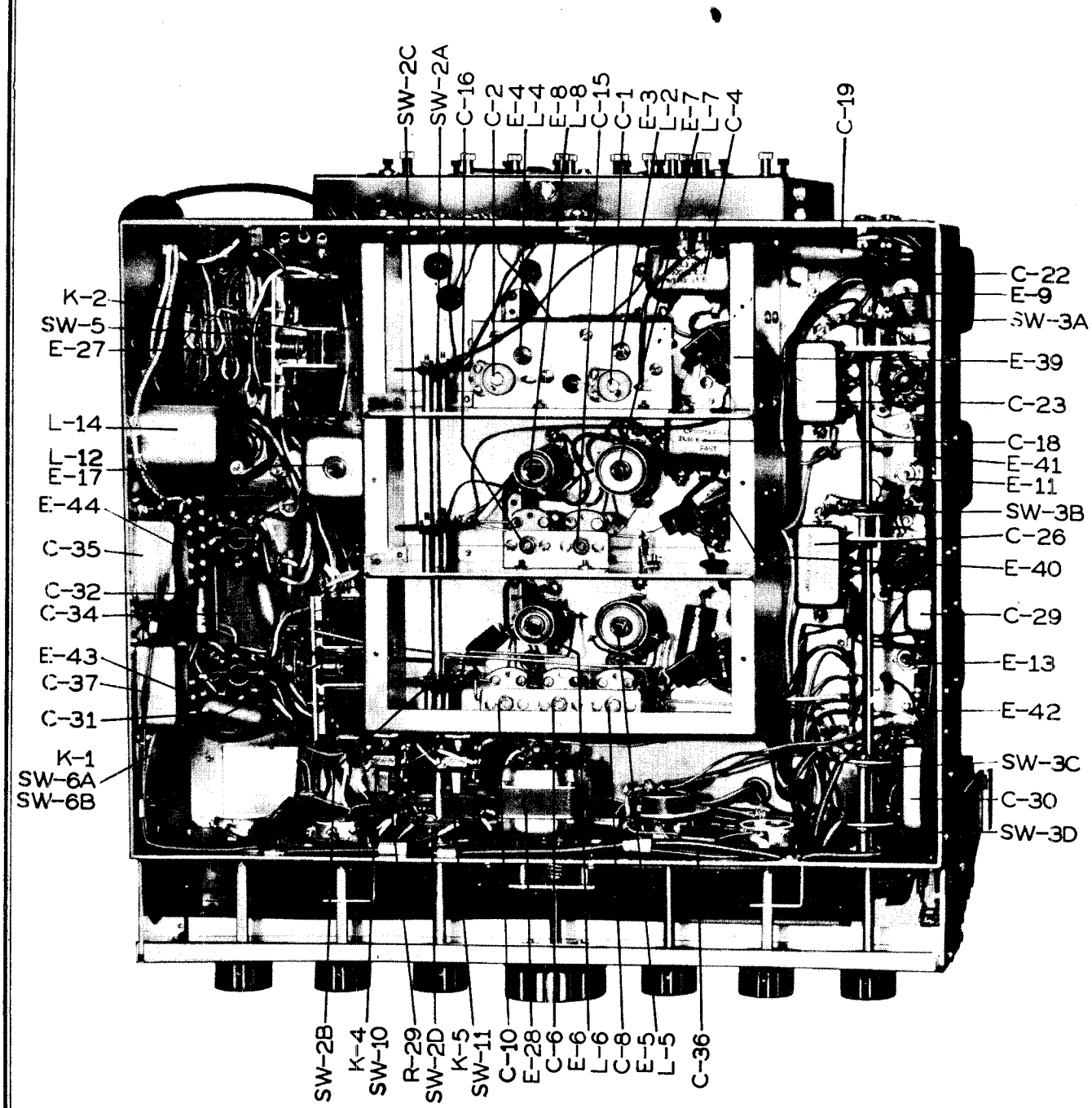

Figure 19 Bottom View Model 800-B Receiver Chassis

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MODEL 800-B

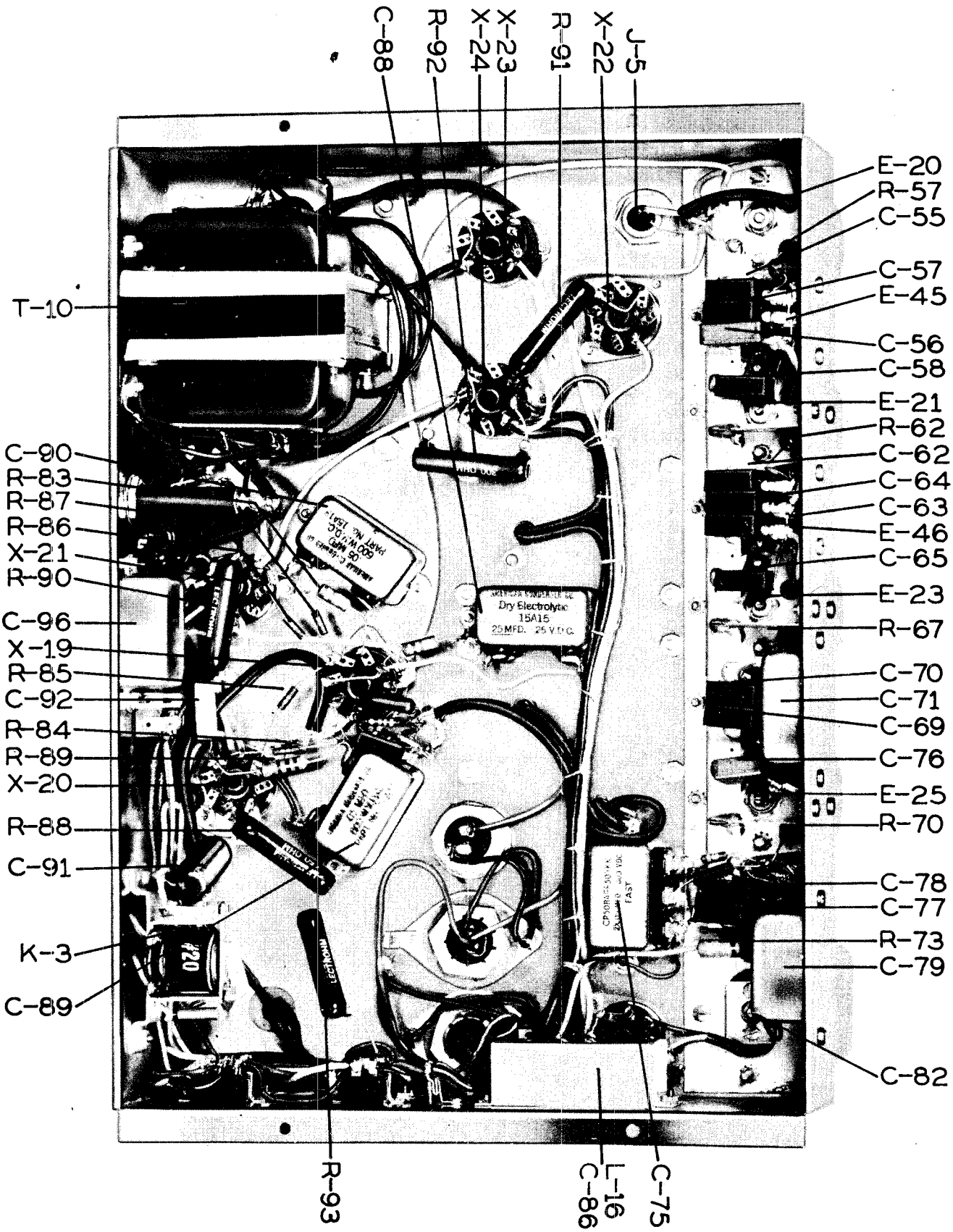

Figure 22 Bottom View Model 800-B Power Supply Chassis

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Table 3 Point to Point Resistance (Continued)
Terminal to Chassis

Terminal	Pin	Variable		Resistance Ohms Plus or Minus 10%
		Symbol	Setting	
V11 Grid	1			5 ohms
Cathode	2-7			150 ohms
Screen	6	SW6A	AM Position	110,000 ohms
	6	SW6A	FM Position	66,000 ohms
Plate	5	SW6A	AM Position	55,000 ohms
	5	SW6A	FM Position	11,000 ohms
V12 Grid	6			.1 megohm
Cathode	7			0.0 ohms
Plate	5	SW6A	AM Position	Infinite
	5	SW6A	FM Position	20,400 ohms
V13 Grid	1			5 ohms
Cathode	2-7			1,000 ohms
Screen	6	SW6A	AM Position	274,000 ohms
	6	SW6A	FM Position	230,000 ohms
Plate	5	SW6A	AM Position	56,400 ohms
	5	SW6A	FM Position	12,400 ohms
V14 Grid	4			56 ohms
Cathode	5			160 ohms
Suppressor	3			0.0 ohms
Screen	6	SW6A	AM Position	110,000 ohms
	6	SW6A	FM Position	66,000 ohms
Plate	8	SW6A	AM Position	56,400 ohms
	8	SW6A	FM Position	12,400 ohms
V15 Grid	4			56 ohms
Cathode	5			160 ohms
Suppressor	3			0.0 ohms
Screen	6	SW6A	AM Position	110,000 ohms
	6	SW6A	FM Position	66,000 ohms
Plate	8	SW6A	AM Position	56,400 ohms
	8	SW6A	FM Position	12,400 ohms
V16 Grid	4			27 ohms
Cathode	5			0.0 ohms
Suppressor	3			0.0 ohms
Screen	6	SW6A	AM Position	93,000 ohms
	6	SW6A	FM Position	49,000 ohms
Plate	8	SW6A	AM Position	93,000 ohms
	8	SW6A	FM Position	49,000 ohms
V17 Grid	4			42,027 ohms
Cathode	5			0.0 ohms
Suppressor	3			0.0 ohms
Screen	6	SW6A	AM Position	15,000 ohms
	6	SW6A	FM Position	11,600 ohms
Plate	8	SW6A	AM Position	154,000 ohms
	8	SW6A	FM Position	115,000 ohms
V18 Cathode#1	8			0.0 ohms
Plate #1	5			.156 megohms
Cathode#2	4			.2 megohms
Plate #2	3			.156 megohms
V19A Grid	1			44,000 ohms
Cathode	3			1,500 ohms
Plate	2			.232 megohms

Table 3 Point to Point Resistance (Continued)
Terminal to Chassis

Terminal	Pin	Variable		Resistance Ohms Plus or Minus 10%
		Symbol	Setting	
V19B Grid	4			.22 megohms
Cathode	6			1,500 ohms
Plate	5			.232 megohms
V20 Grid	5			.44 megohms
Cathode	8			250 ohms
Screen	4			12,000 ohms
Plate	3			12,680 ohms
V21 Grid	5			.44 megohms
Cathode	8			250 ohms
Screen	4			12,000 ohms
Plate	3			12,680 ohms
V22 Cathode	2			0.0 ohms
Anode	5			15,300 ohms
V23 Filament	2-8			12,800 ohms
Plates	4-6			32 ohms
V24 Filament	2-8			12,800 ohms
Plates	4-6			35 ohms

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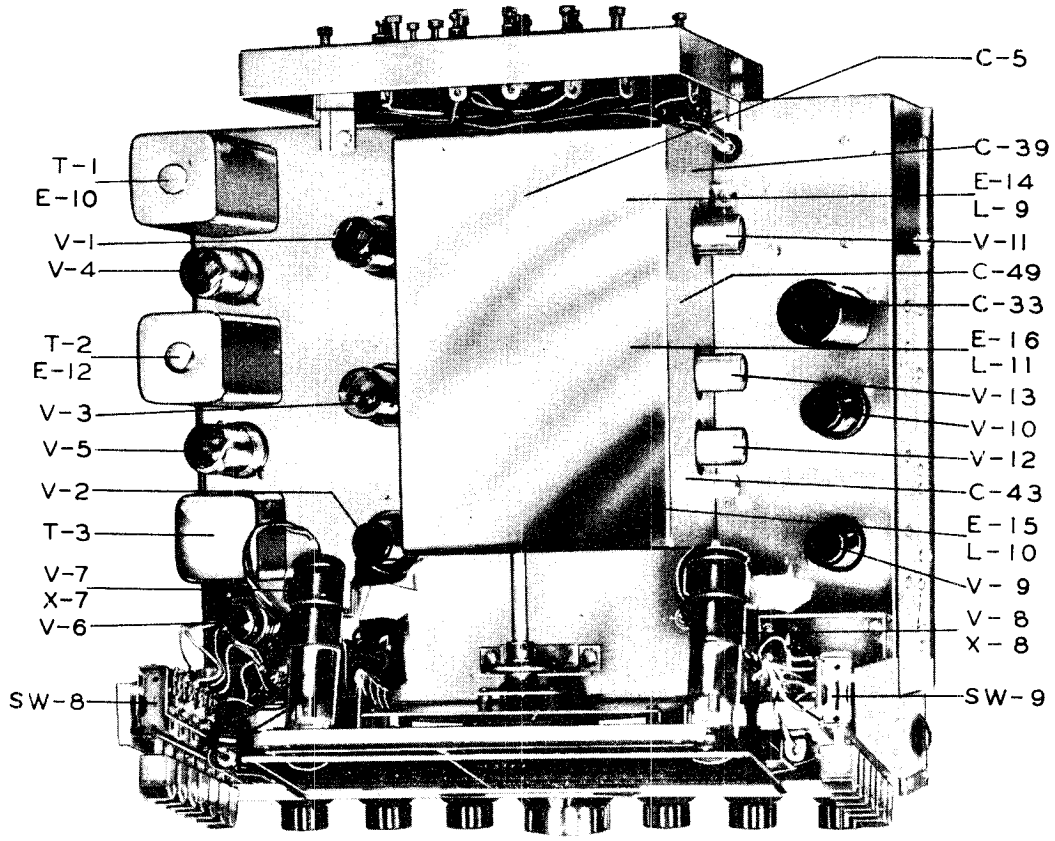

Figure 17 Top View Model 800-B Receiver Chassis

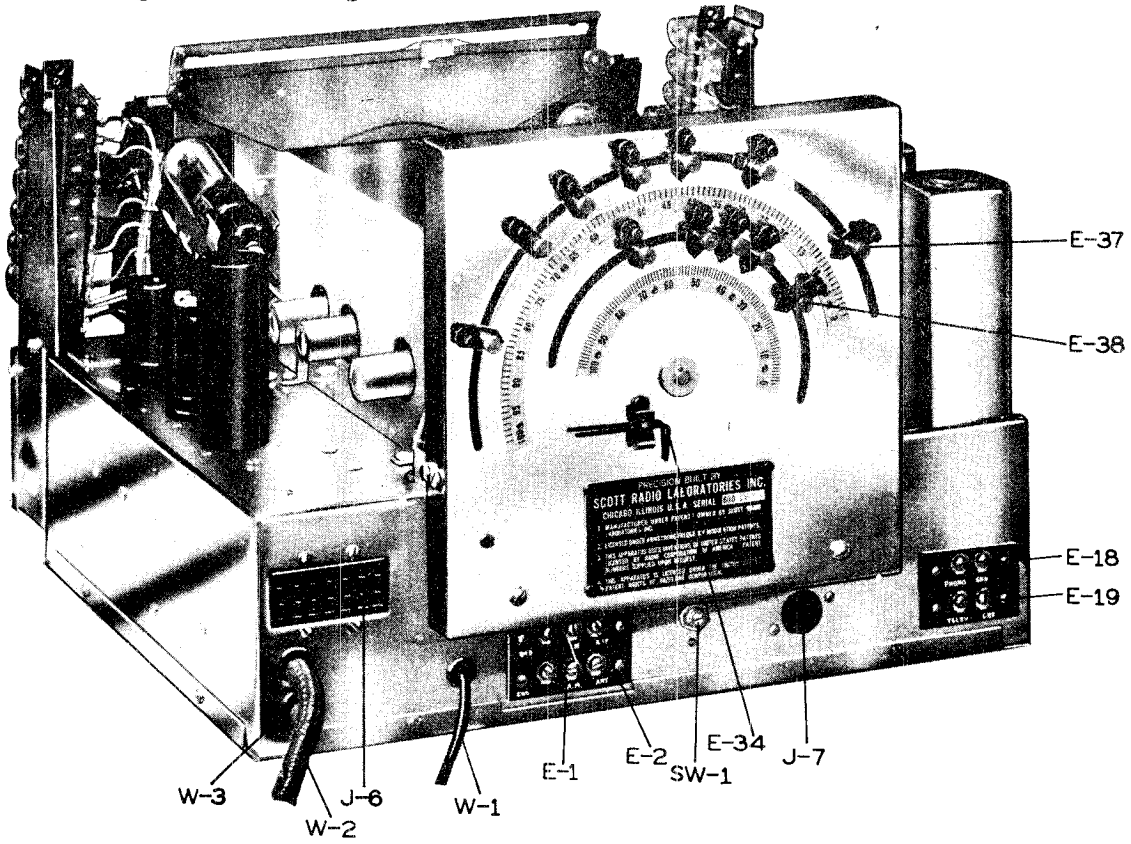

Figure 18 Rear View Model 800-B Receiver Chassis

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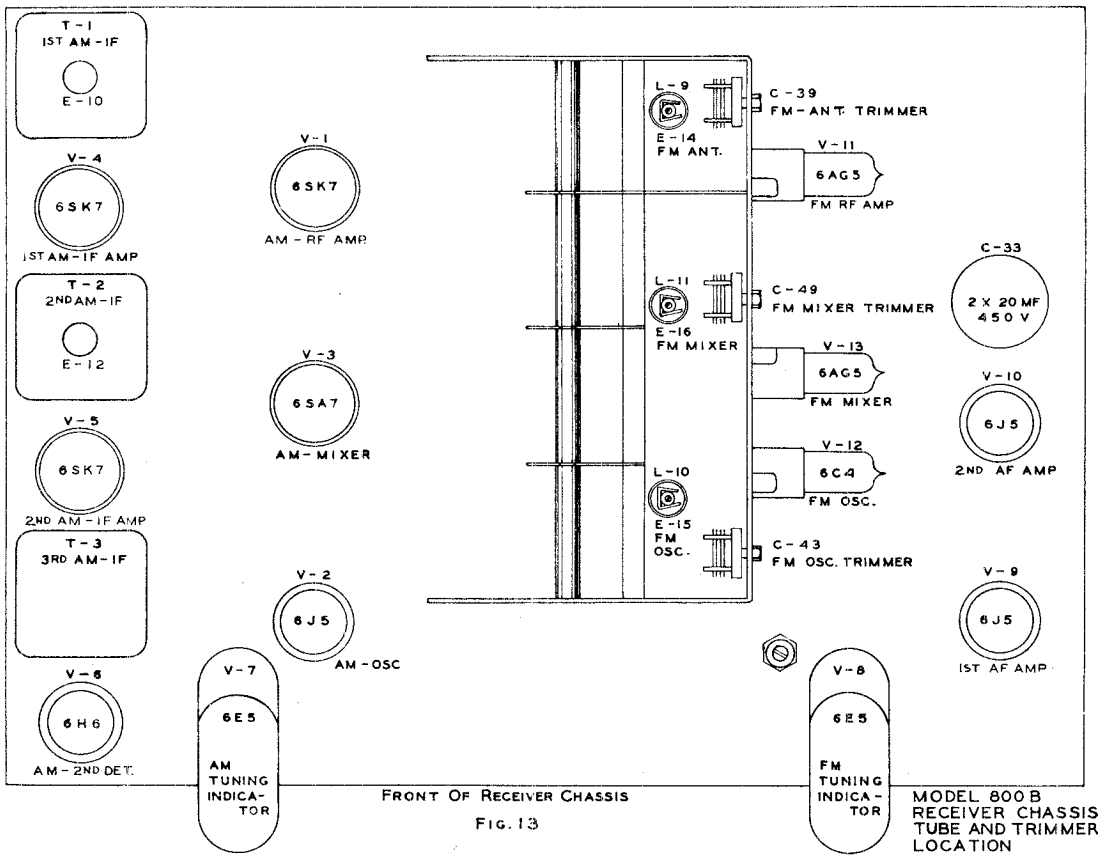

FRONT OF RECEIVER CHASSIS

FIG. 13

MODEL 800 B
RECEIVER CHASSIS
TUBE AND TRIMMER
LOCATION

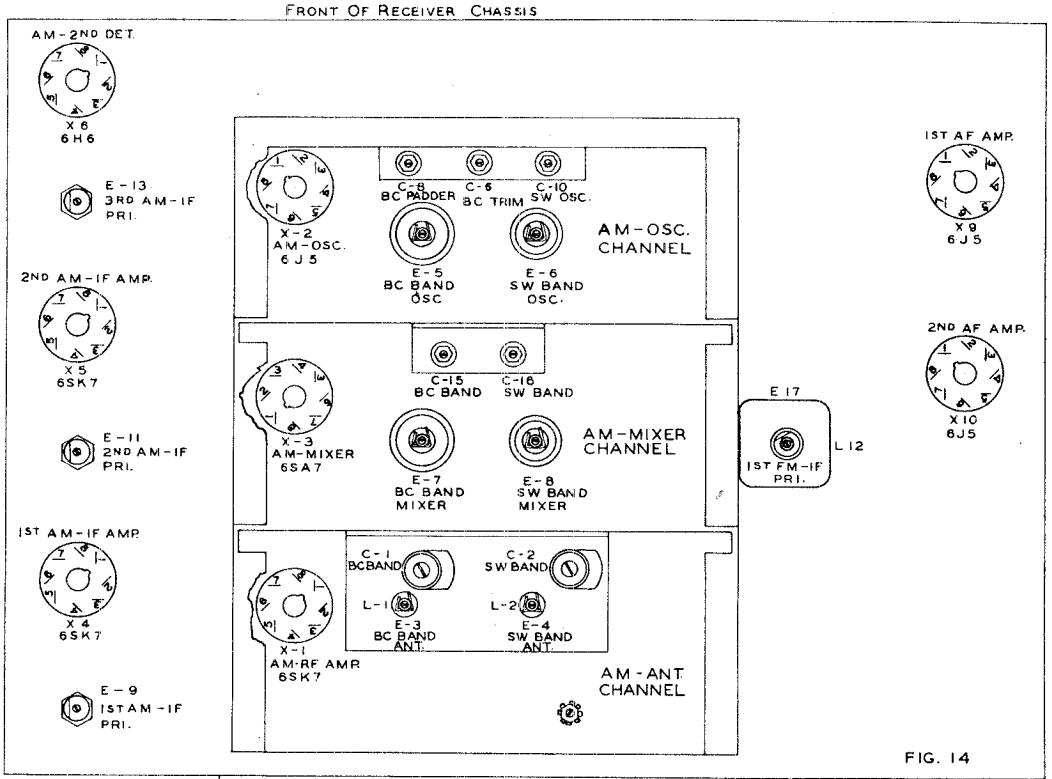

FIG. 14

BOTTOM VIEW OF RECEIVER CHASSIS

MODEL 800-B
SOCKET & TRIMMER
LOCATION
RECEIVER CHASSIS

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Section VII ALIGNMENT DATA

7.1 General

Should realignment of the receiver become necessary the following data should be carefully studied before making any circuit adjustments so that correct alignment may be made quickly and accurately.

The complete alignment of the radio receiver may be divided into the following steps. The circuits should be checked in the order listed.

Amplitude Modulation Channel

1. AM-IF amplifier alignment
2. AM oscillator alignment
3. AM-RF amplifier alignment

Frequency Modulation Channel

1. FM-IF amplifier alignment
2. FM discriminator alignment
3. FM oscillator alignment
4. FM-RF amplifier alignment

The receiver must be removed from the cabinet and connected as for normal operation on the power source specified for the receiver. The bottom plates must be removed from the receiver and power supply chassis and for realignment of the FM-RF circuits, the cover over the main tuning capacitor must be removed.

7.2 AM Circuit Alignment

For alignment of the AM circuits the controls should be adjusted as follows:

1. Selectivity control set at "S" Sharp position.
2. Sensitivity control advanced to maximum point just before the noise limiter switch throws.
3. Band change control set to "BC" or "SW" band as noted.
4. Bass and treble controls set at maximum position.
5. Volume control set as noted.

7.21 AM-IF Amplifier Alignment

The intermediate frequency of the AM-IF channel is 455 kilocycles.

Tuning adjustments are provided in each transformer. These adjustments consist of adjustable powdered iron cores and are designated on the circuit diagram by symbols E9 to E13 inclusive. All adjustments for the AM-IF channel are on the receiver chassis.

An output meter must be connected across the voice coil leads of the speaker on terminals 3 and 5 of the speaker receptacle in the power supply chassis when the 15 inch Jensen coaxial speaker is used or across terminals 1 and 5 when the 15 inch Tru-sonic single speaker is used. This connection is changed for different speakers because of the difference in voice coil impedance which is 8 ohms for the Jensen coaxial speaker and 16 ohms for the Tru-sonic speaker.

The high potential lead of the signal generator should be connected to the control grid (terminal #8) of the AM mixer, tube V3-6SA7 through a .005 to .05 mfd capacitor and the ground lead of the signal generator connected to any metal part of the chassis. The volume control should be advanced to a point where the noise level of the receiver starts to indicate on the output meter.

The frequency of the signal generator should be carefully adjusted to 455 kilocycles, modulated 30% at 400 or 1000 cycles and the signal input to the mixer tube adjusted to provide a reading on the output meter. The signal input should be kept at a low level so as not to overload the second detector or audio circuits and to keep the AVC voltage as low as possible. If a high signal level is used the AVC voltage developed by the second detector may become so high as to cause the trimmer adjustments on the IF transformer to appear very broad in tuning and a false indication of true resonance will result.

Starting with the 3rd IF transformer the adjustments should be set for maximum output in the following order E13, E12, E11, E10 and E9.

The sensitivity of the IF amplifier can be checked against the following figures to ascertain that each stage is in proper working order.

Input Terminal	Signal Input Microvolts	Output Mod. On	Output Mod. Off
2nd IF V5 Grid	6000	1 volt	.1 volt or less
1st IF V4 Grid	200	1 volt	.1 volt or less
Mixer V3 Grid	35	1 volt	.1 volt or less

The above measurements are made at a 10 db signal to noise ratio with the output voltage shown measured across an 8 ohm voice coil. If the speaker has a 16 ohm voice coil the voltage with Mod. ON will be 1.4 volts and with Mod. OFF .14 volts.

The selectivity control should be set at "S" (Sharp) position, Sensitivity control at maximum with noise limiter switch off and Volume control at maximum. The oscillator tube V2-6J5 should be removed.

MODEL 800-B

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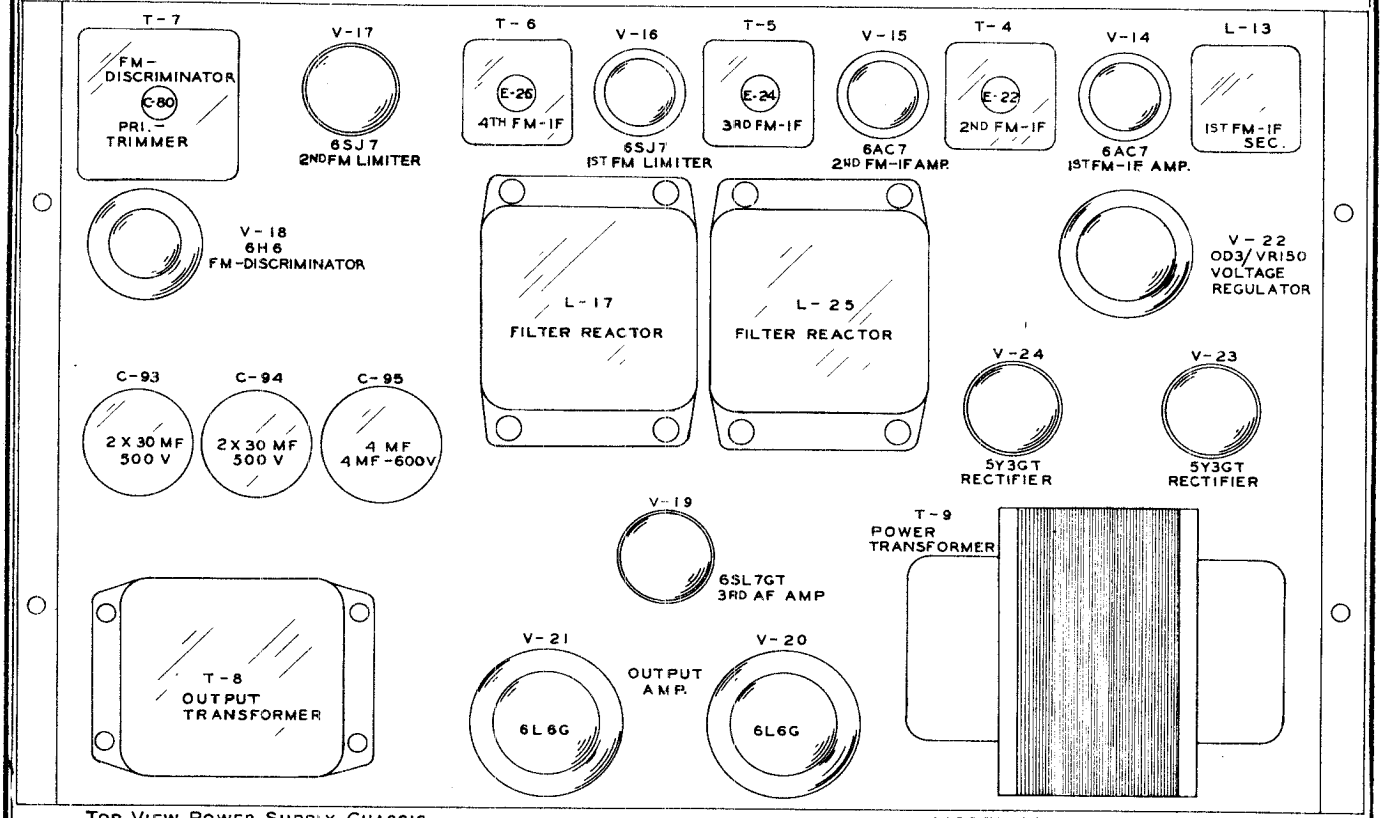
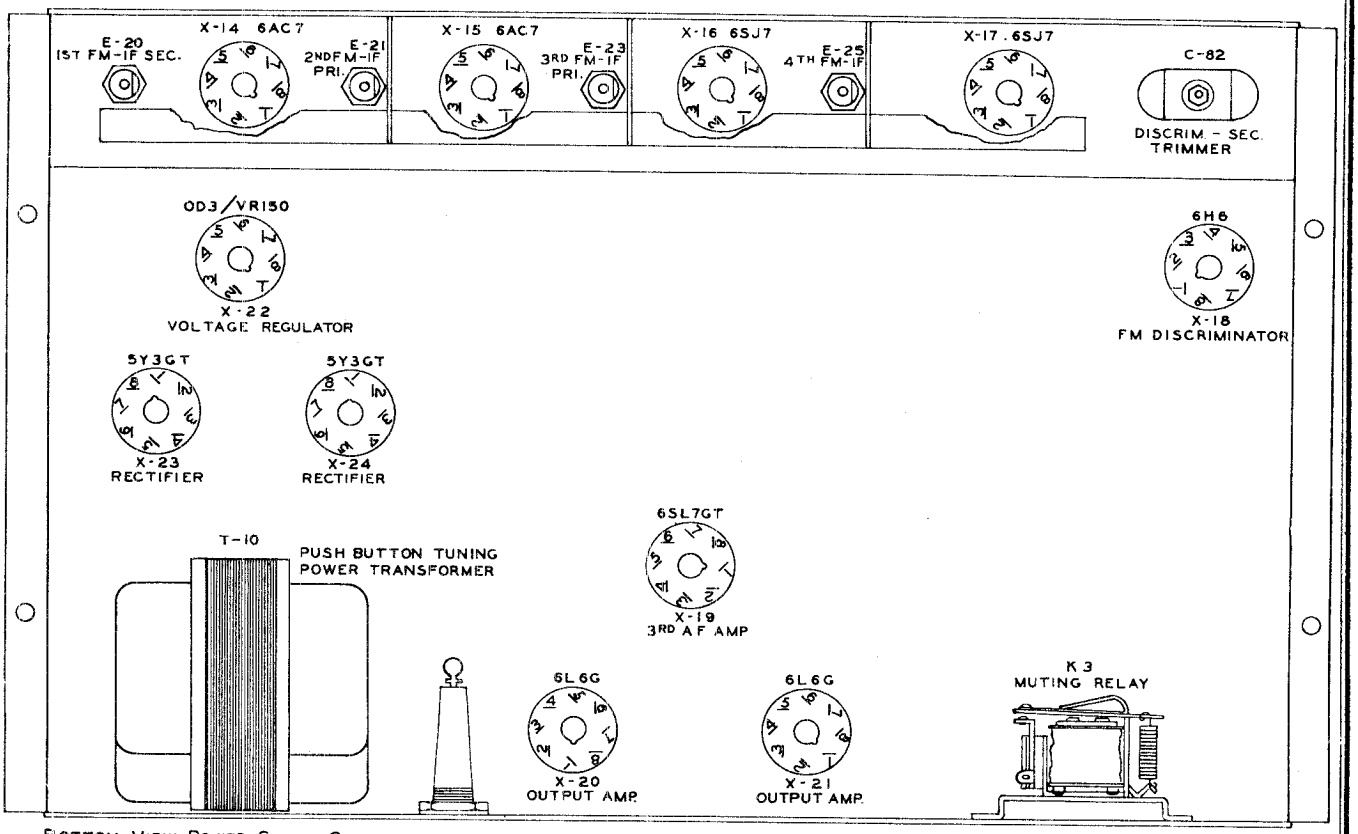


TOP VIEW POWER SUPPLY CHASSIS

FIG. 15

MODEL 800 B - POWER SUPPLY TUBE AND TRIMMER LOCATION



BOTTOM VIEW POWER SUPPLY CHASSIS

FIG. 16

MODEL 800 B - POWER SUPPLY SOCKET & TRIMMER LOCATION

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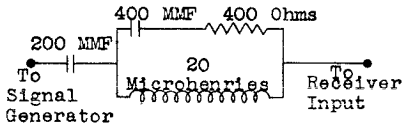
7.22 AM-RF and Oscillator Alignment

Caution: Readjustment of the oscillator circuit trimmers should not be attempted until after the need for such readjustment has been positively established. The following table gives the alignment frequency, trimmer adjustments and nominal sensitivity for the "BC" and "SW" bands. Sensitivity measurements are for a 6 db signal to noise ratio.

Band	Freq.	Adjustment			Signal Input	Output Mod.ON	Output Mod. OFF
		Osc.	Mixer	Ant.			
BC	1500 KC	C6	C15	C1	5 uv	1 Volt	.5 V or less
	1000 KC	E5			5 uv	1 Volt	.5 V or less
	600 KC	C8	E7	E3	5 uv	1 Volt	.5 V or less
SW	16 MC	C10	C16	C2	8 uv	1 Volt	.5 V or less
	6.5 MC	E6	E8	E4	8 uv	1 Volt	.5 V or less



The signal generator should be connected through a standard RMA dummy antenna to the AM antenna input terminal E1. The center terminal of E1 should be connected to the ground terminal with a short jumper wire. The controls should be set as follows:

1. Selectivity control set to "S" (Sharp) position.
2. Sensitivity control set at maximum position with noise limiter switch off.
3. Bass and treble controls set at maximum.
4. AM Band control set to band desired.
5. Volume control set as noted.

It is important that the oscillator circuits operate on the high frequency side of the signal circuits, particularly on the SW Band where the trimmer will allow the oscillator circuit to be resonated on either the high or low side of the signal circuits. When properly aligned the image will appear 910 KC lower in frequency than the signal being received and it will be considerably weaker than the signal, therefore, it will be necessary to increase the output of the signal generator in order to check the image.

The following general procedure should be employed in the alignment of the AM oscillator and RF amplifier circuits.

1. Turn dial to extreme left side of scale and make certain that the pointer lines up with the zero designation on the top logging scale
2. Set the signal generator to the high frequency alignment point of the desired band.
3. Set the dial pointer of the receiver to the high frequency alignment point of the desired band.
4. Adjust the oscillator trimmer capacitor until the signal is tuned in to resonance, then adjust the mixer and antenna circuit trimmer capacitors for maximum reading on the output meter.
5. Set the signal generator and receiver dial pointer to the low frequency alignment point.
6. Set the low frequency oscillator trimmer adjustments outlined in chart ~~on Page 42~~ until the signal is tuned to resonance, then adjust the mixer and antenna adjustments for maximum output.
7. Repeat this entire alignment procedure as a final adjustment.

On the BC band an adjustment E5 is provided for alignment of the oscillator circuit at 1000 KC. This adjustment should not be altered unless the calibration of the BC Band is still off frequency after the trimmer adjustments for the high and low frequency ends of the band have been adjusted.

7.3 Frequency Modulation Circuit Alignment

7.31 FM-IF Circuit Alignment

For alignment of the FM circuits the controls should be adjusted as follows:

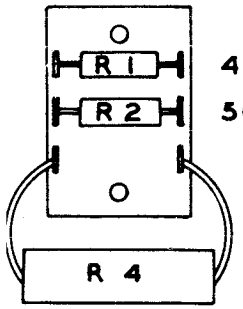
1. Turn receiver on and push one of the FM pushbuttons to switch the receiver over to FM reception.
2. Set bass and treble controls at maximum position.
3. Adjust volume control as noted.

7.32 FM-IF Amplifier Alignment

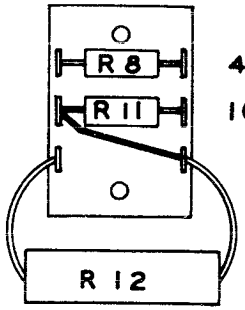
The intermediate frequency of the FM channel is 10.7 megacycles. Tuning adjustments are provided in each IF transformer. These adjustments consist of powdered iron cores in the IF transformer and variable air capacitors in the discriminator transformer. These adjustments are designated by symbols E17 to E26 inclusive for the IF transformers and C80 and C82 for the discriminator transformer. The 1st FM-IF transformer primary adjustment E17 is located on the receiver chassis. The other adjustments are located on the power supply chassis.

The high potential lead of the signal generator should be connected to the control grid (Pin #4) of FM mixer tube V13-6AG5 through a .01 mfd capacitor, and the ground lead connected to the chassis frame. A high resistance DC voltmeter such as the RCA Volt-ohmyst should be connected across the second limiter filter resistor R72.

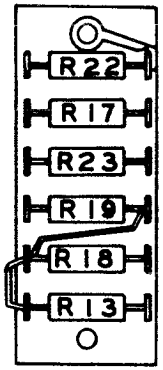
Set the signal generator to 10.7 megacycles and feed in a signal with modulation OFF until the meter reads 1.5 volts.



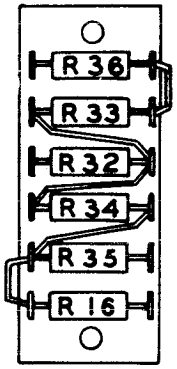
470000 Ω
560 Ω
5000 Ω 2 WATTS
E 39



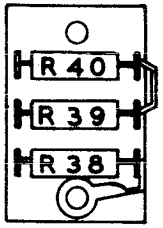
470000 Ω ½ WATT
1000 Ω ½ WATT
18000 Ω 2 WATTS
E 40



560 Ω ½ WATT
560 Ω ½ WATT
100000 Ω ½ WATT
1000 Ω ½ WATT
100000 Ω ½ WATT
1000 Ω ½ WATT
E 41

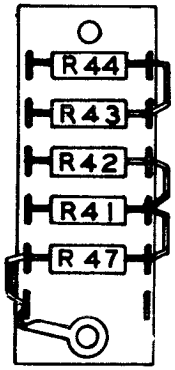


.82 MEG. ½ WATT
.82 MEG. ½ WATT
47000 Ω ½ WATT
.82 MEG. ½ WATT
2.2 MEG. ½ WATT
220000 Ω ½ WATT
E 42

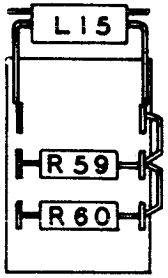


47000 Ω ½ WATT
47000 Ω ½ WATT
1300 Ω ½ WATT
E 43

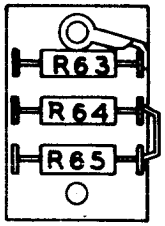
Figure 23 Resistor Terminal Strip Detail Drawings



47000 Ω ½ WATT
47000 Ω ½ WATT
1300 Ω ½ WATT
100000 Ω ½ WATT
10000 Ω ½ WATT
E 44



R.F. CHOKE
56000 Ω ½ WATT
2400 Ω ½ WATT
E 45



160 Ω ½ WATT
56000 Ω ½ WATT
2400 Ω ½ WATT
E 46

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Starting with the 4th IF transformer T6, adjust the trimmers in the following order: E26, E25, E24, E23, E22, E21, E20 and E17. Each trimmer should be adjusted for maximum meter reading, keeping the input from the signal generator at a point where not more than 1.5 volts output is obtained on the meter. It is important to keep the signal input down so that meter does not read more than 1.5 volts as above this the limiters start to level off and the IF adjustments will act very broad and cannot be set to the true resonant position.

7.33 FM Discriminator Circuit Alignment

Set the signal generator at 10.7 megacycles and connect to the grid (Pin #4) of mixer tube V13-6AG5 through a .01 mfd capacitor. Connect the Volt-ohmyst or equivalent meter to the discriminator diode output at the junction of R78 and C84 to ground. If a volt-ohmyst or equivalent meter with polarity reversing switch is not available a zero center 50-0-50 microammeter can be used.

If the discriminator is correctly aligned the meter will read zero when the signal generator is set to 10.7 megacycles. If the meter reads either plus or minus realignment is necessary. The secondary trimmer C82 at the bottom of the discriminator transformer should be detuned so that the meter reads either plus or minus. The primary trimmer C80 at the top of the transformer should then be realigned for maximum output. The secondary trimmer C82 should now be carefully adjusted for zero reading on the meter.

Next adjust the signal generator 75 KC higher in frequency or 10.775 MC and record the reading of the meter. Then set the signal generator 75 KC lower in frequency or 10.625 MC and record this reading of the meter. These two readings should be identical, if they are not a slight readjustment of the primary trimmer C80 should be made to coincide these readings at plus and minus 75 KC from 10.7 megacycles. The zero voltage setting of the secondary trimmer C82 should then be rechecked for if this adjustment is not correctly made distortion on FM signals will result.

7.34 FM-RF and Oscillator Circuit Alignment

All the trimmer adjustments for the FM-RF and oscillator circuits are located on the top of the receiver chassis and it is necessary to remove the cover over the main tuning capacitor for access to these trimmer adjustments.

The signal generator should be connected to the FM antenna terminal E2 with a 50 ohm carbon resistor in series with the high potential lead of the generator and the center antenna terminal of E2 shorted to the ground terminal.

The FM oscillator circuit operates on the low side of the signal circuits and no trouble with aligning the oscillator circuit on the image should be encountered since it will be twice the IF frequency or 21.4 megacycles away from the signal frequency and the trimmer capacitor will not allow this much variation. The following chart lists the trimmer adjustments.

The high resistance DC voltmeter should be connected across the second limiter grid filter resistor R72. The sensitivity measurement given in the chart below is for 1.8 volts output as read on the high resistance DC voltmeter.

Band	Freq. MC	Adjustment			Sensitivity
		Osc.	Mixer	Ant.	
FM	106	C43	C49	C39	15 microvolts for 1.8 volts
	90	E15	E16	E14	Across limiter resistor R72

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SCOTT RADIO LABS. INC.

Table 4 Coil Data

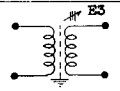
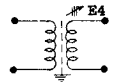
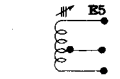
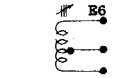
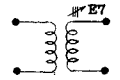
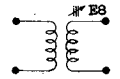
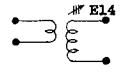
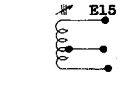
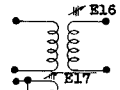
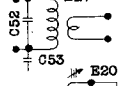
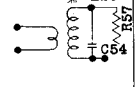
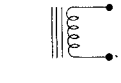
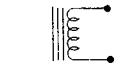
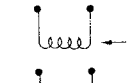
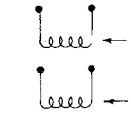
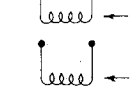
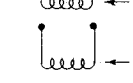
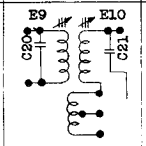
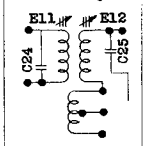
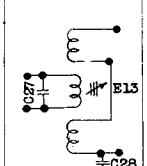
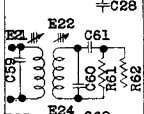
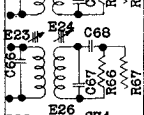
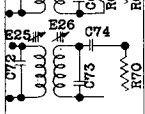
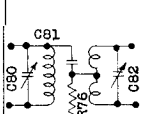
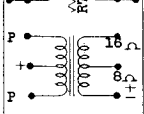
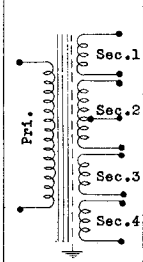
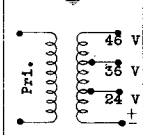
Symbol Desig.	Diagram	Description	DC Resis. Ohms
L1		AM Broadcast band antenna primary coil. Part No. 20B604	14.5
L2		AM Broadcast band antenna secondary coil. Part No. 20B605 Electrostatic shield is separate unit.	7.5
L3		AM Shortwave band antenna primary coil. Part No. 20B608	.45
L4		AM Shortwave band antenna secondary coil. Part No. 20B609 Electrostatic shield is separate unit.	.07
L5		AM Broadcast band oscillator coil Part No. 20B607	Start to tap .6 Total 3
L6		AM Shortwave band oscillator coil Part No. 20B611	Start to tap .03 Total .07
L7		AM Broadcast band mixer coil Part No. 20B606	Pri. 2.5 Sec. 7.5
L8		AM Shortwave band mixer coil Part No. 20B610	Pri. .1 Sec. .07
L9		FM Antenna coil Part No. 20B612	Pri. .04 Sec. .015
L10		FM Oscillator coil Part No. 20B614	Total.017
L11		FM Mixer coil Part No. 20B613	Pri. .07 Sec. .015
L12		1st FM-IF primary coil Part No. 20B618	Pri. .18 Sec. .06
L13		1st FM-IF secondary coil Part No. 20B619	Pri. .06 Sec. .18
L14		Bass boost choke 11 H @ 1000 CPS no DC. Laminated iron core - potted Part No. 17B591	230
L15 L16		RF choke, 2 uH @ 1000 CPS, no DC Part No. 17B761	.15
L17 L25		Filter reactor, 5 H @ 10 V 60 CPS with 220 MA DC, laminated iron core, potted. Part No. 17B492	82
L18 L19		FM-AM relay coil - operates on 10 V 60 CPS, used on all receivers to Serial 2000. Part No. 20B707	2
L18 L19		FM-AM relay coil - operates on 24 V 60 CPS, used on receivers after Serial 2000. Part No. 20B982	14
L20 L21		AC power ON-OFF relay, operates on 24 V 60 CPS, used on receivers to Serial 2000. Part No. 20B719	16
L20 L21		AC power ON-OFF relay, operates on 22 V 60 CPS, used on receivers after Serial 2000. Part No. 20B977	23
L22 L23 L24		Muting relay coil, operates on 2.4 V 60 CPS. Relay assembly Part No. 69B958	

Table 4 Coil Data (Continued)

Symbol Desig.	Diagram	Description	DC Resis. Ohms
T1		1st AM-IF transformer, 455 KC, adjustable iron core on primary and secondary. Part No. 20B615	Pri. 5 Sec. 4.8 Ter. .3
T2		2nd AM-IF transformer, 455 KC, adjustable iron core on primary and secondary. Part No. 20B616	Pri. 5.2 Sec. 4.8 Ter. .3
T3		3rd AM-IF transformer, 455 KC, diode coupling transformer, adjustable iron core for primary. Part No. 20B617	Pri. 11.5 Sec. 16.5
T4		2nd FM-IF transformer, 10.7 MC, adjustable iron core primary and secondary. Part No. 20B620	Pri. .26 Sec. .26
T5		3rd FM-IF transformer, 10.7 MC adjustable iron core primary and secondary. Part No. 20B621	Pri. .26 Sec. .26
T6		4th FM-IF transformer, 10.7 MC adjustable iron core primary and secondary. Part No. 20B622	Pri. .26 Sec. .26
T7		FM discriminator transformer, 10.7 MC adjustable air trimmers primary and secondary. Part No. 20B623	Pri. .7 Sec. 1.3
T8		Output transformer, primary 9000 ohms @ 1000 CPS, 100 MA DC, Brown-red-brown Secondary, 16 ohms tapped at 8 ohms, 25 watts, common-black, 8 ohm black-yellow, 16 ohm yellow. Part No. 91B664	Pri. 300 Total Sec. Total .85 Sec. Tap .5
T9		Power transformer, primary - 120 V, 50-60 CPS, white and black Sec.1 - 5 V @ 4 A, blue and blue Sec.2 - 390-390 V @ 210 MA, red-red yellow-red Sec.3 - 6.3 V @ 4 A, yellow and yellow Sec.4 - 6.6 V @ 4.6 A, green and green Electrostatic shield between primary and secondaries. Part No. 91B429	Pri. 1.0 Sec.1 .7 Sec.2 68 Sec.3 .8 Sec.4 .8
T10		Pushbutton tuning system transformer Primary - 117 V 50-60 CPS, for intermittent duty Secondary - 46 V @ 2 A tapped at 36 V and 24 V Part No. 91B694	Pri. 8.2 Sec. Total 2.5 36 V Tap 2.1 24 V Tap 1.25

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INSTALLATION AND SERVICE DATA ON REMOTE CONTROL KEYBOARD FOR USE WITH MODEL 800-BR RADIO-PHONOGRAPH

Remote Keyboard

The remote control keyboard is provided in order that the Model 800-BR Radio-Phonograph may be controlled from remote points in the same room or in other rooms of the house. It is provided with 16 pushbuttons, 12 of which are used to tune in stations exactly the same as the push-buttons on the front panel of the receiver. Two buttons are used to turn the receiver ON and OFF and the two remaining pushbuttons are used to raise and lower the volume of the receiver as shown in Figure 1.

The remote keyboard was designed for use with the Model 800-BR Receiver which is the same as the Model 800-B with the addition of a motor driven volume control. The keyboard will however, work with the standard Model 800-B Receiver chassis without any changes having to be made in wiring. However, the volume cannot be controlled from a remote point. The receiver cannot be turned ON or OFF from the keyboard and the indicator lamp in the kayboard will not light.

The keyboard is provided with 20 feet of flat cable and a 21 contact plug which inserts into the 21 contact receptacle at the rear of the receiver. Any length of cable can be furnished upon request.

For installations where the keyboard is to be located in one or more positions remote from the room where the radio-phonograph is placed, an outlet box with a 21 contact receptacle should be mounted in the wall behind the radio-phonograph. This receptacle can then be connected to one or more receptacles located in different parts of the house by means of a round multi-conductor cable, all receptacles being wired in parallel. If more than one remote outlet box is used, a junction box should be used to terminate the cables from all outlets to facilitate wiring and servicing. A short piece of flat cable with 21 contact plugs on both ends is then inserted between the receptacle on the chassis and the receptacle in the wall at the rear of the radio-phonograph. A keyboard may then be inserted in any of these receptacles and the receiver operated from any point.

The pictorial diagram of the keyboard is shown in Figure 2 which shows the contact layout with the connections numbered to correspond with the numbers of the connections on the 21 contact plug. The schematic diagram of the keyboard is shown in Figure 3.

The keyboards are wired at the factory so that buttons 5, 6 and 7 are used to select FM stations while buttons 1, 2, 3, 4, 8, 9, 10, 11 and 12 are used to select AM stations. Any of the buttons now wired for FM may be used for AM station selection by disconnecting the jumper wire for that particular button from the FM common lead No. 15 and connecting the jumper wire to the AM common lead No. 13 and by reversing this procedure any of the buttons now used for AM can be used for FM. If the pushbuttons on the receiver have been changed so that more AM or FM stations can be tuned in, after the set has been received from the factory, it will be necessary to make the same changes on the keyboard pushbuttons as the receiver will not operate properly, for example:

If button No. 5 has been changed to tune in an AM station on the receiver push-button switch gang, when the keyboard is plugged in and button No. 5 is pushed the set will switch over to FM reception and if no FM station happens to be located at the point on the dial scale where button No. 5 contact is set nothing will be heard but background noise, therefore, it is necessary to change the wiring of No. 5 switch in the keyboard from the FM common lead over to the Am common lead, then button No. 5 on the keyboard will tune in exactly the same station as button No. 5 on the receiver chassis.

The two buttons marked ON and OFF are provided to control the volume of the receiver without having to go all the way back to where the receiver is located. The two buttons on either side of the lamp bezel are used to turn the receiver ON and OFF. The button on the right side turns the set ON while the button on the left side turns it OFF. When the receiver is turned ON, the indicator in the keyboard will glow.

The lamp used for the indicator is a standard 30 volt switchboard lamp which has a very long life. It can easily be replaced when necessary by removing the four screws on the bottom of the keyboard, removing the bottom plate then sliding out the old lamp and inserting the new one.

REMOTE VOLUME CONTROL MOTOR

The remote volume control motor consists of a reversible type motor operating on 24 volts 60 cycle AC. This motor drives the volume control through a gear train and a clutch. The shaft of the intermediate gear is extended in order that the volume control may be manually operated at the front of the receiver. The clutch is provided in order that damage will not be incurred if the motor is kept running momentarily after the volume control has reached the end of its travel.

The schematic diagram shown in Figure 4 and the pictorial diagram shown in Figure 5 depict the changes in wiring necessary when the remote volume control motor is added to the standard 800-B Radio Receiver chassis.

INSTRUCTIONS FOR INSTALLING REMOTE VOLUME CONTROL MOTOR IN 800-B RADIO RECEIVER CHASSIS

By utilizing the following instructions and the pictorial diagram of Figure 5 the remote volume control may be easily installed in a standard Model 800-B Receiver chassis. It is necessary to remove the panel and knob escutcheon plate before proceding with the installation.

1. Remove the angle cover plate over the cutout used for mounting the volume control motor.

2. Disconnect the three leads from the volume control and remove it from the chassis.

3. Fasten the volume control bearing plate on the inside of the chassis using two 6-32 x 5/16 screws and two nuts. Center the 1/4 inch hole in the bearing plate in the 3/8 inch hole used to mount the old volume control.

4. Remove the screws fastening capacitor C37 and resistor strip E43 to the side of the chassis and push these two items toward the rear of the chassis as far as the connecting leads will allow.

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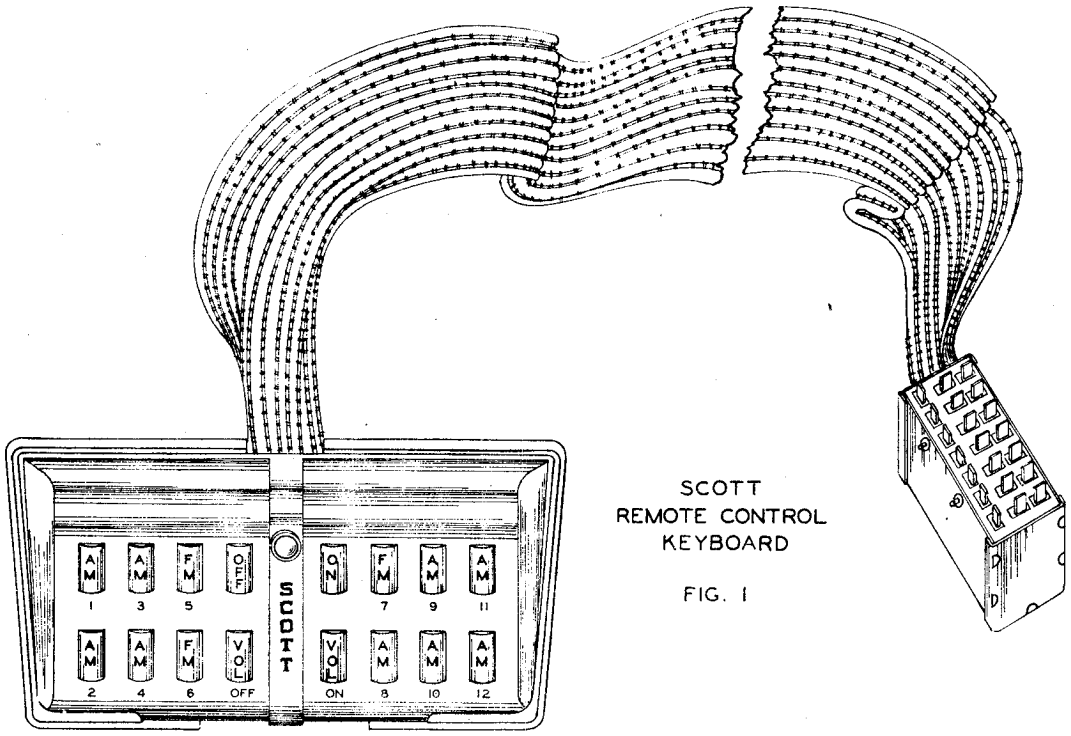

SCOTT
REMOTE CONTROL
KEYBOARD

FIG. 1

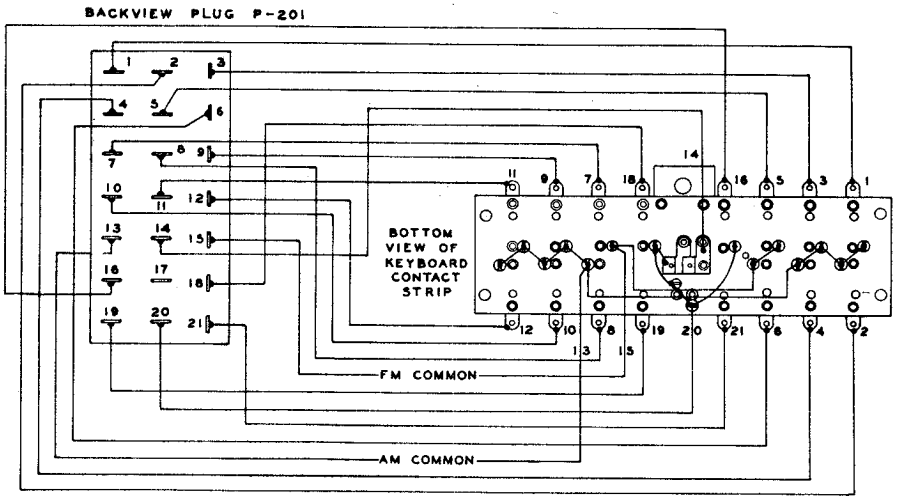

FIG. 2 PICTORIAL DIAGRAM OF KEYBOARD WIRING

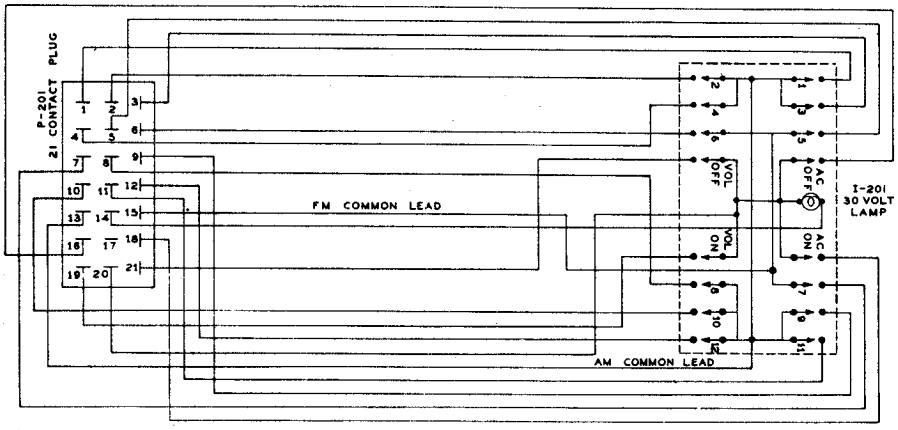

FIG. 3
SCHEMATIC DIAGRAM KEYBOARD ASSEMBLY 2B945

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5. Insert the tuning motor assembly in place and fasten down with two 5-40 x 1/4 BH screws and two 6-32 x 1/4 BH screws as shown in Figure 5. The two 5-40 x 1/4 BH screws are used to mount the motor assembly spacers to the chassis while the two 6-32 x 1/4 BH screws are used to mount the motor assembly bracket to the chassis. Make certain that the manual drive shaft rotates freely in the bearing plate. If not, loosen the bearing plate mounting screws and center it properly over the shaft, then tighten down again.

6. Reconnect the volume control leads as shown in Figure 5 using the tie point mounted on the motor frame for connecting the shield braids of the two shielded leads. The off terminal of the volume control should then be connected to this tie point by a short piece of wire.

7. Connect wire W201 as shown in Figure 5 from contact No. 16 of the 21 contact receptacle J6 to one terminal of the AC relay coil L21.

8. Connect wire W202 from contact No. 18 of receptacle J6 to one terminal of AC relay coil L20.

9. Connect wire W203 from contact No. 19 of receptacle J6 to terminal No. 1 of the volume control motor as shown in Figure 5.

10. Connect wire W204 from contact No. 21 of receptacle J6 to terminal No. 2 of the volume control motor.

11. Connect wire W205 from terminal X of AC relay switch SW5 to terminal No. 3 of volume control motor as shown in Figure 5.

12. Connect resistor R201 between contact No. 14 of receptacle J6 and contact X of AC relay switch SW5 as shown in Figure 5.

13. Check the wiring of the common terminal of the pushbutton system transformer in the power supply. In the older sets this terminal was grounded to a soldering lug fastened under one of the transformer mounting screws. It will be necessary to remove this short lead and run a wire from the common terminal of the transformer over to No. 10 contact of the 12 contact receptacle J3. This change is necessary in order to eliminate hum when operating the volume control motor.

14. When connecting in the wires outlined above, they should be run in under the present cables in order to hold them in place and present a neater appearance.

After the wiring has been completed, connect the set for normal operation, plug in the keyboard and with the controls on the receiver set the same as for pushbutton tuning operation, operate all the buttons on the keyboard to make sure the installation has been correctly made. Then reassemble the knob escutcheon plate and panel. It will be noted that when the volume control is now operated manually that seven complete revolutions will be necessary to turn it from minimum to maximum.

If the motor clutch chatters while running or if the clutch does not release immediately when either of the volume control pushbuttons are released, it will be necessary to adjust the clutch release spring on the back of the motor. If the clutch chatters, release pressure on the spring and if the clutch fails to release immediately apply more pressure on the spring.

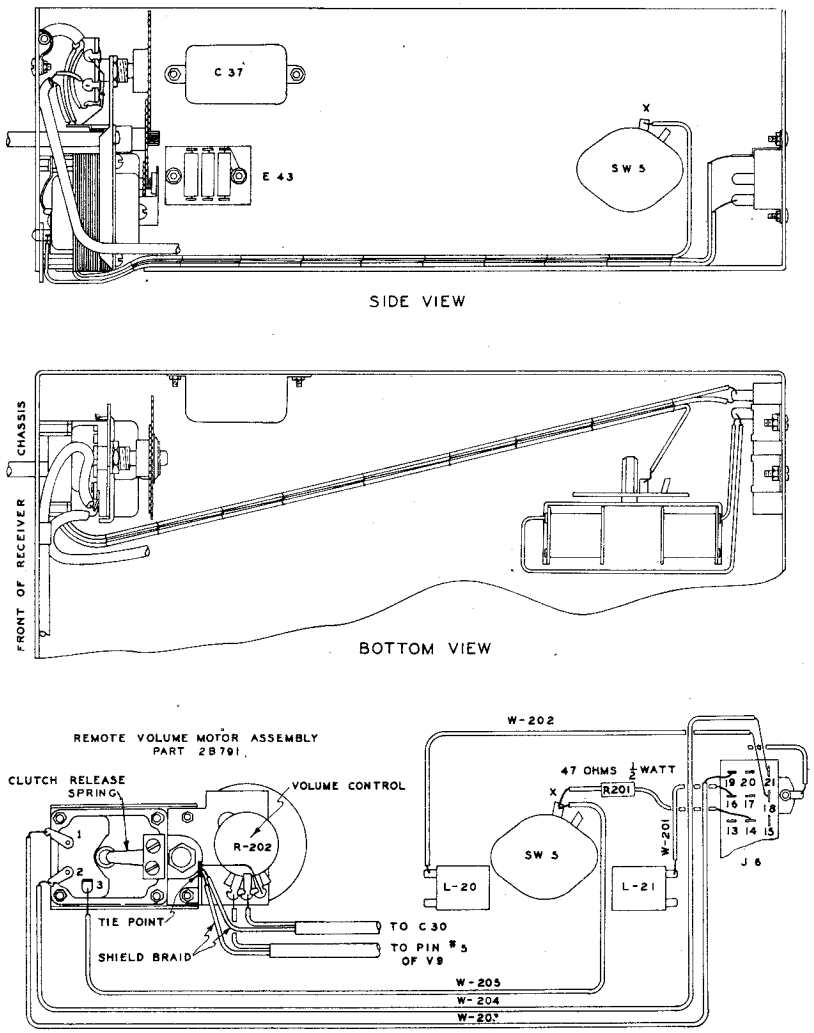

FIG. 5 PICTORIAL DIAGRAM OF CHANGES NECESSARY TO ADD REMOTE VOLUME CONTROL IN STANDARD 800 B RECEIVER CHASSIS

SCOTT RADIO LABS. INC.

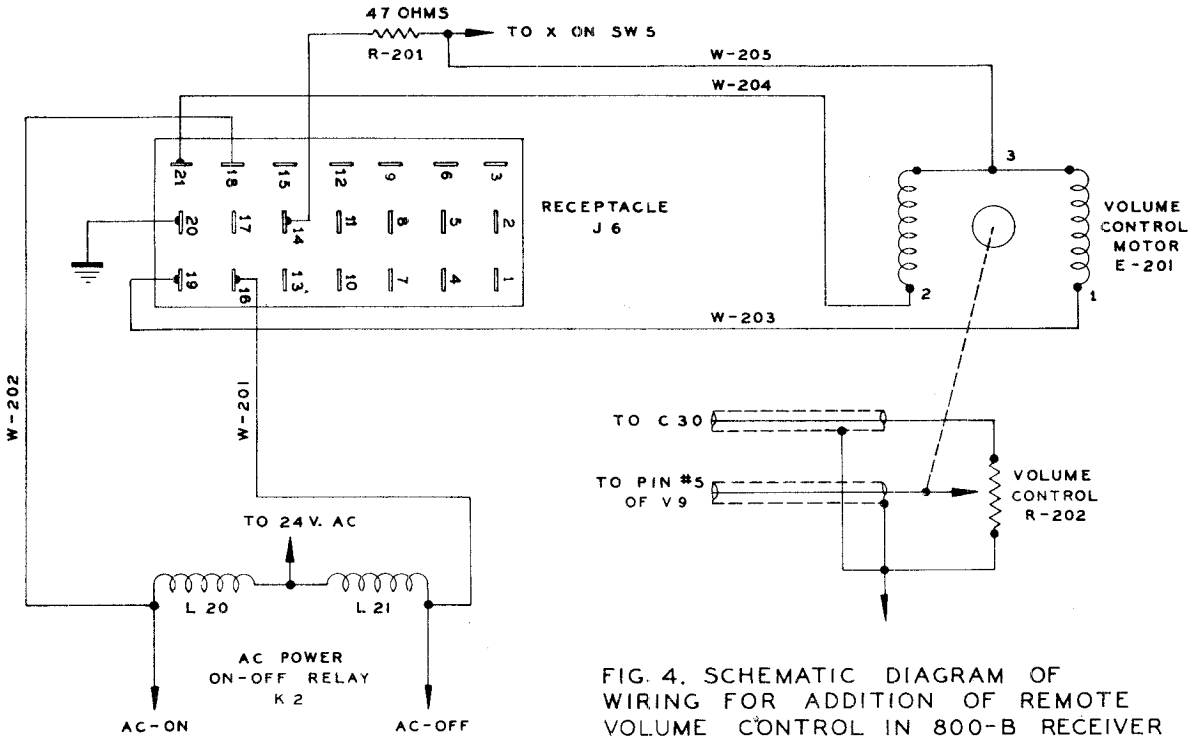

FIG. 4. SCHEMATIC DIAGRAM OF WIRING FOR ADDITION OF REMOTE VOLUME CONTROL IN 800-B RECEIVER

Parts List by Symbol Designation For
Model 800-BR Remote Volume Control Kit

Symbol Desig.	Function	Description	Part Number
		Miscellaneous Electrical Parts	
E-201	Remote volume motor assembly	Motor assembly with gears, drive shaft clutch and volume control	2B791
E-202	Volume control drive motor	Motor, shaded pole reversible type operates on 24 volts 60 cycles, Part of E-201 assembly	58B446
E-203	Clutch assembly	Clutch for remote volume control drive complete with gear, bushing and set screw. Part of E-201 assembly	2B2332
E-204	Drive shaft assembly	Manual drive shaft for volume control motor consists of shaft with gears attached. Part of E-201 assembly	2B2333
		Resistors	
R-201	Pilot lamp current limiting resistor	Resistor, composition, 47 ohms 10% ½ watt, wire leads	70A420
R-202	Remote volume control	Potentiometer, composition, 1 meg 20% .4 watt clockwise audio taper, shaft: 1/4" dia. x 1" long	70B571
		Wire	
W-201	Relay coil L-21 to Pin 16 of J6 connecting lead	Wire- #20 stranded, tinned copper, cotton braid covered, yellow tracer 9 1/4" long, stripped 3/8" each end	96B743
W-202	Relay coil L-20 to Pin 18 of J6 connecting lead	Wire- #20 stranded, tinned copper, cotton braid covered, orange tracer 6" long, stripped 3/8" each end	96B741
W-203	Drive motor to Pin 19 of J6 connecting lead	Wire- #20 stranded, tinned copper, cotton braid covered, brown tracer 18" long, stripped 3/8" each end	96B740
W-204	Drive motor to Pin 21 of J6 connecting lead	Wire- #20 stranded, tinned copper, cotton braid covered, brown tracer, 17 3/4" long, stripped 3/8" each end	96B740
W-205	Common of drive motor to SW5 connecting lead	Wire- #20 stranded, tinned copper, cotton braid covered, blue tracer, 14" long, stripped 3/8" each end	96B678

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Technical Data

Power Requirements	117 volts AC 60 Cycles Current Consumption 197 Watts Normal-310 Watts Maximum
Audio Power Output	25 watts undistorted 40 watts maximum
Audio Frequency Range	35 to 20,000 cycles
Overall Frequency Range - AM	35 to 8,500 cycles
Overall Frequency Range - FM	35 to 15,000 cycles
Tuning Range - AM	540 KC to 1600 KC 5.9 MC to 18.2 MC
Tuning Range - FM	88 to 108 MC

Installing Loudspeaker

The loudspeaker baffle is provided with four small holes provided as pilot holes for the wood screws used to fasten the speaker to the baffle. The loudspeaker may easily be located over the baffle opening by first centering the speaker over the opening with connecting cable at the bottom. The speaker should then be fastened down with the wood screws provided. The speaker should be fastened down firmly but DO NOT tighten the screws so as to warp or pull the edge of the speaker frame as this will throw the voice coil out of alignment and cause the speaker to distort.

Installing Power Supply Chassis

The power supply chassis should be fastened to the lower shelf of the cabinet by means of four wood screws provided. It should be fastened down in a position where the fuse receptacles and connecting cable receptacles are readily accessible.

Installing Receiver Chassis

The receiver chassis has been designed so that it can be rolled in or out of the front of the cabinet with a spring latch arrangement which holds the receiver at a position where the front of the panel extrudes out approximately 2 inches for ease in tuning. By releasing the spring latches on both sides of the panel the receiver may be rolled out approximately 10 inches for inspection of the receiver or tube replacement.

The receiver should be installed in the cabinet using the following procedure:

1. The front panel is mounted on the chassis as shown in Figure 1 using the hardware furnished.

2. Next mount the latch springs on the sides of the receiver chassis as shown in Figure 1. The retaining screw which is used to center the latch spring in the slot on the side of the panel should be screwed in far enough to bring the latch spring flush with the outside of the panel. It may be necessary to adjust the screw on the latch spring further in to make the latch catch smoothly when the set is pulled out. However, DO NOT leave the latch adjustment screws sticking out beyond the sides of the panel as they may catch in the latch spring plate when the set is pushed into the cabinet.

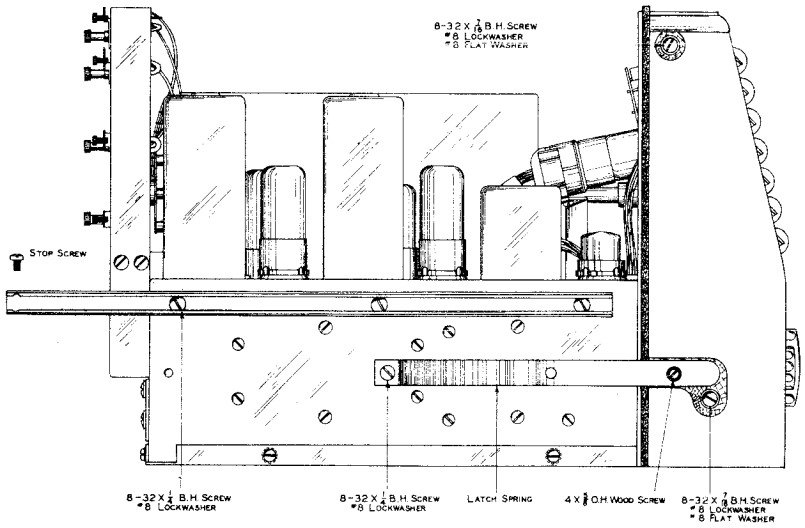

Figure 1 800-B Radio Receiver - Side View

3. Mount the slide rails on the sides of the receiver chassis as shown in Figure 1 using the hardware provided for this purpose. Remove the stop screws from the ends of the rails as shown.

4. Open the door of the cabinet and slide it back inside as far as it will go.

5. Fasten the slide rail hanger brackets, which are packed with the receiver, onto the support brackets which are mounted in the cabinet using the rubber grommets, screws and flat washers furnished with the receiver, as shown in detail drawing Figure 2.

6. Insert the rails on the receiver into the slides which are mounted in the cabinet and slide the receiver back into the cabinet.

7. Insert the stop screws in the ends of the slide rails.

8. Open the cable hole clamp at the back of the cabinet and lay the cables in the slot provided. The cables may then be inserted in their respective receptacles in the power supply. DO NOT force the plugs as they are polarized and will enter the receptacle in only one position.

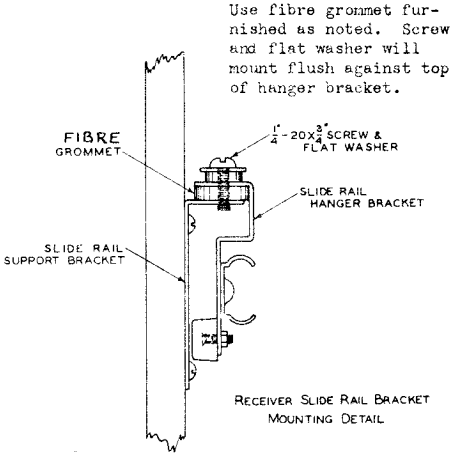
Use fibre grommet furnished as noted. Screw and flat washer will mount flush against top of hanger bracket.
FIBRE GROMMET
1/4-20 X 3/4 SCREW & FLAT WASHER
SLIDE RAIL HANGER BRACKET
SLIDE RAIL SUPPORT BRACKET
RECEIVER SLIDE RAIL BRACKET MOUNTING DETAIL

Figure 2

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9. Insert the screw eye furnished, under the top at the rear of the cabinet in the center of the receiver compartment and tie the connecting cables to the screw eye leaving enough slack so that the receiver will pull all the way out without pulling the cables tight. This will allow the cables to loop when the receiver is run in and out of the cabinet.

Installing the Record Changer

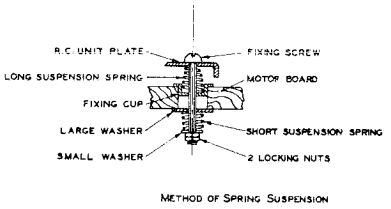
The record changer furnished with the receiver is designed for floating spring mounting. Although it is not necessary to remove the drawer to install the changer, it will be much more convenient to do so. The back of the compartment should be removed; then remove the slide rail stop screws, the drawer can then be removed from the cabinet.

Remove the spindle and turntable. Then mount the changer with the hardware provided, following the method shown in Figure 3.

CAUTION: DO NOT LIFT THE RECORD CHANGER BY THE PICKUP ARM OR THE OVER-ARM AS UNDUE STRAIN ON THESE PARTS WILL PUT THE CHANGER OUT OF WORKING ORDER.

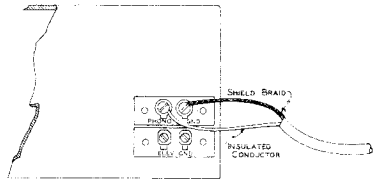
The drawer can now be reinserted in the cabinet, feeding the record changer power cord and pickup leads through the hole in the center of the shelf. Put the stop screws back in the slide rails and fasten the back of the cabinet on.

The power cord for the record changer should be inserted in the power receptacle which is fastened to the power chassis by a short cord, and the pickup cord connected to the PHONO-GND terminals at the rear of the receiver; connect the shield braid to the GND terminal, and the insulated conductor to the PHONO terminal as shown in Figure 4.



METHOD OF SPRING SUSPENSION

Figure 3



RECORD PLAYER PICK-UP CONNECTIONS

Figure 4

Antenna Connections

The Model 800-B Radio Receiver is designed to be used with either a straight antenna with single conductor lead-in or a doublet type antenna with 2 conductor lead-in. Separate connections are provided for antenna on AM and FM bands and for best reception a doublet type antenna should be used on the AM bands with a separate dipole antenna for the FM band as shown in Figure 5.

A double doublet antenna with pretuned matching transformer such as the SCOTT Double Doublet Antenna system will give maximum transfer of signal energy with greatest noise reduction on both broadcast and shortwave bands and a horizontal dipole with the flat top legs cut to the correct length for operation in the 88-108 megacycle band used with a two conductor lead-in with low-loss properties will give maximum results on the FM band.

In installations where it is not possible to install a doublet antenna system, a single wire antenna with the flat top 60 to 75 ft long and the lead-in as short and direct as possible, should be used. For FM reception a small mica capacitor of 51 MMF may be connected between the AM antenna connection and the FM antenna connection as shown in Figure 7.

A four contact receptacle is provided, at the rear of the receiver chassis for using a loop antenna on the "BC" and "SW" bands in metropolitan areas where a number of powerful stations may be located. It is not recommended that a loop antenna be used for receiving distant stations. Directions for installing the loop antenna are furnished with each antenna.

A two position switch with a screwdriver slot located at the left of the loop receptacle is provided so that the input circuits of the receiver may be connected to the loop antenna or an outside antenna. This switch should be set in the counter-clockwise position for use with an outside antenna and set to the clockwise position for use with the loop antenna.

TUNING THE RECEIVER

After the receiver has been installed in the cabinet and the antenna connections, record changer connections and power line connections are made, the receiver is ready for operation. Push the "ON" button to turn the receiver on, then for initial operation set the controls as follows:

Pushbutton Operation

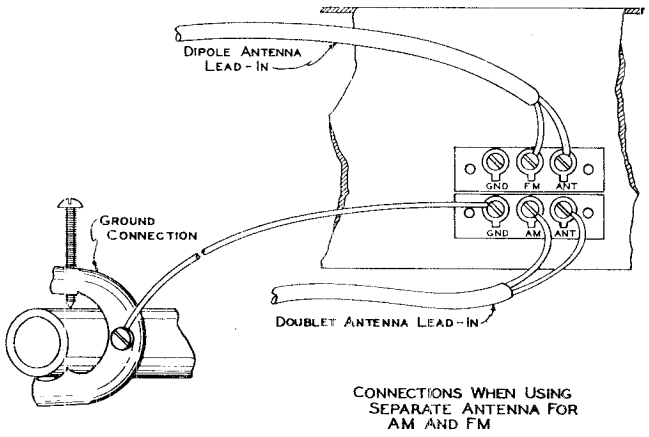
1. Set SELECTIVITY control to "M" or "B" position.
2. Set AM-BAND control to "BC" position.
3. The SENSITIVITY control should be set at approximately vertical position or half rotation but it can be adjusted to suit receiving conditions, however, it is effective only on the "BC" and "SW" bands.
4. Press the button which is marked with the desired station call letters, holding the button down until the dial mechanism stops.
5. Adjust the VOLUME control to the desired level and the BASS and TREBLE controls for the tone quality desired.

In order to change from AM reception to FM reception the SELECTIVITY control must be set at "M" or "B" position and the AM BAND control set at "BC" position then by pushing any AM button the set automatically switches to AM reception and if any FM button is pushed the receiver automatically switches to FM reception. The indicator lamps behind the colored dots at the end of the frequency scale are also automatically switched with the above procedure.

Manual Operation in the AM-Broadcast Band

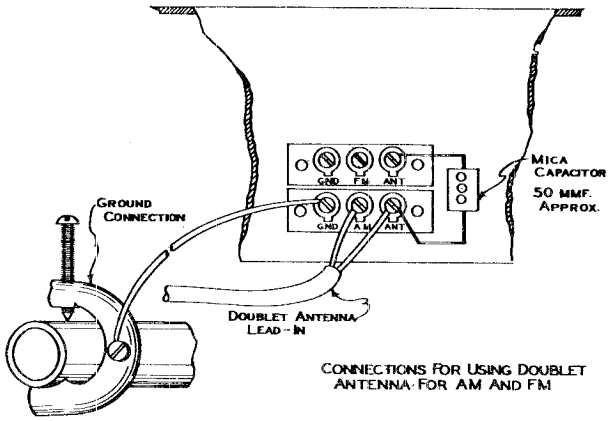
1. Set receiver for AM reception as outlined above.
2. Set SELECTIVITY control to "S" (sharp) position.
3. Set TREBLE control to approximately vertical position.
4. Set SENSITIVITY control to approximately vertical position.

SCOTT RADIO LABS. INC. MODEL 800-B



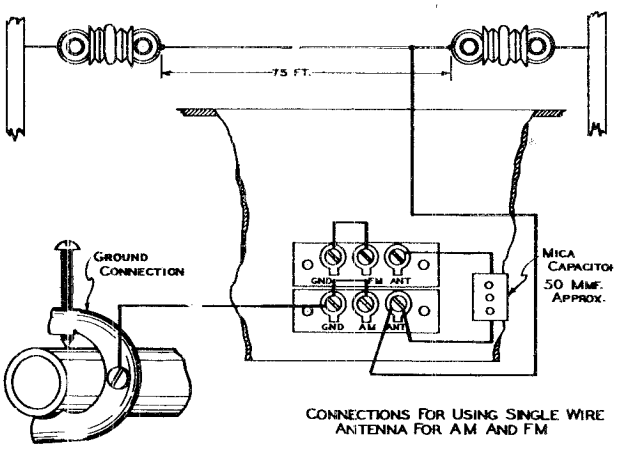
CONNECTIONS WHEN USING SEPARATE ANTENNA FOR AM AND FM

Figure 5



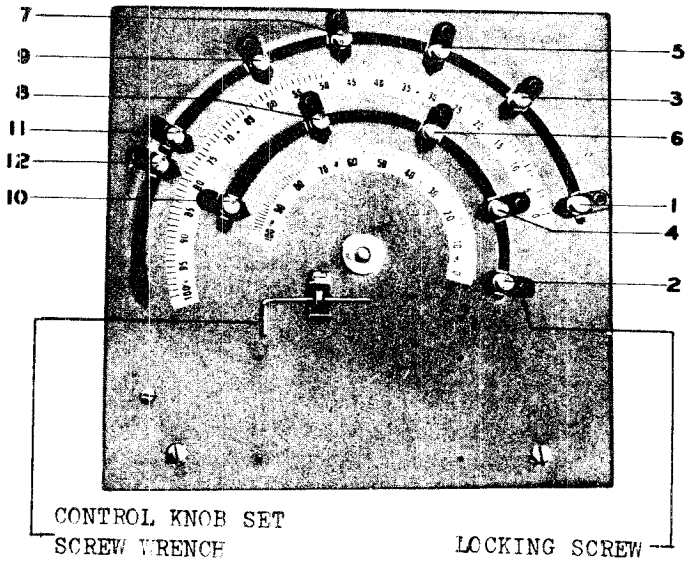
CONNECTIONS FOR USING DOUBLET ANTENNA FOR AM AND FM

Figure 6



CONNECTIONS FOR USING SINGLE WIRE ANTENNA FOR AM AND FM

Figure 7



CONTROL KNOB SET SCREW WRENCH

LOCKING SCREW

Figure 9 Pushbutton Tuning Backplate

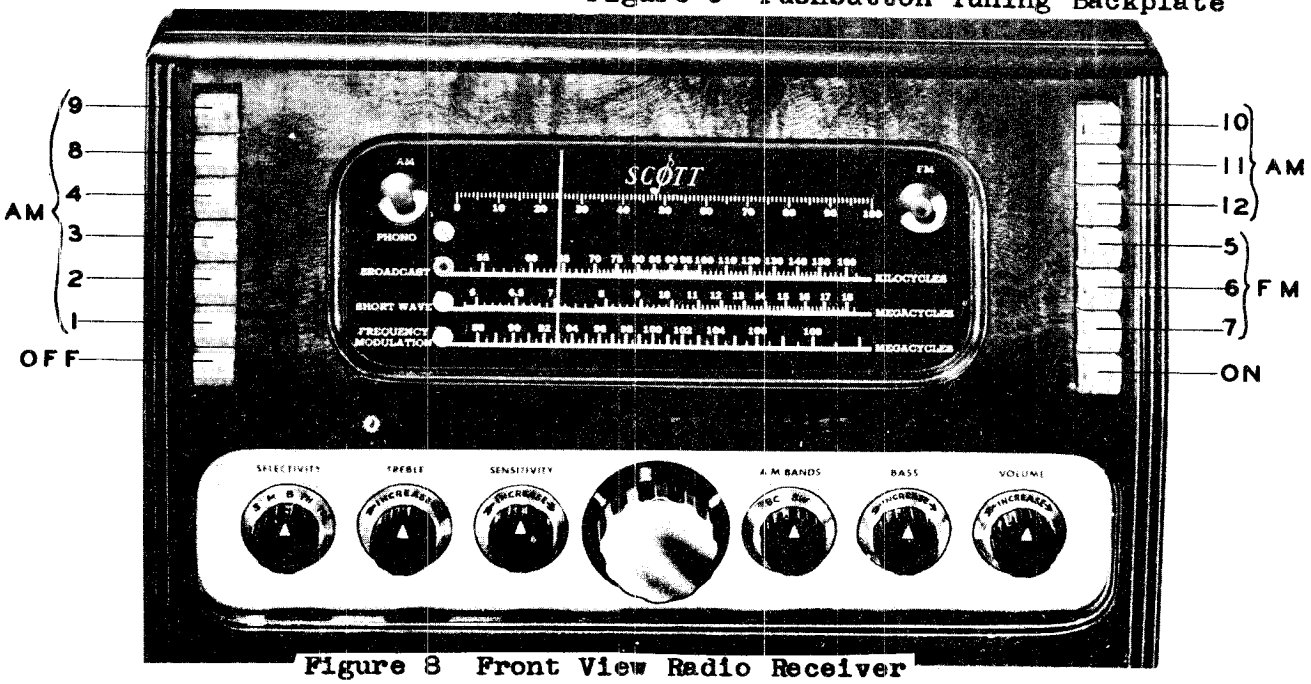


Figure 8 Front View Radio Receiver

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5. Set AM BAND control to "BC" position.

6. Set BASS control to approximately vertical position.

7. Tune in a station with the MAIN TUNING control using the AM tuning eye to indicate when the set is properly tuned, then adjust the VOLUME control for desired volume level.

8. Advance SELECTIVITY control to "M" or "B" position for desired fidelity, then adjust the TREBLE and BASS controls for desired tone.

9. When tuning for weak distant stations, advance the SENSITIVITY control and when tuning strong local stations turn back the control to eliminate noise between stations.

Manual Operation in the AM-Shortwave Band

1. Set controls as above except the AM-BAND control set to "SW" position.

2. When tuning on the Shortwave Band the SENSITIVITY control should be advanced to near maximum position. If automobile ignition noise or other noise with decided peaks is encountered, the SENSITIVITY control should be advanced to maximum until the switch mounted on this control clicks. This will put the noise limiter circuit into operation and will reduce the noise so that weak stations can be heard.

Manual Operation on the FM Band

1. With the SELECTIVITY control set at "M" position and AM-BAND control set at "BC" position, push any of the pushbuttons which are set up for FM reception. The set will automatically switch to FM reception and the lamp behind the colored dot marking the FM Band will be illuminated.

2. Tune in an FM station noting carefully that the dial is tuned to the point where maximum closure is obtained on the FM tuning eye.

OPERATION OF CONTROLS

All operating positions of the controls of the Model 800-B Radio Receiver, with the exception of the Main Tuning Control, are marked, and indicator markings on the knobs are provided so that adjustment of the controls for various operating conditions is easily accomplished.

Six variable controls plus the main tuning control are provided so that maximum efficiency may be obtained at any operating condition. The functions and settings of the operating controls are listed below.

1. SELECTIVITY Control

The SELECTIVITY control located at the left side of the panel has five positions marked S-M-B-PH-Tel. The S-M-B positions are effective only for AM (amplitude modulation) reception on the "BC" and "SW" Bands. They designate the "Sharp", "Medium" and "Broad" condition of the AM-IF amplifier. The "S" position should be used at all times when manually tuning in stations as the IF amplifier is so broad in the "M" and "B" positions that a true resonant point cannot be obtained with the tuning eye. After the station has been tuned in properly in the "S" position the control may be advanced to the "M" or "B" position to obtain better fidelity.

When the SELECTIVITY control is set at "PH" position it connects the record changer pickup into the audio circuit of the receiver and provides for record reproduction.

With the SELECTIVITY control set at "TEL" position, the audio amplifier of the receiver is connected to the television input terminals at the rear of the receiver. These terminals are provided so that a television tuner may be connected to the 800-B Receiver and the audio amplifier of the receiver used for reproduction of television sound broadcasts, while the picture will be reproduced at the television tuner.

2. TREBLE Control

The TREBLE control is located at the right of the selectivity control and is provided in order that the high frequency response of the audio amplifier in the receiver may be changed to suit operating conditions and program material. Maximum high frequency response is obtained with this control set at maximum clockwise position.

3. SENSITIVITY Control

The SENSITIVITY control is located at the right of the treble control. This control is effective only on the AM broadcast and shortwave bands and is provided to vary the sensitivity of the receiver. When manually tuning the receiver the control should be set to the position where the AM tuning eye shadow just closes or on weak stations to the point where maximum closure of the tuning eye is obtained. For maximum sensitivity when tuning in weak distant stations the control should be advanced to the point where the switch incorporated on this control just starts to throw. The switch mentioned above which is incorporated in the SENSITIVITY control is provided to switch the Noise Limiter Circuit on and off. When the control is advanced to maximum clockwise rotation, the switch will throw on. The Noise Limiter Circuit with which this switch is associated, is effective on noises which have definite peaks, such as automobile ignition, it will have very little effect on noise which is of constant amplitude. Although the switch may be turned on or off when the set is tuned to any frequency band, it is effective only on the AM shortwave band.

4. MAIN TUNING Control

The MAIN TUNING control is the large knob in the center of the panel. This control is provided for tuning the receiver to the station frequency desired.

5. AM-BAND SELECTOR Control

The AM-Band switch is located at the right of the main tuning control. This control is provided in order that either the broadcast or shortwave bands may be selected for AM reception. This control is effective only for AM reception.

6. BASS Control

The BASS control is located at the right of the AM-Band control. This control is provided to enable the listener to raise or lower the bass response of the receiver to suit operating conditions and program material. Maximum bass response is obtained when this control is rotated to maximum clockwise position. Turning the control counter-clockwise will reduce the bass response.

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7. VOLUME Control

The VOLUME control is located at the right side of the panel. This control is provided to regulate the audio output or "Volume" of the receiver. Maximum volume is obtained when this control is rotated to maximum clockwise position; zero output is obtained when the control is rotated to maximum counter-clockwise rotation. On standard 800-B Receivers this control will operate from minimum to maximum through an arc of 270 degrees. On receivers where remote volume control has been incorporated, the control will rotate seven complete revolutions from minimum to maximum since this control is driven by a motor controlled from the remote position, therefore when manually tuning the set it will be necessary to turn the control considerably more than is the case on the standard receiver.

8. PUSHBUTTON OPERATION

Fourteen pushbuttons are provided on the panel of the receiver. The bottom button on the right side is provided to turn the receiver "ON" when this button is pushed in. The bottom button on the left side shuts the receiver "OFF" when pushed in. The other twelve buttons are provided for selecting stations. These twelve station selector buttons are effective only when the SELECTIVITY control is set at "M" or "B" positions and the AM band controls set at "BC" position. A set of insert tabs listing all North American stations is included with each receiver. The sequence in which the inserts should be placed and the method of setting up the tuning system for pushbutton control is described above.

After the pushbutton tuning system has been set up for operation , when any pushbutton which has been set for an AM station is pushed the receiver will automatically switch over for reception of AM broadcast stations. When any pushbutton which has been set up for an FM station is pushed, the receiver will automatically switch over for reception of FM stations. When manually tuning the receiver, in order to switch from AM to FM or vice-versa, it is only necessary to push any AM or FM button momentarily and the circuits will be switched automatically.

9. TUNING INDICATORS

In the upper right and left hand corners of the dial scale are located two tuning indicators which are provided to enable the operator to properly tune the receiver to resonance with the station when manually tuning. The indicator in the left hand corner is marked AM and is used only when tuning in stations on the broadcast or short-wave bands. The indicator in the right hand corner is marked FM and is used only when tuning in stations on the FM band. A control, with a screwdriver adjustment slot, located on the top of the chassis directly under the FM tuning eye, is provided so that the tuning eye shadow may be made to close on the strongest FM signal for the particular location. This adjustment will then enable the listener to accurately tune the receiver to all FM stations by watching for maximum closure of the FM tuning eye.

10. TUNING DIAL

The three frequency bands are individually calibrated on the edge lighted glass scale. The BC band is calibrated in kilocycles with the last zero omitted on the numeral markings because of space limitations.

The SW band is calibrated in megacycles and the important bands are marked off for ease in tuning.

The FM band is calibrated in megacycles and divided in one-half megacycle divisions for help in tuning.

A scale marked off in 100 divisions located at the top of the dial face, is provided to enable the listener to log stations which may be tuned in on any of the three frequency bands and also permits setting up the pushbutton system.

At the left side of the dial face are located four colored dots which are provided to indicate which frequency band the receiver is operating on and when the receiver is adjusted for record player reproduction. Each dot is illuminated by a small lamp located at the back of the dial mechanism and are automatically turned on with the setting of the controls for changing frequency bands.

TUBE REPLACEMENT

The tube complement of the Model 800-B Radio Receiver is as follows:

Symbol	Type	Application
V1	6SK7	AM-RF Amplifier
V2	6J5	AM Oscillator
V3	6SA7	AM Mixer
V4	6SK7	AM-1st IF Amplifier
V5	6SK7	AM-2nd IF Amplifier
V6	6H6	AM-2nd Detector
V7	6E5	AM-Indicator
V8	6E5	FM-Indicator
V9	6J5	1st Audio Amplifier
V10	6J5	2nd Audio Amplifier
V11	6AG5	FM-RF Amplifier
V12	6C4	FM Oscillator
V13	6AG5	FM Mixer
V14	6AC7	FM-1st IF Amplifier
V15	6AC7	FM-2nd IF Amplifier
V16	6SJ7	FM-1st Limiter
V17	6SJ7	FM-2nd Limiter
V18	6H6	FM-Discriminator
V19	6SL7GT	3rd Audio Amplifier
V20	6L6G	Audio Power Output
V21	6L6G	Audio Power Output
V22	OD3	Voltage Regulator
V23	5Y3GT	Rectifier
V24	5Y3GT	Rectifier

When it is found necessary to replace any tube, by referring to Figures 10 and 11 the location and tube type can very easily be identified.

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INSTRUCTIONS FOR INSTALLING LOOP ANTENNA

SYSTEM IN MODEL 800-B RADIO-PHONOGRAPH

The loop antenna system is provided for installations in locations where it is found impossible to erect an outside antenna for AM and FM reception. It consists of separate loops for the broadcast and shortwave bands for AM reception, these two loops being coupled to the antenna input circuit of the receiver through a matching transformer which has adjustments for each band in order to insure maximum signal input. A separate folded dipole antenna is provided for FM reception, this antenna being connected directly to the FM antenna terminals.

Figure 1 depicts the manner in which the loop antennas are fastened in the radio-phonograph cabinet, and by using the following instructions, step by step, the installation and adjustment of the antennas may be easily made and maximum results obtained.

1. First install the FM antenna which is a two wire flat cable which has been cut to the proper length and terminals attached. This antenna should be installed around the inside of the receiver compartment of the cabinet, at the rear, as follows:

   a. Place the junction of the antenna proper and the lead-in approximately 2 inches to the left of center and at the extreme outer edge of the back of the compartment with the lead-in facing toward the receiver chassis. Tack the antenna down with the staples furnished, following the contour of the cabinet, inserting a staple at each bend, the ends of the antenna will terminate approximately 8 inches apart at the top inside of the cabinet.

2. The broadcast band loop is installed around the bottom of the cabinet shelf on the Chippendale and Modern style cabinets as shown in Figure 1. On the Regency cabinet it is necessary to install it around the left side of the speaker compartment and under the shelf of the receiver compartment as shown in Figure 2. Although this loop can be installed in other ways, it is best to install it as shown in order to prevent the loop from being too directional. This loop consists of a 5 wire flat cable cut to the correct length, with a two wire flat lead-in attached. To install the BC band loop in the Chippendale and Modern Cabinets, place the junction of the loop and the lead-in under the shelf approximately ½ inch in from the back and 2 inches to the right of the center of the radio compartment, with the lead-in cable facing out from the cabinet. Tack the loop down at this point with the staples furnished and follow around the inside of the cabinet with the rest of the loop fastening it to the bottom side of the shelf. When going around the corner of the cabinet it will be necessary to fold over the loop in order to keep the corners flat as shown in Figure 1. Loop the lead-in up over the edge of the shelf and fasten down at one point to relieve any strain on the junction point of the loop and lead-in. To install the BC band loop in the Regency cabinet, start by fastening the junction of the loop and lead-in the same as in the Chippendale or Modern cabinets but since the Regency cabinets have a record storage compartment it is necessary to fasten the loop around the left side of the cabinet and under the shelf of the radio compartment only, with a small section in back of the record storage compartment as shown in Figure 2. This will apply to any cabinet with a record storage compartment.

3. The shortwave loop consists of a formed copper tubing fastened to the loop coupler coil shield can. This unit is assembled at the factory ready to mount to the chassis. This assembly is mounted under the two screws used to hold the backplate to the chassis as shown in Figure 1. The procedure is as follows:

   a. Remove the screw on the right side of the backplate and loosen the screw on the left side sufficient to allow the long mounting bracket of the loop coupler to slide under. Then reinsert the screw on the right side through the short bracket of the coupler and tighten down both screws.

   b. Insert the loop coupler plug P-301 into the loop receptacle at the rear of the chassis. This plug is polarized and can be inserted only one way.

   c. Connect the broadcast band loop lead-in as shown in the detail in Figure 1.

4. Connect the FM loop antenna to the two terminals marked ANT on the FM antenna terminal strip as shown in the detail of Figure 1.

5. Turn the loop selector switch SW1, which is located directly under the loop coupler on the rear of the receiver chassis, to the clockwise position. The slot will then be in the position shown in Figure 1.

6. After the loop has been installed and connected the receiver should be put in operation and the loop coupler adjusted for maximum signal on the broadcast and shortwave bands. The FM band loop requires no adjustment.

   If a fairly strong signal can be tuned in so that the tuning eye will show deflection at approximately 1500 K C and 600 KC on the broadcast band or 16 MC and 6.5 MC on the shortwave band, the adjustments on the coupler can be made using these signals with the tuning eye as an indicator as follows:

   a. Remove the AM tuning eye from the bracket and face the front of the tube toward the rear of the set so that it can be easily seen when adjusting the loop coupler.

   b. Set the receiver for operation in the AM band and with the selectivity control in the "Sharp" position, make the adjustments outlined below, setting each adjustment for maximum closure of the tuning eye. Figure 3 shows the location of the four adjustments on the loop coupler.

Band	Freq.	Adj.
BC	1500 KC	C-301
BC	600 KC	E-301
SW	16 MC	C-302
SW	6.5 MC	E-302

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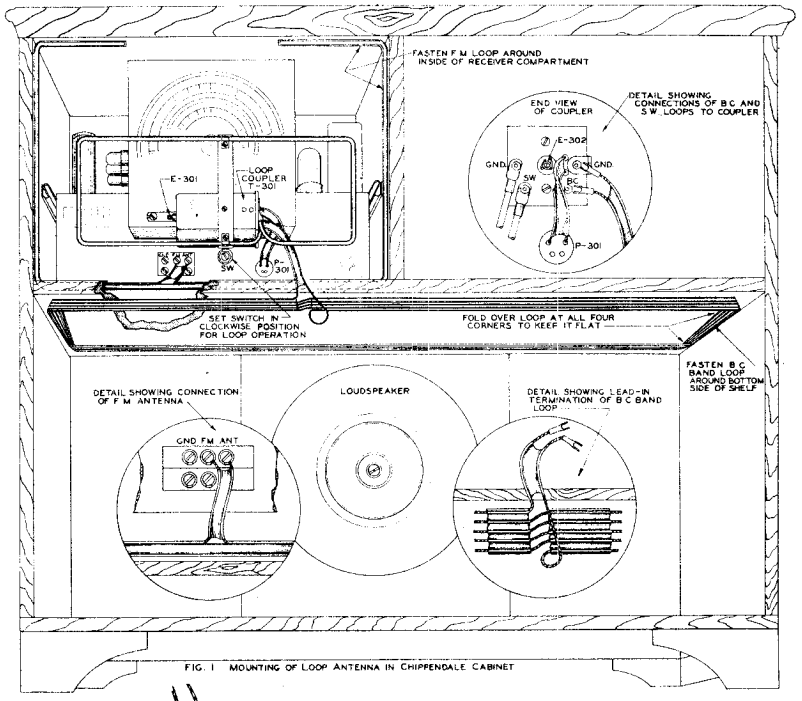
FASTEN F M LOOP AROUND INSIDE OF RECEIVER COMPARTMENT
END VIEW OF COUPLER
DETAIL SHOWING CONNECTIONS OF B C AND S W LOOPS TO COUPLER
E-302
GND
SW
BC
P-301
E-301
LOOP COUPLER T-301
SET SWITCH IN CLOCKWISE POSITION FOR LOOP OPERATION
FOLD OVER LOOP AT ALL FOUR CORNERS TO KEEP IT FLAT
FASTEN B C BAND LOOP AROUND BOTTOM SIDE OF SHELF
DETAIL SHOWING CONNECTION OF F M ANTENNA
GND FM ANT
LOUDSPEAKER
DETAIL SHOWING LEAD-IN TERMINATION OF B C BAND LOOP

FIG. 1 MOUNTING OF LOOP ANTENNA IN CHIPPENDALE CABINET

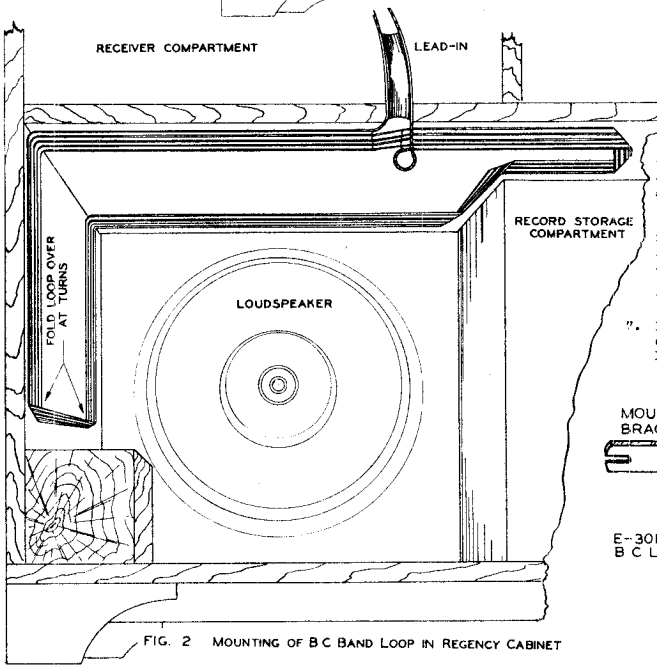

FIG. 2 MOUNTING OF B C BAND LOOP IN REGENCY CABINET

If a strong steady signal is not available for setting the adjustments on the coupler a signal generator must be used with either the tuning eye or an output meter as a signal indicator. The signal generator output terminals are connected to a single turn loop of wire placed adjacent to the loop in the set, the adjustments are made as in the table above keeping the output of the signal generator as low as possible and still maintain a clear signal. In noisy locations it may be necessary to set up a screened booth to do this alignment although this is seldom necessary as the adjustments on the coupler are not critical and with a signal generator a sufficiently strong signal to override the noise level can be obtained so that the adjustments can be made to obtain maximum signal input to the receiver.

". In the Regency cabinet caution should be taken to mount the power supply chassis as far away from the BC band loop as possible to prevent detuning the loop.

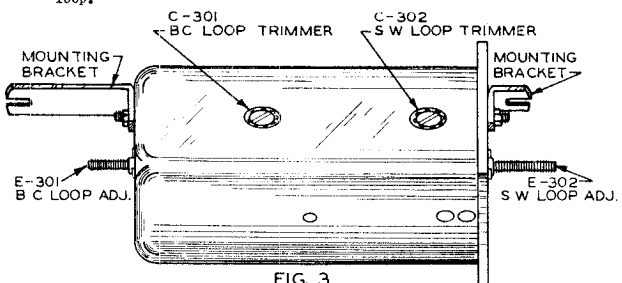

FIG. 3
COUPLER SHOWING TRIMMER LOCATION

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MODEL 800-B

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In a high fidelity instrument such as the Model 800-B a very wide range of audio frequencies are reproduced and the hum problem is of special significance. Any hum voltages which reach the loudspeaker will be reproduced to a considerably greater degree than in the case of ordinary receivers having only a limited bass response. Thus, it becomes quite important that every effort be made to keep this hum at an absolute minimum. The several possibilities for hum pickup are treated in these notes. When customer complaints of an excessive hum level are experienced the following corrective measures are suggested. If the service man does not have an adequate stock of parts to make the changes which may be required, the additional parts may be procured from the Service Department, Scott Radio Laboratories, Inc., 4541 N. Ravenswood Avenue, Chicago, Ill.

Before taking any corrective measures check the wiring of the power supply, particularly the receiver receptacle J-3, to make sure that it conforms fully with the circuit diagram.

CONDITIONS FOR ELECTRICAL HUM AND SUGGESTED MEASURES

A. Hum present when receiver is switched on but Volume Control is adjusted for minimum output.

Elimination of Defective Components

The first step in locating the cause of hum under these conditions is to remove the 3rd audio amplifier tube V-19 (6SL7GT, located in the power supply chassis). If the hum disappears or is greatly reduced the indicated fault lies in or ahead of this tube. If ahead of this tube it is, undoubtedly, caused by the 1st or 2nd audio amplifier tubes, V-9 (6J5) or V-10 (6J5), or their associated circuits located on the receiver chassis. If this source of hum is indicated, replace these tubes one at a time with a tube of known good quality, preferably one with a reversed coil heater which has the lowest hum pickup. If these tube replacements do not reduce the hum the 6L6 output tubes should also be replaced. If none of these tube replacements affect the hum the electrolytic capacitor C-33 which is used as a filter for the plate supply of the 1st and 2nd audio stages should be checked. It may be checked in a simple manner by bridging it temporarily with another 20 mfd., 300 to 450 volt rated capacitor, making certain that the correct polarity is observed.

If the hum is still present when the 3rd audio amplifier tube, V-19 (6SL7GT), is removed the fault may lie in a defective electrolytic filter capacitor in the high voltage supply, that is, C-93 or C-94. By shunting each capacitor with another unit of the same capacity and voltage rating, the defective unit can be easily located.

Also check the d.c. potential on each audio grid to determine whether it is excessive. A high d.c. voltage at any grid point indicates a leaky coupling condenser.

IMPROVEMENT OF FILTERING ACTION IN POWER SUPPLY

If the occasion arises where the above measures fail to improve the hum situation sufficiently to satisfy the customer, the only alternative is to provide additional filtering in the power supply. Such filtering may be essential in those localities where the A.C. power supply has a bad waveform. If the 60 cycle supply is distorted, the higher harmonics will appear particularly objectionable and may demand a greater degree of filtering. The circuit is arranged so that the additional choke serves to filter the entire supply and therfore, reduces hum from the output tubes as well as the other points of the audio amplifier. In the new arrangement two chokes part no. 17B492 are used instead of one as used in earlier layout. This additional filtering may be installed by relocating L-17 on the power supply chassis and mounting the second choke adjacent to it. The suggested arrangement and wiring diagram are shown on an attached sheet.

The following additional components are required for making this installation:

1 - Insulated wire - 4 1/4" long
1 - Single lug terminal - Part No. 90B711
1 - Filter choke - Part No. 17B492
4 - Screws - 8/32 x 3/8" long - Part No. 77A382
4 - Lockwashers - #8 - Part No. 95A251
4 - Nuts - #8 - Part No. 59A178
1 - Screw - 6/32 x 1/8" long - Part No. 77A202

The following steps may be taken for ease of installation: (Refer to Diagrams on Wiring and Schematic for Installation of Additional Filter Reactor - Model 800-B).

1. Remove 6/32 mounting screws of C-88 and R-82.
2. Remount terminal strip holding C-87 and R-80 under mounting foot of C-89.
3. Unsolder leads of L-17 and remove choke.
4. Remove one of the red leads of C-94 from #2 terminal point and connect this lead to the new single terminal point #3.
5. Drill 11 holes.
   - 8 - Clearance holes, #22 drill, for choke mtg.
   - 1 - Tapped hole for 6/32 screw.
   - 2 - 3/8" clearance holes for choke leads.
6. Mount chokes (L-17 and additional one).
7. Mount C-88 using 1/8" 6/32 screw and one of the old 6/32 screws, securing the ground lug under the unit.

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8. Wire new yellow cathode lead from point #4, (the positive terminal) on C-88 to #6 pin on 6SL7 tube socket.

9. Wire short lead from 1st choke to #2 pin on 5Y3 socket. Wire long lead on 1st choke to #3 lug - also **short lead** from 2nd choke to **#3** lug

10. Wire long lead from 2nd choke to #2 terminal lug.

B. Excessive hum with Volume Control in an advanced position and receiver switched into "Phono" or "Television" position.

A considerable improvement in the higher pitched hum level will be realized by rearranging the wiring of the "phono" and "television" input circuits and the high level audio lead running to the volume control. These leads are placed in cables in the wiring of earlier receivers, and have to be routed separately and generally isolated from other circuits to achieve the desired result. However, to avoid excessive dismantling of the receiver in the field the leads now running in the cables should be cut off and may be left in the cable while additional isolated leads are connected between the points concerned.

The following additional components are required for making this installation:

3 - Cable Clamps	- Part No.	18A312
3 - Shielded leads	- Part No.	96B962
1 - Screw - 6/32 x 1/8" long	- Part No.	77A202
3 - Lockwashers - #6	- Part No.	95A255
2 - Screws - 6/32 x 5/16" long	- Part No.	77A374
2 - Spacers - 1 1/8"	- Part No.	84A211
2 - Screws - 5/40 x 1 3/4" long	- Part No.	77B957
1 - Single lug terminal	- Part No.	90B711
2 - Nuts - 6/32	- Part No.	59A177

The following steps should be taken:

1. Disconnect ground braids and wires leading to the "phono" and "television" terminals.
2. Disconnect the other ends of these two shielded leads from switch C-3.
3. Disconnect shielded lead from C-30 coupling condenser.
4. Disconnect shielded lead from the high potential terminal of the volume control.
5. Remove short spacers from switch C-3 and substitute long spacers and screws. Reassemble using all washers and lockwashers which were used previously.
6. Add terminal #1 to chassis, mounting it under one foot of condenser C-30, or if possible drill #22 hole under C-30 as this will make wiring simpler as per diagram.
7. Add shielded lead to connect from volume control to C-30, connecting shields together at the volume control. Route lead across chassis toward the bottom edge which adjoins the bottom plates. Fasten lead under new cables clamps instead of the ones used previously. Insert one cable clamp with a short mounting screw on the left side of the chassis near the treble control.
8. Do not ground shield braid at terminal of C-30. Connect it to the added ground terminal mounted under one foot of C-30. Use this point also for connecting shields of leads coming from "phono" and "television" terminals.
9. Add new shielded leads from "phono and "television" terminals. Connect shield braids of these leads to the "ground" terminals at these points, but do not make a connection between either of these "ground" terminals and the chassis. Route leads along the lower edge of the chassis to switch C-3 using a cable clamp, fastened under one foot of the bathtub condenser C-29 to secure the cable.

C. Hum present only when a station carrier is tuned in and volume advanced.

Hum present under these conditions is generally caused by a defective tube. The most common fault being found in the second detector V-6 (6H6) when AM signals are being received or the discriminator V-18 (6H6) when FM signals are being received. The fault can be easily corrected by replacing these tubes with tubes of known good quality preferably of the metal type.

In some cases hum may be induced into the receiver from the power line. This form of pickup can usually be eliminated by employing a good ground connection between the receiver chassis and a cold water pipe or a pipe driven into the ground. Do not attempt to use the house wiring conduit or BX as a ground connection. Such an arrangement usually results in increased noise or hum pickup.

CONDITIONS FOR VIBRATIONAL OR MECHANICAL HUM AND SUGGESTED REMEDIES

A. Receiver hums when power is switched off.

In the 800-B, push-button tuning is accomplished by means of a motor driven mechanism. The transformer supplying the power for the drive motor, FM-AM changeover relay and the "power on-off" relay, is connected to the power circuit at all times. Therefore, a mechanical vibration may be heard even though the receiver is switched off. This form of hum is caused by transformer laminations vibrating against the bottom cover plate of the power amplifier.

To remedy this condition, remove the bottom plate of the power supply and apply strips of masking or adhesive tape along the bottom edge of the transformer so that the bottom plate cannot make metal to metal contact with the transformer case. In some extreme cases it may be necessary to mount the power supply on sponge rubber strips or felt bumpers in order to entirely eliminate this trouble.

May 13, 1946

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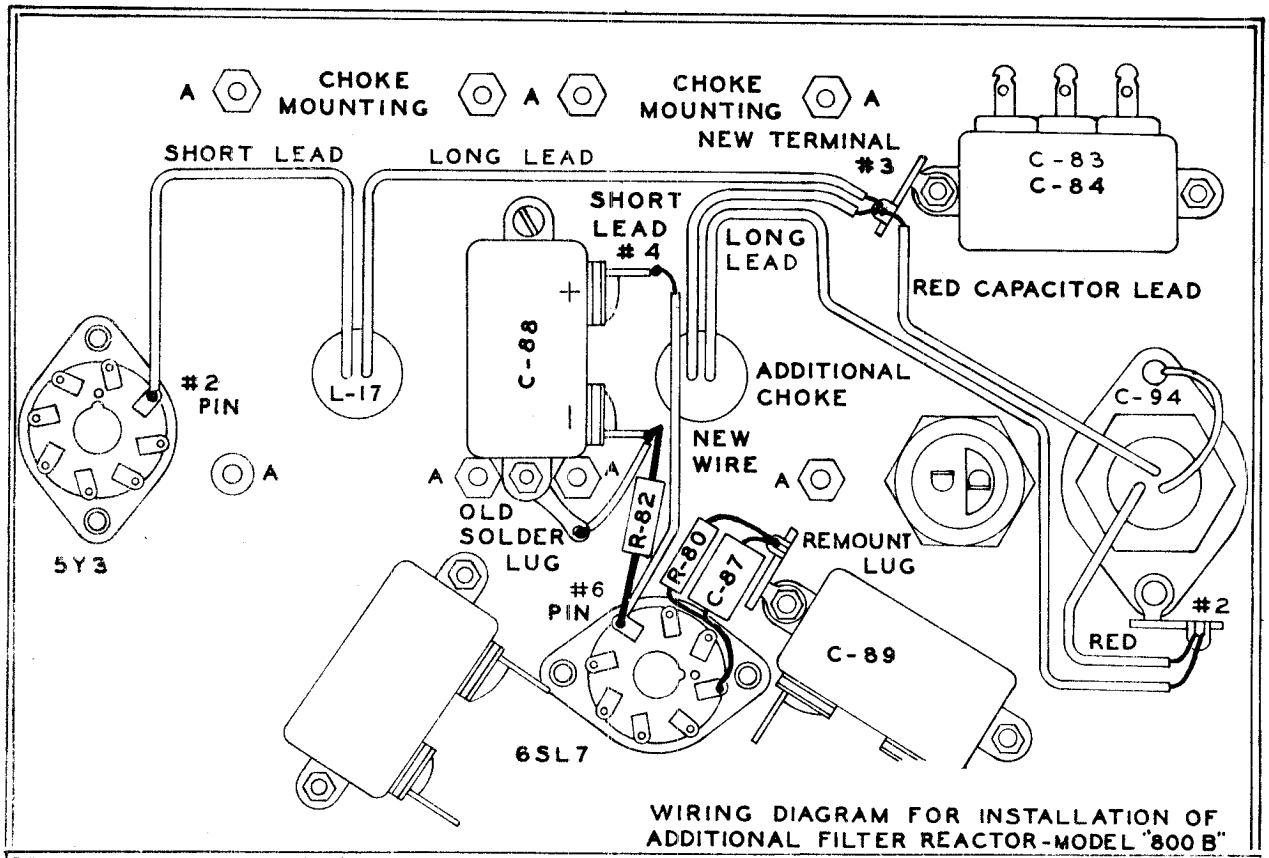
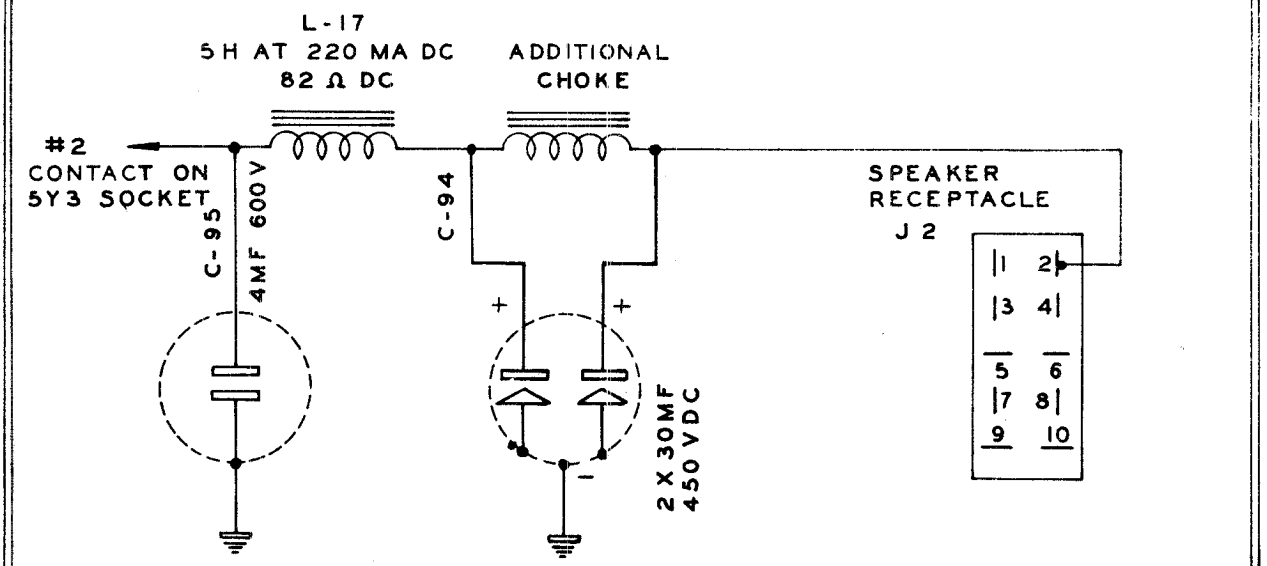


WIRING DIAGRAM FOR INSTALLATION OF ADDITIONAL FILTER REACTOR-MODEL "800 B"



SCHEMATIC DIAGRAM FOR INSTALLATION OF ADDITIONAL FILTER REACTOR-MODEL 800 B

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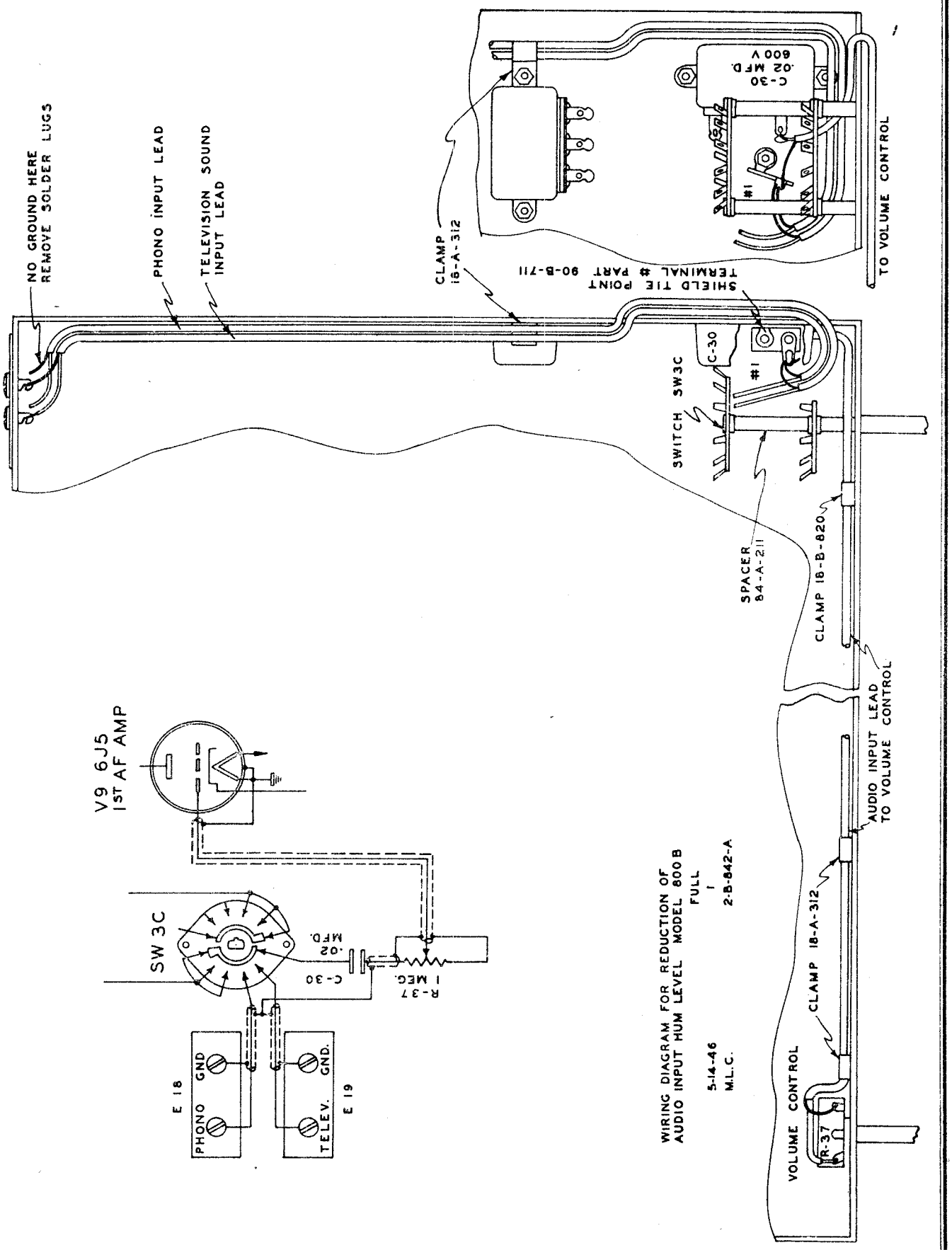
MODEL 800-B



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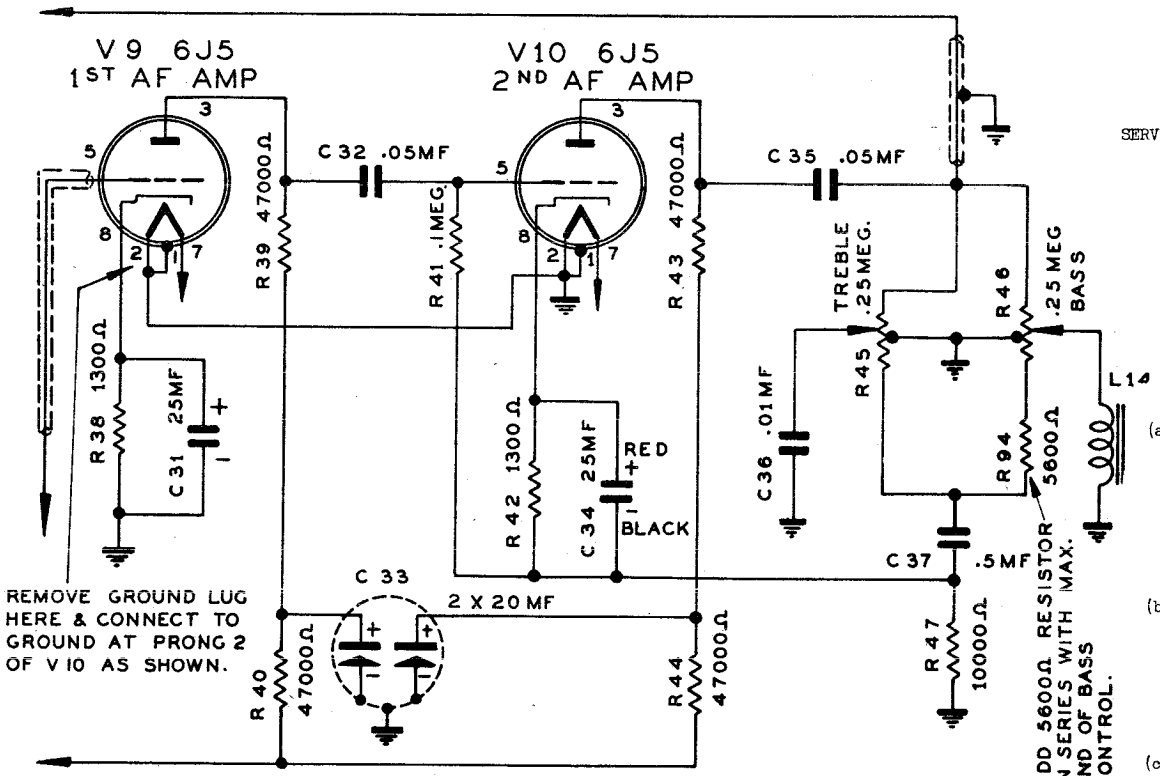

MODEL 800 B RADIO-PHONOGRAPH

CIRCUIT REVISION OF CHANGES OUTLINED IN SERVICE NOTES DATED AUGUST 9 1946

Further investigations of hum problems have revealed that additional steps can be taken if satisfactory hum level is not accomplished by changes recommended in previous Service Notes.

We wish to repeat that tubes are often the cause of hum. Here at the Laboratory individual tubes have developed excessive hum output after the sets passed all our tests. Therefore, be sure to select tubes having the lowest hum level by trying several 6J5 and 6SL7 tubes. Carry spare tubes with you when installing the set as some may go bad from jolting received during delivery. If the receiver has incorporated the changes covered in previous Service Notes the following additional steps may be taken:

(1) Check to determine whether the lead from muting relay K3 is connected to the 6SL7 grid pin No. 1 or the 6L6-V20 grid. If it is connected to the 6SL7 input grid, move it to the 6L6-V20 input grid. This change prevents hum in the relay lead from being amplified by the 6SL7 tube.

(2) To reduce hum to the lowest possible level the following steps may be taken:

CONTINUED NOTES ON REDUCTION OF HUM OUTPUT AND AUDIO NOISES

(a) Add a 5600 ohm resistor (our Part No. 70A50, or equivalent) to the bass control circuit between the yellow leads and their terminal of the control R46. This resistor may be supported by a single lug terminal strip (our Part No. 90B711 or equivalent.) which can be mounted by a screw and nut already available near the bass control. The new resistor will be designated by the symbol R94.

(b) Remove the direct ground lug connection from contact #2 of the 1st audio socket X9 and add a 6¼" insulated wire between the common connection of pins #1 and #2 on the 1st audio socket and the same points on the 2nd audio socket X10. This change simply grounds the 1st audio shield and filament at the 2nd audio socket instead of at the 1st audio socket.

(c) The 1st audio shielded grid lead may be shortened from 10½" to 7" and run directly across the sockets to the volume control, instead of routing it around the chassis.

(d) Dress R80 and C87 as far as possible from heater pin #7 of the 6SL7 socket to prevent hum pickup in these components.

(3) Check the wiring of capacitor (C34), 25 mfd 25 volt electrolytic condenser, to determine whether it is connected correctly The positive end of this capacitor should be connected to the cathode of the 6J5 and the negative end to the junction of R42 and R47 Some sets may have gone through our inspection with this capacitor wired backwards. An incorrect connection will not show initially on electrical tests, but some hum and noise may develop from it after a period of a few weeks operation.

Items Nos. 1 and 2 will be incorporated in sets numbering Serial 3,000 up to eliminate possible trouble from these sources.

AUGUST 9, 1946

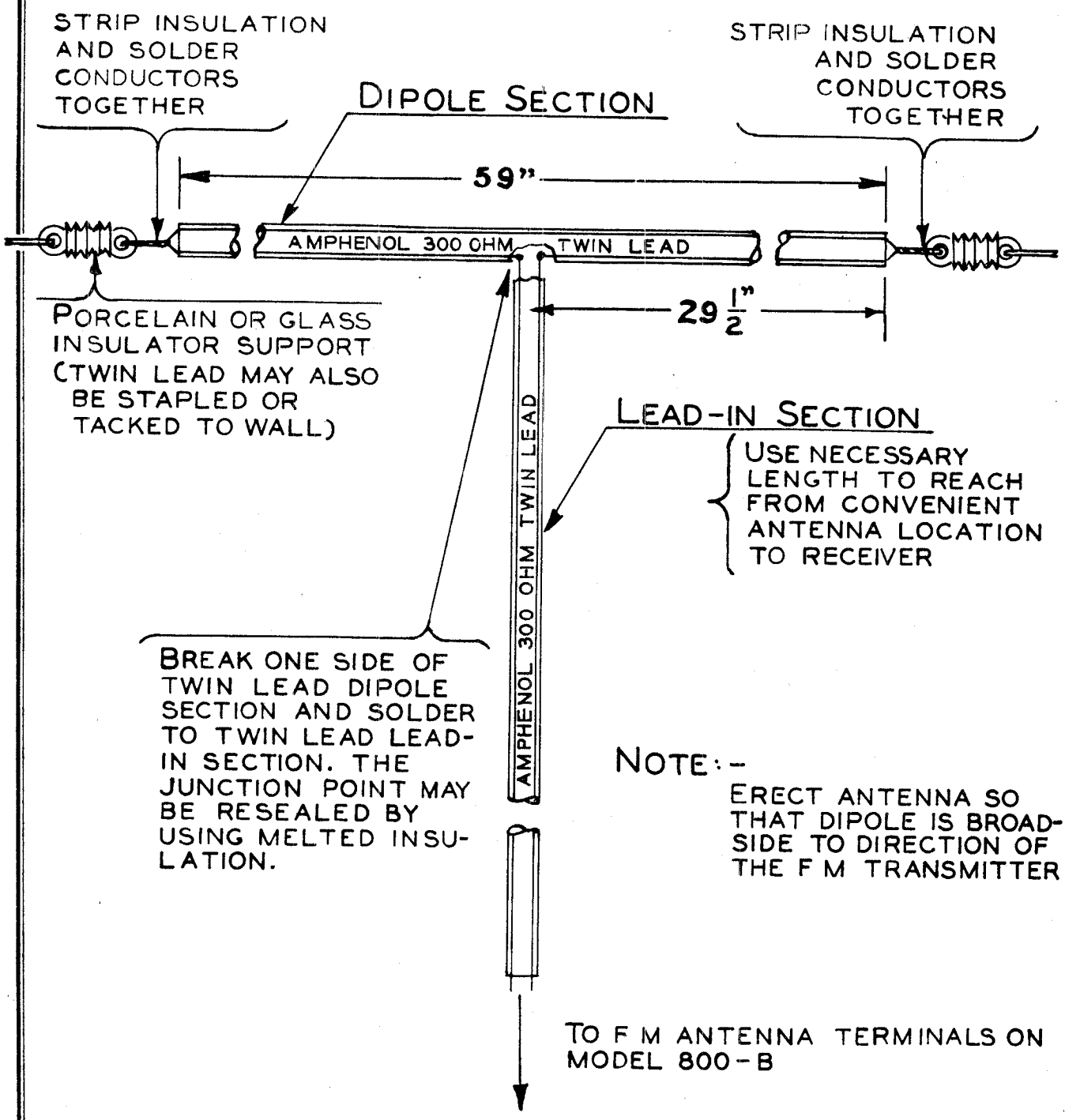
STRIP INSULATION AND SOLDER CONDUCTORS TOGETHER
DIPOLE SECTION
STRIP INSULATION AND SOLDER CONDUCTORS TOGETHER
59"
AMPHENOL 300 OHM TWIN LEAD
29 1/2"
PORCELAIN OR GLASS INSULATOR SUPPORT (TWIN LEAD MAY ALSO BE STAPLED OR TACKED TO WALL)
LEAD-IN SECTION
USE NECESSARY LENGTH TO REACH FROM CONVENIENT ANTENNA LOCATION TO RECEIVER
AMPHENOL 300 OHM TWIN LEAD
BREAK ONE SIDE OF TWIN LEAD DIPOLE SECTION AND SOLDER TO TWIN LEAD LEAD-IN SECTION. THE JUNCTION POINT MAY BE RESEALED BY USING MELTED INSULATION.
NOTE:-
ERECT ANTENNA SO THAT DIPOLE IS BROADSIDE TO DIRECTION OF THE F M TRANSMITTER
TO F M ANTENNA TERMINALS ON MODEL 800-B

DIAGRAM 1. INSTALLATION OF 300 OHM FOLDED F M DIPOLE INDOOR OR OUTDOOR ANTENNA.

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Table 5
Parts List By Symbol Designation

Symbol Desig.	Function	Description	Part Number
	CAPACITORS		
C1	BC Band ant. sec. trimmer	Capacitor, ceramic trimmer, 4-25 MMF, screwdriver adj.	15A21
C2	SW Band ant. sec. trimmer	Same as C1	
C3	V1, AM-RF amp. grid coupling	Capacitor, mica, 240 MMF, 10%, 500 V DC wkg., CM20 case, wire leads	15A31
C4		Capacitor, paper, .1/.1 MFD	15B796
C4A	V1, AM-RF amp. cathode bypass	20%, 600 V DC wkg., bathtub can, 2 lugs, can common	
C4B	V1, AM-RF amp. screen bypass		
C5	Main tuning capacitor	Capacitor, variable air, 3 gang in 4 gang frame, 2 sections per gang. Section 1: 21 plates, min.cap. 8.5 MMF, max. cap. 410.5 MMF. Section 2: 5 plates, min. cap. 6 MMF, max. cap. 26.4 MMF. Shaft: 3/8" dia. x 2 5/8" L at front - 3/8" dia. x 9/16" at rear	15B475
C5A1	AM-RF amp. tuning		
C5A2	FM-RF amp. tuning		
C5B1	AM-Osc. tuning		
C5B2	FM-Osc. tuning		
C5C1	AM-mixer tuning		
C5C2	FM-mixer tuning		
C6	BC Band osc. trimmer	Capacitor, variable air trimmer, 3-25 MMF 7 plates, 1/4" hex shaft 1/8" L with screwdriver adj. slot	15A18
*C7	BC Band osc. fixed padder	Capacitor, silver mica, 390 MMF 5%, 500 V DC wkg., CM20 case, wire leads	15B861
C8	BC Band osc. variable padder	Capacitor, variable air trimmer, 6-75 MMF, 19 plates, 1/4" hex shaft 1/8" L with screwdriver adj.slot	15A20
C9	SW Band osc. fixed padder	Capacitor, silver mica, 4700 MMF 5%, 500 V DC wkg., CM 35 case, wire leads	15B798
C10	SW Band osc. trimmer	Same as C6	
C11	V2, AM osc. grid coupling	Capacitor, silver mica, 51 MMF 5%, 500 V DC wkg, CM20 case, wire leads	15A28
C12	V2, AM osc. plate bypass	Capacitor, paper, .05 MFD +30-10%, 600 V DC wkg., metal tubular can, insulated wire leads	15B639
C13	AM-osc. temp. compensating	Capacitor, silver ceramic, 10 MMF plus or minus 1 MMF 500 V DC wkg., temp. coeff N-750	15B804
C14	V2 cathode to V3 osc. input grid	Same as C11	
C15	BC Band mixer trimmer	Same as C6	
C16	SW Band mixer trimmer	Same as C6	
C17	V3 grid coupling	Same as C3	
C18		Capacitor, paper, .1/.1/.1	15A10
C18A	V1 plate filter	MFD 20%, 600 V DC wkg.,	
C18B	V3 screen filter	bathtub can, 3 lugs, can	
C18C	V3 cathode bypass	common	
C19	V3 plate bypass	Capacitor, paper, .1 MFD +30-10%, 600 V DC wkg., metal tubular case, mtg. strap, insulated wire leads both ends	15A409
C20	T1 - 1st AM-IF primary tuning	Capacitor, silver mica, 220 MMF 5%, 500 V DC wkg., CM20 case, wire leads	15A30
C21	T1 - 1st AM-IF secondary tuning	Capacitor, silver mica, 240 MMF 5%, 500 V DC wkg., CM20 case, wire leads	15B602
C22	V4 grid return filter	Same as C12	
C23		Same as C18	
C23A	V4 cathode bypass		
C23B	V4 screen bypass		
C23C	V4 plate filter		
C24	T2 - 2nd AM-IF primary tuning	Same as C21	
C25	T2 - 2nd AM-IF secondary tuning	Same as C21	
C26		Same as C18	
C26A	V5 cathode bypass		
C26B	V5 screen bypass		
C26C	V5 plate filter		
C27	T3 - 3rd AM-IF primary tuning	Capacitor, silver mica, 100 MMF 5%, 500 V DC wkg., CM20 case, wire leads	15A423
C28	V6 diode return bypass	Capacitor, mica, 51 MMF 20% 500 V DC wkg., CM20 case, wire leads	15A27
C29		Capacitor, paper,.05/.05/.05	15B599
C29A	V6 - N.L. cathode filter	MFD 20%, 600 V DC wkg., bathtub can, 3 lugs, can common	
C29B	AVC bypass		
C29C	AM tuning eye bypass		
C30	Volume control input coupling	Capacitor, paper, .02 MFD 20%, 600 V DC wkg., bathtub can, 2 lugs	15A12
C31	V9 - 1st AF amp. cathode bypass	Capacitor, electrolytic, 25 MFD, 25 V DC wkg., paper tubular case, wire leads	15B795
C32	V9 plate to V10 grid coupling	Same as C12	

Table 5
Parts List By Symbol Designation

Symbol Desig.	Function	Description	Part Number
	CAPACITORS (Continued)		
C33		Capacitor, electrolytic,	15B745
C33A	V9 plate filter	20/20 MFD, 450 V DC wkg.,	
C33B	V10 plate filter	bakelite case 1 3/8" dia. x 3 1/2" long, 3 wire leads, black common, mounts by 3/4-16 threaded bushing	
C34	V10 cathode bypass	Same as C31	
C35	V10 plate coupling	Capacitor, paper, .05 MFD 20%, 600 V DC wkg., bathtub can, 2 lugs	15A13
C36	Treble control series	Capacitor, mica, .01 MFD 20%, 500 V DC wkg., CM35 case, wire leads	15A41
C37	Tone control circuit series	Capacitor, paper, .5 MF 20%, 600 V DC wkg., bathtub can, 2 lugs	15B636
C38	L9 - FM ant. secondary shunt	Capacitor, silver ceramic, 20 MMF 10%, 500 V DC wkg., insulated, wire leads	15B864
C39	L9 - FM ant. secondary trimmer	Same as C6	
C40	V11 - FM-RF amp. cathode bypass	Capacitor, mica, 390 MMF 10%, 500 V DC wkg., CM20 case, wire leads	15B799
C41	V11 - FM-RF amp. screen bypass	Same as C40	
C42	L10 - FM osc. coil shunt	Capacitor, silver ceramic, 10 MMF plus or minus 1 MMF 500 V DC wkg., insulated, wire leads	15A22
C43	L10 - FM osc. coil trimmer	Same as C6	
C44	V12 - FM osc. grid coupling	Same as C27	
C45	V13 - FM mixer cathode bypass	Same as C40	
C46	V12 - FM osc. plate bypass	Same as C40	
C47	V11 - FM-RF amp. plate filter	Same as C40	
C48	L11 - FM mixer coil shunt	Same as C42	
C49	L11 - FM mixer coil trimmer	Same as C6	
C50	V13 heater bypass	Same as C40	
C51	V13 screen bypass	Same as C40	
C52	L12 - 1st FM-IF primary tuning	Same as C27	
C53	V13 plate filter	Capacitor, mica, 6200 MMF 20%, 500 V DC wkg., CM35 case, wire leads	15A40
C54	L13 - 1st FM-IF secondary tuning	Same as C27	
C55	V14 cathode bypass	Same as C53	
C56	V14 heater bypass	Capacitor, mica .01 MFD 20% 300 V DC wkg., CM40 case, wire leads	15A427
C57	V14 screen bypass	Same as C53	
C58	V14 plate filter	Same as C53	
C59	T4 - 2nd FM-IF primary tuning	Same as C11	
C60	T4 - 2nd FM-IF secondary tuning	Same as C11	
C61	V15 grid coupling	Same as C11	
C62	V15 cathode bypass	Same as C53	
C63	V15 heater bypass	Same as C53	
C64	V15 screen bypass	Same as C53	
C65	V15 plate filter	Same as C53	
C66	T5 - 3rd FM-IF primary tuning	Same as C11	
C67	T5 - 3rd FM-IF secondary tuning	Same as C11	
C68	V16 grid coupling	Same as C11	
C69	V16 heater bypass	Same as C53	
C70	V16 screen bypass	Same as C53	
C71	V16 plate filter	Capacitor, paper, .25 MFD 20%, 600 V DC wkg., bathtub can, 2 lugs	15A14
C72	T6 - 4th FM-IF primary tuning	Same as C11	
C73	T6 - 4th FM-IF secondary tuning	Same as C11	
C74	V17 grid coupling	Same as C11	
C75		Capacitor, paper, .05/.05 MF	15A11
C75A	FM tuning eye bypass	20%, 600 V DC wkg.,bathtub	
C75B	V17 grid return bypass	can, 3 lug	
C76	B + bypass at V16 plate return	Same as C36	
C77	V17 heater bypass	Same as C53	
C78	V17 screen bypass	Same as C53	
C79		Capacitor, paper, .25/.25	15A425
C79A	V17 screen bypass	MFD, 20% 600 V DC wkg.,	
C79B	V17 plate filter	bathtub can, 2 lugs, can common	
C80	T7 primary trimmer	Same as C6	
C81	T7 primary to secondary coupling	Same as C42	

* 470 MMF Part 15A32 after Serial 1500

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Table 5
Parts List By Symbol Designation

Symbol Desig.	Function	Description	Part Number
	CAPACITORS (Continued)		
C82	T7 secondary trimmer	Same as C6	
C83	Discriminator diode filter	Same as C27	
C84	Discriminator diode filter	Same as C27	
C85	Discriminator output de-emphasis network	Capacitor, silver mica, 1300 MMF 5%, 500 V DC wkg., CM30 case, wire leads	15A415
C86	Audio input bypass at power supply	Same as C3	
C87	Audio compensating network at V19A grid	Same as C40	
C88	V19 cathode bypass	Capacitor, electrolytic, 25 MFD, 25 V DC wkg., bathtub can, 2 lugs, black negative	15A15
C89	V19A plate to V20 grid coupling	Same as C35	
C90	V19B plate to V21 grid coupling	Same as C35	
C91	V20, V21 cathode bypass	Capacitor, electrolytic, 25 MFD, 50 V DC wkg., paper tubular case, wire leads	15B638
C92	Audio output shunt	Capacitor, mica, 5000 MMF 20%, 1000 V DC wkg., bakelite case, tab terminals	15B763
C93	High voltage output filter	Capacitor, electrolytic, 30/30 MFD 450 V DC wkg., bakelite case 1 3/8" dia. x 3 1/2" long, 3 wire leads, black common, mounts by 3/4-16 threaded bushing	15B744
C94	Filter reactor output bypass	Same as C93	
C95	Filter reactor input bypass	Capacitor, paper, 4 MFD, 600 V DC wkg., metal can 1½" dia. x 4½" long, mounts by 3/4-16 threaded bushing, 2 lugs	15B481
C96	AC power input bypass	Same as C75	
C97	V19A input compensating	Capacitor, mica, 1000 MMF 10%, 500 V DC wkg., CM30 case, wire leads	15A35
	MISCELLANEOUS ELECTRICAL PARTS		
E1	AM-antenna terminal strip	Terminal strip, 3 terminals mounted on 3/4" W x 2" L bakelite strip, marked AM-ANT-GND	87B644
E2	FM-antenna terminal strip	Terminal strip, 3 terminals mounted on 3/4" W x 2" L bakelite strip, marked FM-ANT-GND	87B643
E3	BC Band ant. sec., L2 inductance adj.	Powdered iron core 5/16" dia. x 1/2" L, adj. screw 6-32 x 1" L slotted at end	24A99
E4	SW Band ant. sec., L4 inductance adj.	Powdered iron core 5/16" dia. x 1/2"L, adj. screw 6-32 x 1¼" L, slotted at end	24A98
E5	BC Band oscillator, L5 inductance adj.	Same as E3	
E6	SW Band oscillator, L6 inductance adj.	Same as E3	
E7	BC Band mixer, L7 inductance adj.	Same as E4	
E8	SW Band mixer, L8 inductance adj.	Same as E3	
E9	1st AM-IF primary inductance adj.	Same as E4	
E10	1st AM-IF secondary inductance adj.	Same as E4	
E11	2nd AM-IF primary inductance adj.	Same as E4	
E12	2nd AM-IF secondary inductance adj.	Same as E4	
E13	3rd AM-IF primary inductance adj.	Same as E4	
E14	FM antenna secondary inductance adj.	Powdered iron core .274"dia. x 9/16" L, adj. screw 6-32 x 1¼"L slotted at end, iron core insulated from screw	24B758
E15	FM oscillator inductance adj.	Same as E14	
E16	FM mixer secondary inductance adj.	Same as E14	
E17	1st FM-IF primary inductance adj.	Same as E3	
E18	Phono-input terminal strip	Terminal strip, 2 terminals mounted on 3/4" W x 2 1/8"L bakelite strip, marked PHONO-GND	87A220
E19	Television input terminal strip	Terminal strip, 2 terminals mounted on 3/4"W x 2 1/8" L bakelite strip, marked TELEV-GND	87B642
E20	1st FM-IF secondary inductance adj.	Same as E3	

Table 5
Parts List By Symbol Designation

Symbol Desig.	Function	Description	Part Number
	MISCELLANEOUS ELECTRICAL PARTS (Continued)		
E21	2nd FM-IF primary inductance adj.	Same as E4	
E22	2nd FM-IF secondary inductance adj.	Same as E4	
E23	3rd FM-IF primary inductance adj.	Same as E4	
E24	3rd FM-IF secondary inductance adj.	Same as E4	
E25	4th FM-IF primary inductance adj.	Same as E4	
E26	4th FM-IF secondary inductance adj.	Same as E4	
E27	Pushbutton switch cable terminal board	Terminal strip with 12 solder lugs, 1" W x2 17/32" long bakelite strip	87B546A
E28	Dial drive motor	Motor, reversible type shaded pole, operates on 24 volts 50-60 CPS	58B447
E29	Dial pointer assembly	Dial indicator pointer with guide	29B749
E30	Dial calibration scale	Calibration scale on glass plate 4½" x 11 7/32"	29B637
E31	Control knob	Plastic knob 1 1/8" dia. black with red arrow 1/4" bushing, 8-32 set screw	47B659
E32	Main tuning knob	Plastic knob 2" dia. Polished chrome finish ¼" bushing - 8-32 set screw	47B660
E33	Pushbutton	Clear plastic pushbutton 11/16" sq. with slot for station indicator tab, fits .050 x .312 flat shaft	10B735
E34	Knob set screw wrench	Wrench for #8 hollow head set screws 5/64" hex x 1 7/8" long	94B810
E35	Backplate rotor disk insulator strip	Strip, bakelite 27/32" x 9/16" x 3/16" with .040 W x .058 H, rib in center	87B560
E36	Backplate rotor disk assembly	Rotor disk assembly for pushbutton tuning system backplate	2B890
E37	Backplate contact assembly (long bracket)	Contact assembly for pushbutton tuning system backplate - long bracket	8B503A
E38	Backplate contact assembly(short bracket)	Contact assembly for pushbutton tuning system backplate - short bracket	8B504A
E39	AM-RF resistor strip assembly	Strip, bakelite 6 lugs with resistors R1, R2 and R4	87B547B
E40	Converter channel resistor strip assembly	Strip, bakelite 6 lugs with resistors R8, R11 and R12	87B547C
E41	AM-IF resistor strip assembly	Strip, bakelite 12 lugs with resistors R22, R17, R23, R19, R18 and R13	87B546C
E42	AM diode resistor strip assembly	Strip, bakelite 12 lugs with resistors R36, R33, R32, R34, R35 and R16	87B546B
E43	1st audio amp. resistor strip assembly	Strip, bakelite 6 lug with resistors R40, R39 and R38	87B547D
E44	2nd audio amp. resistor strip assembly	Strip, bakelite 12 lugs with resistors R44, R43, R42, R41 and R47	87B546D
E45	1st FM-IF resistor strip assembly	Strip, bakelite 6 lugs with resistors R59, R6 and R F choke L15	87B547E
E46	2nd FM-IF resistor strip assembly	Strip, bakelite 6 lugs with resistors R63, R64 and R65	87B547F
	FUSES		
F1	Power transformer primary fuse	Fuse, miniature cartridge, 3A, 250 V, 1/4" dia. x 1¼"L Type 3AG	37A162
F2	Pushbutton tuning transformer primary fuse	Fuse, miniature cartridge, 1A, 250 V, ¼" dia. x 1¼" L Type 3AG	37B655
	DIAL LAMPS		
I1	Dial lighting lamp	Lamp, miniature bayonet base, 6-8 V @ .150 amp. #47, brown bead	49A168
I2	Dial lighting lamp	Same as I1	
I3	Phono indicator lamp	Same as I1	
I4	BC Band indicator lamp	Same as I1	
I5	SW Band indicator lamp	Same as I1	
I6	FM Band indicator lamp	Same as I1	
	JACKS & RECEPTACLES		
J1	Record changer power receptacle	2 contact female plug with metal shield cap and cable clamp	65B840
J2	Speaker receptacle	10 contact female receptacle, 11/16" W x 1 9/16"L H.B.Jones type S-310-AB	67B542
J3	Receiver power receptacle	12 contact female receptacle, 15/16" W x 1¼" L, H.B.Jones type S-312-AB	67B541

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Table 5
Parts List By Symbol Designation

Symbol Desig.	Function	Description	Part Number
	JACKS & RECEPTACLES (Continued)		
J4	Audio input receptacle	4 contact female receptacle 11/16" W x 3/4" L, H. B. Jones type S-304-AB	67B543
J5	FM-IF input receptacle	Single contact female receptacle, mounts in 5/8"dia. hole, Amphenol type 80C Used on early model sets	67B634
J5	FM-IF input receptacle	Receptacle, 2 contact female mounts in 5/8" dia. hole, type PC2F. Used on late model sets	67B960
J6	Remote keyboard receptacle	21 contact female receptacle 1" W x 2¼" L, H.B. Jones type S-321-AB	67B786
J7	Loop antenna receptacle	4 contact female receptacle 13/16" W x 1½" L	67B645
	RELAYS		
K1	FM-AM changeover relay	Relay, 2 position with 2 rotary type wafer switches SW6A and SW6B, 2 coils L18 and L19, operates on 10 V AC. Used before Serial 2000	69B733
K1	FM-AM changeover relay	Relay, 2 position with 2 rotary type wafer switches SW6A and SW6B, 2 coils L18 and L19, operates on 24 V AC. Used after Serial 2000	69B983
K2	AC power ON-OFF relay	Relay, 2 position with 1 rotary switch section SW5, 2 coils L20 and L21, operates on 24 V AC. Used before Serial 2000	69B734
K2	AC power ON-OFF relay	Relay, 2 position with 1 rotary switch section SW5, 2 coils L20 and L21, operates on 22 V AC. Used after Serial 2000	69B984
K3	Audio muting relay	Relay, S.P.S.T. contacts normally open operates on 2.4 V AC	69B507
K4	Relay for dial drive motor	Same as K3. Added after Serial 2000	
K5	Relay for dial drive motor	Same as K3. Added after Serial 2000	
	INDUCTORS & CHOKES		
L1	BC Band antenna primary coil	RF inductor, universal wound on 1" dia. x 7/8" L form	20B604
L2	BC Band antenna secondary coil	RF inductor, universal progressive wound on 1" dia. x 1¾" L form, adjustable iron core	20B605
L3	SW Band antenna primary coil	RF inductor, solenoid wound on 3/4" dia. x 7/8"L form	20B608
L4	SW Band antenna secondary coil	RF inductor, solenoid wound on 3/4" dia. x 1¾" L form, adjustable iron core	20B609
L5	BC Band oscillator coil	RF inductor, solenoid wound on 1" dia. x 2¼" L form, adjustable iron core	20B607
L6	SW Band oscillator coil	RF inductor, solenoid wound on 3/4" dia. x 2¼" L form, adjustable iron core	20B611
L7	BC Band mixer coil	RF transformer, primary universal wound, secondary progressive universal wound on 1" dia. x 2¼" L form, adjustable iron core	20B606
L8	SW Band mixer coil	RF transformer, primary and secondary solenoid wound on 3/4" dia. x 2¼" L form, adjustable iron core	20B610
L9	FM antenna coil	RF transformer, primary and secondary solenoid wound on ⅜" dia. x 2 1/8" L form, adjustable iron core	20B612
L10	FM oscillator coil	RF inductor, solenoid wound on ⅜" dia. x 2 1/8" L form, adjustable iron core	20B614
L11	FM mixer coil	RF transformer, primary and secondary solenoid wound on ⅜" dia. x 2 1/8" L form, adjustable iron core	20B613
L12	1st FM-IF primary coil	RF inductor, solenoid wound on ⅜" dia. x 2 1/8" L form, adjustable iron core	20B618
L13	1st FM-IF secondary coil	RF inductor, solenoid wound on 7/16" dia. x 1 3/8" L form, adjustable iron core	20B619
L14	Bass boost choke	Audio reactor, 11 H @ 1000 CPS, no DC, laminated iron core, potted	17B591
L15	V14 plate filter choke	RF choke, 40 T #26 SSE wire on 9/32" dia. x 7/8" L form wire leads	17B761

Table 5
Parts List By Symbol Designation

Symbol Desig.	Function	Description	Part Number
	INDUCTORS AND CHOKES (Continued)		
L16	FM discriminator audio filter	Same as L15	
L17	High voltage filter choke	Filter reactor, 5 H @ 200 MA DC, laminated iron core, potted in chrome plated case	17B492
L18	FM-AM relay coil	Relay coil, wound on insulated copper sleeve, two terminals, 425 T #24 E wire DC resistance 2 ohm or 350 T #22 E wire, DC resistance 1 ohm, operates on 10 volts 60 CPS. Used on receivers before Serial 2000	20B707
L19	FM-AM relay coil	Same as L18	20B707
*L18	FM-AM relay coil	Relay coil, wound on insulated copper sleeve, two terminals, 800 T #30 E wire DC resistance 13 ohms, operates on 24 volts 60 CPS Used on receivers after Serial 2000	20B932
*L19	FM-AM relay coil	Same as L18	20B932
L20	AC power ON-OFF relay coil	Relay coil wound on insulated copper sleeve, two terminals, 1200 T #28 E wire, DC resistance 20 ohms or 1100 T #29 E wire, DC resistance 16 ohms, operates on 24 volts 60 CPS. Used on receivers before Serial 2000	20B719
L21	AC power ON-OFF relay coil	Same as L20	20B719
*L20	AC power ON-OFF relay coil	Relay coil wound on insulated copper sleeve, two terminals, 900 T #32 E wire, DC resistance 23 ohms operates on 24 volts, 60 CPS. Used on receivers after Serial 2000	20B977
*L21	AC power ON-OFF relay coil	Same as L20	20B977
L22	Muting relay coil	Audio muting relay coil, part of K3 assembly, operates on 2.4 volts 60 CPS	
L23	Drive motor relay coil	Same as L22. See relay K4	
L24	Drive motor relay coil	Same as L22. See relay K5	
L25	High voltage filter choke	Same as L17	
	LOUDSPEAKERS		
LS1	Loudspeaker for 800-B	Loudspeaker, coaxial type, 15 inch low frequency with 5 inch PM tweeter mounted axially, complete with crossover network and cable with 10 contact plug P-310-CCT. Field for 15 inch speaker 675 ohms series and 9000 ohms shunt. Input impedance 8 ohms	85B490
LS2	Loudspeaker for 800-B	Loudspeaker, 15" dynamic extended range. Field 675 ohm series and 9000 ohms shunt. Input impedance 16 ohms	85B909
	PLUGS		
P1	Receiver chassis power plug	Plug, 12 contact, male, metal cover with cable clamp, Type P-312-CCT	65A184
P2	Receiver chassis audio plug	Plug, 4 contact, male, metal cover with cable clamp, Type P-304-CCT complete with 4 wire cable	96B677
P3	FM-IF input plug	Plug, single contact, male Type 80M. Used on early model sets	65B656
P3	FM-IF input plug	Plug, 2 contact, male, Type MC2M. Used on later model sets	65B959
P4	Loudspeaker plug	Plug, 10 contact, male, metal cover with cable clamp, Type P-310-CCT	65A186
P5	AC power input plug	Plug, 2 contact, male, plastic shell	65B679
	RESISTORS		
R1	V1 - AM-RF grid return	Resistor, composition, .47 meg 10%, ½ watt, wire leads	70A61
R2	V1 - cathode bias	Resistor, composition, 560 ohms 10%, ½ watt, wire leads	70A46
R3	V1 - screen bleeder	Resistor, composition, 10,000 ohms 10%, ½ watt, wire leads	70A419

* These coils used on FM-AM and AC relays after Serial 2000.

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Table 5
Parts List By Symbol Designation

Symbol Desig.	Function	Description	Part Number
	RESISTORS (Continued)		
R4	V1 - Screen filter	Resistor, composition, 15,000 ohms 10%, 2 watt, wire leads	70B818
R5	Sensitivity control	Potentiometer, wire wound, 10,000 ohms 10%, 2 watt, linear taper, shaft: ¼" dia. x 3" L, complete with SPDT switch SW4 for N.L. circuit	70B569
R6	V2 - AM osc. grid leak	Resistor, composition, 47,000 ohms 10% ½ watt, wire leads	70A54
R7	V2 plate filter	Resistor, composition, 5100 ohms 10%, 1 watt, wire leads	70B648
R8	V3 - AM mixer grid return	Same as R1	
R9	V3 - injector grid return	Resistor, composition, 20,000 ohms 5%, ½ watt, wire leads	70A52
R10	V3 cathode bias	Resistor, composition, 240 ohms 5%, ½ watt, wire leads	70A45
R11	V1 - RF amp. plate filter	Resistor, composition, 1000 ohms 10%, ½ watt, wire leads	70A47
R12	V3 screen filter	Resistor, composition, 18,000 ohms 10%, 2 watt, wire leads	70A68
R13	V3 plate filter	Same as R11	
R14	1st AM-IF secondary series	Resistor, composition, 47 ohms 10%,½ watt, wire leads	70A420
R15	1st AM-IF secondary series	Resistor, composition, 10 ohms 10%,½ watt, wire leads	70A42
R16	V4 - 1st AM-IF amp. grid return	Resistor, composition, .22 meg 10%, ½ watt, wire leads	70A59
R17	V4 cathode bias	Same as R2	
R18	V4 screen filter	Resistor, composition, .1 meg 10%, ½ watt, wire leads	70A58
R19	V4 plate filter	Same as R11	
R20	2nd AM-IF secondary series	Same as R14	
R21	2nd AM-IF secondary series	Same as R14	
R22	V5 - 2nd AM-IF amp. cathode bias	Same as R2	
R23	V5 screen filter	Same as R18	
R24	V5 plate filter	Same as R11	
R25	AM tuning eye target series	Resistor, composition, 1 meg 20%, ½ watt, wire leads	70A63
R26	V11 - FM-RF amp. grid series	Resistor, composition, 5 ohms 10%,½ watt, wire leads	70B860
R27	Not used		
R28	V8 FM tuning eye grid return	Same as R1	
R29	V8 FM tuning eye adj.	Potentiometer, composition, 1 meg 20%, .4 watt, shaft: ¼" dia. x 11/32" L, screwdriver slot adj. linear taper	70B568
R30	V8 FM tuning eye target series	Same as R25	
R31	AM diode load	Same as R6	
R32	AM diode filter	Same as R6	
R33	V6 noise limiter cathode filter	Resistor, composition, .82 meg 10%,½ watt, wire leads	70B649
R34	AVC line filter	Same as R33	
R35	V7 AM tuning eye filter	Resistor, composition, 2.2 meg 20%,½ watt,wire leads	70A64
R36	V6 noise limiter cathode bias	Same as R33	
R37	Volume control	Potentiometer, composition, 1 meg 20%, .4 watt, clockwise audio taper, shaft: ¼" dia. x 3" long	70B570
R38	V9 1st AF amp. cathode bias	Resistor, composition, 1300 ohms 5%, ½ watt, wire leads	70B650
R39	V9 plate load	Same as R6	
R40	V9 plate filter	Same as R6	
R41	V10 2nd AF amp. grid return	Same as R18	
R42	V10 cathode bias	Same as R38	
R43	V10 plate load	Same as R6	
R44	V10 plate filter	Same as R6	
R45	Treble control	Potentiometer, composition, .25 meg 20%, .4 watt,clockwise audio taper, tapped at .125 meg 20%, shaft: ¼" dia. x 3" L.	70B540
R46	Bass control	Same as R45	
R47	Tone control circuit return	Same as R3	
R48	V11 FM-RF amp. cathode bias	Resistor, composition, 150 ohms 10%, ½ watt,wire leads	70A44
R49	V11 screen filter	Resistor, composition, 56,000 ohms 10%, ½ watt, wire leads	70A55
R50	V12 FM oscillator grid return	Same as R18	
R51	V11 plate filter	Same as R11	
R52	V12 plate filter	Same as R7	

Table 5
Parts List By Symbol Designation

Symbol Desig.	Function	Description	Part Number
	RESISTORS (Continued)		
R53	V13 FM mixer grid series	Same as R26	
R54	V13 cathode bias	Same as R11	
R55	V13 screen filter	Same as R16	
R56	V13 plate filter	Resistor, composition, 2400 ohms 5%, ½ watt, wire leads	70A49
R57	V14 1st FM-IF amp. grid series	Resistor, composition, 56 ohms 10%,½ watt, wire leads	70A43
R58	V14 cathode bias	Resistor, composition, 160 ohms 5%, ½ watt, wire leads	70B654
R59	V14 screen filter	Same as R49	
R60	V14 plate filter	Same as R56	
R61	T4 secondary shunt	Resistor, composition, 27,000 ohms 10%, ½ watt, wire leads	70A418
R62	V15 2nd FM-IF amp. grid series	Same as R57	
R63	V15 cathode bias	Same as R58	
R64	V15 screen filter	Same as R49	
R65	V15 plate filter	Same as R56	
R66	T5 secondary shunt	Same as R6	
R67	V16 1st FM limiter grid series	Resistor, composition, 27 ohms 10%,½ watt, wire leads	70B666
R68	V16 plate and screen filter	Resistor, composition, 39,000 ohms 10%, 1 watt, wire leads	70B653
R69	V8 FM tuning eye grid filter	Same as R35	
R70	V17 2nd FM limiter grid series	Same as R67	
R71	V17 grid leak	Same as R61	
R72	V17 grid return filter	Resistor, composition, 15,000 ohms 10%, ½ watt, wire leads	70A51
R73	V17 screen bleeder	Resistor, composition, 15,000 ohms 10%, 1 watt, wire leads	70B683
R74	V17 screen filter	Same as R68	
R75	V17 plate filter	Same as R18	
R76	V18 FM discriminator filter	Same as R49	
R77	V18 diode load	Same as R18	
R78	V18 diode load	Same as R18	
R79	FM de-emphasis network	Same as R6	
R80	V19A grid series	Same as R1	
R81	V19A grid return	Same as R6	
R82	V19A, V19B cathode bias	Resistor, composition, 1500 ohms 10%,½ watt,wire leads	70A48
R83	V19B plate load	Same as R16	
R84	V19A plate load	Same as R16	
R85	V20 grid return	Same as R16	
R86	V21 grid return	Same as R16	
R87	V19B grid return	Same as R16	
R88	V20,V21 cathode bias	Resistor, wirewound, 250 ohms 5%, 10 watt, vitreous enamel, wire leads	70A70
R89	V20 plate to V19A plate feedback	Same as R25	
R90	Audio output filter	Resistor, wirewound, 10,000 ohms 10%, 10 watt, vitreous enamel, wire leads	70B760
R91	V22 anode, dropping resistor	Resistor, wirewound, 3000 ohms 10%, 10 watt, vitreous enamel, wire leads	70B681
R92	Receiver high voltage dropping resistor	Resistor, wirewound, 300 ohms 10%, 10 watt, vitreous enamel, wire leads	70B682
R93	Speaker series field dropping resistor	Same as R91	
	SWITCHES		
SW1	Loop antenna switch	Switch, rotary, D.P.D.T., shaft: ¼" dia. x 11/32"long screwdriver slot	89B628
SW2	AM Band change switch	Switch, 4 section rotary, 2 position indent, front shaft ¼" x 2 13/16" long, shaft at rear 1½" long, ¼" dia. flat on 2 sides	89B508
SW2A	Antenna channel switch section	Switch section, 2 pole, 2 position, bakelite wafer, rotary type	89B508-2
SW2B	Oscillator channel switch section	Same as SW2A	
SW2C	Mixer channel switch section	Same as SW2A	
SW2D	Indicator lamp switch section	Switch section, 3 pole, 2 position, bakelite wafer, rotary type	89B508-1
SW3	Selectivity switch	Switch, 4 section rotary, 5 position indent, front shaft ¼" dia. x 2 13/16" long, shaft at rear 1¼" long, ¼" dia. flat on two sides	89B509
SW3A	1st AM-IF Switch section	Switch section, 2 pole, 5 position, rotary type, bakelite wafer	89B509-1
SW3B	2nd AM-IF switch section	Same as SW3A	

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SCOTT RADIO LABS. INC.

Table 5
Parts List By Symbol Designation

Symbol Desig.	Function	Description	Part Number
	SWITCHES (Continued)		
SW3C	Phono-Radio switch section	Same as SW3A	
SW3D	Indicator lamp switch section	Same as SW3A	
SW4	Noise limiter switch	Switch, S.P.D.T. mounted on rear of sensitivity control R5, throws at maximum rotation of control	
SW5	AC power relay switch section	Switch section, 3 pole, 2 position, rotary type, bakelite wafer	89B626-1
SW6A	FM-AM relay switch top section	Switch section, 4 pole, 2 position, rotary type, bakelite wafer	89B625-1
SW6B	FM-AM relay switch bottom section	Switch section, 2 pole, 2 position, rotary type, bakelite wafer	89B625-2
SW7	Muting relay switch	Switch, S.P.S.T. mounted on relay K3	
SW8	Pushbutton switch gang	Switch, gang consisting of 7, S.P.S.T. momentary contact switches actuated by push levers	89B478
SW9	Pushbutton switch gang	Same as SW8	
SW10	Drive motor relay switch	Same as SW7. See relay K4	
SW11	Drive motor relay switch	Same as SW7. See relay K5	
	TRANSFORMERS, RF, AUDIO, POWER		
T1	1st AM-IF transformer	IF transformer, 455 KC, adjustable iron cores on primary and secondary	20B615
T2	2nd AM-IF transformer	IF transformer, 455 KC, adjustable iron cores on primary and secondary	20B616
T3	3rd AM-IF transformer	IF transformer, 455 KC, adjustable iron core on primary, secondary untuned	20B617
T4	2nd FM-IF transformer	IF transformer, 10.7 MC adjustable iron cores on primary and secondary	20B620
T5	3rd FM-IF transformer	IF transformer, 10.7 MC adjustable iron cores on primary and secondary	20B621
T6	4th FM-IF transformer	IF transformer, 10.7 MC adjustable iron cores on primary and secondary	20B622
T7	FM discriminator transformer	IF transformer, 10.7 MC, primary and secondary tuned by variable air trimmers	20B623
T8	Audio output transformer	Output transformer, primary 9000 ohms @ 1000 CPS, 100 MA DC, secondary 16 ohms tapped at 8 ohms, 25 watts	91B664
T9	Power transformer	Transformer, primary 120 V 50-60 CPS. Sec. 1-5 V @ 4A. Sec.-2-390-390 V @ 210 MA. Sec. 3-6.3 V @ 4 A. Sec. 4 6.6 V @ 4.6 A. Electrostatic shield between primary and secondaries	91B429
T10	Pushbutton tuning system transformer	Transformer, primary 117 volts 50-60 CPS. Sec. 46 V @ 2.5 A, tapped at 36 V and 24 V, primary designed for intermittent duty	91B694
	VACUUM TUBES		
V1	AM-RF amplifier	Vacuum tube, 6SK7, octal base, remote cutoff pentode Heater: 6.3 V @ .3 amp	92A225
V2	AM oscillator	Vacuum tube, 6J5, octal base triode, Heater: 6.3 V @ .3 amp	92A223
V3	AM mixer	Vacuum tube, 6SA7, octal base, pentagrid converter, Heater: 6.3 V @ .3 amp	92A227
V4	1st AM-IF amp.	Same as V1	
V5	2nd AM-IF amp.	Same as V1	
V6	AM 2nd detector AVC, noise limiter	Vacuum tube, 6H6, octal base, twin diode, Heater: 6.3 V @ .3 amp.	92A229
V7	AM tuning indicator	Vacuum tube, 6E5, 6 prong base, cathode ray indicator, Heater: 6.3 V @.3 amp	92B479
V8	FM tuning indicator	Same as V7	
V9	1st audio amp.	Same as V2	
V10	2nd audio amp.	Same as V2	
V11	FM-RF amp.	Vacuum tube, 6AG5, miniature type, RF amplifier pentode, Heater: 6.3 V @ .3 amp	92B593
V12	FM oscillator	Vacuum tube, 6C4, miniature type, H.F. triode, Heater: 6.3 V @ .15 amp	92B597
V13	FM mixer	Same as V11	

Table 5
Parts List By Symbol Designation

Symbol Desig.	Function	Description	Part Number
	VACUUM TUBES (Continued)		
V14	1st FM-IF amp.	Vacuum tube, 6AC7, octal base, amplifier pentode, Heater: 6.3 V @ .45 amp	92A235
V15	2nd FM-IF amp.	Same as V14	
V16	1st FM-IF limiter	Vacuum tube, 6SJ7, octal base, sharp cutoff pentode, Heater: 6.3 V @ .3 amp	92A236
V17	2nd FM-IF limiter	Same as V16	
V18	FM discriminator	Same as V6	
V19	3rd audio amp. Phase inverter	Vacuum tube, 6SL7GT, octal base, twin triode, Heater: 6.3 V @ .3 amp	92B669
V20	Power output audio amp.	Vacuum tube, 6L6G, octal base, beam power amp., Heater: 6.3 V @ .9 amp	92A233
V21	Power output audio amp.	Same as V20	
V22	Voltage regulator	Vacuum tube, OD3-VR150/30, octal base, glow discharge voltage regulator	92A237
V23	High voltage rectifier	Vacuum tube, 5Y3GT, octal base, full wave high vacuum rectifier, filament 5 V @ 2 amp	92B[illegible]
V24	High voltage rectifier	Same as V23	
	WIRES AND CABLES		
W1	FM-IF lead	Shielded lead consisting of 7 ft RG58/u concentric line with single contact plug P3 type 80M attached. Used on early model sets.	65B656A
W1	FM-IF lead	Same as W1 above except plug is 2 contact type MC2M	65B959A
W2	Receiver power cable	Cable, 12 conductor, 2 shielded, with 12 contact plug P-312-CCT attached	96B676
W3	Audio connecting cable	Cable, 4 conductor, 2 shielded, with 4 contact P-304-CCT plug attached	96B677
	SOCKETS		
X1	Socket for V1	Socket, 8 contact octal, black bakelite type MIP-8, marked 6SK7	82B431
X2	Socket for V2	Socket, 8 contact octal, black bakelite type MIP-8, marked 6J5	82B433
X3	Socket for V3	Socket, 8 contact octal, black bakelite type MIP-8, marked 6SA7	82B432
X4	Socket for V4	Same as X1	
X5	Socket for V5	Same as X1	
X6	Socket for V6	Socket, 8 contact octal, black bakelite type MIP-8, marked 6H6	82B434
X7	Socket for V7	Socket, 6 contact, black bakelite PF-6 with metal cap	82B708
X8	Socket for V8	Same as X7	
X9	Socket for V9	Same as X2	
X10	Socket for V10	Same as X2	
X11	Socket for V11	Socket, 7 contact, miniature type with tube shield	82B663
X12	Socket for V12	Same as X11	
X13	Socket for V13	Same as X11	
X14	Socket for V14	Socket, 8 contact octal, black bakelite type MIP-8, marked 6AC7	82B438
X15	Socket for V15	Same as X14	
X16	Socket for V16	Socket, 8 contact octal, black bakelite type MIP-8, marked 6SJ7	82B439
X17	Socket for V17	Same as X16	
X18	Socket for V18	Same as X6	
X19	Socket for V19	Socket, 8 contact octal, black bakelite type MIP-8, marked 6SL7GT	82B687
X20	Socket for V20	Socket, 8 contact octal, black bakelite type MIP-8, marked 6L6G	82B436
X21	Socket for V21	Same as X2	
X22	Socket for V22	Socket, 8 contact octal, black bakelite type MIP-8, marked VR-150	82B440
X23	Socket for V23	Socket, 8 contact octal, black bakelite type MIP-8 marked 5Y3-GT	82B437
X24	Socket for V24	Same as X23	

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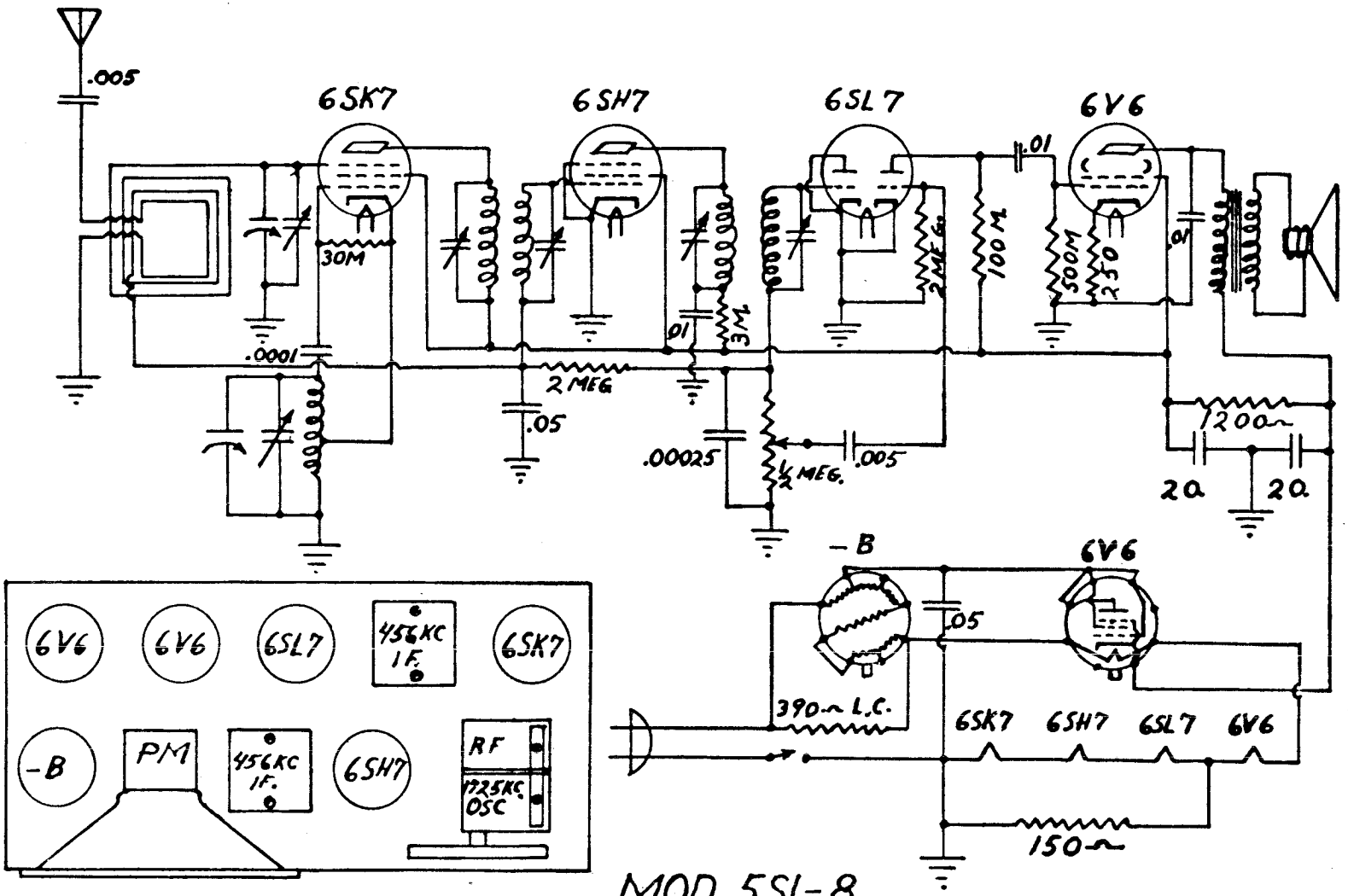

MOD. 5SI-8

CLIPPER

This apparatus uses inventions of United States patents licensed by Radio Corporation of America. Patent numbers supplied upon request.

This apparatus is licensed under the patent rights of Hazeltine Corporation.

SEARLE AERO IND. INC.	
RADIO MOD. 5SI-8	
DATE 10-22-45	DRAWN BY LHC
PART NO -26 SCHEMATIC	CHECKED BY LHC

MODEL 5S1-8

SEARLE AERO INDUSTRIES INC.

LIST OF MOST COMMON TROUBLES - SEARLE MOD.5S1-8 CLIPPER

A - SET DEAD

1. Tubes don't light up right.

IF nothing lights up - 6V6 Line Cord or Switch is open.

IF 150 OHM Resistor is too hot - 6SK7, 6SH7 or 6SL7 is open.

IF Tubes glow dull Red inside cathodes - Ballast is open or line cord resistor is open.

IF Tubes light too bright - Ballast or Line Cord is low.

2. If Tubes light up properly.

IF Voltage at V5 #8 is below 90 and Voltage is over 15 volt lower DN V4 #4 Circuit is shorted probably if trans or filter condenser.

IF Voltage is below 90 at V5 #8 and Voltage at V4 #4 is nearly same 6V6 rectifier is bad.

IF Voltage is low with hum Filter condenser is bad.

IF Voltages to above points are OK Check to V1 #6 and #8 V2 #6 and #8 - Low V on #6 pins - bad solder, Low V on #8 pins - bad IF Trans.

IF Set hums when finger is touched to hot side of pot Audio is OK.

IF Set is still dead, try new 6SL7 and 6SH7 then K7.

IF 456 KC comes through with tuning cond. open but not when closed - condenser is shorted.

IF A.V.C. is shorted to ground 1st IF trans. is shorted.

IF Set plays good, test OKsbut hums little try new 6SL7.

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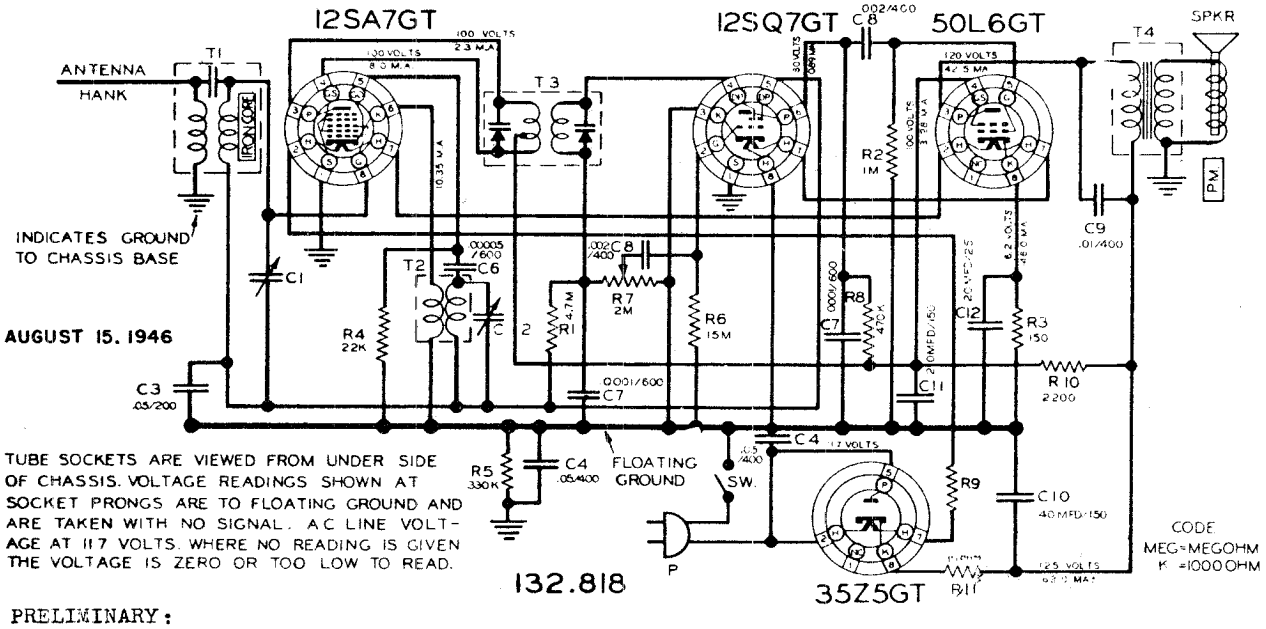
SEARS ROEBUCK & CO.

MODEL 6002
Ch.132.818


12SA7GT
12SQ7GT
50L6GT
35Z5GT
ANTENNA
HANK
SPKR
INDICATES GROUND TO CHASSIS BASE
AUGUST 15. 1946
FLOATING GROUND
SW.
TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS. VOLTAGE READINGS SHOWN AT SOCKET PRONGS ARE TO FLOATING GROUND AND ARE TAKEN WITH NO SIGNAL. A.C LINE VOLTAGE AT 117 VOLTS. WHERE NO READING IS GIVEN THE VOLTAGE IS ZERO OR TOO LOW TO READ.
132.818
CODE
MEG=MEGOHM
K =1000 OHM

PRELIMINARY:

Output meter connection	Across loud speaker voice coil
Output meter reading to indicate 200 milliwatts	.8 volts
Connection of generator ground lead	Floating ground
Generator Modulation	30%, 400 cycles
Position of Volume Control	Fully clockwise
Position of Dial Pointer with Variable fully closed	54 on dial

POSITION OF VARIABLE	FREQUENCY GENERATOR	DUMMY ANTENNA	GENERATOR CONNECTION (high)	TRIMMERS ADJUSTED (In order shown)	TRIMMER FUNCTION
Open	455 kc.	.05 mfd.	12SA7GT grid	Top of T3	IF
1400 kc.	1400 kc.	.00005 mfd.	**Ant.	*C2	Osc.
600 kc.	600 kc.	.00005 mfd.	**Ant.	Check point	----

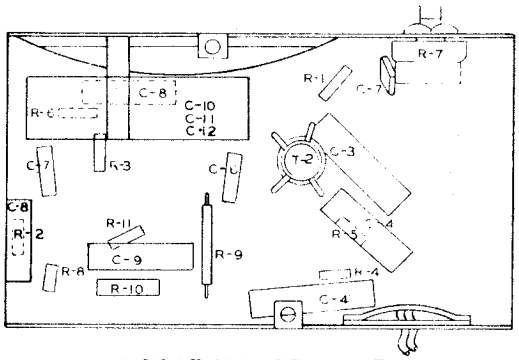
IMPORTANT ALIGNMENT NOTES

*Since the antenna stator section of the variable has no trimmer, the rotor is rocked back and forth while adjusting oscillator trimmer, to obtain maximum output.

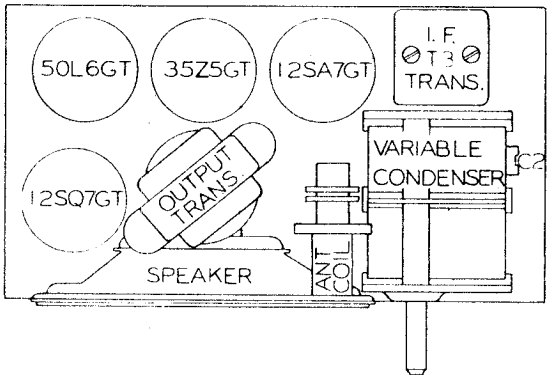
Check the sensitivity at 600 kc, if weak adjust antenna section plates for maximum output at 600 kc, tracking is accomplished by adjusting plates of rotor.

**Unsolder 20' antenna lead from lug on antenna coil, and connect signal generator lead to lug through .00005 uuf Dummy Antenna.

Approximate stage by stage sensitivities are: Mixer - 455 kc - 2600 uv; Mixer 1000 kc - 2600 uv; Antenna - 1000 kc - 180 uv.



LOCATION OF PARTS UNDER CHASSIS



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MODEL 6002
MODEL 6100

SEARS ROEBUCK & CO.

MODEL 6200
MODEL 6220

MODEL 6100
Ch.101.660-1A

SCHEMATIC LOCATION	PART NUMBER	DESCRIPTION
	R13961	Button-Snap,Dial Mounting
	R17915	Cell-Bias
	R46116	Clip-Dial Light Socket
L1	R45439	Coil-Antenna Loading
L2	R45453	Coil-Oscillator
C11,C13,C14	R45421	Capacitor-Elect. 10 mfd. 25 V. 16 mfd. 300 V. 16 mfd. 375 V.
VC,C1,C4	R45409	Capacitor-Variable
C7		Capacitor-.05 mfd. 200 V.
C5,C6		Capacitor-.1 mfd. 400 V.
C2		Capacitor-.1 mfd. 200 V.
C10,C12		Capacitor-.01 mfd. 400 V.
C16		Capacitor-.01 mfd. 600 V.
C15		Capacitor-.008 mfd. 600 V.
C3		Capacitor-.00023 mfd. mica
C9		Capacitor-.0001 mfd. mica
C17		Capacitor-.00005 mfd. mica
R7	R45414	Control-On-Off & Vol.
	R18395	Cord-Line
	R57175	Dial-Station
	R57164	Escutcheon-Dial
	R49936	Knob-On-Off & Vol.
	R49935	Knob-Phono-Radio
	R49937	Knob-Tone
	R49938	Knob-Tuning
		Lamp-Pilot-Mazda #44
	R59036	Leaflet-Instruction
	R18112	Mounting-Bias Cell
	R57176	Pointer-Dial
R9		Resistor-10 meg. 1/3 W.
R3,R6		Resistor-2.2 meg. 1/3 W.
R8,R10		Resistor-470M ohms 1/3 W.
R1		Resistor-22M ohms 1/3 W.
R2		Resistor-15M ohms 2 W.
R11		Resistor-390 ohms 1 W.
R12		Resistor-68 ohms 1/3 W.
	R45598	Shaft-Drive
	R44897	Socket-Phono
	R17982	Socket-Speaker
	R17987	Socket-Tube
		WHEN ORDERING SPEAKER PARTS, ALWAYS GIVE THE PART NUMBER APPEARING ON THE SPEAKER.
	R57103	Speaker-8" Dynamic
	R45475	Cone & Voice Coil
T3	R45476	Output Transf.
	R45477	Field Coil
	R19735	Spring-Drive String Tension
	R40241	String-Drive
	R57286	Switch-Phono-Radio
	R45438	Switch-Tone
T1	R57276	Transformer-#1 I.F.
T2	R57277	Transformer-#2 I.F.
T4	R45417	Transformer-Power 60 and 50 cycle

MODEL 6200
Ch.101.800

SCHEMATIC LOCATION	PART NUMBER	DESCRIPTION
	R57145	Antenna-Stratobeam Receptor Kit Complete
	R57037	Board-Antenna
	R13961	Button-Snap
	R57149	Cabinet
	R57045	Cable-Battery
C6,C12,C16		Capacitor-.01 mfd. 400 V.
C3		Capacitor-.05 mfd. 200 V.
C15,C10		Capacitor-.001 mfd. 600 V.
C17		Capacitor-.005 mfd. 400 V.
C9,C18		Capacitor-Mica-50 mmfd.
C1		Capacitor-Mica-150 mmfd.
C19		Capacitor-Mica-250 mmfd.
C2	R46799	Capacitor-Silver Mica 250 mmfd. 500 V.
C20	R57054	Capacitor-Dry. Elect. 10 mfd. 150 V.
C4,C8	R57096	Capacitor-Trimmer-2 Gang
	R57010	Clip-Drive Cord Anchor
	R57035	Cloth-Grille
L1	R45255	Coil-Choke-Antenna
R10	R57072	Control-On-Off & Volume
	R57132	Cover-Dial
	R57084	Dial-Station
	R57168	Knob-On-Off & Volume
	R57169	Knob-Tuning
	R59015	Leaflet-Instruction
	R57155	Pointer-Dial
	R57017	Pulley-Drive Shaft
	R43416	Pulley-Wood
R14		Resistor-1200 ohm 1/3 W.
R15		Resistor-4700 ohm 1/3 W.
R4		Resistor-22000 ohm 1/3 W.
R2		Resistor-47000 ohm 1/3 W.
R5		Resistor-180000 ohm 1/3 W.
R7		Resistor-220000 ohm 1/3 W.
R1,R12		Resistor-1 megohm 1/3 W.
R13		Resistor-2.2 megohm 1/3 W.
R3		Resistor-3.3 megohm 1/3 W.
R11		Resistor-6.8 megohm 1/3 W.
R9		Resistor-15 megohm 1/3 W.
	R57008	Shaft-Drive
	R57049	Socket-Tube-8 Prong Lock-in
	R57034	Speaker-5-1/4" P.M.
	R57118	Spring-Extension
	R40241	String-Drive
T1	R57094	Transformer-I.F. #1
T2	R57116	Transformer-I.F. #2
T3	R57076	Transformer-Output
L2,L3	R57087	Tuner-Permeability Coil Unit

MODEL 6220
Ch.101.801

SCHEMATIC LOCATION	PART NUMBER	DESCRIPTION
	R57145	Antenna-Stratobeam Receptor Kit Complete
	R57037	Board-Antenna
	R13961	Button-Snap
	R57045	Cable-Battery
C22,C17		Capacitor-.001 mfd. 600 V.
C20		Capacitor-.005 mfd. 400 V.
C4,C5,C8 C12,C18		Capacitor-.01 mfd. 200 V.
C10,C14		Capacitor-.05 mfd. 200 V.
C19,C11		Capacitor-Mica-50 mmfd.
C7		Capacitor-Mica-100 mmfd.
C1		Capacitor-Mica-150 mmfd.
C21		Capacitor-Mica-250 mmfd.
C3	R46799	Capacitor-Silver Mica 250 mmfd. 5%-500 V.
C13,C23	R57128	Capacitor-Dry. Elect.
C2,C6,C9	R57081	Capacitor-Trim.3 Gang
	R57010	Clip-Drive Cord Anchor
L4	R45255	Coil-Choke-Antenna
R12	R57071	Control.On-Off Vol.& Tone
	R45218	Cover-Dial
	R57085	Dial-Station
	R57150	Knob-On-Off Ind. & Vol.
	R57151	Knob-Tuning
	R57153	Knob-Tone Control
	R59019	Leaflet-Instructions
	R57156	Pointer Dial
	R18245	Pulley-Wood
	R43416	Pulley-Wood
	R57017	Pulley-Drive Shaft
R20		Resistor-680 ohms 1/3 W.
R17	R45254	Resistor-Flexohm 0.72 ohm 1.2 W.
R1,R2,R15		Resistor-1 meg. 1/3 W.
R16,R10		Resistor-2.2 meg. 1/3 W.
R3		Resistor-3.3 meg. 1/3 W.
R14		Resistor-6.8 meg. 1/3 W.
R13		Resistor-15 meg. 1/3 W.
R7		Resistor-680 ohm 1/3 W.
R19		Resistor-820 ohm 1/3 W.
R18		Resistor-1800 ohm 1/3 W.
R6		Resistor-33000 ohm 1/3 W.
R4		Resistor-68000 ohm 1/3 W.
R8		Resistor-68000 ohm 1/3 W.
R5		Resistor-180000 ohm 1/3 W.
	R57032	Shaft-Drive
	R57049	Socket-Tube-8 Prong Lock-in
	R57061	Speaker-5-1/4" P.M.
	R57118	Spring-Extension
	R40241	String-Drive
	R57038	Switch Slide-D.P.S.T.
T3	R57075	Transformer-Output
T2	R57095	Transformer-I.F. #2
T1	R57120	Transformer-I.F. #1
L1,L2,L3	R57102	Unit-Perm. Tuning Coil

MODEL 6002, Chassis 132.818

SCH. LOC.	PART NO.	DESCRIPTION
R1		Resistor, 4.7 Megohms, ½ watt
R2		Resistor, 1 Megohm, ½ watt
R3		Resistor, 150 ohms ½ watt
R4		Resistor, 22,000 ohms, ½ watt
R5		Resistor, 330,000 ohms, ½ watt
R6		Resistor, 15 Megohms, ½ watt
R7	N18587	Resistor, 2 Megohm Volume Control & Switch
R8		Resistor, 470,000 ohms, ½ watt
R9	N19177	Resistor, 47 ohms, 1 watt
R10		Resistor, 2,200 ohms, 1 watt
R11		Resistor, 15 ohms, ½ watt
C1,C2	N17115	Condenser, Variable 2-gang
C3		Condenser, .05 mfd., 200 volts
C4		Condenser, .05 mfd., 400 volts
C6		Condenser, .00005 mfd., 500 volts
C7		Condenser, .0001 mfd., 500 volts
C8		Condenser, .002 mfd., 500 volts
C9		Condenser, .01 mfd., 400 volts
C10		Condenser, 40 mfd., 150 volts
C11	N19176	Condenser, 20 mfd., 150 volts
C12		Condenser, 20 mfd., 25 volts
	N19212	Cabinet rear cover assembly
T1	N18255	Coil, antenna
T2	N18256	Coil, oscillator
T3	N19649	Transformer, I.F.
Spk.	N17209	Speaker less output transformer
T4	N18258	Transformer output
	N19937	Speaker & output transformer ass'y.
	N19122	Dial scale emblem
	N19936	Cabinet, ivory
	N19120	Knob, tuning, ivory
	N18673	Knob, volume, ivory
	N20064	Line Cord
	N20040	Washer - White Felt
	N18254	Socket - Tube
	N19292	Antenna Wire
	N19215	Instruction Sheet
	N19119	Wood Insulator, Rear Cover

Power Supply -- 105-125 Volts AC-DC, 35 Watts
Power Output
Undistorted .8 Watts, Maximum - 2.5 Watts

Tuning Range Broadcast Band 540-1600 Kc
Speaker
Voice Coil Impedance 3.2 Ohms

GENERAL INFORMATION & SERVICE HINTS

Due to a wide variation in characteristics of 12SA7 tubes the set may have a tendency to oscillate when tube replacements are made. A 1 megohm resistor placed across the I F coil from B- to plate will usually correct this condition. Some sets already have this resistor installed.

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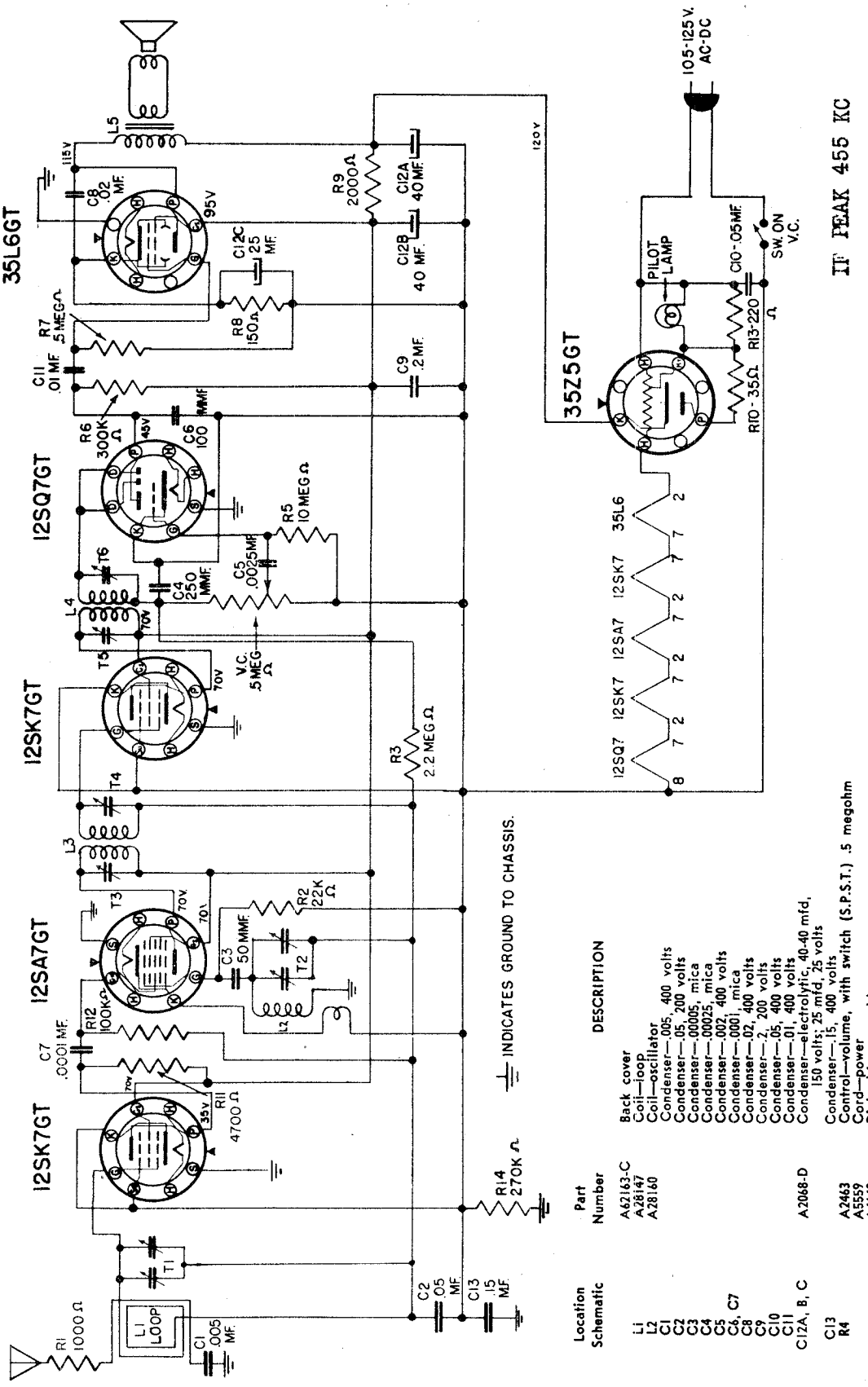
MODEL 6052
Ch.110.452



Location Schematic	Part Number	DESCRIPTION
	A62163-C	Back cover
L1	A28147	Coil—loop
L2	A28160	Coil—oscillator
C1		Condenser—.005, 400 volts
C2		Condenser—.05, 200 volts
C3		Condenser—.00005, mica
C4		Condenser—.00025, mica
C5		Condenser—.002, 400 volts
C6, C7		Condenser—.0001, mica
C8		Condenser—.02, 400 volts
C9		Condenser—.2, 200 volts
C10		Condenser—.05, 400 volts
C11		Condenser—.01, 400 volts
C12A, B, C	A2068-D	Condenser—electrolytic, 40-40 mfd, 150 volts; 25 mfd, 25 volts
C13		Condenser—.15, 400 volts
R4	A2463	Control—volume, with switch (S.P.S.T.) .5 megohm
	A5559	Cord—power
	A4640	Dial—drive assembly
	A1851	Dial—lamp socket
	A4137	Dial—pointer
	A4574	Dial—pointer drive cord
	A4633	Dial—pointer drive spring
	A40112	Dial—scale (glass)
	A39125	Knob—off-volume
	A39126	Knob—tune
	A59259	Leaflet—instruction
R1		Resistor—1000 ohms, ¼ watt
R2		Resistor—22,000 ohms, ¼ watt
R3		Resistor—2.2 megohms, ¼ watt
R5		Resistor—10 megohms, ¼ watt
R6		Resistor—330,000 ohms, ¼ watt
R7		Resistor—500,000 ohms, ¼ watt
R8		Resistor—150 ohms, ½ watt
R9		Resistor—2000 ohms, 2 watt, carbon
R10		Resistor—33 ohms, ¼ watt
R11		Resistor—4700 ohms, ¼ watt
R12		Resistor—100,000 ohms, ¼ watt
R13		Resistor—200-400 ohms, ½ watt
R14		Resistor—270,000 ohms, ¼ watt
	A5871	Speaker—5"
	A1330	Transformer—audio output
L5	A3329	Transformer—I.F. input
L3	A3529	Transformer—I.F. output
L4	A1652	Variable Condenser

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MODEL 6052
Ch.110.452

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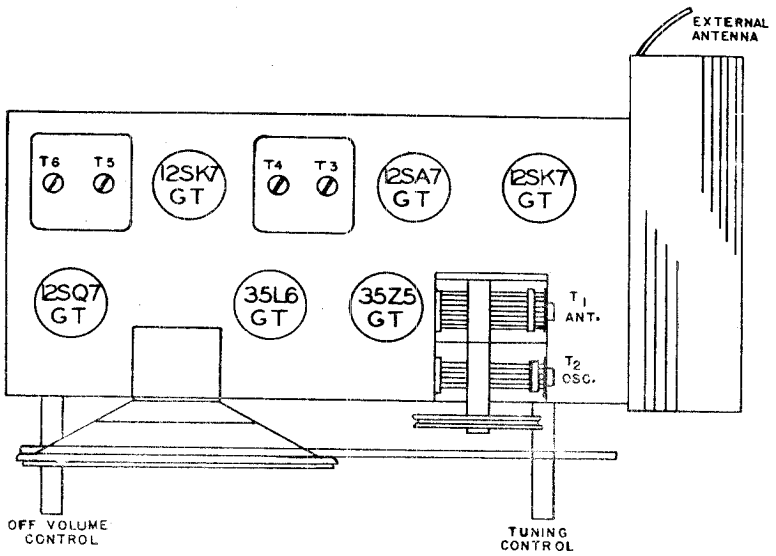

Output meter connections	Across primary output transformer
Connection of generator ground	Floating Ground
Generator modulation	App. 30% @ 400 cycles
Position of volume control	Fully Clockwise

POSITION OF DIAL POINTER	GENERATOR FREQUENCY	GENERATOR CONNECTION	TRIMMERS ADJUSTED	TRIMMER FUNCTION
540 kc	455 kc	12SA7GT	T3, T4, T5, T6	I. F.
1500 kc	1500 kc	* * *	T2, T1	Osc., R. F.

See Note Below

IMPORTANT ALIGNMENT NOTES

It is advisable to repeat the entire alignment procedure in the original order to insure greater accuracy.

Always keep the output from the test oscillator at its lowest possible value. As the sensitivity is increased by alignment, the generator output should be reduced correspondingly.

***Run a wire from the output terminal of the generator near the receiver. However, no connection is made between the signal generator and the receiver.

DIAL LAMP:

A six volt bayonet dial lamp No. 47 is used in this receiver. The dial lamp may be removed for replacement by gently squeezing the dial lamp socket mounting bracket and withdrawing from the dial assembly. Replace the lamp with another of the same type. DISCONNECT THE RECEIVER FROM THE ELECTRICAL OUTLET BEFORE REPLACING THE LAMP.

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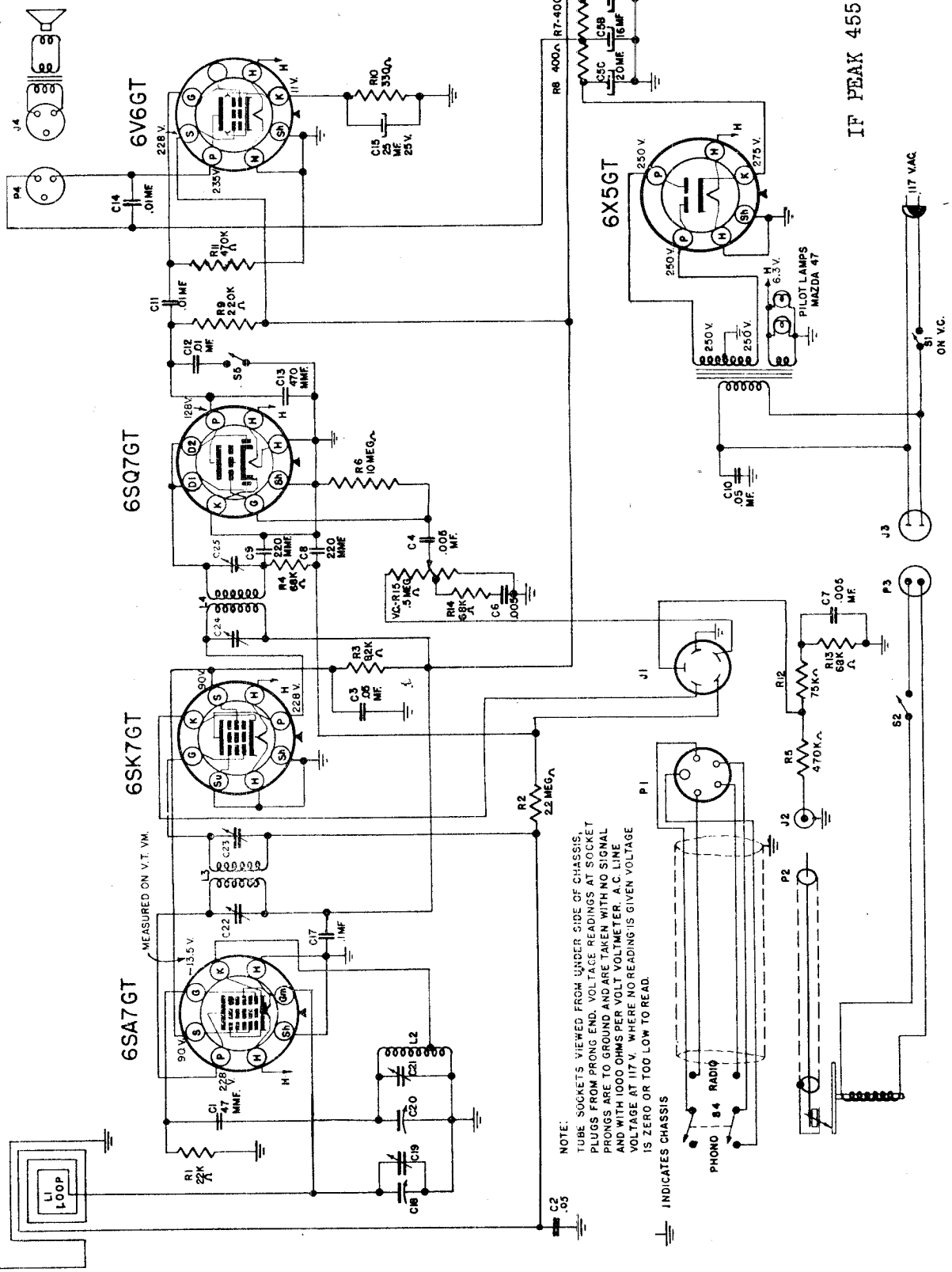
MODEL 6072
Ch.110.454



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ALIGNMENT PROCEDURE

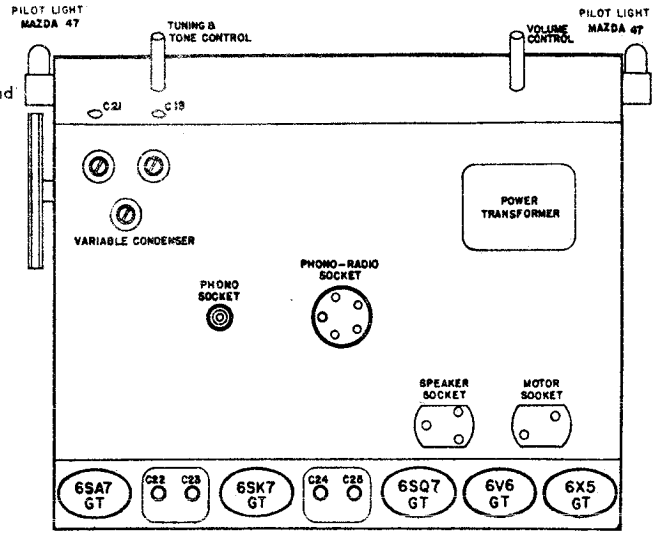
Output meter connections.....Across voice coil (3.2 ohms)
Output meter reading for 1/2 watt output.....1.25 volts
Connection of generator ground.....to chassis
Generator modulation.....Approx. 30% at 400 cycles
Position of volume control.....Full clockwise
Position of tone control.....High (In)
Position of dial pointer with variable cond. fully closed.....First mark to left of "55" on dial scale

POSITION OF DIAL POINTER	GENERATOR FREQUENCY	GENERATOR CONNECTION	DUMMY ANTENNA	TRIMMERS ADJUSTED IN ORDER SHOWN	TRIMMER FUNCTION
540 kc	455 kc	6SA7GT Grid	.1 μfd	C25, C24, C23, C22	I.F.
High end of scale	1720 kc	Radiated Signal		C21	Osc.
1500 kc	1500 kc	Radiated Signal		C19	Ant.

The alignment procedure should be repeated stage by stage to obtain greatest accuracy. Always keep the output from the test oscillator at its lowest possible value. As the sensitivity is increased by alignment, the generator output should be reduced correspondingly so as to minimize the effect of the automatic volume control.

Schematic Location	Number Part	DESCRIPTION
	A62187	Back Cover
L1	A28148	Coil—Loop
L2	A28158	Coil—Oscillator
C1		Condenser—47 mmfd, mica
C8, C9		Condenser—220 mmfd, mica
C13		Condenser—470 mmfd, 500 volts, mica
C2, C3		Condenser—.05 mfd, 400 volts
C4, C6, C7		Condenser—.005 mfd, 400 volts
C11, C12, C14		Condenser—.01 mfd, 400 volts
C10		Condenser—.05 mfd, 600 volts
C17		Condenser—.1 mfd, 400 volts
C18, C19, C20, C21	A1693	Condenser—Variable
C5A, B, C	A20102	Condenser—Electrolytic 16-16-20 mfd, 350 volts
C15	A20108	Condenser—Electrolytic 25 mfd, 25 volts
C16	A20109	Condenser—Electrolytic, 16 mfd, 450 volts
R15	A2466	Control—Volume and Switch
	A5578	Line Cord with Plug
	A4633	Spring, Dial Cord
	A4674	Dial—Drive Tone Control Assy.
	A18114	Socket—Dial Light
	A4149	Pointer—Dial
	A40103	Dial—Scale (glass)
	A4673	Cord—Dial
	A39131	Knob—Tone-Tuning
	A39132	Knob—On-Off
	A59276	Leaflet—Instruction

Schematic Location	Part Number	DESCRIPTION
		Pilot Light #47
R7, R8		Resistor—400 ohms, 2W, wire wound
R5, R11		Resistor—470K ohms, ½W
R6		Resistor—10 Megohms, ½W
R12		Resistor—75K ohms, ½W
R2		Resistor—2.2 Megohms, ½W
R9		Resistor—220K ohms, ½W
R3		Resistor—8200 ohms, 2W
R1		Resistor—22K ohms, ½W
R10		Resistor—330 ohms, 1W
R4, R13, R14		Resistor—68K ohms, ½W
	A5866	Speaker—5" PM and Output Transformer
S5	A3822	Switch—Tone Control
S4	A3824	Switch—Radio-Phono
S2	A3825	Switch—Phono-Motor
	A1020	Transformer—Power
L3, C22, C23	A3360	Transformer—First I. F.
L4, C24, C25	A3530	Transformer—Second I. F.
	A18102	Socket—A.C. for Phono-Motor
	A18104	Socket for Phono Input
	A6414	Motor, Phono with 9" Turntable
	A6342	Rest, Pick-up Arm
	A4441	Escutcheon, Phono-Radio-Motor, "on-off"
	A18103	Plug—A.C. Phono-Motor
	A1861	Plug—Phono-Input
	A18117	Plug, Phono-Radio
	A18116	Socket, Phono-Radio



SEARS ROEBUCK & CO.

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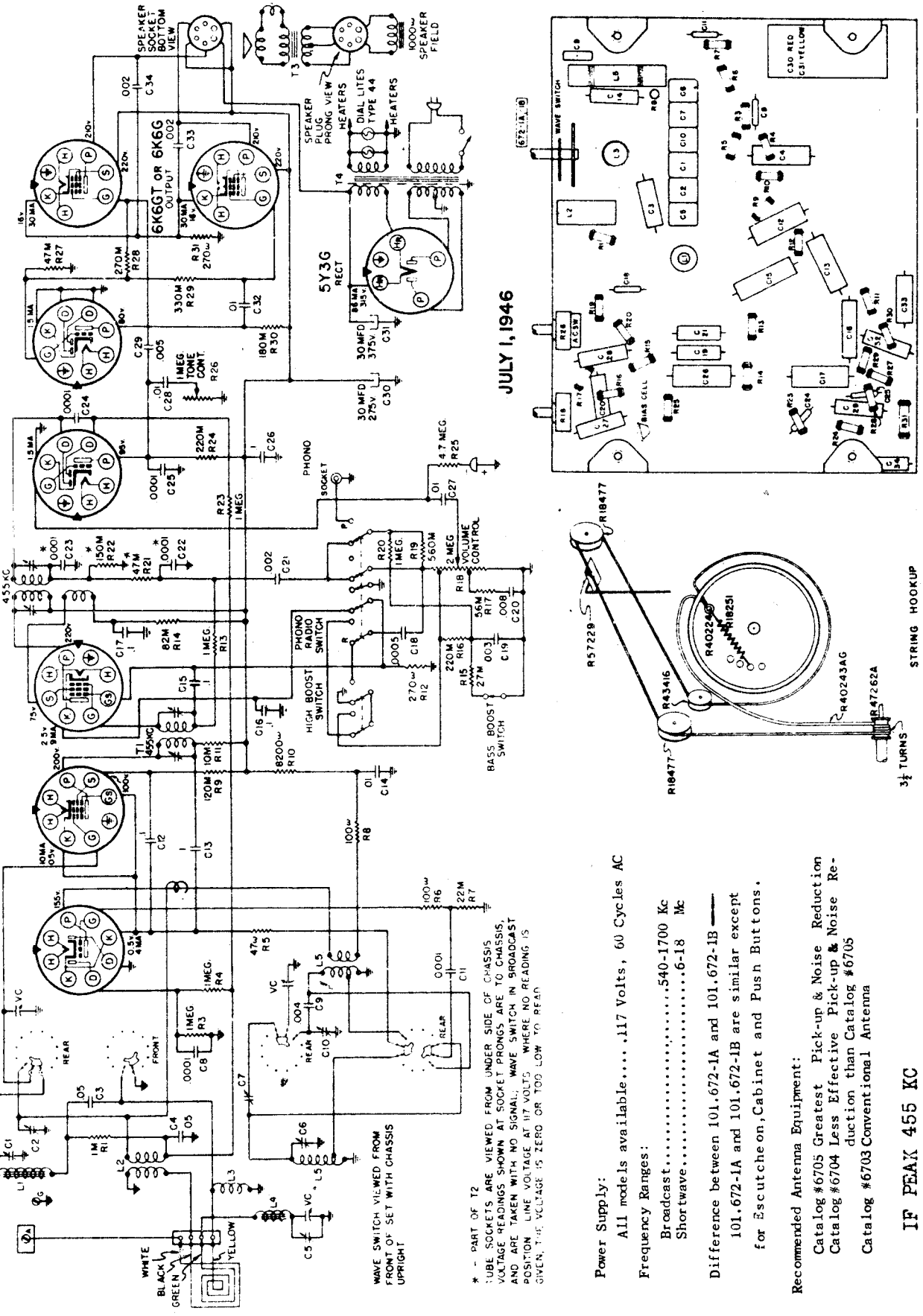
MODELS 6092,Ch.101.672-1B
6093,Ch.101.672-1A

JULY 1, 1946



* - PART OF T2

TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS. VOLTAGE READINGS SHOWN AT SOCKET PRONGS ARE TO CHASSIS, AND ARE TAKEN WITH NO SIGNAL. WAVE SWITCH IN BROADCAST POSITION. LINE VOLTAGE AT 117 VOLTS. WHERE NO READING IS GIVEN, THE VOLTAGE IS ZERO OR TOO LOW TO READ.

Power Supply:
All models available.....117 Volts, 60 Cycles AC

Frequency Ranges:
Broadcast.....540-1700 Kc
Shortwave.....6-18 Mc

Difference between 101.672-1A and 101.672-1B —
101.672-1A and 101.672-1B are similar except for Escutcheon, Cabinet and Push Buttons.

Recommended Antenna Equipment:
Catalog #6705 Greatest Pick-up & Noise Reduction
Catalog #6704 Less Effective Pick-up & Noise Reduction than Catalog #6705
Catalog #6703 Conventional Antenna

IF PEAK 455 KC

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MODELS 6092,6093
MODELS 6104A,-B,
6105A,-B

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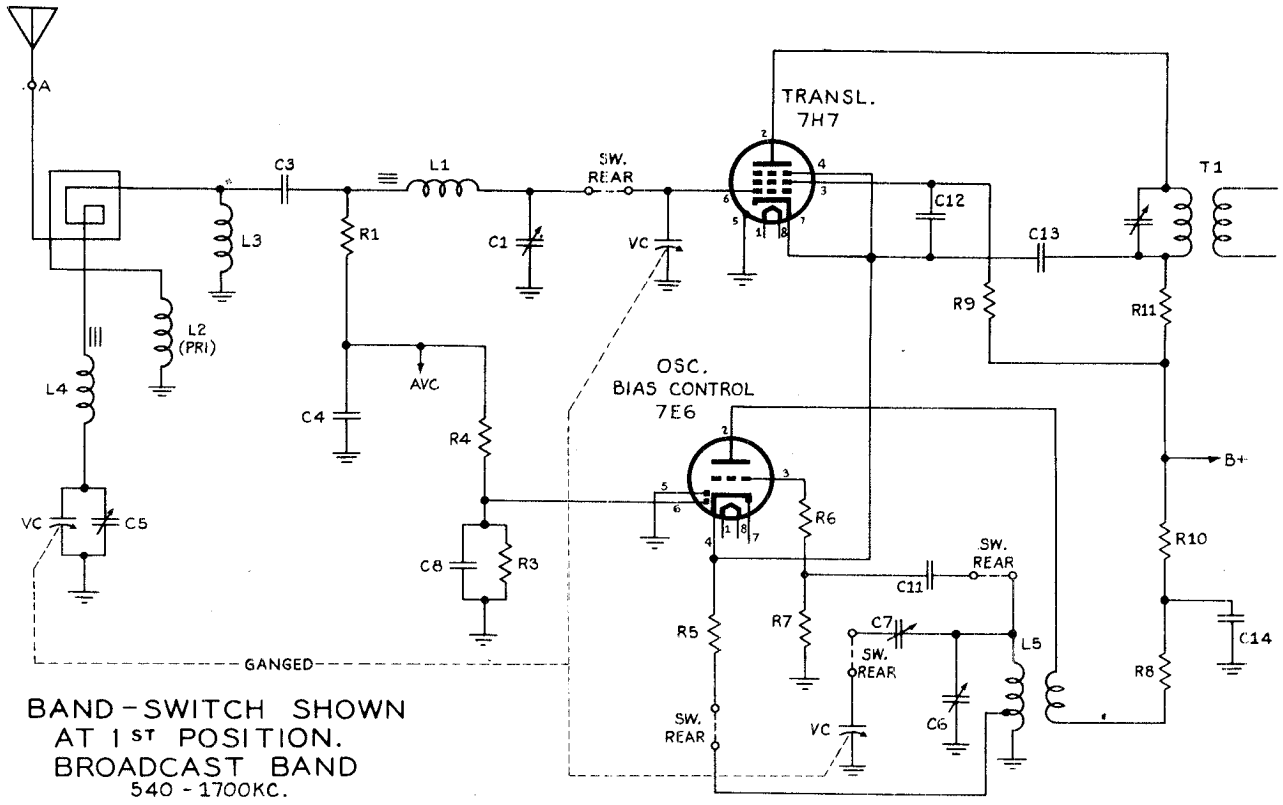
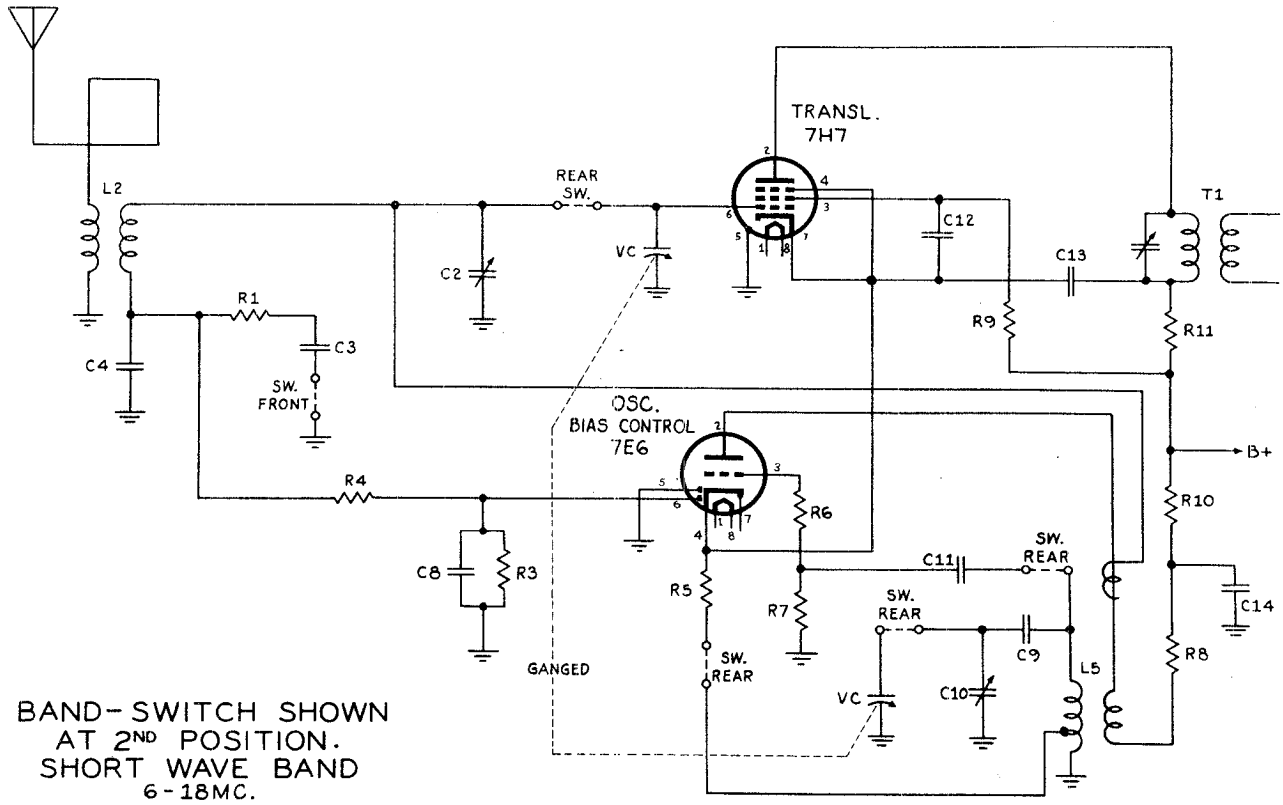


BAND-SWITCH SHOWN AT 1ST POSITION. BROADCAST BAND 540 - 1700KC.



BAND-SWITCH SHOWN AT 2ND POSITION. SHORT WAVE BAND 6 - 18MC.

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ALIGNMENT PROCEDURE

PRELIMINARY:

Output Meter Connection.....Across loud speaker voice coil
Output meter reading to indicate 50 Milliwatts (Standard Output).....1.2 Volts
Generator ground lead connection.....Receiver chassis
Dummy Antenna value to be in series with generator output.....See chart below
Connection of generator output lead.....See chart below
Generator Modulation.....30%, 400 cycles
Position of Volume Control.....Fully on
Position of Tone Control.....Treble
Position of pointer with tuner fully closed.....Last line below 540 calibration mark

WAVE BAND SWITCH POSITION	POSITION OF TUNER	GENERATOR FREQUENCY	DUMMY ANTENNA	GENERATOR CONNECTION	ADJUSTMENTS (IN ORDER SHOWN)	FUNCTION
BC	Closed	455 KC	.1 mfd.	7H7 Transl. grid	T2, T1	IF
BC	Open	1750 KC	.0002 mfd.	Ant. Terminal	C6	Oscillator
BC	1410	1410 KC	.0002 mfd.	Ant. Terminal	C5, C1	Ant.,Transl.
BC	600 (rock)	600 KC	.0002 mfd.	Ant. Terminal	C7	Padder
SW	Open	18.3 MC	400 ohms	Ant. Terminal	C10	Oscillator
SW	15 (rock)	15 MC	400 ohms	Ant. Terminal	C2	Transl.

IMPORTANT ALIGNMENT NOTES

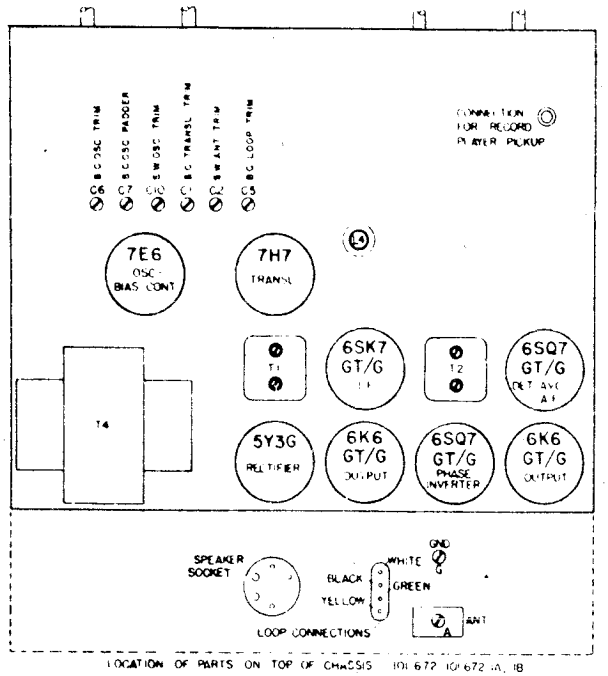
The Alignment must be done in the order given.

The Antenna Alignment Procedure should be repeated step by step in the original order for greatest accuracy.

Always keep the output power from the generator at its lowest possible value to prevent the AVC of the receiver from interfering with accurate alignment.

During alignment of the 'BC' Band Padder and the 'SW' Band Translator Trimmers, the Tuner should be rocked through resonance to assure alignment.

Power Output — Undistorted 3.6 Watts — Maximum 6.5 Watts



LOCATION OF PARTS ON TOP OF CHASSIS 101 672 101 672 A, B

SCHEMATIC LOCATION	PART NUMBER	DESCRIPTION
	R18112	Mounting-Bias Cell
	R16039	Pin-Loop Lead
	R57229	Pointer-Dial
	R18477	Pulley-Wood, large
	R43416	Pulley-Wood, small
R3,R4,R13 R20,R23		Resistor - 1 megohm, 1/3 W.
R25		Resistor - 4.7 megohm, 1/3 W.
R1		Resistor - 1M ohms, 1/3 W.
R11		Resistor - 10M ohms, 1/3 W.
R7		Resistor - 22M ohms, 1/3 W.
R15		Resistor - 27M ohms, 1/3 W. T3
R21,R27		Resistor - 47M ohms, 1/3 W.
R17		Resistor - 56M ohms, 1/3 W.
R14		Resistor - 82M ohms, 1/3 W.
R9		Resistor - 120M ohms, 1/3 W.
R30		Resistor - 180M ohms, 1/3 W.
R16,R24		Resistor - 220M ohms, 1/3 W.
R28		Resistor - 270M ohms, 1/3 W.
R29		Resistor - 330M ohms, 1/3 W. T1
R19		Resistor - 560M ohms, 1/3 W. T2
R5		Resistor - 47 ohms, 1/3 W. T4
R6,R8		Resistor - 100 ohms, 1/3 W. VC
R12		Resistor - 270 ohms, 1/3 W.
R31		Resistor - 270 ohms, 2 W
R10		Resistor - 8200 ohms, 1 W.
	R47262A	Shaft-Drive Assy.
	R44897	Socket-Phono.-Tel.-Freq. Mod.
	R16958	Socket-Rectifier
	R17983	Socket-Speaker
	R17987	Socket-Tube
		WHEN ORDERING SPEAKER PARTS,ALWAYS GIVE THE PART NUMBER APPEARING ON THE SPEAKER
	R57221	Speaker-10" Dynamic
	R45836	Cone & Voice Coil
	R45838	Field Coil
	R45837	Output Transformer
	R18251	Spring-Drive Tension
	R45844	Switch-Tone & Phono.-Tel.-Freq. Mod.
	R47191	Switch-Wave
	R45995	Tab-Bass Boost
	R45994	Tab-High Boost
	R45996	Tab-Phono.-Tel.-Freq. Mod.
	R42879	Tabs-Call Letter
	R45305	Transformer - #1 I.F.
	R45306	Transformer - #2 I.F.
	R45953	Transformer - Power - 60 cycle
	R45259	Tuner -Push Button with Var.Capacitor
C8,C11		Capacitor- .0001 mfd. Mica
C24,C25		Capacitor- .0005 mfd. Mica
C18	R17915	Cell-Bias
	R57203	Clip-Pilot Light
L4	R47193	Coil-Ant. Loop Loading
L5	R47192	Coil-BC. & S.W. Oscillator
L1	R47194	Coil-BC. Translator
L3	R47187	Coil-Preselector Coupling C30,C31
L2	R47195	Coil-S.W. Antenna
R26	R47235	Control-On-Off & Tone - 1 meg. C1,C2,C5
R18	R47240	Control-Volume- 2 meg. C6,C7,C10
	R18395	Cord-Line C15,C16
	R42673	Cover-Push Button Tabs C12,C13
	R57234	Dial-Station C17,C26
	R57271	Escutcheon-Dial (Cat. #6092) C14,C28
	R57231	Escutcheon-Dial (Cat. #6093) C27,C32
	R49940	Knob-On-Off & Tone C3,C4
	R49939	Knob-Tuning C21,C33,C34
	R49941	Knob-Volume C19
	R49943	Knob-Wave Switch C29
		Lamp-Pilot-Mazda #44 C20
	R59042	Leaflet- Instruction C9
	R57216	Loop-Complete
	R17998	Board-Antenna
	R45512	Board-Terminal-Loop
	R57285	Buttons-Push (High Boost,Bass Boost, Phono.-Tel.-Freq. Mod.)(Cat. #6092)
	R57205	Buttons-Push (High Boost,Bass Boost, Phono.-Tel.-Freq. Mod.)(Cat. #6093)
	R57284	Buttons-Push Stations (Cat. #6092)
	R57204	Buttons-Push Stations (Cat. #6093)
	R45829	Capacitor-Elect. 30 mfd. 275 V; 30 mfd. 375 V.
	R47199	Capacitor-Trimmer-6 Gang
		Capacitor- .1 mfd. 200 V.
		Capacitor- .1 mfd. 400 V.
		Capacitor- .01 mfd. 400 V.
		Capacitor- .01 mfd. 600 V.
		Capacitor- .05 mfd. 200 V.
		Capacitor- .002 mfd. 600 V.
		Capacitor- .003 mfd. 400 V.
		Capacitor- .005 mfd. 400 V.
		Capacitor- .008 mfd. 400 V.
		Capacitor- .004 mfd. Mica

MODEL 6100, Ch. 101.660-1A

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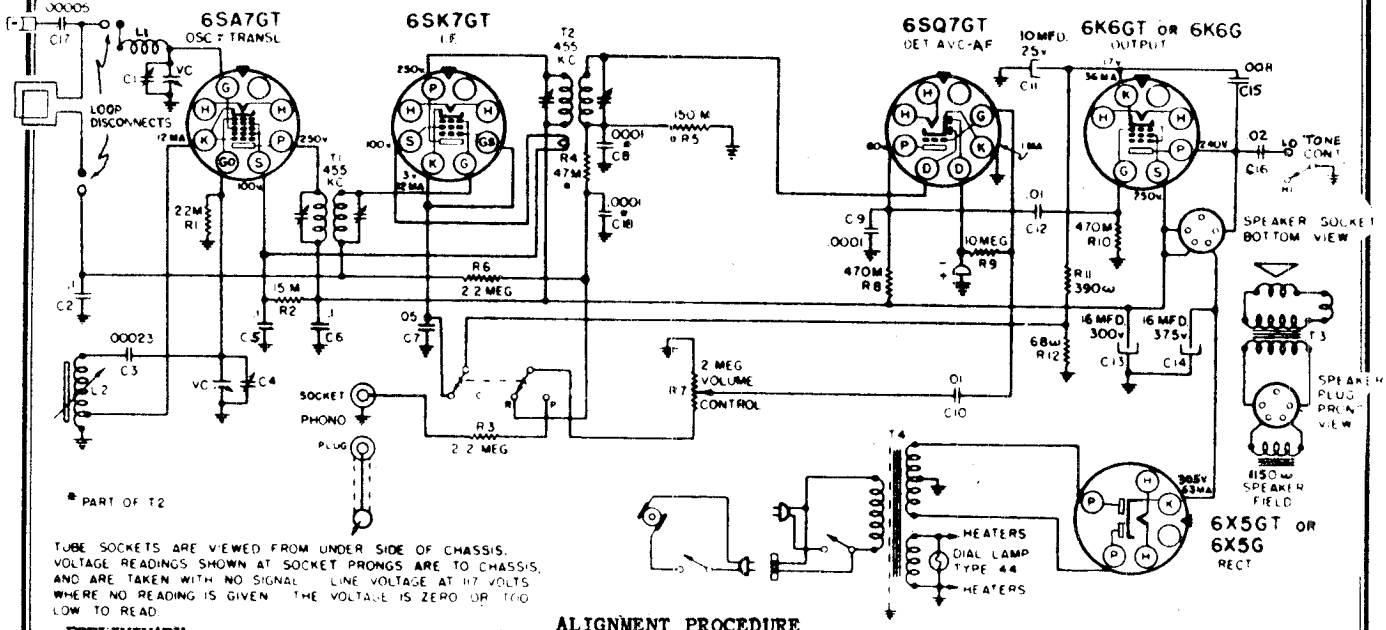


TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS. VOLTAGE READINGS SHOWN AT SOCKET PRONGS ARE TO CHASSIS, AND ARE TAKEN WITH NO SIGNAL. LINE VOLTAGE AT 117 VOLTS WHERE NO READING IS GIVEN THE VOLTAGE IS ZERO OR TOO LOW TO READ.

ALIGNMENT PROCEDURE

PRELIMINARY:

Output meter connection.....Across loudspeaker voice coil
Output meter reading to indicate 500 milliwatts.....1.25 volts
Dummy antenna value to be in series with generator output.....See chart below
Connection of generator output lead.....See chart below
Connection of generator ground lead.....Receiver chassis
Generator modulation.....30%, 400 cycles
Position of Volume Control.....Fully clockwise
Position of Tone Control.....Counterclockwise (HI)
Position of Dial Pointer with variable fully closed.....On mark below 540 Kc Calibration mark

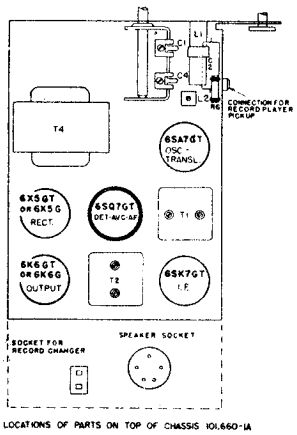
POSITION OF VARIABLE	GENERATOR FREQUENCY	DUMMY ANTENNA	GENERATOR CONNECTION	ADJUSTMENTS (IN ORDER SHOWN)	FUNCTION
Closed	455 Kc	.1 mfd.	6SA7 Grid	T2, T1	I.F.
Fully open	1620 Kc	.00005 mfd.	Ant. Clip	C4	Oscillator
1410 Kc	1410 Kc	.00005 mfd.	Ant. Clip	C1	Translator
600 Kc (rock)	600 Kc	.00005 mfd.	Ant. Clip	L2	Padder
Fully open	1620 Kc	.00005 mfd.	Ant. Clip	C4	Oscillator

IMPORTANT ALIGNMENT NOTES

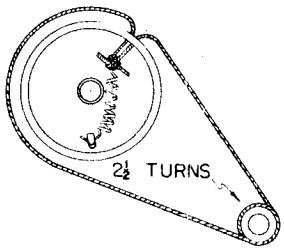
Where indicated by the word "Rock", the variable should be rocked back and forth a degree or two while making the adjustment.

The alignment procedure should be repeated stage by stage, in the original order for greatest accuracy. Always keep the output from the test oscillator at its lowest possible value to make the AVC action of the receiver ineffective.

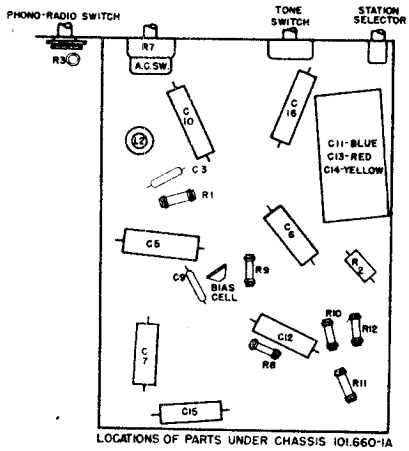
POWER OUTPUT Undistorted.....2.5 watts Maximum.....6 watts



LOCATIONS OF PARTS ON TOP OF CHASSIS 101.660-1A



CONDENSER DRIVE HOOKUP



LOCATIONS OF PARTS UNDER CHASSIS 101.660-1A

For Parts list, see P.15-2

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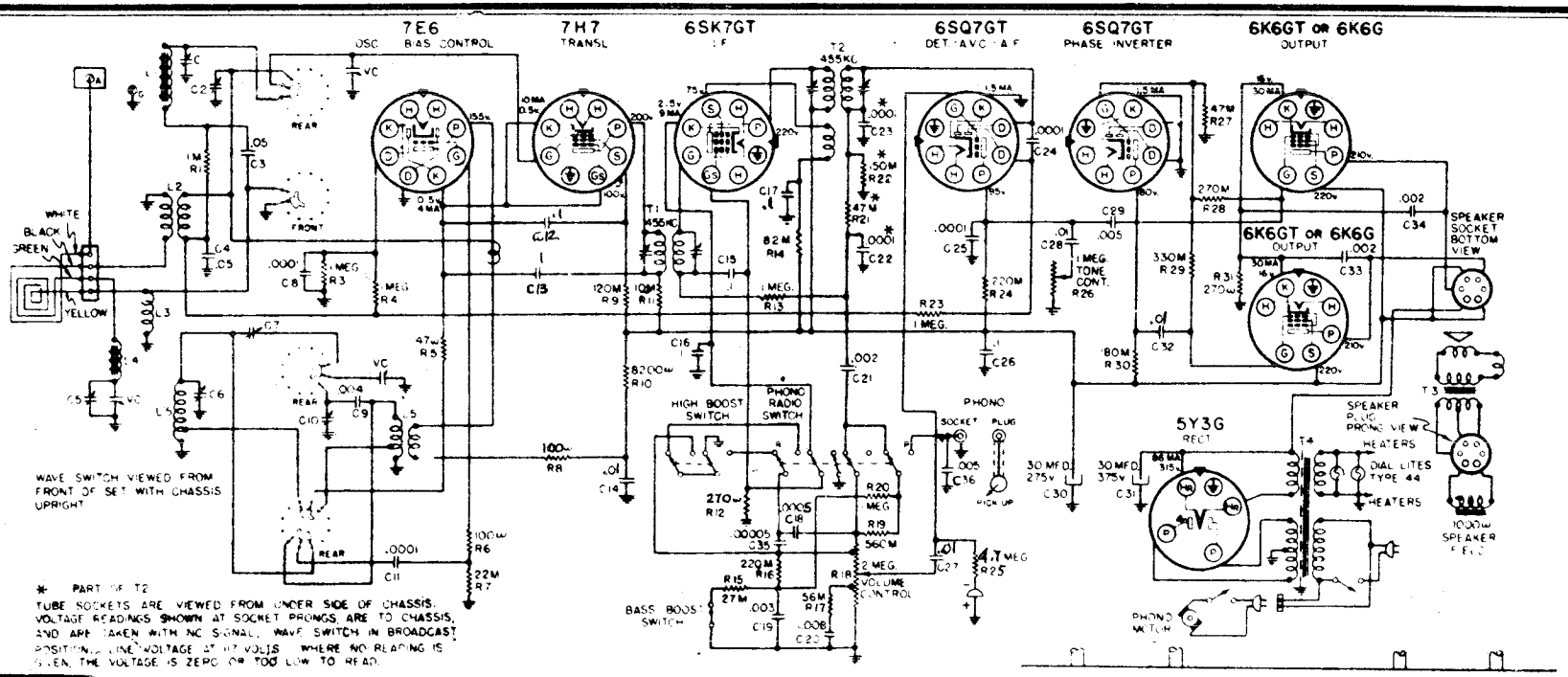
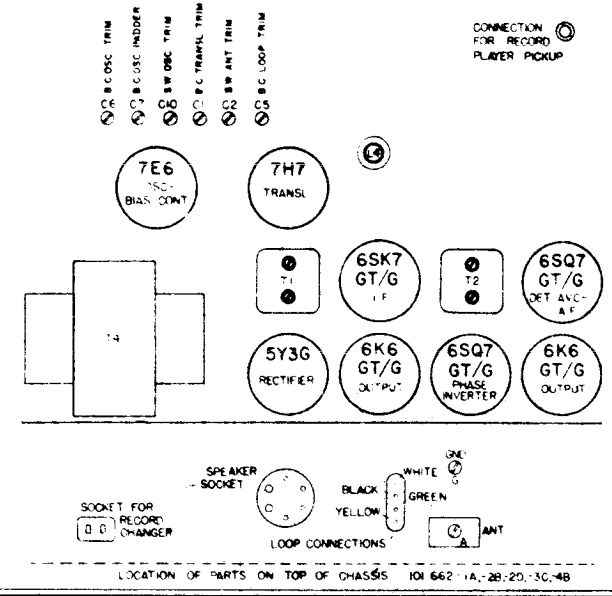

7E6 OSC BIAS CONTROL
7H7 TRANSL
6SK7GT I F
6SQ7GT DET AVC A F
6SQ7GT PHASE INVERTER
6K6GT OR 6K6G OUTPUT
6K6GT OR 6K6G OUTPUT
5Y3G RECT
SPEAKER SOCKET BOTTOM VIEW
SPEAKER PLUG PRONG VIEW
HEATERS
DIAL LITES TYPE 44
HEATERS
HIGH BOOST SWITCH
PHONO RADIO SWITCH
PHONO SOCKET
PLUG
PICK UP
VOLUME CONTROL
BASS BOOST SWITCH
PHONO MOTOR
WAVE SWITCH VIEWED FROM FRONT OF SET WITH CHASSIS UPRIGHT
WHITE
BLACK
GREEN
YELLOW
REAR
FRONT
* PART OF T2
TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS. VOLTAGE READINGS SHOWN AT SOCKET PRONGS ARE TO CHASSIS, AND ARE TAKEN WITH NO SIGNAL, WAVE SWITCH IN BROADCAST POSITION. LINE VOLTAGE AT 117 VOLTS WHERE NO READING IS GIVEN, THE VOLTAGE IS ZERO OR TOO LOW TO READ.



ALIGNMENT PROCEDURE

PRELIMINARY:

Output Meter Connection.....Across loud speaker voice coil
Output meter reading to indicate 50 Milliwatts(Standard Output)..... 1.2 Volts
Generator ground lead connection.....Receiver chassis
Dummy Antenna value to be in series with generator output.....See chart below
Connection of generator output lead.....See chart below
Generator Modulation.....30%, 400 cycles
Position of Volume Control.....Fully on
Position of Tone Control.....Treble
Position of pointer with tuner fully closed..... Last line below 540 calibration mark

WAVE BAND SWITCH POSITION	POSITION OF TUNER	GENERATOR FREQUENCY	DUMMY ANTENNA	GENERATOR CONNECTION	ADJUSTMENTS (IN ORDER SHOWN)	FUNCTION
BC	Closed	455 KC	.1 mfd.	7H7 Transl. grid	T2, T1	IF
BC	Open	1759 KC	.0002 mfd.	Ant. Terminal	C6	Oscillator
BC	1410	1410 KC	.0002 mfd.	Ant. Terminal	C5, C1	Ant.,Transl.
BC	600 (rock)	600 KC	.0002 mfd.	Ant. Terminal	C7	Padder
SW	Open	18.3 MC	400 ohms	Ant. Terminal	C10	Oscillator
SW	15 (rock)	15 MC	400 ohms	Ant. Terminal	C2	Transl.

IMPORTANT ALIGNMENT NOTES

The Alignment must be done in the order given.

The Antenna Alignment Procedure should be repeated step by step in the original order for greatest accuracy.

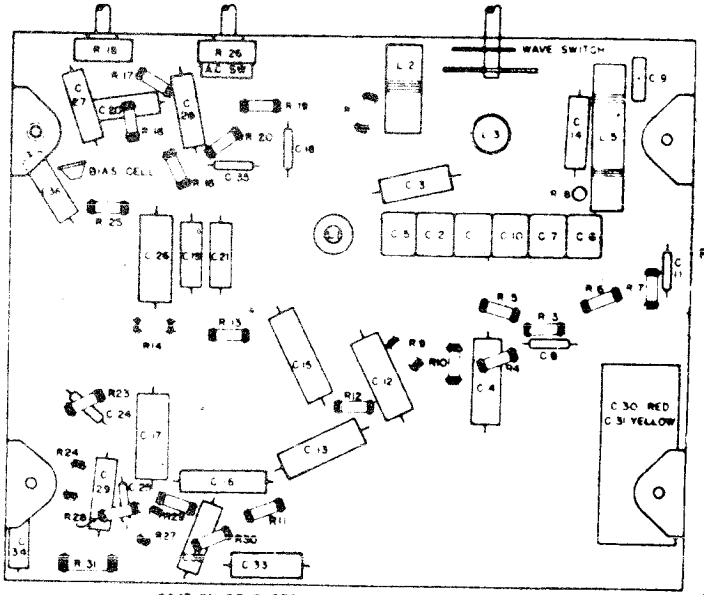
Always keep the output power from the generator at its lowest possible value to prevent the AVC of the receiver from interfering with accurate alignment.

During alignment of the 'BC' Band Padder and the 'SW' Band Translator Trimmers, the Tuner should be rocked through resonance to assure alignment.

For Clarified schematics, see P.15-8

SCHEMATIC LOCATION	PART NUMBER	DESCRIPTION
	R17998	Board-Antenna
	R45512	Board-Terminal-Loop
	R57285	Buttons-Push (High Boost,Bass Boost, Phono.-Tel.-Freq. Mod.)(Cat. 6104A & B)
	R57205	Buttons-Push (High Boost,Bass Boost, Phono-Tel.-Freq. Mod.)(Cat. #6105A & B)
	R57284	Buttons-Push Stations (Cat. #6104A & B)
	R57204	Buttons-Push Stations (Cat. #6105A & B)
C30,C31	R45829	Capacitor-Elect. 30 mfd. 275 V; 30 mfd. 375 V.
C1,C2,C5	R47199	Capacitor-Trimmer-6 Gang
C6,C7,C10		
C15,C16		Capacitor- .1 mfd. 200 V.
C12,C13		
C17,C26		Capacitor- .1 mfd. 400 V.
C14,C28		Capacitor- .01 mfd. 400 V.
C27,C32		Capacitor- .01 mfd. 600 V.
C3,C4		Capacitor- .05 mfd. 200 V.
C21,C33,C34		Capacitor- .002 mfd. 600 V.
C19		Capacitor- .003 mfd. 400 V.
C29		Capacitor- .005 mfd. 400 V.
C20		Capacitor- .008 mfd. 400 V.
C9		Capacitor- .004 mfd. Mica
C8,C11,C24		Capacitor- .0001 mfd. Mica
C25		
C18		Capacitor- .0005 mfd. Mica
C35		Capacitor- .00005 mfd. Mica
	R17915	Cell-Bias
	R57203	Clip-Pilot Light
L4	R47193	Coil-Ant. Loop Loading
L5	R47192	Coil-BC. & S.W. Oscillator
L1	R47194	Coil-BC. Translator
L3	R57187	Coil-Preselector Coupling
L2	R47195	Coil-S.W. Antenna
R26	R47235	Control-On-Off & Tone - 1 meg.
R18	R47240	Control-Volume - 2 meg.
	R57273	Cord-Line (Phono)
	R18395	Cord-Line (Power)
	R42673	Cover-Push Button Tabs
	R57206	Dial-Station
	R57271	Escutcheon-Dial (Cat. #6104A & B)
	R57231	Escutcheon-Dial (Cat. #6105A & B)
	R49940	Knob-On-Off & Tone
	R49939	Knob-Tuning
	R49941	Knob-Volume
	R49943	Knob-Wave Sw.
		Lamp-Pilot-Mazda #44
	R57221	Speaker-10" Dynamic
	R45836	Cone & Voice Coil
	R45838	Field Coil
T3	R45837	Output Transformer
	R18251	Spring-Drive Tension
	R45844	Sw.-Tone & Phono.-Tel.-Freq. Mod.
	R47191	Switch-Wave
	R45995	Tab-Bass Boost
	R45994	Tab-High Boost
	R45996	Tab-Phono.-Tel.-Freq. Mod.
	R42879	Tabs-Call Letter
T1	R45305	Transformer - #1 I.F.
T2	R45306	Transformer - #2 I.F.
T4	R45953	Transformer - Power - 60 cycle
VC	R47259	Tuner-Push Button with Var. Capacitor

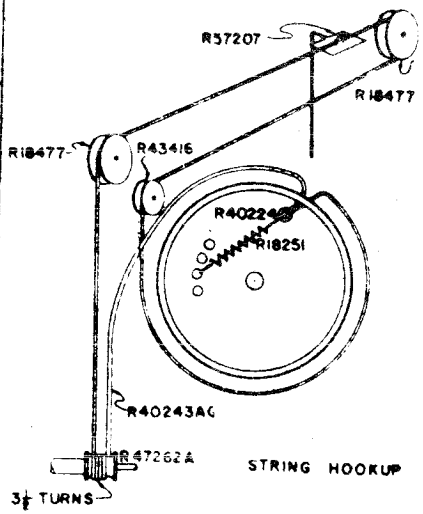
SCHEMATIC LOCATION	PART NUMBER	DESCRIPTION
	R57216	Loop-Complete
	R18112	Mounting-Bias Cell
	R57192	Needle-Phono
	R16039	Pin-Loop Lead
	R57207	Pointer-Dial
	R18477	Pulley-Wood, large
	R43416	Pulley-Wood, small
R3,R4,R13		Resistor - 1 megohm, 1/3 W.
R20,R23		
R25		Resistor - 4.7 megohm, 1/3 W.
R1		Resistor - 1M ohms, 1/3 W.
R11		Resistor - 10M ohms, 1/3 W.
R7		Resistor - 22M ohms, 1/3 W.
R15		Resistor - 27M ohms, 1/3 W.
R21,R27		Resistor - 47M ohms, 1/3 W.
R17		Resistor - 56M ohms, 1/3 W.
R14		Resistor - 82M ohms, 1/3 W.
R9		Resistor -120M ohms, 1/3 W.
R30		Resistor -180M ohms, 1/3 W.
R16,R24		Resistor -220M ohms, 1/3 W.
R28		Resistor -270M ohms, 1/3 W.
R29		Resistor -330M ohms, 1/3 W.
R19		Resistor -560M ohms, 1/3 W.
R5		Resistor - 47 - ohms, 1/3 W.
R6,R8		Resistor -100 ohms, 1/3 W.
R12		Resistor -270 ohms, 1/3 W.
R31		Resistor -270 ohms, 2 W.
R10		Resistor -8200 ohms, 1 W.
	R47262A	Shaft-Drive Assy.
	R44897	Socket-Phono.-Tel.-Freq. Mod.
	R16958	Socket-Rectifier
	R17983	Socket-Speaker
	R17987	Socket-Tube



LOCATION OF PARTS UNDER CHASSIS (1662-28, -20, -3C, -48)

Frequency Ranges:

Broadcast.....540-1700 KC
Shortwave.....6-18 MC



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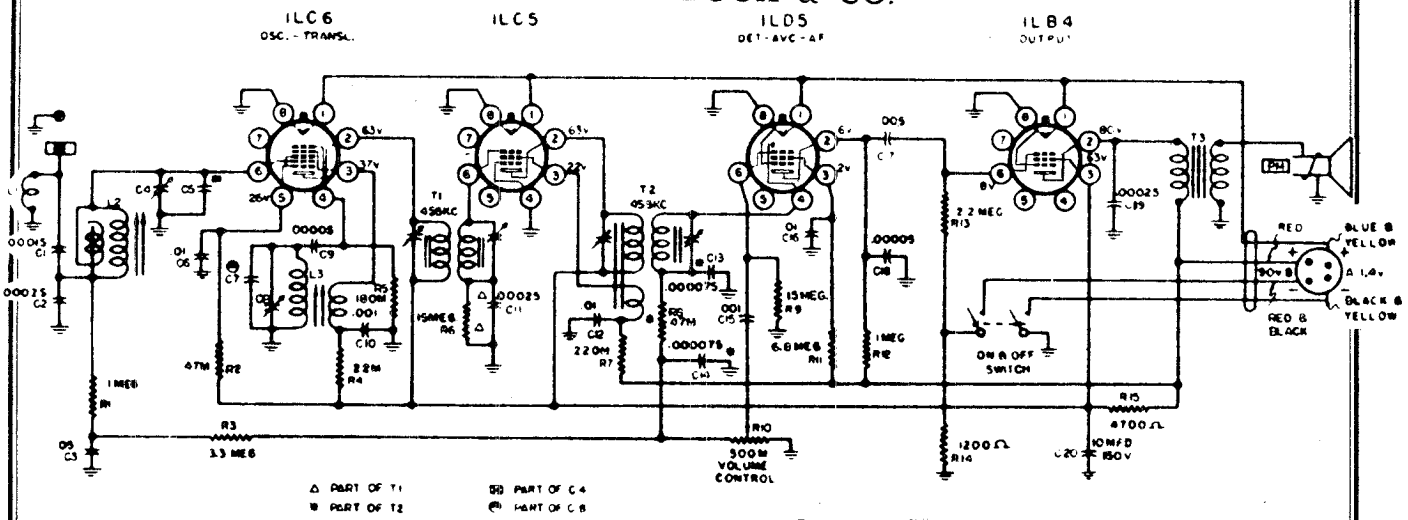
MODEL 6200, Ch. 101, 800



Δ PART OF T1 — ⊛ PART OF C4

■ PART OF T2 — ◉ PART OF C 8

TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS. VOLTAGE READINGS SHOWN AT SOCKET PRONGS ARE TO CHASSIS, AND ARE TAKEN WITH NO SIGNAL. WHERE NO READING IS GIVEN, THE VOLTAGE IS ZERO OR TOO LOW TO READ

Frequency Ranges:

Broadcast	550-1700 Kc

ALIGNMENT PROCEDURE

PRELIMINARY:

Output meter connection . . . . . Across loud speaker voice coil
Output meter reading to indicate 50 Milliwatts (Standard Output) . . . . . 0.4 Volts
Generator ground lead connection . . . . . Receiver chassis
Dummy antenna value to be in series with generator output. . . . . See chart below
Connection of generator output lead . . . . . See chart below
Generator Modulation . . . . . 30%, 400 cycles
Position of Volume Control . . . . . Fully on
Position of pointer with tuner fully closed . . . . Last mark to the left of 540 Kc calibration mark

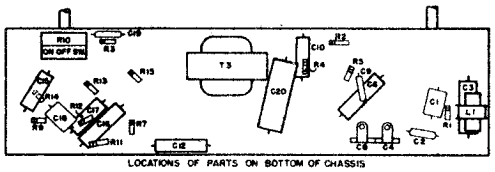
POSITION OF TUNER	GENERATOR FREQUENCY	DUMMY ANTENNA	GENERATOR CONNECTION	ADJUSTMENTS (IN ORDER SHOWN)	FUNCTION
Closed	455 Kc.	.1 mfd.	1LC6 Transl. grid	T2, T1	I.F.
1725	1725 Kc.	.000075 mfd	Ant. Terminal	C8	Oscillator
1725	1725 Kc.	.000075 mfd.	Ant. Terminal	C4	Antenna
1500	1500 Kc.	.000075 mfd.	Ant. Terminal	L3	Oscillator Core
1500	1500 Kc.	.000075 mfd.	Ant. Terminal	L2	Antenna Core
1725	1725 Kc.	.000075 mfd.	Ant. Terminal	C8, C4	Osc. & Ant. Recheck

IMPORTANT ALIGNMENT NOTES

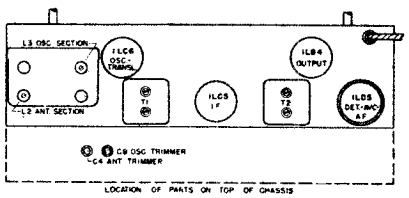
The alignment must be done in the order given.

Always keep the output power from the generator at its lowest possible value to prevent the AVC of the receiver from interfering with accurate alignment.

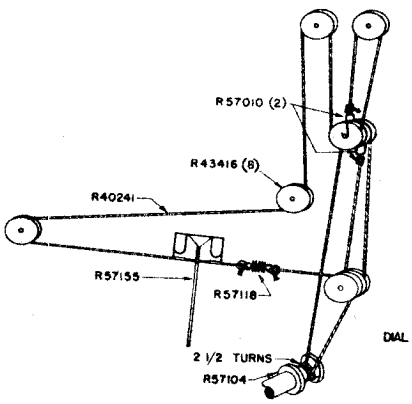
Power Output — Undistorted 0.080 Watts — Maximum 0.150 Watts



LOCATIONS OF PARTS ON BOTTOM OF CHASSIS



LOCATION OF PARTS ON TOP OF CHASSIS



For Parts list, see P.15-2

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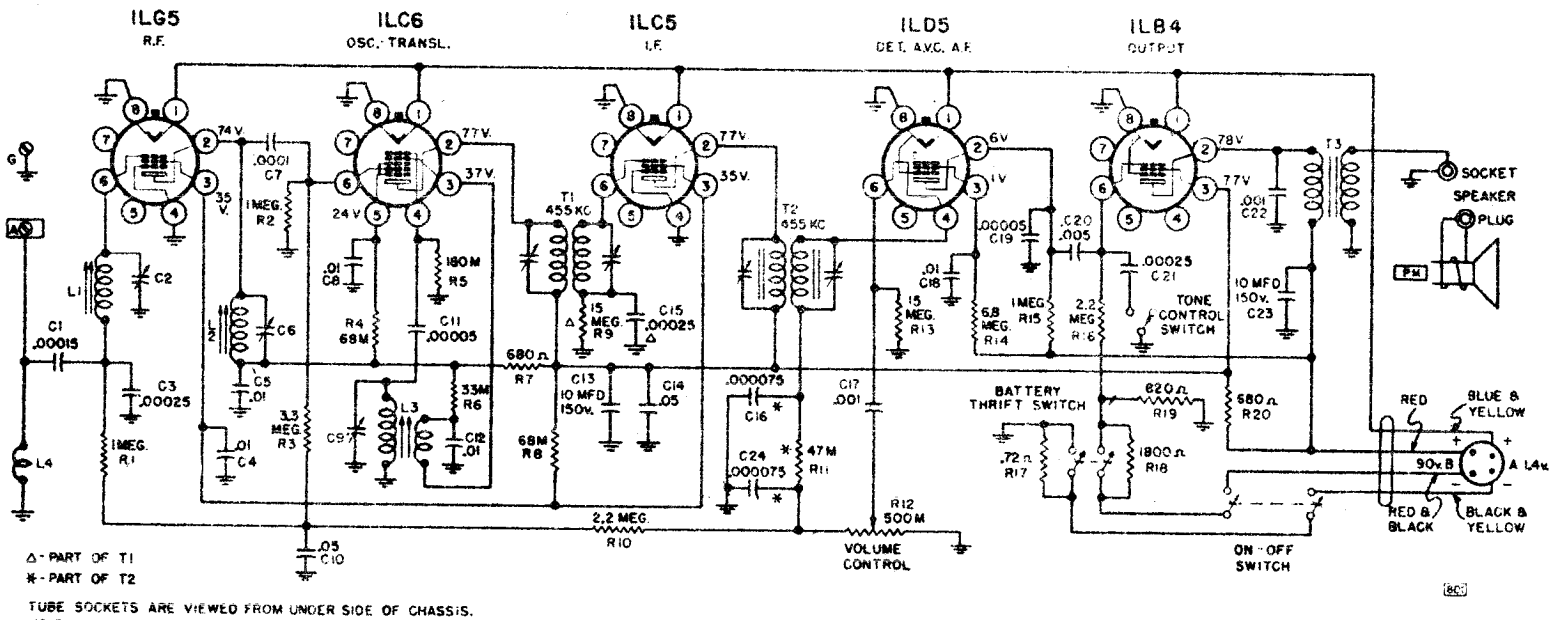
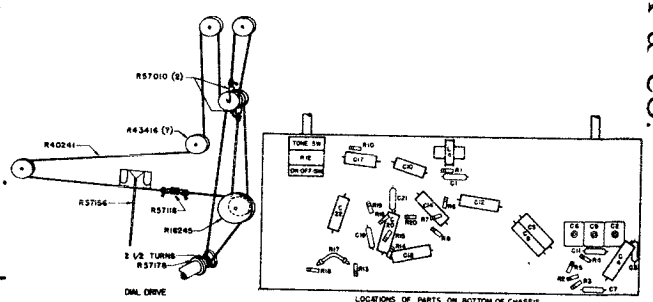
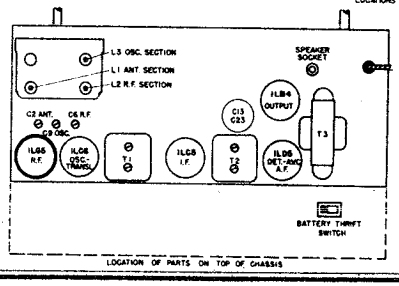


TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS.
VOLTAGE READINGS SHOWN AT SOCKET PRONGS ARE TO CHASSIS, AND ARE TAKEN WITH NO SIGNAL. WHERE NO READING IS GIVEN, THE VOLTAGE IS ZERO OR TOO LOW TO READ.

Output meter connections . . . . . .Across loud speaker voice coil
Output meter reading to indicate 50 milliwatts (Standard Output). . . . . .0.4 volts
Generator ground lead connection . . . . . Receiver chassis
Dummy antenna value to be in series with generator output . . . . . See chart below
Connection of generator output lead . . . . . See chart below
Generator modulation . . . . . 30%, 400 cycles
Position of Volume Control . . . . . Fully on
Position of Tone Control . . . . . HI
Position of pointer with tuner fully closed. . . . . Last mark to the left of 540 Kc calibration mark.

POSITION OF TUNER	GENERATOR FREQUENCY	DUMMY ANTENNA	GENERATOR CONNECTION	ADJUSTMENTS (IN ORDER SHOWN)	FUNCTION
Closed	455 Kc.	.1 mfd.	1LC6 Transl. Grid	T2, T1	I.F.
1725	1725 Kc.	.000075 mfd.	Ant. Terminal	C9	Oscillator
1725	1725 Kc.	.000075 mfd.	Ant. Terminal	C2, C6	Ant., Transl.
1500	1500 Kc.	.000075 mfd.	Ant. Terminal	L3	Oscillator Core
1500	1500 Kc.	.000075 mfd.	Ant. Terminal	L1, L2	Ant., Transl. Cores
1725	1725 Kc.	.000075 mfd.	Ant. Terminal	C9, C2, C6	Oscillator, Ant., & Transl. Recheck





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For Parts list, see P.15-2

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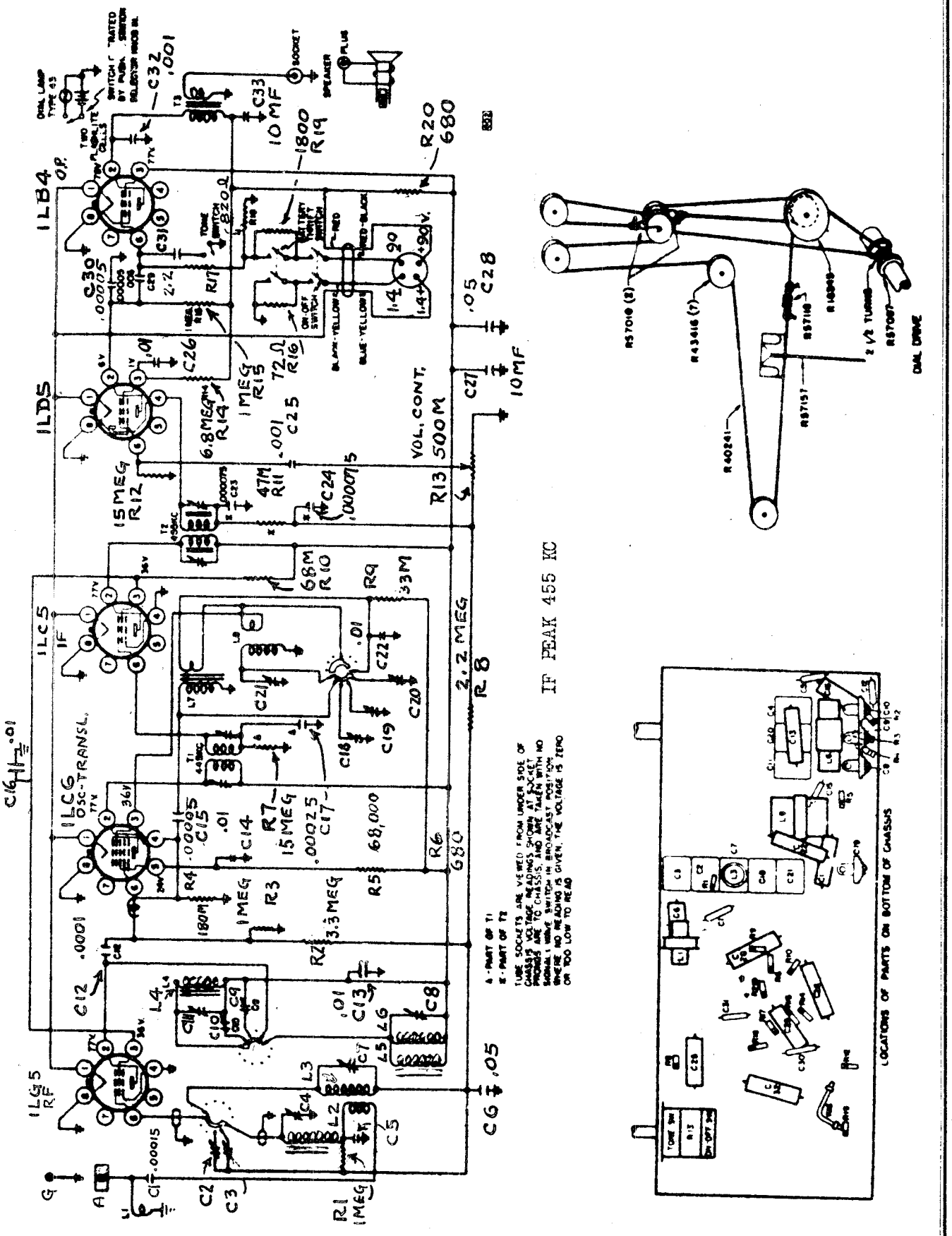
MODEL 6230
Ch.101.802



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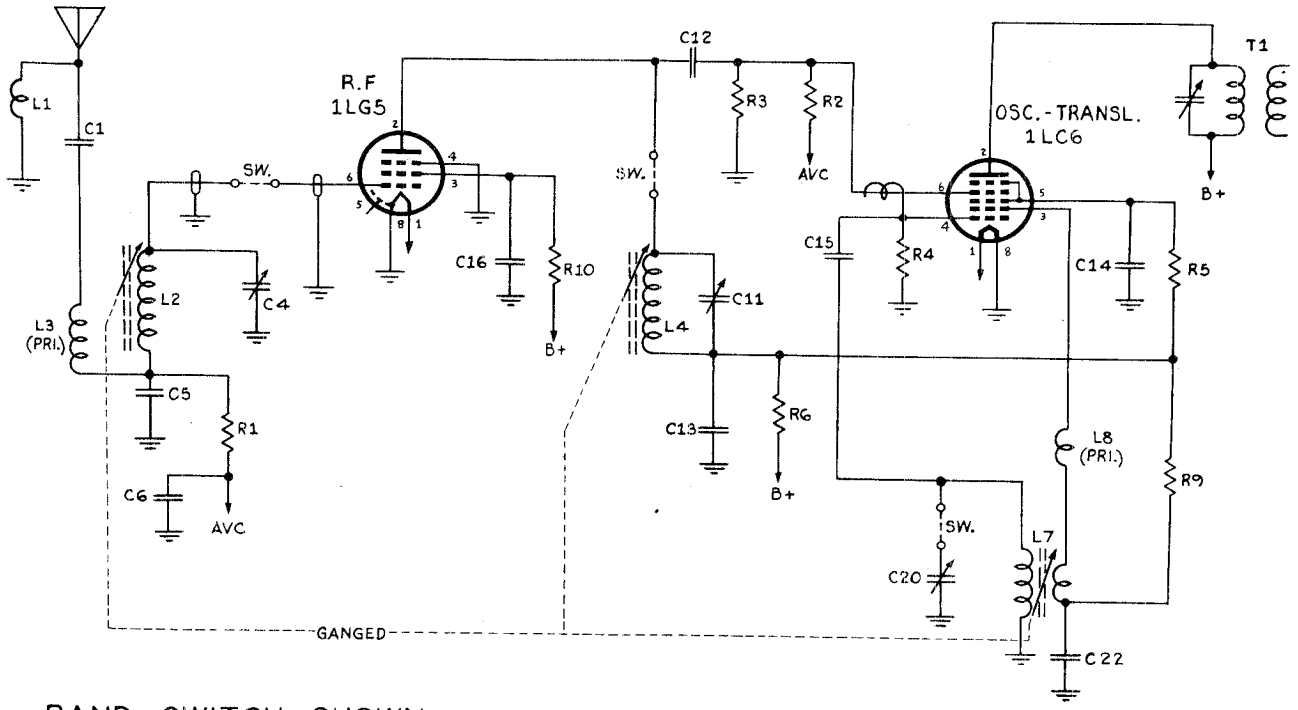
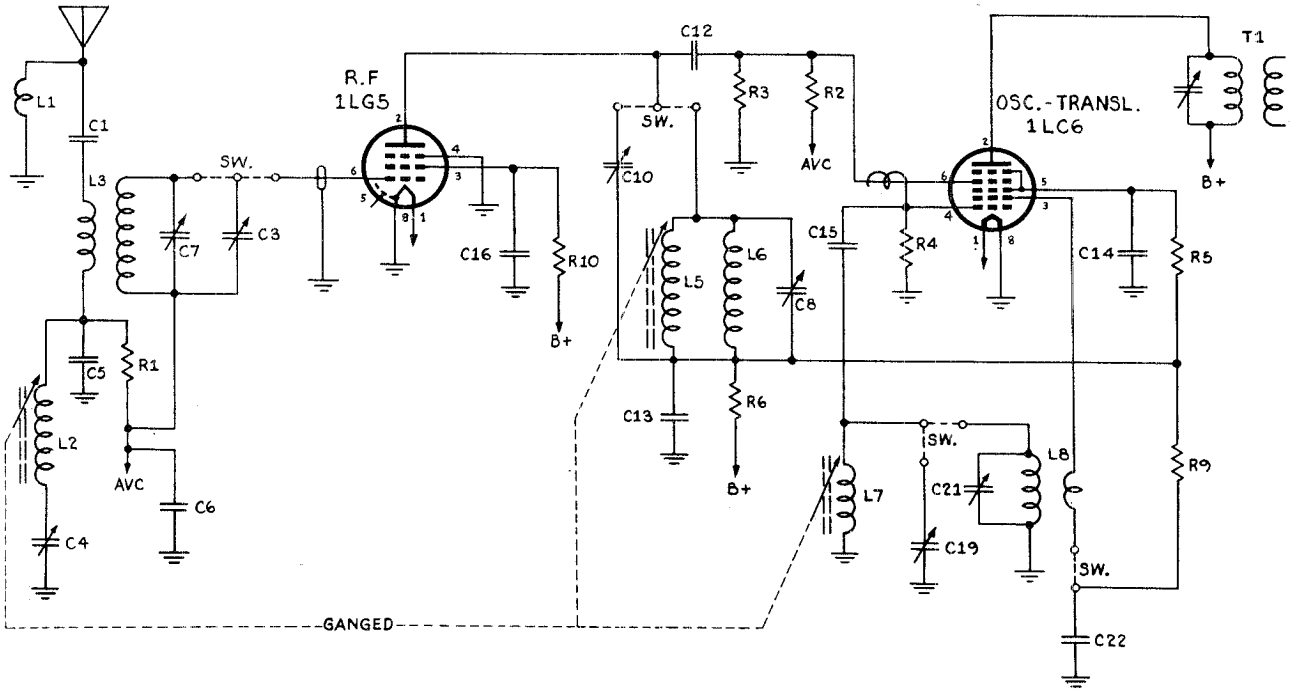
"clarified schematics"

MODEL 6230

SEARS ROEBUCK & CO.



BAND-SWITCH SHOWN
AT 1ST POSITION.
BROADCAST BAND
540 - 1700 KC.



BAND-SWITCH SHOWN
AT 2ND POSITION.
9 MC. SPREAD BAND
9.4 - 9.7 MC.

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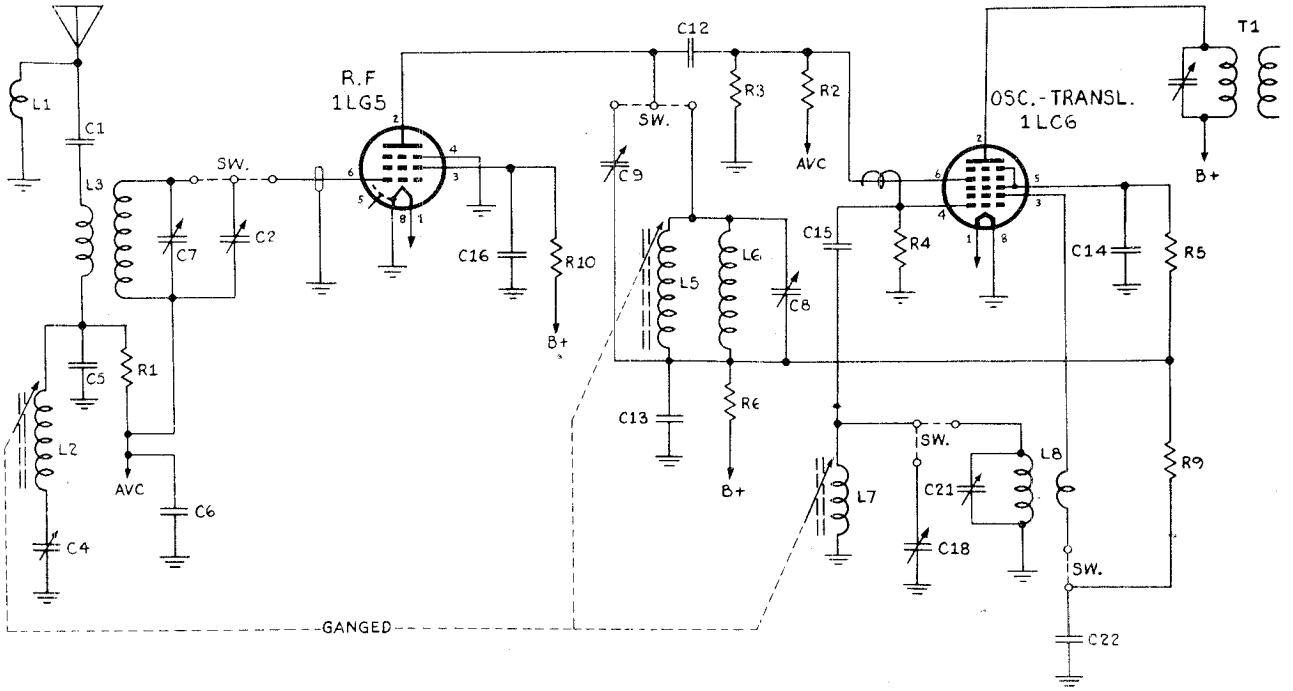
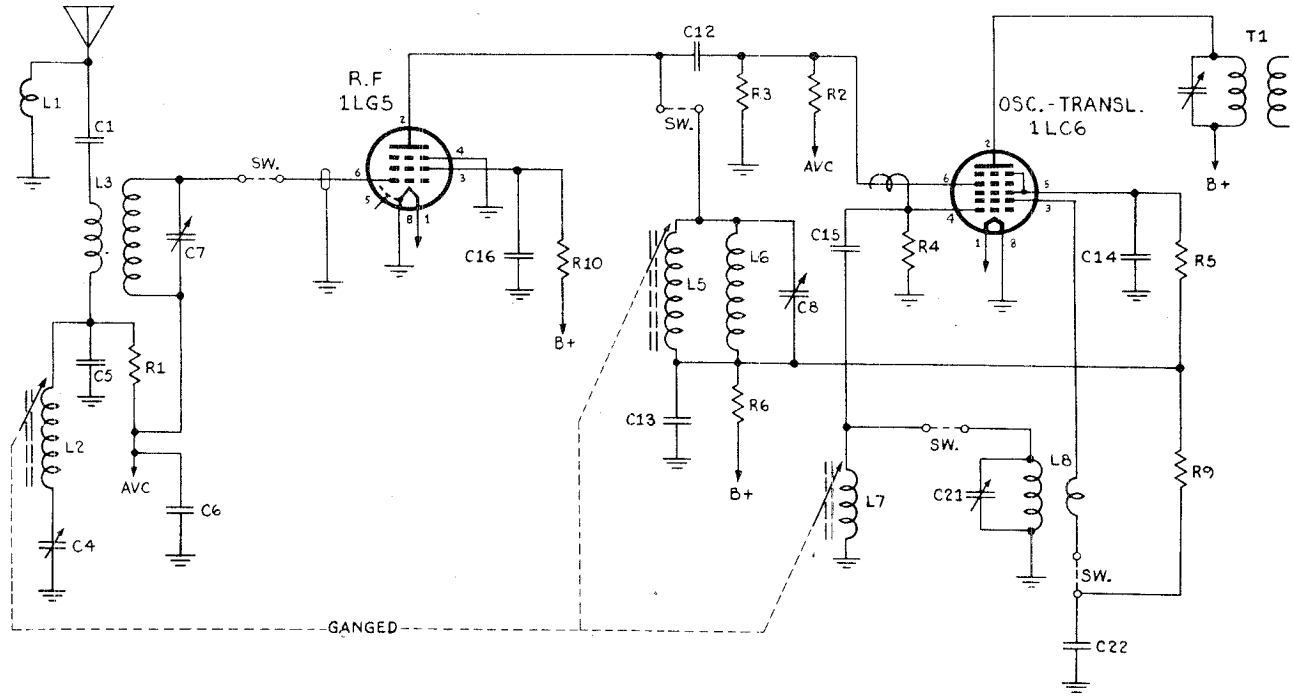


BAND-SWITCH SHOWN
AT 3RD POSITION
11 MC. SPREAD BAND
11.6 - 12.0 MC.



BAND-SWITCH SHOWN
AT 4TH POSITION
15 MC. SPREAD BAND
15.0 - 15.5 MC.

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MODEL 6230
Ch.101.802

SEARS ROEBUCK & CO.

ALIGNMENT PROCEDURE

PRELIMINARY:

Output meter connection.....Across loud speaker voice coil
Output meter reading to indicate 50 milliwatts (standard output).....0.4 Volts
Generator ground lead connection.....Receiver chassis
Dummy antenna value to be in series with generator output.....See chart below
Connection of generator output lead.....See chart below
Generator Modulation.....30%, 400 cycles
Position of Volume Control.....Fully on (Clockwise)
Position of Tone Control.....Hi (Counter-clockwise)
Position of dial pointer with tuner fully closed.....Last line to the left of the 540 Kc. calibration mark

Last line to the right of the 1700 Kc. calibration mark shall be considered 1725 Kc.

BAND SWITCH POSITION	POSITION OF TUNER	GENERATOR FREQUENCY	DUMMY ANTENNA	GENERATOR CONNECTION	ADJUSTMENTS (IN ORDER SHOWN)	FUNCTION
BC	Closed	455 Kc	0.1 mfd.	1LC6 Transl. Grid	T2, T1	IF
BC	1725	1725 Kc	.000075 mfd.	Ant. Terminal	C20	Oscillator
BC	1725	1725 Kc	.000075 mfd.	Ant. Terminal	C4, C11	Ant., RF
BC	1500	1500 Kc	.000075 mfd.	Ant. Terminal	L7	Oscillator Core
BC	1500	1500 Kc	.000075 mfd.	Ant. Terminal	L2, L4	Ant., RF Cores
15 Mc	15.2	15.2 Mc	400 ohms	Ant. Terminal	C21	Oscillator
15 Mc	15.2	15.2 Mc	400 ohms	Ant. Terminal	C7, C8	Ant., RF
11 Mc	11.8	11.8 Mc	400 ohms	Ant. Terminal	C18	Oscillator
11 Mc	11.8	11.8 Mc	400 ohms	Ant. Terminal	C2, C9	Ant., RF
9 Mc	9.6	9.6 Mc	400 ohms	Ant. Terminal	C19	Oscillator
9 Mc	9.6	9.6 Mc	400 ohms	Ant. Terminal	C3, C10	Ant., RF

IMPORTANT ALIGNMENT NOTES

Before attempting short-wave alignment the L5 core should be adjusted to a dimension of approximately 1-21/32" from the top core to the top turn of the winding. This should be done with the tuner in the 1725 Kc. position.

During alignment of the Antenna and RF trimmers on the shortwave spread bands the tuner should be rocked through resonance to assure alignment.

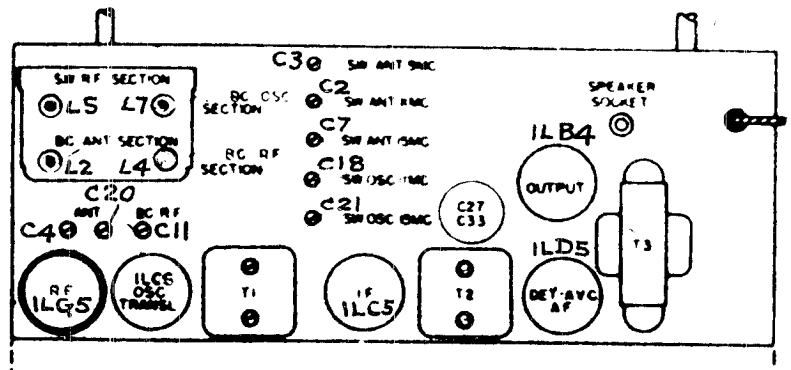
The alignment must be done in the order given. Adjust all trimmers and cores for maximum output.

The antenna alignment procedure should be repeated step by step in the original order for greatest accuracy.

Always keep the output power rrom the generator at its lowest possible value to prevent the AVC action of the receiver from interfering with accurate alignment.

Power Output — Undistorted 0.125 Watts — Maximum 0.250 Watts

SCHEMATIC LOCATION	PART NUMBER	DESCRIPTION
	R57145	Antenna-Stratobeam Receptor Kit Complete
	R57037	Board-Antenna
	R13961	Button-Snap
	R57045	Cable-Battery
C13,C14,C16 C22,C26		Capacitor-.01 mfd. 200 V.
C6,C28		Capacitor-.05 mfd. 200 V.
C25,C32		Capacitor-.001 mfd. 600 V.
C29		Capacitor-.005 mfd. 400 V.
C15,C30		Capacitor-Mica-50 mmfd.
C12		Capacitor-Mica-100 mmfd.
C1		Capacitor-Mica-150 mmfd.
C31		Capacitor-Mica-250 mmfd.
C5		Capacitor-Silver Mica 250 mmfd.-500 V.
C27,C33	R57126	Capacitor-Dry. Elect. 10X10 mfd. 150 V.
C19 C8,C9	R57080	Capacitor-Trim.-Single
C10 C4,C11	R57020	Capacitor-Trim.-3 Gang
C20	R57081	Capacitor-Trim.-3 Gang
C2,C3,C7 C18,C21	R57082	Capacitor-Trim.-5 Gang
	R57010	Clip-Drive Cord Anchor
L3	R45074	Coil-Antenna-S.W. Shunt
L1	R45255	Coil-Choke-Antenna
L8	R57078	Coil-Osc.-S.W. Shunt
L6	R45077	Coil-R.F.-S.W. Shunt
R13	R57071	Control-On-Off, Vol. & Tone
	R45218	Cover-Dial
	R57086	Dial-Station
	R57150	Knob-On-Off Ind. & Vol.
	R57153	Knob-Tone Control
	R57028	Shaft-Pointer Drive
	R57049	Socket-Tube-8 Prong Lock-in
	R57062	Speaker-5-1/4" P.M.
	R57118	Spring-Extension
	R40241	String-Drive
	R57038	Switch-Slide Type D.P.S.T.
	R57064	Switch-Wave
T1	R57120	Transformer - I.F. #1
T2	R57095	Transformer - I.F. #2
T3	R57075	Transformer - Output
L2,L4	R57089	Tuner-Permeability Coil Unit
L5,L7		



LOCATION OF PARTS ON TOP OF CHASSIS

R20		Resistor 680 ohms 1/3 W.
R6		Resistor 680 ohms 1/3 W.
R18		Resistor 820 ohms 1/3 W.
R19		Resistor 1800 ohms 1/3 W.
R9		Resistor 33000 ohms 1/3 W.
R5		Resistor 68000 ohms 1/3 W.
R10		Resistor 68000 ohms 1/3 W.
R4		Resistor 180000 ohms 1/3 W.
R1,R3,R15		Resistor 1.0 meg. 1/3 W.
R8,R17		Resistor 2.2 meg. 1/3 W.
R2		Resistor 3.3 meg. 1/3 W.
R14		Resistor 6.8 meg. 1/3 W.
R12		Resistor 15 meg. 1/3 W.
R16	R45254	Resistor-Flexohm-0.72 ohm 1/2 W.

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MODEL 6685
Ch.139.150

SEARS ROEBUCK & CO.

Power Shifter

"A" SUPPLY

The "A" supply is obtained from a full wave copper sulphide rectifier filtered by a condenser input filter consisting of three condensers and two low resistance chokes. A tap on the power transformer allows the voltage on the rectifier to be changed giving two "A" load voltages. Terminal voltages for various loads are indicated on the wiring diagram.

"B" SUPPLY

The "B" supply employs a 6J5GT tube operated as a half wave rectifier operating into a condenser input filter of one choke followed by another condenser.

The "A" and "B" circuits are not common to each other or to the chassis. Different tube biasing methods make this necessary.

POWER DRAIN

When the "A" voltage is excessively low the rectifier, condensers or transformer may be defective. To check the transformer remove one lead of transformer winding from the rectifier and measure for A.C. voltage indicated on the wiring diagram. To check the rectifier remove the plus lead from the choke L2 and condenser C2. Also disconnect one side of jumper wire and measure D.C. voltage across the rectifier. This should be 1.4 to 1.5 volts with the tap changer tie block in the 4-5 tube position.

"B" SUPPLY FAILS

The 6J5GT tube should be tested with a standard tube tester. The transformer may be tested by measuring the A.C. voltage across the secondary plate winding with the tube removed.

EXCESSIVE HUM

When excessive hum is noticed in the radio it may be due to the "A" supply or the "B" supply. The hum will be very loud when the input condenser C2 opens in service and this open condenser will cause the output voltage to drop to 1.35 volts without load (4-5 tube position). The hum will be somewhat less in volume if the second section or output condenser has opened and this will not change the output voltage.

When the hum is caused by the "B" supply, the condensers of this filter circuit have probably opened. If the input condenser has opened the output voltage will drop to approximately 110 volts without load. Less hum is caused when the output condenser opens and the output voltage is not changed.

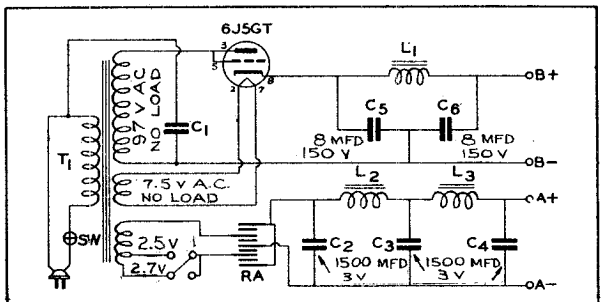
To determine whether the hum is introduced by the "A" supply or the "B" supply, batteries may be substituted for each separate supply while one circuit is being tested.

IMPORTANT - READ CAREFULLY

The "A" supply of this power unit is supplied through a dry disc rectifier. If the radio ceases to operate or drops off in performance, it may be due to a chemical change in this rectifier. This may cause the "A" voltage to drop low enough to affect the performance of the receiver.

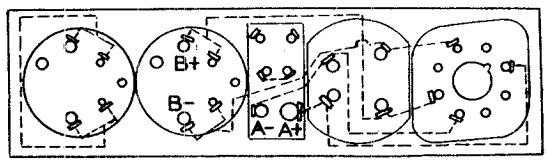
To reactivate the rectifier it is only necessary to short (connect together) the "A" plus and "A" minus of plug or terminals of socket for a period of 4 minutes. The high temperature developed in the rectifier during this period has the tendency to restore the discs to their normal rectifying capacity. The unit will not be harmed by this process.

This deactivated condition is more likely to occur in the rectifier when the power unit has been out of service for some length of time (4 months or more).



	"A" OUTPUT	"B" OUTPUT
4-5 Tube	1.50 V at 200 Ma. 1.35 V at 250 Ma.	90 V at 13 Ma. 101 V at 8.5Ma.
6 Tube	1.55 V at 300 Ma. 1.35 V at 350 Ma.	138 V at 0 Ma.

CIRCUIT DIAGRAM



WIRING DIAGRAM OF SOCKET ASSEMBLY (Back)

Schematic Location	Part No.	Description
C1	J 1060	Line Condenser .01 mfd 400 volt
C2 C3 C4	J 2036	"A" Filter Condenser 1500 mfd 3 Volt
C5 C6	J 2037	"B" Filter Condenser 8 X 8 mfd 150 volt
L1	J 1061	"B" Choke
L2 L3	J 1435	"A" Choke
RA	J 2933	Rectifier
SW	J 5538	Line Cord, Switch and Plug
T1	J 1059	Power Transformer
—	J 1841	Combination Panel Socket
—	J 1062	Tube Socket
—	J 5442	Tap Changer Plug

JUNE 17, 1946

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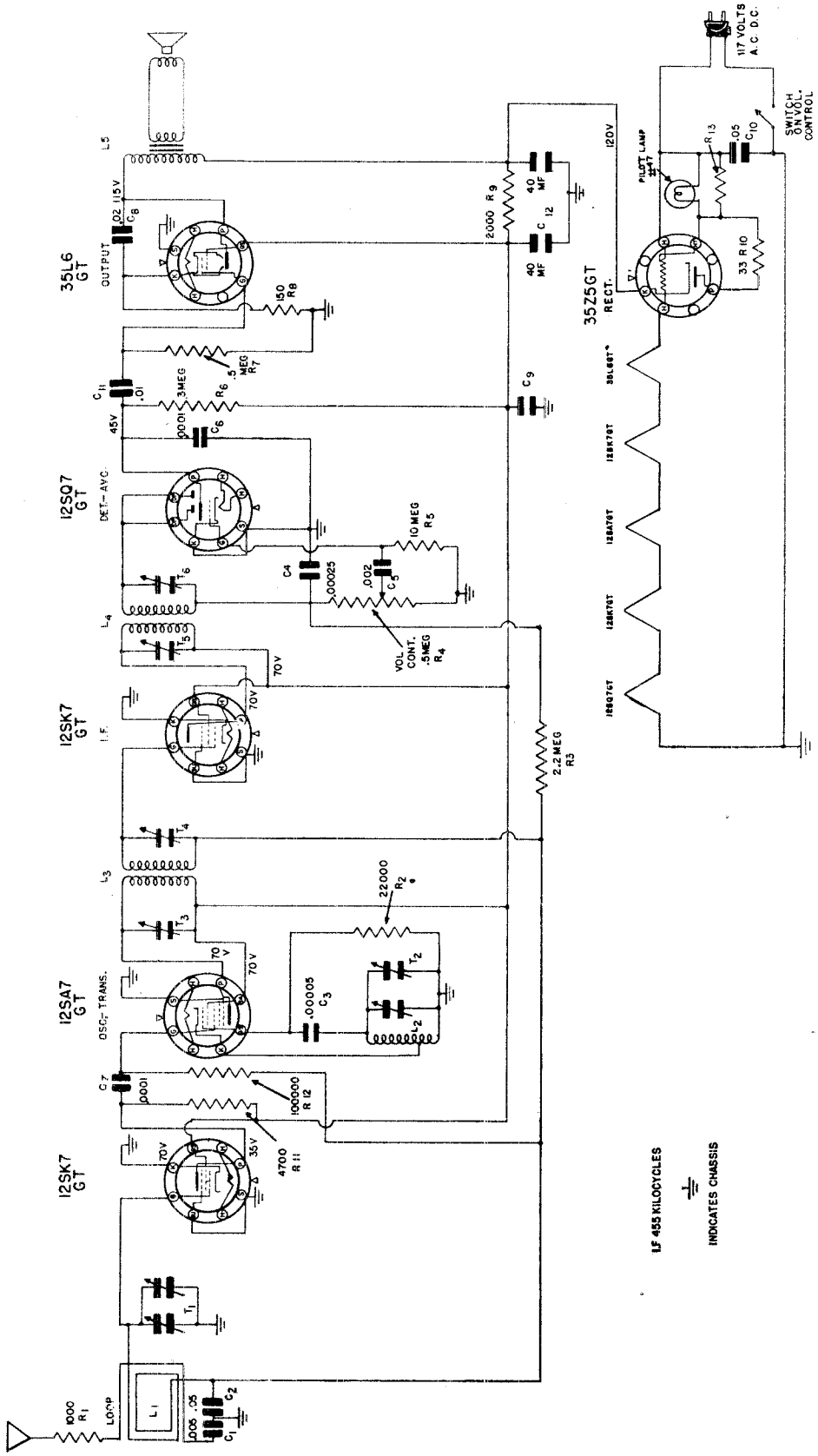
CHASSIS 110.451

SEARS ROEBUCK & CO.



DIAL LAMP:

A six volt bayonet dial lamp No. 47 is used in this receiver. The dial lamp may be removed for replacement by gently squeezing the dial lamp socket mounting bracket and withdrawing from the dial assembly. Replace the lamp with another of the same type. DISCONNECT THE RECEIVER FROM THE ELECTRICAL OUTLET BEFORE REPLACING THE LAMP.

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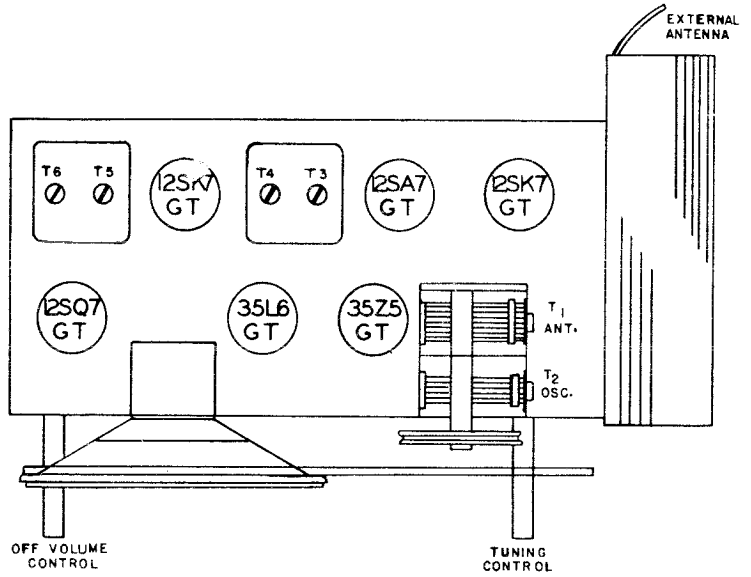
Location Schematic	Part Number	DESCRIPTION
	A62163	Back cover
L1	A28147	Coil—loop
L2	A28133	Coil—oscillator
C1		Condenser—.005, .01, 400 volts
C2		Condenser—.05, 200 volts
C3		Condenser—.00005, mica
C4		Condenser—.00025, mica
C5		Condenser—.002, 400 volts
C6, C7		Condenser—.0001, mica
C8		Condenser—.02, 400 volts
C9		Condenser—.2-.3, 200 volts
C10		Condenser—.05, 400 volts
C11		Condenser—.01, 400 volts
C12	A2065	Condenser—electrolytic, 40 mfd. 40 mfd, 150 volts
R4	A2463	Control—volume, with switch (S.P.S.T.) .5 megohm
	A5559	Cord—power
	A4640	Dial—drive assembly
	A1851	Dial—lamp socket
	A4137	Dial—pointer
	A4574	Dial—pointer drive cord
	A4633	Dial—pointer drive spring
	A4087-A	Dial—scale (glass)
	A39125	Knob—off-volume
	A39126	Knob—tune
	A59235	Leaflet—instruction
R1		Resistor—1000 ohms, 1/4 watt
R2		Resistor—22,000 ohms, 1/4 watt
R3		Resistor—2.2 megohms, 1/4 watt
R5		Resistor—10 megohms, 1/4 watt
R6		Resistor—330,000 ohms, 1/4 watt
R7		Resistor—500,000 ohms, 1/4 watt
R8		Resistor—150 ohms, 1/2 watt
R9		Resistor—2000 ohms, 2 watt, carbon
R10		Resistor—33 ohms, 1/4 watt
R11		Resistor—4700 ohms, 1/4 watt
R12		Resistor—100,000 ohms, 1/4 watt
R13		Resistor—200-400 ohms, 1/2 watt
	A5855	Speaker—5"
L5	A1322	Transformer—audio output
L3	A3329	Transformer—I.F. input
L4	A3529	Transformer—I.F. output
		Variable Condenser



Output meter connections	Across primary output transformer
Connection of generator ground	Chassis
Generator modulation	App. 30% @ 400 cycles
Position of volume control	Fully Clockwise

POSITION OF DIAL POINTER	GENERATOR FREQUENCY	GENERATOR CONNECTION	TRIMMERS ADJUSTED	TRIMMER FUNCTION
540 kc	455 kc	12SA7GT	T3, T4, T5, T6	I. F.
1500 kc	1500 kc	* * *	T2, T1	Osc., R. F.

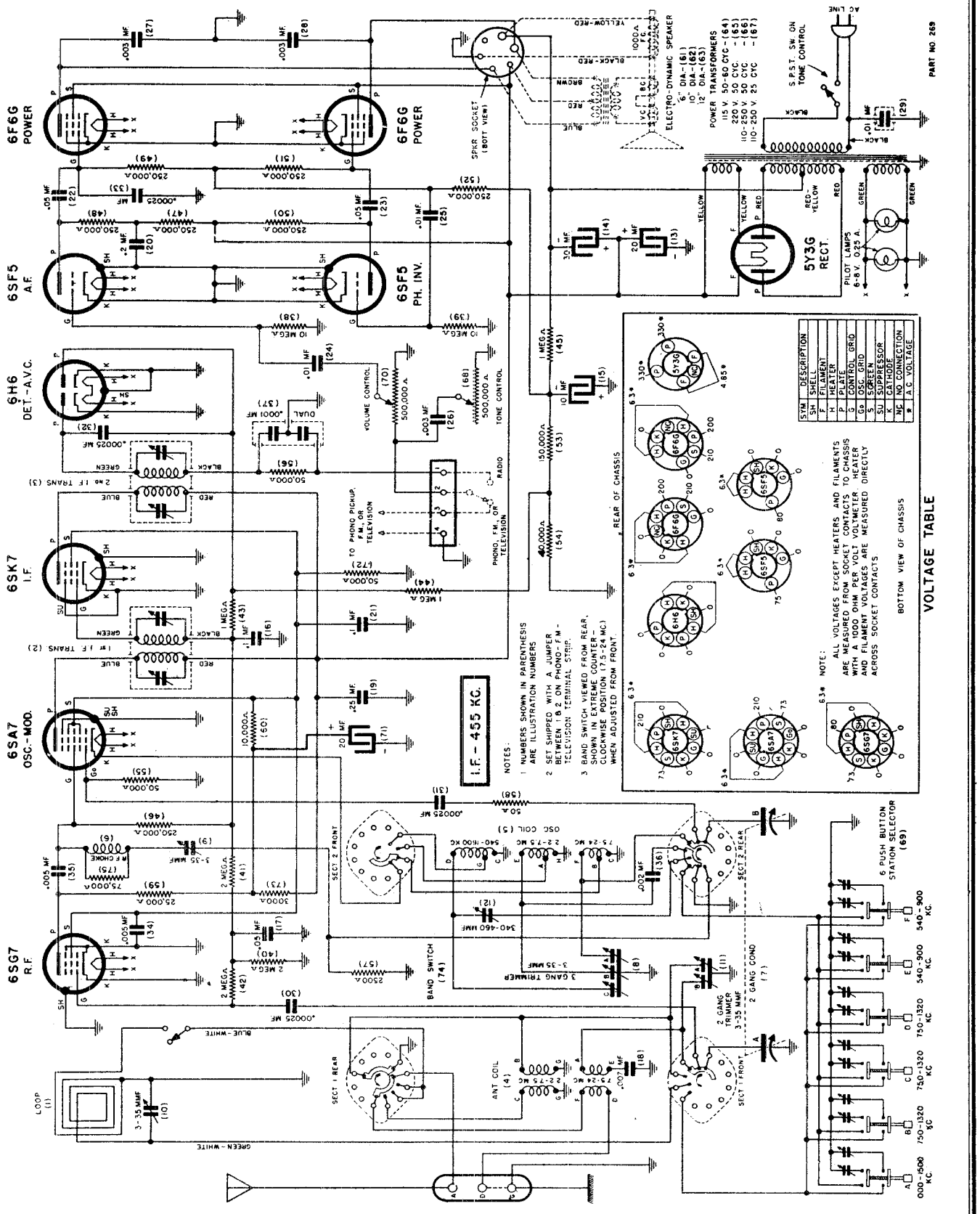
It is advisable to repeat the entire alignment procedure in the original order to insure greater accuracy.

Always keep the output from the test oscillator at its lowest possible value. As the sensitivity is increased by alignment, the generator output should be reduced correspondingly.

***Run a wire from the output terminal of the generator near the receiver. However, no connection is made between the signal generator and the receiver.

MODELS 269T, 269C, 269F

SENTINEL RADIO CORP.



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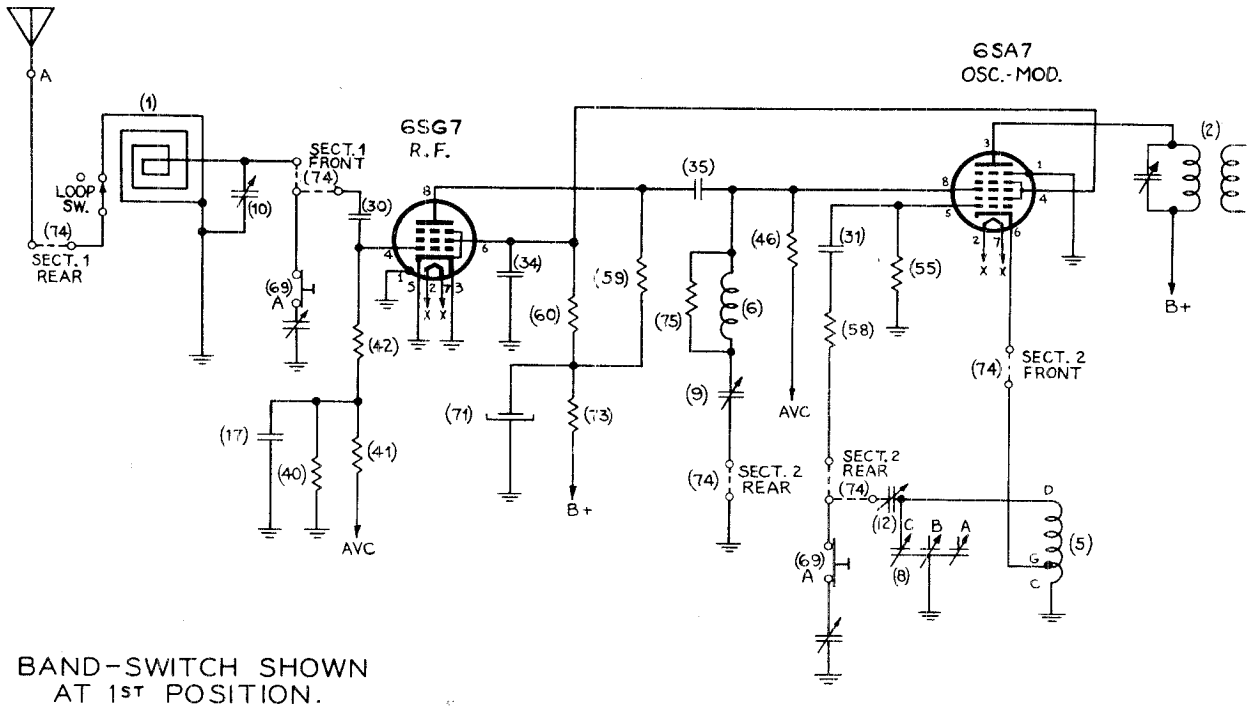
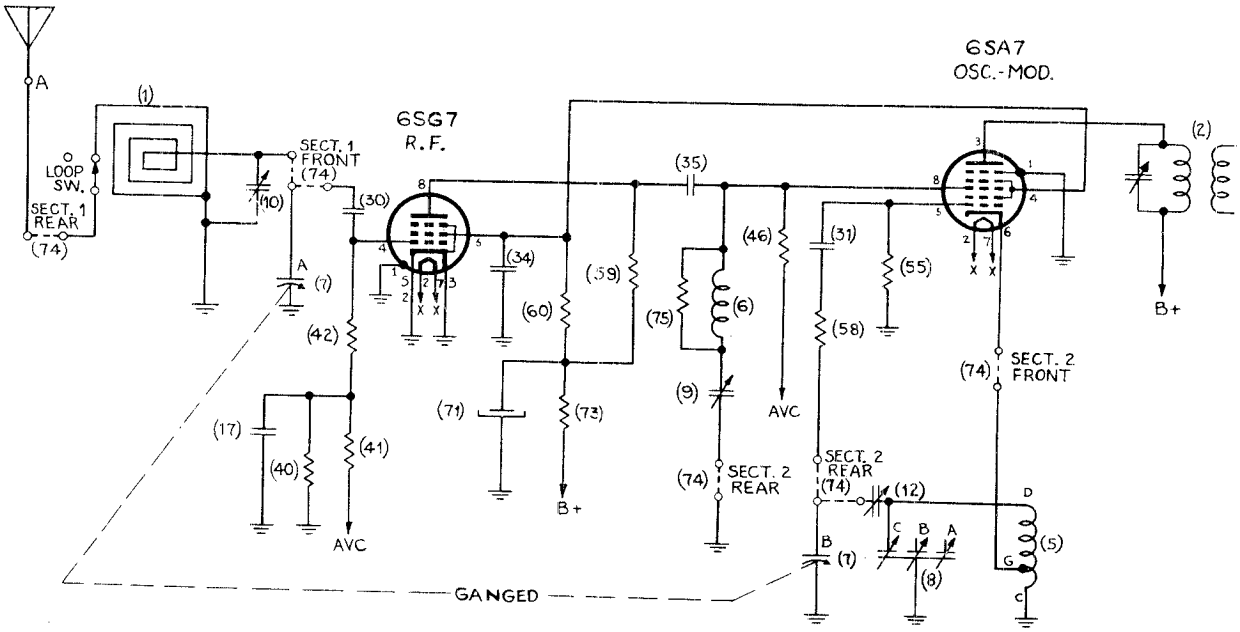
"clarified schematics"

MODELS 269T, 269C, 269F

SENTINEL RADIO CORP.



BAND-SWITCH SHOWN AT 1ST POSITION.
PUSH BUTTON TUNING
BUTTON 'A' DEPRESSED
1000-1500 KC



BAND-SWITCH SHOWN AT 2ND POSITION COUNTERCLOCKWISE
BROADCAST BAND
540-1600 KC.

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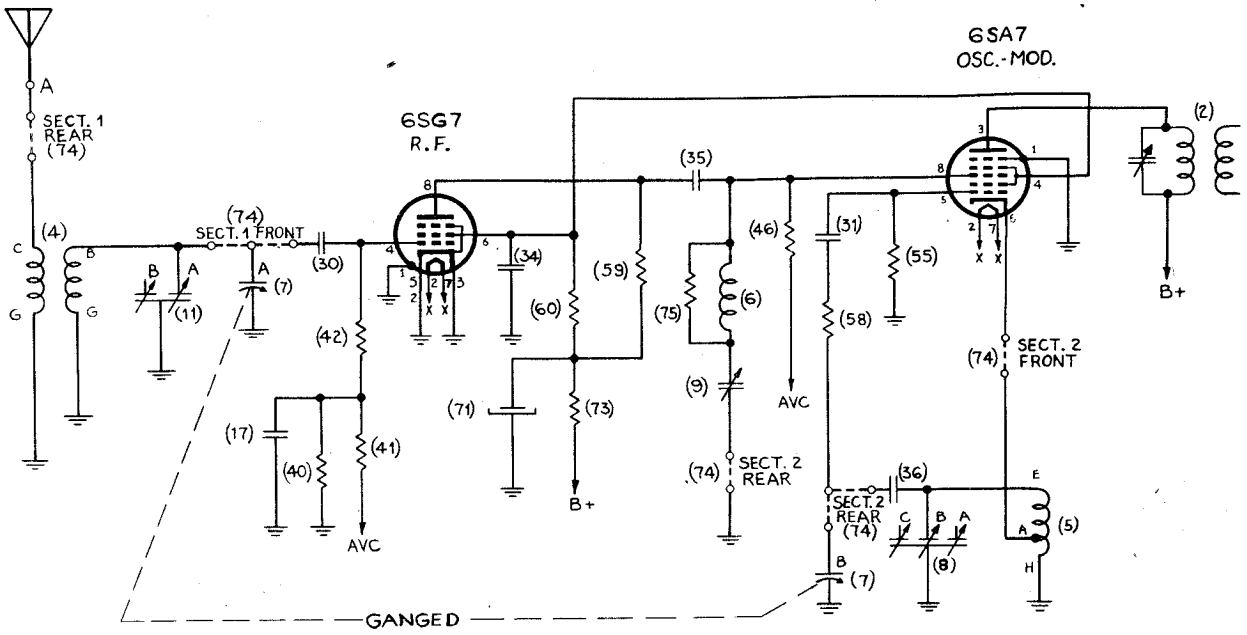
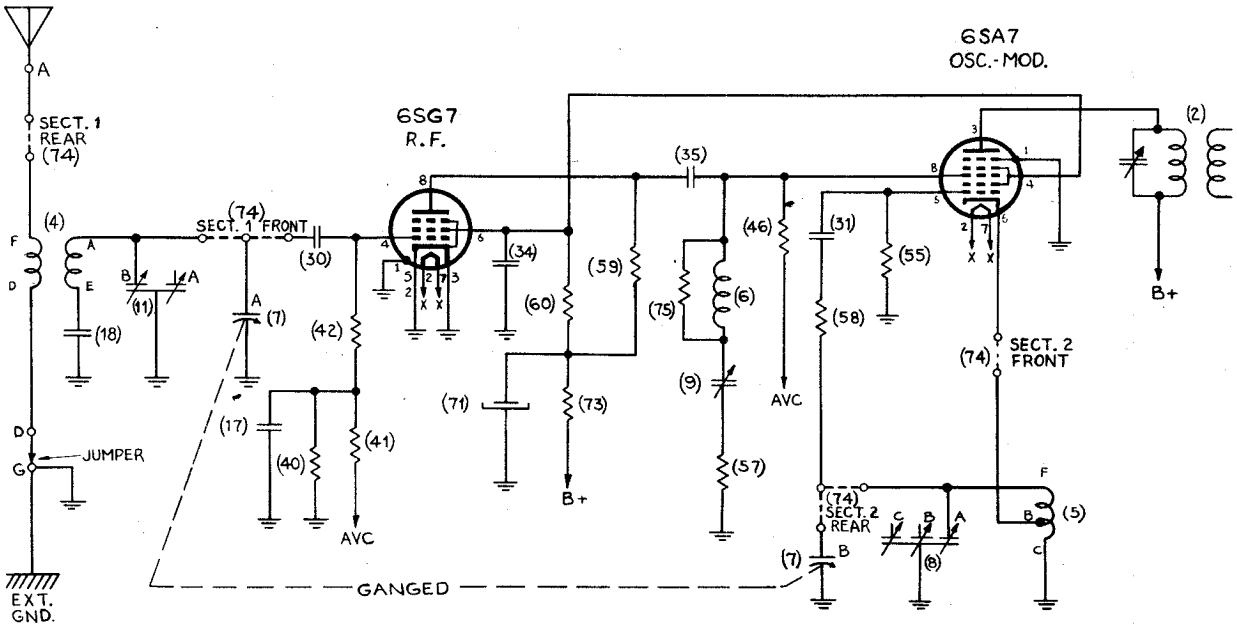
MODELS 269T, 269C, 269F

SENTINEL RADIO CORP.



BAND-SWITCH SHOWN
AT 3RD POSITION COUNTERCLOCKWISE
SHORT WAVE BAND
2.2 - 7.5 MC.



BAND-SWITCH SHOWN
AT 4TH POSITION COUNTERCLOCKWISE
SHORT WAVE BAND
7.5 - 24 MC.

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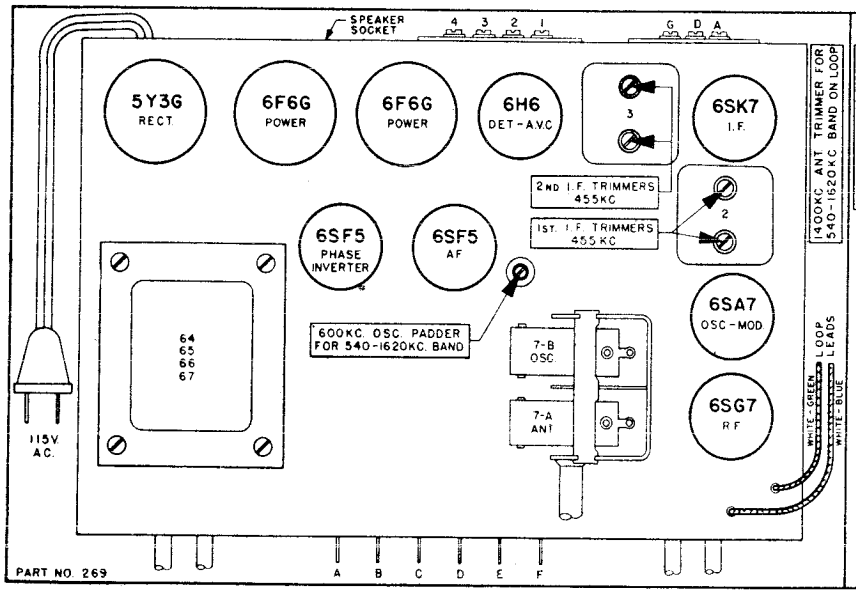
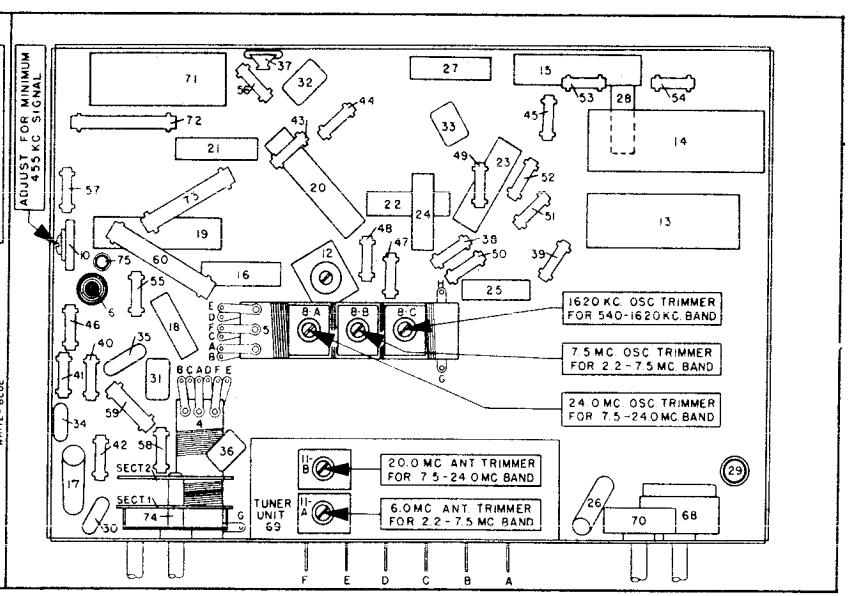
ALIGNMENT PROCEDURE

For alignment procedure read tabulations from left to right. If more than one adjustment is required on any one band, make the adjustment marked (1) first, (2) next, (3) third. IMPORTANT: BEFORE ALIGNING, PLACE LOOP ANTENNA IN THE SAME POSITION IT WILL BE IN WHEN THE SET IS IN THE CABINET.

When adjusting 1620 kilocycle oscillator trimmer 600 K.C. padder, 455 K.C. R.F. trimmer and 1400 kilocycle antenna trimmer, do not connect test oscillator to loop. Couple test oscillator to receiver loop by: (a) Make a loop consisting of five to ten turns of No. 20 to 30 size wire wound on a three inch form and attach across output of test oscillator. (b) Place test oscillator loop near set loop—BE SURE THAT NEITHER MOVES WHILE ALIGNING.

Place band switch for operation on:	Set receiver dial to:	TEST OSCILLATOR: Adjust test oscillator frequency to:	TEST OSCILLATOR: Use dummy antenna in series with output of test oscillator consisting of:	TEST OSCILLATOR: Attach output of test oscillator to:	Refer to parts layout diagram for location of trimmers mentioned below:
I. F. alignment use any band position.	Any point where no interfering signal is received	Exactly 455 K.C.	0.2 Mfd. condenser	High side to grid of 6SA7 tube. Low side to frame of gang condenser.	Adjust each of the second I.F. transformer trimmers for maximum output, then adjust each of the first I.F. transformer trimmers for maximum output.
1620 to 540 K.C. Band	1 Rotate gang condenser to Maximum Capacity	Exactly 455 K.C.	None	Use Small Loop to couple test oscillator to receiver loop. Low side to frame of condenser.	Adjust R.F. coil for minimum 455 K.C. signal.
	2 Exactly 1620 K.C.	Exactly 1620 K.C.	None	Use Small Loop to couple test oscillator to receiver loop. Low side to frame of condenser.	Adjust 1620 K. C. oscillator trimmer for maximum output.
	3 Approx. 1400 K.C.	Approx. 1400 K.C.	None	Use Small Loop to couple test oscillator to receiver loop. Low side to frame of condenser.	While rocking gang condenser adjust 1400 K. C. loop trimmer for maximum output.
	4 Approx. 600 K.C.	Approx. 600 K.C.	None	Use Small Loop to couple test oscillator to receiver loop. Low side to frame of condenser.	While rocking gang condenser adjust 600 K. C. oscillator padder for maximum output.
2.2 to 7.5 M.C. Band	1 Exactly 7.5 M.C.	Exactly 7.5 M.C.	400 Ohm carbon resistor	Receiver antenna "A" post	Adjust 7.5 M. C. oscillator trimmer for maximum output.
	2 Approx. 6. M.C.	Approx. 6. M.C.	400 Ohm carbon resistor	Receiver antenna "A" post	While rocking gang condenser adjust 6 M. C. antenna trimmer for maximum output.
7.5 to 24 M.C. Band	1 Exactly 24 M.C.	Exactly 24 M.C.	400 Ohm carbon resistor	Receiver antenna "A" post	Adjust 24 M. C. oscillator trimmer for maximum output.
	2 Approx. 20 M.C.	Approx. 20 M.C.	400 Ohm carbon resistor	Receiver antenna "A" post	While rocking gang condenser adjust 20 M. C. antenna trimmer for maximum output.




1620 KC. OSC TRIMMER FOR 540-1620 KC. BAND
7.5 MC. OSC TRIMMER FOR 2.2-7.5 MC. BAND
24.0 MC. OSC TRIMMER FOR 7.5-24.0 MC. BAND
20.0 MC ANT TRIMMER FOR 7.5-24.0 MC. BAND
6.0 MC ANT. TRIMMER FOR 2.2-7.5 MC. BAND
TUNER UNIT 69
SECT 2
SECT 1
F E D C B A

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The loop aerial cannot be used for short wave reception. WHEN TUNING FOR SHORT WAVE 2.2-7.5 AND 7.5-24 M.C. BAND STATIONS, CONNECT A 25-50 FOOT OUTDOOR AERIAL TO THE RADIO.

THERE ARE THREE AERIAL & GROUND POSTS marked "A," "D," and "G" on the rear of the chassis. When the receiver is shipped from the factory a flexible wire is connected to post "D" and "G." When a straight aerial is used this wire should be left in this position and the aerial lead-in connected to the post marked "A."

When a doublet type antenna is used, remove the small piece of wire connecting "G" and "D" posts together and attach one of the doublet antenna lead-ins to "A" post and the other to "D" post.

The metal arm on loop need not be moved to "Ant" position as arm is inoperative when band selector switch is in 2.2-7.5 and 7.5-24 M.C. bands position.

REGARDLESS OF THE TYPE OF AERIAL USED ALWAYS HAVE A GOOD GROUND ATTACHED TO THE POST MARKED "G" ON REAR OF CHASSIS. A cold water pipe, steam radiator or an iron rod driven 3 or 4 feet into moist ground will provide a suitable ground.

PUSH BUTTON TUNING

SIX STATIONS OPERATING IN THE 1620-540 K.C. BAND MAY BE "AUTOMATIC PUSH BUTTON" TUNED BY PROPERLY SETTING THE 6 SETS OF TRIMMER SCREWS LOCATED UNDERNEATH PUSH BUTTON ESCUTCHEON ON FRONT OF CABINET.

As the push buttons are not preset at the factory for any definite stations, be sure to set them by:

(a) It is important to have the aerial, if an outdoor antenna is to be used, attached to the radio when adjusting the trimmers.

(b) BE SURE TO OPERATE THE RADIO AT LEAST ONE-HALF HOUR BEFORE ADJUSTING TRIMMERS. If set is not thoroughly warmed up when trimmers are adjusted, the trimmers may shift position after they do become warm, resulting in poor tone, weak signals and excessive background noise.

(c) Obtain the transmitter frequency—number of kilocycles—and call letters of the six stations you wish to "Push Button" tune. FOR BEST RESULTS SET PUSH BUTTONS FOR LOCAL OR STRONG NEAR-BY STATIONS ONLY.

(d) Remove push button escutcheon from front of cabinet by unscrewing small wood screws that hold this in place.

(e) Rotate band switch to the next to the maximum right hand position.

(f) Using manual tuning knob, carefully tune in to the point of clearest tone, one of the selected stations whose transmitter frequency is somewhere between 540 and 900 kilocycles.

(g) Rotate band switch knob to the maximum right hand position.

(h) Press in either one of the two push buttons indicated on label adjacent to trimmers marked 540 to 900 K.C. Note: Station signal will disappear, or may be distorted and in some instances another station may be heard.

(i) Using a screwdriver ADJUST THE LARGE 540 to 900 KILOCYCLE ADJUSTING SCREW, LOCATED ABOVE THE PUSH BUTTON THAT IS PUSHED IN—until the 540 to 900 kilocycle station that had been previously tuned in with the manual tuning knob, is heard with maximum volume and clearest tone. AFTER ADJUSTING THE LARGE SCREW CAREFULLY ADJUST THE SMALL SCREW DIRECTLY BELOW THE LARGE ONE FOR CLEAREST TONE AND MAXIMUM VOLUME.

(j) Remove the printed tab, having the call letters of the station tuned in, from the paper call letter sheet. Press this into the depression in the push button escutcheon that will be adjacent to the push button just adjusted when the escutcheon is remounted in place on the cabinet.

(k) Set other trimmers for selected stations operating between the frequency range of the trimmers, as indicated on the label.

IMPORTANT: THE WAVE SWITCH KNOB MUST BE IN THE MAXIMUM RIGHT HAND POSITION FOR PUSH BUTTON TUNING.

In some instances it may be necessary, after the set is operated for a period of time, to reset the trimmers as they may drift due to heat, humidity, etc.

THE FOLLOWING PARTS LIST, WIRING DIAGRAM AND ALIGNMENT CHARTS ARE INTENDED FOR USE BY PROFESSIONAL SERVICE MEN

If your radio should ever require attention, show this data to your service man . . . it will help him to make a faster and better adjustment.

PARTS LIST

Illus. No.	Part No.	Part Name	Description	List Price
1	13503	Antenna	Loop used with Table Model Cabinet	$1.25
1	13505	Antenna	Loop used with Console Model Cabinet	2.00
2	4404	Coil	First I.F. Transformer	1.20
3	13510	Coil	Second I.F. Transformer	1.00
4	13511	Coil	Antenna for 2.2-7.5 & 7.5-24 MC Band	.90
5	13513	Coil	Oscillator	.80
6	13370	Coil	R.F. Choke	.50
7	12392	Condenser	Tuning Two Gang with Pulley	2.00
8	3762	Condenser	Trimmer Three Gang	.47
9	11636	Condenser	Trimmer 3-35 MMF Working Range	.20
10	1597	Condenser	Trimmer 3-35 MMF Working Range	.21
11	13512	Condenser	Trimmer Two Gang	.30
12	3596	Condenser	Padding 340-460 Working Range	.44
13	13493	Condenser	Tubular Dry Elec. 20 Mfd. 450 Volt	.80
14	13494	Condenser	Tubular Dry Elec. 30 Mfd. 450 Volt	.90
15	1693	Condenser	Tubular Dry Elec. 10 Mfd. 25 Volt	.75
16	10076	Condenser	Tubular .1 Mfd. 200 Volt	.20
17	10077	Condenser	Tubular .05 Mfd. 200 Volt	.19
18	10078	Condenser	Tubular .007 Mfd. 200 Volt + or — 10%	.19
19	11766	Condenser	Tubular .25 Mfd. 400 Volt	.25
20	10098	Condenser	Tubular .2 Mfd. 400 Volt	.19
21	10082	Condenser	Tubular .1 Mfd. 400 Volt	.20
22	10083	Condenser	Tubular .05 Mfd. 400 Volt	.18
23	10083	Condenser	Tubular .05 Mfd. 400 Volt	.18
24	10088	Condenser	Tubular .01 Mfd. 400 Volt	.17
25	10088	Condenser	Tubular .01 Mfd. 400 Volt	.17
26	10084	Condenser	Tubular .003 Mfd. 400 Volt	.17
27	10085	Condenser	Tubular .003 Mfd. 600 Volt	.21
28	10085	Condenser	Tubular .003 Mfd. 600 Volt	.21
29	4305	Condenser	Tubular .01 Mfd. 220 Volt	.30
30	9458	Condenser	Mica .00025 Mfd.	.21
31	9458	Condenser	Mica .00025 Mfd.	.21
32	9458	Condenser	Mica .00025 Mfd.	.21
33	9458	Condenser	Mica .00025 Mfd.	.21
34	10892	Condenser	Mica .005 Mfd. + or — 3%	.30
35	10892	Condenser	Mica .005 Mfd. + or — 3%	.30
36	1440	Condenser	Mica .002 Mfd. + or — 3%	.30
37	10217	Condenser	Mica Dual .0001 Mfd.	.21
38	4804	Resistor	Carbon 10 Meg Ohm 1/3 Watt	.19
39	4804	Resistor	Carbon 10 Meg Ohm 1/3 Watt	.19
40	2705	Resistor	Carbon 2 Meg Ohm 1/3 Watt	.19
41	2705	Resistor	Carbon 2 Meg Ohm 1/3 Watt	.19
42	2705	Resistor	Carbon 2 Meg Ohm 1/3 Watt	.19
43	7998	Resistor	Carbon 1 Meg Ohm 1/3 Watt	.19
44	7998	Resistor	Carbon 1 Meg Ohm 1/3 Watt	.19
45	7998	Resistor	Carbon 1 Meg Ohm 1/3 Watt	.19
46	8906	Resistor	Carbon 250,000 Ohm 1/3 Watt	.19
47	8906	Resistor	Carbon 250,000 Ohm 1/3 Watt	.19
48	8906	Resistor	Carbon 250,000 Ohm 1/3 Watt	.19
49	8906	Resistor	Carbon 250,000 Ohm 1/3 Watt	.19
50	8906	Resistor	Carbon 250,000 Ohm 1/3 Watt	.19
51	8906	Resistor	Carbon 250,000 Ohm 1/3 Watt	.19
52	8906	Resistor	Carbon 250,000 Ohm 1/3 Watt	.19
53	3418	Resistor	Carbon 150,000 Ohm 1/3 Watt	.19
54	10992	Resistor	Carbon 60,000 Ohm 1/3 Watt	.19
55	6879	Resistor	Carbon 50,000 Ohm 1/3 Watt	.19
56	6879	Resistor	Carbon 50,000 Ohm 1/3 Watt	.19
57	2437	Resistor	Carbon 2500 Ohm 1/3 Watt	.19
58	3706	Resistor	Carbon 50 Ohm 1/3 Watt	.19
59	9346	Resistor	Carbon 25,000 Ohm ½ Watt	.19
60	13532	Resistor	Carbon 10,000 Ohm 3 Watt	.25
61	13498	Speaker	E.D. 6" used with Table Model Cabinet	4.50
62	13499	Speaker	E.D. 10" used with Console Model Cabinet	6.75
63	13578	Speaker	E.D. 12" used with Console Combination Model	
64	11436	Transformer	Power 115 Volt 50/60 Cycle	3.50
65	11437	Transformer	Power 220 Volt 50 Cycle	4.25
66	11438	Transformer	Power 110-250 Volt 50 Cycle	6.75
67	11439	Transformer	Power 110-250 Volt 25 Cycle	8.75
68	12350	Tone Control	With S.P.S.T. Switch	.75
69	13560	Tuning Unit	Six Button Trimmer Assembly	4.00
70	12132	Volume Control		.55
71	13491	Condenser	Tubular Dry Elec. 20 Mfd. 350 Volt	.70
72	6787	Resistor	Carbon 50,000 Ohm 1 Watt	.19
73	13593	Resistor	Carbon 3,000 Ohm 1½ Watt	.22
74	13531	Switch	Wave	1.10
75	3524	Resistor	Carbon 75,000 Ohm 1/3 Watt	.19

MISCELLANEOUS PARTS

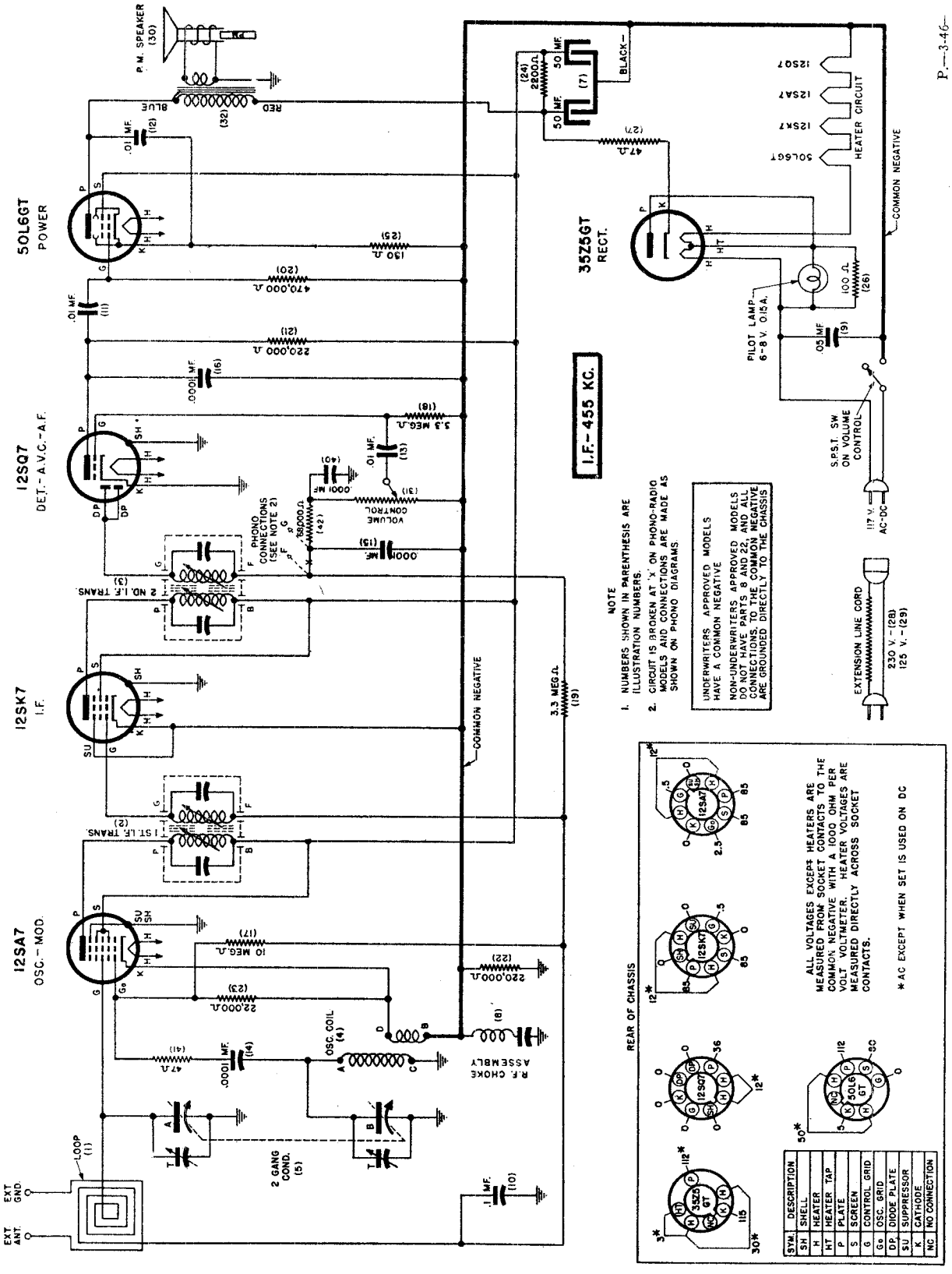
Illus. No.	Part No.	Part Name	Description	List Price
	10292	Bulb	Dial Light 6.8 Volt 250 Amp. No. 44	$0.10
	8184	Dial Cord	32" of 18 lb. Drive Cord	.20
	13476	Dial Shaft	Drive Shaft Assembly with Bearing	.35
	11693	Dial Spring	Cord Tension Spring	.04
	13516	Dial Scale	Calibrated Glass Scale	.75
	12647	Dial Pointer	Slide Rule for Dial	.15
	13520	Escutcheon	Less Clear Glass for Dial	1.25
	13521	Escutcheon	For Pushbuttons	.50
	13533	Escutcheon Glass	Clear Glass for Dial Escutcheon	.15
	12764	Knob	Marked "Band Switch"	.15
	12760	Knob	Marked "Tuning"	.15
	12763	Knob	Marked "Off-on-Tone"	.15
	12761	Knob	Marked "Volume"	.15
	12854	Knob	Pushbutton	.08

PRICES ARE SUBJECT TO CHANGE WITHOUT NOTICE

When ordering parts be sure to mention part number.

MODELS 284W,284I,284NI,284NA,
1U-284W,1U-284I,1U-284NI,
1U-284NA

SENTINEL RADIO CORP.



P.—3-46—

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For alignment procedure read tabulations from left to right, and make the adjustment marked (1) first, (2) next, (3) third.

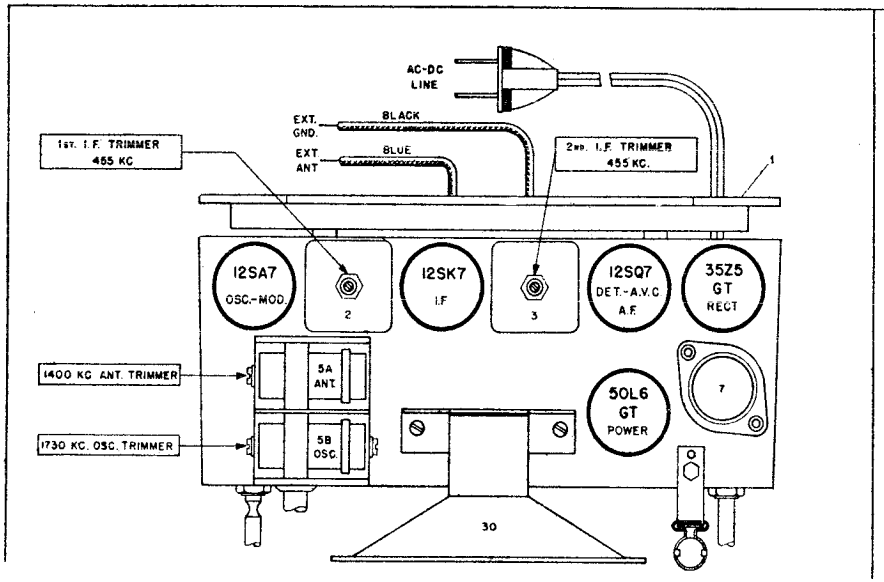
Before starting alignment:

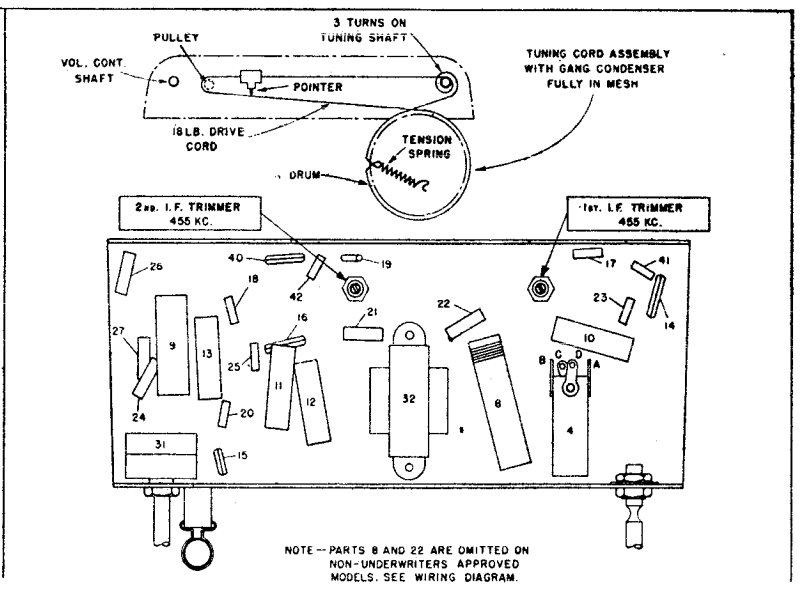
(a) Check tuning dial adjustment by tuning gang condenser until plates touch maximum capacity stop (completely in mesh) at which point the dial needle must be exactly even with the last line at the low frequency end of the dial calibration. If dial needle does not point exactly to last line move to correct position.

(b) Use an accurately calibrated test oscillator with some type of output measuring device.

(c) PLACE LOOP ANTENNA IN THE SAME POSITION IT WILL BE IN WHEN THE SET IS IN THE CABINET.

Steps	Set receiver dial to:	TEST OSCILLATOR			Refer to parts layout diagram for location of trimmers mentioned below:
		Adjust test oscillator frequency to:	Use dummy antenna in series with output of test oscillator consisting of:	Attach output of test oscillator to:	
1	Any point where no interfering signal is received.	455 K. C.	.02 MFD. condenser	High side to rear stator plates of tuning condenser. Low side to frame of condenser through a .02 Mfd. blocking condenser.	Adjust each of the second I. F. transformer trimmers for maximum output—then adjust each of the first I. F. trimmers for maximum output.
2	Exactly 1730 K. C.	Exactly 1730 K. C.	.00025 MFD. condenser	Receiver blue antenna lead Receiver black ground lead	Adjust 1730 K. C. oscillator trimmer for maximum output.
3	Approx. 1400 K. C.	Exactly 1400 K. C.	.00025 MFD. condenser	Receiver blue antenna lead Receiver black ground lead	While rocking gang condenser adjust 1400 K. C. antenna trimmer for maximum output.




PULLEY
3 TURNS ON TUNING SHAFT
VOL. CONT. SHAFT
POINTER
TUNING CORD ASSEMBLY WITH GANG CONDENSER FULLY IN MESH
18 LB. DRIVE CORD
TENSION SPRING
DRUM
2nd. I.F. TRIMMER 455 KC.
1st. I.F. TRIMMER 455 KC.
NOTE — PARTS 8 AND 22 ARE OMITTED ON NON-UNDERWRITERS APPROVED MODELS. SEE WIRING DIAGRAM.

MODELS 284W,284I,284NI,
284NA,1U-284W,1U-284I,
1U-284NI,1U-284NA
MODEL 289T

SENTINEL RADIO CORP.

MODELS 284W, 284I, 284NI, 284NA, 1U-284W, 1U-284I, 1U-284NI, 1U-284NA,

PARTS LIST

Ill. No.	Part No.	Part Name	Description
1	20E24	Antenna	Loop
2	20E21	Coil	1st I.F. Transformer
3	20E22	Coil	2nd I.F. Transformer
*4	20E13	Coil	Oscillator See *Note
	or		
*4	20E162	Coil	Oscillator See *Note
5	24E2	Condenser	Tuning, 2 Gang (3 Hole Mtg.)
5	24E18	Condenser	Tuning, 2 Gang (2 Hole Mtg.)
7	25E1	Condenser	Dry Electrolytic, 50-50 Mfd. 150 V.
8	20E75	Choke	R.F. Choke Assembly (Und. Appd. Only)
9	23E416	Condenser	Tubular, .05 Mfd. 400 Volts
10	23E218	Condenser	Tubular, .1 Mfd. 200 Volts
11	23E211	Condenser	Tubular, .01 Mfd. 200 Volts
12	23E211	Condenser	Tubular, .01 Mfd. 200 Volts
13	23E211	Condenser	Tubular, .01 Mfd. 200 Volts
14	23E39	Condenser	Mica, .0001 Mfd.
15	23E39	Condenser	Mica, .0001 Mfd.
16	23E39	Condenser	Mica, .0001 Mfd.
17	27E106	Resistor	Carbon, 10 Megohm 1/3 Watt
18	27E335	Resistor	Carbon, 3.3 Megohm 1/3 Watt
19	27E335	Resistor	Carbon, 3.3 Megohm 1/3 Watt

Ill. No.	Part No.	Part Name	Description
20	27E474	Resistor	Carbon, 470,000 Ohm 1/3 Watt.
21	27E224	Resistor	Carbon, 220,000 Ohm 1/3 Watt
22	27E224	Resistor	Carbon, 220,000 Ohm 1/3 Watt (Und. Appd. Only)
*23	27E223	Resistor	Carbon, 22,000 Ohm 1/3 Watt See *Note
	or		
*23	27E473	Resistor	Carbon, 47,000 Ohm See *Note
24	27E222-2	Resistor	Carbon, 2,200 Ohm 1 Watt
25	27E151	Resistor	Carbon, 150 Ohm 1/3 Watt
26	27E101	Resistor	Carbon, 100 Ohm 1/3 Watt
27	27E470-2	Resistor	Carbon, 47 Ohm 1/2 Watt
28		Resistor	230 Volt Extension Line Cord Used in models not Underwriters Apprd.
29		Resistor	125 Volt Extension Line Cord Used in models not Underwriters Apprd.
30	1E9	Speaker	5" PM
31	28E1	Volume Control	With S.P.S.T. Switch
32	22E2	Transformer	Output for Speaker
40	23E39	Condenser	Mica, .001 Mfd.
*41	27E470	Resistor	Carbon, 47 Ohm 1/3 W. See *Note
42	27E683	Resistor	Carbon, 68,000 Ohm, 1/3 W.

MISCELLANEOUS PARTS

Part No.	Part Name	Description
7E31-1	Cabinet	Walnut Plastic
7E31-2	Cabinet	Ivory Plastic
7E1-1	Cabinet	Catalin Plastic
7E70	Cabinet Back	For Catalin Cabinet
7E32	Cabinet Back	For Walnut & Ivory Plastic Cabinets
41E1	Cord	6 Ft. Rubber Line Cord
20E12	Dial Plate Assem.	Dial Back Plate Assem. Less Scale
4E1	Dial Cord	30" of 18 Lb. Dial Drive Cord
9E2	Dial Crystal	Acetate Dial Crystal
36E10	Dial Scale	Calibrated Scale

Part No.	Part Name	Description
68E1	Dial Shaft	Drive Shaft
19E3	Dial Shaft Bearing	Bearing For Drive Shaft
35E8	Dial Pointer	Dial Indicator
65E2	Dial Spring	Tension Spring For Drive Cord
37E17-1	Knob	For Walnut Cabinet
37E17-3	Knob	For Ivory Cabinet
37E29-1	Knob	For Catalin Cabinet
20E43	Pilot Lamp Socket	Pilot Lamp Socket Assembly
40E1	Pilot Lamp	6-8 Volt .150 Amp. Type 47 Lamp

*NOTE: First production run of this model used Oscillator Coil Part Number 20E13, Illus. No. 4, with the 47 Ohm Resistor, Illus. No. 41, and the value of the 12SA7 grid leak Resistor, Illus. No. 23, was 47,000 Ohms.
In later production, Part Number 20E13, Oscillator Coil, was replaced with Part Number 20E162; also the 47 Ohm Resistor, Illus. No. 41, was eliminated and the value of Resistor, Illus. No. 23, was changed to 22,000 Ohms.
BECAUSE PERFORMANCE OF THE SET WILL BE SOMEWHAT IMPROVED BY USING OSCILLATOR COIL Part Number 20E162, WE RECOMMEND THAT WHENEVER IT IS NECESSARY TO REPLACE THE OSCILLATOR COIL, THAT ONLY Part Number 20E162 BE USED FOR THIS PURPOSE.

MODEL 289-T

PARTS LIST

Illus. No.	Part No.	Part Name	Description
1	20E58	Cable	Battery with 4 Prong Plug
2	20E32	Coil	Antenna
3	20E21	Coil	1st I.F. Transformer
4	20E35	Coil	2nd I.F. Transformer
5	20E77	Coil	Oscillator
6	24E4	Condenser	Tuning 2 Gang, 3-hole mounting
6	24E19	Condenser	Tuning 2 Gang, 2-hole mounting
7	25E9	Condenser	Tubular Dry Elect. 10 Mfd. 100 V.
8	23E224	Condenser	Tubular .5 Mfd. 200 Volt
9	23E224	Condenser	Tubular .5 Mfd. 200 Volt
10	23E216	Condenser	Tubular .05 Mfd. 200 Volt
11	23E216	Condenser	Tubular .05 Mfd. 200 Volt
12	23E151	Condenser	Tubular .01 Mfd. 120 Volt
13	23E151	Condenser	Tubular .01 Mfd. 120 Volt
14	23E204	Condenser	Tubular .001 Mfd. 200 Volt

Illus. No.	Part No.	Part Name	Description
15	23E42	Condenser	Mica, .00025
16	23E3	Condenser	Fixed Ceramic .0001 Mfd.
17	23E3	Condenser	Fixed Ceramic .0001 Mfd.
18	27E475	Resistor	Carbon, 4.7 Megohm, 1/3 W.
19	27E335	Resistor	Carbon, 3.3 Megohm, 1/3 W.
20	27E106	Resistor	Carbon, 10 Megohm, 1/3 W.
21	27E335	Resistor	Carbon, 3.3 Megohm, 1/3 W.
22	27E105	Resistor	Carbon, 1 Megohm, 1/3 W.
23	27E224	Resistor	Carbon, 220,000 Ohm, 1/3 W.
24	27E223	Resistor	Carbon, 22,000 Ohm, 1/3 W.
25	27E561	Resistor	Carbon, 560 Ohm, 1/3 W.
26	1E15	Speaker	6" PM
27	28E2	Volume Control	With D.P.S.T. Switch
28	22E4	Transformer	Output

MISCELLANEOUS PARTS

Part No.	Part Name	Description
7E50	Cabinet	Wood Table Model
4E1	Dial Cord	18 Lb. Drive Cord
65E2	Dial Cord Spring	Dial Cord Tension Spring
68E2	Dial Shaft	Drive Shaft
36E11	Dial Scale	Calibrated Scale
35E9	Dial Pointer	Dial Needle
36E14	Dial Indicator	"On-Off" Indicator

Part No.	Part Name	Description
19E3	Dial Shaft Bearing	Bearing for Drive Shaft
65E3	Dial Indicator Spring	Tension Spring for "On-Off" Indicator
12E103-F10	Dial Shaft Washer	"C" Retainer Washer for Drive Shaft
37E25-1	Knob	
17E3-4	Plug	4-Prong Battery Plug
46E1-1	Throw Arm	Operates On-Off Indicator

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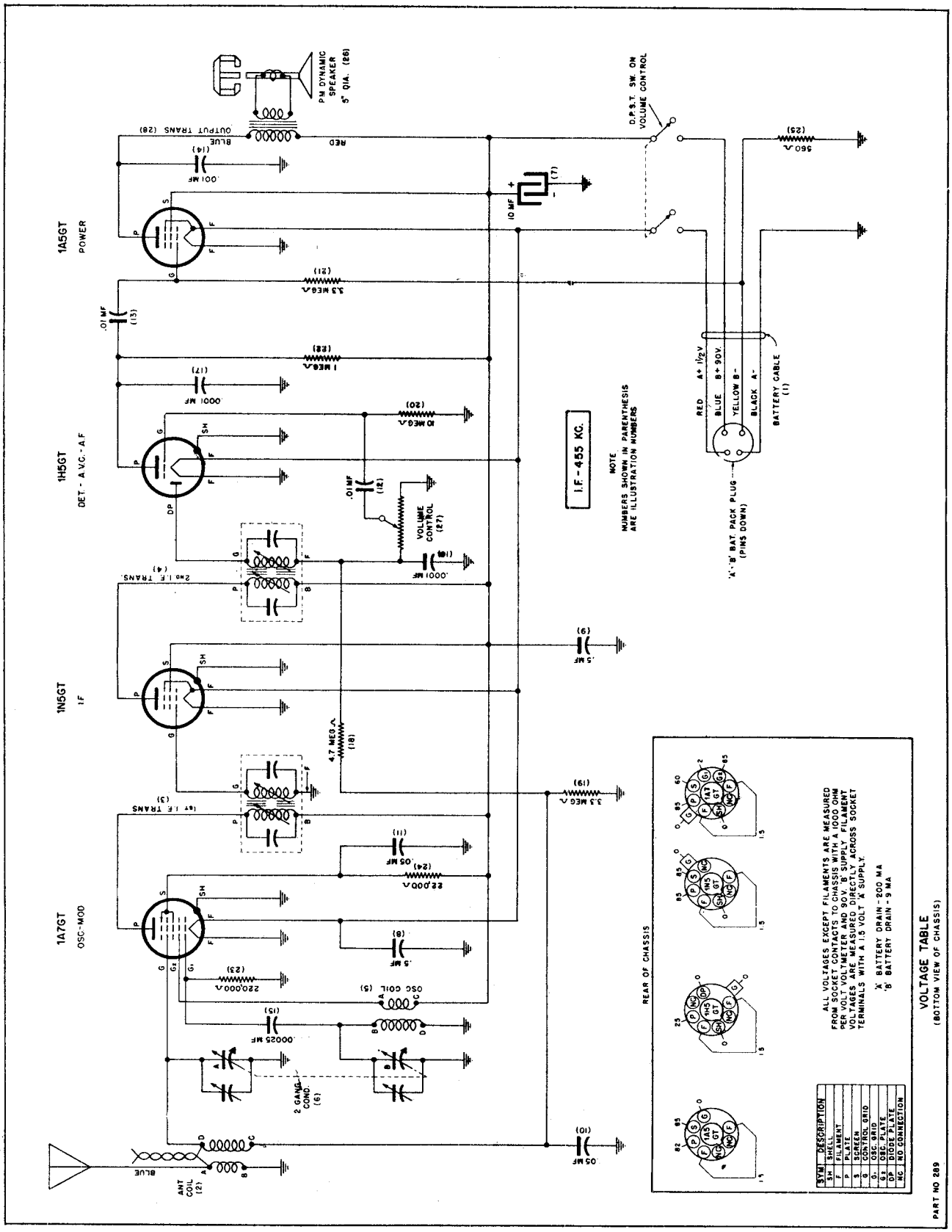
MODEL 289T

SENTINEL RADIO CORP.



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For Parts list, see P.15-8

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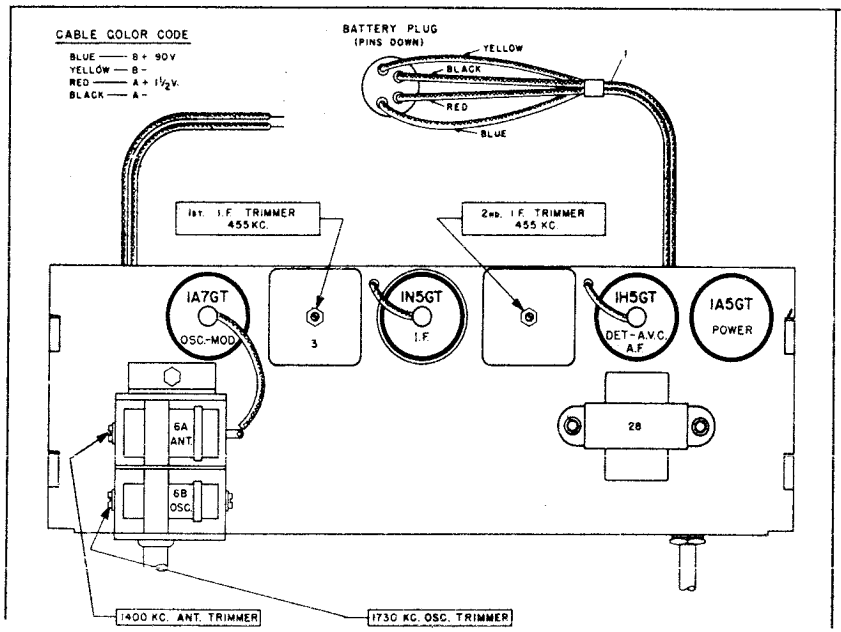
Be sure to follow procedure carefully and in the order given—otherwise the receiver will be insensitive and the dial calibration incorrect. For alignment procedure read tabulations from left to right. If more than one adjustment is required on any one band, make the adjustment marked (1) first, (2) next, etc.

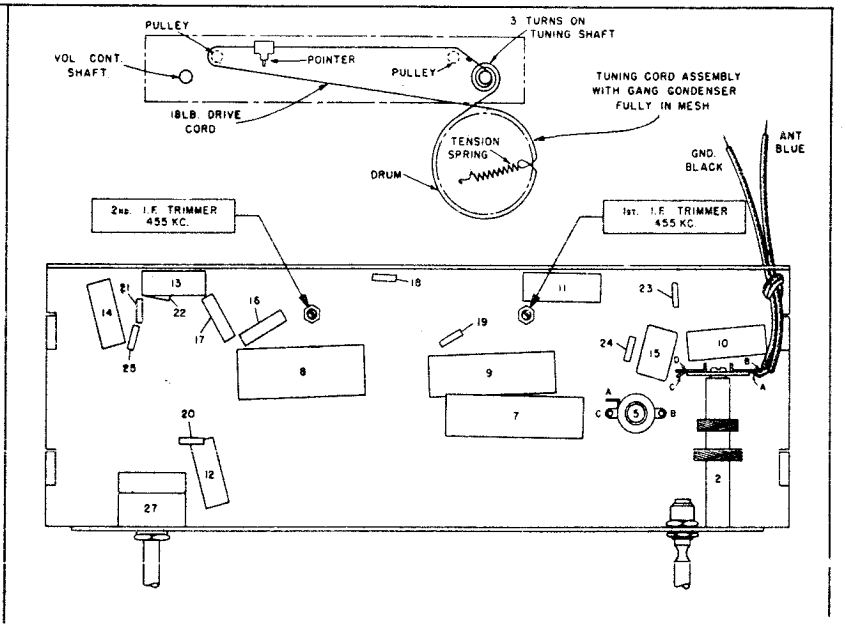
Before starting alignment:

(a) Check tuning dial adjustment by tuning gang condenser until plates touch maximum capacity stop (completely in mesh) at which point the dial needle must be exactly even with the last line at the low frequency end of the dial calibration. If dial needle does not point exactly to last line move to correct position.

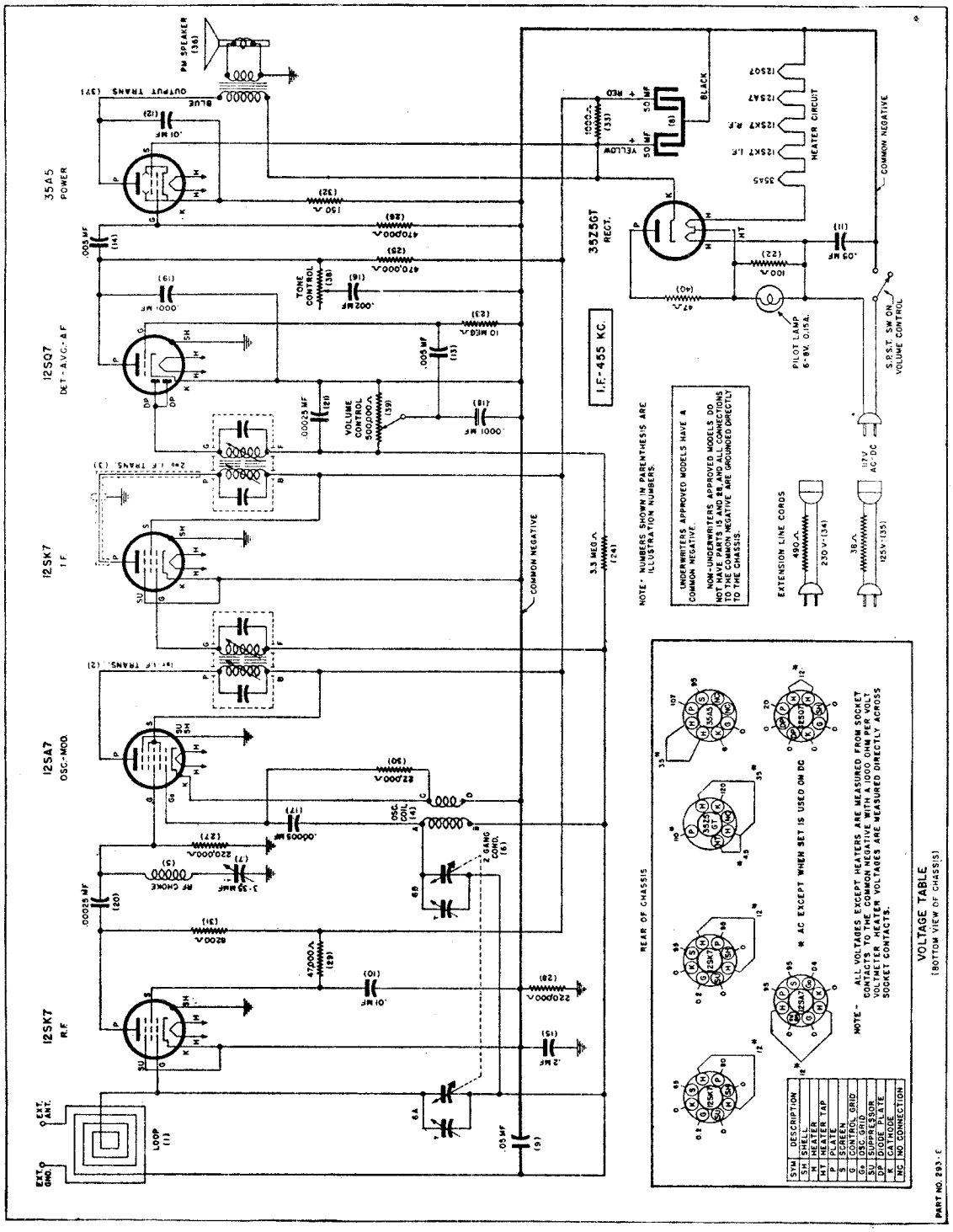
(b) Use an accurately calibrated test oscillator with some type of output measuring device.

Steps	Set receiver dial to:	TEST OSCILLATOR			Refer to parts layout diagram for location of trimmers mentioned below:
		Adjust test oscillator frequency to:	Use dummy antenna in series with output of test oscillator consisting of:	Attach output of test oscillator to:	
1	I.F. Any point where no interfering signal is received	455 K. C.	.02 MFD. condenser	High side to grid terminal of 1A7GT tube DO NOT REMOVE CAP. Low side to receiver black ground lead.	Adjust each of the second I. F. transformer trimmers for maximum output—then adjust each of the first I. F. trimmers for maximum output.
2	Exactly 1730 K. C.	Exactly 1730 K. C.	.00025 MFD. condenser	Receiver blue antenna lead Receiver black ground lead	Adjust 1730 K. C. oscillator trimmer for maximum output.
3	Exactly 1400 K. C.	Exactly 1400 K. C.	.00025 MFD. condenser	Receiver blue antenna lead Receiver black ground lead	While rocking gang condenser adjust 1400 K. C. antenna trimmer for maximum output.





SENTINEL RADIO CORP. MODELS 293W, 293I, 293T, 1U-293W, 1U-293I, 1U-293T



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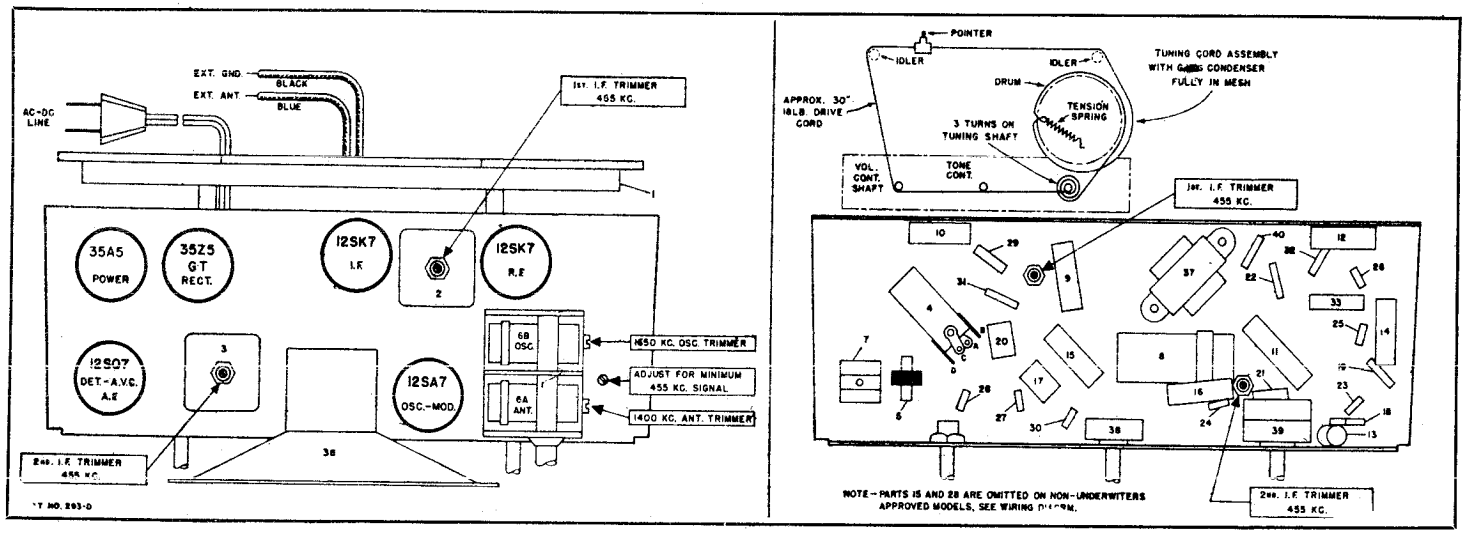
For Alignment procedure read tabulations from left to right, and make the adjustment marked (1) first, (2) next, (3) third.
IMPORTANT: BEFORE ALIGNING, PLACE LOOP ANTENNA IN THE SAME POSITION IT WILL BE IN WHEN THE SET IS IN THE CABINET. BE SURE THAT IT DOES NOT MOVE WHILE ALIGNING.

When adjusting 1650 kilocycle oscillator trimmer, 455 K.C. R.F. trimmer and 1400 kilocycle antenna trimmer, connect test oscillator to loop external antenna and ground connections with a .0002 Mfd. capacitor in series with antenna lead.

Steps	Set receiver dial to:	TEST OSCILLATOR: Adjust test oscillator frequency to:	TEST OSCILLATOR: Use dummy antenna in series with output of test oscillator consisting of:	TEST OSCILLATOR: Attach output of test oscillator to	Refer to parts layout diagram for location of trimmers mentioned below:
	Any point where no interfering signal is received	Exactly 455 K. C.	0.2 Mfd. Condenser	High side to grid of 12SA7 tube. Low side to chassis (if non-Underwriter Approved) or Common Negative (if Underwriter Approved).	Adjust each of the 2nd I.F. transformer trimmer adjustment screws for maximum output, then adjust each of the 1st I.F. transformer trimmer adjustment screws for maximum output.
1	Rotate gang condenser to maximum capacity	Exactly 455 K. C.	.0002 Mfd. Condenser	To loop external antenna and ground connections	Adjust R. F. coil trimmer for minimum 455 K. C. signal.
2	Rotate gang condenser to minimum capacity	Exactly 1650 K. C.	.0002 Mfd. Condenser	To loop external antenna and ground connections	Adjust 1650 K. C. oscillator trimmer for maximum output.
3	Approximately 1400 K. C.	Approx. 1400 K. C.	.0002 Mfd. Condenser	To loop external antenna and ground connections	Adjust 1400 K. C. antenna trimmer for maximum output.



SENTINEL RADIO CORP.

MODELS 293W,293I,293T,
1U-293W,1U-293I,1U-293T
MODELS 294N,294I,294T,
1U-294W,1U-294I,1U-294T

MODELS 293W, 293I, 293T 1U-293W, 1U-293I, 1U-293T

PARTS LIST

Illus. No.	Part No.	Part Name	Description	List Price
1	64E3	Antenna	Loop	
2	20E21	Coil	1st I. F. Transformer	
3	20E22	Coil	2nd I. F. Transformer	
4	20E64	Coil	Oscillator	
5	2E19	Coil	R. F. Choke	
6	24E8	Condenser	Tuning, 2 Gang	
7	24E3	Condenser	Trimmer (3-35 MMF Working)	
8	25E6	Condenser	Tubular, Dry Elect. 50-50 Mfd.—150 V.	
9	23E216	Condenser	Tubular, .05 Mfd.—200 V.	
10	23E211	Condenser	Tubular, .01 Mfd.—200 V.	
11	23E416	Condenser	Tubular, .05 Mfd.—400 V.	
12	23E411	Condenser	Tubular, .01 Mfd.—400 V.	
13	23E408	Condenser	Tubular, .005 Mfd.—400 V.	
14	23E408	Condenser	Tubular, .005 Mfd.—400 V.	
15	23E421	Condenser	Tubular, .2 Mfd.—400 V.	
16	23E405	Condenser	Tubular, .002 Mfd. — 400 V.	
17	23E37	Condenser	Mica, .00005 Mfd.	
18	23E39	Condenser	Mica, .0001 Mfd.	
19	23E39	Condenser	Mica, .0001 Mfd.	
20	23E42	Condenser	Mica, .00025 Mfd.	
21	23E42	Condenser	Mica, .00025 Mfd.	
22	27E101-2	Resistor	Carbon, 100 Ohm, 1/2 W.	
23	27E106	Resistor	Carbon, 10 Megohm, 1/3 W.	
24	27E335	Resistor	Carbon, 3.3 Megohm, 1/3 W.	
25	27E474	Resistor	Carbon, 470,000 Ohm, 1/3 W.	
26	27E474	Resistor	Carbon, 470,000 Ohm, 1/3 W.	
27	27E224	Resistor	Carbon, 220,000 Ohm, 1/3 W.	
28	27E224	Resistor	Carbon, 220,000 Ohm, 1/3 W.	
29	27E473	Resistor	Carbon, 47,000 Ohm, 1/3 W.	
30	27E223	Resistor	Carbon, 22,000 Ohm, 1/3 W.	
31	27E822	Resistor	Carbon, 8,200 Ohm, 1/3 W.	
32	27E151	Resistor	Carbon, 150 Ohm, 1/3 W.	
33	27E102-3	Resistor	Carbon, 1,000 Ohm, 1 W.	
34		Resistor Line Cord	230 Volt Extension Line Cord—Used in Models not having Common Ground	
35		Resistor Line Cord	125 Volt Extension Line Cord—Used in Models not having Common Ground	
36	1E1	Speaker	4"x6" Elliptical P.M., less Transformer	
37	22E8	Transformer	Output for Speaker	
38	28E8	Tone Control		
39	28E7	Volume Control	With S. P. S. T. Switch	
40	27E470-2	Resistor	Carbon, 47 Ohm, 1/3 W.	

MISCELLANEOUS PARTS

Part No.	Part Name	Description	List Price
40E1	Bulb	6-8 Volt, 150 Amp. Dial Light Mazda No. 47, Bayonet Base	
7E48	Cabinet Back	For Walnut and Ivory Plastic Cabinets	
7E33	Cabinet Back	For Wood Cabinet	
7E46-1	Cabinet	Walnut Plastic	
7E46-2	Cabinet	Ivory Plastic	
7E3	Cabinet	Wood Table Model	
65E2	Dial Cord Spring	Tension Spring	
4E1	Dial Cord	30" of 18 lb. Drive Cord	
68E1	Dial Shaft	Drive Shaft	
19E3	Dial Shaft Bearing	Drive Shaft Bushing	
12E103F10	Dial Shaft Washer	"C" Retainer Washer for Drive Shaft	
20E65	Dial Back Plate	Backplate Assembly less Calibrated Scale	
36E16	Dial Scale	Calibrated Glass Scale	
35E13	Dial Pointer	Dial Indicator	
37E27-11	Knob	Walnut, for Walnut Plastic Cabinet	
37E27-15	Knob	Ivory, for Ivory Plastic Cabinet	
37E21-7	Knob	For Wood Cabinet	

MODELS 294N, 294I, 294T, 1U-294W, 1U-294I, 1U-294T,

PARTS LIST

Illus. No.	Part No.	Part Name	Description	List Price
1	64E5	Coil	Antenna Loop	
2	20E21	Coil	1st I. F. Transformer	
3	20E22	Coil	2nd I. F. Transformer	
4	20E72	Coil	Antenna	
5	20E102	Coil	Oscillator, Broadcast Band	
6	20E103	Coil	Oscillator, Short Wave Band	
7	2E19	Coil	R. F. Choke	
8	24E9	Condenser	Tuning, 2 gang with pulley	
9	24E3	Capacitor	Trimmer, 2-40 MMF (On Loop)	
10	24E15	Capacitor	Trimmer, 4 Gang Strip	
11	24E16	Capacitor	Padder, 200-600 MMF	
12	25E6	Capacitor	50-50 Mfd. 150 Volt Dry Electrolytic	
13	23E216	Capacitor	Tubular, .05 Mfd.—200 Volt	
14	23E211	Capacitor	Tubular, .01 Mfd.—200 Volt	
15	23E416	Capacitor	Tubular, .05 Mfd.—400 Volt	
16	23E411	Capacitor	Tubular, .01 Mfd.—400 Volt	
17	23E408	Capacitor	Tubular, .005 Mfd.—400 Volt	
18	23E208	Capacitor	Tubular, .005 Mfd.—200 Volt	
19	23E411	Capacitor	Tubular, .01 Mfd.—400 Volt	
20	23E205	Capacitor	Tubular, .002 Mfd.—200 Volt	
21	23E421	Capacitor	Tubular, .2 Mfd. 400 Volt (Und. App'd Only)	
22	23E37	Capacitor	Mica, .00005 Mfd.	
23	23E39	Capacitor	Mica, .0001 Mfd.	
24	23E39	Capacitor	Mica, .0001 Mfd.	
25	23E42	Capacitor	Mica, .00025 Mfd.	
26	23E42	Capacitor	Mica, .00025 Mfd.	
27	27E106	Resistor	Carbon, 10 Megohm, 1/3 Watt	
28	27E335	Resistor	Carbon, 3.3 Megohm, 1/3 Watt	
29	27E474	Resistor	Carbon, 470,000 Ohm, 1/3 Watt	
30	27E474	Resistor	Carbon, 470,000 Ohm, 1/3 Watt	
31	27E224	Resistor	Carbon, 220,000 Ohm, 1/3 Watt	
32	27E224	Resistor	Carbon, 22,000 Ohm, 1/3 Watt (Und. App'd Only)	
33	27E223	Resistor	Carbon, 22,000 Ohm, 1/3 Watt	
34	27E103	Resistor	Carbon, 10,000 Ohm, 1/3 Watt	
35	27E822	Resistor	Carbon, 8,200 Ohm, 1/3 Watt	
36	27E151	Resistor	Carbon, 150 Ohm, 1/3 Watt	
37	27E102-3	Resistor	Carbon, 1,000 Ohm, 1 Watt	
38		Resistor	230 Volt Extension Line Cord Used Only in in Models Not Having Common Ground	
39		Resistor	125 Volt Extension Line Cord Used Only in Models Not Having Common Ground	
40	1E1	Speaker	Elliptical Shape 4" x 6"	
41	29E8	Switch	Band	
42	28E7	Resistor	Volume Control with S.P.S.T. Switch	
43	28E8	Resistor	Tone Control	
44	27E101-2	Resistor	Carbon, 100 Ohm, 1/2 Watt	
45	22E8	Transformer	Output, Speaker	
46	23E211	Capacitor	Tubular, .01 Mfd., 200 Volt	
47	23E2000	Capacitor	Mica, .0021 Mfd.	
48	27E560	Resistor	Carbon, 56 Ohm, 1/3 Watt	
49	27E471	Resistor	Carbon, 470 Ohm 1/3 Watt	
50	23E211	Capacitor	Tubular, .01 Mfd. 200 Volt	
51	27E470-2	Resistor	Carbon 47 Ohm, 1/2 Watt	

MISCELLANEOUS PARTS

Part No.	Part Name	Description	List Price
40E1	Bulb	6-8 Volt .150 Amp. Dial light, No. 47	
7E52-1	Cabinet	Walnut Plastic	
7E52-2	Cabinet	Ivory Plastic	
7E60	Cabinet	Wood Table Model	
7E54-1	Cabinet Back	For Walnut and Ivory Plastic Cabinet	
7E61	Cabinet Back	For Wood Table Model	
65E2	Dial Cord Spring	Tension Spring	
4E1	Dial Cord	36" of 18 lb. Drive Cord	
68E1	Dial Shaft	Drive Shaft	
19E3	Dial Shaft Bearing	Bearing for Drive Shaft	
12E103-F10	Dial Shaft Washer	"C" Retainer Washer for Drive Shaft	
20E65	Dial Back Plate	Back Plate Assem. less Calibrated Scale	
36E19	Dial Scale	Calibrated Glass Scale	
32E4	Dial Scale Clip	For Mounting Dial Scale	
35E13	Dial Pointer	Dial Indicator	
9E5	Dial Crystal		
37E27-2	Knob	Marked "ON-OFF-VOLUME" for Walnut Cabt.	
37E27-3	Knob	Marked "TONE" for Walnut Cabt.	
37E27-4	Knob	Marked "TUNING" for Walnut Cabt.	
37E27-5	Knob	Marked "SW-BC" for Walnut Cabt.	
37E27-7	Knob	Marked "OFF-ON-VOLUME" for Ivory Cabt.	
37E27-8	Knob	Marked "TONE" for Ivory Cabt.	
37E27-9	Knob	Marked "TUNING" for Ivory Cabt.	
37E27-10	Knob	Marked "SW-BC" for Ivory Cabt.	
37E21-10	Knob	Marked "OFF-ON-VOLUME" for Wood Table Cabt.	
37E21-11	Knob	Marked "TONE" for Wood Table Cabt.	
37E21-12	Knob	Marked "TUNING" for Wood Table Cabt.	
37E21-13	Knob	Marked "SW-BC" for Wood Table Cabt.	

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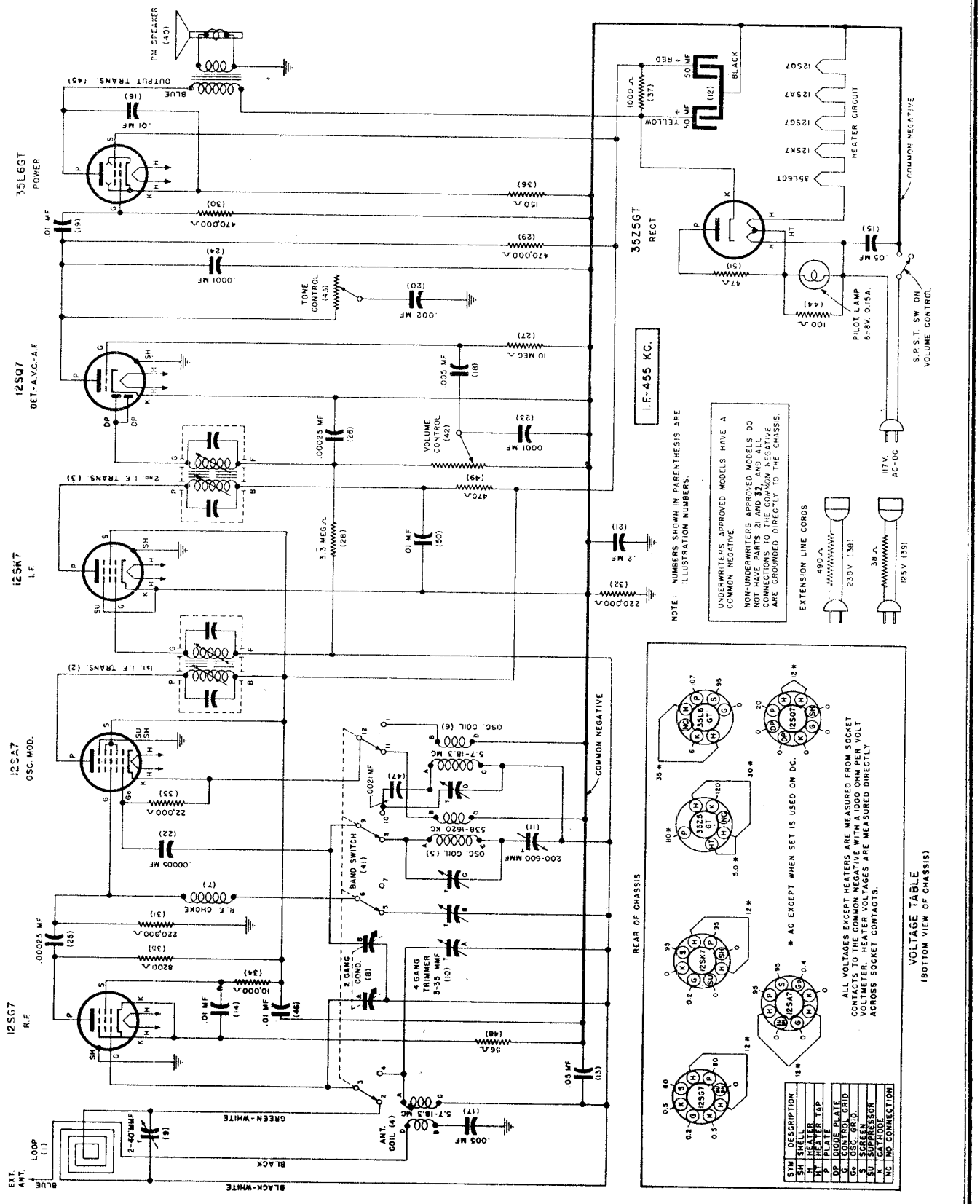
MODELS 294N,294I,294T,
1U-294W,1U-294I,1U-294T

SENTINEL RADIO CORP.


35L6GT POWER
12SQ7 DET-AVC-A.F.
12SK7 I.F.
12SA7 OSC. MOD.
12SG7 R.F.
35Z5GT RECT
I.F.-455 KC.
2nd I.F. TRANS. (3)
1st I.F. TRANS. (2)
OUTPUT TRANS. (45)
P.M. SPEAKER (40)
TONE CONTROL (43)
VOLUME CONTROL (42)
BAND SWITCH (41)
2 GANG COND. (8)
4 GANG TRIMMER 3-35 MMF (10)
R.F. CHOKE (7)
OSC. COIL (6)
OSC. COIL (5)
ANT. COIL (4)
EXT. ANT. LOOP (1)
HEATER CIRCUIT
PILOT LAMP 6-8V. 0.15A.
S.P.S.T. SW. ON VOLUME CONTROL
117 V. AC-DC
EXTENSION LINE CORDS
COMMON NEGATIVE
NOTE: NUMBERS SHOWN IN PARENTHESIS ARE ILLUSTRATION NUMBERS.
UNDERWRITERS APPROVED MODELS HAVE A COMMON NEGATIVE
NON-UNDERWRITERS APPROVED MODELS DO NOT HAVE PARTS 2, AND 22, AND ALL CONNECTIONS TO THE COMMON NEGATIVE ARE GROUNDED DIRECTLY TO THE CHASSIS.
REAR OF CHASSIS
VOLTAGE TABLE
(BOTTOM VIEW OF CHASSIS)
* AC EXCEPT WHEN SET IS USED ON DC.
ALL VOLTAGES EXCEPT HEATERS ARE MEASURED FROM SOCKET CONTACTS TO THE COMMON NEGATIVE WITH A 1000 OHM PER VOLT VOLTMETER. HEATER VOLTAGES ARE MEASURED DIRECTLY ACROSS SOCKET CONTACTS.
SYM DESCRIPTION
SH SHELL
H HEATER
HT HEATER TAP
P PLATE
DP DIODE PLATE
G CONTROL GRID
G2 OSC. GRID
S SCREEN
SU SUPPRESSOR
K CATHODE
NC NO CONNECTION

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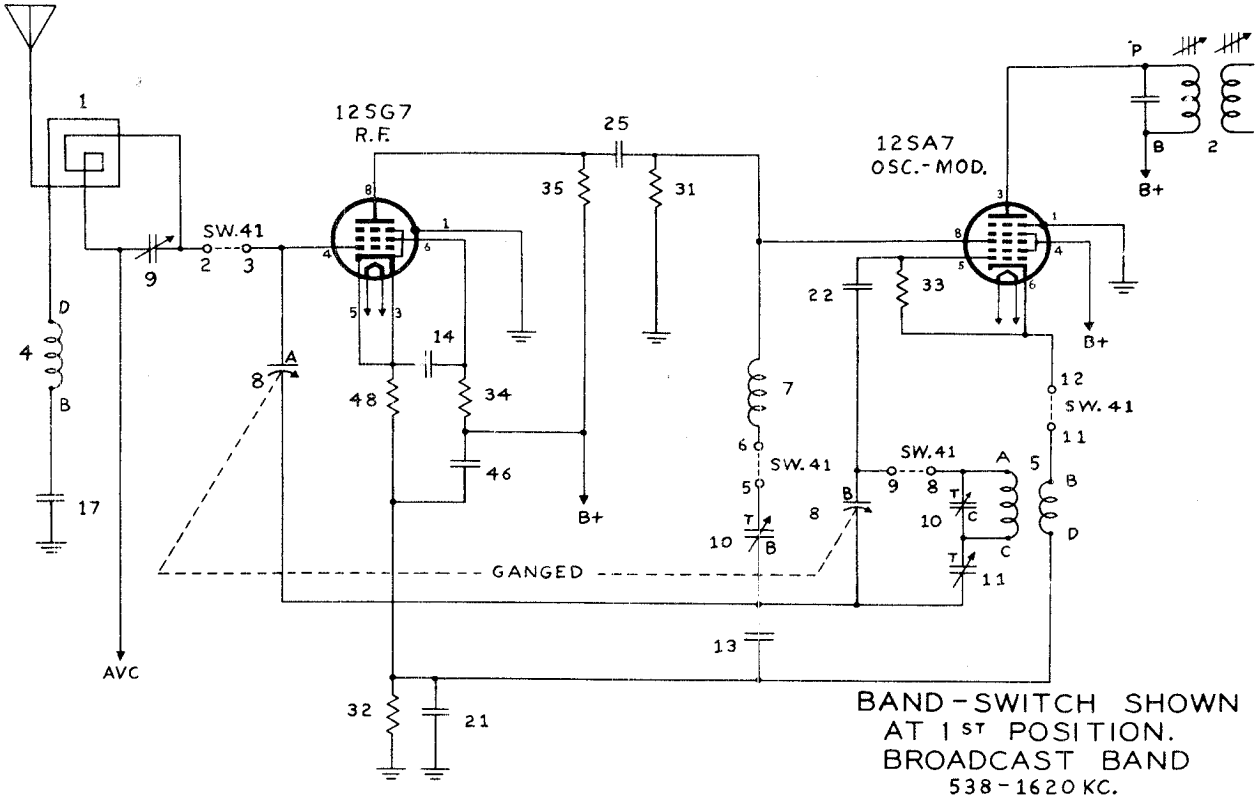
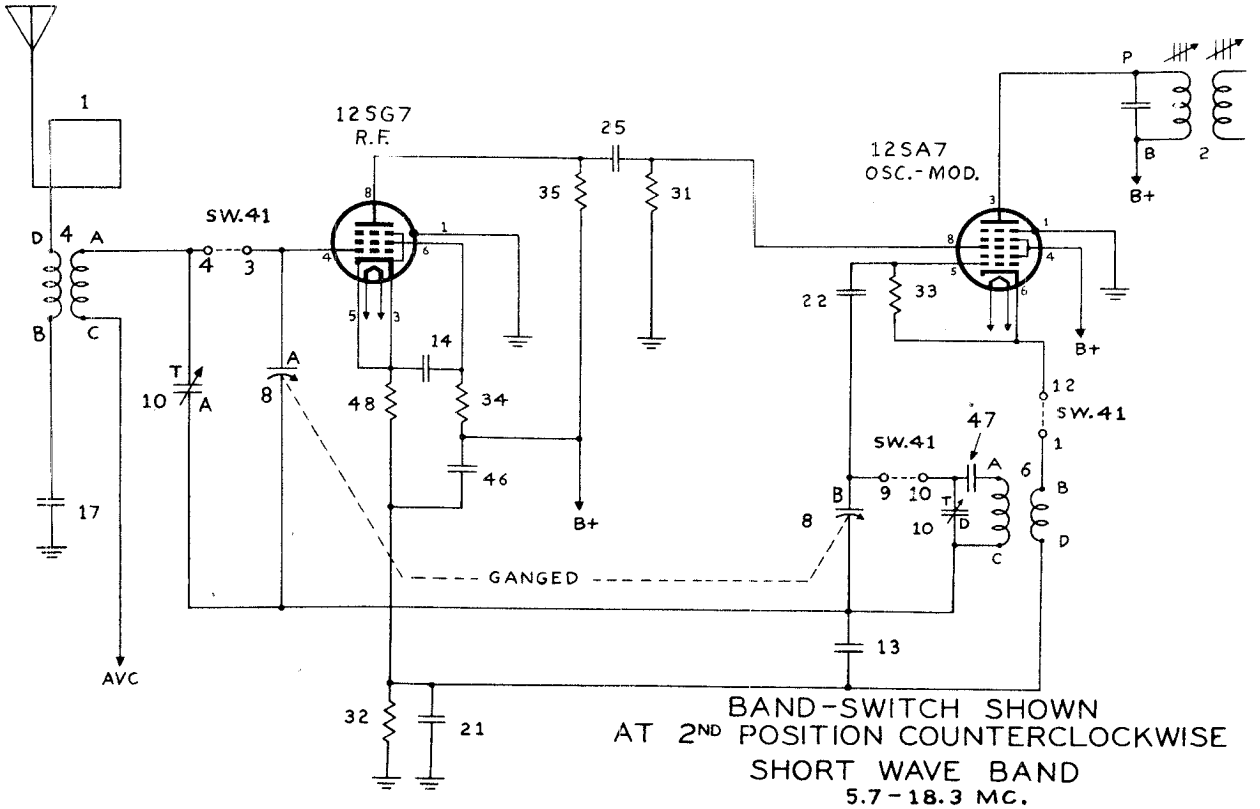
For Parts list, see P.15-13

SENTINEL RADIO CORP.

MODELS 294N, 294I, 294T,
1U-294W, 1U-294I, 1U-294T



BAND-SWITCH SHOWN
AT 1ST POSITION.
BROADCAST BAND
538-1620 KC.



BAND-SWITCH SHOWN
AT 2ND POSITION COUNTERCLOCKWISE
SHORT WAVE BAND
5.7-18.3 MC.

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Be sure to follow procedure carefully and in the order given—otherwise the receiver will be insensitive and the dial calibration incorrect. For alignment procedure read tabulations from left to right. Make the adjustment marked (1) first, (2) next, (3) third, etc.

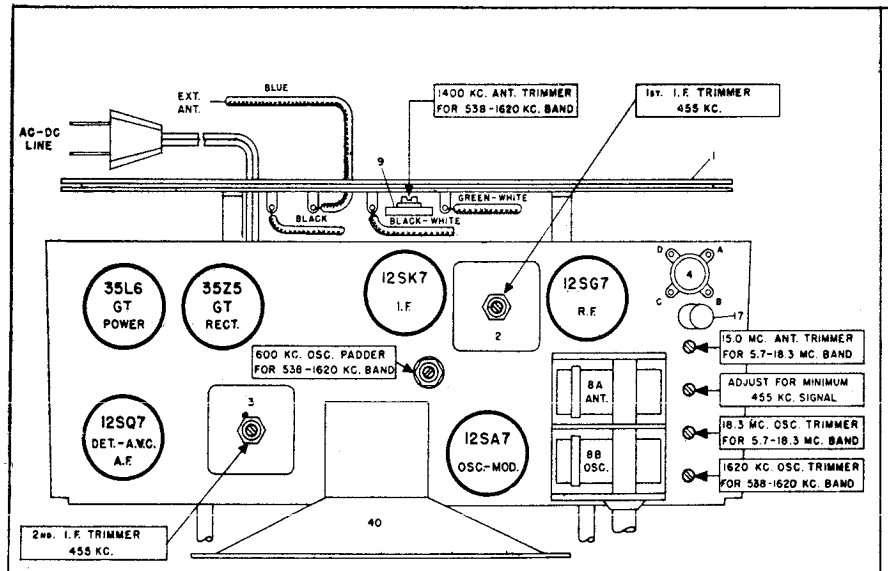
Before starting alignment:

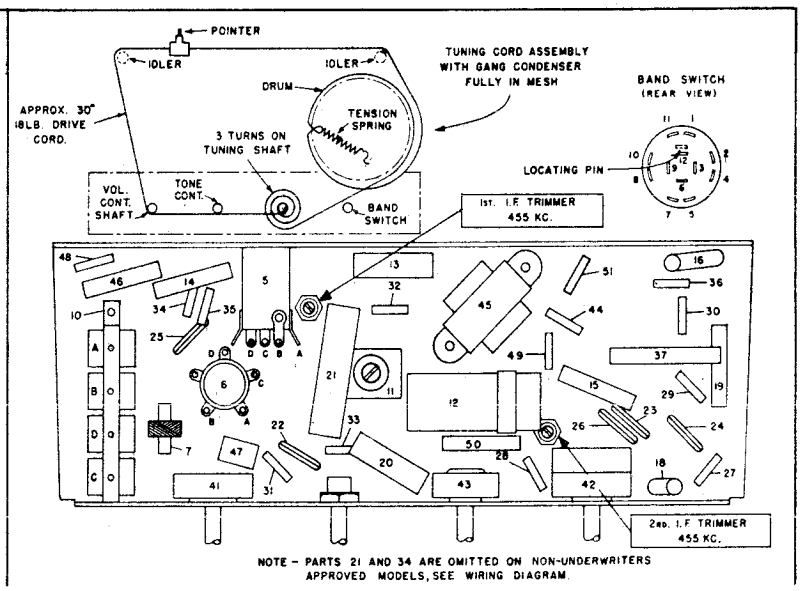
(a) Check tuning dial adjustment by tuning gang condenser until plates touch maximum capacity stop (completely in mesh) at which point the dial needle must be exactly even with the last line at the low frequency end of the dial calibration. If dial needle does not point exactly to last line move to correct position.

(b) Use an accurately calibrated test oscillator with some type of output measuring device.

(c) Place loop antenna in the same position it will be in when set is in the cabinet.

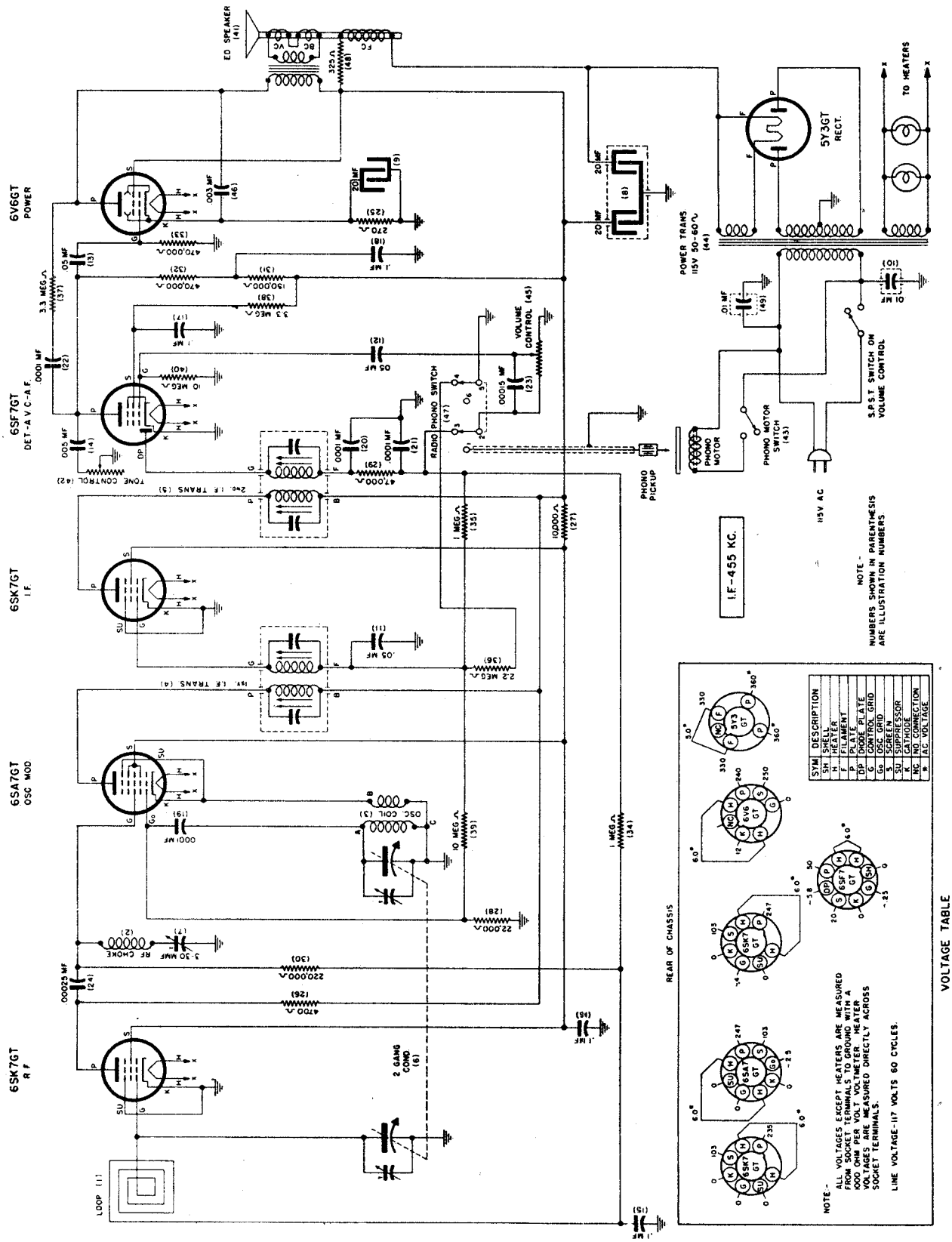
Steps	Place band switch for operation on:	Set receiver dial to:	TEST OSCILLATOR: Adjust test oscillator frequency to:	TEST OSCILLATOR: Use dummy antenna in series with output of test oscillator consisting of	TEST OSCILLATOR: Attach output of test oscillator to:	Refer to parts layout diagram for location of trimmers mentioned below:
1	I.F. alignment use any band position.	Any point where no interfering signal is received	Exactly 455 K.C.	0.2 Mfd. condenser	High side to rear stator plates of tuning condenser. Low side to frame of condenser through .01 Mfd. condenser.	Adjust each of the second I.F. transformer trimmers for maximum output, then adjust each of the first I.F. transformer trimmers for maximum output.
2	1620 to 538 K.C. Band	Rotate gang condenser to Maximum Capacity	Exactly 455 K.C.	.00025 Condenser	High side to BLUE Antenna Lead. Low side to chassis through a .01 mfd. condenser.	Adjust R.F. coil trimmer for **minimum** 455 K.C. signal.
		Exactly 1620 K.C.	Exactly 1620 K.C.			Adjust 1620 K.C. oscillator trimmer for maximum output.
		Approx. 1400 K.C.	Approx. 1400 K.C.			While rocking gang condenser adjust 1400 K.C. loop trimmer for maximum output.
		Approx. 600 K.C.	Approx. 600 K.C.			While rocking gang condenser adjust 600 K.C. oscillator padder for maximum output.
3	5.7 to 18.3 M.C. Band	Exactly 18.3 M.C.	Exactly 18.3 M.C.	400 Ohm carbon resistor		Adjust 18.3 M.C. oscillator trimmer for maximum output.
		Approx. 15 M.C.	Approx. 15 M.C.	400 Ohm carbon resistor		While rocking gang condenser adjust 15 M.C. antenna trimmer for maximum output.





NOTE - PARTS 21 AND 34 ARE OMITTED ON NON-UNDERWRITERS APPROVED MODELS, SEE WIRING DIAGRAM.

SENTINEL RADIO CORP.



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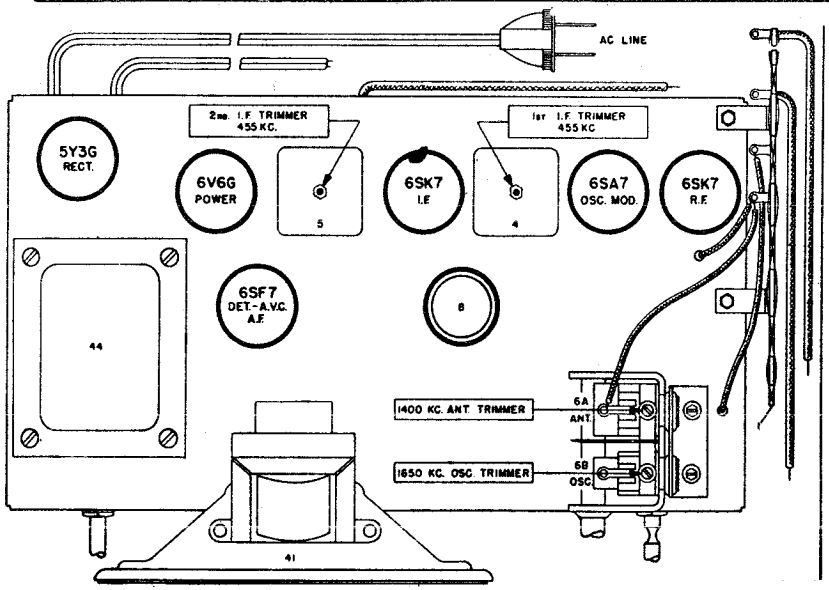
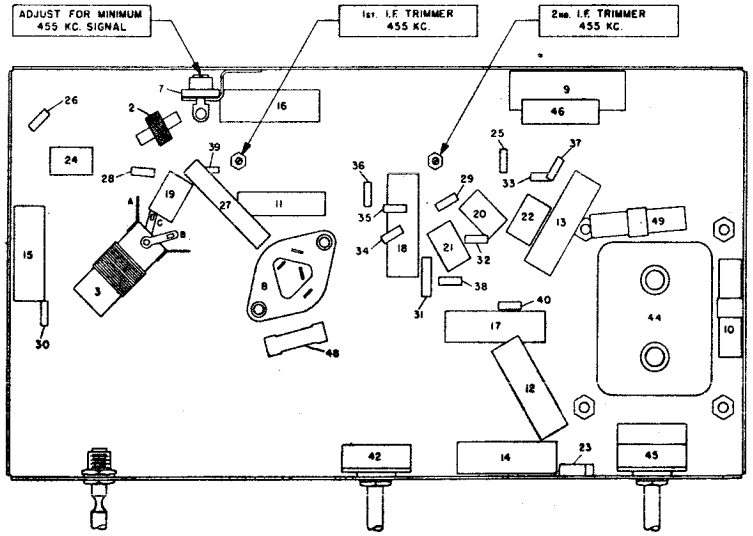
ALIGNMENT PROCEDURE

For Alignment procedure read tabulations from left to right, and make the adjustment marked (1) first, (2) next, (3) third.
IMPORTANT: BEFORE ALIGNING, HAVE LOOP ANTENNA IN THE SAME POSITION IT WILL BE IN WHEN THE SET IS IN THE CABINET. BE SURE THAT IT DOES NOT MOVE WHILE ALIGNING.

When adjusting 1650 kilocycle oscillator trimmer, 455 K.C. R.F. trimmer and 1400 kilocycle antenna trimmer, connect test oscillator to loop external antenna and ground connections with a .0002 Mfd. capacitor in series with antenna lead.

Steps	Set receiver dial to:	TEST OSCILLATOR: Adjust test oscillator frequency to:	TEST OSCILLATOR: Use dummy antenna in series with output of test oscillator consisting of:	TEST OSCILLATOR: Attach output of test oscillator to	Refer to parts layout diagram for location of trimmers mentioned below:
	Any point where no interfering signal is received	Exactly 455 K. C.	0.2 Mfd. Condenser	High side to grid of 6SA7 Tube. Low side to chassis.	Adjust each of the 2nd I.F. transformer trimmer adjustment screws for maximum output, then adjust each of the 1st I.F. transformer trimmer adjustment screws for maximum output.
1	Rotate gang condenser to maximum capacity	Exactly 455 K. C.	.0002 Mfd. Condenser	To loop external antenna and ground connections	Adjust R.F. coil trimmer for **minimum** 455 K. C. signal.
2	Rotate gang condenser to minimum capacity	Exactly 1650 K. C.	.0002 Mfd. Condenser	To loop external antenna and ground connections	Adjust 1650 K. C. oscillator trimmer for maximum output.
3	Approximately 1400 K. C.	Approx. 1400 K. C.	.0002 Mfd. Condenser	To loop external antenna and ground connections	Adjust 1400 K. C. antenna trimmer for maximum output.





SENTINEL RADIO CORP.

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PARTS LIST

Illus. No.	Part No.	Part Name	Description
1	20E51	Antenna	Loop
2	2E19	Coil	R. F. Choke
3	20E38	Coil	Oscillator
4	20E41	Coil	1st I. F. Transformer
5	20E42	Coil	2nd I F. Transformer
6	24E6	Condenser	2 Gang Tuning
7	24E30	Condenser	Trimmer 3-30 MMF
8	25E2	Condenser	Dry Electrolytic 20-20 Mfd. 450 V.
9	25E3	Condenser	Dry Electrolytic 20 Mfd. 25 V.
10	23E250	Condenser	.01 Mfd. 220 V. In Metal Can
11	23E216	Condenser	Tubular .05 Mfd. 200 V.
12	23E416	Condenser	Tubular .05 Mfd. 400 V.
13	23E416	Condenser	Tubular .05 Mfd. 400 V.
14	23E408	Condenser	Tubular .005 Mfd. 400 V.
15	23E218	Condenser	Tubular .1 Mfd. 200 V.
16	23E418	Condenser	Tubular .1 Mfd. 400 V.
17	23E418	Condenser	Tubular .1 Mfd. 400 V.
18	23E418	Condenser	Tubular .1 Mfd. 400 V.
19	23E39	Condenser	Mica .0001 Mfd.
20	23E39	Condenser	Mica .0001 Mfd.
21	23E39	Condenser	Mica .0001 Mfd.
22	23E39	Condenser	Mica .0001 Mfd.
23	23E40	Condenser	Mica .00015 Mfd.
24	23E42	Condenser	Mica .00025 Mfd.

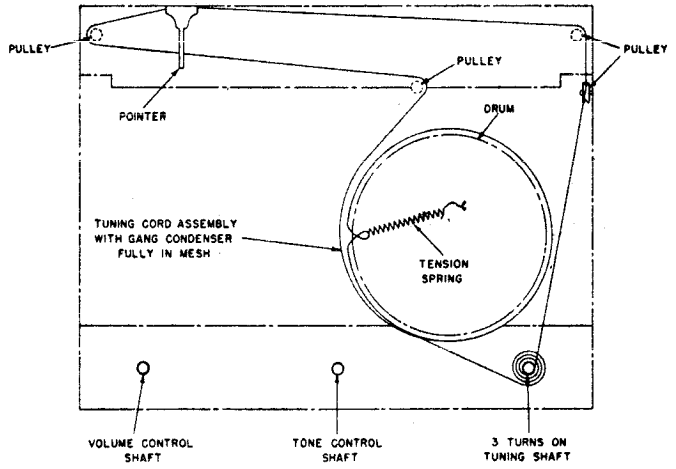
Illus. No.	Part No.	Part Name	Description
25	27E271-2	Resistor	Carbon 270 Ohm, 1/2 W.
26	27E472	Resistor	Carbon 4700 Ohm, 1/3 W.
27	27E103-3	Resistor	Carbon, 10,000 Ohm, 1 W.
28	27E223	Resistor	Carbon, 22,000 Ohm, 1/3 W.
29	27E473	Resistor	Carbon, 47,000 Ohm, 1/3 W.
30	27E224	Resistor	Carbon, 220,000 Ohm, 1/3 W.
31	27E154	Resistor	Carbon, 150,000 Ohm, 1/3 W.
32	27E474	Resistor	Carbon, 470,000 Ohm, 1/3 W.
33	27E474	Resistor	Carbon, 470,000 Ohm, 1/3 W.
34	27E105	Resistor	Carbon, 1 Megohm, 1/3 W.
35	27E105	Resistor	Carbon, 1 Megohm, 1/3 W.
36	27E225	Resistor	Carbon, 2.2 Megohm, 1/3 W.
37	27E335	Resistor	Carbon, 3.3 Megohm, 1/3 W.
38	27E335	Resistor	Carbon, 3.3 Megohm, 1/3 W.
39	27E106	Resistor	Carbon, 10 Megohm, 1/3 W.
40	27E106	Resistor	Carbon, 10 Megohm, 1/3 W.
41	1E10	Speaker	6" Electro Dynamic
42	28E18	Tone Control	500,000 Ohm
44	22E5	Transformer	Power 115 Volt, 50-60 Cycles
45	28E4	Volume Control	500,000 Ohm with S.P.S.T. Switch
46	23E606	Condenser	Tubular, .003 Mfd. 600 Volt
47	20E203	Switch Assembly	D.P.D.T. (Radio-Phono)
48	27E1004	Resistor	Wire Wound 325 Ohm 5 Watt

MISCELLANEOUS PARTS

Part No.	Part Name	Description
7E39	Cabinet	Complete Cabinet and Lid
7E103	Cabinet Back	Back for Cabinet
7E104	Cabinet Bottom	Bottom for Cabinet
36E12	Dial Scale	Calibrated Glass Scale
4E1	Dial Cord	18 Lb. Drive Cord
35E8-2	Dial Pointer	Dial Indicator

Part No.	Part Name	Description
65E2	Dial Spring	Tension Spring for Dial Cord
68E3	Dial Shaft	Drive Shaft Assembly
37E25-5	Knob	Walnut
40E2	Pilot Lamp	6-8 Volt, .250 Amp. Type No. 47
17E5	Plug	2 Prong for Motor
17E7	Plug	4 Prong for Phono

MODEL NO. 292-K
DIAL CORD AND POINTER ARRANGEMENT



PART NO. 292-K

VOLTAGE RATING

THIS RADIO IS DESIGNED FOR USE ON 110-120 VOLT 60 CYCLE ALTERNATING CURRENT (AC).

OUTSIDE AERIAL

If the radio is used in shielded areas or located a great distance from broadcast stations, the volume of some or all stations may not be ample, in which case it would be necessary to ATTACH a 25-50 ft. OUTDOOR AERIAL TO THE BLUE LEAD COMING OUT OF THE REAR OF THE CHASSIS.

GROUND

When a regular aerial is used, best results will be obtained with a ground attached to the black lead coming out of the rear of the chassis.

FUNCTION OF CONTROLS ON RADIO

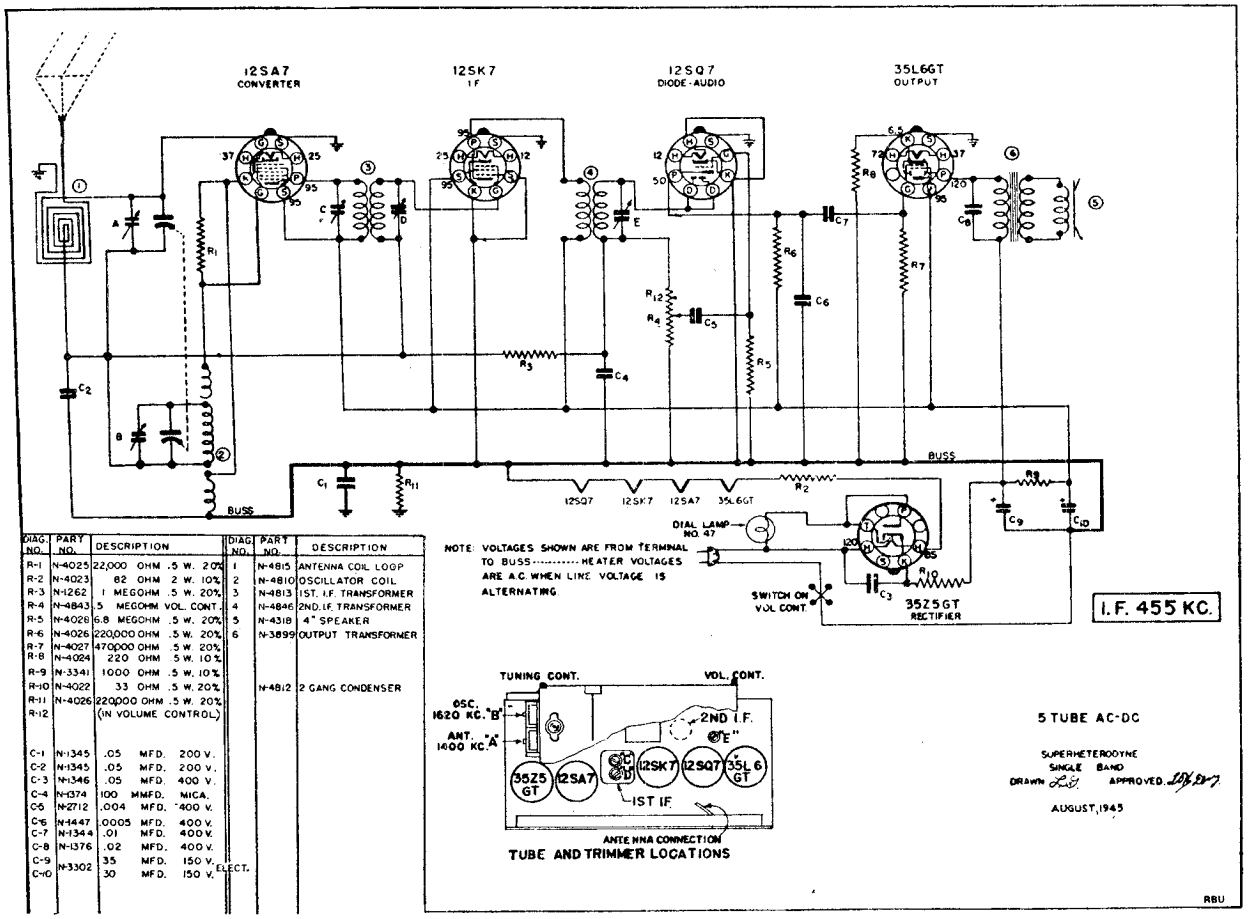
THE LEFT HAND KNOB controls the volume control and Off-On switch.

THE CENTER KNOB is the tone control.

THE RIGHT HAND KNOB is the station selector.

MODEL RBU

SONORA RADIO & TELEV. CORP.



DIAG. NO.	PART NO.	DESCRIPTION
R-1	N-4025	22,000 OHM .5 W. 20%
R-2	N-4023	82 OHM 2 W. 10%
R-3	N-1262	1 MEGOHM .5 W. 20%
R-4	N-4843	.5 MEGOHM VOL. CONT.
R-5	N-4026	6.8 MEGOHM .5 W. 20%
R-6	N-4026	220,000 OHM .5 W. 20%
R-7	N-4027	470,000 OHM .5 W. 20%
R-8	N-4024	220 OHM .5 W. 10%
R-9	N-3341	1000 OHM .5 W. 10%
R-10	N-4022	33 OHM .5 W. 20%
R-11	N-4026	220,000 OHM .5 W. 20%
R-12		(IN VOLUME CONTROL)
C-1	N-1345	.05 MFD. 200 V.
C-2	N-1345	.05 MFD. 200 V.
C-3	N-1346	.05 MFD. 400 V.
C-4	N-1374	100 MMFD. MICA.
C-6	N-2712	.004 MFD. 400 V.
C-6	N-1447	.0005 MFD. 400 V.
C-7	N-1344	.01 MFD. 400 V.
C-8	N-1376	.02 MFD. 400 V.
C-9	N-3302	.35 MFD. 150 V. ELECT.
C-10		30 MFD. 150 V.

DIAG. NO.	PART NO.	DESCRIPTION
1	N-4815	ANTENNA COIL LOOP
2	N-4810	OSCILLATOR COIL
3	N-4813	1ST. I.F. TRANSFORMER
4	N-4846	2ND. I.F. TRANSFORMER
5	N-4318	4" SPEAKER
6	N-3899	OUTPUT TRANSFORMER
	N-4812	2 GANG CONDENSER

ALIGNMENT PROCEDURE

GENERAL DATA. The alignment of this receiver requires the use of a test oscillator that will cover the frequencies of 455, 600, 1400 and 1620 KC and an output meter to be connected across the primary or secondary of the output transformer. If possible, all alignments should be made with the volume control on maximum and the test oscillator output as low as possible to prevent the AVC from operating and giving false readings.

CORRECT ALIGNMENT PROCEDURE. The intermediate frequency (I.F.) stages should be aligned properly as the first step. After the I.F. transformers have been properly adjusted and peaked, the broadcast band should be adjusted.

I. F. ALIGNMENT. Remove the chassis and loop antenna from the cabinet and set them up on the bench so that they occupy exactly the same respective position on the bench as they did in the cabinet. Care should be taken to have no iron or other metal near the loop. Do not make this set-up on a metal bench. With the gang condenser set at minimum, adjust the test oscillator to 455 KC and connect the output to the grid of the first detector tube (12SA7) through a .05 or .1 mfd. condenser. The ground on the test oscillator should be connected to the ground buss, indicated on the circuit diagram. Align all three I.F. trimmers to peak or maximum reading on the output meter.

BROADCAST BAND ALIGNMENT. Connect the test oscillator to the antenna of the set through a 100 mmfd. (.0001) condenser. With the gang condenser set at minimum capacity, set the test oscillator at 1620 KC, and adjust the oscillator (or 1620 KC trimmer) on the gang condenser. Next—set the test oscillator at 1400 KC, and tune in the signal on the gang condenser. Adjust the antenna trimmer (or 1400 KC trimmer) for maximum signal. Next set the test oscillator at 600 KC, and tune in signal on condenser to check alignment of coils.

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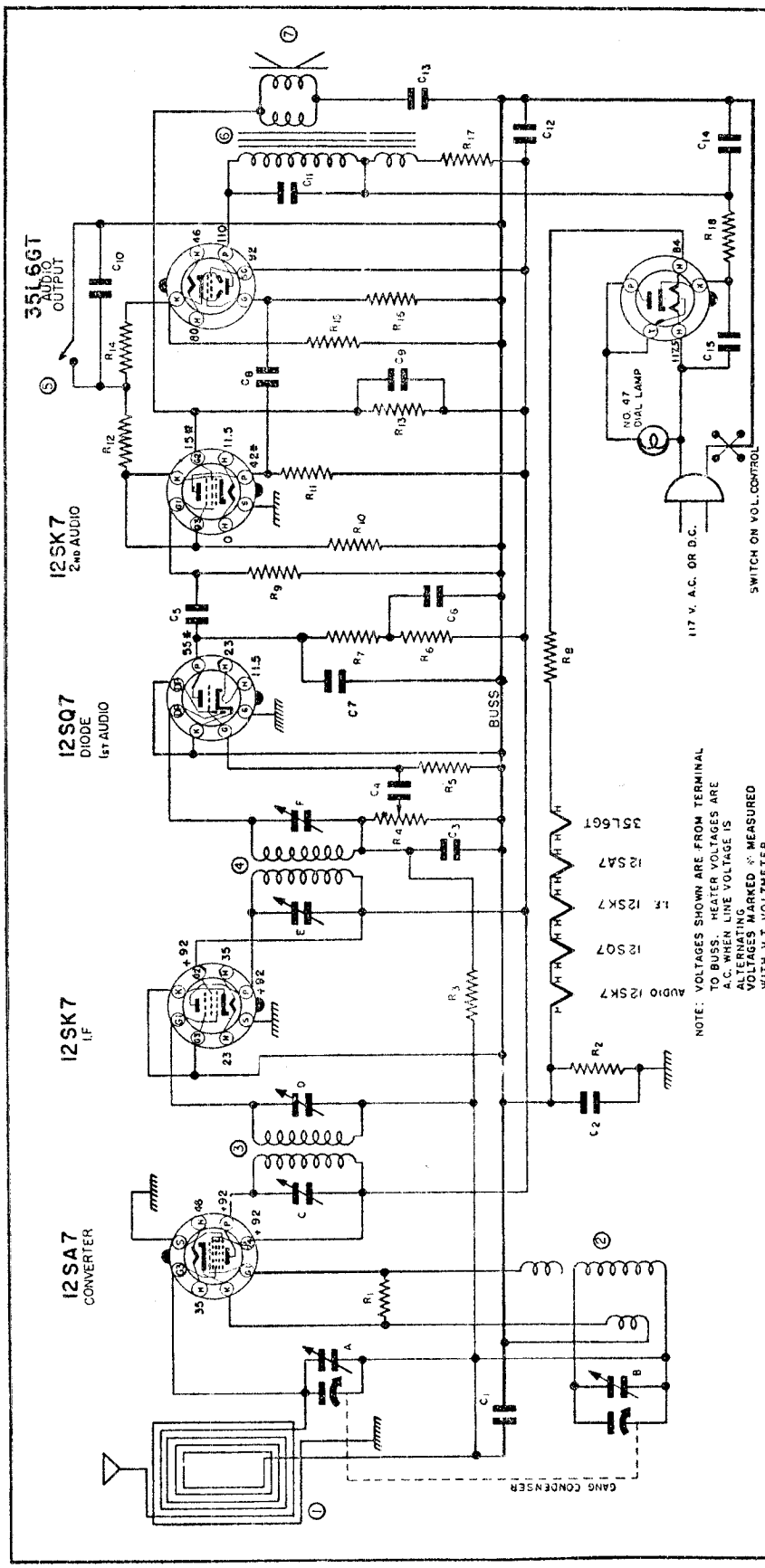
MODEL RCU
MODEL RDU

SONORA RADIO & TELEV. CORP.



NOTE: VOLTAGES SHOWN ARE FROM TERMINAL TO BUSS. HEATER VOLTAGES ARE A.C. WHEN LINE VOLTAGE IS ALTERNATING. VOLTAGES MARKED * MEASURED WITH V.T. VOLTMETER.

MODEL RDU

DIAG. NO.	PART NO.	DESCRIPTION		DIAG. NO.	PART NO.	DESCRIPTION		
C1	N-1345	.05 MFD. 200 V.	20%	R8	N-4068	33 OHM	1.0 W.	20%
C2	N-4957	.09 MFD. 200 V.	-10%+10%	R9	N-4061	4.7 MEGOHM	.5 W.	20%
C3	N-1374	100 MMFD. MICA 500 V.	20%	R10	N-4896	2200 OHM	.5 W.	10%
C4	N-4834	.005 MFD. 600 V.	-15%+40%	R11	N-4899	220,000 OHM	.5 W.	10%
C5	N-2063	.003 MFD. 600 V.	-15%+40%	R12	N-5029	22,000 OHM	.5 W.	5%
C6	N-1367	6 MFD. 150 W.V. ELECTROLYTIC		R13	N-4470	12 MEGOHM	.5 W.	10%
C7	N-4890	.0005 MFD. 600 V.	-25%+60%	R14	N-4897	8,200 OHM	.5 W.	10%
C8	N-1344	.01 MFD. 400 V.	20%	R15	N-4067	180 OHM	.5 W.	10%
C9	N-1376	.02 MFD. 400 V.	20%	R16	N-4027	470,000 OHM	.5 W.	20%
C10	N-1351	.1 MFD. 200 V.	-10%+20%	R17	N-4900	1200 OHM	1. W.	10%
C11	N-1376	.02 MFD. 400 V.	20%	R18	N-4058	33 OHM	1. W.	20%
C12	N-3658	40 MFD. 150 W.V. ELECTROLYTIC						
C13	N-1345	.05 MFD. 200 V.	20%	1	N-4877	LOOP COIL		
C14	N-3658	40 MFD. 150 W.V. ELECTROLYTIC		2	N-4810	OSCILLATOR COIL		
C15	N-1346	.05 MFD. 400 V.	20%	3	N-4872	1ST. I.F. COIL		
				4	N-4873	2ND I.F. COIL		
R1	N-4025	22,000 OHM	.5 W. 20%	5	N-4634	TONE SWITCH		
R2	N-4026	220,000 OHM	.5 W. 20	6	N-4875	OUTPUT TRANSFORMER		
R3	N-4062	3.3 MEGOHM	.5 W. 20%	7	N-4868	5" P.M. DYNAMIC SPEAKER		
R4	N-4889	0.5 MEGOHM VOLUME CONTROL			N-4907	2 GANG CONDENSER		
R5	N-4061	4.7 MEGOHM	.5 W. 20%					
R6	N-1778	100,000 OHM	.5 W. 20%					
R7	N-4895	10,000 OHM	.5 W. 10%					

MODEL RCU

DIAG. NO.	PART NO.	DESCRIPTION		DIAG. NO.	PART NO.	DESCRIPTION		
C1	N-1345	.05 MFD. 200 V.	20%	R8	N-4068	33 OHM	1.0 W.	20%
C2	N-4957	.09 MFD. 200 V.	-10%+10%	R9	N-4061	4.7 MEGOHM	.5 W.	20%
C3	N-1374	100 MMFD. MICA 500 V.	20%	R10	N-4896	2200 OHM	.5 W.	10%
C4	N-4834	.005 MFD. 600 V.	-15%+40%	R11	N-4899	220,000 OHM	.5 W.	10%
C5	N-2063	.003 MFD. 600 V.	-15%+40%	R12	N-5029	22,000 OHM	.5 W.	5%
C6	N-1367	6 MFD. 150 W.V. ELECTROLYTIC		R13	N-4470	12 MEGOHM	.5 W.	10%
C7	N-4890	.0005 MFD. 600 V.	-25%+60%	R14	N-4897	8,200 OHM	.5 W.	10%
C8	N-1903	.01 MFD. 400 V.	20%	R15	N-4067	180 OHM	.5 W.	10%
C9	N-4927	.015 MFD. 400 V.	20%	R16	N-4027	470,000 OHM	.5 W.	20%
C10	N-1351	.1 MFD. 200 V.	-10%+20%	R17	N-4900	1200 OHM	1. W.	10%
C11	N-1376	.02 MFD. 400 V.	20%	R18	N-4058	33 OHM	1. W.	20%
C12	N-3658	40 MFD. 150 W.V. ELECTROLYTIC						
C13	N-1345	.05 MFD. 200 V.	20%	1	N-4877	LOOP COIL		
C14	N-3658	40 MFD. 150 W.V. ELECTROLYTIC		2	N-4810	OSCILLATOR COIL		
C15	N-1346	.05 MFD. 400 V.	20%	3	N-4872	1ST. I.F. COIL		
				4	N-4873	2ND I.F. COIL		
R1	N-4025	22,000 OHM	.5 W. 20%	5	N-4634	TONE SWITCH		
R2	N-4026	220,000 OHM	.5 W. 20	6	N-4875	OUTPUT TRANSFORMER		
R3	N-4062	3.3 MEGOHM	.5 W. 20%	7	N-4869	5½" P.M. DYNAMIC SPEAKER		
R4	N-4889	0.5 MEGOHM VOLUME CONTROL						
R5	N-4061	4.7 MEGOHM	.5 W. 20%		N-4976	2 GANG CONDENSER		
R6	N-778	100,000 OHM	.5 W. 20%					
R7	N-4895	10,000 OHM	.5 W. 10%					

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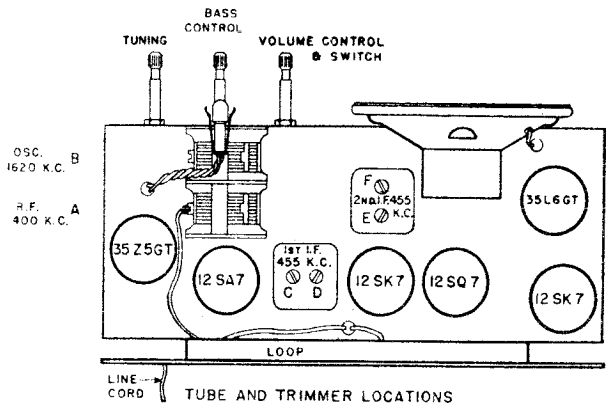
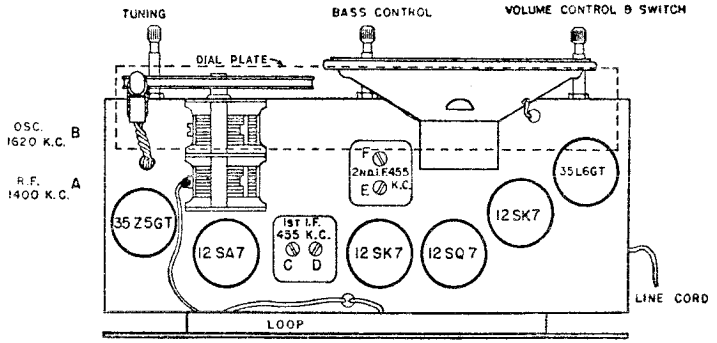
MODEL RCU



TUBE AND TRIMMER LOCATIONS

MODEL RDU



TUBE AND TRIMMER LOCATIONS

MODELS RCU AND RDU

Lack of sensitivity and poor tone quality may be due to any one or a combination of causes such as weak or defective tubes or speaker, open or grounded bias resistor, bypass condenser, etc. Never attempt to realign set until all other possible sources of trouble have been first thoroughly investigated and definitely proved not to be the cause.

NOTE: IT IS ABSOLUTELY NECESSARY THAT AN ACCURATELY CALIBRATED TEST OSCILLATOR WITH SOME TYPE OF OUTPUT MEASURING DEVICE BE USED WHEN ALIGNING THE RECEIVER AND THAT THE PROCEDURE BE CAREFULLY FOLLOWED. OTHERWISE THE RECEIVER WILL BE INSENSITIVE AND THE DIAL CALIBRATION WILL BE INCORRECT. THE TRIMMERS WILL BE REFERRED TO BY THEIR FUNCTION AS INDICATED ON THE PARTS DIAGRAM.

ALIGNMENT PROCEDURE

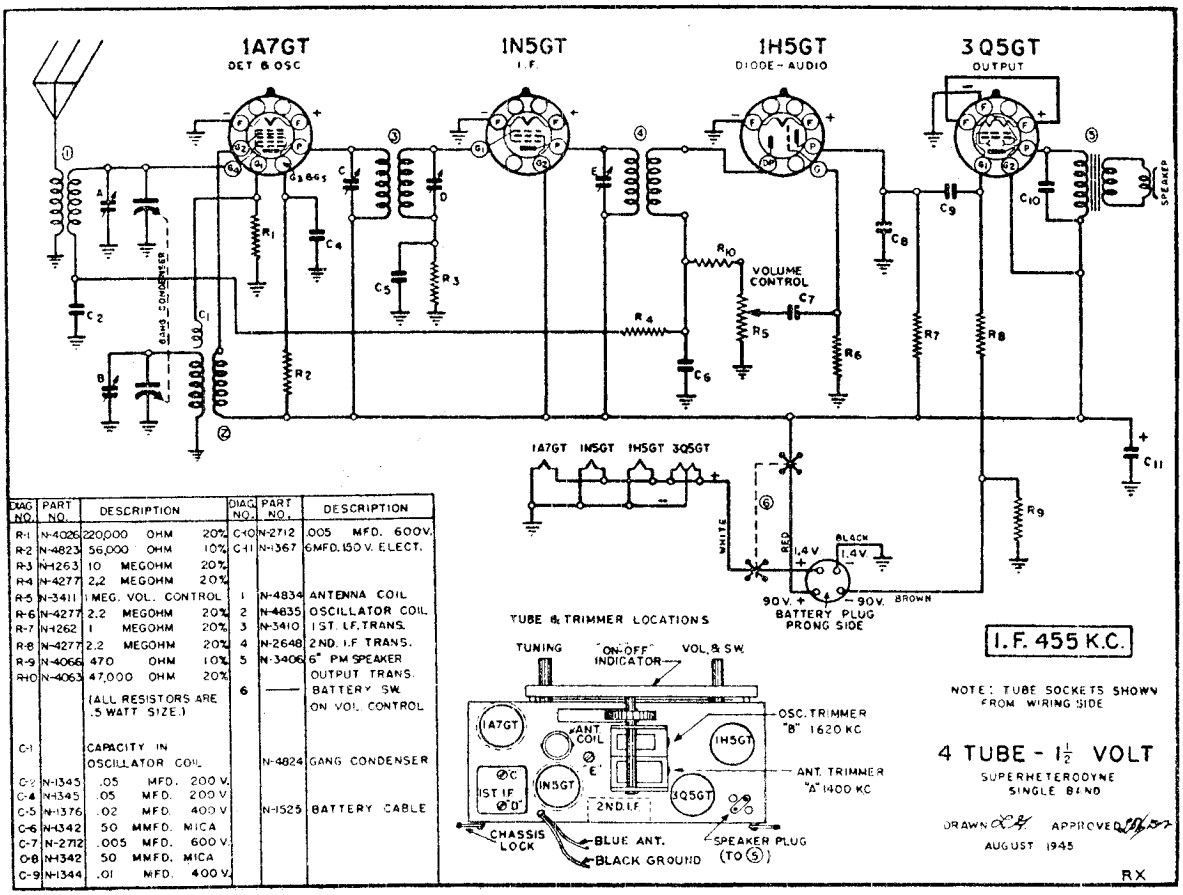
GENERAL DATA. The alignment of this receiver requires the use of a test oscillator that will cover the frequencies of 455, 600, 1400 and 1620 KC and an output meter to be connected across the primary or secondary of the output transformer. If possible, all alignments should be made with the volume control on maximum and the test oscillator output as low as possible to prevent the AVC from operating and giving false readings.

CORRECT ALIGNMENT PROCEDURE. The intermediate frequency (I.F.) stages should be aligned properly as the first step. After the I.F. transformers have been properly adjusted and peaked, the broadcast band should be adjusted.

I. F. ALIGNMENT. Remove the chassis and loop antenna from the cabinet and set them up on the bench so that they occupy exactly the same respective positions on the bench as they did in the cabinet. Care should be taken to have no iron or other metal near the loop. Do not make this set-up on a metal bench. With the gang condenser set at minimum, adjust the test oscillator to 455 KC and connect the output to the grid of the first detector tube (12SA7) through a .05 or .1 mfd. condenser. The ground on the test oscillator should be connected to the ground buss, indicated on the circuit diagram. Align all four I.F. trimmers to peak or maximum reading on the output meter.

BROADCAST BAND ALIGNMENT. Connect the test oscillator to the antenna of the set through a 100 mmfd. (.0001) condenser. With the gang condenser set at minimum capacity, set the test oscillator at 1620 KC, and adjust the oscillator (or 1620 KC trimmer) on gang condenser. Next—set the test oscillator at 1400 KC, and tune in the signal on the gang condenser. Adjust the antenna trimmer (or 1400 KC trimmer) for maximum signal. Next set the test oscillator at 600 KC, and tune in signal on condenser to check alignment of coils.

SONORA RADIO & TELEV. CORP.



DIAG. NO.	PART NO.	DESCRIPTION	DIAG. NO.	PART NO.	DESCRIPTION
R-1	N-4026	220,000 OHM 20%	C-10	N-2712	.005 MFD. 600V.
R-2	N-4823	56,000 OHM 10%	C-11	N-1367	6MFD. 150 V. ELECT.
R-3	N-1263	10 MEGOHM 20%			
R-4	N-4277	2.2 MEGOHM 20%	1	N-4834	ANTENNA COIL
R-5	N-3411	1 MEG. VOL. CONTROL	2	N-4835	OSCILLATOR COIL
R-6	N-4277	2.2 MEGOHM 20%	3	N-3410	1ST. I.F. TRANS.
R-7	N-1262	1 MEGOHM 20%	4	N-2648	2ND. I.F. TRANS.
R-8	N-4277	2.2 MEGOHM 20%	5	N-3406	6" P.M. SPEAKER
R-9	N-4066	470 OHM 10%			OUTPUT TRANS.
R-10	N-4063	47,000 OHM 20%	6	——	BATTERY SW. ON VOL. CONTROL
		(ALL RESISTORS ARE .5 WATT SIZE.)			
C-1		CAPACITY IN OSCILLATOR COIL		N-4824	GANG CONDENSER
C-2	N-1345	.05 MFD. 200 V.			
C-4	N-1345	.05 MFD. 200 V.			
C-5	N-1376	.02 MFD. 400 V.		N-1525	BATTERY CABLE
C-6	N-1342	50 MMFD. MICA			
C-7	N-2712	.005 MFD. 600 V.			
C-8	N-1342	50 MMFD. MICA			
C-9	N-1344	.01 MFD. 400 V.			

ALIGNMENT PROCEDURE

GENERAL DATA. The alignment of this receiver requires the use of a test oscillator that will cover the frequencies of 455, 600, 1400 and 1620 KC and an output meter to be connected across the primary or secondary of the output transformer. If possible, all alignments should be made with the volume control on maximum and the test oscillator output as low as possible to prevent the AVC from operating and giving false readings.

CORRECT ALIGNMENT PROCEDURE. The intermediate frequency (I.F.) stages should be aligned properly as the first step. After the I.F. transformers have been properly adjusted and peaked, the broadcast band should be adjusted.

I. F. ALIGNMENT. Remove the chassis and speaker from the cabinet and connect output meter across primary or secondary of output transformer. With the gang condenser set at minimum, adjust the test oscillator to 455 KC, connect its output to the grid of the first detector tube (1A7GT) through a .05 or .1 mfd. condenser. The ground on the test oscillator should be connected to the chassis ground. Align all three I.F. trimmers to peak or maximum reading on the output meter.

BROADCAST BAND ALIGNMENT. Connect the test oscillator to the antenna lead through a 200 mmfd. (.0002) condenser. With the gang condenser set at minimum capacity, set the test oscillator at 1620 KC, and adjust the oscillator (or 1620 KC trimmer) on gang condenser. Next—set the test oscillator at 1400 KC, and tune in the signal on the gang condenser. Adjust the antenna trimmer (or 1400 KC trimmer) for maximum signal. Next set the test oscillator at 600 KC, and tune in signal on condenser to check alignment of coils.

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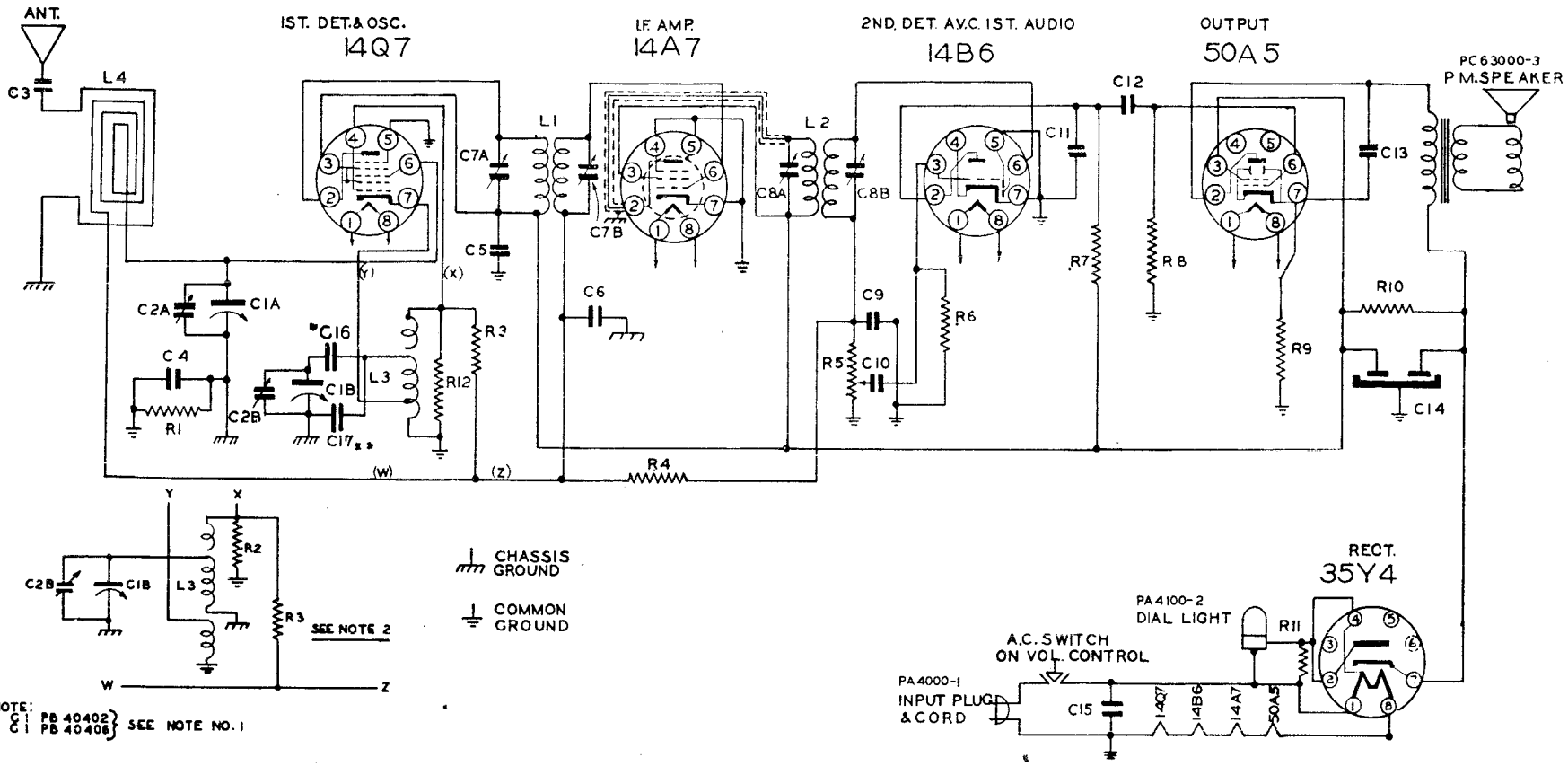
SCHEMATIC DIAGRAM
SPARTON SUPERHETERODYNE MODEL 5-06
INTERMEDIATE FREQUENCY 456K.C.
BOTTOM VIEWS OF ALL SOCKET CONNECTIONS



C1A&B	VARIABLE CONDENSER [SEE NOTE]		
C2A&B	TRIMMERS ON VARIABLE		
C3	.001 MFD. 400 V.	PC 40GL-102	
C4	.15 MFD. 400 V.	PC 40GL-154	
C5	.05 MFD. 200 V.	PC 40GK-503	
C6	.05 MFD. 200 V.	PC 40GK-503	
C7A&B	NO.1 I.F. TRIMMERS	AB 43500-1	
C8A&B	NO.2 I.F. TRIMMERS	AB 43500-2	

C9	270 MMF.	MICA	MC60G-271
C10	.01 MFD.	400 V.	PC 40GL-103
C11	510 MMF.	MICA	MC60G-511
C12	.002 MFD.	400 V.	PC 40GL-202
C13	.01 MFD.	400 V.	PC 40GL-103
C14	ELECT. CONDENSER		PA 4301
	RED 30 MFD.		YELLOW 40 MFD.
C15	.05 MFD.	400 V.	PC 40GL-503
*C16	.05 MFD.	200 V.	PC 40FK-503
* *C17	15 MMF.		PA 4328-1

* SEE NOTE NOTE NO. 2
* * SEE NOTE NOTE NO. 1

R1	150,000 Ω	.5W.	BR12N-154
R2	22,000 Ω	.5W.	BR12S-223
R3	15 MEGOHM	.5W.	BR12S-156
R4	2.2 MEGOHM	.5W.	BR12N-225
R5	.5 MEG. VOL. CONT. & SW.		PA 4400-2
R6	5.6 MEGOHM	.5W.	BR12S-565
R7	220,000 Ω	.5W.	BR12N-224
R8	470,000 Ω	.5W.	BR12N-474
R9	150 Ω	.5W.	BR12S-151
R10	1200 Ω	1W.	CR12S-122
R11	82 Ω	.5W.	BR12S-820
R12	47,000 Ω	.5W.	BR12S-473

L1	NO.1 I.F. COIL ASSEMBLY	AA6800-1
L2	NO.2 I.F. COIL ASSEMBLY	AA6800-2
L3	B.C. OSCILLATOR COIL ASSEMBLY	AB 42200-1 (SEE NOTE NO. 2)
L4	LOOP ASSEMBLY	AB43015-1 } SEE NOTE NO. 1
L4	LOOP ASSEMBLY	AB 43024-1 }

NOTE NO.1. THE FIRST 4,000 UNITS WILL BE ASSEMBLED USING C1 AS PB 40402 AND L4 AS AB 43015-1. AFTER FIRST 4000, C1 WILL BE PB 40406 MOUNTED ON SPECIAL BRACKET PB 41913 AND USING L4 AS AB 43024-1 ELIMINATING USE OF C17 (15 MMF. CONDENSER.)

NOTE NO.2 AFTER 15,000 UNITS USE L3 AS AA 8752-3 AND HOOK UP AS SHOWN IN SECTIONAL DRAWING ELIMINATING C16 CONDENSER.

(Original) June 1, 1946

THE SPARKS WITHINGTON CO.

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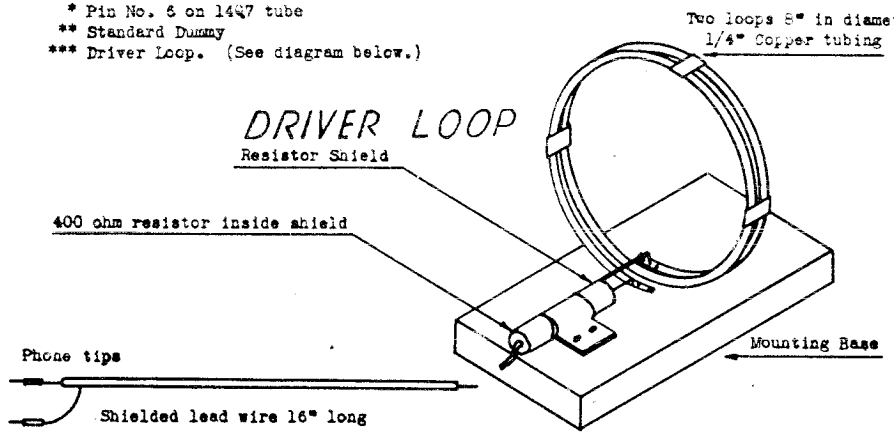
ALIGNMENT DATA

OPERATION	ALIGNMENT OF	GENERATOR CONNECTED TO	DUMMY ANTENNA	GENERATOR FREQUENCY	TUNING COND. SETTING	TRIMMER	REMARKS
1	Set dial pointer with left hand stop line and with condenser closed.						
2	I.F.	*	* *	456 KC	Open	C8A&B	Peak accurately
						C7A&B	Peak accurately
3	B.C.	* * *	Dummy Loop	1500 KC	1500 KC	C2B Osc Trim	Peak accurately
						C2A RF Trim	Peak accurately
4	(Repeat operation 2 and 3)						
5	(Check calibration at 600 KC, 1000 KC and 1500 KC)						
6	(Check operations 1 to 5 inclusive.)						

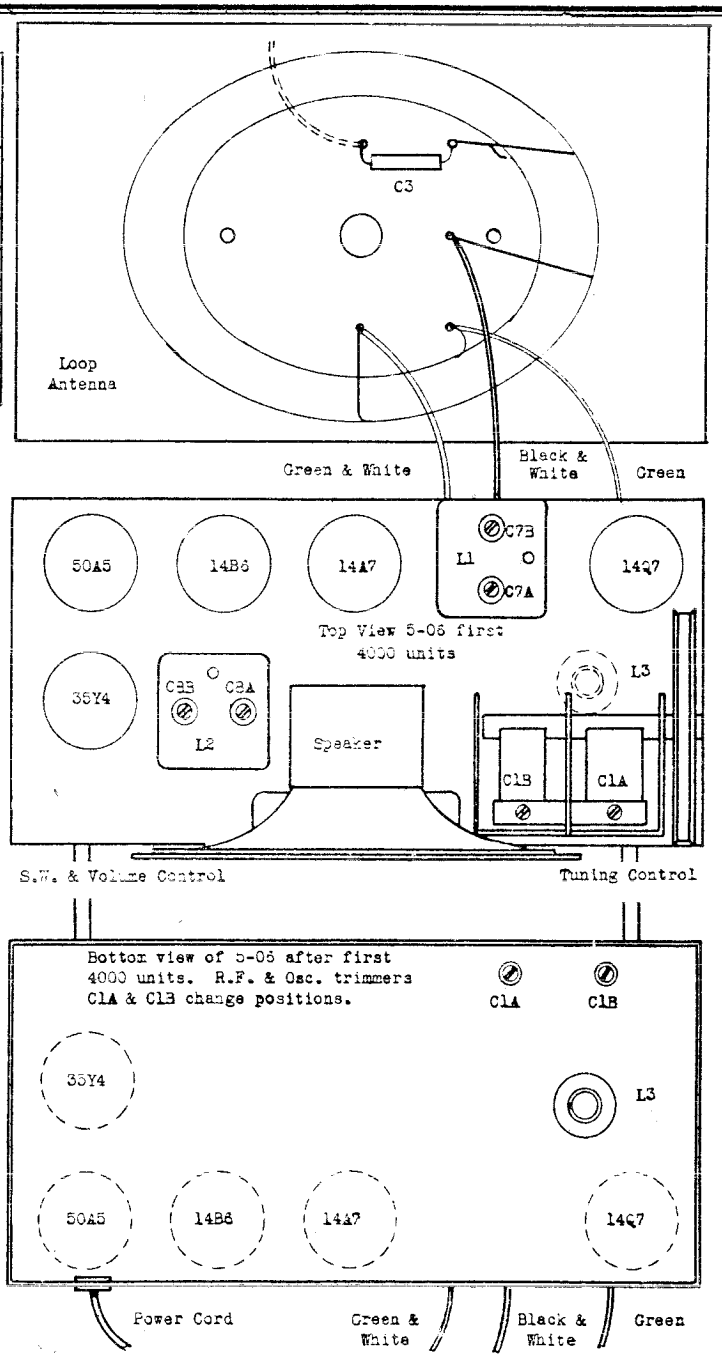
* Pin No. 6 on 14Q7 tube
** Standard Dummy
*** Driver Loop. (See diagram below.)



SPECIFICATIONS

Two loops of 1/4" copper tubing 8" in diameter spaced 1/4" apart with 400 ohms resistor in series. Connecting cable and resistor must be shielded.
The loop should be spaced twice the diameter of the loop from the receiver being aligned to prevent an over modulated signal and poor alignment of the receiver.

Special Note: The first 4,000 units will be assembled using C1 as PB40402 and L4 as AB43015-1. After first 4,000 units C1 will be PB40406 mounted on a special bracket PB41913 and using L4 as AB43024-1. On part No. PB40402 trimmers C1A and C1B are located on top of the tuning condenser, while on PB40406 condenser C1A and C1B are on the bottom of the condenser and must be adjusted from chassis bottom side.



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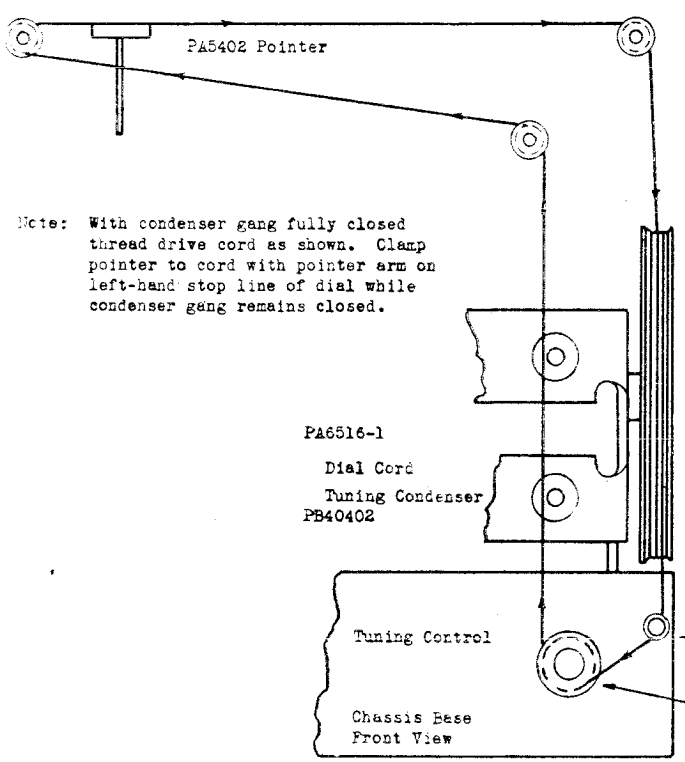
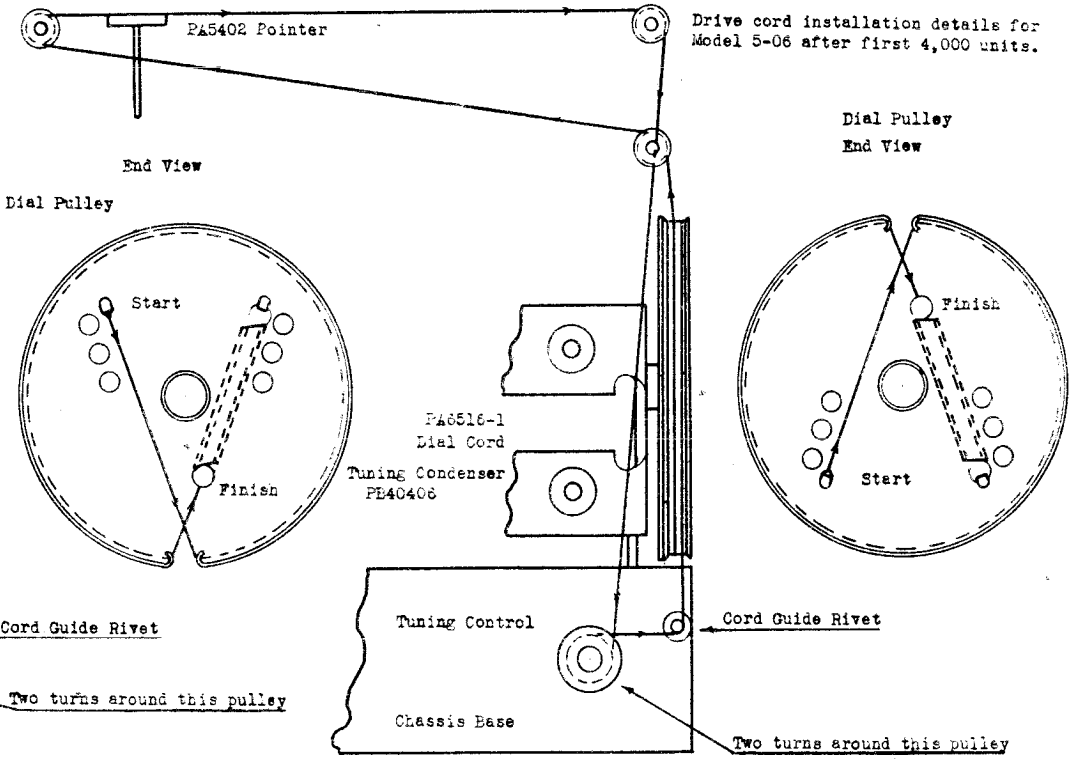
DRIVE CORD INSTALLATION DETAILS FOR MODEL 5-06
FIRST 4,000 UNITS


PA5402 Pointer
Note: With condenser gang fully closed thread drive cord as shown. Clamp pointer to cord with pointer arm on left-hand stop line of dial while condenser gang remains closed.
PA6516-1
Dial Cord
Tuning Condenser
PB40402
Tuning Control
Chassis Base
Front View
Cord Guide Rivet
Two turns around this pulley



VOLTAGE CHART

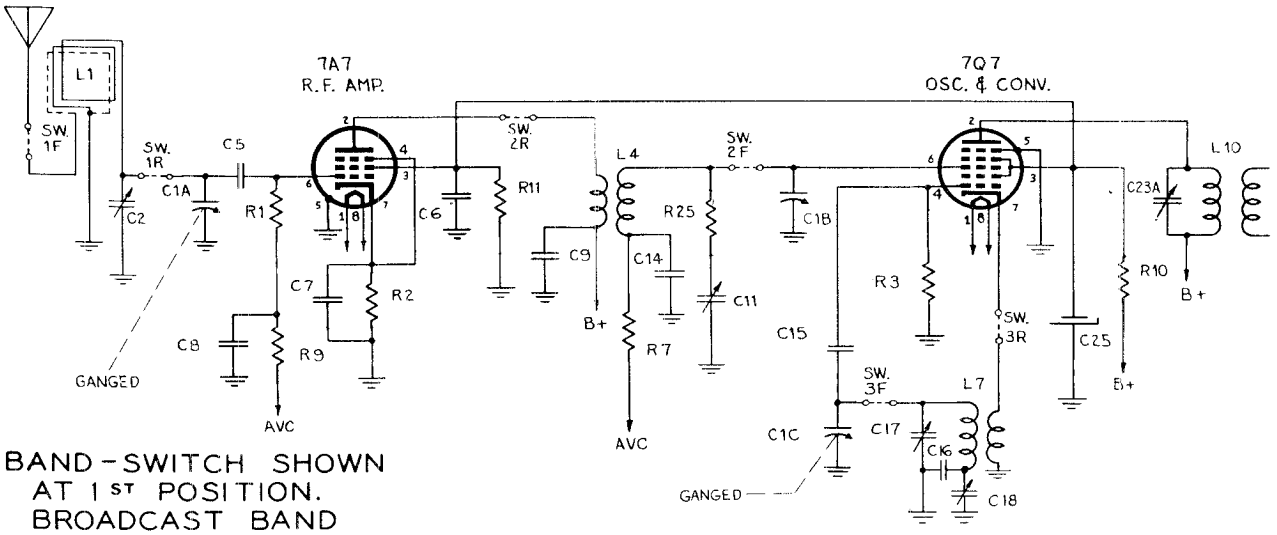
Line Voltage: 117 Volts A.C. Position of Volume Control: Full with set tunned to quiet channel.

TUBE	FUNCTION	Voltage of Socket Prong to Gnd. (See Prong Nos. on Schematic Dia.)							
		No. 1	No. 2	No. 3	No. 4	No. 5	No. 6	No. 7	No. 8
14Q7	1st Det. & Osc.	12*	80	80	* *	0	* *	* *	0
14A7	I.F. Amp.	24*	80	80	0	0	* *	0	36*
14B6	2nd. Det. A.V.C. & 1st audio	24*	55	-.35	0	0	-.35	0	12*
50A5	Power Output	85*	110	85	0	0	* *	5.4	36*
35Y4	Rectifier	117*	110*	0	110*	0	0	115	85*

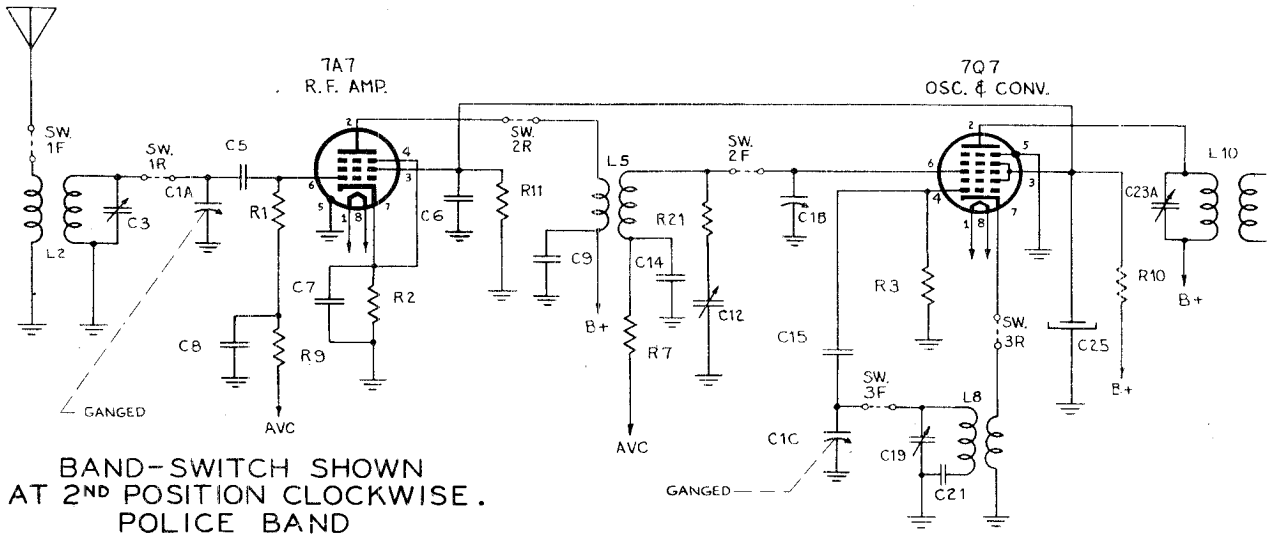
Notes: Voltage readings are for schematic diagram on back of sheet. Allow 15% + or - on all measurements. Always use meter scale which will give greatest deflection within scale limits. All DC measurements made with 20,000 ohms per volt voltmeter. All AC voltages made with rectifier type voltmeter. Unless designated otherwise, voltages in table are + DC voltages.
*AC volts.
**Cannot be measured with 20,000 ohms per volt voltmeter.

MODEL 7-46, 7-46-PA, 846, 846-PA

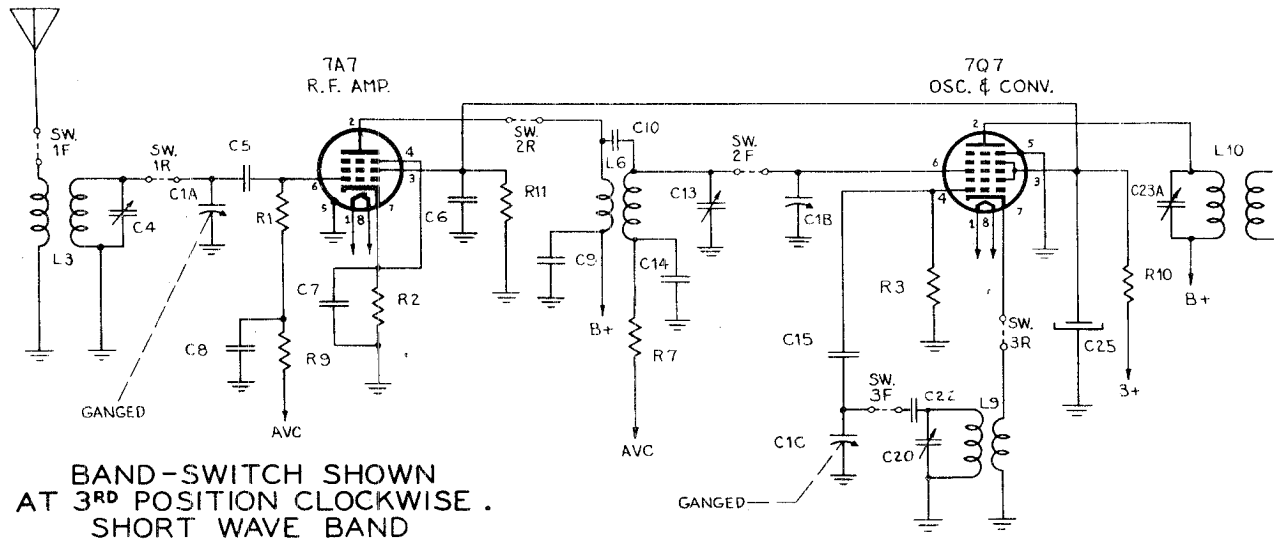
THE SPARKS WITHINGTON CO.



BAND-SWITCH SHOWN AT 1ST POSITION. BROADCAST BAND



BAND-SWITCH SHOWN AT 2ND POSITION CLOCKWISE. POLICE BAND



BAND-SWITCH SHOWN AT 3RD POSITION CLOCKWISE. SHORT WAVE BAND

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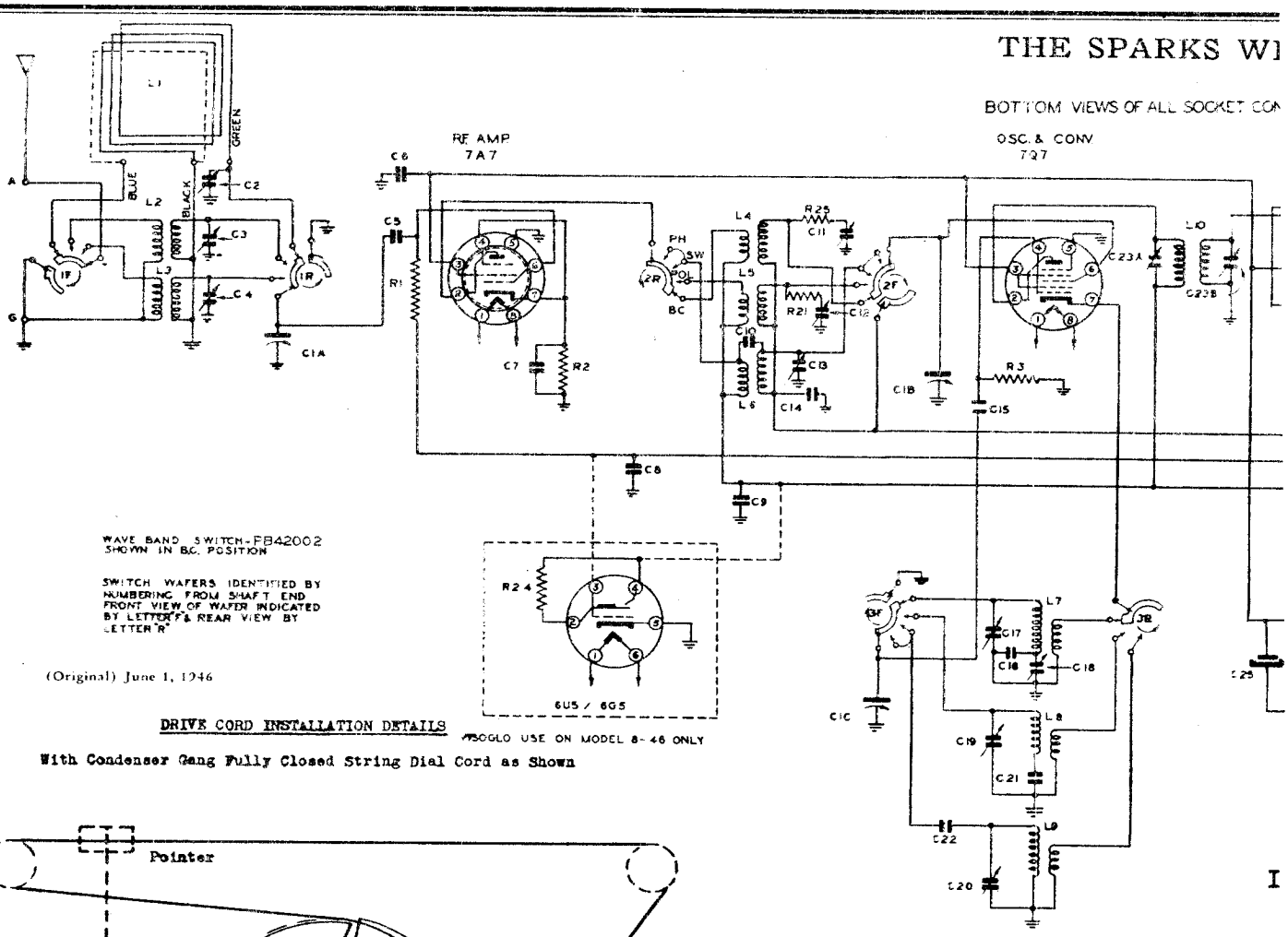
THE SPARKS WI

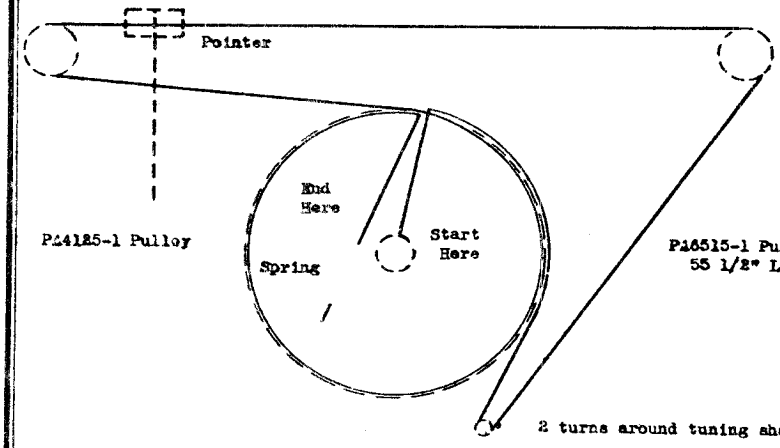
BOTTOM VIEWS OF ALL SOCKET CO


RF AMP
7A7
OSC. & CONV
7Q7
WAVE BAND SWITCH-FB42002
SHOWN IN B.C. POSITION
SWITCH WAFERS IDENTIFIED BY NUMBERING FROM SHAFT END
FRONT VIEW OF WAFER INDICATED BY LETTER 'F' & REAR VIEW BY LETTER 'R'
6U5 / 6G5
#SOGLO USE ON MODEL 8-46 ONLY

(Original) June 1, 1946

DRIVE CORD INSTALLATION DETAILS

With Condenser Gang Fully Closed String Dial Cord as Shown



VOLTAGE CHART

Line Voltage: 117 Volts A.C. Position of Volume Control: Full with dial tuned to Quiet Channel
Position of Band Switch: Broadcast

TUBE	FUNCTION	Voltage of socket prongs to Gnd, See prong on schematic dia.							
		No. 1	No. 2	No. 3	No. 4	No. 5	No. 6	No. 7	No. 8
7A7	R. F. Amp.	0	230	63	2.8	0	**	2.8	6*
7Q7	Osc-Conv.	0	230	63	-6	0	-.6	*	6*
7A7	I. F. Amp.	0	230	63	2.3	0	**	2.3	6*
7B6	Det-AVC-1st Audio	0	100	**	0	**	0	0	6*
6F8	Push Pull Output	0	0	247	220	**	**	6*	14
6F6	Push Pull Output	0	0	247	227	**	0	6*	14
5Y3	Rectifier	0	325	0	320*	0	320*	0	325

NOTES: Voltage readings are for schematic diagram in this bulletin. Allow 15% + or - on all measurements. Always use meter scale which will give greatest deflection within scale limits. All DC measurements made with 20,000 ohms per volt voltmeter. All AC voltages made with rectifier type voltmeter.
* AC Volts.
** Cannot be measured with 20,000 Ohms per volt voltmeter.

I

Descript

Coil - Ant. (Pol.
Coil - Ant. (S.W.
Coil - Det. (B.C.
Coil - Det. (Pol.
Coil - Det. (S.W.
Coil - Osc. (B.C.
Coil - Osc. (Pol.
Coil - Osc. (S.W.
Coil - No. 1 I.F. trimmer, less sl
Coil - No. 2 I.F. trimmer, less sl
Condenser - Elect
Condenser - Padde
Condenser - Padde
Condenser - Trimm (Osc.
Condenser - Varia
Control - Tone &
Control - Volume
Dial Chart - Hori Reac
Dial Chart - Vert Reac

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THINGTON CO.

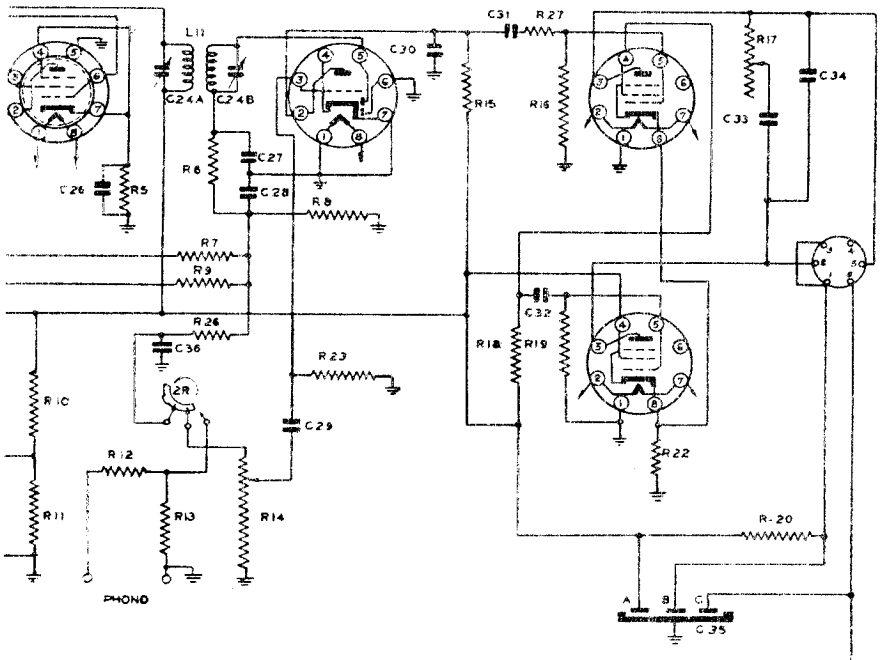
MODELS 7-46, 7-46-PA, 846, 846-PA

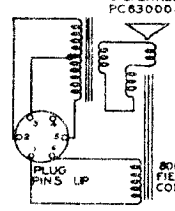
ECTIONS

F AMP
7A7

DET AVC & 1ST AUDIO
7B6

PUSH PULL OUTPUT
TWO 6F6G/GT

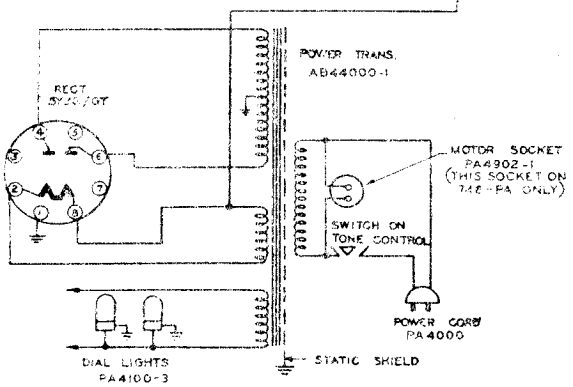




L1	LOOP	ANTENNA	AB43011-1
L2	POL.	ANT. COIL	AA6754-1
L3	SW.	ANT. COIL	AA6758-1
L4	BC.	DET. COIL	AA6756-1
L5	POL.	DET. COIL	AA6757-1
L6	SW.	DET. COIL	AA6760-1
L7	BC.	OSC. COIL	AA6759-1
L8	POL.	OSC. COIL	AA6755-1
L9	SW.	OSC. COIL	AA6753-2
L10	NO.1	I.F. COIL	AA6800-5
L11	NO.2	I.F. COIL	AA6800-6

C1ABC	VARIABLE	CONDENSER	PB40400-1
C2	BC. ANT.	TRIMMER	
C3	POL. ANT.	TRIMMER	PA4353-1
C4	SW. ANT.	TRIMMER	
C5	240 MMF.	MICA.	MC60G-241
C6	.05 MFD.	400V.	PC40HL-503
C7	.05 MFD.	200V.	PC40HK-503
C8	.05 MFD.	200V.	PC40HK-503
C9	.05 MFD.	400V.	PC40HL-503
C10	.5 MMF.	MICA.	MC60G-050
C11	BC. DET.	TRIMMER	PA4358-2
C12	POL. DET.	TRIMMER	
C13	SW. DET.	TRIMMER	
C14	.05 MFD.	200V.	PC40HK-503
C15	51 MMF.	MICA.	MC60F-510
C16	240 MMF.	MICA.	MC60G-241
C17	BC. OSC.	TRIMMER	AB43503-36
C18	BC. OSC.	PADDER	
C19	POL. OSC.	TRIMMER	PA4357-1
C20	SW. OSC.	TRIMMER	
C21	1680 MMF.	MICA.	PA4354-2
C22	3320 MMF.	MICA.	PA4354-1
C23AB	NO.1 I.F.	TRIMMER	AB43500-44
C24AB	NO.2 I.F.	TRIMMER	AB43500-55
C25	4 MFD.	400V ELECT.	PA4303-1
C26	.05 MFD.	200V.	PC40HK-503
C27	100 MMF.	MICA.	MC60F-101
C28	100 MMF.	MICA.	MC60F-101
C29	.02 MFD.	200V.	PC40GK-203
C30	100 MMF.	MICA.	MC60F-101
C31	.05 MFD.	400V.	PC40GL-503
C32	.05 MFD.	400V.	PC40GL-503
C33	.02 MFD.	600V.	PC40GM-203
C34	.002 MFD.	600V.	PC40GM-202
C35A	15 MFD.	450V.	
C35B	10 MFD.	450V.	PA4300-1
C35C	15 MFD.	450V.	
C36	100 MFD.	MICA.	MC60F-101

R1	1 MEGOHM	.5W	BR12S-105
R2	820Ω	.5W	BR12S-821
R3	20000Ω	.5W	BR12S-203
	DELETE		
R5	560Ω	.5W	BR12S-561
R6	18000Ω	.5W	BR12S-183
R7	3.3MEGOHM	.5W	BR12S-335
R8	180000Ω	.5W	BR12S-184
R9	3.3MEGOHM	.5W	BR12S-335
R10	16000Ω	2W	DR12G-163
R11	22000Ω	1W	DR12G-223
R12	270000Ω	.5W	BR12S-274
R13	270000Ω	.5W	BR12S-274
R14	2 MEGOHM VOL. CONT.		PA4401-2
R15	270000Ω	.5W	BR12S-274
R16	470000Ω	.5W	BR12S-474
R17	.25MEG. TONE	CONT. & SW.	PA4404-1
R18	2000Ω	.5W	BR12G-202
R19	470000Ω	.5W	BR12S-474
R20	1000Ω	.5W	DR12S-102
R21	150Ω	.5W	BR12S-151
R22	240Ω	2W	DR12G-241
R23	10 MEGOHM	.5W	BR12S-106
R25	330Ω	.5W	BR12S-331
R26	18000Ω	.5W	
R27	1000Ω	.5W	BR12S-102
FOR 8-46 ADD			
R24	1 MEGOHM	.5W	BR12S-105



F PEAK 456 KC

ion	
)	AA6754-1
)	AA6758-1
)	AA6756-1
)	AA6757-1
)	AA6760-1
)	AA6759-1
)	AA6755-1
)	AA6753-2
(with nield)	AB43501-5
(with nield)	AB43501-6
rolytic	PA4300-1
r 3330 MMF	PA4354-1
r 1660 MMF	PA4354-2
ner Padder - B.C.)	AB43503-36
ible	PB40400-1
A.C. Sw.	PA4404-1
	PA4401-2
zontal ling	PC60001
al	
g	PC60006

Description	Part Number
Model "K" Automatic Record Changer	PD93100
Dial Glass - Cabinet	PB41909
Fly Wheel & Shaft Assy. Tuning	AA6735-1
Knob - Control (3) Walnut	PA5602-1
Knob - Control (3) Mahog.	PA5602-2
Knob - Wave Band Sw. (1) Walnut	PA5603-1
Knob - Wave Band Sw. (1) Mahogany	PA5603-2
Loop - Ant.	AB43011-1
Pointer & Slide Assy.	AA6700-1
Speaker - Complete (10")	PC63000-1
Switch - Wave Band	PB42002
Transformer - Power (60 cy.)	AB44000-1
Transformer - Speaker	PC63000-1-3

* Complete speakers may be returned to factory Service Dept for repair or replacement.

Record Changer: Seeburg Model K

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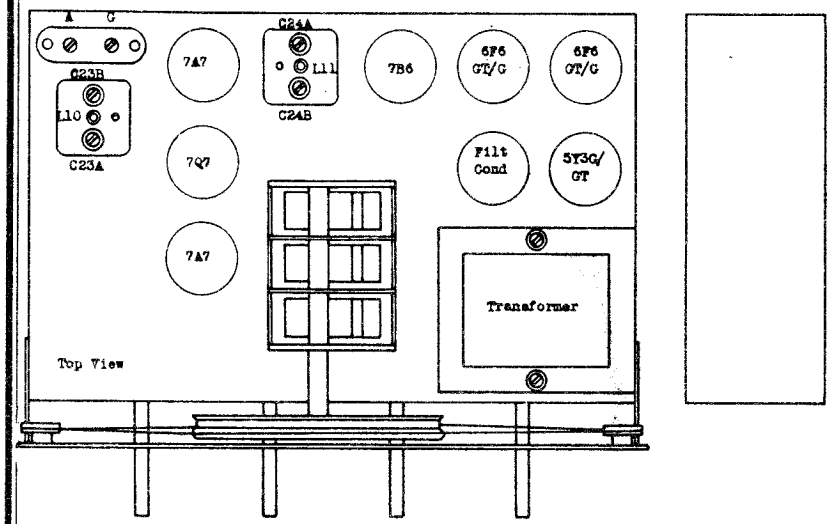
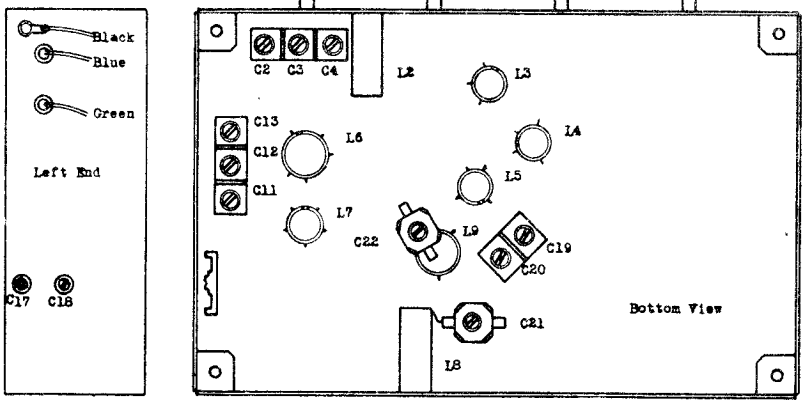
CHASSIS DIAGRAM

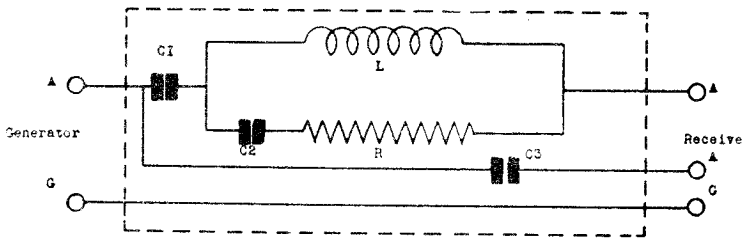




OPERATION	ALIGNMENT OF	GENERATOR CONNECTED TO	DUMMY ANTENNA	GENERATOR FREQUENCY	BAND SWITCH SETTING	TUNING CONDENSER SETTING	TRIMMERS	REMARKS
1	Set dial pointer even with stop line when condenser gang is fully meshed.							
2	I.F.	*	1.mf cond.	456KC	BC	Open	C24 A&B	Peak Accurately
							C23 A&B	" "
3	Broadcast Band	Ant.	See note	1500KC	BC	1500KC	C17 Osc.Trim	" "
							C11 Det.Trim	" "
							C2 Ant.Trim	" "
4				600KC	BC	600KC	C18 Osc. Pad.	Rock **
5	(Repeat operation 3).							
6	Check Calibration at 600 KC, 1000 KC and 1500 KC.							
7	Police Band	Ant.	See note	5 MC	Police Band	5 MC	C19 Osc.Trim	Peak Accurately
							C12 Det.Trim	Rock **
							C3 Ant.Trim	Rock **
							C21 Osc.Pad	See operation #8
8	Oscillator Padder C21 is precision set at the factory and should not be readjusted in the field.							
9	(Repeat operation 7).							
10	Check Calibration at 1.8 MC and 5 MC.							
11	SW Band	Ant.	See note	18 MC	SW Band	18 MC	C20 Osc.Trim	Peak Accurately
							C13 Det.Trim	Rock **
							C4 Ant.Trim	Rock **
							C22 Osc.Pad	See operation #12
12	Oscillator Padder C22 is precision set at the factory and should not be readjusted in the field.							
13	(Repeat operation 11).							
14	Check Calibration and at 6 MC and 18 MC.							
15	Check operations 1 to 11 inclusive.							

NOTES: Use Dummy Antenna as described on page No. 1 of this bulletin.
* Connect generator to pin #6 on 7Q7 Osc-conv. tube.
** Rock dial while adjusting for maximum output.

DUMMY ANTENNA



Note: When using this dummy antenna the generator output impedance should be 10 Ohms or lower.

C1 - 200 mmf. Condenser 400 V.D.C.
C2 - 400 mmf. Condenser 400 V.D.C.
C3 - .02 mmf. Condenser 400 V.D.C.
R - 100 Ohms Resistor 1/4 Watt
L - 20 Microhenryies Choke

---- Case Shield
Choke Coil Specifications
Tubing - 3/8" diameter bakelite
Wire - No. 38 Enameled
Turns - 50 closely wound (Impregnated)

SPIEGEL

MODEL F Compact
MODEL P Compact
Battery Eliminators

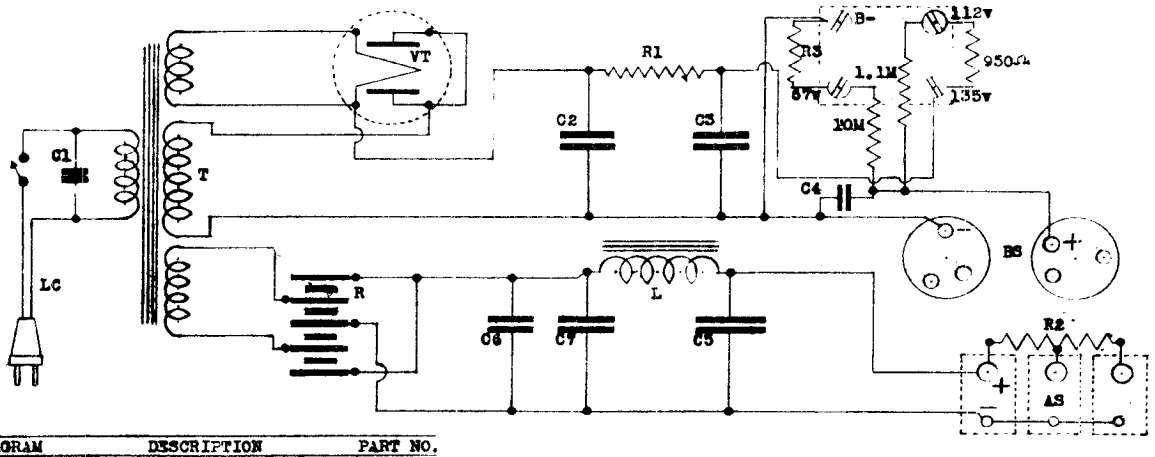


DIAGRAM	DESCRIPTION	PART NO.
LC	Line cord and switch	1601
C1	Condenser .05 mfd 400v	1602
C2,C3,C4	Condenser 20-10-10- 150v	1603
C5	Condenser 1000 mfd 2v	1605
C6	Condenser .25 mfd 180v	1612
C7	Condenser 1000 mfd 3v	1604
R1	Resistor 1600 ohms 1w	1606
R2	Resistor 1.5 ohms tapped	1618
R3	Resistor, voltage divider	1613
R	Rectifier	1608
T	Transformer	1609
VT	Tube 5Y3 GT	1610
L	Filter choke	1611
AS	"A" socket	1614
BH	Battery plug harness	1515
BS	"B" socket	1616
S	Tube socket	1617

MODEL "F" COMPACT

Operates any 2 Volt—4, 5, 6 or 7 tube battery radio from 115 v. 60 cy. source.

For use in receivers employing 1A4, 1C7, 1D5, 1E5 1F5, 1F7, 1H4G, etc., tubes to change radio into an all-electric set giving maximum performance at all times. Inexpensive to operate. Excellent to use when AC current is available and save batteries for occasions when used as portable.

TECHNICAL DATA

Primary
115 Volts A.C. @ 60 cycles.

Specifications
6 foot cord and plug—switch in cord.
Size: 2⅜" x 4½" x 8¼".
Weight packed—5½ pounds.

"A" Supply Output
7 tubes . . . . . 2V. @ 480ma.
6 tubes . . . . . 2V. @ 420ma.
4-5 tubes (average) . . . . . 2V. @ 325ma.

"B" Supply Output
67, 90, 112, 135 Volts D.C. @ 18ma.

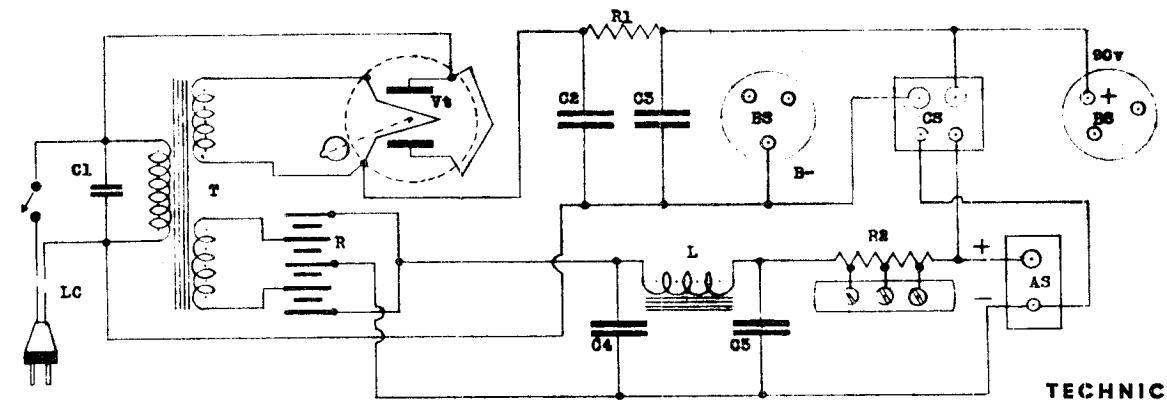


DIAGRAM	DESCRIPTION	PART NO.
LC	Line cord and switch	1501
C1	Condenser .05 mfd 400v	1502
C2, C3	Condenser 20-10 mfd 150v	1516
C4, C5	Condenser 2x1000 mfd 6-3v	1504
R1	Resistor 2500 ohms 1w	1505
R2	Resistor 3.8 ohms tapped	1517
T	Transformer	1506
R	Rectifier	1507
VT	Tube 5Y3 GT	1509
L	Filter choke	1510
AS	"A" socket	1511
BH	Battery plug harness	1512
BS	"B" socket	1513
S	Tube socket	1514
CS	"AB" socket	1515

MODEL "P" COMPACT

Operates any 1.4 volt—4, 5 or 6 tube battery radio from 115 v. 60 cy. source.

Designed for sets using 1A7, 1E4, 1N5G, 1Q5G, etc., tubes to convert battery radio to an efficient AC receiver with low operating cost. Fits in battery compartment of most radios. Ideal for use in home, hotel, camp or any place where normal AC is available.

TECHNICAL DATA

"A" Supply Output
5-6 tubes (average) . 1.4V. @ 275ma
4 tubes . . . . . 1.4V. @ 250ma
4 tubes . . . . . 1.4V. @ 200ma

"B" Supply Output
90 Volts D.C. @ 12 ma. max.

Primary
115 Volts A.C. @ 60 cycles.

Specifications:
Six foot cord and plug—switch in cord.
Size: 2⅜" x 3½" x 6¾".
Weight packed—3½ pounds.

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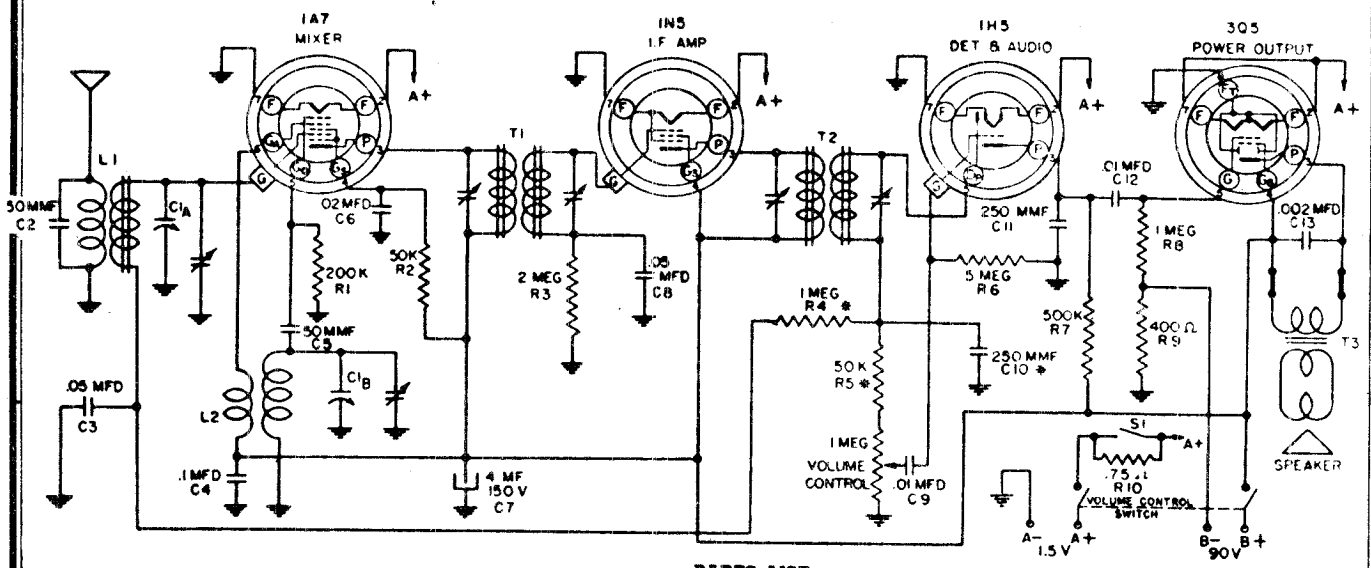
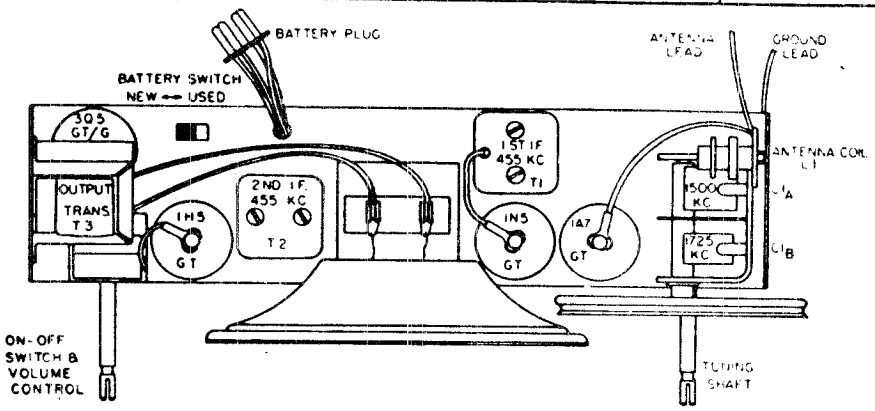
MODEL PX

SPIEGEL



PARTS LIST

Code	Part No.	DESCRIPTION	Code	Part No.	DESCRIPTION	Code	Part No.	DESCRIPTION
C1A C1B	B19-185	Variable Condenser	R1		200 K Ohm 1/3 Watt Carbon Resistor	L1	A10-414	Antenna Coil
C2		50 MMFD Mica Condenser (Part of L1)	R2		50 K Ohm 1/3 Watt Carbon Resistor	L2	A10-415	Oscillator Coil
C3 C8		05 MFD 200 V Tubular Condenser	R3		2 Megohm 1/3 Watt Carbon Resistor	T1	B10-416	1st I.F. Transformer
C4		1 MFD 200 V Tubular Condenser	R4		1 Megohm 1/3 Watt Carbon Resistor (Part of T-2)	T2	B10-417	2nd I.F. Transformer
C5		50 MMFD Mica Condenser	R5		50 K Ohm 1/3 Watt Carbon Resistor (Part of T-2)	T3	A80-218	Speaker Output Transformer
C6		02 MFD 400 V Tubular Condenser	R6		.5 Megohm 1/3 Watt Carbon Resistor	S1	A69-164	Battery Switch
C7	A18-273	4 MFD 150 V Electrolytic Condenser	R7		500 K Ohm 1/3 Watt Carbon Resistor		A24-165	Volume Control and Switch
C9 C12		01 MFD 400 V Tubular Condenser	R8		1 Megohm 1/3 Watt Carbon Resistor		B79-335	Speaker
C10		250 MMFD Mica Condenser (Part of T-2)	R9		400 Ohm 1/3 Watt Carbon Resistor			
C11		250 MMFD Mica Condenser	R10	A60-69	.75 Ohm 1 Watt Resistor			
C13		.002 MFD 600 V Tubular Condenser						



ALIGNMENT PROCEDURE

With an output meter connected across the voice coil of the speaker, the output meter reading for 50 milliwatts is .4 volts using a signal which is modulated 30% at 400 c.p.s. Follow through the procedure as outlined below for proper alignment.

Connect the signal generator to the grid cap of the 1A7 GT Tube through a .1 MFD. Condenser. Connect the ground lead of the generator to the chassis. Adjust the signal generator to 455 K.C. and set the variable condenser of the receiver to minimum capacity (fully opened). With the volume control full on and minimum output from the signal generator adjust the two trimmers on top of the first and second I.F. transformers for maximum output.

Now connect the signal generator to the antenna connection of the receiver through a .00025 condenser. Adjust the signal generator frequency to 1725 K. C. and set the variable condenser to minimum capacity (fully opened), and adjust the oscillator trimmer (C1B) for maximum output. Set signal generator to 1500 K. C. and tune receiver to signal. Adjust the antenna trimmer (C1A) on the variable condenser for maximum output.

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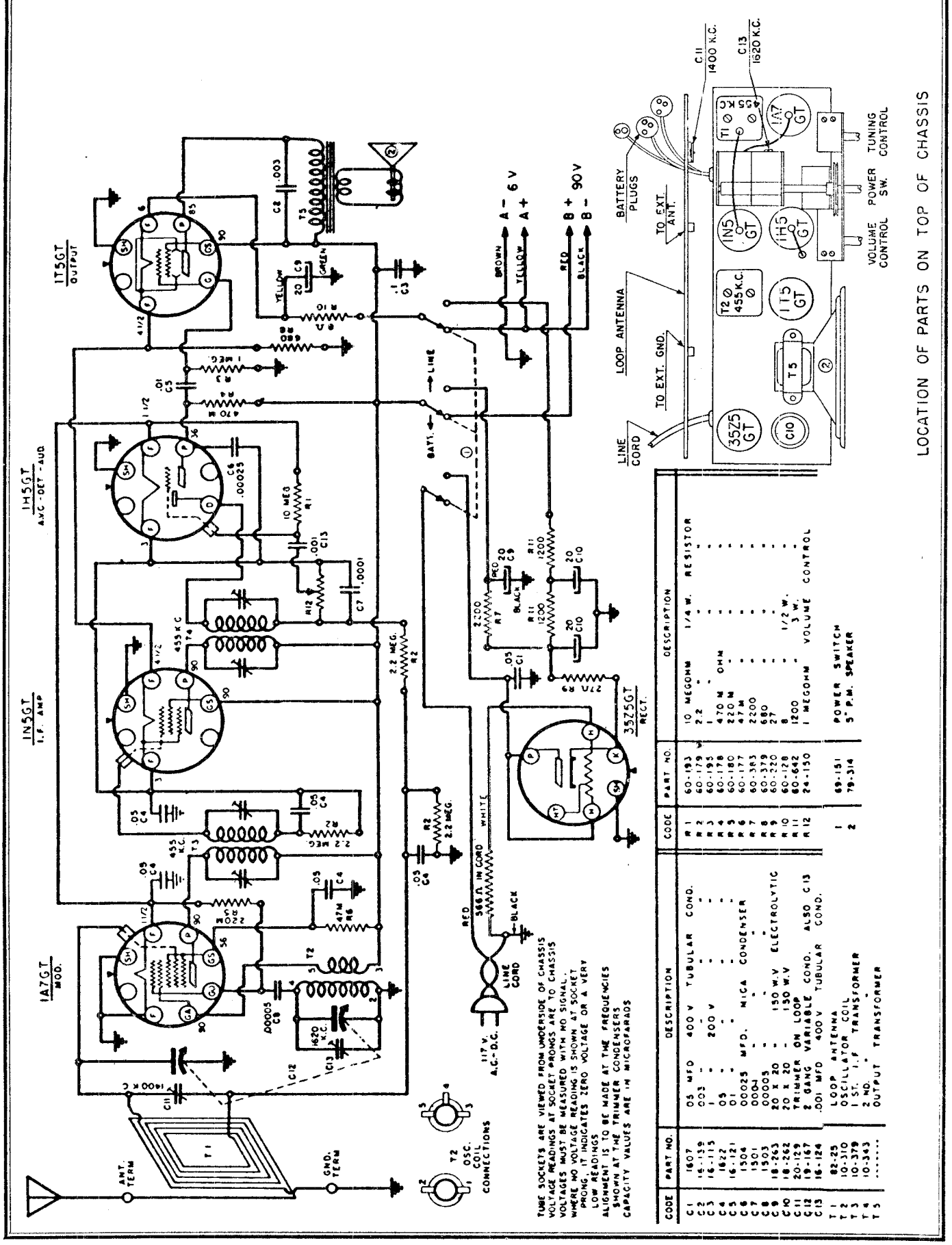
MODEL 1-53

SPIEGEL



CODE	PART NO.	DESCRIPTION
C1	1607	.05 MFD 400 V TUBULAR COND.
C2	16-139	.003 " " " "
C3	16-115	.1 " 200 V " "
C4	1622	.05 " " " "
C5	16-121	.01 " " " "
C6	1504	.00025 MFD. MICA CONDENSER
C7	1501	.0001 " " "
C8	1503	.00005 " " "
C9	18-263	20 X 20 " 150 W.V ELECTROLYTIC
C10	18-262	20 X 20 " 150 W.V "
C11	20-129	TRIMMER ON LOOP COND. ALSO C13
C12	19-167	2 GANG VARIABLE COND.
C13	16-124	.001 MFD 400 V TUBULAR COND.
T1	82-25	LOOP ANTENNA
T2	10-310	OSCILLATOR COIL
T3	10-379	1 ST. I.F. TRANSFORMER
T4	10-343	2 ND. " "
T5	.....	OUTPUT TRANSFORMER

CODE	PART NO.	DESCRIPTION
R1	60-193	10 MEGOHM 1/4 W. RESISTOR
R2	60-179	2.2 " " " "
R3	60-195	1 " " " "
R4	60-178	470 M OHM " "
R5	60-180	220 M " " "
R6	60-177	47 M " " "
R7	60-383	2200 " " "
R8	60-379	680 " " "
R9	60-320	27 " " "
R10	60-128	8 " 1/2 W. "
R11	60-642	1200 " 3 W. "
R12	24-150	1 MEGOHM VOLUME CONTROL
1	69-151	POWER SWITCH
2	79-314	5" P.M. SPEAKER

LOCATION OF PARTS ON TOP OF CHASSIS

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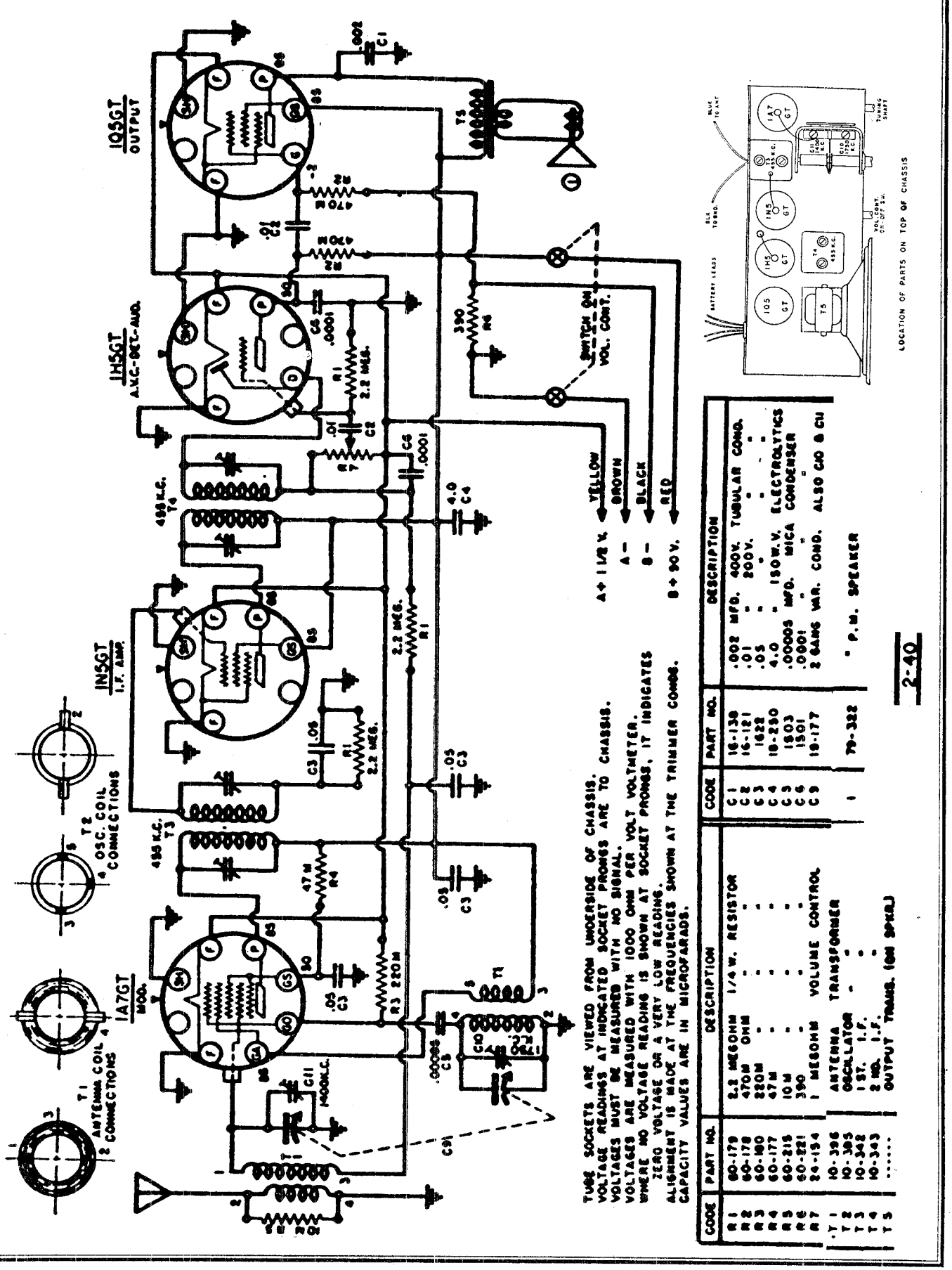
MODEL 1-421

SPIEGEL


1A7GT MOD.
1N5GT I.F. AMP
1N5GT A.V.C.-DET.-AUD.
19SGT OUTPUT
T1 ANTENNA COIL 2 CONNECTIONS
T2 4 OSC. COIL CONNECTIONS
455 K.C. T3
455 K.C. T4
SWITCH ON VOL. CONT.
YELLOW
BROWN
BLACK
RED
A+ 1 1/2 V.
A-
B-
B+ 90 V.
TUBE SOCKETS ARE VIEWED FROM UNDERSIDE OF CHASSIS.
VOLTAGE READINGS AT INDICATED SOCKET PRONGS ARE TO CHASSIS.
VOLTAGES MUST BE MEASURED WITH NO SIGNAL.
VOLTAGES ARE MEASURED WITH 1000 OHM PER VOLT VOLTMETER.
WHERE NO VOLTAGE READING IS SHOWN AT SOCKET PRONGS, IT INDICATES ZERO VOLTAGE OR A VERY LOW READING.
ALIGNMENT IS MADE AT THE FREQUENCIES SHOWN AT THE TRIMMER CONDS.
CAPACITY VALUES ARE IN MICROFARADS.
LOCATION OF PARTS ON TOP OF CHASSIS
2-40

CODE	PART NO.	DESCRIPTION
R1	60-179	2.2 MEGOHM 1/4 W. RESISTOR
R2	60-178	470M OHM " " "
R3	60-180	220M " " "
R4	60-177	47M " " "
R5	60-215	10M " " "
R6	60-221	390 " " "
R7	24-154	1 MEGOHM VOLUME CONTROL
T1	10-336	ANTENNA TRANSFORMER
T2	10-305	OSCILLATOR "
T3	10-342	1ST. I.F. "
T4	10-343	2 ND. I.F. "
T5	.....	OUTPUT TRANS. (SEE SPKR.)

CODE	PART NO.	DESCRIPTION
C1	16-138	.002 MFD. 400V. TUBULAR COND.
C2	16-121	.01 " 200V. " "
C3	1622	.05 " " " "
C4	18-230	4.0 " 150 W.V. ELECTROLYTICS
C5	1803	.00005 MFD. MICA CONDENSER
C6	1501	.0001 " "
C9	19-177	2 GANG VAR. COND. ALSO C10 & C11
-	79-322	" P.M. SPEAKER

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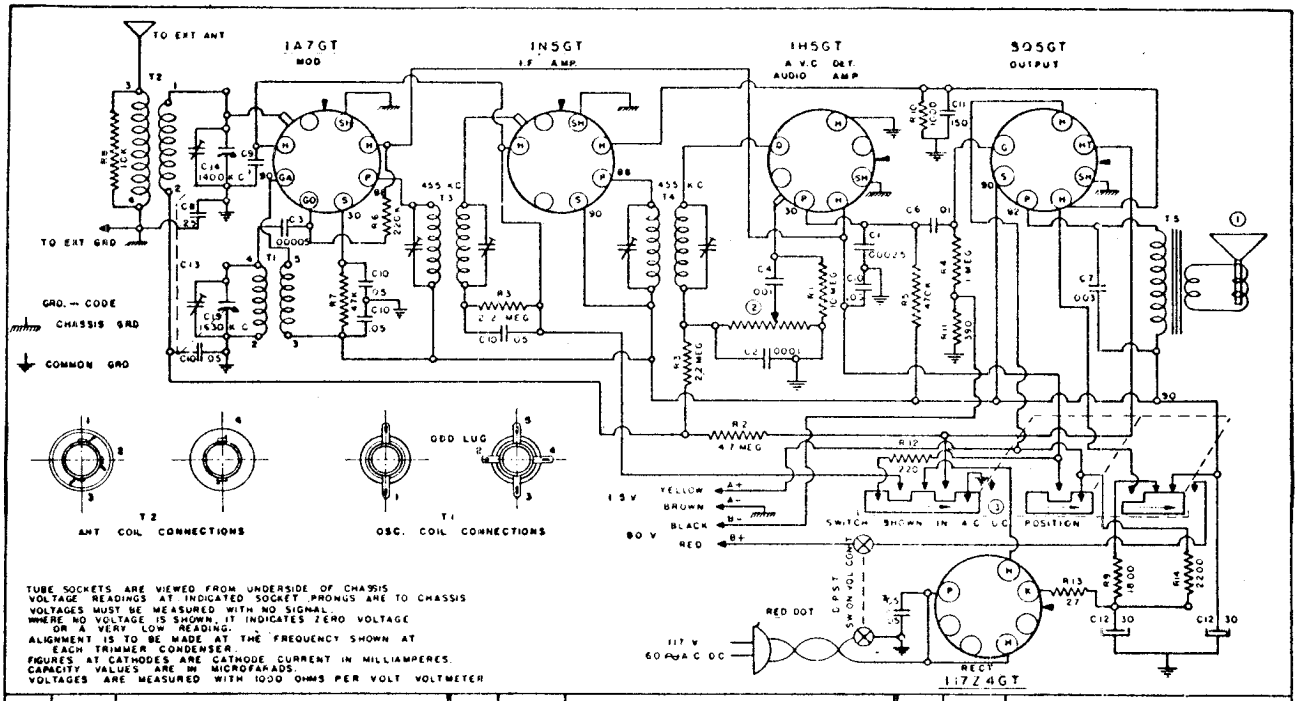
SPIEGEL

MODELS 2-560 to 2-569 inclusive

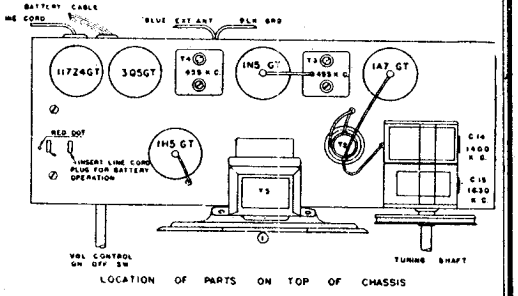


CODE	PART NO.	DESCRIPTION
R1	60-193	10 MEGOHM 1/4 WATT RESISTOR
R2	60-269	4.7 - - -
R3	60-179	2.2 - - -
R4	60-195	1 - - -
R5	60-178	470K OHM - -
R6	60-180	220K - - -
R7	60-177	47K - - -
R8	60-215	10K - - -
R9	60-257	1800 - - -
R10	60-381	1000 - - -
R11	60-221	390 - - -
R12	60-190	220 - - -
R13	60-651	27 - - -
R14	60-652	2200 OHM 8 WATT RESISTOR
C1	1504	.00025 MFD MICA CONDENSER
C2	1501	.0001 - - -
C3	1503	.00005 - - -
C4	16-108	.001 MFD 600V. TUBULAR CONDENSER
C5	1607	.05 - 400V - -
C6	16-119	.01 - - - -
C7	16-139	.003 - - - -
C8	16-120	.25 - 200V - -
C9	16-115	1 - - - -
C10	1622	.05 - - - -
C11	18-271	150 MFD 25 W.V. ELECTROLYTIC
C12	18-266	30 X 30 " 150 W.V. ELECTROLYTIC
C13	19-178	2 GANG VARIABLE CONDENSER (ALSO C14 & C15)
T1	10-395	OSCILLATOR COIL
T2	10-396	ANTENNA COIL
T3	10-342	1ST I.F. TRANSFORMER
T4	10-405	2ND I.F. TRANSFORMER
T5		OUTPUT TRANSFORMER (ON SPKR.)
1	79-326	5" P.M. SPEAKER
2	24-162	1 MEGOHM VOLUME CONTROL (WITH SW.)
3	69-158	SWITCH (A.C.-D.C. BATTERY)

PARTS PRICE LIST

Part No.	Description	Price
18-266	30 & 30 mfd. 150 w.v. Elec.	$1.50
18-271	150 mfd. 25 w.v. Elec.	1.25
24-162	Volume Control	.88
69-158	A.C.-D.C. Battery Switch	1.25
10-395	Osc. Coil	.75
10-396	Ant. Coil	.75
10-342	1st I.F. Transformer	1.25
10-405	2nd I.F. Transformer	1.25
79-326	5" P.M. Speaker	4.00
19-178	Variable Condenser	3.00

Prices subject to change without notice.



LOCATION OF PARTS ON TOP OF CHASSIS

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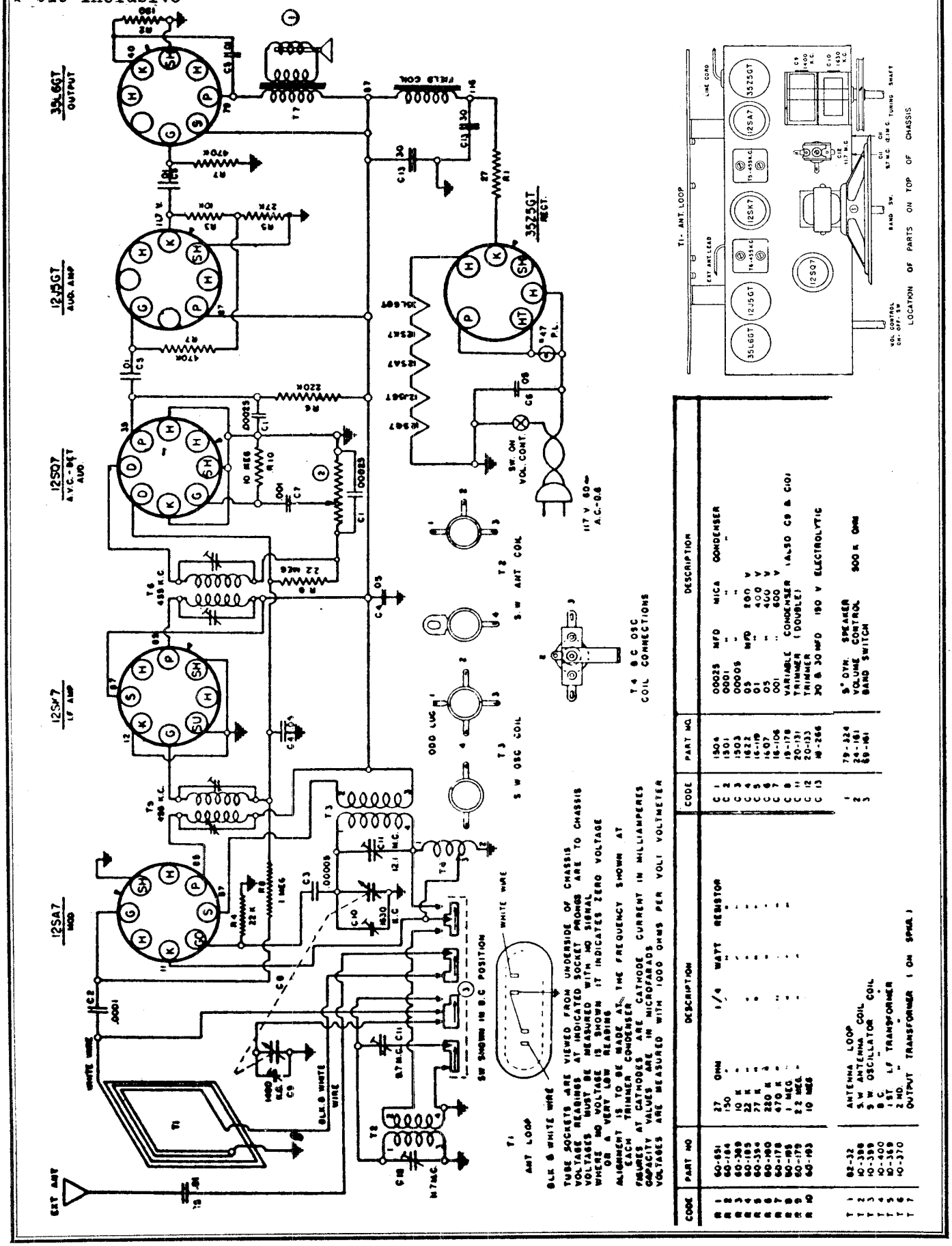
MODELS 2-610 to
2-619 inclusive

SPIEGEL


35L6GT OUTPUT
12J5GT AUD. AMP
12SQ7 AVC-DET AUD
12SK7 I.F. AMP
12SA7 MOD
35Z5GT RECT.
T1 ANT LOOP
T2 S.W. ANT COIL
T3 S.W. OSC COIL
T4 B.C. OSC COIL CONNECTIONS
T5 456 K.C.
T6 456 K.C.
T7 456 K.C.
T8 1700 K.C.
SW. ON VOL. CONT.
117 V 60~ A.C.-D.C.
EXT. ANT.
WHITE WIRE
BLK. & WHITE WIRE
BLK. & WHITE WIRE
SW SHOWN IN B.C. POSITION
ODD LUG #1
TUBE SOCKETS ARE VIEWED FROM UNDERSIDE OF CHASSIS
VOLTAGE READINGS AT INDICATED SOCKET PROBES ARE TO CHASSIS
VOLTAGES MUST BE MEASURED WITH NO SIGNAL
WHERE NO VOLTAGE IS SHOWN IT INDICATES ZERO VOLTAGE OR A VERY LOW READING
ALIGNMENT IS TO BE MADE AT THE FREQUENCY SHOWN AT EACH TRIMMER CONDENSER
FIGURES AT CATHODES ARE CATHODE CURRENT IN MILLIAMPERES
CAPACITY VALUES ARE IN MICROFARADS
VOLTAGES ARE MEASURED WITH 1000 OHMS PER VOLT VOLTMETER
T1 - ANT. LOOP
EXT. ANT. LEAD
LINE CORD
VOL. CONTROL ON-OFF SW.
BAND SW.
LOCATION OF PARTS ON TOP OF CHASSIS

CODE	PART NO	DESCRIPTION	CODE	PART NO	DESCRIPTION
R 1	60-151	27 OHM 1/4 WATT RESISTOR	C 1	1504	.00025 MFD MICA CONDENSER
R 2	60-164	150 " " " "	C 2	1501	.0001 " " "
R 3	60-309	10 K " " " "	C 3	1503	.00005 " " "
R 4	60-185	22 K " " " "	C 4	1622	.05 " 600 V
R 5	60-334	77 K " " " "	C 5	16-119	.01 " 400 V
R 6	60-190	220 K " " " "	C 6	1607	.05 " 400 V
R 7	60-178	470 K " " " "	C 7	16-106	.001 " 600 V
R 8	60-196	1 MEG " " " "	C 8	18-178	VARIABLE CONDENSER (ALSO C9 & C10)
R 9	60-179	2.2 MEG " " " "	C 11	20-131	TRIMMER (DOUBLE)
R 10	60-193	10 MEG " " " "	C 12	20-133	TRIMMER
			C 13	40-266	30 & 30 MFD 150 V ELECTROLYTIC
T 1	82-32	ANTENNA LOOP	1	79-324	5" DYN. SPEAKER
T 2	10-398	S.W. ANTENNA COIL	2	24-161	VOLUME CONTROL 500 K OHM
T 3	10-399	S.W. OSCILLATOR COIL	3	69-161	BAND SWITCH
T 4	10-400	B.C. " "			
T 5	10-369	1ST I.F. TRANSFORMER			
T 6	10-368	2ND. " "			
T 7	10-370	OUTPUT TRANSFORMER (ON SPKR.)			

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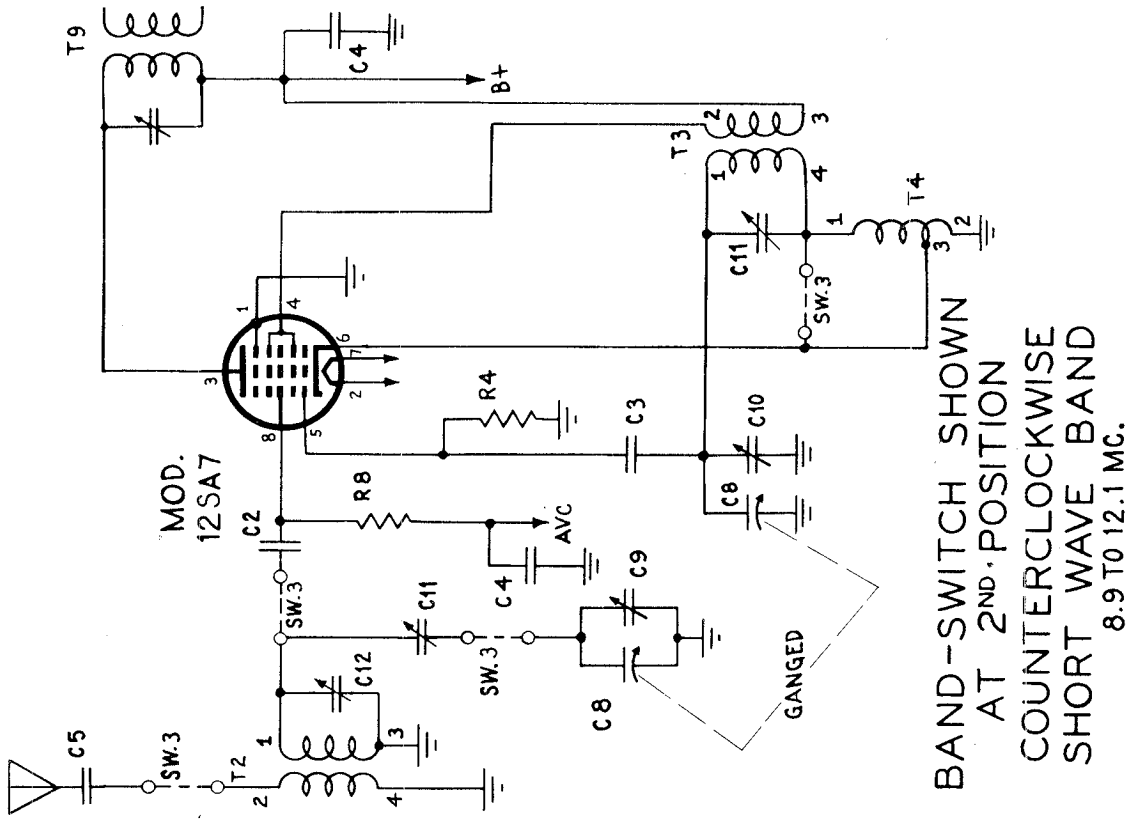
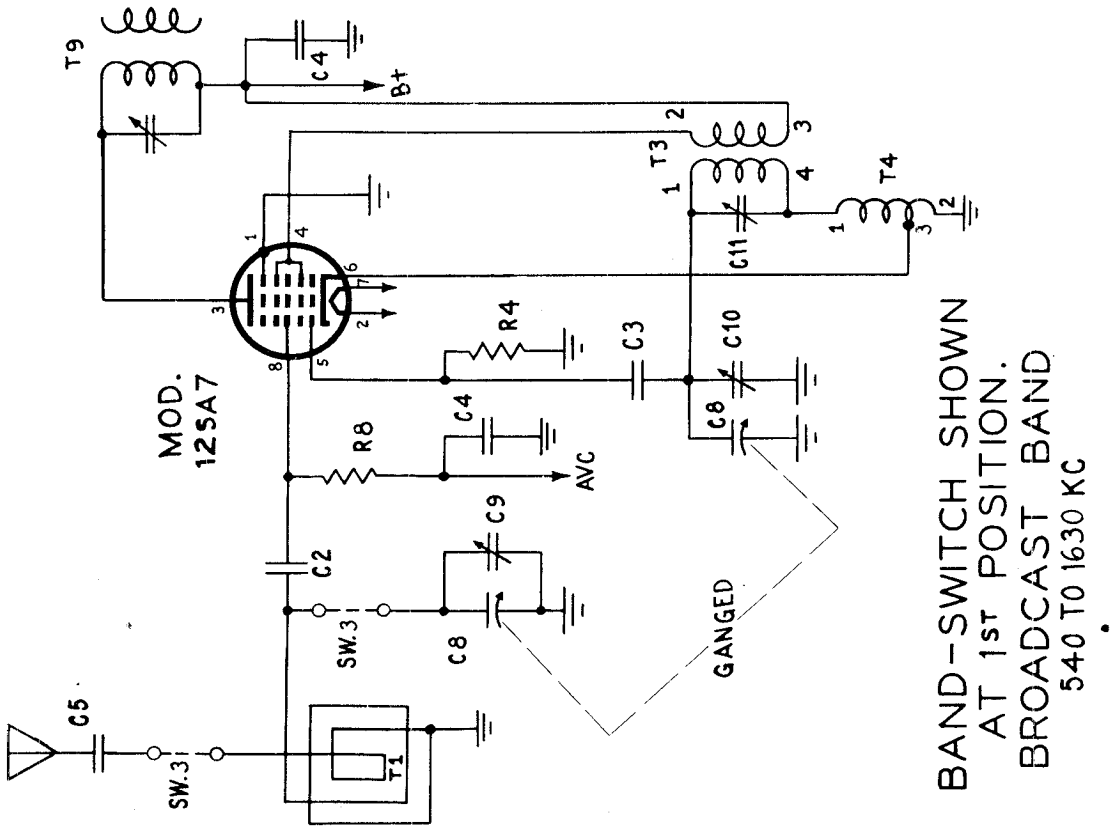
MODELS 2-610 to 2-619 inclusive

SPIEGEL





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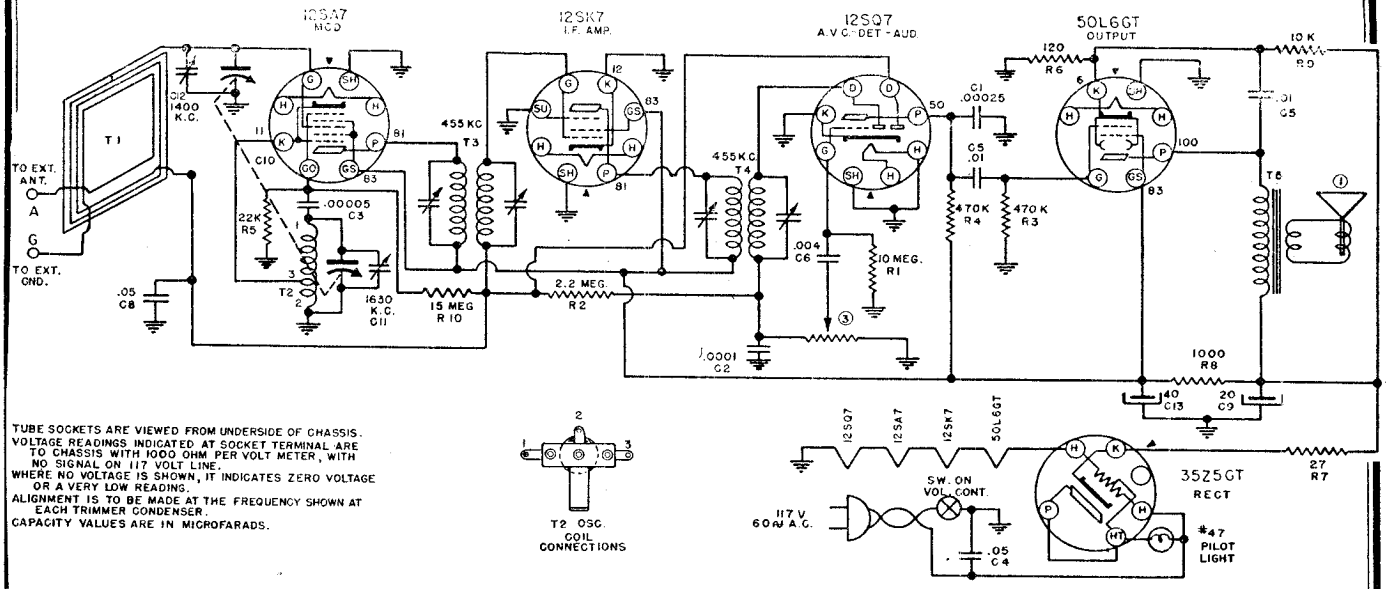
MODEL 106B

SPIEGEL



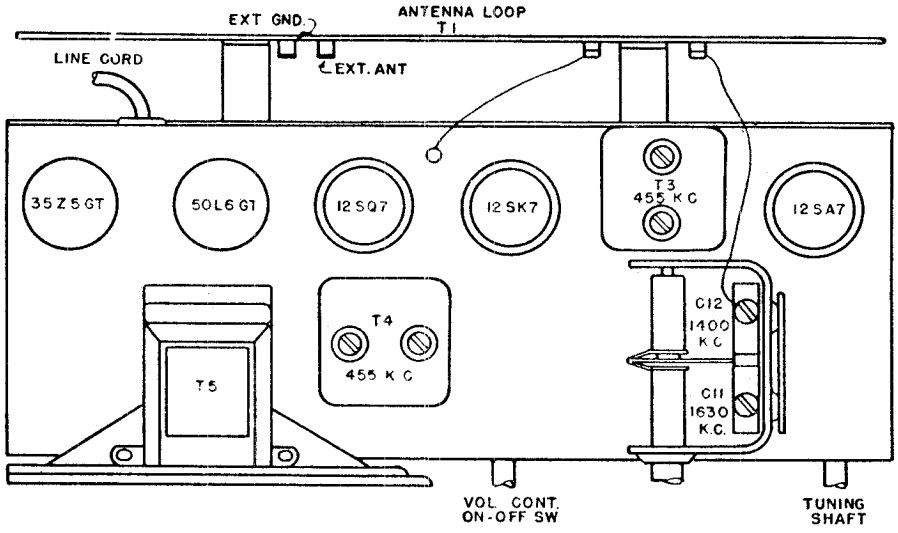
TUBE SOCKETS ARE VIEWED FROM UNDERSIDE OF CHASSIS.
VOLTAGE READINGS INDICATED AT SOCKET TERMINAL ARE TO CHASSIS WITH 1000 OHM PER VOLT METER, WITH NO SIGNAL ON 117 VOLT LINE.
WHERE NO VOLTAGE IS SHOWN, IT INDICATES ZERO VOLTAGE OR A VERY LOW READING.
ALIGNMENT IS TO BE MADE AT THE FREQUENCY SHOWN AT EACH TRIMMER CONDENSER.
CAPACITY VALUES ARE IN MICROFARADS.

C73-18

CODE	PART NO.	DESCRIPTION
R1		10 MEGOHM 1/4 WATT RESISTOR
R2		2.2 " " "
R3		470K " "
R4		470K " "
R5		22 K " "
R6		120 " "
R7		27 " "
R8		1000 1/2 WATT "
R9		10 K 1 WATT "
R10		15 MEG 1/3 WATT "

CODE	PART NO.	* DESCRIPTION
C1		.00025 MFD. MICA CONDENSER
C2		.0001 " " "
C3		.00005 " " "
C4		.05 MFD. 400V. TUBULAR CONDENSER
C5		.01 " " " "
C6		.004 " " " "
C7		
C8		.05 " 200 V. " "
C9	18-272	20 MFD. 150 W.V. ELECTROLYTIC
C10	19-177	2 GANG VARIABLE CONDENSER (ALSO C11 & C12)
C13	18-280	40 MFD. 150 W.V. ELECTROLYTIC

CODE	PART NO	DESCRIPTION
T1	82-30	LOOP ANTENNA
T2	10-394	OSCILLATOR COIL
T3	10-369	1ST. I.F. TRANSFORMER
T4	10-370	2 ND I.F. TRANSFORMER
T5	80-212	OUTPUT TRANSFORMER USED WITH 79-307A SPR.
①	B 79-339	5" P.M. SPEAKER WITH A80-224 OUTPUT TRANS.
	79-307A	5" P.M. SPEAKER
③	24-153	500K OHM VOLUME CONTROL (WITH SW.)



B73-19

ALIGNMENT PROCEDURE

CAUTION: This is an A.C./D. C. receiver and when aligning the set it is necessary to **isolate the Signal Generator or the receiver from the line by use of a transformer, or place a .2 MFD. condenser in both test leads of the Signal Generator.**

Connect the Signal Generator through a .1 MFD. condenser to the variable condenser side of the loop. Connect the ground side of the Signal Generator to the chassis. Adjust the Signal Generator to 455 Kilocycles and set the variable condenser of the receiver to minimum capacity (fully opened). With volume control full on and minimum output from the Signal Generator adjust the two trimmers on top of the 1st and 2nd I.F. transformers (T3-T4) for maximum output. Now connect the Signal Generator through a .00025 condenser to the **external** antenna connection on the back of the loop. Connect ground side of Signal Generator to terminal marked "G" on back of loop. Adjust frequency to 1630 K. C., set variable condenser at minimum capacity (fully opened) and adjust the oscillator trimmer (C11) for maximum output. Set Signal Generator to 1400 K.C., tune receiver to signal and adjust the Antenna trimmer (C12) on top of the variable condenser for maximum output.

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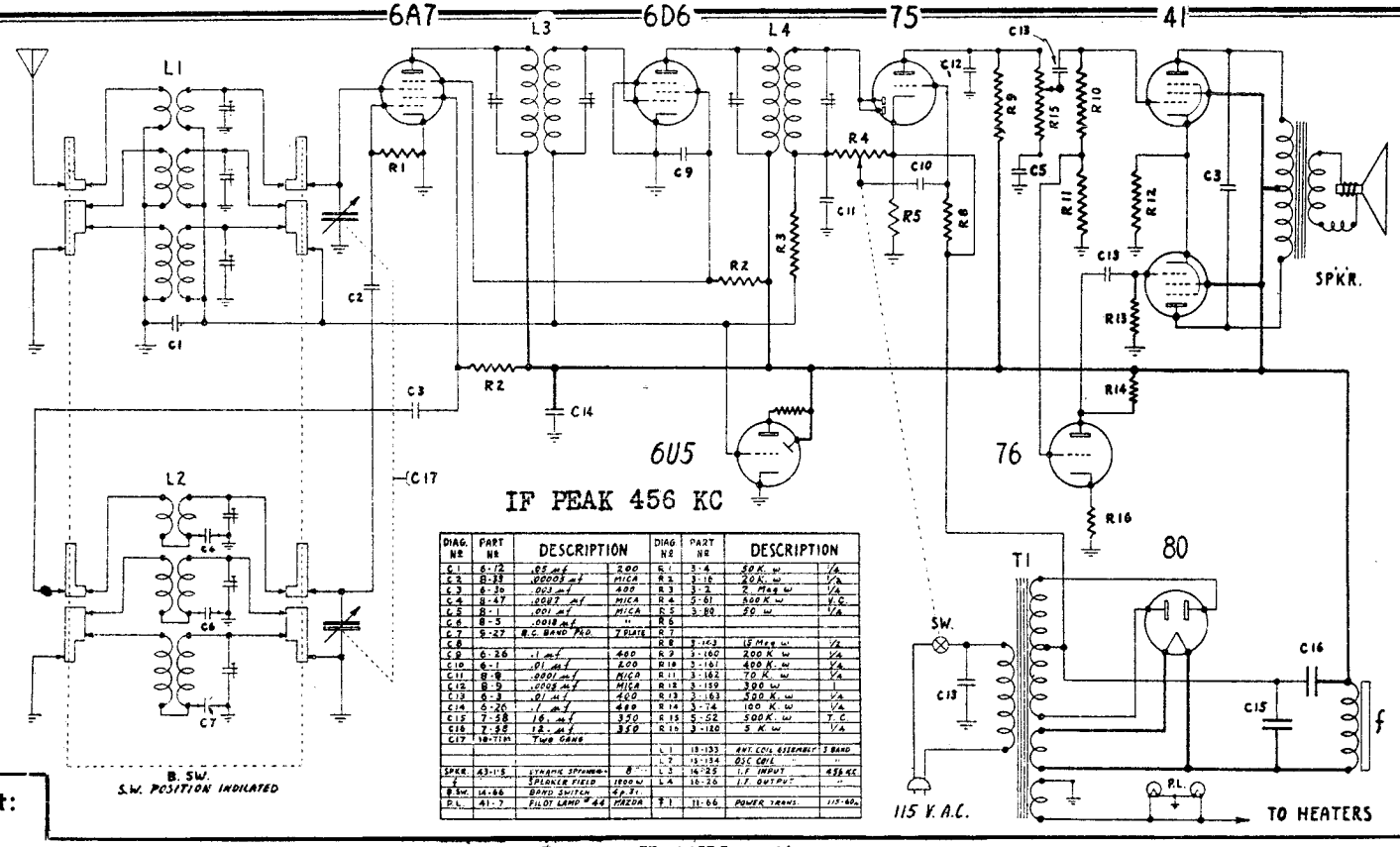


DIAG. NR	PART NR	DESCRIPTION		DIAG NR	PART NR	DESCRIPTION	
C 1	6-12	.05 mf	200	R 1	3-4	20 K. w	1/4
C 2	6-39	.00025 mf	MICA	R 2	3-16	10 K. w	1/4
C 3	6-30	.005 mf	400	R 3	3-2	2. Meg w	1/4
C 4	6-47	.00025 mf	MICA	R 4	5-61	500 K w	V.C.
C 5	6-1	.001 mf	MICA	R 5	3-80	50 w	1/4
C 6	6-5	.0018 mf	"	R 6			
C 7	5-27	B.C. BAND PAD.	TRIMR.	R 7			
C 8				R 8	3-143	15 Meg w	1/4
C 9	6-26	.1 mf	400	R 9	3-160	200 K w	1/4
C 10	6-1	.01 mf	600	R 10	3-161	400 K w	1/4
C 11	6-9	.0001 mf	MICA	R 11	3-162	70 K. w	1/4
C 12	6-9	.0002 mf	MICA	R 12	3-159	300 w	1
C 13	6-3	.01 mf	400	R 13	3-163	500 K w	1/4
C 14	6-26	.1 mf	400	R 14	3-74	100 K w	1/4
C 15	7-58	16 mf	350	R 15	5-52	500 K w	T.C.
C 16	7-58	12 mf	350	R 16	3-120	5 K w	1/4
C 17	18-7134	TWO GANG					
				L 1	18-133	ANT. COIL ASSEMBLY	3 BAND
				L 2	18-134	OSC COIL	"
SPKR.	43-115	DYNAMIC SPEAKER	8 "	L 3	16-125	I.F. INPUT	456 KC
f		SPEAKER FIELD	1800 w	L 4	16-36	I.F. OUTPUT	"
B.SW.	14-66	BAND SWITCH	4 p. 3 t.				
P.L.	41-7	PILOT LAMP #44	MAZDA	T 1	11-66	POWER TRANS.	115-60~

Parts List:

C —Two gang variable cond. with trimmers. C-6.032

C 1—.002 Mfd., 200V paper

C 2—.02 Mfd., 400V paper

C 3—.02 Mfd., 400V paper

C 4—.00025 Mfd., mica

C 5—.005 Mfd., 600V paper

C 6—.005 Mfd., 400V (or 600V) paper

C 7—.00025 Mfd., mica

C 8—.25 Mfd. (or .20 Mfd.), 200V paper

C 9—.05 Mfd., 400V, molded bakelite

C10, 11—Dual 40 Mfd., 150V A-25.019

*C12—50 Mmf., 20%

R 1—22K, 1/4W, 20%

R 2—10 meg, 1/4W, 20%

R 3—3.3 meg, 1/4W, 20%

R 4—500K variable, audio taper, with SPST A-9.066

R 5—470K, 1/4W, 20%

R 6—470K, 1/4W, 20%

R 7—150 ohms, 1/2W, 10%

R 8—10 meg, 1/4W, 20%

R 9—220K, 1/4W, 20%

R10—1000 ohms, 2W (or 1W), 20%

*R11—2.2 meg, 1/4W, 20%

*R12—220K, 1/4W, 20%

L 1—Transformer, IF input, 455KC C-2.191-1

L 2—Transformer, IF output, 455KC C-2.191-2

L 3—Coil, oscillator B-2.192

Antenna, loop B-5.006

Loudspeaker, PM, 5", Transformer to match 50A5 B-11.037

Pilot light, Mazda No. 47, 150 Ma.

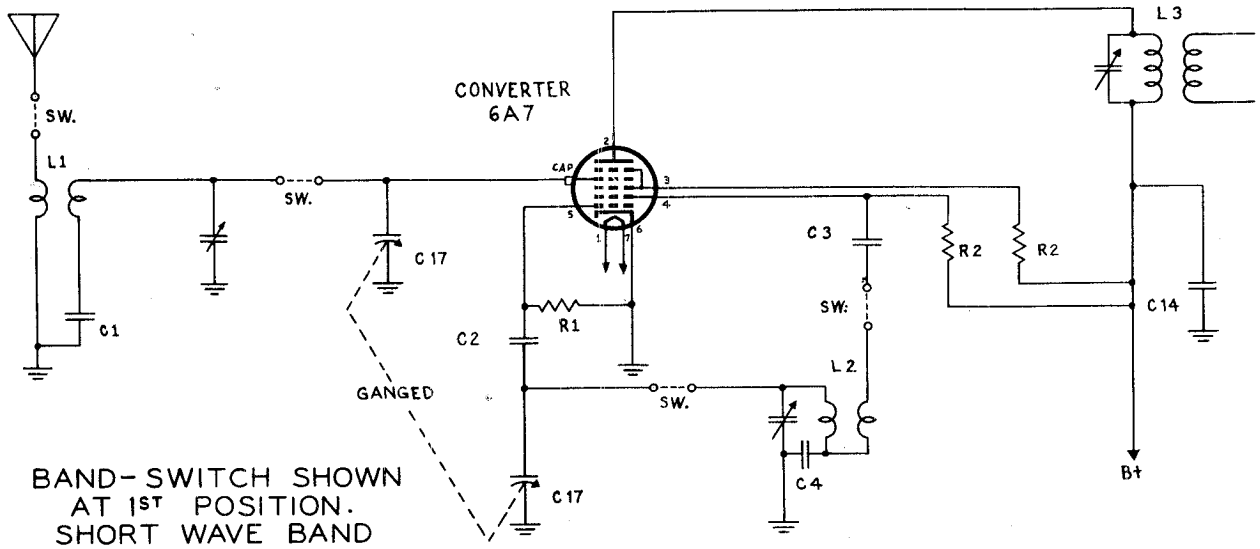
* Used in phono combinations only.

MODELS 651, 6514, 6541, 6547
CHASSIS FJ-97

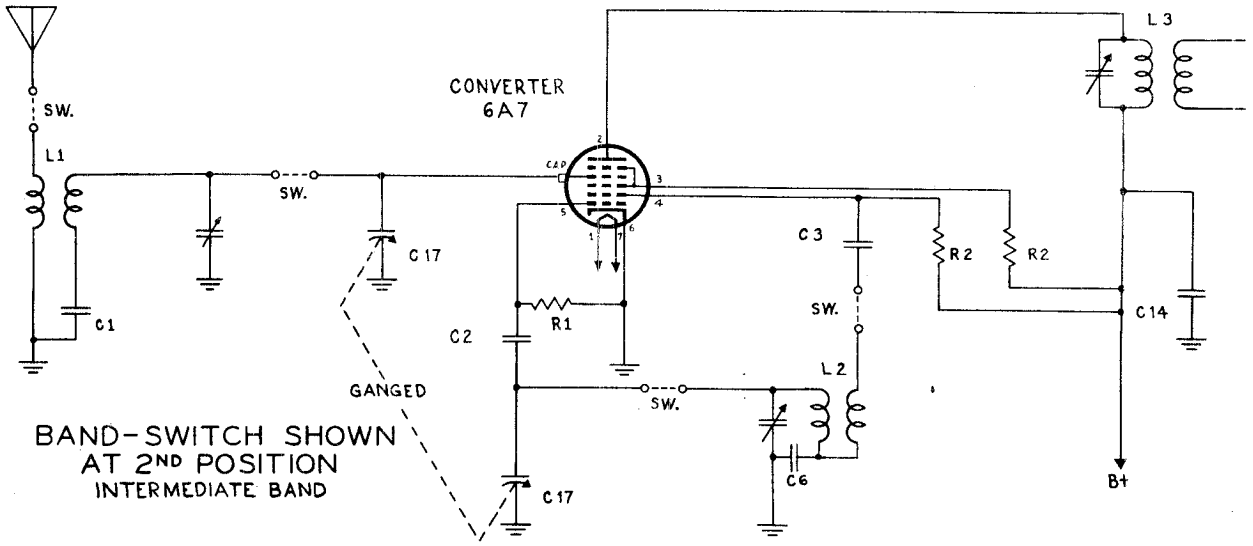
MODELS W-106, Z7004, Z-7052
MODELS 651, 6514, 6541, 6547 (Chassis FJ-97)

MODELS W-106, Z7004, Z-7052

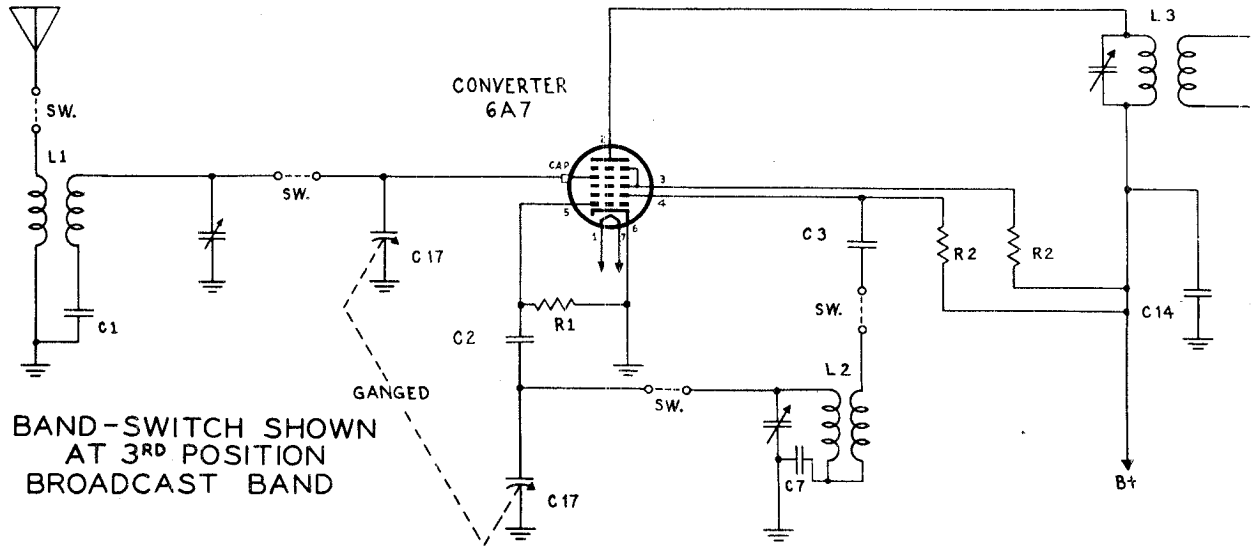
SPIEGEL



BAND-SWITCH SHOWN AT 1ST POSITION. SHORT WAVE BAND



BAND-SWITCH SHOWN AT 2ND POSITION INTERMEDIATE BAND



BAND-SWITCH SHOWN AT 3RD POSITION BROADCAST BAND

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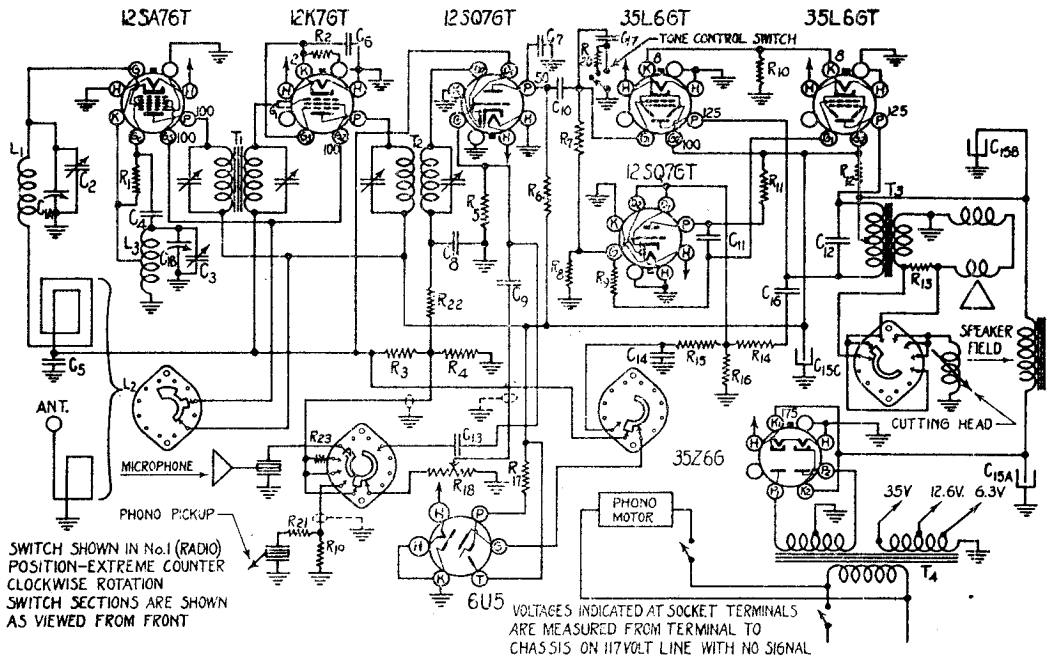
SPIEGEL

MODEL 390



IF PEAK 455 KC

Schematic Location	Part Number	Description
		CHASSIS PARTS
	4417	Button, Snap (Dial Mounting)
	8931	Cable, Tuning Tube
	2163	Cable, drive
	3227	Cap, Grid
R18	8910	Control, Volume and Switch
	1732	Cord, Line
	6424	Clamp, Linecord
	4314	Clamp, Tapped—For Tuning Tube
	4315	Clamp, Plain—For Tuning Tube
L3	8422	Coil, Oscillator
L1	8423	Coil, Tracking
C1a,b	8911	Condenser, Variable (with Pulley)
C2,3	8504	Condenser, Dual Trimmer
C15a,b,c	8425	Condenser, Electrolytic (20-250)—(20-150)—(20-150)
C4		Condenser, 100 Mmf. Mica
C5,14		Condenser, 1 Mfd. 200 v.
C6		Condenser, .05 Mfd. 200 v.
C7		Condenser, 250 Mmf. Mica
C8		Condenser, 100 Mmf. Mica
C9		Condenser, .002 Mfd. 600 v.
C10,16		Condenser, .01 Mfd. 400 v.
C11		Condenser, .05 Mfd. 400 v.
C12,13		Condenser, .001 Mfd. 600 v.
C17		Condenser, .005 Mfd. 600 v.
	7209	Grommet, Tuner Assembly Mtg.
	9121	Dial Chart
	8941	Microphone Socket Assembly
	6244	Pulley, Idler
	5026	Pointer
	6158	Pilot Lite
	1207	Retainer, "C" Washer (Holds Tuning Shaft)
R1		Resistor, 20M, 1/3 Watt
R2		Resistor, 200 Ohm, 1/3 Watt
R3,4,14,16		Resistor, 1 Meg. 1/3 Watt
R5		Resistor, 10 Meg. 1/3 Watt
R6,7,8,9,11		Resistor, 200M. 1/3 Watt
R10		Resistor, 120 Ohm, 1/2 Watt
R12		Resistor, 1000 Ohm, 1 Watt
R13		Resistor, 35 Ohm, 1/2 Watt
R15		Resistor, 2 Meg. 1/3 Watt
R17		Resistor, 1 Meg (in Tuning Tube Socket)
R19,20,21,22		Resistor, 50M, 1/3 Watt
R23		Resistor, 4 Meg. 1/3 Watt
	8440	Socket, Dual Dial Lamp
	8648	Spring, Drive Cable
	8427	Shaft, Drive
	8428	Switch, Tone Control
	8932	Switch, Master Control
	8919	Speaker, 6½" Dynamic
T4	8918	Transformer, Power, 60 cycle
T4	8933	Transformer, Power, 50 cycle
T3	89191	Transformer, Output
T1	8434	Transformer, 1st IF
T2	8435	Transformer, 2nd IF
		CABINET ASSEMBLY PARTS
		Back for Cabinet
		Book, Instruction
	8462	Bushing, Rubber (Recorder Unit Mtg.)
	9205	Carton, Shipping
	9210	Cabinet
	9206	Escutcheon
	2750	Knob, Motor Switch
	8487	Knob, Tuning
	8488	Knob, Tone
	8489	Knob, Volume
	8925	Knob, Master Control Switch
	8491	Loop Antenna Assembly

cont'd

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MODEL 390

SPIEGEL

Schematic Location	Part Number	Description
	9208	Plate, Instruction
	8477	Plate, Motor-on-off
	8287	Plug, 1 Prong (for Cutter Leads)
	3288	Plug, 1 Prong (for Phono Pickup Leads)
	8493	Plug, 2 Prong (for Motor Leads)
	8454	Switch, Motor
	2997	Washer, Rubber (for Recorder Mtg.)
		RECORDER UNIT PARTS
	6943	Hex Nut for Pivot Post
	6947	Motor Mounting Screw
	6948	Adjusting Screw (Follower Arm)
	9413	Turntable Shaft Locking Screw
	9417	Recorder Arm Rest
	9418	Follower Arm Complete
	9424	Pickup Cartridge
	9426	Pickup Arm Complete
	9428	Cutter Head Tension Spring

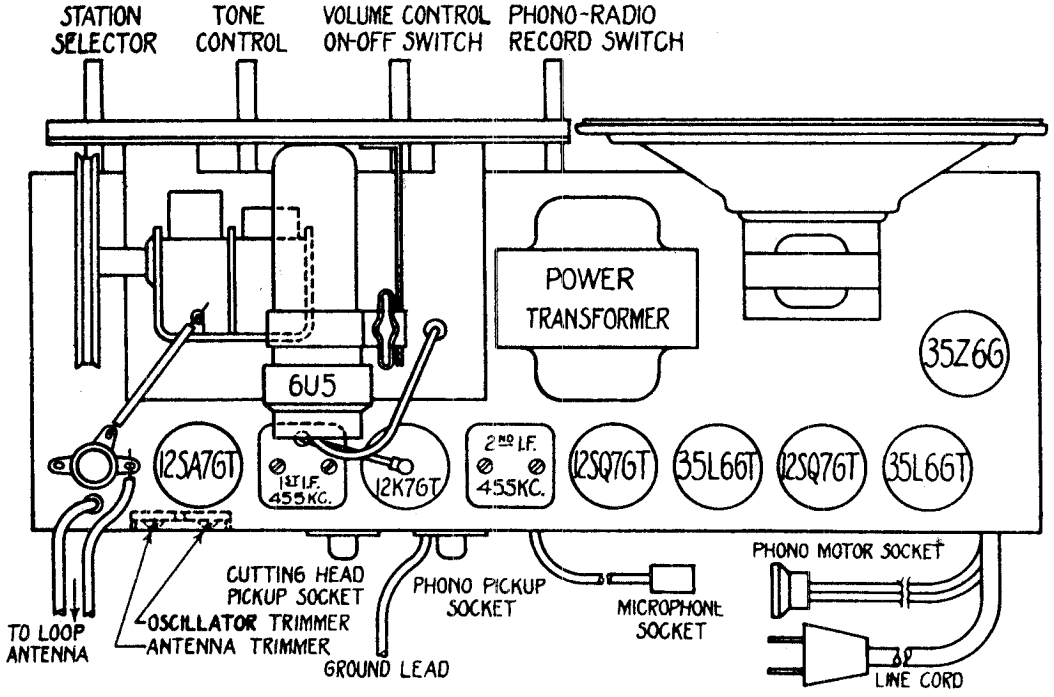
Schematic Location	Part Number	Description
	9484	Magnetic Cutter Head with Leads
	9434	Recorder Arm Complete
	9438	Pivot Post Return Spring
	9450	10" One-piece Turntable
	9456	Turntable Drive Disc Stud Clip
	9458	Lead Screw and Pinion Assembly
	9463	Turntable Drive Disc Tension Spring
	9464	Turntable Shaft
	9466	Turntable Drive Disc
	9467	Turntable Drive Disc Mounting Bracket Assembly
		The following parts are for models with ONE-PIECE TURNTABLE ONLY
	9469	Retractable Pin Spring
	9470	Retractable Pin
	9472	Rotor Shaft Pulley
	9474	Rotor Shaft Pulley Set-Screw
	9481	Motor 60 Cycle
	9482	Motor 50 Cycle

ALIGNMENT PROCEDURE

Output meter connection . . . . . Across speaker voice coil
Connection of generator ground lead . . . . . To Chassis
Connection of generator output lead . . . . . See chart below
Dummy antenna value to be used in series with generator . . . See chart
Position of volume control . . . . . Full on (Clockwise)

POSITION OF VARIABLE	GENERATOR FREQUENCY	DUMMY ANTENNA	GENERATOR CONNECTION	TRIMMERS ADJUSTED (IN ORDER SHOWN)
Open (Min. capacity)	455 kc.	.1 mfd.	Ant. section of variable	T2, T1.
Min. capacity	1720 kc.	50 mmf.	Ant. Terminal	Oscillator Trimmer
Tune in signal from generator	1400 kc.	50 mmf.	Ant. Terminal	Antenna Trimmer

ALL ALIGNMENT OPERATIONS MUST BE DONE WITH THE MASTER CONTROL SWITCH IN THE NO. 1 (RADIO) POSITION.



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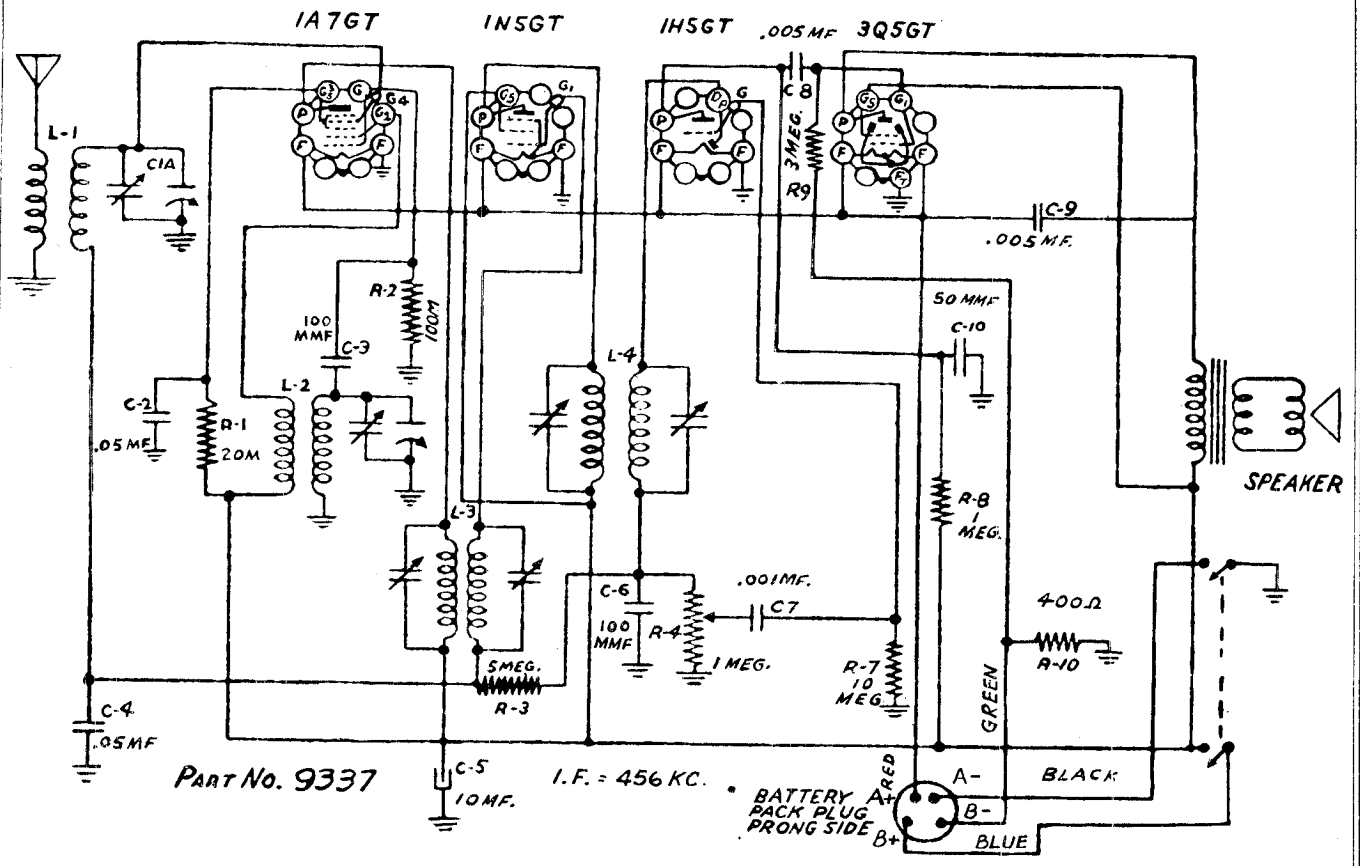
SPIEGEL

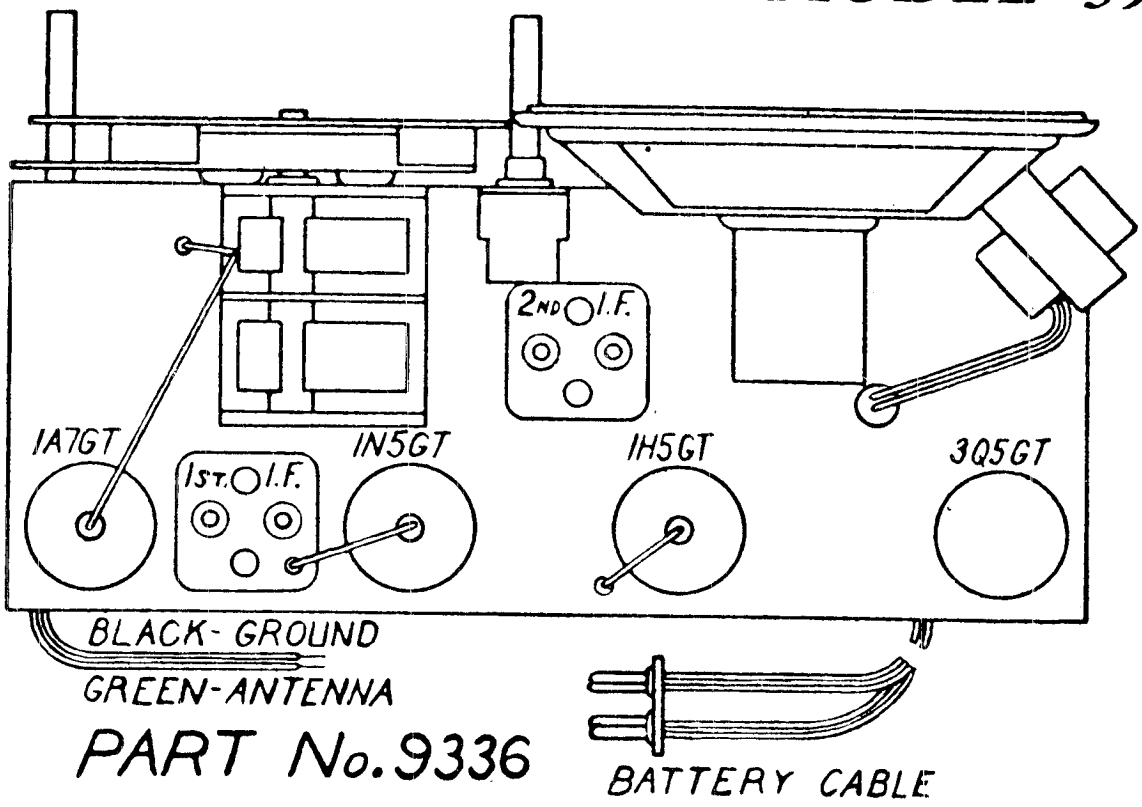
MODEL 397



STATION SELECTOR

VOLUME CONTROL & ON OFF SWITCH

MODEL 397



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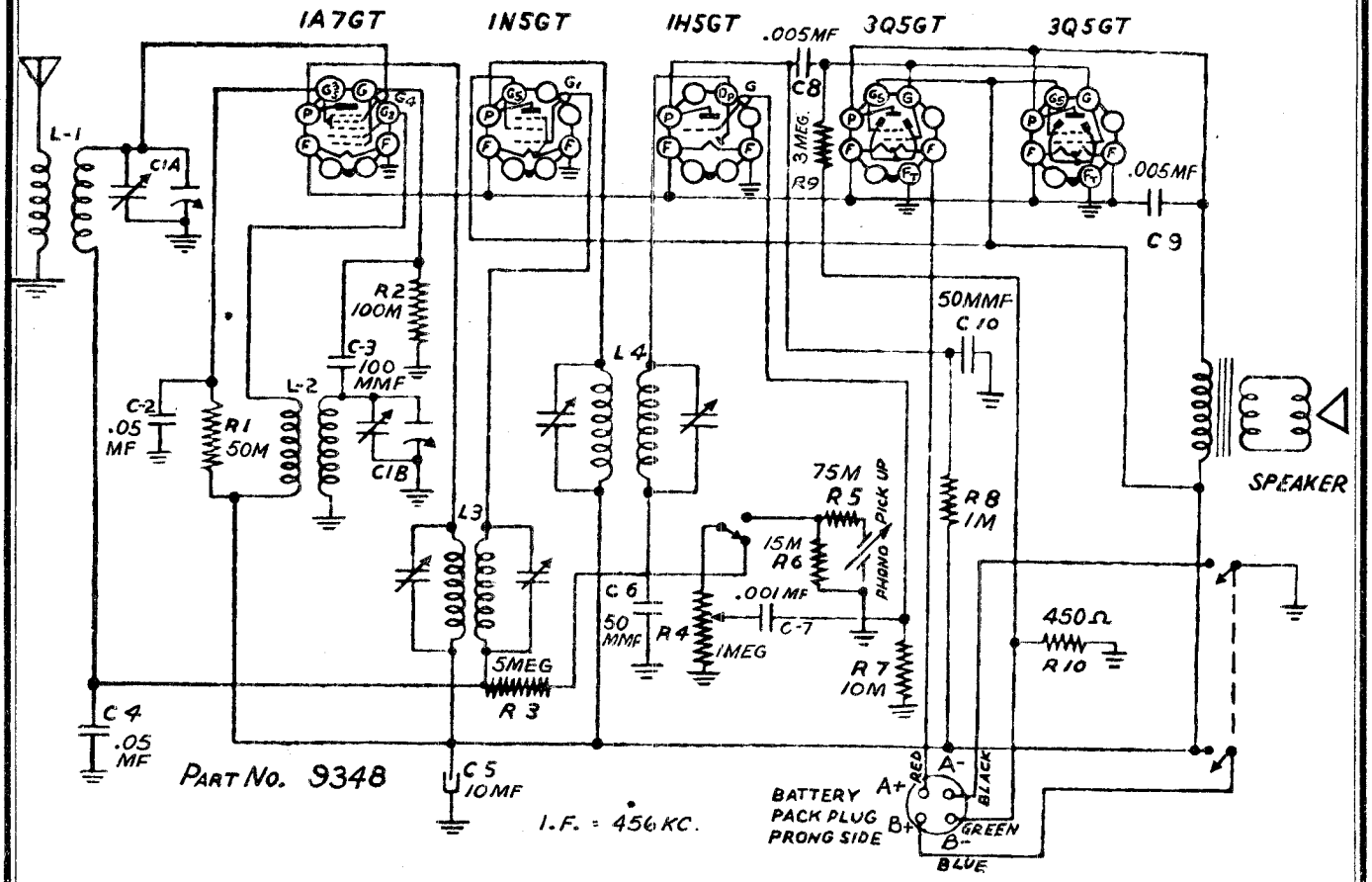
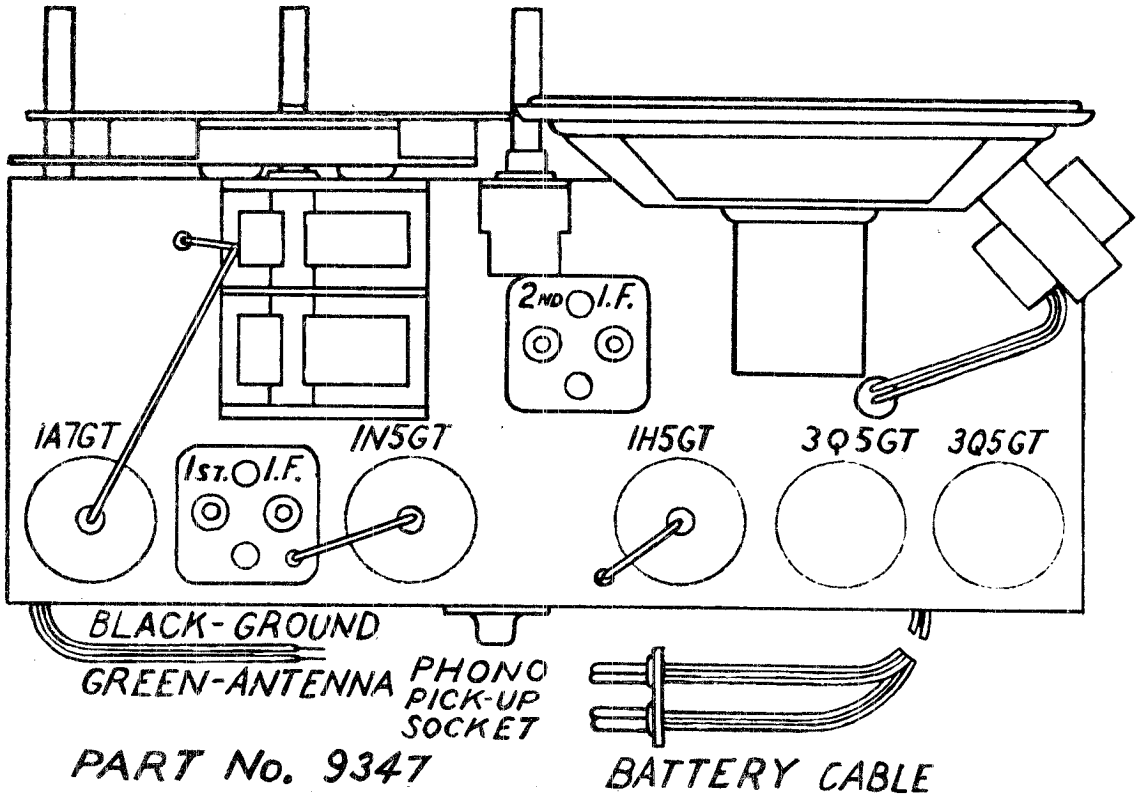
MODEL 408

SPIEGEL



STATION SELECTOR — PHONO-RADIO SWITCH — VOLUME CONTROL & ON-OFF SWITCH

MODEL 408



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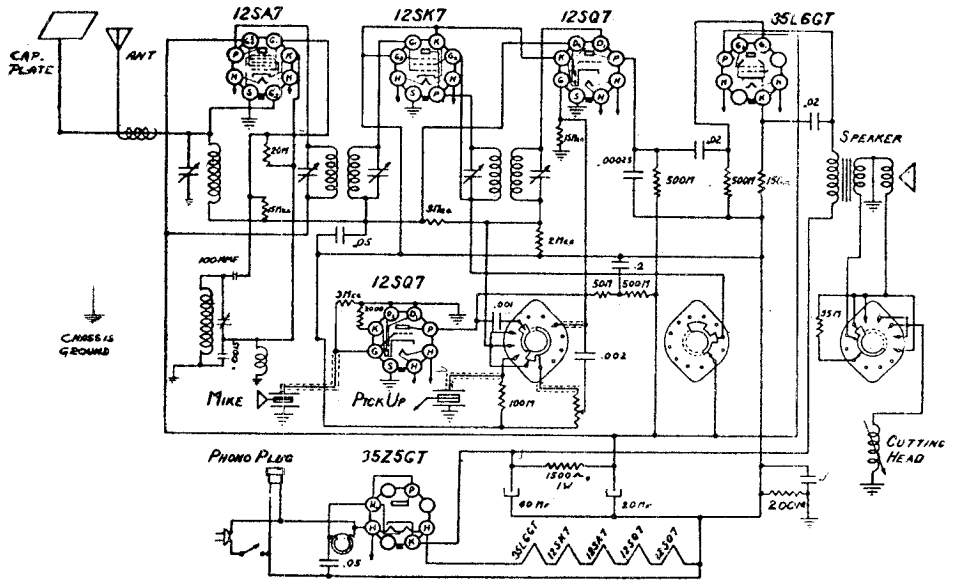
SPIEGEL

MODEL 433



ALIGNMENT PROCEDURE

Output meter connection . . . . . Across speaker voice coil

Connection of generator ground lead . . . . . To Chassis

Connection of generator output lead . . . . . See chart below

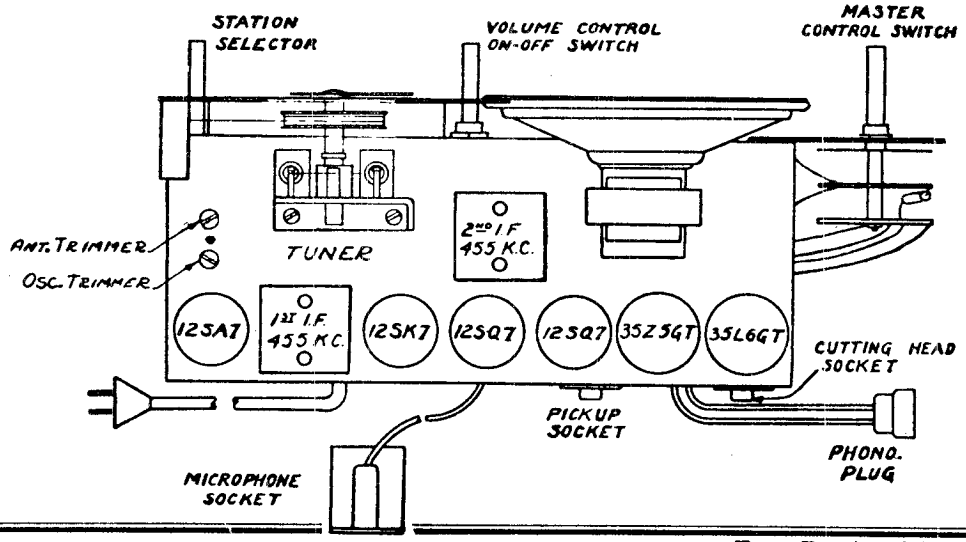
Dummy antenna value to be used in series with generator . . . . . See chart

Position of volume control . . . . . Full on (Clockwise)

ALL ALIGNMENT OPERATIONS MUST BE DONE WITH THE MASTER CONTROL SWITCH IN THE NO. 1 (RADIO) POSITION.

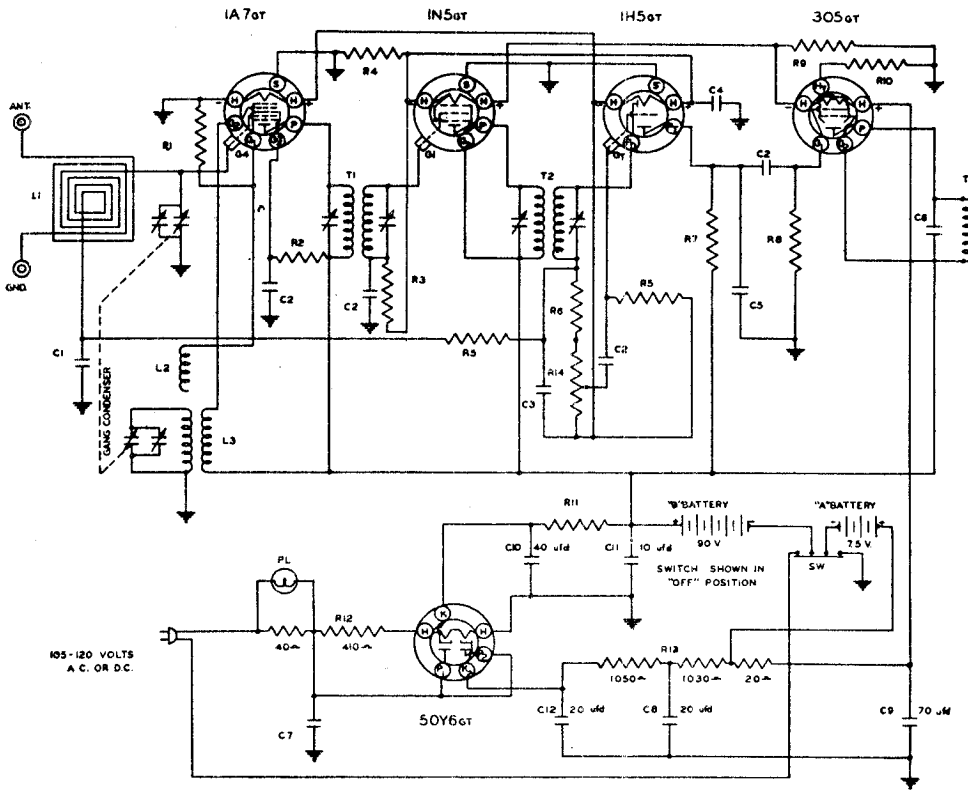
GENERATOR	CONNECTION AT RADIO	DUMMY ANTENNA	DIAL	TRIMMERS TO TUNE	REMARKS
IF 455 KC	12SA7 Grid	.1 mfd.	H. F. End	IF Transformers 4 Trimmers	Tune to Max.
1720 KC	Antenna	200 mmf.	H. F. End (1720)	Oscillator Trimmer	Set Limit Of Band
1400 KC	"	"	1400	Antenna Trimmer	Tune to Max.

Repeat Above Alignment Procedure at least once more.



MODEL TB-503

SPIEGEL



DRAWN BY E.K. APPROVED BY

MODEL TB-503

PART NO.	SCHEMATIC LOCATION	DESCRIPTION
3-135	R1	100,000Ω ½W -20% RESISTOR
3-27	R2	40,000Ω " " "
3-9	R3	4 MEG. " " "
3-364	R4	2000Ω " 10% "
3-141	R5	6 MEG. " 20% "
3-137	R6	50,000Ω " " "
3-308	R7	500,000Ω " " "
3-2	R8	2 MEG. " " "
3-315	R9	800Ω " 10% "
3-150	R10	1000Ω " " "
3-318	R11	2200Ω " " "
4-304	R12	450Ω 10.5-W-10% -WW "
4-303	R13	2100Ω 5.5-W-5% -WW "
5-305	R14	1 MEG VOLUME CONTROL &
	SW	SWITCH
6-12	C1	.05 MFD.-200V CONDENSER
6-3	C2	.01 " -400V "
6-46	C3	.00025 " -600V "
6-70	C4	.1 " -200V "
6-69	C5	.0005 " -600V "
6-68	C6	.001 " " "
6-14	C7	.05 " -400V "
7-306	C8	20 " -80V ELECTROLYTIC CONDENSER
7-305	C9	70 " -7V " " "
7-304	C10	40 " -150V
	C11	10 " " " " "
	C12	20 " "
15-311	L1	LOOP
15-310	L2	OSCILLATOR COIL
	L3	" "
16-306	T1	INPUT I.F. TRANSFORMER
16-303	T2	OUTPUT I.F. "
43-306	T3	" " " ON
	SPKR.	P.M. SPEAKER
41-308	PL	PILOT LIGHT #47
40-305	1A7 GT	OSCILLATOR-MIXER
	1N5 GT	I.F. AMPLIFIER
	1H5 GT	DETECTOR-AUDIO
	306 GT	POWER AMPLIFIER
	50Y6 GT	RECTIFIER

ALIGNMENT AND SERVICE DATA

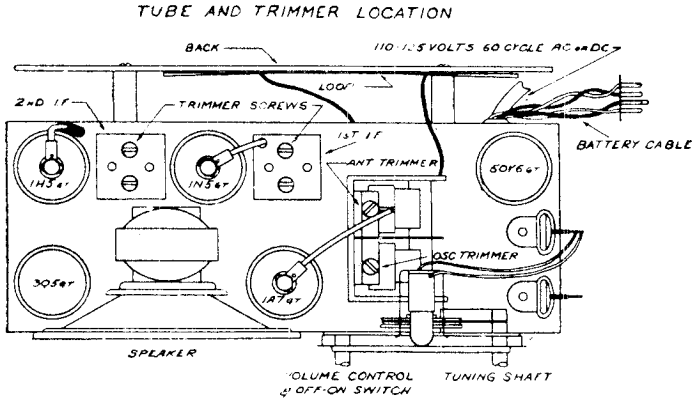
(For Professional Service Men Only)

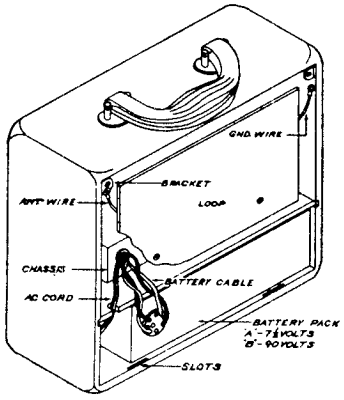
Remove chassis from cabinet for alignment.

A signal generator is required having the following frequencies: 456KC, 1400KC, 1720KC.

First Step: Connect the generator lead through a .1 mfd. condenser to the terminal lug next to the Antenna trimmer on top of the tuning condenser. The ground lead from the generator may be connected to any convenient spot on the metal chassis. Adjust generator to 456KC and adjust IF trimmer screws until a maximum reading is noted on the output meter which has been connected across the speaker. The tuning condenser should be turned out to complete minimum capacity when aligning the IF. With generator lead still connected to antenna trimmer terminal, adjust generator frequency to 1720KC, and with tuning condenser still at minimum, adjust oscillator trimmer till the 1720KC signal is tuned in. Next, remove generator leads from set and connect both to a transmitting loop. This loop can be made with 2 turns of wire about 6 inches in diameter and placed about one foot away from the loop antenna of the receiver. Adjust generator frequency to 1400KC. Turn tuning condenser until the signal is tuned in and adjust antenna trimmer until a maximum reading is noted. No further adjustment should be necessary, unless the set has been damaged, as the coils and condenser in this receiver have been specially handled at the factory so as to insure proper alignment at the lower frequency end of the dial.

TUBE AND TRIMMER LOCATION





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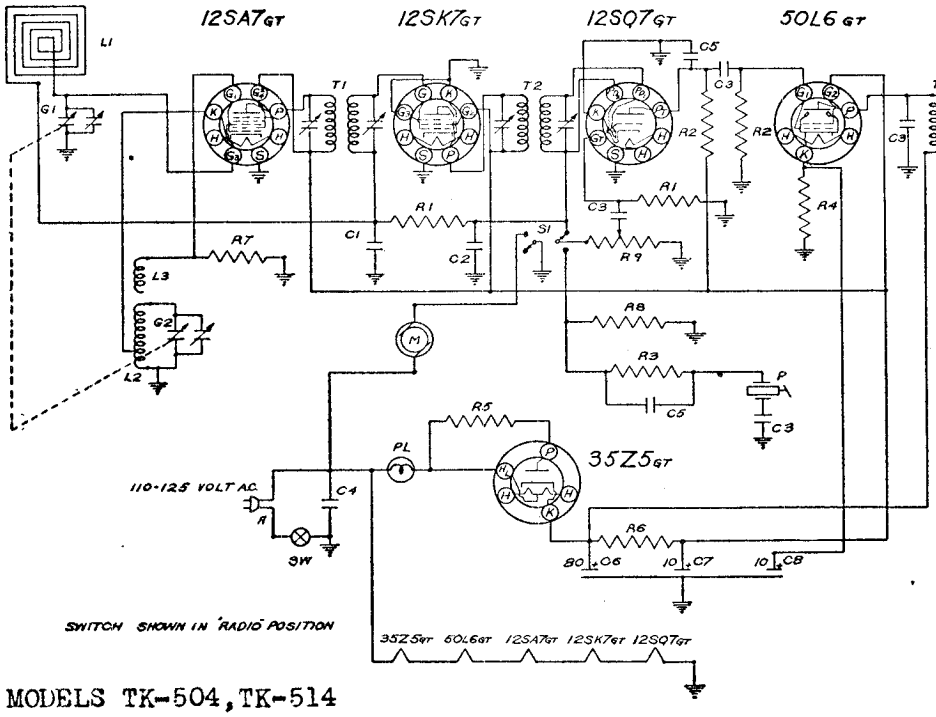
SPIEGEL

MODEL 433
MODELS TK-504, TK-514



MODELS TK-504, TK-514

IF PEAK 456 KC

3-11-41 DRAWN BY APPROVED BY

PART No	SCHEMATIC LOCATION	DESCRIPTION
3-2	R1	2 MEG ½ W 20% RESISTOR
3-6	R2	1 MEG " " "
3-1	R3	.5 MEG " " "
3-31	R4	100 " " "
3-174	R5	50 " " "
3-120	R6	2500 " " "
3-26	R7	25000 " " "
3-62	R8	200000 " " "
6-301	R9 SW	1 MEGOHM VOL CONTROL & SWITCH
14-301	SI	CHANGEOVER SWITCH
6-12	C1	.05 MFD. 200V CONDENSER
8-8	C2	.0001 MFD. MICA "
6-3	C3	.01 MFD. 400V. "
6-14	C4	.05 MFD. 400V "
6-306	C5	.0005 MFD. 400V "
7-301	C6	80 MFD. 150V } ELECTROLYTIC
	C7	10 MFD. 150V } ELECTROLYTIC
	C8	10 MFD. 25V } ELECTROLYTIC
15-302	L1	LOOP
15-303	L2	OSCILLATOR COIL
	L3	GRID COUPLING COIL
16-302	T1	INPUT I.F. TRANSFORMER
16-303	T2	OUTPUT I.F. "
13-301	T3	OUTPUT TRANSFORMER
	S	6" P.M. SPEAKER
41-800	PL	PILOT LIGHT #47
34-8	A	POWER CORD
51-301	P	CRYSTAL PICKUP L-26A
10-301	G1 G2	GANG CONDENSER
55-300	M	PHONO MOTOR
40-301	12SA7GT	OSCILLATOR-MIXER
	12SK7GT	I.F. AMPLIFIER
	12SQ7GT	DETECTOR-AUDIO
	50L6GT	AUDIO AMPLIFIER
	35Z5GT	RECTIFIER

MODEL 433

Part No.	Description
9811	Book—Instruction
8462	Bushing-Stem—Motor Mounting
9813	Cabinet
2163	Cable—Drive
9724	Capacity Plate
8031	Coil—Oscilator
9221	Control—Volume and Switch
8036	Cord—AC Line
5562	Condenser—Antenna Trimmer
8525	Condenser—Electrolytic 40-20-150 V
3352	Condenser—Paper .2-400 V
563	Condenser—Paper .05-400 V
576	Condenser—Paper .02-400 V
3137	Condenser—Paper .001-400 V
824	Condenser—Paper .002-600 V
572	Condenser—Paper .1-200 V
580	Condenser—Paper .05-200 V
1286	Condenser—Mica 250 mmfd
7799	Connector—Microphone—with bracket and lead
7084	Crystal—Dial
9548	Indicator
9545	Indicator—Back Plate
9247	Knob—Master Control
2750	Knob—Motor Switch
9246	Knob—Tuning
9248	Knob—Volume
6158	Lamp—Pilot No. 47 Mazda
8285	Microphone No. X-20
9211	Needles—Cutting
9207	Needles—Playing
9439	Plate—Instruction
8477	Plate—Motor on-off
8287	Plug—1 Prong Large (Play)
8288	Plug—1 Prong Small (Cut)
8493	Plug—Phono Motor
9547	Pointer
9209	Records—Blank
8929	Recorder Unit—Complete
7326	Resistor—150 ohm ½ W
3807	Resistor—35 ohm ½ W Flexohm
9093	Resistor—1500 ohm 1 W
9225	Resistor—2 M ⅓ W
8580	Resistor—50 M ⅓ W
7122	Resistor—100 M ⅓ W
6722	Resistor—500 M ⅓ W
6721	Resistor—200 M ⅓ W
8970	Resistor—2 Meg ⅓ W
8062	Resistor—3 Meg. ⅓ W
8039	Resistor—15 Meg. ⅓ W
7121	Resistor—20 M ⅓ W
9228	Shaft—Drive
9230	Speaker—5" P.M.
2908	Spring—Pointer Drive
8430	Socket—Phono Motor
6267	Socket—1 Prong—Large (Playing)
8266	Socket—1 Prong—Small (Cutting)
7573	Socket—Dial Lamp
9226	Switch—Master Control
8454	Switch—Motor
8042	Transformer—1st I.F.
8043	Transformer—2nd I.F.
9581	Tuner—Permeability

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ALIGNMENT AND SERVICE DATA

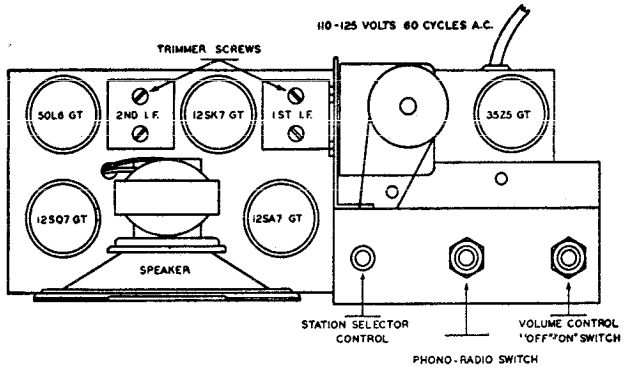
(For Professional Service Men Only)

Remove chassis from cabinet for alignment.

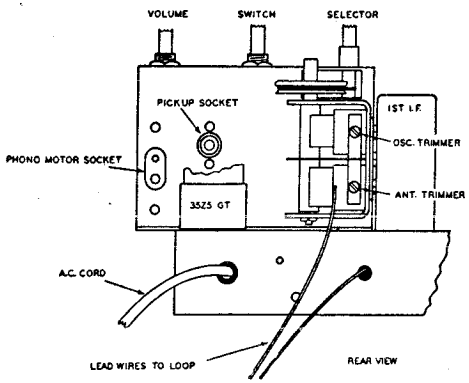
A signal generator is required having the following frequencies: 456KC, 1400KC, 1720KC.

First Step: Connect the generator lead through a .1 mfd. condenser to the terminal lug next to the Antenna trimmer on top of the tuning condenser. The ground lead from the generator may be connected to any convenient spot on the metal chassis. Adjust generator to 456KC and adjust IF trimmer screws until a maximum reading is noted on the output meter which has been connected across the speaker. The tuning condenser should be turned out to complete minimum capacity when aligning the IF. With generator lead still connected to antenna trimmer terminal, adjust generator frequency to 1720KC, and with tuning condenser still at minimum, adjust oscillator trimmer till the 1720KC signal is tuned in. Next, remove generator leads from set and connect both to a transmitting loop. This loop can be made with 2 turns of wire about 6 inches in diameter. Adjust generator frequency to 1400KC. Turn tuning condenser until the signal is tuned in and adjust antenna trimmer until a maximum reading is noted. No further adjustment should be necessary, unless the set has been damaged, as the coils and condenser in this receiver have been specially handled at the factory so as to insure proper alignment at the lower frequency end of the dial.

TUBE AND TRIMMER LOCATION



TRIMMER AND CONNECTOR SOCKET LOCATION



MODELS TK-504, TK-514

Remove the chassis from the cabinet for alignment.

A signal generator is required having the following frequencies: 456KC, 1400KC, 1720KC, 6MC, 16MC, 18.3MC. An output meter should be connected across the speaker.

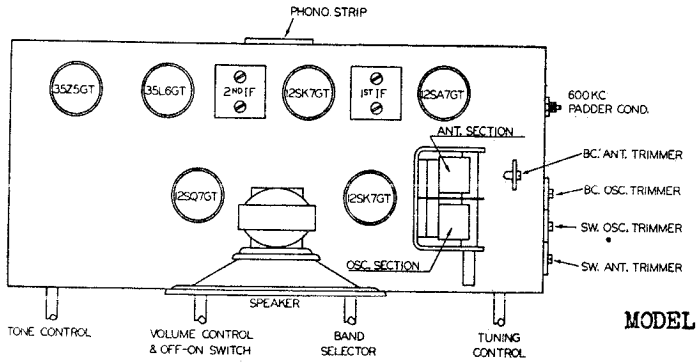
I. F. Alignment: Connect the generator lead through a .1MFD condenser to the terminal lug on the "Antenna" section of the gang condenser. The ground lead from the generator should be connected to the chassis base. Set the generator at 456KC. Adjust the trimmer screws in the 1st and 2nd I. F. cans (see Fig. No. 1) until a maximum reading is noted on the output meter.

The receiver volume control should be turned to maximum during the I F and all subsequent alignments, to keep the AVC from working and giving false readings. Keep the generator output as low as possible to prevent overloading.

BC or Broadcast Alignment: With the generator leads still connected as in I. F. Alignment, rotate the tuning condenser to complete minimum capacity. Set the generator to 1720KC. Adjust the BC oscillator trimmer until the signal is tuned in. Next, remove the generator leads and connect them to the antenna lead of the loop antenna, through a 100 MMFD condenser. Set the generator to 1400KC and rotate the tuning condenser until the signal is tuned in. Adjust the BC antenna trimmer until a maximum reading is noted on the output meter. Set the generator to 600KC and turn the tuning condenser until the signal is tuned in. Rock the tuning control back and forth slowly until a maximum reading is noted on the output meter. It is advisable to return to the 1720KC adjustment and recheck that setting to make sure it has not changed while padding at 600KC.

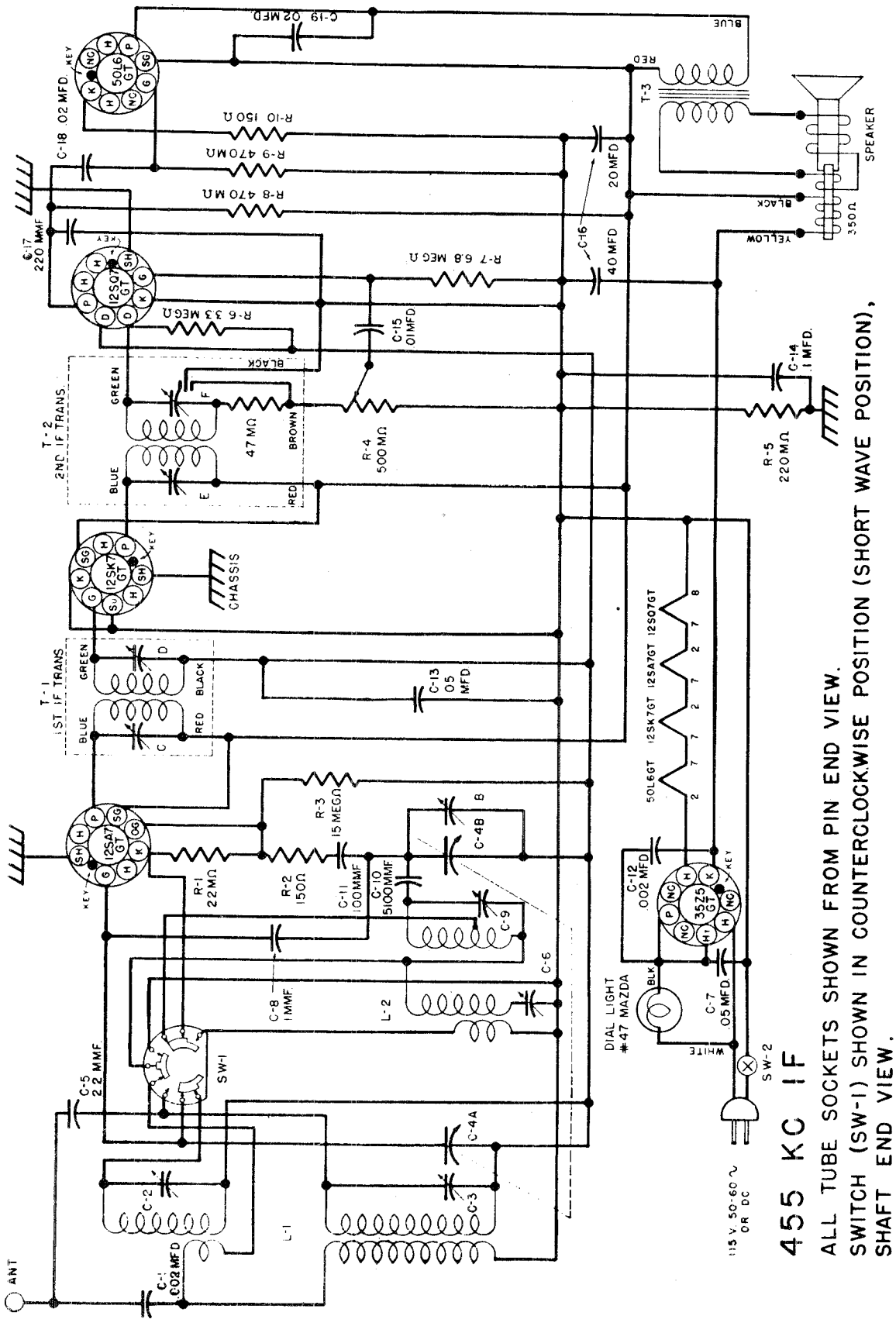
SW or Short Wave Alignment: Set the generator at 18.3MC. Turn the receiver band switch to short wave position. Turn the tuning condenser to complete minimum capacity. The generator leads should be connected to the antenna lead of the loop through a 400 Ohm resistor. Adjust the S. W. oscillator trimmer slowly until the 18.3MC signal is tuned in. At this point, it will be well to make sure that the fundamental signal is tuned in. Turn up the generator output and tune the receiver to approximately 17.3MC. At this point, the 18.3MC signal will be heard again but much weaker. This is the image frequency. If the image is not heard, then turn the tuning condenser back to complete minimum and readjust the SW oscillator trimmer. Remember the image must always be heard (at 2 times the IF frequency in KC) lower in frequency than the fundamental signal. After the oscillator has been properly set, tune the signal generator to 16MC and rotate the tuning control until the signal is tuned in. Adjust the SW antenna trimmer until a maximum reading is noted on the output meter. It is advisable to rock the gang slowly while adjusting the antenna trimmer. Set the generator to 6MC and tune the signal in on the receiver. Check the alignment at this frequency. No adjustment should be necessary, as the coils have been carefully checked before leaving the factory. A fixed oscillator padding condenser is used at 6MC.

TUBE AND TRIMMER LOCATION
110-125 VOLTS 60 CYCLE AC OR DC



MODEL T-2625

SPIEGEL



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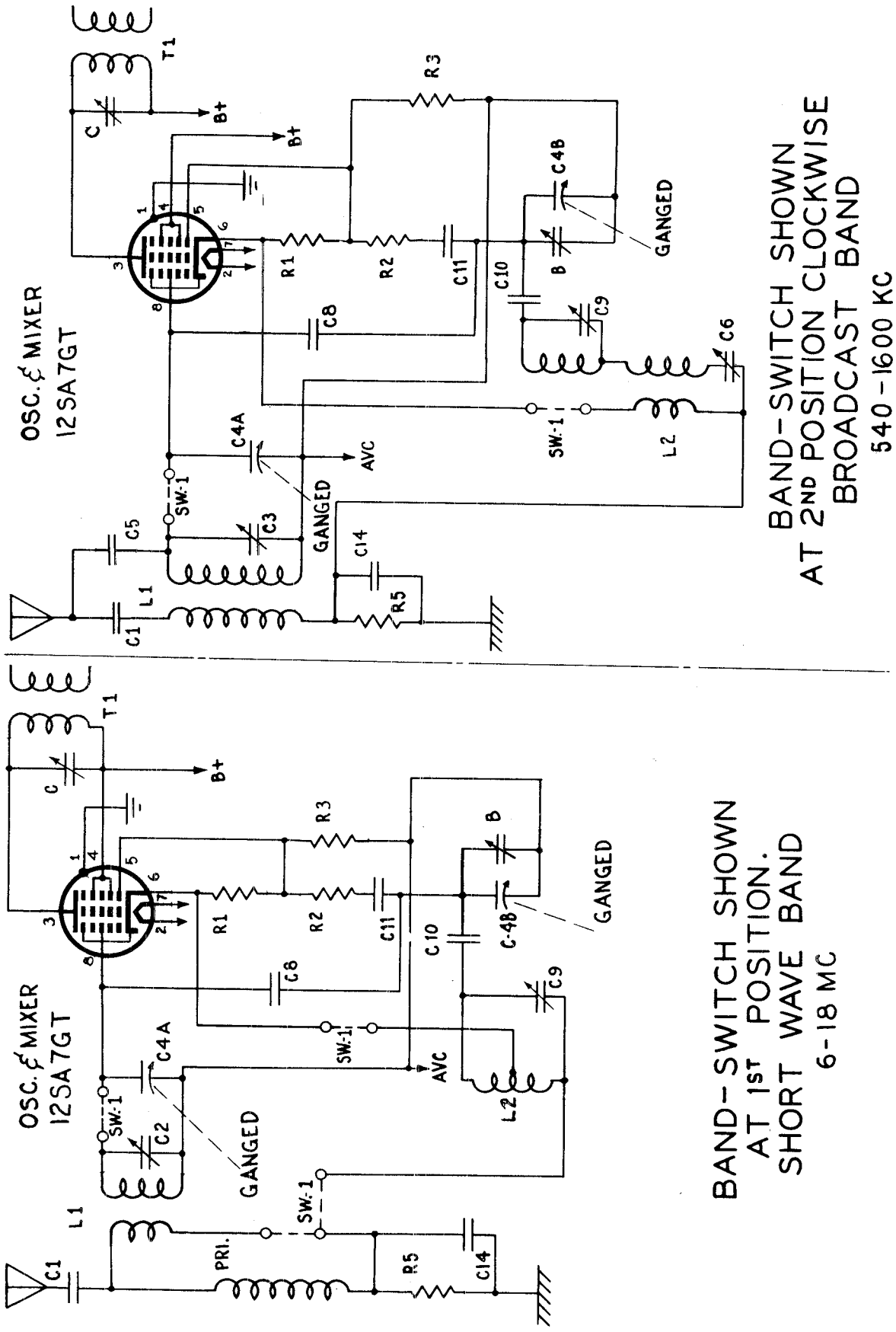
"clarified schematics"

MODEL 568

SPIEGEL



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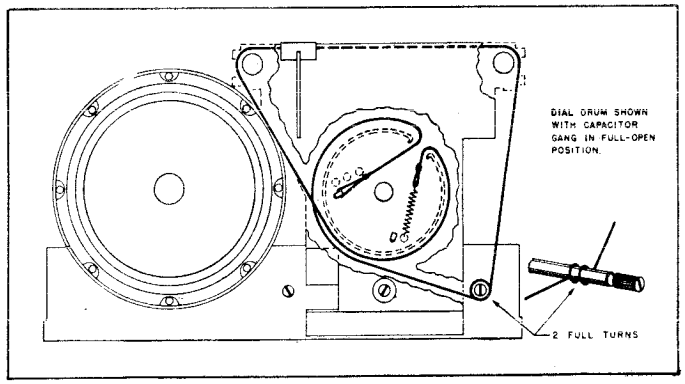
ALIGNMENT PROCEDURE

The following equipment is necessary to properly align this chassis:

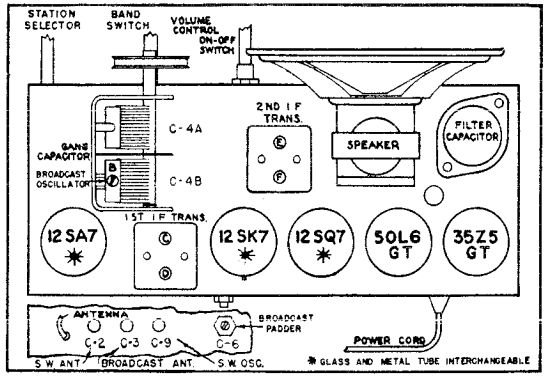
1. A signal generator which will provide an accurately calibrated signal at the frequencies listed.
2. An output meter.
3. A non-metallic screwdriver.
4. Dummy antenna: — .1 mfd. — 200 mmf. — 400 ohms

CONNECT TEST OSCILLATOR TO	DUMMY ANTENNA	INPUT SIGNAL FREQUENCY	BAND	SET DIAL AT	TRIMMERS	PURPOSE
12SA7GT grid	.1 mfd.	455 kc.	Broadcast	HF end	C D E F	Align IF
12SA7GT grid	.1 mfd.	1620 kc.	Broadcast	HF end	B	Set limit of band
Ant. terminal	400 ohms	18.3 mc.	Short Wave	HF end	C-9	Set limit of band
Ant. terminal	400 ohms	18.0 mc.	Short Wave	18 mc.	C-2	Align antenna
Ant. terminal	200 mmf.	1400 kc.	Broadcast	1400 kc.	C-3	Align antenna
Ant. terminal	200 mmf.	600 kc.	Broadcast	600 kc.	C-6	Rock gang and adjust to max.

NOTE: Recheck alignment of trimmers B and C-3 after adjusting C-6.



Dial Mechanism



e Layout

Electrical and Mechanical Specifications

Frequency Range	540-1600 kc., 6-18 mc.	V.C. Impedance	3.5 ohms at 400 cycles
Intermediate Frequency	455 kc.	Power Output (Undistorted)	.75 watt
Power Supply	105-125 volts, 50-60 cycle AC or DC	Power Output (Maximum)	1.5 watts
Loudspeaker	Dynamic	Tuning Drive Ratio	5-1

TUBE COMPLEMENT

1-12SA7GT
Osc. & Mixer tube

1-12SK7GT
IF Amplifier tube

1-12SQ7GT
2nd Det. & 1st Audio tube

1-50L6GT
Power Output tube

1-35Z5GT
Rectifier tube

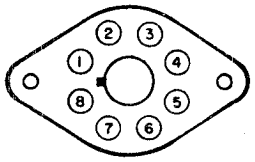
NOTE: The above glass tubes are interchangeable with their metal equivalent.

MODEL 568

SPIEGEL

SOCKET VOLTAGES

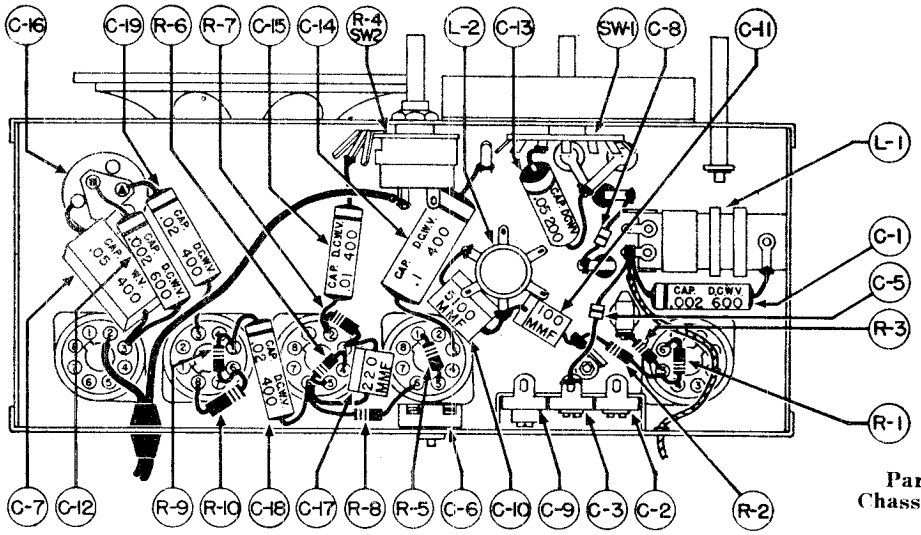
TUBE	POSITION	1	2	3	4	5	6	7	8
12SA7GT	Oscillator and Mixer	0	37.5 AC	99	99	–4.2	0	24.5 AC	0
12SK7GT	IF Amplifier	0	24.5 AC	0	0	0	99	12.5 AC	99
12SQ7GT	2nd Det.—1st Audio	0	0	0	0	0	16	12.5 AC	0
50L6GT	Power Output	0	85 AC	91.5	99	0	0	37.5 AC	5.9
35Z5GT	Rectifier	0	117 AC	112 AC	0	112 AC	0	85 AC	112



NOTE: All DC voltages measured with a 1000 ohm-per-volt meter from ON-OFF switch (—B) to socket contact indicated. All voltages are positive DC unless otherwise marked.

Volume control full on. No signal.

Line Voltage 117 volts AC.



Parts Layout
Chassis Model 568

SERVICE PARTS LIST

Symbol	Part No.	Description
C-7	BC31B503	Cap., Molded Paper, .05 mfd.
C-13	BD210503	Cap., Paper, .05 mfd., 200 v.
C-15	BD410103	Cap., Paper, .01 mfd., 400 v.
C-14	BD410104	Cap., Paper, .1 mfd., 400 v.
C-18, 19	BD410203	Cap., Paper, .02 mfd., 400 v.
C-1, 12	BD610202	Cap., Paper, .002 mfd., 600 v.
C-10	BM58D512	Cap., Mica, 5100 mmf.
C-11	BM78A101	Cap., Mica, 100 mmf.
C-17	BM78A221	Cap., Mica, 220 mmf.
R-10	BR16C151	Resistor, 150 ohm, ½ w.
R-2	BR17B151	Resistor, 150 ohm, ⅓ w.
R-3	BR17B156	Resistor, 15 meg., ⅓ w.
R-1	BR17B223	Resistor, 22,000 ohm, ⅓ w.
R-5	BR17B224	Resistor, 220,000 ohm, ⅓ w.
R-6	BR17B335	Resistor, 3.3 meg., ⅓ w.
R-8, 9	BR17B474	Resistor, 470,000 ohm, ⅓ w.
R-7	BR17B685	Resistor, 6.8 meg., ⅓ w.
	A-2163	Cable, Drive
	A-6158	Lamp, Pilot, No. 47, Mazda, 6.3 v.

Symbol	Part No.	Description
C-16	A-8948	Cap., Electrolytic, 40-20 mfd.
R-4	R-9051-5	Control, Vol & Sw. 500,000 ohm
T-1	B-51010-1	Transformer Assembly, 1st IF
T-2	B-51011-1	Transformer Assembly, 2nd IF
	C-51014	Speaker, 5-inch Dynamic
	A-51160-1	Cord, Power, 6 ft.
	A-51163	Clip, Spring
C-6	B-51428-5	Capacitor, Padder
	B-51591	Spring, Dial Bracket
SW-1	B-51764-1	Switch, Band
	A-51787	Spring, Cable, Music Wire
L-1	B-51828	Coil Assembly, BC & SW Ant.
C-2, 3, 9	A-51834	Capacitor, Trimmer, 3-section
L-2	B-51836	Coil Assembly, Osc.
C-4	C-51837-1	Capacitor, Variable
C-8	B-51839-2	Capacitor, 1 mmf.
C-5	B-51839-4	Capacitor, 2.2 mmf.
	A-51869	Antenna Reel Assembly

Order parts not listed by specifying (1) Part Name and (2) Model Number (include number following dash)

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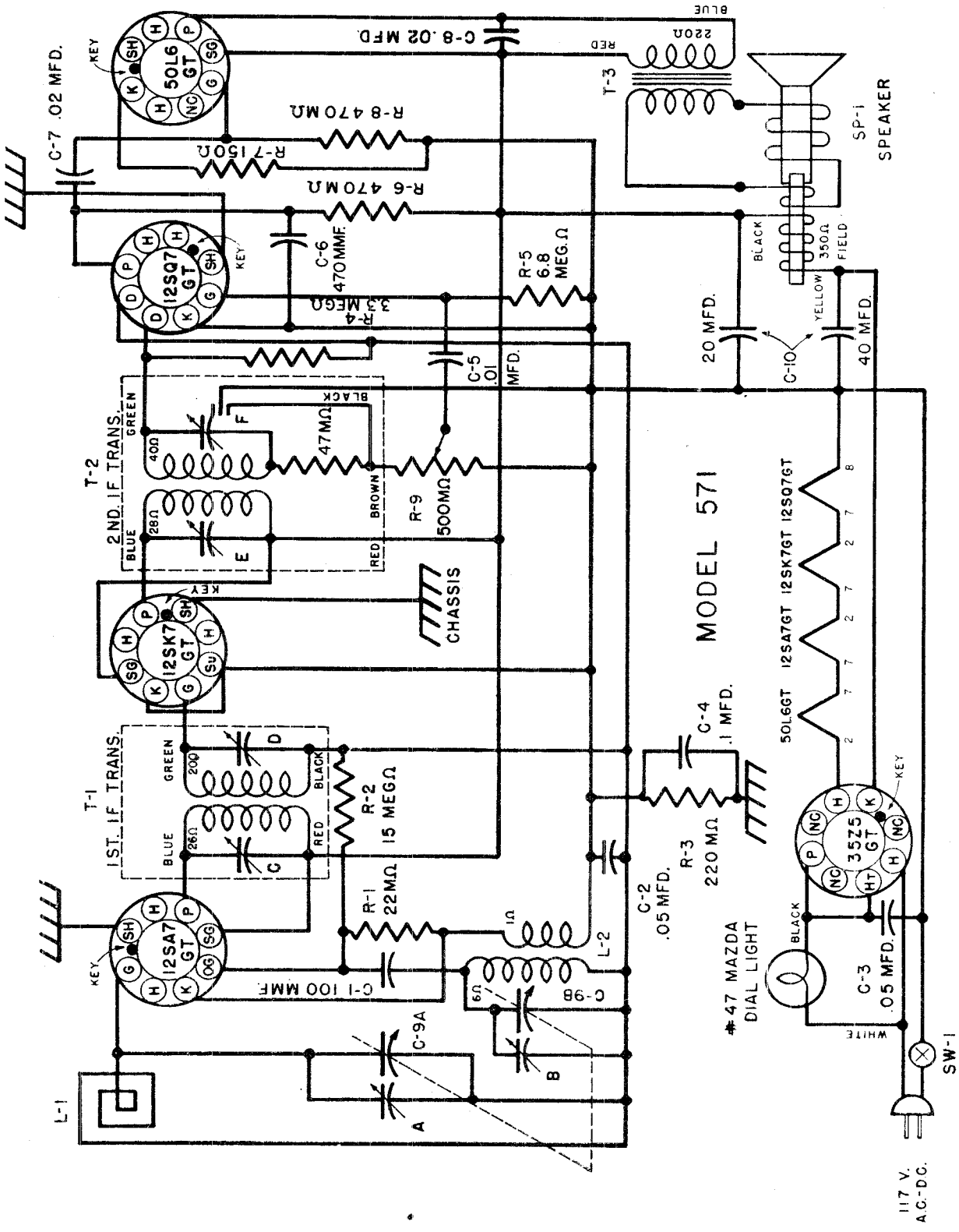
MODEL 571

SPIEGEL



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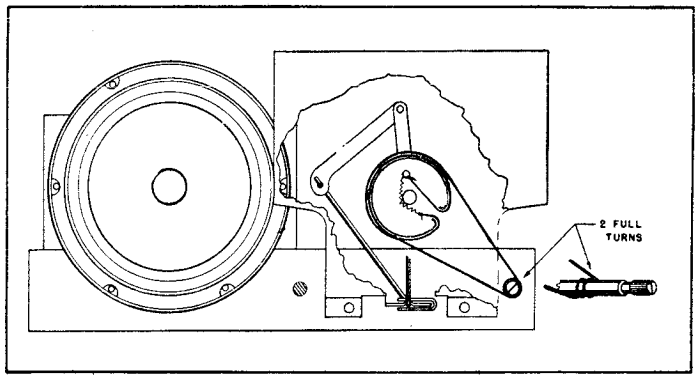
ALIGNMENT PROCEDURE

The following equipment is necessary to properly align this chassis:

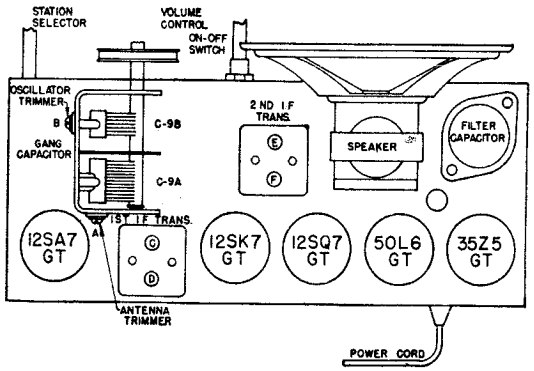
1. A signal generator which will provide an accurately calibrated signal at the frequencies listed.
2. An output meter.
3. A non-metallic screwdriver.
4. Dummy antenna: — .1 mfd., — RMA loop.

NOTE: Intermediate Frequency and Oscillator adjustments may be made with the loop disconnected provided a resistor of 10,000 to 50,000 ohms is substituted to close the 12SA7GT grid circuit. The loop alignment must be done with the loop and chassis mounted in operating position in the cabinet. A single turn loosely coupled to loop may be substituted for RMA loop.

GENERATOR	CONNECTION AT RADIO	DUMMY ANTENNA	DIAL	TO TUNE TRIMMERS	REMARKS
IF 455 kc.	12SA7GT grid	.1 mfd.	HF end	IF trimmers C D E F	Tune to max.
1620 kc.	Through loop	RMA loop	HF end	Osc. trimmer B	Set limit of band
1400 kc.	Through loop	RMA loop	1400 kc.	Ant. trimmer A	Tune to max.



Dial Mechanism



Tube Layout

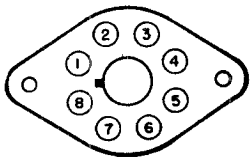
Electrical and Mechanical Specifications

Frequency Range ..... 540-1600 kc.
Intermediate Frequency ..... 455 kc.
Power Supply ..... 105-125 volts AC-DC
Loudspeaker ..... Dynamic
V.C. Impedance ..... 3.5 ohms at 400 cycles
Power Output (Undistorted) ..... .75 watts
Power Output (Maximum) ..... 1.5 watts
Tuning Drive Ratio ..... 3 to 1

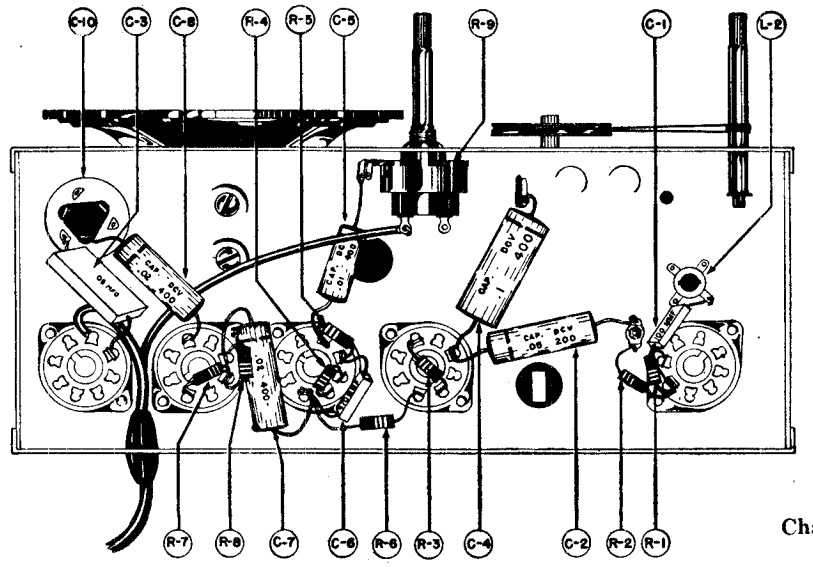
SPIEGEL

SOCKET VOLTAGES

TUBE	POSITION	1	2	3	4	5	6	7	8
12SA7GT	Osc. and Mixer	0	37.5 AC	99	99	-4.2	0	24.5 AC	0
12SK7GT	IF Amplifier	0	24.5 AC	0	0	0	99	12.5 AC	99
12SQ7GT	2nd Det.—1st Audio	0	0	0	0	0	16	12.5 AC	0
50L6GT	Power Output	0	85 AC	91.5	99	0	0	37.5 AC	5.9
35Z5GT	Rectifier	0	117 AC	112 AC	0	112 AC	0	85 AC	112



NOTE: All DC voltages measured with a 1000 ohm per volt meter from ON-OFF switch (—B) to socket contact indicated. All AC voltages are measured from ON-OFF switch (—B) to socket contact indicated.
All voltages are positive DC unless otherwise marked.
Volume control full on.
Line voltage 117 volts AC.



Parts Layout
Chassis Model 571

SERVICE PARTS LIST

Symbol	Part No.	Description
C-1	BM78A101	Cap., Mica, 100 mmf.
C-2	BD210503	Cap., Paper, .05 mfd., 200 v.
C-3	BC31B503	Cap., Mold., Paper, .05 mfd.
C-4	BD410104	Cap., Paper, .1 mfd., 400 v.
C-5	BD410103	Cap., Paper, .01 mfd., 400 v.
C-6	BM78A471	Cap., Mica, 470 mmf.
C-7, 8	BD410203	Cap., Paper, .02 mfd., 400 v.
C-9	C-51155-1	Cap., Variable, 2 Section
C-10	A-8948	Cap., Electro., 40-20 mfd., 150 v.
L-2	B-51159	Coil, Osc. Assembly
R-1	BR17B223	Resistor, 22M ohm 1/3 w.
R-2	BR17B156	Resistor, 15 meg. 1/3 w.
R-3	BR17B224	Resistor, 220M ohm 1/3 w.
R-4	BR17B335	Resistor, 3.3 meg. 1/3 w.
R-5	BR17B685	Resistor, 6.8 meg. 1/3 w.
R-6, 8	BR17B474	Resistor, 470M ohm 1/3 w.
R-7	BR16C151	Resistor, 150 ohm. 1/2 w.
R-9	B-9051-1	Control, Vol. & Sw. 500M ohm.
T-1	B-51010-1	Trans., Assembly, 1st IF
T-2	B-51011-1	Trans., Assembly, 2nd IF
SP-1	C-51014	Speaker, 5" Dynamic, 350 ohm.
	A-2163	Cable, Drive
	A-6158	Lamp, Pilot No. 47 Mazda 6.3 v.
	A-51160-1	Cord, AC-DC Line, 6 ft.
	B-51162-1	Shaft, Drive
	A-51163	Clip, Spring
	B-51177	Brkt. Assy., Dial (571A-571B only)
	A-51202	Link, Insulating
	A-51206	Arm, Dial Drive
	B-51330-1	Channel, Rubber (571 only)
	A-51331	Spring, Dial Bracket
	C-51335	Bracket, Dial (571 only)
	A-51787	Spring, Cable

Order parts not listed by specifying (1) Part Name and (2) Model Number (include number following dash)

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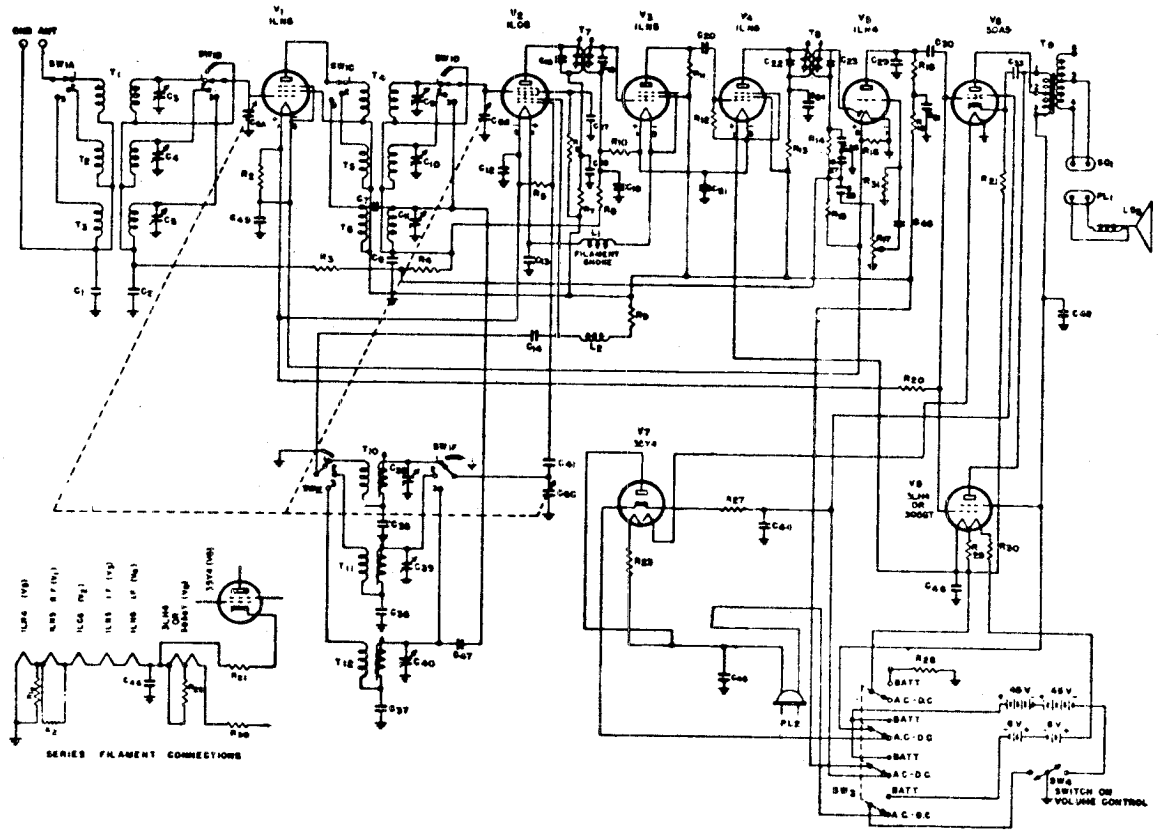
MODEL 581

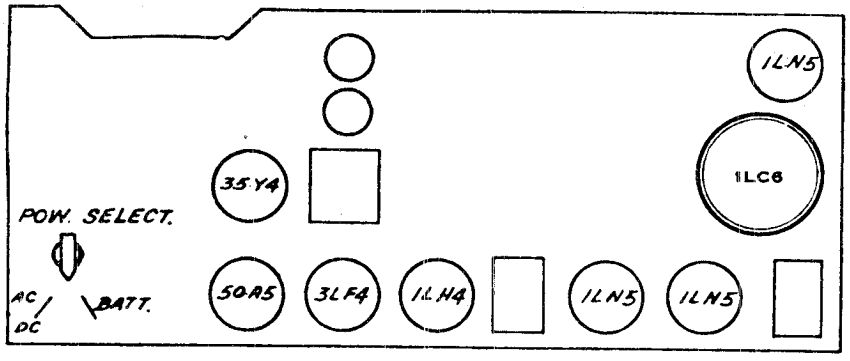
SPIEGEL



Batteries:

Two six (6) volt "A" batteries and two forty five (45) volt batteries are required for self-contained operation. These batteries are located under the chassis and may be inserted or replaced by removing the machine screw on either side of the cabinet holding the battery plate in place. The "A" batteries will provide approximately 30 hours of normal operation allowing the batteries to recuperate after several hours use. The "B" batteries will normally outlast two sets of "A" batteries. Batteries should be removed if radio set is to be stored for more than sixty (60) days.

Tube Location:



Batteries:

Suitable batteries for use with this Receiver are:
"A" Batteries: 6 Volt; Length, $3\frac{15}{16}$"; Width, $2\frac{3}{4}$"; Height, $5\frac{1}{2}$"; such as: Ever-Ready #718 or equivalent.
"B" Batteries: 45 Volt; Length, $4\frac{3}{16}$"; Width, $2\frac{19}{32}$"; Height, $5\frac{3}{8}$": such as: Ever-Ready #762-S, Burgess #5308, or equivalent.

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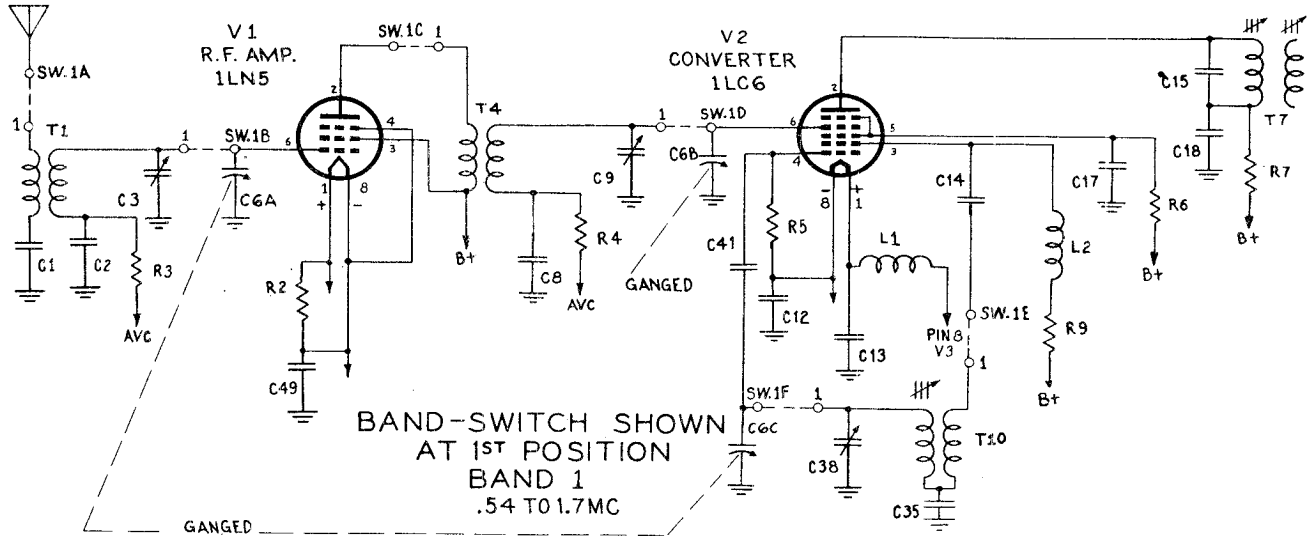
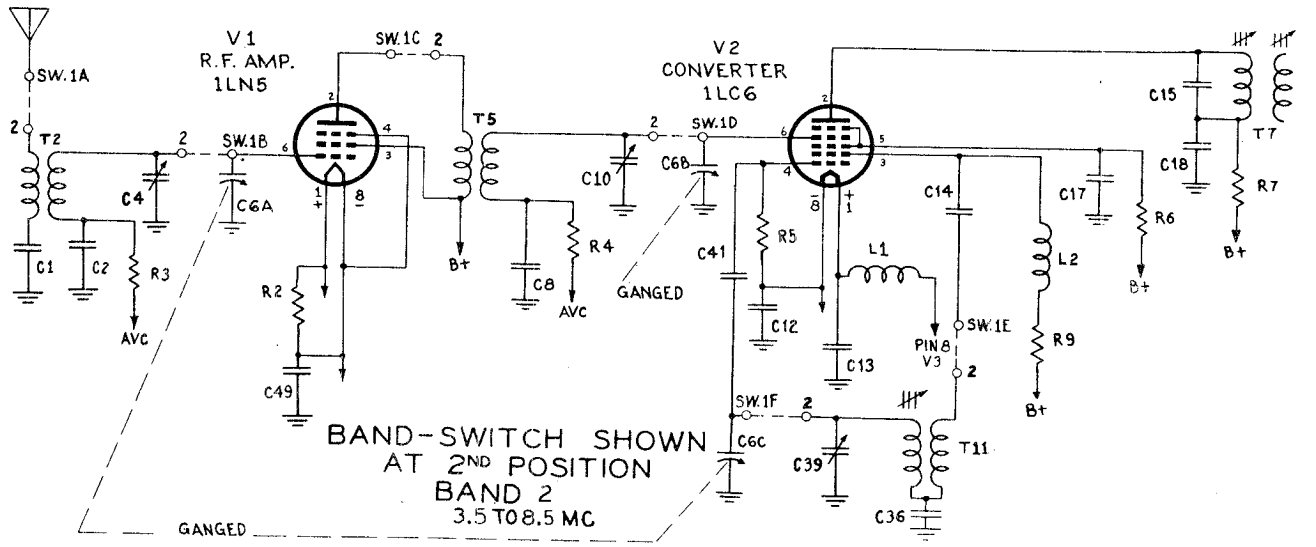
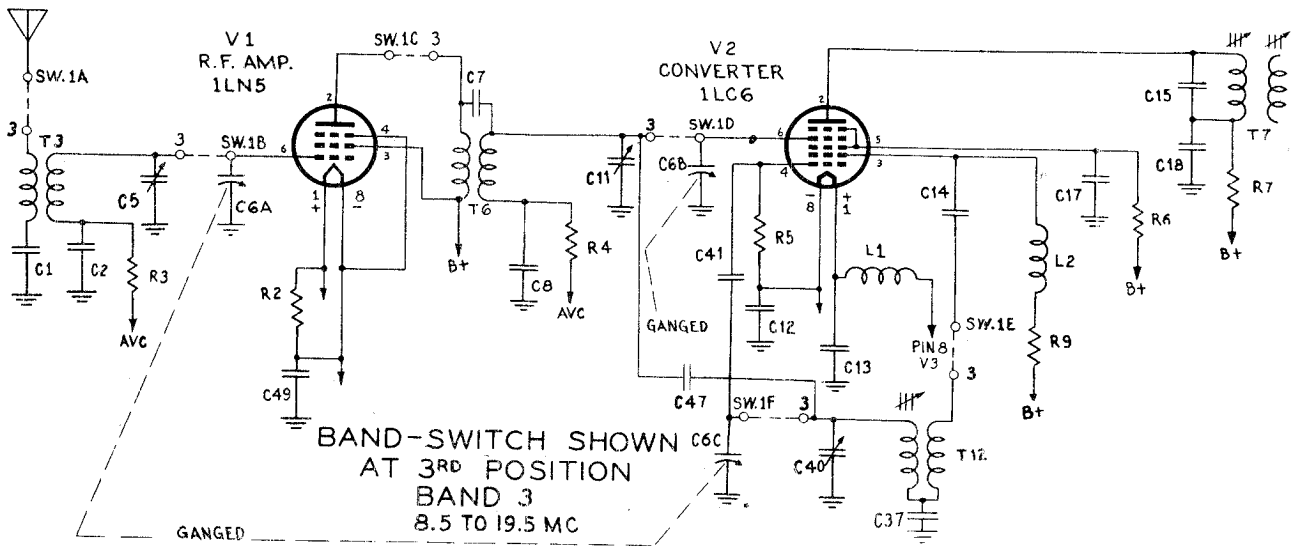
SPIEGEL







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Location of Parts:

C1—.006 mfd., ±20%, 600v., paper
C2—.01 mfd., +20 —10%, 200v., paper
C3—Ceramic trimmer (7-35-mmf.)
C4—Ceramic trimmer (35-55-mmf.)
C5—Ceramic trimmer (35-55-mmf.)
C6A—Variable 3 gang
C6B—Variable 3 gang
C6C—Variable 3 gang
C7—15 mmf., 20%, 500v., ceramic
C8—.05 mfd., +20 —10%, 200v., paper
C9—Ceramic trimmer (7-35-mmf.)
C10—Ceramic trimmer (7-35-mmf.)
C11—Ceramic trimmer (35-55 mmf.)
C12—.1 mfd., +40 —10%, 400v., paper
C13—.1 mfd., +40 —10%, 400v., paper
C14—.0022 mfd., 10%, 500v., mica
C15—150 mmf., 5%, 500v., mica
C16—82 mmf., 5%, 500v., mica
C17—.02 mfd., +40 —10%, 200v., paper
C18—.05 mfd., ±20%, 600v., paper
C19—.02 mfd., +40 —10%, 200v., paper
C20—220 mmf., 20%, 500v., mica
C21—.1 mfd., +40 —10%, 400v., paper
C22—51 mmf., 5%, 500v., mica
C23—82 mmf., 5%, 500v., mica
C24—.05 mfd., +40 —10%, 600v., paper
C26—100 mmf., 20%, 500v., mica
C27—100 mmf., 20%, 500v., mica
C28—.006 mfd., ±20%, 600v., paper
C29—100 mmf., 20%, 400v., mica
C30—.006 mfd., ±20%, 600v., paper
C31—.1 mfd., +40 —10%, 400v., paper
C33—.01 mfd., +40 —10%, 600v., paper
C35—430 mmf., 2%, 500v., mica
C36—2,200 mmf., 5%, 500v., mica
C37—4,300 mmf., 5%, 500v., mica
C38—Ceramic trimmer (7-35-mmf.)
C39—Ceramic trimmer (7-35-mmf.)
C40—Ceramic trimmer (7-35-mmf.)
C41—100 mmf., 20%, 500v., mica
C42 & C44—40 mfd., 250v. (dual electrolytic)
C45—.05 mfd., ±20%, 600v., paper
C46—1000 mfd., 15wv. (electrolytic)
C47—2 mmf., ±15%, 500v., bakelite
C48—.006 mfd., ±20%, 600v., paper
C49—.1 mfd., +40 —10%, 400v., paper

R2—270 ohms, 10%, ¼w.
R3—3.3 megohms, 10%, ¼w.
R4—3.9 megohms, 10%, ¼w.
R5—220,000 ohms, 20%, ¼w.
R6—68,000 ohms, 10%, ¼w.
R7—1,000 ohms, 20%, ¼w.
R8—3.3 megohms, 10%, ¼w.
R9—22,000 ohms, 10%, ¼w.
R10—3.3 megohms, 10%, ¼w.
R11—22,000 ohms, 10%, ¼w.
R12—470,000 ohms, 20%, ¼w.
R13—1,000 ohms, 20%, ¼w.
R14—47,000 ohms, 20%, ¼w.
R15—470,000 ohms, 20%, ¼w.
R16—330 ohms, 10%, ¼w.
R17—1 megohm, 20%—volume control
R18—470,000 ohms, 20%, ¼w.
R19—100,000 ohms, 20%, ¼w.
R20—470,000 ohms, 10%, ¼w.
R21—50 ohms, 5%, ½w.
R23—220 ohms, 5%, 30w.
R27—500 ohms, 10%, 1w.
R28—820 ohms, 10%, ¼w.
R29—330 ohms, 10%, ¼w.
R30—27 ohms, 10%, ¼w.
R31—12 megohms, 10%, ¼w.

SO1—Receptacle speaker
SW1A & B—C & D—Switch wafer
SW1E & F—Switch wafer
SW3—Switch AC-DC battery
SW4—Switch D.P.S.T.

T1—Transformer, band 1 Ant.
T2—Transformer, band 2 Ant.
T3—Transformer, band 3 Ant.
T4—Transformer, band 1 R.F.
T5—Transformer, band 2 R.F.
T6—Transformer, band 3 R.F.
T7—Transformer, 1st I.F.
T8—Transformer, 2nd I.F.
T9—Transformer, speaker output
T10—Transformer, band 1 osc.
T11—Transformer, band 2 osc.
T12—Transformer, band 3 osc.

V1, 3 & 4—R.F., 1st & 2nd I.F. 1LN5
V2—Converter 1LC6
V5—2nd Detector—1st audio 1LH4
V6—Output (power line) 50A5
V7—Rectifier 35V4
V8—Output (batt.) 3LH4 or 3Q5GT

L1—Choke coil, line filter
L2—Choke, R. F.
LS3—Speaker, 6" P. M. dynamic

PL1—Plug, speaker
PL2—Plug, line cord

Operate on:

(a) 105-125 Volts A.C., 60 cycle.
(b) 105-125 Volts D.C.
(c) Self contained batteries.

The instrument provides for commercial broadcast and short wave reception in the following frequency ranges:

(a) .54-1.7 M.C.
(b) 3.5-8.5 M.C.
(c) 8.5-19.5 M.C.

Electric Operation:

Set the power selector switch mounted on the rear left hand side of the chassis to "A.C.-D.C." for electric operation.

Battery Operation:

For battery operation, the power selector switch is set to the position marked "Batt". This switch is easily accessible through a door in the rear of the cabinet.

Unwind the hank antenna, connect to Antenna Binding Post and extend to full length along floor or window ledge.

Rotate control marked "ON-OFF-VOLUME in a clockwise position. This control turns the set on and permits the operator to adjust the output to the desired volume.

Select the desired frequency range by means of the control marked "Band Switch". Tuning is accomplished by rotating the control marked "Station Selector".

In locations where weak signals prevail, reception may be improved by connecting an additional outside antenna to the binding post marked "Ant". Where a ground is used, it must be connected to the binding post marked "Gnd" and NOT to the chassis directly.

Failure of the Radio Receiver to operate may be due to:

1. Incorrect setting of power selector switch.
2. Weak batteries or no current at power outlet.
3. With D.C. power — reverse position of power plug in power outlet.
4. Tubes not firmly locked in socket.
5. Defective tubes.
6. Weak reception in particular location (use longer aerial).

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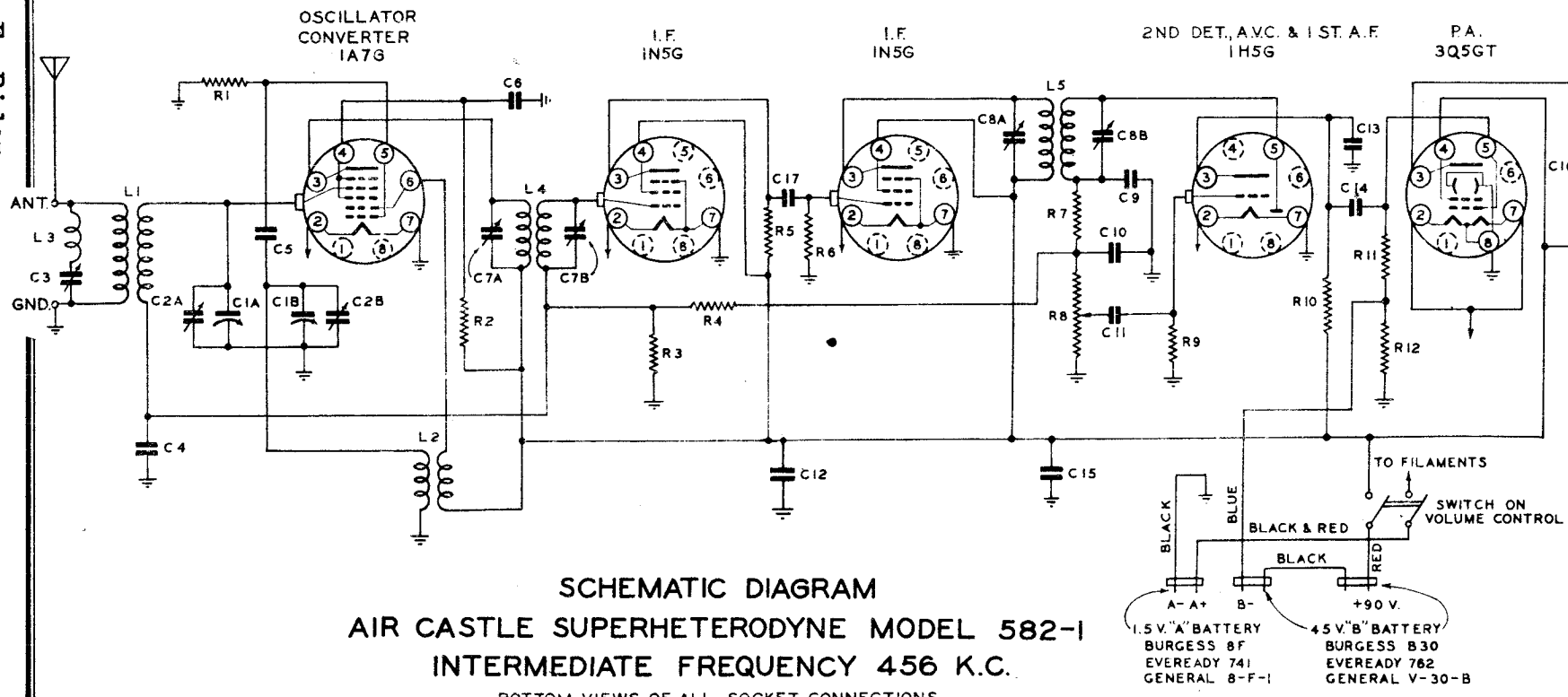


SCHEMATIC DIAGRAM
AIR CASTLE SUPERHETERODYNE MODEL 582-1
INTERMEDIATE FREQUENCY 456 K.C.

BOTTOM VIEWS OF ALL SOCKET CONNECTIONS

C1A&B	VARIABLE CONDENSER	B-8204-1
C2A&B	TRIMMERS ON VAR. COND.	
C3	I.F. REJECTOR TRIMMER	A-14088-2
C4	.05 MFD. 200 V.	C-3202-140C
C5	100 MMF. MICA	C-720-325
C6	.05 MFD. 200 V.	C-3202-28C
C7A&B	NO. 1 I.F. TRIMMER	B-7200-GG
C8A&B	NO. 2 I.F. TRIMMER	B-7200-GG
C9	100 MMF.	A-15697-1
C10	100 MMF.	
C11	.01 MFD. 200 V.	C-3202-132C
C12	.05 MFD. 200 V.	C-3202-140C
C13	100 MMF. MICA	C-720-325
C14	.01 MFD. 400 V.	C-3204-132C
C15	8 MFD. 150 V. ELECT.	A-14958
C16	.001 MFD. 1000 V.	C-3210-114C
C17	250 MMF. MICA	C-720-324

R1	180,000 Ω	.25 W.	C-2795-89B
R2	68,000 Ω	.25 W.	C-2795-84B
R3	2.2 MEGOHMS	.25 W.	C-2795-102B
R4	3.3 MEGOHMS	.25 W.	C-2795-104B
R5	22,000 Ω	.25 W.	C-2795-91B
R6	3.3 MEGOHMS	.25 W.	C-2795-104B
R7	56,000 Ω	.25 W.	C-2795-83B
R8	500,000 Ω VOL. CONT.		A-15132-2
R9	10 MEGOHM	.25 W.	C-2795-110B
R10	1 MEGOHM	.25 W.	C-2795-98B
R11	2.2 MEGOHMS	.25 W.	C-2795-102B
R12	470 Ω	.25 W.	C-2795-151B

L1	B.C. ANT. COIL	A-14974-8
L2	B.C. OSC. COIL	A-15232-8
L3	I.F. REJECTOR COIL	A-14718-1
L4	NO. 1 I.F. COIL	A-12064-40
L5	NO. 2 I.F. COIL	A-12064-40

MODEL 582-1

SPIEGEL

Superheterodyne Model 582-1

VOLTAGE CHART

"A" Battery Voltage 1½ Volts
"B" Battery Voltage 90 Volts

Position of Volume Control: Full with antenna disconnected

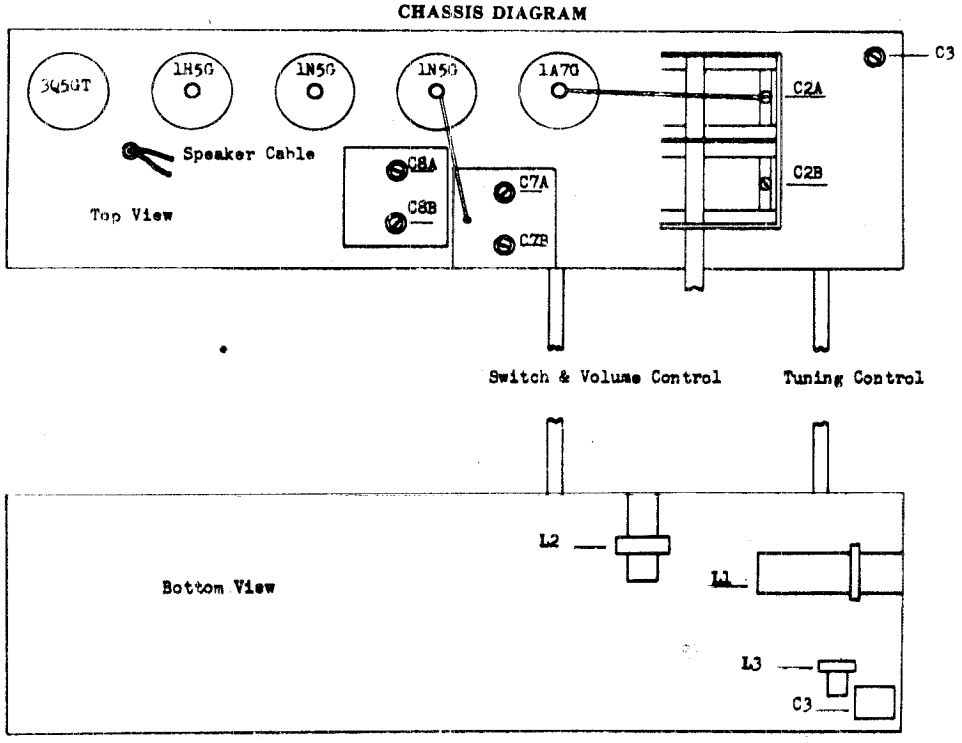
TUBE	FUNCTION	Voltage of Socket Prongs to Gnd. See Nos. on Schematic Diagram							
		No. 1	No. 2	No. 3	No. 4	No. 5	No. 6	No. 7	No. 8
1A7G	Osc - Converter	0	1.5	83	42	-5	82	0	0
1N5G	I-F Amplifier	0	1.5	62	82	0	0	0	0
1N5G	I-F Amplifier	0	1.5	82	82	0	0	0	0
1H5G	Det - AVC - AF	0	1.5	57	82	0	0	0	0
3Q5GT	Power Amplifier	0	1.5	82	83	-4	-6	1.5	0

Notes: Voltage readings are for schematic diagram on back of sheet. Allow 15% + or - on all measurements. Always use meter scale which will give greatest deflection within scale limits. All DC measurements made with 20,000 ohms per volt voltmeter.

ALIGNMENT CHART

OPER-ATION	ALIGNMENT OF	GENERATOR CONNECTED TO	DUMMY ANTENNA	GENERATOR FREQUENCY	TUNING COND. SETTING	TRIMMER	REMARKS
1	Set dial pointer even with last calibration mark when condenser gang is fully meshed.						
2	I.F.	1A7G Grid.	.1 mf. Cond.	456 KC	Open	C8 A&B	Peak accurately
						C7 A&B	Peak accurately
3	I.F. Rej.	Ant.	200 mf.	456 KC	Closed	C3	Adjust to minimum
4	Broad cast	Ant.	200 mf.	1500 KC	1500 KC	C2B Osc. Trim	Peak accurately
						C2A Ant. "	Peak accurately
5	Repeat operation 4.						
6	Check operations 1 to 4 inclusive.						

CHASSIS DIAGRAM



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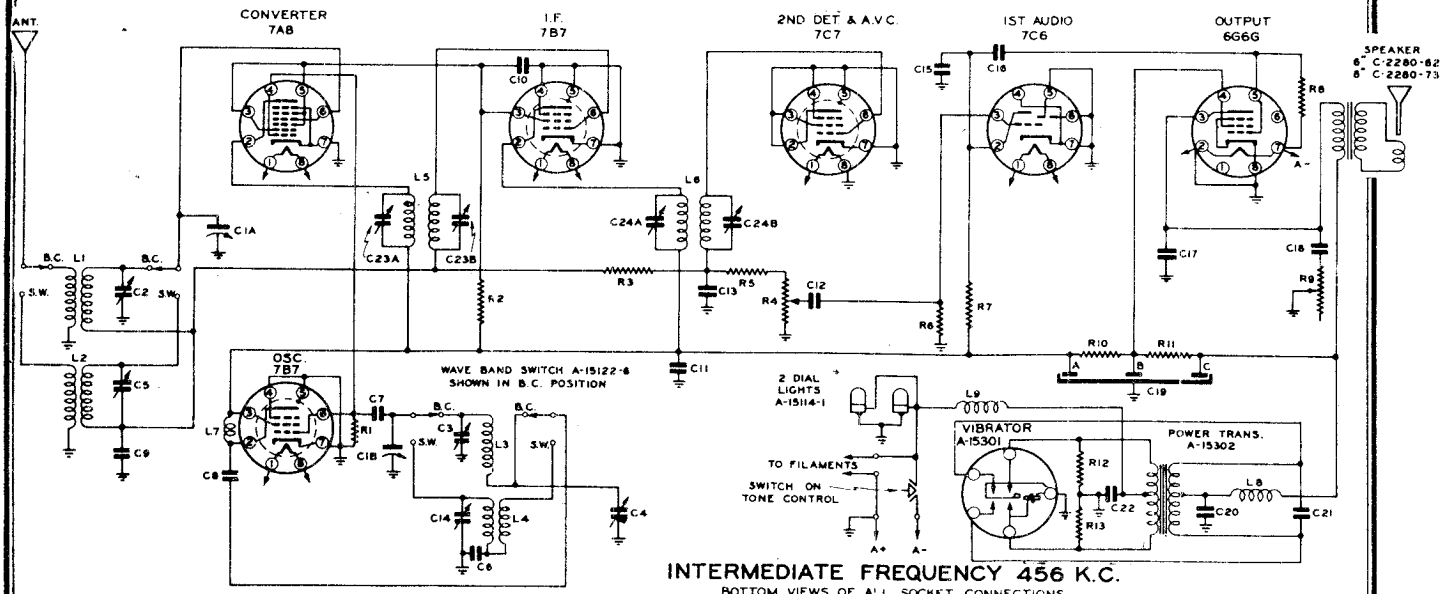
SPIEGEL



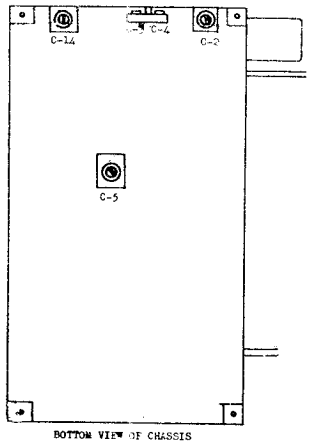
C1A&B	VARIABLE CONDENSER	B-7229	C13	250 MMF. MICA	C-720-324	R1	56,000 Ω	.25W	C-2795-83B	L1	B.C. ANT. COIL	A-15349-1
C2	B.C. ANT. TRIMMER	A-14088-B	C14	S.W. OSC. TRIMMER	A-14088-B	R2	18,000 Ω	.5 W.	C-2796-77C	L2	S.W. ANT. COIL	A-14682-3
C3	B.C. OSC. TRIMMER	B-7199-EY	C15	250 MMF. MICA	C-720-324	R3	1 MEGOHM	.25W.	C-2795-98B	L3	B.C. OSC. COIL	A-15352-1
C4	B.C. OSC. PADDER		C16	.05 MFD. 200V.	C-3202-28C	R4	500,000 Ω VOLUME CONT.		A-15130-3	L4	S.W. OSC. COIL	A-15233-5
C5	S.W. ANT. TRIMMER	A-14088-5	C17	.001 MFD. 400V.	C-3204-56C	R5	47,000 Ω	.25W.	C-2795-23B	L5	NO. 1 I.F. COIL	A-12084-39
C6	2700 MMF. MICA	A-15451	C18	.02 MFD. 400V.	C-3204-78C	R6	4.7 MEGOHM	.25W.	C-2795-35B	L6	NO. 2 I.F. COIL	A-12084-17
C7	50 MMF. MICA	C-720-315	C19A,B,C	20-20-20 MFD. 150V. ELECT.	A-14684-6	R7	220,000 Ω	.25W.	C-2795-27B	L7	B+ PLATE CHOKE	A-14881-1
C8	250 MMF. MICA	C-720-324	C20	1000 MMF. MICA	C-720-297	R8	1 MEGOHM	.25W.	C-2795-98B	L8	B+ HASH CHOKE	A-14718-2
C9	.05 MFD. 200V.	C-3202-84C	C21	.01 MFD. 600V.	C-3206-132C	R9	TONE CONTROL & SWITCH		A-15128-2	L9	A LEAD HASH CHOKE	A-14944
C10	.1 MFD. 200V.	C-3202-38C	C22	.5 MFD 120V.	C-3203-46B	R10	330 Ω	.5 W.	C-2796-10C			
C11	.1 MFD. 200V.	C-3202-38C	C23	NO.1 I.F. TRIMMER	B-7200-GN	R11	68 Ω	.5 W.	C-2796-48C			
C12	.02 MFD. 200V.	C-3202-22C	C24	NO.2 I.F. TRIMMER	B-7200-GN	R12	68 Ω	.5 W.	C-2796-6C			
						R13	68 Ω	.5 W.	C-2796-6C			

VOLTAGE CHART

Condition of Storage Battery Good (6 Volts) Position of Volume Control: Full with Antenna Disconnected
Band Switch - Broadcast

Tube	Function	Voltage of Socket Prongs to Gnd. (See Nos. on Schematic Diagram)							
		No. 1	No. 2	No. 3	No. 4	No. 5	No. 6	No. 7	No. 8
7A8	Converter	6	110	45	-20	45	0	0	0
7B7	Oscillator	6	110	110	0	0	-20	0	0
7B7	I. F. Amp.	6	110	45	0	0	0	0	0
7C7	2 Det. AVC	6	0	0	0	0	0	0	0
7C6	1st Aud. Amp.	6	16	0	--	0	0	0	0
6G6G	Power Amp.	0	0	110	115	0	--	6	0

Notes: Voltage readings are for schematic diagram on back of sheet. Allow 15% + or - on all measurements. Always use meter scale which will give greatest deflection within scale limits. All DC measurements made with 1000 ohms per volt voltmeter.

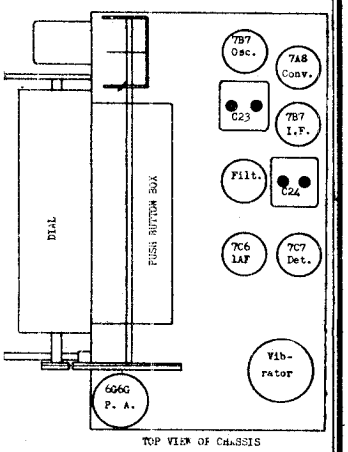


BOTTOM VIEW OF CHASSIS

ALIGNMENT CHART

OPERATION	ALIGNMENT OF	GENERATOR CONNECTED TO	DUMMY ANTENNA	GENERATOR FREQUENCY	BAND SWITCH SETTING	TUNING COND. SETTING	TRIMMER	REMARKS
1	(Set dial drum so that indicator points to last dial mark when gang is fully closed.)							
2	I.F.	Ant.	.1 mf.	456 KC	BC	Open	C24 A&B	2nd I-F
							C23 A&B	1st I-F
3	Broadcast Band	Ant.	200 mmf.	1500 KC	BC	1500 KC	C3 (Osc.)	Peak accurately
							C2 (Ant.)	Peak accurately
4				600 KC	BC	600 KC	C4 (Pad.)	Peak accurately
5	(Repeat operation 3)							
6	(Check calibration and sensitivity at 600 KC, 900 KC and 1500 KC)							
7	SW Band	Ant.	*	18 MC.	SW	18 MC	C14 (Osc.)	**
							C5 (Ant.)	**
8	(Check calibration and sensitivity at 6 MC and 18 MC)							
9	(Check operations 1 to 8 inclusive.)							

*100 ohms non-inductive resistor and 200 mmf. condenser in series.
**Rock dial while making this adjustment. Make certain that adjustment is made on fundamental signal and not on image. Peak accurately.



TOP VIEW OF CHASSIS

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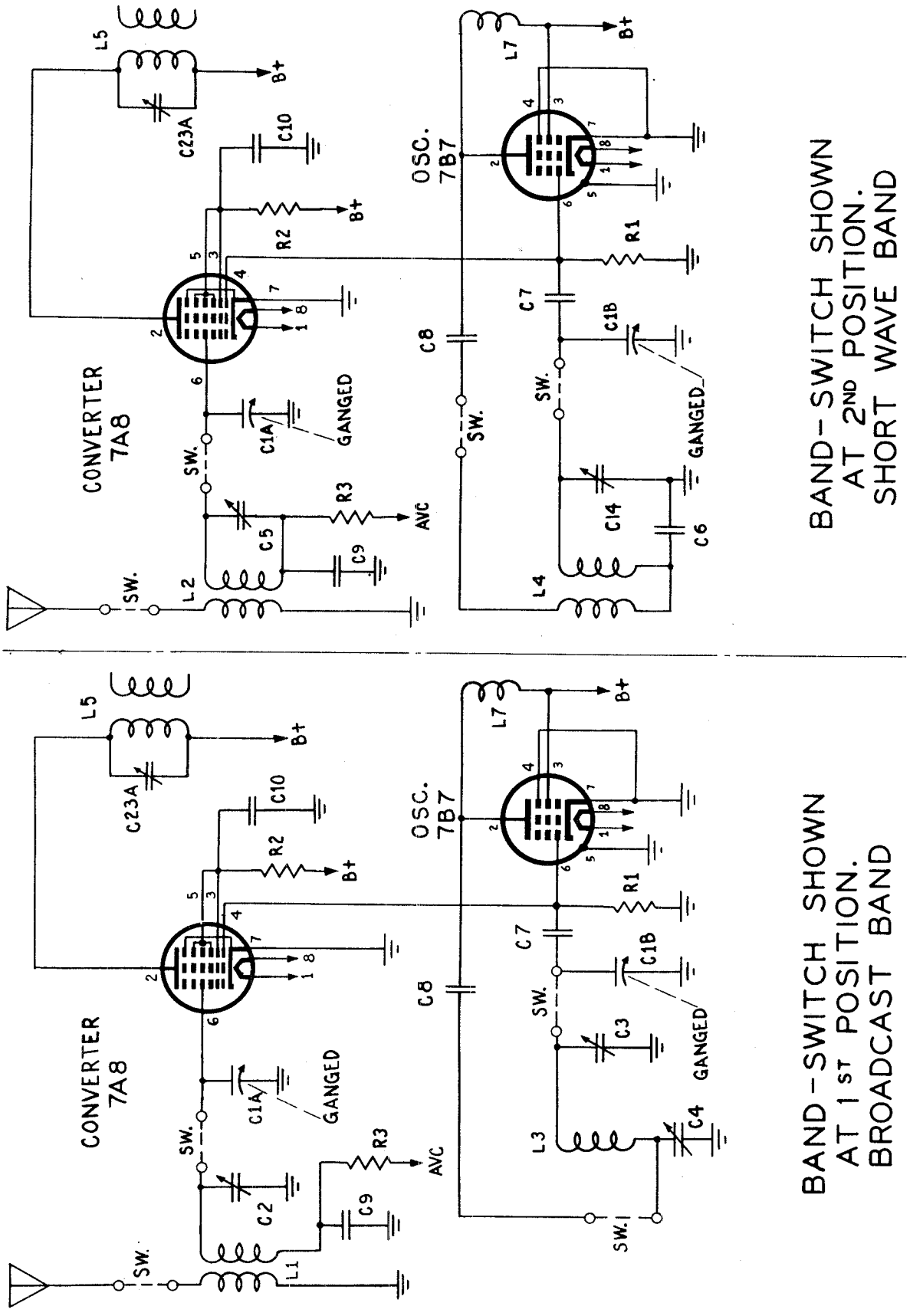
MODEL 630

SPIEGEL



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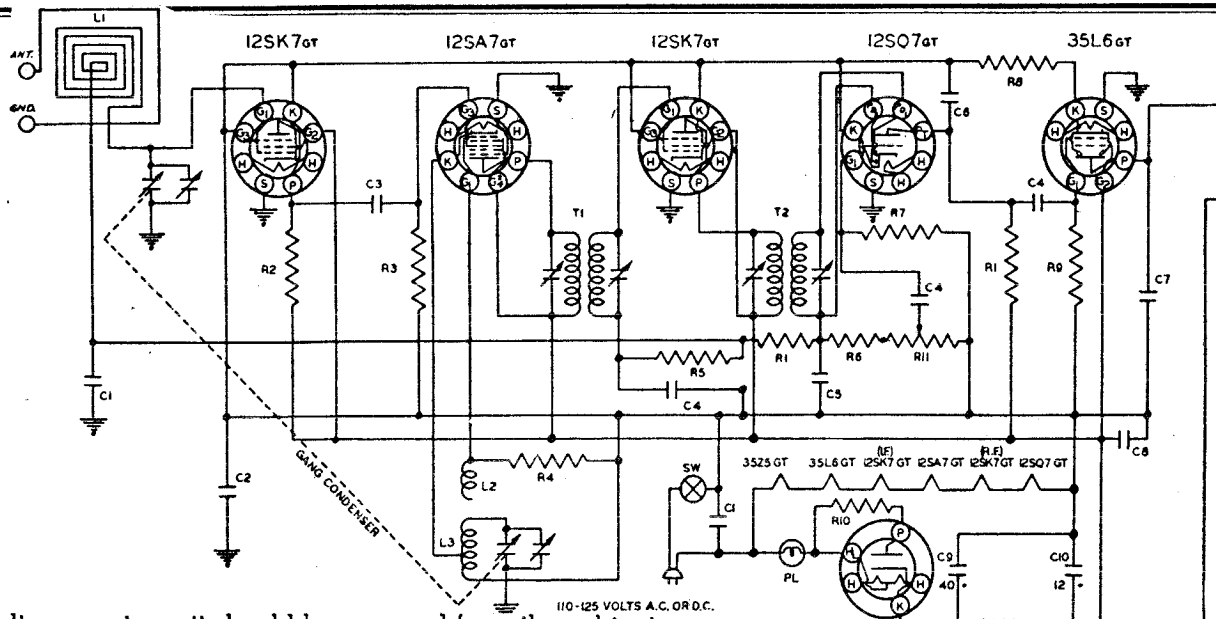


PART NO.	SCHEMATIC LOCATION	DESCRIPTION
3-6	R1	1 MEG. Ω ½ WATT 20% RESISTOR
3-36	R2	1500 Ω " " "
3-17	R3	100000 Ω " " "
3-26	R4	30000 Ω " " "
3-141	R5	6 MEG. Ω " " "
3-4	R6	50000 Ω " " "
3-2	R7	2 MEG Ω " " "
3-34	R8	100 Ω " " "
3-1	R9	500000 Ω " " "
3-313	R10	50 Ω " " "
5-301	R11	1 MEGOHM VOLUME CONTROL ϕ
	SW	SWITCH
6-14	C1	.05 MFD. 400 VOLTS CONDENSER
6-30	C2	.25 " 200 " "
6-8	C3	.0001 " MICA "
6-3	C4	.01 " 400 VOLTS "
6-10	C5	.00025 " MICA "
6-305	C6	.0005 " 600 VOLTS "
6-306	C7	.005 " " " "
6-26	C8	.1 " 400 " "
7-301	C9	40 " 150 " } ELECTROLYTIC
	C10	12 " 150 " }
15-302	L1	LOOP
15-309	L2	} OSCILLATOR COIL
	L3	
16-302	T1	INPUT I.F. TRANSFORMER
16-303	T2	OUTPUT I.F. "
43-307	T3	OUTPUT " OH
	S	SPEAKER (ELECTRODYNAMIC)
41-300	PL	PILOT LIGHT #47
40-306	12SK7 GT	R.F. AMPLIFIER
	12SA7 GT	CONVERTER
	12SK7 GT	I.F. AMPLIFIER
	12SQ7GT	DETECTOR - AUDIO
	35L6 GT	AUDIO AMPLIFIER
	35Z5 GT	RECTIFIER
10-301		GANG CONDENSER

JUNE 5, 1941

To properly align receiver, it should be removed from the cabinet.

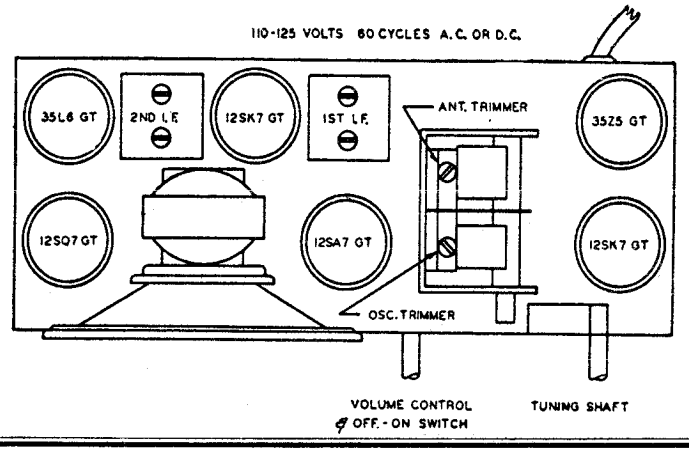
A signal generator is required, having the following frequencies: 456KC, 1400KC, 1720KC. An output meter of some kind is also necessary. (See figure No. 1 for trimmer locations).

All adjustments in aligning this receiver should be made with the volume control fully turned on, so as to prevent the A. V. C. from working and giving false readings. It is also advisable to keep the gang condenser turned all the way out to complete minimum capacity and keep the signal from the generator down as low as possible so as to prevent false peaks when aligning the I. F. transformers.

FIRST STEP: Connect the generator lead through a .1 condenser to the No. 8 pin at the 12SA7GT socket base (this is the control grid) and connect the generator ground lead to some point on the floating ground, above the .25 MFD floating ground condenser. Adjust the signal generator to 456KC and adjust the I. F. trimmer screws till a maximum reading is noted on the output meter which has been connected across the speaker leads. With the generator leads still connected to the 12SA7GT grid, adjust the generator frequency to 1720KC and adjust the oscillator trimmer till the signal is tuned in, with the gang condenser still at complete minimum.

SECOND STEP: Disconnect the generator leads from the receiver and connect both to a transmitting loop which may be made with two turns of wire about six inches in diameter and placed about one foot from the receiver loop. Adjust the generator frequency to 1400KC and turn the tuning condenser till this signal is tuned in. Adjust the antenna trimmer on the gang till a maximum reading is noted on the output meter.

TUBE AND TRIMMER LOCATION



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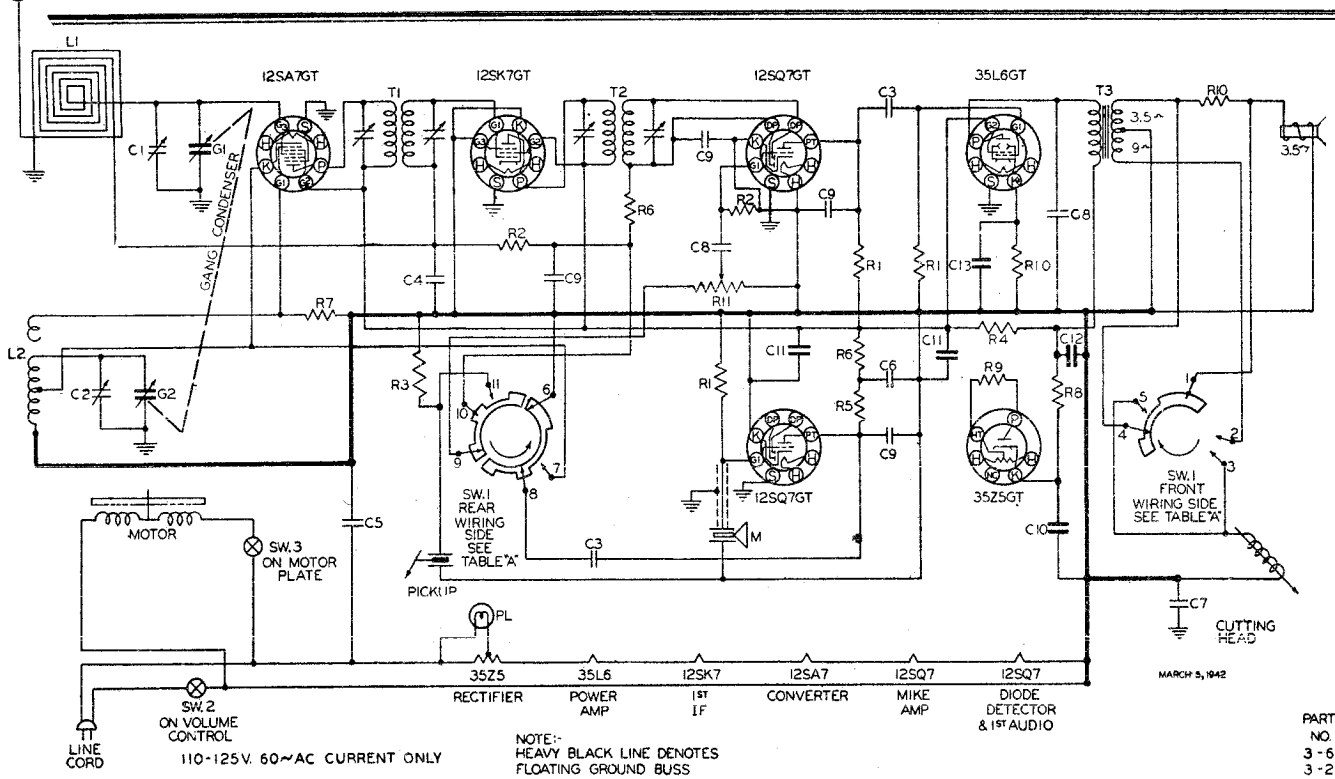


TABLE A
SELECTOR SWITCH CONTACTS

POSITION		CONTACTS CLOSED
RADIO	#1	[1-4] [6-8] [9-10]
PHONO	#2	[1-4] [6-7-8] [9-11]
RADIO RECORDING	#3	[2-5] [6-8-11] [9-10]
MIKE RECORDING	#4	[2-3] [6-7-10-11] [8-9]

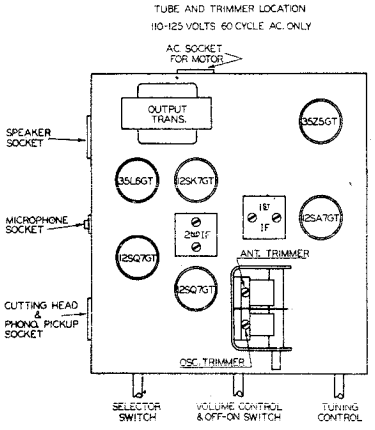


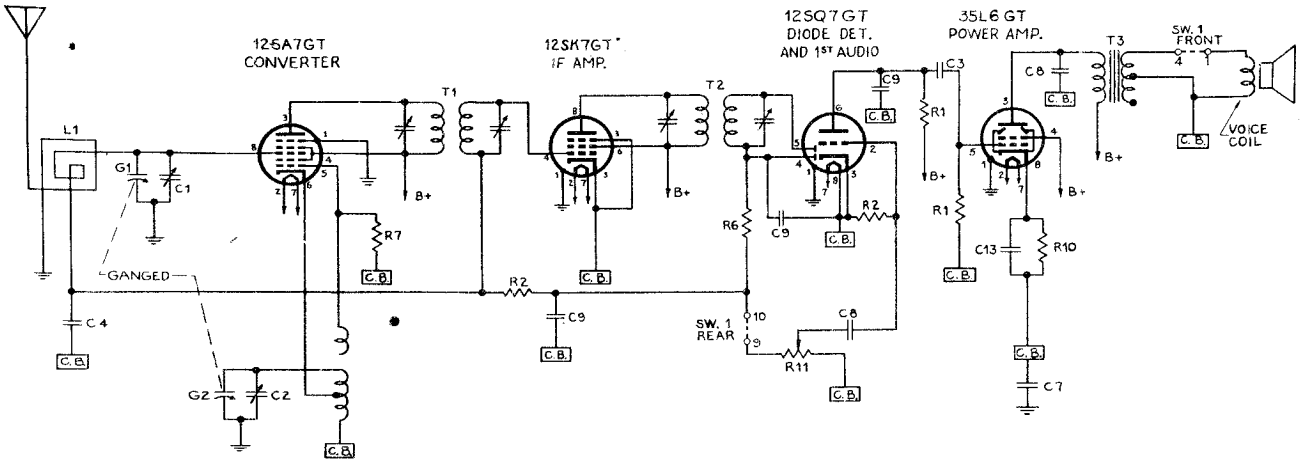
FIG. 3

PART NO.	SCHEMATIC LOCATION	DESCRIPTION
3-6	R1	1MEG.-½-W.-20%-RESISTOR
3-2	R2	2 " " " " "
3-62	R3	200M " " " " "
3-53	R4	2000~ " " " " "
3-5	R5	250M " " " " "
3-4	R6	50M " " " " "
3-29	R7	25M " " " " "
3-11	R8	500~ " " " " "
3-313	R9	50~ " " " " "
3-20	R10	100~ " " " " "
5-310	R11	1 MEG. VOLUME CONTROL
6-17	C3	.002-600 V. PAPER CONDENSER
6-12	C4	.05 -200V " " " " "
6-14	C5	.05 -400V " " " " "
6-30	C6	.25 - 200V " " " " "
6-32	C7	.25 - 400V. " " " " "
6-3	C8	.01 - " " " " " "
8-8	C9	.0001-MOLDED MICA " "
7-304	C10, C11, C12	20MFD. ELECTROLYTIC 150W.V. 40 " " " " " " 10 " " " " " "
7-308	C13	10 " 35W.V.
10-301	G1	ANT. SECTION-GANG CONDENSER
	G2	OSC. " " " " "
	C1	ANT. TRIMMER ON " " "
	C2	OSC. " " " " "
14-302	SW1	SELECTOR SWITCH
	SW2	POWER SWITCH ON VOL. CONTROL
	SW3	MOTOR " " " MOTOR PLATE
16-39	T1	INPUT I.F. TRANSFORMER 456KC.
16-40	T2	OUTPUT " " " " "
12-300	T3	AUDIO OUTPUT " " ON CHASSIS
43-305	S	6" P.M. SPEAKER [" INPUT TRANSFORMER, OUTPUT]
MOTR PLATE		PICKUP & ARM; CUTTING HEAD & ARM; 117V.-60~AC MOTOR & TURNTABLE
	M	CRYSTAL MICROPHONE

Remove chassis from cabinet for alignment.
A signal generator is required having the following frequencies: 456KC, 1400KC, 1720KC. Also an output meter of some type.

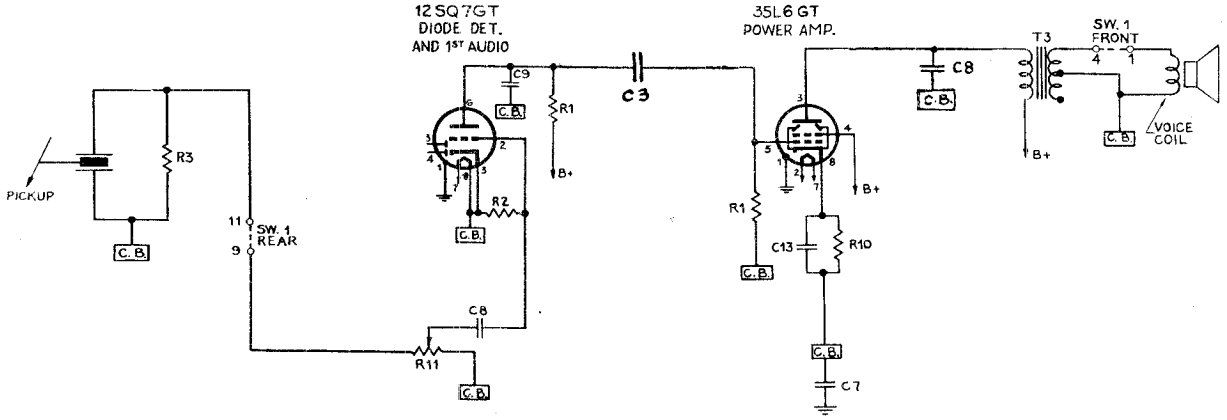
First Step: Connect the generator lead through a .1 mfd. condenser to the terminal lug next to the Antenna trimmer on top of the tuning condenser. The ground lead from the generator, must be connected to the floating ground buss underneath the chassis. Adjust generator to 456KC and adjust IF trimmer screws until a maximum reading is noted on the output meter which has been connected across the speaker. The tuning condenser should be turned out to complete minimum capacity when aligning the IF. With generator lead still connected to antenna trimmer terminal, adjust generator frequency to 1720KC, and with tuning condenser still at minimum, adjust oscillator trimmer till the 1720KC signal is tuned in. Next remove generator leads from set and connect both to a transmitting loop. This loop can be made with 2 turns of wire about 6 inches in diameter and placed about one foot away from the loop antenna of the receiver. Adjust generator frequency to 1400KC. Turn tuning condenser until the signal is tuned in and adjust antenna trimmer until a maximum reading is noted. No further adjustment should be necessary, unless the set has been damaged, as the coils and condenser in this receiver have been specially handled at the factory so as to insure proper alignment at the lower frequency end of the dial.

SPIEGEL



SELECTOR SWITCH SHOWN
AT 1ST POSITION.
RADIO

C.B. - DENOTES COMMON BUS, FLOATING GROUND



SELECTOR SWITCH SHOWN
AT 2ND POSITION
PHONO

C.B. - DENOTES COMMON BUS, FLOATING GROUND

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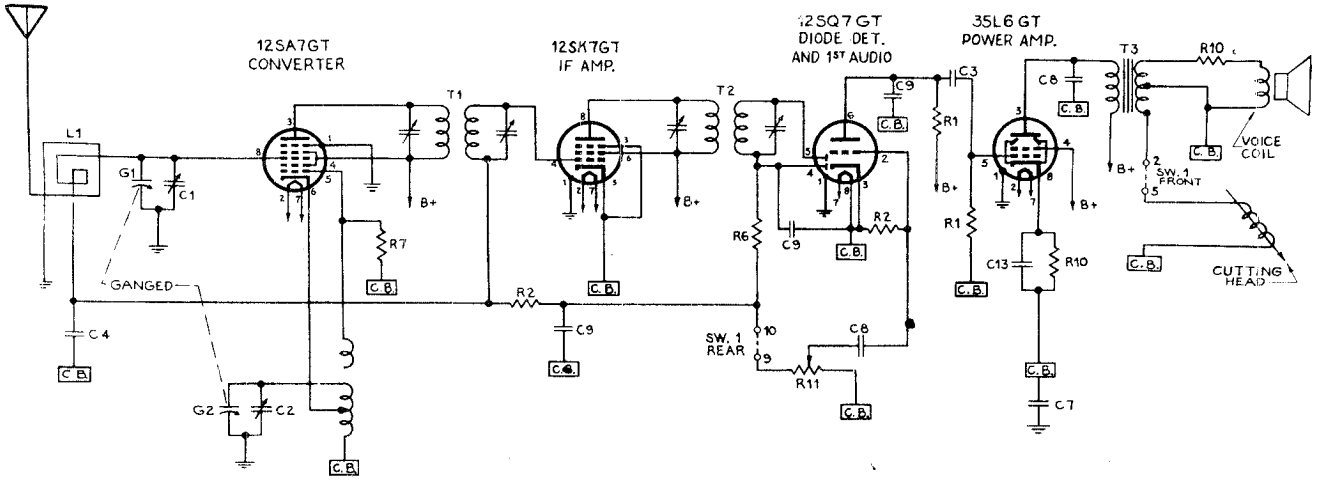
"clarified schematics"

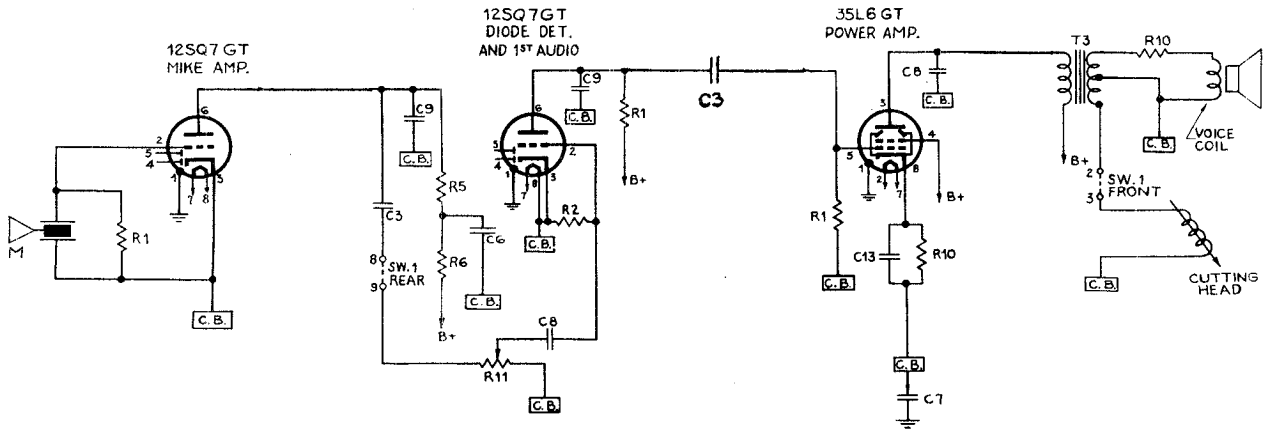
MODEL TR-640

SPIEGEL



SELECTOR SWITCH SHOWN
AT 3RD POSITION
RADIO RECORDING

C.B. DENOTES COMMON BUS, FLOATING GROUND



SELECTOR SWITCH SHOWN
AT 4TH POSITION
MIKE RECORDING

C.B. - DENOTES COMMON BUS, FLOATING GROUND

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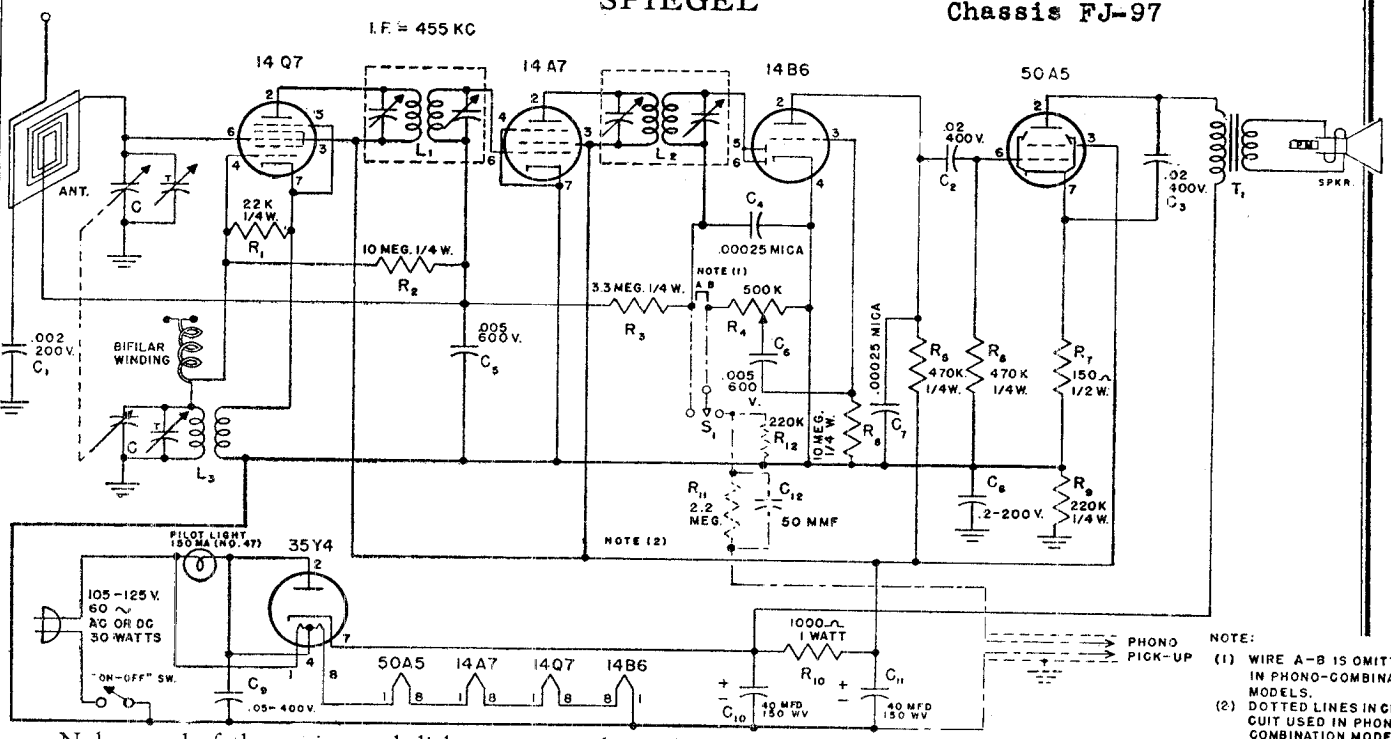
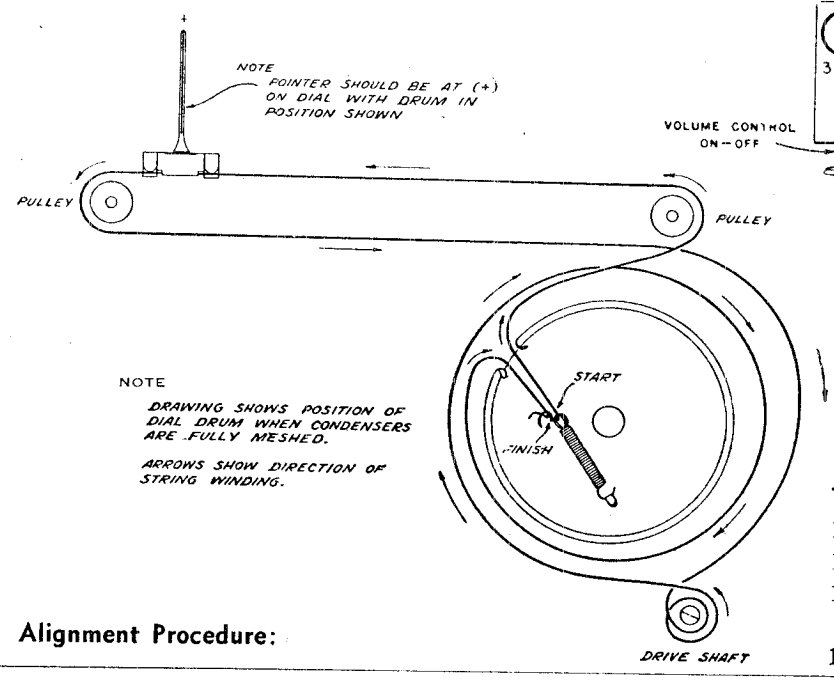
SPIEGEL

MODELS 651,6514,6541,6547
Chassis FJ-97

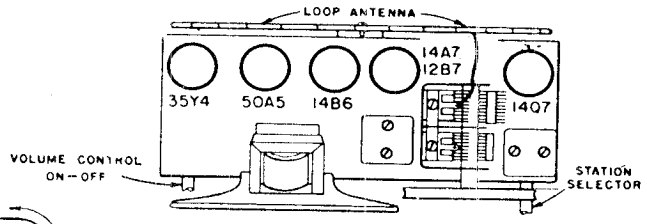


NOTE:
(1) WIRE A-B IS OMITTED IN PHONO-COMBINATION MODELS.
(2) DOTTED LINES IN CIRCUIT USED IN PHONO-COMBINATION MODELS ONLY.

Nylon cord of the tuning and dial system may be replaced by following the diagram below.



NOTE
DRAWING SHOWS POSITION OF DIAL DRUM WHEN CONDENSERS ARE FULLY MESHED.
ARROWS SHOW DIRECTION OF STRING WINDING.



Note: Trimmers may be located on either long or short side of variable condenser.

Tube Complement:

1 Type 14Q7—Oscillator—Converter.
1 Type 14A7—I. F. Amplifier.
1 Type 14B6—Det. A.V.C. and Amp.
1 Type 50A5—Power Amp.
1 Type 35Y4—Rectifier.

Alignment Procedure:

Steps	Connect output of oscillator to	Tune osc. to	Tune radio dial to	Adjust the following for max. peak output
1.	Tuning condenser stator (ant.) in series with .01 mfd.	455	Quiet point at high frequency end of dial.	1st and 2nd I. F. Transformers
2.	Antenna term. of Ant. loop in series with 100 mmf.	1720	Full clockwise (out of mesh)	Osc. trimmer
3.	Antenna term. of Ant. loop in series with 100 mmf.	1500	1500	Ant. trimmer

Output meter is connected across voice coil. Receiver volume is turned to maximum.

For Parts list, see P. 15-9. For Record Changer: Seeburg Model K

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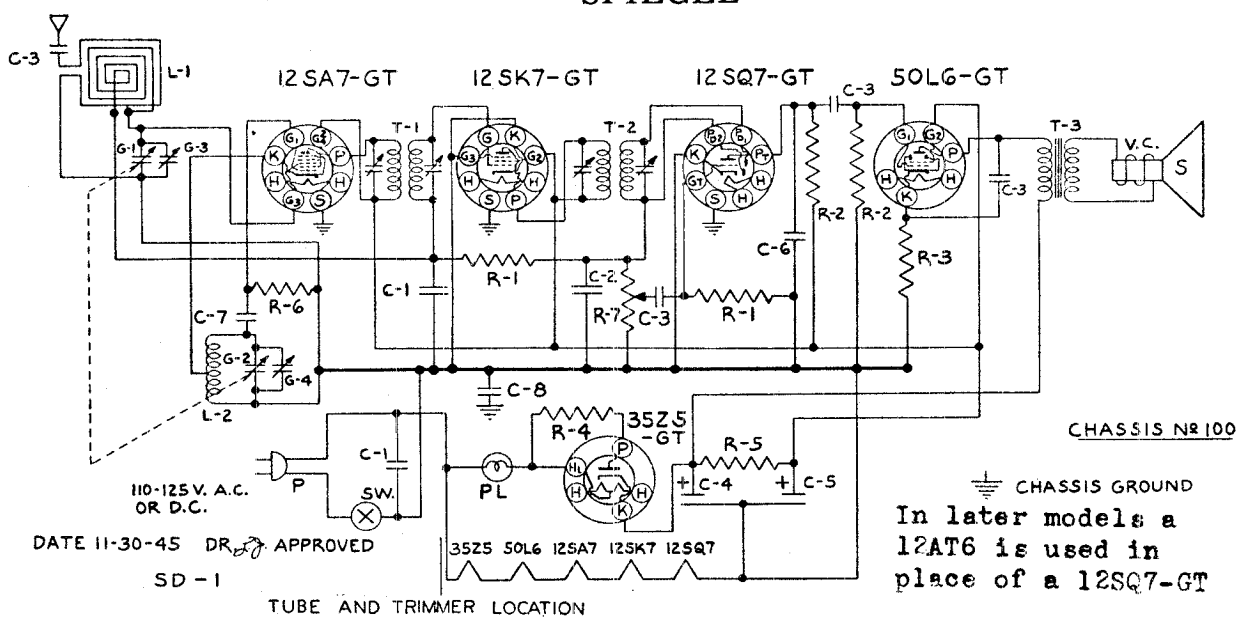
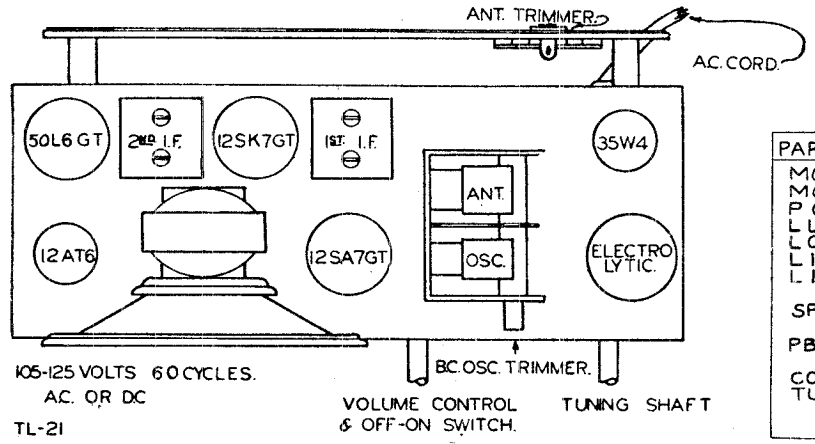
MODEL 5001

SPIEGEL





PART NO		DESCRIPTION
MC-5	C-6	.0005 MFD. COND. 20%
MC-4	C-7	.000056 MFD. MICA 20%
PC-9	C-8	.1 MFD COND. 400 V.
LL-1	L-1	LOOP ANTENNA
LO-2	L-2	OSC. COIL
LI-1	T-1	INPUT I.F. TRANSFORMER
LI-2	T-2	OUTPUT I.F. TRANSFORMER
	T-3	OUTPUT SPK. TRANSFORMER
SPK-4	V.C.	VOICE COIL
	S	P.M. SPEAKER
PB-1	PL	#47 PILOT BULB
	SW	A.C. SWITCH ON VOL. CONTROL
CO-1	P	LINE CORD
TU-3		12SA7 GT 12SK7 GT 12SQ7 GT 50L6 GT 35Z5 GT

Remove chassis from cabinet for alignment.

A Signal Generator is required having the following frequencies: 455 KC, 1400 KC, 1720 KC. An output meter should be connected across the speaker.

The receiver volume control should be turned to maximum during the I.F. and all subsequent alignments to keep the AVC from working and giving false readings. Keep the generator output as low as possible to prevent overloading.

FIRST STEP: Connect the hot lead from the generator to the ANT. section of the gang condenser, through a .1 MFD condenser. The ground lead from the generator must be connected to the metal frame of the gang condenser. Turn the gang condenser to complete minimum capacity. Adjust the generator to 455 KC and adjust the trimmers of the 1st and 2nd I.F. transformers until a maximum reading is noted on the output meter.

SECOND STEP: With the leads from the generator still connected in the same manner, adjust the Signal Generator to 1720 KC. The OSC. trimmer is located on the front of the chassis between the volume and tuning controls. Adjust this trimmer until the 1720 KC signal is tuned in.

THIRD STEP: Remove the hot lead of the generator from the ANT. section of the gang condenser. Connect this lead to the antenna lead wire that projects from the back of the loop antenna through a 200 MMFD condenser. Adjust the Signal Generator to 1400 KC. Rotate the tuning control until this signal is tuned in. The ANT. trimmer is located on the back of the loop antenna. Adjust this trimmer until a maximum reading is noted on the output meter. No further adjustment should be necessary, unless the set has been damaged, as the coils and condenser in this receiver have been specially handled at the factory to insure proper alignment at the lower frequencies.

PART NO.		DESCRIPTION
IR-13	R-1	2 MEG. RESISTOR ½W 20%
IR-11	R-2	470M Ω " " "
IR-14	R-3	150 Ω " " "
IR-4	R-4	47 Ω " " "
IR-15	R-5	2200 Ω " " "
IR-16	R-6	33,000 Ω " " "
VC-3	R-7	1 MEG. VOLUME CONTROL
GC-2	G-1, G-2	GANG COND.
TC-7	G-3	ANT. TRIMMER COND.
TC-6	G-4	OSC. TRIMMER COND.
PC-5	C-1	.05 MFD. COND. 400 V.
MC-2	C-2	.0001 MFD. MICA 20%
PC-7	C-3	.01 MFD. COND. 400 V.
EC-3	C-4	40 MFD. 150 V.
	C-5	20 MFD. ELECTROLYTIC

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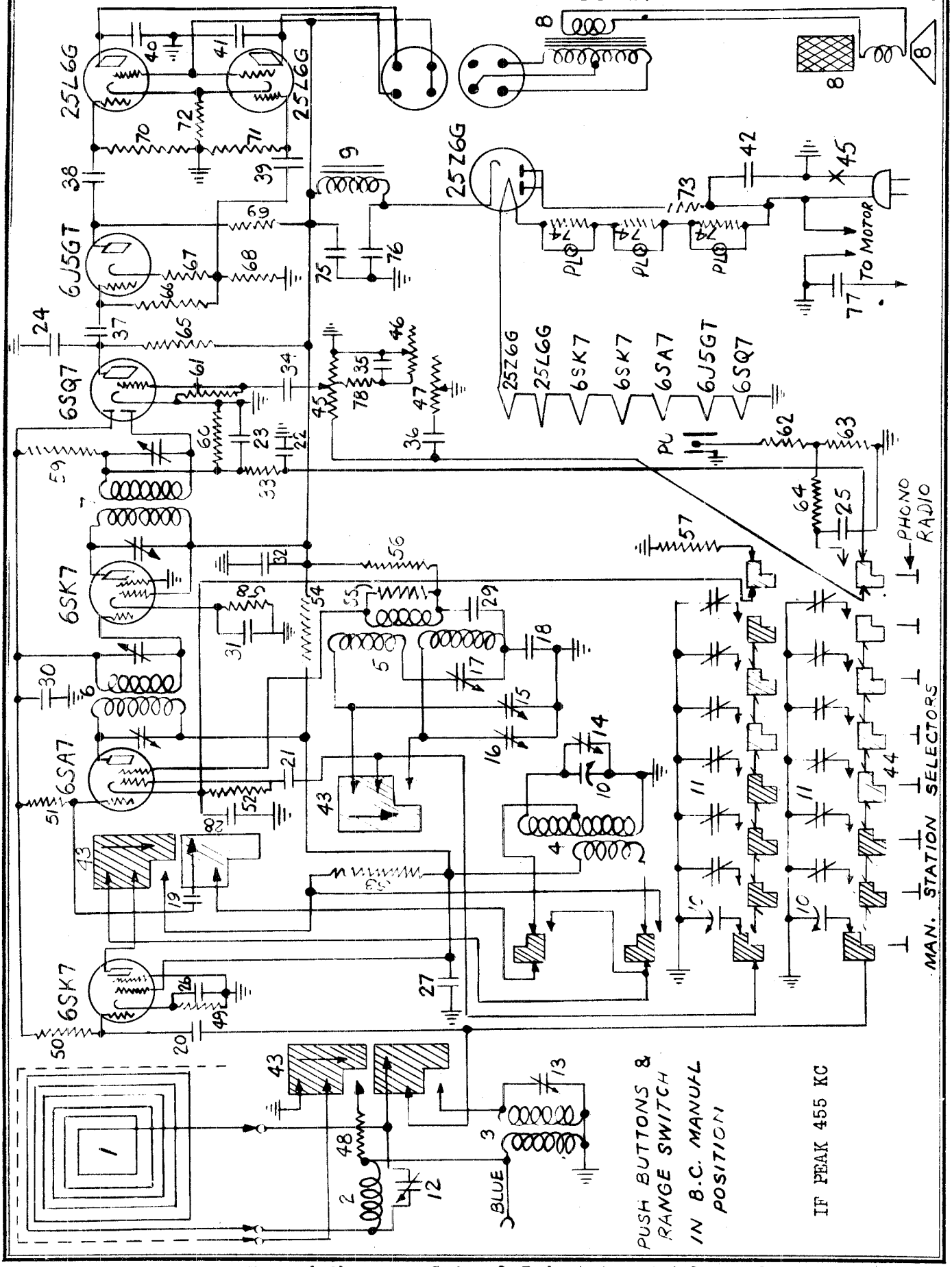
17-8E12,17-8E9Z STEWART WARNER CORP. MODELS 17-8E1,17-8E9,



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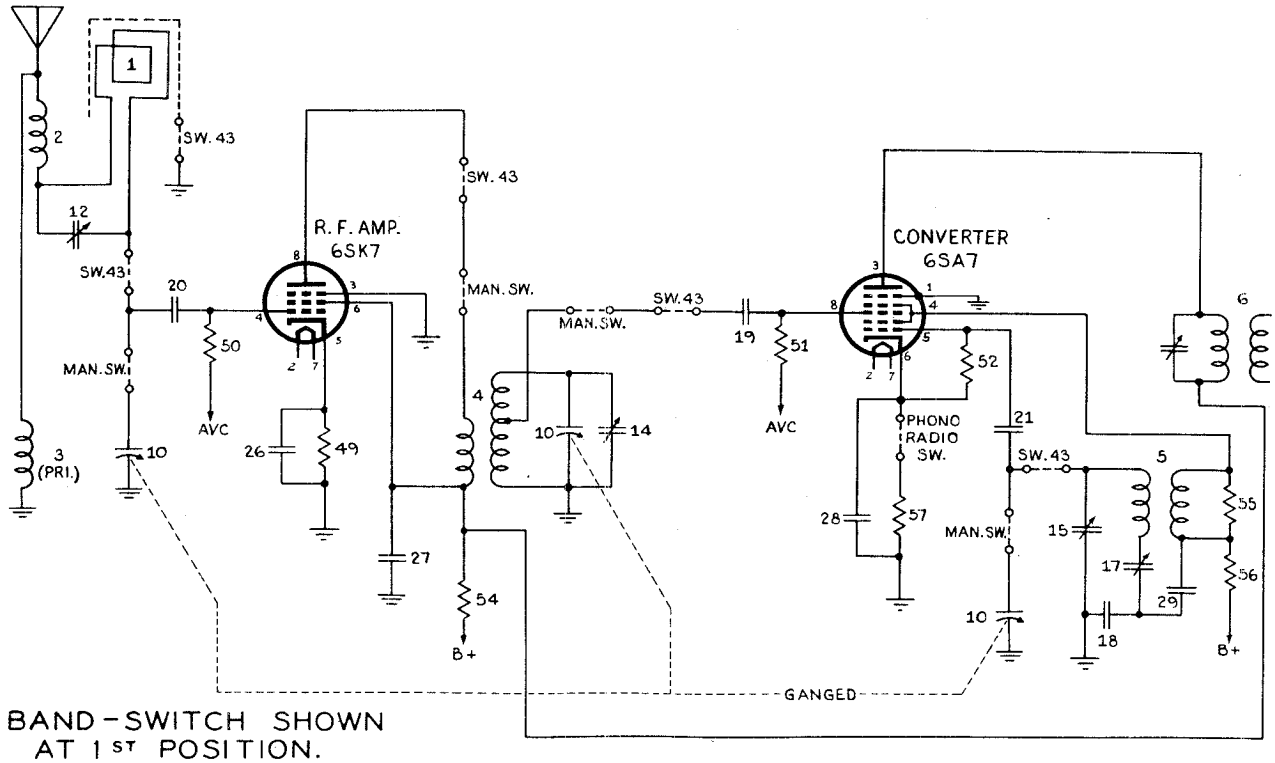
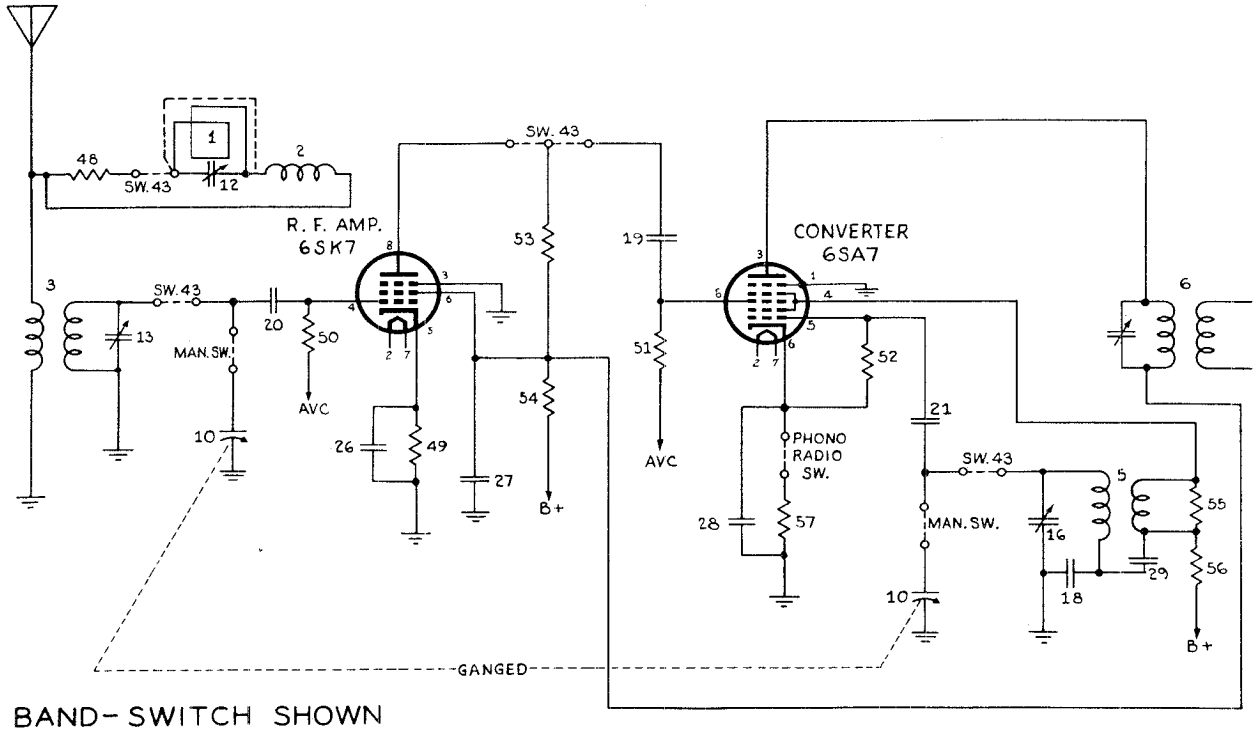
Record Changer: General Industries Model GI-C120. See Rider's "Automatic Record Changer" book p. 248

MODELS 17-8E1, 17-8E9,
17-8E12, 17-8E9Z

STEWART WARNER CORP.



BAND-SWITCH SHOWN
AT 1ST POSITION.
BROADCAST BAND



BAND-SWITCH SHOWN
AT 2ND POSITION.
SHORT WAVE BAND

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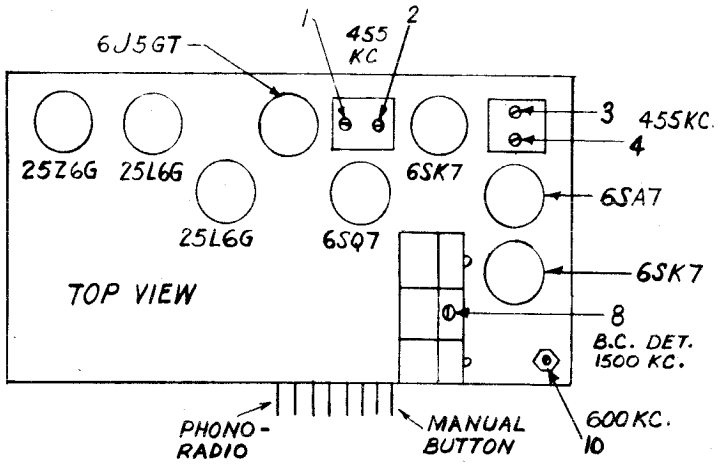
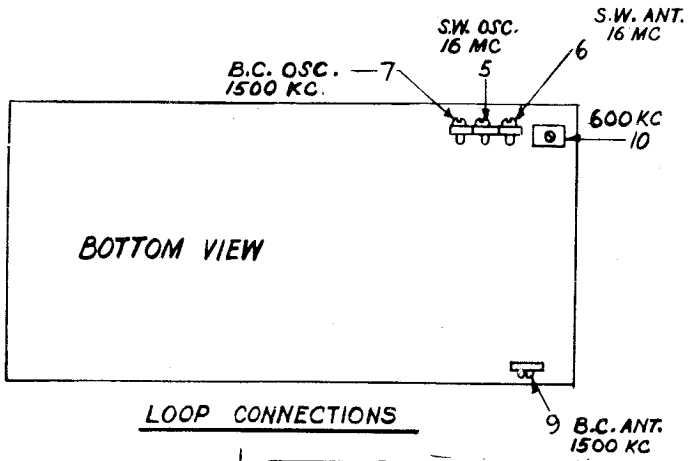
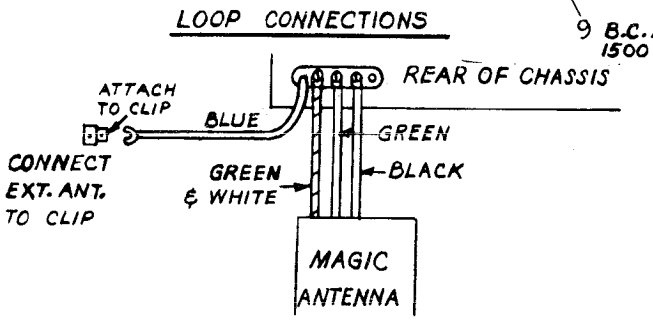
ALIGNMENT PROCEDURE FOR 17-8E & 17-8E-Z CHASSIS

1. Connect the output meter in the conventional manner.
2. Connect the ground lead of the signal generator to the receiver chassis through a .25 mfd. condenser.
3. Turn the volume control to maximum volume position and turn both tone controls to the position giving highest tone.
4. PUSH THE MANUAL BUTTON IN AND KEEP IT PUSHED IN. Turn the BAND SWITCH to the BROADCAST position.
5. Connect the loop as shown under "LOOP CONNECTIONS". Try to keep the loop in the same relative position to the chassis as when in the cabinet.
6. Connect the signal generator antenna lead to the lug on the middle section of the gang condenser, using a .1 mfd. condenser in series with the lead.
7. Set the signal generator to 455 KC. and adjust trimmers 1, 2, 3 and 4 for maximum output.
8. Connect the signal generator antenna lead through a 400 ohm carbon resistor to the blue wire coming from the chassis, and turn the BAND SWITCH to the SHORT WAVE position.
9. With the signal generator and receiver dial set to 16 MC. adjust trimmer 5 to bring in signal. Check to see if image appears at 15.1 MC. on receiver dial, if it does not, realign at 16 MC with trimmer screw farther out. Recheck image.
10. Adjust trimmer 6 for maximum output at 16 MC. Try to increase output by detuning trimmer and retuning receiver dial until maximum output is obtained.
11. Place the signal generator antenna lead near the loop and turn the BAND SWITCH to the BROADCAST position.
12. With signal generator and receiver dial set at 1500 KC. adjust trimmer 7 for maximum output.
13. Now install the chassis in the cabinet.
14. Adjust trimmers 8 and 9 for maximum output at 1500 KC. as before.
15. Set signal generator to 600 KC and tune rec3iver dial to 600 KC signal. Adjust trimmer 10 for maximum output. Try to increase output by detuning the trimmer and retuning the receiver dial until maximum output is obtained.







MODELS 17-8E1,17-8E9,
17-8E12,17-8E9Z

STEWART WARNER CORP.

DIA. NO.	PART NO.	DESCRIPTION	LIST PRICE
1	160572	Loop antenna complete-	3.60
2	161228	Coil-loop compensating	.25
3	160444	Coil-short wave antenna	.54
4	160478	Coil - R. F.----------	.60
5	160128	Coil - oscillator------	.70
6	119042	Transformer-Ist I.F.---1.	10
7	119024	Transformer-2nd I.F.---1.	15
8	U115125	Speaker-P.M. (12") with transformer---13.	50
8	U161361	Transformer-output for U115125 speaker------.	95
8	U161362	Cone & Voice coil for U115125 speaker-----1.	60
9	161266	Filter choke----------	.90
10	160373	Condenser-var. tuning-	3.20
11	119662	Condenser-push button trimmers(low freq.)	.24
11	119663	Condenser-push botton trimmers(med.freq.)	.24
11	119664	Condenser-push button trimmers(high freq)	.24
12	160449	Condenser-trimmer-----	.18
13-15 16	160415	Condenser-trim(3 sec.)	.48
17	119934	Condenser-padder------	.36
18	88587	Condenser-mica .0042 mfd.----------	.35
19	83783	Condenser-mica 110 mmfd.----------	.20
20	83539	Condenser-mica 260 mmfd.----------	.20
21	85061	Condenser-mica 51mmfd.	.15
22	83783	Condenser-mica110mmfd.	.20
23 24-25	83539	Condenser-mica 260 mmfd.----------	.20
26-27 28	116819	Condenser-.05 mfd. 600 volt----------	.20
29	119417	Condenser-.006 mfd. 600 volt----------	.15
30-31	116819	Condenser-.05 mfd. 600 volt----------	.20
32	116625	Condenser-.1 mfd. 600V	.25
33	110552	Resistor-carbon 47000 ohms 1/4 watt--	.12
34	119875	Conden.-.002 mfd. 600V	.15
35	119193	Conden.-.01 mfd. 600 V	.15
36	119875	Conden.-.002 mfd. 600V	.15
37-38 39	119193	Conden.-.01 mfd. 600 V	.15
40-41	119415	Conden.-.015 mfd. 600V	.15
42	116819	Conden.-.05 mfd. 600V.	.20
43	160371	Switch-band----------	1.00
44	160369	Switch-push button----	3.00
45	160412	Vol.Cont.-2 meg. & switch-----	1.40
46	160414	Tone Control(1 meg.)(bass)----	.95
47	160413	Tone Control(5 meg)(treble)--	.85
48	118804	Res.-carb. 400 ohms 1/4 watt-	.10
49	110556	Res.-carb. 330 ohms 1/4 watt-	.12
50	110554	Res.-carb. 1 meg. 1/4 watt---	.12
51	110578	Res.-carb. 68000 ohm 1/4 watt--	.12
52	110552	Res.-carb. 47000 ohm 1/4 watt--	.12
53	110557	Res.-carb. 4700 ohm 1/4 watt---	.12
54	118824	Res.-carb. 1500 ohm 1/2 watt---	.12
55	116068	Res.-carb. 680 ohms 1/4 watt-	.10
56	118824	Res.-carb. 1500 ohms 1/2 watt--	.12
57	110560	Res.-carb. 100 ohms 1/4 watt-	.12
58	112963	Res.-ins. 330 ohm 1/4 watt---	.15
59	110570	Res.-carb. 2.2 meg. 1/4 watt-	.15
60	110584	Res.-carb. 330000 ohm 1/4 watt-	.12
61	112975	Res.-carb. 10 meg. 1/4 watt--	.12
62	110554	Res.-carb. 1 meg. 1/4 watt---	.12
63-64 65	110553	Res.-carb. 220000 ohm 1/4 watt-	.12
66	110559	Res.-carb. 470000 ohm 1/4 watt-	.12
67	110586	Res.-carb. 2200 ohm 1/4 watt---	.12
68-69	110565	Res.-carb. 22000 ohm 1/4 watt--	.12
70-71	110559	Res.-carb. 470000 ohm 1/4 watt-	.12
72	111514	Res.-W.W. 170 ohm 2 watts----	.15
73	88465	Res.-W.W. 25 ohms 1/2 watt-----	.15
74	161313	Res.-bleeder 30-30-30 ohms---	.75
75	160095	Condenser-40 mfd. 300 volts--	.90
76	116470	Condenser-elect. 20-20 mfd. 150 volt----------	.95
77	116819	Condenser-.05 mfd. 600 volt--	.20
78	110566	Res.-carb. 33000 ohm 1/4 watt--	.12
	112636	Lamp-dial-Mazda #44(frosted)-	.25
	110629	Record changer lamp-Mazda #44 (unfrosted)----------	.15

ALL PRICES SUBJECT TO CHANGE

WITHOUT NOTICE

MISCELLANEOUS PARTS

PART NO.	DESCRIPTION	LIST PRICE
117117	Cable-motor----------	.38
161304	Call Tabs & Instructions----------	.50
114955	Clamp-for dial cord----------	.01
117057	Cord-drive (3 ft. lengths)--------	.16
160480	Dial scale----------	.35
113402	Drum-dial cord drive----------	.56
160182	Escutcheon-dial----------	2.10
160184	Escutcheon-push button----------	.50
160186	Push button assembly----------	1.15
160219	Knob----------	.06
160560	Loop drive shaft & cable----------	.54
160033	Needle cup----------	.08
160520	Pointer----------	.16
160185	Push button----------	.06
119791	Socket-8 prong (7 used)----------	.12
114876	Socket-octal (1 used)----------	.15
500035	Crystal Cartridge for pickup-----	

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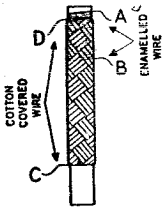
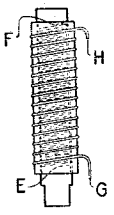


ANTENNA COUPLING COIL
504760

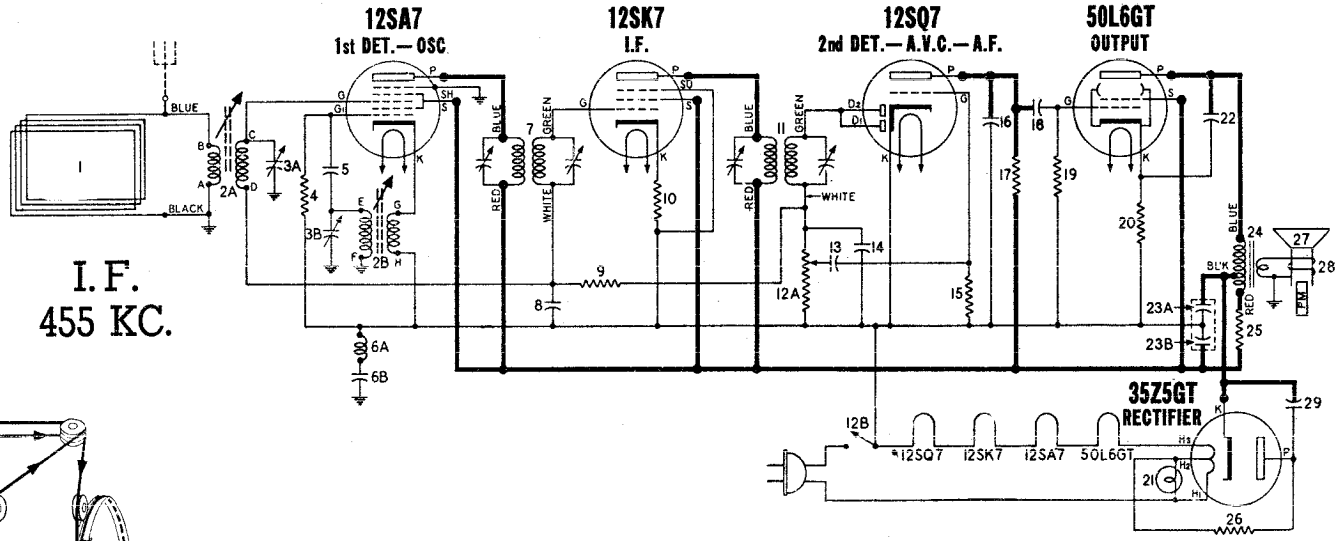
SLUG CORES FOR COILS
ANT.—504211
OSC.—504213

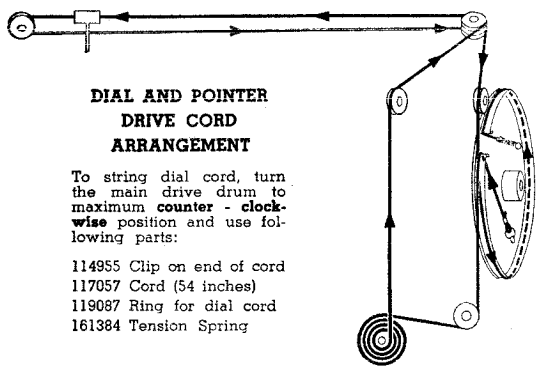


OSCILLATOR COIL
504212

Lettered terminals in illustrations correspond to similarly lettered terminals on the circuit diagram.

I.F. 455 KC.





DIAL AND POINTER DRIVE CORD ARRANGEMENT

To string dial cord, turn the main drive drum to maximum **counter - clockwise** position and use following parts:

114955 Clip on end of cord
117057 Cord (54 inches)
119087 Ring for dial cord
161384 Tension Spring

SOCKET VOLTAGES

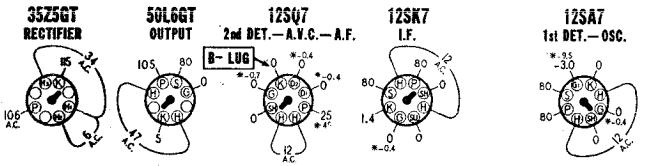
Measured with voltmeter having sensitivity of 1000 ohms per volt except where indicated by (*).

VOLUME ON FULL WITH NO SIGNAL **DIAL TUNED TO 540 KC.**

BOTTOM VIEW OF CHASSIS

HEATER VOLTAGES MEASURED ACROSS SOCKET TERMINALS. ALL OTHER VOLTAGES MEASURED BETWEEN SOCKET TERMINALS AND B- LUG.

117 VOLT 60 CYCLE A.C. POWER SUPPLY USED FOR THESE MEASUREMENTS.



REAR OF CHASSIS

*—Measured with vacuum tube voltmeter

DIAGRAM NO.	PART NO.	DESCRIPTION	LIST PRICE
		CONDENSERS	
3A, B	504330	Condenser—trimmer assembly A-20 to 270 Mmfd. B-40 to 370 Mmfd.	$1.10
5	502931	Condenser—100 Mmfd. 500 volt.	.24
6B	502158	Condenser—.2 Mfd. 400 volt.	.36
8	502153	Condenser—.05 Mfd. 200 volt.	.24
13	502156	Condenser—.004 Mfd. 400 volt.	.20
14	502882	Condenser—220 Mmfd. 500 volt.	.40
16	502470	Condenser—.0008 Mfd. 400 volt.	.20
18	502156	Condenser—.004 Mfd. 400 volt.	.20
22	502152	Condenser—.02 Mfd. 400 volt.	.24
23-A, B	500256	Condenser—electrolytic A-40 Mfd. 150 volt B-20 Mfd. 150 volt	1.50
29	502157	Condenser—.05 Mfd. 400 volt.	.24
		RESISTORS	
4	502130	Resistor—carbon 22,000 ohms ¼ watt.	.12
9	502135	Resistor—carbon 2.2 Meg. ¼ watt.	.12
10	502264	Resistor—carbon 47 ohms ¼ watt.	.12
12A, B	502928	Volume control—with switch; 1 Meg.	1.25
15	502136	Resistor—carbon 10 Meg. ¼ watt.	.12
17	502134	Resistor—carbon 470,000 ohms ¼ watt.	.12
19	502134	Resistor—carbon 470,000 ohms ¼ watt.	.12
20	502932	Resistor—carbon 150 ohms 1 watt.	.16
25	502933	Resistor—carbon 1,500 ohms 1 watt.	.16
26	502574	Resistor—carbon 33 ohms ½ watt.	.12
		COILS AND TRANSFORMERS	
1	504348	Loop antenna	2.50
2-A, B	504335	Tuning unit; complete assembly.	8.70
2A	504760	Coil—antenna (less slug)	
2-B	504212	Coil—oscillator (less slug)	1.05
	504211	Slug for Ant. coil (yellow end).	.45
	504213	Slug for Osc. coil (white end).	.45
6A		Choke: three turns of #22 insulated wire closely wound on condenser 6B.	
7	502926	Transformer—1st I.F.	2.30
11	502927	Transformer—2nd I.F.	2.30
24	502817	Transformer—output for C-502816 speaker.	2.00
	504583	Transformer—output for W-502816 speaker.	2.00

DIAGRAM NO.	PART NO.	DESCRIPTION	LIST PRICE
		OTHER ELECTRICAL PARTS	
21	118921	Lamp—dial (Mazda 47) 6-8V. 150 Ma.	$0.15
27	502818	Cone and voice coil for C-502816 speaker.	
	504584	Cone and voice coil for W-502816 speaker.	
28	502816	Speaker—P.M. dynamic (4 inch)	7.00
		MISCELLANEOUS PARTS	
	502940	Back for cabinet (Model 51T46).	.20
	504556	Back for cabinet (Model 51T56).	.20
	116467	Base for mtg. electrolytic condenser.	.04
	500383	Cabinet—ivory (Model 51T46)	5.10
	500261	—Clamp—dial scale mounting (Model 51T46)	.02
	114955	Clip—retainer on end of dial cord.	.01
	500497	Clip—retainer for cabinet back.	.02
	117057	Cord—dial drive (54" required), per ft.	.05
	500324	Cover—cardboard, for elect. condenser.	.04
	504347	Dial scale—glass (Model 51T46).	.70
	504558	Dial scale—glass (Model 51T56).	.70
	502564	Knob—ivory (Models 51T46, 51T56).	.08
	502367	Pointer	.16
	81145	Retaining ring for tuning shaft.	.01
	119087	Ring for dial cord.	.01
	85078	Rubber grommet; Ant. coil mtg.	.03
	504045	Rubber grommet; Osc. coil mtg.	.04
	17064	Screw No. 4 x 7/32	.02
	83047	Screw No. 8 x ⅜; chassis mtg.	.02
	114628	Screw No. 8 x ½; chassis mtg.	.01
	501777	Screw No. 4 x ½; for mtg. cabinet back.	.02
	502173	Shaft—tuning control	.15
	116690	Socket—octal base	.12
	160392	Socket—octal (rectifier)	.16
	500499	Socket—dial lamp (with leads).	.44
	161384	Spring—dial cord tension	.06
	504012	Spring for tuning slug drive cord.	.05
	111456	Washer—spring, for tuning shaft.	.005

PRICES SUBJECT TO CHANGE WITHOUT NOTICE

MODELS 51T46,51T56

STEWART WARNER CORP.

ALIGNMENT PROCEDURE

1. Turn the tuning control knob clockwise as far as it will go (tuner mechanism is now in maximum open position with tuning slugs almost completely withdrawn from coils). Dial pointer should then point to 1600 Kc mark on scale. If it is set incorrectly, release pointer clip on dial cord and reposition pointer.
2. Remove chassis and loop from cabinet by taking out two screws which hold chassis to bottom of cabinet. Solder approximately 8' of insulated wire to any B— connection (see voltage chart on opposite side for convenient B— location).
3. During the alignment of this receiver it will be necessary to set the dial pointer to the following frequencies: 1500 Kc., 1400 Kc. In order to avoid replacing the chassis in the cabinet each time a dial setting is required, it will be found more convenient to mark the required frequency points on the white dial background plate before starting the alignment.
4. Connect ground lead of signal generator to B— lead through a 0.25Mfd. condenser.
5. Connect output meter across the speaker voice coil (terminals at back of speaker) or from plate of 50L6GT tube to B—through a 0.1 Mfd. condenser.
6. Set volume control at maximum volume position and use a weak signal from the signal generator.

DUMMY ANT. IN SERIES WITH SIGNAL GENERATOR	CONNECT HIGH SIDE OF GENERATOR TO	SIGNAL GENERATOR FREQUENCY	RECEIVER DIAL SETTING	TRIMMER NUMBER	TRIMMER DESCRIPTION	TYPE OF ADJUSTMENT
Set tuner mechanism to maximum open position by turning the tuning control knob clockwise as far as it will go. Then check whether the positions of the tuning slugs correspond to the positions shown in Fig. 1 below. If settings are incorrect, rotate the individual core and threaded stem until desired position is reached. Note that threaded stem is prevented from moving by a dab of speaker cement at top and that this seal must be removed before stem can be rotated.						
200 MMFD. Mica Condenser	Control Grid of 12SA7	455 KC	Any point where it does not affect the signal.	1-2	2nd I.F.	Adjust for maximum output. Then repeat adjustment.
				3-4	1st I.F.	
200 MMFD. Mica Condenser	External Antenna Clip on Loop Frame	1600 KC	1600 KC	5	Broadcast Oscillator (Shunt)	Adjust for maximum output.
			Tune to 1600 KC generator signal	6	Broadcast Antenna	Adjust for maximum output.
200 MMFD. Mica Condenser	External Antenna Clip on Loop Frame	1400 KC	Set pointer to 1400 KC mark on dial scale. **Do not** attempt to tune to generator signal.	Osc. coil tuning slug		Adjust position of slug for maximum output.
				Ant. coil tuning slug		Adjust position of slug for maximum output.
200 MMFD. Mica Condenser	External Antenna Clip on Loop Frame	1600 KC	Set pointer to 1600 KC mark on dial scale. **Do not** attempt to tune to generator signal.	5	Broadcast Oscillator (Shunt)	Adjust for maximum output.
			Tune to 1600 KC generator signal	6	Broadcast Antenna	Adjust for maximum output.
200 MMFD. Mica Condenser	External Antenna Clip on Loop Frame	1400 KC	Tune to 1400 KC generator signal	Ant. coil tuning slug		Adjust position of slug for maximum output.
Apply a coating of speaker cement at top of each tuning core stem to prevent movement.						

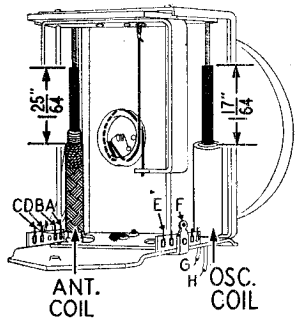
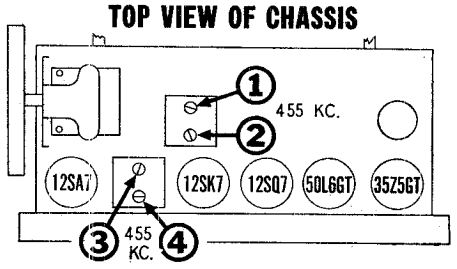


FIG. 1

SLUG TUNER ASSEMBLY
(Drive Parts)

117057 Cord (8")
114955 Clip on cord
504012 Spring



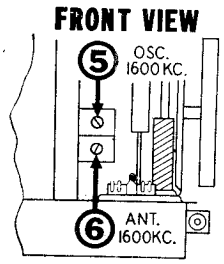


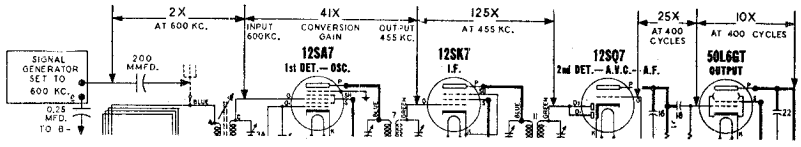
FIG. 2—TRIMMER LOCATIONS

APPROXIMATE STAGE GAIN DATA

Be sure R.F. and I.F. stages are accurately aligned before measuring gain. R.F. gains can be measured with a "channel" type instrument containing a tuned and calibrated R.F. amplifier. A vacuum tube voltmeter may be used for audio gain measurements. Observe following precautions:

1. For all gain measurements connect signal generator as shown. Use 600 KC. signal with 400 cycle modulation (use nearby frequency if local station interferes.)
2. For R.F. and I.F. measurements connect negative terminal of a 3 volt battery (two 1½ volt cells in series) to A.V.C. lead at terminal "D" of antenna coil; then connect positive battery lead to B—. This provides a definite operating point.
3. Be sure radio is carefully tuned to generator signal (use weak signal for sharp tuning.)
4. When using a "channel" type instrument carefully tune it for maximum output at desired frequency before making measurements.

The R.F. and I.F. stage gains shown below are less than under normal operating conditions due to the use of 3 volts fixed bias in order to establish a definite operating point. Therefore, these values are not intended to indicate the full capability of a stage.



Differences in tube characteristics, tolerance of parts, adjustment of tuned circuits, and variations of line voltage will influence stage gain. Accuracy of measurements is dependent upon careful tuning of receiver to generator signal and experience in using your test equipment. These factors may create considerable variation in gain measurements.

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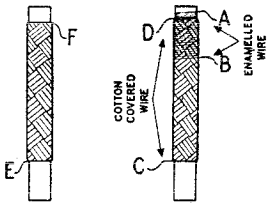
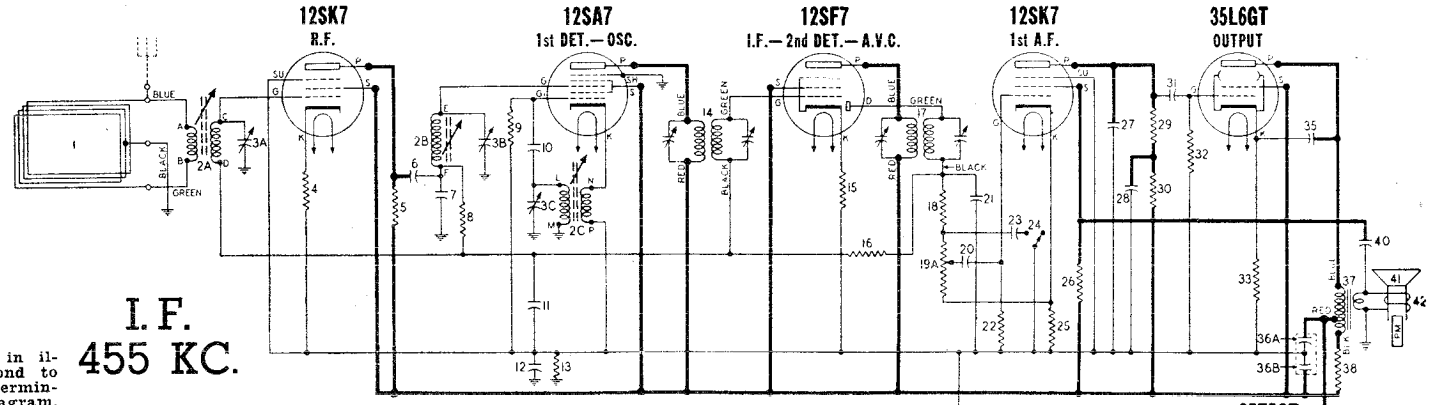
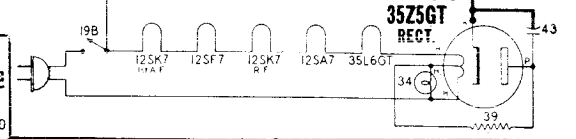


R.F. COIL 504214

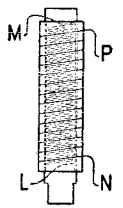
ANTENNA COUPLING COIL 504210

I.F. 455 KC.





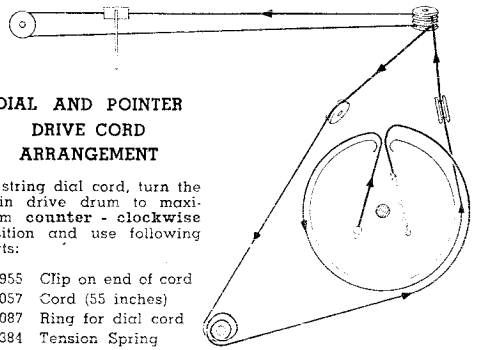
Lettered terminals in illustrations correspond to similarly lettered terminals on the circuit diagram.



OSCILLATOR COIL 504212

SLUG CORES FOR COILS

ANT.—504211	114955	Clip on end of cord
R.F.—504215	117057	Cord (55 inches)
OSC.—504213	119087	Ring for dial cord
	161384	Tension Spring



DIAL AND POINTER DRIVE CORD ARRANGEMENT

To string dial cord, turn the main drive drum to maximum counter - clockwise position and use following parts:

SOCKET VOLTAGES

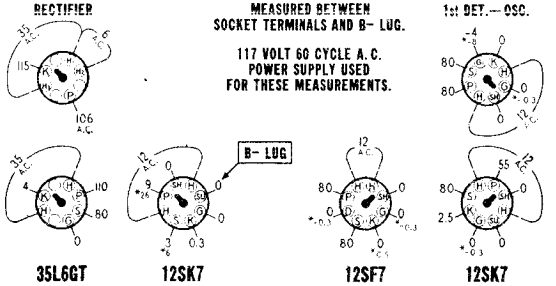
Measured with voltmeter having sensitivity of 1000 ohms per volt except where indicated by (*).

VOLUME ON FULL WITH NO SIGNAL — DIAL TUNED TO 540 KC.

BOTTOM VIEW OF CHASSIS

HEATER VOLTAGES MEASURED ACROSS SOCKET TERMINALS. ALL OTHER VOLTAGES MEASURED BETWEEN SOCKET TERMINALS AND B- LUG.

117 VOLT 60 CYCLE A.C. POWER SUPPLY USED FOR THESE MEASUREMENTS.



REAR OF CHASSIS

*— Measured with vacuum tube voltmeter

DIAGRAM NO.	PART NO.	DESCRIPTION	LIST PRICE
		CONDENSERS	
3-A, B, C	504086	Condenser—trimmer assembly A—20 to 270 Mmfd. B—40 to 370 Mmfd. C—40 to 370 Mmfd.	$1.10
6	502271	Condenser—mica 260 Mmfd. 500 volt	.30
7	502165	Condenser—mica 1,000 Mmfd. 500 volt	.45
10	502159	Condenser—mica 50 Mmfd. 500 volt	.24
11	502155	Condenser—.1 Mfd. 200 volt	.30
12	502158	Condenser—.2 Mfd. 400 volt	.36
20	502453	Condenser—.002 Mfd. 400 volt	.20
21	502160	Condenser—mica 110 Mmfd. 500 volt	.24
23	502470	Condenser—.0008 Mfd. 400 volt	.20
27	502160	Condenser—mica 110 Mmfd. 500 volt	.24
28	502153	Condenser—.05 Mfd. 200 volt	.24
31	502156	Condenser—.004 Mfd. 400 volt	.20
35	502151	Condenser—.01 Mfd. 400 volt	.20
36-A, B	500256	Condenser—electrolytic A—40 Mfd. 150 volt B—20 Mfd. 150 volt	1.50
40	502152	Condenser—.02 Mfd. 400 volt	.24
43	502157	Condenser—.05 Mfd. 400 volt	.24
		RESISTORS	
4	502140	Resistor—carbon 390 ohms ¼ watt	.12
5	502291	Resistor—carbon 4700 ohms ¼ watt	.12
8	502134	Resistor—carbon 470,000 ohms ¼ watt	.12
9	502130	Resistor—carbon 22,000 ohms ¼ watt	.12
13	502133	Resistor—carbon 220,000 ohms ¼ watt	.12
15	502264	Resistor—carbon 47 ohms ¼ watt	.12
16	502269	Resistor—carbon 3.3 Meg. ¼ watt	.12
18	502131	Resistor—carbon 47,000 ohms ¼ watt	.12
19-A, B	502145	Volume control 500,000 ohms (with switch)	1.25
22	502136	Resistor—carbon 10 Meg. ¼ watt	.12
25	502128	Resistor—carbon 2200 ohms ¼ watt	.12
26	502135	Resistor—carbon 2.2 Meg. ¼ watt	.12
29, 30	502133	Resistor—carbon 220,000 ohms ¼ watt	.12
32	502134	Resistor—carbon 470,000 ohms ¼ watt	.12
33	502138	Resistor—carbon 130 ohms ¼ watt	.12
38	502469	Resistor—carbon 1500 ohms 1 watt	.16
39	502574	Resistor—carbon 33 ohms ½ watt	.12
		COILS & TRANSFORMERS	
1	502246	Loop antenna	2.90
2-A, B, C	504096	Tuning unit; complete assembly	10.80
2-A	504210	Coil—antenna (less slug)	1.20
2-B	504214	Coil—R.F. (less slug)	.85
2-C	504212	Coil—oscillator (less slug)	1.05
	504211	Slug core for Ant. coil (yellow end)	.45
	504213	Slug core for Osc. coil (white end)	.45
	504215	Slug core for R.F. coil (purple end)	.45

DIAGRAM NO.	PART NO.	DESCRIPTION	LIST PRICE
14	502102	Transformer—1st I.F.	$2.30
17	502103	Transformer—2nd I.F.	2.30
37	502213	Transformer—output (for R-502998 spkr.)	2.50
	502904	Transformer—output (for A-502998 spkr.)	2.50
	504244	Transformer—output (for W-502998 spkr.)	2.50
		OTHER ELECTRICAL PARTS	
24	500546	Switch—tone control	.84
34	502473	Lamp—dial (Mazda 47) 6-8V. 150 Ma.	.22
41	502214	Cone & voice coil for R-502998 spkr.	2.00
	502903	Cone & voice coil for A-502998 spkr.	2.00
	504245	Cone & voice coil for W-502998 spkr.	2.00
42	502998	Speaker P.M. dynamic (5 inch)	6.60
		MISCELLANEOUS PARTS	
	502185	Back for Cabinet	.30
	116467	Base for mtg. electrolytic condenser	.04
	500384	Cabinet ivory (Model 61T26)	5.00
	502244	Cabinet mahogany (Model 61T16)	4.30
	500261	Clamp dial scale mtg.	.02
	504084	Clip—holds tuning slugs to frame	.01
	500497	Clip retainer for cabinet back	.02
	114955	Clip—retainer on end of dial cord	.01
	116563	Connector for antenna leads	.01
	117057	Cord—dial drive (55 in. required) per ft.	.05
	500324	Cover cardboard, for elect. cond.	.04
	504142	Dial scale—glass	.80
	501186	Grounding plate (under I.F. trans. can)	.10
	502552	Knob maroon (Model 61T26)	.10
	502551	Knob—mahogany (Model 61T16)	.10
	502367	Pointer	.16
	81145	Retaining ring for tuning shaft	.01
	119087	Ring for dial cord	.01
	85078	Rubber grommet; Ant. & R.F. coil mtg.	.03
	504045	Rubber grommet; Osc. coil mtg.	.04
	17063	Screw—No. 6 x ¼	.01
	17064	Screw—No. 4 x 7/32	.02
	114628	Screw No. 8 x ½ chassis mtg.	.01
	502173	Shaft—tuning control	.15
	116690	Socket octal base	.12
	160392	Socket octal (rectifier)	.16
	500499	Socket—dial lamp (with leads)	.44
	504012	Spring for tuning slug drive cord	.05
	161384	Spring—dial cord tension	.06
	111456	Washer—spring washer for tuning shaft	.005

PRICES SUBJECT TO CHANGE WITHOUT NOTICE

MODELS 61T16, 61T26

STEWART WARNER CORP.

ALIGNMENT PROCEDURE

1. Remove chassis and loop from cabinet. Solder approximately 8" of insulated wire to any B— connection (see voltage chart on opposite side for convenient B— location). Then reinstall chassis and loop in cabinet. The B lead should extend from under the chassis at the back.
2. Connect ground lead of signal generator to B— lead.
3. Connect output meter across the speaker voice coil (terminals at back of speaker.)
4. Turn the tuning control knob clockwise as far as it will go (tuner mechanism is now in maximum open position with tuning slugs almost completely withdrawn from coils). Dial pointer should then point to 1600 Kc mark on scale. If it is set incorrectly, release pointer clip on dial cord and reposition pointer.
5. Set volume control at maximum volume position and use a weak signal from the signal generator.

DUMMY ANT. IN SERIES WITH SIGNAL GENERATOR	CONNECT HIGH SIDE OF GENERATOR TO	SIGNAL GENERATOR FREQUENCY	RECEIVER DIAL SETTING	TRIMMER NUMBER	TRIMMER DESCRIPTION	TYPE OF ADJUSTMENT
Set tuner mechanism to maximum open position by turning the tuning control knob clockwise as far as it will go (Dial pointer at 1600 Kc). Then check whether the positions of the tuning slugs correspond to the positions shown in Fig. 1 below. If settings are incorrect, rotate the individual core and threaded stem until desired position is reached. Note that threaded stem is prevented from moving by a dab of speaker cement at top.						
.1 MFD. Condenser	Ungrounded terminal of trimmer No. 6 (see Fig. 2 below for location of trimmer.)	455 KC	Any point where it does not affect the signal.	1-2	2nd I.F.	Adjust for maximum output. Then repeat adjustment.
				3-4	1st I.F.	
300 MMFD. Mica Condenser	External Antenna Clip on Loop Frame	1600 KC	1600 KC	5	Broadcast Oscillator (Shunt)	Adjust for maximum output.
300 MMFD. Mica Condenser	External Antenna Clip on Loop Frame	1600 KC	Tune to 1600 KC generator signal	6	Broadcast R.F.	Adjust for maximum output.
				7	Broadcast Antenna	Adjust for maximum output.
300 MMFD. Mica Condenser	External Antenna Clip on Loop Frame	1400 KC	Tune to 1400 KC generator signal	Ant. coil tuning slug		Adjust position of slug for maximum output.
				R.F. coil tuning slug		Adjust position of slug for maximum output.
300 MMFD. Mica Condenser	External Antenna Clip on Loop Frame	1600 KC	Tune to 1600 KC generator signal	6	Broadcast R.F.	Recheck adjustment for maximum output.
				7	Broadcast Antenna	Recheck adjustment for maximum output.
Apply a coating of speaker cement at top of each tuning core stem to prevent movement.						

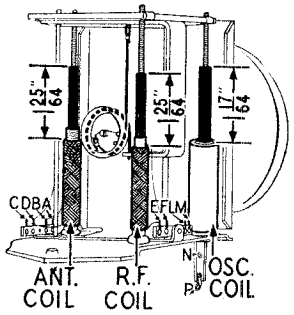


FIG. 1

SLUG TUNER ASSEMBLY
(Drive Parts)

117057 Cord (8")
114955 Clip on cord
504012 Spring

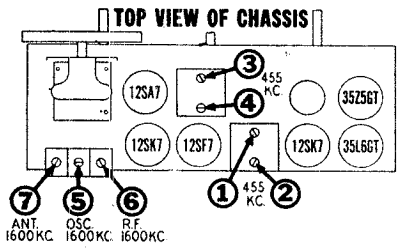


FIG. 2

AUDIO OSCILLATION

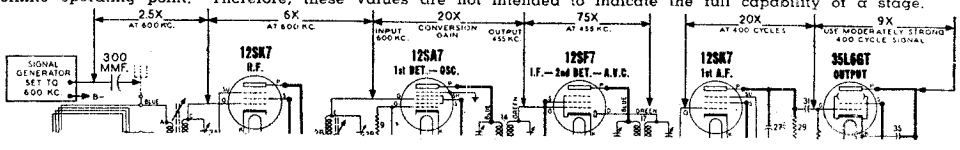
The audio system of this receiver utilizes a two stage type of inverse feed-back arrangement and, should it ever be necessary to replace the speaker or output transformer, it is important to maintain a definite phase relationship in the feed-back circuit. If the connections to the output transformer are reversed or if the feed-back connection is made to the wrong side of the output transformer secondary, the system will become regenerative instead of degenerative. Under those conditions audio oscillation may result. If that occurs, oscillation may be prevented by reversing the connections to the secondary of the output transformer.

APPROXIMATE STAGE GAIN DATA

Be sure R.F. and I.F. stages are accurately aligned before measuring gain. R.F. gains can be measured with a "channel" type instrument containing a tuned and calibrated R.F. amplifier. A vacuum tube voltmeter may be used for audio gain measurements. Observe following precautions:

1. For all gain measurements connect signal generator as shown. Use 600 KC. signal with 400 cycle modulation (use nearby frequency if local station interferes.)
2. For R.F. and I.F. measurements connect negative terminal of a 3 volt battery (two 1½ volt cells in series) to A.V.C. lead and positive terminal to B—. This provides a definite operating point. IMPORTANT: Disconnect battery when measuring audio stage gains.
3. Be sure radio is carefully tuned to generator signal (use weak signal for sharp tuning.)
4. When using a "channel" type instrument carefully tune it for maximum output at desired frequency before making measurements.

The R.F. and I.F. stage gains shown below are less than under normal operating conditions due to the use of 3 volts fixed bias in order to establish a definite operating point. Therefore, these values are not intended to indicate the full capability of a stage.


2.5X AT 600 KC.
6X AT 600 KC.
20X INPUT 600 KC. CONVERSION GAIN OUTPUT 455 KC.
75X AT 455 KC.
20X AT 400 CYCLES
9X USE MODERATELY STRONG 400 CYCLE SIGNAL
SIGNAL GENERATOR SET TO 600 KC.
300 MMF.
12SK7 R.F.
12SA7 1st DET.—OSC.
12SF7 I.F.—2nd DET.—A.V.C.
12SK7 1st A.F.
35L6GT OUTPUT

Differences in tube characteristics, tolerance of parts, adjustment of tuned circuits, and variations of line voltage will influence stage gain. Accuracy of measurements is dependent upon careful tuning of receiver to generator signal and experience in using your test equipment. These factors may create considerable variation in gain measurements.

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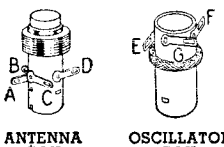
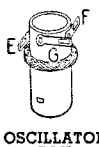
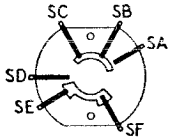


ANTENNA COIL
502649

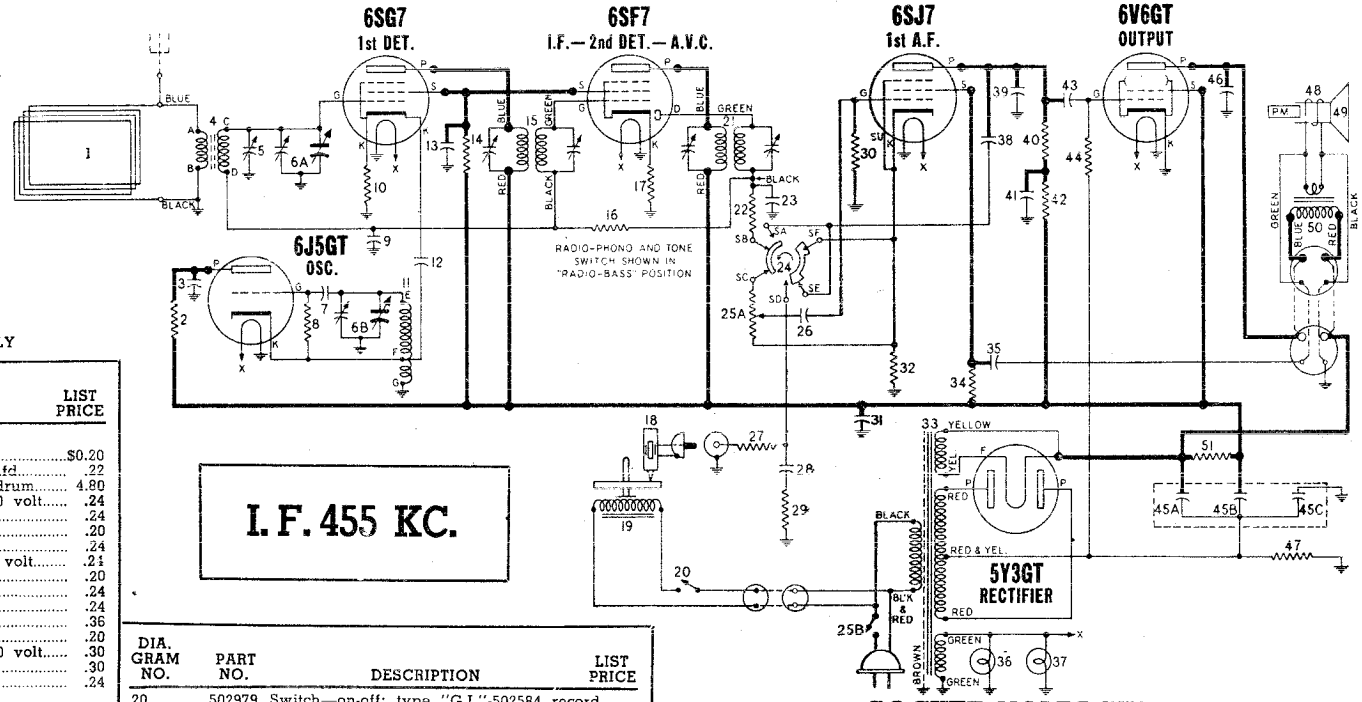


OSCILLATOR COIL
502650



REAR VIEW RADIO-PHONO & TONE SWITCH
502653

Lettered terminals in illustrations correspond to similarly lettered terminals on the circuit diagram.



I.F. 455 KC.

PARTS LIST

ORDER PARTS FROM YOUR STEWART-WARNER DISTRIBUTOR ONLY

DIA-GRAM NO.	PART NO.	DESCRIPTION	LIST PRICE
		CONDENSERS	
3	502151	Condenser—.01 Mfd. 400 volt	$0.20
5	502651	Condenser—trimmer 12 to 19 Mmfd.	.22
6A, B	502652	Condenser—variable gang and drum	4.80
7	502160	Condenser—mica—110 Mmfd. 500 volt	.24
9	502153	Condenser—.05 Mfd. 200 volt	.24
12	502151	Condenser—.01 Mfd. 400 volt	.20
13	502157	Condenser—.05 Mfd. 400 volt	.24
23	502160	Condenser—mica 110 Mmfd. 500 volt	.24
26	502156	Condenser—.004 Mfd. 400 volt	.20
28	502479	Condenser—.006 Mfd. 600 volt	.24
31	502157	Condenser—.05 Mfd. 400 volt	.24
35	502405	Condenser—.25 Mfd. 400 volt	.36
38	502150	Condenser—.004 Mfd. 600 volt	.20
39	502271	Condenser—mica—260 Mmfd. 500 volt	.30
41	502410	Condenser—.1 Mfd. 400 volt	.30
43	502152	Condenser—.02 Mfd. 400 volt	.24
45A, B, C	502207	Condenser—electrolytic A — 20 Mfd. 400 volt B — 10 Mfd. 400 volt C — 20 Mfd. 25 volt	2.20
46	502156	Condenser—.004 Mfd. 400 volt	.20
		RESISTORS	
2	502466	Resistor—carbon—33,000 ohms 1 watt	.16
8	502131	Resistor—carbon—47,000 ohms ¼ watt	.12
10	502514	Resistor—carbon—3,300 ohms ¼ watt	.12
14	502288	Resistor—carbon—47,000 ohms 1 watt	.16
16	502269	Resistor—carbon—3.3 Meg. ¼ watt	.12
17	502264	Resistor—carbon—47 ohms ¼ watt	.12
22	502131	Resistor—carbon—47,000 ohms ¼ watt	.12
25A, B	502654	Volume control—with switch; 1 Meg.	1.25
27	502133	Resistor—carbon—220,000 ohms ¼ watt	.12
29	502408	Resistor—carbon—68,000 ohms ¼ watt	.12
30	502468	Resistor—carbon—4.7 Meg. ¼ watt	.12
32	502406	Resistor—carbon—1,500 ohms ¼ watt	.12
34	502135	Resistor—carbon—2.2 Meg. ¼ watt	.12
40	502133	Resistor—carbon—220,000 ohms ¼ watt	.12
42	502133	Resistor—carbon—220,000 ohms ¼ watt	.12
44	502134	Resistor—carbon—470,000 ohms ½ watt	.12
47	502293	Resistor—wire wound—200 ohms 2 watt	.25
51	504771	Resistor—carbon—3,300 ohms 2 watt	.25
		COILS AND TRANSFORMERS	
1	502697	Loop antenna and cabinet back	3.25
4	502649	Coil—antenna	1.45
11	502650	Coil—oscillator	1.00
15	502657	Transformer—1st I.F.	2.30
21	502658	Transformer—2nd I.F.	2.30
33	502174	Transformer—power	7.50
50	504892	Transformer—output for X-504744 spkr.	2.50
		OTHER ELECTRICAL PARTS	
18	502461	Crystal cartridge (Astatic L-71)	6.10
19	502846	Motor—type "G.I."-502584 record changer; 115 Volt 50 cycle	12.00
	502847	Motor—type "G.I."-502584 record changer; 115 Volt 60 cycle	10.00

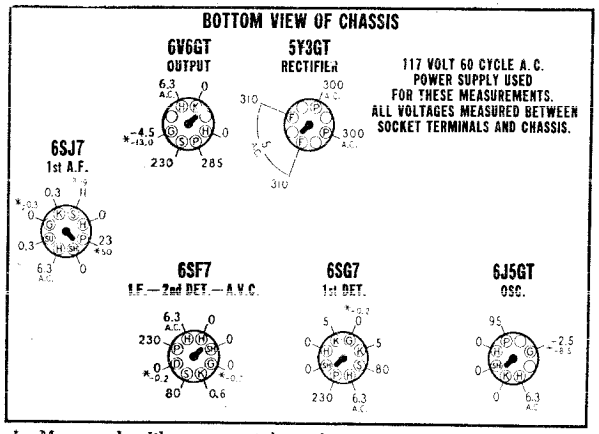
DIA. GRAM NO.	PART NO.	DESCRIPTION	LIST PRICE
20	502979	Switch—on-off; type "G.I."-502584 record changer	$ .48
24	502653	Switch—Radio-Phono and Tone	1.30
36, 37	110629	Lamp—dial (Mazda No. 44) 6.3V 0.25 Amps	.15
48	504744	Speaker—P.M. dynamic (6 inch)	9.50
49	504893	Cone and voice coil for X-504744 spkr.	2.50
		MISCELLANEOUS PARTS	
116467		Base for mtg. electrolytic condenser	.04
504768		Background plate for dial	.20
119559		Clamp—dial glass	.08
112745		Clip—coil mtg.	.01
114955		Clip—retainer on end of dial cord	.01
117057		Cord—dial drive (4 ft. required) per ft.	.05
504765		Dial scale—glass	.80
502564		Knob—ivory, volume or tuning (Model 61TR46)	.08
502698		Knob—Volume or tuning (Model 61TR36)	.08
502701		Knob—Phono-Radio (Model 61TR36)	.10
504698		Knob—Phono-Radio (Model 61TR46)	.12
502460		Needle, phonograph	1.50
500966		Plug—phono. pick-up cable	.10
501031		Plug—phono. motor cable	.15
504108		Plug—speaker	.25
502644		Pointer	.16
81145		Retaining ring for tuning shaft	.01
119087		Ring for dial cord	.01
113463		Rubber pad for mtg. chassis	.03
116584		Rubber spacer for mtg. dial scale	.02
112874		Screw—No. 10 x 1½ for mtg. chassis	.03
501777		Screw—No. 4 x ½ for mtg. loop and back	.02
502173		Shaft—tuning control	.15
110501		Socket—speaker	.16
116690		Socket—octal base	.12
160039		Socket—phono. plug	.08
160392		Socket—octal rectifier	.16
501182		Socket—phono. motor cable	.45
502662		Socket—dial lamp	.16
161384		Spring—dial cord tension	.06
119885		Washer—felt; for mtg. rec. changer	.01

PRICES SUBJECT TO CHANGE WITHOUT NOTICE

SOCKET VOLTAGES

Measured with voltmeter having sensitivity of **1000 ohms** per volt except where indicated by (*).

RADIO-PHONO-TONE SWITCH IN "RADIO-BASS" POSITION
VOLUME ON FULL WITH NO SIGNAL DIAL TUNED TO 540 KC.



*—Measured with vacuum tube voltmeter.

NOTE:—The **6V6GT** grid bias of—13 volts can be measured across resistor **No. 47.**

Record Changer: General Instruments 205

MODELS 61TR36, 61TR46

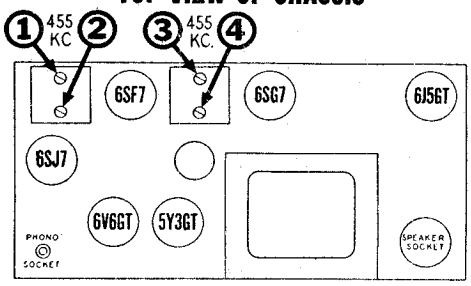
STEWART WARNER CORP.

ALIGNMENT PROCEDURE

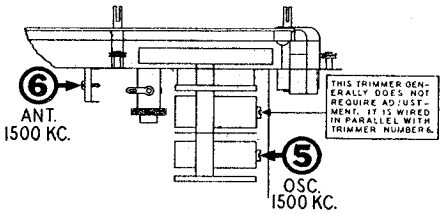
1. Remove chassis and loop antenna (cabinet back) from cabinet. Reconnect loop to chassis and space it approximately same distance from chassis as when installed in cabinet.
2. With the gang condenser fully meshed, the dial pointer should be in the position indicated by the last mark below 55 on the dial. If it is set incorrectly, release the pointer clip on the dial cord and reposition pointer.
3. Connect an output meter across the speaker voice coil or from the plate of the 6V6GT tube to chassis through a .1 Mfd. condenser.
4. Connect the ground lead of signal generator to the receiver chassis.
5. Set volume control at maximum volume position and use a weak signal from the signal generator.

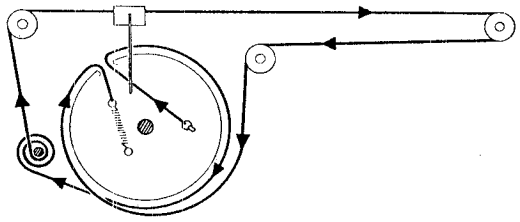
DUMMY ANT. IN SERIES WITH SIGNAL GENERATOR	CONNECT HIGH SIDE OF SIG. GENERATOR TO	SIGNAL GENERATOR FREQUENCY	RECEIVER DIAL SETTING	TRIMMER NUMBER	TRIMMER DESCRIPTION	TYPE OF ADJUSTMENT
.1 MFD. Condenser	Trimmer on top section of gang.	455 KC	Any point where it does not affect the signal	1-2	2nd I.F.	Adjust for maximum output. Then repeat adjustment.
				3-4	1st I.F.	
200 MMFD. Mica Condenser	External Antenna Clip on Loop Antenna	1500 KC	1500 KC	5	Broadcast Oscillator	Adjust for maximum output.
200 MMFD Mica Condenser	External Antenna Clip on Loop Antenna	1500 KC	Tune to 1500 KC generator signal	6	Broadcast Antenna	Adjust for maximum output.

TOP VIEW OF CHASSIS



SIDE VIEW OF CHASSIS





DIAL AND POINTER DRIVE CORD ARRANGEMENT

Top view
Dial plate removed

To string dial cord, set gang condenser to fully meshed position and use following parts:

114955 Clip on end of cord
117057 Cord (4 feet)
119087 Ring for dial cord
161384 Tension Spring

IMPORTANCE OF MAINTAINING FIXED POSITIONS FOR LEADS AT TOP OF CHASSIS

The shielded leads which are routed to the "Radio-Phono" switch and volume control should be tied to the upright bracket which supports the dial assembly. Grounded shields on these leads must not be allowed to contact electrolytic condenser case. If case of condenser is grounded it will short out bias voltage for 6V6GT tube.

AUDIO OSCILLATION

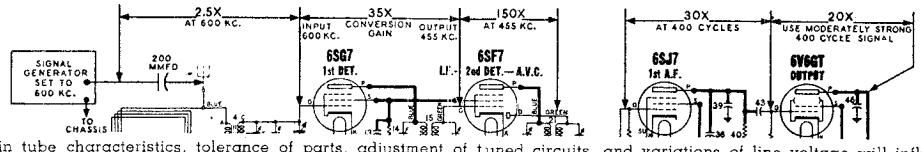
The audio system of this receiver utilizes a two stage type of inverse feed-back arrangement and should it ever be necessary to replace the speaker or output transformer it is important to maintain a definite phase relationship in the feed-back circuit. If the connections to the output transformer are reversed or if the feed-back connection is made to the wrong side of the output transformer secondary, the system will become regenerative instead of degenerative. Under those conditions audio oscillation may result. If that occurs, oscillation may be prevented by reversing the connections to the primary of the output transformer.

APPROXIMATE STAGE GAIN DATA

Be sure R.F. and I.F. stages are accurately aligned before measuring gain. R.F. gains can be measured with a "channel" type instrument containing a tuned and calibrated R.F. amplifier. A vacuum tube voltmeter may be used for audio gain measurements. Observe following precautions:

1. For all gain measurements connect signal generator as shown. Use 600 K.C. signal with 400 cycle modulation (use nearby frequency if local station interferes.)
2. For R.F. and I.F. measurements connect negative terminal of a 3 volt battery (two 1½ volt cells in series) to A.V.C. lead at terminal "D" of antenna coil; then connect positive battery lead to chassis. This provides a definite operating point. IMPORTANT: Disconnect battery when measuring audio stage gains.
3. Be sure radio is carefully tuned to generator signal (use weak signal for sharp tuning.)
4. When using a "channel" type instrument carefully tune it for maximum output at desired frequency before making measurements.

The R.F. and I.F. stage gains shown below are less than under normal operating conditions due to the use of 3 volts fixed bias in order to establish a definite operating point. Therefore, these values are not intended to indicate the full capability of a stage.



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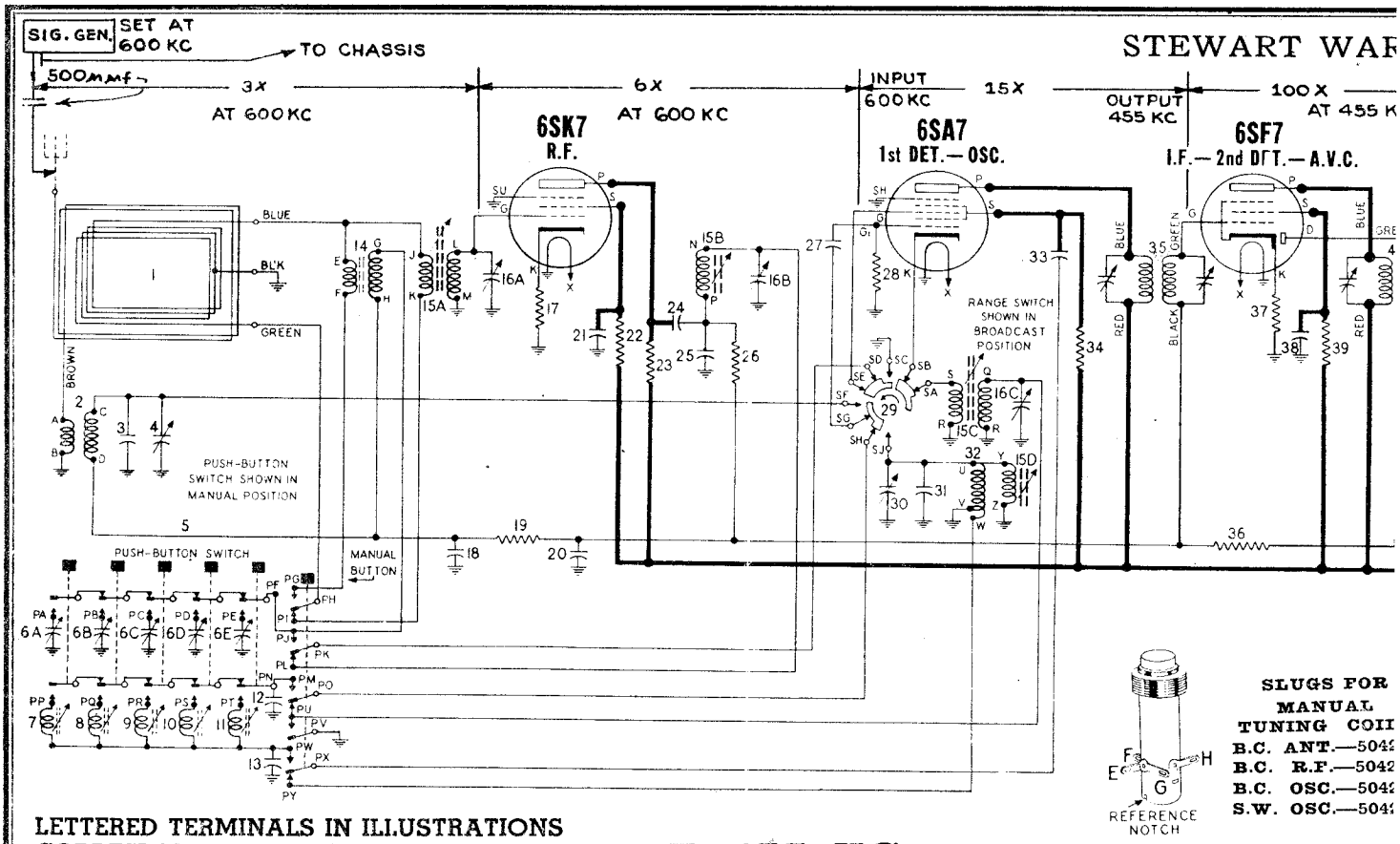

SLUGS FOR MANUAL TUNING COIL

B.C. ANT.—504
B.C. R.F.—5042
B.C. OSC.—5042
S.W. OSC.—504

LETTERED TERMINALS IN ILLUSTRATIONS CORRESPOND TO SIMILARLY LETTERED TERMINALS ON THE CIRCUIT DIAGRAM.

I.F. 455 KC.

B.C. ANT. COUPLING COIL (PUSH-BUTTON) 502112

DIAGRAM NO.	PART NO.	DESCRIPTION	LIST PRICE
		CONDENSERS	
3	502884	Condenser—mica 120 Mmfd. 500 volt	$0.24
4	502171	Condenser—trimmer; 5 to 35 Mmfd.	.24
6A to E	502910	Condenser—trimmer assem. for P-B tuner	3.00
12	502161	Condenser—mica 270 Mmfd. 500 volt	.45
13	502165	Condenser—mica 1,000 Mmfd. 500 volt	.45
16A, B, C	504086	Condenser—trimmer assembly A—20 to 270 Mmfd. B—40 to 370 Mmfd. C—40 to 370 Mmfd.	1.10
18	502153	Condenser—.05 Mfd. 200 volt	.24
20	502155	Condenser—.1 Mfd. 200 volt	.30
21	502157	Condenser—.05 Mfd. 400 volt	.24
24	502271	Condenser—mica 260 Mmfd. 500 volt	.30
25	502165	Condenser—mica 1,000 Mmfd. 500 volt	.45
27	502159	Condenser—mica 50 Mmfd. 500 volt	.24
30	502172	Condenser—trimmer; 25 to 100 Mmfd.	.36
31	502159	Condenser—mica 50 Mmfd. 500 volt	.24
33	502151	Condenser—.01 Mfd. 400 volt	.20
38	502157	Condenser—.05 Mfd. 400 volt	.24
43	502271	Condenser—mica 260 Mmfd. 500 volt	.30
44	502150	Condenser—.004 Mfd. 600 volt	.20
45	502157	Condenser—.05 Mfd. 400 volt	.24
49	502160	Condenser—mica 110 Mmfd. 500 volt	.24
50	502152	Condenser—.02 Mfd. 400 volt	.24
52	502410	Condenser—.1 Mfd. 400 volt	.30
55	502405	Condenser—.25 Mfd. 400 volt	.36
59A, B, C	502207	Condenser—electrolytic A—20 Mfd. 400 volt B—10 Mfd. 400 volt C—20 Mfd. 25 volt	2.20
60	502150	Condenser—.004 Mfd. 600 volt	.20
61	502154	Condenser—.05 Mfd. 600 volt	.24
		RESISTORS	
17	502127	Resistor—carbon 560 ohms ¼ watt	$0.12
19	502134	Resistor—carbon 470,000 ohms ¼ watt	.12
22	502132	Resistor—carbon 100,000 ohms ¼ watt	.12
23	502291	Resistor—carbon 4700 ohms ¼ watt	.12
26	502134	Resistor—carbon 470,000 ohms ¼ watt	.12
28	502130	Resistor—carbon 22,000 ohms ¼ watt	.12
34	502466	Resistor—carbon 33,000 ohms 1 watt	.16
36	502135	Resistor—carbon 2.2 Meg. ¼ watt	.12
37	502264	Resistor—carbon 47 ohms ¼ watt	.12
39	502467	Resistor—carbon 68,000 ohms ½ watt	.12
41	502131	Resistor—carbon 47,000 ohms ¼ watt	.12
42A, B	502148	Volume control 500,000 ohms (with switch)	1.25
46	502468	Resistor—carbon 4.7 Meg. ¼ watt	.12
47	502128	Resistor—carbon 2200 ohms ¼ watt	.12
51	502133	Resistor—carbon 220,000 ohms ¼ watt	.12
53	502132	Resistor—carbon 100,000 ohms ¼ watt	.12
54	502134	Resistor—carbon 470,000 ohms ¼ watt	.12
56	502135	Resistor—carbon 2.2 Meg. ¼ watt	.12
62	502291	Resistor—carbon 4700 ohms ¼ watt	.12
63	502127	Resistor—carbon 560 ohms ¼ watt	.12
65	502137	Resistor—wire wound 330 ohms 2 watt	.25
		COILS & TRANSFORMERS	
1	502436	Loop antenna (Models 62TC16, 26, 36)	$3.00
1	502247	Loop antenna (Model 62T16)	4.15
2	504296	Coil—S.W. antenna	1.35
	502025	Complete coil and trimmer assembly for push-button tuner	8.80
7	502907	Coil less slug (540-1000 Kc.)	1.50
8, 9	502908	Coil less slug (650-1300 Kc.)	1.50
10, 11	502909	Coil less slug (975-1600 Kc.)	1.50
	502911	Slugs for coils 502907, 502908, 502909	.25
	501151	Clip—for mtg. push-button coils	.08
14	502112	Coil—B.C. antenna (for push-button)	1.70
15 A, B / C, D	504294	Tuning unit; complete assembly	10.60
15A	504210	Coil—B.C. antenna coupling (less slug)	1.20
15B	504214	Coil—B.C. R.F. (less slug)	.85
15C	504295	Coil—B.C. oscillator (less slug)	1.00
15D	504342	Coil—S.W. oscillator (less slug)	.75
	504211	Tuning slug for B.C. antenna and S.W. osc. coils (yellow end)	.45
	504213	Tuning slug for B.C. oscillator coil (white end)	.45
	504215	Tuning slug for B.C. R.F. coil (purple end)	.45
32	502111	Coil—S.W. oscillator	1.10
35	502102	Transformer—1st I.F.	2.30
40	502103	Transformer—2nd I.F.	2.30
48	502174	Transformer—power	7.50
68	502170	Transformer—output for R-502168 spkr.	2.00
	504061	Transformer—output for M-502168 spkr.	2.00
	504122	Transformer—output for D-502168 spkr.	2.00
		OTHER ELECTRICAL PARTS	
5	502177	Switch—push button	$4.10
29	502147	Switch—band	2.00
57, 58	110629	Lamp—dial (Mazda No. 44) 6.3 V 0.25 Amps.	.15
64	502146	Switch—tone control	.70
66	502168	Speaker—Electro-Dynamic (6 inch)	9.50
	502169	Cone & voice coil for R-502168 spkr.	2.75
67	504062	Cone & voice coil for M-502168 spkr.	2.75
	504123	Cone & voice coil for D-502168 spkr.	2.75

DIAGRAM NO.	PART NO.	MIS
	502437	Back
	502438	Back
	502439	Back
	502471	Back
	119694	Back
	116467	Base
	119739	Call
	119559	Clar
	112745	Clip
	114955	Clip
	116563	Con
	117057	Cord
	504293	Dial
	502550	Escu
	502819	Escu
	501449	Kno
	501458	Kno
	501498	Kno 62
	501499	Kno 62
	504097	Plug
	502601	Poin
	501497	Push
	501651	Push
	81145	Retc
	119087	Rinc
	85078	Rub B.
	116584	Rub
	504045	Rub B.
	83552	Scre
	114914	Scre
	501777	Scre
	118606	Sha
	112818	Soci
	116690	Soci
	160392	Soci
	502210	Soci
	161384	Spri
	504012	Spri
	119911	Ter
	111456	Wa
	500487	Wa

PRICES SUBJECT TO CHANGE WITHOUT NOTICE

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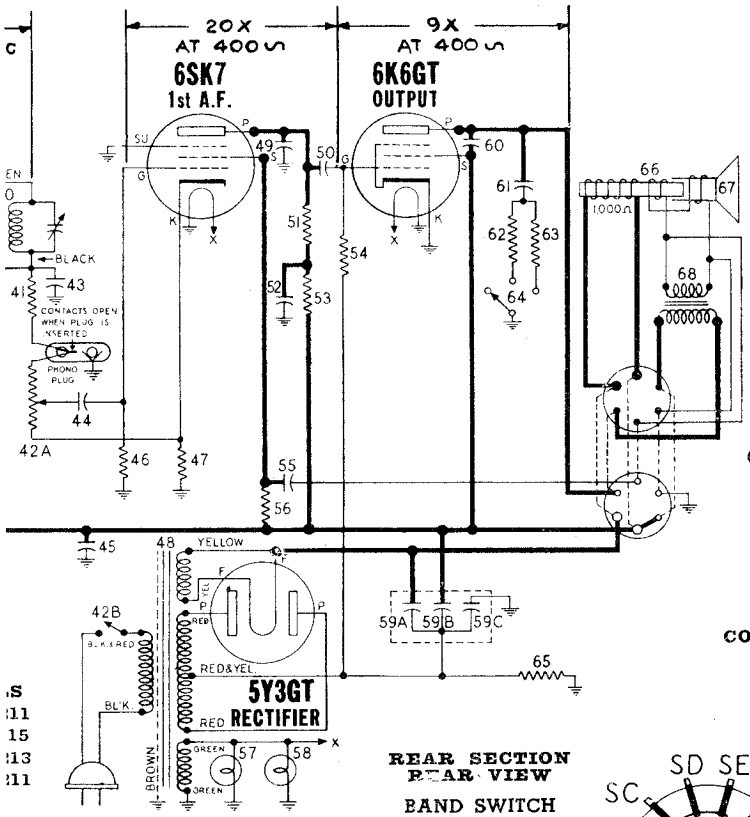
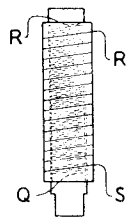
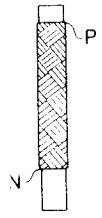
:NER CORP.

MODELS 62T16(9023-C),62TC16(9023-D) 62TC26(9023-E),62TC36(9023-F)

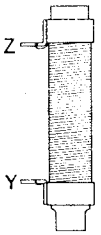




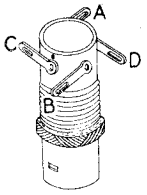
B.C. OSCILLATOR COIL
504295



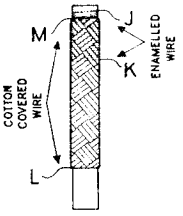
B.C. R.F. COIL
504214



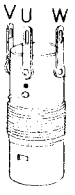
S.W. OSCILLATOR COIL
504342



S.W. ANT. COUPLING COIL
504296

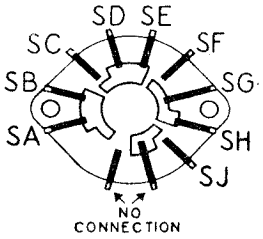


B.C. ANTENNA COUPLING COIL
504210



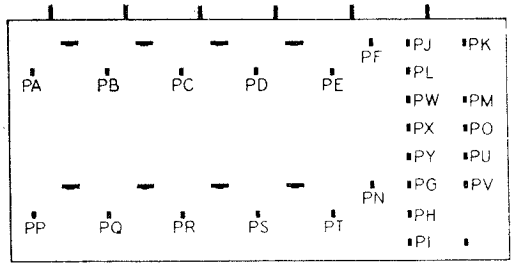
S.W. OSCILLATOR COIL
502111

REAR SECTION REAR VIEW



BAND SWITCH
502147

(Front section not used as switch)



PUSH-BUTTON SWITCH
502177

DESCRIPTION	LIST PRICE
CELLANEOUS PARTS	
: for cabinet (Model 62TC16)	$0.70
: for cabinet (Model 62TC26)	.45
: for cabinet (Model 62TC36)	.60
: for cabinet (Model 62T16)	.85
:ground for dial	.06
for mtg. electrolytic condenser	.04
letter tabs for push-buttons	.48
ıp—dial glass	.08
—coil mtg.	.01
—retainer on end of dial cord	.01
ıector—antenna leads	.01
l—dial drive (40 in. required) per ft.	.05
scale—glass	1.00
:tcheon—(Model 62T16)	2.40
:tcheon (Models 62TC16, 26, 36)	2.40
ɔ—volume or tuning (Model 62T16)	.15
ɔ—tone or band switch (Model 62T16)	.16
ɔ—volume or tuning (Models 62TC16, TC26, 62TC36)	.20
ɔ—tone or band switch (Models TC16, 62TC26, 62TC36)	.18
—speaker	.25
ter	.18
ı-button (Model 62T16)	.15
ı-button (Models 62TC16, 26, 36)	.15
ining ring for tuning shaft	.01
for dial cord	.01
ber grommet for mtg. B.C. Ant. and C. R.F. coils	.03
ber spacer for mtg. dial scale	.02
ber grommet for mtg S.W. osc. and C. osc. coils	.04
w—No. 10x7/8"; for mtg. chassis	.03
w—No. 2x3/8"; for mtg. escutcheon	.02
w—No. 4x1/2"; for mtg. loop & back	.02
ft—tuning control	.18
et—dial lamp with lead	.10
et—octal base	.12
et—octal (rectifier)	.16
et—speaker	.25
ng—dial cord tension	.06
ng—tuning slug drive cord	.05
ninal strip—phono	.16
sher—spring washer for tuning shaft	.005
sher—felt; for knobs	.01

SOCKET VOLTAGES

Measured with voltmeter having sensitivity of 1000 ohms per volt except where indicated by (*).

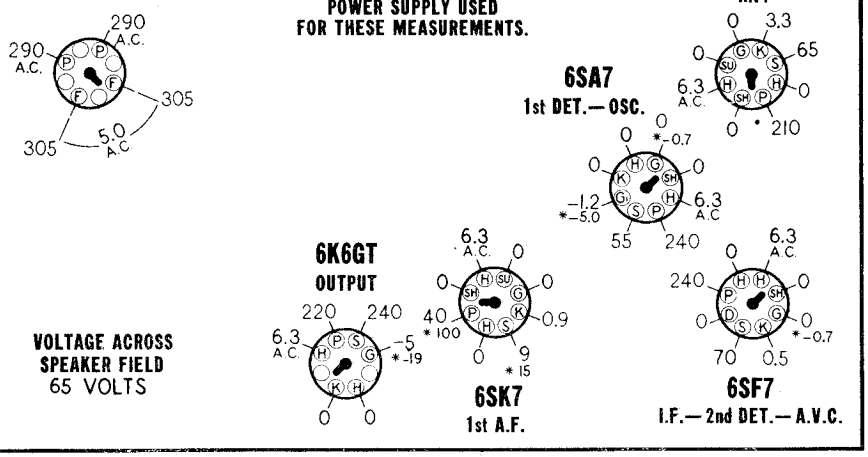
VOLUME ON FULL WITH NO SIGNAL
BAND SWITCH IN BROADCAST POSITION

DIAL TUNED TO 540 KC.
MANUAL BUTTON PUSHED IN

BOTTOM VIEW OF CHASSIS

ALL VOLTAGES MEASURED BETWEEN SOCKET TERMINALS AND CHASSIS.

117 VOLT 60 CYCLE A.C. POWER SUPPLY USED FOR THESE MEASUREMENTS.



REAR OF CHASSIS

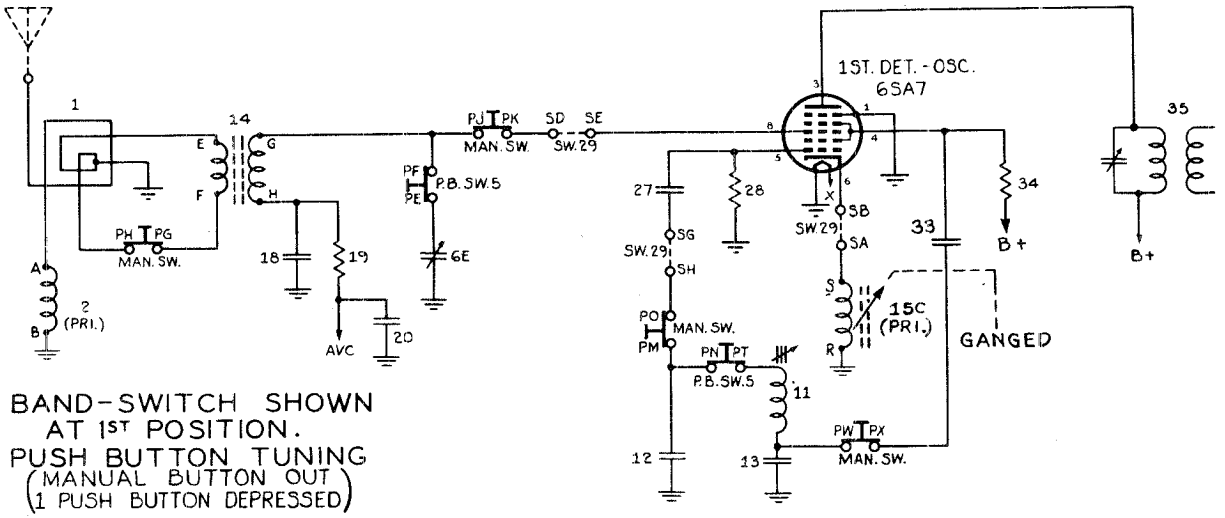
*—Measured with vacuum tube voltmeter.

NOTE:—The 6K6GT grid bias of —19 volts can be measured across resistor No. 65.

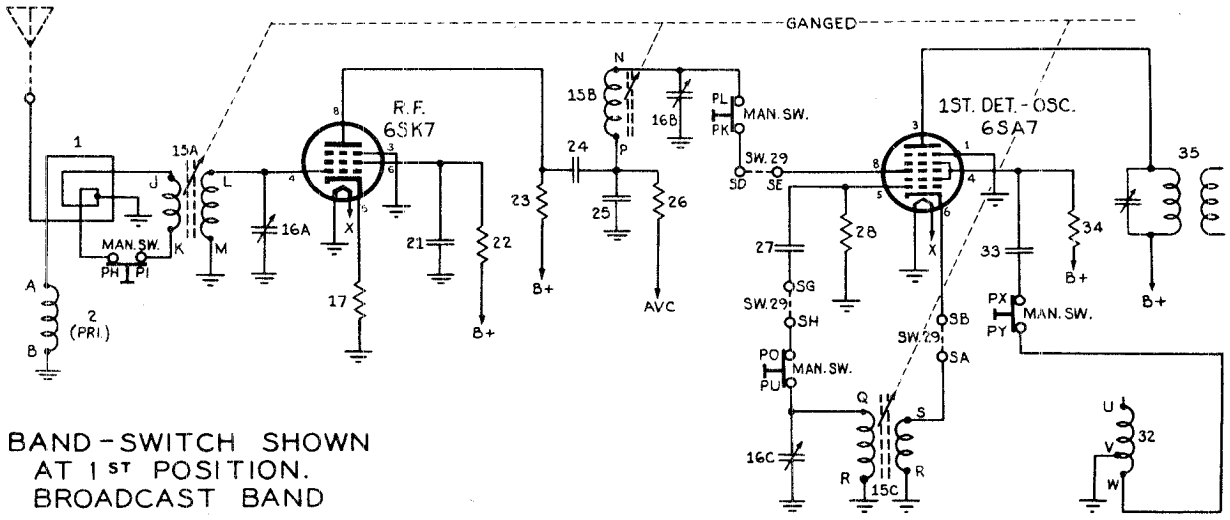
For Dial Cord data, see P.15-15

STEWART WARNER CORP.

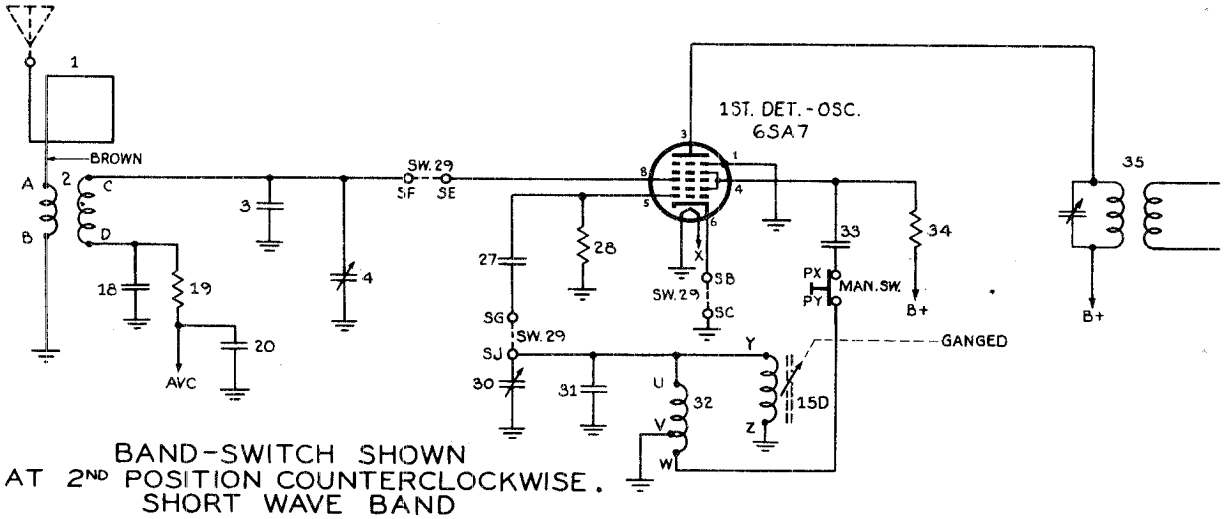
MODELS 62T16, 62TC16, 62TC26, 62TC36



BAND-SWITCH SHOWN AT 1ST POSITION.
PUSH BUTTON TUNING
(MANUAL BUTTON OUT)
(1 PUSH BUTTON DEPRESSED)



BAND-SWITCH SHOWN AT 1ST POSITION.
BROADCAST BAND



BAND-SWITCH SHOWN AT 2ND POSITION COUNTERCLOCKWISE.
SHORT WAVE BAND

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MODELS 62T16,62TC16, 62TC26,62TC36

STEWART WARNER CORP.

ALIGNMENT PROCEDURE

1. Remove chassis and loop antenna from cabinet (do not remove loop of wire stapled to cabinet). After chassis has been removed, replace loop antenna in cabinet. Stand the chassis on one end and space it approximately same distance from loop as when installed in cabinet. Then reconnect all leads to loop antenna and to loop of wire stapled on cabinet.
2. Turn the tuning control knob clockwise as far as it will go (tuner mechanism is now in maximum open position with tuning slugs almost completely withdrawn from coils). Dial pointer should then point to 1600 KC mark on scale. If it is set incorrectly, release pointer clip on dial cord and reposition pointer.
3. Connect output meter across speaker voice coil or from 6K6GT plate to chassis through a .1 Mfd. condenser.
4. Connect the ground lead of the signal generator to the receiver chassis.
5. Set volume control at maximum volume position and use a weak signal from the signal generator.
6. Push in the manual button and leave it in that position throughout the alignment procedure.

IMPORTANT:—Align this receiver in exactly the order shown below.

DUMMY ANT. IN SERIES WITH SIGNAL GENERATOR	CONNECT HIGH SIDE OF SIGNAL GENERATOR TO	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POSITION	RECEIVER DIAL SETTING	TRIMMER NUMBER	TRIMMER DESCRIPTION	TYPE OF ADJUSTMENT
Set tuner mechanism to maximum open position by turning the tuning control knob clockwise as far as it will go (Dial pointer at 1600 KC). Then check whether the positions of the tuning slugs correspond to the positions shown in Fig. 2. If settings are incorrect, rotate the individual core and threaded stem until desired position is reached. Note that threaded stem is prevented from moving by a dab of speaker cement on top and this seal must be removed before stem can be rotated.							
.1 MFD. Condenser	Terminal "N" on Tuner Unit (See Fig. 2).	455 KC	Broadcast (Clockwise)	Any point where it does not affect the signal.	1-2	2nd I.F.	Adjust for maximum output. Then repeat adjustment.
					3-4	1st I.F.	
500 MMFD. Mica Condenser	External Antenna Clip on Loop Frame	1600 KC	Broadcast (Clockwise)	1600 Kc.	5	Broadcast Oscillator	Adjust for maximum output.
				Tune to 1600 Kc. generator signal.	6	Broadcast R.F.	Adjust for maximum output.
					7	Broadcast Ant.	Adjust for maximum output.
500 MMFD. Mica Condenser	External Antenna Clip on Loop Frame	1400 KC	Broadcast (Clockwise)	Set pointer to 1400 Kc. mark on dial scale. **Do not** attempt to tune to generator signal.	BC. Osc. coil tuning slug		Adjust position of slug for maximum output.
					BC. R.F. coil tuning slug		Adjust position of slug for maximum output.
					BC. Ant. coil tuning slug		Adjust position of slug for maximum output.
500 MMFD. Mica Condenser	External Antenna Clip on Loop Frame	1600 KC	Broadcast (Clockwise)	Set pointer to 1600 Kc. mark on dial scale. **Do not** attempt to tune to generator signal.	5	Broadcast Oscillator	Adjust for maximum output.
				Tune to 1600 Kc. generator signal.	6	Broadcast R.F.	Adjust for maximum output.
					7	Broadcast Antenna	Adjust for maximum output.
500 MMFD. Mica Condenser	External Antenna Clip on Loop Frame	1400 KC	Broadcast (Clockwise)	Tune to 1400 Kc. generator signal.	BC. R.F. coil tuning slug		Adjust position of slug for maximum output.
					BC. Ant. coil tuning slug		Adjust position of slug for maximum output.
400 OHM Carbon Resistor	External Antenna Clip on Loop Frame	9.6 MC	Short wave (Counter-Clockwise)	9.6 Mc.	8	S.W. Oscillator	Adjust for maximum output. Check to see if proper peak was obtained by setting the signal generator to 10.5 Mc. and then tune radio in vicinity of 9.6 Mc. If image signal is not heard, realign at 9.6 Mc. with trimmer screw farther out. Recheck image.
400 OHM Carbon Resistor	External Antenna Clip on Loop Frame	9.6 MC	Short wave (Counter-Clockwise)	Tune to 9.6 Mc. generator signal.	9	S.W. Antenna	Adjust for maximum output. Try to increase output by detuning trimmer and retuning receiver dial until maximum output is obtained.

Apply a coating of speaker cement at top of each tuning core stem to prevent movement.

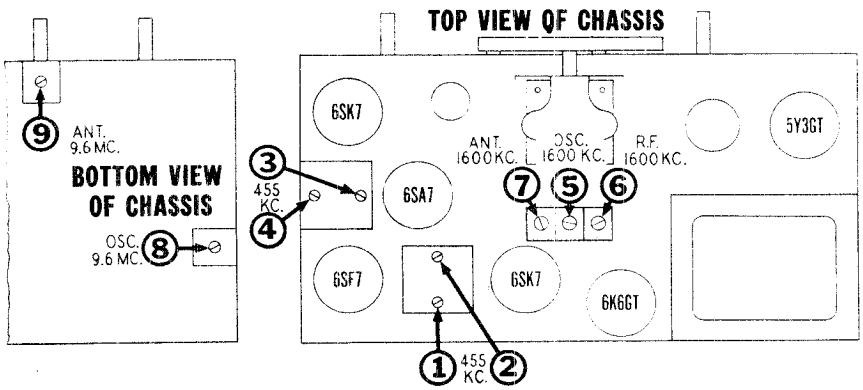

FIG. 1 TRIMMER LOCATIONS

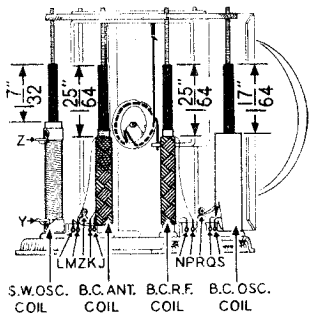

FIG. 2 SLUG TUNER ASSEMBLY (rear view)

Drive Parts
117057 Cord (8")
114955 Clip on cord
504012 Spring

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STEWART WARNER CORP.

MODELS 62T16, 62TC16, 62TC26, 62TC36
MODELS 9001-C, -D, -E, 9001-F

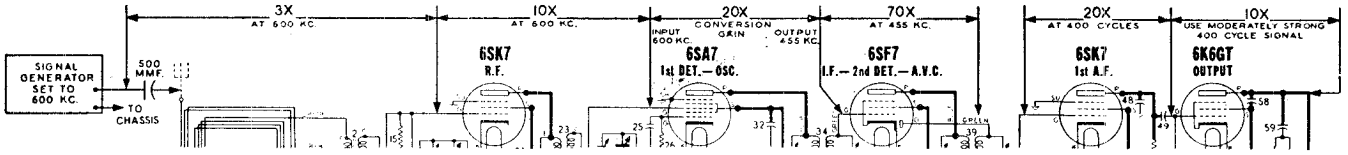
(MODELS 9001-C, D, E, F)

APPROXIMATE STAGE GAIN DATA

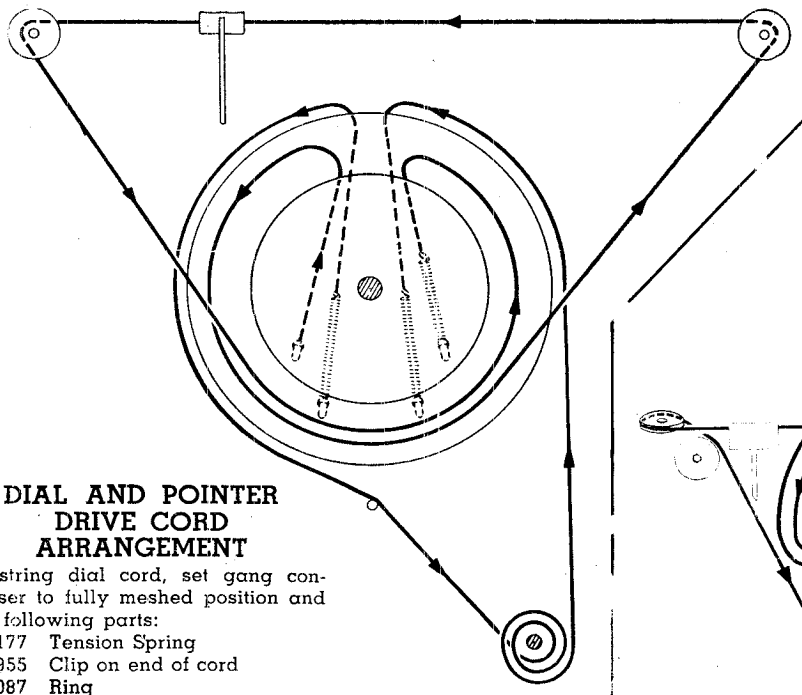
A vacuum tube voltmeter may be used for audio gain measurements. R.F. gains can be measured with a "channel" type instrument containing a tuned and calibrated R.F. amplifier. Observe following precautions:

1. For all gain measurements connect signal generator as shown. Use 600 KC. signal with 400 cycle modulation (use nearby frequency if local station interferes.)
2. For R.F. and I.F. measurements connect negative terminal of a 3 volt battery (two 1½ volt cells in series) to A.V.C. lead and positive terminal to chassis. This provides a definite operating point. IMPORTANT: Disconnect battery when measuring audio stage gains.
3. Be sure radio is carefully tuned to generator signal (use weak signal for sharp tuning.)
4. When using a "channel" type instrument carefully tune it for maximum output at desired frequency before making measurements.

The R.F. and I.F. stage gains shown below are less than under normal operating conditions due to the use of 3 volts fixed bias in order to establish a definite operating point. Therefore, these values are not intended to indicate the full capability of a stage.



Differences in tube characteristics, tolerance of parts, adjustment of tuned circuits, and variations of line voltage will influence stage gain. Accuracy of measurements is dependent upon careful tuning of receiver to generator signal and experience in using your test equipment. These factors may create considerable variation in gain measurements.



DIAL AND POINTER DRIVE CORD ARRANGEMENT

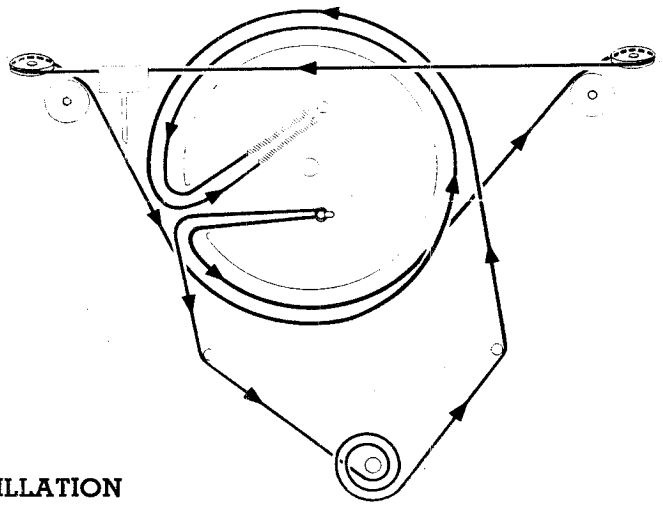
To string dial cord, set gang condenser to fully meshed position and use following parts:

113177 Tension Spring
114955 Clip on end of cord
119087 Ring
117057 Cord (61 inches)
34 inches for pointer drive
27 inches for tuning drive

(MODELS 62T16, 62TC16, 62TC26, 62TC36) DIAL AND POINTER DRIVE CORD ARRANGEMENT

To string dial cord, turn the main drive drum to maximum counter-clockwise position and use following parts:

114955 Clip on end of cord
117057 Cord (40 inches)
119087 Ring for dial cord
161384 Tension Spring



AUDIO OSCILLATION

The audio system of this receiver utilizes a two stage type of inverse feed-back arrangement and should it ever be necessary to replace the speaker or output transformer it is important to maintain a definite phase relationship in the feedback circuit. If the connections to the output transformer are reversed or if the feed-back connection is made to the wrong side of the output transformer secondary, the system will become regenerative instead of degenerative. Under those conditions audio oscillation may result. If that occurs, oscillation may be prevented by reversing the connections to the primary of the output transformer.

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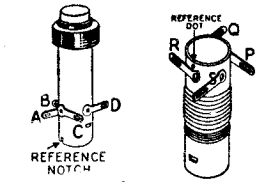
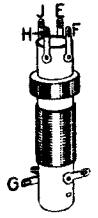
For Clarified schematic, see P-15-47

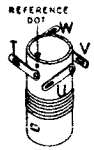


BC. ANTENNA COUPLING COIL 502121

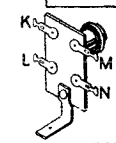
S.W. ANTENNA COIL 502740



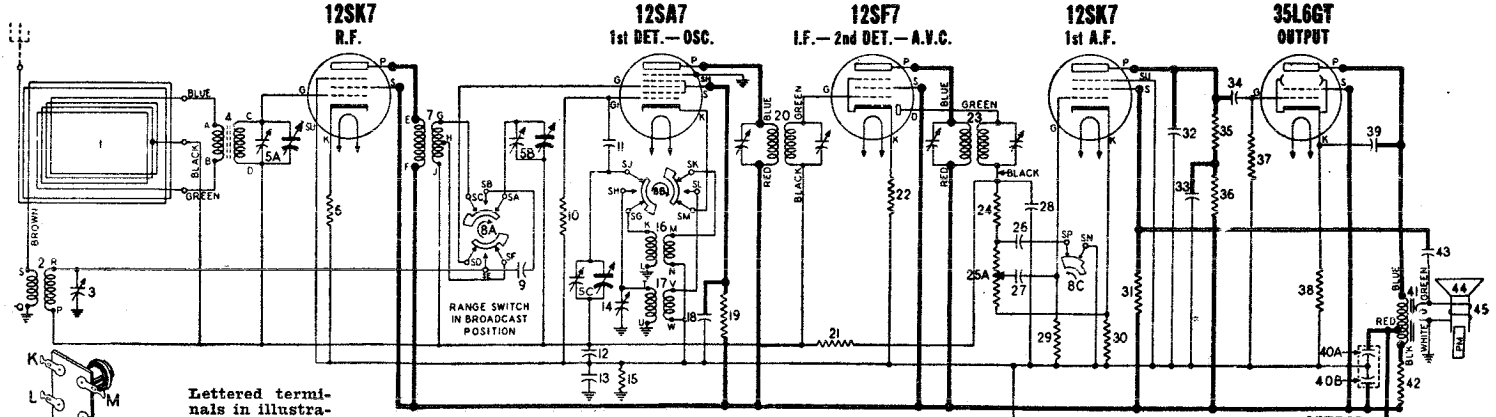
R.F. COIL 502142



S.W. OSC. COIL 502197

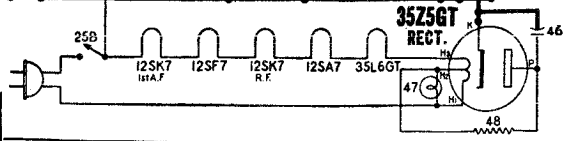


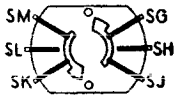
BC. OSC. COIL 502198



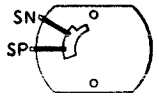
Lettered terminals in illustrations correspond to similarly lettered terminals on the circuit diagram.

I.F. 455 KC.

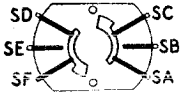




FRONT DECK FRONT VIEW



FRONT DECK REAR VIEW



REAR DECK FRONT VIEW

BAND AND TONE SWITCH
502199

SOCKET VOLTAGES

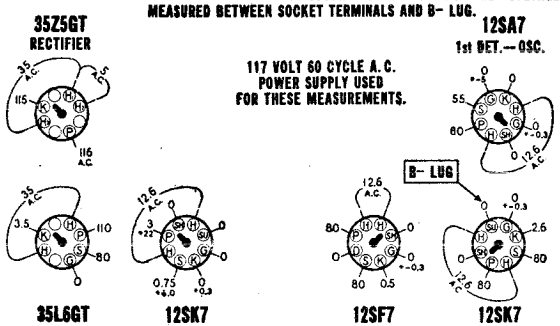
Measured with voltmeter having sensitivity of 1000 ohms per volt except where indicated by (*).

VOLUME ON FULL WITH NO SIGNAL — DIAL TUNED TO 540 KC

BOTTOM VIEW OF CHASSIS

HEATER VOLTAGES MEASURED ACROSS SOCKET TERMINALS. ALL OTHER VOLTAGES MEASURED BETWEEN SOCKET TERMINALS AND B- LUG.

117 VOLT 60 CYCLE A.C. POWER SUPPLY USED FOR THESE MEASUREMENTS.



REAR OF CHASSIS

*—Measured with vacuum tube voltmeter

PARTS LIST

DIAGRAM NO.	PART NO.	DESCRIPTION	LIST PRICE
		CONDENSERS	
3	502172	Condenser—trimmer; 25 to 100 Mmfd.	$0.36
5A-5B-5C	502123	Condenser—variable gang (with drum)	4.60
9	502162	Condenser—315 Mmfd. 500 volt	.45
11	502159	Condenser—mica 50 Mmfd. 500 volt	.24
12	502155	Condenser—.1 Mfd. 200 volt	.30
13	502158	Condenser—.2 Mfd. 400 volt	.36
14	502172	Condenser—trimmer; 25 to 100 Mmfd.	.36
18	502262	Condenser—.25 Mfd. 200 volt	.36
26	502470	Condenser—.0008 Mfd. 400 volt	.20
27	502453	Condenser—.002 Mfd. 400 volt	.20
28	502160	Condenser—mica—110 Mmfd. 500 volt	.24
32	502160	Condenser—mica—110 Mmfd. 500 volt	.24
33	502153	Condenser—.05 Mfd. 200 volt	.24
34	502156	Condenser—.004 Mfd. 400 volt	.20
39	502151	Condenser—.01 Mfd. 400 volt	.20
40A-40B	500256	Condenser—electrolytic (A-40 Mfd. 150 v.) (B-20 Mfd. 150 v.)	1.50
43	502152	Condenser—.02 Mfd. 400 volt	.24
46	502157	Condenser—.05 Mfd. 400 volt	.24
		RESISTORS	
6	502140	Resistor—carbon 390 ohms ¼ watt	.12
10	502130	Resistor—carbon 22,000 ohms ¼ watt	.12
15	502133	Resistor—carbon 220,000 ohms ¼ watt	.12
19	502291	Resistor—carbon 4700 ohms ¼ watt	.12
21	502269	Resistor—carbon 3.3 Meg. ¼ watt	.12
22	502264	Resistor—carbon 47 ohms ¼ watt	.12
24	502131	Resistor—carbon 47,000 ohms ¼ watt	.12
25A-25B	502145	Volume control 500,000 ohms (with switch)	1.25
29	502136	Resistor—carbon 10 Meg. ¼ watt	.12
30	502128	Resistor—carbon 2200 ohms ¼ watt	.12
31	502135	Resistor—carbon 2.2 Meg. ¼ watt	.12
35-36	502133	Resistor—carbon 220,000 ohms ¼ watt	.12
37	502134	Resistor—carbon 470,000 ohms ¼ watt	.12
38	502138	Resistor—carbon 130 ohms ¼ watt	.12
42	502469	Resistor—carbon 1500 ohms 1 watt	.16
48	502574	Resistor—carbon 33 ohms ½ watt	.12
		COILS & TRANSFORMERS	
1	502503	Loop antenna	3.00
2	502740	Coil—S. W. antenna	1.12
4	502121	Coil—antenna coupling	1.64
7	502142	Coil—BC. R.F.	2.26
16	502198	Coil—BC. oscillator	1.32
17	502197	Coil—S.W. oscillator	1.12
20	502102	Transformer—1st I.F.	2.30
23	502103	Transformer—2nd I.F.	2.30
41	502213	Trans.—output, speaker with prefix "R"	$2.50
	502904	Trans.—output, speaker with prefix "A"	2.50
	504244	Trans.—output, speaker with prefix "W"	2.50
	504756	Trans.—output, speaker with prefix "Y"	
	504758	Trans.—output, speaker with prefix "Z"	
	504781	Trans.—output, speaker with prefix "C"	
		OTHER ELECTRICAL PARTS	
8A-8B-8C	502199	Switch—tone & band	2.00
44	502214	Cone & voice coil, spkr. with prefix "R"	2.50
	502903	Cone & voice coil, spkr. with prefix "A"	2.50
	504245	Cone & voice coil, spkr. with prefix "W"	2.50
	504757	Cone & voice coil, spkr. with prefix "Y"	
	504759	Cone & voice coil, spkr. with prefix "Z"	
	504782	Cone & voice coil, spkr. with prefix "C"	
45	502208	Speaker—P.M. dynamic (5 inch)	6.90
47	502998	Speaker—P.M. dynamic (5 inch)	6.60
	502473	Lamp—dial (Mazda 47) 6-8V. 150 Ma.	.22
		MISCELLANEOUS PARTS	
	502501	Back for cabinet	.20
	116467	Base for mtg. electrolytic condenser	.04
	502500	Cabinet	19.00
	502506	Clamp—dial scale mtg.	.04
	112745	Clip—coil mtg.	.01
	114855	Clip—retainer on end of dial cord	.01
	500497	Clip—retainer for cabinet back	.02
	116563	Connector—for antenna leads	.01
	117057	Cord—dial drive (55 in. required), per ft.	.05
	500324	Cover—cardboard, for elect. cond.	.04
	502505	Dial scale—glass	1.60
	501186	Grounding plate (under I.F. trans. can.)	.10
	502531	Knob—volume or tuning	.35
	502532	Knob—tone & range switch	.44
	502367	Pointer	.16
	81145	Retaining ring for tuning shaft	.01
	119087	" for dial cord	.01
	17063	Screw—No. 6x¼; holds clamps to cab.	.01
	114628	Screw—No. 8x½; chassis mtg.	.01
	502173	Shaft—tuning control	.15
	116690	Socket—octal base	.12
	160392	Socket—octal (rectifier)	.16
	500499	Socket—dial lamp (with leads)	.44
	161384	Spring dial cord tension	.06
	111456	Washer—spring washer for tuning shaft	.005

PRICES SUBJECT TO CHANGE WITHOUT NOTICE

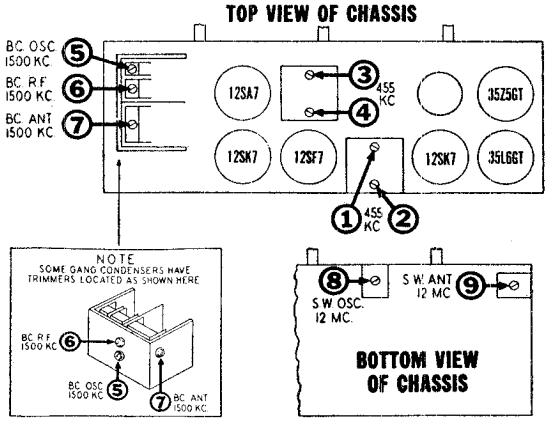
STEWART WARNER CORP. MODEL 62T36

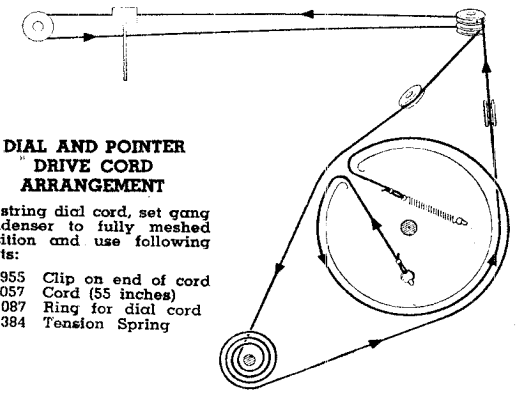
ALIGNMENT PROCEDURE

1. **Remove chassis and loop antenna from cabinet. Reconnect loop to chassis and space it approximately same distance from chassis as when installed in cabinet.**
2. Note that there are four calibrating lines stamped into the metal dial frame. When gang condenser is fully meshed, dial pointer should be in the position indicated by first line at the left. If it is set incorrectly, release pointer clip on dial cord and reposition pointer.
3. Connect an output meter across the speaker voice coil or from plate of 35L6GT tube to B— through a .1 Mfd. condenser (see voltage chart for convenient B— connection).
4. Connect ground lead from signal generator to B— through a .25 Mfd. condenser.
5. Set volume control at maximum volume position and use a weak signal from the signal generator.

IMPORTANT:—Align this receiver in exactly the order shown below. Broadcast band must be aligned before short wave band.

DUMMY ANT. IN SERIES WITH SIGNAL GENERATOR	CONNECT HIGH SIDE OF GENERATOR TO	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POSITION	RECEIVER DIAL SETTING	TRIMMER NUMBER	TRIMMER DESCRIPTION	TYPE OF ADJUSTMENT
200 MMFD. Mica Condenser	Control Grid of 12SA7	455 KC	Broadcast	Any point where it does not affect the signal	1-2	2nd I.F.	Adjust for maximum output. Then repeat adjustment.
					3-4	1st I.F.	
200 MMFD. Mica Condenser	External Antenna Clip on Loop Frame	1500 KC	Broadcast	Set pointer to 1500 KC reference line stamped into metal dial plate (first line at the right)	5	Broadcast Oscillator (Shunt)	Adjust for maximum output.
200 MMFD. Mica Condenser	External Antenna Clip on Loop Frame	1500 KC	Broadcast	Tune to 1500 KC generator signal	6	Broadcast R.F.	Adjust for maximum output.
200 MMFD. Mica Condenser	External Antenna Clip on Loop Frame	1500 KC	Broadcast	Tune to 1500 KC generator signal	7	Broadcast Antenna	Adjust for maximum output.
400 OHM Resistor	External Antenna Clip on Loop Frame	12 MC	Short Wave	Set pointer to 12 MC. Reference line stamped into metal dial plate (second line from the right)	8	Short Wave Oscillator	Adjust to bring in signal. Check to see if proper peak was obtained by tuning in image at approx. 11.1 MC. If image does not appear, realign at 12 MC. with trimmer screw farther out. Recheck image.
400 OHM Resistor	External Antenna Clip on Loop Frame	12 MC	Short Wave	Tune to 12 MC generator signal	9	Short Wave Antenna	Adjust for maximum output. Try to increase output by detuning trimmer and retuning receiver dial until maximum output is obtained.





DIAL AND POINTER DRIVE CORD ARRANGEMENT

To string dial cord, set gang condenser to fully meshed position and use following parts:

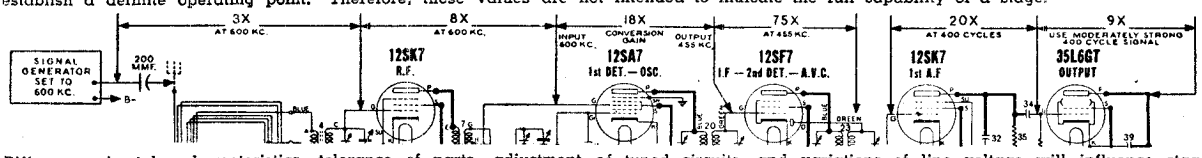
114955 Clip on end of cord
117057 Cord (55 inches)
119087 Ring for dial cord
161384 Tension Spring

APPROXIMATE STAGE GAIN DATA

Be sure R.F. and I.F. stages are accurately aligned before measuring gain. R.F. gains can be measured with a "channel" type instrument containing a tuned and calibrated R.F. amplifier. A vacuum tube voltmeter may be used for audio gain measurements. Observe following precautions:

1. For all gain measurements connect signal generator as shown. Use 600 KC. signal with 400 cycle modulation (use nearby frequency if local station interferes.)
2. For R.F. and I.F. measurements connect negative terminal of a 3 volt battery (two 1½ volt cells in series) to A.V.C. lead and positive terminal to B—. This provides a definite operating point. **IMPORTANT: Disconnect battery when measuring audio stage gains.**
3. Be sure radio is carefully tuned to generator signal (use weak signal for sharp tuning.)
4. When using a "channel" type instrument carefully tune it for maximum output at desired frequency before making measurements.

The R.F. and I.F. stage gains shown below are less than under normal operating conditions due to the use of 3 volts fixed bias in order to establish a definite operating point. Therefore, these values are not intended to indicate the full capability of a stage.



Differences in tube characteristics, tolerance of parts, adjustment of tuned circuits, and variations of line voltage will influence stage gain. Accuracy of measurements is dependent upon careful tuning of receiver to generator signal and experience in using your test equipment. These factors may create considerable variation in gain measurements.

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Record Changer: Webster Model 50; General Instruments Model 205
For Clarified schematics, see P. 15-37

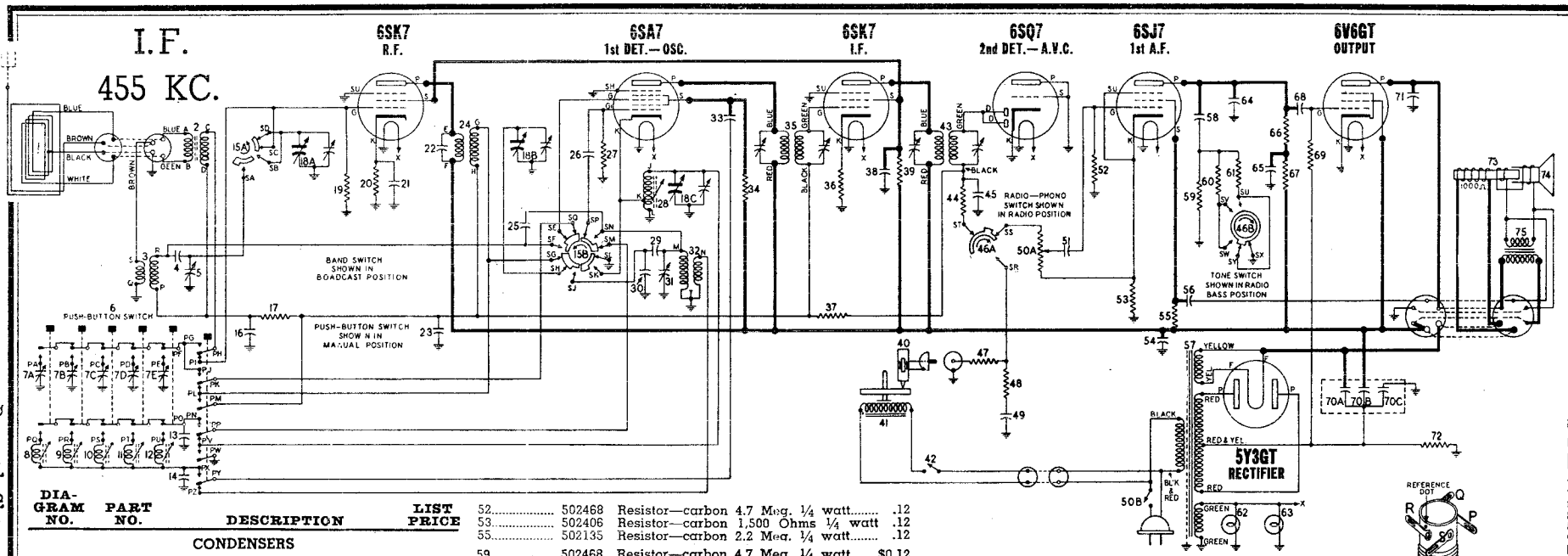
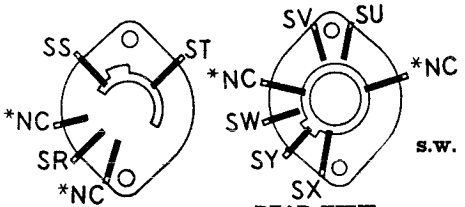


DIAGRAM NO.	PART NO.	DESCRIPTION	LIST PRICE
		CONDENSERS	
4	502202	Condenser—ceramic 150 Mmfd. 500 volt	$0.50
5	502172	Condenser—trimmer 25 to 100 Mmfd.	.36
7-A to E	502910	Condenser—trimmer assembly for P-B tuner	3.00
13	502161	Condenser—mica 270 Mmfd. 500 volt	.45
14	502165	Condenser—mica 1,000 Mmfd. 500 volt	.45
16	502153	Condenser—.05 Mfd. 200 volt	.24
18-A, B, C	502122	Condenser—variable gang	6.60
21	502155	Condenser—.1 Mfd. 200 volt	.30
22	502295	Condenser—ceramic 10 Mmfd. 500 volt	.30
23	502153	Condenser—.05 Mfd. 200 volt	.24
25	502411	Condenser—2 Mmfd. 500 volt	.10
26	502159	Condenser—mica 50 Mmfd. 500 volt	.24
29	502201	Condenser—ceramic 130 Mmfd. 500 volt	.50
30	502182	Condenser—ceramic 39 Mmfd. 500 volt	.40
31	502171	Condenser—trimmer 5 to 35 Mmfd.	.24
33	502152	Condenser—.02 Mfd. 400 volt	.24
38	502154	Condenser—.05 Mfd. 600 volt	.24
45	502160	Condenser—mica 110 Mmfd. 500 volt	.24
49	502151	Condenser—.01 Mfd. 400 volt	.20
51	502150	Condenser—.004 Mfd. 600 volt	.20
54	502154	Condenser—.05 Mfd. 600 volt	.24
56	502405	Condenser—.25 Mfd. 400 volt	.36
58	502151	Condenser—.01 Mfd. 400 volt	.20
64	502271	Condenser—mica 260 Mmfd. 500 volt	.30
65	502157	Condenser—.05 Mfd. 400 volt	.24
68	502152	Condenser—.02 Mfd. 400 volt	.24
70-A, B, C	502207	Condenser—electrolytic A—20 Mfd. 400 volt, B—10 Mfd. 400 volt, C—20 Mfd. 25 volt	2.20
71	502479	Condenser—.006 Mfd. 600 volt	.24
		RESISTORS	
17	502134	Resistor—carbon 470,000 Ohms ¼ watt	$0.12
19	502469	Resistor—carbon 4.7 Meg. ¼ watt	.12
20	502478	Resistor—carbon 1,000 Ohms ¼ watt	.12
27	502130	Resistor—carbon 22,000 Ohms ¼ watt	.12
34	502466	Resistor—carbon 33,000 Ohms 1 watt	.16
36	502457	Resistor—carbon 330 Ohms ¼ watt	.12
37	502135	Resistor—carbon 2.2 Meg. ¼ watt	.12
39	502292	Resistor—carbon 68,000 Ohms 1 watt	.16
44	502131	Resistor—carbon 47,000 Ohms ¼ watt	.12
47	502132	Resistor—carbon 100,000 Ohms ¼ watt	.12
48	502131	Resistor—carbon 47,000 Ohms ¼ watt	.12
50-A, B	502148	Volume control—with switch; 500,000 Ohms	1.25
52	502468	Resistor—carbon 4.7 Meg. ¼ watt	.12
53	502406	Resistor—carbon 1,500 Ohms ¼ watt	.12
55	502135	Resistor—carbon 2.2 Meg. ¼ watt	.12
59	502468	Resistor—carbon 4.7 Meg. ¼ watt	$0.12
60	502469	Resistor—carbon 68,000 Ohms ¼ watt	.12
61	502291	Resistor—carbon 4,700 Ohms ¼ watt	.12
66, 67	502133	Resistor—carbon 220,000 Ohms ¼ watt	.12
69	502134	Resistor—carbon 470,000 Ohms ¼ watt	.12
72	502293	Resistor—wire wound 200 Ohms 2 watt	.25
		COILS AND TRANSFORMERS	
1	502282	Loop antenna	$5.00
2	502112	Coil—BC. antenna	1.70
3	502110	Coil—S.W. antenna	1.10
	502025	Complete coil—trimmer assembly for P-B tuner	8.80
8	502907	Coil less slug (540-1000 Kc.)	1.50
9, 10	502908	Coil less slug (650-1300 Kc.)	1.50
11, 12	502909	Coil less slug (975-1600 Kc.)	1.50
	502911	Slug for coils 502907, 502908, 502909	.25
	501151	Clip—for mtg. push button coils	.08
24	502113	Coil—BC. R.F.	1.85
28	502114	Coil—BC. oscillator	1.45
32	502111	Coil—S.W. oscillator	1.10
35	502102	Transformer—1st I.F.	2.30
43	502103	Transformer—2nd I.F.	2.30
57	502174	Transformer—power	7.50
75	502303	Transformer—output for R-502302 speaker	3.60
	502994	Transformer—output for M-502302 speaker	3.60
		OTHER ELECTRICAL PARTS	
6	502369	Switch—push-button	$4.10
15-A, B	502368	Switch—band	2.50
40	502461	Crystal cartridge (Astatic L-71)	6.10
41	502846	Motor—for type GI-502444 record changer; 115 volt 50 cycle	12.00
	502847	Motor—for type GI-502444 record changer; 115 volt 60 cycle	10.00
	504201	Motor—for type W-504138 record changer; 115 volt 60 cycle	8.30
42	504883	Switch—on-off; for type GI-502444 record changer	2.25
	504203	Switch—on-off; for type W-504138 record changer	.80
46-A, B	502370	Switch—tone and radio-phono	1.30
62, 63	110629	Lamp—dial (Mazda No. 44) 6.3 V. 0.25 Amps.	.15
73	502302	Speaker—electro-dynamic (10 inch)	14.00
74	502304	Cone and voice coil for R-502302 speaker	3.60
	502995	Cone and voice coil for M-502302 speaker	3.60

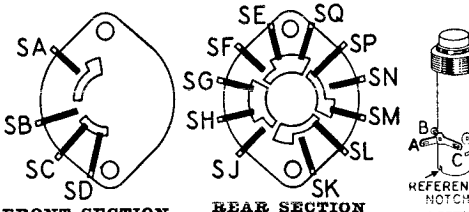
Lettered terminals in illustrations correspond to similarly lettered terminals on the circuit diagram.



FRONT VIEW — REAR VIEW

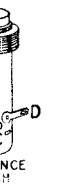
RADIO-PHONO AND TONE SWITCH 502370

*NC—NO CONNECTION

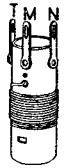


FRONT SECTION REAR VIEW — REAR SECTION REAR VIEW

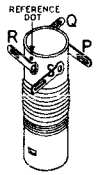
BAND SWITCH 502368



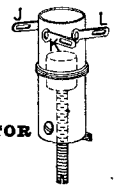
BC. ANTENNA COUPLING COIL 502112



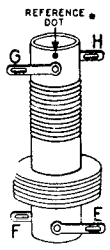
S.W. OSCILLATOR COIL 502111



S.W. ANTENNA COIL 502110



BC. OSCILLATOR COIL 502114



R.F. COIL 502113

STEWART WARNER CORP

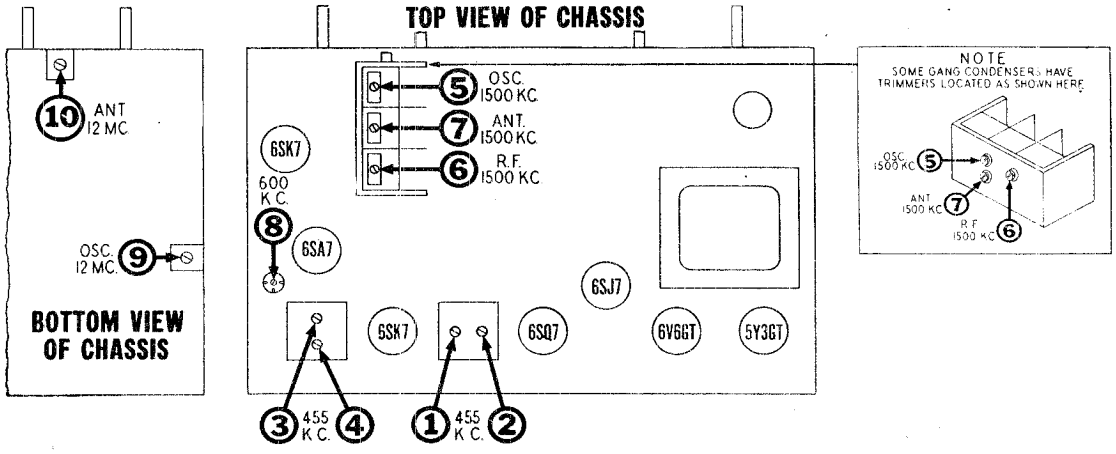
MODELS 72CR16, 72CR26

ALIGNMENT PROCEDURE

1. Remove chassis and loop antenna from cabinet (do not remove loop of wire stapled to cabinet). Wind one turn of insulated wire around frame of antenna so as to provide a means of coupling it to the signal generator. Stand chassis on one end and space it approximately same distance from loop as when installed in cabinet. Connect plug on loop antenna cable to socket at rear of chassis. Brown lead in antenna cable (which was connected to loop of wire stapled to cabinet) should now be connected to one end of new coupling turn on frame of loop.
2. Connect the ground lead of the signal generator to the receiver chassis.
3. With the gang condenser fully meshed, dial pointer should be in the position indicated by the last division below 55 on the dial. If it is set incorrectly, release pointer clip on dial cord and reposition pointer.
4. Connect output meter across speaker voice coil or from plate of 6V6GT to chassis through a .1 Mfd. condenser.
5. Set volume control at maximum volume position and use a weak signal from the signal generator.
6. Push in the manual button and leave it in that position throughout the alignment procedure.

IMPORTANT:—Align this receiver in exactly the order shown below. Broadcast band must be aligned before short wave band.

DUMMY ANT. IN SERIES WITH SIGNAL GENERATOR	CONNECT HIGH SIDE OF SIGNAL GENERATOR TO	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POSITION	RECEIVER DIAL SETTING	TRIMMER NUMBER	TRIMMER DESCRIPTION	TYPE OF ADJUSTMENT
.1 MFD. Condenser	Trimmer on rear section of gang	455 KC	Broadcast (counter-clockwise)	Any point where it does not affect the signal.	1-2	2nd I.F.	Adjust for maximum output. Then repeat adjustment.
					3-4	1st I.F.	
500 MMFD. Mica Condenser	Coupling turn on Loop Frame	1500 KC	Broadcast (counter-clockwise)	1500 KC	5	Broadcast Oscillator (Shunt)	Adjust for maximum output.
500 MMFD. Mica Condenser	Coupling turn on Loop Frame	1500 KC	Broadcast (counter-clockwise)	Tune to 1500 Kc. generator signal.	6	Broadcast R.F.	Adjust for maximum output.
500 MMFD. Mica Condenser	Coupling turn on Loop Frame	1500 KC	Broadcast (counter-clockwise)	Tune to 1500 Kc. generator signal.	7	Broadcast Antenna	Adjust for maximum output.
500 MMFD. Mica Condenser	Coupling turn on Loop Frame	600 KC	Broadcast (counter-clockwise)	Tune to 600 Kc. generator signal.	8	Adjustable core of Broadcast Oscillator Coil	Adjust for maximum output. Try to increase output by rotating core in and out and retuning receiver dial until maximum output is obtained.
500 MFD. Mica Condenser	Coupling turn on Loop Frame	Repeat adjustment of trimmers 5, 6 and 7 at 1500 Kc. Then re-check adjustment of trimmer 8 at 600 Kc.					
400 OHM Carbon Resistor	Coupling turn on Loop Frame	12 MC	Short wave (Clockwise)	12 MC	9	S.W. Oscillator	Adjust for maximum output. Check to see if proper peak was obtained by tuning in image at approx. 11.1 MC. If image does not appear, realign at 12 MC, with trimmer screw farther out. Recheck image.
400 OHM Carbon Resistor	Coupling turn on Loop Frame	12 MC	Short wave (Clockwise)	Tune to 12 MC. generator signal.	10	S.W. Antenna	Adjust for maximum output. Try to increase output by detuning trimmer and retuning receiver dial until maximum output is obtained.



AUDIO OSCILLATION

The audio system of this receiver utilizes a two stage type of inverse feed-back arrangement and should it ever be necessary to replace the speaker or output transformer it is important to maintain a definite phase relationship in the feed-back circuit. If the connections to the output transformer are reversed or if the feed-back connection is made to the wrong side of the output transformer secondary, the system will become regenerative instead of degenerative. Under those conditions audio oscillation may result. If that occurs, oscillation may be prevented by reversing the connections to the primary of the output transformer.

©John F. Rider

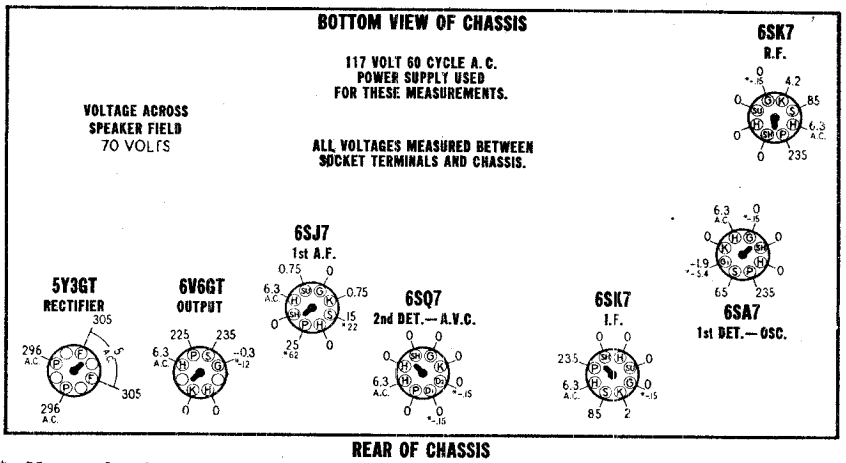
MODELS 72CR16, 72CR26

STEWART WARNER CORP.

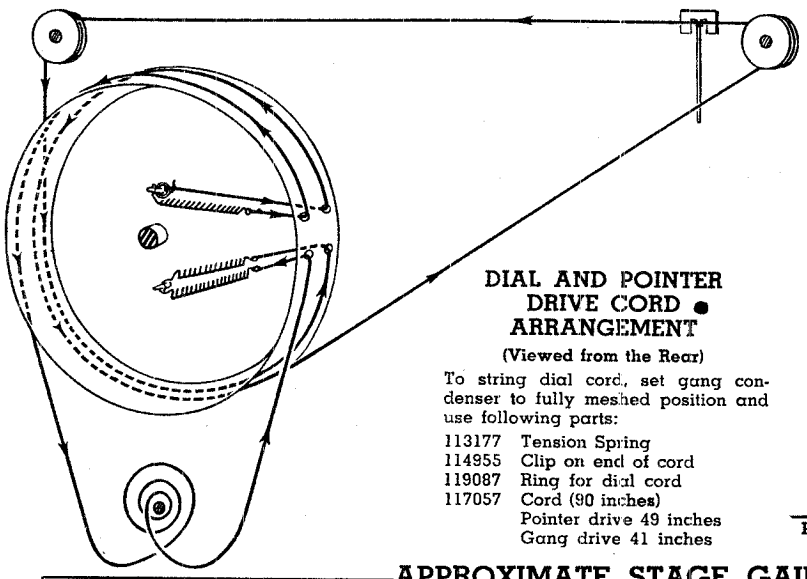
Measured with voltmeter having sensitivity of 1000 ohms per volt except where indicated by (*).

RANGE SWITCH IN BROADCAST POSITION
VOLUME ON FULL WITH NO SIGNAL
RADIO-PHONO-TONE SWITCH IN "RADIO-SPEECH" POSITION

DIAL TUNED TO 540 KC.
MANUAL BUTTON PUSHED IN


BOTTOM VIEW OF CHASSIS
117 VOLT 60 CYCLE A.C. POWER SUPPLY USED FOR THESE MEASUREMENTS.
VOLTAGE ACROSS SPEAKER FIELD 70 VOLTS
ALL VOLTAGES MEASURED BETWEEN SOCKET TERMINALS AND CHASSIS.
6SK7 R.F.
6SJ7 1st A.F.
5Y3GT RECTIFIER
6V6GT OUTPUT
6SQ7 2nd DET.—A.V.C.
6SK7 I.F.
6SA7 1st DET.—OSC.
REAR OF CHASSIS

*—Measured with vacuum tube voltmeter.
NOTE:—The 6V6GT grid bias of —12 volts can be measured across resistor No. 72.

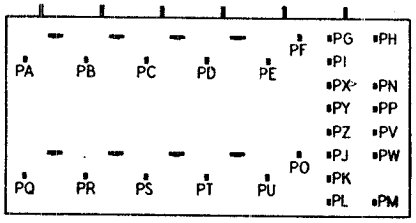


DIAL AND POINTER DRIVE CORD ARRANGEMENT

(Viewed from the Rear)

To string dial cord, set gang condenser to fully meshed position and use following parts:

113177 Tension Spring
114955 Clip on end of cord
119087 Ring for dial cord
117057 Cord (90 inches)
Pointer drive 49 inches
Gang drive 41 inches



PUSH-BUTTON SWITCH
502369

MISCELLANEOUS PARTS

119993	Background for dial	$0.22
116467	Base for mtg. electrolytic condenser	.04
117315	Call letter tabs for push-button	.55
119989	Clamp for dial glass	.10
112745	Clip—coil mtg.	.01
114955	Clip—retainer on end of dial cord	.01
501151	Clip—for mtg. push button coils	.08
117057	Cord—dial drive (90" required) per ft.	.05
502227	Dial scale—glass	1.50
113402	Drum—for dial drive	.70
502428	Escutcheon for push-button (Model 72CR16)	1.00
502429	Escutcheon for push-button (Model 72CR26)	1.00
501449	Knob—volume or tuning (Model 72CR16)	.15
501458	Knob—tone or band switch (Model 72CR16)	.16
501498	Knob—volume or tuning (Model 72CR26)	.20
501499	Knob—tone or band switch (Model 72CR26)	.18
502460	Needle—phonograph	1.50
500966	Plug—phonograph pick-up cable	.10
501031	Plug—phonograph motor cable	.15
502281	Plug—loop antenna cable	.36
504097	Plug—speaker	.25
502496	Pointer	.16
501495	Push-Button (Model 72CR16)	.15
502452	Push-Button (Model 72CR26)	.15
81145	Retaining ring for tuning shaft	.01
119087	Ring for dial cord	.01
113463	Rubber pad—chassis mtg.	.03
116584	Rubber spacer for mtg. dial scale	.02
112874	Screw—No. 10 x 1½"; for mtg. chassis	.03
114914	Screw—No. 2 x ⅜", for mtg. escutcheon	.02
502399	Shaft—tuning control	.15
114876	Socket—octal base (rectifier)	.15
119791	Socket—octal base	.12
118617	Socket—dial lamp	.15
160039	Socket—phonograph plug	.08
500051	Socket—loop antenna plug	.15
501182	Socket—phonograph motor cable	.45
502210	Socket—speaker	.25
113177	Spring—dial cord tension	.09
111456	Washer—spring washer for tuning shaft	.005
500487	Washer—felt for knobs	.01

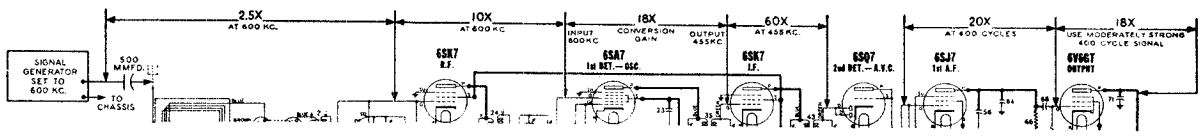
PRICES SUBJECT TO CHANGE WITHOUT NOTICE

APPROXIMATE STAGE GAIN DATA

Be sure R.F. and I.F. stages are accurately aligned before measuring gain. R.F. gains can be measured with a "channel" type instrument containing a tuned and calibrated R.F. amplifier. A vacuum tube voltmeter may be used for audio gain measurements. Observe following precautions:

1. For all gain measurements connect signal generator as shown. Use 600 KC. signal with 400 cycle modulation (use nearby frequency if local station interferes.)
2. For R.F. and I.F. measurements connect negative terminal of a 3 volt battery (two 1½ volt cells in series) to A.V.C. lead at terminal "D" of antenna coil; then connect positive battery lead to chassis. This provides a definite operating point.
   IMPORTANT: Disconnect battery when measuring audio stage gains.
3. Be sure radio is carefully tuned to generator signal (use weak signal for sharp tuning.)
4. When using a "channel" type instrument carefully tune it for maximum output at desired frequency before making measurements.

The R.F. and I.F. stage gains shown below are less than under normal operating conditions due to the use of 3 volts fixed bias in order to establish a definite operating point. Therefore, these values are not intended to indicate the full capability of a stage.



Differences in tube characteristics, tolerance of parts, adjustment of tuned circuits, and variations of line voltage will influence stage gain. Accuracy of measurements is dependent upon careful tuning of receiver to generator signal and experience in using your test equipment. These factors may create considerable variation in gain measurements.

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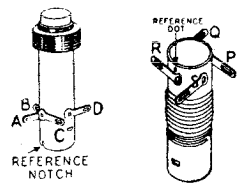
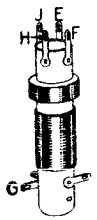
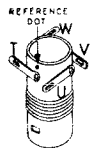


BC. ANTENNA COUPLING COIL 502121

S.W. ANTENNA COIL 502740

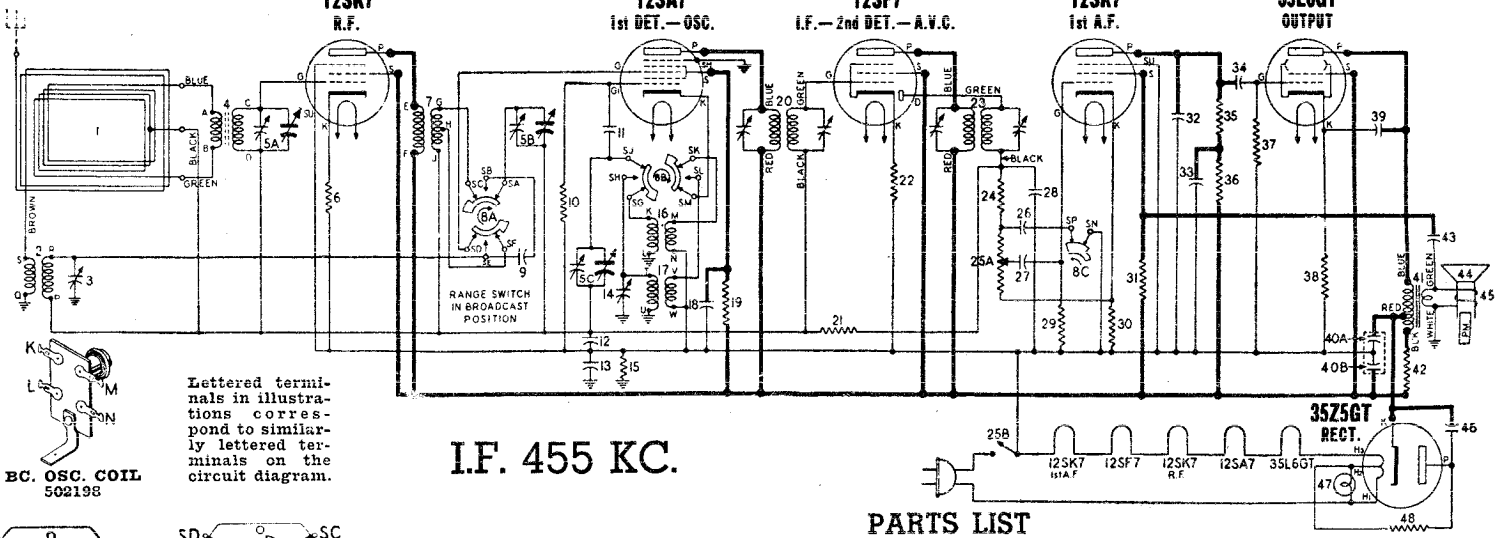


R.F. COIL 502142



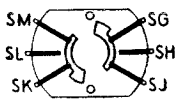
S.W. OSC. COIL 502197

BC. OSC. COIL 502198

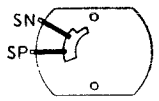


Lettered terminals in illustrations correspond to similarly lettered terminals on the circuit diagram.

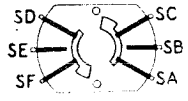
I.F. 455 KC.



FRONT DECK FRONT VIEW



FRONT DECK REAR VIEW



REAR DECK FRONT VIEW

RANGE AND TONE SWITCH 502199

SOCKET VOLTAGES

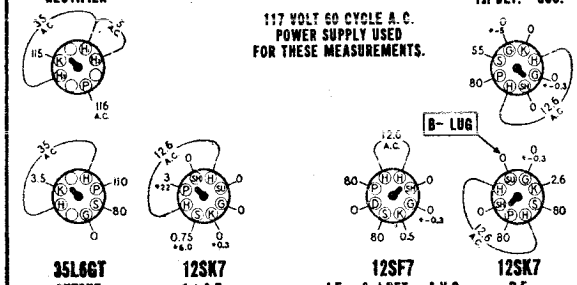
Measured with voltmeter having sensitivity of 1000 ohms per volt except where indicated by (*).

VOLUME ON FULL WITH NO SIGNAL — DIAL TUNED TO 540 KC.

BOTTOM VIEW OF CHASSIS

HEATER VOLTAGES MEASURED ACROSS SOCKET TERMINALS. ALL OTHER VOLTAGES MEASURED BETWEEN SOCKET TERMINALS AND B- LUG.

117 VOLT 60 CYCLE A.C. POWER SUPPLY USED FOR THESE MEASUREMENTS.



REAR OF CHASSIS

*—Measured with vacuum tube voltmeter

PARTS LIST

DIAGRAM NO.	PART NO.	DESCRIPTION	LIST PRICE
		CONDENSERS	
3	502172	Condenser trimmer; 25 to 100 Mmfd.	$0.36
5A-5B-5C	502123	Condenser—variable gang (with drum)	4.60
9	502162	Condenser—315 Mmfd. 500 volt	.45
11	502159	Condenser—mica—50 Mmfd. 500 volt	.24
12	502155	Condenser—.1 Mfd. 200 volt	.30
13	502158	Condenser—.2 Mfd. 400 volt	.36
14	502172	Condenser—trimmer; 25 to 100 Mmfd.	.36
18	502262	Condenser—.25 Mfd. 200 volt	.36
26	502470	Condenser—.0008 Mfd. 400 volt	.20
27	502453	Condenser—.002 Mfd. 400 volt	.20
28	502160	Condenser—mica—110 Mmfd. 500 volt	.24
32	502160	Condenser—mica—110 Mmfd. 500 volt	.24
33	502153	Condenser—.05 Mfd. 200 volt	.24
34	502156	Condenser—.004 Mfd. 400 volt	.20
39	502151	Condenser—.01 Mfd. 400 volt	.20
40A-40B	500256	Condenser—electrolytic A-40 Mfd. 150 volt / B-20 Mfd. 150 volt	1.50
43	502152	Condenser—.02 Mfd. 400 volt	.24
46	502157	Condenser—.05 Mfd. 400 volt	.24
		RESISTORS	
6	502140	Resistor—carbon 390 ohms ¼ watt	.12
10	502130	Resistor—carbon 22,000 ohms ¼ watt	.12
15	502133	Resistor—carbon 220,000 ohms ¼ watt	.12
19	502291	Resistor—carbon 4700 ohms ¼ watt	.12
21	502269	Resistor—carbon 3.3 Meg. ¼ watt	.12
22	502264	Resistor—carbon 47 ohms ¼ watt	.12
24	502131	Resistor—carbon 47,000 ohms ¼ watt	.12
25A-25B	502145	Volume control 500,000 ohms (with switch)	1.25
29	502136	Resistor—carbon 10 Meg. ¼ watt	.12
30	502128	Resistor—carbon 2200 ohms ¼ watt	.12
31	502135	Resistor—carbon 2.2 Meg. ¼ watt	.12
35-36	502133	Resistor—carbon 220,000 ohms ¼ watt	.12
37	502134	Resistor—carbon 470,000 ohms ¼ watt	.12
38	502138	Resistor—carbon 130 ohms ¼ watt	.12
42	502469	Resistor—carbon 1500 ohms 1 watt	.16
48	502574	Resistor—carbon 33 ohms ½ watt	.12
		COILS & TRANSFORMERS	
1	502196	Loop antenna	3.95
2	502740	Coil—S. W. antenna	1.12
4	502121	Coil—antenna coupling	$1.64
7	502142	Coil—BC. R.F.	2.26
16	502198	Coil—BC. oscillator	1.32
17	502197	Coil—S.W. oscillator	1.12
20	502102	Transformer—1st I.F.	2.30
23	502103	Transformer—2nd I.F.	2.30
41	500617 / 502906	Transformer—output for R-500616 spkr. / Transformer—output for A-500616 spkr.	2.50 / 2.50
		OTHER ELECTRICAL PARTS	
8A-8B-8C	502199	Switch-tone & range	2.00
44	500587 / 502905	Cone and voice coil for R-500616 spkr. / Cone and voice coil for A-500616 spkr.	2.00 / 2.00
45	500616	Speaker—P.M. dynamic (5 inch)	8.40
47	502473	Lamp-dial (Mazda 47) 6-8V. 150 Ma.	.22
		MISCELLANEOUS PARTS	
	116467	Base for mtg. electrolytic condenser	.04
	502431	Back for cabinet	.60
	501732	Clamp—dial scale mtg.	.05
	112745	Clip—coil mtg.	.01
	114955	Clip—retainer on end of dial cord	.01
	116563	Connector—for antenna leads	.01
	117057	Cord—dial drive (57 in. required)	.05 per ft.
	500324	Cover—cardboard, for elect. cond.	.04
	502221	Dial scale—glass	1.00
	502700	Grille—metal; for cabinet	3.40
	501186	Grounding plate (under I.F. trans. can)	.10
	501778	Knob—volume or tuning	.12
	501779	Knob—tone & band switch	.14
	502367	Pointer	.16
	81145	Retaining ring for tuning shaft	.01
	14771	Screw—No. 6x⅜; holds frame to cab.	.02
	83047	Screw—No. 8x⅞; chassis mtg.	.02
	500734	Screw—No. 4x5/16; holds clamps to cab.	.02
	501777	Screw—No. 4x½; for mtg. loop & back	.02
	502173	Shaft—tuning control	.15
	116690	Socket—octal base	.12
	160392	Socket—octal (rectifier)	.16
	500499	Socket—dial lamp (with leads)	.44
	161384	Spring—dial cord tension	.06
	111456	Washer—spring washer for tuning shaft	.005
	500487	Washer—felt; for knobs	.01

PRICES SUBJECT TO CHANGE WITHOUT NOTICE

For Clarified schematics, see P.15-47

MODEL 9000-B

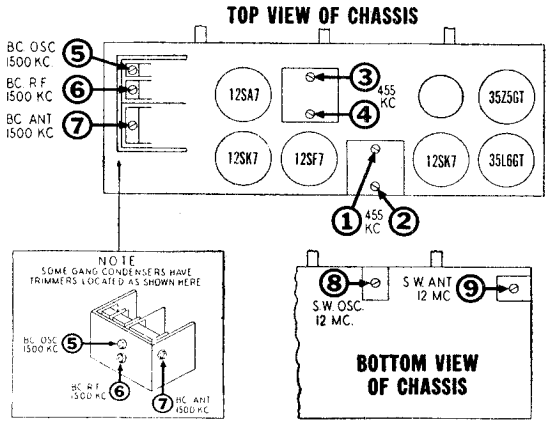
STEWART WARNER CORP.

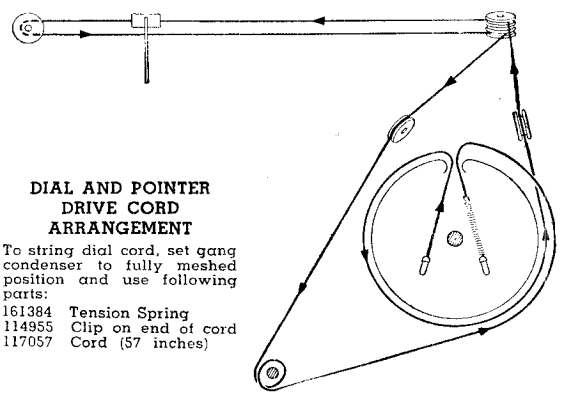
ALIGNMENT PROCEDURE

1. Remove chassis and loop antenna from cabinet (do not remove loop of wire stapled to cabinet). After chassis has been removed, replace loop antenna in cabinet. Stand the chassis on one end and space it approximately same distance from loop as when installed in cabinet. Then reconnect all leads to loop antenna and to loop of wire stapled on cabinet.
2. Note that there are four calibrating lines stamped into the metal dial frame. When gang condenser is fully meshed, dial pointer should be in the position indicated by first line at the left. If it is set incorrectly, release pointer clip on dial cord and reposition pointer.
3. Connect an output meter across the speaker voice coil or from plate of 35L6GT tube to B— through a .1 Mfd. condenser (see voltage chart for convenient B— connection).
4. Connect ground lead from signal generator to B— through a .25 Mfd. condenser.
5. Set volume control at maximum volume position and use a weak signal from the signal generator.

IMPORTANT:—Align this receiver in exactly the order shown below. Broadcast band must be aligned before short wave band.

DUMMY ANT. IN SERIES WITH SIGNAL GENERATOR	CONNECT HIGH SIDE OF GENERATOR TO	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POSITION	RECEIVER DIAL SETTING	TRIMMER NUMBER	TRIMMER DESCRIPTION	TYPE OF ADJUSTMENT
200 MMFD. Mica Condenser	Control Grid of 12SA7	455 KC	Broadcast	Any point where it does not affect the signal	1-2	2nd I.F.	Adjust for maximum output. Then repeat adjustment.
					3-4	1st I.F.	
200 MMFD. Mica Condenser	External Antenna Clip on Loop Frame	1500 KC	Broadcast	Set pointer to 1500 KC reference line stamped into metal dial plate (first line at the right)	5	Broadcast Oscillator (Shunt)	Adjust for maximum output.
200 MMFD. Mica Condenser	External Antenna Clip on Loop Frame	1500 KC	Broadcast	Tune to 1500 KC generator signal	6	Broadcast R.F.	Adjust for maximum output.
200 MMFD. Mica Condenser	External Antenna Clip on Loop Frame	1500 KC	Broadcast	Tune to 1500 KC generator signal	7	Broadcast Antenna	Adjust for maximum output.
400 OHM Resistor	External Antenna Clip on Loop Frame	12 MC	Short Wave	Set pointer to 12 MC. Reference line stamped into metal dial plate (second line from the right)	8	Short Wave Oscillator	Adjust to bring in signal. Check to see if proper peak was obtained by tuning in image at approx. 11.1 MC. If image does not appear, realign at 12 MC. with trimmer screw farther out. Recheck image.
400 OHM Resistor	External Antenna Clip on Loop Frame	12 MC	Short Wave	Tune to 12 MC generator signal	9	Short Wave Antenna	Adjust for maximum output. Try to increase output by detuning trimmer and retuning receiver dial until maximum output is obtained.





DIAL AND POINTER DRIVE CORD ARRANGEMENT

To string dial cord, set gang condenser to fully meshed position and use following parts:

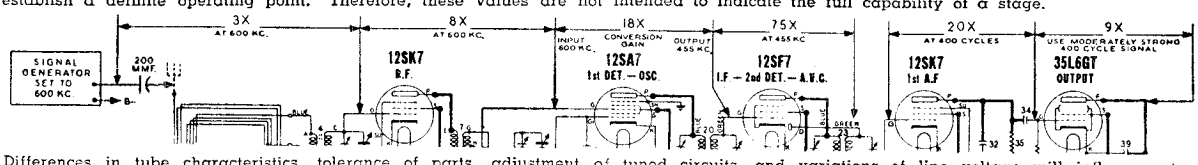
161384 Tension Spring
114955 Clip on end of cord
117057 Cord (57 inches)

APPROXIMATE STAGE GAIN DATA

Be sure R.F. and I.F. stages are accurately aligned before measuring gain. R.F. gains can be measured with a "channel" type instrument containing a tuned and calibrated R.F. amplifier. A vacuum tube voltmeter may be used for audio gain measurements. Observe following precautions:

1. For all gain measurements connect signal generator as shown. Use 600 KC. signal with 400 cycle modulation (use nearby frequency if local station interferes.)
2. For R.F. and I.F. measurements connect negative terminal of a 3 volt battery (two 1½ volt cells in series) to A.V.C. lead and positive terminal to B—. This provides a definite operating point. IMPORTANT: Disconnect battery when measuring audio stage gains.
3. Be sure radio is carefully tuned to generator signal (use weak signal for sharp tuning.)
4. When using a "channel" type instrument carefully tune it for maximum output at desired frequency before making measurements.

The R.F. and I.F. stage gains shown below are less than under normal operating conditions due to the use of 3 volts fixed bias in order to establish a definite operating point. Therefore, these values are not intended to indicate the full capability of a stage.


3X AT 600 KC.
8X AT 600 KC.
18X CONVERSION GAIN
75X AT 455 KC
20X AT 400 CYCLES
9X USE MODERATELY STRONG 400 CYCLE SIGNAL
SIGNAL GENERATOR SET TO 600 KC
200 MMF.
12SK7 R.F.
12SA7 1st DET. — OSC.
12SF7 I.F. — 2nd DET. — A.V.C.
12SK7 1st A.F.
35L6GT OUTPUT

Differences in tube characteristics, tolerance of parts, adjustment of tuned circuits, and variations of line voltage will influence stage gain. Accuracy of measurements is dependent upon careful tuning of receiver to generator signal and experience in using your test equipment. These factors may create considerable variation in gain measurements.

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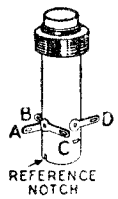
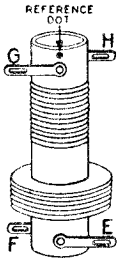
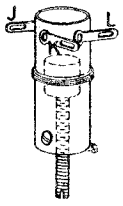


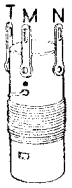
BC. ANTENNA COUPLING COIL 502112



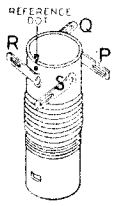
R.F. COIL 502113



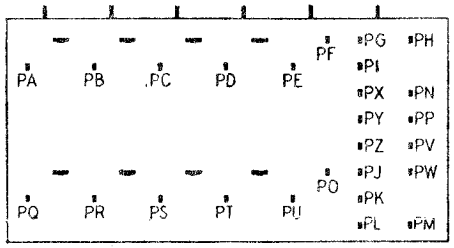
BC. OSCILLATOR COIL 502114



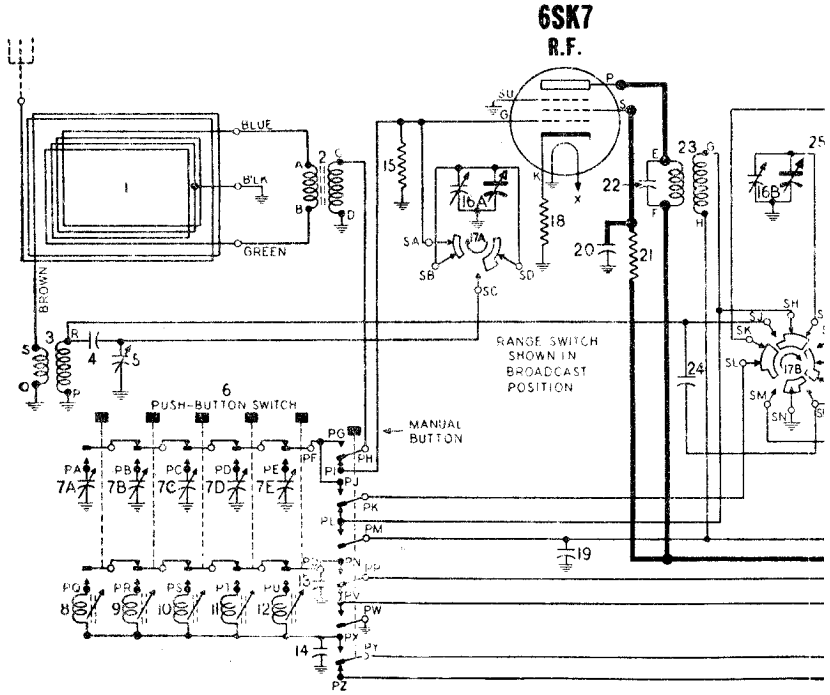
S.W. OSCILLATOR COIL 502111



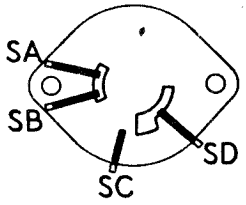
S.W. ANTENNA COIL 502110



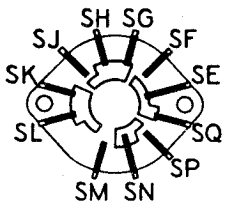
PUSH-BUTTON SWITCH 502177



Lettered terminals in illustrations correspond to similarly lettered terminals on the circuit diagram.



FRONT SECTION REAR VIEW



REAR SECTION REAR VIEW

BAND SWITCH 502147

SOCKET VOLTAGES

Measured with voltmeter having sensitivity of 1000 ohms per volt except where indicated by (*).

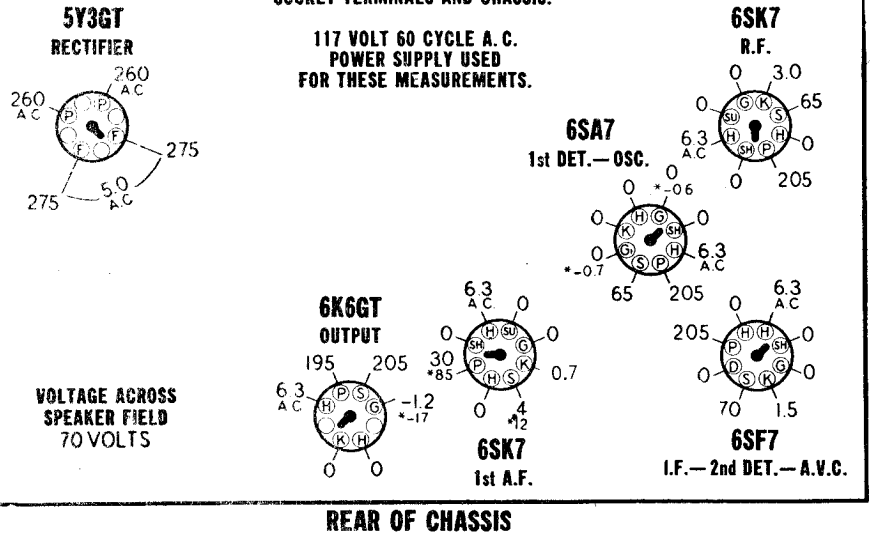
VOLUME ON FULL WITH NO SIGNAL
BAND SWITCH IN BROADCAST POSITION

DIAL TUNED TO 540 KC.
MANUAL BUTTON PUSHED IN

BOTTOM VIEW OF CHASSIS

ALL VOLTAGES MEASURED BETWEEN SOCKET TERMINALS AND CHASSIS.

117 VOLT 60 CYCLE A. C. POWER SUPPLY USED FOR THESE MEASUREMENTS.



VOLTAGE ACROSS SPEAKER FIELD 70 VOLTS

REAR OF CHASSIS

*—Measured with vacuum tube voltmeter.

NOTE:—The 6K6GT grid bias of —17 volts can be measured across resistor No. 67.

DIAGRAM NO.	PART NO.	DESCRIPTION
		CONDENSERS
4	502202	Condenser—ceramic 150 Mmfd. 500
5	502172	Condenser—trimmer; 25 to 100 Mm
7A to E.	502910	Condenser—trimmer assem. for P-B
13	502161	Condenser—mica 270 Mmfd. 500 v
14	502165	Condenser—mica 1,000 Mmfd. 500
16A, B, C.	502122	Condenser—variable gang
19	502155	Condenser—.1 Mfd. 200 volt
20	502157	Condenser—.05 Mfd. 400 volt
22	502295	Condenser—ceramic 10 Mmfd. 500
24	502411	Condenser—2 Mmfd. 500 volt
25	502159	Condenser—mica 50 Mmfd. 500 volt
28	502201	Condenser—ceramic 130 Mmfd. 500
29	502182	Condenser—ceramic 39 Mmfd. 500
30	502171	Condenser—trimmer; 5 to 35 Mmf
32	502151	Condenser—.01 Mfd. 400 volt
37	502157	Condenser—.05 Mfd. 400 volt
41	502271	Condenser—mica 260 Mmfd. 500 v
43	502150	Condenser—.004 Mfd. 600 volt
44	502157	Condenser—.05 Mfd. 400 volt
48	502160	Condenser—mica 110 Mmfd. 500 v
49	502152	Condenser—.02 Mfd. 400 volt
51	502410	Condenser—.1 Mfd. 400 volt
54	502405	Condenser—.25 Mfd. 400 volt
58	502150	Condenser—.004 Mfd. 600 volt
59	502154	Condenser—.05 Mfd. 600 volt
66A, B, C.	502207	Condenser—electrolytic A—20 Mfd. 400 volt B—10 Mfd. 400 volt C—20 Mfd. 25 volt
		RESISTORS
15	502468	Resistor—carbon 4.7 Meg. ¼ watt
18	502127	Resistor—carbon 560 ohms ¼ watt
21	502132	Resistor—carbon 100,000 ohms ¼
26	502130	Resistor—carbon 22,000 ohms ¼ v
33	502466	Resistor—carbon 33,000 ohms 1 w
35	502135	Resistor—carbon 2.2 Meg. ¼ watt
36	502264	Resistor—carbon 47 ohms ¼ watt
38	502467	Resistor—carbon 68,000 ohms ½
40	502131	Resistor—carbon 47,000 ohms ¼ v

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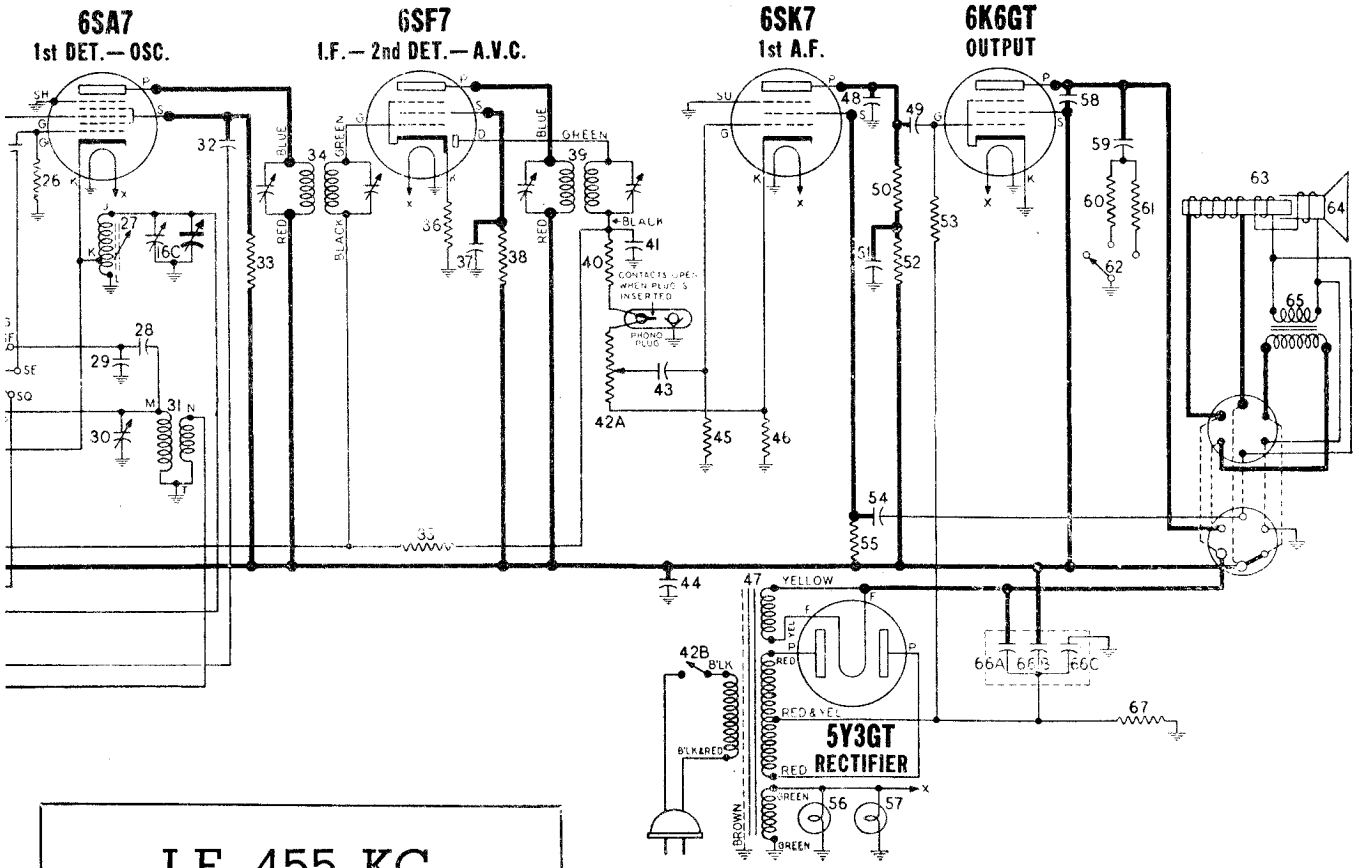
MODELS 9001-C, 9001-D, 9001-E, 9001-F



I.F. 455 KC.

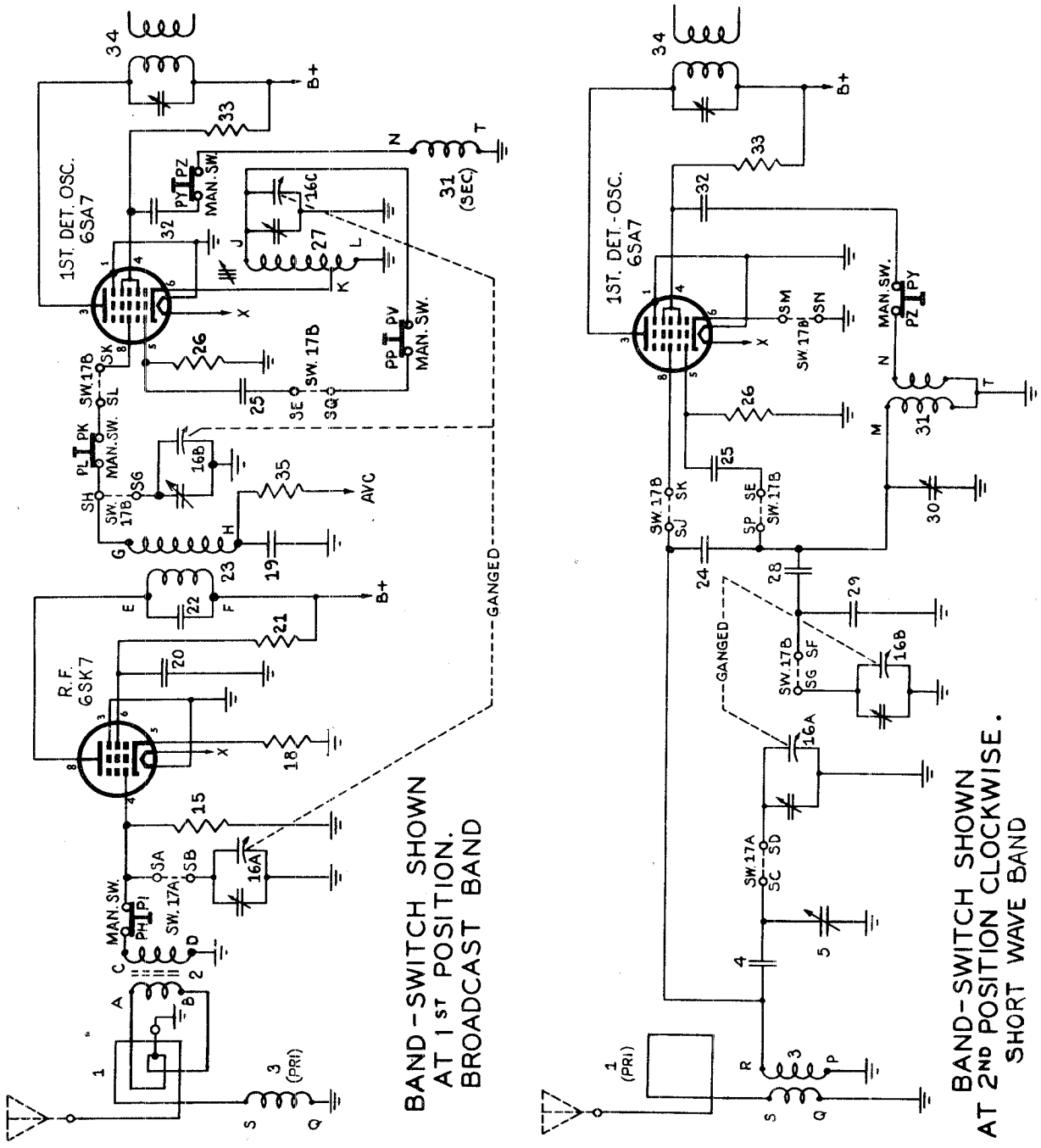
PARTS LIST

LIST PRICE	DIA-GRAM NO.	PART NO.	DESCRIPTION	LIST PRICE
	42A, B	502148	Volume control 500,000 ohms (with switch)	$
	45	502468	Resistor—carbon 4.7 Meg. ¼ watt	
	46	502128	Resistor—carbon 2200 ohms ¼ watt	
	50	502133	Resistor—carbon 220,000 ohms ¼ watt	
	52	502132	Resistor—carbon 100,000 ohms ¼ watt	
	53	502134	Resistor—carbon 470,000 ohms ¼ watt	
	55	502135	Resistor—carbon 2.2 Meg. ¼ watt	
	60	502291	Resistor—carbon 4700 ohms ¼ watt	
	61	502127	Resistor—carbon 560 ohms ¼ watt	
	67	502137	Resistor—wire wound 330 ohms 2 watt	
			COILS & TRANSFORMERS	
	1	502247	Loop antenna (Model 9001-C)	
		502436	Loop antenna (Models 9001-D, E, F)	
	2	502112	Coil—B.C. antenna	
	3	502110	Coil—S.W. antenna	
		502025	Complete coil and trimmer assembly for push-button tuner	
	8	502907	Coil less slug (540-1000 Kc.)	
	9, 10	502908	Coil less slug (650-1300 Kc.)	
	11, 12	502909	Coil less slug (975-1600 Kc.)	
		502911	Tuning slug for coils, 502907, 502908, 502909	
		501151	Clip—for mtg. push-button coils	
	23	502113	Coil—B.C. R.F.	
	27	502114	Coil—B.C. oscillator	
	31	502111	Coil—S.W. oscillator	
	34	502102	Transformer—1st I.F.	
	39	502103	Transformer—2nd I.F.	
	47	502174	Transformer—power	
	65	502170	Transformer—output for R-502168 spkr.	
		504061	Transformer—output for M-502168 spkr.	
			OTHER ELECTRICAL PARTS	
	6	502177	Switch—push-button	
	17A, B	502147	Switch—band	
	56, 57	110629	Lamp—(Mazda No. 44) 6.3 V. 0.25 Amps.	
	62	502146	Switch—tone control	
	63	502168	Speaker—Electro-Dynamic (6 inch); field resistance 1000 ohms	
	64	502169	Cone & voice coil for R-502168 spkr.	
		504062	Cone & voice coil for M-502168 spkr.	

PART NO.	DESCRIPTION	LIST PRICE
	MISCELLANEOUS PARTS	
116467	Base for mtg. Electrolytic Condenser	$
502437	Back for cabinet (Model 9001-D)	
502438	Back for cabinet (Model 9001-E)	
502439	Back for cabinet (Model 9001-F)	
502471	Back for cabinet (Model 9001-C)	
119694	Background for dial	
119559	Clamp—for dial glass	
112745	Clip—coil mtg.	
114955	Clip—retainer on end of dial cord	
501151	Clip—for mtg. push-button coils	
116563	Connector—for antenna lead	
117057	Cord—dial (61 in. required)	
502219	Dial scale—glass	
117029	Drum—for dial drive	
502550	Escutcheon (Model 9001-C)	
502819	Escutcheon (Models 9001-D, E, F)	
501449	Knob—volume or tuning (Model 9001-C)	
501458	Knob—tone or band switch (Model 9001-C)	
501498	Knob—volume or tuning (9001-D, E, F)	
501499	Knob—tone or band switch (9001-D, E, F)	
504097	Plug for speaker	
502601	Pointer	
501497	Push button (Model 9001-C)	
501651	Push button (Models 9001-D, E, F)	
81145	Retaining ring for tuning shaft	
119087	Ring for dial cord	
116584	Rubber spacer for mtg. dial scale	
85832	Screw—No. 8-32 for dial drum	
83552	Screw—No. 10x⅞"; for mtg. chassis	
114914	Screw—No. 2x¾"; for mtg. escutcheon	
501777	Screw—No. 4x1½"; for mtg. loop & back	
118606	Shaft—tuning control	
112818	Socket—dial lamp with lead	
116690	Socket—octal base	
160392	Socket—octal (rectifier)	
502210	Socket for speaker	
113177	Spring—dial cord tension	
119911	Terminal strip-phono.	
111456	Washer—spring washer for tuning shaft	
500487	Washer—felt; for knobs	

STEWART WARNER CORP.

MODELS 9001-C, 9001-D, 9001-E, 9001-F



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MODELS 9001-C, 9001-D, 9001-E, 9001-F

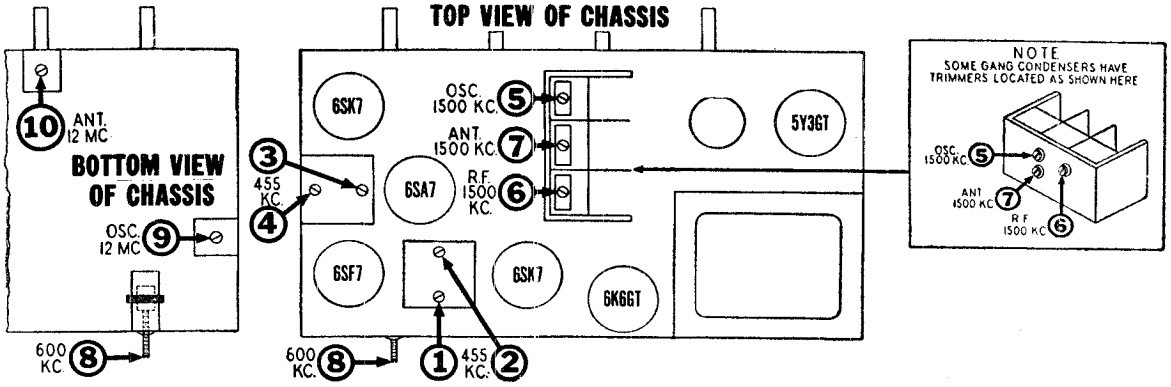
STEWART WARNER CORP.

ALIGNMENT PROCEDURE

1. Remove chassis and loop antenna from cabinet (do not remove loop of wire stapled to cabinet). After chassis has been removed, replace loop antenna in cabinet. Stand the chassis on one end and space it approximately same distance from loop as when installed in cabinet. Then reconnect all leads to loop antenna and to loop of wire stapled on cabinet.
2. With the gang condenser fully meshed, dial pointer should be in the position indicated by the last division below 55 on the dial. If it is set incorrectly, release pointer clip on dial cord and reposition pointer.
3. Connect output meter across speaker voice coil or from plate to chassis through a .1 Mfd. condenser.
4. Connect the ground lead of the signal generator to the receiver chassis.
5. Set volume control at maximum volume position and use a weak signal from the signal generator.
6. Push in the manual button and leave it in that position throughout the alignment procedure.

IMPORTANT:—Align this receiver in exactly the order shown below. Broadcast band must be aligned before short wave band.

DUMMY ANT. IN SERIES WITH SIGNAL GENERATOR	CONNECT HIGH SIDE OF SIGNAL GENERATOR TO	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POSITION	RECEIVER DIAL SETTING	TRIMMER NUMBER	TRIMMER DESCRIPTION	TYPE OF ADJUSTMENT
.1 MFD. Condenser	Trimmer on rear section of gang	455 KC	Broadcast (Clockwise)	Any point where it does not affect the signal.	1-2	2nd I.F.	Adjust for maximum output. Then repeat adjustment.
					3-4	1st I.F.	
500 MMFD. Mica Condenser	External Antenna Clip on Loop Frame	1500 KC	Broadcast (Clockwise)	1500 KC	5	Broadcast Oscillator (Shunt)	Adjust for maximum output.
500 MMFD. Mica Condenser	External Antenna Clip on Loop Frame	1500 KC	Broadcast (Clockwise)	Tune to 1500 Kc. generator signal.	6	Broadcast R.F.	Adjust for maximum output.
500 MMFD. Mica Condenser	External Antenna Clip on Loop Frame	1500 KC	Broadcast (Clockwise)	Tune to 1500 Kc. generator signal.	7	Broadcast Antenna	Adjust for maximum output.
500 MMFD. Mica Condenser	External Antenna Clip on Loop Frame	600 KC	Broadcast (Clockwise)	Tune to 600 Kc. generator signal.	8	Adjustable core of Broadcast Oscillator Coil.	Adjust for maximum output. Try to increase output by rotating core in and out and retuning receiver dial until maximum output is obtained.
500 MFD. Mica Condenser	External Antenna Clip on Loop Frame	Repeat adjustment of trimmers 5, 6 and 7 at 1500 Kc. Then re-check adjustment of trimmer 8 at 600 Kc.					
400 OHM Carbon Resistor	External Antenna Clip on Loop Frame	12 MC	Short wave (Counter-Clockwise)	12 MC	9	S.W. Oscillator	Adjust for maximum output. Check to see if proper peak was obtained by tuning in image at approx. 11.1 MC. If image does not appear, realign at 12 MC, with trimmer screw farther out. Recheck image.
400 OHM Carbon Resistor	External Antenna Clip on Loop Frame	12 MC	Short wave (Counter-Clockwise)	Tune to 12 MC. generator signal.	10	S.W. Antenna	Adjust for maximum output. Try to increase output by detuning trimmer and retuning receiver dial until maximum output is obtained.



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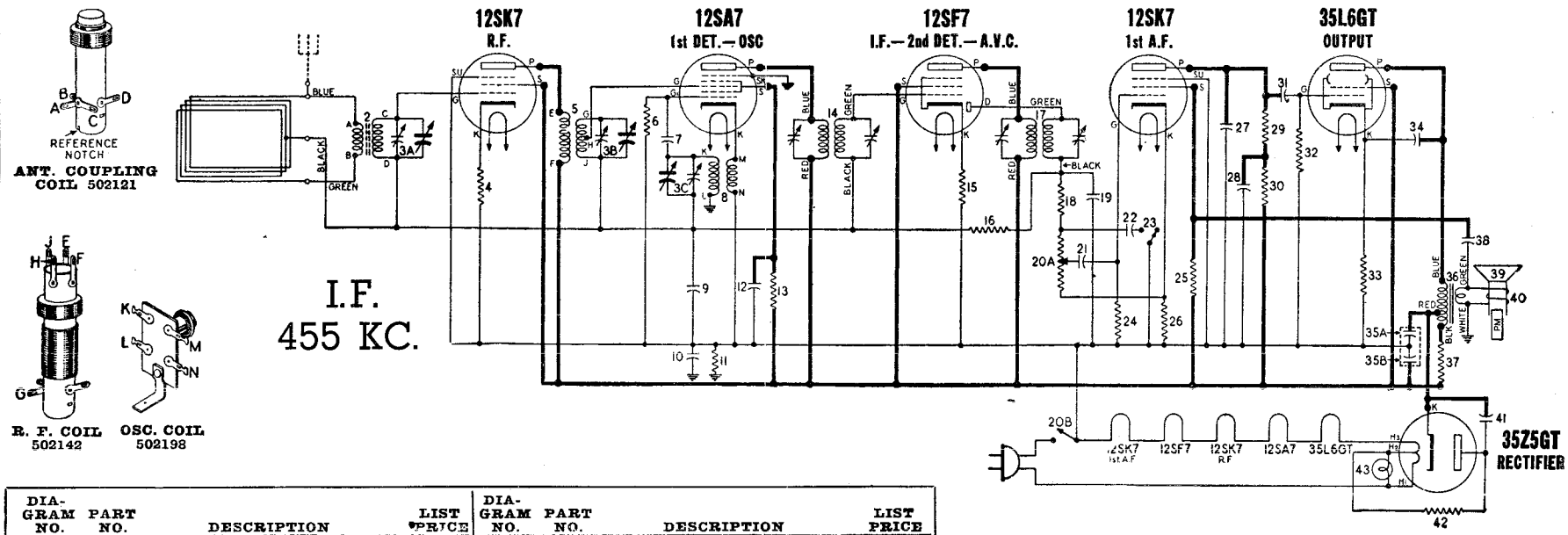


DIA-GRAM NO.	PART NO.	DESCRIPTION	LIST PRICE
		CONDENSERS	
3A-3B-3C	502123	Condenser—variable gang (with drum)	$
7	502159	Condenser—mica—50 Mmfd. 500 Volt	
9	502155	Condenser—.1 Mfd. 200 Volt	
10	502158	Condenser—.2 Mfd. 200 Volt	
12	502262	Condenser—.25 Mfd. 200 Volt	
19	502160	Condenser—mica—110 Mmfd. 500 Volt	
21	502453	Condenser—.002 Mfd. 400 Volt	
22	502470	Condenser—.0008 Mfd. 400 Volt	
27	502160	Condenser—Mica—110 Mmfd. 500 Volt	
28	502153	Condenser—.05 Mfd. 200 Volt	
31	502156	Condenser—.004 Mfd. 400 Volt	
34	502151	Condenser—.01 Mfd. 400 Volt	
35A-35B	500256	Condenser—electrolytic A-40 Mfd. 150 Volt / B-20 Mfd. 150 Volt	
38	502152	Condenser—.02 Mfd. 400 Volt	
41	502157	Condenser—.05 Mfd. 400 Volt	
		RESISTORS	
4	502140	Resistor—carbon 390 Ohms ¼ Watt	
6	502130	Resistor—carbon 22,000 Ohms ¼ Watt	
11	502133	Resistor—carbon 220,000 Ohms ¼ Watt	
13	502291	Resistor—carbon 4700 Ohms, ¼ Watt	
15	502264	Resistor—carbon 47 Ohms ¼ Watt	
16	502269	Resistor—carbon 3.3 Meg. ¼ Watt	
18	502131	Resistor—carbon 47,000 Ohms ¼ Watt	
20A-20B	502145	Volume control 500,000 Ohms (with switch)	
24	502136	Resistor—carbon 10 Meg. ¼ Watt	
25	502135	Resistor—carbon 2.2 Meg. ¼ Watt	
26	502128	Resistor—carbon 2200 Ohms ¼ Watt	
29-30	502133	Resistor—carbon 220,000 Ohms ¼ Watt	
32	502134	Resistor—carbon 470,000 Ohms ¼ Watt	
33	502138	Resistor—carbon 130 Ohms ¼ Watt	
37	502469	Resistor—carbon 1500 Ohms 1 Watt	
42	502574	Resistor—carbon 33 Ohms ½ Watt	
		COILS & TRANSFORMERS	
1	502246	Loop Antenna	
2	502121	Coil—antenna coupling	
5	502142	Coil—R.F.	
8	502198	Coil—oscillator	
14	502102	Transformer 1st I.F.	
17	502103	Transformer 2nd I.F.	
36	502213 / 502904	Transformer—Output for R-502208 spkr. / Transformer—Output for A-502208 spkr.	

DIA-GRAM NO.	PART NO.	DESCRIPTION	LIST PRICE
		OTHER ELECTRICAL PARTS	
23	500546	Switch-tone control	
39	502214 / 502903	Cone & voice coil for R-502208 spkr. / Cone & voice coil for A-502208 spkr.	
40	R-502208	Speaker—P.M. dynamic (5 inch)	
43	118921	Lamp—dial (Mazda 47) 6-8V. 150 Ma.	
		MISCELLANEOUS PARTS	
	17063	Screw—No. 6 x ¼	
	17064	Screw—No. 4 x 7/32	
	114628	Screw—No. 8 x ½ chassis mtg.	
	81145	Retaining ring for tuning shaft	
	111456	Washer—spring washer for tuning shaft	
	112745	Clip—coil mtg.	
	114955	Clip—retainer on end of dial cord	
	500497	Clip—retainer for cabinet back	
	116467	Base for mtg. electrolytic condenser	
	116563	Connector—for antenna leads	
	116690	Socket—octal base	
	160392	Socket—octal (rectifier)	
	500499	Socket—dial lamp (with leads)	
	117057	Cord—dial drive (55" required)	
	161384	Spring—dial cord tension	
	500261	Clamp—dial scale mtg. (Models 9002-A, B)	
	502506	Clamp—dial scale mtg. (Models 9002-P, R)	
	500324	Cover—cardboard, for elect. cond.	
	501186	Grounding plate (under I.F. transformer)	
	502173	Shaft—tuning control	
	502185	Back for cabinet (Models 9002-A, B)	
	502668	Back for cabinet (Models 9002-P, R)	
	502223	Dial scale—glass (Model 9002-A)	
	502224	Dial scale—glass (Model 9002-B)	
	502691	Dial scale—glass (Models 9002-P, R)	
	500384	Cabinet—ivory (Model 9002-B)	
	502244	Cabinet—mahogany (Model 9002-A)	
	502665	Cabinet—ivory (Model 9002-R)	
	502666	Cabinet—mahogany (Model 9002-P)	
	502367	Pointer (Models 9002-A, B)	
	502690	Pointer (Models 9002-P, R)	
	502551	Knob—mahogany (Model 9002-A)	
	502552	Knob—maroon (Model 9002-B)	
	502563	Knob—mahogany (Model 9002-P)	
	502564	Knob—ivory (Model 9002-R)	

SOCKET VOLTAGES

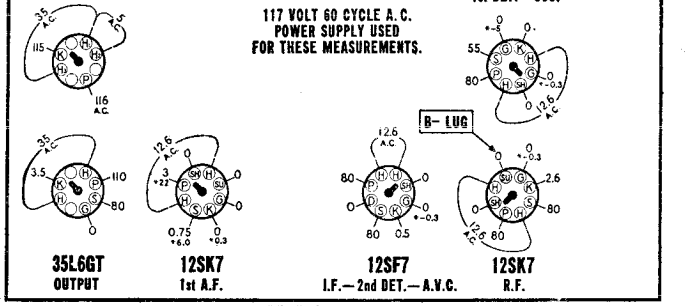
Measured with voltmeter having sensitivity of 1000 ohms per volt except where indicated by (*).

VOLUME ON FULL WITH NO SIGNAL — DIAL TUNED TO 540 KC.

BOTTOM VIEW OF CHASSIS

HEATER VOLTAGES MEASURED ACROSS SOCKET TERMINALS. ALL OTHER VOLTAGES MEASURED BETWEEN SOCKET TERMINALS AND B- LUG.

117 VOLT 60 CYCLE A.C. POWER SUPPLY USED FOR THESE MEASUREMENTS.



REAR OF CHASSIS

*—Measured with vacuum tube voltmeter

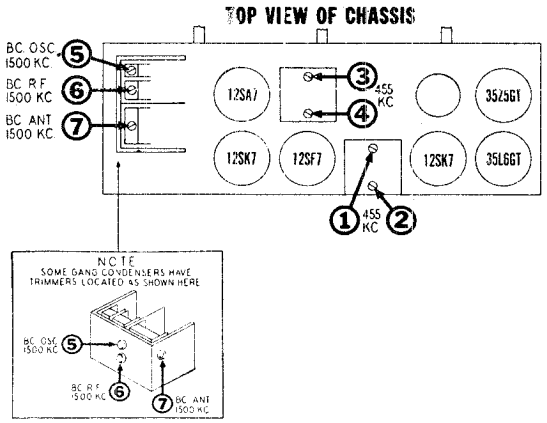
MODELS 9002-A, 9002-B, 9002-P, 9002-R

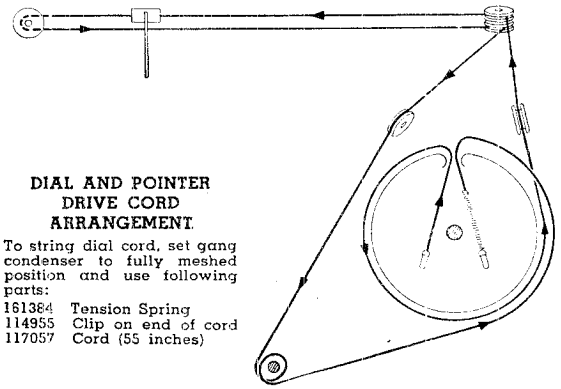
STEWART WARNER CORP.

ALIGNMENT PROCEDURE

1. Remove chassis and loop antenna from cabinet. Reconnect loop to chassis and space it approximately same distance from chassis as when installed in cabinet.
2. Note that there are four calibrating lines stamped into the metal dial frame. When gang condenser is fully meshed, dial pointer should be in the position indicated by first line at the left. If it is set incorrectly, release pointer clip on dial cord and reposition pointer.
3. Connect an output meter across the speaker voice coil or from plate of 35L6GT tube to B— through a .1 Mfd. condenser (see voltage chart for convenient B— connection).
4. Connect ground lead from signal generator to B— through a .25 Mfd. condenser.
5. Set volume control at maximum volume position and use a weak signal from the signal generator.

DUMMY ANT. IN SERIES WITH SIGNAL GENERATOR	CONNECTION OF SIG. GENERATOR OUTPUT TO RECEIVER	SIGNAL GENERATOR FREQUENCY	RECEIVER DIAL SETTING	TRIMMER NUMBER	TRIMMER DESCRIPTION	TYPE OF ADJUSTMENT
200 MMFD. Mica Condenser	Control Grid of 12SA7	455 KC	Any point where it does not affect the signal	1-2	2nd I.F.	Adjust for maximum output. Then repeat adjustment.
				3-4	1st I.F.	
200 MMFD. Mica Condenser	External Antenna Clip on Loop Frame	1500 KC	Set pointer to 1500 KC reference line stamped into metal dial plate (first line at the right)	5	Broadcast Oscillator (Shunt)	Adjust for maximum output.
200 MMFD. Mica Condenser	External Antenna Clip on Loop Frame	1500 KC	Tune to 1500 KC generator signal	6	Broadcast R.F.	Adjust for maximum output.
200 MMFD. Mica Condenser	External Antenna Clip on Loop Frame	1500 KC	Tune to 1500 KC generator signal	7	Broadcast Antenna	Adjust for maximum output.





DIAL AND POINTER DRIVE CORD ARRANGEMENT

To string dial cord, set gang condenser to fully meshed position and use following parts:

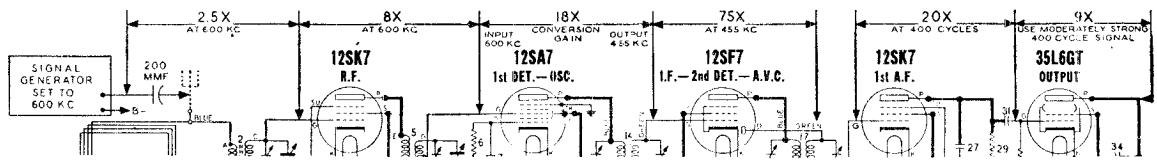
161384 Tension Spring
114955 Clip on end of cord
117057 Cord (55 inches)

APPROXIMATE STAGE GAIN DATA

A vacuum tube voltmeter may be used for audio gain measurements. R.F. gains can be measured with a "channel" type instrument containing a tuned and calibrated R.F. amplifier. Observe following precautions:

1. For all gain measurements connect signal generator as shown. Use 600 KC. signal with 400 cycle modulation (use nearby frequency if local station interferes.)
2. For R.F. and I.F. measurements connect negative terminal of a 3 volt battery (two 1½ volt cells in series) to A.V.C. lead and positive terminal to B—. This provides a definite operating point. IMPORTANT: Disconnect battery when measuring audio stage gains.
3. Be sure radio is carefully tuned to generator signal (use weak signal for sharp tuning.)
4. When using a "channel" type instrument carefully tune it for maximum output at desired frequency before making measurements.

The R.F. and I.F. stage gains shown below are less than under normal operating conditions due to the use of 3 volts fixed bias in order to establish a definite operating point. Therefore, these values are not intended to indicate the full capability of a stage.



Differences in tube characteristics, tolerance of parts, adjustment of tuned circuits, and variations of line voltage will influence stage gain. Accuracy of measurements is dependent upon careful tuning of receiver to generator signal and experience in using your test equipment. These factors may create considerable variation in gain measurements.

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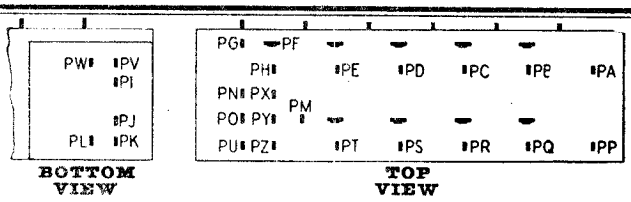
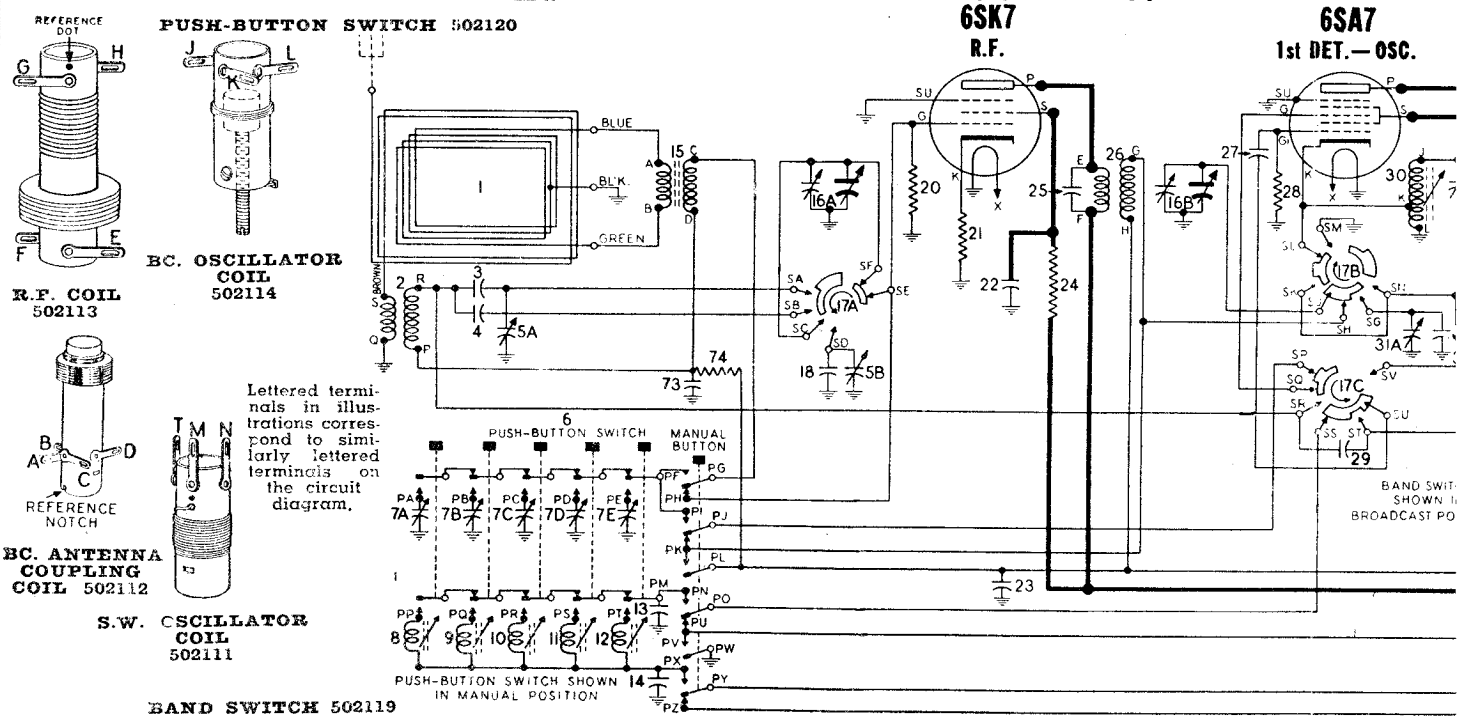


NOTE: The circuit shown below applies to chassis which have a let "S" designation will have the following circuit differences.

1. Terminal "D" of BC. Antenna Coil No. 15 and terminal "P"
2. Condenser No. 73 and resistor No. 74 are omitted.

Improved sensitivity on Push Button tuning and short wave operation n in the circuit on this page and adding parts No. 73 and No. 74.

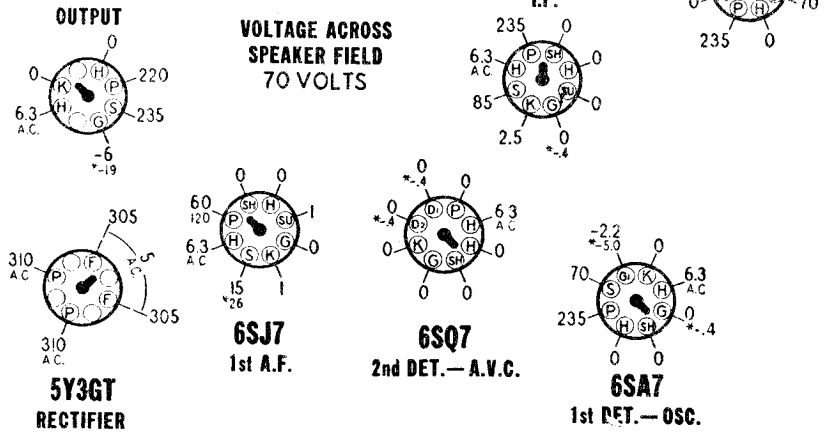

PUSH-BUTTON SWITCH 502120
6SK7 R.F.
6SA7 1st DET.—OSC.
REFERENCE DOT
R.F. COIL 502113
BC. OSCILLATOR COIL 502114
BC. ANTENNA COUPLING COIL 502112
S.W. OSCILLATOR COIL 502111
Lettered terminals in illustrations correspond to similarly lettered terminals on the circuit diagram.
PUSH-BUTTON SWITCH
MANUAL BUTTON
PUSH-BUTTON SWITCH SHOWN IN MANUAL POSITION
BAND SWITCH 502119
S.W. ANTENNA COIL 502110
REAR SECTION FRONT VIEW
REAR SECTION REAR VIEW
FRONT SECTION REAR VIEW

BOTTOM VIEW OF CHASSIS

117 VOLT 60 CYCLE A. C. POWER SUPPLY USED FOR THESE MEASUREMENTS.

ALL VOLTAGES MEASURED BETWEEN SOCKET TERMINALS AND CHASSIS.

VOLTAGE ACROSS SPEAKER FIELD 70 VOLTS



DIAL TUNED TO 540 KC. MANUAL BUTTON PUSHED IN **REAR** VOLUME ON FULL WITH NO SIGNAL RANGE SWITCH IN BROADCAST POSITION

*—Measured with vacuum tube voltmeter.

NOTE:—The 6K6GT grid bias of —19 volts can be measured across resistor No. 72.

DIAGRAM NO.	PART NO.	DESCRIPTION
		CONDENSERS
3	502166	Condenser—ceramic 82 Mmfd. 500
4	502164	Condenser—mica 670 Mmfd. 500 vo
5A, B	502109	Condenser—trimmer assembly Section A 2 to 15 Mmfd. Section B 10 to 40 Mmfd.
7A to E	502910	Condenser—trimmer assem. for P-B
13	502161	Condenser—mica 270 Mmfd. 500
14	502165	Condenser—mica 1,000 Mmfd. 500
16A, B, C	502122	Condenser—variable gang
18	502182	Condenser—ceramic 39 Mmfd. 500
22	502157	Condenser—.05 Mfd. 400 volt
23	502155	Condenser—.1 Mfd. 200 volt
25	502295	Condenser—ceramic 10 Mmfd. 500
27	502159	Condenser—mica 50 Mmfd. 500 vo
29	502411	Condenser—2 Mmfd. 500 volt
31A, B	502108	Condenser—trimmer assem. Section A 2 to 15 Mmfd. Section B 2 to 15 Mmfd.
32	502182	Condenser—ceramic 39 Mmfd. 500
33	502167	Condenser—ceramic 68 Mmfd. 500
34	502163	Condenser—mica 430 Mmfd. 500 vo
37	502151	Condenser—.01 Mfd. 400 volt
42	502157	Condenser—.05 Mfd. 400 volt
46	502271	Condenser—mica 260 Mmfd. 500 vo
49	502150	Condenser—.004 Mfd. 600 volt
49	502157	Condenser—.05 Mfd. 400 volt
53	502160	Condenser—mica 110 Mmfd. 500 vo
54	502152	Condenser—.02 Mfd. 400 volt
56	502410	Condenser—.1 Mfd. 400 volt
59	502405	Condenser—.25 Mfd. 400 volt
63	502150	Condenser—.004 Mfd. 600 volt
64	502154	Condenser—.05 Mfd. 600 volt
71A, B, C	502207	Condenser—Electrolytic A—20 Mfd. 25 volt B—20 Mfd. 400 volt C—10 Mfd. 400 volt
73	502153	Condenser—.05 Mfd. 200 volt
		RESISTORS
20	502468	Resistor carbon 4.7 Meg. 1/4 watt
21	502127	Resistor carbon 560 Ohms 1/4 wa
24	502132	Resistor carbon 100,000 Ohms 1/4
28	502130	Resistor carbon 22,000 Ohms 1/4
38	502466	Resistor carbon 33,000 Ohms 1 w

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MODEL 9003-B, Early and First Revision

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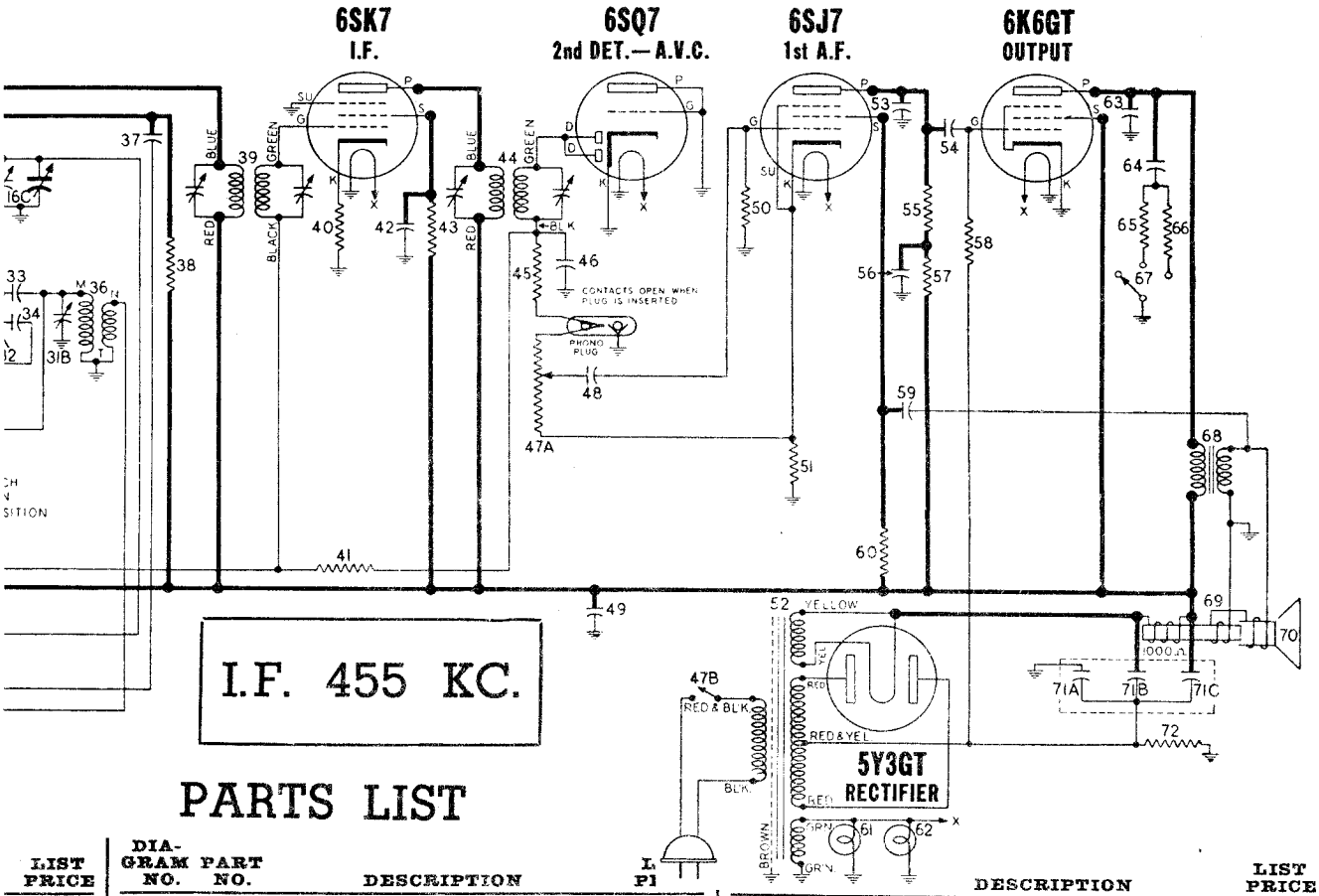
ter "S" stamped on rear surface adjacent to model number. Early production chassis which do not contain the of S.W. Antenna Coil No. 2 are connected to ground and not to A.V.C. as shown below.

ıay be obtained for chassis that do not contain the "S" designation by connecting coils No. 2 and No. 15 as shown



PARTS LIST

DIA-GRAM NO.	PART NO.	DESCRIPTION	LIST PRICE
40	502125	Resistor—carbon 220 Ohms 1/4 watt	$ .12
41	502135	Resistor—carbon 2.2 Meg. 1/4 watt	.12
43	502467	Resistor—carbon 68,000 Ohms 1/2 watt	.12
45	502131	Resistor—carbon 47,000 Ohms 1/4 watt	.12
47A, B	502117	Volume control 500,000 ohms (with switch	1.25
50	502468	Resistor—carbon 4.7 Meg. 1/4 watt	.12
51	502128	Resistor—carbon 2200 Ohms 1/4 watt	.12
55	502133	Resistor—carbon 220,000 Ohms 1/4 watt	.12
57	502132	Resistor—carbon 100,000 Ohms 1/4 watt	.12
58	502134	Resistor—carbon 470,000 Ohms 1/4 watt	.12
60	502135	Resistor—carbon 2.2 Meg. 1/4 watt	.12
65	502291	Resistor—carbon 4700 Ohms 1/4 watt	.12
66	502127	Resistor—carbon 560 Ohms 1/4 watt	.12
72	502137	Resistor—wire wound 330 Ohms 2 watt	.25
74	502134	Resistor—carbon 470,000 Ohms 1/4 watt	.12
		COILS & TRANSFORMERS	
1	502186	Loop antenna	3.15
2	502110	Coil—S.W. antenna	1.10
	502025	Complete coil—trimmer assem. for P-B tuner	8.80
8	502907	Coil less slug (540-1000 Kc.)	1.50
9, 10	502908	Coil less slug (650-1300 Kc.)	1.50
11, 12	502909	Coil less slug (975-1600 Kc.)	1.50
	502911	Slug for coils 502907, 502908, 502909	.25
	501151	Clip—for mtg. push button coils	.08
15	502112	Coil—BC. antenna	1.70
26	502113	Coil—BC. R.F.	1.85
30	502114	Coil—BC. oscillator	1.45
36	502111	Coil—S.W. oscillator	1.10
39	502102	Transformer—1st I.F.	2.30
44	502103	Transformer—2nd I.F.	2.30
52	502174	Transformer—power	7.50
68	504206	Transformer—output for M-504205 speaker	2.00
	504208	Transformer—output for R-504205 speaker	2.00
	504124	Transformer—output for D-504205 speaker	2.00
		OTHER ELECTRICAL PARTS	
6	502120	Switch—push-button	4.00
17A, B, C	502119	Switch—band	2.80
61, 62	110629	Lamp—dial (Mazda 44) 6.3 V. 250 Ma.	.15
67	502118	Switch—tone control	.70
69	504205	Speaker Electro-dynamic (6 inch)	9.00
	504209	Cone & Voice coil for R-504205 speaker	3.00
70	504207	Cone & Voice coil for M-504205 speaker	3.00
	504125	Cone & Voice coil for D-504205 speaker	3.00

DESCRIPTION	LIST PRICE
MISCELLANEOUS PARTS	
502041 Background for dial	$0.15
116467 Base for mtg. electrolytic condenser	.04
502046 Cabinet back	.70
117315 Call lettter tabs for push-button	.55
500420 Clamp for dial glass	.15
112745 Clip—coil mtg.	.01
114955 Clip—retainer on end of dial cord	.01
501151 Clip—for mtg. push button coils	.08
116563 Connector—for antenna leads	.01
117057 Cord—dial drive (102 in. required), per ft.	.05
502216 Dial scale—glass	2.50
113402 Drum—for dial drive	.70
502699 Escutcheon for push-buttons	1.70
501449 Knob—volume or tuning	.15
501458 Knob—tone or band switch	.16
160620 Pointer	.22
501495 Push-button	.15
81145 Retaining ring for tuning shaft	.01
119087 Ring for dial cord	.01
116584 Rubber spacer for mtg. dial scale	.02
502702 Rubber spacer on frame behind escutcheon	.04
83552 Screw—No. 10x7/8"; for mtg. chassis	.03
85827 Screw—No. 8-32 for dial drum	.02
501777 Screw—No. 4x1/2; for mtg. loop & back	.02
502116 Shaft tuning control	.10
114876 Socket octal base (rectifier)	.15
119791 Socket—octal base	.12
500459 Socket—dial lamp (with mtg. bracket)	.15
502980 Spacer for leads to push-button switch	.10
113177 Spring dial cord tension	.09
119911 Terminal strip phono	.16
111456 Washer spring washer for tuning shaft	.005
500487 Washer felt; for knobs	.01

PRICES SUBJECT TO CHANGE WITHOUT NOTICE

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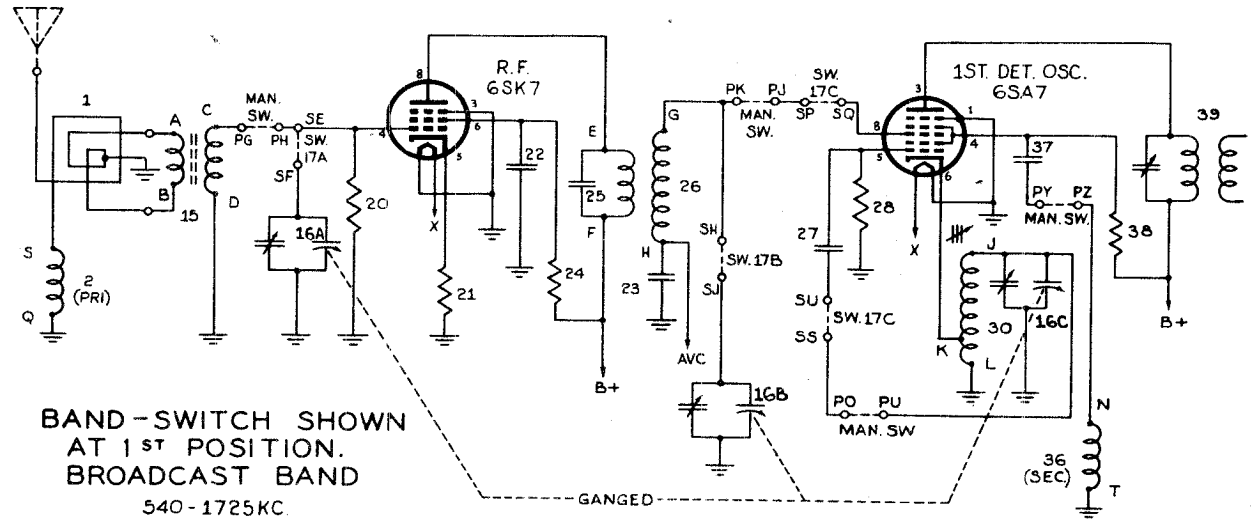

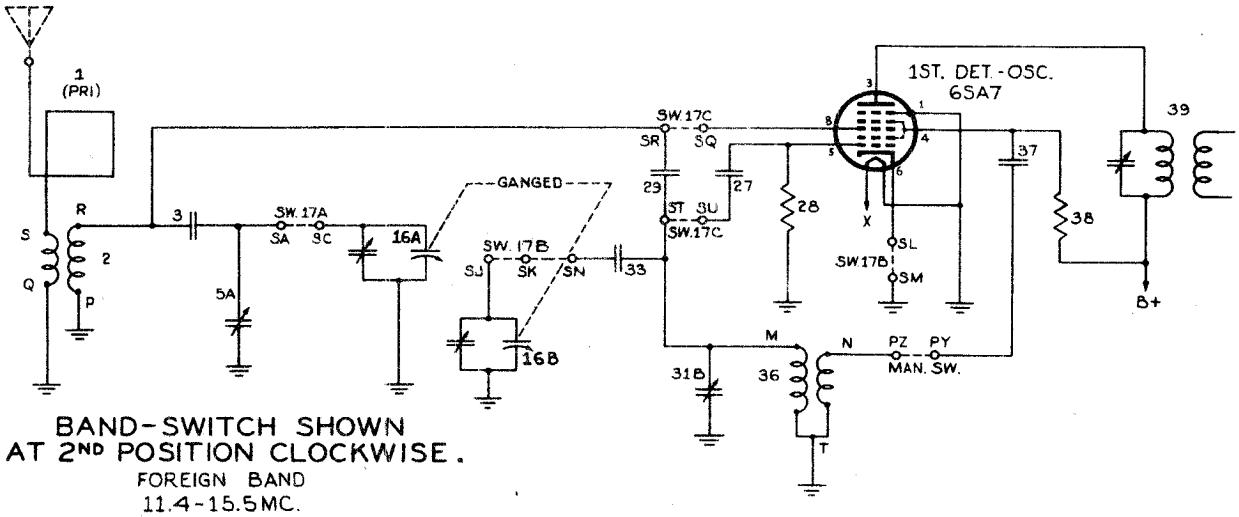

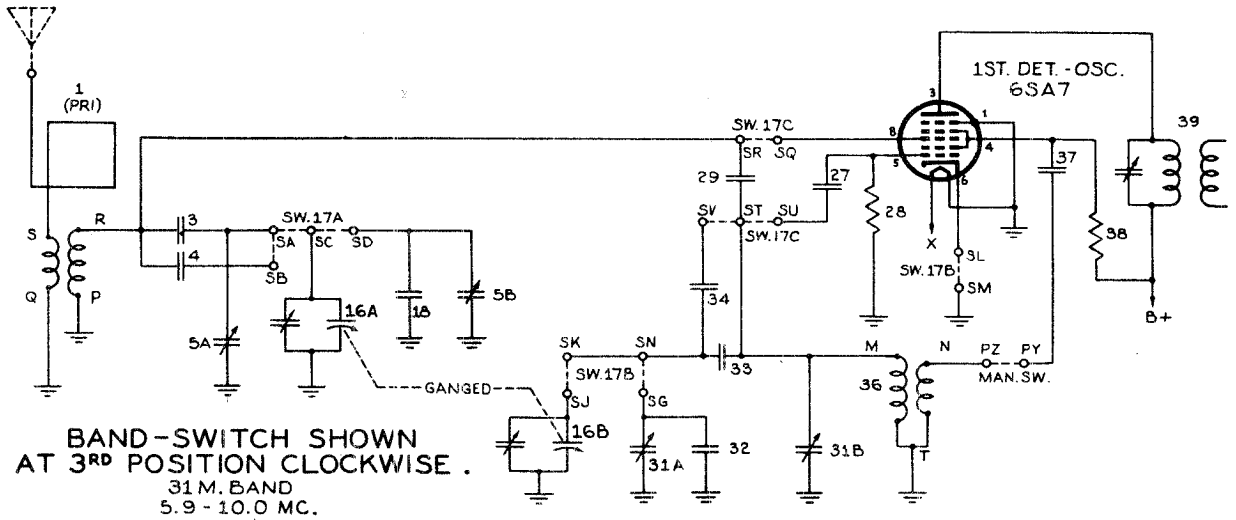

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MODEL 9003-B

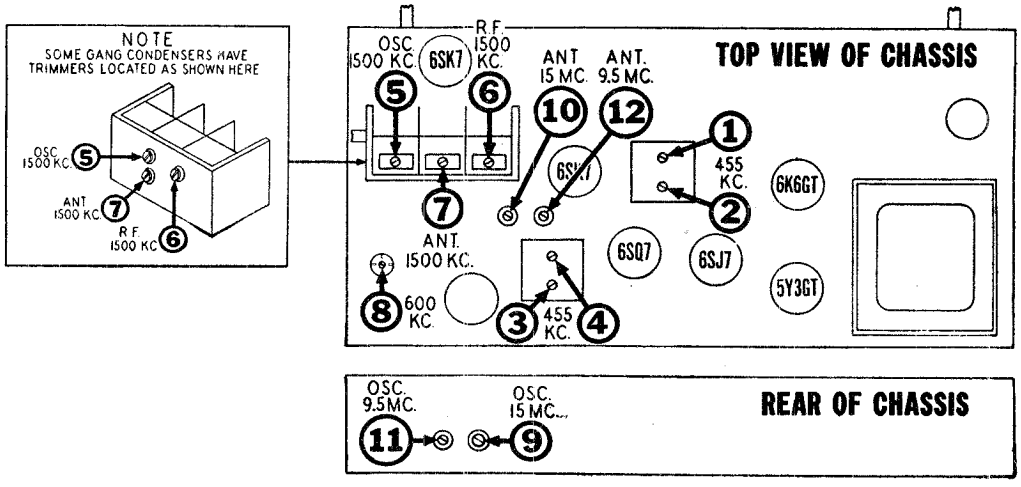
STEWART WARNER CORP.

ALIGNMENT PROCEDURE

1. The chassis and loop antenna should remain in their normal position in the cabinet throughout the following procedure.
2. Check arrangement of leads to push-button switch as shown in illustration on following page.
3. With the gang condenser fully meshed, dial pointer should be in the position indicated by the last division below 55 on the dial. If it is set incorrectly, release pointer clip on dial cord and reposition pointer.
4. Connect output meter across speaker voice coil.
5. Connect the ground lead of the signal generator to the receiver chassis.
6. Set volume control at maximum volume position and use a weak signal from the signal generator.
7. Push in the manual button and leave it in that position throughout the alignment procedure.

IMPORTANT:—Align this receiver in exactly the order shown below. Broadcast band must be aligned before short wave bands.

DUMMY ANT. IN SERIES WITH SIGNAL GENERATOR	CONNECT HIGH SIDE OF SIGNAL GENERATOR TO	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POSITION	RECEIVER DIAL SETTING	TRIMMER NUMBER	TRIMMER DESCRIPTION	TYPE OF ADJUSTMENT
.1 MFD. Condenser	Trimmer on rear section of gang	455 KC	Broadcast (counter-clockwise)	Any point where it does not affect the signal.	1-2	2nd I.F.	Adjust for maximum output. Then repeat adjustment.
					3-4	1st I.F.	
.003 MFD. Condenser	External Antenna Clip on Loop Frame	1500 KC	Broadcast (counter-clockwise)	1500 KC	5	Broadcast Oscillator (Shunt)	Adjust for maximum output.
.003 MFD. Condenser	External Antenna Clip on Loop Frame	1500 KC	Broadcast (counter-clockwise)	Tune to 1500 KC Generator Signal	6	Broadcast R.F.	Adjust for maximum output.
.003 MFD. Condenser	External Antenna Clip on Loop Frame	1500 KC	Broadcast (counter-clockwise)	Tune to 1500 KC Generator Signal	7	Broadcast Antenna	Adjust for maximum output.
.003 MFD. Condenser	External Antenna Clip on Loop Frame	600 KC	Broadcast (counter-clockwise)	Tune to 600 KC Generator Signal	8	Adjustable core of Broadcast Oscillator Coil.	Adjust for maximum output. Try to increase output by rotating core in and out and retuning receiver dial until maximum output is obtained.
.003 MFD. Condenser	External Antenna Clip on Loop Frame	Repeat adjustments of trimmers 5, 6 and 7 at 1500 Kc. Then re-check adjustment of trimmer 8 at 600 Kc.					
400 OHM Carbon Resistor	External Antenna Clip on Loop Frame	15 MC	Short wave	15 MC	9	S.W. Oscillator	Adjust for maximum output. Check to see if proper peak was obtained by tuning in image at approx. 14.1 MC. If image does not appear, realign at 15 MC, with trimmer screw farther out. Recheck image.
400 OHM Carbon Resistor	External Antenna Clip on Loop Frame	15 MC	Short wave	Tune to 15 MC Generator Signal	10	S.W. Antenna	Adjust for maximum output. Try to increase output by detuning trimmer and retuning receiver dial until maximum output is obtained.
400 OHM Carbon Resistor	External Antenna Clip on Loop Frame	9.5 MC	31 M (Clockwise)	9.5 MC	11	31 M Oscillator	Adjust for maximum output. Check to see if proper peak was obtained by tuning in image at approx. 8.6 MC. If image does not appear, realign at 9.5 MC. with trimmer screw farther out. Recheck image.
400 OHM Carbon Resistor	External Antenna Clip on Loop Frame	9.5 MC	31 M (Clockwise)	Tune to 9.5 MC Generator Signal	12	31 M Antenna	Adjust for maximum output. Try to increase output by detuning trimmer and retuning receiver dial until maximum output is obtained.



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MODEL 9003-B

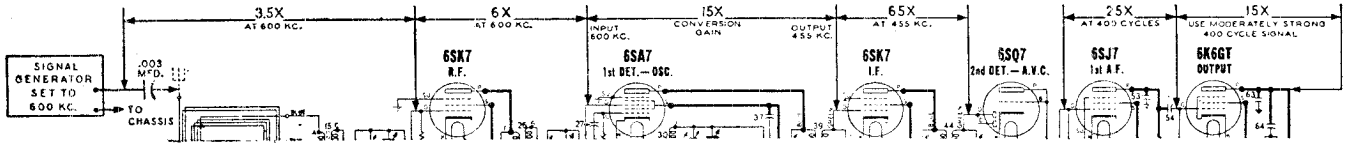
STEWART WARNER CORP.

APPROXIMATE STAGE GAIN DATA

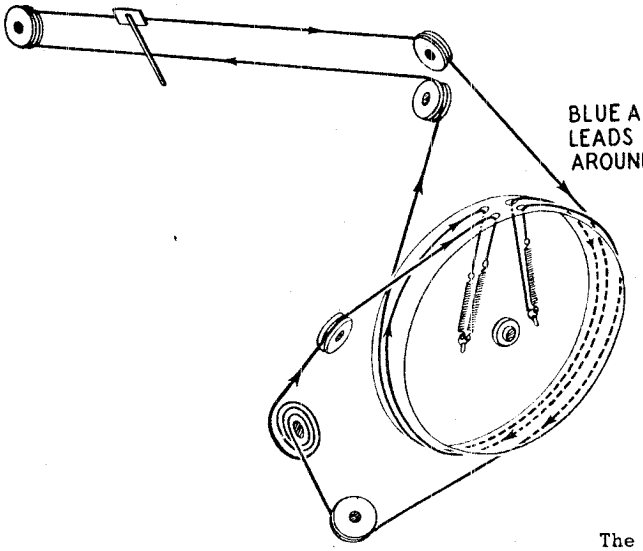
Be sure R.F. and I.F. stages are accurately aligned before measuring gain. R.F. gains can be measured with a "channel" type instrument containing a tuned and calibrated R.F. amplifier. A vacuum tube voltmeter may be used for audio gain measurements. Observe following precautions:

1. For all gain measurements connect signal generator as shown. Use 600 KC. signal with 400 cycle modulation (use nearby frequency if local station interferes.)
2. For R.F. and I.F. measurements connect negative terminal of a 3 volt battery (two 1½ volt cells in series) to A.V.C. lead and positive terminal to chassis. This provides a definite operating point. IMPORTANT: Disconnect battery when measuring audio stage gains.
3. Be sure radio is carefully tuned to generator signal (use weak signal for sharp tuning.)
4. When using a "channel" type instrument carefully tune it for maximum output at desired frequency before making measurements.

The R.F. and I.F. stage gains shown below are less than under normal operating conditions due to the use of 3 volts fixed bias in order to establish a definite operating point. Therefore, these values are not intended to indicate the full capability of a stage.



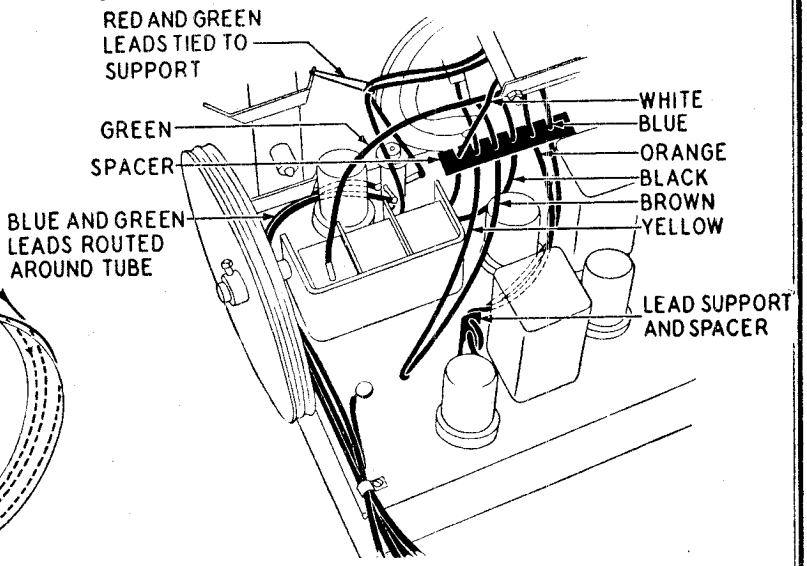
Differences in tube characteristics, tolerance of parts, adjustment of tuned circuits, and variations of line voltage will influence stage gain. Accuracy of measurements is dependent upon careful tuning of receiver to generator signal and experience in using your test equipment. These factors may create considerable variation in gain measurements.



DIAL AND POINTER DRIVE CORD ARRANGEMENT

To string dial cord, set gang condenser to fully meshed position and use following parts:

113177	Tension Spring
114955	Clip on end of cord
119087	Ring for dial cord
117057	Cord (102 inches) Pointer drive 72 inches Gang drive 30 inches



IMPORTANCE OF MAINTAINING FIXED POSITIONS FOR LEADS AT TOP OF CHASSIS

The wires shown in the above illustration are associated with tuned circuits which carry radio frequency currents. Therefore, care must be exercised to insure that they are properly routed and spaced. Anchoring and fixing spacing of wires minimizes freedom of movement and is utilized to maintain a stable arrangement.

Since the relative positions of these wires may affect tuned circuits it is important to avoid any change in arrangement after the receiver has been aligned. If the position of the wires has been disturbed, it is advisable to re-check alignment (see previous page for alignment procedure).

AUDIO OSCILLATION

The audio system of this receiver utilizes a two stage type of inverse feed-back arrangement and should it ever be necessary to replace the speaker or output transformer it is important to maintain a definite phase relationship in the feedback circuit. If the connections to the output transformer are reversed or if the feed-back connection is made to the wrong side of the output transformer secondary, the system will become regenerative instead of degenerative. Under those conditions audio oscillation may result. If that occurs, oscillation may be prevented by reversing the connections to the primary of the output transformer.

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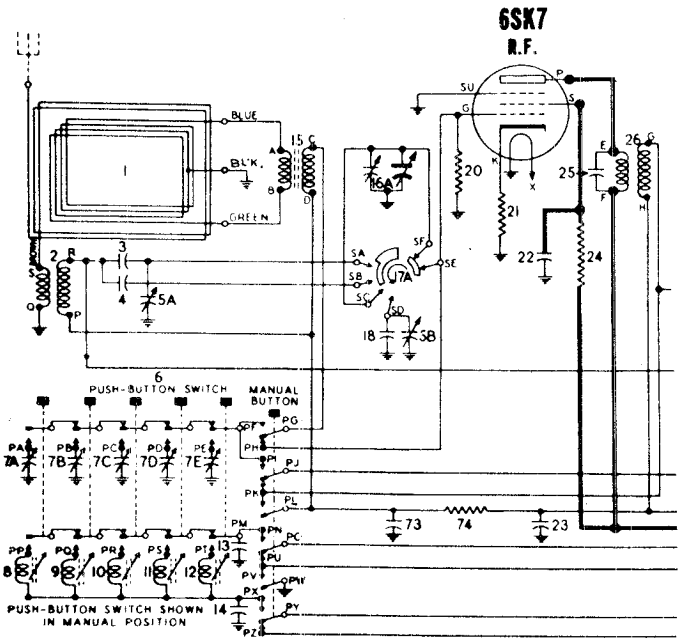
MODEL 9003-B
2nd Revision

STEWART WARNER CORP.



When the model 9003-B is operated on push-button tuning it is possible for a "wide tolerance" 6SA7 tube to cause considerable reduction in sensitivity which may be particularly noticeable when comparison is made to the sensitivity obtained for "manual" tuning. This loss of sensitivity has been traced to a wide variation in one of the characteristics of the 6SA7 tube which permits the flow of a larger than normal grid current. Loss of sensitivity results from the loading effect of grid current flowing through the associated tuned circuit.

Correction of this condition may be accomplished by utilizing one or both of the following remedies.

REMEDY #1: Try replacing the 6SA7 tube; use several different tubes, preferably of different brands, and check the performance of the set with each tube. In event a replacement tube is not available or if changing the tube does not make any improvement, apply remedy #2.

REMEDY #2: The application of this remedy requires that the chassis be removed from the cabinet. After this has been done, you can then make the following changes. These changes make it possible to use the same 6SA7 tube that was supplied with the set and still obtain a considerable improvement in sensitivity when using push-button tuning.

CIRCUIT CHANGES

1. Remove ground connection at terminal "D" of Broadcast Antenna Coil and terminal "P" of Short Wave Antenna Coil and reconnect both coil terminals to the A.V.C. system as indicated in the diagram on next page.

2. Add resistor #74 (470,000 ohms 1/2 watt) and condenser #73 (.05 mfd. 200 volt) by connecting them into the circuit as shown.

3. Check alignment of receiver by adjusting antenna circuit trimmers for maximum output. Broadcast band trimmer (16A) must be adjusted before attempting to peak Short Wave band trimmer (5A).

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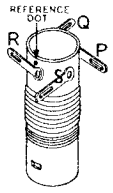
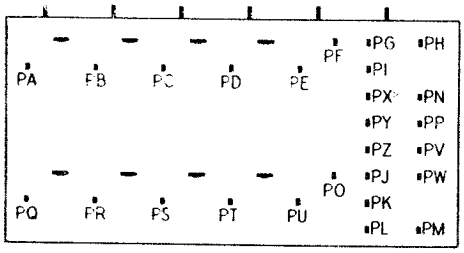
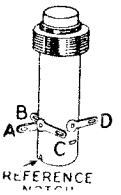
S.W. OSCILLATOR COIL 502111



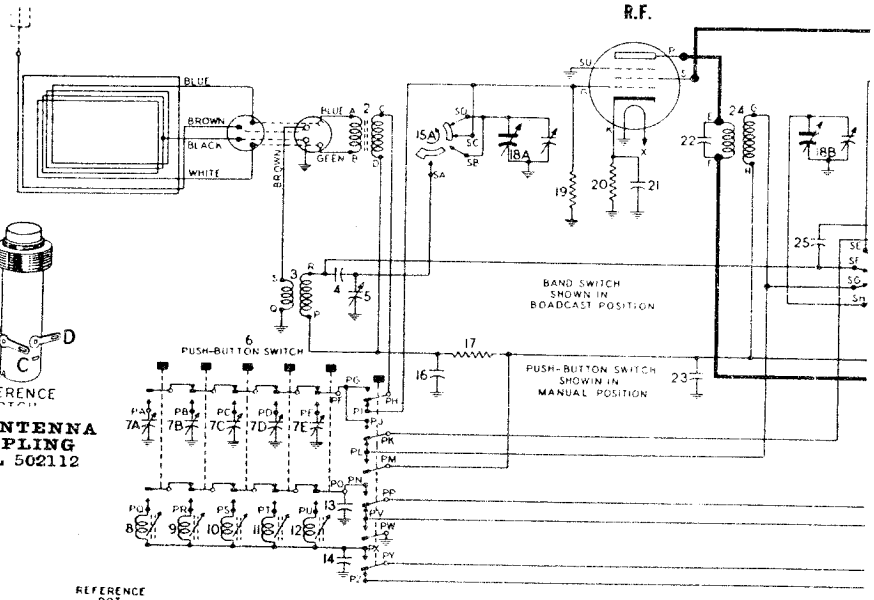
S.W. ANTENNA COIL 502110

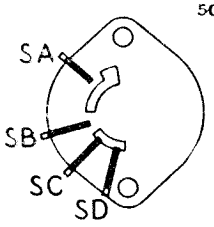


PUSH-BUTTON SWITCH 502369

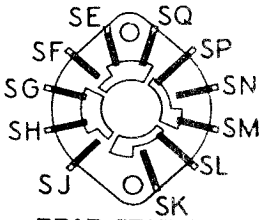


BC. ANTENNA COUPLING COIL 502112



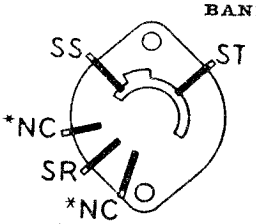


FRONT SECTION REAR VIEW

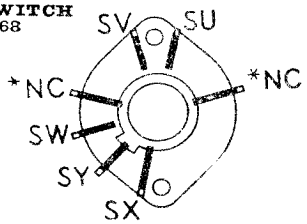


REAR SECTION REAR VIEW

BAND SWITCH 502368



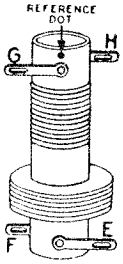
FRONT VIEW



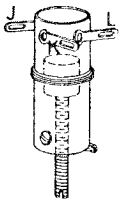
REAR VIEW

RADIO-PHONO AND TONE SWITCH 502370

*NC—NO CONNECTION



R.F. COIL 502113



BC. OSCILLATOR COIL 502114

I.F. 455 KC.

SOCKET VOLTAGES

Measured with voltmeter having sensitivity of 1000 ohms per volt except where indicated by (*)

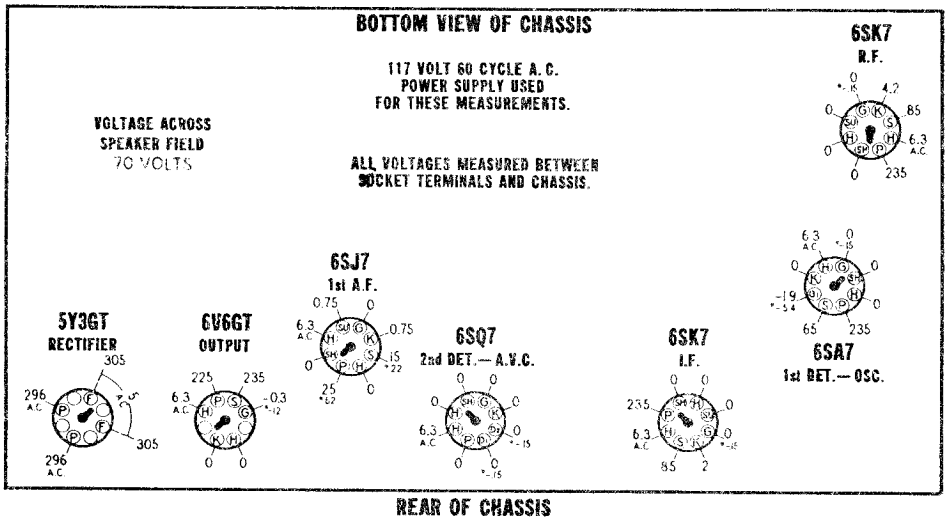
RANGE SWITCH IN BROADCAST POSITION
VOLUME ON FULL WITH NO SIGNAL
DIAL TUNED TO 540 KC.
MANUAL BUTTON PUSHED IN
RADIO-PHONO-TONE SWITCH IN "RADIO-SPEECH" POSITION

BOTTOM VIEW OF CHASSIS

117 VOLT 60 CYCLE A.C. POWER SUPPLY USED FOR THESE MEASUREMENTS.

VOLTAGE ACROSS SPEAKER FIELD 70 VOLTS

ALL VOLTAGES MEASURED BETWEEN SOCKET TERMINALS AND CHASSIS.



REAR OF CHASSIS

* Measured with vacuum tube voltmeter.

NOTE: The 6V6GT grid bias of 12 volts can be measured across resistor No. 72.

DIAGRAM NO.	PART NO.	DESCRIPTION
		CONDENSERS
4	502202	Condenser—ceramic 150 Mmfd
5	502172	Condenser—trimmer 25 to 100
7-A to E	502910	Condenser—trimmer assembly tuner
13	502161	Condenser—mica 270 Mmfd.
14	502165	Condenser—mica 1,000 Mmfd.
16	502153	Condenser—.05 Mfd. 200 volt
18-A, B, C	502122	Condenser—variable gang
21	502155	Condenser—.1 Mfd. 200 volt
22	502295	Condenser—ceramic 10 Mmfd.
23	502153	Condenser—.05 Mfd. 200 volt
25	502411	Condenser—2 Mmfd. 500 volt
26	502159	Condenser—mica 50 Mmfd. 5
29	502201	Condenser—ceramic 130 Mmf volt
30	502182	Condenser—ceramic 39 Mmfd.
31	502171	Condenser—trimmer 5 to 35
33	502152	Condenser—.02 Mfd. 400 volt
38	502154	Condenser—.05 Mfd. 600 volt
45	502160	Condenser—mica 110 Mmfd.
49	502151	Condenser—.01 Mfd. 400 volt
51	502150	Condenser—.004 Mfd. 600 vo
54	502154	Condenser—.05 Mfd. 600 volt
56	502405	Condenser—.25 Mfd. 400 volt
58	502151	Condenser—.01 Mfd. 400 volt
64	502271	Condenser—mica 260 Mmfd.
65	502157	Condenser—.05 Mfd. 400 volt
68	502152	Condenser—.02 Mfd. 400 volt
70-A, B, C	502207	Condenser—electrolytic A—20 Mfd. 400 volt B—10 Mfd. 400 volt C—20 Mfd. 25 volt
71	502479	Condenser—.006 Mfd. 600 volt
		RESISTORS
17	502134	Resistor—carbon 470,000 Ohm
19	502468	Resistor—carbon 4.7 Meg.
20	502478	Resistor—carbon 1,000 Ohms
27	502130	Resistor—carbon 22,000 Ohms
34	502466	Resistor—carbon 33,000 Ohms
36	502457	Resistor—carbon 330 Ohms
37	502135	Resistor—carbon 2.2 Meg.
39	502232	Resistor—carbon 68,000 Ohms
44	502131	Resistor—carbon 47,000 Ohms
47	502132	Resistor—carbon 100,000 Ohm
48	502131	Resistor—carbon 47,000 Ohms
50-A, B	502148	Volume control—with switch, Ohms
52	502468	Resistor—carbon 4.7 Meg.
53	502406	Resistor—carbon 1,500 Ohms
55	502135	Resistor—carbon 2.2 Meg.

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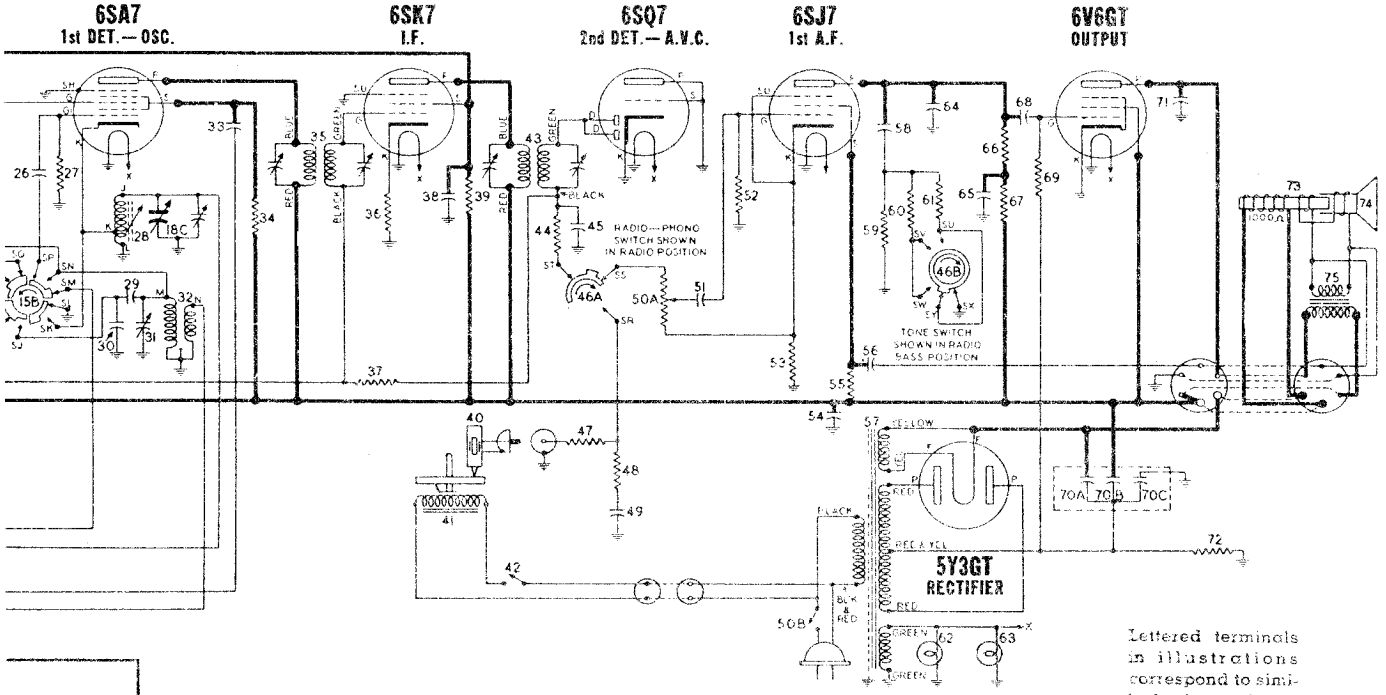
MODELS 9004-B, 9004-F, 9004-G



Lettered terminals in illustrations correspond to similarly lettered terminals on the circuit diagram.

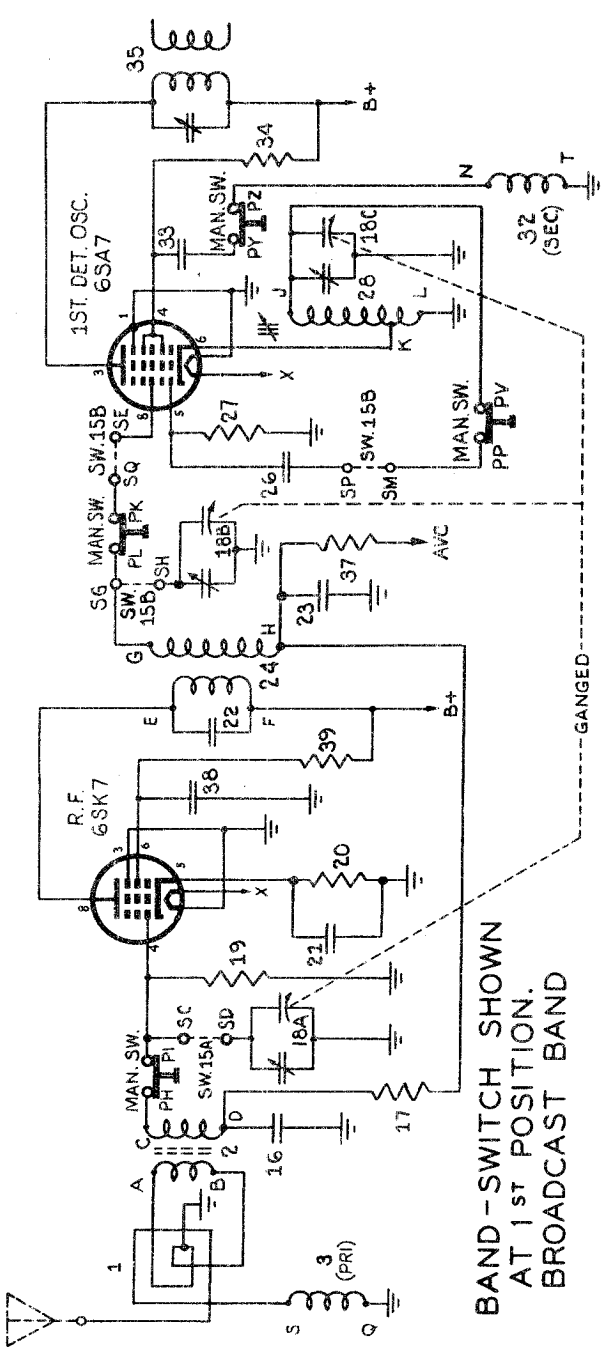
LIST PRICE	DIA-GRAM NO.	PART NO.	DESCRIPTION	LIST PRICE
	59	502468	Resistor—carbon 4.7 Meg. ¼ watt	$
	60	502406	Resistor—carbon 68,000 Ohms ¼ watt	
500 volt.$	61	502291	Resistor—carbon 4,700 Ohms ¼ watt.	
Mmfd.	66, 67	502133	Resistor—carbon 220,000 Ohms ¼ watt	
for P-B	69	502134	Resistor—carbon 470,000 Ohms ¼ watt	
	72	502293	Resistor—wire wound 200 Ohms 2 watt	
00 volt.			**COILS AND TRANSFORMERS**	
500 volt	1	502282	Loop antenna (Models 9004-F, G)	
		502805	Loop antenna (Model 9004-B)	
500 volt	2	502112	Coil—BC. antenna	
	3	502110	Coil—S.W. antenna	
		502025	Complete coil—trimmer assembly for P-B tuner	
0 volt	8	502907	Coil less slug (540-1000 Kc.)	
d. 500	9, 10	502908	Coil less slug (650-1300 Kc.)	
500 volt	11, 12	502909	Coil less slug (975-1600 Kc.)	
Mmfd.		502911	Slug for coils 502907, 502908, 502909	
		501151	Clip—for mtg. push button coils	
	24	502113	Coil—BC. R.F.	
00 volt.	28	502114	Coil—BC. oscillator	
	32	502111	Coil—S.W. oscillator	
t	35	502102	Transformer—1st I.F.	
	43	502103	Transformer—2nd I.F.	
	57	502174	Transformer—power	
00 volt.	75	502303	Transformer—output for R-502302 speaker	
		502994	Transformer—output for M-502302 speaker	
			OTHER ELECTRICAL PARTS	
	6	502369	Switch—push-button	
	15-A, B	502368	Switch—band	
	40	502461	Crystal cartridge (Astatic L-71)	
s ¼ watt		502846	Motor—"G.I." Chgr.; (9004-F, G); 115 V. 50 cyc.	
watt...		502847	Motor—"G.I." Chgr.; (9004-F, G); 115 V. 60 cyc.	
¼ watt	41	502990	Motor—"A" Chgr.; (9004-B); 115 V. 60 cyc.	
¼ watt		504201	Motor—"W" Chgr.; (9004-F, G); 115 V. 60 cyc.	
1 watt		502977	Switch—on-off; "A" Rec. Chgr. (9004-B)	
1 watt	42	502978	Switch—on-off; "G.I." Rec. Chgr. (9004-F, G)	
s ¼ watt		504203	Switch—on-off; "W" Rec. Chgr. (9004-F, G)	
¼ watt	46-A, B	502370	Switch—tone and radio-phono	
watt	62, 63	110629	Lamp—dial (Mazda No. 44) 6.3 V. 0.25 Amps.	
watt	73	502302	Speaker—electro-dynamic (10 inch)	

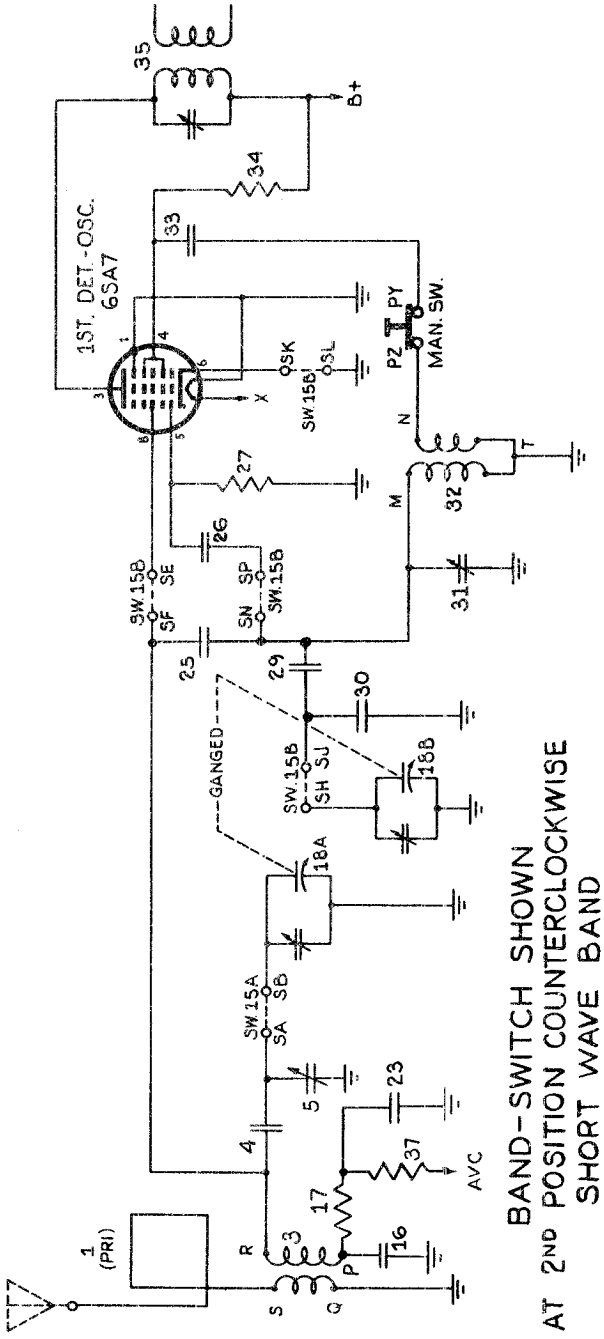
DIA-GRAM NO.	PART NO.	DESCRIPTION	LIST PRICE
	502304	Cone and voice coil for R-502302 speaker	$
74	502995	Cone and voice coil for M-502302 speaker	
		MISCELLANEOUS PARTS	
	119993	Background for dial	
	116467	Base for mtg. electrolytic condenser	
	119989	Clamp for dial glass	
	112745	Clip—coil mtg.	
	114855	Clip—retainer on end of dial cord	
	501151	Clip—for mtg. push button coils	
	117057	Cord—dial drive (90 in. required)	
	502227	Dial scale—glass	
	113402	Drum—for dial drive	
	502428	Escutcheon for push-button (Models 9004-B, F)	
	502429	Escutcheon for push-button (Model 9004-G)	
	501449	Knob—volume or tuning (Models 9004-B, F)	
	501458	Knob—tone or band switch (Models 9004-B, F)	
	501498	Knob—volume or tuning (Model 9004-G)	
	501499	Knob—tone or band switch (Model 9004-G)	
	502460	Needle—phonograph (Fidelitone Master No. 150)	
	500956	Plug—phonograph pick-up cable	
	501031	Plug—phonograph motor cable	
	502281	Plug—loop antenna cable	
	504097	Plug—speaker	
	502496	Pointer	
	501495	Push-Button (Models 9004-B, F)	
	502452	Push-Button (Model 9004-G)	
	81145	Retaining ring for tuning shaft	
	119087	Ring for dial cord	
	113463	Rubber pad—chassis mtg.	
	116584	Rubber spacer for mtg. dial scale	
	112874	Screw—No. 10 x 1⅛"; for mtg. chassis	
	114914	Screw—No. 2 x ⅜"; for mtg. escutcheon	
	502399	Shaft—tuning control	
	114876	Socket—octal base (rectifier)	
	119791	Socket—octal base	
	118617	Socket—dial lamp	
	160039	Socket—phonograph plug	
	500651	Socket—loop antenna plug	
	501182	Socket—phonograph motor cable	
	502210	Socket—speaker	
	113177	Spring—dial cord tension	
	111456	Washer—spring washer for tuning shaft	
	500487	Washer—felt for knobs	

PRICES SUBJECT TO CHANGE WITHOUT NOTICE

STEWART WARNER CORP.

MODELS 72CR16, 72CR26
MODELS 9004-B, 9004-F, 9004-G





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MODELS 9004-B, 9004-F, 9004-G

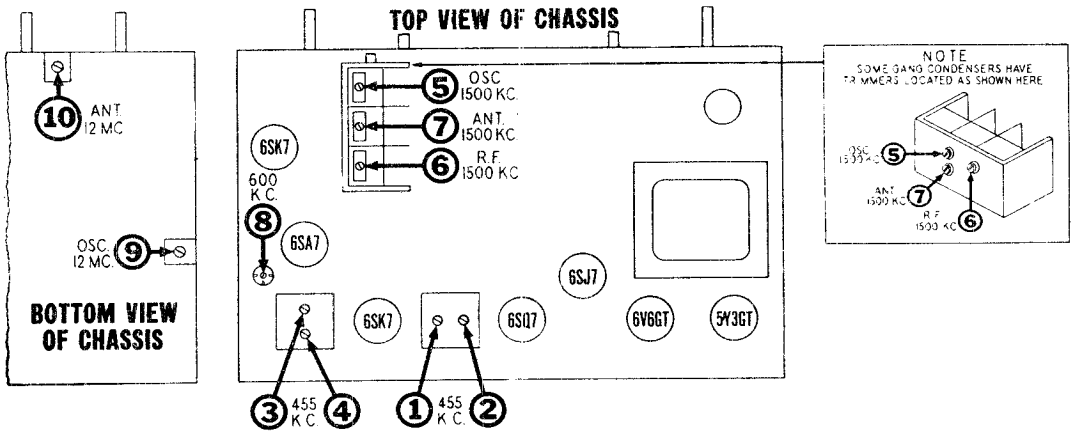
STEWART WARNER CORP.

ALIGNMENT PROCEDURE

1. Remove chassis and loop antenna from cabinet (do not remove loop of wire stapled to cabinet). Wind one turn of insulated wire around frame of antenna so as to provide a means of coupling it to the signal generator. Stand chassis on one end and space it approximately same distance from loop as when installed in cabinet. Connect plug on loop antenna cable to socket at rear of chassis. Brown lead in antenna cable (which was connected to loop of wire stapled to cabinet) should now be connected to one end of new coupling turn on frame of loop.
2. Connect the ground lead of the signal generator to the receiver chassis.
3. With the gang condenser fully meshed, dial pointer should be in the position indicated by the last division below 55 on the dial. If it is set incorrectly, release pointer clip on dial cord and reposition pointer.
4. Connect output meter across speaker voice coil or from plate of 6V6GT to chassis through a .1 Mfd. condenser.
5. Set volume control at maximum volume position and use a weak signal from the signal generator.
6. Push in the manual button and leave it in that position throughout the alignment procedure.

IMPORTANT:—Align this receiver in exactly the order shown below. Broadcast band must be aligned before short wave band.

DUMMY ANT. IN SERIES WITH SIGNAL GENERATOR	CONNECT HIGH SIDE OF SIGNAL GENERATOR TO	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POSITION	RECEIVER DIAL SETTING	TRIMMER NUMBER	TRIMMER DESCRIPTION	TYPE OF ADJUSTMENT
.1 MFD. Condenser	Trimmer on rear section of gang	455 KC	Broadcast (counter-clockwise)	Any point where it does not affect the signal.	1-2	2nd I.F.	Adjust for maximum output. Then repeat adjustment.
					3-4	1st I.F.	
500 MMFD. Mica Condenser	Coupling turn on Loop Frame	1500 KC	Broadcast (counter-clockwise)	1500 KC	5	Broadcast Oscillator (Shunt)	Adjust for maximum output.
500 MMFD. Mica Condenser	Coupling turn on Loop Frame	1500 KC	Broadcast (counter-clockwise)	Tune to 1500 Kc. generator signal.	6	Broadcast R.F.	Adjust for maximum output.
500 MMFD. Mica Condenser	Coupling turn on Loop Frame	1500 KC	Broadcast (counter-clockwise)	Tune to 1500 Kc. generator signal.	7	Broadcast Antenna	Adjust for maximum output.
500 MMFD. Mica Condenser	Coupling turn on Loop Frame	600 KC	Broadcast (counter-clockwise)	Tune to 600 Kc. generator signal.	8	Adjustable core of Broadcast Oscillator Coil	Adjust for maximum output. Try to increase output by rotating core in and out and retuning receiver dial until maximum output is obtained.
500 MFD. Mica Condenser	Coupling turn on Loop Frame	Repeat adjustment of trimmers 5, 6 and 7 at 1500 Kc. Then re-check adjustment of trimmer 8 at 600 Kc.					
400 OHM Carbon Resistor	Coupling turn on Loop Frame	12 MC	Short wave (Clockwise)	12 MC	9	S.W. Oscillator	Adjust for maximum output. Check to see if proper peak was obtained by tuning in image at approx. 11.1 MC. If image does not appear, realign at 12 MC, with trimmer screw farther out. Recheck image.
400 OHM Carbon Resistor	Coupling turn on Loop Frame	12 MC	Short wave (Clockwise)	Tune to 12 MC. generator signal.	10	S.W. Antenna	Adjust for maximum output. Try to increase output by detuning trimmer and retuning receiver dial until maximum output is obtained.



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STEWART WARNER CORP.

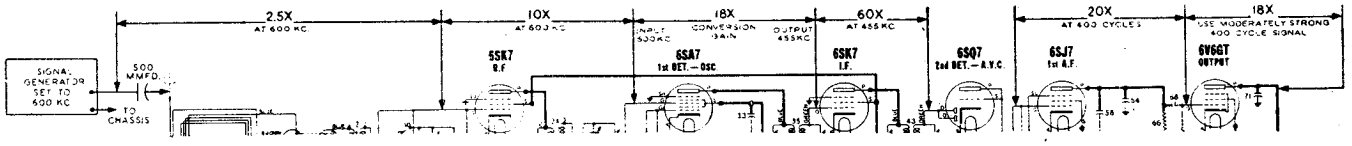
MODELS 9004-B, 9004-F, 9004-G

APPROXIMATE STAGE GAIN DATA

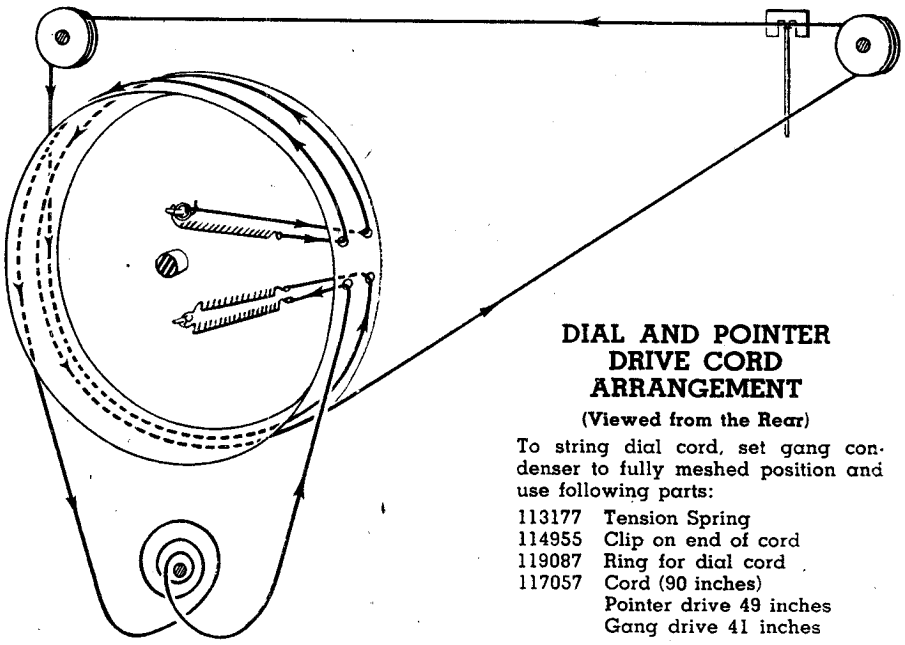
Be sure R.F. and I.F. stages are accurately aligned before measuring gain. R.F. gains can be measured with a "channel" type instrument containing a tuned and calibrated R.F. amplifier. A vacuum tube voltmeter may be used for audio gain measurements. Observe following precautions:

1. For all gain measurements connect signal generator as shown. Use 600 KC. signal with 400 cycle modulation (use nearby frequency if local station interferes.)
2. For R.F. and I.F. measurements connect negative terminal of a 3 volt battery (two 1½ volt cells in series) to A.V.C. lead and positive terminal to chassis. This provides a definite operating point. IMPORTANT: Disconnect battery when measuring audio stage gains.
3. Be sure radio is carefully tuned to generator signal (use weak signal for sharp tuning.)
4. When using a "channel" type instrument carefully tune it for maximum output at desired frequency before making measurements.

The R.F. and I.F. stage gains shown below are less than under normal operating conditions due to the use of 3 volts fixed bias in order to establish a definite operating point. Therefore, these values are not intended to indicate the full capability of a stage.



Differences in tube characteristics, tolerance of parts, adjustment of tuned circuits, and variations of line voltage will influence stage gain. Accuracy of measurements is dependent upon careful tuning of receiver to generator signal and experience in using your test equipment. These factors may create considerable variation in gain measurements.



DIAL AND POINTER DRIVE CORD ARRANGEMENT

(Viewed from the Rear)

To string dial cord, set gang condenser to fully meshed position and use following parts:

113177	Tension Spring
114955	Clip on end of cord
119087	Ring for dial cord
117057	Cord (90 inches)
	Pointer drive 49 inches
	Gang drive 41 inches

AUDIO OSCILLATION

The audio system of this receiver utilizes a two stage type of inverse feed-back arrangement and should it ever be necessary to replace the speaker or output transformer it is important to maintain a definite phase relationship in the feed-back circuit. If the connections to the output transformer are reversed or if the feed-back connection is made to the wrong side of the output transformer secondary, the system will become regenerative instead of degenerative. Under those conditions audio oscillation may result. If that occurs, oscillation may be prevented by reversing the connections to the primary of the output transformer.

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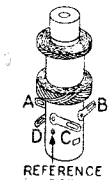
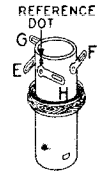
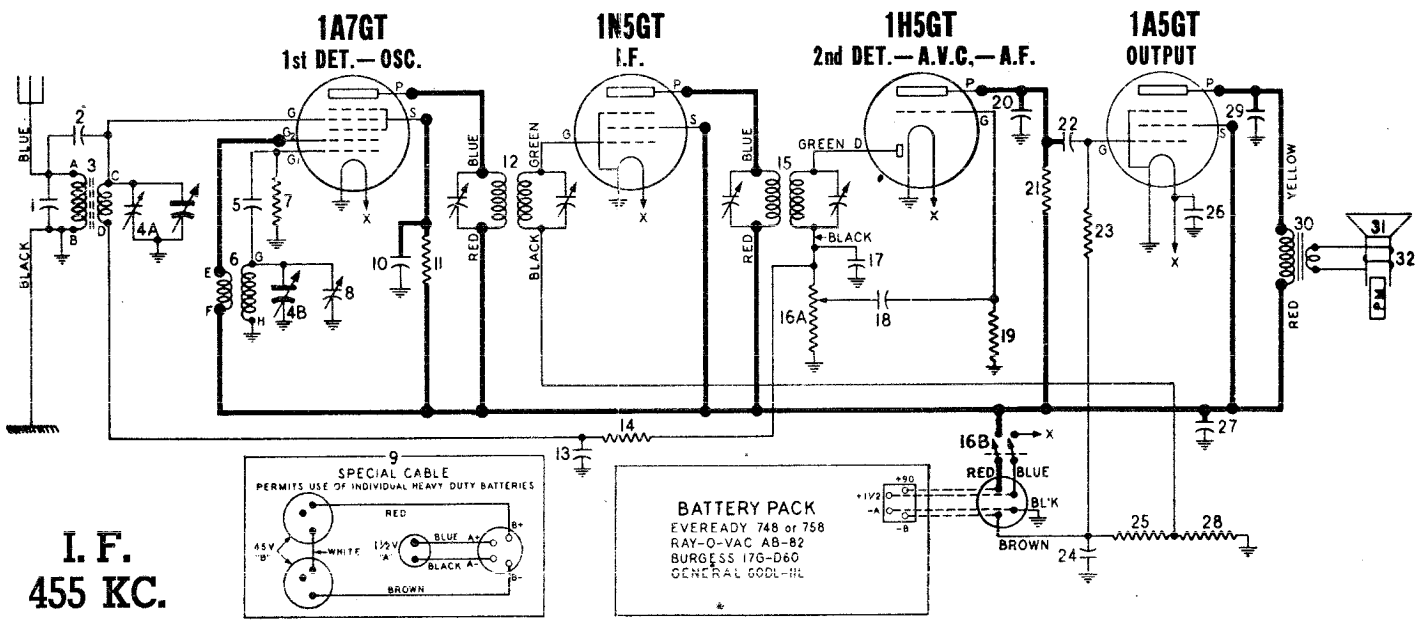
SERVICE DATA FOR STEWART-WARNER MODELS 9005-A, B.



ANTENNA COIL 502277



OSCILLATOR COIL 502278



I. F. 455 KC.

Lettered terminals in illustrations correspond to similarly lettered terminals on the circuit diagram.

SOCKET VOLTAGES

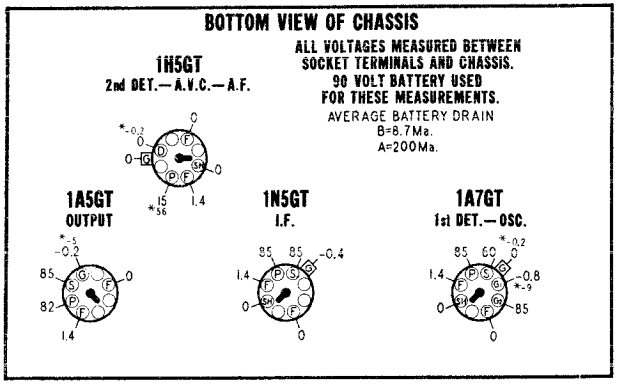
Measured with voltmeter having sensitivity of 1000 ohms per volt except where indicated by (*).

VOLUME ON FULL WITH NO SIGNAL DIAL TUNED TO 540 KC.

BOTTOM VIEW OF CHASSIS

ALL VOLTAGES MEASURED BETWEEN SOCKET TERMINALS AND CHASSIS. 90 VOLT BATTERY USED FOR THESE MEASUREMENTS.

AVERAGE BATTERY DRAIN
B=8.7Ma.
A=200Ma.



REAR OF CHASSIS

*—Measured with vacuum tube voltmeter

PARTS LIST

DIAGRAM NO.	PART NO.	DESCRIPTION	LIST PRICE
		CONDENSERS	
1	502159	Condenser—mica—50 Mmfd. 500 volt	$0.24
2	502411	Condenser—2 Mmfd. 500 volt	.10
4A, B	119528	Condenser variable gang	4.45
5	502159	Condenser—mica—50 Mmfd. 500 volt	.24
8	119719	Condenser—trimmer 5 to 50 Mmfd.	.36
10	502157	Condenser—.05 Mfd. 400 volt	.24
13	502157	Condenser—.05 Mfd. 400 volt	.24
17	502160	Condenser—mica—110 Mmfd. 500 volt	.24
18	502151	Condenser .01 Mfd. 400 volt	.20
20	502271	Condenser—mica—260 Mmfd. 500 volt	.30
22	502151	Condenser—.01 Mfd. 400 volt	.20
24	502286	Condenser—electrolytic 10 Mfd. 25 volt	.60
26	502263	Condenser—.5 Mfd. 150 volt	.36
27	502262	Condenser—.25 Mfd. 200 volt	.36
29	502260	Condenser—.002 Mfd. 600 volt	.16
		RESISTORS	
7	502133	Resistor—carbon—220,000 ohms ¼ watt	.12
11	502266	Resistor—carbon—15,000 ohms ¼ watt	.12
14	502269	Resistor—carbon—3.3 Meg. ¼ watt	.12
16A, B	161325	Volume control (with switch) 500,000 ohms	1.50
19	502269	Resistor—carbon—3.3 Meg. ¼ watt	.12
21	502267	Resistor—carbon—680,000 ohms ¼ watt	.12
23	502268	Resistor—carbon—1 Meg. ¼ watt	.12
25	502127	Resistor—carbon—560 ohms ¼ watt	.12
28	502264	Resistor—carbon—47 ohms ¼ watt	.12
		COILS & TRANSFORMERS	
3	502277	Coil—antenna coupling	1.80
6	502278	Coil—oscillator	1.05
12	502279	Transformer—1st I.F.	2.30
15	502280	Transformer—2nd I.F.	2.30
30	119749	Transformer—output for M-115095 Spkr.	3.40
		OTHER ELECTRICAL PARTS	
9	116566	Battery cable for use with indiv. batt.	$1.60
31	119748	Cone & voice coil for M-115095 spkr.	2.85
32	115095	Speaker P.M. dynamic (6 inch)	10.00
		MISCELLANEOUS PARTS	
	502575	Background (foil) around indicator hole	.05
	112745	Clip—coil mtg.	.01
	114955	Clip—retainer on end of dial cord	.01
	117057	Cord—dial drive (36 in. required), per ft.	.05
	502226	Dial scale	.16
	501449	Knob	.15
	111372	Lever for OFF-ON indicator	.04
	119518	OFF-ON indicator plate (less foil tab)	.10
	502576	OFF-ON indicator tab (with red dot)	.42
	502281	Plug for battery cable	.36
	502602	Pointer	.08
	81145	Retaining ring for tuning shaft	.01
	119087	Ring—dial cord	.01
	83047	Screw No. 9 x ⅞; chassis mtg.	.02
	85827	Screw—No. 8-32 for indicator lever	.02
	161327	Shaft—tuning control	.18
	113169	Spring—OFF-ON indicator	.05
	114968	Spring—dial cord tension	.03
	116690	Socket—octal base	.12
	111456	Washer—spring washer for tuning shaft	.005
	500487	Washer—felt; for knobs	.01
	502397	Window—dial, celluloid	.30
	502398	Window—OFF-ON indicator, celluloid	.07

PRICES SUBJECT TO CHANGE WITHOUT NOTICE

ALIGNMENT PROCEDURE

1. When gang condenser is fully meshed, dial pointer should be in the position indicated by the 54 mark on the dial. If it is set incorrectly, release the pointer clip on the dial cord and reposition pointer.

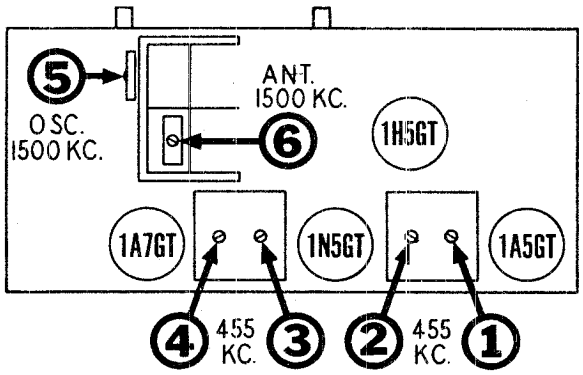
2. Connect an output meter across speaker voice coil or from the plate of the 1A5GT tube to chassis through a 0.1 Mfd. condenser.

3. Connect the ground lead of the signal generator to the receiver ground lead (black) or to the chassis.

4. Set volume control to maximum volume position and use a weak signal from the signal generator.

DUMMY ANT. IN SERIES WITH SIGNAL GENERATOR	CONNECT HIGH SIDE OF SIG. GENERATOR TO	SIGNAL GENERATOR FREQUENCY	RECEIVER DIAL SETTING	TRIMMER NUMBER	TRIMMER DESCRIPTION	TYPE OF ADJUSTMENT
.1 MFD. Condenser	Grid cap on 1A7GT tube	455 KC	Any point where it does not affect the signal	1-2	2nd I.F.	Adjust for maximum output. Then repeat adjustment.
				3-4	1st I.F.	
200 MMFD. Mica Condenser	External antenna lead (blue)	1500 KC	1500 KC	5	Broadcast Oscillator	Adjust for maximum output.
200 MMFD. Mica Condenser	External antenna lead (blue)	1500 KC	Tune to 1500 KC generator signal	6	Broadcast Antenna	Adjust for maximum output.

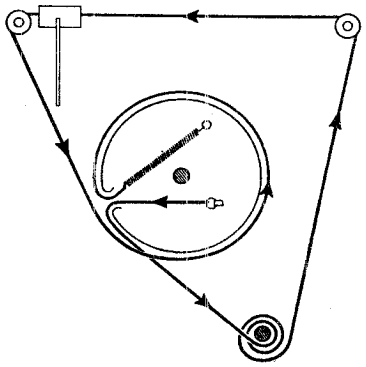
TOP VIEW OF CHASSIS



DIAL AND POINTER DRIVE CORD ARRANGEMENT

To string dial cord, set gang condenser to fully meshed position and use following parts:

114955 Clip on end of cord
117057 Cord (36 inches)
119087 Ring for dial cord
114968 Tension Spring



POWER LINE OPERATION

The following power pack may be used to operate this set on 110 volt 50-60 cycle A.C. power lines.

Porta-Power Model "H"

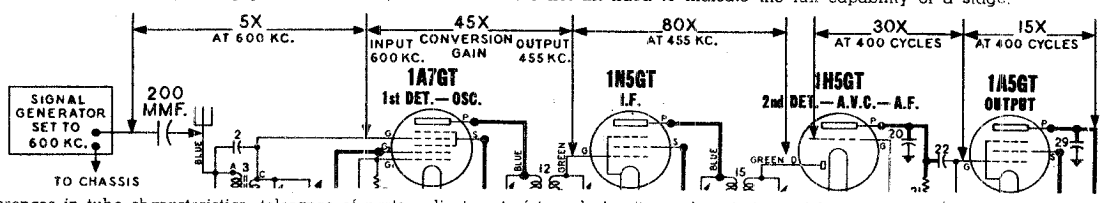
This unit is manufactured by the General Transformer Corp., 1250 W. Van Buren St., Chicago, Ill.

APPROXIMATE STAGE GAIN DATA

Be sure R.F. and I.F. stages are accurately aligned before measuring gain. R.F. gains can be measured with a "channel" type instrument containing a tuned and calibrated R.F. amplifier. A vacuum tube voltmeter may be used for audio gain measurements. Observe following precautions.

1. For all gain measurements connect signal generator as shown. Use 600 KC signal with 400 cycles modulation (use nearby frequency if local station interferes.)
2. For R.F. and I.F. measurements connect negative terminal of a 1½-volt battery to A.V.C. lead and positive terminal to chassis. This provides a definite operating point.
3. Be sure radio is carefully tuned to generator signal (use weak signal for sharp tuning.)
4. When using a "channel" type instrument carefully tune it for maximum output at desired frequency before making measurements.

The R.F. and I.F. stage gains shown below are less than under normal operating conditions due to the use of 1½ volts fixed bias in order to establish a definite operating point. Therefore, these values are not intended to indicate the full capability of a stage.



Differences in tube characteristics, tolerance of parts, adjustment of tuned circuits, and variations of line voltage will influence stage gain. Accuracy of measurements is dependent upon careful tuning of receiver to generator signal and experience in using your test equipment. These factors may create considerable variation in gain measurements.

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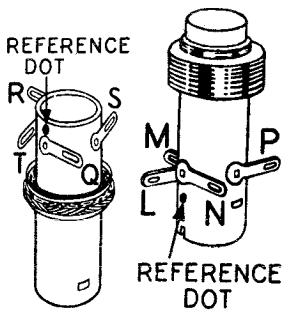
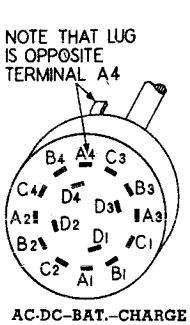
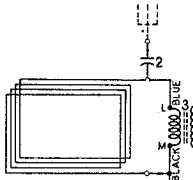


OSC. COIL
502498

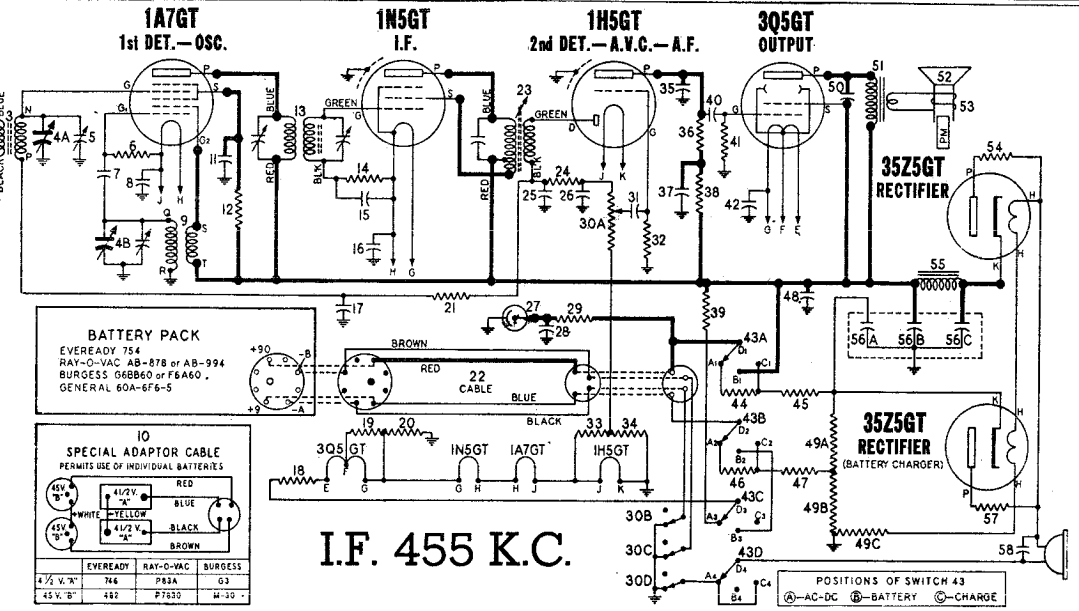
ANTENNA COIL
502499



AC-DC-BAT.-CHARGE SWITCH
502526



Lettered terminals in illustrations correspond to similarly lettered terminals on the circuit diagram.



I.F. 455 K.C.

PARTS LIST

DIA-GRAM NO.	PART NO.	DESCRIPTION	LIST PRICE
		CONDENSERS	
2	502150	Condenser—.004 Mfd. 600 volt	$0.20
4-A, B	502494	Condenser—variable gang	4.80
5	119132	Condenser—trimmer 2 to 15 Mmfd.	.36
7	502159	Condenser—mica 50 Mmfd. 500 volt	.24
8	502153	Condenser—.05 Mfd. 200 volt	.24
11	502547	Condenser—electrolytic 4 Mfd. 150 volt	.75
15	502153	Condenser—.05 Mfd. 200 volt	.24
16	502155	Condenser—.1 Mfd. 200 volt	.30
17	502153	Condenser—.05 Mfd. 200 volt	.24
25, 26	502159	Condenser—mica 50 Mmfd. 500 volt	.24
28	502155	Condenser—.1 Mfd. 200 volt	.30
31	502156	Condenser—.004 Mfd. 400 volt	.20
35	502160	Condenser—mica 110 Mmfd. 500 volt	.24
37	502155	Condenser—.1 Mfd. 200 volt	.30
40	502151	Condenser—.01 Mfd. 400 volt	.20
42	502527	Condenser—electrolytic 50 Mfd. 25 volt	1.10
48	502155	Condenser—.1 Mfd. 200 volt	.30
50	502453	Condenser—.002 Mfd. 400 volt	.20
56-A,B,C	500714	Condenser—electrolytic A—20 Mfd. 150 volt B—20 Mfd. 200 volt C—20 Mfd. 200 volt	1.70
58	502153	Condenser—.05 Mfd. 200 volt	.24
		RESISTORS	
6	502133	Resistor—carbon 220,000 ohms ¼ watt	.12
12	502131	Resistor—carbon 47,000 ohms ¼ watt	.12
14	502136	Resistor—carbon 10 Meg. ¼ watt	.12
18	502455	Resistor—carbon 27 ohms ¼ watt	.12
19	502457	Resistor—carbon 330 ohms ¼ watt	.12
20	502458	Resistor—carbon 430 ohms ¼ watt	.12
21	502269	Resistor—carbon 3.3 Meg. ¼ watt	.12
24	502132	Resistor—carbon 100,000 ohms ¼ watt	.12
29	502269	Resistor—carbon 3.3 Meg. ¼ watt	.12
30-A,B,C,D	502525	Volume control (with switch) 1 Meg.	1.25
32	502269	Resistor—carbon 3.3 Meg. ¼ watt	.12
33, 34	502456	Resistor—carbon 220 ohms ¼ watt	.12
36	502268	Resistor—carbon 1 Meg. ¼ watt	.12
38	502134	Resistor—carbon 470,000 ohms ¼ watt	.12
39	500712	Resistor—wire wound 1830 ohms 5 watt	.55
41	502135	Resistor—carbon 2.2 Meg. ¼ watt	.12
44	502266	Resistor—carbon 15,000 ohms ¼ watt	.12
45	502459	Resistor—carbon 6800 ohms ¼ watt	.12
46	502457	Resistor—carbon 330 ohms ¼ watt	.12
47	502455	Resistor—carbon 27 ohms ¼ watt	.12
49-A,B,C	500715	Resistor—wire wound A—1460 ohms 10 watt B— 155 ohms 1 watt C— 310 ohms 10 watt	1.65
54	502454	Resistor—wire wound 47 ohms 1 watt	.16
57	502454	Resistor—wire wound 47 ohms 1 watt	.16

DIA-GRAM NO.	PART NO.	DESCRIPTION	LIST PRICE
		COILS AND TRANSFORMERS	
3	502499	Coil—antenna coupling	$1.70
9	502498	Coil—oscillator	1.05
13	502495	Transformer—1st I.F.	2.30
23	500749	Transformer—2nd I.F.	2.30
51	502902	Trans.—output for A-502491 speaker	2.50
	502492	Trans.—output for R-502491 speaker	2.50
55	502528	Filter choke	2.35
		OTHER ELECTRICAL PARTS	
10	500746	Cable—for use with individ. batteries	1.60
22	502536	Cable—for use with battery pack	.85
27	500713	Neon indicator lamp	.75
43-A,B,C,D	502526	Switch—"AC-DC—BAT.—CHARGE"	1.50
52	502901	Cone & voice coil for A-502491 speaker	2.00
	502493	Cone & voice coil for R-502491 speaker	2.00
53	502491	Speaker—P.M. dynamic (5 inch)	7.70
		MISCELLANEOUS PARTS	
	160026	Base for mtg. electrolytic condenser	.04
	112745	Clip—coil mtg.	.01
	114955	Clip—retainer on end of dial cord	.01
	117057	Cord—dial drive (28" required) per ft.	.05
	502535	Escutcheon plate	2.40
	502544	Knob—volume or tuning	.10
	502545	Knob—"AC-DC—BAT.—CHARGE"	.12
	500747	Plug for battery cable (fits chassis)	.10
	502537	Plug for battery cable (fits batt. pack)	.16
	502546	Pointer	.16
	81145	Retaining ring for tuning shaft	.01
	119087	Ring for dial cord	.01
	79894	Screw—No. 8x5/8"; for mtg. chassis	.01
	502524	Shaft—tuning control	.10
	117716	Shield—tube	.07
	116690	Socket—octal base	.12
	500681	Socket—for battery cable	.10
	161384	Spring—dial cord tension	.06
	502533	Terminal strip for antenna	.20
	111456	Washer—spring washer for tuning shaft	.005
	502534	Washer—felt; for knobs	.01

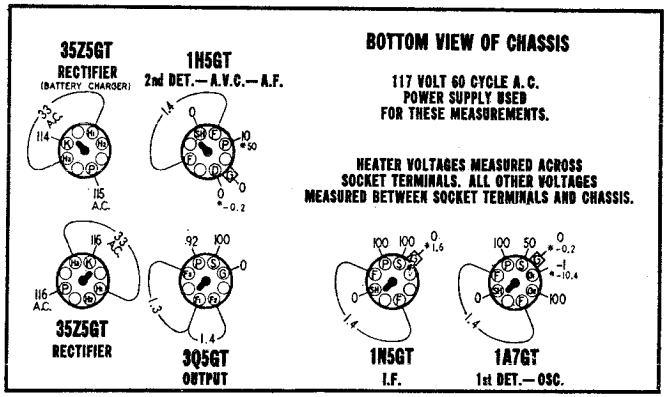
PRICES SUBJECT TO CHANGE WITHOUT NOTICE

SOCKET VOLTAGES

Measured with voltmeter having sensitivity of 1000 ohms per volt except where indicated by (*).

VOLUME ON FULL WITH NO SIGNAL — **DIAL TUNED TO 540 KC.**

"AC-DC—BAT.—CHARGE" SWITCH IN "AC-DC" POSITION



REAR OF CHASSIS

*—Measured with vacuum tube voltmeter.

STEWART WARNER CORP.

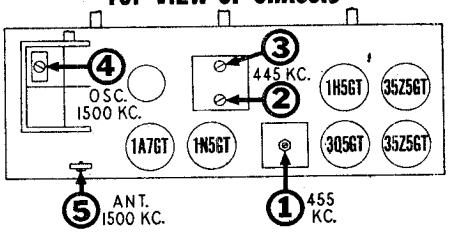
MODELS 9007-A, 9007-F, 9007-G

ALIGNMENT PROCEDURE

1. Slide chassis partially out of cabinet by removing staples at each side of wood shelf and pulling entire shelf back about 2 inches. Do not disturb connections to loop antenna.
2. Connect an output meter across the voice coil of the speaker or between the plate of the 3Q5GT output tube and chassis through a .1 mfd. condenser.
3. Connect the ground lead of the signal generator to chassis through a .25 mfd. condenser.
4. Set the volume control in the maximum position and use a weak signal from the generator.
5. Set "AC-DC—BAT.—CHARGE" Switch in "AC-DC" position.

DUMMY ANT. IN SERIES WITH SIGNAL GENERATOR	CONNECT HIGH SIDE OF SIG. GENERATOR TO	SIGNAL GENERATOR FREQUENCY	RECEIVER DIAL SETTING	TRIMMER NUMBER	TRIMMER DESCRIPTION	TYPE OF ADJUSTMENT
300 MMFD. Condenser	Grid Cap of 1A7GT Tube	455 KC.	Any Point Where It Does Not Affect Signal	1	2nd I.F.	Loosen lock nut. Adjust screw for maximum output.
				2-3	1st I.F.	Adjust for maximum output. Recheck 1, 2 and 3 for maximum output and tighten lock nut on 1.
300 MMFD. Condenser	Center Terminal on Antenna Terminal Strip at bottom of cabinet.	1500 KC.	1500 KC. (Slide set into cabinet and replace pointer to set dial.)	4	Broadcast Oscillator (Shunt)	Adjust trimmer for maximum output.
300 MMFD. Condense	Center Terminal on Antenna Terminal Strip at bottom of cabinet.	1500 KC.	Tune to 1500 KC. Generator Signal	5	Broadcast Antenna	Adjust for maximum output. Slide chassis all the way into cabinet when making this adjustment.

TOP VIEW OF CHASSIS



INDICATOR LAMP

The flashing neon lamp on the dial face indicates condition of batteries. This lamp is included in an oscillating (R-C) circuit which is designed to oscillate at approximately 3 pulses per second when batteries are in a fully charged condition. As the battery voltage decreases with use, number of pulses per second decreases.

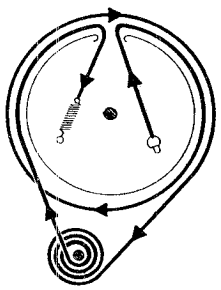
This lamp will only show the true condition of the batteries when the Selector Switch is in the "Battery" position. Lamp flashes more rapidly during charging or "AC-DC" operation.

When battery voltage is low (approximately 72 volts) the lamp flashes more slowly (about once per second). The set should not be operated from battery power after this point is reached and batteries should be recharged immediately. Charge for at least twice the time they were used and as soon as possible after they are run down. As batteries age it is necessary to charge for a longer period. For longest battery life, charge immediately after using.

IMPORTANT:
1. Completely dead batteries cannot be recharged.
2. When set is connected to a DC line, check for correct polarity by operating it before attempting to charge the batteries.
3. Batteries will be discharged if ON-OFF switch is left ON when power cord is not connected to wall outlet.

CHARGING CIRCUIT

The battery charging circuit consists of a 35Z5GT rectifier and a suitable resistor voltage dividing network. This circuit provides a very low charging current when the receiver is operated on AC-DC and is just enough to maintain the batteries but will not charge them. A separate charging position is provided for the regular charging operation. A charging rate of approximately ⅓ the discharge rate is used to give best results.



DIAL DRIVE CORD ARRANGEMENT

To string dial cord, set gang condenser to fully meshed position and use following parts:

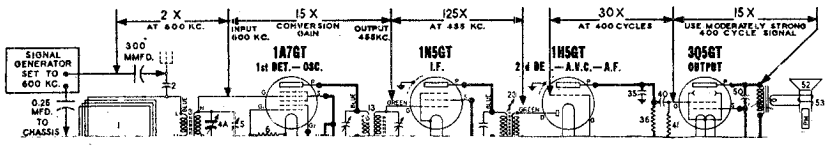
114955	Clip on end of cord
117057	Cord (28 inches)
119087	Ring for dial cord
161384	Tension Spring

APPROXIMATE STAGE GAIN DATA

Be sure R.F. and I.F. stages are accurately aligned before measuring gain. R.F. gains can be measured with a "channel" type instrument containing a tuned and calibrated R.F. amplifier. A vacuum tube voltmeter may be used for audio gain measurements.

1. For all gain measurements connect signal generator as shown. Use 600 KC. signal with 400 cycle modulation (use nearby frequency if local station interferes).
2. For R.F. and I.F. measurements connect negative terminal of a 1½-volt battery to A.V.C. lead and positive terminal to chassis. This provides a definite operating point.
3. Be sure radio is carefully tuned to generator signal (use weak signal for sharp tuning).
4. When using a "channel" type instrument carefully tune it for maximum output at desired frequency before making measurements.

The R.F. and I.F. stage gains shown below are less than under normal operating conditions due to the use of 1½ volts fixed bias in order to establish a definite operating point. Therefore, these values are not intended to indicate the full capability of a stage.



Differences in tube characteristics, tolerance of parts, adjustment of tuned circuits, and variations of line voltage will influence stage gain. Accuracy of measurements is dependent upon careful tuning of receiver to generator signal and experience in using your test equipment. These factors may create considerable variation in gain measurements.

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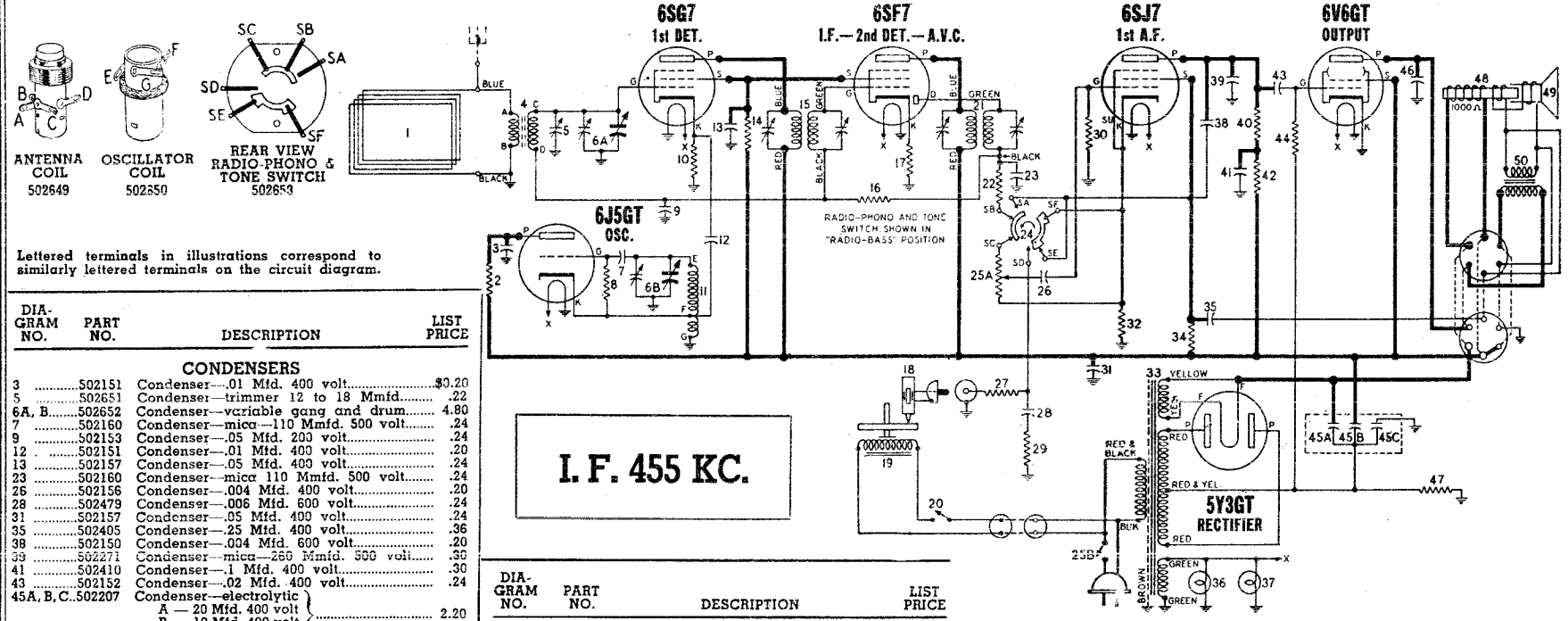
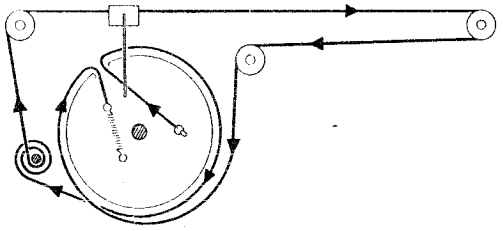


Lettered terminals in illustrations correspond to similarly lettered terminals on the circuit diagram.

DIAGRAM NO.	PART NO.	DESCRIPTION	LIST PRICE
		CONDENSERS	
3	502151	Condenser—.01 Mfd. 400 volt	$0.20
5	502651	Condenser—trimmer 12 to 18 Mmfd.	.22
6A, B	502652	Condenser—variable gang and drum	4.80
7	502160	Condenser—mica—110 Mmfd. 500 volt	.24
9	502153	Condenser—.05 Mfd. 200 volt	.24
12	502151	Condenser—.01 Mfd. 400 volt	.20
13	502157	Condenser—.05 Mfd. 400 volt	.24
23	502160	Condenser—mica 110 Mmfd. 500 volt	.24
26	502156	Condenser—.004 Mfd. 400 volt	.20
28	502479	Condenser—.006 Mfd. 600 volt	.24
31	502157	Condenser—.05 Mfd. 400 volt	.24
35	502405	Condenser—.25 Mfd. 400 volt	.36
38	502150	Condenser—.004 Mfd. 600 volt	.20
39	502271	Condenser—mica—260 Mmfd. 500 volt	.30
41	502410	Condenser—.1 Mfd. 400 volt	.30
43	502152	Condenser—.02 Mfd. 400 volt	.24
45A, B, C	502207	Condenser—electrolytic A — 20 Mfd. 400 volt, B — 10 Mfd. 400 volt, C — 20 Mfd. 25 volt	2.20
46	502156	Condenser—.004 Mfd. 400 volt	.20
		RESISTORS	
2	502466	Resistor—carbon—33,000 ohms 1 watt	.16
8	502131	Resistor—carbon—47,000 ohms ¼ watt	.12
10	502514	Resistor—carbon—3,300 ohms ¼ watt	.12
14	502288	Resistor—carbon—47,000 ohms 1 watt	.16
16	502269	Resistor—carbon—3.3 Meg. ¼ watt	.12
17	502264	Resistor—carbon—47 ohms ¼ watt	.12
22	502131	Resistor—carbon—47,000 ohms ¼ watt	.12
25A, B	502654	Volume control—with switch; 1 Meg.	1.25
27	502133	Resistor—carbon—220,000 ohms ¼ watt	.12
29	502408	Resistor—carbon—68,000 ohms ¼ watt	.12
30	502468	Resistor—carbon—4.7 Meg. ¼ watt	.12
32	502406	Resistor—carbon—1,500 ohms ¼ watt	.12
34	502135	Resistor—carbon—2.2 Meg. ¼ watt	.12
40	502133	Resistor—carbon—220,000 ohms ¼ watt	.12
42	502133	Resistor—carbon—220,000 ohms ¼ watt	.12
44	502134	Resistor—carbon—470,000 ohms ¼ watt	.12
47	502293	Resistor—wire wound—200 ohms 2 watt	.25
		COILS & TRANSFORMERS	
1	502697	Loop antenna and cabinet back	3.25
4	502649	Coil—antenna	1.45
11	502650	Coil—oscillator	1.00
15	502657	Transformer—1st I.F.	2.30
21	502658	Transformer—2nd I.F.	2.30
33	502174	Transformer—power	7.50
50	502170	Transformer—output for R-502168 spkr.	2.00
	504061	Transformer—output for M-502168 spkr.	2.00
	504122	Transformer—output for D-502168 spkr.	2.00
		OTHER ELECTRICAL PARTS	
18	502461	Crystal cartridge (Astatic L-71)	6.10
19	502846	Motor—type "GI"-502584 record changer 115 volt 50 cycle	12.00
	502847	Motor—type "GI-502584 record changer 115 volt 60 cycle	10.00
20	502979	Switch-on-off; type "GI"-502584 record changer	.48

DIAGRAM NO.	PART NO.	DESCRIPTION	LIST PRICE
24	502653	Switch—Radio-Phono and Tone	$1.30
36, 37	110629	Lamp—dial (Mazda No. 44) 6.3 V. 0.25 Amps.	.15
48	502168	Speaker—electro-dynamic (6 inch)	9.50
49	502169	Cone & Voice coil for R-502168 spkr.	2.75
	504062	Cone & Voice coil for M-502168 spkr.	2.75
	504123	Cone & Voice coil for D-502168 spkr.	2.75
		MISCELLANEOUS PARTS	
	116467	Base for mtg. electrolytic condenser	.04
	119559	Clamp—dial glass	.08
	112745	Clip—coil mounting	.01
	114955	Clip—retainer on end of dial cord	.01
	117057	Cord—dial drive (40 in. required) per ft.	.05
	502672	Dial scale—glass	1.05
	502564	Knob—volume or tuning (Model 9009-H)	.09
	502698	Knob—volume or tuning (Model 9009-B)	.08
	502701	Knob—"Phono-Radio" (Model 9009-B)	.10
	504698	Knob—"Phono-Radio" (Model 9009-H)	.12
	502460	Needle—phonograph	1.50
	500968	Plug—phono. pick-up cable	.10
	501031	Plug—phono. motor cable	.15
	504097	Plug—speaker	.25
	502664	Pointer	.16
	81145	Retaining ring for tuning shaft	.01
	119087	Ring for dial cord	.01
	113463	Rubber pad—chassis mtg.	.03
	116584	Rubber spacer for mtg. dial scale	.02
	112874	Screw—No. 10 x 1⅛; chassis mtg.	.03
	501777	Screw—No. 4 x ½; for mtg. loop & back	.02
	502173	Shaft—tuning control	.15
	116690	Socket—octal base	.12
	160039	Socket—phono. pick-up plug	.08
	160392	Socket—octal (rectifier)	.16
	501182	Socket—phono. motor cable	.45
	502210	Socket—speaker	.25
	502662	Socket—dial lamp	.16
	161394	Spring—dial cord tension	.06
	111456	Washer—spring washer for tuning shaft	.005
	500487	Washer—felt; for knobs	.01
	119885	Washer—felt for phono. mtg.	.01



DIAL AND POINTER DRIVE CORD ARRANGEMENT

Top view
Dial plate removed

To string dial cord, set gang condenser to fully meshed position and use following parts:

114955 Clip on end of cord
117057 Cord (40 inches)
119087 Ring for dial cord
161394 Tension Spring

IMPORTANCE OF MAINTAINING FIXED POSITIONS FOR LEADS AT TOP OF CHASSIS

The shielded leads which are routed to the "Radio-Phono" switch and volume control should be tied to the upright bracket which supports the dial assembly. Grounded shields on these leads must not be allowed to contact electrolytic condenser case. If case of condenser is grounded it will short out bias voltage for 6V6GT tube.

AUDIO OSCILLATION

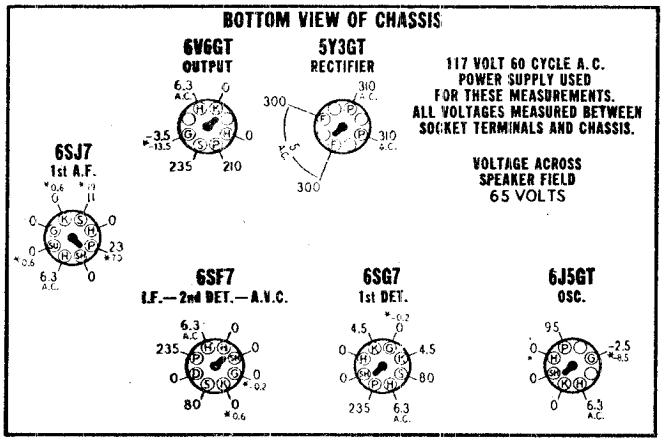
The audio system of this receiver utilizes a two stage type of inverse feed-back arrangement and should it ever be necessary to replace the speaker or output transformer it is important to maintain a definite phase relationship in the feed-back circuit. If the connections to the output transformer are reversed or if the feed-back connection is made to the wrong side of the output transformer secondary, the system will become regenerative instead of degenerative. Under those conditions audio oscillation may result. If that occurs, oscillation may be prevented by reversing the connections to the primary of the output transformer.

PRICES SUBJECT TO CHANGE WITHOUT NOTICE

STEWART WARNER CORP.

Measured with voltmeter having sensitivity of 1000 ohms per volt except where indicated by (*).

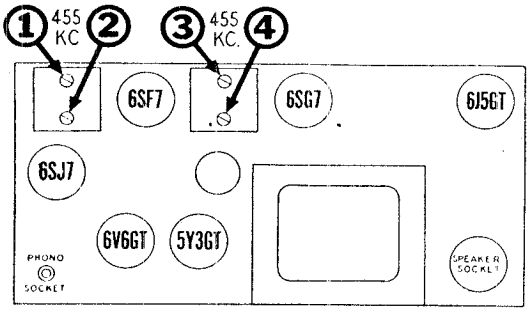
RADIO-PHONO-TONE SWITCH IN "RADIO-BASS" POSITION
VOLUME ON FULL WITH NO SIGNAL DIAL TUNED TO 540 KC.



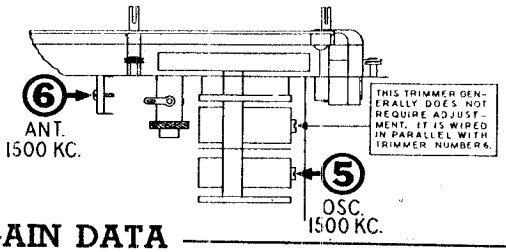
*—Measured with vacuum tube voltmeter.

NOTE:—The 6V6GT grid bias of —13½ volts can be measured across resistor No. 47.

TOP VIEW OF CHASSIS



SIDE VIEW OF CHASSIS

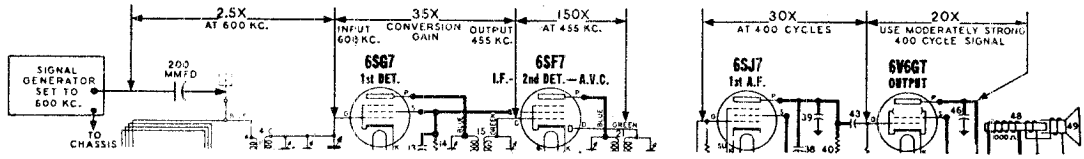


APPROXIMATE STAGE GAIN DATA

Be sure R.F. and I.F. stages are accurately aligned before measuring gain. R.F. gains can be measured with a "channel" type instrument containing a tuned and calibrated R.F. amplifier. A vacuum tube voltmeter may be used for audio gain measurements. Observe following precautions:

1. For all gain measurements connect signal generator as shown. Use 600 K.C. signal with 400 cycle modulation (use nearby frequency if local station interferes.)
2. For R.F. and I.F. measurements connect negative terminal of a 3 volt battery (two 1½ volt cells in series) to A.V.C. lead at terminal "D" of antenna coil; then connect positive battery lead to chassis. This provides a definite operating point. IMPORTANT: Disconnect battery when measuring audio stage gains.
3. Be sure radio is carefully tuned to generator signal (use weak signal for sharp tuning.)
4. When using a "channel" type instrument carefully tune it for maximum output at desired frequency before making measurements.

The R.F. and I.F. stage gains shown below are less than under normal operating conditions due to the use of 3 volts fixed bias in order to establish a definite operating point. Therefore, these values are not intended to indicate the full capability of a stage.



Differences in tube characteristics, tolerance of parts, adjustment of tuned circuits, and variations of line voltage will influence stage gain. Accuracy of measurements is dependent upon careful tuning of receiver to generator signal and experience in using your test equipment. These factors may create considerable variation in gain measurements.

Remove chassis and loop antenna (cabinet back) from cabinet. Reconnect loop to chassis and space it approximately same distance from chassis as when installed in cabinet.

With the gang condenser fully meshed, the dial pointer should be in the position indicated by the last mark below 55 on the dial. If it is set incorrectly, release the pointer clip on the dial cord and reposition pointer.

Connect an output meter across the speaker voice coil or from the plate of the 6V6GT tube to chassis through a .1 Mfd. condenser.

Connect the ground lead of signal generator to the receiver chassis.

Set volume control at maximum volume position and use a weak signal from the signal generator.

DUMMY ANT. IN SERIES WITH SIGNAL GENERATOR	CONNECT HIGH SIDE OF SIG. GENERATOR TO	SIGNAL GENERATOR FREQUENCY	RECEIVER DIAL SETTING	TRIMMER NUMBER	TRIMMER DESCRIPTION	TYPE OF ADJUSTMENT
.1 MFD. Condenser	Trimmer on top section of gang.	455 KC	Any point where it does not affect the signal	1-2	2nd I.F.	Adjust for maximum output. Then repeat adjustment.
				3-4	1st I.F.	
200 MMFD. Mica Condenser	External Antenna Clip on Loop Antenna	1500 KC	1500 KC	5	Broadcast Oscillator	Adjust for maximum output.
200 MMFD. Mica Condenser	External Antenna Clip on Loop Antenna	1500 KC	Tune to 1500 KC generator signal	6	Broadcast Antenna	Adjust for maximum output.

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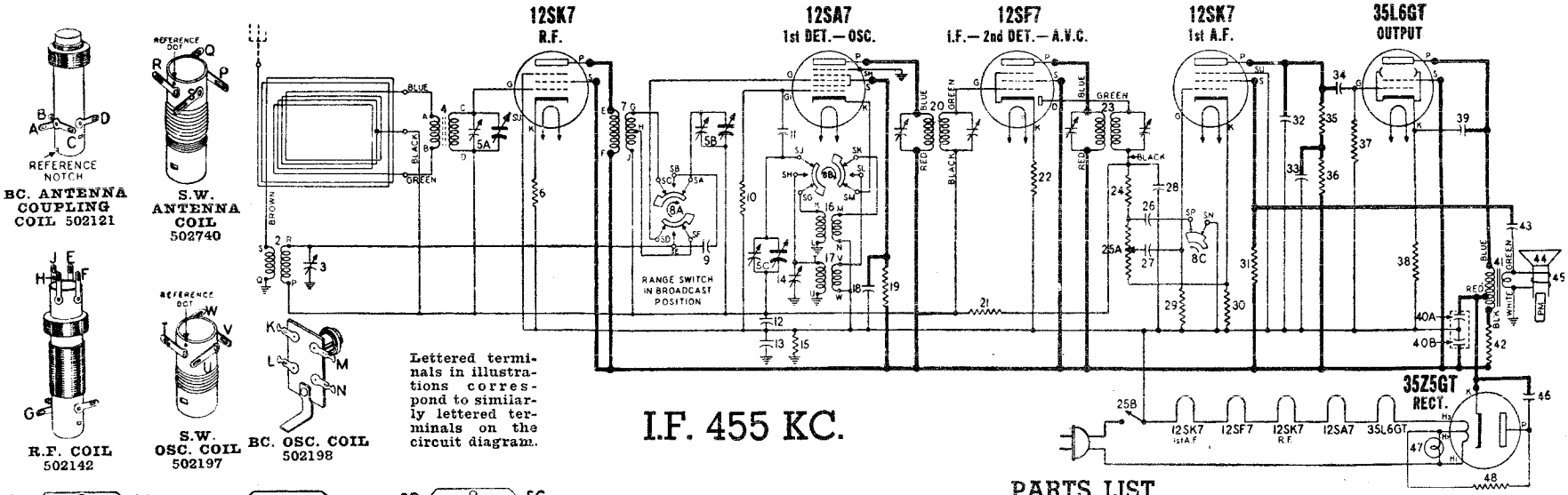


I.F. 455 KC.

BC. ANTENNA COUPLING COIL 502121

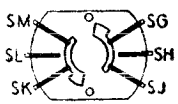
S.W. ANTENNA COIL 502740

R.F. COIL 502142

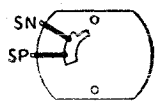
S.W. OSC. COIL 502197

BC. OSC. COIL 502198

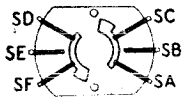
Lettered terminals in illustrations correspond to similarly lettered terminals on the circuit diagram.



FRONT DECK FRONT VIEW



FRONT DECK REAR VIEW



REAR DECK FRONT VIEW

BAND AND TONE SWITCH 502199

SOCKET VOLTAGES

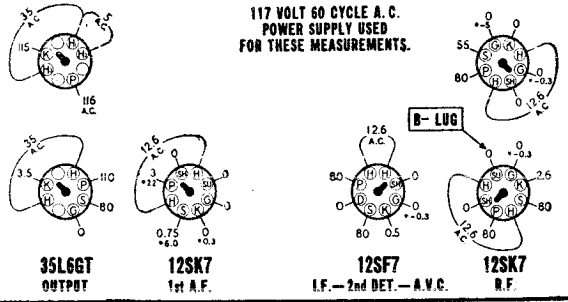
Measured with voltmeter having sensitivity of 1000 ohms per volt except where indicated by (*).

VOLUME ON FULL WITH NO SIGNAL — DIAL TUNED TO 540 KC.

BOTTOM VIEW OF CHASSIS

HEATER VOLTAGES MEASURED ACROSS SOCKET TERMINALS. ALL OTHER VOLTAGES MEASURED BETWEEN SOCKET TERMINALS AND B- LUG.

117 VOLT 60 CYCLE A.C. POWER SUPPLY USED FOR THESE MEASUREMENTS.



REAR OF CHASSIS

*—Measured with vacuum tube voltmeter

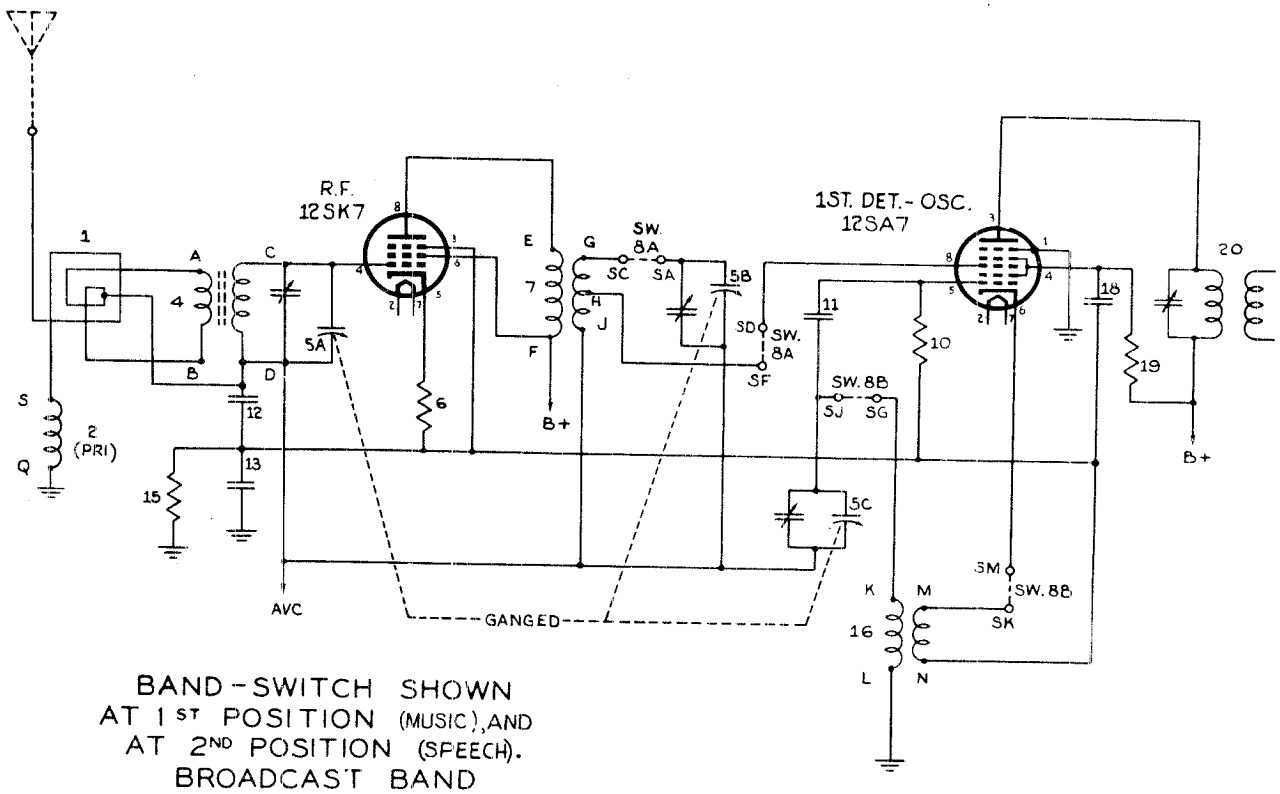
PARTS LIST

DIAGRAM NO.	PART NO.	DESCRIPTION	LIST PRICE
		CONDENSERS	
3	502172	Condenser—trimmer; 25 to 100 Mmfd.	$0.36
5A-5B-5C	502123	Condenser—variable gang (with drum)	4.60
9	502162	Condenser—315 Mmfd. 500 volt	.45
11	502159	Condenser—mica—50 Mmfd. 500 volt	.24
12	502155	Condenser—.1 Mfd. 200 volt	.30
13	502158	Condenser—.2 Mfd. 400 volt	.36
14	502172	Condenser—trimmer; 25 to 100 Mmfd.	.36
18	502262	Condenser—.25 Mfd. 200 volt	.36
26	502470	Condenser—.0008 Mfd. 400 volt	.20
27	502453	Condenser—.002 Mfd. 400 volt	.20
28	502160	Condenser—mica—110 Mmfd. 500 volt	.24
32	502160	Condenser—mica—110 Mmfd. 500 volt	.24
33	502153	Condenser—.05 Mfd. 200 volt	.24
34	502156	Condenser—.004 Mfd. 400 volt	.20
39	502151	Condenser—.01 Mfd. 400 volt	.20
40A-40B	500256	Condenser—electrolytic A-40 Mfd. 150 volt / B-20 Mfd. 150 volt	1.50
43	502152	Condenser—.02 Mfd. 400 volt	.24
46	502157	Condenser—.05 Mfd. 400 volt	.24
		RESISTORS	
6	502140	Resistor—carbon 390 ohms ¼ watt	.12
10	502130	Resistor—carbon 22,000 ohms ¼ watt	.12
15	502133	Resistor—carbon 220,000 ohms ¼ watt	.12
19	502291	Resistor—carbon 4700 ohms ¼ watt	.12
21	502269	Resistor—carbon 3.3 Meg. ¼ watt	.12
22	502264	Resistor—carbon 47 ohms ¼ watt	.12
24	502131	Resistor—carbon 47,000 ohms ¼ watt	.12
25A-25B	502145	Volume control 500,000 ohms (with switch)	1.25
29	502136	Resistor—carbon 10 Meg. ¼ watt	.12
30	502128	Resistor—carbon 2200 ohms ¼ watt	.12
31	502135	Resistor—carbon 2.2 Meg. ¼ watt	.12
35-36	502133	Resistor—carbon 220,000 ohms ¼ watt	.12
37	502134	Resistor—carbon 470,000 ohms ¼ watt	.12
38	502138	Resistor—carbon 130 ohms ¼ watt	.12
42	502469	Resistor—carbon 1500 ohms 1 watt	.16
48	502574	Resistor—carbon 33 ohms ½ watt	.12
		COILS & TRANSFORMERS	
1	502503	Loop antenna	3.00
2	502740	Coil—S. W. antenna	1.12
4	502121	Coil—antenna coupling	$1.64
7	502142	Coil—BC. R.F.	2.26
16	502198	Coil—BC. oscillator	1.32
17	502197	Coil—S.W. oscillator	1.12
20	502102	Transformer—1st I.F.	2.30
23	502103	Transformer—2nd I.F.	2.30
41	502213 / 502904 / 504244	Transformer—output for R-502998 spkr. / Transformer—output for A-502998 spkr. / Transformer—output for W-502998 spkr.	2.50 / 2.50 / 2.50
		OTHER ELECTRICAL PARTS	
8A-8B-8C	502199	Switch—tone & band	2.00
44	502214 / 502903 / 504245	Cone and voice coil for R-502998 spkr. / Cone and voice coil for A-502998 spkr. / Cone & voice coil for W-502998 spkr.	2.00 / 2.00 / 2.00
45	502998	Speaker—P.M. dynamic (5 inch)	6.60
47	502473	Lamp—dial (Mazda 47) 6-8V. 150 Ma.	.22
		MISCELLANEOUS PARTS	
	502501	Back for cabinet	.20
	116467	Base for mtg. electrolytic condenser	.04
	502500	Cabinet	19.00
	502506	Clamp—dial scale mtg.	.04
	112745	Clip—coil mtg.	.01
	114955	Clip—retainer on end of dial cord	.01
	500497	Clip—retainer for cabinet back	.02
	116563	Connector—for antenna leads	.01
	117057	Cord—dial drive (55 in. required), per ft.	.05
	500324	Cover—cardboard, for elect. cond.	.04
	502505	Dial scale—glass	1.60
	501186	Grounding plate (under I.F. trans. can.)	.10
	502531	Knob—volume or tuning	.35
	502532	Knob—tone & range sw.	.44
	502367	Pointer	.16
	81145	Retaining ring for tuning shaft	.01
	119087	Ring for dial cord	.01
	17063	Screw—No. 6x¼; holds clamps to cab.	.01
	114628	Screw—No. 8x½; chassis mtg.	.01
	502173	Shaft—tuning control	.15
	116690	Socket—octal base	.12
	160392	Socket—octal (rectifier)	.16
	500499	Socket—dial lamp (with leads)	.44
	161384	Spring—dial cord tension	.06
	111456	Washer—spring washer for tuning shaft	.005

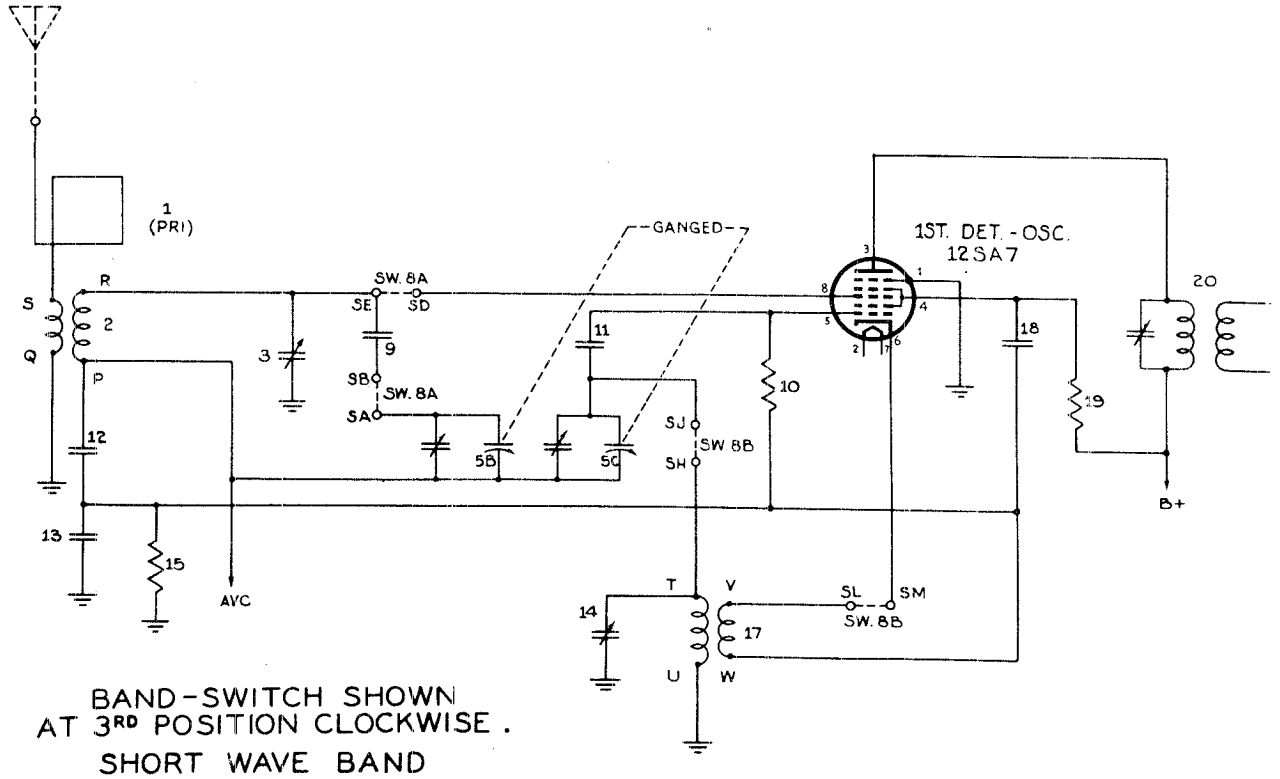
PRICES SUBJECT TO CHANGE WITHOUT NOTICE

STEWART WARNER CORP.

MODEL 62T36
MODEL 9000-B
MODEL 9014-E



BAND-SWITCH SHOWN
AT 1ST POSITION (MUSIC), AND
AT 2ND POSITION (SPEECH).
BROADCAST BAND
540-1650KC.



BAND-SWITCH SHOWN
AT 3RD POSITION CLOCKWISE.
SHORT WAVE BAND
9-12 MC

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MODEL 9014-E

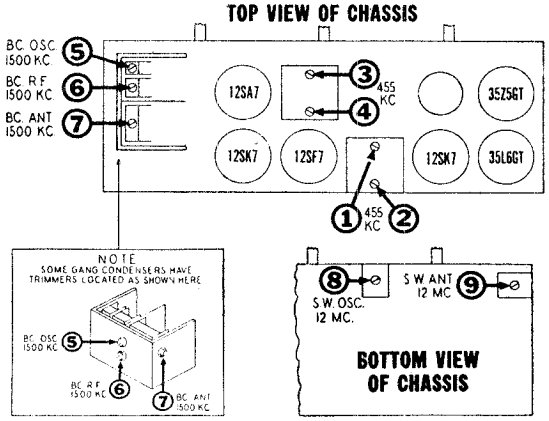
STEWART WARNER CORP.

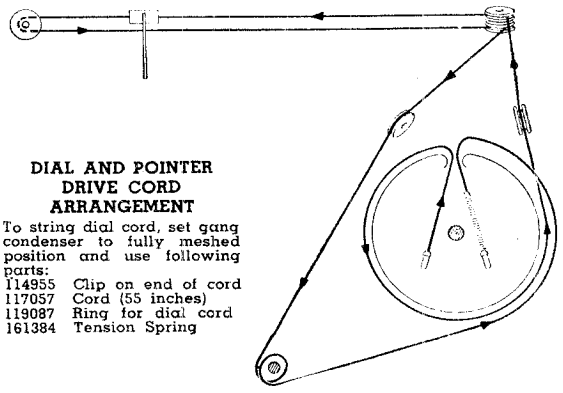
ALIGNMENT PROCEDURE

1. Remove chassis and loop antenna from cabinet. Reconnect loop to chassis and space it approximately same distance from chassis as when installed in cabinet.
2. Note that there are four calibrating lines stamped into the metal dial frame. When gang condenser is fully meshed, dial pointer should be in the position indicated by first line at the left. If it is set incorrectly, release pointer clip on dial cord and reposition pointer.
3. Connect an output meter across the speaker voice coil or from plate of 35L6GT tube to B— through a .1 Mfd. condenser (see voltage chart for convenient B— connection).
4. Connect ground lead from signal generator to B— through a .25 Mfd. condenser.
5. Set volume control at maximum volume position and use a weak signal from the signal generator.

IMPORTANT:—Align this receiver in exactly the order shown below. Broadcast band must be aligned before short wave band.

DUMMY ANT. IN SERIES WITH SIGNAL GENERATOR	CONNECT HIGH SIDE OF GENERATOR TO	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POSITION	RECEIVER DIAL SETTING	TRIMMER NUMBER	TRIMMER DESCRIPTION	TYPE OF ADJUSTMENT
200 MMFD. Mica Condenser	Control Grid of 12SA7	455 KC	Broadcast	Any point where it does not affect the signal	1-2	2nd I.F.	Adjust for maximum output. Then repeat adjustment.
					3-4	1st I.F.	
200 MMFD. Mica Condenser	External Antenna Clip on Loop Frame	1500 KC	Broadcast	Set pointer to 1500 KC reference line stamped into metal dial plate (first line at the right)	5	Broadcast Oscillator (Shunt)	Adjust for maximum output.
200 MMFD. Mica Condenser	External Antenna Clip on Loop Frame	1500 KC	Broadcast	Tune to 1500 KC generator signal	6	Broadcast R.F.	Adjust for maximum output.
200 MMFD. Mica Condenser	External Antenna Clip on Loop Frame	1500 KC	Broadcast	Tune to 1500 KC generator signal	7	Broadcast Antenna	Adjust for maximum output.
400 OHM Resistor	External Antenna Clip on Loop Frame	12 MC	Short Wave	Set pointer to 12 MC. Reference line stamped into metal dial plate (second line from the right)	8	Short Wave Oscillator	Adjust to bring in signal. Check to see if proper peak was obtained by tuning in image at approx. 11.1 MC. If image does not appear, realign at 12 MC. with trimmer screw farther out. Recheck image.
400 OHM Resistor	External Antenna Clip on Loop Frame	12 MC	Short Wave	Tune to 12 MC generator signal	9	Short Wave Antenna	Adjust for maximum output. Try to increase output by detuning trimmer and retuning receiver dial until maximum output is obtained.





DIAL AND POINTER DRIVE CORD ARRANGEMENT

To string dial cord, set gang condenser to fully meshed position and use following parts:

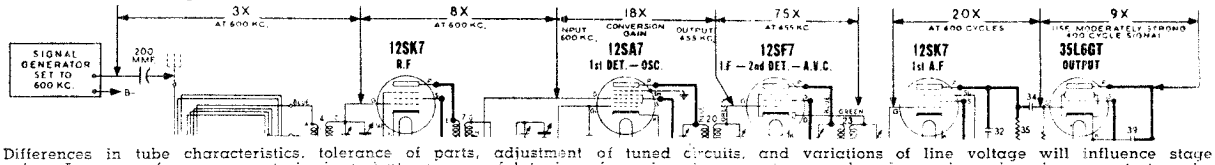
114955 Clip on end of cord
117057 Cord (55 inches)
119087 Ring for dial cord
161384 Tension Spring

APPROXIMATE STAGE GAIN DATA

Be sure R.F. and I.F. stages are accurately aligned before measuring gain. R.F. gains can be measured with a "channel" type instrument containing a tuned and calibrated R.F. amplifier. A vacuum tube voltmeter may be used for audio gain measurements. Observe following precautions:

1. For all gain measurements connect signal generator as shown. Use 600 KC. signal with 400 cycle modulation (use nearby frequency if local station interferes.)
2. For R.F. and I.F. measurements connect negative terminal of a 3 volt battery (two 1½ volt cells in series) to A.V.C. lead and positive terminal to B—. This provides a definite operating point. IMPORTANT: Disconnect battery when measuring audio stage gains.
3. Be sure radio is carefully tuned to generator signal (use weak signal for sharp tuning.)
4. When using a "channel" type instrument carefully tune it for maximum output at desired frequency before making measurements.

The R.F. and I.F. stage gains shown below are less than under normal operating conditions due to the use of 3 volts fixed bias in order to establish a definite operating point. Therefore, these values are not intended to indicate the full capability of a stage.



Differences in tube characteristics, tolerance of parts, adjustment of tuned circuits, and variations of line voltage will influence stage gain. Accuracy of measurements is dependent upon careful tuning of receiver to generator signal and experience in using your test equipment. These factors may create considerable variation in gain measurements.

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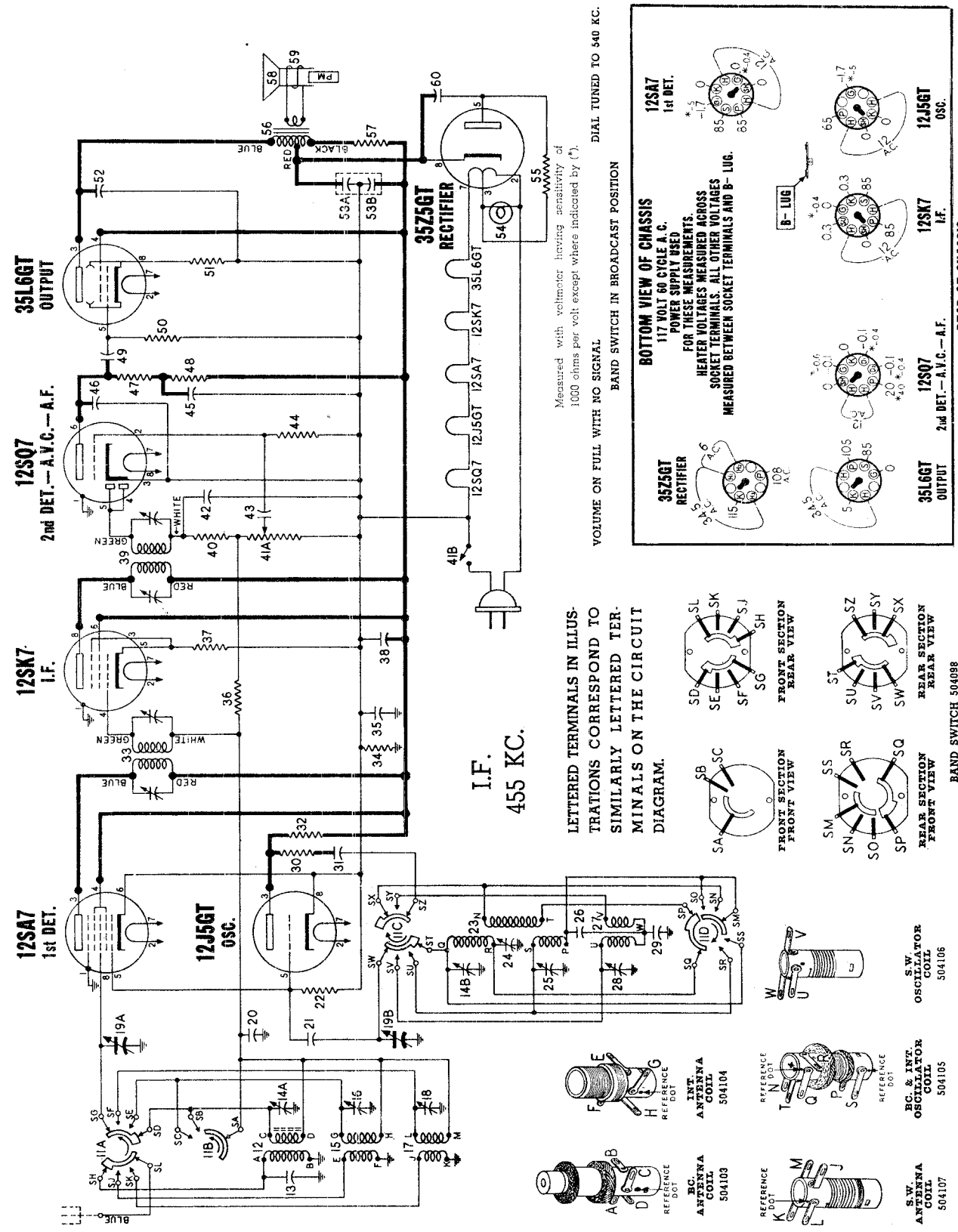
MODEL 9017-A

STEWART WARNER CORP.


12SA7
1st DET.
12J5GT
OSC.
12SK7
I.F.
12SQ7
2nd DET.—A.V.C.—A.F.
35L6GT
OUTPUT
35Z5GT
RECTIFIER
I.F.
455 KC.
LETTERED TERMINALS IN ILLUSTRATIONS CORRESPOND TO SIMILARLY LETTERED TERMINALS ON THE CIRCUIT DIAGRAM.
VOLUME ON FULL WITH NO SIGNAL
BAND SWITCH IN BROADCAST POSITION
DIAL TUNED TO 540 KC.
Measured with voltmeter having sensitivity of 1000 ohms per volt except where indicated by (*).
BOTTOM VIEW OF CHASSIS
117 VOLT 60 CYCLE A.C. POWER SUPPLY USED
FOR THESE MEASUREMENTS.
HEATER VOLTAGES MEASURED ACROSS SOCKET TERMINALS. ALL OTHER VOLTAGES MEASURED BETWEEN SOCKET TERMINALS AND B- LUG.
B- LUG
REAR OF CHASSIS
*Measured with vacuum tube voltmeter.
FRONT SECTION FRONT VIEW
FRONT SECTION REAR VIEW
REAR SECTION FRONT VIEW
REAR SECTION REAR VIEW
BAND SWITCH 504098
BC. ANTENNA COIL 504103
INT. ANTENNA COIL 504104
BC. & INT. OSCILLATOR COIL 504105
S.W. ANTENNA COIL 504107
S.W. OSCILLATOR COIL 504106

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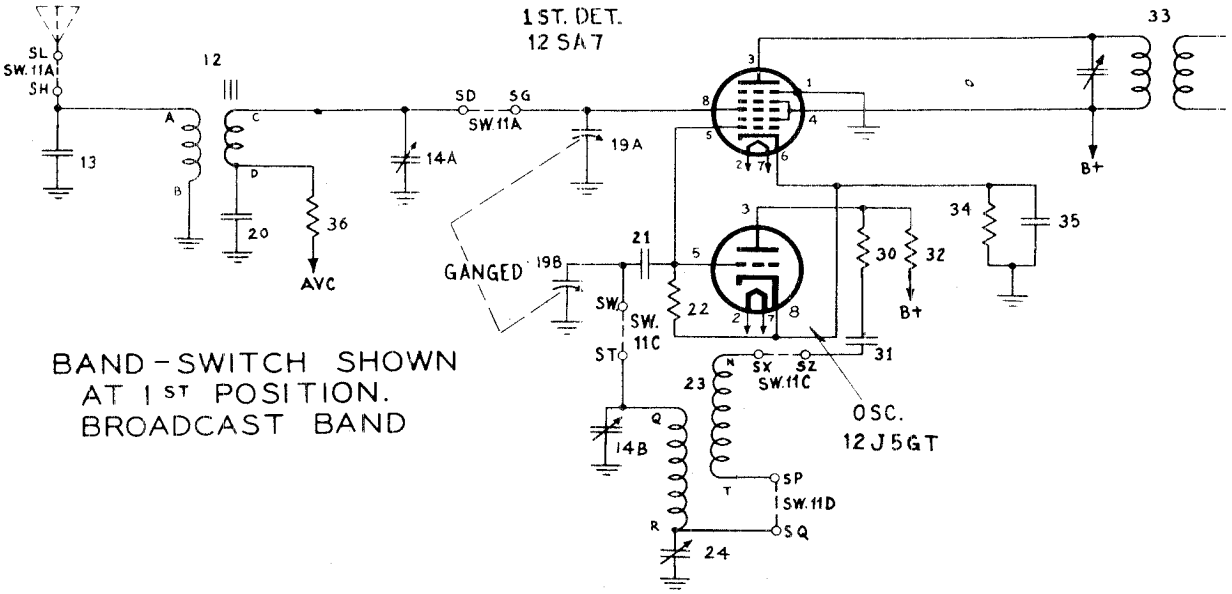
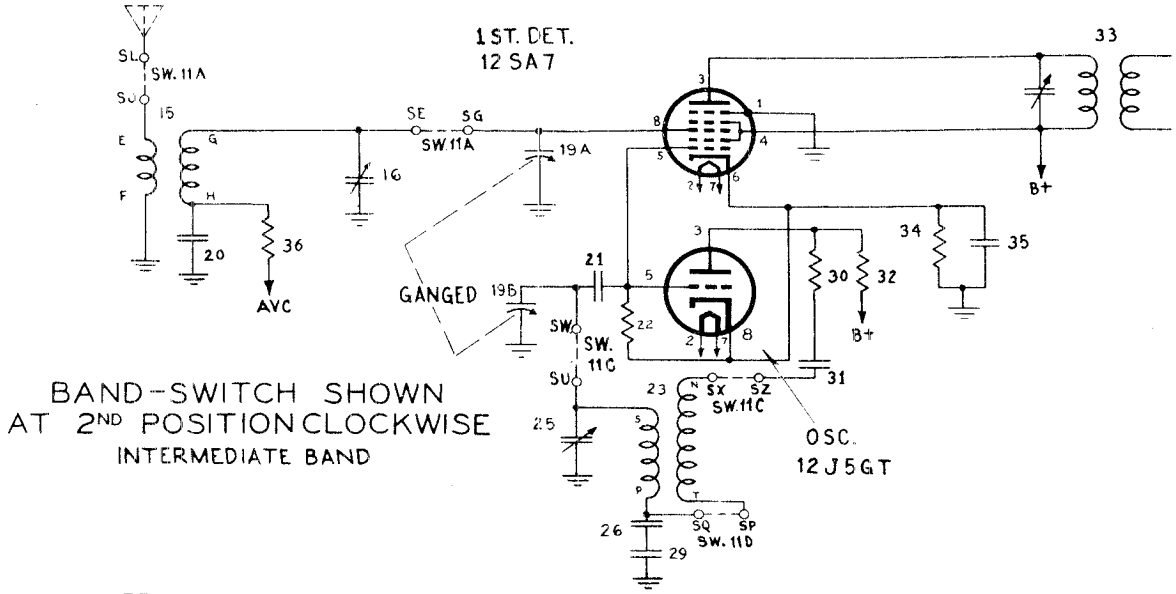
"clarified schematics"

MODEL 9017-A

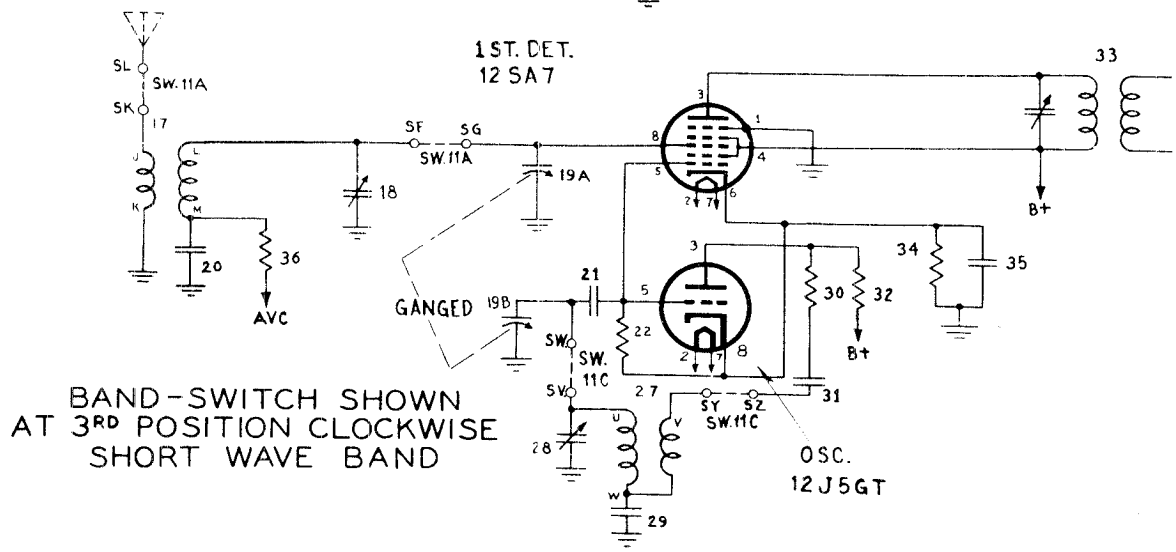
STEWART WARNER CORP.



BAND-SWITCH SHOWN AT 1ST POSITION. BROADCAST BAND



BAND-SWITCH SHOWN AT 2ND POSITION CLOCKWISE INTERMEDIATE BAND



BAND-SWITCH SHOWN AT 3RD POSITION CLOCKWISE SHORT WAVE BAND

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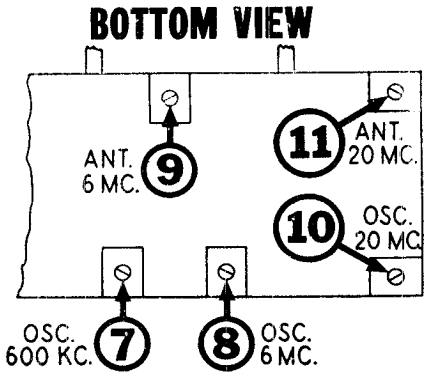
STEWART WARNER CORP.

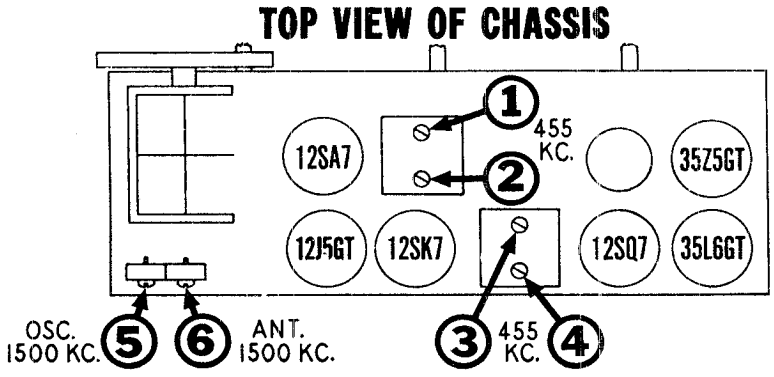
ALIGNMENT PROCEDURE

1. With the gang condenser fully meshed, the dial pointer should be in the position indicated by the last mark below 55 on the dial. If it is set incorrectly, release the pointer clip on the dial cord and reposition pointer.
2. During the alignment of this receiver it will be necessary to set the dial pointer to the following frequencies: 1500 Kc., 600 Kc., 6 Mc., 5.1 Mc., 20 Mc., and 19.1 Mc. In order to avoid replacing the chassis in the cabinet each time a dial setting is required, it will be found more convenient to mark the required frequency points on the white dial background plate before starting the alignment.
3. Connect an output meter across the speaker voice coil or from plate of 35L6GT tube to B— lug through a .1 Mfd. condenser (see voltage chart for convenient B— connection).
4. Connect ground lead of signal generator to B— lug.
   CAUTION: If your test oscillator is designed with an AC-DC power supply, connect ground lead of signal generator to B— lug through a .25 mfd. condenser.
5. Set volume control at maximum volume position and use a weak signal from the signal generator.

IMPORTANT: Align this receiver in exactly the order shown below. Broadcast band should be aligned before short wave bands.

DUMMY ANT. IN SERIES WITH SIGNAL GENERATOR	CONNECT HIGH SIDE OF SIGNAL GENERATOR TO	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POSITION	RECEIVER DIAL SETTING	TRIMMER NUMBER	TRIMMER DESCRIPTION	TYPE OF ADJUSTMENT
200 MMFD. Mica Condenser	Lug on front section of gang.	455 KC	Broadcast (counter-clockwise)	Any point where it does not affect the signal.	1-2	2nd I.F.	Adjust for maximum output. Then repeat adjustment.
					3-4	1st I.F.	
200 MMFD. Mica Condenser	External antenna lead (blue)	1500 KC	Broadcast (counter-clockwise)	1500 KC	5	Broadcast Oscillator (Shunt)	Adjust for maximum output.
200 MMFD. Mica Condenser	External antenna lead (blue)	1500 KC	Broadcast (counter-clockwise)	Tune to 1500 KC Generator Signal	6	Broadcast Antenna	Adjust for maximum output.
200 MMFD. Mica Condenser	External antenna lead (blue)	600 KC	Broadcast (counter-clockwise)	Tune to 600 KC Generator Signal	7	Broadcast Oscillator (Series Pad)	Adjust for maximum output. Try to increase output by detuning trimmer and retuning receiver dial until maximum output is obtained.
200 MMFD. Mica Condenser	External antenna lead (blue)	Repeat adjustment of trimmers 5 and 6 at 1500 Kc. Then re-check adjustment of trimmer 7 at 600 Kc.					
400 OHM Carbon Resistor	External antenna lead (blue)	6 MC	Intermediate (middle)	6 MC	8	Intermediate Oscillator	Adjust for maximum output. Check to see if proper peak was obtained by tuning in image at approx. 3.1 MC. If image does not appear, realign at 6 MC. with trimmer screw farther out. Recheck image.
400 OHM Carbon Resistor	External antenna lead (blue)	6 MC	Intermediate (middle)	Tune to 6 MC Generator Signal	9	Intermediate Antenna	Adjust for maximum output. Try to increase output by detuning trimmer and retuning receiver dial until maximum output is obtained.
400 OHM Carbon Resistor	External antenna lead (blue)	20 MC	Short wave (Clockwise)	20 MC	10	S.W. Oscillator	Adjust for maximum output. Check to see if proper peak was obtained by tuning in image at approx. 19.1 MC. If image does not appear, realign at 20 MC. with trimmer screw farther out. Recheck image.
400 OHM Carbon Resistor	External antenna lead (blue)	20 MC	Short wave (Clockwise)	Tune to 20 MC Generator Signal	11	S.W. Antenna	Adjust for maximum output. Try to increase output by detuning trimmer and retuning receiver dial until maximum output is obtained.





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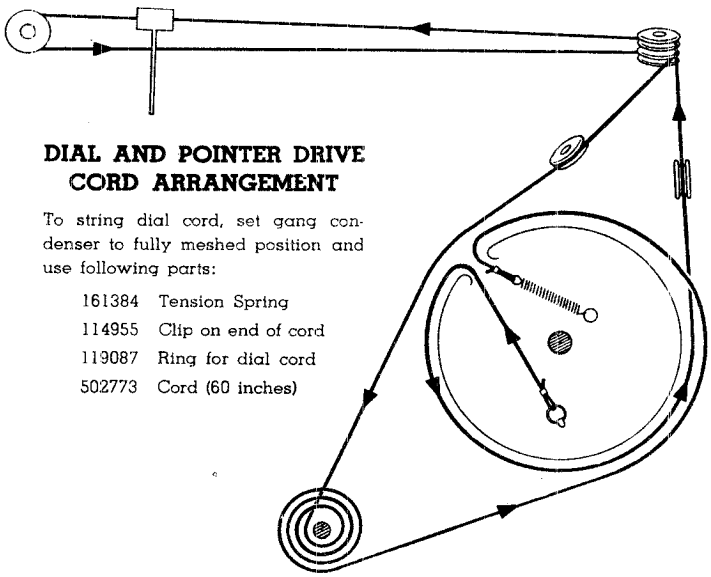
MODEL 9017-A

STEWART WARNER CORP.

DIAGRAM NO.	PART NO.	DESCRIPTION	LIST PRICE
		CONDENSERS	
13	502931	Condenser—Mica 100 mmfd. 500 volt	$ .24
14-A, B	504067	Condenser—trimmer assembly A-1.6 to 18 Mmfd. B-3 to 35 Mmfd.	.65
16	504069	Condenser—trimmer; 3 to 35 Mmfd.	.25
18	504069	Condenser—trimmer; 3 to 35 Mmfd.	.25
19-A, B	504064	Condenser—variable gang with drum	4.80
20	502806	Condenser—.05 Mfd. 200 volt	.36
21	502929	Condenser—mica 47 Mmfd. 500 volt	.24
24	504068	Condenser—trimmer; 300 to 600 Mmfd.	.50
25	502758	Condenser—trimmer; 1.6 to 18 Mmfd.	.35
26	504049	Condenser—mica 4,300 Mmfd. 500 volt	1.30
28	502758	Condenser—trimmer; 1.6 to 18 Mmfd.	.35
29	504049	Condenser—mica 4,300 Mmfd. 500 volt	1.30
31	502804	Condenser—.01 Mfd. 400 volt	.30
35	502809	Condenser—.25 Mfd. 400 volt	.36
38	502807	Condenser—.05 Mfd. 400 volt	.37
42	502931	Condenser—mica 100 Mmfd. 500 volt	.24
43	504051	Condenser—.004 Mfd. 400 volt	.24
45	502807	Condenser—.05 Mfd. 400 volt	.37
46	502931	Condenser—mica 100 Mmfd. 500 volt	.24
49	504051	Condenser—.004 Mfd. 400 volt	.24
52	502804	Condenser—.04 Mfd. 400 volt	.30
53-A, B	500256	Condenser—electrolytic A-40 Mfd. 150 Volt B-20 Mfd. 150 volt	1.50
60	502807	Condenser—.05 Mfd. 400 volt	.37
		RESISTORS	
22	502130	Resistor—carbon 22,000 Ohms ¼ watt	.12
30	504111	Resistor—carbon 56 Ohms ¼ watt	.12
32	504114	Resistor—carbon 6,800 Ohms ½ watt	.12
34	502133	Resistor—carbon 220,000 Ohms ¼ watt	.12
36	502135	Resistor—carbon 2.2 Meg. ¼ watt	.12
37	504109	Resistor—carbon 27 Ohms ¼ watt	.12
40	502131	Resistor—carbon 47,000 Ohms ¼ watt	.12
41-A, B	502145	Volume control—500,000 Ohms (with switch)	1.25
44	502269	Resistor—carbon 3.3 Meg. ¼ watt	.12
47, 48	502133	Resistor—carbon 220,000 Ohms ¼ watt	.12
50	502134	Resistor—carbon 470,000 Ohms ¼ watt	.12
51	504112	Resistor—carbon 130 Ohms ½ watt	.12
55	504110	Resistor—carbon 33 Ohms ½ watt	.12
57	504113	Resistor—carbon 1,000 Ohms 1 watt	.16
		COILS AND TRANSFORMERS	
12	504103	Coil—B.C. antenna	2.00
15	504104	Coil—Int. Band antenna	1.50
17	504107	Coil—S.W. antenna	1.25
23	504105	Coil—B.C. and Int. Band oscillator	2.10
27	504106	Coil—S.W. oscillator	1.20
33	504065	Transformer—1st I.F.	2.50
39	504066	Transformer—2nd I.F.	2.50
56	504101	Transformer—output for R-504100 speaker	2.75
	504102	Transformer—output for A-504100 speaker	2.75
		OTHER ELECTRICAL PARTS	
11 A,B, C,D	504098	Switch-band	3.00
54	118921	Lamp-dial (Mazda 47) 6-8 V. 150 Ma.	.15
58	502214	Cone & voice coil for R-504100 spkr.	2.00
	502903	Cone & voice coil for A-504100 spkr.	2.00
59	504100	Speaker—P.M. dynamic (5 inch)	7.50



DIAL AND POINTER DRIVE CORD ARRANGEMENT

To string dial cord, set gang condenser to fully meshed position and use following parts:

161384 Tension Spring
114955 Clip on end of cord
119087 Ring for dial cord
502773 Cord (60 inches)

MISCELLANEOUS PARTS

504118	Back for cabinet	.45
504034	Base for mtg. electrolytic condenser	.04
502666	Cabinet—mahogany	5.40
502773	Cord—dial drive (60 in. required) per ft.	.05
500324	Cover—cardboard for elect. cond.	.04
502506	Clamp—dial scale mtg.	.04
112745	Clip—coal mtg.	.01
114955	Clip—retainer on end of dial cord	.01
500497	Clip—retainer for cabinet back	.02
504134	Dial scale—glass	3.00
502563	Knob—volume or tuning	.08
504117	Knob—band switch	.08
502690	Pointer	.16
81145	Retaining ring for tuning shaft	.01
119087	Ring for dial cord	.01
17063	Screw—# 6 x ¼ holds dial clamp	.01
114628	Screw—# 8 x ½ chasis mtg.	.01
502173	Shaft—tuning control	.15
160392	Socket—octal	.16
504099	Socket—dial lamp with leads	.44
161384	Spring—dial cord tension	.06
111456	Washer—spring washer for tuning shaft	.005

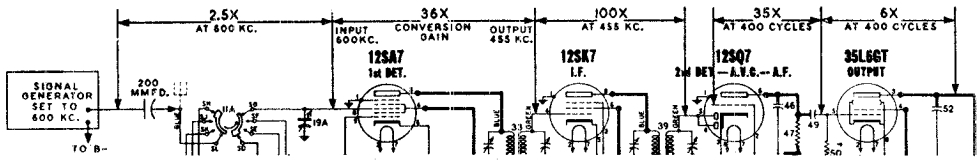
PRICES SUBJECT TO CHANGE WITHOUT NOTICE

APPROXIMATE STAGE GAIN DATA

Be sure R.F. and I.F. stages are accurately aligned before measuring gain. R.F. gains can be measured with a "channel" type instrument containing a tuned and calibrated R.F. amplifier. A vacuum tube voltmeter may be used for audio gain measurements. Observe following precautions:

1. For all gain measurements connect signal generator as shown. Use 600 KC. signal with 400 cycle modulation (use nearby frequency if local station interferes.)
2. For R.F. and I.F. measurements connect negative terminal of a 3 volt battery (two 1½ volt cells in series) to A.V.C. lead at terminal "H" of Intermediate band antenna coil (15); then connect positive battery lead to chassis. This provides a definite operating point.
3. Be sure radio is carefully tuned to generator signal (use weak signal for sharp tuning.)
4. When using a "channel" type instrument carefully tune it for maximum output at desired frequency before making measurements.

The R.F. and I.F. stage gains shown below are less than under normal operating conditions due to the use of 3 volts fixed bias in order to establish a definite operating point. Therefore, these values are not intended to indicate the full capability of a stage.



Differences in tube characteristics, tolerance of parts, adjustment of tuned circuits, and variations of line voltage will influence stage gain. Accuracy of measurements is dependent upon careful tuning of receiver to generator signal and experience in using your test equipment. These factors may create considerable variation in gain measurements.

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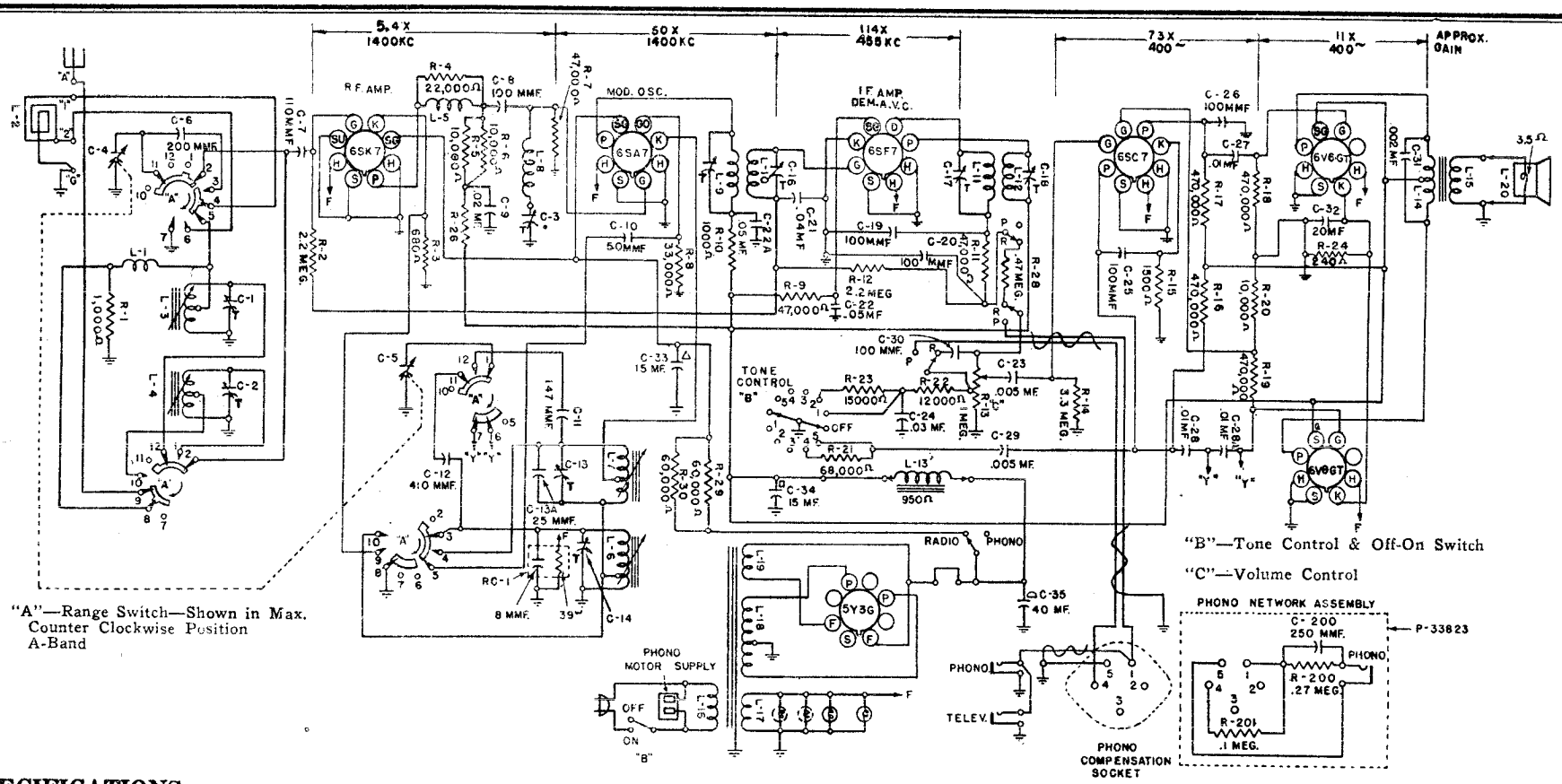

SPECIFICATIONS

Voltage Rating ..... A.C. 105 to 130 Volts
Type of Circuit ..... Superheterodyne with Push Button Tuning
Tuning Ranges ..... A—540 to 1600 Kc., C—8.8 to 12 Mc.
Number and Type of Tubes—7
1—6SK7 R. F. Amplifier
1—6SA7 Modulator and Oscillator
1—6SF7 I. F. Amplifier, Demodulator and A. V. C.
1—6SC7 Audio Amplifier and Inverter
2—6V6GT Output
1—5Y3G Rectifier

Input Power Rating ..... 96-115 Watts
Intermediate Frequency ..... 455 Kilocycles
Speaker Voice Coil Impedance at 400 Cycles Approximately 3.5 Ohm
Speaker Field Coil Resistance ..... 950 Ohms
Power Output ..... 10 Watts 10% Distortion, 12 Watts Maximum

NORMAL VOLTAGE READINGS

Take all readings with chassis operating and tuned to 1000 kc.—No signal.
Use a line voltage of 117 ±5 volts or make allowance for the variations.
Voltages on location chart are taken with a 1000 ohm per voltmeter.
Voltages on table listed below are taken with an electronic voltmeter.
Read from indicated terminals to chassis base.

VOLTAGE TABLE FOR ELECTRONIC VOLTMETER

Tube		1	2	3	4	5	6	7	8
6V6	Output	0	6.3AC	245	251	0	0	0	16
6V6	Output	0	0	245	251	0	0	6.3AC	16.
6SC7	1st A.F. Conv.	0	93	0	0	93	1.1	0	6.3AC
6SA7	Mod. Osc.	0	0	246	80	7.5	0	6.3AC	0
5Y3	Rect.	0	360	0	340AC	0	340AC	0	360
6SF7	1.F. Det. A.V.C.	0	.6	0	92	0	250	0	6.3AC
6SK7	R.F. Amp.	0	6.3AC	0	.6	0	80	0	196

Record Changers: Model 1020PL, Seeburg Model K; Models 1120PL, -PM, Seeburg Model K and Oak Model 6666

"clarified schematics"

MODELS 1020PL, 1020PLM, 1120PLW, 1120PLM, 1120LW, 1120PL, 1120PM

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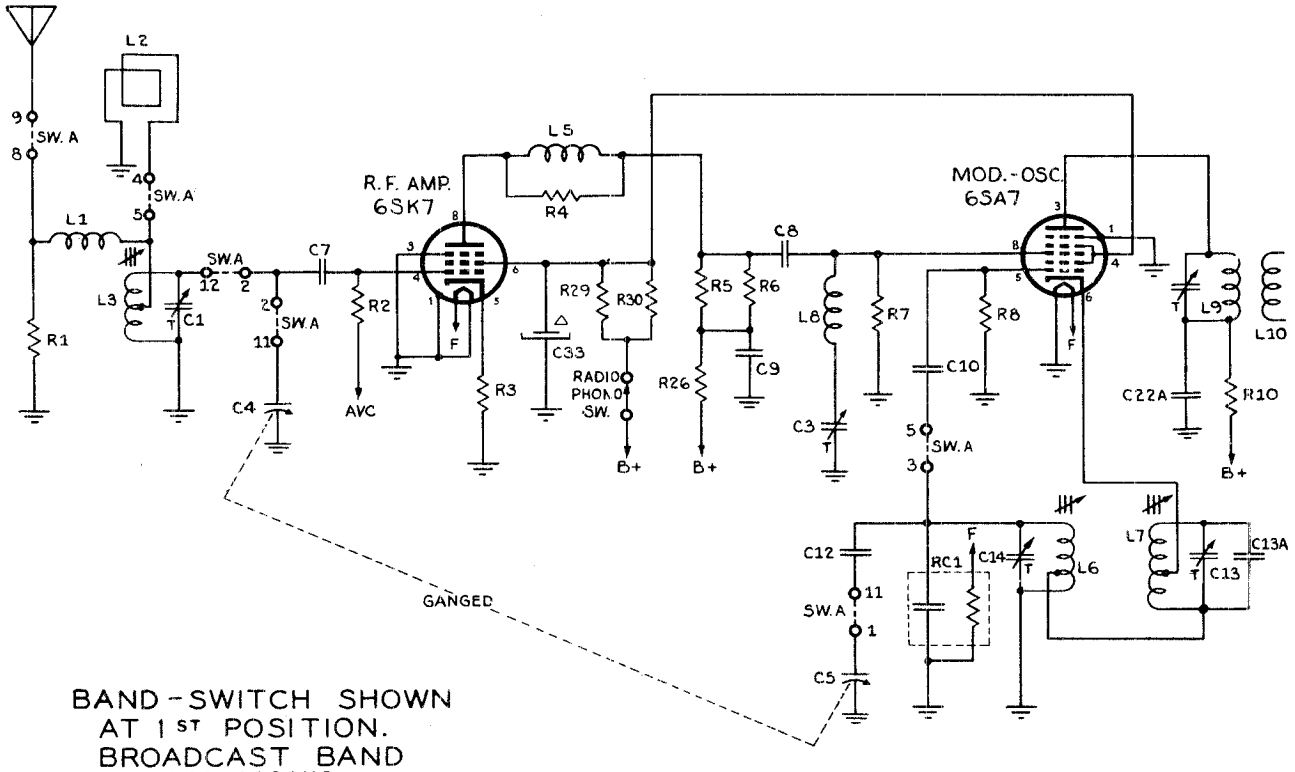
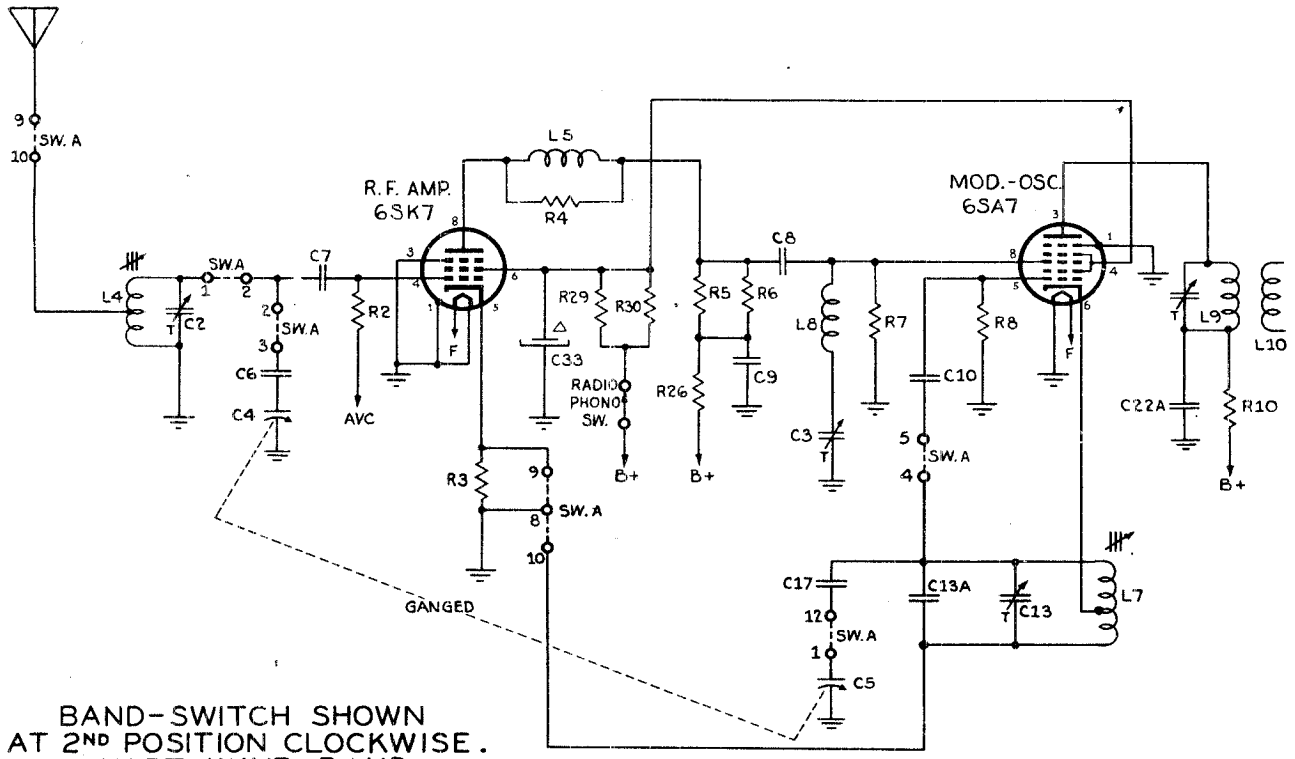


BAND-SWITCH SHOWN AT 1ST POSITION. BROADCAST BAND 540-1600KC.



BAND-SWITCH SHOWN AT 2ND POSITION CLOCKWISE. SHORT WAVE BAND 8.8 - 12 MC.

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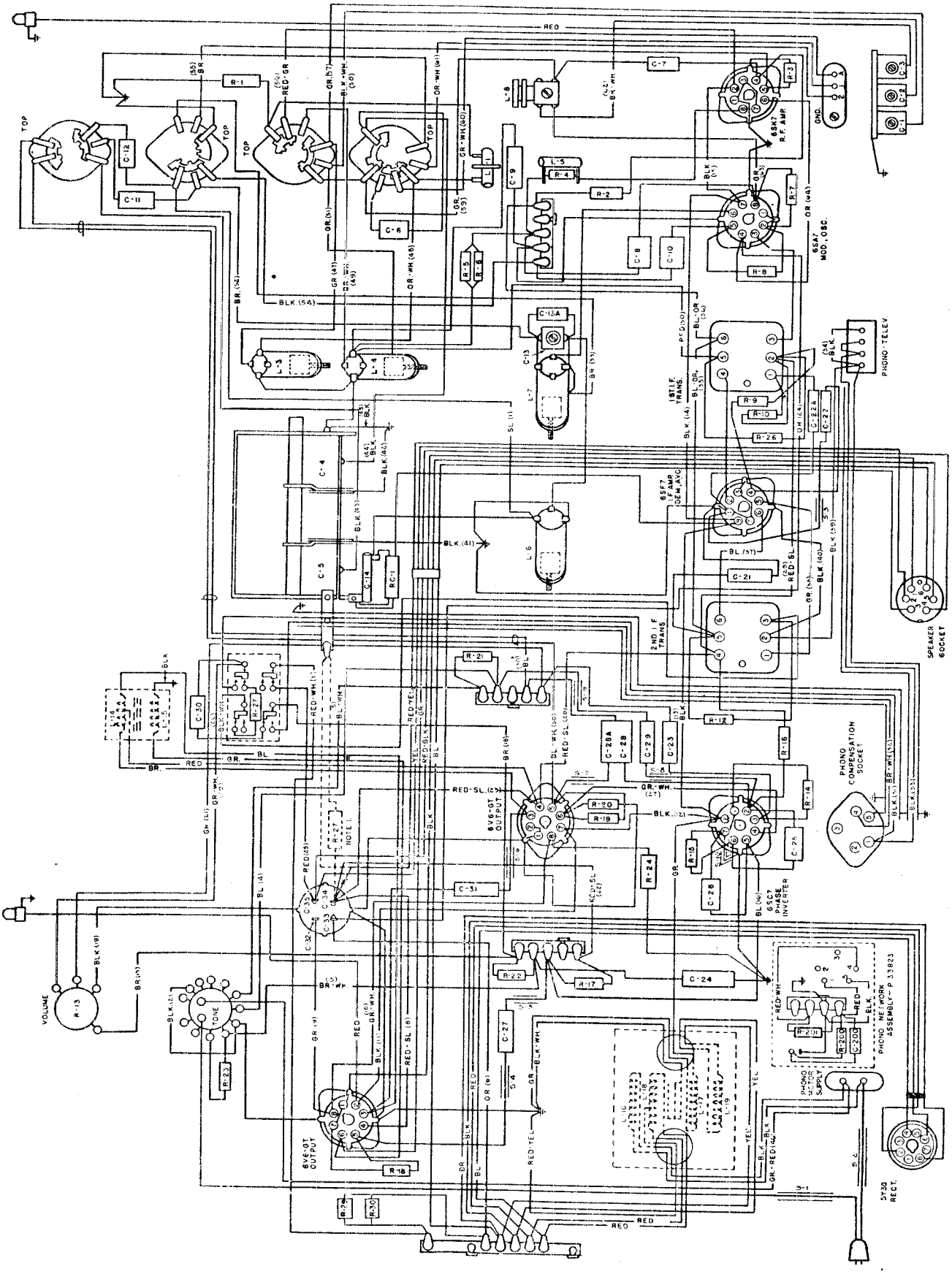
MODELS 1020PL, 1020PLM, 1120LW, 1120PLW, 1120PLM, 1120PL, 1120PM



Wiring Diagram

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MODELS 1020PL, 1020PLM, 1120LW, 1120PLW, 1120PLM, 1120PL, 1120PM

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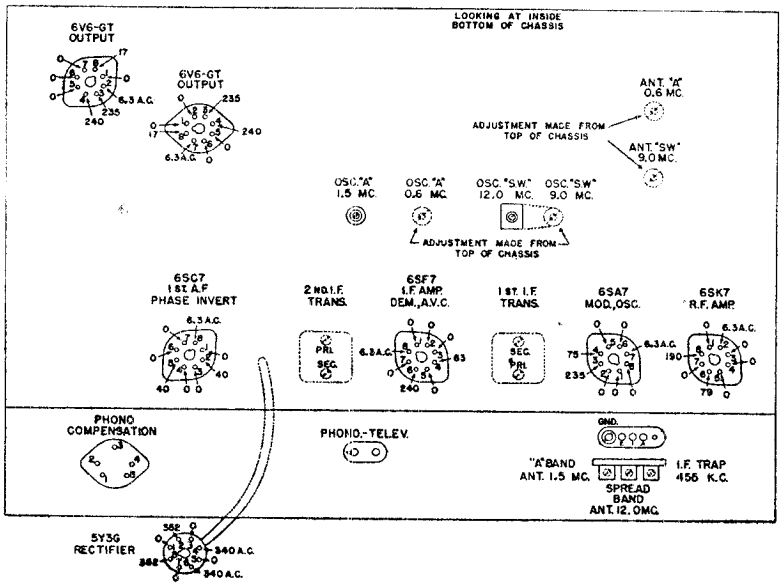
LOCATION CHART



ALIGNING INFORMATION

Never re-align unless absolutely necessary.

Use a good modulated signal generator (test oscillator with variable output voltage and a sensitive output meter across the voice coil of the speaker).

Always align using the smallest possible input from the signal generator. A strong signal makes adjustments inaccurate.

Always have the volume control "full on".

ALIGNING PROCEDURE (follow this order exactly).

I. Intermediate Frequency Adjustments.

1. Set range switch to Standard Broadcast position (loop).
2. Turn the tuning control to extreme low frequency end of dial.
3. Connect the ground terminal of the signal generator to the ground terminal of the chassis.
4. Introduce a modulated signal of 455 kilocycles to the grid of the 6SA7 Modulator and Oscillator tube (terminal No. 8) using a 0.1 microfarad capacitor in series with the output lead of the signal generator.
5. Adjust the I. F. aligners for maximum output in the following order:
   A. Secondary of second I. F. Transformer.
   B. Primary of second I. F. Transformer.
   C. Secondary of first I. F. Transformer.
   D. Primary of first I. F. Transformer.

II. Dial Pointer Adjustment.

With the plates of the gang tuning capacitor fully engaged, check to be sure that the dial pointer is in a vertical position directly on the calibration marks located at the low frequency end of the dial scale. Adjust the dial pointer if necessary.

III. Radio Frequency Adjustments.

Short Wave Range

1. Remove the output lead of the signal generator and the 0.1 microfarad capacitor from the grid of the 6SA7 tube.
2. Disconnect the output lead from the signal generator and replace with a few turns of wire connected to the signal generator output terminals.
3. Place the signal generator two or three feet from the receiver's loop.
4. Set the range switch to the short-wave range position.
5. Set the signal generator frequency and the receiver tuning dial to 9 megacycles.
6. Adjust the 9 megacycle oscillator and loop aligners (iron cores) for maximum signal.
7. Set the signal generator frequency and the receiver tuning dial to 12 megacycles.
8. Adjust the 12 megacycle oscillator aligning capacitors for maximum signal. Then rock the tuning gang capacitor slowly through resonance and adjust the 12 megacycle antennae aligning capacitor for maximum signal.
9. Repeat operations 5 and 6.
10. Repeat operations 7 and 8.

Standard Broadcast Range

1. Set the range switch to the "Loop" position.
2. Set the signal generator frequency and the receiver tuning dial to 600 kilocycles.
3. Adjust the 600 K. C. oscillator and antennae aligner (iron cores) for maximum signal.
4. Set the signal generator frequency and the receiver tuning dial to 1400 kilocycles.
5. Adjust the 1400 K. C. oscillator and antennae aligning capacitors for maximum signal.
6. Repeat operations 2 and 3.
7. Repeat operations 4 and 5.

IV. Wave Trap Adjustment.

1. Tune the receiver to 1000 kc.
2. Set the signal generator frequency to 455 kc. Increase signal generator output until audible in speaker.
3. Adjust the wave trap aligning capacitor for minimum signal.

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Model	Input Power Frequency	Chassis	Cabinet	Speaker	Phonograph Equipment
1020PLM	50-60 Cycles	33449	35924	33435	41650
1120LW	50-60 Cycles	37086	37057	33435	-----
1120PLW	50-60 Cycles	37086	35987	33435	41650
1120PLM	50-60 Cycles	37086	108012	33435	41650

Capacitors

Part No.		
24405	C-21	.04 mf.
25150	C-9	.02 mf.
25481	C-31	.002 mf.
25485	C-27	.01 mf.
27760	C-23, 29	.005 mf.
27782	C-24	.03 mf.
29891	C-22, 22A	.05 mf.
31480	C-28, 28A	.01 mf.
32056	C-13A	25 mmf.
27305	C-10	50 mmf.
24559	C-7, 8, 19, 20, 25, 26, 30	100 mmf.
33907	C-11	.147 mmf.
33909	C-6	200 mmf.
33904	C-12	410 mmf.
33894	C-32, 33, 34, 35	Electrolytic—20-15-15-40
27081	C-13	Aligning Capacitor
33567	C-14	Aligning Capacitor
33885	C-1, 2, 3	Aligning Capacitor
33755	C-4, 5	Variable Condenser and Pulley
33906	RC-1	Compensator

Controls—Switches—Knobs

Part No.		
29560	R-13	Volume Control—1 Meg.
32063		Off-On Tone Switch
32064		Phono-Radio Switch
33893		Range Switch
35725		Knob—Off-On, Range
32224		Knob—Volume, Tone
37093		Knob Selector
32156		Push Buttons
35996		Push Button—Phono
35997		Push Button—Radio

Coils—Transformers

Part No.		
33876	L-3	Antenna Coil, "A" Band
33877	L-6	Oscillator Coil, "A" Band
33878	L-4	Antenna Coil, "SW" Band
33879	L-7	Oscillator Coil, "SW" Band
33880	L-9, 10; C-15, C-16	1st I. F. Transformer
33882	L-11, 12; C-17, C-18	2nd I. F. Transformer
33886	L-5	RF Choke Assembly
33908	L-8	Wave Trap
33910	L-1	Antenna Coupling Coil
33900	L-16, 17, 18, 19	Power Transformer
33853	L-14, 15	Output Transformer
37114	L-2	Loop (1020PL)
33845	L-2	Loop (1120L)
33435		Speaker
33438		Speaker Cone

Resistors

Part No.		
26329	R-26	470 Ohms
26331	R-3	680 Ohms
26333	R-10, R-1	1,000 Ohms
26335	R-15	1,500 Ohms
26345	R-20	10,000 Ohms
26346	R-22	12,000 Ohms
26347	R-23	15,000 Ohms
26349	R-4	22,000 Ohms
26351	R-8	33,000 Ohms
26353	R-7, 9, 11	47,000 Ohms
26355	R-21	68,000 Ohms
26365	R-16, 17, 18, 19, 28	470,000 Ohms
26373	R-2, 12	2.2 Megohms
26375	R-14	3.3 Megohms
30417	R-5, 6	10,000 Ohms
33913	R-24	240 Ohms
149003	R-29-30	60,000 Ohms

Cabinet Parts—Hardware

1020PL—1120PL Part No.		1120L Part No.
38427	Pulls—Ornamental	37147
37084	Key Pull	
37143	Hinge	
37145	Lid Support	
38382	Pussy Foot Glider	
37156	Grille Cloth—Album Door	
37157	Grille Cloth—Baffle	37163
41102	Stop Hinge Door—Lower	
41103	Stop Hinge Door—Upper	
38442	Bullet Catch with Strikes and Nails	
37155	Metal Grille	37162

Miscellaneous

Part No.		
22973		Tube Socket, 5 PT.
30151		Tube Socket, 8 PT. Wafer
33248		Tube Socket, 8 PT. Molded
32048		Socket (AC Outlet)
28694		Socket (Pilot Lamp)
28652		AC Cord
33056		Cable Assembly—Rectifier
33824		Cable Assembly—Speaker
32078		Drive Assembly
35728		Pointer Assembly
33891	(1020)	Dial
37070	(1120)	Dial
29956		Pilot Lamp
32128		Cord Assembly—Pointer Drive
80000		Cord Assembly—Cond. Drive
30224		Phono Plug
33444		Speaker Plug
35866		Station Call Letters—Kit

Model	Input Power Frequency	Chassis	Cabinet	Speaker
1100-H	25-60 Cycles AC (or DC)	35982	33528	34505
1100-HI	25-60 Cycles AC (or DC)	35982	37269	34505

Capacitors

Part No.		
34506	C-1, C-2	Electrolytic Capacitor, 2—40 mfd.
27921	C-28	Aligning Capacitor
24166	C-17	25 mmf.
27101	C-3	200 mmf.
29371	C-5	500 mmf. Capacitor
24560	C-7, C-24	50 mmf. Capacitor
27760	C-25	.005 mfd. Capacitor
27646	C-6	.002 mfd. Capacitor
25485	C-27, C-8	.01 mfd. Capacitor
29891	C-13, C-26	.05 mfd. Capacitor
40632	C-16	.05 mfd. Capacitor
28002	C-29	.25 mfd. Capacitor
31698	C-19, C-22	Variable Capacitor and Pulley

Resistors

Part No.		
26322	R-15	120 Ohm Resistor
26323	R-21, R-3	150 Ohm Resistor
26341	R-14	4700 Ohm Resistor
26349	R-10	22,000 Ohm Resistor
26353	R-8	47,000 Ohm Resistor
26362	R-11, R-5	270,000 Ohm Resistor
26365	R-4	470,000 Ohm Resistor
26369	R-13, R-7	1 Megohm Resistor
26373	R-9	2.2 Megohm Resistor
26381	R-6	10 Megohm Resistor
41580	R-22	22 Ohm Resistor

Coils, Transformers and Speakers

Part No.		
33205	L-10, 11	Loop
33206	L-8, 9	Oscillator Coil
33249	L-12	Wave Trap
31686	L-6, 7; C-14, 15	1st I. F. Transformer
33208	L-4, 5; C-9, 10, 11, 12	2nd I. F. Transformer
34505		Speaker Assembly

Controls and Knobs

Part No.		
31694	R-7	Off-On Switch and Volume Control
42495		Switch
31260		Knob (3)

Miscellaneous Parts

Part No.		
33599		Back Panel
34590		Tube Socket
37125		Dial
33531		Dial Glass
33533		Grill Cloth
31693		Bottom Cover
33211		Pointer
31824		Dial Cord Assembly
30947		Socket (Pilot Lamp)
30933		Pilot Light
33218		Power Supply Cord

MODELS 1100H, 1100HI

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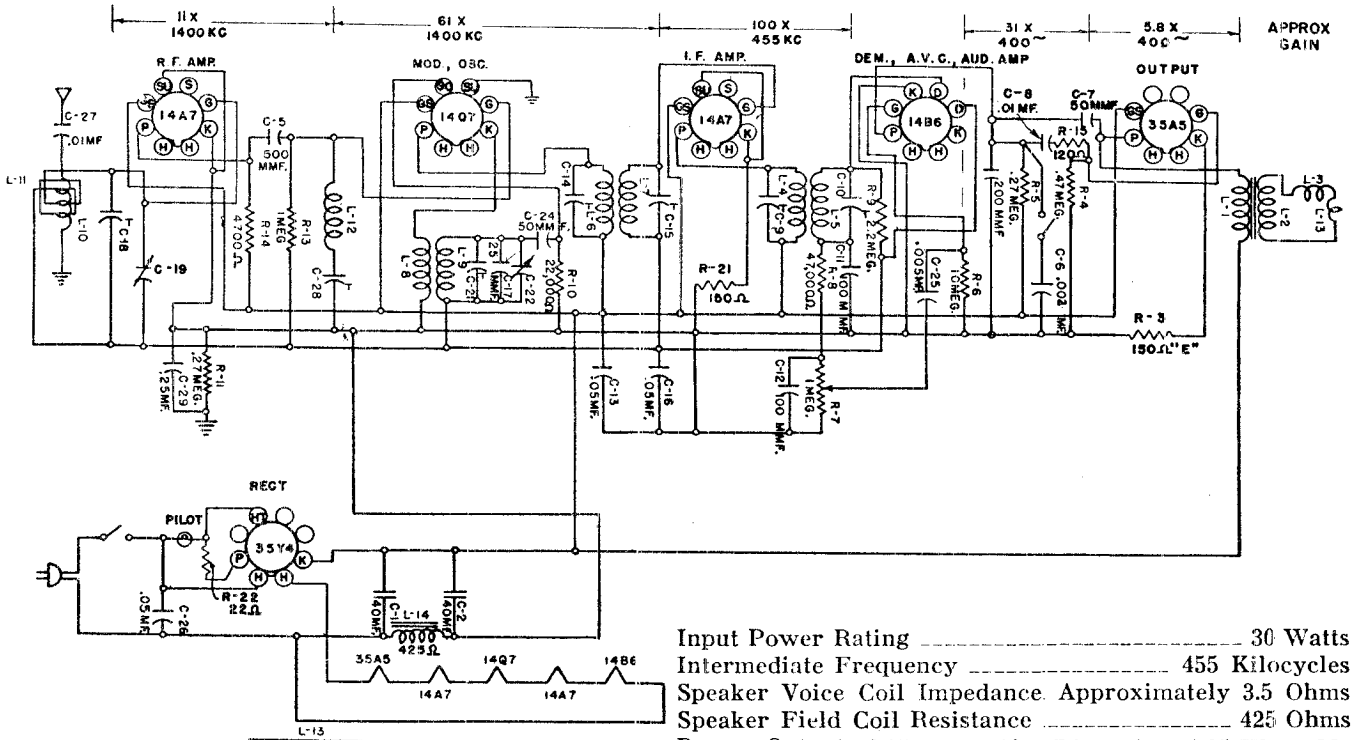
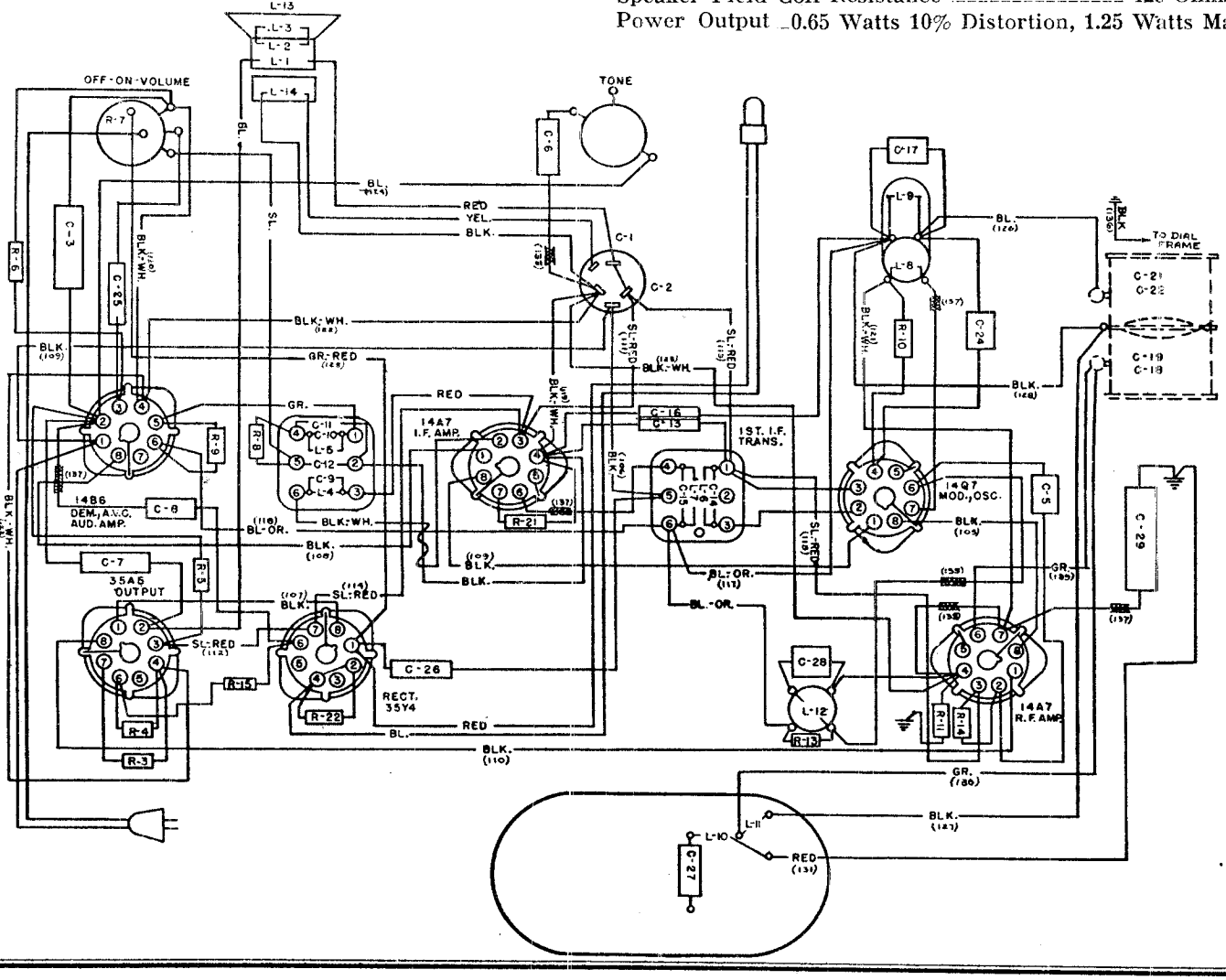


Input Power Rating	30 Watts
Intermediate Frequency	455 Kilocycles
Speaker Voice Coil Impedance	Approximately 3.5 Ohms
Speaker Field Coil Resistance	425 Ohms
Power Output	0.65 Watts 10% Distortion, 1.25 Watts Max



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VOLTAGE CHART FOR ELECTRONIC VOLTMETER

Tube	Circuit	1	2	3	4	5	6	7	8
14B6	Dem. A.V.C. Audio Amp.	—B	81	14	26.5	23.5	18	27	12AC
14A7	I. F. Amp.	11.5AC	105	105	36.5	26	18.4	27.6	24AC
14A7	R. F. Amp.	47AC	69	105	26.7	26	18.4	26.7	35AC
35A5	Output	82.5AC	100	105	26.5	0	25	32	49AC
14Q7	Mod. Osc.	27.5AC	105	105	18	26	17.2	26.5	36AC
35Y4	Rect.	105AC	117AC	0	117AC	0	25.8	105	85AC

NORMAL VOLTAGE READINGS

Use a good voltmeter having a resistance of at least 1000 ohms per volt. See chart below if electronic voltmeter is used.

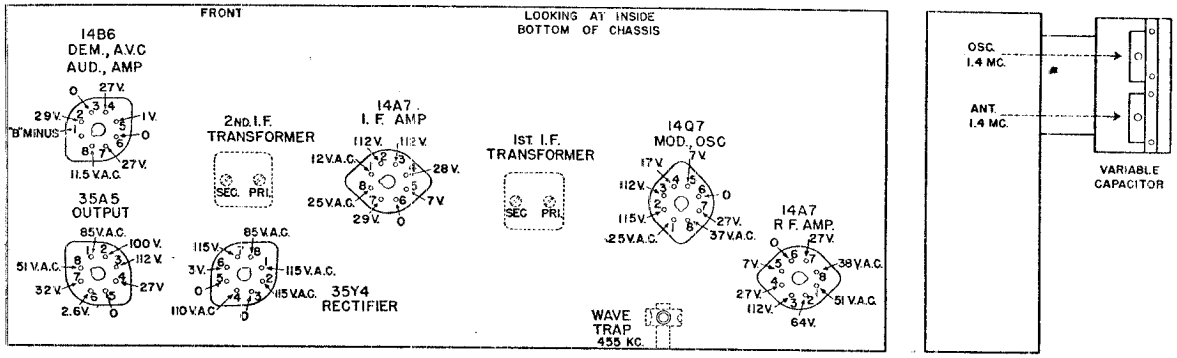
Take all readings with chassis operating and tuned to approximately 1000 Kc.—no input signal.

Use a line voltage of 117 volts or make allowance for the variation.

Read from indicated socket terminals to B minus. A convenient point is terminal No. 1 of the 14B6 Dem. A.V.C. Socket.

See Location Chart for position of terminals.

A. C. Voltages are indicated as A. C.; when the receiver is operated from a D. C. power supply, D. C. voltages will be obtained in place of A. C. voltages shown.



ALIGNING INFORMATION

Never realign unless absolutely necessary.

Use a good modulated signal generator (test oscillator) with variable output voltage and a sensitive output meter across the voice coil of the speaker.

Always align using the smallest possible input from the signal generator. A strong signal makes adjustments inaccurate.

Always have the volume control "full on".

Important: Be sure the metal plate is fastened in place on the bottom of the chassis before alignment is attempted.

ALIGNING PROCEDURE (follow this order exactly).

I. Intermediate Frequency Adjustments.

1. Turn the tuning control to the extreme low frequency position. (Variable capacitor plates all the way in.)
2. Connect the ground terminal of the signal generator to the chassis base.
3. Introduce a modulated signal of 455 kilocycles using a .01 mfd. capacitor in series with the lead from the signal generator to the antenna connection located at rear of the pickup loop.
4. Adjust the I. F. aligners for maximum output in the following order:
   - A. Secondary of second I. F. Transformer.
   - B. Primary of second I. F. Transformer.
   - C. Secondary of first I. F. Transformer.
   - D. Primary of first I. F. Transformer.

II. Dial Pointer Adjustment.

With the plates of the gang tuning capacitor fully engaged set the dial pointer in a horizontal position directly on the upper edge of the calibration mark located at 550 Kc. on the dial scale.

III. Radio Frequency Adjustments.

1. Replace the .01 mfd. capacitor in series with the output lead of the signal generator with a 200 mmf. capacitor and connect to the antenna terminal located on the back of the loop assembly.
2. Set the signal generator's frequency and the receiver's tuning dial to 1.4 megacycles.
3. Adjust the oscillator and antenna aligning capacitors for maximum signal.
4. Set both the signal generator's frequency and the receiver's tuning dial to 0.6 megacycles and check calibration.
   NOTE: If the calibration is too far off at 0.6 megacycles, operations 2 and 3 may be repeated until the best results are obtained.

Wave Trap Adjustment.

(Leave the receiver connected in the same manner as when making the Radio Frequency Adjustments.)

1. Tune set to 1000 K. C.
2. Set the signal generator frequency to 455 K. C. and introduce a fairly strong modulated signal to the receiver.
3. Adjust the wave trap aligner for minimum signal.

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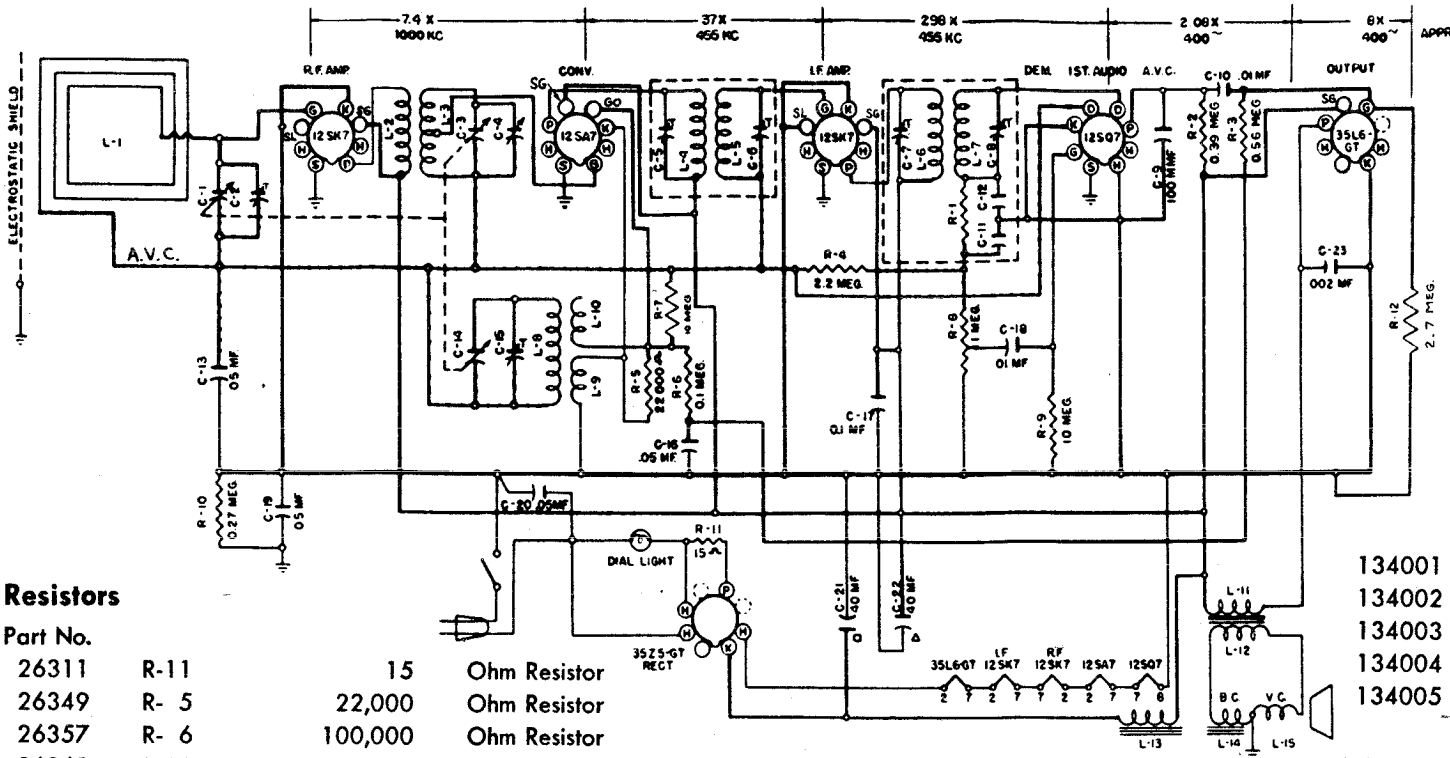

Resistors

Part No.			
26311	R-11	15	Ohm Resistor
26349	R- 5	22,000	Ohm Resistor
26357	R- 6	100,000	Ohm Resistor
26362	R-10	270,000	Ohm Resistor
26364	R- 2	390,000	Ohm Resistor
26366	R- 3	560,000	Ohm Resistor
26373	R- 4	2.2	Meg. Resistor
26381	R- 7, 9	10	Meg. Resistor
28196	R-12	2.7	Meg. Resistor
145001	R- 8	Volume Control-off-on-switch	

Capacitors

Part No.		
24559	C- 9	100 mmf. Capacitor
25485	C-10, 18	.01 mfd. Capacitor
40632	C-13, 19, 20-16	.05 mfd. Capacitor
111001	C-21, 22	Electrolytic Capacitor 2-40 mfd.
23483	C-17	0.1 mfd. Capacitor
27646	C-23	.002 mf. Capacitor
110001	C- 1, 2, 3, 4, 14, 15	Variable Capacitor

Miscellaneous

Part No.	
30151	Socket—8 Pt.
152001	Socket, Pilot Light
138008	Dial Lens HB-HI
105048	Bracket, Right Dial
105049	Bracket, Left Dial
122011	Dial HW, HB, HI, HY
122003	Dial—HM
144001	Pointer—1101-HB, HI, HW, HY
144002	Pointer—1101-HM
124001	Drive Cord Assembly
32075	Pulley
40546	Clip
30933	Pilot Light
33218	Power Supply Cord

134001	Knob (1101-HW) (2)
134002	Knob (1101-HY) (2)
134003	Knob (1101-HM) (2)
134004	Knob (1101-HB) (2)
134005	Knob (1101-HI) (2)

Coils—Transformers

Part No.		
114001	L- 2, 3	RF Coil Assembly
114002	L- 4, 5	Osc. Coil Assembly
114301	L- 8, 9, 10, C-14, 15	1st I.F. Transformer
114302	L- 6, 7, C-7, 8, 11, 12, R-1	2nd I.F. Transformer
139005	L- 1	Loop Assembly
151013	Electro Static Shield and Back	HB-HI
151014	Electro Static Shield & Back	HM, HW, HY
155001	L-11, 12, 13, 14, 15	Speaker Assembly

Voltage Rating	105-125 Volts
Type of Circuit	Superheterodyne
Tuning Range	540 Kc. to 1600 Kc.
Input Power Rating	50 Watts
Input Power Frequency	25-60 Cycles AC-DC
Intermediate Frequency	455 Kc.
Speaker Voice Coil Impedance	at 400 Cycles 3.5 Ohms
Speaker Field Coil Resistance	425 Ohms
Power Output	0.65 Watts

MODELS 1101-HB,-HI,
-HM,-HW,-HY

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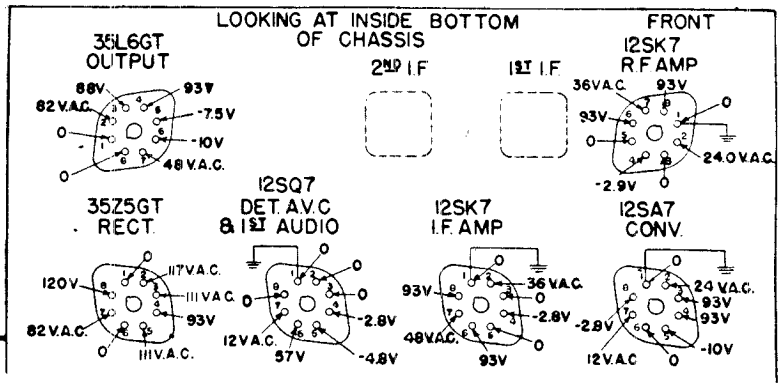
Voltage Chart

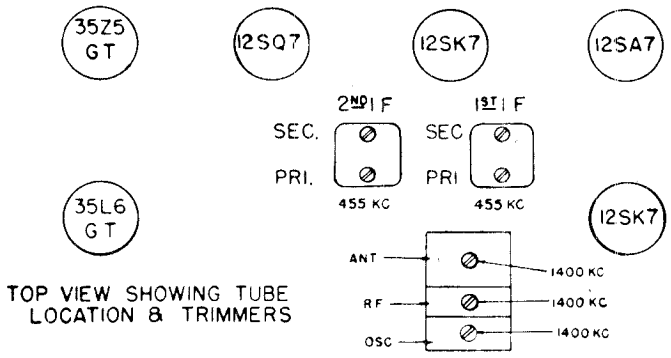
Measurements are made at 117 volt line, using electronic voltmeter.

Except where otherwise indicated, voltages are D.C. and are positive with respect to the reference point which is the minus S or neutral buss, black and white wire.



IDENTIFICATION TABLE

MODEL	CHASSIS	CABINET	SPEAKER	
			SERIES 10	SERIES 11
1101—HB Br. Bakelite	112002	108031	155001	155013
1101—HI lv. Bakelite	112002	108032	155001	155013
1101—HM Mahogany	112003	108011	155001	155013
1101—HW Walnut	112001	108001	155001	155013
1101—HY Bleached	112001	108002	155001	155013



TOP VIEW SHOWING TUBE LOCATION & TRIMMERS

ALIGNING

Never realign unless absolutely necessary

Use a good signal generator modulated at 400 or 1000 cycles with variable output voltage and a sensitive output meter across the voice coil of the speaker.

Always align using the smallest possible input from the signal generator. *A strong signal makes adjustments approximate.*

Always have the volume control "full on."

Aligning Procedure *(follow this order exactly)*

Intermediate Frequency Adjustments

1. Turn the tuning control to the extreme low frequency position. (Variable capacitor plates all the way in).
2. Connect the ground terminal of the signal generator to the common buss. (Black and White wire).
3. Introduce a modulated signal of 455 kilocycles using a .01 mfd. capacitor in series with the lead from the signal generator to the modulator grid, terminal No. 8, of the 12SA7 tube.
4. Adjust the I.F. Aligners for maximum output in the following order:
   A. Secondary of second I.F. Transformer.
   B. Primary of second I.F. Transformer.
   C. Secondary of first I.F. Transformer.
   D. Primary of first I.F. Transformer.

Dial Pointer Adjustments

1. Disconnect the .01 mfd. capacitor in series with the signal generator, disconnect signal generator ground from black and white buss. Connect both signal generator lead and ground lead to an 8 inch radiating loop. *(1 turn)*. Place the radiating loop close to the antenna of the receiver.
2. Turn the plates of the gang tuning capacitor full out *(complete clockwise rotation)*.
3. Set signal generator to 1580 kilocycles and adjust oscillator trimmer for maximum output. Now set signal generator to 1400 kilocycles and tune set to receive 1400 kilocycle signal. Adjust pointer to center of 1400 kilocycles calibration on dial.

Radio Frequency Adjustments

1. Leave signal generator loop connected in same position as for dial pointer adjustment.
2. Set signal generator and receiver tuning dial to 1400 kilocycles.
3. Adjust the oscillator, radio frequency and antenna trimmers for maximum output.
4. Set both the signal generator's frequency and the receiver's tuning dial to a 600 kilocycles and check calibration.

Note: If the calibration is too far off at 600 kilocycles, operations 2 and 3 may be repeated until the best results are obtained.

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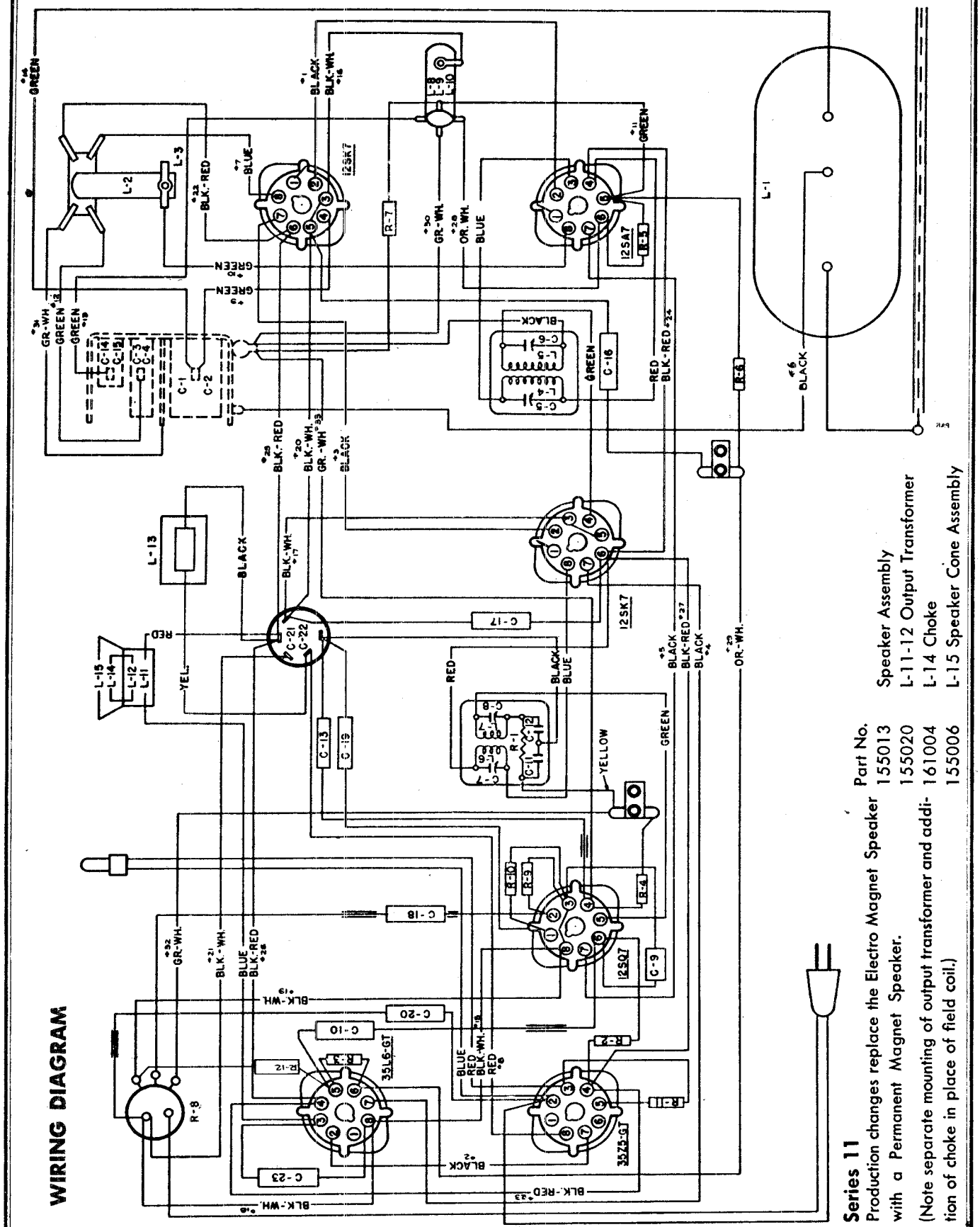
MODELS 1101-HB,-HI, -HM,-HW,-HY



WIRING DIAGRAM

Series 11

Production changes replace the Electro Magnet Speaker with a Permanent Magnet Speaker.

(Note separate mounting of output transformer and addition of choke in place of field coil.)

	Part No.	
	155013	Speaker Assembly
	155020	L-11-12 Output Transformer
	161004	L-14 Choke
	155006	L-15 Speaker Cone Assembly

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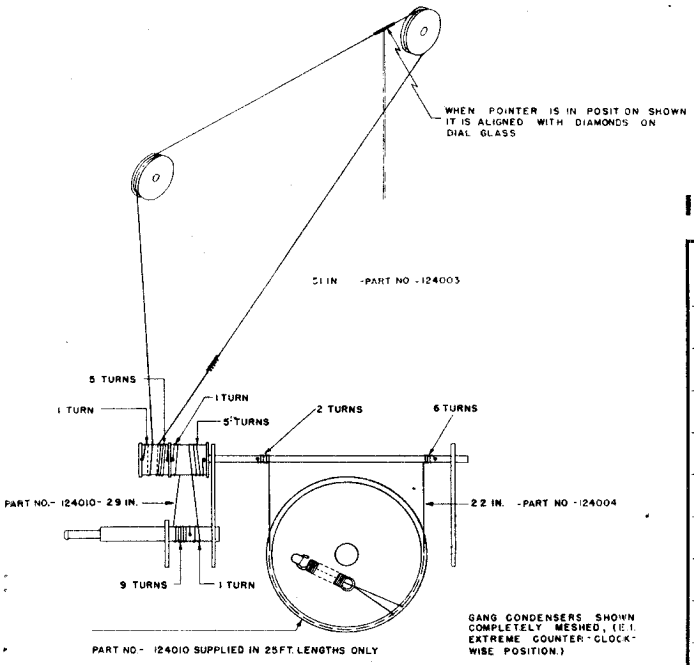
MODELS 1121-PFM,-PFW,-PGM,
-PGW,-PLW,-PLM,-M1-0,-PSM, STROMBERG CARLSON CO.
-M2-Y,-M2-W,-LW,-HW

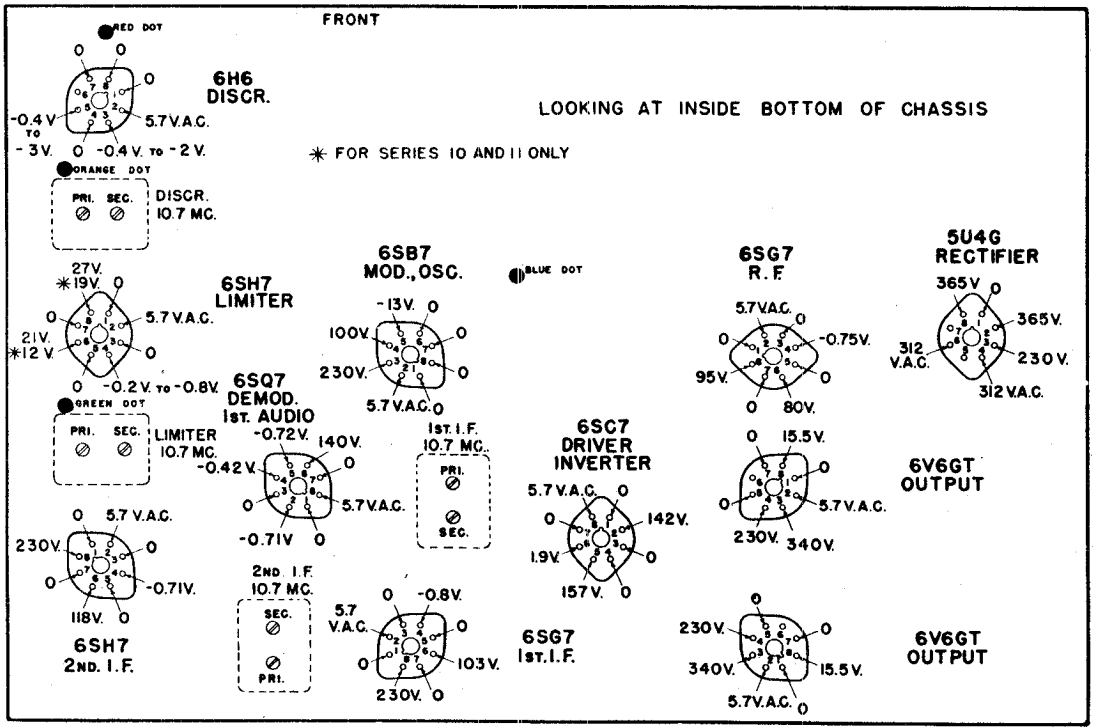
STRINGING CHART


WHEN POINTER IS IN POSITION SHOWN IT IS ALIGNED WITH DIAMONDS ON DIAL GLASS
51 IN. -PART NO. -124003
5 TURNS
1 TURN
1 TURN
5 TURNS
2 TURNS
6 TURNS
PART NO.- 124010- 29 IN.
22 IN. -PART NO -124004
9 TURNS
1 TURN
PART NO- 124010 SUPPLIED IN 25FT. LENGTHS ONLY
GANG CONDENSERS SHOWN COMPLETELY MESHED, (I.E. EXTREME COUNTER-CLOCK-WISE POSITION.)

IDENTIFICATION TABLE

Model	Chassis	Cabinet	Speaker	Phonograph Equipment
PFM	112004	41654	33435	148001
PFW	112004	41653	33435	148001
PGM	112004	35777	33435	41612
PGW	112004	35985	33435	41612
PLW	112004	108015	33435	148001
PLM	112004	108014	33435	148001
M1-0	112004	39213	33435	41612
PSM	112004	108028	33435	41612
M2-Y	112004	108019	33435	41612
M2-W	112004	45207	33435	41612
LW	112004	47908	33435	———
HW	112004	108020	155012	———

Measurements are made at the 117 volt line, using electronic voltmeter. Except where otherwise indicated, voltages are D. C. and are positive with respect to the reference point which is the chassis.



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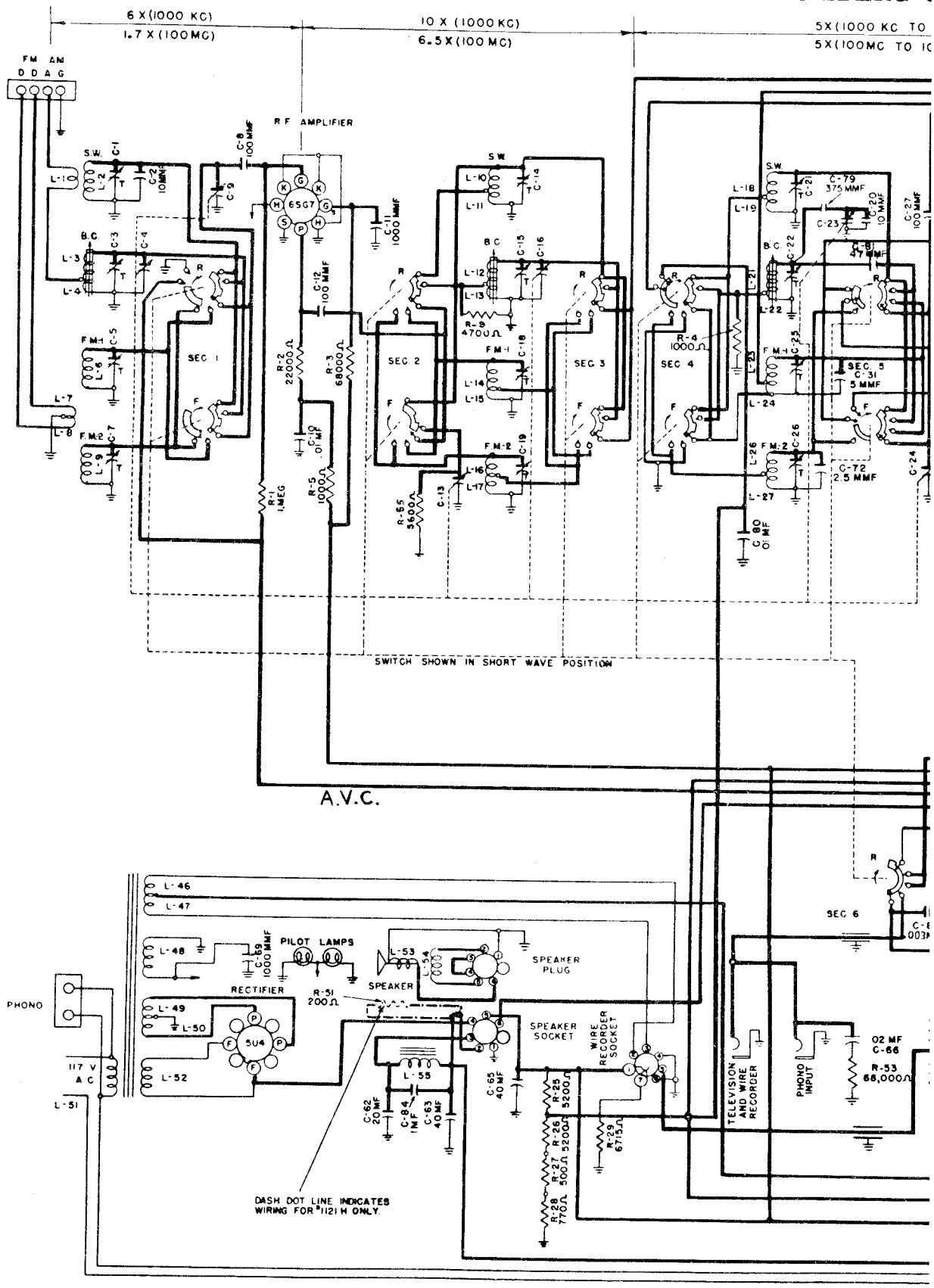
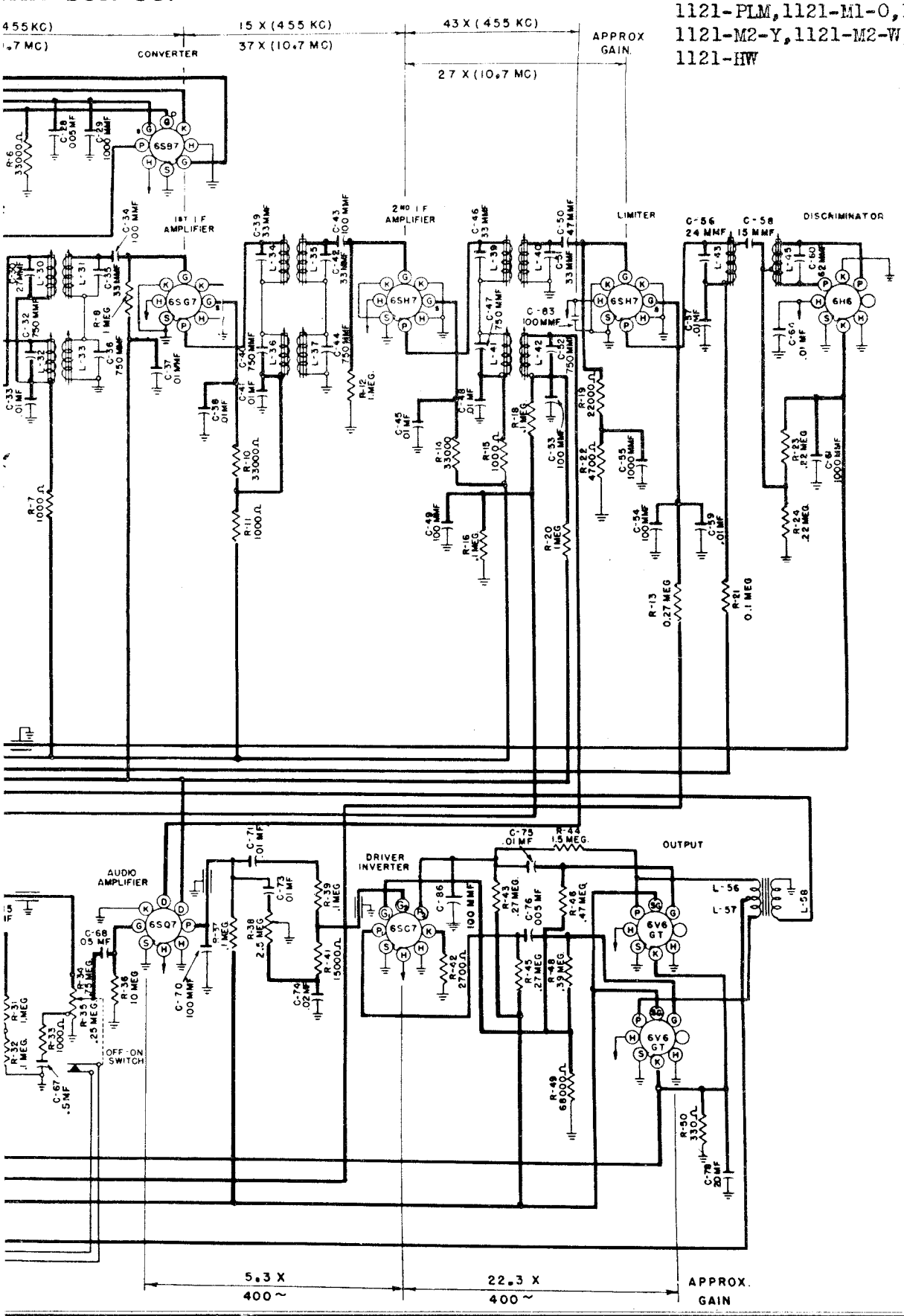


© John F. Rider Phonograph equipment 148001 uses Webster Record Changer Model 5

CARLSON CO.

MODELS 1121-PFM, 1121-PFW, 1121-PGM, 1121-PGW, 1121-PLW, 1121-PLM, 1121-M1-O, 1121-PSM, 1121-M2-Y, 1121-M2-W, 1121-LW, 1121-HW



O; phonograph equipment 41612 uses Seeburg Record Changer Model L. See Table P.15-12

MODELS 1121-PFM,-PFW,
-PGM,-PLW,-PLM,-M1-O,
-PSM,-M2-Y,-M2-W,-LW,
-HW

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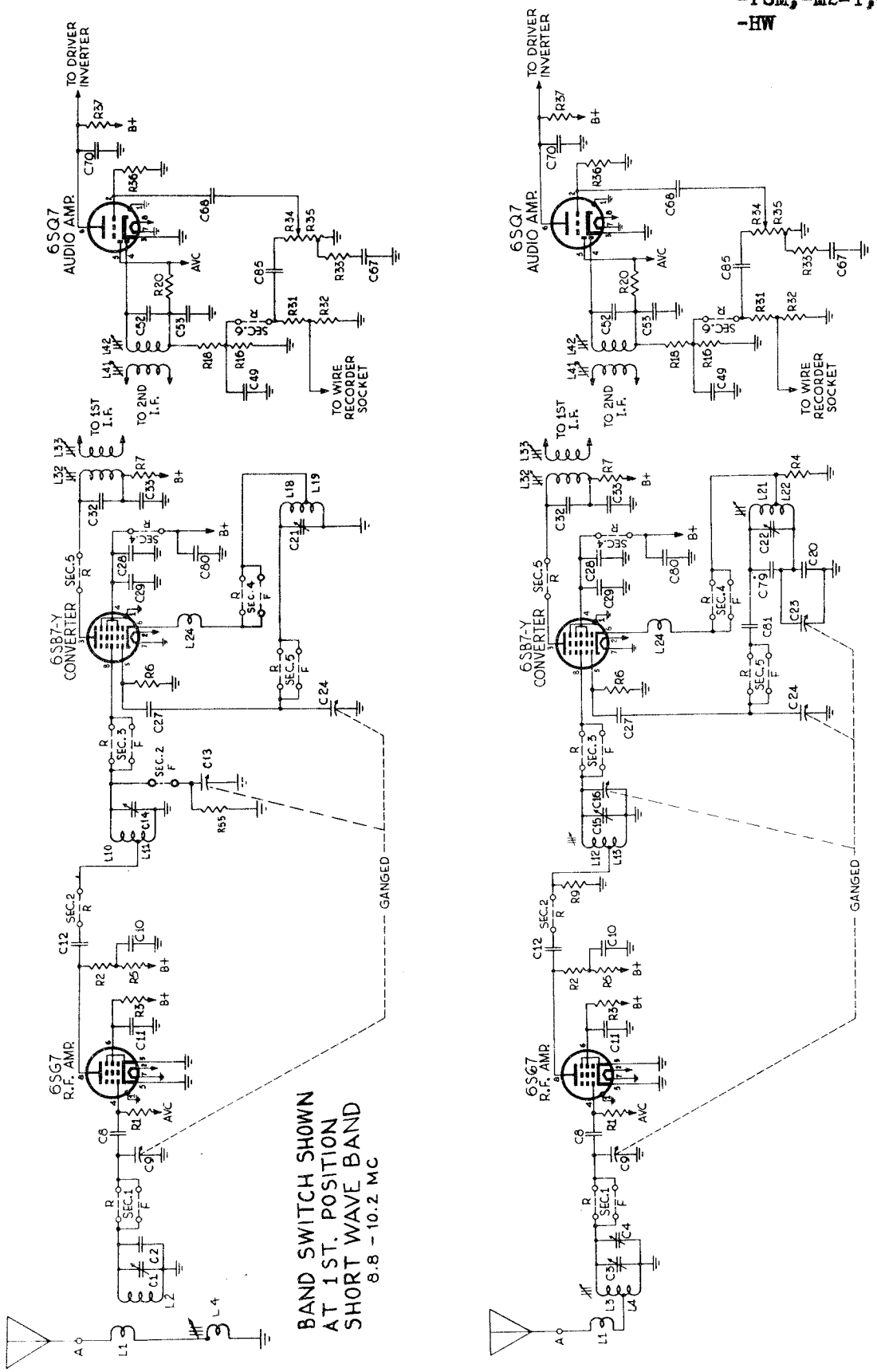
TO DRIVER INVERTER
6SQ7 AUDIO AMP.
TO 1ST I.F.
TO 2ND I.F.
TO WIRE RECORDER SOCKET
6SB7-Y CONVERTER
6SG7 R.F. AMP.
GANGED
BAND SWITCH SHOWN AT 1 ST. POSITION SHORT WAVE BAND 8.8 - 10.2 MC
BAND-SWITCH SHOWN AT 2ND POSITION CLOCKWISE. BROADCAST BAND 540 - 1620 KC

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MODELS 1121-PFM,-PFW,
-PGM,-PGW,-PLW,-PLM,
-M1-O,-PSM,-L2-Y,
-M2-W,-LW,-HW

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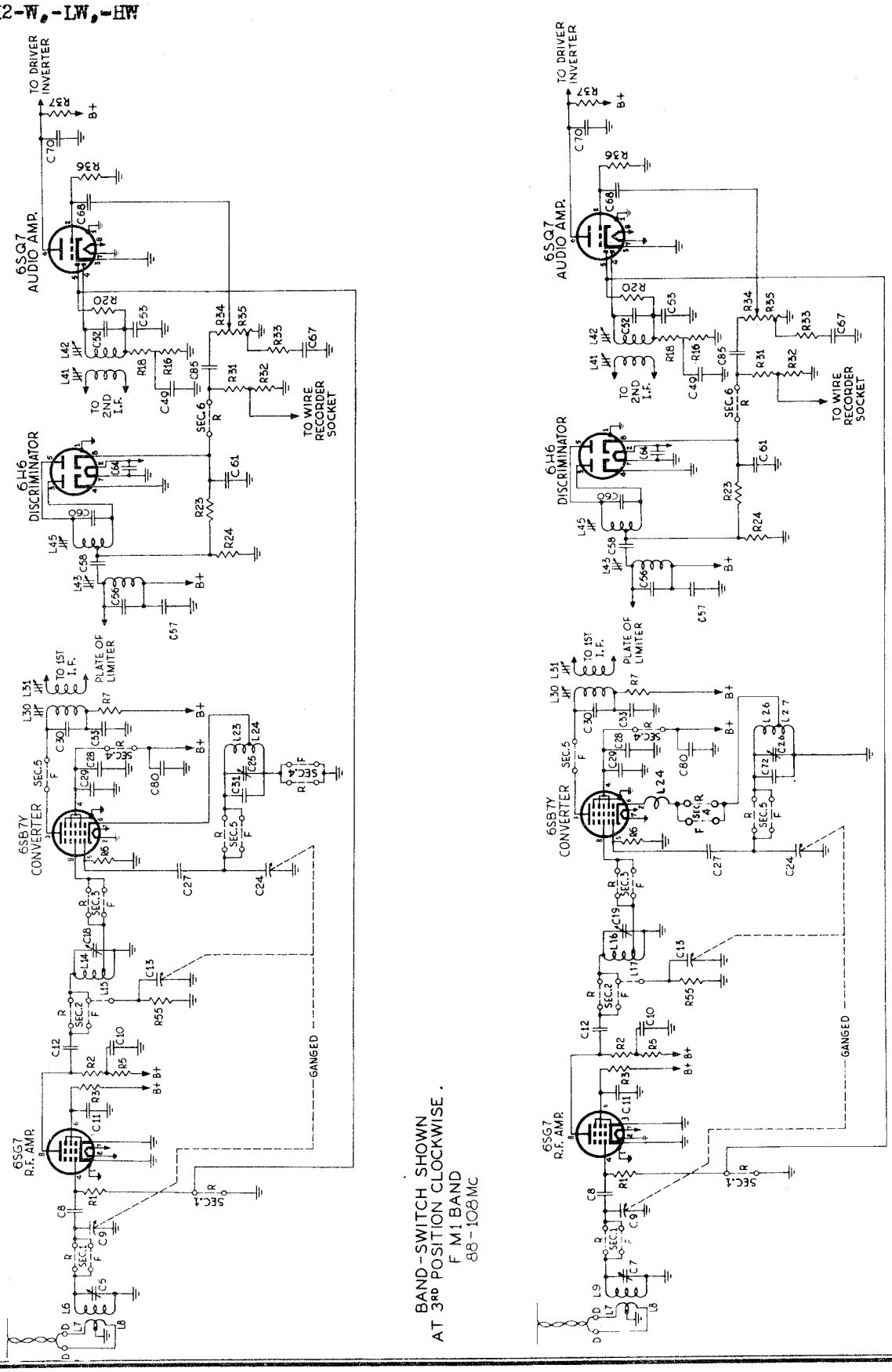

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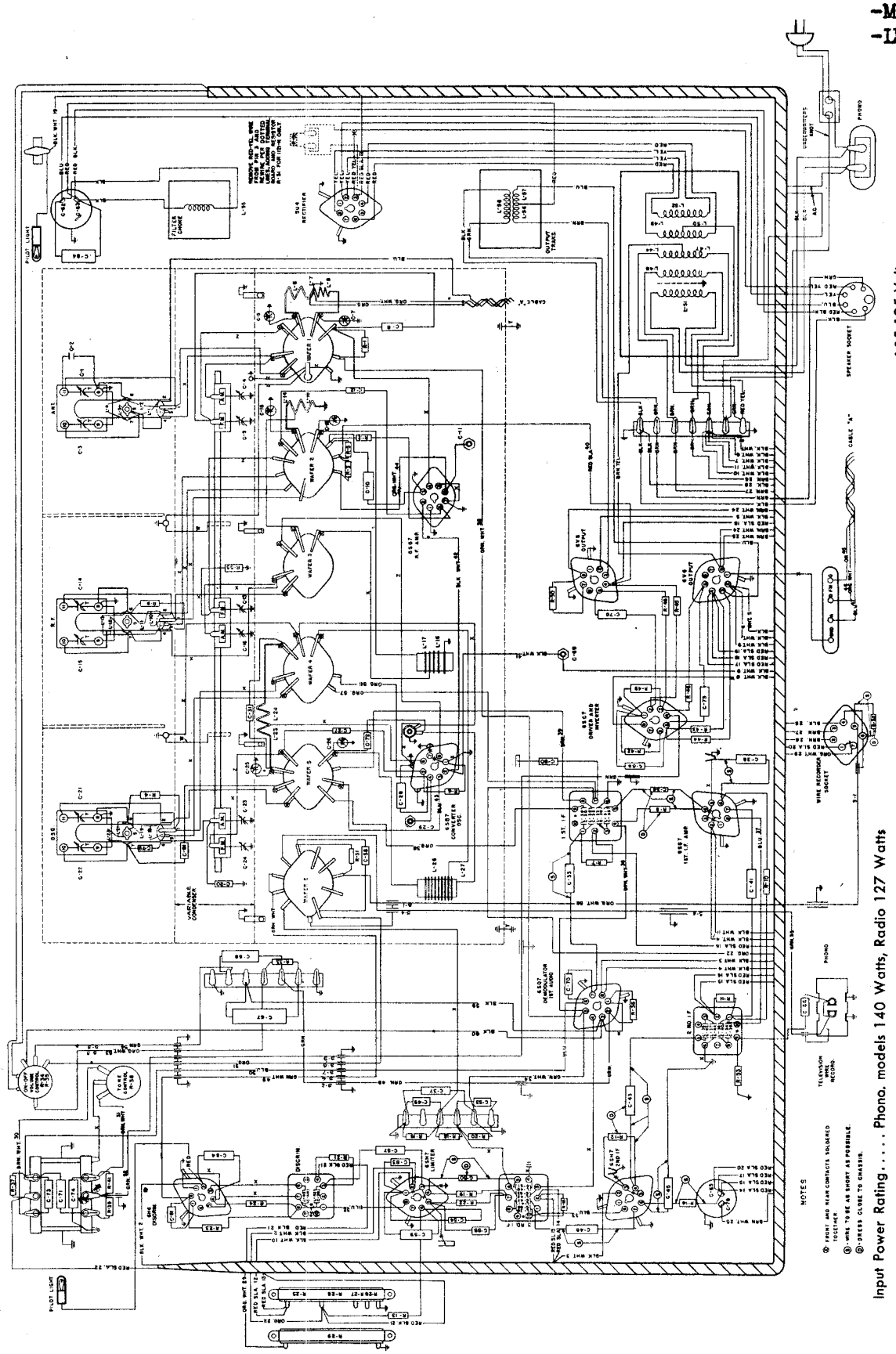
MODELS 1121-PFM,-PFW, -PGM,-PGW,-PLW,-PLM, -M1-O,-PSM,-M2-Y, -M2-W, -LW,-HW

WIRING DIAGRAM



Input Power Rating.....Phono. models 140 Watts, Radio 127 Watts
Intermediate Frequency .....A.M. 455 KC, F.M. 10.7 MC.
Speaker Voice Coil Impedance at 400 cycles.....3.5 Ohms
Speaker Field Resistance .....950 ohms, Model HW 800 ohms
Power Output.....8 Watts less than 10% Distortion

Voltage Rating.....105-125 Volts
Type of Circuit.....Superheterodyne
Tuning Range:.....Broadcast—540—1620 KC SW 8.8—10.2 MC
FM 42-50 MC 88-108 MC

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MODELS 1121 Series

STROMBERG CARLSON CO.

ALIGNING

Never realign unless absolutely necessary.

Refer to "Location Chart" for alignment adjusters. Allow set to warm up 10 to 15 minutes before attempting to align.

Always align using the smallest possible input from the signal generator. *A strong signal makes adjustments approximate.*

Always have volume full on.

The alignment of this receiver does not require special equipment or information; however, it is well to adhere to the standard procedure as outlined.

The required equipment is: 1 Electronic Voltmeter, 1 Output Meter, 1 Standard Signal Generator, 1 High Frequency Signal Generator, 1 No. 80777 Aligning Tool.

Aligning Procedure *(follow this order exactly)*

Intermediate Frequency Adjustments
Amplitude Modulation

The I.F. aligners that are used to adjust the amplitude modulation (AM) channel are found on the top side of the chassis. They consist of 6 adjustable iron cores used to tune the inductance of the 1st, 2nd & 3rd I.F. transformers (161202, 161200, 161201). These cores are found inside the plastic tubes protruding from the top of the I.F. transformers and are equipped with small screwdriver slots.

Caution: These cores are made of high quality R.F. iron and are fragile; therefore care must be used in adjusting them.

1. Connect the signal generator to the modulator grid, terminal number 8 of the 6SB7 converter tube which is connected to the wave band switch, and is identified by a blue dot.
2. Connect the output meter across the voice coil of the speaker (green and black wires from cable).
3. Adjust the signal generator to 455 KC. Use 30% modulation at 400 cycles.
4. Adjust volume control full on.
5. Adjust tone control to maximum high (counter clockwise).
6. Adjust range switch to standard broadcast band, (second position clockwise.)
7. Adjust the tuning selector to approximately 600 KC.
8. Adjust I.F. cores for maximum output with a reduced signal Input.

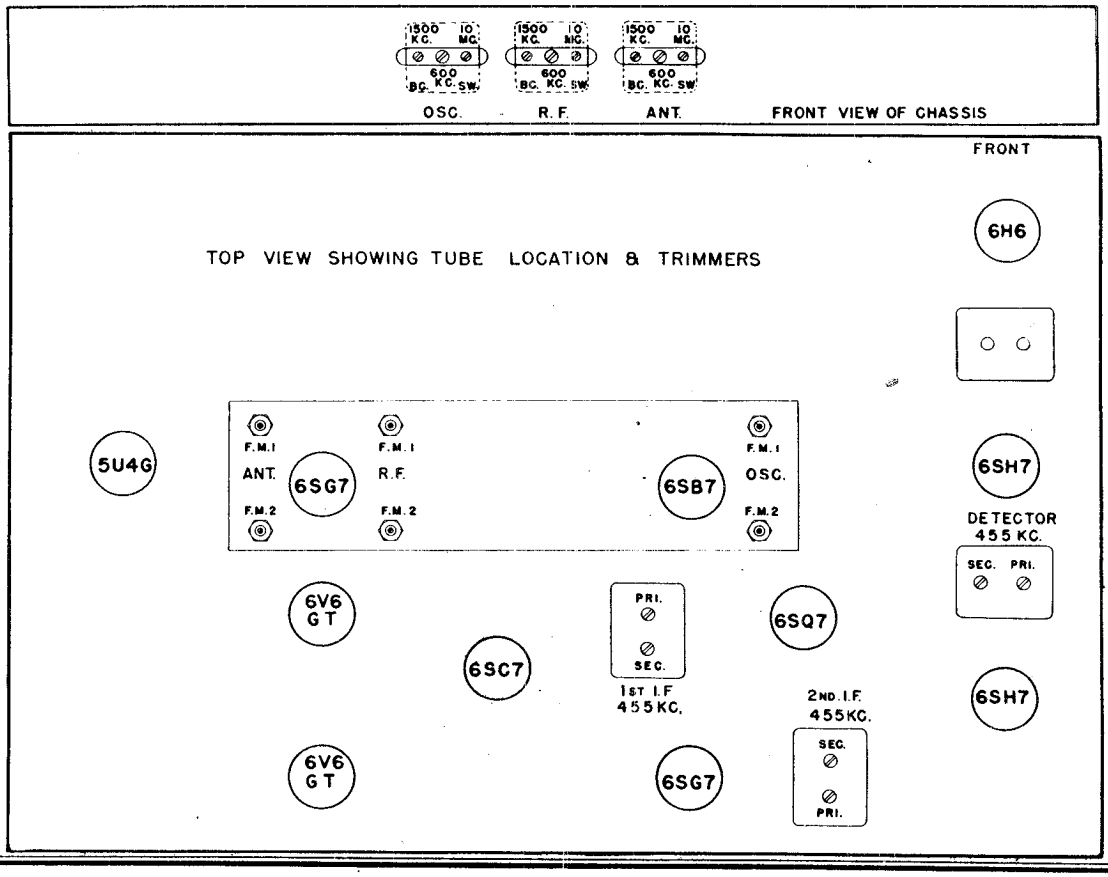
Frequency Modulation

The I.F. Aligners may be found from the underside of the chassis. The adjusters are 6 Iron cores used to tune the inductance of the high frequency coils.

1. Connect the signal generator to the modulator grid, terminal number 8 of the 6SB7 converter tube, which is connected to the wave band switch, and is identified by a blue dot.

LOCATION CHARTS

TUBES, TRIMMERS AND VOLTAGE



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2. Connect the electronic voltmeter to the junction of the 22,000 and the 4,700 ohm resistors in the limiter grid circuit, identified by a green dot.
3. Adjust the voltmeter to the lowest negative voltage scale.
4. Turn the range switch to the 2nd F.M. band (fourth position clockwise).
5. Adjust the tuning selector to approximately 21 on this band.
6. Adjust the signal generator to 10.7 megacycles. No modulation is required.
7. Adjust the cores for maximum output of the voltmeter. Reduce the input signal and readjust until the maximum output is secured for minimum input.

Discriminator Alignment (FM)

1. Connect the signal generator to the grid of the second I.F. tube, terminal No. 4 of the 6SH7.
2. Connect the electronic voltmeter to the center of the diode load resistors at the point indicated by the orange dot.
3. Adjust the primary for maximum output with the signal generator set at 10.7 megacycles.
4. Switch the electronic voltmeter to the high side of the diode load resistors, identified by a red dot.
5. Adjust the secondary for zero output.
6. Swing generator to 75 KC higher and 75 KC lower in frequency and note the plus and minus voltage. If these voltage values are not approximately equal, repeat operations 3, 4 and 5.

Dial Pointer Adjustment

Check dial pointer to see that it is aligned through the center of the 2 in the number 201 of FM Band (1) when the variable capacitor plates are completely engaged.

R.F. Adjustment — Amplitude Modulation

The Broadcast band should be adjusted first.

The built-in loop should remain connected to the antenna and ground terminals.

1. Connect the signal generator to the antenna terminal, using a 200 mmf. capacitor. Use 30% modulation at 400 cycles.
2. Adjust the signal generator to 1500 KC.
3. Adjust station selector to 1500 KC.
4. Adjust range switch to AM Broadcast. (Second position clockwise.)
5. Adjust the oscillator, R.F. and antenna trimmer for maximum output.
6. Reduce the input signal and readjust the trimmers until the maximum output is secured for minimum input.
7. Adjust station selector to 600 KC.
8. Set signal generator to 600 KC.
9. Adjust iron cores in oscillator, R.F. and antenna coils for maximum output.
10. Repeat 1500 KC and 600 KC alignments until no further change is required.

R.F. Adjustment — Short Wave

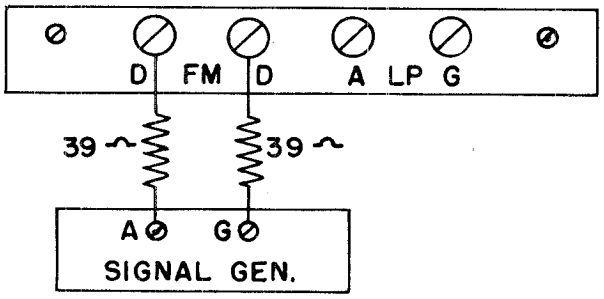
The built-in loop should remain connected to the antenna and ground terminals.

1. Connect the signal generator to the antenna and ground terminals of the receiver using a 400 ohm resistor.
2. Set the dial pointer to 9.5 megacycles.
3. Adjust signal generator to 9.5 megacycles.
4. Adjust range switch to Short Wave (first position clockwise).
5. Adjust oscillator, R.F., and antenna trimmer for maximum output. (No further alignment is required on this band.)

R.F. Adjustments — Frequency Modulation

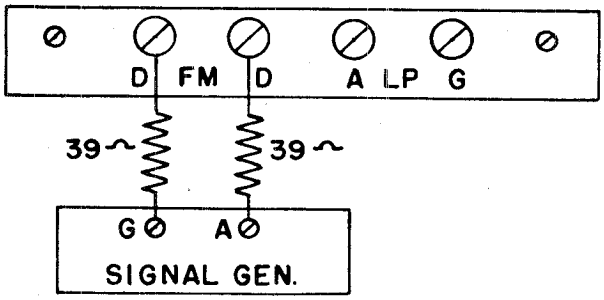
Align the FM (2) Band first.

1. Set the dial pointer to 61.
2. Connect the signal generator to FM dipole terminals using 39 ohm resistors as indicated. (Disconnect dipole antenna.) *Connect Signal Generator ground to chassis ground.*
3. Set signal generator to 46.1 megacycles.
4. Adjust range switch to FM (2) (fourth position clockwise).
5. Connect the electronic voltmeter to the junction of the 22,000 and 4,700 ohm resistors in the limiter grid circuit. (Identified by green dot.)
6. Adjust oscillator R.F. and antenna trimmers for maximum output on electronic voltmeter.



FM (1) Band

Adjust the same as the FM (2) band using 100.1 megacycles, setting the dial pointer to 261. Connect the generator to the dipole input using 39 ohm resistors as indicated. *Connect Signal Generator ground to chassis ground. Note reversed Signal Generator connection.*



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REPLACEMENT PARTS

Resistors

Part No.		
28006	R-16, 18, 21, 32, 37, 39	.1 Meg.
28158	R-4, 5, 7, 11, 15, 33	1,000 Ohm
28163	R-42	2,700 Ohm
28167	R-55	5,600 Ohm
28172	R-41	15,000 Ohm
28175	R-10-14	33,000 Ohm
28179	R-3-49-53	68,000 Ohm
28183	R-23-24	.22 Meg.
28184	R-13-43-45	.27 Meg.
28186	R-48	.39 Meg.
28187	R-46	.47 Meg.
28191	R-20-31	1. Meg.
28193	R-44	1.5 Meg.
28203	R-36	10.0 Meg.
69892	R-50	330 Ohm
149001	R-29	Voltage Divider
149002	R-25, 26, 27, 28	Voltage Divider
149004	R-9-22	4,700 Ohm
149005	R-2-19	22,000 Ohm
149006	R-6	33,000 Ohm
149007	R-1-8-12	1.0 Meg.
149008	R-51 (Model H)	200 Ohm 5 W

Controls—Switches

Part No.		
145002	R-34-35	1 Meg. Volume Control & Switch
145003	R-38	2.5 Meg. Tone and Bass Control

Coils—Transformers—Speakers

Part No.		
33435		Speaker Assembly
33437	L-54	Speaker Field Coil
33438	L-53	Speaker Cone
33518	L-53	Model H Speaker Cone
153001	L-54	Model H Field Coil Speaker
155012		Model H Speaker Assembly
114003	L-10-11-12-13	R.F. Coil Broadcast & S.W.
114004	L-18-19-21-22	Osc. Coil Broadcast & S. W.
114005	L-1-2-3-4	Ant. Coil Broadcast & S.W.
161200	L-34-35-36-37	2nd I.F. Transformer
161201	L-39-40-41-42	3rd I.F. Transformer
161202	L-30-31-32-33	1st I.F. Transformer
161203	L-55	Choke, Filter
161204	L-46-47-48-49-50-51-52	Power Transformer 60 Cy.
161205	L-43-45	Discriminator Transformer
161401	L-56-57-58	Output Transformer
*112005		R.F. Chassis Assembly

*Band Switch, Sockets, variable cap., R.F. coils all bands. This is a complete R.F. assembly. Sold as a unit only.

Capacitors

Part. No.		
24559	C-49-53-70-86	100 mmf.
25484	C-66-74	.02 mf.
25485	C-10-33-37-38-41-45 -48-57-59-64-71-73-75-80	.01 mf.
25487	C-55-61	.001 mf.
27760	C-28-76	.005 mf.
40632	C-68	.05 mf.
110006	C-5-18-19-25-26	R.F. Trimmer (F.M.)
110007	C-7	R.F. Trimmer Ant. (2) (F.M.)
110201	C-32-36-40-44-47-52	750 mmf.
110202	C-2	10 mmf.
110203	C-79	375 mmf.
110401	C-8-12-27-34-43-54-83	100 mmf.
110402	C-50-81	47 mmf.
110403	C-56	24 mmf.
110405	C-58	15 mmf.
110406	C-60	62 mmf.
110407	C-35-39-42-46-51	33 mmf.
110408	C-11-29	1000 mmf.
110410	C-30	27 mmf.
110411	C-20	10 mmf.
110412	C-72	2.5 mmf.
110413	C-31	5 mmf.
110414	C-67	.5 mf.
110422	C-84	1 mf.
110430	C-85	.003 mf.
111002	C-62-63	20-40 mf. Electrolytic
111003	C-65-78	40-20 mf. Electrolytic

Miscellaneous

Part No.	
28694	Socket, Pilot
29956	Lamp, Pilot
30269	Corner Mtg., Dial Scale
32076	Pulley, Dial Cord
40546	Clip, Pulley
109001	Cable Assembly, Speaker
113002	Ground Clip, Tube
150004	Drive Shaft, Pulley
150005	Drive Shaft, Dial
124010	Drive Cord, 25 ft.
124004	Cord Assembly, Pulley
122006	Dial Scale
124003	Cord Assembly, Pointer
144003	Pointer
151035	Shield, Pilot Lamp
152002	Socket, 8 Point Wafer
152004	Socket, 7 point
33444	Speaker Plug
33218	A.C. Cord
118001	Iron Core (I.F.)
118002	Iron Core (R.F.)
80484	Phono. Cartridge
35866	Call Letters Kit
31539	Phono & Tele. Jack
32048	Socket A.C., Outlet
159002	Ant. Gnd. Dipole Terminal Strip
80777	Aligning Tool

Knobs

Part No.		
32224	Off-On-Vol., Tone	
35725	Range	
37093	Tuning	
32156	Push Button	
134006	On-Off-Vol., Tone M1, M2, HW	Square Edge
134007	Range M1, M2, HW	Square Edge
134008	Tuning M1, M2, HW	Square Edge
80768	Off-On-Vol., Tone M1, M2, HW	Bevel Edge
80769	Range M1, M2, HW	Bevel Edge
80770	Tuning M1, M2, HW	Bevel Edge

Escutcheons

Part No.	
35792	Dial
125002	Dial M1, M2
125009	Dial HW

Decals

Part No.		
34126	(Off-On-Vol.) Designation Plate	
32262	Stations	
121002	Tone	
121003	Range	
121002	Tone	M1-M2-HW
121004	Range	M1-M2-HW

Series 10 has matching Phono. Network for (L72) 80670 Pickup Cartridge.

Series 11 has matching Phono. Network for (LP6) 80484 Pickup Cartridge.

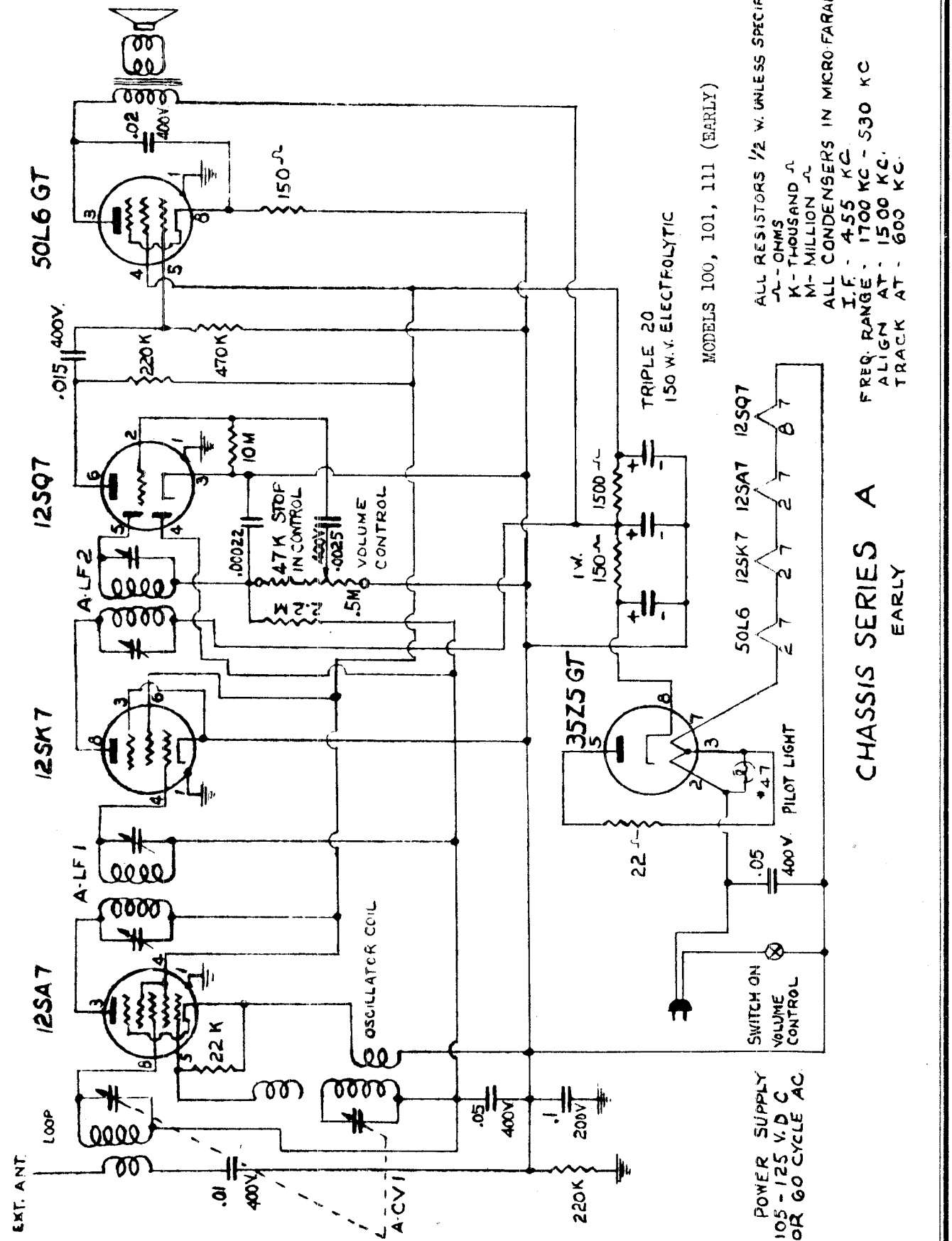
Series 12 R-21 changed from 1000 ohms to .1 Meg.
R-13—.27 Meg. Resistor added.
Leads from R-27, R-28 removed and made common with lead from R-26.
TerminalN umber 4 of wire recorder socket grounded.
Center tap of L-46, L-47 removed from ground, and connected to cathode of 6V6 tube.

Cabinet Parts

Part No.	PFM PFW	PGM PGW	LW	PLM PLW	M1-0	M2-Y M2-W	HW	PSM	
80681	X	X		X				X	Stop Hinge
132016				X		X			Bullet Catch
37084				X					Key Pull
39200				X	X				Piano Hinge
130007				X					Grille Cloth
130009				X					Grille, Metal
37145				X	X				Lid Support
37148		X							Door—Pull Inv. Std.
38442	X	X			X			X	Bullet Catch
39350		X							Grille Cloth
130006			X						Grille Cloth
130010			X						Grille, Metal
130015	X								Grille Cloth W Album 130004
130016	X								Grille Cloth W Speaker 130005
132020	X								Door—Pull
132027	X								Piano Hinge
130011							X		Grille Cloth
132001					X				Door Strike Left
132002					X				Door Stop Left
132003					X				Door Rail, Top Left
132045					X				Concealed Hinge Album Door
132040					X				Door Rail & Plate, Lower Right
132007					X				Door Track, Upper Right
132008					X				Wheel Track, Upper Right
132009					X	X			Door Pull, Concealed
130002					X				Grille Cloth
125001					X	X			Speaker Bezel
132035					X				Door Stop, Bottom Right
132037					X				Door Rail, Lower Left
130003						X			Grille Cloth
132012						X			Door Pull
132013						X			Butt Hinge
132014						X			Door Track
132015						X			Semi-Concealed Hinge
37153								X	Door Pull
37167								X	Grille Cloth
132019	X								Knob Door
38382	X	X	X	X	X	X		X	Glider
108016		X				X		X	Phono Drawer Assem. Comp.
132022	X	X				X		X	Phono Drawer Track, Left
132021	X	X				X		X	Phono Drawer Track, Right
108017	X								Phono Drawer Assem. Comp.

TELETONE RADIO CORP.

MODELS 100,101,111, 113, Chassis A, Early



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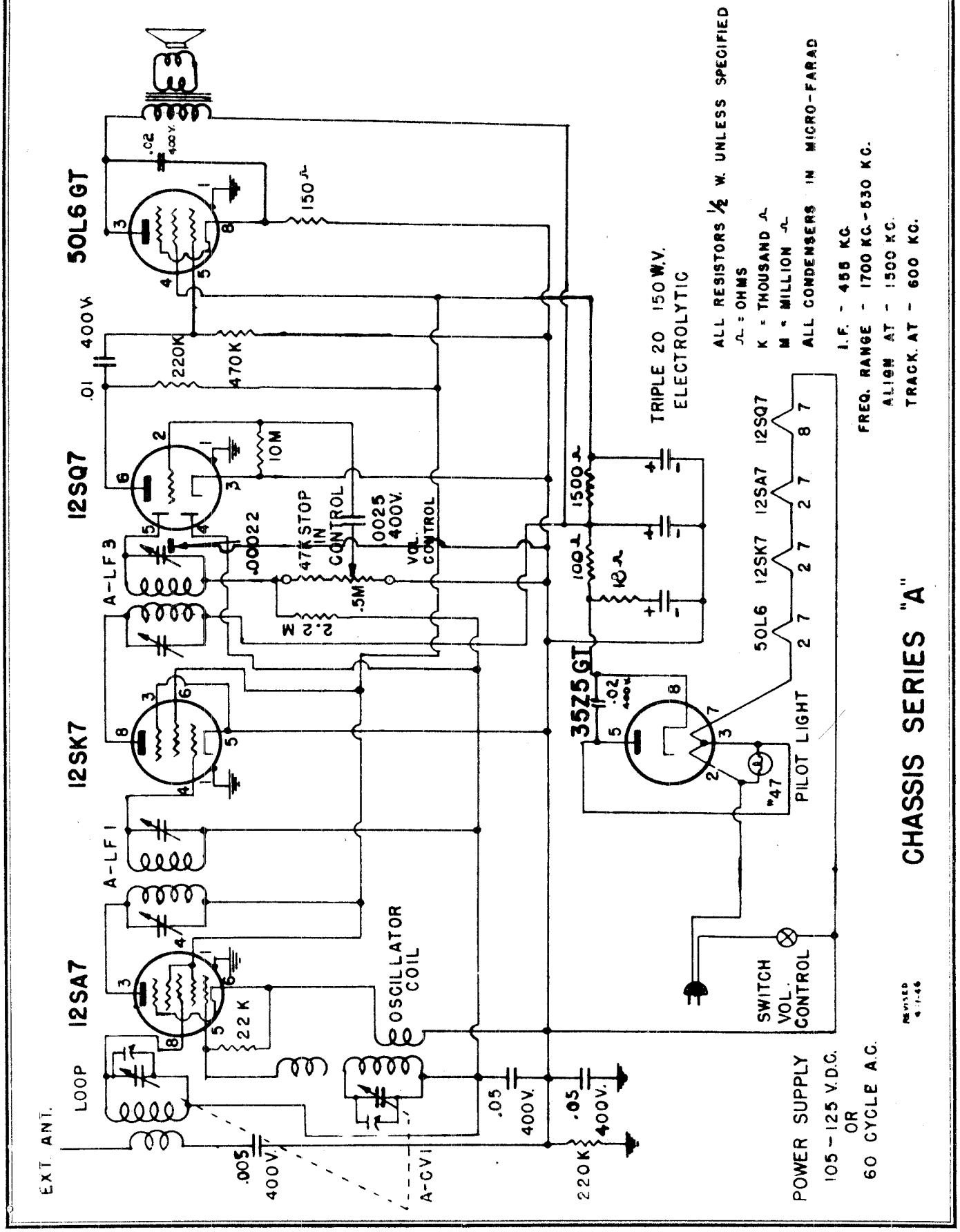
MODELS 100,100A,101,
109,111,122,130
Chassis A, Late

TELETONE RADIO CORP.



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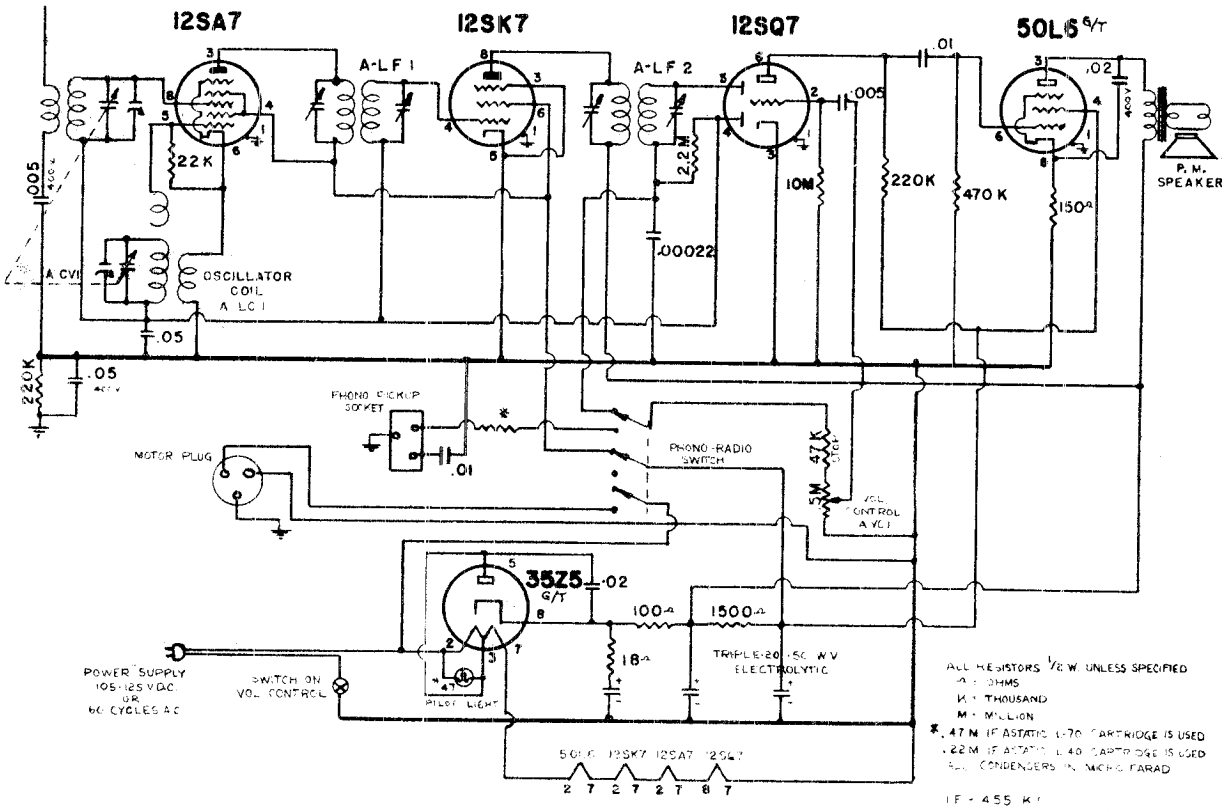
TELETONE RADIO CORP. MODEL 115, Chassis Series B
MODEL 134, Chassis Series C

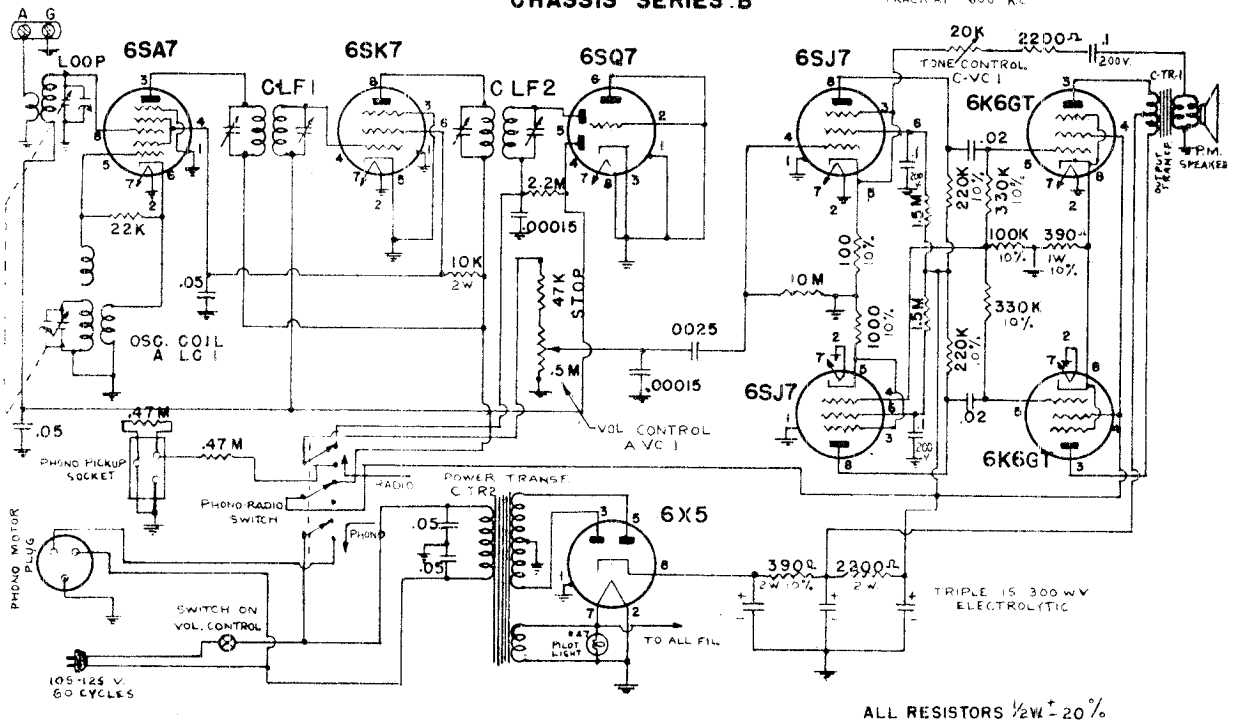


MODEL 115

CHASSIS SERIES "B"

ALL RESISTORS 1/2 W. UNLESS SPECIFIED
Ω = OHMS
K = THOUSAND
M = MILLION
*.47 M IF ASTATIC L-70 CARTRIDGE IS USED
.22M IF ASTATIC L-40 CARTRIDGE IS USED
ALL CONDENSERS IN MICRO FARAD

I.F. = 455 K.C.
FREQ. RANGE = 1700 K.C. 530 K.C.
ALIGN AT = 1500 K.C.
TRACK AT = 600 K.C.



I.F. = 455 K.C.
FREQ. RANGE = 1700 KC - 530 KC
ALIGN AT = 1500 KC
TRACK AT = 600 & 1000 KC

CHASSIS SERIES "C"

MODEL "134

ALL RESISTORS 1/2W ± 20 % UNLESS SPECIFIED
Ω : OHMS
K : THOUSAND Ω
M : MILLION Ω
ALL CONDENSERS IN MICRO FARAD 400 V.D.C. UNLESS SPECIFIED

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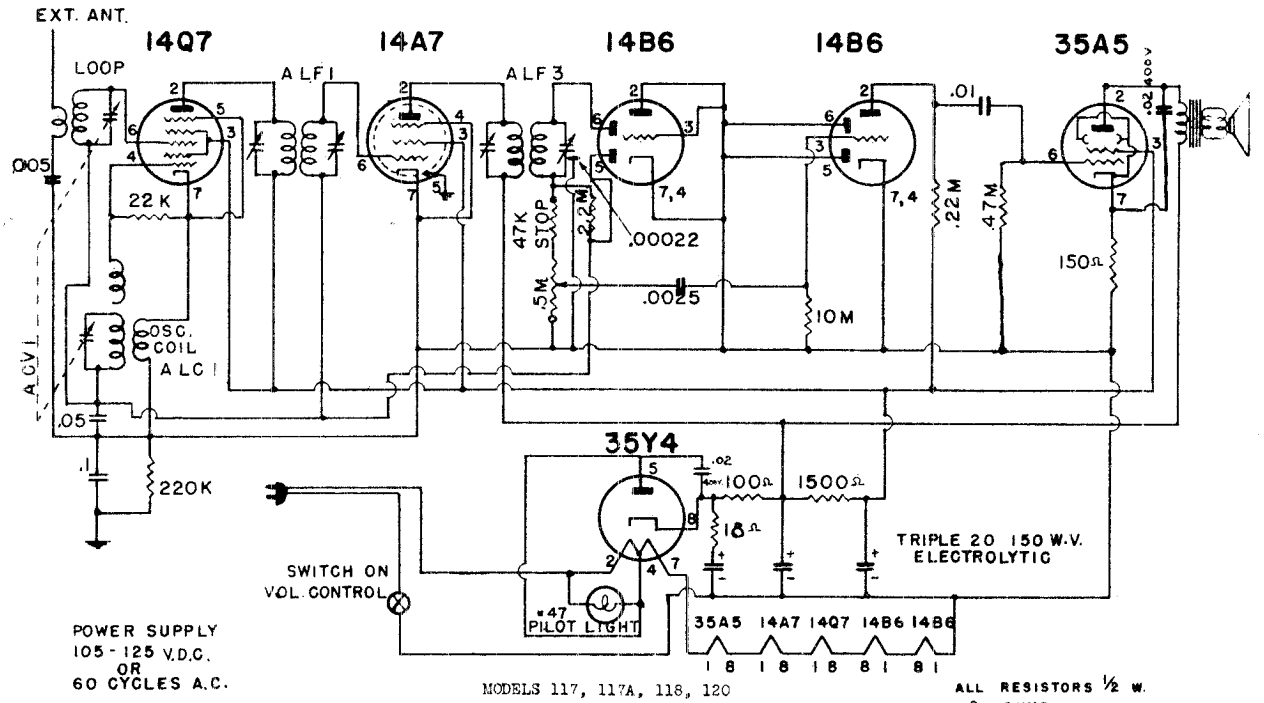
MODELS 117,117A,118,120
Chassis Series D
MODELS 101J,122J,130J
Chassis Series J

TELETONE RADIO CORP.

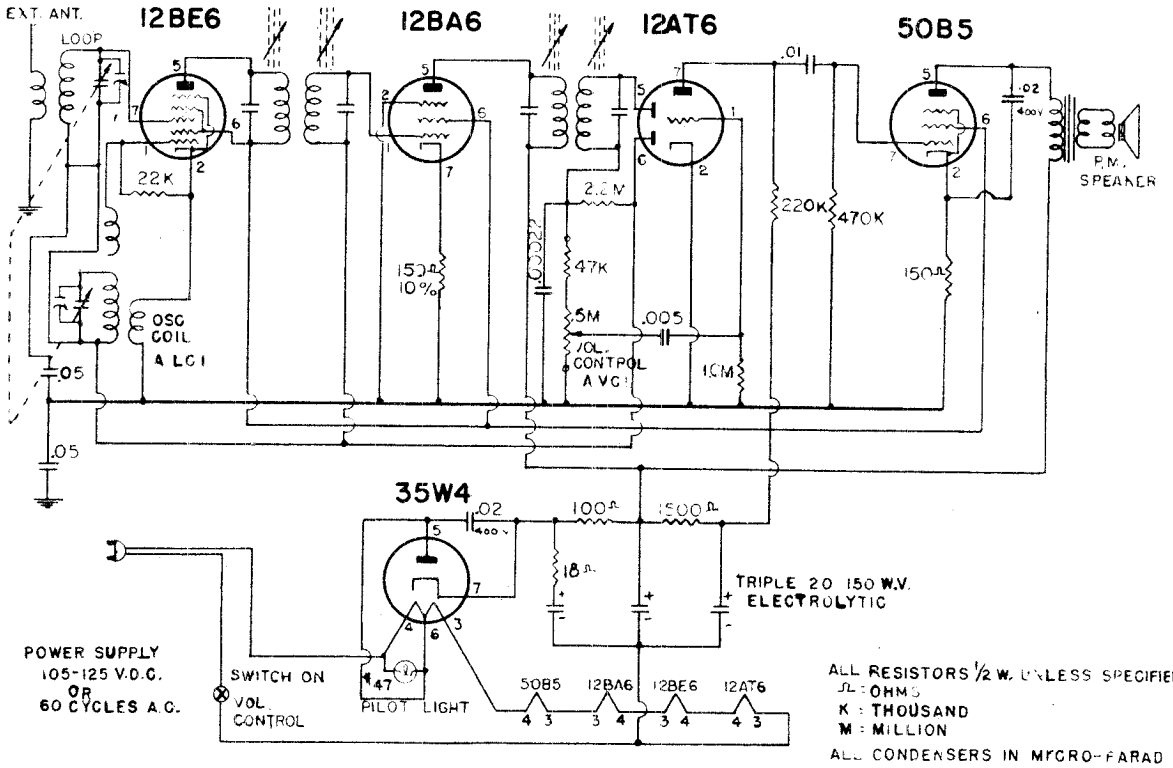


MODELS 117, 117A, 118, 120

CHASSIS SERIES "D"

I.F.-455 KC
FREQ. RANGE-1700 530 KC
ALIGN AT-1500 KC
TRACK AT-600 KC

ALL RESISTORS ½ W.
Ω = OHMS
K = THOUSAND Ω
M = MILLION Ω
ALL CONDENSERS IN MICROFARAD



MODELS 101-J, 122-J, 130-J

CHASSIS SERIES "J"

ALL RESISTORS ½ W. UNLESS SPECIFIED
Ω = OHMS
K = THOUSAND
M = MILLION
ALL CONDENSERS IN MICRO-FARAD

I.F.-455 KC
FREQ. RANGE-1700 KC 530 KC
ALIGN AT-1500 KC
TRACK AT-600 KC

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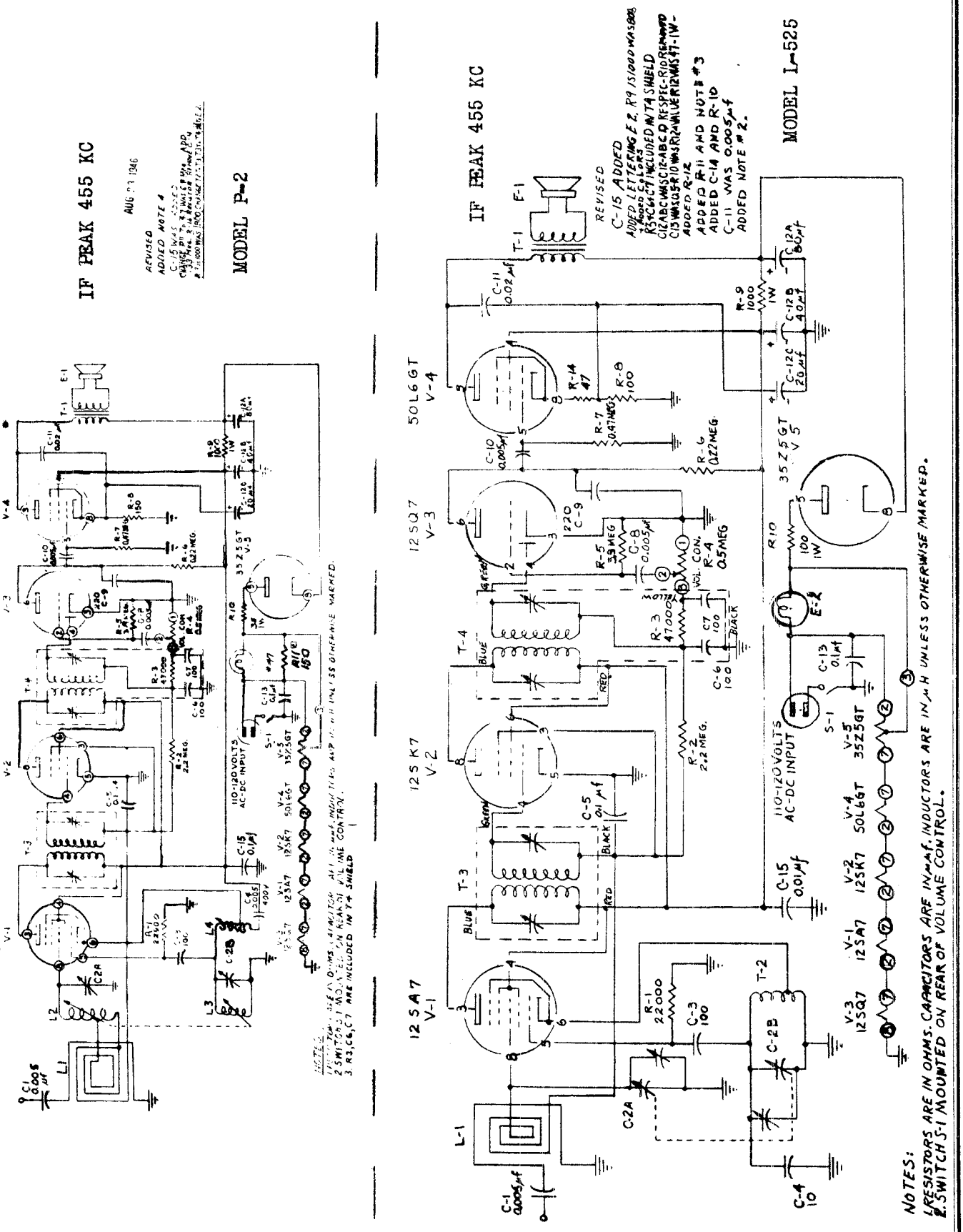
TEMPLETONE RADIO MFG. CORP.

MODEL P-2
MODEL L-525


IF PEAK 455 KC
MODEL P-2
IF PEAK 455 KC
MODEL L-525
12SA7 V-1
12SK7 V-2
12SQ7GT V-3
50L6GT V-4
35Z5GT V-5
110-120 VOLTS AC-DC INPUT
NOTES:
1. RESISTORS ARE IN OHMS, CAPACITORS ARE IN mf, INDUCTORS ARE IN μH UNLESS OTHERWISE MARKED.
2. SWITCH S-1 MOUNTED ON REAR OF VOLUME CONTROL.

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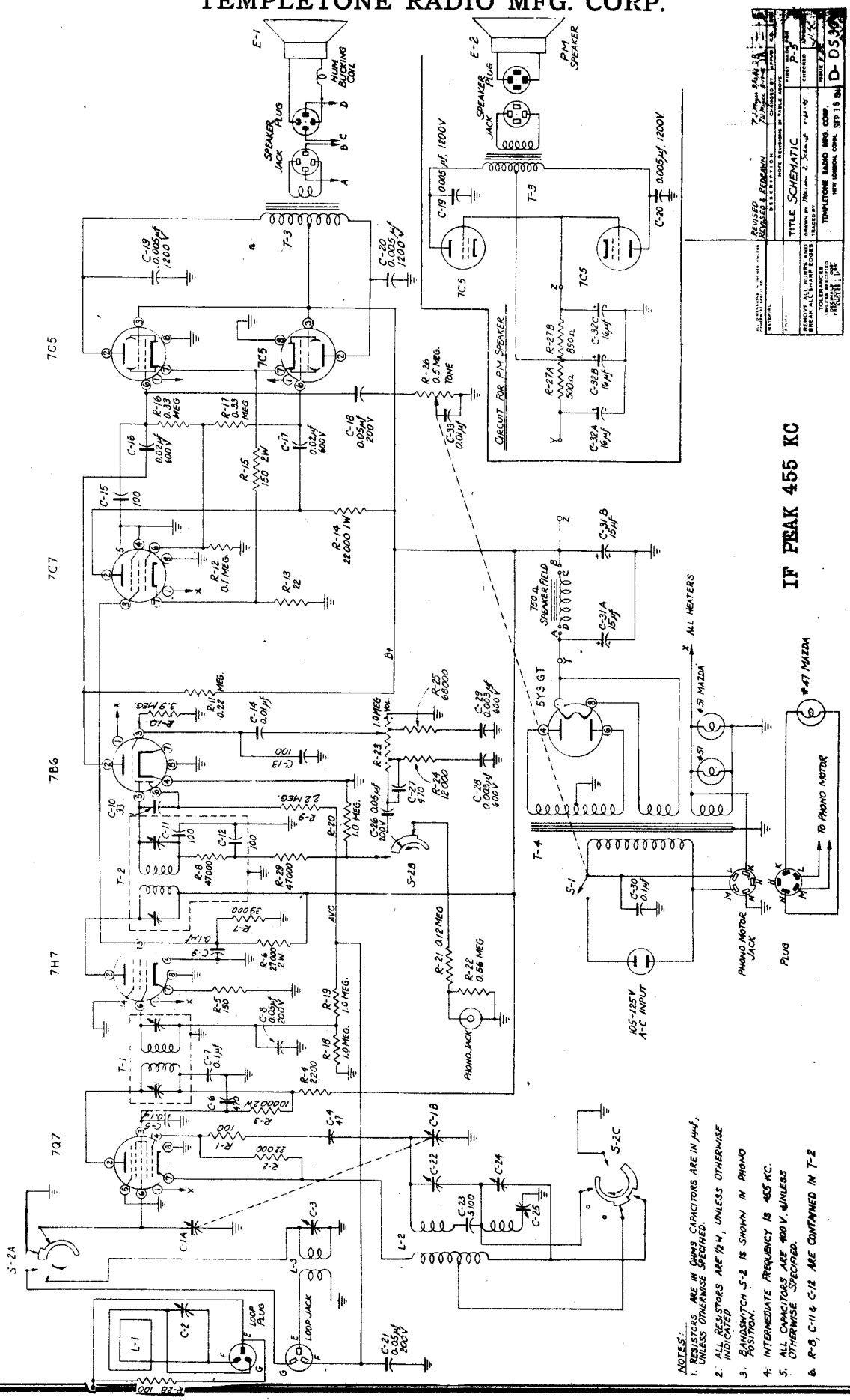
MODEL P-5

TEMPLETONE RADIO MFG. CORP.


IF PEAK 455 KC
TITLE SCHEMATIC
P-5
D-
NOTES:
1. RESISTORS ARE IN OHMS, CAPACITORS ARE IN μμf, UNLESS OTHERWISE SPECIFIED.
2. ALL RESISTORS ARE ½ W, UNLESS OTHERWISE INDICATED
3. BANDSWITCH S-2 IS SHOWN IN PHONO POSITION.
4. INTERMEDIATE FREQUENCY IS 455 KC.
5. ALL CAPACITORS ARE 400 V. UNLESS OTHERWISE SPECIFIED.
6. R-8, C-11 & C-12 ARE CONTAINED IN T-2

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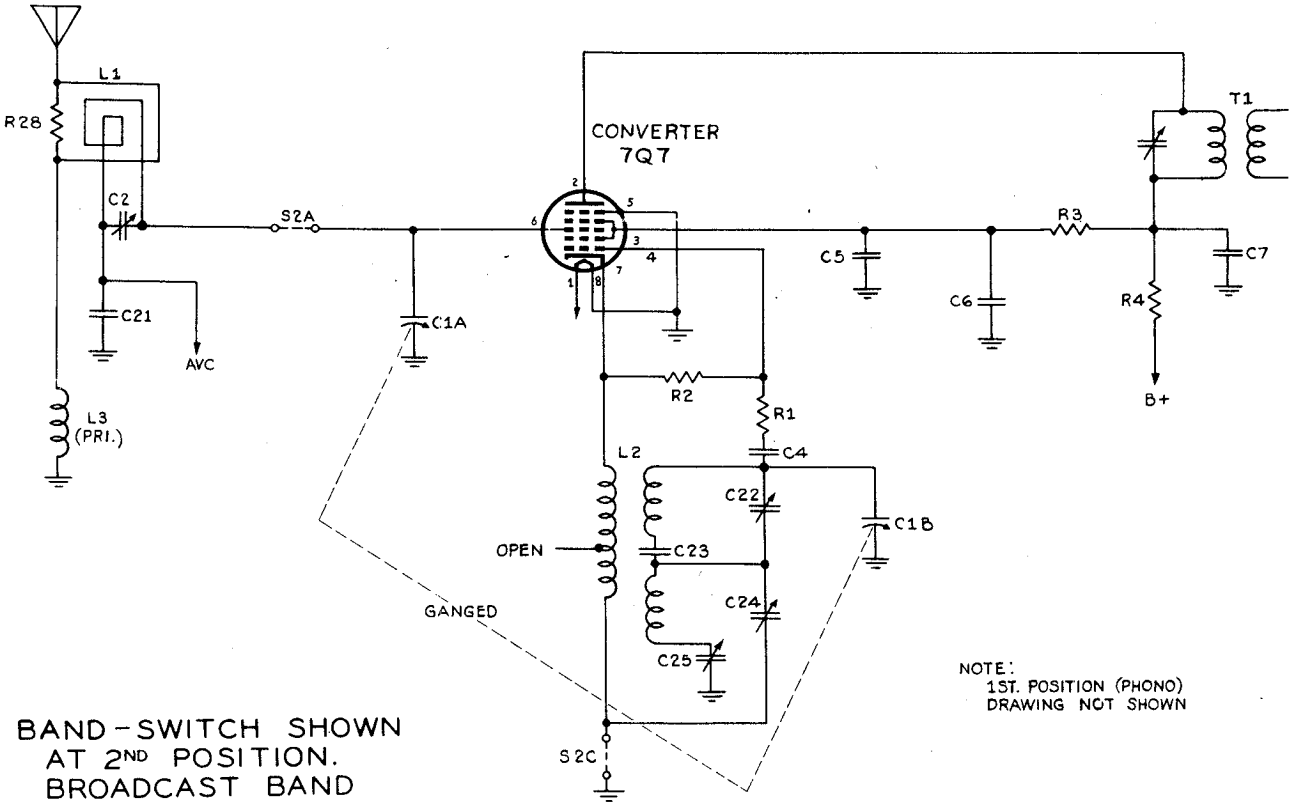
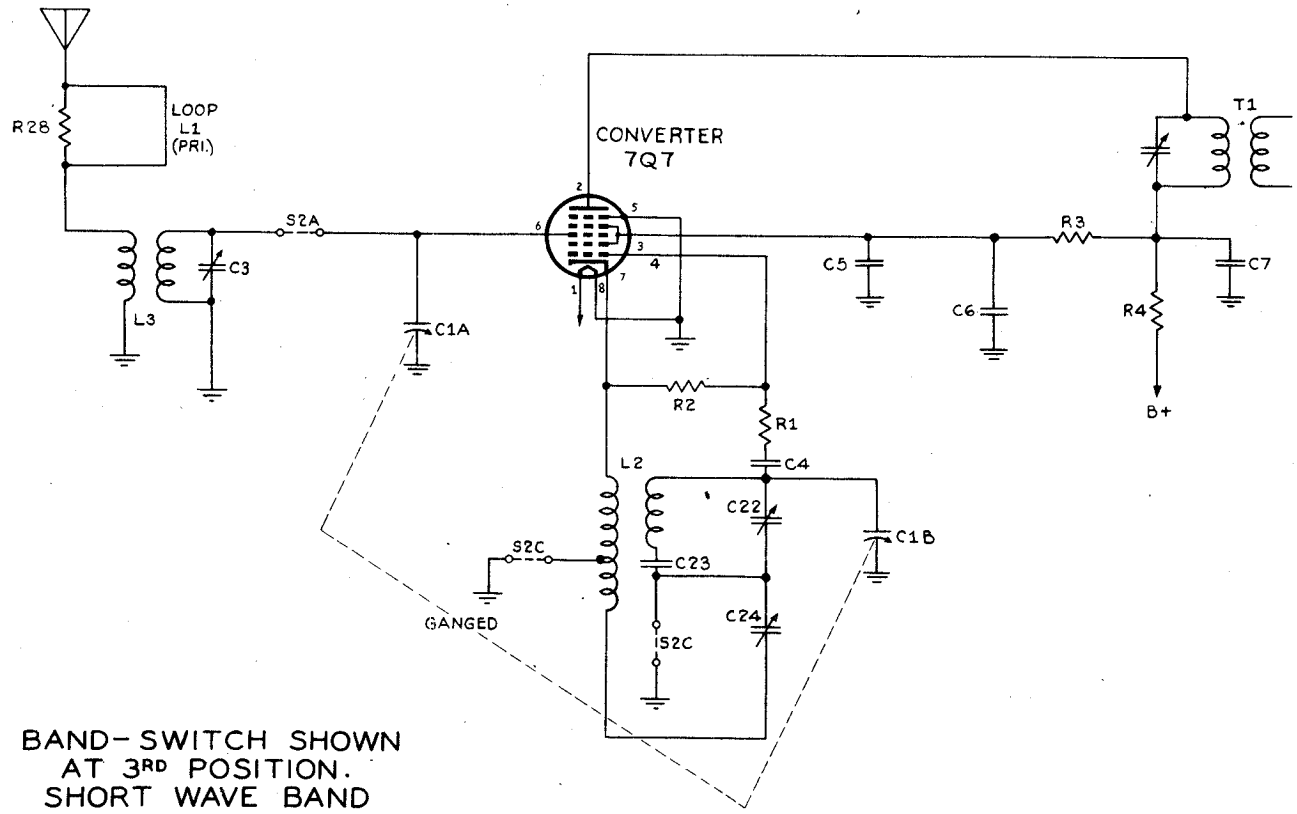
TEMPLETONE RADIO MFG. CORP.



BAND-SWITCH SHOWN
AT 2ND POSITION.
BROADCAST BAND



BAND-SWITCH SHOWN
AT 3RD POSITION.
SHORT WAVE BAND

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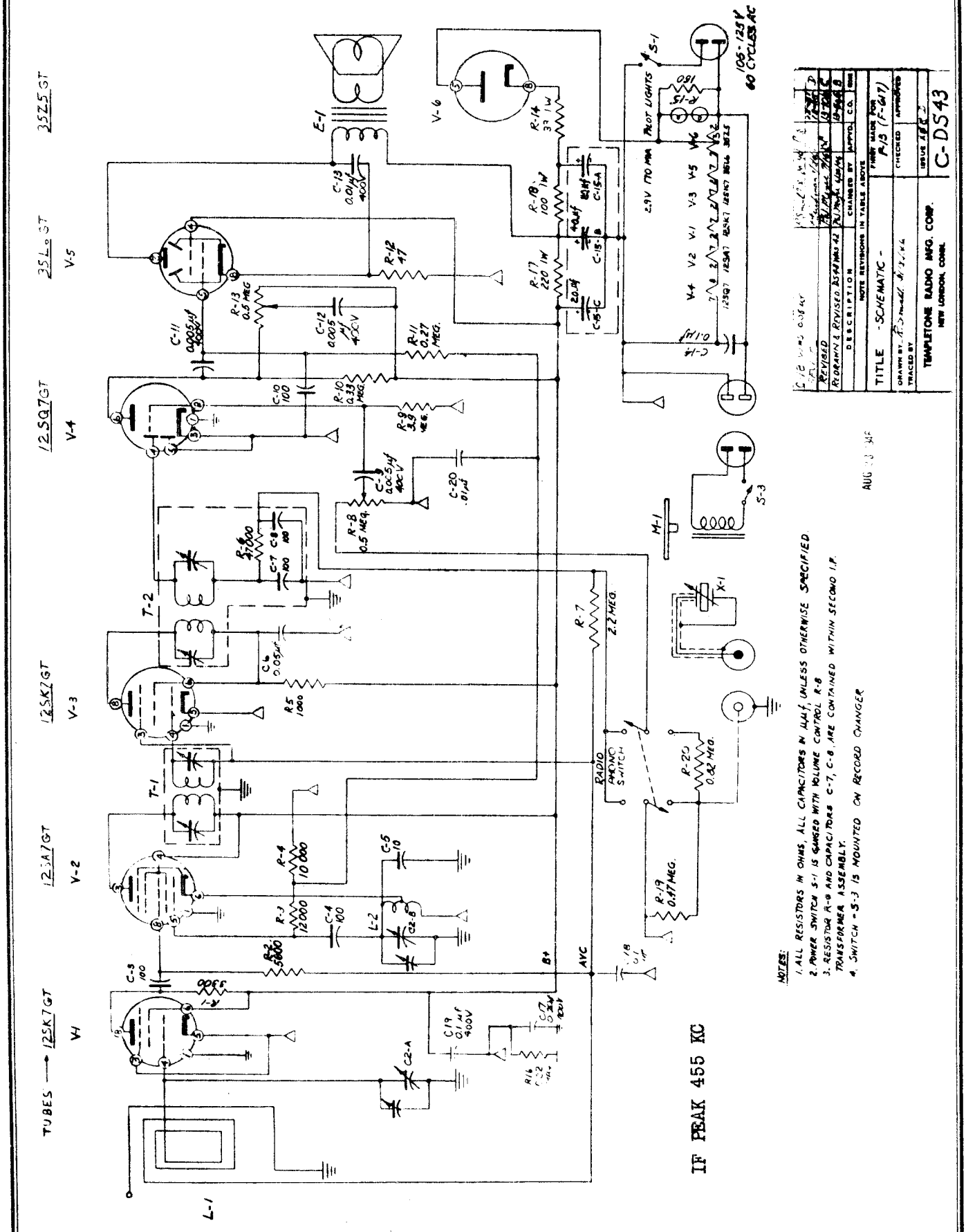
MODEL P-13(F-617)

TEMPLETONE RADIO MFG. CORP.



Record Changer: Detrola Model 550

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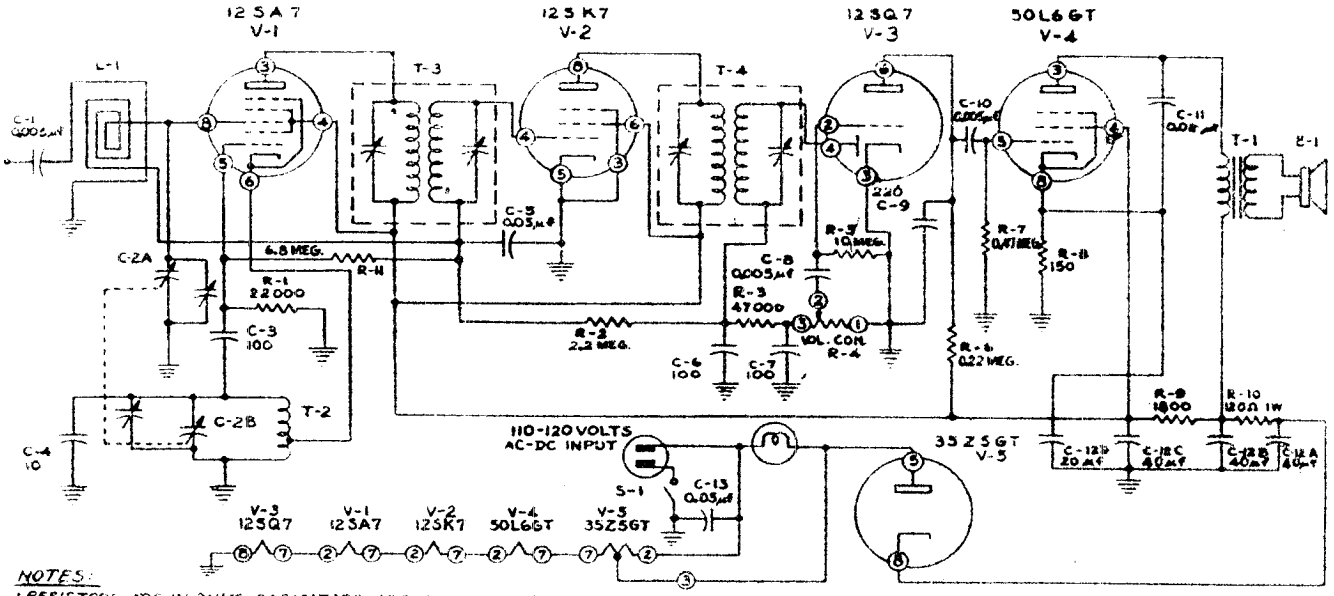
MODELS E-510 to E-519 Inclusive

TEMPLETONE RADIO MFG. CORP.



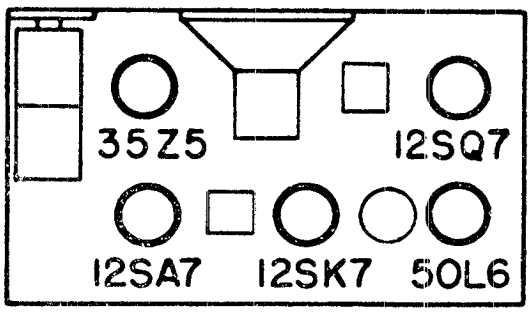
NOTES:
1. RESISTORS ARE IN OHMS, CAPACITORS ARE IN μμf, INDUCTORS ARE IN μH UNLESS OTHERWISE MARKED.
2. VOLUME CONTROL R-4 IS 0.5 MEGOHMS, WITH SWITCH S-1 MOUNTED ON REAR.
3. IN A FEW EARLY MODELS C-12D WAS A SEPARATE 25μf CAPACITOR, C-12A WAS 80μf, C-12C WAS 20μf AND R-11 WAS NOT USED.

IF PEAK 455 KC

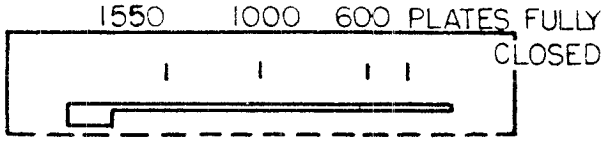
Alignment: No attempt should be made to realign this receiver until it has been determined that a poor tube, or some local condition is not responsible for faulty reception. An output meter may be clipped directly across the voice coil lugs.

The Signal Generator may be connected through a 0.01 mf capacitor (used as dummy antenna) to the lug on RF section (B) of tuning capacitor. Connect ground clip of generator directly to chassis. Align the I. F. trimmers to 455 kc, using least possible input from Signal Generator to avoid developing A.V.C. voltage which would make the tuning adjustments very broad.

To align RF trimmers, remove the 0.01 mf capacitor and connect the Signal Generator leads or two or three turns of heavy wire, forming a self-supporting loop of about 7 or 8 inches diameter, placed about a foot away from the receiver's loop antenna. Again, use the least possible input from the Signal Generator. With the tuning capacitor plates completely out of mesh, and pointer at extreme left end of travel, adjust the oscillator trimmer (A) (on front section of tuning capacitor) to 1700 kc. Readjust both Signal Generator and tuning capacitor to 1550 kc and adjust the RF trimmer (B) (on rear section) for maximum response. With tuning capacitor plates fully meshed, the receiver should tune to 535 kc; however, no adjustment is required at this point. For checking purposes, four fine marks are engraved on the dial plate. These represent, in order, the pointer settings for 1550, 1000, 600 kc, and the pointer position with capacitor plates fully meshed.



LOCATION OF TUBES



DIAL PLATE MARKINGS

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MODELS E-510 to E-519 Inclusive
MODEL F-611

TEMPLETONE RADIO MFG. CORP.

Repair Parts List

MODELS E-510 TO E-519 INCLUSIVE

Circuit Symbol	Part No.	Item	
E-1	780.008	Speaker	5" P. M. Including T-1
T-1	851.514	O P. Tranformer	(if required separately)
T-2	251.143	Oscillator Coil	
T-3	251.146	I. F. Transformer	Input
T-4	251.147	I. F. Transformer	Output
L-1	251.145	Loop Antenna	
R-1	605.2231	Resistor	22K Ohm, ½ W, 10%
R-2	605.2251	Resistor	2.2 meg. ½ W, 10%
R-3	605.4731	Resistor	47K Ohm ½ W, 10%
R-4	650.504E	Vol. Control	0.5 Meg. with Power Switch
R-5	605.1061	Resistor	10. Meg. ½ W, 10%
R 6	605.2241	Resistor	220 K Ohm ½ W, 10%
R-7	605.4741	Resistor	470 K Ohm ½ W, 10%
R-8	601.1511	Resistor	150 Ohm 1 W, 10%
R-9	602.1821	Resistor	1800 Ohm, 2 W, 10%
C-1	164.009	Capacitor	0.005 MF, 600V, paper
C-2A, C-2B	165.513	Tuning Capacitor	Variable
C-3	162.522	Capacitor	100 MMF, 500V, Mica
C-4	162.580	Capacitor	10 MF, 500V, Mica
C-5	164.004	Capacitor	0.05 MF, 400V, Paper
C-6	162.522	Capacitor	100 MMF, 500V, Mica
C-7	162.522	Capacitor	100 MMF, 500V, Mica
C-8	164.009	Capacitor	0.005 MF, 600V, Paper
C-9	162 556	Capacitor	220 MMF, 500V, Mica
C-10	164.009	Capacitor	0.005 MF, 600V, Paper
C-11	164.003	Capacitor	0.02 MF, 600V, Paper
C-12A, C-12B, C-12C, C-12D	161.520	Filter Capacitor	40 MF, 150V; 40 MF, 150V; 40 MF, 150V; 20 MF, 150V
C-13	164.004	Capacitor	0.05 MF, 400V, Paper
	311.003	Dial Scale	
	591.005	Pointer	
	315.501	Dial Cord	Red
	572.110	Dial Light Socket	Black, 3½-ft.
V-6	No. 51	Dial Lamp	

Operation: The set operates on 110 to 120 volts, 50 or 60 cycles A. C. and 110 to 120 volts D. C. Power drain is approximately 25 watts.

When operated on direct current (D. C.), if no reception is obtained after approximately one minute of warm-up time, reverse the line plug in the power outlet.

Range: Model E-510 covers the broadcast band from 540 to 1600 kilocycles. Since the scale is calibrated 54 to 160, the actual frequency of the station received is obtained by adding a zero to the dial calibration.

Circuit Symbol	Part No.	Item	Description
E-1	EH-6-8	Speaker	5" P.M. less output transformer
L-1	LL-3	Loop Antenna	
L-2	LO-1	Oscillator Coil	
T-1	TM2-6	Transformer	IF input
T-2	TM2-7	Transformer	IF output
T-3	TA-7-1	Transformer	Speaker Output, for 3Q5
C-1	CV-6	Capacitor	Variable, 2-gang
C-2		Capacitor	Mica, 220 MMF, 500 V
C-3		Capacitor	Paper, 0.01 MF, 400 V
C-4		Capacitor	Mica, 100 MMF, 500 V
C-5		Capacitor	Paper, 0.05 MF, 200 V
C-6		Capacitor	Paper, 0.01 MF, 200 V
C-7		Capacitor	Mica, 100 MMF, 500 V
C-8		Capacitor	Paper, 0.002 MF, 400 V
C-9		Capacitor	Paper, 0.002 MF, 400 V
C-10		Capacitor	Paper, 0.05 MF, 200 V
C-11		Capacitor	Paper, 0.05 MF, 200 V
C-12		Capacitor	Paper, 0.20 MF, 400 V
C-13		Capacitor	Paper, 0.1 MF, 400 V
C-14	CE1-4A81	Capacitor	Electrolytic, 40-40-40-20 MF, 150 WVDC
C-15		Capacitor	Paper, 0.05 MF, 200 V
C-16		Capacitor	Paper, 0.05 MF, 200 V
C-17		Capacitor	Paper, 0.1 MF, 400 V
C-18		Capacitor	Paper, 0.05 MF, 200 V
C-19		Capacitor	Paper, 0.1 MF, 400 V
C-20		Capacitor	Paper, 0.05 MF, 200 V
R-1		Resistor	Carbon, 0.22 Meg., ½ W
R-2		Resistor	Carbon, 47,000, ½ W
R-4		Resistor	Carbon, 10,000, ½ W
R-5		Resistor	Carbon, 15,000, ½ W
R-8		Resistor	Carbon, 3.9 Meg. ½ W
R-9	RP6-2	Volume Control	0.5 Meg with switch
R-10		Resistor	Carbon, 0.47 Meg. ½ W

Circuit Symbol	Part No.	Item	Description
R-11		Resistor	Carbon, 1.2 Meg. ½ W
R-12		Resistor	Carbon, 3.9 Meg. ½ W
R-13		Resistor	Carbon, 2200, 1 W
R-14	RW-2	Resistor	Wirewound 2550, 10W, tapped at 1200
R-15		Resistor	Carbon, 820, ½ W
R-16		Resistor	Carbon, 820, ½ W
R-17		Resistor Fuse	15 Ohms
R-18		Resistor	Carbon, 2.2 Meg
R-19		Resistor	Carbon, 2.2 Meg
S-2	SS-1	Switch	Slide, DPDT
		Battery	ER #746, 4.5 Volt "A"
		Battery	ER #482, 45.0 Volt "B"
		Dial Cord	42" long
	HF-88	Dial Cord Spring	
	NP-3	Pointer	
	ND-12	Dial Scale	
	PM2-1	Battery Plug	2 prong, A
	PM2-2	Battery Plug	3 prong, B
	PM1-1	Speaker Plug Receptacle	
	PM1-2	Speaker Plug	
	HF-85	Grid Cap	
	CCCD-618	Cabinet	
	AP-8	Cabinet Back	
	HK-16	Knob	
	NW-1	Window	
	HK-27	Handle	
	HA-55	Handle Retainer Shell	
	AP-5	Cabinet Front Panel	

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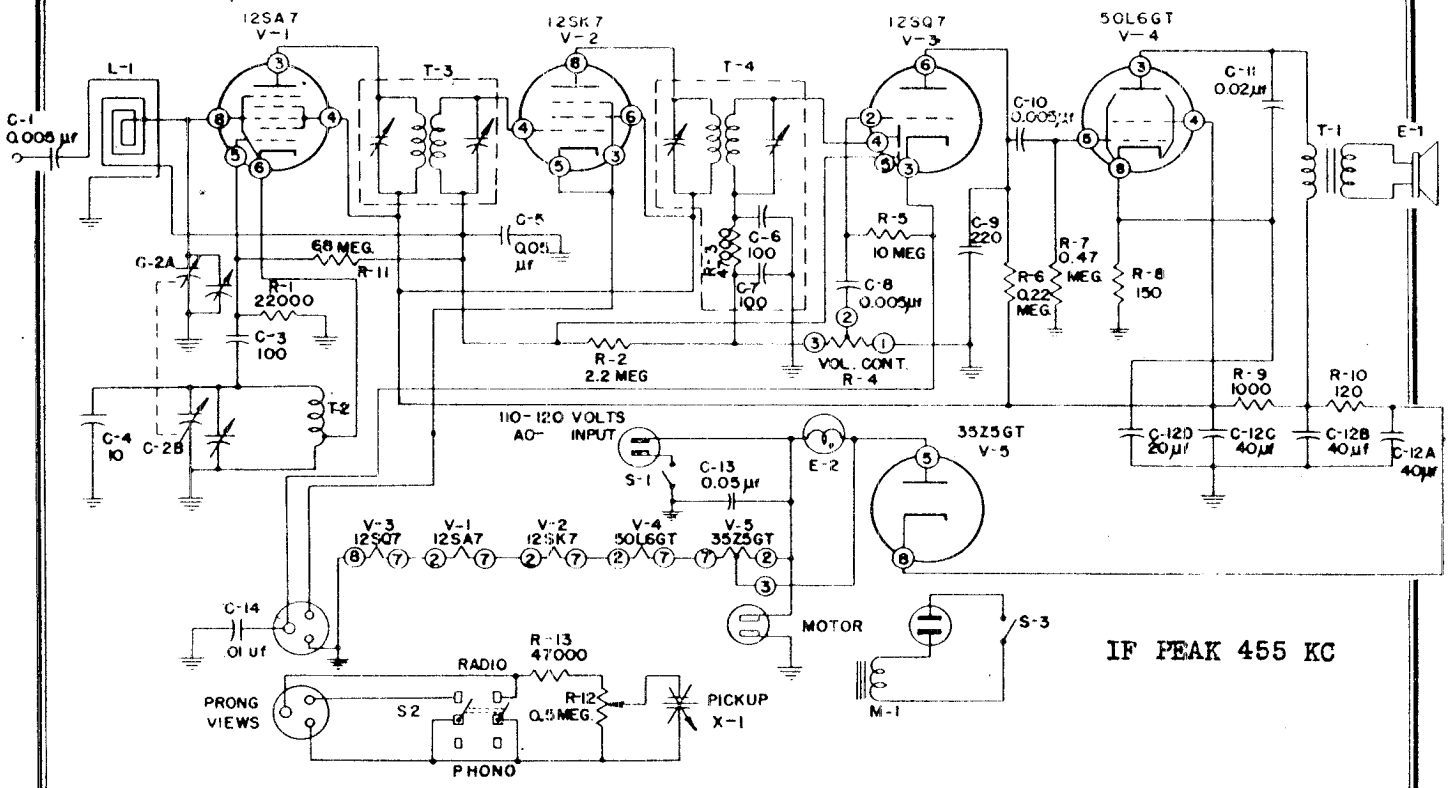
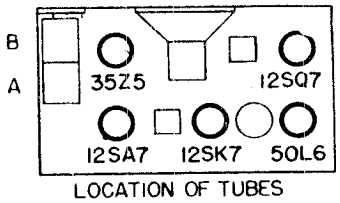
MODEL E-511

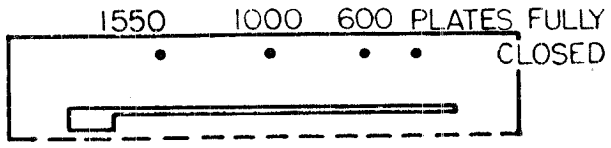
TEMPLETONE RADIO MFG. CORP.



IF PEAK 455 KC



LOCATION OF TUBES



DIAL PLATE MARKINGS

REPLACEMENT PARTS LIST

Circuit Symbol	Part No.	Item	Description
E-1	780.008	Speaker	5" P. M. Including T-1
E-2	No. 51	Dial Lamp	
T-1	851.514	O. P. Transformer	(if required separately)
T-2	251.143	Oscillator Coil	
T-3	251.146	I. F. Transformer	Input
T-4	251.147	I. F. Transformer	Output
L-1	251.145	Loop Antenna	
R-1	605.2231	Resistor	22K Ohm, ½ W, 10%
R-2	605.2251	Resistor	2.2 meg. ½ W, 10%
R-4	650.504E	Volume Control	0.5 Meg. with Power Switch
R-5	605.1061	Resistor	10. Meg. ½ W, 10%
R-6	605.2241	Resistor	220 K Ohm, ½ W, 10%
R-7	605.4741	Resistor	470 K Ohm, ½ W, 10%
R-8	601.1511	Resistor	150 Ohm, 1 W, 10%
R-9	601.1021	Resistor	1000 Ohm, 1 W, 10%
R-10	601.1211	Resistor	120 Ohm, 1 W, 10%
R-11	605.6851	Resistor	6.8 Meg, ½ W, 10%
R-12	650.504J	Volume Control	0.5 Meg. with Switch
R-13	605.4731	Resistor	47K Ohm, ½ W, 10%
C-1	164.009	Capacitor	0.005 MF, 600V, paper
C-2A C-2B	165.513	Tuning Capacitor	Variable
C-3	162.522	Capacitor	100 MMF, 500V, Mica
C-4	162.580	Capacitor	10 MMF, 500V, Mica
C-5	164.004	Capacitor	0.05 MF, 400V, Paper
C-8	164.009	Capacitor	0.005 MF, 600V, Paper
C-9	162.556	Capacitor	220 MMF, 500V, Mica
C-10	164.009	Capacitor	0.005 MF, 600V, Paper
C-11	164.002	Capacitor	0.02 MF, 600V, Paper
C-12A C-12B C-12C C-12D	161.520	Filter Capacitor	40 MF, 150V 40 MF, 150V 40 MF, 150V 20 MF, 150V
C-13	164.004	Capacitor	0.05 MF, 400V, Paper
C-14	164.013	Capacitor	0.01 MF, 400V, Paper
M-1	GA-3	Motor	110-120 V, 60 cycles; with 9" turntable
S-2	801.507	Switch	DPDT
X-1	EM-6	Cartridge	For pick-up arm
	ND-11	Dial Scale	
	591.005	Pointer	Red
	315.501	Dial Cord	3½' long
	572.110	Dial Light Socket	

NOTES:

1. Resistors are in ohms; Capacitors are in mmf.
2. Volume control R-4 is 0.5 megohms, with switch S-1 mounted on rear.
3. In some production runs C-12D is a seperate 20 mmf. 25V capacitor and C-12A is 6mf., C12B is 40 mf., C12C is 20mf.
4. Phonograph volume control R-12A is 0.5 megohms, with switch S-3 mounted on rear.

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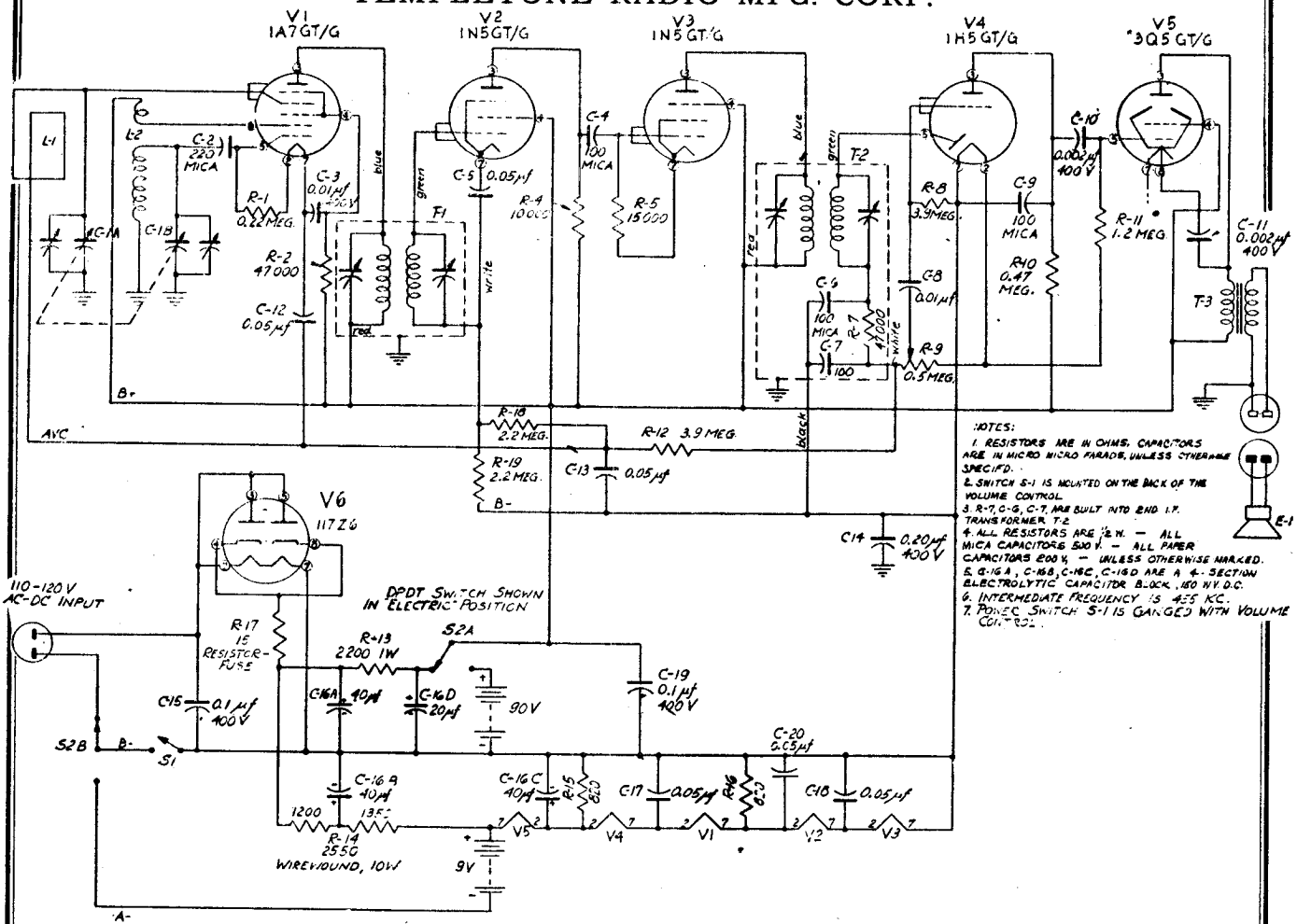
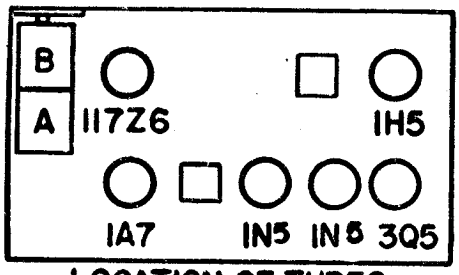
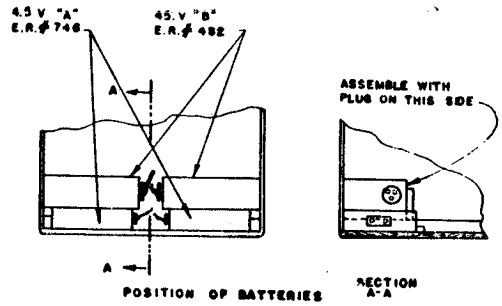
MODEL F-611

TEMPLETONE RADIO MFG. CORP.





LOCATION OF TUBES



Alignment: No attempt should be made to realign this receiver until it has been determined that a poor tube, or some local condition is not responsible for faulty reception.

The Signal Generator may be connected through a 0.01 mf capacitor (used as dummy antenna) to the lug on RF section A of tuning capacitor. Connect ground clip of generator to a convenient B-minus point (such as the case of the electrolytic capacitor, or one of the switch terminals on the back of the volume control). An output meter may be clipped directly across the voice coil lugs. Align the I.F. trimmers to 455 kc, using least possible input from Signal Generator to avoid developing A.V.C. voltage which would make the tuning adjustments very broad.

To align RF trimmers, remove the 0.01 mf capacitor and connect the Signal Generator leads to two or three turns of heavy wire, forming a self-supporting loop of about 7 or 8 inches diameter, placed about a foot away from the receiver's loop antenna. Again, use the least possible input from the Signal Generator. With the tuning capacitor plates completely out of mesh, and pointer at extreme right end of travel, adjust the oscillator trimmer (B) (on front section of tuning capacitor) to 1700 kc. Readjust both Signal Generator and tuning capacitor to 1550 kc and adjust the RF trimmer (A) (on rear section) for maximum response.

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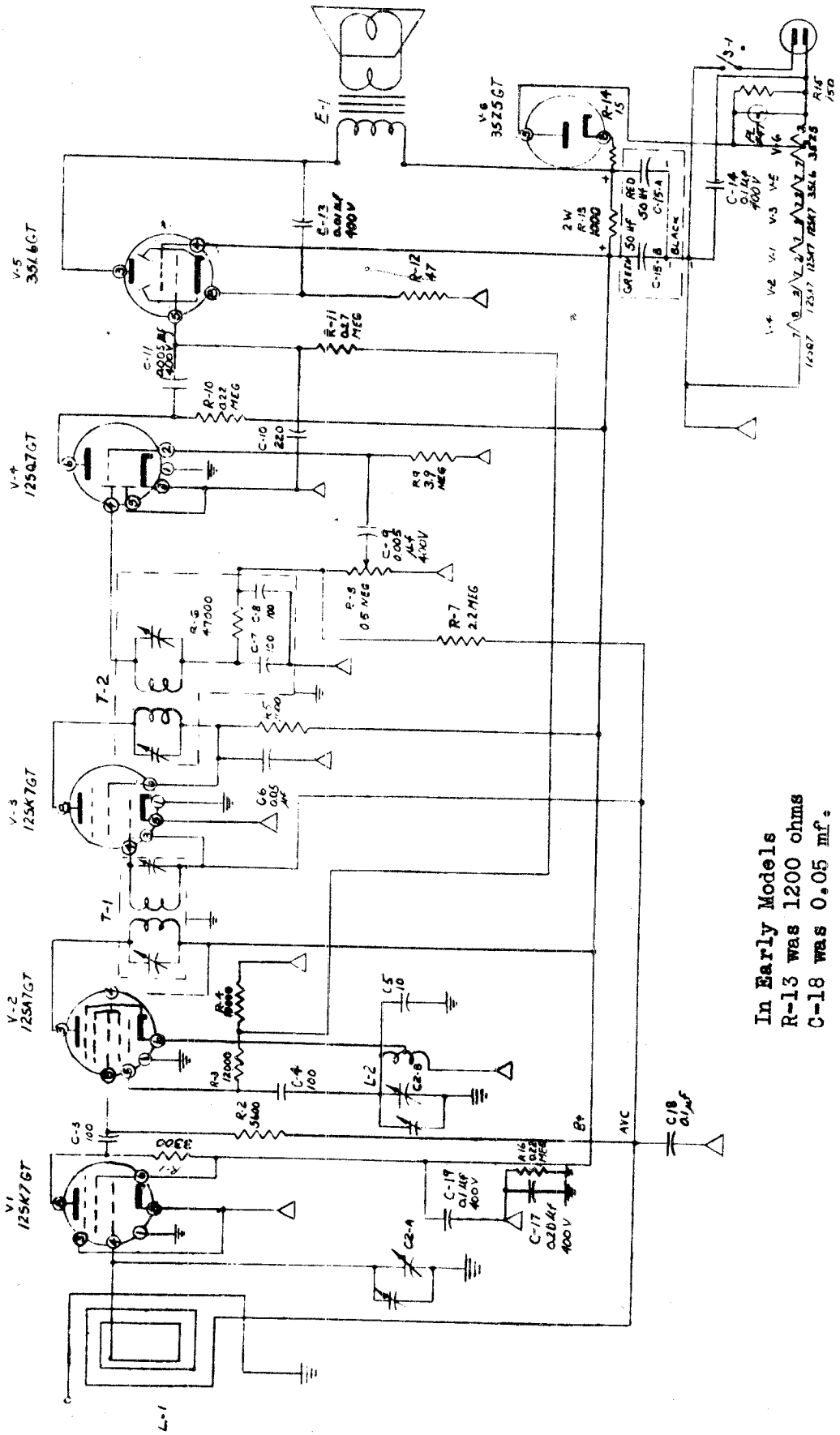
For Parts list, see P.15-6

MODEL G-619

TEMPLETONE RADIO MFG. CORP.



In Early Models
R-13 was 1200 ohms
C-18 was 0.05 mf.

C-16 and ground connection have been removed from this model.

NOTES
1 ALL RESISTORS 1/2 WATT ALL CAPACITORS 200 V UNLESS OTHERWISE SPECIFIED
2. POWER SWITCH S-1 IS GANGED WITH VOLUME CONTROL R-8
3. IF FREQUENCY 455 KC

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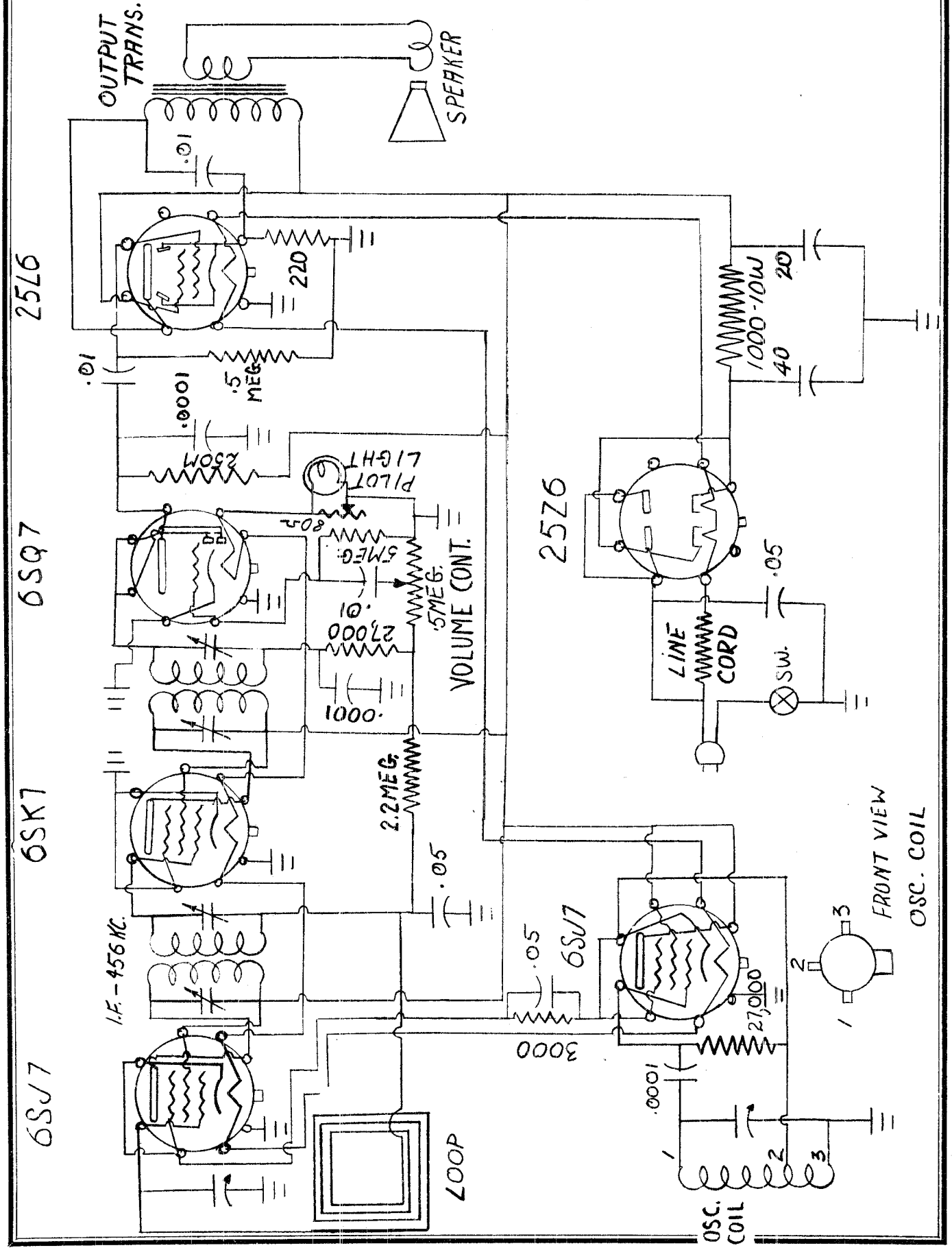
TEXAN RADIO MFG. CO.



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TEXAN RADIO MFG. CO.

TEXAN RADIO, MODEL NO. 199
Type Set - AC-DC, superheterodyne with loop or antenna coil
Tubes - - 6SJ7 Osc., 6SJ7 Mixer, 6SQ7 Det., 6SK7 I.F., 25L6 Output, 25Z6 rectifier
Tuning range - 540-1600 KC Supply voltage - 117 volts, AC or DC

Dummy Ant.	Connect Signal Generator	Signal Gen. Set	Dial Set	Output Meter	Adjust	Remarks
.05	High side to signal grid of 6SJ7 Mixer low side to grid	455 KC	Rotor full open	Across voice coil	IF trimmers	Adjust for maximum output if modulation hum is excessive decrease Dummy Antenna to .001 MFD.
	Loop	1500 KC	1500 KC	"	Osc. trimmers	Adjust for maximum output. Connect signal gen. to loop of few turns of wire and couple loosely to receiver by a pacing.
	"	"	"	"	RF trimmers	Adjust for maximum output.

Volumn control at maximum, signal generator as low as possible.

Voltage and Resistance Chart

1. DC voltage measurements are at 20,000 ohms per volt, AC - 1000 ohms per volt.
2. Values are from socket pins to chassis with no signal applied.
3. There may be a possible variation of + - 10% in voltage and resistance readings.

Tubes	Pin #1	Pin #2	Pin #3	Pin #4	Pin #5	Pin #6	Pin #7	Pin #8
6SJ7	0	6 AC	112.5 DC	6.3 DC	0	112.5 DC	12.5 AC	110 DC
6SJ7	0	12.5 AC	0	0	5.5 DC	"	18 AC	112.5 DC
6SQ7	0	.4 DC	0	.4 DC	.4 DC	87.5 DC	6 AC	0
25L6	0	23 AC	132 DC	110 DC	0	0	52 AC	7.75 DC
25Z6	0	56 AC	105 AC	4.2 AC	105 AC	0	56 AC	134 DC
6SK7	0	18 AC	0	.2 DC	0	112.5 DC	23 AC	110 DC

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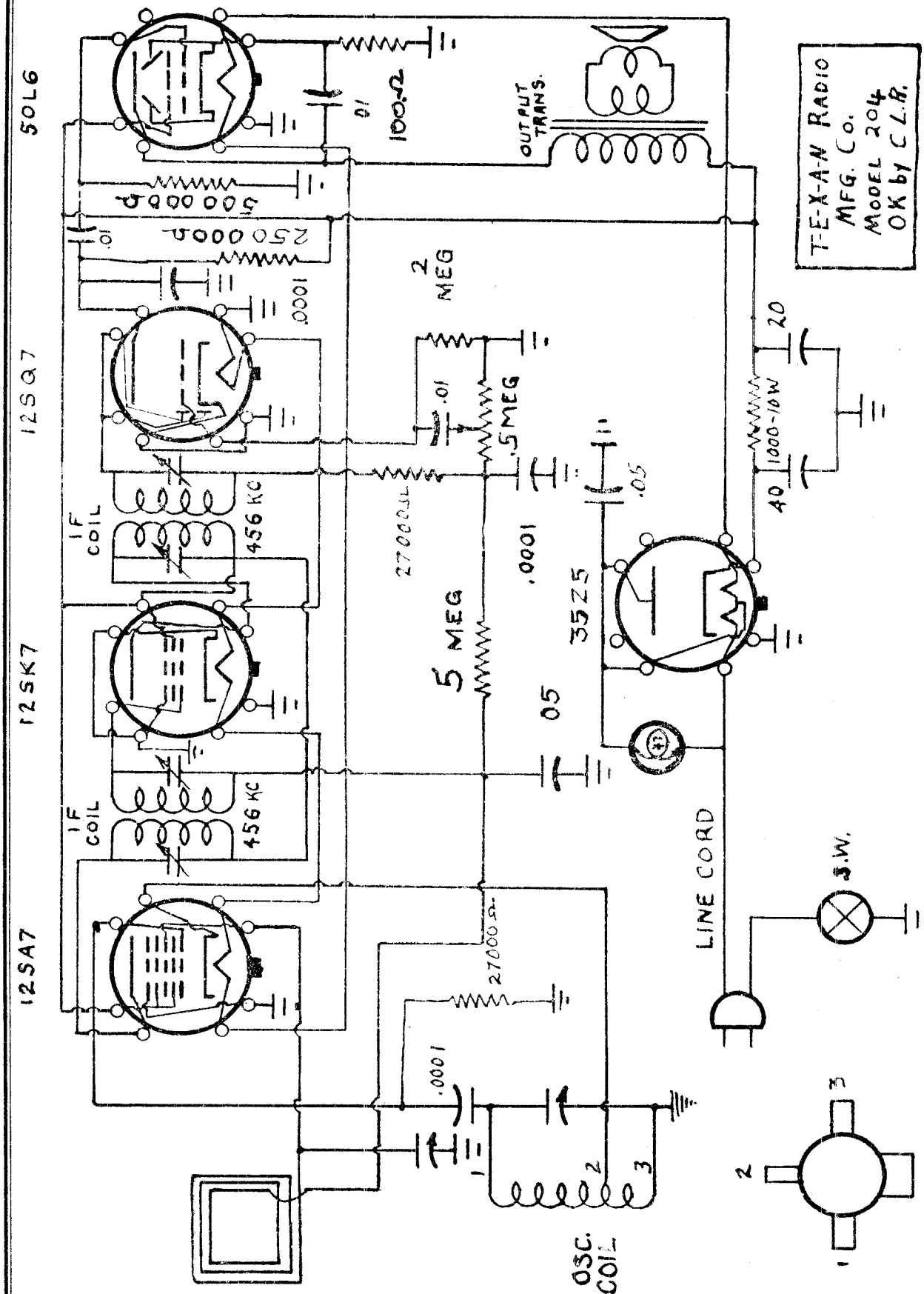
TEXAN RADIO MFG. CO.



Type Set - AC-DC, superheterodyne with loop or antenna coil.
Tubes - - 12SA7 Mixer, 12SK7 I.F. Amplifier, 12SQ7 2nd Det., 50L6 output, 35Z5 rectifier.
Tuning range - 540-1600 KC Supply voltage - 117 volts, AC or DC

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Dummy Ant.	Connect Signal Generator	Signal Gen. Set	Dial Set	Output Meter	Adjust	Remarks
.05	High side to signal grid of 12SA7 low side to Grd.	455 KC	Rotor full open	Across voice coil	IF trimmers	Adjust for maximum output if modulation hum is excessive decrease Dummy Ant. to .001 MFD.
	Loop	1500 KC	1500 KC	"	Osc. trimmer	Adjust for maximum output. Connect signal gen. to loop of few turns of wire and couple loosely to receiver by a pacing.
	"	"	"	"	RF trimmer	Adjust for maximum output.

Volumn control at maximum, Signal gen. as low as possible.

Voltage Chart

Tube	Pin #1	Pin #2	Pin #3	Pin #4	Pin #4	Pin #6	Pin #7	Pin #8
12SA7	0	25V - AC	90V - DC	90V - DC	16.5V - DC	0	12.5V - AC	0
12SK7	0	33V - AC	0	0	0	90V - DC	25V - AC	90V - DC
12SQ7	0	1V - DC	0	3V - DC	3V - DC	60V - DC	12.6V - AC	0
50L6	0	85V - AC	115V - DC	90V - DC	0	0	34V - AC	5.2V - DC
35Z5	0	117V - AC	110V - AC	120V - DC	110V - DC	0	85V - AC	120V - DC

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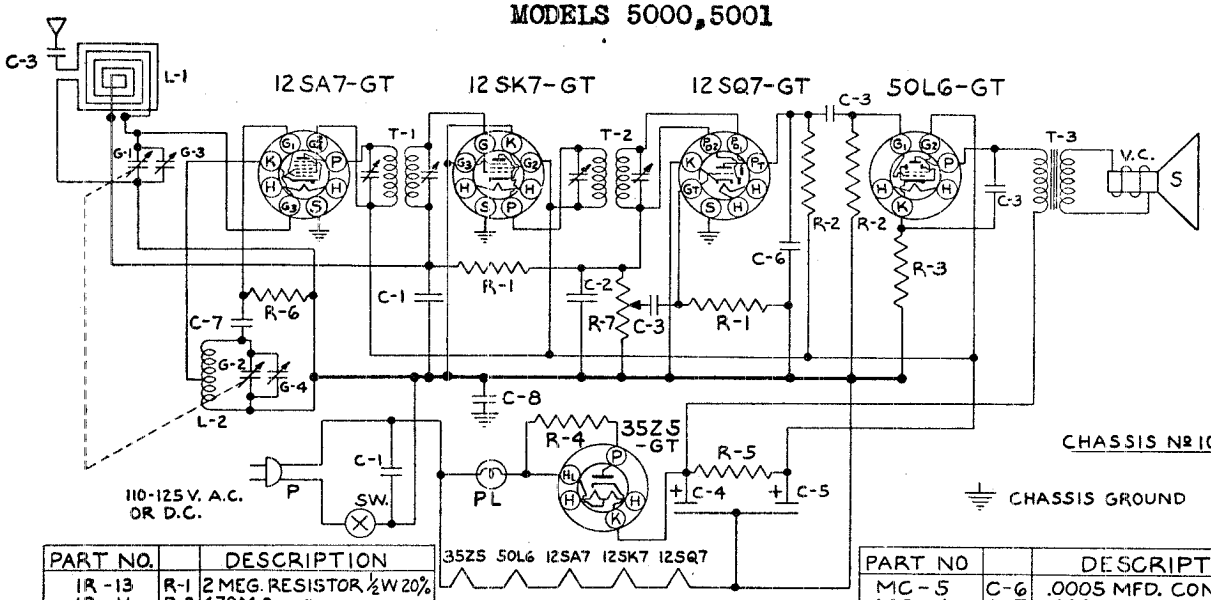
TRAV-LER RADIO CORP.

MODELS 5000,5001
Chassis 100
MODEL 5002,Ch.102

MODELS 5000,5001



CHASSIS Nº 100

CHASSIS GROUND

PART NO.		DESCRIPTION
IR-13	R-1	2 MEG. RESISTOR ½W 20%
IR-11	R-2	470M " " "
IR-14	R-3	150 " " "
IR-4	R-4	47 " " "
IR-15	R-5	2200 " " "
IR-16	R-6	33,000 " " "
V.C.-3	R-7	1 MEG. VOLUME CONTROL
GC-2	G-1, G-2	GANG COND.
TC-7	G-3	ANT. TRIMMER COND.
TC-6	G-4	OSC. TRIMMER COND.
PC-5	C-1	.05 MFD. COND. 400 V.
MC-2	C-2	.0001 MFD. MICA 20%
PC-7	C-3	.01 MFD. COND. 400 V.
EC-3	C-4	40 MFD. 150 V.
	C-5	20 MFD. ELECTROLYTIC

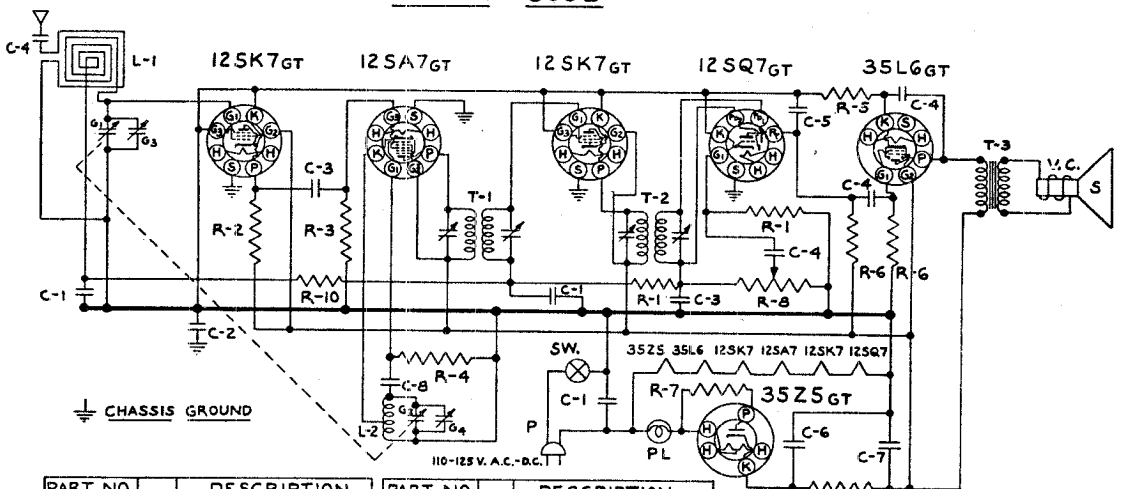
IF PEAK 455 KC

DATE 11-30-45 DR. APPROVED

SD-1

PART NO		DESCRIPTION
MC-5	C-6	.0005 MFD. COND. 20%
MC-4	C-7	.000056 MFD. MICA 20%
PC-9	C-8	.1 MFD COND. 400 V.
LL-1	L-1	LOOP ANTENNA
LO-2	L-2	OSC. COIL
LI-1	T-1	INPUT I.F. TRANSFORMER
LI-2	T-2	OUTPUT I.F. TRANSFORMER
SPK-4	T-3	OUTPUT SPK. TRANSFORMER
	V.C.	VOICE COIL
	S	P.M. SPEAKER
PB-1	PL	#47 PILOT BULB
	SW	A.C. SWITCH ON VOL. CONTROL
CO-1	P	LINE CORD
TU-3		12SA7 GT 12SK7 GT 12SQ7 GT 50L6 GT 35Z5 GT

MODEL- 5002



PART NO		DESCRIPTION
IR-13	R-1	2 MEG. RESISTOR ½W 20%
IR-7	R-2	2200 " " 5%
IR-10	R-3	47,000 " " 20%
IR-16	R-4	33,000 " " "
IR-5	R-5	220 " " "
IR-11	R-6	470 M " " "
IR-4	R-7	47 " " "
VC-3	R-8	1 MEG VOLUME CONTROL
IR-15	R-9	2200 RESISTOR ½W 20%
IR-12	R-10	1 MEG. " " "
PC-5	C-1	.05 MFD. COND. 400 V.
PC-8	C-2	.1 MFD. COND. 400 V.
MC-2	C-3	.0001 MFD. MICA 20%
PC-7	C-4	.01 MFD. COND. 400 V.
MC-5	C-5	.0005 MFD. MICA 20%
EC-3	C-6	40 MFD. 150 V. ELECTROLYTIC
	C-7	20 MFD.

PART NO.		DESCRIPTION
MC-4	C-8	.000056 MFD. MICA 20%
LL-1	L-1	LOOP ANTENNA
LO-2	L-2	OSC. COIL
LI-1	T-1	INPUT I.F. TRANSFORMER
LI-2	T-2	OUTPUT I.F. "
SPK-4	T-3	OUTPUT SPK. "
	V.C.	VOICE COIL
	S	P.M. SPEAKER
PB-1	PL	#47 PILOT BULB
GC-2	G-1, G-2	GANG COND.
TC-7	G-3	ANT. TRIMMER COND.
TC-6	G-4	OSC. TRIMMER COND.
CO-1	P	LINE CORD
TU-4	—	12SK7GT 12SA7GT 12SK7GT 12SQ7GT 35L6GT 35Z5GT

CHASSIS Nº 102

DATE: 12-1-45 DR. APPROVED

SD-5

IF PEAK 455 KC

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ALIGNMENT AND SERVICE DATA

Remove chassis from cabinet for alignment.

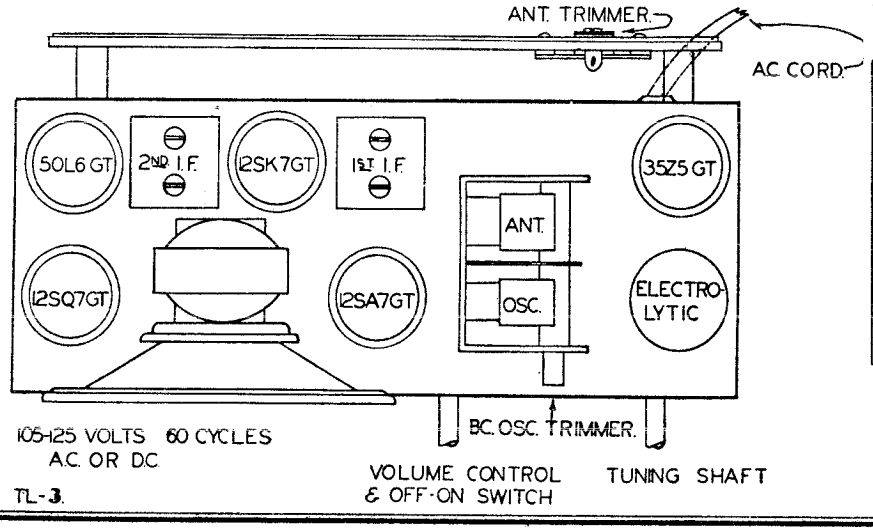
A Signal Generator is required having the following frequencies: 455 KC, 1400 KC, 1720 KC. An output meter should be connected across the speaker.

FIRST STEP: Connect the hot lead from the generator to the ANT. section of the gang condenser, through a .1 MFD condenser. The ground lead from the generator must be connected to the metal frame of the gang condenser. Turn the gang condenser to complete minimum capacity. Adjust the generator to 455KC and adjust the trimmers of the 1st and 2nd I.F. transformers until a maximum reading is noted on the output meter.

SECOND STEP: With the leads from the generator still connected in the same manner, adjust the Signal Generator to 1720 KC. The OSC. trimmer is located on the front of the chassis between the volume and tuning controls. Adjust this trimmer until the 1720 KC signal is tuned in.

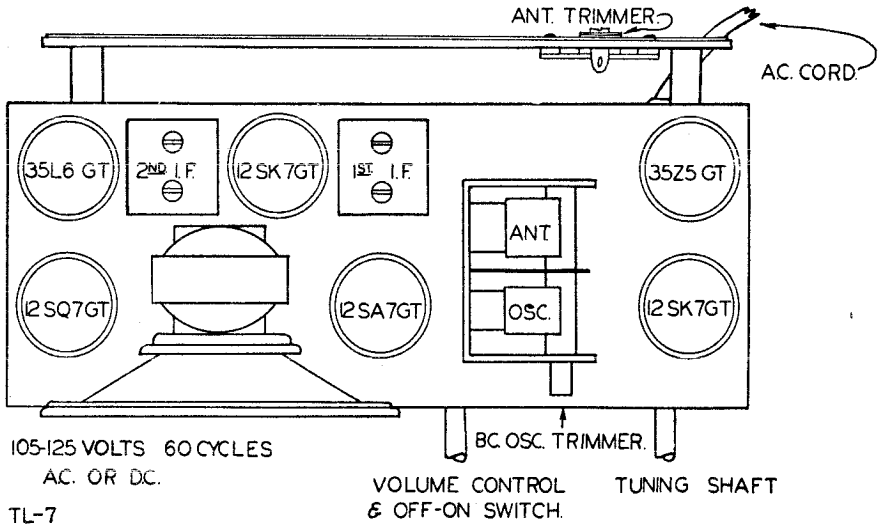
THIRD STEP: Remove the hot lead of the generator from the ANT section of the gang condenser. Connect this lead to the antenna lead wire that projects from the back of the loop antenna through a 200 MMFD condenser. Adjust the Signal Generator to 1400 KC. Rotate the tuning control until this signal is tuned in. The ANT trimmer is located on the back of the loop antenna. Adjust this trimmer until a maximum reading is noted on the output meter. No further adjustment should be necessary, unless the set has been damaged, as the coils and condenser in this receiver have been specially handled at the factory to insure proper alignment at the lower frequencies.

MODEL 5000, 5001
TUBE AND TRIMMER LOCATION.



TL-3.

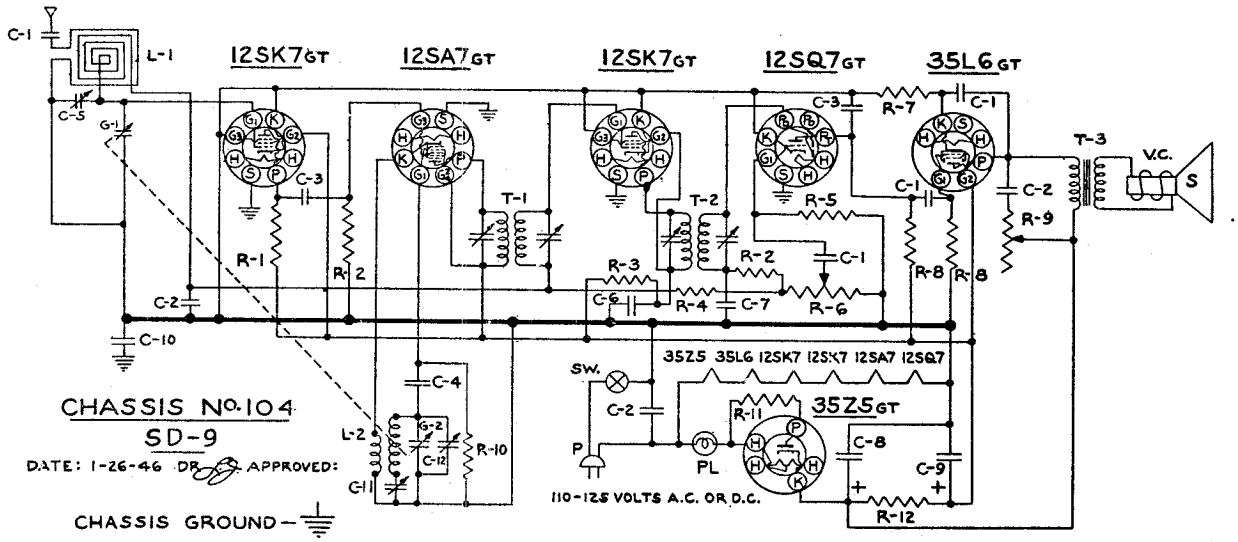
MODEL 5002
TUBE AND TRIMMER LOCATION

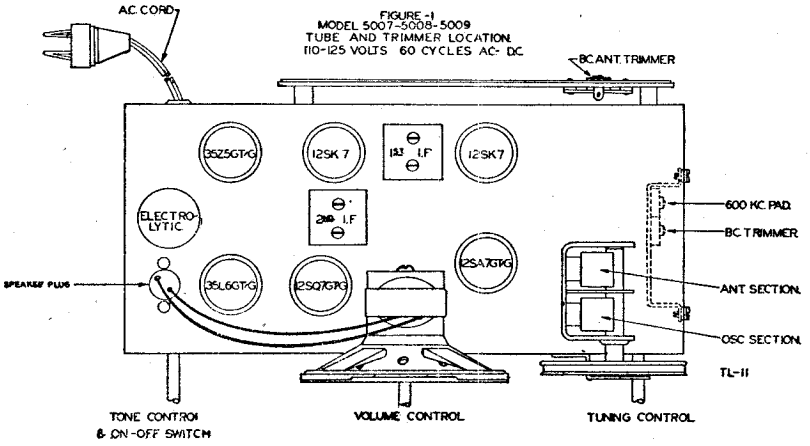


TL-7

TRAV-LER RADIO CORP.

MODELS 5007, 5008
5009, Chassis 104





PART NO.		DESCRIPTION
IR-22	R-1	3900Ω RESISTOR 1/2 W 10%
IR-10	R-2	47MΩ RESISTOR 1/2 W-20%
IR-24	R-3	1000Ω RESISTOR 1/2 W-20%
IR-23	R-4	3.9 MEG. RESISTOR 1/2W-20%
IR-13	R-5	2 MEG. RESISTOR 1/2 W-20%
VC-3	R-6	1 MEG. VOLUME CONTROL
IR-5	R-7	220Ω RESISTOR 1/2 W-10%
IR-11	R-8	470MΩ RESISTOR 1/2 W-20%
VC-1	R-9	25MΩ TONE CONTROL & SW.
IR-9	R-10	22MΩ RESISTOR 1/2 W-20%
IR-17	R-11	39Ω RESISTOR 1/2 W-20%
IR-25	R-12	2,000Ω RESISTOR—1 W-10%
PC-7	C-1	.01 MFD. COND. 400 V.
PC-5	C-2	.05 MFD. COND. 400 V.
MC-3	C-3	.00022 MFD. MICA COND.
MC-4	C-4	.000056 MFD. MICA COND.
TC-7	C-5	LOOP ANTENNA TRIMMER
PC-8	C-6	.1 MFD. COND. 400 V.
MC-2	C-7	.0001 MFD. COND. 400 V.
EC-3	C-8	40 MFD. 150 V. ELECTROLYTIC
	C-9	20 MFD.
PC-9	C-10	.25 MFD. COND. 400 V.
GC-1	G-1	GANG CONDENSER
	G-2	
TC-5	C-11	OSC. PADDING COND.
	C-12	OSC. TRIMMER COND.
LL-2	L-1	LOOP ANTENNA
LO-3	L-2	OSC. COIL
LI-1	T-1	INPUT I.F. TRANSFORMER
LI-2	T-2	OUTPUT I.F. TRANSFORMER
SPK-4	T-3	OUTPUT SPEAKER TRANS.
	V.C.	VOICE COIL
	S	P.M. SPEAKER
PB-1	PL	PILOT BULB #47
CO-1	P	LINE CORD
TU-4		12SK7GT 12SA7GT 12SQ7GT 35L6GT 35Z5GT

Remove the chassis from the cabinet for alignment.

A signal generator is required, having the following frequencies: 455 KC, 1400 KC, 1730 KC. An output meter should be connected across the speaker.

I. F. ALIGNMENT: — Connect the generator lead through a .1 MFD Condenser to the terminal lug on the "Antenna" section of the gang condenser. The ground lead from the generator should be connected to the gang frame. Set the generator at 455 KC. Adjust the trimmer screws in the 1st and 2nd I. F. cans (See Fig. 1) until a maximum reading is noted on the output meter.

The receiver volume control should be turned to maximum during the I. F. and all subsequent alignments, to keep the AVC from working and giving false readings. Keep the generator output as low as possible to prevent overloading.

BC. OR BROADCAST ALIGNMENT: — With the generator leads still connected as in I. F. Alignment, rotate the tuning condenser to complete minimum capacity. Set the generator to 1730 KC. Adjust the BC. oscillator trimmer until the signal is tuned in. Next remove the hot lead of the generator from the "Ant" section of the gang condenser. Connect this lead to the antenna lead wire that projects from the back of the loop antenna through a 200 MMFD condenser. Set the generator to 1400 KC and rotate the tuning condenser until the signal is tuned in. Adjust the BC. antenna trimmer until a maximum reading is noted on the output meter. Set the generator to 600 KC and turn the tuning control until the signal is tuned in. Rock the tuning control back and forth slowly and at the same time adjust the 600 KC pad, slowly to the right or left until a maximum reading is noted on the output meter. It is advisable to return to the 1730 KC adjustment and re-check that setting to make sure it has not changed while padding at 600 KC.

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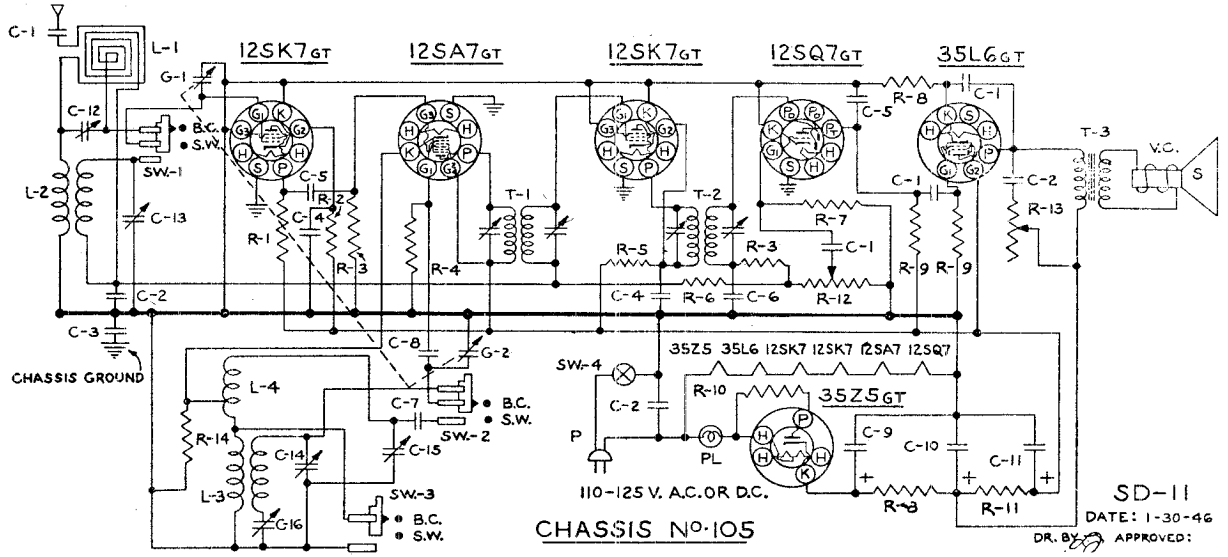
MODELS 5010, 5011, 5012
Chassis 105

TRAV-LER RADIO CORP.



Remove the chassis from the cabinet for alignment.

A signal generator is required, having the following frequencies: 455 KC, 1400 KC, 1730 KC. 6 MC, 16 MC, and 18.3 MC. An output meter should be connected across the speaker.

I. F. ALIGNMENT: — Connect the generator lead through a .1 MFD Condenser to the terminal lug on the "Antenna" section of the gang condenser. The ground lead from the generator should be connected to the gang frame. Set the generator at 455 KC. Adjust the trimmer screws in the 1st and 2nd I. F. cans (See Fig. 1) until a maximum reading is noted on the output meter.

The receiver volume control should be turned to maximum during the **I. F.** and all subsequent alignments, to keep the AVC from working and giving false readings. Keep the generator output as low as possible to prevent overloading.

BC. OR BROADCAST ALIGNMENT: — With the generator leads still connected as in I. F. Alignment, rotate the tuning condenser to complete minimum capacity. Set the generator to 1730 KC. Adjust the BC. oscillator trimmer until the signal is tuned in. Next remove the hot lead of the generator from the "Ant" section of the gang condenser. Connect this lead to the antenna lead wire that projects from the back of the loop antenna through a 200 MMFD condenser. Set the generator to 1400 KC and rotate the tuning condenser until the signal is tuned in. Adjust the BC. antenna trimmer until a maximum reading is noted on the output meter. Set the generator to 600 KC and turn the tuning control until the signal is tuned in. Rock the tuning control back and forth slowly and at the same time adjust the 600 KC pad, slowly to the right or left until a maximum reading is noted on the output meter. It is advisable to return to the 1730 KC adjustment and re-check that setting to make sure it has not changed while padding at 600 KC.

S. W. OR SHORT WAVE ALIGNMENT: — Set the generator at 18.3 MC. Turn the receiver band switch to short band position. Turn the tuning condenser to complete minimum capacity. The generator leads should be connected to the antenna lead wire that projects from the back of the loop antenna through a 400 Ohm resistor. Adjust the S. W. oscillator trimmer slowly until the 18.3 MC signal is tuned in. At this point, it will be well to make sure that the fundamental signal is turned in. Turn up the generator output and tune the receiver to approximately 17.3 MC. At this point the 18.3 MC signal will be heard again but much weaker. This is the image frequency. If the image is not heard, then turn the tuning condenser back to complete minimum and readjust the S. W. oscillator trimmer. Remember, the image must always be heard (at 2 times the I. F. frequency in KC) lower the frequency than the fundamental signal. After the oscillator has been properly set, tune the signal generator to 16 MC and rotate the tuning control until the signal is tuned in. Adjust the S.W. antenna trimmer until a maximum reading is noted on the output meter. It is advisable to rock the gang slowly while adjusting the antenna trimmer. Set the generator to 6 MC and tune the signal in on the receiver. Check the alignment at this frequency. No adjustment should be necessary as the coils have been carefully checked before leaving the factory. A fixed oscillator padding condenser is used at 6 MC.

PART NO.		DESCRIPTION
1R-22	R-1	3900Ω RESISTOR 1/2 W. 10%
1R-8	R-2	22000Ω RESISTOR 1/2 W. 10%
1R-10	R-3	47000Ω RESISTOR 1/2 W. 20%
1R-9	R-4	22000Ω RESISTOR 1/2 W. 20%
1R-24	R-5	1000Ω RESISTOR 1/2 W. 20%
1R-23	R-6	3.9 MEG. RESISTOR 1/2 W. 20%
1R-13	R-7	2 MEG. RESISTOR 1/2 W. 20%
1R-5	R-8	220Ω RESISTOR 1/2 W. 10%
1R-11	R-9	47000Ω RESISTOR 1/2 W. 20%
1R-17	R-10	39Ω RESISTOR 1 W. 20%
1R-21	R-11	330Ω RESISTOR 1/2 W. 10%
VC-3	R-12	1 MEG. VOLUME CONTROL
VC-1	R-13	25MΩ TONE CONTROL & SW.
1R-6	R-14	470Ω RESISTOR 1/2 W. 10%
PC-7	C-1	.01 MFD. CONDENSER 400 V.
PC-5	C-2	.05 MFD. CONDENSER 400 V.
PC-9	C-3	.25 MFD. CONDENSER 400 V.
PC-8	C-4	.1 MFD. CONDENSER 400 V
MC-3	C-5	.00022 MFD. MICA COND. 500 V.
MC-2	C-6	.0001 MFD. MICA COND. 500 V.
MC-1	C-7	.00475 MFD. MICA COND. 2%
MC-4	C-8	.00005 MFD. MICA COND. 500 V.
EC-4	C-9	40 MFD. 150 V. ELECTROLYTIC
	C-10	40 MFD. 150 V. ELECTROLYTIC
	C-11	40 MFD. 150 V. ELECTROLYTIC
TC-7	C-12	LOOP ANTENNA TRIMMER
TC-8	C-13	S.W. ANTENNA TRIMMER
TC-1	C-14	B.C. OSC. TRIMMER
	C-15	S.W. OSC. TRIMMER
	C-16	B.C. OSC. PADDING COND.
GC-1	G-1	GANG CONDENSER
	G-2	
	SW-1	
SW-1	SW-2	BAND SWITCH
	SW-3	
	SW-4	A.C. SW. ON TONE CONTROL
LI-1	T-1	INPUT I.F. TRANSFORMER
LI-2	T-2	OUTPUT I.F. TRANSFORMER
	T-3	OUTPUT SPK. TRANSFORMER
SPK-4	V.C.	VOICE COIL
	S	P.M. SPEAKER
PB-1	PL	PILOT BULB #47
CO-1	P	LINE CORD
LL-2	L-1	LOOP ANTENNA
LA-2	L-2	S.W. ANTENNA COIL
LO-3	L-3	B.C. OSC. COIL
LO-4	L-4	S.W. OSC. COIL
TU-4		12SK7GT 12SA7GT 12SK7GT 12SQ7GT 35L6GT 35Z5GT

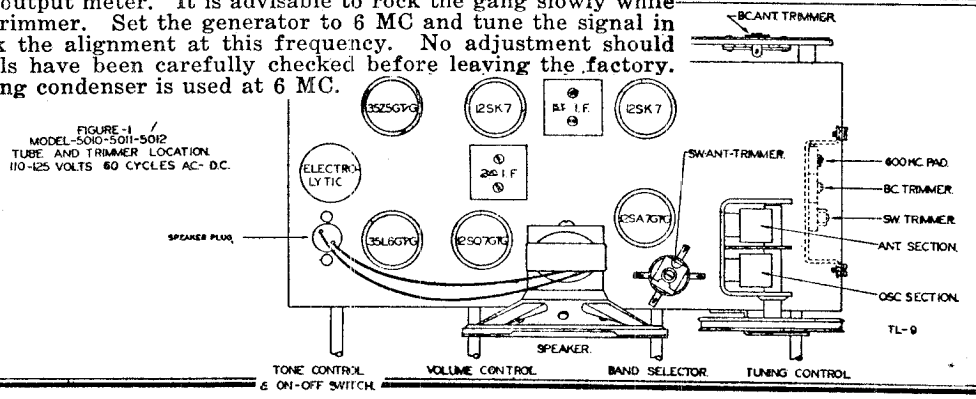


FIGURE-1
MODEL-5010-5011-5012
TUBE AND TRIMMER LOCATION
110-125 VOLTS 60 CYCLES AC-DC

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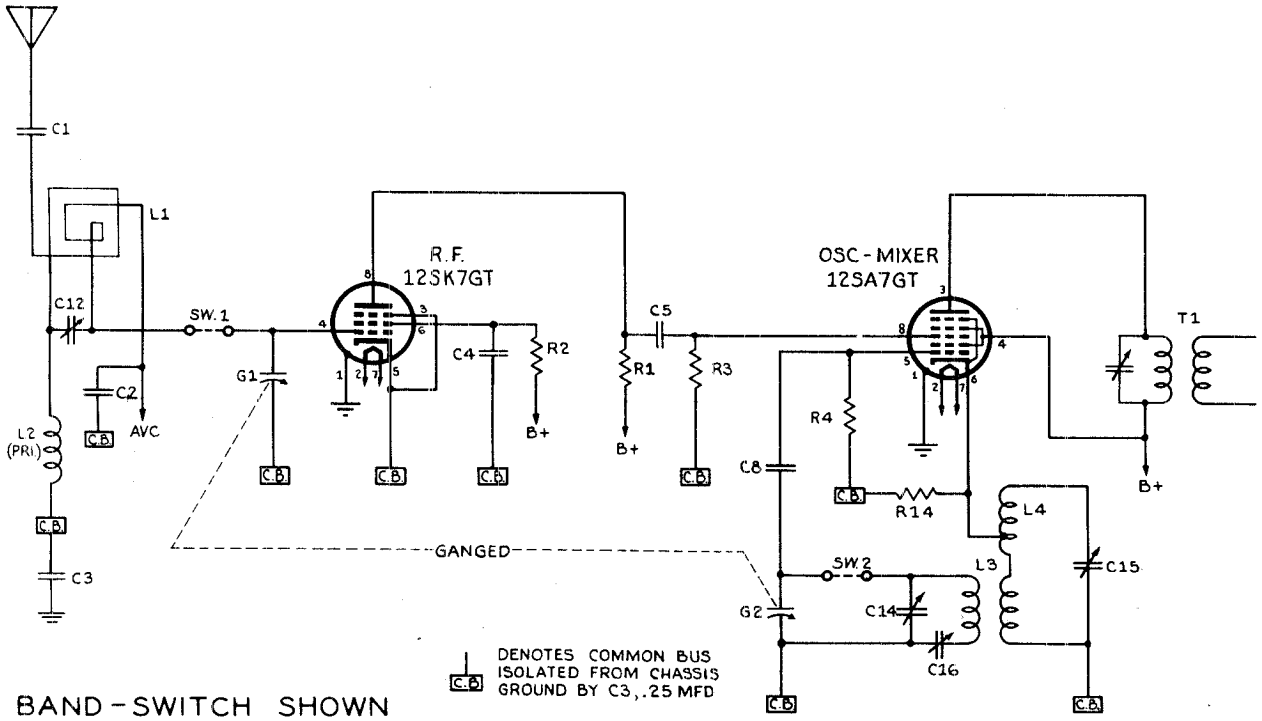
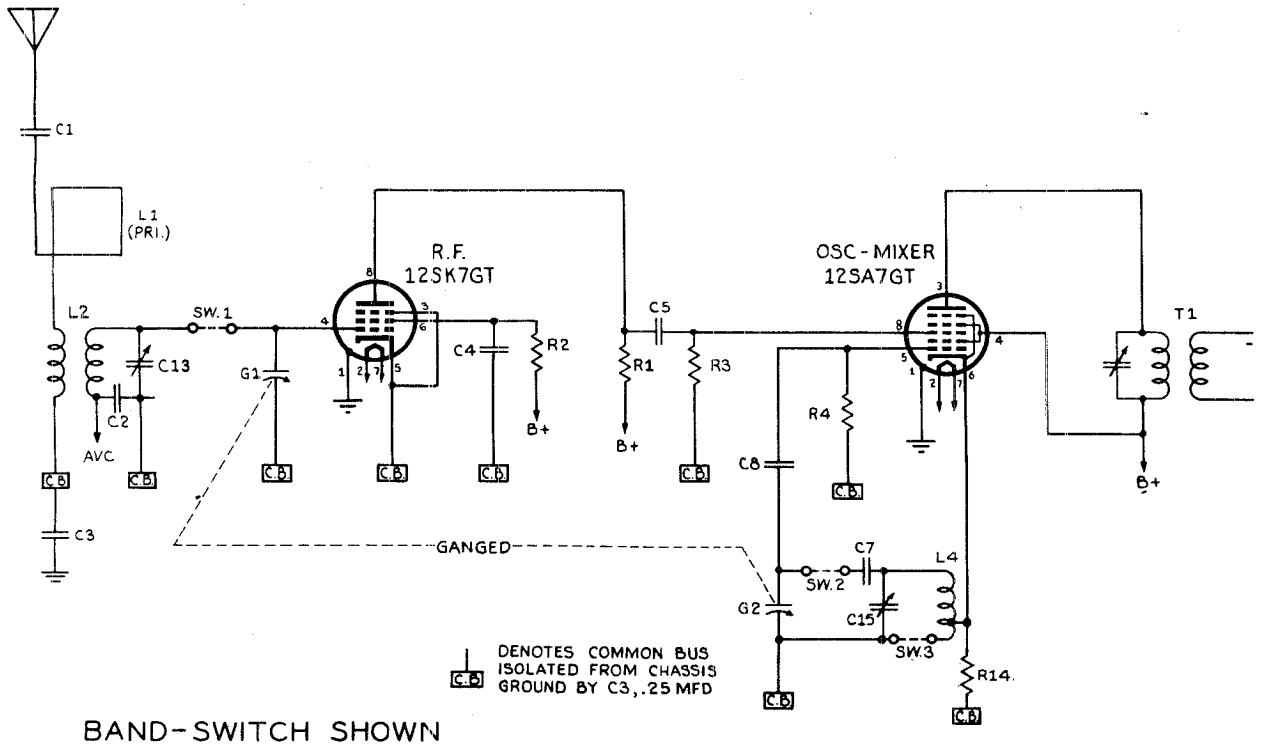
TRAV-LER RADIO CORP.

MODELS 5010,5011,5012



BAND-SWITCH SHOWN
AT 1ST POSITION.
BROADCAST BAND



BAND-SWITCH SHOWN
AT 2ND POSITION CLOCKWISE.
SHORT WAVE BAND

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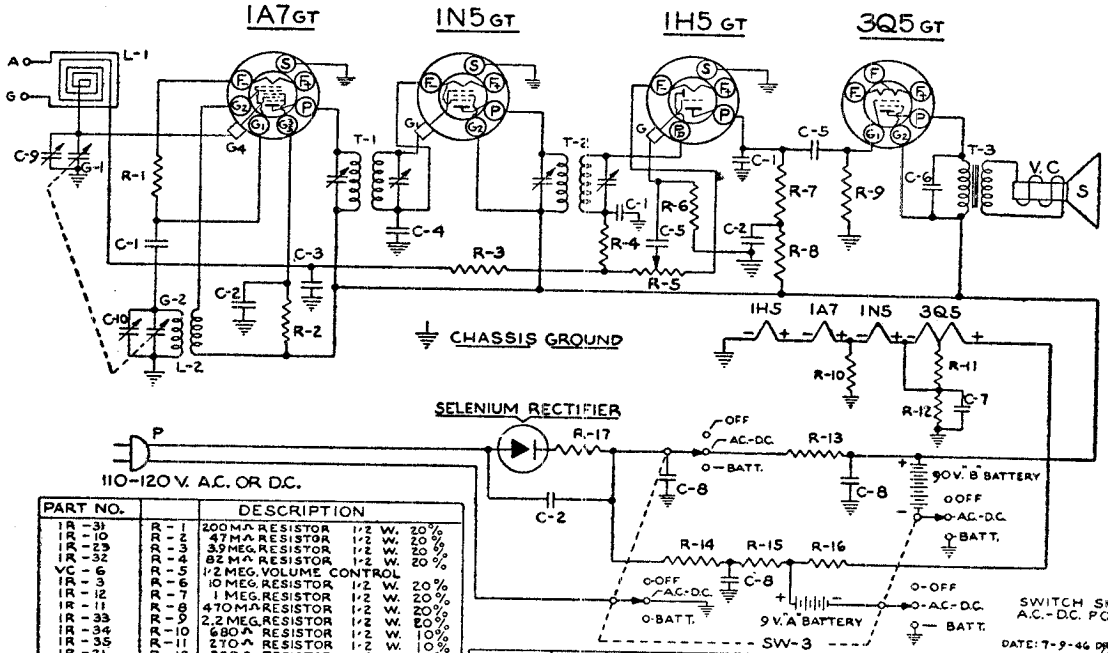
MODEL 5020
Chassis 800

TRAV-LER RADIO CORP.



PART NO.		DESCRIPTION
1R-31	R-1	200 M/A RESISTOR 1/2 W. 20%
1R-10	R-2	47 M/A RESISTOR 1/2 W. 20%
1R-29	R-3	3.9 MEG. RESISTOR 1/2 W. 20%
1R-32	R-4	82 M/A RESISTOR 1/2 W. 20%
VC-6	R-5	1/2 MEG. VOLUME CONTROL
1R-3	R-6	10 MEG. RESISTOR 1/2 W. 20%
1R-12	R-7	1 MEG. RESISTOR 1/2 W. 20%
1R-11	R-8	470 M/A RESISTOR 1/2 W. 20%
1R-33	R-9	2.2 MEG. RESISTOR 1/2 W. 20%
1R-34	R-10	680 Ω RESISTOR 1/2 W. 10%
1R-35	R-11	270 Ω RESISTOR 1/2 W. 10%
1R-21	R-12	330 Ω RESISTOR 1/2 W. 10%
1R-36	R-13	1200 Ω RESISTOR 1/2 W. 10%
WR-3	R-14	1050 Ω
	R-15	1050 Ω — CANDOHM RESISTOR
	R-16	55 Ω
WR-4	R-17	75 Ω WIRE WOUND RESISTOR 2W. 5%
MC-2	C-1	100 MMFD. MICA CONDENSER
PC-5	C-2	.05 MFD. CONDENSER - 400 V.
PC-2	C-3	.05 MFD. CONDENSER - 200 V.
PC-3	C-4	.1 MFD. CONDENSER - 200 V.
PC-10	C-5	.005 MFD. CONDENSER - 400 V.
PC-12	C-6	.0025 MFD. CONDENSER - 400 V.

PART NO.		DESCRIPTION
EC-10	C-7	70 MFD. 10 V. ELECTROLYTIC
EC-4	C-8	40-40-40 150 V. ELECTROLYTIC
TC-7	C-9	ANTENNA TRIMMER COND.
TC-6	C-10	OSC. TRIMMER COND.
GC-2	G-1	GANG CONDENSER
	G-2	
LL-5	L-1	LOOP ANTENNA
LO-8	L-2	OSC. COIL
LI-3	T-1	INPUT I.F. TRANSFORMER
LI-4	T-2	OUTPUT I.F. TRANSFORMER
CO-1	F	LINE CORD

PART NO.		DESCRIPTION
SPK-5	T-3	OUTPUT SPEAKER TRANSFORMER
	V.C.	VOICE COIL
	S	P.M. SPEAKER
SW-3	SW-3	4 POLE 3-POSITION SW.
SR-1	—	SELENIUM RECTIFIER
TU-11	—	1A7GT 1N5GT 1H5GT 3Q5GT
"A" BATTERY		9 VOLTS
"B" BATTERY		90 VOLTS

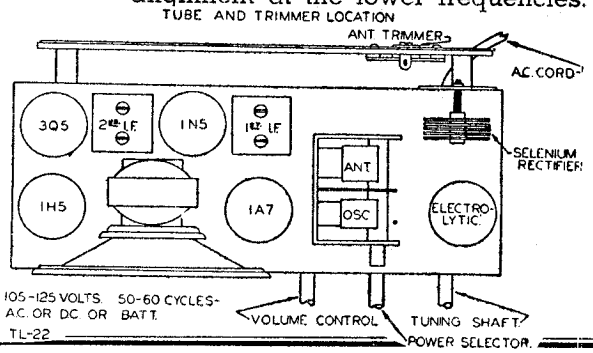
Remove chassis from cabinet for alignment.

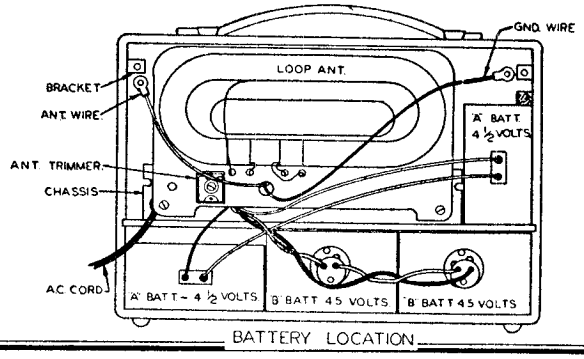
A Signal Generator is required having the following frequencies: 455 KC, 1400 KC, 1720 KC. An output meter should be connected across the speaker.

FIRST STEP: Connect the hot lead from the generator to the ANT. section of the gang condenser, through a .1 MFD condenser. The ground lead from the generator must be connected to the metal frame of the gang condenser. Turn the gang condenser to complete minimum capacity. Adjust the generator to 455KC and adjust the trimmers of the 1st and 2nd I.F. transformers until a maximum reading is noted on the output meter.

SECOND STEP: With the leads from the generator still connected in the same manner, adjust the Signal Generator to 1720 KC. The OSC. trimmer is located on the top of the oscillator section of the gang condenser. Adjust this trimmer until the 1720 KC signal is tuned in.

THIRD STEP: Remove the hot lead of the generator from the ANT section of the gang condenser. Connect this lead to the antenna lead wire that projects from the back of the loop antenna through a 200 MMFD condenser. Adjust the Signal Generator to 1400 KC. Rotate the tuning control until this signal is tuned in. The ANT trimmer is located on the back of the loop antenna. Adjust this trimmer until a maximum reading is noted on the output meter. No further adjustment should be necessary, unless the set has been damaged, as the coils and condenser in this receiver have been specially handled at the factory to insure proper alignment at the lower frequencies.





TL-22

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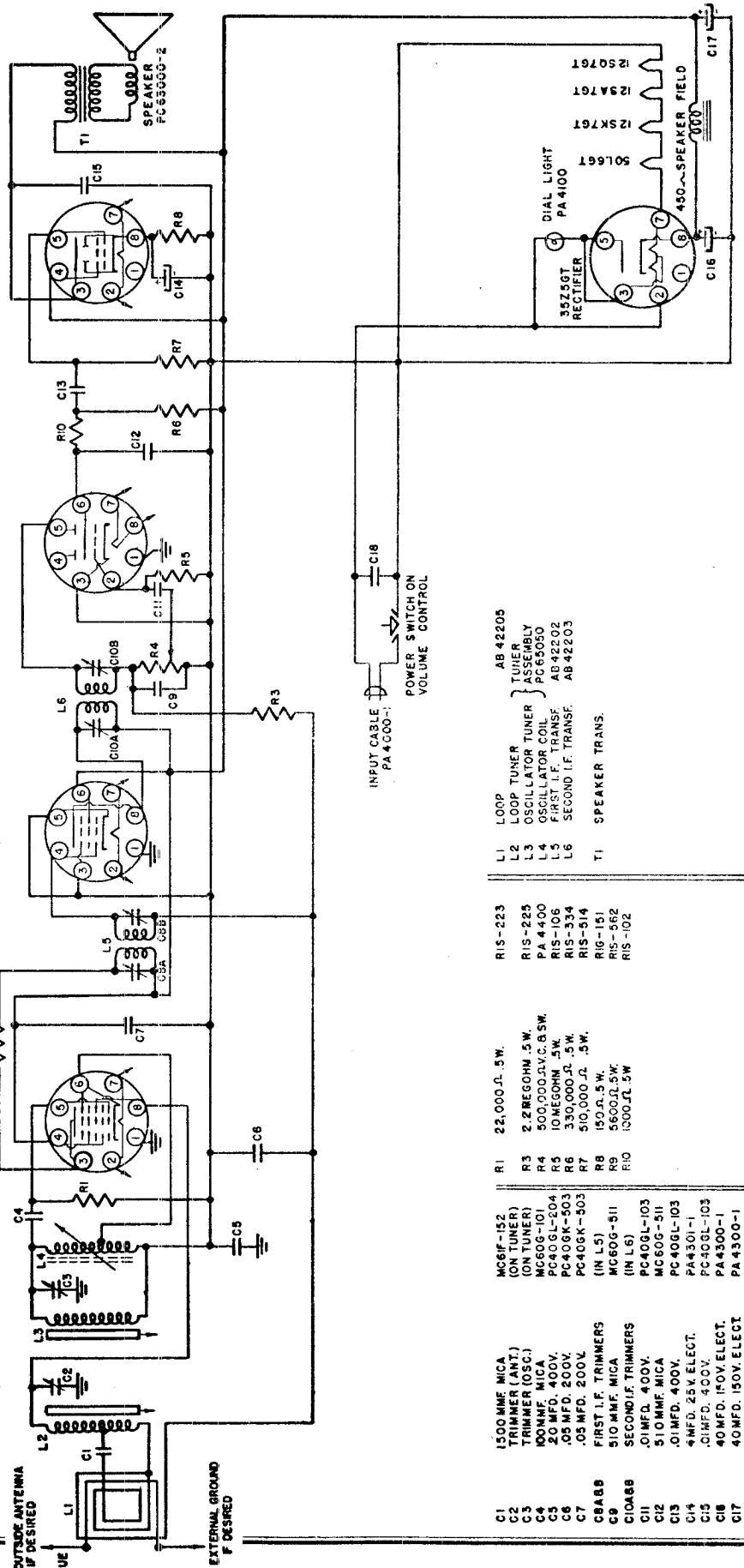
MODEL 5-16 Series

U. S. TELEV. MFG. CORP.

UST SUPERHETERODYNE 5-16 SERIES

INTERMEDIATE FREQUENCY 455 K.C.

BOTTOM VIEWS OF ALL SOCKET CONNECTIONS



C1	1500 MMF. MICA	MC61F-152	R1	22,000Ω .5W.	RIS-223	L1 LOOP	AB 42205
C2	TRIMMER (ANT.)	(ON TUNER)	R3	2.2 MEGOHM .5W.	RIS-225	L2 LOOP TUNER	TUNER ASSEMBLY PC65050
C3	TRIMMER (OSC.)	(ON TUNER)	R4	500,000Ω V.C. B.S.W.	PA4400	L3 OSCILLATOR TUNER	
C4	100 MMF. MICA	MC60G-101	R5	10 MEGOHM .5W.	RIS-106	L4 OSCILLATOR COIL	AB 42202
C5	.02 MFD. 400V.	PC40GL-204	R6	330,000Ω .5W.	RIS-334	L5 FIRST I.F. TRANSF.	AB 42202
C6	.05 MFD. 200V.	PC40GK-503	R7	510,000Ω .5W.	RIS-514	L6 SECOND I.F. TRANSF.	AB 42203
C7	.05 MFD. 200V.	PC40GK-503	R8	150Ω .5W.	RIG-151		
C8A&B	FIRST I.F. TRIMMERS	(IN L5)	R9	5600Ω .5W.	RIS-562	T1 SPEAKER TRANS.	
C9	510 MMF. MICA	MC60G-511	R10	1000Ω .5W	RIS-102		
C10A&B	SECOND I.F. TRIMMERS	(IN L6)					
C11	.01 MFD. 400V.	PC40GL-103					
C12	510 MMF. MICA	MC60G-511					
C13	.01 MFD. 400V.	PC40GL-103					
C14	4 MFD. 25V. ELECT.	PA4301-1					
C15	.01 MFD. 400V.	PC40GL-103					
C16	40 MFD. 150V. ELECT.	PA4300-1					
C17	40 MFD. 150V. ELECT.	PA4300-1					
C18	.05 MFD. 600V.	PC40GM-503					

(ORIGINAL) EFFECTIVE APRIL 22, 1946

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MODEL 5-16 Series

U. S. TELEV. MFG. CORP.

UST SUPERHETERODYNE 5-16 SERIES

VOLTAGE CHART

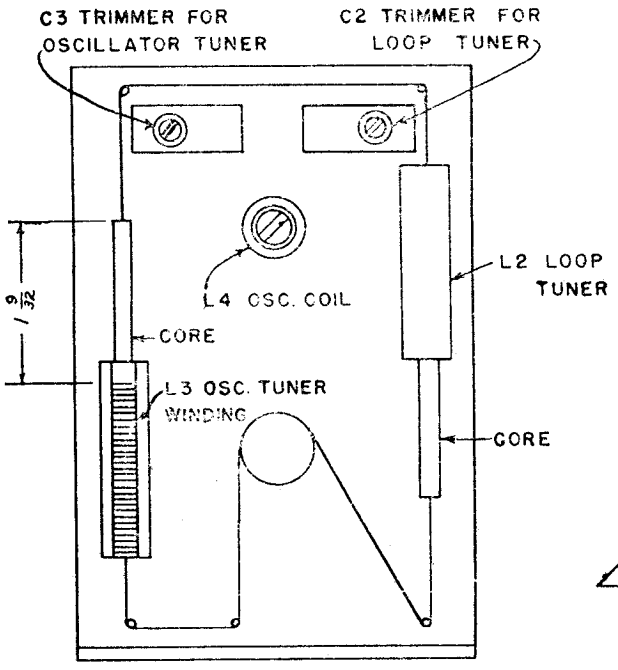
LINE VOLTAGE: 117 VOLTS AC — VOLUME CONTROL ON FULL WITH NO SIGNAL

TUBE	FUNCTION	Voltage of Each Socket Prong to Switch on Volume Control							
		No. 1	No. 2	No. 3	No. 4	No. 5	No. 6	No. 7	No. 8
12SA7GT	Converter	0	24*	82	92	—4.5	0	12*	—.6
12SK7GT	I. F. Amp.	0	36*	0	—.5	0	92	24*	91
12SQ7GT	2nd Det. - AVC - AF	0	—.7	0	0	0	62	12*	0
50L6LGT	Power Amp.	0	36*	86	92	0	—	86*	5.3
35Z5GT	Rectifier	0	117*	112*	—	112*	—	86*	123

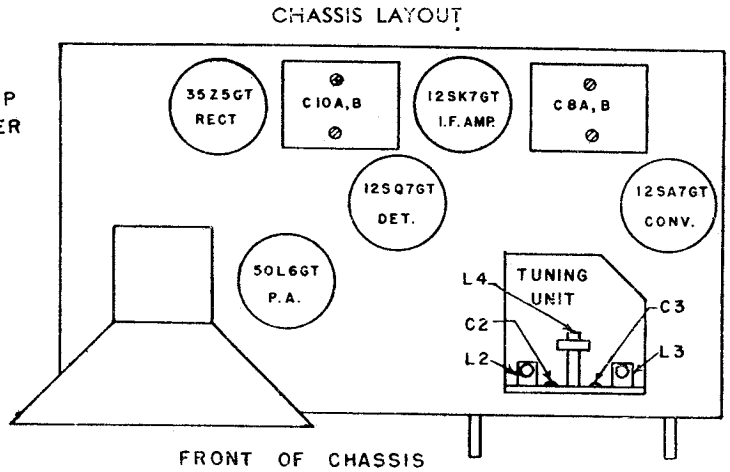
Voltage readings are for schematic diagram shown on back of sheet. Allow 15%+ or — on all measurements. Measurements were made with Weston Model 772 Analyzer.
* AC volts.

ALIGNMENT CHART FOR 5-16 SERIES

OPERATION	ALIGNMENT OF	GENERATOR CONNECTED TO	DUMMY ANTENNA	GENERATOR FREQUENCY	TUNER SETTING	TRIMMER	REMARKS
1	I.F.	Converter Pin No. 5	.01 mfd.	455 KC	High Freq. End	C10 A&B	2nd I.F.
						C 8 A&B	1st I.F.
2	Osc. Tuner Core	When tuner is against stop at high frequency end, the end of core should be 1-9/32" away from end of winding L3, oscillator tuner					
3	Pointer	Set pointer to coincide with the first horizontal line below 160 on dial					
4	Trimmers	Blue Ant. Lead	200 mmf.	1400 KC	1400 KC	C3 Osc. Tuner Trim.	Peak at max.
						C2 Loop Tuner Trim.	Peak at max.
5	Oscillator	Blue Ant. Lead	200 mmf.	600 KC	Rock Tuner Control	Adjust Iron Core in L4 Osc. Coil	Use short non-metallic screw driver to fit slot of core from back of tuner
6	Repeat operations 4 and 5						
7	Creck operations 1 to 6 inclusive						



BACK VIEW OF TUNING UNIT



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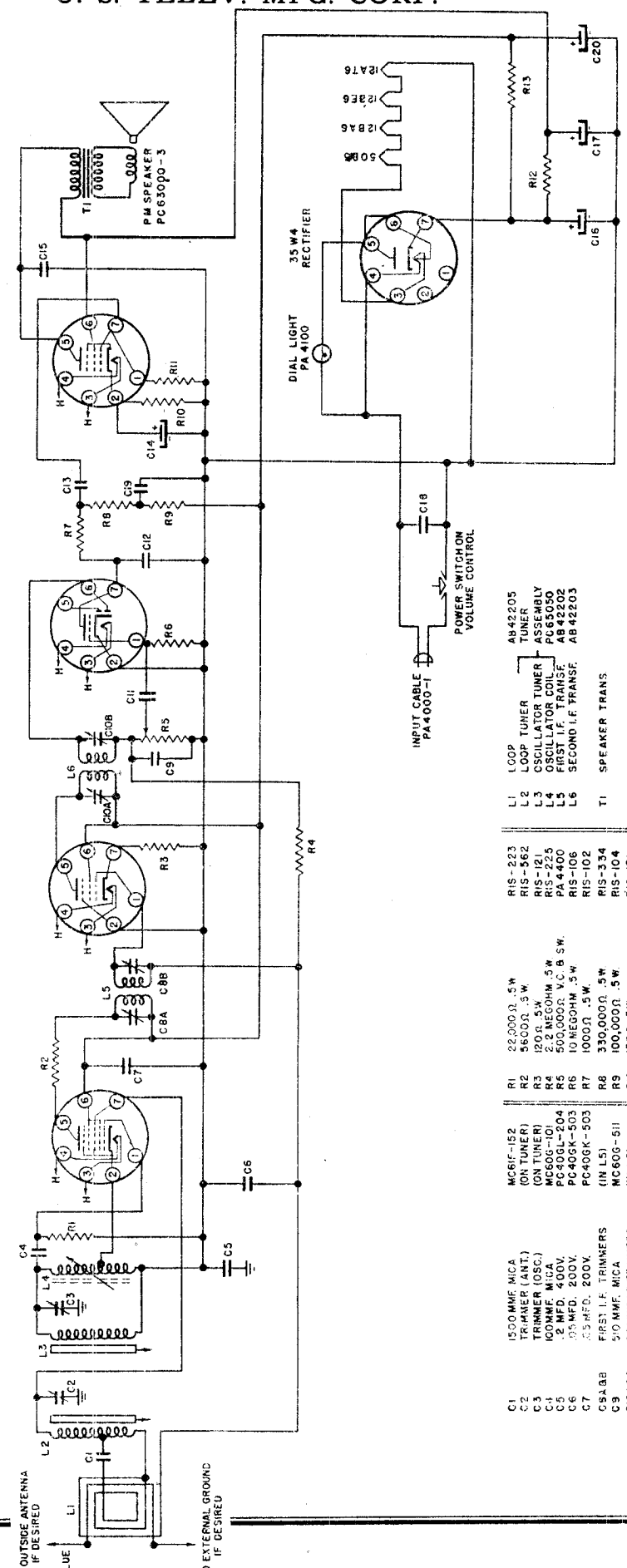
U. S. TELEV. MFG. CORP.

MODEL 5-46
Series

SCHEMATIC DIAGRAM

UST SUPERHETERODYNE 5-46 SERIES
INTERMEDIATE FREQUENCY 455K.C.

BOTTOM VIEWS OF ALL SOCKET CONNECTIONS



C1	1500 MMF. MICA	MC61F-152
C2	TRIMMER (ANT.)	(ON TUNER)
C3	TRIMMER (OSC.)	(ON TUNER)
C4	100MMF. MICA	MC600-101
C5	.2 MFD. 400V.	PC406L-204
C6	.05MFD. 200V.	PC406K-503
C7	.05MFD. 200V.	PC406K-503
C8A,B	FIRST I.F. TRIMMERS	(IN L5)
C9	510 MMF. MICA	MC600-511
C10A,B	SECOND I.F. TRIMMERS	(IN L6)
C11	.01MFD. 400V.	PC406L-103
C12	510 MMF. MICA	MC600-511
C13	.01MFD. 400V.	PC406L-103
C14	4MFD. 25V. ELECT.	PA4301-1
C15	.01MFD. 400V.	PC406L-103
C16	40 MFD. 150V. ELECT.	PA4300-1
C17	40 MFD. 150V. ELECT.	PA4300-1
C18	.05MFD. 600V.	PC406M-503
C19	.05MFD. 200V.	PC406K-503
C20	10MFD. 150V. ELECT.	PA4300-5

R1	22,000Ω .5W	RIS-223
R2	5600Ω .5W	RIS-562
R3	120Ω .5W	RIS-121
R4	2.2 MEGOHM .5W	RIS-225
R5	500,000Ω V.C. & SW.	PA4400
R6	10 MEGOHM .5W	RIS-106
R7	1000Ω .5W.	RIS-102
R8	330,000Ω .5W	RIS-334
R9	100,000Ω .5W	RIS-104
R10	150Ω .5W.	RIG-151
R11	510,000 .5W	RIS-514
R12	390Ω 1.W.	R2S-391
R13	2200Ω 1.W.	R2S-222

L1	LOOP	AB42205
L2	LOOP TUNER	TUNER
L3	OSCILLATOR TUNER	ASSEMBLY
L4	OSCILLATOR COIL	PC65050
L5	FIRST I.F. TRANSF.	AB42202
L6	SECOND I.F. TRANSF.	AB42203
T1	SPEAKER TRANS.	

SEPT. 5, 1946

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MODEL 5-46
Series

U. S. TELEV. MFG. CORP.

UST SUPERHETERODYNE 5-46 SERIES

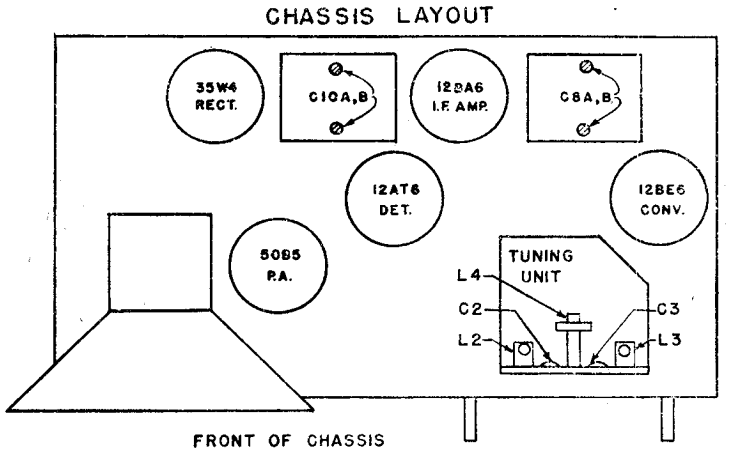
VOLTAGE CHART

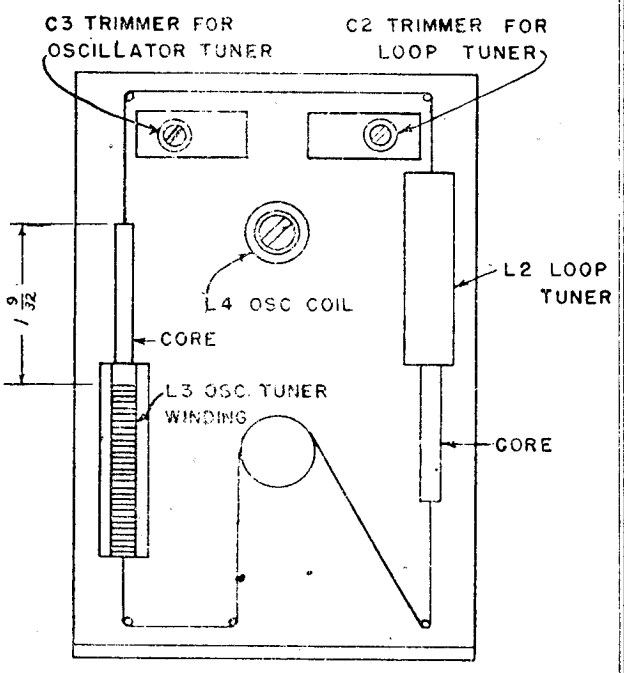
LINE VOLTAGE: 117 VOLTS AC		VOLUME CONTROL ON FULL WITH NO SIGNAL						
TUBE	FUNCTION	Voltage of Each Socket Prong to Switch on Volume Control						
		No. 1	No. 2	No. 3	No. 4	No. 5	No. 6	No. 7
12BE6	Converter	—6.7	0	12.5*	24.3*	69	77	0
12BA6	I. F. Amp.	0	0	24.3*	36 *	75	75	1.1
12AT6	2nd Det. - AVC - AF	—6.5	0	12.5*	0	—	—.4	34
50B5	Power Amp.	0	6.2	36 *	85 *	92	95	0
35W4	Rectifier	—	—	85 *	117*	112*	112*	113

Voltage readings are for schematic diagram shown on back of sheet. Allow 15%+ or — on all measurements. Measurements were made with Simpson Model 260 Meter.
* AC volts.

ALIGNMENT CHART FOR 5-46 SERIES

OPERATION	ALIGNMENT OF	GENERATOR CONNECTED TO	DUMMY ANTENNA	GENERATOR FREQUENCY	TUNER SETTING	TRIMMER	REMARKS
1	I.F.	Converter Pin No. 7	.01 mfd.	455 KC	High Freq. End	C10 A&B	2nd I.F.
						C 8 A&B	1st I.F.
2	Osc. Tuner Core	When tuner is against stop at high frequency end, the end of core should be 1-9/32" away from end of winding L3, oscillator tuner					
3	Pointer	Set pointer to coincide with the first horizontal line below 160 on dial					
4	Trimmers	Blue Ant. Lead	200 mmf.	1400 KC	1400 KC	C3 Osc. Tuner Trim.	Peak at max.
						C2 Loop Tuner Trim.	Peak at max.
5	Oscillator	Blue Ant. Lead	200 mmf.	600 KC	Rock Tuner Control	Adjust Iron Core in L4 Osc. Coil	Use short non-metallic screw driver to fit slot of core from back of tuner
6	Repeat operations 4 and 5						
7	Check operations 1 to 6 inclusive						





BACK VIEW OF TUNING UNIT

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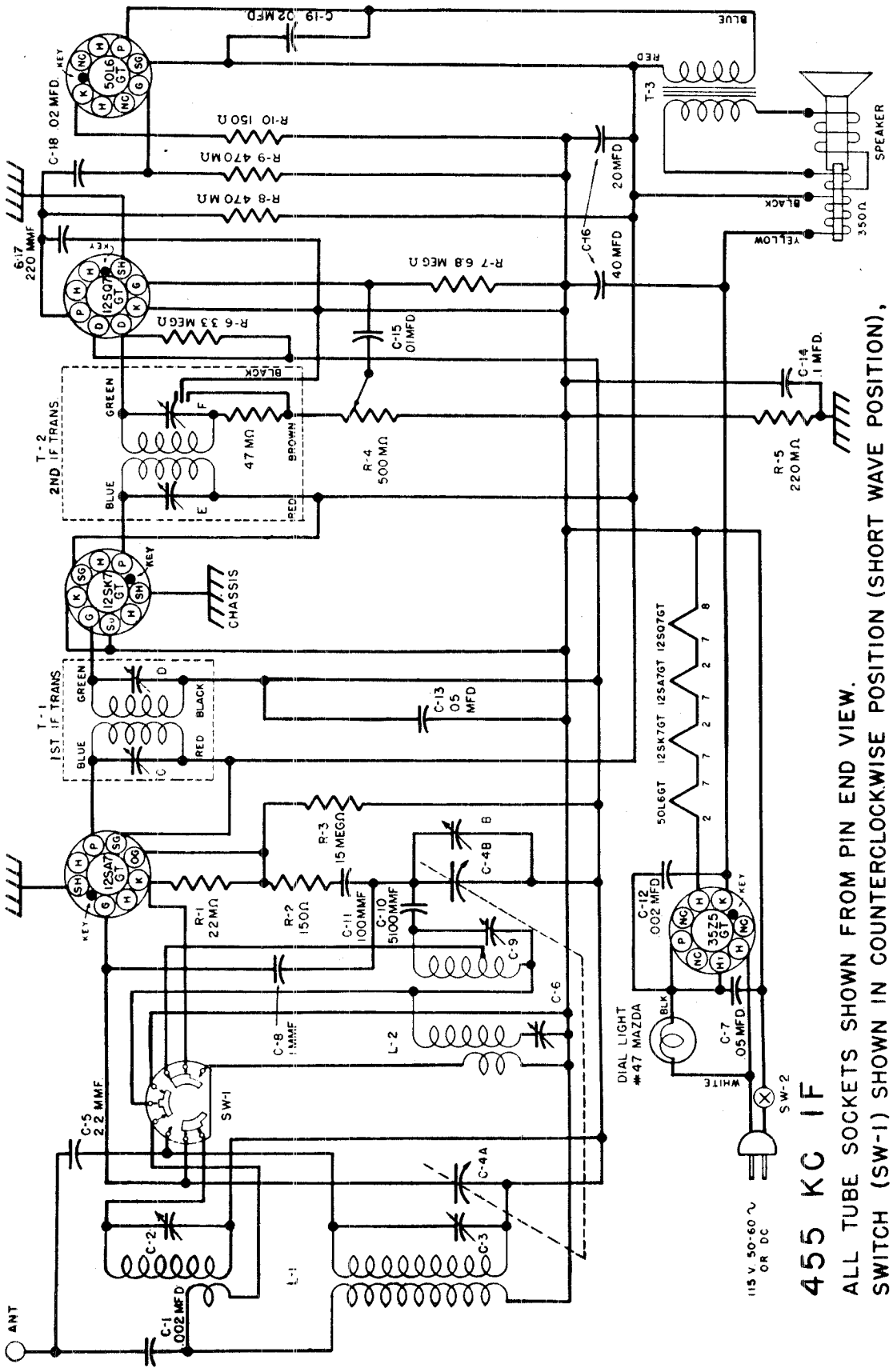
MODEL 568

WALGREEN CO.



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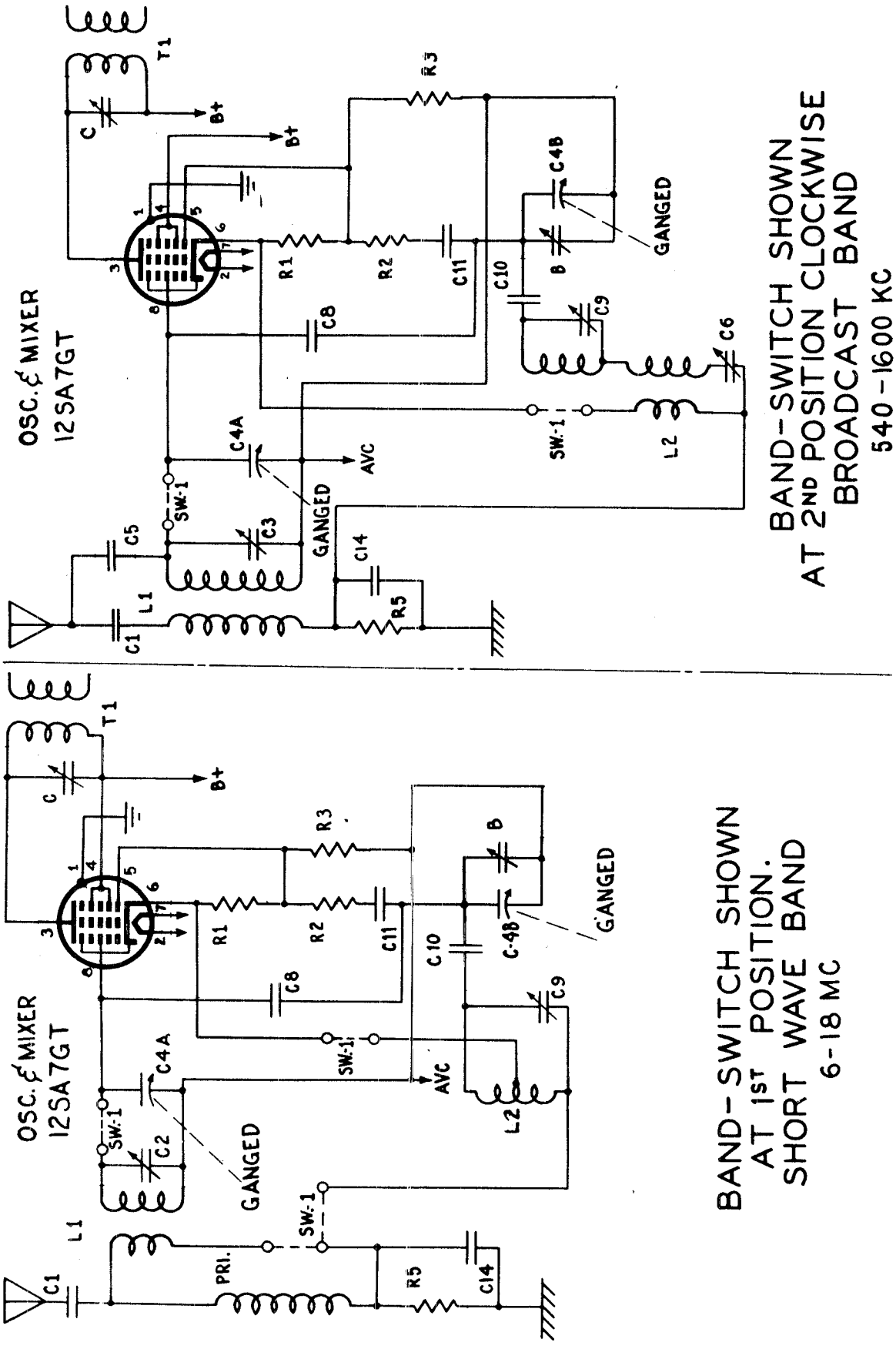
"clarified schematics"

MODEL 568

WALGREEN CO.



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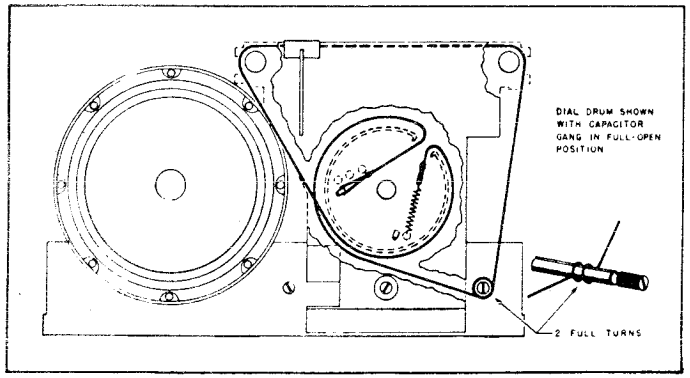
ALIGNMENT PROCEDURE

The following equipment is necessary to properly align this chassis:

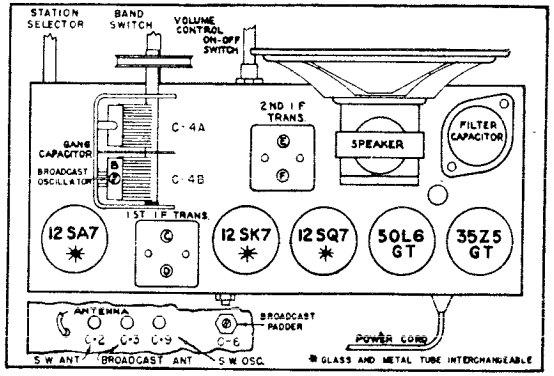
1. A signal generator which will provide an accurately calibrated signal at the frequencies listed.
2. An output meter.
3. A non-metallic screwdriver.
4. Dummy antenna: — .1 mfd. — 200 mmf. — 400 ohms

CONNECT TEST OSCILLATOR TO	DUMMY ANTENNA	INPUT SIGNAL FREQUENCY	BAND	SET DIAL AT	TRIMMERS	PURPOSE
12SA7GT grid	.1 mfd.	455 kc.	Broadcast	HF end	C D E F	Align IF
12SA7GT grid	.1 mfd.	1620 kc.	Broadcast	HF end	B	Set limit of band
Ant. terminal	400 ohms	18.3 mc.	Short Wave	HF end	C-9	Set limit of band
Ant. terminal	400 ohms	18.0 mc.	Short Wave	18 mc.	C-2	Align antenna
Ant. terminal	200 mmf.	1400 kc.	Broadcast	1400 kc.	C-3	Align antenna
Ant. terminal	200 mmf.	600 kc.	Broadcast	600 kc.	C-6	Rock gang and adjust to max.

NOTE: Recheck alignment of trimmers B and C-3 after adjusting C-6.



Dial Mechanism



Tube Layout

Electrical and Mechanical Specifications

Frequency Range	540-1600 kc., 6-18 mc.	V.C. Impedance	3.5 ohms at 400 cycles
Intermediate Frequency	455 kc.	Power Output (Undistorted)	.75 watt
Power Supply	105-125 volts, 50-60 cycle AC or DC	Power Output (Maximum)	1.5 watts
Loudspeaker	Dynamic	Tuning Drive Ratio	5-1

TUBE COMPLEMENT

1-12SA7GT
Osc. & Mixer tube

1-12SK7GT
IF Amplifier tube

1-12SQ7GT
2nd Det. & 1st Audio tube

1-50L6GT
Power Output tube

1-35Z5GT
Rectifier tube

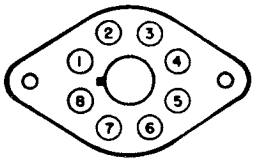
NOTE: The above glass tubes are interchangeable with their metal equivalent.

MODEL 568

WALGREEN CO.

SOCKET VOLTAGES

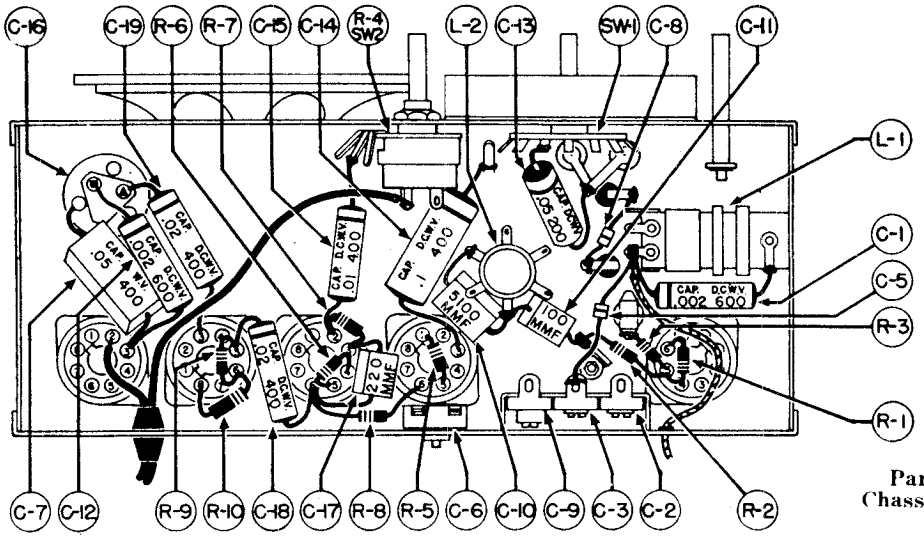
TUBE	POSITION	1	2	3	4	5	6	7	8
12SA7GT	Oscillator and Mixer	0	37.5 AC	99	99	-4.2	0	24.5 AC	0
12SK7GT	IF Amplifier	0	24.5 AC	0	0	0	99	12.5 AC	99
12SQ7GT	2nd Det.—1st Audio	0	0	0	0	0	16	12.5 AC	0
50L6GT	Power Output	0	85 AC	91.5	99	0	0	37.5 AC	5.9
35Z5GT	Rectifier	0	117 AC	112 AC	0	112 AC	0	85 AC	112



NOTE: All DC voltages measured with a 1000 ohm-per-volt meter from ON-OFF switch (—B) to socket contact indicated. All voltages are positive DC unless otherwise marked.

Volume control full on. No signal.

Line Voltage 117 volts AC.



Parts Layout
Chassis Model 568

SERVICE PARTS LIST

Symbol	Part No.	Description
C-7	BC31B503	Cap., Molded Paper, .05 mfd.
C-13	BD210503	Cap., Paper, .05 mfd., 200 v.
C-15	BD410103	Cap., Paper, .01 mfd., 400 v.
C-14	BD410104	Cap., Paper, .1 mfd., 400 v.
C-18, 19	BD410203	Cap., Paper, .02 mfd., 400 v.
C-1, 12	BD610202	Cap., Paper, .002 mfd., 600 v.
C-10	BM58D512	Cap., Mica, 5100 mmf.
C-11	BM78A101	Cap., Mica, 100 mmf.
C-17	BM78A221	Cap., Mica, 220 mmf.
R-10	BR16C151	Resistor, 150 ohm, ½ w.
R-2	BR17B151	Resistor, 150 ohm, ⅓ w.
R-3	BR17B156	Resistor, 15 meg., ⅓ w.
R-1	BR17B223	Resistor, 22,000 ohm, ⅓ w.
R-5	BR17B224	Resistor, 220,000 ohm, ⅓ w.
R-6	BR17B335	Resistor, 3.3 meg., ⅓ w.
R-8, 9	BR17B474	Resistor, 470,000 ohm, ⅓ w.
R-7	BR17B685	Resistor, 6.8 meg., ⅓ w.
	A-2163	Cable, Drive
	A-6158	Lamp, Pilot, No. 47, Mazda, 6.3 v.

Symbol	Part No.	Description
C-16	A-8948	Cap., Electrolytic, 40-20 mfd.
R-4	R-9051-5	Control, Vol & Sw. 500,000 ohm
T-1	B-51010-1	Transformer Assembly, 1st IF
T-2	B-51011-1	Transformer Assembly, 2nd IF
	C-51014	Speaker, 5-inch Dynamic
	A-51160-1	Cord, Power, 6 ft.
	A-51163	Clip, Spring
C-6	B-51428-5	Capacitor, Padder
	B-51591	Spring, Dial Bracket
SW-1	B-51764-1	Switch, Band
	A-51787	Spring, Cable, Music Wire
L-1	B-51828	Coil Assembly, BC & SW Ant.
C-2, 3, 9	A-51834	Capacitor, Trimmer, 3-section
L-2	B-51836	Coil Assembly, Osc.
C-4	C-51837-1	Capacitor, Variable
C-8	B-51839-2	Capacitor, 1 mmf.
C-5	B-51839-4	Capacitor, 2.2 mmf.
	A-51869	Antenna Reel Assembly

Order parts not listed by specifying (1) Part Name and (2) Model Number (include number following dash)

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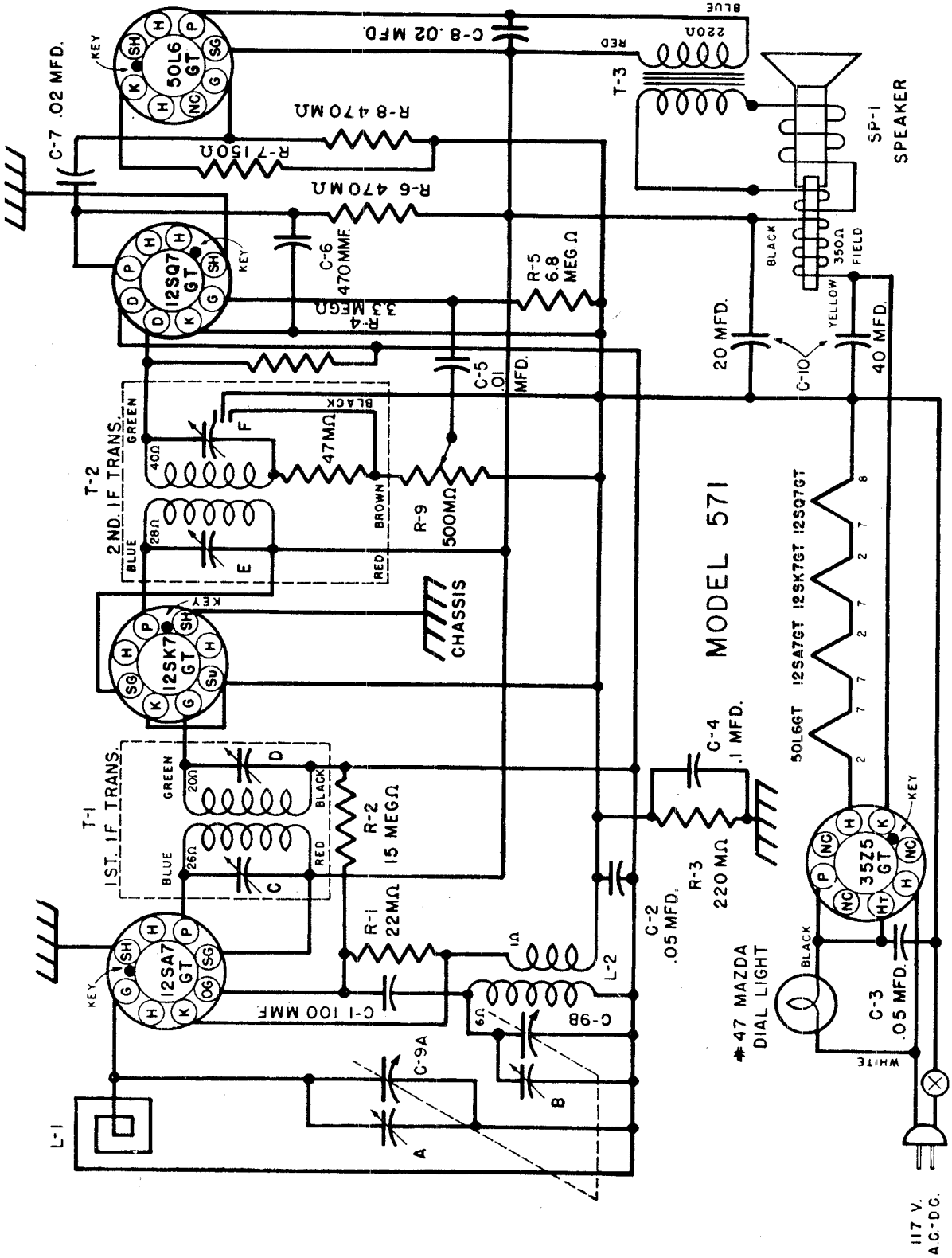

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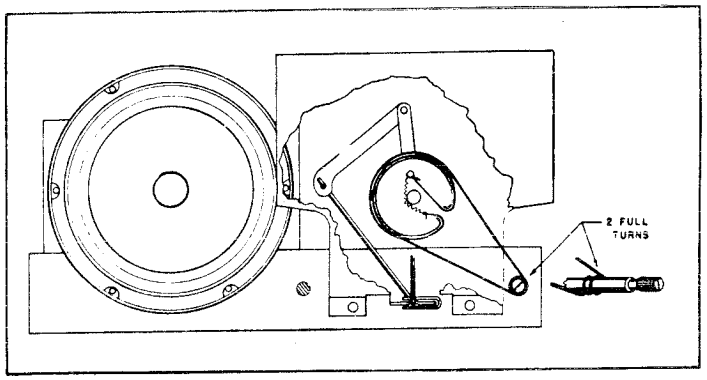
ALIGNMENT PROCEDURE

The following equipment is necessary to properly align this chassis:

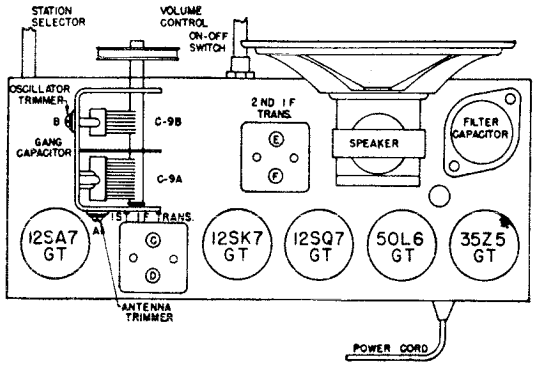
1. A signal generator which will provide an accurately calibrated signal at the frequencies listed.
2. An output meter.
3. A non-metallic screwdriver.
4. Dummy antenna: — .1 mfd., — RMA loop.

NOTE: Intermediate Frequency and Oscillator adjustments may be made with the loop disconnected provided a resistor of 10,000 to 50,000 ohms is substituted to close the 12SA7GT grid circuit. The loop alignment must be done with the loop and chassis mounted in operating position in the cabinet. A single turn loosely coupled to loop may be substituted for RMA loop.

GENERATOR	CONNECTION AT RADIO	DUMMY ANTENNA	DIAL	TO TUNE TRIMMERS	REMARKS
1F 455 kc.	12SA7GT grid	.1 mfd.	HF end	1F trimmers C D E F	Tune to max.
1620 kc.	Through loop	RMA loop	HF end	Osc. trimmer B	Set limit of band
1400 kc.	Through loop	RMA loop	1400 kc.	Ant. trimmer A	Tune to max.



Dial Mechanism



Tube Layout

Electrical and Mechanical Specifications

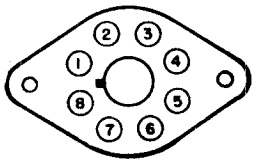
Frequency Range ..... 540-1600 kc.
Intermediate Frequency ..... 455 kc.
Power Supply ..... 105-125 volts AC-DC
Loudspeaker ..... Dynamic
V.C. Impedance ..... 3.5 ohms at 400 cycles
Power Output (Undistorted) ..... .75 watts
Power Output (Maximum) ..... 1.5 watts
Tuning Drive Ratio ..... 3 to 1

MODEL 571

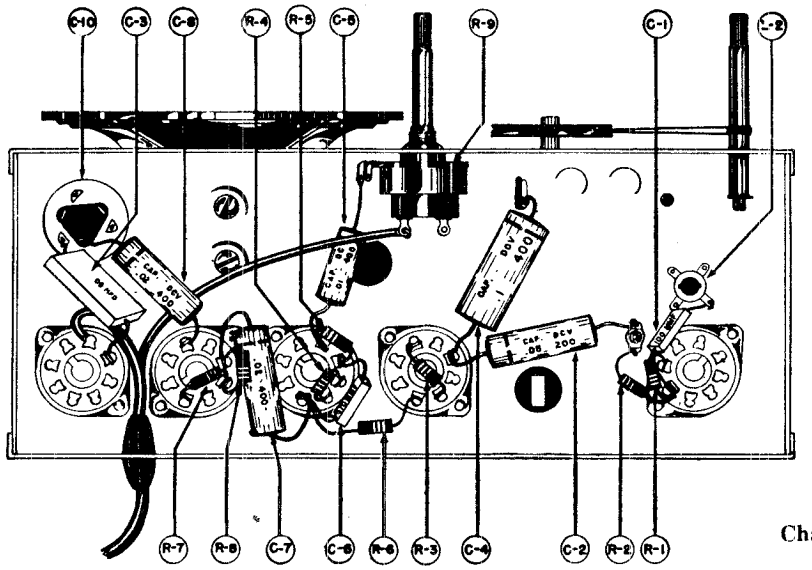
WALGREEN CO.

SOCKET VOLTAGES

TUBE	POSITION	1	2	3	4	5	6	7	8
12SA7GT	Osc. and Mixer	0	37.5 AC	99	99	-4.2	0	24.5 AC	0
12SK7GT	IF Amplifier	0	24.5 AC	0	0	0	99	12.5 AC	99
12SQ7GT	2nd Det.—1st Audio	0	0	0	0	0	16	12.5 AC	0
50L6GT	Power Output	0	85 AC	91.5	99	0	0	37.5 AC	5.9
35Z5GT	Rectifier	0	117 AC	112 AC	0	112 AC	0	85 AC	112



NOTE: All DC voltages measured with a 1000 ohm per volt meter from ON-OFF switch (—B) to socket contact indicated. All AC voltages are measured from ON-OFF switch (—B) to socket contact indicated.
All voltages are positive DC unless otherwise marked.
Volume control full on.
Line voltage 117 volts AC.



Parts Layout
Chassis Model 571

SERVICE PARTS LIST

Symbol	Part No.	Description
C-1	BM78A101	Cap., Mica, 100 mmf.
C-2	BD210503	Cap., Paper, .05 mfd., 200 v.
C-3	BC31B503	Cap., Mold., Paper, .05 mfd.
C-4	BD410104	Cap., Paper, .1 mfd., 400 v.
C-5	BD410103	Cap., Paper, .01 mfd., 400 v.
C-6	BM78A471	Cap., Mica, 470 mmf.
C-7, 8	BD410203	Cap., Paper, .02 mfd., 400 v.
C-9	C-51155-1	Cap., Variable, 2 Section
C-10	A-8948	Cap., Electro., 40-20 mfd., 150 v.
L-2	B-51159	Coil, Osc. Assembly
R-1	BR17B223	Resistor, 22M ohm 1/3 w.
R-2	BR17B156	Resistor, 15 meg. 1/3 w.
R-3	BR17B224	Resistor, 220M ohm 1/3 w.
R-4	BR17B335	Resistor, 3.3 meg. 1/3 w.
R-5	BR17B685	Resistor, 6.8 meg. 1/3 w.
R-6, 8	BR17B474	Resistor, 470M ohm 1/3 w.

Symbol	Part No.	Description
R-7	BR16C151	Resistor, 150 ohm. 1/2 w.
R-9	B-9051-1	Control, Vol. & Sw. 500M ohm.
T-1	B-51010-1	Trans., Assembly, 1st IF
T-2	B-51011-1	Trans., Assembly, 2nd IF
SP-1	C-51014	Speaker, 5" Dynamic, 350 ohm.
	A-2163	Cable, Drive
	A-6158	Lamp, Pilot No. 47 Mazda 6.3 v.
	A-51160-1	Cord, AC-DC Line, 6 ft.
	B-51162-1	Shaft, Drive
	A-51163	Clip, Spring
	B-51177	Brkt. Assy., Dial (571A-571B only)
	A-51202	Link, Insulating
	A-51206	Arm, Dial Drive
	B-51330-1	Channel, Rubber (571 only)
	A-51331	Spring, Dial Bracket
	C-51335	Bracket, Dial (571 only)
	A-51787	Spring, Cable

Order parts not listed by specifying (1) Part Name and (2) Model Number (include number following dash)

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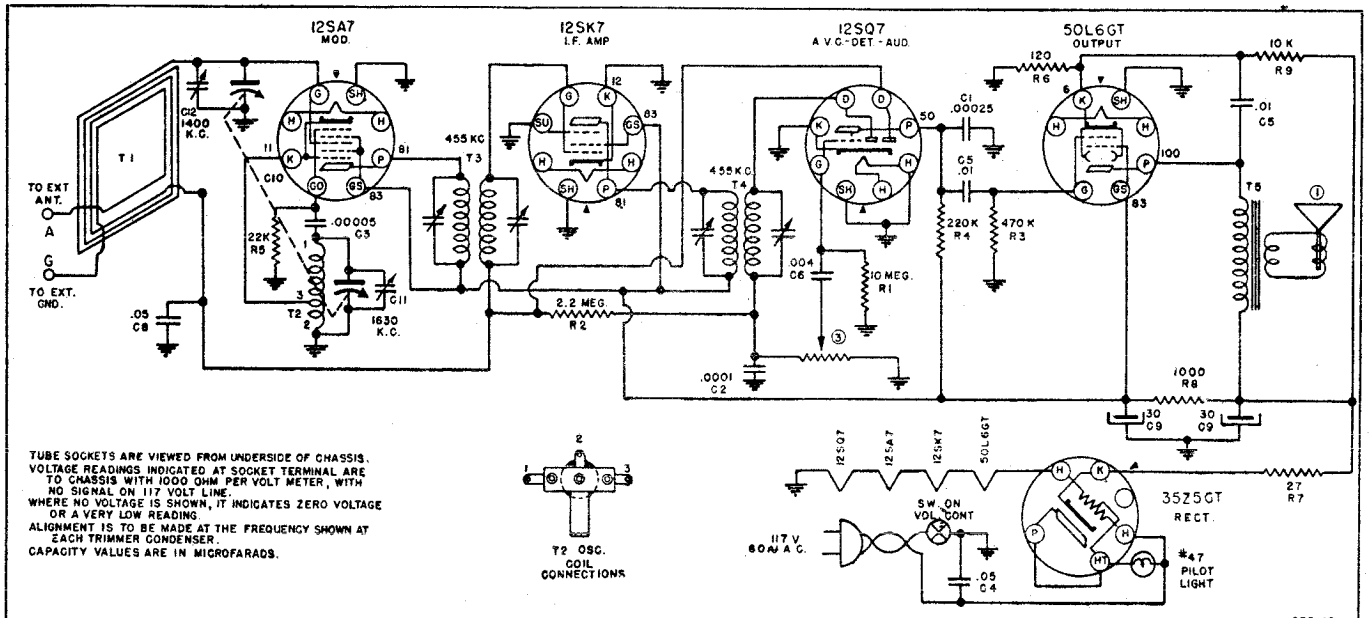
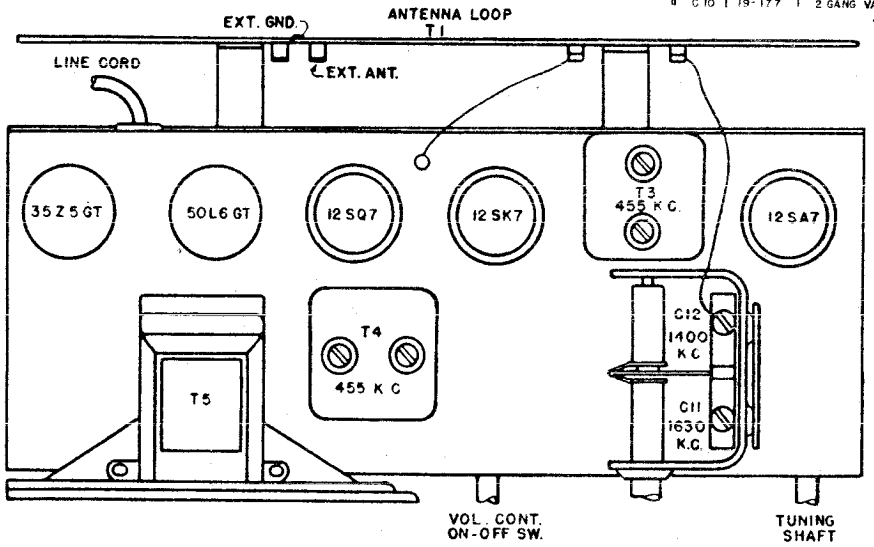


CODE	PART NO.	DESCRIPTION
R1		10 MEGOHM 1/4 WATT RESISTOR
R2		2.2 " " "
R3		470K " "
R4		220K " "
R5		22 K " "
R6		120 " "
R7		27 " "
R8		1000 1/2 WATT
R9		10 K 1 WATT

CODE	PART NO.	DESCRIPTION
C1		.00025 MFD MICA CONDENSER
C2		.0001 " " "
C3		.00005 " " "
C4		.05 MFD. 400 V. TUBULAR CONDENSER
C5		.01 " " "
C6		.004 " " "
C7		" " " "
C8		.05 " 200 V " "
C9	18-266	30 X 30 MFD 150 W.V. ELECTROLYTIC
C10	19-177	2 GANG VARIABLE CONDENSER (ALSO C11 & C12)

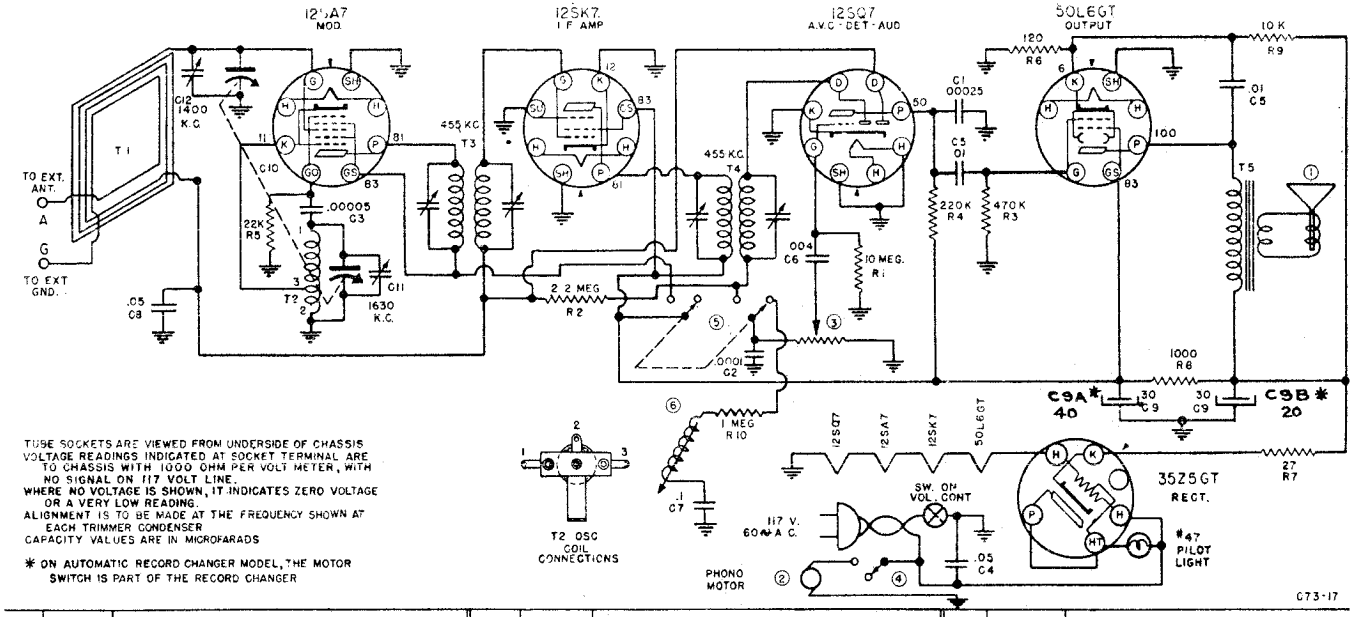
CODE	PART NO.	DESCRIPTION
T1	82-30	LOOP ANTENNA
T2	10-394	OSCILLATOR COIL
T3	10-369	1ST I.F. TRANSFORMER
T4	10-370	2 ND. I.F. TRANSFORMER
T5	80-212	OUTPUT TRANSFORMER USED WITH 79-307A SPR.
(1)	79-339	5" P.M. SPEAKER WITH A80-224 OUTPUT TRANS.
	79-307A	5" P.M. SPEAKER
(3)	24-153	500 K OHM VOLUME CONTROL (WITH SW.)



ALIGNMENT PROCEDURE

CAUTION: This is an A.C./D. C. receiver and when aligning the set it is necessary to isolate the Signal Generator or the receiver from the line by use of a transformer, or place a .2 MFD. condenser in both test leads of the Signal Generator.

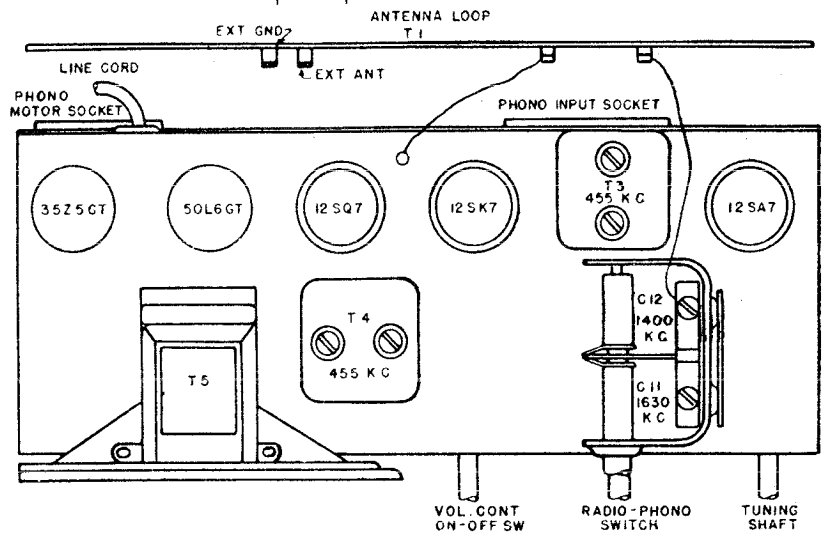
Connect the Signal Generator through a .1 MFD. condenser to the variable condenser side of the loop. Connect the ground side of the Signal Generator to the chassis. Adjust the Signal Generator to 455 Kilocycles and set the variable condenser of the receiver to minimum capacity (fully opened). With volume control full on and minimum output from the Signal Generator adjust the two trimmers on top of the 1st and 2nd I.F. transformers (T3-T4) for maximum output. Now connect the Signal Generator through a .00025 condenser to the external antenna connection on the back of the loop. Connect ground side of Signal Generator to terminal marked "G" on back of loop. Adjust frequency to 1630 K. C., set variable condenser at minimum capacity (fully opened) and adjust the oscillator trimmer (C11) for maximum output. Set Signal Generator to 1400 K.C., tune receiver to signal and adjust the Antenna trimmer (C12) on top of the variable condenser for maximum output.



CODE	PART NO	DESCRIPTION
R 1		10 MEGOHM 1/4 WATT RESISTOR
R 2		2.2 " " "
R 3		470K " "
R 4		220K " "
R 5		22 K " "
R 6		120 " "
R 7		27 " "
R 8		1000 1/2 WATT "
R 9		10 K 1 WATT "
R 10		1 MEGOHM 1/3 WATT "

CODE	PART NO	DESCRIPTION
C 1		.00025 MFD MICA CONDENSER
C 2		.0001 " " "
C 3		.00005 " " "
C 4		.05 MFD 400 V TUBULAR CONDENSER
C 5		.01 " " " "
C 6		.004 " " " "
C 7		.1 " " " "
C 8		.05 " 200 V " "
C 9	18-266	30 X 30 MFD 150 W V ELECTROLYTIC
C 10	19-177	2 GANG VARIABLE CONDENSER (ALSO C11 & C12)

CODE	PART NO	DESCRIPTION
T 1	82-32	LOOP ANTENNA
T 2	10-394	OSCILLATOR COIL
T 3	10-389	1ST I.F. TRANSFORMER
T 4	10-370	2 ND I.F TRANSFORMER
T 5	80-212	OUTPUT TRANSFORMER-USED WITH 79-307A SP
	79-339	5" P.M. SPEAKER WITH A80-224 OUTPUT TRANS
	79-307A	5" P.M. SPEAKER
	59-13	PHONO MOTOR
	24-153	500K OHM VOLUME CONTROL (WITH SW.)
*	69-153	MOTOR SWITCH
	69-162	PHONO SWITCH
	83-297	PHONO PICK-UP



* In later sets, C9A changed to a single 40-μf, 150-v condenser, Part No. A-18-280 and C9B changed to a single 20-μf, 150-v condenser, Part No. A-18-272.

CAUTION: This is an A.C./D. C. receiver and when aligning the set it is necessary to isolate the Signal Generator or the receiver from the line by use of a transformer, or place a .2 MFD. condenser in both test leads of the Signal Generator.

Connect the Signal Generator through a .1 MFD. condenser to the variable condenser side of the loop. Connect the ground side of the Signal Generator to the chassis. Adjust the Signal Generator to 455 Kilocycles and set the variable condenser of the receiver to minimum capacity (fully opened). With volume control full on and minimum output from the Signal Generator adjust the two trimmers on top of the 1st and 2nd I.F. transformers (T3-T4) for maximum output. Now connect the Signal Generator through a .00025 condenser to the external antenna connection on the back of the loop. Connect ground side of Signal Generator to terminal marked "G" on back of loop. Adjust frequency to 1630 K. C., set variable condenser at minimum capacity (fully opened) and adjust the oscillator trimmer (C11) for maximum output. Set Signal Generator to 1400 K.C., tune receiver to signal and adjust the Antenna trimmer (C12) on top of the variable condenser for maximum output.

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Record Changer: Detrola Model 550, General Instruments Model 205

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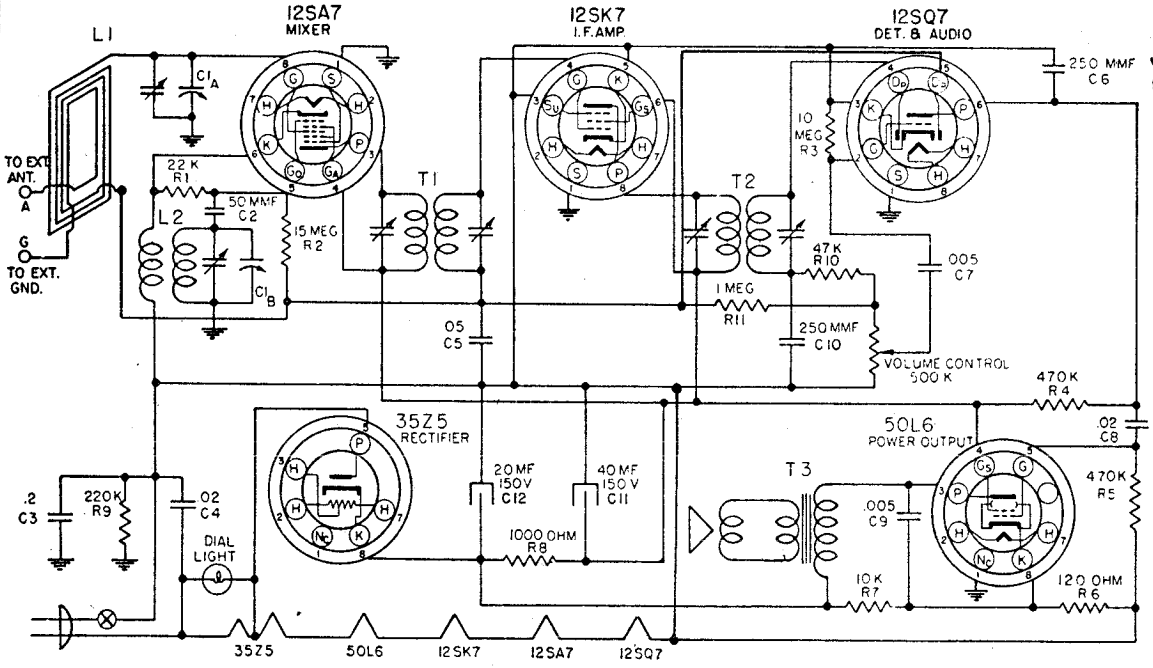

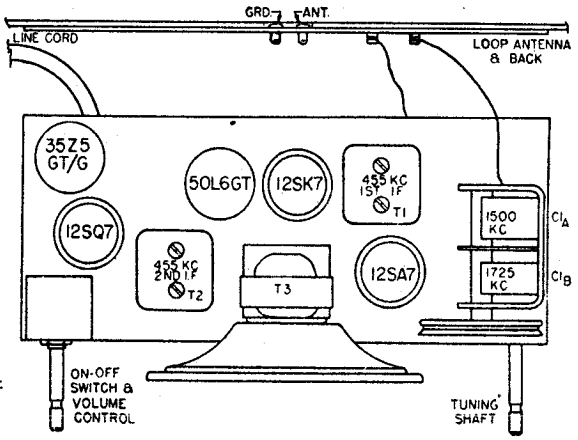

The alignment should be made with volume control fully on, and the output from the signal generator as low as possible, to prevent A.V.C. action from interfering with correct alignment.

With the output meter connected across the voice coil of the speaker, the output meter reading for 50 milliwatts is .4 volts using a signal which is modulated 400 c.p.s.

Adjust all trimmers for maximum output. Repeat alignment procedure given below as a final check.

CAUTION: This is an A.C.-D.C. receiver and when aligning the set it is necessary to isolate the Signal Generator or the Receiver from the line by use of a transformer, or place a .2 MFD. condenser in both test leads of the Signal Generator.

Position of Variable	Generator Frequency	Dummy Ant. Mfd.	Generator Connections	Trimmer Adjustment	Trimmer Function
Fully open	455 KC	.1	* 12SA7 Grid (Stator of C1A)	T1	Input I.F.
Fully open	455 KC	.1	* 12SA7 Grid (Stator of C1A)	T2	Output I.F.
Fully open	1725 KC	.00025	** Ant. terminal on loop	C1B	Oscillator
Tune in signal from generator	1500 KC	.00025	** Ant. terminal on loop	C1A	Antenna

* Connect ground lead of signal generator to chassis.
** Connect ground lead of signal generator to terminal marked "G" on the back of the loop.

Code	Part No.	DESCRIPTION
C1A, C1B	B19-180	Variable condenser
C2	A15-175	50 mmfd. mica condenser
C3	A16-154	.2 mfd. 400 volt tubular condenser
C4	A16-151	.02 mfd. 600 volt tubular condenser
C5	A16-152	.05 mfd. 200 volt tubular condenser
C6, C10	A15-176	250 mmfd. mica condense.
C7, C9	A16-153	.005 mfd. 600 volt tubular condenser
C8	A16-150	.02 mfd. 400 volt tubular condenser
C11	A18-280	40 mfd. 150 volt electrolytic condenser
C12	A18-272	20 mfd. 150 volt electrolytic condenser
R1	A60-659	22K ohm 1/3 watt resistor
R2	A60-664	15 megohm 1/3 watt resistor
R3	A60-663	10 megohm 1/3 watt resistor
R4, R5	A60-662	470K ohm 1/3 watt resistor
R6	A60-658	120 ohm 1/3 watt resistor
R7	A60-698	10K ohm 1 watt resistor
R8	A60-198	1000 ohm 1/2 watt resistor
R9	A60-660	220K ohm 1/3 watt resistor
R10	A60-685	47K ohm 1/3 watt resistor
R11	A60-668	1megohm 1/3 watt resistor
L1	B82-40	Antenna, loop
L2	A10-411	Oscillator coil
T1	B10-453	1st I.F. transformer
T2	B10-454	2nd I.F. transformer
T3		Output transformer (part of speaker)
	A71-22	Cover, for volume control
	A75-52	Dial drive shaft
	A24-164	Volume control and switch
	B79-340	5" P. M. speaker with output transformer
	B79-343	Alternate speaker
	B79-344	Alternate speaker
	C83-333	Cabinet back (mahogany)
	A83-336	Cabinet back (ivory)
	D42-376	Cabinet, molded bakelite (mahogany)
	A42-398	Cabinet, molded bakelite (ivory)
	C67-490	Dial scale
	A52-181	Knob (mahogany)
	A52-189	Knob (ivory)
	A58-46	Dial pointer
	A83-279	Retainer, dial scale left
	A83-280	Retainer, dial scale right
	A83-273	Dial diffusing plate

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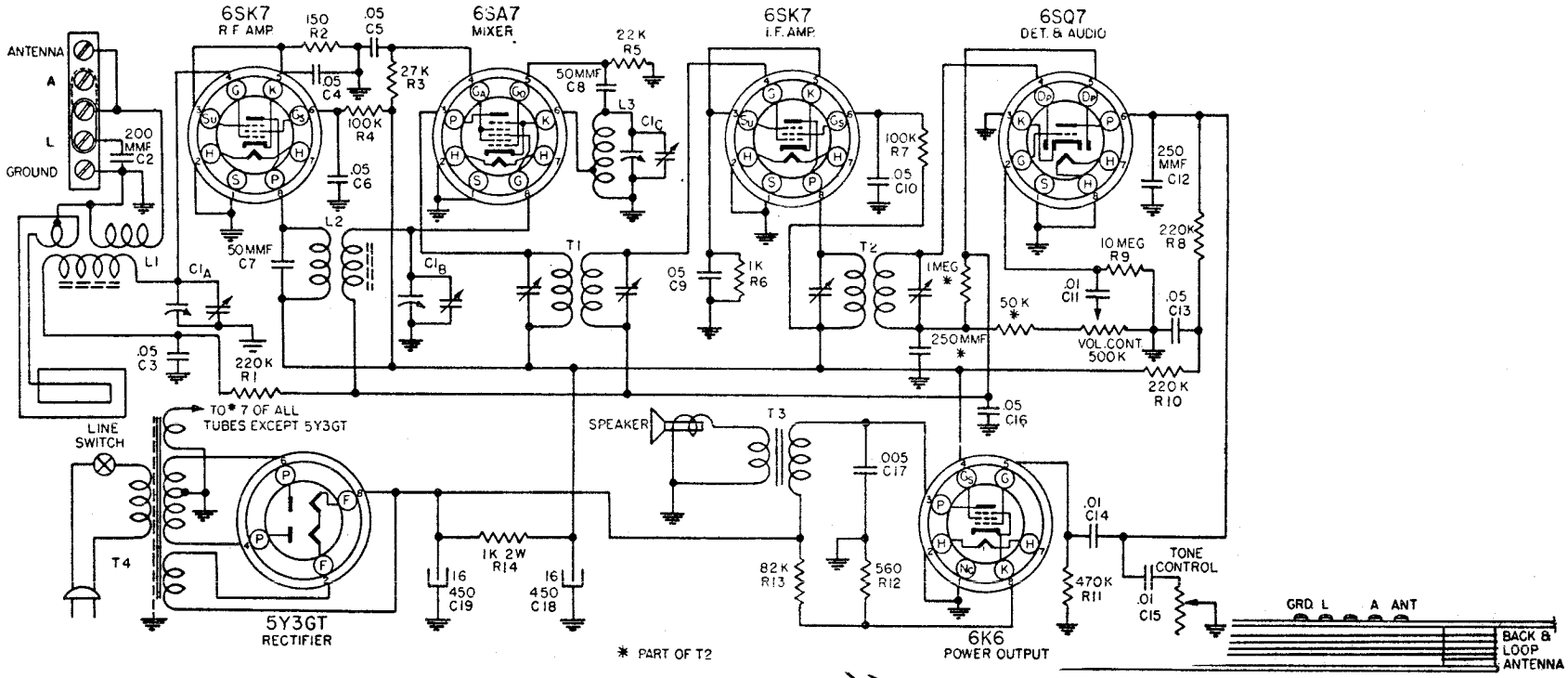


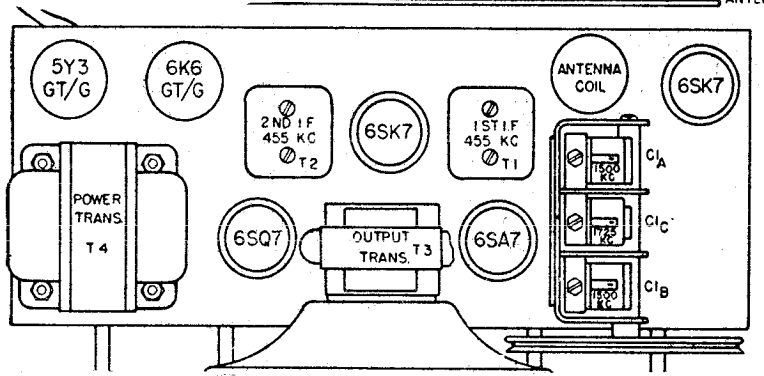
With an output meter connected across the voice coil of the speaker, the output meter reading for ½ watt is 1.25 volts using a signal which is modulated 400 c.p.s. Follow through the procedure as outlined below for proper alignment.

The alignment should be made with volume control fully on, and the output from the signal generator as low as possible, for accurate alignment.

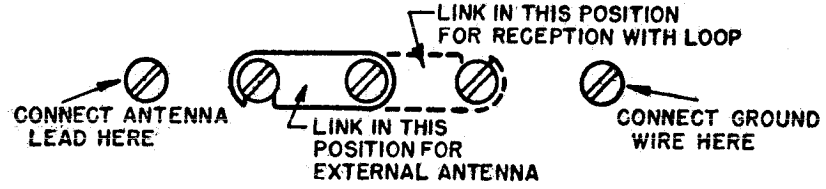
Position of Variable	Generator Freq.	Dummy Ant. mfd.	Generator Connections	Trimmer Adjustment		Trimmer Function
Fully Open	455 KC	.1	6SA7 Grid (Stator of C1B)	T1	T2	I. F.
Fully Open	1725 KC	.00025	*Ant. Terminal on Loop	C1C		Osc.
Tune in signal from Generator	1500 KC	.00025	*Ant. Terminal on Loop	C1B		R. F.
Tune in signal from Generator	1500 KC	.00025	*Ant. Terminal on Loop	C1A		Ant.

*Be sure coupling link is in correct position for external antenna operation. See illustration below.

Repeat the above alignment procedure as a final check.



ANTENNA and GROUND CONNECTIONS


LINK IN THIS POSITION FOR RECEPTION WITH LOOP
CONNECT ANTENNA LEAD HERE
LINK IN THIS POSITION FOR EXTERNAL ANTENNA
CONNECT GROUND WIRE HERE

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MODEL C103

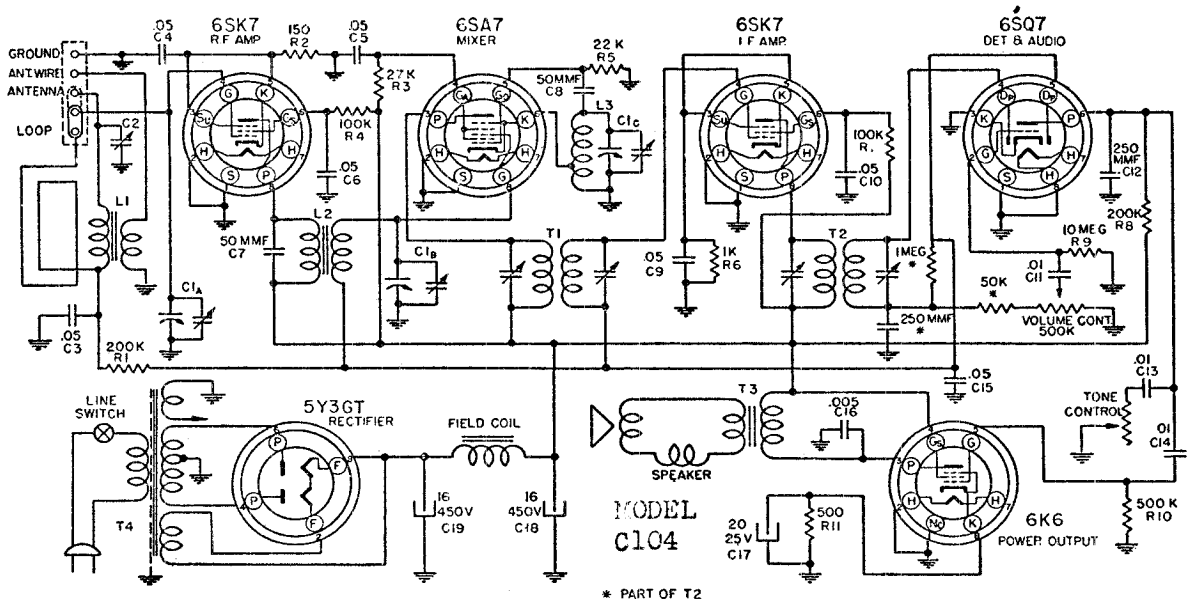
Circuit Reference	Part No.	DESCRIPTION
C1A, C1B, C1C	B19-186	Variable condenser
C2		200 MMF mica condenser (on Loop)
C3, C4, C9, C16	A16-152	.05 MFD. 200 volt tubular condenser
C5, C6, C10, C13	A16-158	.05 MFD. 400 volt tubular condenser
C7, C8	A15-175	50 MMF mica condenser
C11, C14, C15	A16-156	.01 MFD. 400 volt tubular condenser
C12	A15-176	250 MMF mica condenser
C17	A16-153	.005 MFD. 600 volt tubular condenser
C18	A18-279	16 MFD. 450 volt electrolytic condenser
C19	A18-274	16 MFD. 450 volt electrolytic condenser
R1, R8 & R10	A60-667	220K ohm 1/3 watt resistor
R2	A60-686	150 ohm 1/3 watt resistor
R3	A60-692	27K ohm 1 watt resistor
R4, R7	A60-671	100K ohm 1/2 watt resistor
R5	A60-659	22K ohm 1/3 watt resistor
R6	A60-675	1K ohm 1/3 watt resistor
R9	A60-663	10 megohm 1/3 watt resistor
R11	A60-662	470K ohm 1/3 watt resistor
R12	A60-701	560 ohm 1 watt resistor
R13	A60-700	82K ohm 1 watt resistor
R14	A60-699	1000 ohm 2 watt resistor
L1	B10-451	Antenna coil
L2	B10-452	R. F. coil
L3	A10-446	Oscillator coil
T1	B10-412	1st I.F. transformer
T2	B10-444	2nd I.F. transformer
T3		Output transformer (part of speaker)
T4	C80-223	Power transformer
	S84-50	Loop antenna assembly (with mahogany back)
	S84-52	Loop antenna assembly (with Ivory back)
	B83-325	Baffle, cardboard
	D42-379	Cabinet, bakelite (mahogany)
	A42-401	Cabinet, bakelite (ivory)
	C67-482	Dial scale
	A98-4	Grille cloth (for mahogany cabinet)
	A98-5	Grille cloth (for ivory cabinet)
	A52-187	Knob (mahogany)
	A52-191	Knob (ivory)
	A58-48	Dial pointer
	A83-292	Dial scale retainer, right
	A83-293	Dial scale retainer, left
	S84-49	6" P. M. Speaker assembly (includes speaker output transformer and necessary mounting brackets)

MODEL C104-A

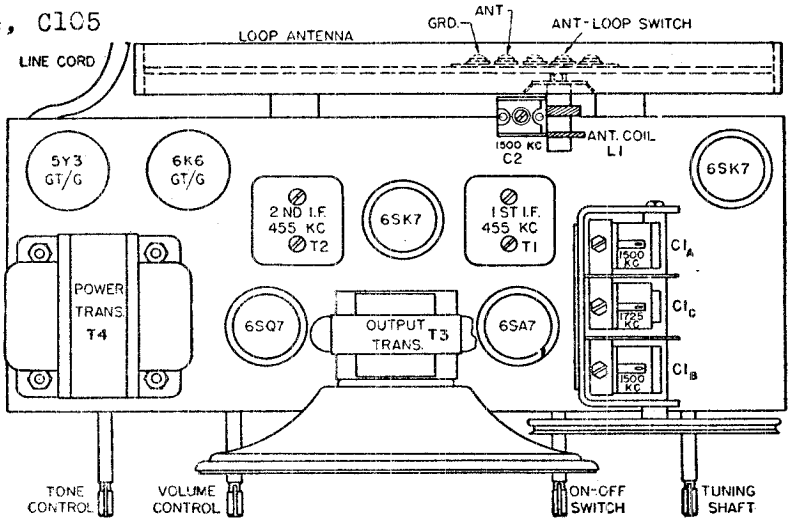
Circuit Reference	Part No.	DESCRIPTION
C1A, C1B, C1C	B19-186	Variable condenser
C2		200 MMF mica condenser (on Loop)
C3, C4, C9, C16	A16-152	.05 MFD. 200 volt tubular condenser
C5, C6, C10, C13	A16-158	.05 MFD. 400 volt tubular condenser
C7, C8	A15-175	50 MMF mica condenser
C11, C14, C15	A16-156	.01 MFD. 400 volt tubular condenser
C12	A15-176	250 MMF mica condenser
C17	A16-153	.005 MFD. 600 volt tubular condenser
C18	A18-279	16 MFD. 450 volt electrolytic condenser
C19	A18-274	16 MFD. 450 volt electrolytic condenser
C20	A84-71	6.9 MMF. condenser
R1, R8 & R10	A60-667	220K ohm 1/3 watt resistor
R2	A60-686	150 ohm 1/3 watt resistor
R3	A60-692	27K ohm 1 watt resistor
R4, R7	A60-671	100K ohm 1/2 watt resistor
R5	A60-659	22K ohm 1/3 watt resistor
R6	A60-675	1K ohm 1/3 watt resistor
R9	A60-663	10 megohm 1/3 watt resistor
R11	A60-662	470K ohm 1/3 watt resistor
R12	A60-701	560 ohm 1 watt resistor
R13	A60-700	82K ohm 1 watt resistor
R14	A60-699	1000 ohm 2 watt resistor
L1	B10-451	Antenna coil
L2	B10-452	R. F. coil
L3	A10-446	Oscillator coil
T1	B10-412	1st I.F. transformer
T2	B10-444	2nd I.F. transformer
T3		Output transformer (part of speaker)
T4	C80-223	Power transformer
	B79-341	Speaker assembly, with output transformer
	B79-342	Alternate speaker assembly
	S84-66	Loop antenna assembly
	D42-390	Cabinet, wood
	C67-488	Dial scale
	A52-187	Knob
	A58-49	Dial pointer
	A83-289	Dial diffusing plate
	A84-41	Dial drive shaft and pulley
	A69-169	On-Off switch
	A24-169	Volume control
	A26-123	Tone control

MODEL C-104
MODEL C-105

WARWICK MFG. CO.



Models C104, C105



With an output meter connected across the voice coil of the speaker, the output meter reading for ½ watt is 1.25 volts using a signal which is modulated 30% at 400 c.p.s. Follow through the procedure as outlined below for proper alignment.

The alignment should be made with volume control fully on, and the output from the signal generator as low as possible, for accurate alignment.

Position of Variable	Generator Freq.	Dummy Ant. mfd.	Generator Connections	Trimmer Adjustment	Trimmer Function
Fully Open	455 KC	.1	6SA7 Grid (Stator of C1B)	T1 T2	I. F.
Fully Open	1725 KC	.00025	*Ant. Terminal on Loop	C1C	Osc.
Tune in signal from Generator	1500 KC	.00025	*Ant. Terminal on Loop	C1B	R. F.
Tune in signal from Generator	1500 KC		**Loosely coupled to Loop	C1A	Ant. (Loop)
Tune in signal from Generator	1500 KC	.00025	*Ant. Terminal on Loop	C2	Ant. (Coil)

*Be sure coupling link is in correct position for external antenna operation, (between 2nd and 3rd screws from the left.)

**Be sure coupling link is in correct position for loop operation, (between 1st and 2nd screws from the left).

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For Parts list, see P.15-8

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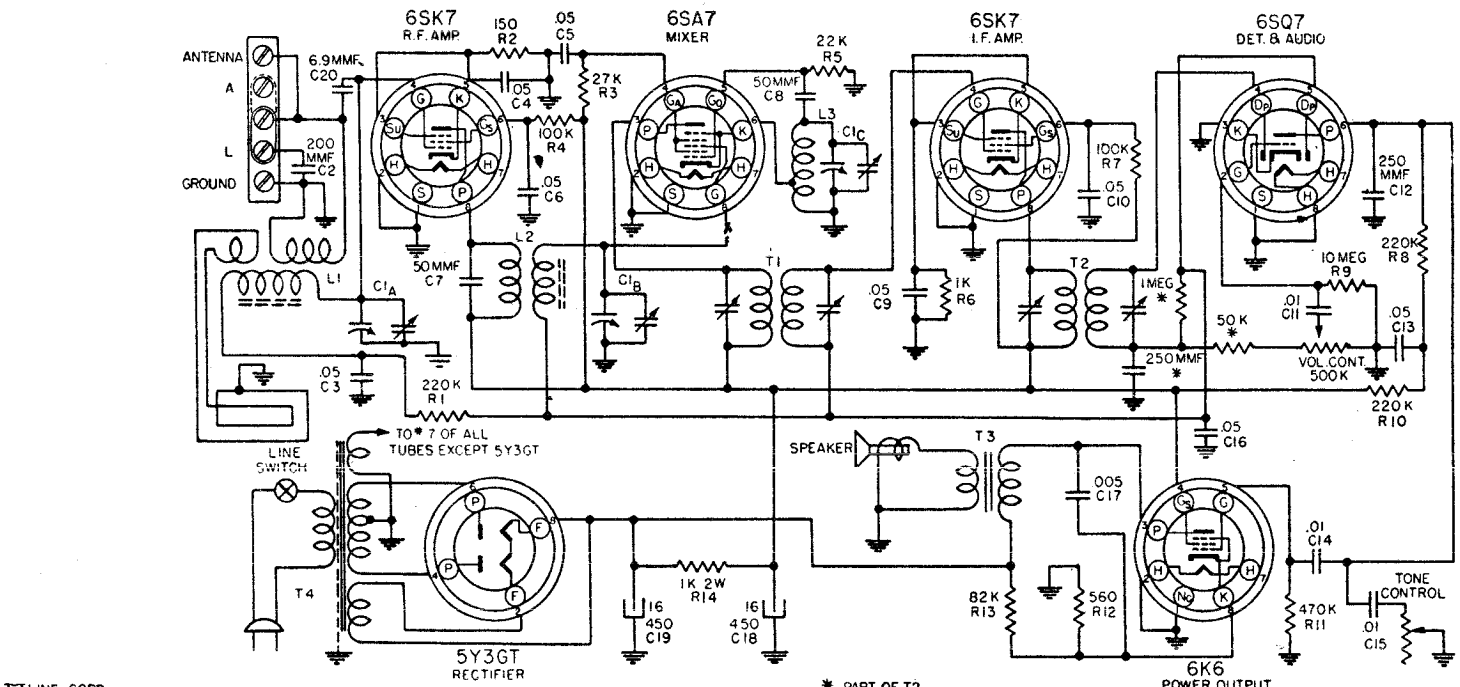
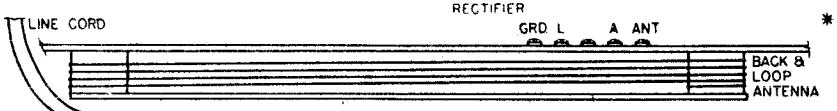
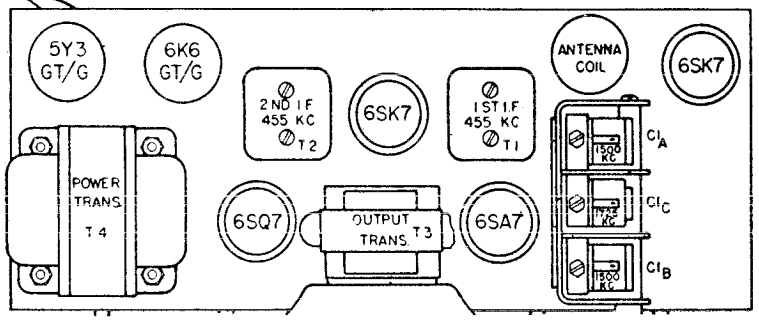
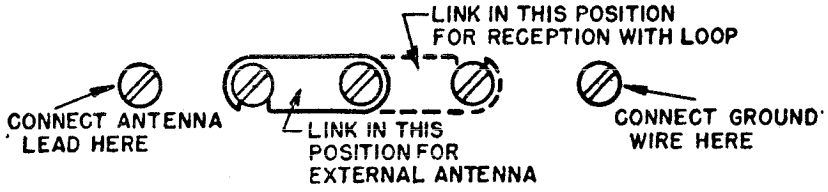






ANTENNA and GROUND CONNECTIONS


LINK IN THIS POSITION FOR RECEPTION WITH LOOP
CONNECT ANTENNA LEAD HERE
LINK IN THIS POSITION FOR EXTERNAL ANTENNA
CONNECT GROUND WIRE HERE

With an output meter connected across the voice coil of the speaker, the output meter reading for ½ watt is 1.25 volts using a signal which is modulated 400 c.p.s. Follow through the procedure as outlined below for proper alignment.

The alignment should be made with volume control fully on, and the output from the signal generator as low as possible, for accurate alignment.

Position of Variable	Generator Freq.	Dummy Ant. mfd.	Generator Connections	Trimmer Adjustment	Trimmer Function
Fully Open	455 KC	.1	6SA7 Grid (Stator of C1B)	T1 T2	I. F.
Fully Open	1725 KC	.00025	*Ant. Terminal on Loop	C1C	Osc.
Tune in signal from Generator	1500 KC	.00025	*Ant. Terminal on Loop	C1B	R. F.
Tune in signal from Generator	1500 KC	.00025	*Ant. Terminal on Loop	C1A	Ant.

* Be sure coupling link is in correct position for external antenna operation. See illustration below.

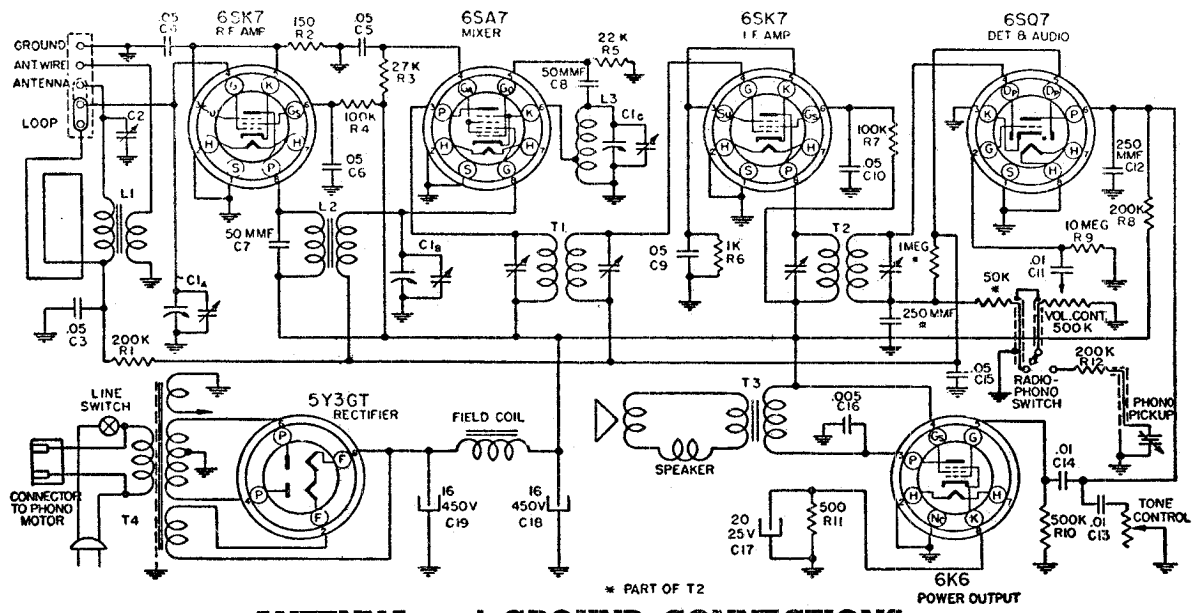
Repeat the above alignment procedure as a final check.

For Parts list, see P.15-5

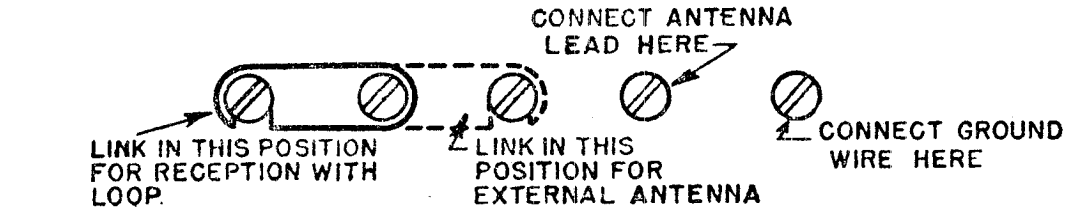
MODEL C-104
MODEL C-105

WARWICK MFG. CO.

MODEL C105



ANTENNA and GROUND CONNECTIONS


CONNECT ANTENNA LEAD HERE
IF PEAK 455 KC
LINK IN THIS POSITION FOR RECEPTION WITH LOOP
LINK IN THIS POSITION FOR EXTERNAL ANTENNA
CONNECT GROUND WIRE HERE

Code	Part No.	DESCRIPTION	Code	Part No.	DESCRIPTION	Code	Part No.	DESCRIPTION
C1A, C1B, C1C	B19-186	Variable Condenser	R1, R8		200 K Ohm 1/3 Watt Resistor		B82-39	Loop Antenna (Less Antenna Coil)
C2	A20-139	Trimmer Condenser (On Loop)	R2		150 Ohm 1/3 Watt Resistor		A69-169	On-Off Switch
C3, C4, C9, C15		.05 MFD 200 V Tubular Condenser	R3		27 K Ohm 1 Watt Resistor		A24-169	Volume Control 500 K Ohm
C5, C6, C10		.05 MFD 400 V Tubular Condenser	R4, R7		100 K Ohm 1/2 Watt Resistor		A26-123	Tone Control
C7, C8		50 MMF Mica Condenser	R5		22 K Ohm 1/3 Watt Resistor		B79-338	6¼" Dynamic Speaker (without Output Transformer)
C11, C13, C14		.01 MFD 400 V Tubular Condenser	R6		1 K Ohm 1/3 Watt Resistor			
C12		250 MMF Mica Condenser	R9		10 Megohm 1/3 Watt Resistor		A84-41	Dial Drive Shaft and Pulley
C16		.005 MFD 600 V Tubular Condenser	R10		500 K Ohm 1/3 Watt Resistor		B83-290	Dial Diffusing Plate
C17	A18-278	20 MFD 25 V. Electrolytic Condenser	R11		500 Ohm 1 Watt Resistor		C83-310	Back
C18	A18-279	16 MFD 450 V. Electrolytic Condenser	L1	A10-445	Antenna Coil		C67-488	Dial Scale
C19	A18-274	16 MFD 450 V Electrolytic Condenser	L2	A10-447	R. F Coil		A58-47	Dial Pointer
			L3	A10-446	Oscillator Coil		D42-389	Wood Cabinet
			T1	B10-412	1st I. F Transformer		C71-23	Cover, Dial Plate Assembly
			T2	B10-444	2nd I F Transformer			
			T3	A80-222	Speaker Output Transformer			
			T4	C80-223	Power Transformer			

MODEL C104

Code	Part No.	DESCRIPTION	Code	Part No.	DESCRIPTION	Code	Part No.	DESCRIPTION
C1A, C1B, C1C	B19-186	Variable Condenser	R1, R8		200 K Ohm 1/3 Watt Resistor		B82-39	Loop Antenna (Less Antenna Coil)
C2	A20-139	Trimmer Condenser (On Loop)	R2		150 Ohm 1/3 Watt Resistor		A69-169	On-Off Switch
C3, C4, C9, C15		.05 MFD. 200 V. Tubular Condenser	R3		27 K Ohm 1 Watt Resistor		A24-169	Volume Control 500 K Ohm
C5, C6, C10		.05 MFD. 400 V. Tubular Condenser	R4, R7		100 K Ohm 1/2 Watt Resistor		A26-123	Tone Control
C7, C8		50 MMF. Mica Condenser	R5		22 K Ohm 1/3 Watt Resistor		B79-338	6¼" Dynamic Speaker (without Output Transformer)
C11, C13, C14		.01 MFD. 400 V. Tubular Condenser	R6		1 K Ohm 1/3 Watt Resistor			
C12		250 MMF. Mica Condenser	R9		10 Megohm 1/3 Watt Resistor		A84-41	Dial Drive Shaft and Pulley
C16		.005 MFD. 600 V. Tubular Condenser	R10		500 K Ohm 1/3 Watt Resistor		B83-289	Dial Diffusing Plate
C17	A18-278	20 MFD. 25 V. Electrolytic Condenser	R11		500 Ohm 1 Watt Resistor		B83-300	Chipboard Back, Walnut
C18	A18-279	16 MFD. 450 V. Electrolytic Condenser	L1	A10-445	Antenna Coil		C67-488	Dial Scale
C19	A18-274	16 MFD. 450 V. Electrolytic Condenser	L2	A10-447	R. F Coil		A58-49	Dial Pointer
			L3	A10-446	Oscillator Coil		D42-390	Wood Cabinet
			T1	B10-412	1st I F Transformer			
			T2	B10-444	2nd I F Transformer			
			T3	A80-222	Speaker Output Transformer			
			T4	C80-223	Power Transformer			

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Record Changer: Detrola Model 550, Milwaukee Erwood Model 10700, General Instrument Model 205. For Alignment, see P.15-6

WARWICK MFG. CO.

MODEL 105-A

Circuit Reference	Part No.	DESCRIPTION
C1A, C1B, C1C	B19-186	Variable condenser
C2	B15-189	200 MMF mica condenser (on Loop)
C3, C4, C9, C16	A16-152	.05 MFD. 200 volt tubular condenser
C5, C6, C10, C13	A16-158	.05 MFD. 400 volt tubular condenser
C7, C8	A15-175	50 MMF mica condenser
C11, C14, C15	A16-156	.01 MFD. 400 volt tubular condenser
C12	A15-176	250 MMF mica condenser
C17	A16-153	.005 MFD. 600 volt tubular condenser
C18	A18-279	16 MFD. 450 volt electrolytic condenser
C19	A18-274	16 MFD. 450 volt electrolytic condenser
C20	A84-71	6.9 MMF. condenser
R1, R8, R10, R15	A60-667	220K ohm 1/3 watt resistor
R2	A60-686	150 ohm 1/3 watt resistor
R3	A60-692	27K ohm 1 watt resistor
R4, R7	A60-671	100K ohm 1/2 watt resistor
R5	A60-659	22K ohm 1/3 watt resistor
R6	A60-675	1K ohm 1/3 watt resistor
R9	A60-663	10 megohm 1/3 watt resistor
R11	A60-662	470K ohm 1/3 watt resistor
R12	A60-701	560 ohm 1 watt resistor
R13	A60-700	82K ohm 1 watt resistor
R14	A60-699	1000 ohm 2 watt resistor
L1	B10-451	Antenna coil
L2	B10-452	R. F. coil
L3	A10-446	Oscillator coil
T1	B10-412	1st I.F. transformer
T2	B10-444	2nd I.F. transformer
T3		Output transformer (part of speaker)
T4	C80-223	Power transformer
	S84-64	Loop antenna assembly
	C67-488	Dial scale
	A52-190	Knob
	A52-188	Knob (Phono-Radio)
	A58-47	Dial pointer
	B83-290	Dial diffusing plate
	C71-23	Cover, dial plate assembly
	A84-41	Dial drive shaft and pulley
	B79-341	6¼" P.M. Speaker assembly (Includes output transformer)
	B79-342	Alternate speaker assembly
	A69-172	Switch, Phono-Radio
	A69-169	On-Off switch
	A24-169	Volume control
	A26-123	Tone control

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Record Changer:Detrola Model 550;Milwaukee Erwood Model 10700; General Instrument Model 205. For Alignment,see P.15-7

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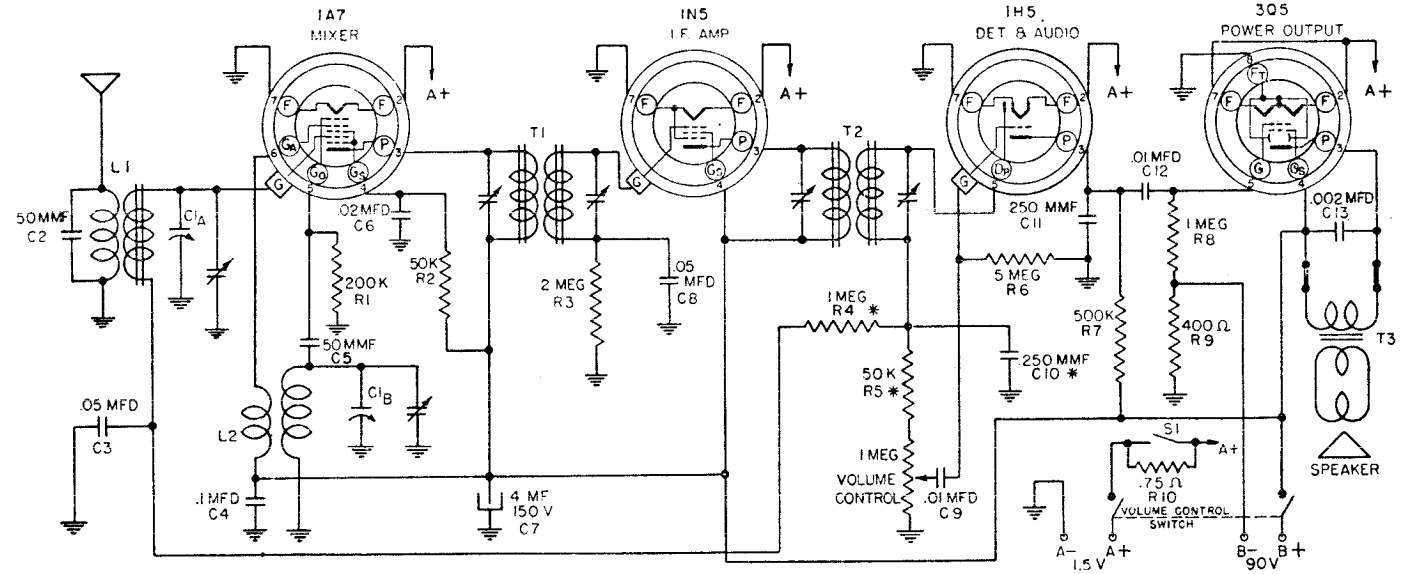
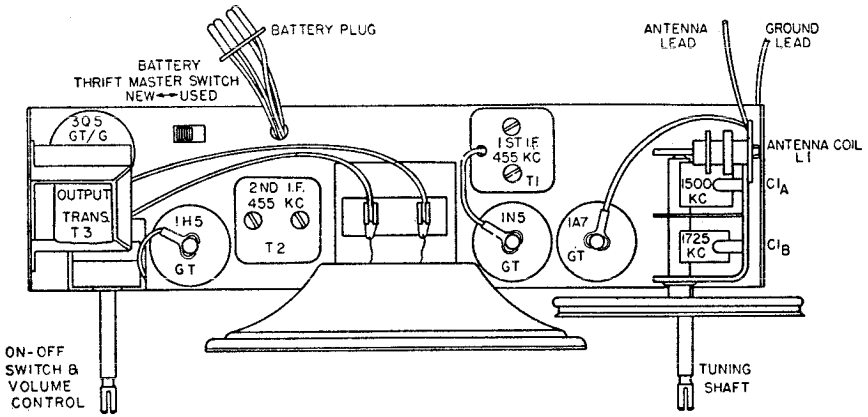




ALIGNMENT PROCEDURE

With an output meter connected across the voice coil of the speaker, the output meter reading for 50 milliwatts is .4 volts using a signal which is modulated 30% at 400 c.p.s. Follow through the procedure as outlined below for proper alignment.

Connect the signal generator to the grid cap of the 1A7 GT Tube through a .1 MFD. Condenser. Connect the ground lead of the generator to the chassis. Adjust the signal generator to 455 K.C. and set the variable condenser of the receiver to minimum capacity (fully opened). With the volume control full on and minimum output from the signal generator adjust the two trimmers on top of the first and second I.F. transformers for maximum output.

Now connect the signal generator to the antenna connection of the receiver through a .00025 condenser. Adjust the signal generator frequency to 1725 K. C. and set the variable condenser to minimum capacity (fully opened), and adjust the oscillator trimmer (C1B) for maximum output. Set signal generator to 1500 K. C. and tune receiver to signal. Adjust the antenna trimmer (C1A) on the variable condenser for maximum output.

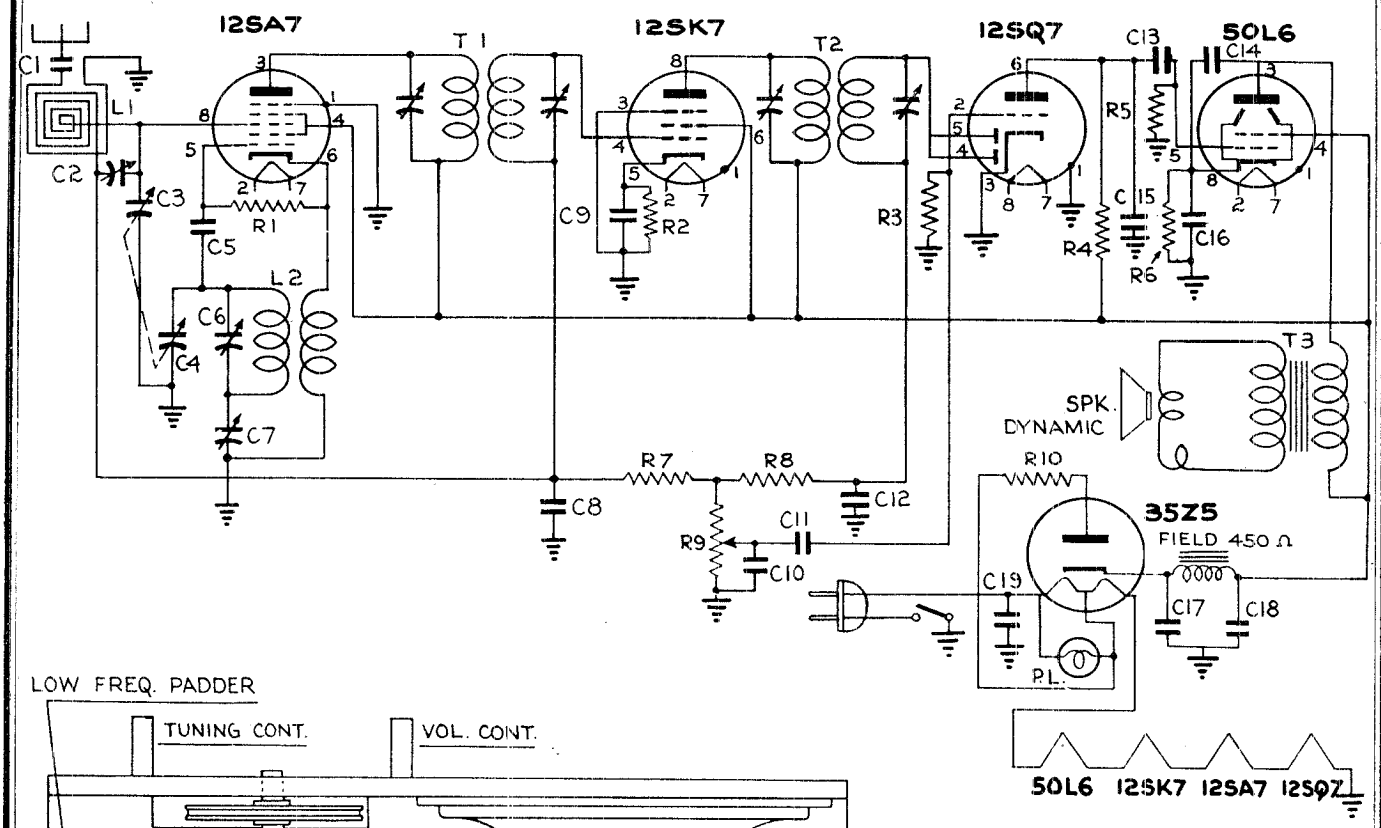
Code	Part No.	DESCRIPTION
C1A C1B	B19-185	Variable Condenser
C2		50 MMFD Mica Condenser (Part of L-1)
C3, C8		.05 MFD. 200 V Tubular Condenser
C4		.1 MFD. 200 V Tubular Condenser
C5		50 MMFD Mica Condenser
C6		.02 MFD 400 V Tubular Condenser
C7	A18-273	4 MFD 150 V. Electrolytic Condenser
C9, C12		.01 MFD. 400 V Tubular Condenser
C10		250 MMFD Mica Condenser (Part of T-2)
C11		250 MMFD Mica Condenser
C13		.002 MFD. 600 V Tubular Condenser

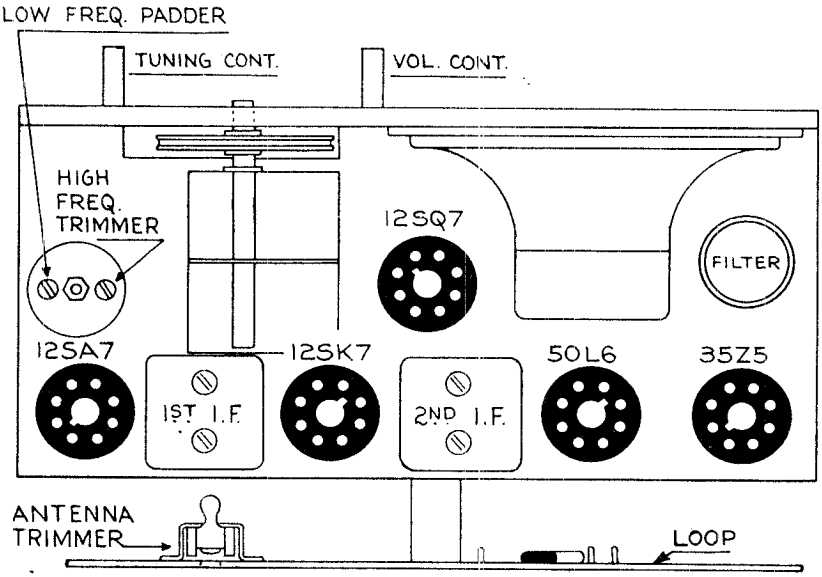
Code	Part No.	DESCRIPTION
R1		200 K Ohm 1/3 Watt Carbon Resistor
R2		50 K Ohm 1/3 Watt Carbon Resistor
R3		2 Megohm 1/3 Watt Carbon Resistor
R4		1 Megohm 1/3 Watt Carbon Resistor (Part of T-2)
R5		50 K Ohm 1/3 Watt Carbon Resistor (Part of T-2)
R6		5 Megohm 1/3 Watt Carbon Resistor
R7		500 K Ohm 1/3 Watt Carbon Resistor
R8		1 Megohm 1/3 Watt Carbon Resistor
R9		400 Ohm 1/3 Watt Carbon Resistor
R10	A50-691	.75 Ohm 1 Watt Resistor

Code	Part No.	DESCRIPTION
L1	A10-414	Antenna Coil
L2	A10-415	Oscillator Coil
T1	B10-416	1st I.F. Transformer
T2	B10-417	2nd I.F. Transformer
T3	A80-218	Speaker Output Transformer
S1	A69-164	Battery Thriftmaster Switch
	A24-165	Volume Control and Switch
	B79-335	Speaker

MODEL 4581

WATTERSON RADIO MFG. CO.





CODE	PART NO.	DESCRIPTION
C1	5W1	.001 MFD. COND.
C2	8W1	TRIMMER - 30 MMFD.
C3	7WM1961	GANG CONDENSER - ANT.
C4	7WM1961	GANG COND. OSC. SECTION
C5	6W3	.0005 MFD. MICA COND.
C6	3W30	TRIMMER - OSC. - H.F.
C7	3W30	PADDER - OSC. - LOW FREQ.
C8	5W9	.05 MFD. 400 V. TUBULAR
C9	5W9	.05 MFD. 400 V. TUBULAR
C10	6W2	.00025 MFD. MICA COND.
C11	5W2	.005 MFD. 400V. TUBULAR
C12	6W2	.00025 MFD. MICA COND.
C13	5W21	.01 MFD. 600V. TUBULAR
C14	5W7	.02 MFD. 400 V. TUBULAR
C15	6W2	.00025 MFD. MICA COND.
C16	19W2	20 MFD. 25V. ELECTROLYTIC
C17	19W2	30 MFD. 150 V. ELECTROLYTIC
C18	19W2	20 MFD. 150 V. ELECTROLYTIC
C19	5W13	.1 MFD. 400 V. TUBULAR
R1	9W6	20,000 Ω - 1/4 WATT
R2	9W11	250 Ω - 1/4 WATT
R3	9W9	10 MEGOHM - 1/4 WATT
R4	9W5	200,000 Ω - 1/4 WATT
R5	9W3	500,000 Ω - 1/4 WATT
R6	9W2	150 Ω - 1/4 WATT
R7	9W8	2 MEGOHM - 1/4 WATT
R8	9W4	50,000 Ω - 1/4 WATT
R9	13W1	500,000 Ω - VOL. CONT.
R10	9W15	15 Ω - 1/4 WATT
T1	3W20	FIRST I.F.
T2	3W21	SECOND I.F.
T3	12W1	OUTPUT TRANS.
L1	3W31	LOOP
L2	3W30	OSC. COIL
SPK.	22W20	SPEAKER, DYNAMIC
P.L.	26W2	PILOT LT. 150 MILLS

ALIGNMENT PROCEDURE

I.F. ALIGNMENT – SWING THE VARIABLE CONDENSER TO MINIMUM CAPACITY POSITION. FEED 455 K.C. SIGNAL TO GRID OF 12SA7 TUBE THRU .1 MFD. CONDENSER AND ADJUST FOUR I.F. TRIMMERS FOR MAXIMUM RESPONSE.

R.F. ALIGNMENT – SET DIAL POINTER TO 1400 K.C. ON DIAL. SET SIGNAL GENERATOR TO 1400 K.C. FEEDING OUTPUT INTO STANDARD RADIATING LOOP. ADJUST HIGH FREQUENCY TRIMMER FOR MAXIMUM OUTPUT THEN ADJUST ANT. TRIMMER LOCATED ON RECEIVER LOOP FOR MAXIMUM OUTPUT.

SET SIGNAL GENERATOR TO 600 K.C. AND WHILE ROCKING GANG, ADJUST LOW FREQUENCY TRIMMER FOR MAXIMUM OUTPUT. RETURN TO 1400 K.C. AND REPEAT HIGH FREQUENCY ADJUSTMENT.

WATTERSON RADIO MFG. COMPANY
DALLAS, TEXAS. ENGINEERING DEPT.

NAME **MODEL 4581**

DRAWN BY	DATE	CHECKED BY	PRINT NO.	ISSUE
H.C.P.	11-15-45		4581	
SCALE	VERIFIED BY	APPROVED		

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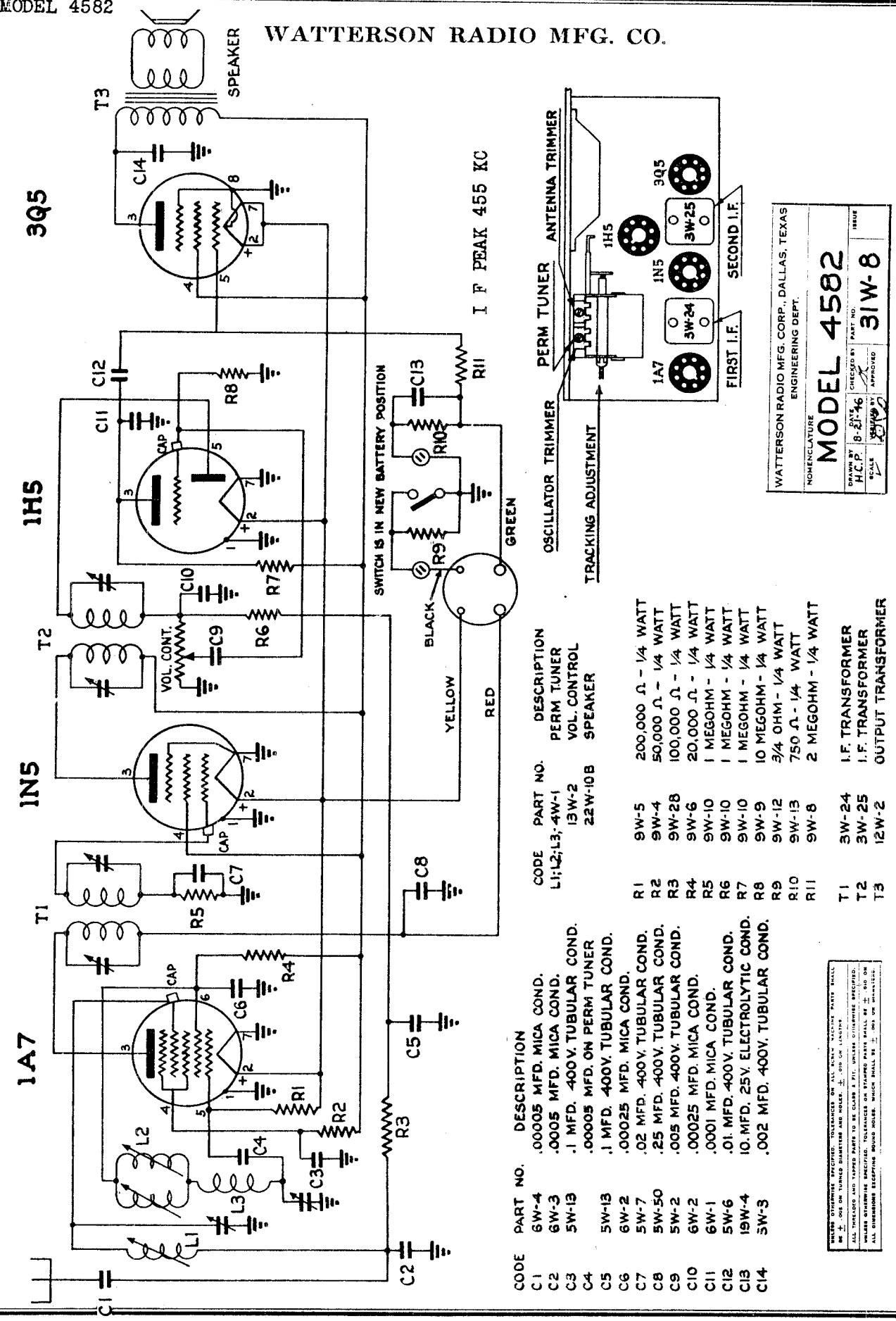
MODEL 4582

WATTERSON RADIO MFG. CO.



CODE	PART NO.	DESCRIPTION
C1	6W-4	.00005 MFD. MICA COND.
C2	6W-3	.0005 MFD. MICA COND.
C3	5W-13	.1 MFD. 400 V. TUBULAR COND.
C4		.00005 MFD. ON PERM TUNER
C5	5W-13	.1 MFD. 400 V. TUBULAR COND.
C6	6W-2	.00025 MFD. MICA COND.
C7	5W-7	.02 MFD. 400 V. TUBULAR COND.
C8	5W-50	.25 MFD. 400 V. TUBULAR COND.
C9	5W-2	.005 MFD. 400 V. TUBULAR COND.
C10	6W-2	.00025 MFD. MICA COND.
C11	6W-1	.0001 MFD. MICA COND.
C12	5W-6	.01 MFD. 400 V. TUBULAR COND.
C13	19W-4	10 MFD. 25 V. ELECTROLYTIC COND.
C14	3W-3	.002 MFD. 400 V. TUBULAR COND.

CODE	PART NO.	DESCRIPTION
L1;L2;L3;	4W-1	PERM TUNER
	13W-2	VOL. CONTROL
	22W-10B	SPEAKER
R1	9W-5	200,000 Ω - 1/4 WATT
R2	9W-4	50,000 Ω - 1/4 WATT
R3	9W-28	100,000 Ω - 1/4 WATT
R4	9W-6	20,000 Ω - 1/4 WATT
R5	9W-10	1 MEGOHM - 1/4 WATT
R6	9W-10	1 MEGOHM - 1/4 WATT
R7	9W-10	1 MEGOHM - 1/4 WATT
R8	9W-9	10 MEGOHM - 1/4 WATT
R9	9W-12	3/4 OHM - 1/4 WATT
R10	9W-13	750 Ω - 1/4 WATT
R11	9W-8	2 MEGOHM - 1/4 WATT
T1	3W-24	I.F. TRANSFORMER
T2	3W-25	I.F. TRANSFORMER
T3	12W-2	OUTPUT TRANSFORMER

UNLESS OTHERWISE SPECIFIED: TOLERANCES ON ALL BLACK MACHINE PARTS SHALL BE ± .005 ON TURNED DIAMETERS AND HOLES, ± .010 ON LENGTHS.
ALL THREADED AND TAPPED PARTS TO BE CLASS 2 FIT, UNLESS OTHERWISE SPECIFIED.
UNLESS OTHERWISE SPECIFIED, TOLERANCES ON STAMPED PARTS SHALL BE ± .010 ON ALL DIMENSIONS EXCEPTING ROUND HOLES, WHICH SHALL BE ± .005 ON DIAMETERS.

WATTERSON RADIO MFG. CORP., DALLAS, TEXAS
ENGINEERING DEPT.

NOMENCLATURE: MODEL 4582

DRAWN BY	DATE	CHECKED BY	PART NO.	ISSUE
H.C.P.	8-21-46		31W-8	
SCALE		APPROVED		

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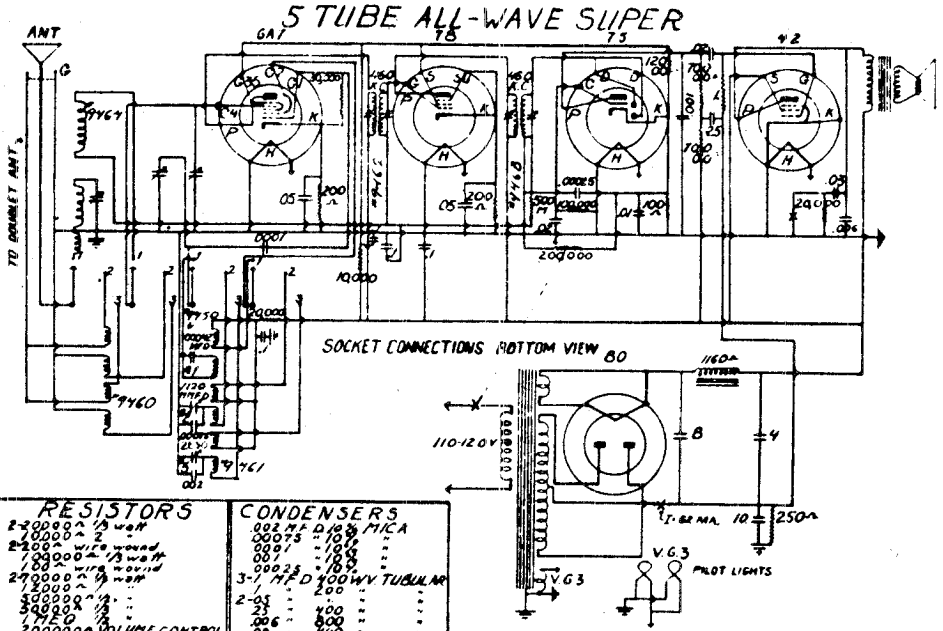
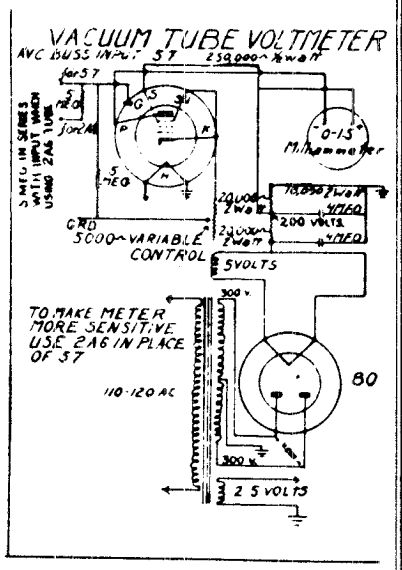
MODEL 38(W415)
MODEL 76(W487)

WESTERN AIR PATROL

5 TUBE ALL-WAVE SUPER



VACUUM TUBE VOLTMETER



RESISTORS

2-20000Ω 1/2 WATT
1-10000Ω 2 "
2-200Ω WIRE WOUND
1-100000Ω 1/2 WATT
1-100Ω WIRE WOUND
2-70000Ω 1/2 WATT
1-2000Ω 1/2 "
3-300000Ω 1/2 "
3-30000Ω 1/2 "
1-1750Ω 2 "
1-200000Ω VOLUME CONTROL
1-250Ω CARBOHM 2 WATT

CONDENSERS

.002 MFD 10% MICA
.00075 " 10% "
.0001 " 10% "
.001 " 10% "
.0025 " 10% "
3-1 MFD 400 WV TUBULAR
2-.05 " 200 " "
.25 " 400 " "
.006 " 600 " "
.02 " 400 " "
.02 " 200 " "
.05 " 600 " "
.10 " 400 " "
.01 " 600 " "
8 " 450 WV
32 " 450 "
100 MMF VARIABLE #1 *
300 " " #2 *
1000 " " #3 *

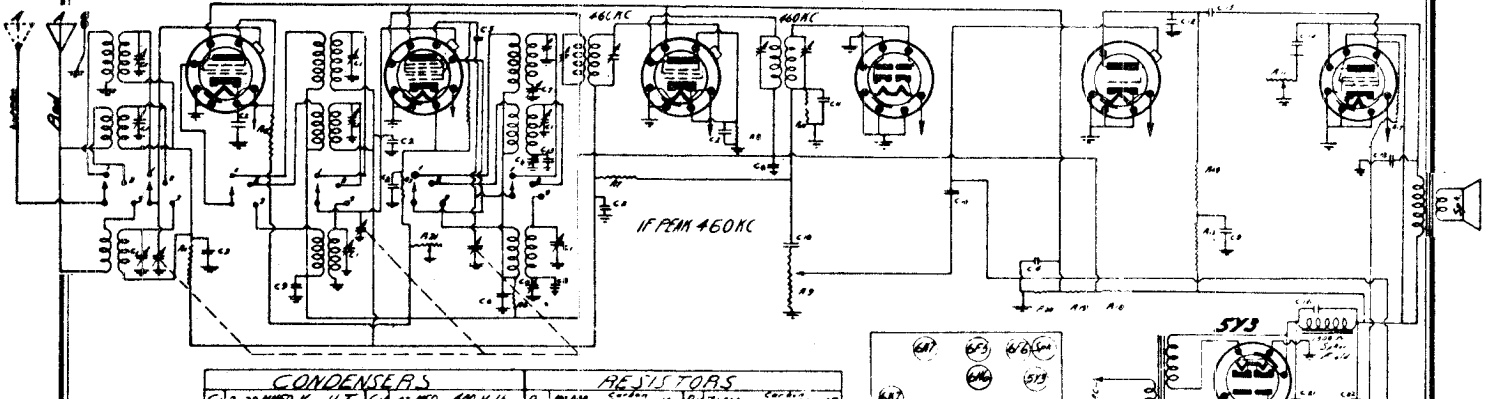
*#1 1750 to 550 KC
#2 600 to 1730 KC
#3 150 to 6000 KC

I.F PEAK 460 KC

TOTAL CURRENT DRAIN 62 MA - DROP ACROSS FIELD 80 VOLTS
1ST DET & OSC 110 V AC NO SIGNAL
6A7 - PLATE VOLTAGE 240 VOLTS
GRID #1 TO GROUND 7 VOLTS
" #2 " " 140 "
" #3 & 5 " " 100 "
CATHODE " " 2 "
78 - IF CATHODE TO GROUND 1 VOLT
SCREEN " " 100 "
PLATE " " 240 "
75 - 2ND DET CATHODE TO GROUND 1.5 VOLT
PLATE VOLTAGE " " " "
42 - POWER-GRID VOLTAGE TO GRD 16.5 VOLT
PLATE " " " 225 "
SCREEN " " " 240 "

MODEL 38

6K7 6A8 6K7 6H6 6F5 6F6

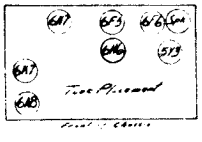


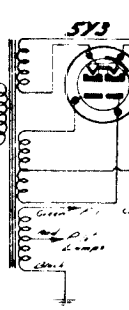
CONDENSERS

C1	3-30 MMFD Variable Trimmer	C14	.03 MFD - 400 Volts
C2	1 MFD 200 Volts	C15	.01 - 800 "
C3	.05 - " "	C16	.05 - 400 "
C4	1000 MMFD Mica 10%	C17	.10 - 25 "
C5	.00005 - Mica 10%	C18	.006 - 800 "
C6	1 MFD - 400 Volts	C19	8 - 500V Combination
C7	500 MMFD Mica	C20	- - - -
C8	.002 MFD - Mica 10%	C21	25 - 200 Volts
C9	25 - 400 Volts		
C10	.01 - -		
C11	.0003 - Mica 10%		
C12	.001 - -		
C13	.00025 - -		

RESISTORS

A1	100,000Ω - 1/2 Watt 10%	A14	70,000Ω - 1/2 Watt 10%
A2	300 -	A15	100,000 -
A3	-	A16	280 - 2 Watt
A4	22 - Screen Resistor	A17	500,000 - 1/2 Watt 10%
A5	60,000Ω - 1/2 Watt 10%	A18	3990 - Composition 1 Watt
A6	1,000 -	A19	12,600 - Composition 1 Watt
A7	500,000 -	A20	12,000 - 2 Watt 10%
A8	300 -	A21	3000 - Screen Control
A9	500 - Composite Volume Control		
A10	200,000 - 1/2 Watt 10%		
A11	50,000 - Screen Control		
A12	1 Meg - 1/2 Watt 10%		
A13	70,000Ω - -		





MODEL 76

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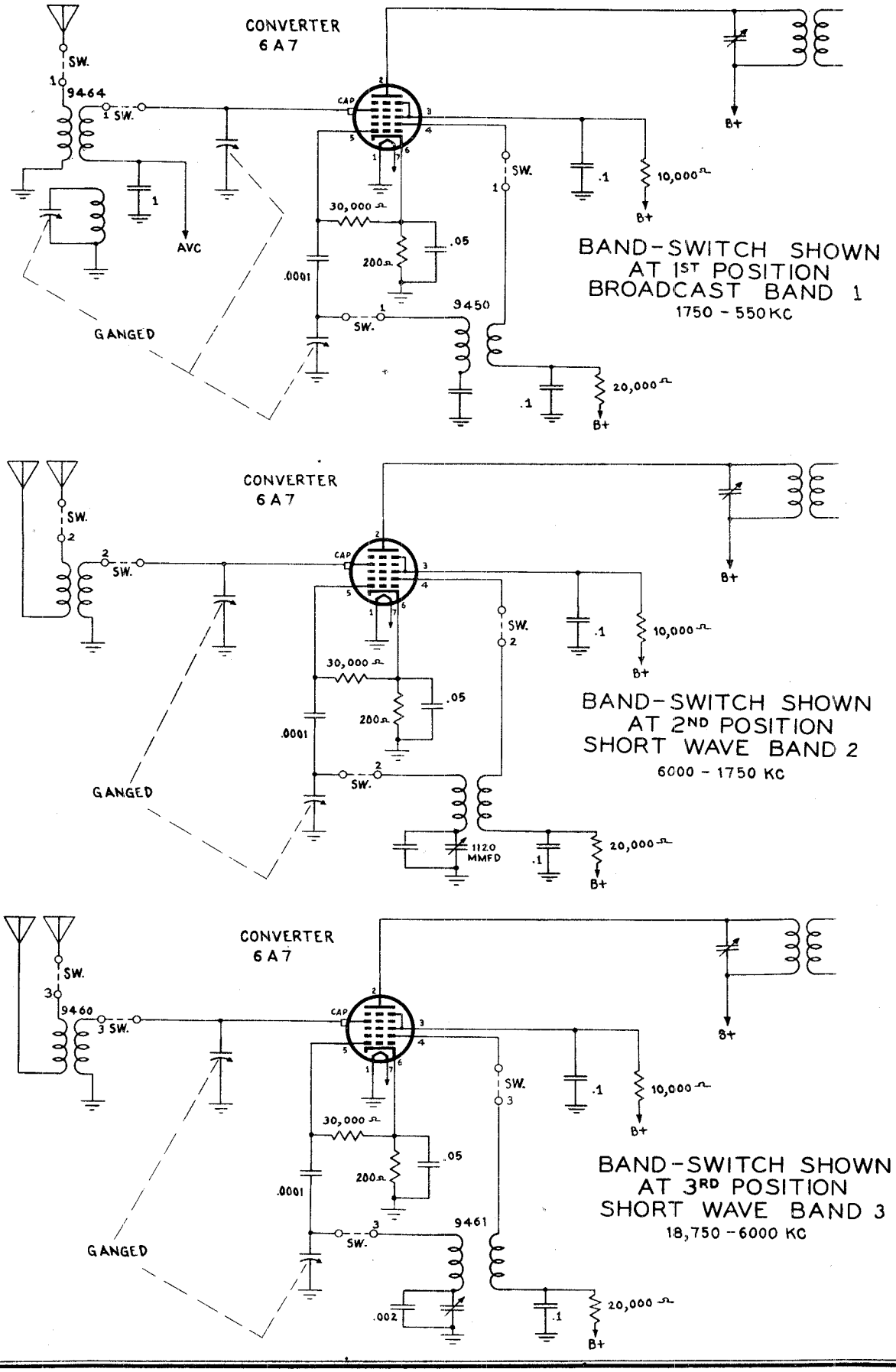
WESTERN AIR PATROL



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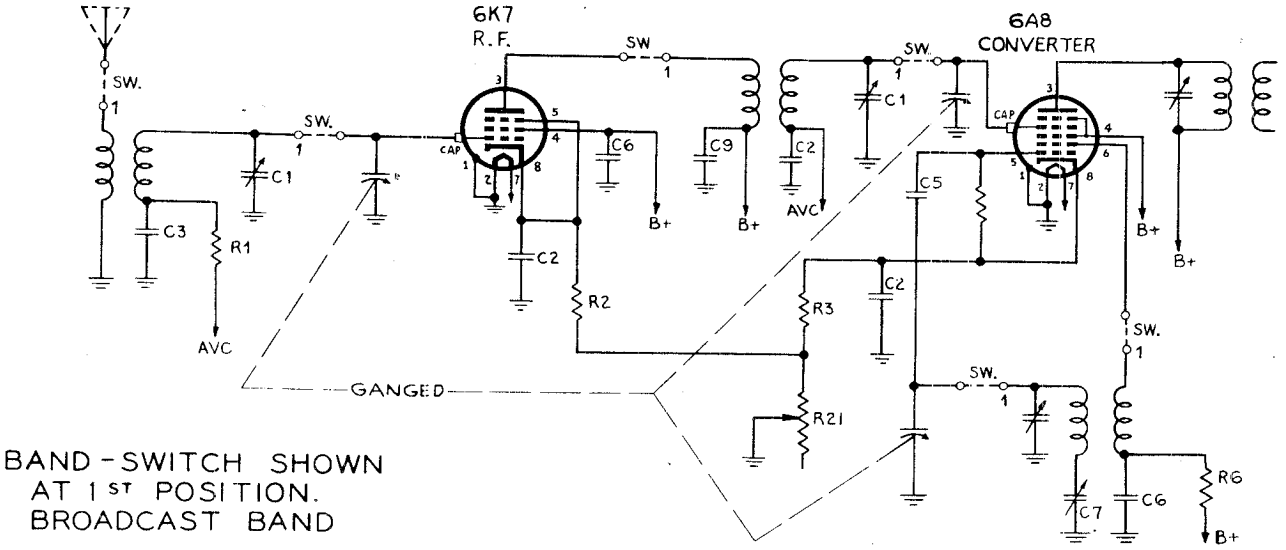
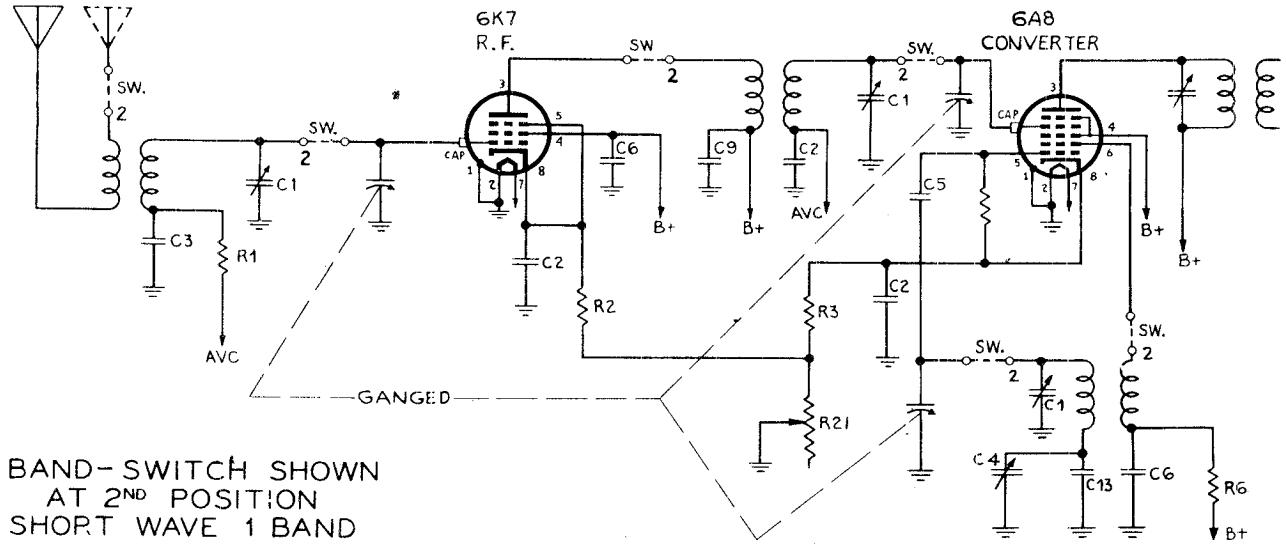
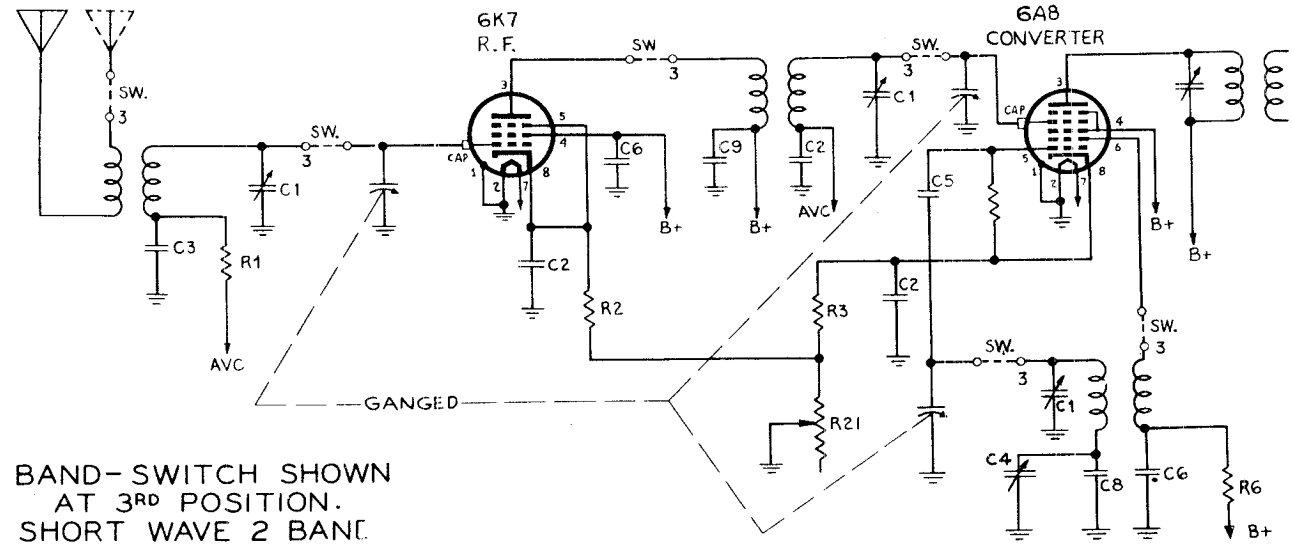
WESTERN AIR PATROL



BAND-SWITCH SHOWN
AT 1ST POSITION.
BROADCAST BAND



BAND-SWITCH SHOWN
AT 2ND POSITION
SHORT WAVE 1 BAND



BAND-SWITCH SHOWN
AT 3RD POSITION.
SHORT WAVE 2 BAND

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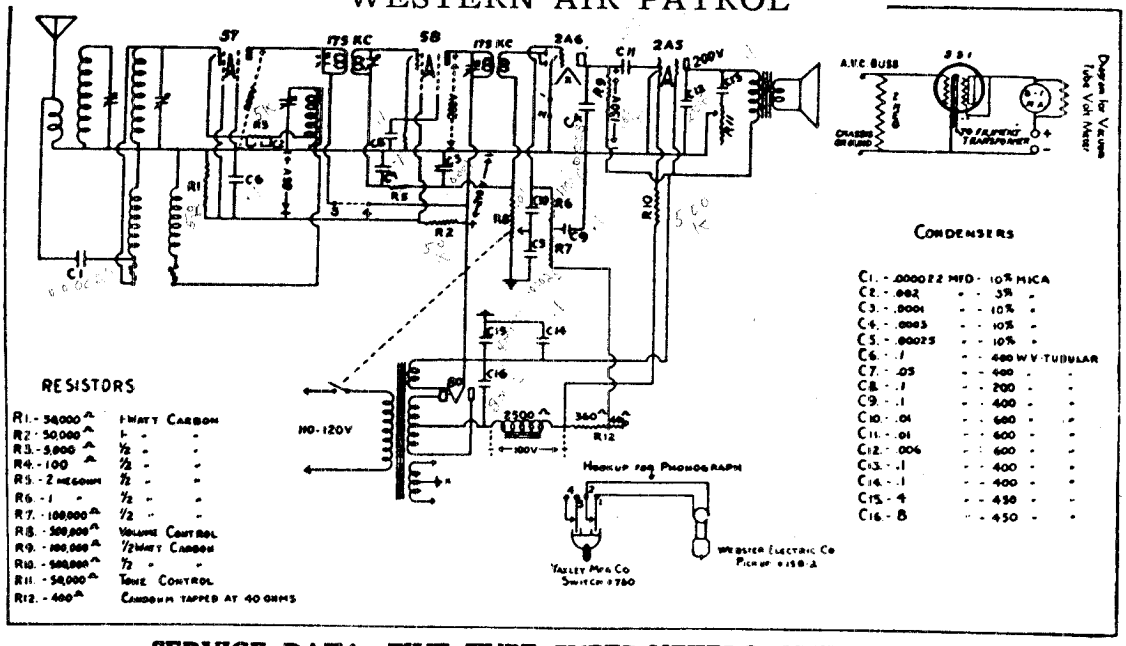
MODEL 5-Tube
Super. '34-'35

WESTERN AIR PATROL



SERVICE DATA, FIVE TUBE SUPER-HETERODYNE, 1934-1935

All models have automatic volume control of the diode type, controlling the first detector as well as the high frequency amplifier tubes. This A.V.C. makes it impossible to service and rebalance without a meter of the type to be described. This meter will work on any make or type of A.V.C., provided care is used. It can not be damaged by improper connection of the leads.

PARTS REQUIRED FOR VACUUM TUBE VOLT METER

1—0 to 1 or 0 to 1.5 milliampmeter.
1—Bell ringing transformer with secondary of 6-10 volts.
1—5 prong socket.
1—551 tube.
1—2 megohn grid leak.
1—10 ohm rheostat.
1—45 volt B battery.
Clips, Box, Cord, Hookup Wire.

USING VACUUM TUBE VOLT METER

The cathode clip is connected to the cathodes of the tubes controlled by the A.V.C. The buss clip is connected to the A.V.C. buss in front of the isolating resistor.

Adjust rheostat shunt until meter shows full scale reading.

All balancing is done with maximum peak indicated by the meter swing toward O. Sensitivity of various receivers can be checked by the swing of meter from a known station. Short Wave fading can be seen by tuning in the station with meter connected to set.

REBALANCING

Do not rebalance a set until you are sure it requires it. 99 per cent of the sets do not need it. We do not find one case in one hundred that really should be rebalanced.

INTERMEDIATES

Connect a 175 K.C. oscillator to the first detector grid (No. 57 tube) leaving grid cap in place. Set dial at 1400 K.C. Hook up vacuum tube volt meter as described and carefully adjust 3 screws on top of Intermediates for maximum gain (minimum reading of meter). Don't flat top any stages. Have all shields in place. Keep volume control at lowest level.

CONDENSER GANG

Set dial at 1400 K.C. when gang is at minimum position and tighten dial set screws. Tune in a station (or use an oscillator) to a known frequency signal around 1400 K.C. Carefully adjust oscillator section of gang until frequency is correct on dial.

If the intermediates are balanced on 175 K.C., the dial will now track within 5 K.C. over the entire dial.

Adjust first detector section for maximum gain and follow by adjusting band pass trimmers.

Don't bend any condenser plates unless absolutely necessary.

OVERLOADING—OR POOR QUALITY AT LOW VOLUME

The chief cause of this trouble is too long an antenna. A powerful local station will cause the R. F. tubes to block. Check this by disconnecting the antenna on the station causing the trouble. If too close to a powerful station, installing a switch in the aerial circuit helps this. In rare cases the set seems to overload and the A.V.C. works too quickly on all stations.

Check the following:

Disconnect 2 meg. resistor from A.V.C. buss at tie point. Have all tubes cold. Use high voltage, high resistance ohmmeter capable of reading 25 megohms and test from ground to A.V.C. buss for leakage. After condensers have charged, no leakage should be shown. This must read around 100 megohms to ground.

If slight leakage is observed, disconnect bypass condensers from buss until defective one is found. Sometimes moisture is found on coil terminals. Scrape this clear.

NOISY OPERATION (Not Static)

A defective tube will cause a sharp 60 cycle R.F. pickup. This is most prominent on low frequency. Replace with a good tube.

In many cases it is found that the noise cannot be eliminated by servicing the receiver. Noise may enter into the light lines or via the antenna. The only way to check the source is to turn off one after another all electrical apparatus in the vicinity of the set.

There is no freak or trick antenna that will eliminate natural static.

GENERAL

All resistors, bypass condensers and filter units are marked.

Voltages are shown at tube socket on diagram.

99 per cent of trouble in a chassis is caused by defective tubes, check them carefully.

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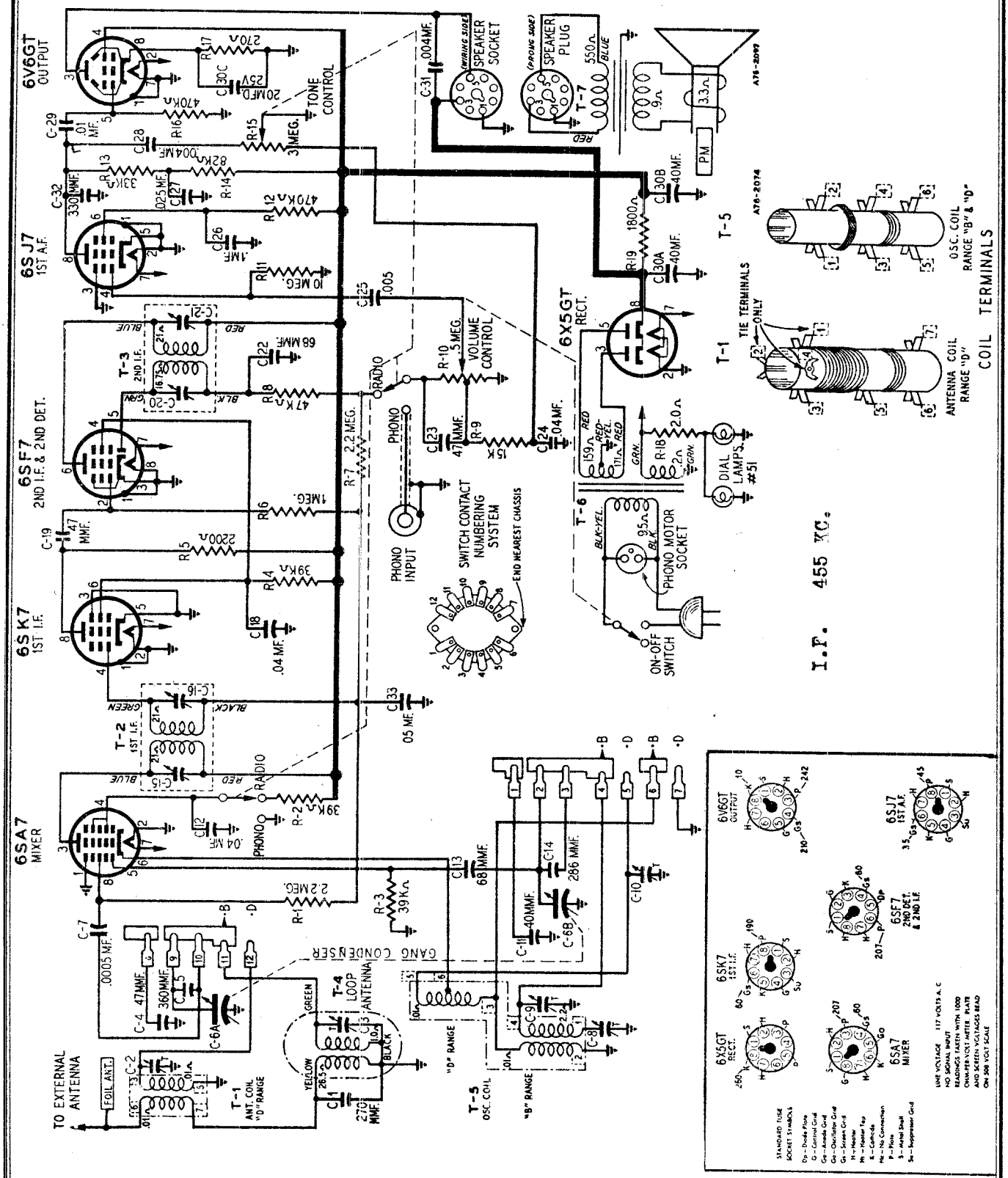
MODEL D1645

WESTERN AUTO SUPPLY CO.



Record Changer: Oak Model 6666

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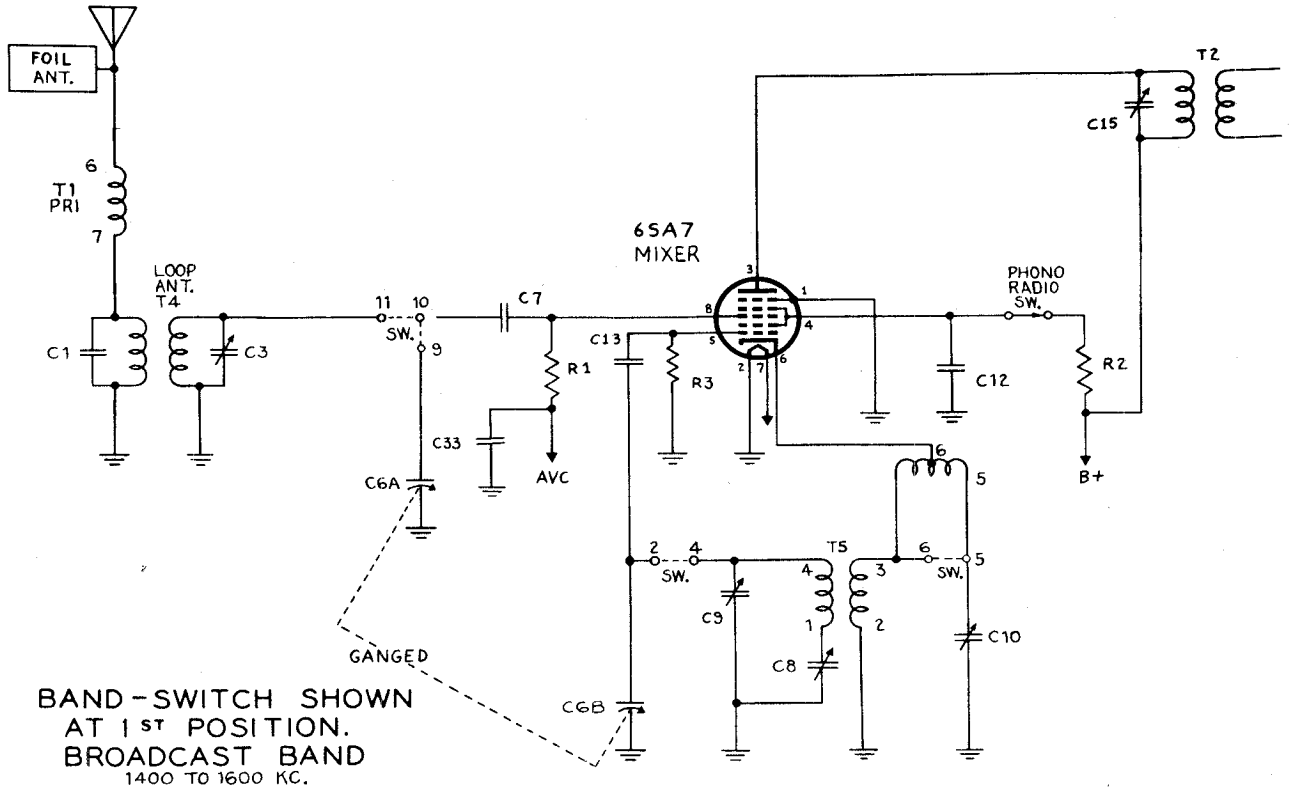
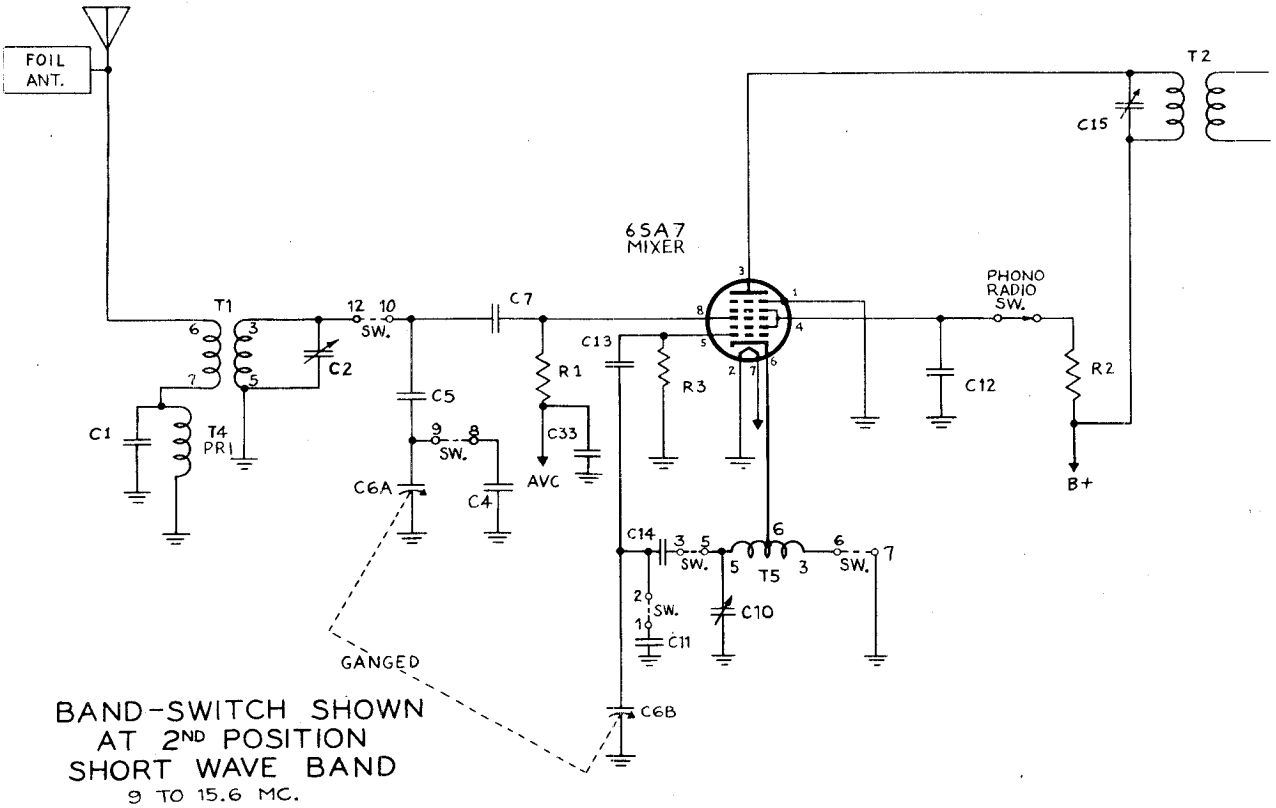
MODEL D1645

WESTERN AUTO SUPPLY CO.



BAND-SWITCH SHOWN AT 1ST POSITION. BROADCAST BAND
1400 TO 1600 KC.



BAND-SWITCH SHOWN AT 2ND POSITION SHORT WAVE BAND
9 TO 15.6 MC.

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WESTERN AUTO SUPPLY CO.

REPLACEMENT PARTS LIST

NOTICE: There is a power rating label on the chassis. This label specifies the power supply on which the radio may be used, and identifies the radio as to chassis, dial and issue letter. When ordering parts or writing, give ALL information appearing on this label.

MISCELLANEOUS

12A436	8" P.M. Speaker Complete with Output Transformer
	Cone and Voice Coil Assembly (Specify part number and letters stamped on speaker)
	Output Transformer (Specify part number and letters stamped on speaker)
3A303	Tube socket-octal (8 prong) moulded
3A304	Phono motor socket
3A305	Phono socket—single pin tip
10A467	Knob (Tuning)
10A468	Knob (Off-On, Volume)
10A529	Knob (Tone, Radio-Phono)
10A469	Knob (SW-BC)
2A359	Band Change Switch
13X328	Line cord and plug assembly
9A1229	Counterpoise antenna

TRANSFORMERS AND COILS

T-1	9A1812	"D" Range Antenna Coil Assembly
T-2	9A1814	1st I.F. Coil Assembly
T-3	9A1815	2nd I.F. Coil Assembly
T-4	9A1821	"B" Range Loop Antenna
T-5	9A1813	"B" Range and "D" Range Oscillator Coil Assembly
T-6	53X282	117 Volt 60 Cycle Standard Power Transformer
T-6	53X283	117 Volt 25 Cycle Standard Power Transformer
T-6	53X284	117-234 Volt, 40-60 Cycle Universal Power Transformer

CAPACITORS

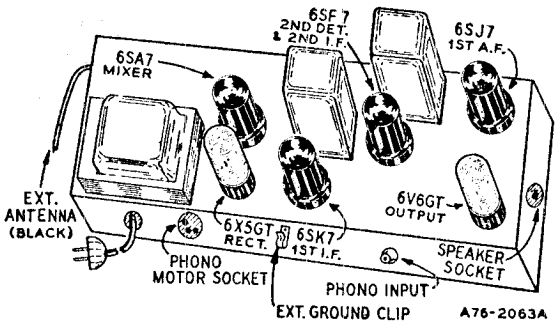
C-1	47X445	270 mmf		Moulded
C-2	17A164	5-50 mmf		Trimmer
C-3	17A235	2-12 mmf		Trimmer
C-4	47X473	47 mmf		Silvered mica
C-5	47X474	360 mmf		Silvered mica
C-6A, C-6B	14A184	Gang Condenser with drive pulley		
C-7	B66501	.0005 mf	200 V	Tubular
C-8	17A157	440-490 mmf		Trimmer
C-9, C-10	17A109	2.5-35 mmf		Dual Trimmer Condenser
C-11	47X472	40 mmf		Silvered mica
C-12, C-18	D66403	.04 mf	400 V	Tubular
C-13	47X466	68 mmf		Moulded
C-14	47X481	286 mmf		Silvered mica
C-15, C-16	Part of T-2 (1st I.F. Coil Assem.)			
C-19, C-23	47X463	47 mmf		Moulded
C-20, C-21	Part of T-3 (2nd I.F. Coil Assem.)			
C-22	47X471	68 mmf		Moulded
C-24	D64403	.04 mf	400 V	Tubular
C-25	D66502	.005 mf	400 V	Tubular
C-26	D66104	.10 mf	400 V	Tubular
C-27	D64253	.025 mf	400 V	Tubular
C-28, C-31	D66402	.004 mf	400 V	Tubular
C-29	D66103	.01 mf	400 V	Tubular
C-30A	45X346	40 mf	450 V	3 Section Electrolytic
C-30B		40 mf	450 V	
C-30C		20 mf	25 V	
C-32	47X470	330mmf		Moulded
C-33	B66503	.05 mf	200 V	Tubular

RESISTORS

B85225	R-1, R-7	2.2 megohms	0.5 W	Carbon
C84393	R-2, R-4	39 K ohms	1.0 W	Carbon
B84393	R-3	39 K ohms	0.5 W	Carbon
B84222	R-5	2200 ohms	0.5 W	Carbon
B85105	R-6	1 megohm	0.5 W	Carbon
B85473	R-8	47 K ohms	0.5 W	Carbon
B84153	R-9	15 K ohms	0.5 W	Carbon
36X358	R-10	.5 megohm	Volume control and line switch	
B85106	R-11	10 megohms	0.5 W	Carbon
B85474	R-12, R-16	470 K ohms	0.5 W	Carbon
B84333	R-13	33 K ohms	0.5 W	Carbon
B84823	R-14	82 K ohms	0.5 W	Carbon
40X276	R-15	3.0 megohms	Tone control & Radio-Phono switch	
C84271	R-17	270 ohms	1.0 W	Carbon
43X213	R-18	2.0 ohms	0.5 W	Wire wound
D84182	R-19	1800 ohms	2.0 W	Carbon

DIAL AND DRIVE ASSEMBLY

6X21	Rubber Grommet	Mtg. Gang Condenser
20X329	Cond. Cushion Stud	
57X176	Mounting Plate	
25X1488	Idler Bracket	
25X1489	Pulley Bracket (right)	
25X1490	Pulley Bracket (left)	
24X360	Idler Pulley	
26X485	Drive Shaft	
19X192	"C" Washer (for drive shaft)	
25X1491	Pointer Bracket	
15X229	Pointer	
	50" Drive Cord (18 lb. test)	
28X113	Tension Spring (Drive cord)	
30X517	Dial clamp	
4X915	Escutcheon, Dial (Right)	
4X916	Escutcheon, Dial (Left)	
4X931	Escutcheon Insert	
58X613	Dial Glass	
7A200	Pilot light socket assembly	
	No. 51 Pilot light	



SPECIFICATIONS

Power Consumption (at 117 Volts AC) ..... 40 Watts (normal)
65 Watts (phono operating)

Power Output ..... 4 Watts, Maximum
2.3 Watts, 10% Harmonics

Tuning Frequency Range
B Range ..... 540-1600 Kilocycles
D Range ..... 9-15.6 Megacycles

Speaker ..... 8" PM Dynamic

Intermediate Frequency ..... 455 KC

Selectivity ..... 40 KC Broad at 1000 Times Signal

Sensitivity (For 0.5 Watt Output, with External Antenna)
B Range ..... 9 Microvolts Average
D Range ..... 20 Microvolts Average

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MODEL D1645
MODELS D2610,D2611

WESTERN AUTO SUPPLY CO.

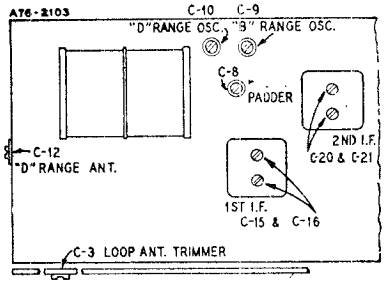
MODEL D1645

ALIGNMENT PROCEDURE

Volume Control—Maximum All Adjustments.
Connect Radio Chassis to Ground Post of Signal Generator with a Short Heavy Lead.
Allow Chassis and Signal Generator to "Heat Up" for several minutes.

The following equipment is required for aligning:
An All Wave Signal Generator which will provide an accurately calibrated signal at the test frequencies as listed.
Output Indicating Meter—Non-Metallic Screwdriver.
Dummy Antennas—.1 mf., 100 mmf., and 400 ohms.

	SIGNAL GENERATOR FREQUENCY SETTING	SIGNAL GENERATOR CONNECTION AT RADIO	DUMMY ANTENNA	BAND SWITCH SETTING	CONDENSER SETTING	ADJUST TRIMMERS TO MAXIMUM
I.F.	455 KC	Grid of 6SA7 Pin 8	.1 mf.	B Range	Turn Rotor to Full Open	1st I.F. (C15) & (C16) 2nd I.F. (C20) & (C21)
RANGE B	1620 KC	Antenna Lead	100 mmf.	B Range	Turn Rotor to Full Open	Oscillator Range B (C9)
	1400 KC	Antenna Lead	100 mmf.	B Range	Tune Rotor to Max. Output	Ant. Range B (C3)
	600 KC	Antenna Lead	100 mmf.	B Range	Tune Rotor to Max. Output	Oscillator (C8) See Note B
	Repeat above steps at 1620 and 600 KC until readjusting the oscillator Range B Trimmer (C8) causes no further improvement of output.					
RANGE D	15,600 KC	Antenna Lead	400 Ohm	D Range	Turn Rotor to Full Open	Oscillator Range D (C10)
	15,600 KC	Antenna Lead	400 Ohm	D Range	Turn Rotor to Full Open	Ant. Range D (C2)
LOOP RANGE B	Reassemble chassis in cabinet. 1400 KC	Antenna Lead	100 mmf.	B Range	Tune Rotor to Max. Output See Note A	Ant. Range B (C3)

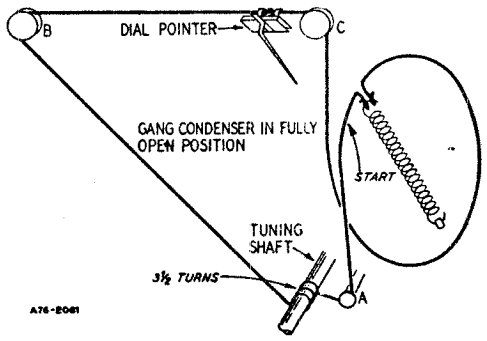


NOTE A—Set pointer at the 1400 KC mark on the dial scale. Attach pointer to drive cord.

NOTE B—Turn rotor back and forth and adjust the trimmer until peak of greatest intensity is obtained.

DRIVE CORD REPLACEMENT

The drive cord should be replaced as shown on the accompanying illustration using a 50" drive cord for the purpose. After the cord has been installed, stretch the tension spring and tie the free end of the cord to it, then cut off any excess string that may remain.



Before removing the chassis from the cabinet it will be necessary to detach the dial pointer from the dial string. To do this, spread the tabs on the pointer and pull the dial string off the pointer.

The dial lamp socket assemblies may be disengaged from the cabinet mounting by squeezing together and pulling away from the cabinet mounting, the spring bracket to which the dial lamp socket is mounted. Take care not to bend or damage the large drive pulley on the gang condenser while doing this.

When replacing the chassis in the cabinet it will be necessary to tune in a station of a known frequency and move the dial pointer until that frequency is indicated on the dial and then attach the pointer to the dial string. Take care not to scuff or cut the dial string or bend the pointer during this operation.

MODELS D2610, D2611

REPLACEMENT PARTS LIST

When ordering parts mention part number, model number, and series

Schematic Diagram Symbol	Part No.	Description
		CONDENSERS
C1		See "Antenna plate" under "Miscellaneous"
C2, C8	12912	.00025 mfd., mica, 20%
C3, C6	124150	Dual trimmer, antenna and oscillator
C4	12938	.00005 mfd., mica, 10%
C5	1001	.1 mfd., 400 volts, +50%-10%
C7	1009	.05 mfd., 200 volts, 25%
C9	10025	.002 mfd., 600 volts, 25%
C10	10091	.15 mfd., 400 volts, 25%
C11	129160	.0004 mfd., mica, 20%
C12	10078	.01 mfd., 200 volts, 25%
C13, C14 or	11992	Electrolytic, for 60-cycle sets, 20 mfd. x 150 volts, 40 mfd. x 150 volts
C13, C14	11993	Electrolytic, for 25-cycle sets, 60 mfd. x 150 volts, 60 mfd. x 150 volts
C15	10011	.01 mfd., 400 volts, 25%
		RESISTORS*
R1	A-9B1-78	22,000 ohms, 10%, ½ watt
R2	A-9B1-3	22 ohms, 20%, ½ watt
R3	A-9B1-34	3.3 megohms, 20%, ½ watt
R4	101230	Volume control, 500,000 ohms
R5, R7	A-9B1-88	150,000 ohms, 10%, ½ watt
R6	A-9B1-35	4.7 megohms, 20%, ½ watt
R8	A-9B1-28	330,000 ohms, 20%, ½ watt
R9	A-9B1-52	150 ohms, 10%, ½ watt
R10	A-9B2-64	1500 ohms, 10%, 1 watt
R11	A-9B1-50	100 ohms, 10%, ½ watt
		SPEAKER
T6	114213	4-inch P.M. speaker (less output transformer)
T5	105117	Output transformer for speaker
		COILS
T1, T2	112827	Tuning assembly, complete (consists of antenna and oscillator coils)
T3	108157J	Input I.F. coil, complete in can
T4	108157K	Output I.F. coil, complete in can

*The values of all resistors listed above are based on RMA standards. Due to conditions beyond our control some receivers have been shipped with resistors of pre-standardized values. This receiver will operate equally well with resistors of either group. An illustration of the difference follows:

Pre-standardized value—50,000 ohms, ±10%, 1/3 watt
RMA value—47,000 ohms, ±10%, 1/2 watt

NOTE ON TUBE REPLACEMENT

Replace a defective metal 125K7 tube with another metal tube. Replace a glass 12SK7 tube with either a metal tube or with an exact duplicate of the tube now in the set.

		DIAL PARTS
	112822	Dial scale
	112824	Crystal for dial scale
	A-2M-7758	Cinch buttons
	112825	Pointer
	120184	Coiled tension spring for dial string
	1209	Dial string
	117809	Shaft for pointer
	115647	Bracket for dial
	115648	Support for dial bracket
	117808	Drive shaft
	115594	Drive bracket
		MISCELLANEOUS
	121210	Octal socket, molded
	121216	Socket base for filter condenser, bakelite
	10798	Line cord and plug
R4, S1	101230	Volume control and switch (500,000 ohms)
P1	107249	Pilot light bulb, 6-8 volts, type T-47
	107344	Socket assembly for pilot light
	13220	Chassis mounting screws, No. 6-32 x 3/8"
	131193	Cinch buttons, for mounting antenna plate
C1	115649	Antenna plate, walnut (includes washer condenser)
C1	115649B	Antenna plate, ivory (includes washer condenser)
	128501-36	Cabinet, bakelite, walnut
	128501-9	Cabinet, bakelite, ivory
	128499-36	Knob, bakelite, walnut
	128499-9	Knob, bakelite, ivory

We cannot supply speaker cones or fields separately. We can replace or repair a damaged speaker if it is returned to our factory, transportation charges prepaid.

WESTERN AUTO SUPPLY COMPANY

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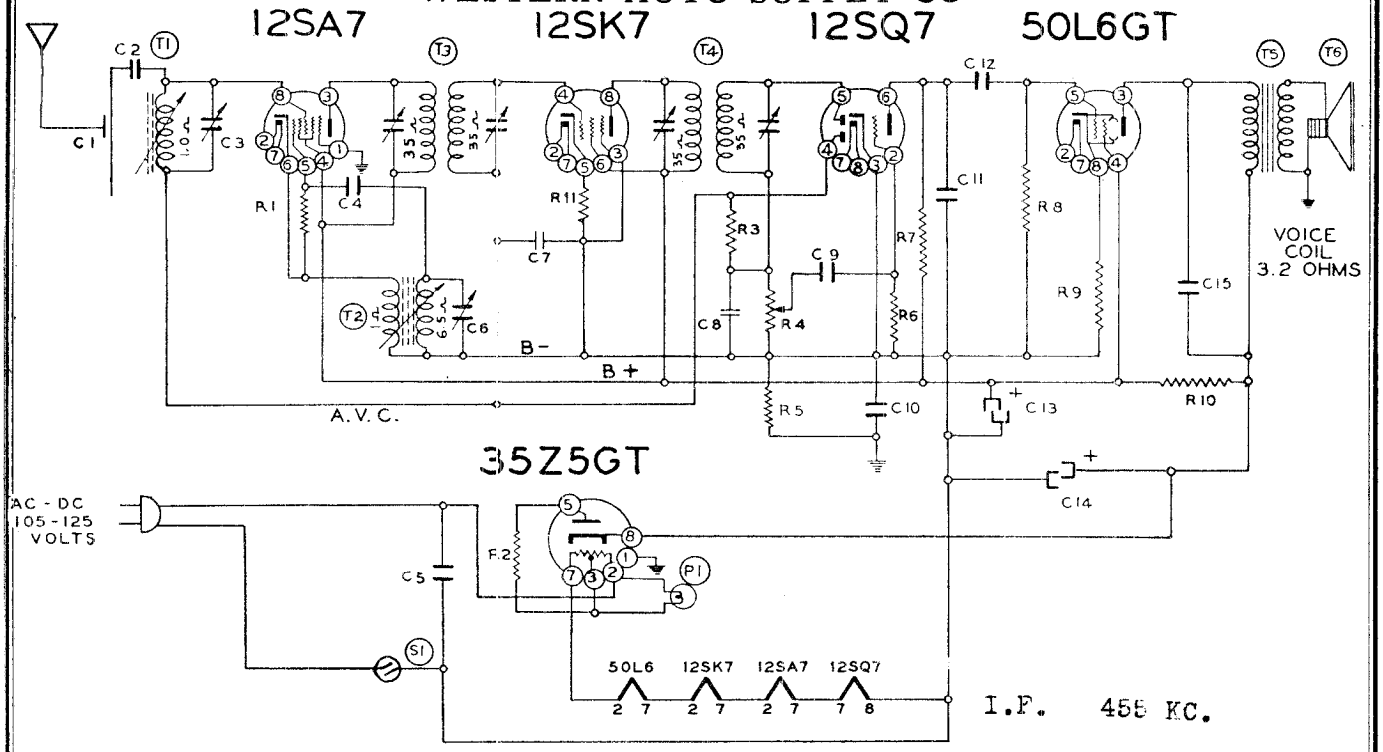
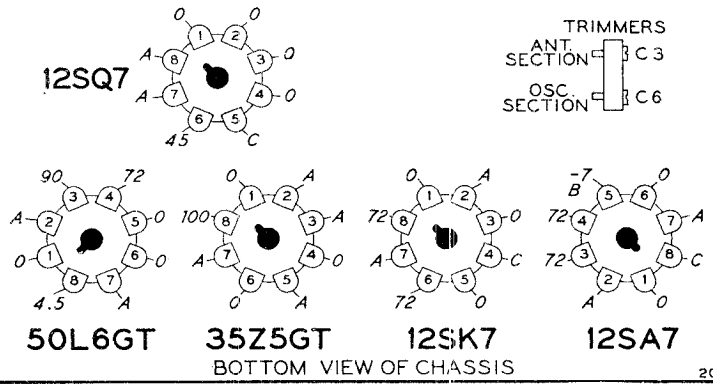
WESTERN AUTO SUPPLY CO



NOTES - VOLTAGES MEASURED WITH A 1000-OHM-PER-VOLT VOLTMETER BETWEEN SOCKET TERMINALS AND NEGATIVE B SUPPLY.
A - CANNOT BE MEASURED WITH VOLTMETER.
B - OSCILLATOR VOLTAGE MEASURED WITH R.F. CHOKE IN SERIES WITH VOLTMETER LEAD.
C - DIODE VOLTAGE, LESS THAN ONE VOLT NEGATIVE, CANNOT BE MEASURED ACCURATELY.



Voltages at tube sockets

Technical Data

Tuning Range	535 to 1720 kc.
Intermediate Freq.	455 kc.
Power Consumption	35 watts
Sensitivity (for 0.05 watt output)	60 microvolts average
Selectivity	80 kc. at 1000 times signal at 1000 kc.
Power Output(in voice coil)	
Undistorted	0.8 watt
Maximum	1.2 watt

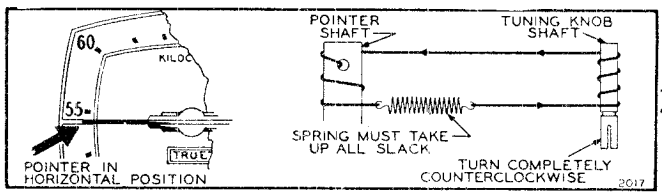
REPLACING DIAL STRING (See Illustration)

1. Rotate the tuning shaft to its extreme counter-clockwise position (rotors completely closed).

2. Tie one end of the string to the tension spring. Wind the string around the pointer shaft, passing it through the hole, and around the tuning knob shaft as shown. The direction of winding and the number of turns must be exactly as illustrated. IMPORTANT: When the installation is complete, and when the condenser rotors are closed, the spring should be close to the pointer shaft.

3. Tie the other end of the string to the spring, first stretching the spring so that it will take up all slack.

4. Remove the crystal covering the face of the dial. Rotate the pointer, against the friction of the shaft, until it is in a horizontal position, as illustrated.



Dial string replacement

For Parts list, see P.15-4

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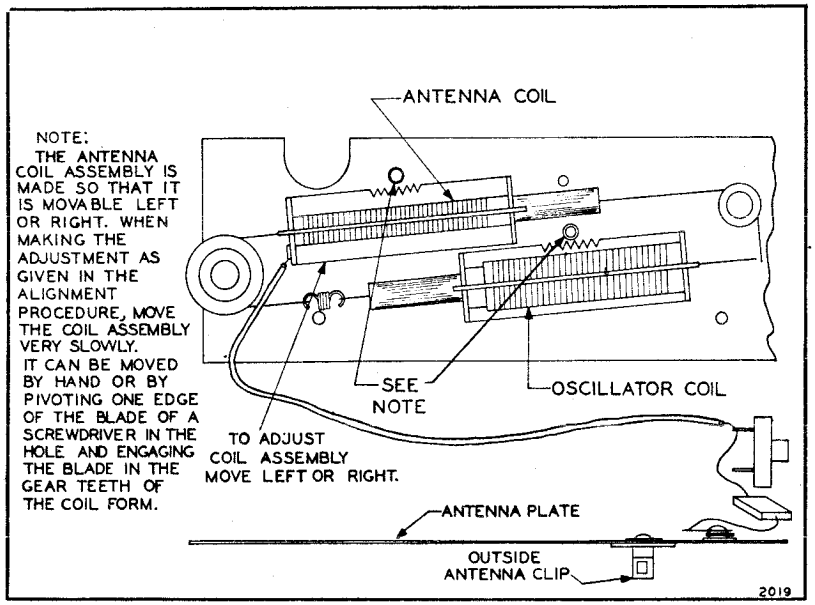
ALIGNMENT PROCEDURE

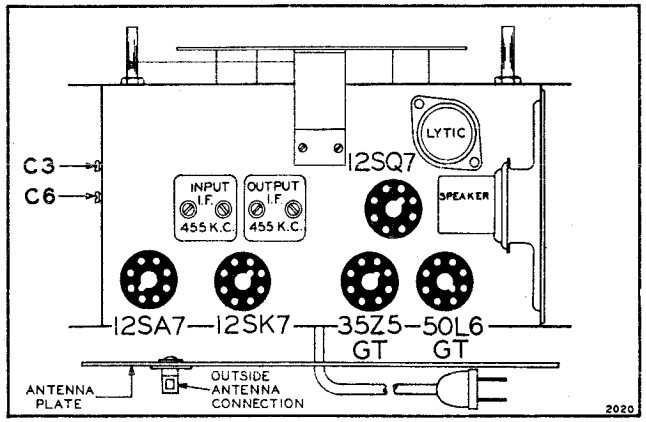
- No aligning adjustments should be attempted until all other possible causes of trouble have been checked.
- Turn volume control to maximum for all adjustments.
- Connect ground post of signal generator to B— of radio through a 0.1 mfd. condenser.
- Connect dummy antenna value in series with generator output lead.
- Connect output meter across primary of output transformer.

Band	Signal Generator Frequency Setting	Dummy Antenna	Connection to Radio	Position of Iron Cores (Dial Setting)	Trimmers Adjusted (in order shown)	Adjustment
I.F.	455 Kc.	.1 mfd.	Grid of 12SA7	All the way out	Two trimmers on top of output I.F. can	Adjust for maximum output
	455 Kc.	.1 mfd.	Grid of 12SA7	All the way out	Two trimmers on top of input I.F. can	Adjust for maximum output
BROADCAST	1720 Kc.	.1 mfd.	Grid of 12SA7	All the way out	Oscillator trimmer C6 (see chassis view, page 2)	Adjust for maximum output
	1720 Kc.	200 mmf.	Outside Antenna Clip	All the way out	Antenna trimmer C3 (see chassis view, page 2)	Adjust for maximum output
	1400 Kc.	200 mmf.	Outside Antenna Clip	Turn dial to 1400 Kc.	Adjust position of antenna coil	Adjust for maximum output (see coil view below)
	1720 Kc.	200 mmf.	Outside Antenna Clip	Turn dial to 1720 Kc.	Antenna trimmer C3 (see chassis view, page 2)	Check for tracking (see note below)

NOTE: After the antenna coil has been tracked at 1400 Kc. it is necessary to check the adjustment of antenna trimmer C3 again at 1720 Kc. If no appreciable change in trimmer adjustment is necessary, the coil is in track. If the trimmer requires considerable adjustment, it will be necessary again to adjust the position of the antenna coil at 1400 Kc. These two adjustments should be made several times, until no change of trimmer adjustment is required at 1720 Kc.


NOTE:
THE ANTENNA COIL ASSEMBLY IS MADE SO THAT IT IS MOVABLE LEFT OR RIGHT. WHEN MAKING THE ADJUSTMENT AS GIVEN IN THE ALIGNMENT PROCEDURE, MOVE THE COIL ASSEMBLY VERY SLOWLY. IT CAN BE MOVED BY HAND OR BY PIVOTING ONE EDGE OF THE BLADE OF A SCREWDRIVER IN THE HOLE AND ENGAGING THE BLADE IN THE GEAR TEETH OF THE COIL FORM.
ANTENNA COIL
SEE NOTE
OSCILLATOR COIL
TO ADJUST COIL ASSEMBLY MOVE LEFT OR RIGHT.
ANTENNA PLATE
OUTSIDE ANTENNA CLIP
2019

View of coil assembly



Top view of chassis

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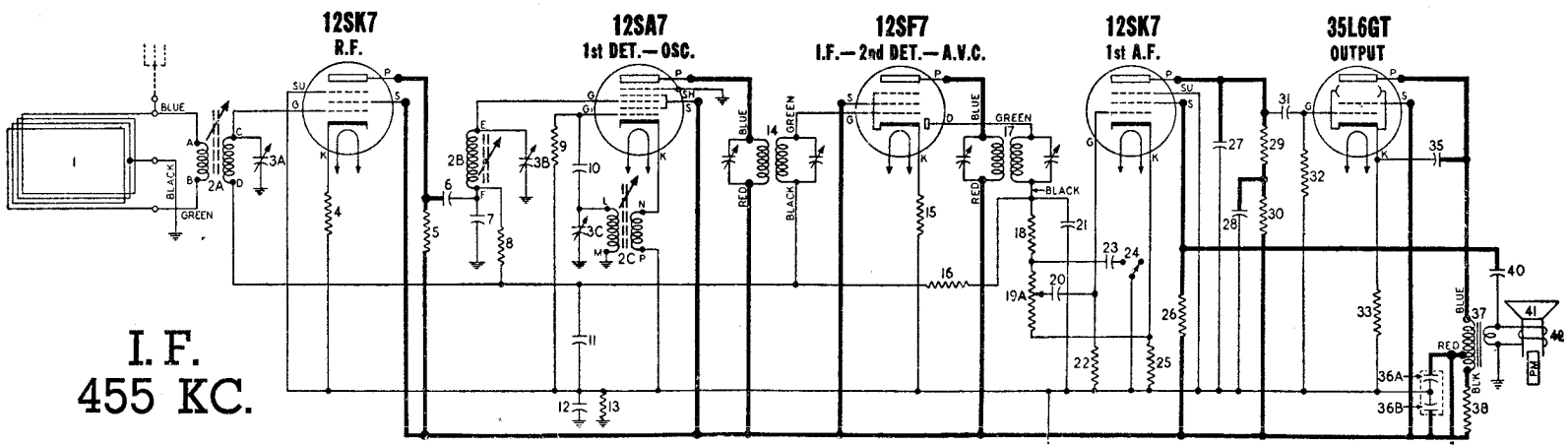
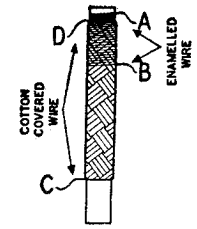
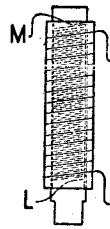


I.F. 455 KC.



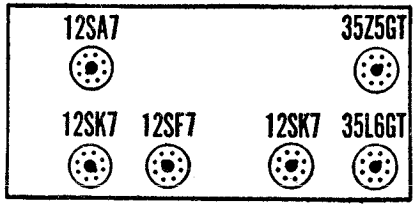
ANTENNA COUPLING COIL
504210



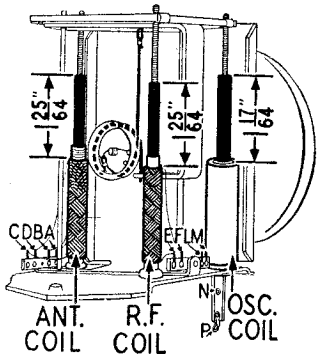
OSCILLATOR COIL
504212

SLUG CORES FOR COILS
ANT.—504211
R.F.—504215
OSC.—504213

TUBE LOCATIONS

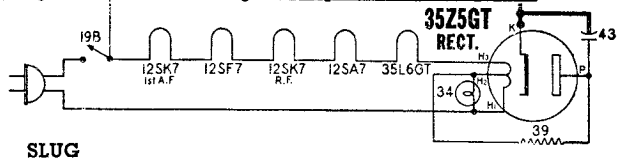


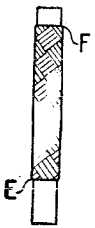
REAR OF CHASSIS



SLUG TUNER ASSEMBLY
(Drive Parts)

117057 Cord (8")
114955 Clip on cord
504012 Spring





R.F. COIL
504214

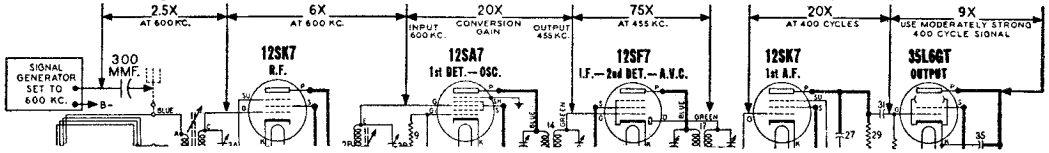
Lettered terminals in illustrations correspond to similarly lettered terminals on the circuit diagram.

APPROXIMATE STAGE GAIN DATA

Be sure R.F. and I.F. stages are accurately aligned before measuring gain. R.F. gains can be measured with a "channel" type instrument containing a tuned and calibrated R.F. amplifier. A vacuum tube voltmeter may be used for audio gain measurements. Observe following precautions:

1. For all gain measurements connect signal generator as shown. Use 600 KC. signal with 400 cycle modulation (use nearby frequency if local station interferes.)
2. For R.F. and I.F. measurements connect negative terminal of a 3 volt battery (two 1½ volt cells in series) to A.V.C. lead and positive terminal to B—. This provides a definite operating point.
   IMPORTANT: Disconnect battery when measuring audio stage gains.
3. Be sure radio is carefully tuned to generator signal (use weak signal for sharp tuning.)
4. When using a "channel" type instrument carefully tune it for maximum output at desired frequency before making measurements.

The R.F. and I.F. stage gains shown below are less than under normal operating conditions due to the use of 3 volts fixed bias in order to establish a definite operating point. Therefore, these values are not intended to indicate the full capability of a stage.



Differences in tube characteristics, tolerance of parts, adjustment of tuned circuits, and variations of line voltage will influence stage gain. Accuracy of measurements is dependent upon careful tuning of receiver to generator signal and experience in using your test equipment. These factors may create considerable variation in gain measurements.

MODEL D2612

WESTERN AUTO SUPPLY CO.

ALIGNMENT PROCEDURE

1. Remove chassis and loop from cabinet. Solder approximately 8" of insulated wire to any B— connection (see voltage chart on opposite side for convenient B— location). Then reinstall chassis and loop in cabinet. The B— lead should extend from under the chassis at the back.
2. Connect ground lead of signal generator to B— lead.
3. Connect output meter across the speaker voice coil (terminals at back of speaker.)
4. Turn the tuning control knob clockwise as far as it will go (tuner mechanism is now in maximum open position with tuning slugs almost completely withdrawn from coils). Dial pointer should then point to 1600 Kc mark on scale. If it is set incorrectly, release pointer clip on dial cord and reposition pointer.
5. Set volume control at maximum volume position and use a weak signal from the signal generator.

DUMMY ANT. IN SERIES WITH SIGNAL GENERATOR	CONNECT HIGH SIDE OF GENERATOR TO	SIGNAL GENERATOR FREQUENCY	RECEIVER DIAL SETTING	TRIMMER NUMBER	TRIMMER DESCRIPTION	TYPE OF ADJUSTMENT
Set tuner mechanism to maximum open position by turning the tuning control knob clockwise as far as it will go (Dial pointer at 1600 Kc). Then check whether the positions of the tuning slugs correspond to the positions shown in Fig. 1 below. If settings are incorrect, rotate the individual core and threaded stem until desired position is reached. Note that threaded stem is prevented from moving by a dab of speaker cement at top.						
.1 MFD. Condenser	Ungrounded terminal of trimmer No. 6 (see Fig. 2 below for location of trimmer.)	455 KC	Any point where it does not affect the signal.	1-2	2nd I.F.	Adjust for maximum output. Then repeat adjustment.
				3-4	1st I.F.	
300 MMFD. Mica Condenser	External Antenna Clip on Loop Frame	1600 KC	1600 KC	5	Broadcast Oscillator (Shunt)	Adjust for maximum output.
300 MMFD. Mica Condenser	External Antenna Clip on Loop Frame	1600 KC	Tune to 1600 KC generator signal	6	Broadcast R.F.	Adjust for maximum output.
				7	Broadcast Antenna	Adjust for maximum output.
300 MMFD. Mica Condenser	External Antenna Clip on Loop Frame	1400 KC	Tune to 1400 KC generator signal	Ant. coil tuning slug		Adjust position of slug for maximum output.
				R.F. coil tuning slug		Adjust position of slug for maximum output.
300 MMFD. Mica Condenser	External Antenna Clip on Loop Frame	1600 KC	Tune to 1600 KC generator signal	6	Broadcast R.F.	Recheck adjustment for maximum output.
				7	Broadcast Antenna	Recheck adjustment for maximum output.
Apply a coating of speaker cement at top of each tuning core stem to prevent movement.						

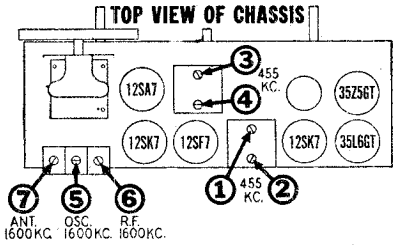


FIG. 2

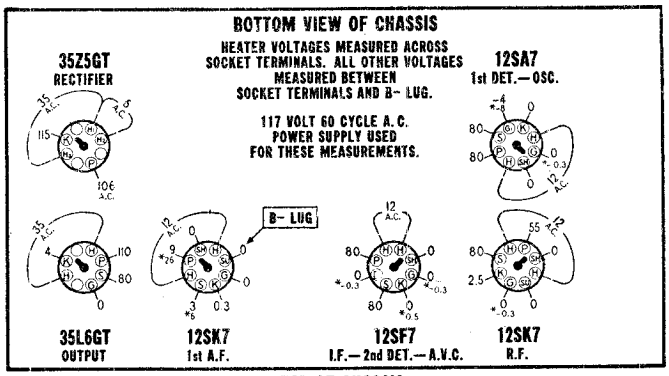
AUDIO OSCILLATION

The audio system of this receiver utilizes a two stage type of inverse feed-back arrangement and, should it ever be necessary to replace the speaker or output transformer, it is important to maintain a definite phase relationship in the feed-back circuit. If the connections to the output transformer are reversed or if the feed-back connection is made to the wrong side of the output transformer secondary, the system will become regenerative instead of degenerative. Under those conditions audio oscillation may result. If that occurs, oscillation may be prevented by reversing the connections to the secondary of the output transformer.

SOCKET VOLTAGES

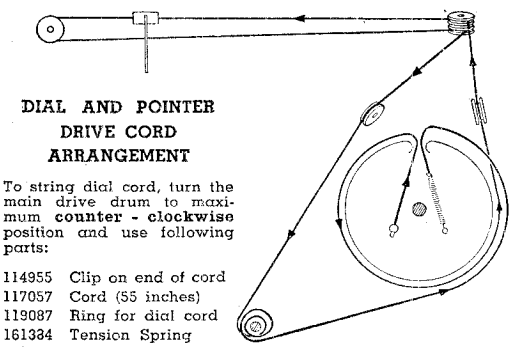
Measured with voltmeter having sensitivity of 1000 ohms per volt except where indicated by (*).

VOLUME ON FULL WITH NO SIGNAL DIAL TUNED TO 540 KC.



REAR OF CHASSIS

*—Measured with vacuum tube voltmeter



DIAL AND POINTER DRIVE CORD ARRANGEMENT

To string dial cord, turn the main drive drum to maximum **counter - clockwise** position and use following parts:

114955	Clip on end of cord
117057	Cord (55 inches)
119087	Ring for dial cord
161334	Tension Spring

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MODEL D2612
MODEL D2613

MODEL D2612

WESTERN AUTO SUPPLY CO.

DIA-GRAM NO.	PART NO.	DESCRIPTION	LIST PRICE
		CONDENSERS	
3-A, B, C	504086	Condenser—trimmer assembly A—10 to 160 Mmfd. B—20 to 270 Mmfd. C—20 to 270 Mmfd.	$
6	502271	Condenser—mica 260 Mmfd. 500 volt	
7	502165	Condenser—mica 1,000 Mmfd. 500 volt	
10	502159	Condenser—mica 50 Mmfd. 500 volt	
11	502155	Condenser—.1 Mfd. 200 volt	
12	502158	Condenser—.2 Mfd. 400 volt	
20	502453	Condenser—.002 Mfd. 400 volt	
21	502160	Condenser—mica 110 Mmfd. 500 volt	
23	502470	Condenser—.0008 Mfd. 400 volt	
27	502160	Condenser—mica 110 Mmfd. 500 volt	
28	502153	Condenser—.05 Mfd. 200 volt	
31	502156	Condenser—.004 Mfd. 400 volt	
35	502151	Condenser—.01 Mfd. 400 volt	
36A, B	500256	Condenser—electrolytic A—40 Mfd. 150 volt B—20 Mfd. 150 volt	
40	502152	Condenser—.02 Mfd. 400 volt	
43	502157	Condenser—.05 Mfd. 400 volt	
		RESISTORS	
4	502140	Resistor—carbon 390 ohms ¼ watt	
5	502291	Resistor—carbon 4700 ohms ¼ watt	
8	502134	Resistor—carbon 470,000 ohms ¼ watt	
9	502130	Resistor—carbon 22,000 ohms ¼ watt	
13	502133	Resistor—carbon 220,000 ohms ¼ watt	
15	502264	Resistor—carbon 47 ohms ¼ watt	
16	502269	Resistor—carbon 3.3 Meg. ¼ watt	
18	502131	Resistor—carbon 47,000 ohms ¼ watt	
19-A, B	502145	Volume control 500,000 ohms (with switch)	
22	502136	Resistor—carbon 10 Meg. ¼ watt	
25	502128	Resistor—carbon 2200 ohms ¼ watt	
26	502135	Resistor—carbon 2.2 Meg. ¼ watt	
29, 30	502133	Resistor—carbon 220,000 ohms ¼ watt	
32	502134	Resistor—carbon 470,000 ohms ¼ watt	
33	502138	Resistor—carbon 130 ohms ¼ watt	
38	502469	Resistor—carbon 1500 ohms 1 watt	
39	502574	Resistor—carbon 33 ohms ½ watt	
		COILS & TRANSFORMERS	
1	502246	Loop antenna	
2-A, B, C	504096	Tuning unit; complete assembly	
2-A	504210	Coil—antenna (less slug)	
2-B	504214	Coil—R.F. (less slug)	
2-C	504212	Coil—oscillator (less slug)	
	504211	Slug core for Ant. coil (yellow end)	
	504213	Slug core for Osc. coil (white end)	
	504215	Slug core for R.F. coil (purple end)	
14	502102	Transformer—1st I.F.	
17	502103	Transformer—2nd I.F.	
37	502213	Transformer—output (for R-502998 spkr.)	
	502904	Transformer—output (for A-502998 spkr.)	
	504244	Transformer—output (for W-502998 spkr.)	
		OTHER ELECTRICAL PARTS	
24	500546	Switch—tone control	
34	502473	Lamp—dial (Mazda 47) 6-8V. 150 Ma.	
41	502214	Cone & voice coil for R-502998 spkr.	
	502903	Cone & voice coil for A-502998 spkr.	
	504245	Cone & voice coil for W-502998 spkr.	
42	502998	Speaker—P.M. dynamic (5 inch)	
		MISCELLANEOUS PARTS	
	502185	Back for cabinet	
	116467	Base for mtg. electrolytic condenser	
	502236	Cabinet—mahogany	
	500261	Clamp—dial scale mtg.	
	500497	Clip—retainer for cabinet back	
	114955	Clip—retainer on end of dial cord	
	116563	Connector—for antenna leads	
	117057	Cord—dial drive (55 in. required)	
	500324	Cover—cardboard for elect. cond.	
	504144	Dial scale—glass	
	501186	Grounding plate (under I.F. trans. can)	
	502551	Knob—mahogany	
	502230	Metal grille for cabinet	
	502367	Pointer	
	81145	Retaining ring for tuning shaft	
	119087	Ring for dial cord	
	85078	Rubber grommet; Ant. & R.F. coil mtg.	
	504045	Rubber grommet; Osc. coil mtg.	
	17063	Screw—No. 6 x ¼	
	17064	Screw—No. 4 x 7/32	
	114628	Screw—No. 8 x ½ chassis mtg.	
	502173	Shaft—tuning control	
	116690	Socket—octal base	
	160392	Socket—octal (rectifier)	
	500499	Socket—dial lamp (with leads)	
	504012	Spring for tuning slug drive cord	
	161384	Spring—dial cord tension	
	111456	Washer—spring washer for tuning shaft	

MODEL D26

PARTS LIST

DIA-GRAM NO.	PART NO.	DESCRIPTION	LIST PRICE
		CONDENSERS	
3	502172	Condenser—trimmer; 25 to 100 Mmfd.	$0.36
5A-5B-5C	502123	Condenser—variable gang (with drum)	4.60
9	502162	Condenser—315 Mmfd. 500 volt	.45
11	502159	Condenser—mica—50 Mmfd. 500 volt	.24
12	502155	Condenser—.1 Mfd. 200 volt	.30
13	502158	Condenser—.2 Mfd. 400 volt	.36
14	502172	Condenser—trimmer; 25 to 100 Mmfd.	.36
18	502262	Condenser—.25 Mfd. 200 volt	.36
26	502470	Condenser—.0008 Mfd. 400 volt	.20
27	502453	Condenser—.002 Mfd. 400 volt	.20
28	502160	Condenser—mica—110 Mmfd. 500 volt	.24
32	502160	Condenser—mica—110 Mmfd. 500 volt	.24
33	502153	Condenser—.05 Mfd. 200 volt	.24
34	502156	Condenser—.004 Mfd. 400 volt	.20
39	502151	Condenser—.01 Mfd. 400 volt	.20
40A-40B	500256	Condenser—electrolytic A-40 Mfd. 150 volt B-20 Mfd. 150 volt	1.50
43	502152	Condenser—.02 Mfd. 400 volt	.24
46	502157	Condenser—.05 Mfd. 400 volt	.24
		RESISTORS	
6	502140	Resistor—carbon 390 ohms ¼ watt	.12
10	502130	Resistor—carbon 22,000 ohms ¼ watt	.12
15	502133	Resistor—carbon 220,000 ohms ¼ watt	.12
19	502291	Resistor—carbon 4700 ohms ¼ watt	.12
21	502269	Resistor—carbon 3.3 Meg. ¼ watt	.12
22	502264	Resistor—carbon 47 ohms ¼ watt	.12
24	502131	Resistor—carbon 47,000 ohms ¼ watt	.12
25A-25B	502145	Volume control 500,000 ohms (with switch)	1.25
29	502136	Resistor—carbon 10 Meg. ¼ watt	.12
30	502128	Resistor—carbon 2200 ohms ¼ watt	.12
31	502135	Resistor—carbon 2.2 Meg. ¼ watt	.12
35-36	502133	Resistor—carbon 220,000 ohms ¼ watt	.12
37	502134	Resistor—carbon 470,000 ohms ¼ watt	.12
38	502138	Resistor—carbon 130 ohms ¼ watt	.12
42	502469	Resistor—carbon 1500 ohms 1 watt	.16
48	502574	Resistor—carbon 33 ohms ½ watt	.12
		COILS & TRANSFORMERS	
1	502503	Loop antenna	3.00
2	502740	Coil—S. W. antenna	1.12
4	502121	Coil—antenna coupling	1.64
7	502142	Coil—BC. R.F.	$2.26
16	502198	Coil—BC. oscillator	1.32
17	502197	Coil—S.W. oscillator	1.12
20	502102	Transformer—1st I.F.	2.30
23	502103	Transformer—2nd I.F.	2.30
41	502213	Transformer—output for R-502998 spkr.	2.50
	502904	Transformer—output for A-502998 spkr.	2.50
	504244	Transformer—output for W-502998 spkr.	2.50
		OTHER ELECTRICAL PARTS	
8A-8B-8C	502199	Switch—tone & band	2.00
44	502214	Cone and voice coil for R-502998 spkr.	2.00
	502903	Cone and voice coil for A-502998 spkr.	2.00
	504245	Cone and voice coil for W-502998 spkr.	2.00
45	502998	Speaker—P.M. dynamic (5 inch)	6.60
47	502473	Lamp—dial (Mazda 47) 6-8V. 150 Ma.	.22
		MISCELLANEOUS PARTS	
	502185	Back for cabinet	.30
	116467	Base for mtg. electrolytic condenser	.04
	502242	Cabinet	5.00
	500261	Clamp—dial scale mtg.	.02
	112745	Clip—coil mtg.	.01
	114955	Clip—retainer on end of dial cord	.01
	500497	Clip—retainer for cabinet back	.02
	116563	Connector—for antenna leads	.01
	117057	Cord—dial drive (55 in. required) per ft.	.05
	500324	Cover—cardboard, for elect. cond.	.04
	502445	Dial scale—glass	.80
	501186	Grounding plate (under I.F. Trans. can)	.10
	502553	Knob—volume or tuning	.10
	502554	Knob—tone & range sw.	.12
	502230	Metal grill for cabinet	1.00
	502367	Pointer	.16
	81145	Retaining ring for tuning shaft	.01
	119087	Ring for Dial cord	.01
	17063	Screw—No. 6x¼; holds clamps to cab.	.01
	17064	Screw—No. 4x7/32	.02
	114628	Screw—No. 8x½; chassis mtg.	.01
	502173	Shaft—tuning control	.15
	116690	Socket—octal base	.12
	160392	Socket—octal (rectifier)	.16
	500499	Socket—dial lamp (with leads)	.44
	161384	Spring—dial cord tension	.06
	111456	Washer—spring washer for tuning shaft	.005

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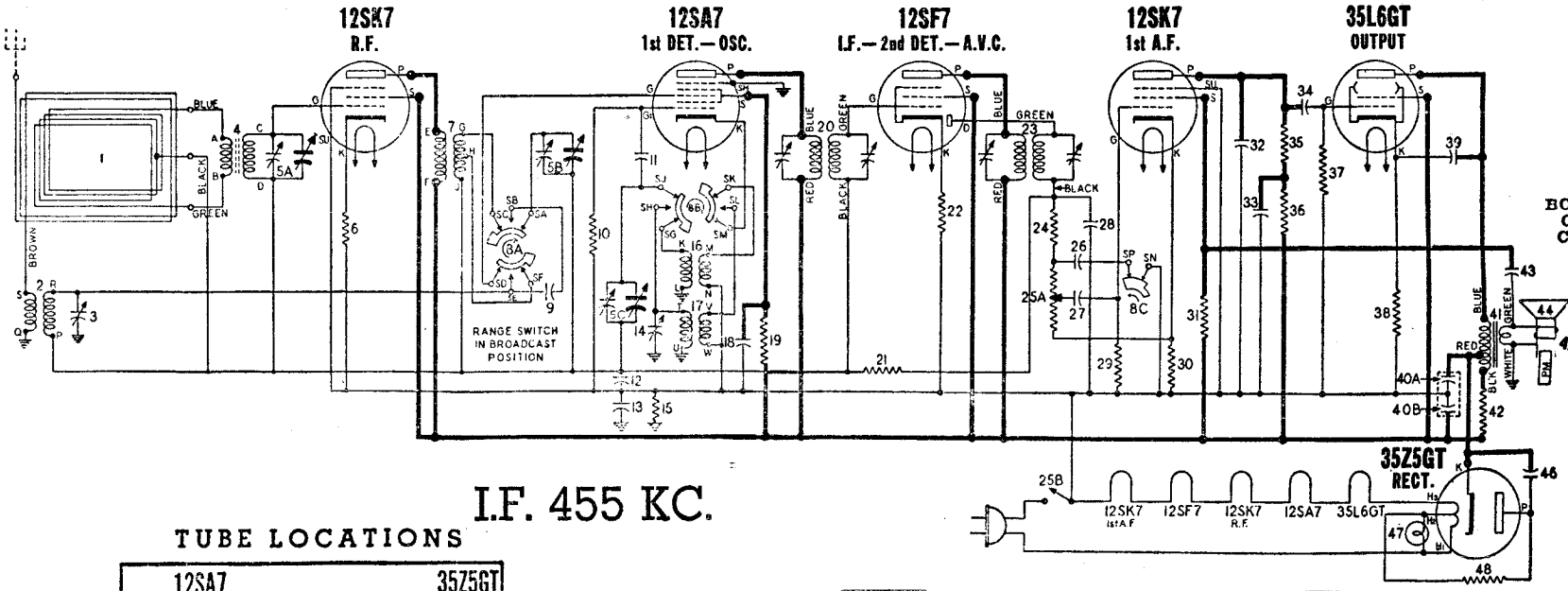
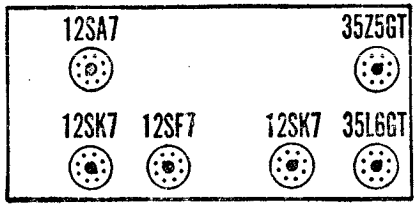
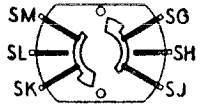


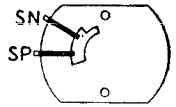
I.F. 455 KC.

TUBE LOCATIONS

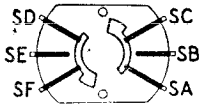




FRONT DECK
FRONT VIEW

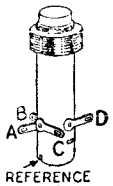


FRONT DECK
REAR VIEW

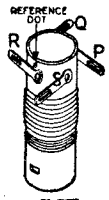


REAR DECK
FRONT VIEW

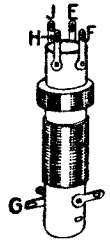
BAND AND TONE SWITCH
502199



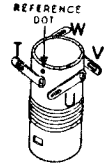
BC. ANTENNA COUPLING COIL 502121



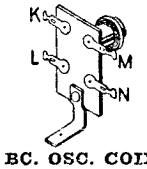
S.W. ANTENNA COIL 502740



R.F. COIL 502142



S.W. OSC. COIL 502197



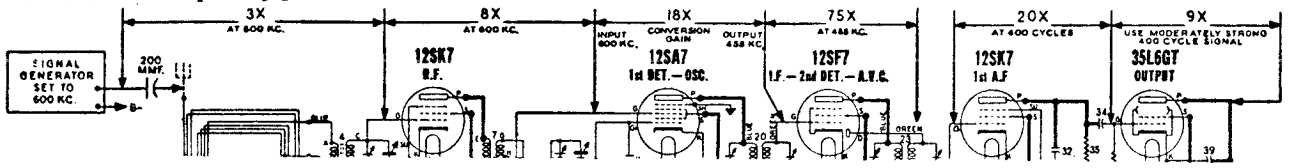
BC. OSC. COIL 502198

APPROXIMATE STAGE GAIN DATA

Be sure R.F. and I.F. stages are accurately aligned before measuring gain. R.F. gains can be measured with a "channel" type instrument containing a tuned and calibrated R.F. amplifier. A vacuum tube voltmeter may be used for audio gain measurements. Observe following precautions:

1. For all gain measurements connect signal generator as shown. Use 600 KC. signal with 400 cycle modulation (use nearby frequency if local station interferes.)
2. For R.F. and I.F. measurements connect negative terminal of a 3 volt battery (two 1½ volt cells in series) to A.V.C. lead and positive terminal to B—. This provides a definite operating point. IMPORTANT: Disconnect battery when measuring audio stage gains.
3. Be sure radio is carefully tuned to generator signal (use weak signal for sharp tuning.)
4. When using a "channel" type instrument carefully tune it for maximum output at desired frequency before making measurements.

The R.F. and I.F. stage gains shown below are less than under normal operating conditions due to the use of 3 volts fixed bias in order to establish a definite operating point. Therefore, these values are not intended to indicate the full capability of a stage.

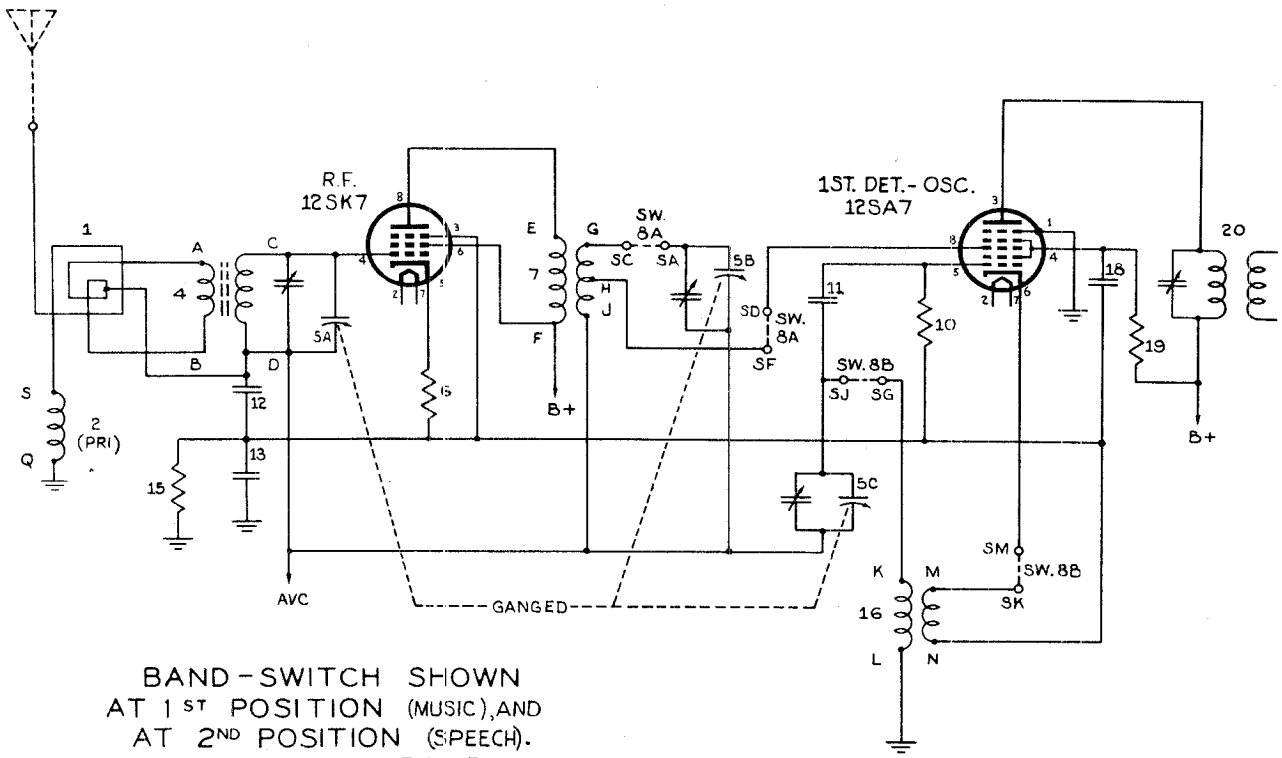


Differences in tube characteristics, tolerance of parts, adjustment of tuned circuits, and variations of line voltage will influence stage gain. Accuracy of measurements is dependent upon careful tuning of receiver to generator signal and experience in using your test equipment. These factors may create considerable variation in gain measurements.

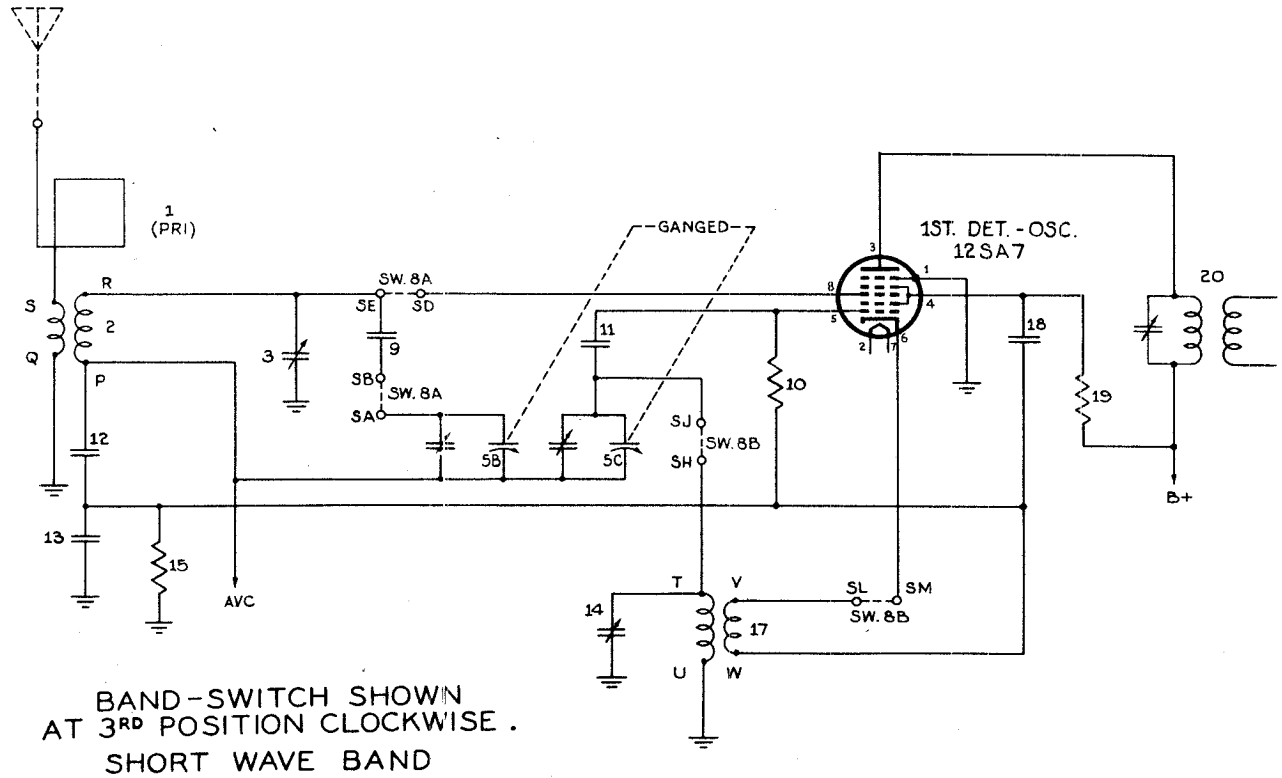
Lettered terminals in illustrations correspond to similarly lettered terminals on the circuit diagram.

For Parts list, see P.15-9

WESTERN AUTO SUPPLY CO.



BAND-SWITCH SHOWN
AT 1ST POSITION (MUSIC), AND
AT 2ND POSITION (SPEECH).
BROADCAST BAND
540-1650KC.



BAND-SWITCH SHOWN
AT 3RD POSITION CLOCKWISE.
SHORT WAVE BAND
9-12 MC

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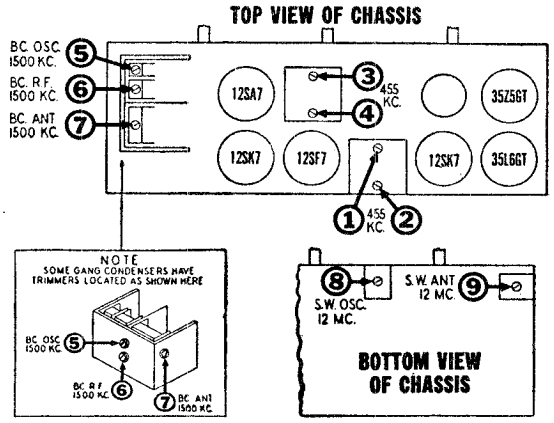
MODEL D2613

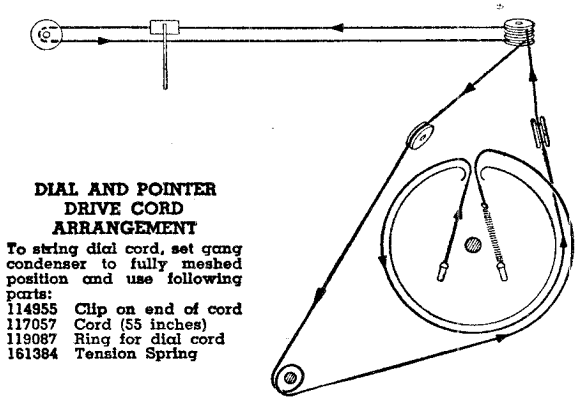
WESTERN AUTO SUPPLY CO.
ALIGNMENT PROCEDURE

1. **Remove chassis and loop antenna from cabinet. Reconnect loop to chassis and space it approximately same distance from chassis as when installed in cabinet.**
2. Note that there are four calibrating lines stamped into the metal dial frame. When gang condenser is fully meshed, dial pointer should be in the position indicated by first line at the left. If it is set incorrectly, release pointer clip on dial cord and reposition pointer.
3. Connect an output meter across the speaker voice coil or from plate of 35L6GT tube to B— through a .1 Mfd. condenser (see voltage chart for convenient B— connection).
4. Connect ground lead from signal generator to B— through a .25 Mfd. condenser.
5. Set volume control at maximum volume position and use a weak signal from the signal generator.

IMPORTANT:—Align this receiver in exactly the order shown below. Broadcast band must be aligned before short wave band.

DUMMY ANT. IN SERIES WITH SIGNAL GENERATOR	CONNECT HIGH SIDE OF GENERATOR TO	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POSITION	RECEIVER DIAL SETTING	TRIMMER NUMBER	TRIMMER DESCRIPTION	TYPE OF ADJUSTMENT
200 MMFD. Mica Condenser	Control Grid of 12SA7	455 KC	Broadcast	Any point where it does not affect the signal	1-2	2nd I.F.	Adjust for maximum output. Then repeat adjustment.
					3-4	1st I.F.	
200 MMFD. Mica Condenser	External Antenna Clip on Loop Frame	1500 KC	Broadcast	Set pointer to 1500 KC reference line stamped into metal dial plate (first line at the right)	5	Broadcast Oscillator (Shunt)	Adjust for maximum output.
200 MMFD. Mica Condenser	External Antenna Clip on Loop Frame	1500 KC	Broadcast	Tune to 1500 KC generator signal	6	Broadcast R.F.	Adjust for maximum output.
200 MMFD. Mica Condenser	External Antenna Clip on Loop Frame	1500 KC	Broadcast	Tune to 1500 KC generator signal	7	Broadcast Antenna	Adjust for maximum output.
400 OHM Resistor	External Antenna Clip on Loop Frame	12 MC	Short Wave	Set pointer to 12 MC. Reference line stamped into metal dial plate (second line from the right)	8	Short Wave Oscillator	Adjust to bring in signal. Check to see if proper peak was obtained by tuning in image at approx. 11.1 MC. If image does not appear, realign at 12 MC. with trimmer screw farther out. Recheck image.
400 OHM Resistor	External Antenna Clip on Loop Frame	12 MC	Short Wave	Tune to 12 MC generator signal	9	Short Wave Antenna	Adjust for maximum output. Try to increase output by detuning trimmer and retuning receiver dial until maximum output is obtained.





DIAL AND POINTER DRIVE CORD ARRANGEMENT

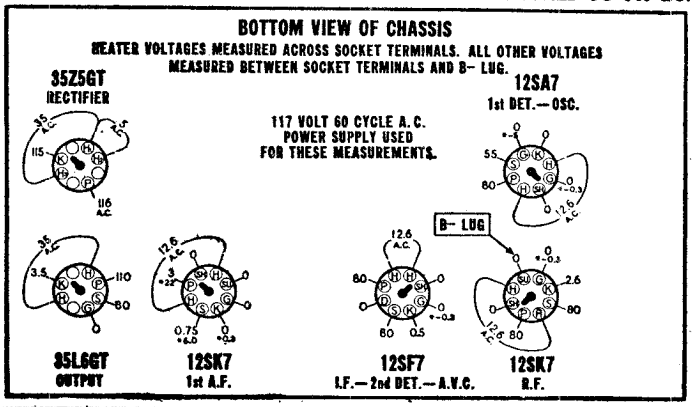
To string dial cord, set gang condenser to fully meshed position and use following parts:

114955 Clip on end of cord
117057 Cord (55 inches)
119087 Ring for dial cord
161384 Tension Spring

SOCKET VOLTAGES

Measured with voltmeter having sensitivity of 1000 ohms per volt except where indicated by (*).

VOLUME ON FULL WITH NO SIGNAL — DIAL TUNED TO 540 KC.


BOTTOM VIEW OF CHASSIS
HEATER VOLTAGES MEASURED ACROSS SOCKET TERMINALS. ALL OTHER VOLTAGES MEASURED BETWEEN SOCKET TERMINALS AND B- LUG.
35Z5GT RECTIFIER
117 VOLT 60 CYCLE A.C. POWER SUPPLY USED FOR THESE MEASUREMENTS.
12SA7 1st DET.—OSC.
B- LUG
35L6GT OUTPUT
12SK7 1st A.F.
12SF7 I.F.—2nd DET.—A.V.C.
12SK7 R.F.

REAR OF CHASSIS

*—Measured with vacuum tube voltmeter

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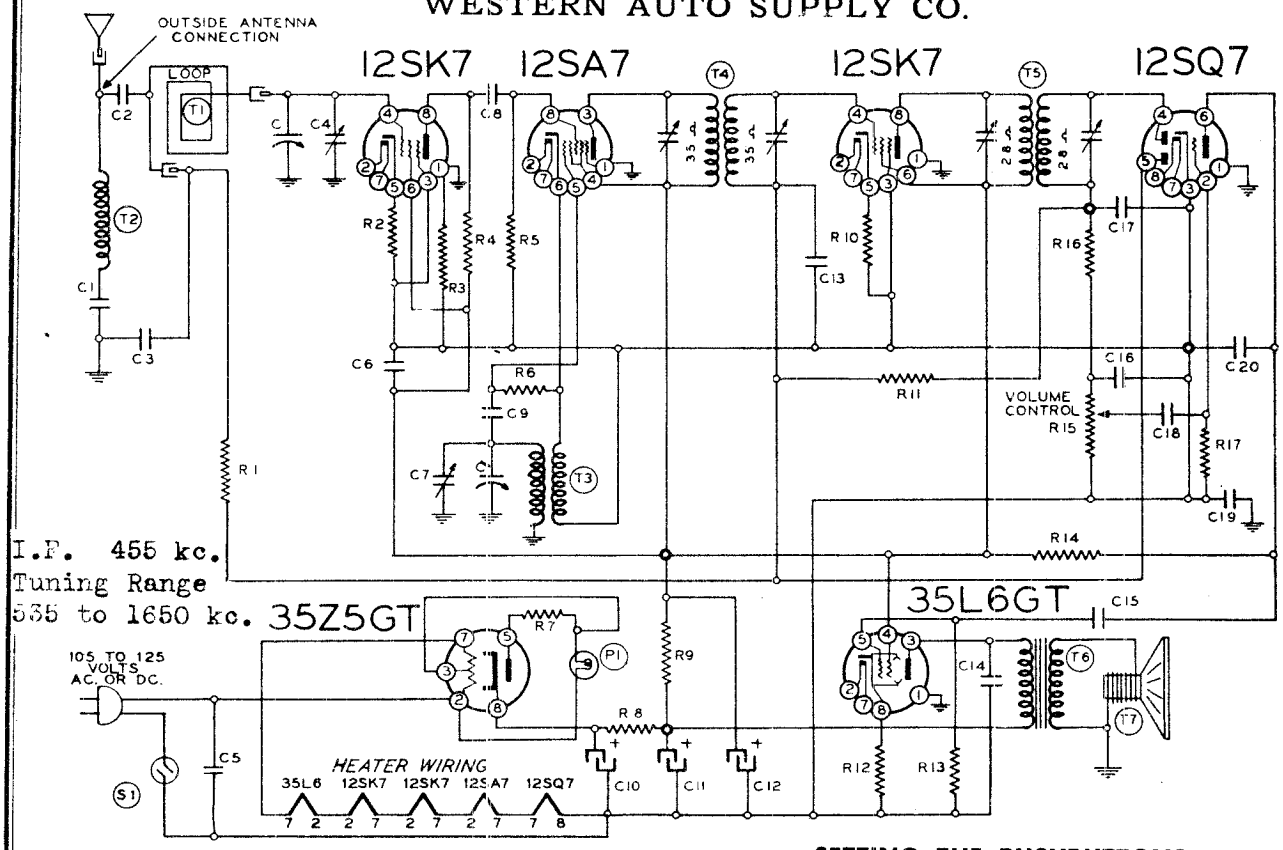
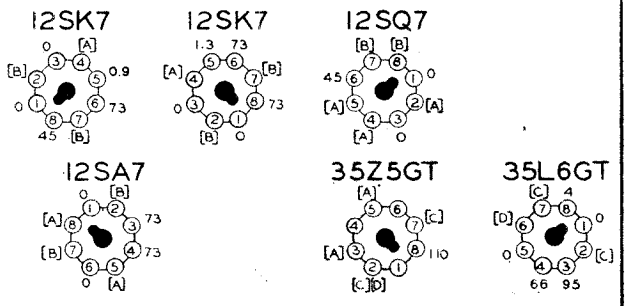


BOTTOM VIEW OF CHASSIS

VOLTAGES MEASURED WITH 1000 OHM PER VOLT VOLTMETER BETWEEN SOCKET TERMINALS AND B— WITH A LINE VOLTAGE OF 117 VOLTS A.C.

[A] CANNOT BE READ WITH VOLTMETER
[B] 12 VOLTS A.C. BETWEEN PINS MARKED B
[C] 32 VOLTS A.C. BETWEEN PINS 2 & 7
[D] 117 VOLTS A.C. BETWEEN PINS MARKED D



Voltages at tube socket terminals

IMPORTANT!

This receiver, unless otherwise marked, must be operated on an AC voltage of 105 to 125 volts, 50 to 60 cycles, or on a DC voltage of 105 to 125 volts. If you are in doubt as to the voltage of your power supply, consult your local power company. DO NOT INSERT THE PLUG IN THE POWER RECEPTACLE UNLESS YOU ARE SURE THAT THE CORRECT VOLTAGE IS AVAILABLE. Receivers of this same model which are for use on voltages other than those specified above are so marked.

SETTING THE PUSHBUTTONS

The pushbuttons may be used, after proper adjustment, for the automatic tuning of any six stations which you select. They can be set up in any order.

1. Turn on the radio. Allow it to warm up for at least one minute.
2. Push out the call letters of the six stations from the call-letter sheets supplied with this manual.
3. Insert one call-letter tab in the rectangular opening in each of the pushbuttons, in any sequence. Press an acetate tab (supplied in small envelope) into each of the pushbuttons.
4. Check to see that the locking screw in the center of the tuning knob (see illustration) is loose. If it is not, turn it several turns to the left (counterclockwise). A coin may be used for this purpose.
5. Press the first pushbutton down all the way. With one hand hold the button down firmly and with the other carefully tune in the desired station. Release the pushbutton.
6. Follow this procedure for each of the five other buttons, adjusting each one for a different station.
7. Rotate the tuning knob on the side of the cabinet as far to the right as it will go. Tighten the locking screw in the center of the knob. IT IS IMPORTANT THAT THIS SCREW BE TIGHTENED VERY FIRMLY.
8. The pushbuttons are now properly set for automatic tuning. Any of the six stations may now be tuned in simply by pressing the proper button down as far as it will go. If it is desired to reset any of the buttons for a new station, loosen the locking screw in the center of the tuning knob, set the pushbutton as described above, and re-tighten the locking screw.

Power consumption ..... 35 watts
Selectivity ..... 55 Kc. broad at 1000 times signal at 1000 Kc.

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MODEL D2615

WESTERN AUTO SUPPLY CO.
LIST OF REPLACEMENT PARTS

When ordering parts specify part number, model number, and series
Use Only Genuine Factory Replacement Parts

NOTE ON TUBE REPLACEMENT

Replace a defective metal 12SK7 tube with another metal tube. Replace a glass 12SK7 tube with either a metal tube or with an exact duplicate of the tube now in the set.

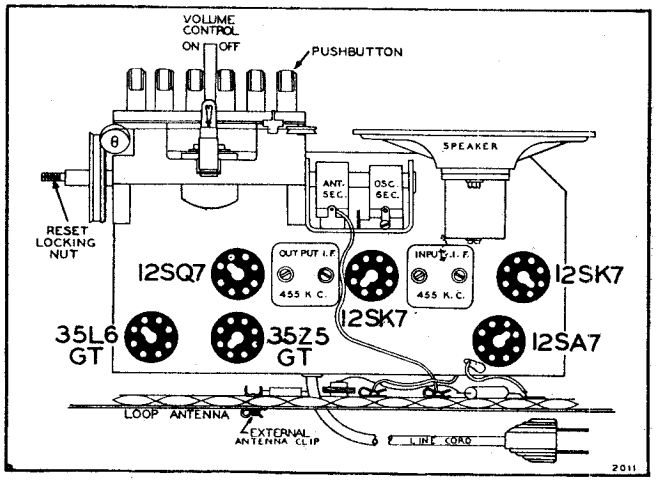
Schematic Diagram Symbol	Part No.	Description
		CONDENSERS
C1	10011	0.01 mfd., ±25%, 400 volts, tubular
C2	129132	0.000125 mfd., ±5%, mica
C3, C14	10026	0.02 mfd., ±25%, 400 volts, tubular
C5	1001	0.1 mfd., +50%-10%., 400 volts, tubular
C6	1006	0.25 mfd., ±20%, 200 volts, tubular
C8, C9, C17, C20	1295	0.0001 mfd., ±20%, mica
C10, C11, C12	11994	40 mfd., 20 mfd., 20 mfd., electrolytic (for 60 cycles)
	or	
C10, C11, C12	11995	60 mfd., 40 mfd., 40 mfd., electrolytic (for 25 cycles)
C13	1009	0.05 mfd., ±25%, 200 volts, tubular
C15	100106	0.004 mfd., ±10%, 600 volts, tubular
C16	12939	0.00005 mfd., ±20%, mica
C18	10025	0.002 mfd., ±25%, 600 volts, tubular
C19	100110	0.2 mfd., +30%-10%, 400 volts
		RESISTORS *
R1, R3	A-9B1-26	150,000 ohms, ±20%, ½ watt
R2	A-9B1-50	100 ohms, ±10%, ½ watt
R4	A-9B1-70	4700 ohms, ±10%, ½ watt
R5	A-9B1-25	100,000 ohms, ±20%, ½ watt
R6	A-9B1-82	47,000 ohms, ±10%, ½ watt
R7	A-9B1-42	22 ohms, ±10%, ½ watt
R8	A-9B2-54	220 ohms, ±10%, 1 watt
R9	A-9B2-63	1200 ohms, ±10%, 1 watt
R10, R12	A-9B1-52	150 ohms, ±10%, ½ watt
R11	A-9B1-34	3.3 megohms, ±20%, ½ watt
R13	A-9B1-29	470,000 ohms, ±20%, ½ watt
R14	A-9B1-27	220,000 ohms, ±20%, ½ watt
R16	A-9B1-23	47,000 ohms, ±20%, ½ watt
R17	A-9B1-35	4.7 megohms, ±20%, ½ watt
		COILS
T1, T2	B-13E-10213	Loop antenna, complete with back and loading coil.
T3	A-13D-10215	Oscillator coil assembly, complete
T4	108140G	Input I.F. coil assembly, complete in can
T5	108145C	Output I.F. coil assembly, complete in can
		SPEAKER
T7	114191	5-inch P.M. speaker, with bracket
T6	10595B	Output transformer for speaker

*The values of all resistors listed above are based on RMA standards. Due to conditions beyond our control some receivers have been shipped with resistors of pre-standardized values. This receiver will operate equally well with resistors of either group. An illustration of the difference follows:
Pre-standardized value—50,000 ohms, ±10%, 1/3 watt
RMA value—47,000 ohms, ±10%, 1/2 watt

Sensitivity (0.05 watt output).....10 microvolts ave.
Power output (in voice coil)
Undistorted .....1 watt
Maximum .....1.7 watts
Voice coil impedance.....3.2 ohms

Schematic Diagram Symbol	Part No.	Description
		DIAL AND TUNING PARTS
P1	107249	Pilot light bulb, 6-8 volts, type T-47
	107311	Socket assembly for pilot light
	112784	Station call letters, set of two sheets
	115448B	End plate for tuner assembly (end of chassis)
	115448D	End plate for tuner assembly (next to gang)
	115146	Cams (6 used on cam shaft)
	115143	Key washers (13 used on cam shaft)
	117528	Brass spacer (1 used on cam shaft)
	117602	Brass spacer (4 used on cam shaft)
	131181	Compression spring for locking collar
	117604	Locking collar
	117470	Brass spacer
	112746	Drive pulley
	117600	Lever shaft
	115361	Lever, assembled with cam roller
	120283	Return spring for lever
	117612	Stop rod for lever
	115543	Dial bracket with three pulleys
	112745	Pointer
	B-6D-10214	Dial scale, calibrated
	112744	Crystal, clear, to cover dial scale
	120285	Coil tension spring (inside of cam shaft string drum)
	117424	Locking screw, in center of tuning knob.
		MISCELLANEOUS
	121171	Tube sockets, 8-prong octal
R15, S1	101211	Volume control and on-off switch
C, C4, C7	B-8A-10212	Variable condenser, 2-gang
	10798D	Line cord and plug

We cannot supply speaker cones or fields separately. We can replace or repair a damaged speaker if it is returned to our factory, transportation charges prepaid.



Top view of chassis

ALIGNMENT PROCEDURE

- No aligning adjustments should be attempted until all other possible causes of trouble have been checked.
- Chassis must be removed from cabinet for proper alignment. Slight adjustments of the oscillator and antenna circuits can be made, without removing the chassis, through two holes provided on the bottom of the cabinet. The two adjustment screws can be reached with a long insulated screwdriver.
- It is important that during alignment the loop antenna be maintained at the same distance from the chassis as when the chassis is installed in the cabinet.
- Turn volume control to maximum for all adjustments.
- Connect ground post of signal generator to B— of radio through a 0.1 mfd. condenser.
- Connect dummy antenna value in series with generator output lead.
- Connect output meter across primary of output transformer.

Band	Signal Generator Frequency Setting	Dummy Antenna	Connection to Radio	Tuning Condenser Setting	Adjust for maximum output (see chassis view)
I.F.	455 Kc.	.1 mfd.	Grid of 12SA7	Rotor full open (plates out of mesh)	4 trimmers on input and output I.F. transformers
Broadcast	1650 Kc.	.1 mfd.	Grid of 12SA7	Rotor full open (plates out of mesh)	Oscillator trimmer C7 on bottom of radio
	1400 Kc.	None	See note below	Set dial at 1400 Kc.	Antenna trimmer C2 on bottom of radio

Note: Lay output lead of generator in back of loop antenna. Turn up generator output. Loop antenna will pick up energy.

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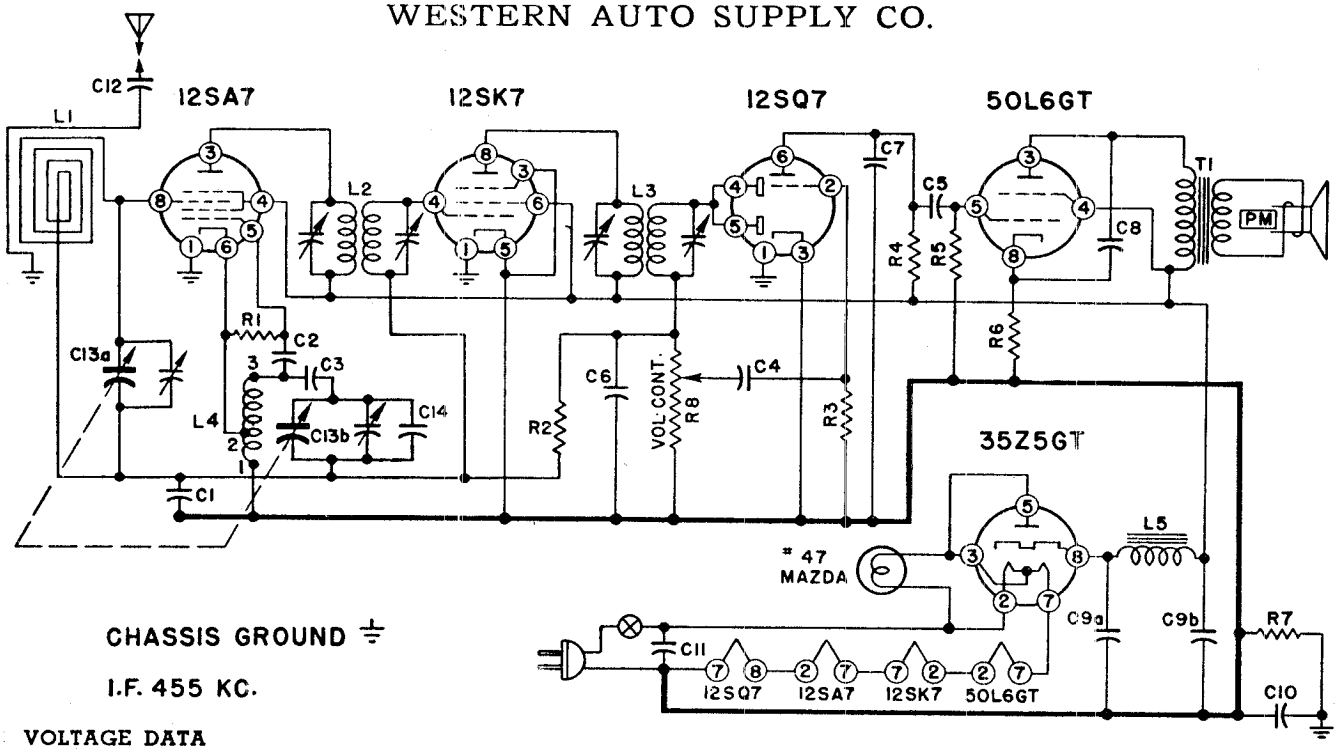
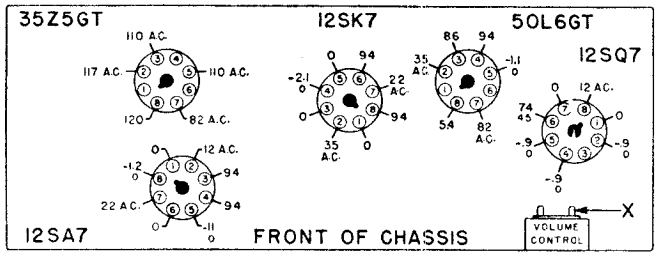


VOLTAGE DATA

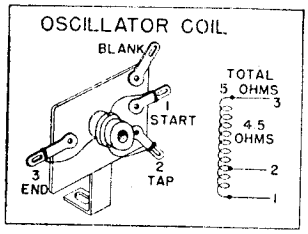
Voltages are measured from the socket terminals and the point marked "X" on the voltage chart. With the dial tuned to the low frequency end, no signal and the volume control set at maximum, a vacuum tube voltmeter was used for all readings. The A.C. line input was 117 volts A.C. for all measurements shown. Where use of a 1000 ohm per voltmeter would result in noticeably lower readings due to the increased drain of this type of instrument, a second reading is shown directly below the initial reading.

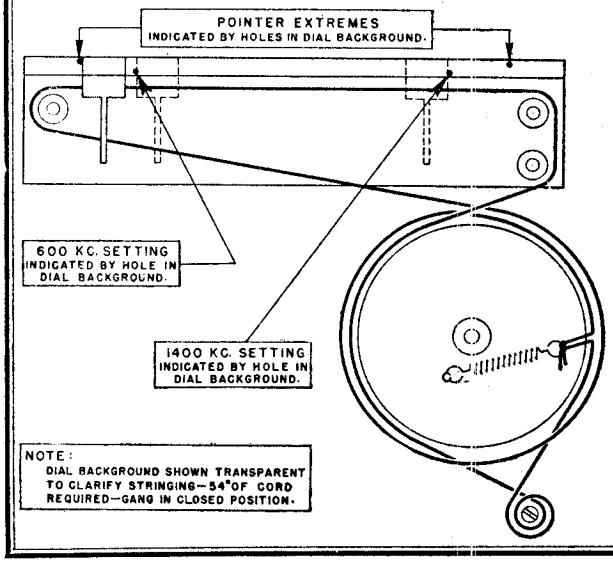


VOLTAGE CHART — BOTTOM VIEW

TRUETONE TUBES USED

12SA7—1st Det. Osc.
12SK7—I. F. Amplifier
12SQ7—2nd Det. — A. V. C. — 1st Audio
50L6 GT—Beam Power Output
35Z5 GT—Rectifier




POINTER EXTREMES INDICATED BY HOLES IN DIAL BACKGROUND.
600 KC. SETTING INDICATED BY HOLE IN DIAL BACKGROUND.
1400 KC. SETTING INDICATED BY HOLE IN DIAL BACKGROUND.
NOTE:
DIAL BACKGROUND SHOWN TRANSPARENT TO CLARIFY STRINGING—54" OF CORD REQUIRED—GANG IN CLOSED POSITION.

POWER SUPPLY

This receiver is designed to operate from any AC (Alternating Current) power supply line of 110-120 volts, 50-60 cycles or DC (Direct Current) power supply line of 110-120 volts. If the receiver fails to operate after several minutes on DC, reverse the power line plug.

On AC only the line plug should be tried both ways and left in a position that gives minimum hum.

ALIGNING INSTRUCTIONS

All of the adjustments have been very carefully set with signal generators at the factory and require no further adjustment, unless it becomes necessary to replace a coil or transformer, or if the adjustments have been tampered with in the field. Under no circumstances attempt any adjustments without first making certain that adjustment is necessary and only after voltages, tubes and condensers have been checked and found to be normal. To properly re-align this receiver, a signal generator as well as an output meter, must be used. (See next page for full instructions.)

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MODEL D2620

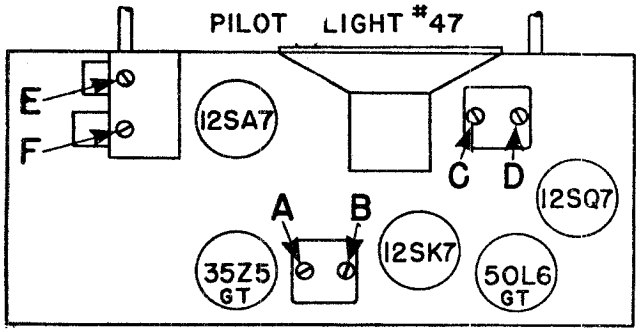
WESTERN AUTO SUPPLY CO.
ALIGNMENT PROCEDURE

- Volume control—Maximum all adjustments.
- Connect radio chassis to ground post of signal generator with a short heavy lead.
- Connect dummy antenna value in series with generator output lead, when needed (see below).
- Connect output meter across primary of output transformer.
- Allow chassis and signal generator to "heat up" for several minutes.

The following equipment is required for aligning:

- An all wave signal generator which will provide an accurately calibrated signal at the test frequencies as listed.
- Output indicating meter.
- Non-metallic screwdriver.

Dummy antenna—.1 mf.



BACK OF CHASSIS

BAND	SIGNAL GENERATOR Frequency Setting	Dummy Antenna	Connection to Radio	Variable Condenser Setting	Trimmers Adjusted (In Order Shown)	Trimmer Function	Adjustment
I. F.	455 KC.	.1 MFD.	Gang Condenser Ant. Stator	Rotor full open (Plates out of mesh)	C, D	Output I.F.	Adjust to maximum output
	455 KC.	.1 MFD.	Gang Condenser Ant. Stator	Rotor full open (Plates out of mesh)	A, B	Input I.F.	Adjust to maximum output
BROAD-CAST	1630 KC.	.1 MFD.	Gang Condenser Ant. Stator	Rotor full open (Plates out of mesh)	E gang-front	Oscillator	Adjust to maximum output
	1400 KC.	Inductive Coupling—Use a loop or place Gen. lead close to Rec. loop. No connection bet. Receiver and Generator		Set dial to tune in Generator Signal	F gang-rear	Antenna	Adjust to maximum output

This is all that is necessary for the alignment unless the plates of the gang have been bent out of shape. In case of bent plates, set the signal generator and receiver to 600 KC and bend the plates into the position for maximum output.

Attenuate the signal from the signal generator to prevent the leveling-off action of the AVC. After each band is completed, repeat the procedure as a final check.

Frequency Range—540 to 1630 K.C.

Intermediate Frequency 455 K.C. Power consumption 30 watts.

REPLACEMENT PARTS

PAPER CONDENSERS

Part No.	Symbol No.	Description
64B1-12	C-12	Condenser, Tubular .005 mfd. 600 V.
64B1-22	C-11	Condenser, Tubular .05 mfd. 400 V.
64B1-24	C-3, C-8	Condenser, Tubular .02 mfd. 400 V.
64B1-25	C-4, C-5	Condenser, Tubular .01 mfd. 400 V.
64B1-30	C-1	Condenser, Tubular .01 mfd. 200 V.
64A2-1	C-10	Condenser, Tubular .2 mfd. 900 V.

VARIABLE CONDENSERS

68A2	C-13a, C-13b	Condenser, Gang

MICA CONDENSERS

65B5-5	C-14	Condenser, Mica 20 mmf. ±10%
65B5-11	C-2	Condenser, Mica 50 mmf. ±10%
65B7-22	C-6	Condenser, Mica 250 mmf. ±20%
65B7-27	C-7	Condenser, Mica 500 mmf. ±20%

ELECTROLYTIC CONDENSERS

67A3	C-9a	30 mfd. 150 V.
	C-9b	50 mfd. 150 V.

RESISTORS

60B8-151	R-6	150 ohm ½ W. ±10%
60B8-223	R-1	22,000 ohm ½ W. ±10%
60B8-154	R-7	150,000 ohm ½ W. ±10%
60B8-224	R-4	220,000 ohm ½ W. ±10%
60B8-474	R-5	470,000 ohm ½ W. ±10%
60B8-105	R-2	1 meg ½ W. ±10%
60B8-106	R-3	10 meg ½ W. ±10%
75B1-6	R-8	1 meg Volume Control & Switch

TRANSFORMERS and COILS

69B4	L-1	Antenna, Loop
72B3	L-2	Transformer, 1st I. F.
72B4	L-3	Transformer, 2nd I. F.
69A5	L-4	Oscillator, Coil
74A1	L-5	Choke Coil (Filter)
		Transformer, Output
		(Specify full part number of Speaker, including Mfg. Code when ordering)

MISCELLANEOUS (Alphabetical)

Part No.	Description
X22C3-1	Background, Dial
35C29	Cabinet (Wood) (D-2620)
43B17	Cover, Back
89A1	Cord, Line
50A1-1	Cord, Dial (54")
A10I2	Drum and Hub Assy., Dial
23A7-1	Escutcheon
12A1-2	Grommets, Rubber
33A10-2	Knob, Walnut
1A67-29-2	Mounting Bolts, 8-32x¾" lg.
81A1-8	Pilot Light #47
82A2-3	Pilot Light Socket & Leads
25A10-3	Pointer Slide
25A11-3	Pointer Clip
25A12-1	Pointer
17A1-3	Pulley, Fibre Dial
21B16	Scale, Glass Dial
28A1-1	Shaft, Tuning
13A1-4-47	Snap Buttons, (Cabinet Back)
87A10-2	Socket, Laminated Octal Tube
78B4-1	Speaker, 5" PM and Output Trans.
19A1-3	Spring, Dial Cord Tension

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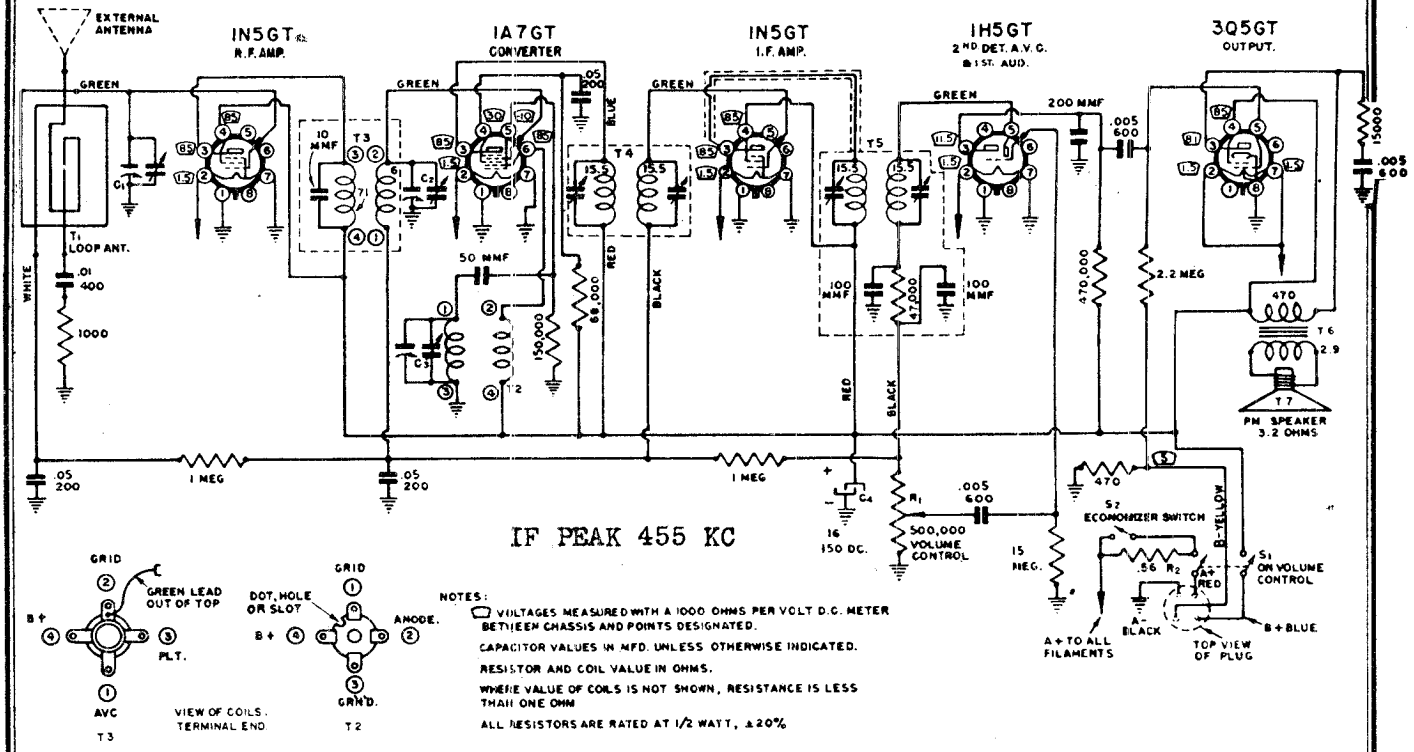
WESTERN AUTO SUPPLY CO. OF CAL.

MODEL 43-6451



SERVICE PARTS LIST MODEL 43-6451

Order Parts by Model No. and Part No.

Part No.	Name
25296	Adaptor, for use with 2 volt storage battery.
25566	Bearing (for wood pulleys)
25561	Cabinet
25597	Coil, R. F. (T3)
25598	Coil, Oscillator (T2)
25600	Condenser, Electrolytic 16 Mfd, 150 V. (C4)
25592	Condenser—Tuning, 3 Gang, less Tuning Shaft (C1, C2, C3)
25367	Control, Volume, with On-Off Switch (R1)
25811	Cord, Dial, complete with Spring and Pointer Coupling
25696	Knob, Tuning or Volume
25609	Loop (T1)
25612	Plug, Battery Cable 4 Prong
	Pointer, Dial — See, "Track-Pointer"
25336	Pulley—Wood
25616	Scale, Dial
25766	Shaft—Tuning with "spool" pulley
25620	Socket—Tube
25593	Speaker 5" P. M. Dynamic (T7) (less Transformer)
25319	Switch, Economizer (S2)
25808	Track, Pointer, complete with Brackets and Pointer
25621	Transformer I. F. Input (T4)
25622	Transformer I. F. Output (T5)
25594	Transformer—Speaker Output (T6)

Reference Numbers such as (C4) are shown on circuit diagram.

Parts not listed above, may be ordered by part number as shown in the picture and by complete description, send a sketch if possible.

We cannot supply speaker cones. We can replace or repair a damaged speaker for a nominal price if it is returned to our factory, transportation charges prepaid.

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MODEL 43-6451

WESTERN AUTO SUPPLY CO. OF CAL.

Model 43-6451

Five Tube Battery Radio

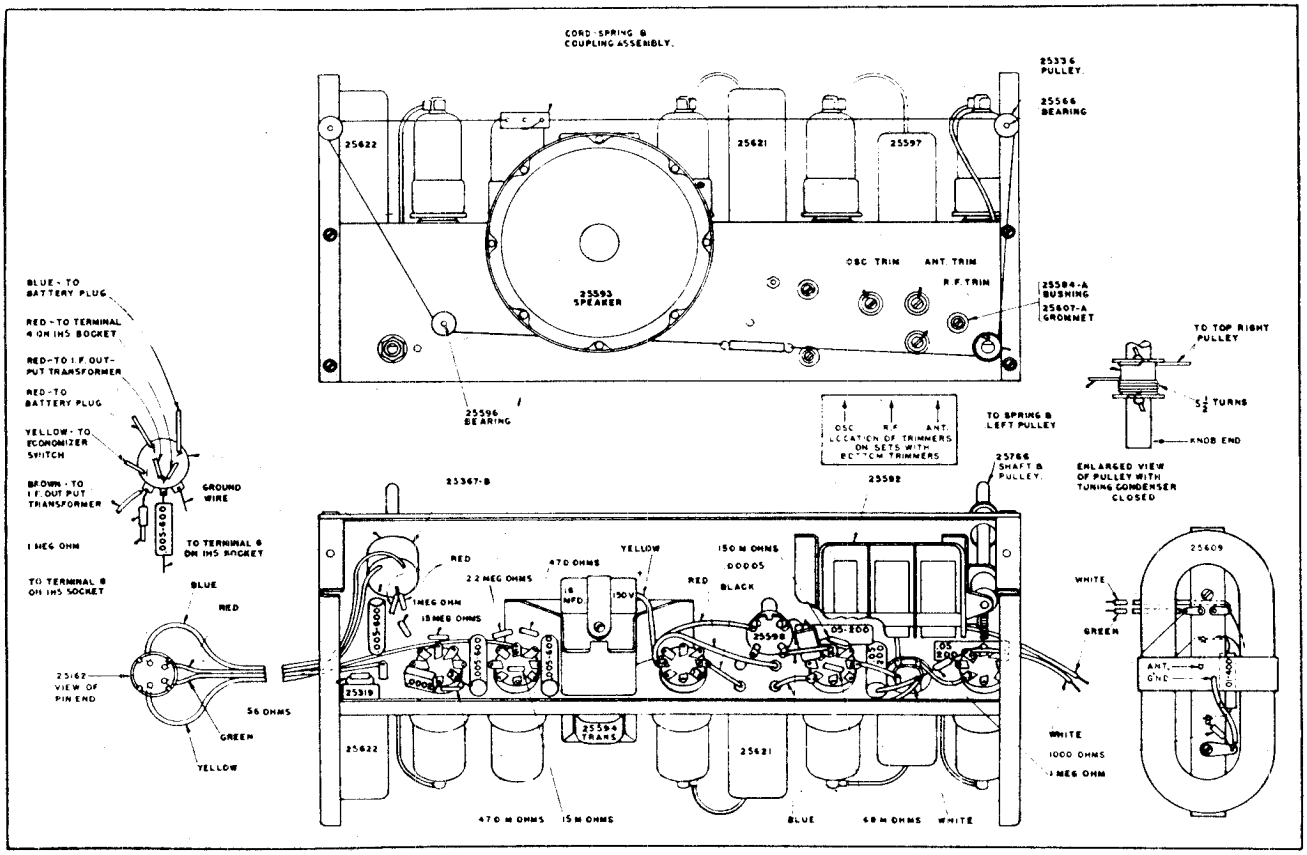
Service Notes

How To Remove Chassis From Cabinet—Remove knobs by pulling straight off, disconnect battery by removing plug, and remove two screws inserted through bottom of cabinet. Chassis can be removed now. To REMOVE GLASS DIAL—remove the four wood screws which are inserted from the interior of cabinet. (Note—After installing chassis in cabinet see that the bakelite strip attached to dial cord is engaged with the pin on the dial pointer.)

To Properly Align—Remove chassis from cabinet, and align I. F. Transformers in the conventional manner with a test oscillator adjusted to 455 KC, connected to the grid of the 1A7GT through a .1 Mfd condenser, with the tuning condenser set at minimum capacity. To align tuning condenser, connect test oscillator to antenna wire (green) through a .0001 Mfd. condenser. Adjust oscillator trimmer condenser (located on left top) to 1620 KC with tuning condenser at minimum capacity (completely out of mesh). The antenna and R. F. sections are trimmed at 1400 KC. Antenna trimmer is top right; R. F. trimmer is below at right. Dial pointer may be adjusted to scale by slipping bakelite pointer coupling on dial cord.

Battery Unit Voltages—Should be checked with receiver turned on—if B voltage is below 60 Volts, battery unit should be replaced.

Dial Cord Replacement—Is best accomplished by replacing complete cord assembly #25811, which is made up to correct length. In an emergency 30 lb. fish line may be used. See picture of chassis for correct installation.



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WESTERN AUTO SUPPLY CO. OF CAL.

MODEL 43-8685

Model 43-8685

Six Tube AC Operated Radio
Including Rectifier

Service Notes

The circuit diagram below is complete and will enable the serviceman to check all component parts in the event service is required. Voltages at various important points are indicated, as well as values of condensers and resistors.

REMOVAL OF CHASSIS—Disconnect set from wall plug. Remove knobs by pulling straight out. Remove loop plug on back of chassis. Remove two screws under cabinet, chassis may be withdrawn from rear.

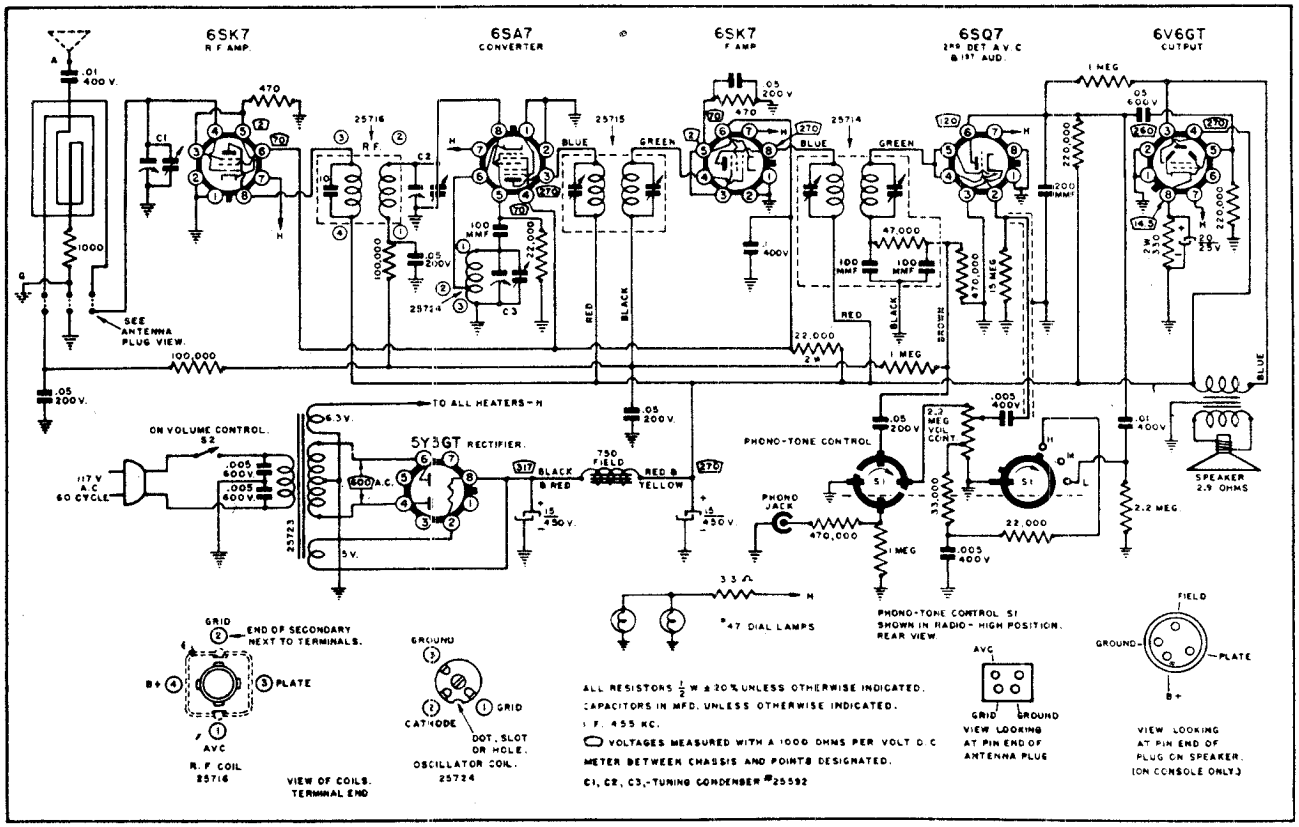
ALIGNMENT—Sets are properly aligned at the factory with precision equipment and the adjustments should not be disturbed unless a coil, tuning condenser or IF transformer has to be replaced or the set has been subject to damage or tampering. Alignment should only be done with the aid of an accurate signal generator and output indicating instrument.

TO PROPERLY ALIGN—Remove chassis from cabinet, and align I. F. Transformers in the conventional manner with a Signal Generator adjusted to 455 KC, connected to the grid of the 6SA7 through a .1 Mfd. condenser, with the tuning condenser set at minimum capacity. To align tuning condenser, carefully place loop in normal relation to chassis, connect Signal Generator to antenna clip through a .0001 Mfd. condenser. Adjust oscillator trimmer condenser (located on left top) to 1620 KC with tuning condenser at minimum capacity (complete out of mesh). The antenna and R. F. sections are trimmed at 1400 KC. Antenna trimmer is top right; R. F. trimmer is below at right. Dial pointer may be adjusted to scale by slipping pointer coupling on dial cord.

DIAL CORD REPLACEMENT—Is best accomplished by replacing complete cord assembly No. 25834 which is made up to correct length. In an emergency 30 lb. fish line may be used. See picture of chassis for correct installation.

DIAL SCALE REPLACEMENT—Remove chassis. Remove pointer track by removing the two wood screws holding it to the cabinet. Dial scale may now be lifted out from front of cabinet. When installing new scale —see that long screws in track bracket engage the notches in the ends of the scale.

INSTALLING CHASSIS—Replace chassis in cabinet—noting that shafts are approximately centered in holes. Replace screws under base of cabinet, replace loop plug, push knobs on shafts. Hold the pointer, back of dial, near center of scale, with your finger or any small instrument, turn the tuning knob to the right or left until the pointer drive coupling connects itself with the pointer.


6SK7
R F AMP.
6SA7
CONVERTER
6SK7
I F AMP
6SQ7
2ND DET A V C & 1ST AUD.
6V6GT
OUTPUT
5Y3GT RECTIFIER.
TO ALL HEATERS - H
ON VOLUME CONTROL S2
117 V A C 60 CYCLE
PHONO-TONE CONTROL
PHONO JACK
SPEAKER 2.9 OHMS
47 DIAL LAMPS
PHONO-TONE CONTROL S1 SHOWN IN RADIO - HIGH POSITION. REAR VIEW.
VIEW OF COILS. TERMINAL END
OSCILLATOR COIL. 25724
VIEW LOOKING AT PIN END OF ANTENNA PLUG
VIEW LOOKING AT PIN END OF PLUG ON SPEAKER. (ON CONSOLE ONLY.)
ALL RESISTORS 1/2 W & 20% UNLESS OTHERWISE INDICATED.
CAPACITORS IN MFD. UNLESS OTHERWISE INDICATED.
I. F. 455 KC.
VOLTAGES MEASURED WITH A 1000 OHMS PER VOLT D C METER BETWEEN CHASSIS AND POINTS DESIGNATED.
C1, C2, C3,-TUNING CONDENSER #25592

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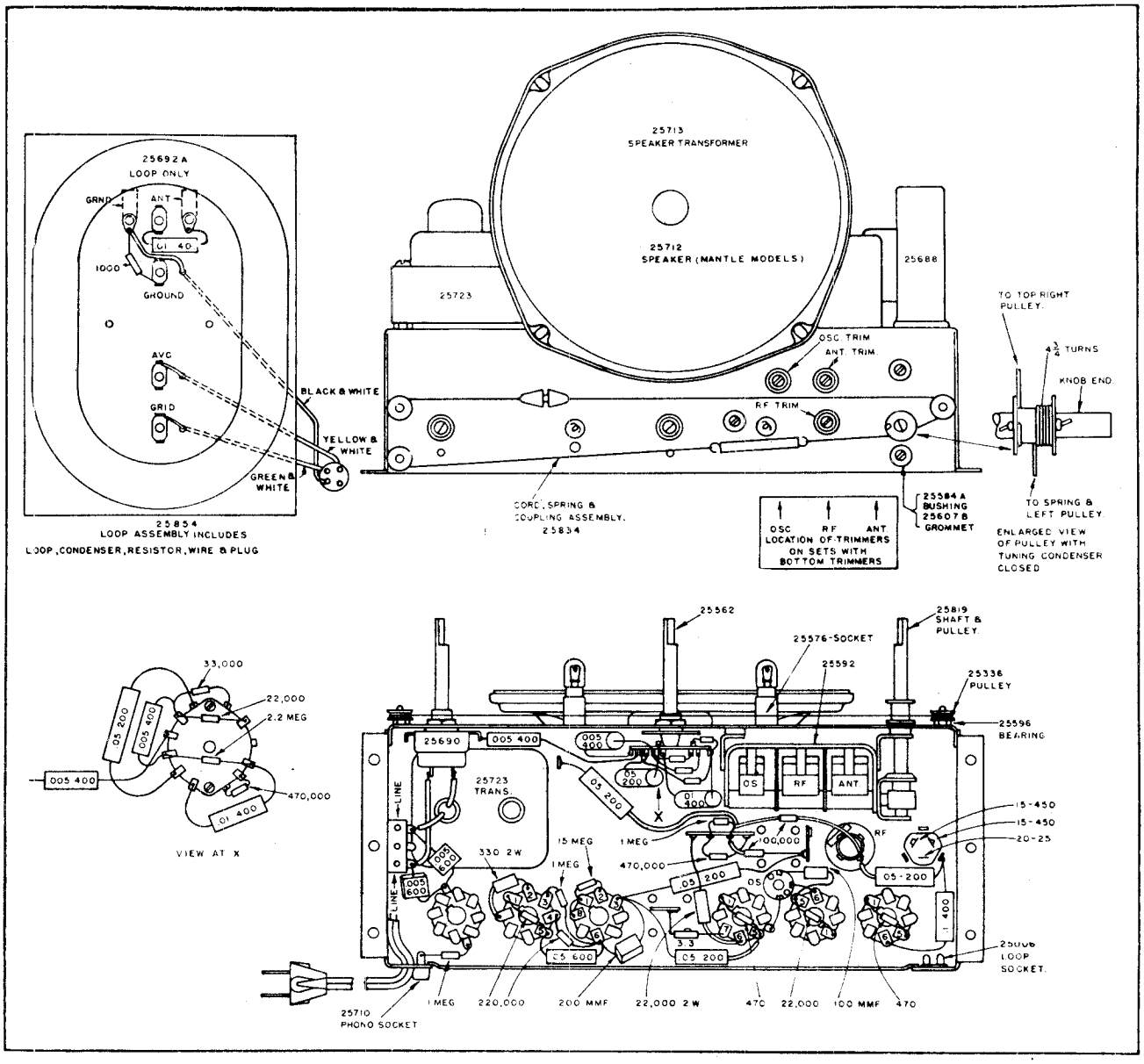
MODEL 43-8685

WESTERN AUTO SUPPLY CO. OF CAL.



SERVICE PARTS LIST

MODEL 43-8685

When ordering parts always mention complete factory model number, series and issue.

Part No.	Description
25692	Antenna—Loop
25596	Bearings—For Wood Pulleys
25572	Bracket—Tuning Condenser—Front
25573	Bracket—Tuning Condenser—Rear
25574	Bracket—Speaker
25765	Bracket—Pointer Track
25660	Cabinet
25597	Coil—R. F.
25724	Coil—Oscillator
25688	Condenser—Filter 15-450, 15-450, 20-25
25592	Condenser—Tuning C-1, C-2, C-3
25690	Control—Volume (with AC Switch S-2)
25068	Cord—AC and Plug
25834	Cord—Dial (includes Spring and Pointer Coupling)
25751	Dial Scale Glass
25578	Dial Pointer
25829	Knob—Tone
25696	Knob—Volume and Tuning
25710	Phono—Pick-Up Socket
25693	Plug—For Loop

Part No.	Description
25336	Pulley—Wood—Small
25819	Pulley—Manual Drive With Shaft
25607	Rubber—Grommets
25774	Screw—Set For Worm Gear (Tuning Condenser)
25576	Socket—Dial Lamp
25620	Socket—Octal
25006	Socket—For Loop
25712	Speaker—With Transformer
25562	Switch—Tone S-1,
25711	Track—Pointer
25715	Transformer—I. F. Input
25714	Transformer—I. F. Output
25713	Transformer—Output- Speaker
25723	Transformer—Power 60 Cycles

Note: Resistors and condensers not listed will be supplied on order—specify value.

We cannot supply speaker cones. We can replace or repair a damaged speaker for a nominal price if it is returned to our factory, transportation charges prepaid.

In ordering any part not listed give complete description and a sketch, if possible.

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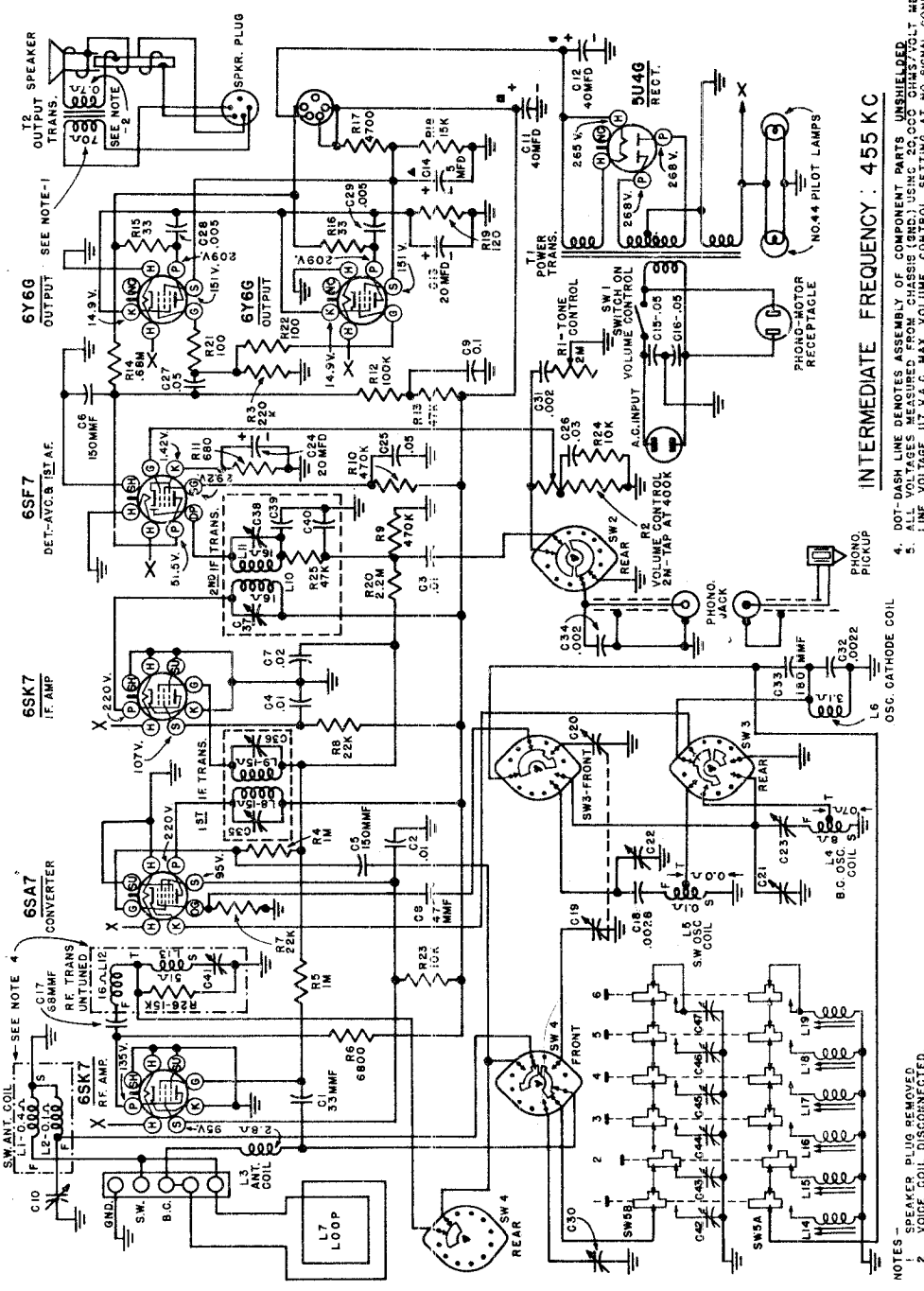
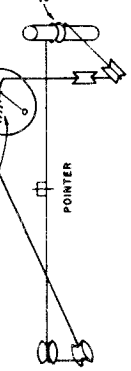
WESTINGHOUSE ELECTRIC CORP.

MODELS H104,H105,H107, H108,H110,H111,H137, H138



NOTES-
1. SPEAKER PLUG REMOVED.
2. VOICE COIL DISCONNECTED.
3. SWITCH SHOWN AS VIEWED FROM FRONT OF SET IN P.B-B.C. POSITION.
EXTREME COUNTER CLOCKWISE POSITION IS PHONO.
SECOND POSITION CLOCKWISE IS P.B-B.C. BAND.
THIRD POSITION CLOCKWISE IS MANUAL B.C. BAND.
FOURTH POSITION CLOCKWISE IS S.W. BAND.
4. DOT-DASH LINE DENOTES ASSEMBLY OF COMPONENT PARTS UNSHIELDED.
5. ALL VOLTAGES MEASURED FROM CHASSIS (GND.) USING 20,000 OHMS/VOLT METER.
LINE VOLTAGE 117 V.A.C. MAX. VOLUME CONTROL SETTING AT NO SIGNAL CONDITIONS FOR THE BROADCAST BAND.
READINGS SHOULD APPROXIMATE THE VALUES SHOWN WITHIN 20 PERCENT.

Tuning Drive Ratio ..... 30 to 1



DIAL DRIVE MECHANISM

PUSH BUTTONS

Push buttons 1 to 3 are designed to receive stations from 900 to 1600 kc; push buttons 4 to 6 are designed to receive stations from 540 to 900 kc.

1. Turn on radio and allow it to warm up for five minutes.
2. Set the phono-band switch on "BROADCAST." Tune in the desired station in the frequency range 900 to 1600 kc.
3. Reset the phono-band switch on "PUSH BUTTON" and depress the first push button (right button, viewed from the front). Adjust L14, using a small long-handled screwdriver, to receive the station. Adjust C42 for maximum volume on the station.
4. Return the band switch to "BROADCAST" to make sure that the push button has been set to the desired station.
5. Adjust remaining push buttons in the same manner.

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Record Changer: For H107,H108, General Instrument Model 205; For H110,H111, General Instrument Model 204

MODELS H104, H105, H107, H108, H110, H111, H137, H138

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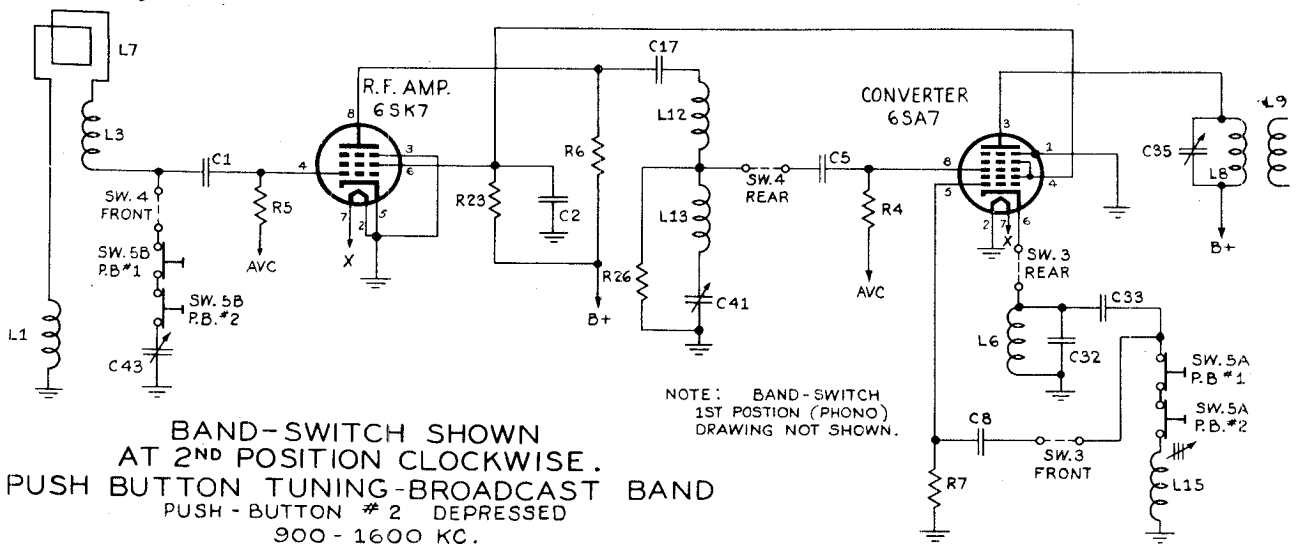
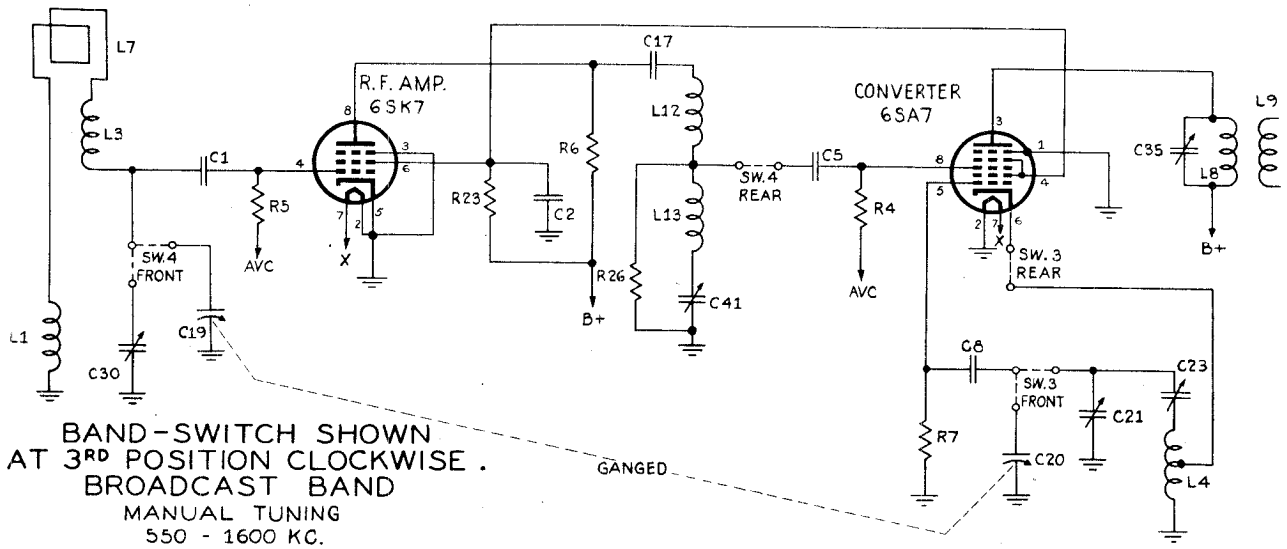
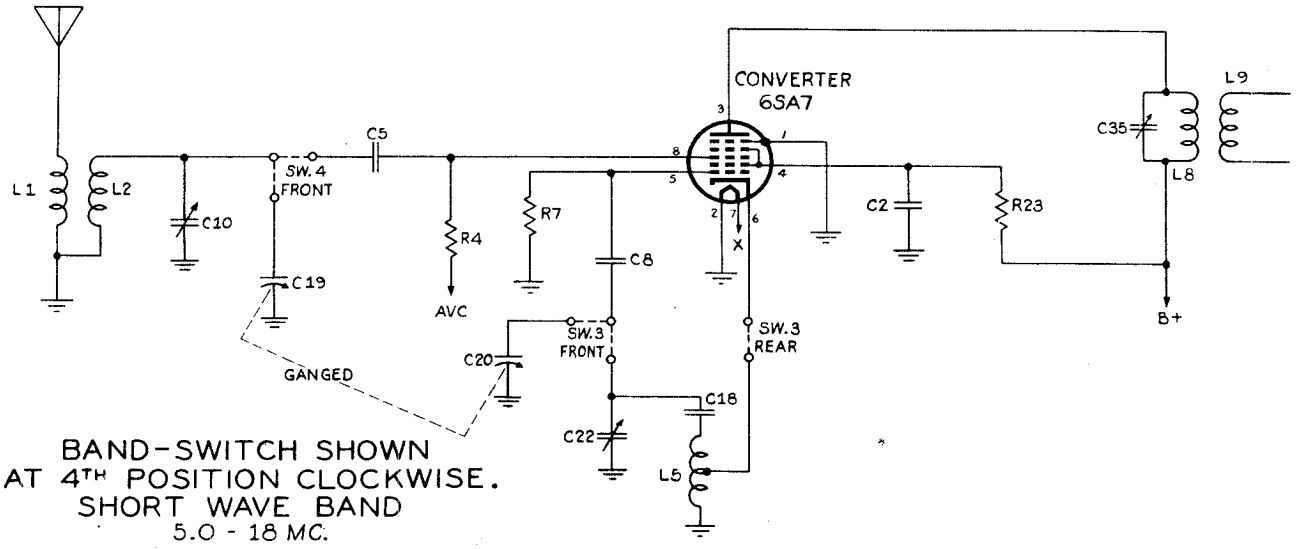


BAND-SWITCH SHOWN AT 2ND POSITION CLOCKWISE.
PUSH BUTTON TUNING-BROADCAST BAND
PUSH-BUTTON # 2 DEPRESSED
900 - 1600 KC.



BAND-SWITCH SHOWN AT 3RD POSITION CLOCKWISE.
BROADCAST BAND
MANUAL TUNING
550 - 1600 KC.



BAND-SWITCH SHOWN AT 4TH POSITION CLOCKWISE.
SHORT WAVE BAND
5.0 - 18 MC.

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WESTINGHOUSE ELECTRIC CORP.

MODELS H104, H105, H107, H108, H110, H111, H137, H138

SPECIAL PROVISIONS:

H-137 & H-138 ..... Phonograph, FM and television sound input. 110 volt A-C outlet for phonograph motor at rear of chassis.

H-110 & H-111 ..... FM and television sound input at rear of chassis.

SPECIAL PROVISIONS:

H-104 & H-105 ..... Phonograph, F.M. and television sound input. 110 volt A-C outlet for phonograph motor at rear of chassis.

H-107 & H-108 ..... F.M. and television sound input at rear of chassis.

FREQUENCY RANGES:

Standard Broadcast	550 to 1600 kc.
International Short Wave	5.0 to 18 mc.

POWER CONSUMPTION:

H-104 & H-105	145 watts
H-107 & H-108	185 watts

POWER CONSUMPTION:

H-137 & H-138	145 watts
H-110 & H-111	185 watts

PILOT LAMPS: (2),
Westinghouse No. 44, 6.3 volts, 0.25 amps.

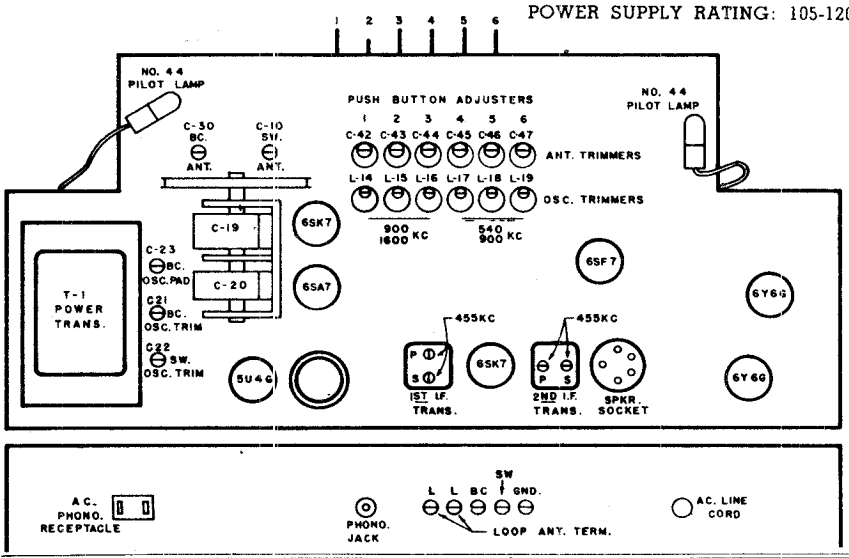
POWER OUTPUT:

Undistorted (radio)	10 watts
Undistorted (phonograph)	10 watts
Maximum	15 watts

LOUDSPEAKER:

Type	Electro-dynamic
Field Resistance	200 ohms
Voice Coil Impedance	3.2 ohms
Size (H-104 & H-105)	6 inches
Size (H-107 & H-108)	8 inches

POWER SUPPLY RATING: 105-120 volts, 50-60 cycles A-C



Steps	Connect Signal Generator to—	Adjust Signal Generator to—	Tune Radio Dial to —	Adjust
1	6SK7, i-f amplifier, control grid through a 0.1 mfd. capacitor	455 kc	550 kc	secondary trimmer of 2nd i-f transformer for maximum output
2	6SK7, i-f amplifier, control grid through a 0.1 mfd. capacitor	455 kc	550 kc	primary trimmer of 2nd i-f transformer for maximum output
3	6SA7, converter, control grid through a 0.1 mfd. capacitor	455 kc	550 kc	secondary trimmer of 1st i-f transformer for maximum output
4	6SA7, converter, control grid through a 0.1 mfd. capacitor	455 kc	550 kc	primary trimmer of 1st i-f transformer for maximum output
5	6SA7, converter, control grid through a 0.1 mfd. capacitor	455 kc	550 kc	"peak" all i-f trimmers for maximum output
6	6SK7, r-f amplifier, control grid through a 0.1 mfd. capacitor	455 kc	550 kc	i-f rejection trap trimmer for minimum output
7	"B.C." antenna terminal through a 200 mmfd. capacitor	600 kc	600 kc	broadcast band "oscillator padder" for maximum output
8	"B.C." antenna terminal through a 200 mmfd. capacitor	1620 kc	minimum capacity stop	broadcast band "oscillator trimmer" for maximum output
9	recheck steps 7 and 8 in order given			
10	radiated signal (no actual connection)	1400 kc	1400 kc	broadcast band "antenna trimmer" for maximum output
11	set phono-band switch on position "4"			
12	"S.W." antenna terminal through 400 ohm resistor	18.5 mc	minimum capacity stop	short wave "oscillator trimmer" for maximum output
13	radiated signal (no actual connection)	16 mc	16 mc	short wave "antenna trimmer" for maximum output

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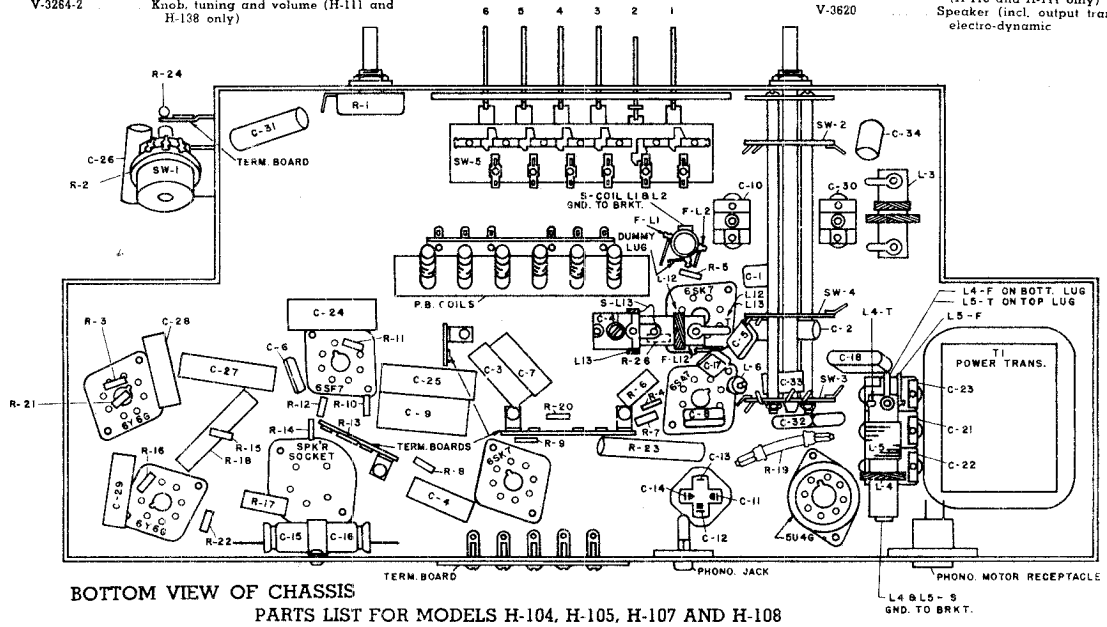
MODELS H104, H105, H107, H108, H110, H111, H137, H138 WESTINGHOUSE ELECTRIC CORP.

PARTS LIST FOR MODELS H-110, H-111, H-137 AND H-138

The parts listed below for the MODELS H-104, H-105, H-107and H-108 apply to MODELS H-110, H-111, H-137 and H-138 with the following exceptions:

V-3390	Decal, band (H-110 and H-111 only)
V-3792	Decal, band (H-137 and H-138 only)
V-3197	Decal, tone (H-110 and H-111 only)
V-3791	Decal, tone (H-137 and H-138 only)
V-3262-1	Knob, tone (H-110 and H-137 only)
V-3262-2	Knob, tone (H-111 and H-138 only)
V-3262-3	Knob, band (H-110 and H-137 only)
V-3262-4	Knob, band (H-111 and H-138 only)
V-3264-1	Knob, tuning and volume (H-110 and H-107 only)
V-3264-2	Knob, tuning and volume (H-111 and H-138 only)
V-3832-1	Cardboard and grille cloth assy., speaker section (H-110 only)
V-3832-2	Cardboard and grille cloth assy., speaker section (H-111 only)
V-3833-1	Cardboard and grille cloth assy., record storage section (H-110 only)
V-3833-2	Cardboard and grille cloth assy., record storage section (H-111 only)
V-3686-1	Grille cloth, speaker (H-137 only)
V-3686-2	Grille cloth, speaker (H-138 only)
V-3283-1	Loop assembly (L7)
V-3229-2	Moulding, dial
V-3534	Plate, front glass (H-110 only)
V-3819	Plate, front glass (H-111 only)
V-3813	Plate, front glass (H-137 only)
V-3685	Plate, front glass (H-138 only)
V-3639-1	Slide mechanism, left hand unit (H-110 and H-111 only)
V-3639-2	Slide mechanism, right hand unit (H-110 and H-111 only)
V-3620	Speaker (incl. output trans. T2) 10" electro-dynamic



BOTTOM VIEW OF CHASSIS

PARTS LIST FOR MODELS H-104, H-105, H-107 AND H-108

When ordering parts specify model number of set in addition to part number and description of part.

Part No.	Description
V-3615	Asbestos sheet (H-104 and H-105 only)
V-3186	Background, felt
V-3532S	Bar, flat, for phono mtg. (H-107 and H 108 only).
V-3336	Bracket assembly, dial background
V-3185	Bracket, dial light
V-1102-1	Cabinet (H-104 only)
V-1102-2	Cabinet (H-105 only)
RCM20A330M	Capacitor, 33 mmf mica (C1)
RCP10W4103A	Capacitor, 0.01 mfd 400 v. (C2, C3, C4)
RCM20A151M	Capacitor, 150 mmf mica (C5, C6)
RCP10W4203A	Capacitor, 0.02 mfd 400 v. (C7)
RCM20B470M	Capacitor, 47 mmf mica (C8)
RCP10W4104A	Capacitor, 0.1 mfd 400 v. (C9)
V-3170	Capacitor, S.W. ant. trimmer (C10)
V-3216	Capacitor, electrolytic, 40 mfd 350 v. (C11), 40 mfd 350 v. (C12), 20 mfd 25 v. (C13), 5 mfd 250 v. (C-14)
V-3241	Capacitor, dual line filter (C15, C16)
RCM20A680M	Capacitor, 68 mmf mica (C17)
RCM30C282H	Capacitor, 0.0028 mfd S.W. padder (C18)
V-3233	Capacitor, variable, 2-gang (C19, C20)
V-3217	Capacitor, 3-gang trimmer (C21, C22, C23)
V-3236	Capacitor, electrolytic, 20 mfd 25 v. (C24)
RCP10W4503A	Capacitor, 0.05 mfd 400 v. (C25)
RCP10W4303A	Capacitor, 0.03 mfd 400 v. (C26)
RCP10M4503A	Capacitor, 0.05 mfd 400 v. (C27)
RCP10M6502A	Capacitor, 0.005 mfd 600 v. (C28, C29)
V-3191	Capacitor, B.C. ant. trimmer (C30)
RCP10W6202A	Capacitor, 0.002 mfd 600 v. (C31)
RCM30B222M	Capacitor, 0.0022 mfd mica (C32)
RCM20C181J	Capacitor, 180 mmf mica (C33)
RCP10W6202M	Capacitor, 0.002 mfd 600 v. (C34)
V-3183	Clip, speed
V-3224	Coil, S.W. ant. (L1, L2)
V-3238	Coil, ant. loading (L3)
V-3243	Coil, B.C. and S.W. osc. (L4, L5)
V-3313	Coil, osc. cathode (L6)
V-3254	Connector, phono
V-3222	Control, tone, 2 megohms (R1)
V-3221	Control, volume and power, 2 megohms tapped at 400,000 ohms (R2) and switch (SW1)
V-3219S-1	Cord, dial drive
V-3239	Cord, power A-C
V-3421	Cover, back (H-107 and H-108 only)
V-3390	Decal, band
V-3197	Decal, tone
V-3263	Dial
V-3364	Escutcheon, push button
V-3348-1	Grille cloth, speaker (H-107 only)
V-3348-2	Grille cloth, speaker (H-108 only)
V-3924-1	Panel and grille cloth assy., cabinet door (H-107 only)
V-3924-2	Panel and grille cloth assy., cabinet door (H-108 only)
V-3268	Grommet, var. cond. mounting
V-3274S	Holder, tube
V-3262-3	Knob, band (H-104 and H-107 only)
V-3262-4	Knob, band (H-105 and H-108 only)
V-3262-1	Knob, tone (H-104 and H-107 only)
V-3262-2	Knob, tone (H-105 and H-108 only)
V-3264-1	Knob, tuning and volume (H-104 and H-107 only)
V-3264-2	Knob, tuning and volume (H-105 and H-108 only)
(W) No. 44	Lamp, pilot light 6.3 v.
V-3394	Loop assembly (L7) (H-104 and H-105 only)
V-3283-1	Loop assembly (L7) (H-107 and H-108 only)
V-3229-1	Moulding, dial (H-104 and H-105 only)
V-3229-2	Moulding, dial (H-107 and H-108 only)
V-3414	Plate, glass front (H-104 only)
V-3817	Plate, glass front (H-105 only)
V-3194	Plate, glass front (H-107 only)
V-3818	Plate, glass front (H-108 only)
V-3178	Pointer assembly
V-3166S	Pulley, 7 16 dia.
V-3398-1	Push button with spring (H-104 and H-107 only)
V-3398-2	Push button with spring (H-105 and H-108 only)
V-3181	Rail, pointer
RC10AE224M	Resistor, 220K 1/4 w. (R3)
RC10AE105M	Resistor, 1M 1/4 w. (R4, R5)
RC41AE682K	Resistor, 6800 ohms 2 w. (R6)
RC10AE223M	Resistor, 22K 1/4 w. (R7, R8)
RC10AE474M	Resistor, 470K 1/4 w. (R9, R10)
RC10AE681M	Resistor, 680 ohms, 1/4 w. (R11)
RC10AE104M	Resistor, 100K 1/4 w. (R12)
RC10AE473M	Resistor, 47K 1/4 w. (R13)
RC10AE684M	Resistor, 0.68M 1/4 w. (R14)
RC10AE330K	Resistor, 33 ohms 1/4 w. (R15, R16)
RC41AE472M	Resistor, 4700 ohms 2 w. (R17)
RC41AE153M	Resistor, 15K 2 w. (R18)
V-3282	Resistor, 120 ohms 3 w. (R19)
RC10AE225M	Resistor, 2.2M 1/4 w. (R20)
RC10AE101M	Resistor, 100 ohms 1/4 w. (R21, R22)
RC41AE103M	Resistor, 10K 2 w. (R23)
RC10AE103M	Resistor, 10K 1/4 w. (R24)
V-3164	Shaft, tuning
V-3353-1	Slide mechanism, left hand unit (H-107 and H-108 only)
V-3353-2	Slide mechanism, right hand unit (H-107 and H-108 only)
V-3220	Socket, A-C power
V-3275S	Socket, moulded octal
V-3246S	Socket, octal
V-3252-2	Socket, pilot light
V-3162S	Socket, speaker input
V-3294	Speaker (incl. output trans. T2) 6" electro-dynamic (H-104 and H-105 only)
V-3244	Speaker (incl. output trans. T2) 8" electro-dynamic (H-107 and H-108 only)
V-3248S	Spring, dial drive
V-3167S-1	Stud, pulley—threaded (short)
V-3167S-2	Stud, pulley—threaded (long)
V-3261-1	Switch, push button (SW5A, SW5B)
V-3289	Switch, selector (SW2, SW3, SW4)
V-3395	Tabs, station
V-3431	Window, station tab
V-3255	Terminal board, ant. gnd.
V-3228S-2	Terminal board, 2 lugs
V-3231	Terminal board, 3 lugs
V-3232	Terminal board, 5 lugs
V-3218	Transformer, 1st I-F (L8, L9, C35, C36)
V-3249	Transformer, 2nd I-F (L10, L11, C37, C38, C39, C40, R25)
V-3250	Transformer, power (T1)
V-3245	Transformer, untuned R-F (L12, L13, C41, R26)
V-3317	Tuner, push button (L14 to L19, and C42 to C47 incl.)
V-3237	Washer, cup
V-3184S	"C" washer
V-3215S	Washer, spring

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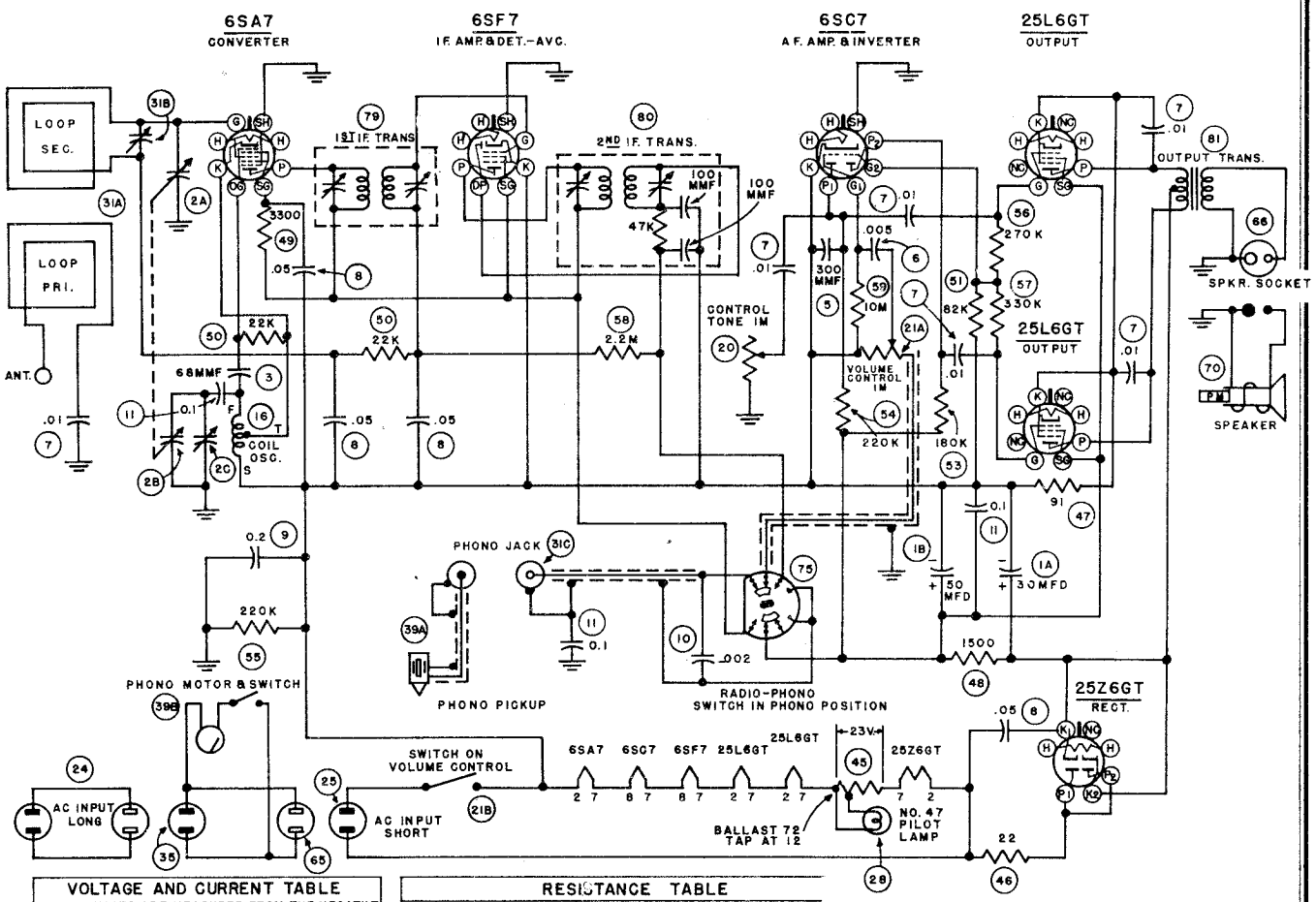


VOLTAGE AND CURRENT TABLE

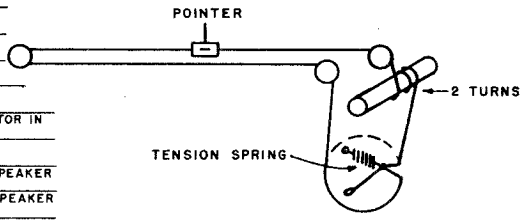
ALL VOLTAGES ARE MEASURED FROM THE NEGATIVE SIDE OF THE DUAL FILTER CAPACITOR USING A 20,000 OHMS PER VOLT METER. ALL CURRENTS ARE MEASURED FROM TOP OF TUBE SOCKETS USING A BREAK-IN ADAPTER. LINE VOLTAGE 117 V.A.C. SIGNAL VOLTAGE ZERO.

TUBE	SOCKET TERMINAL K		SG	P	I_K ma.
6SA7	ZERO		65	82	
6SC7	ZERO			NO.1-46 NO.2-30	
6SF7	ZERO		82	82	
25L6GT	5.4		82	120	60
25Z6GT	125				84

READINGS SHOULD APPROXIMATE THE ABOVE WITHIN 20 PERCENT.

RESISTANCE TABLE

ITEM	PRIMARY OHMS	SECONDARY OHMS	REMARKS
31A	$\frac{1}{8}$	$1\frac{1}{2}$	
16	"T" TO "S"- $\frac{1}{2}$	"T" TO "F"- $3\frac{1}{2}$	"F" TO "S"- $4\frac{1}{4}$ OHMS
79	28	28	
80	19	19	
80		47,000	INCLUDES INTERNAL RESISTOR IN SERIES WITH SECONDARY.
81	285.		PLATE TO PLATE
81		$\frac{1}{2}$	PLUGS REMOVED FROM SPEAKER SOCKET
70		3.2	PLUGS REMOVED FROM SPEAKER SOCKET



Pilot Lamp: (1).....Westinghouse No. 47, 6.3 volts, .15 ampere

Frequency Range:

Standard Broadcast .....550 to 1600 kc
Intermediate Frequency .....455 kc

Phonograph Specifications:

1. Automatic record changer, single button control.
2. Plays either 12 ten-inch or 10 twelve-inch records automatically.
3. Balanced tone arm.
4. Voltage and frequency of motor - 105 - 120 volts, 50 - 60 cycles, single phase a.c.
5. Type of cartridge - high impedance crystal.
6. Type of needle - straight shank steel or semi-permanent sapphire.

Record Changer: General Instrument Model 205

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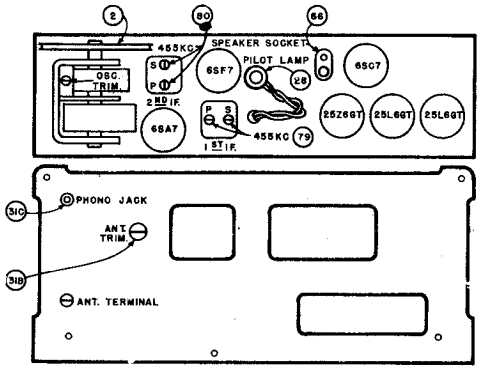
Alignment Procedure

The overall sensitivity and selectivity of these models is affected to a great extent by the alignment of the i-f and r-f circuits. In general, a complete realignment of both circuits is unnecessary. If realignment is required, however, the following procedure must be used:

1. Disconnect the receiver from the 105-120 volt power source.
2. Remove the rear cover - loop assembly as outlined above.
3. Pull off the four knobs at the front of the cabinet.
4. Remove the pilot lamp socket from the speaker bracket. Remove the speaker plug from its socket. This socket is located at the front of the chassis near the 6SC7 tube.
5. To release the chassis, remove the two screws from the bottom of the cabinet.
6. Reconnect the speaker. Place the power plug in the 105-120 volt a-c or d-c convenience outlet and set the controls on the front as follows:
   a. Volume control and a-c switch - full on.
   b. Radio-phonograph switch - in RADIO position (extreme counter clockwise).
   c. Tone control - HIGH position (extreme clockwise).
   d. Tuning dial - 1600 kc position.
7. Connect the signal generator to the control grid of the 6SF7 i-f amplifier tube through a series capacitor of 0.1 mfd. Adjust the signal generator for an output frequency of 455 kc; keep the signal reduced to avoid a.v.c. action.
8. Connect an a-c output meter across the speaker voice coil; place the meter range switch on the highest output scale position for the preliminary adjustments.
9. Using an alignment tool, adjust the secondary trimmer of the second i-f transformer for the maximum output indication on the meter. As the circuits come into alignment, it will be necessary to further reduce the test signal amplitude in order to prevent a.v.c. action. Always use the lowest range on the meter which will give at least one-half scale deflection. Adjust the primary trimmer of the second i-f transformer for maximum output indication.
10. Connect the signal generator output to the control grid of the 6SA7 mixer tube, and adjust in turn, the secondary and primary trimmers of the first i-f transformer for maximum output indication.
11. Leave the signal generator connected to the control grid of the 6SA7 mixer tube. Reduce the test signal to the lowest perceptible value and carefully "peak" each adjustment in Steps 9 and 10 for maximum output indication.
12. Connect the signal generator to the antenna terminal on the back cover - loop assembly through a capacitor of approximately 200 mmfd.; adjust the signal generator to an output frequency of 1615 kc. Rotate the tuning condenser until the minimum capacity stop is reached, and adjust the oscillator trimmer for the maximum response on the output meter.
13. Disconnect the signal generator test lead from the antenna terminal. Turn attenuator on the signal generator for full output. Adjust the signal generator for 1400 kc. Bring the output lead near, but do not connect to, the loop antenna. Tune in the test signal as accurately as possible on the radio. If the test signal is too strong, move the lead farther away. Adjust the antenna trimmer for maximum output on the meter.

    Note: The antenna trimmer must be readjusted after the chassis is replaced in the cabinet as the metal chassis and speaker affect the inductance of the loop.
14. Check on radio stations at selected points for calibration and sensitivity.



The foregoing alignment procedure is condensed in the following table as a convenience for the service technician.

Steps	Connect Signal Generator to—	Adjust Signal Generator to—	Tune Radio Dial to—	Adjust
1	6SF7 control grid through 0.1 mfd. capacitor	455 kc	1600 kc	secondary trimmer of 2nd i-f transformer for maximum output
2	6SF7 control grid through 0.1 mfd. capacitor	455 kc	1600 kc	primary trimmer of 2nd i-f transformer for maximum output
3	6SA7 control grid through 0.1 mfd. capacitor	455 kc	1600 kc	secondary trimmer of 1st i-f transformer for maximum output
4	6SA7 control grid through 0.1 mfd. capacitor	455 kc	1600 kc	primary trimmer of 1st i-f transformer for maximum output
5	antenna terminal through 200 mmfd. capacitor	1615 kc	gang at minimum	trimmer of oscillator section, tuning capacitor for maximum output
6	radiated signal (no actual connection)	1400 kc	1400 kc	antenna trimmer for maximum output

Power Supply Polarity:

When the receiver is operated on 105-120 volts 60 cycles a.c., a slight hum may be heard if the power plug is inserted in such a manner that the "hot" side of the supply line is connected nearest to the chassis. To eliminate this trouble, reverse the plug in the convenience outlet.

When operated on direct current, the set will not function at all if the power plug polarity is reversed with respect to the line voltage. If it does not function within one minute after it is turned on, reverse the plug.

Ground Connection:

The use of an external ground is not recommended for two reasons: First, the r-f circuits are returned to ground through the a-c or d-c supply line; second, the radio chassis is connected to one side of the supply line through a 220,000 ohm resistor and a capacitor of 0.2 mfd. If the power plug is inserted in such a manner that the "hot" side of the supply line is connected nearest to the chassis, the use of an external ground would place the 105-120 volt supply voltage directly across the resistor-capacitor combination. This might cause a loud hum or, under certain conditions, actual damage to the receiver.

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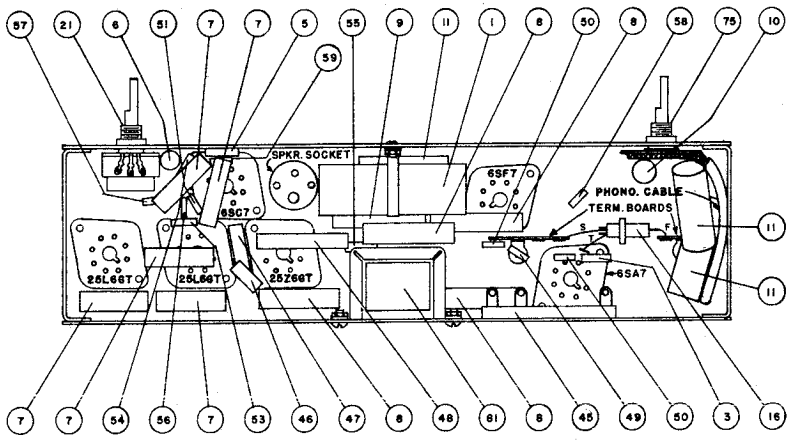
PARTS LIST FOR H-122 AND H-130

When ordering parts specify model number of set in addition to part number and description of part.

Item No.	Part No.	Description of Part
1	V-3304	Capacitor, electrolytic
1A	Part of Item 1	Capacitor, 30 mfd.
1B	Part of Item 1	Capacitor, 50 mfd.
2	V-3535	Capacitor, variable two-gang
2A	Part of Item 2	Capacitor, loop tuning
2B	Part of Item 2	Capacitor, oscillator tuning
2C	Part of Item 2	Capacitor, oscillator trimmer
3	RCM20A680M	Capacitor, 68 mmfd.
5	RCM20A301M	Capacitor, 300 mmfd.
6	RCP10W6502A	Capacitor, .005 mfd.
7	RCP10W4103A	Capacitor, .01 mfd.
8	RCP10W4503A	Capacitor, .05 mfd.
9	RCP10W4204K	Capacitor, 0.2 mfd.
10	RCP10W6202A	Capacitor, .002 mfd.
11	RCP10W4104A	Capacitor, 0.1 mfd.
16	V-3382	Coil, oscillator
20	V-3303	Control, tone
21	V-3298	Control, volume and switch
21A	Part of Item 21	Control, variable resistor
21B	Part of Item 21	Control, switch
24	V-3392	Cord, power a.c. long (H-122 only)
25	V-3372-122	Cord, power short (H-122 only)
25	V-3372-130	Cord, power (H-130 only)
28	Westinghouse No. 47	Light, pilot
31	V-3660	Loop, antenna (H-122 only)
31	V-3666	Loop, antenna (H-130 only)
31A	Part of Item 31	Loop, winding
31B	Part of Item 31	Loop, trimmer
31C	Part of Item 31	Phono socket
35	V-3379	Receptacle
39A		Phonograph pickup (See Service Notes, V-3269-2 Record Changer)
39B		Phonograph motor and switch (See Service Notes, V-3269-2 Record Changer)
45	V-3311	Resistor, ballast
46	RC20AE220M	Resistor, 22 ohms ½ watt
47	RC30AE910J	Resistor, 91 ohms 1 watt
48	RC40AE152M	Resistor, 1,500 ohms 2 watts
49	RC10AE332M	Resistor, 3,300 ohms ¼ watt
50	RC10AE223M	Resistor, 22,000 ohms ¼ watt
51	RC10AE823K	Resistor, 82,000 ohms ¼ watt
53	RC20AE184K	Resistor, 180,000 ohms ½ watt
54	RC20AE224K	Resistor, 220,000 ohms ½ watt
55	RC10AE224M	Resistor, 220,000 ohms ¼ watt
56	RC10AE274K	Resistor, 270,000 ohms ¼ watt
57	RC10AE334K	Resistor, 330,000 ohms ¼ watt
58	RC10AE225M	Resistor, 2.2 megohms ¼ watt
59	RC10AE106M	Resistor, 10 megohms ¼ watt
65	V-3398-1	Socket, regular a.c. power
66	V-3299	Socket, speaker
70	V-3291	Speaker, 6" PM
75	V-3301	Switch, radio phono
79	V-3328	Transformer, 1st i-f
80	V-3329	Transformer, 2nd i-f



81	V-3297	Transformer, output
	V-3219S-1	Cord, dial drive
	V-3343	Pointer assembly
	V-3321	Rail, pointer
	V-3335	Socket, pilot light
	V-3246S	Socket
	V-3248S	Spring, dial drive
	V-1109-1	Cabinet (radio section H-122 only)
	V-1110-1	Cabinet (less radio section H-122 only)
	V-1111-2	Cabinet (H-130 only)
	V-3425	Dial (H-122 only)
	V-3647-2	Dial (H-130 only)
	V-3413	Knob, tone (H-122 only)
	V-3262-2	Knob, tone (H-130 only)
	V-3413	Knob, tuning (H-122 only)
	V-3262-2	Knob, tuning (H-130 only)
	V-3331-1	Knob assembly, volume (H-122 only)
	V-3667-2	Knob assembly, volume (H-130 only)
	V-3331-2	Knob assembly, radio-phono (H-122 only)
	V-3667-4	Knob assembly, radio-phono (H-130 only)
	V-3333S-1	Medallion

Power Output:

Undistorted (radio) ..... 3 watts
Undistorted (phonograph) .....3.5 watts
Maximum ..... 5 watts

Loudspeaker:

Type .....6⅝" dia. P.M. dynamic
Voice Coil Impedance .....3.2 ohms

Power Supply Rating:

H-122 combination .....105 - 120 volts, 50 - 60 cycles a.c.
H-130 or radio section of H-122 only .....105 - 120 volts d.c. or 105 - 120 volts, 50 - 60 cycles a.c.

Power Consumption:

H-122 combination .....150 watts
H-130 or radio section of H-122 .....60 watts

Special Provisions:

H-130: Phonograph, FM, and television sound input connection at rear of cabinet
H-122: FM and television sound input connection at rear of cabinet

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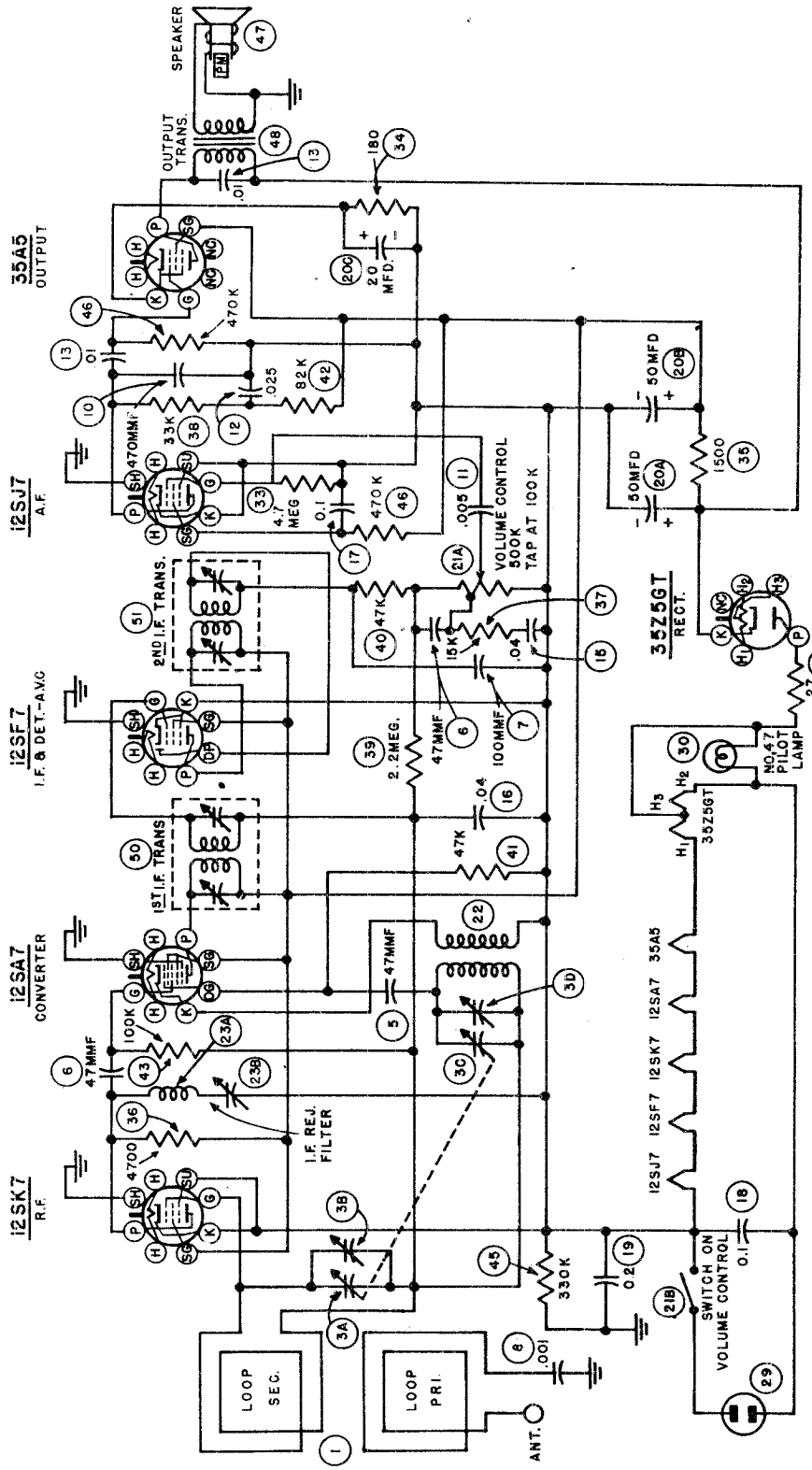

RESISTANCE TABLE

ITEM	PRIMARY OHMS	SECONDARY OHMS	REMARKS
1		2	
22	½	7	
23A	50		
50	27	26	
51	27	23	
47		2.95	VOICE COIL DISCONNECTED
48	375	¾	VOICE COIL DISCONNECTED

VOLTAGE AND CURRENT TABLE

ALL VOLTAGES ARE MEASURED FROM THE NEGATIVE SIDE OF THE DUAL FILTER CAPACITOR USING A 20,000 OHMS PER VOLT METER. LINE VOLTAGE IS 117 V.A.C. SIGNAL VOLTAGE IS ZERO.

TUBE	SOCKET TERMINAL K	SG	P	I_K ma
12SK7	ZERO	70	31	
12SA7	ZERO	70	69	
12SF7	ZERO	70	69	
12SJ7	ZERO	19	26	0.5
35A5	4.25	70	115	24.0
35Z5GT	122			52.0

READINGS SHOULD APPROXIMATE THE ABOVE WITHIN 20 PERCENT.

Loudspeaker:

Type ..... 5" dia. P.M. dynamic
V.C. Impedance ..... 3.2 ohms at 400 cps

Power Output:

Undistorted ..... 0.85 watt
Maximum ..... 1.25 watts

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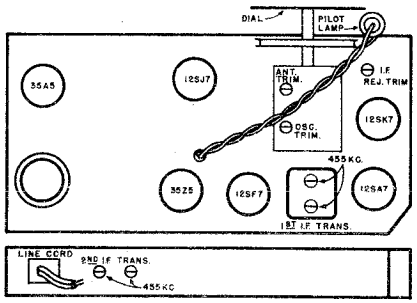

Fig. 1

Alignment Procedure (Refer to Fig. 1):

The overall sensitivity and selectivity of the Little Jewel are affected to a great extent by the alignment of the i-f and r-f circuits. In general, a complete realignment of both circuits is unnecessary. If realignment is required, however, the following procedure is recommended:

1. Remove the knobs, the plastic cover, and the loop as outlined above.
2. Remove the Allen head screw from the left-hand plastic cover and carefully lift off the cover.
3. Turn on the receiver and tune to a quiet spot near 1600 kc.
4. Connect an a-c output meter across the speaker voice coil. Turn the meter range switch to a high-voltage position.
5. Connect the outer conductor of the signal generator test lead to the common negative (this is the metal can enclosing the filter capacitors). Reduce the output of the signal generator to prevent a.v.c. action during the alignment procedure.
6. Connect the inner conductor of the signal generator test lead to the 12SF7 i-f amplifier control grid through a capacitance of 0.01 mfd. Adjust the signal generator frequency to 455 kc.
7. With an insulated screwdriver or neutralizing tool, adjust the second i-f transformer **secondary** trimmer for maximum reading on the output meter. Use the lowest practicable scale on the meter and, as the circuits come into alignment, reduce the signal generator output to prevent a.v.c. action.
8. Repeat operation 7, this time adjusting the second i-f transformer **primary** trimmer.
9. Connect the signal generator output, through the 0.01 mfd. capacitor, to the control grid of the 12SA7 converter tube. Repeat operations 7 and 8, this time adjusting the secondary and primary trimmers of the **first** i-f transformer.
10. Connect the signal generator output, adjusted to 455 kc, to the antenna terminal at the bottom of the cabinet. Tune the radio dial to 600 kc. Adjust the i-f rejection trimmer for **minimum** reading on the output meter.
11. Connect the test oscillator output through a capacitance of 50 mmfd. to the antenna terminal at the bottom of the cabinet. Adjust the signal generator frequency to 1615 kc. Tune the receiver tuning condenser to minimum. Adjust the trimmer on the oscillator section of the main tuning condenser for **maximum** reading on the output meter.
12. Adjust the signal generator to 1400 kc. Bring the output lead near the receiver input but do not make an actual connection. Tune in the test signal on the receiver dial and adjust the antenna trimmer for maximum output as read on the output meter.

The foregoing alignment procedure is condensed in the following table as a convenience for the service technician:

Steps	Connect Signal Generator to—	Adjust Signal Generator to—	Tune Radio Dial to—	Adjust for Maximum Output
1	12SF7 grid in series with a .01 mfd. capacitor	455 kc	quiet point near 1600 kc.	primary and secondary 2nd i-f transformer
2	12SA7 grid in series with a .01 mfd. capacitor	455 kc	quiet point near 1600 kc.	primary and secondary 1st i-f transformer
3	12SA7 grid in series with a .01 mfd. capacitor	455 kc	quiet point near 1600 kc.	repeat 1 and 2
4	antenna terminal	455 kc	600 kc	adjust i-f rejection trimmer for minimum output
5	antenna terminal in series with a 50 mmfd. capacitor	1615 kc	gang at minimum	oscillator trimmer
6	radiated signal from signal generator	1400 kc	1400 kc	adjust antenna trimmer

Power Supply Polarity:

When the receiver is operated on 110 volts 60 cycles a.c., a slight hum may be heard if the power plug is inserted in such a manner that the "hot" side of the supply line is connected nearest to the chassis. To eliminate this trouble, reverse the supply plug in the convenience outlet.

When operated on direct current, the set will not function at all if the power plug polarity is reversed with respect to the line voltage. If it does not operate within one minute after it is turned on, reverse the plug in the convenience outlet.

Tube Replacement:

When replacing tubes this procedure must be followed to prevent damage to the loop and other delicate parts:

1. Disconnect the power plug from the 110-volt service outlet.
2. Pull the knobs and remove the Phillips head screw from the right-hand plastic cover.
3. Carefully remove the plastic cover and handle.
4. Lift the loop assembly and tilt it forward until the tubes are accessible.
5. Turn the tuning dial to 550 kc to avoid damage to the rotor plates of the tuning condenser.

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PARTS LIST FOR H-125 AND H-126

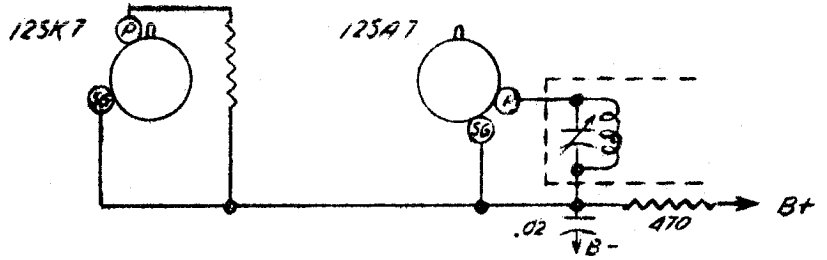
When ordering parts specify model number of set in addition to part number and description of part.

Item No.	Part No.	Description of Part
1	V-3466	Loop antenna
3	V-3474	Capacitor, variable
3A	Part of Item 3	Capacitor, antenna tuner
3B	Part of Item 3	Capacitor, antenna trimmer
3C	Part of Item 3	Capacitor, oscillator tuner
3D	Part of Item 3	Capacitor, oscillator trimmer
5	RCM20A470K	Capacitor, 47 mmfd.
6	RCM20A470M	Capacitor, 47 mmfd.
7	RCM20A101M	Capacitor, 100 mmfd.
.8	RCP10W6102A	Capacitor, 1,000 mmfd.
'0	RCM20A471M	Capacitor, 470 mmfd.
11	RCP10W6502A	Capacitor, .005 mfd.
12	RCP10W2253K	Capacitor, .025 mfd.
13	RCP10W2103A	Capacitor, .01 mfd.
15	RCP10W2403K	Capacitor, .04 mfd.
16	RCP10W2403A	Capacitor, .04 mfd.
17	RCP10W2104A	Capacitor, .10 mfd.
18	RCP10W4104A	Capacitor, .10 mfd.
19	RCP10W2204A	Capacitor, .20 mfd.
20	V-3470	Capacitor, electrolytic
20A	Part of Item 20	Capacitor, 50 mfd. 150 volts electrolytic
20B	Part of Item 20	Capacitor, 50 mfd. 150 volts electrolytic
20C	Part of Item 20	Capacitor, 20 mfd. 25 volts electrolytic
21	V-3476	Control, volume and switch
21A	Part of Item 21	Control, variable resistor
21B	Part of Item 21	Control, switch
22	V-3473	Coil, oscillator
23	V-3465	Coil, trap assembly
23A	Part of Item 23	Coil
23B	Part of Item 23	Trap trimmer
29	V-3477	Cord, power A.C.
30	Westinghouse Type No. 47	Light, pilot
31	RC20AE270K	Resistor, 27 ohms 0.5 watt
33	RC20AE475M	Resistor, 4.7 megohms 0.5 watt
34	RC20AE181J	Resistor, 180 ohms 0.5 watt
35	RC30AE152K	Resistor, 1,500 ohms 1 watt
36	RC20AE472K	Resistor, 4,700 ohms 0.5 watt
37	RC20AE153K	Resistor, 15,000 ohms 0.5 watt
38	RC20AE333K	Resistor, 33,000 ohms 0.5 watt
39	RC20AE225M	Resistor, 2.2 megohms 0.5 watt
40	RC20AE473M	Resistor, 47,000 ohms 0.5 watt
41	RC20AE473K	Resistor, 47,000 ohms 0.5 watt
42	RC20AE823K	Resistor, 82,000 ohms 0.5 watt
43	RC20AE104K	Resistor, 100,000 ohms 0.5 watt
45	RC20AE334M	Resistor, 330,000 ohms 0.5 watt
46	RC20AE474K	Resistor, 470,000 ohms 0.5 watt
47	V-3475	Speaker, 5 inch permanent magnet
48	V-3496	Transformer, output
50	V-3471	Transformer, 1st i-f
51	V-3472	Transformer, 2nd i-f
	V-3219S-1	Cord, dial drive
	V-3455-1	Dial (for Model H-125 only)
	V-3455-2	Dial (for Model H-126 only)
	V-3449	Drive shaft bearing
	V-3480	Shaft, drive
	V-3468	Socket, molded octal tube
	V-3469	Socket, molded octal tube (shielded)
	V-3499	Socket, pilot light
	V-3448	Spring, dial drive
	V-3435	Bumper, felt (screw type)
	V-3501-1	Case assembly, center
	V-3461-1	Cover, left-hand (H-125 only)
	V-3459-1	Cover, right-hand (H-125 only)
	V-3498-1	Handle assembly (H-125 only)
	V-3481-1	Knob (H-125 only)
	V-3491	Terminal strip assembly
	V-3461-2	Cover, left-hand (H-126 only)
	V-3459-2	Cover, right-hand (H-126 only)
	V-3498-2	Handle assembly (H-126 only)
	V-3481-2	Knob (H-126 only)
	V-3711-1	Baffle and Grille Cloth Assembly (H-125)
	V-3711-2	Baffle and Grille Cloth Assembly (H-126)
	V-3333S-1	Medallion (H-125 only)
	V-3333S-2	Medallion (H-126 only)
	V-3745	Socket, lock-in

SUBJECT: CIRCUIT CHANGE, H-125 and H-126 Radios

Effective July 11, 1946, all Model H-125 and H-126 radios which have the letter "C" stamped on the end of the chassis directly below the output tube, have been changed as follows:

A 470 ohm 1/4 watt isolating resistor has been inserted in the plate and screen supply line for the R.F. and converter stages, and a .02 mfd, 200 volt paper by-pass capacitor has been connected from the tube side of this resistor to the common negative line. These connections are shown below.

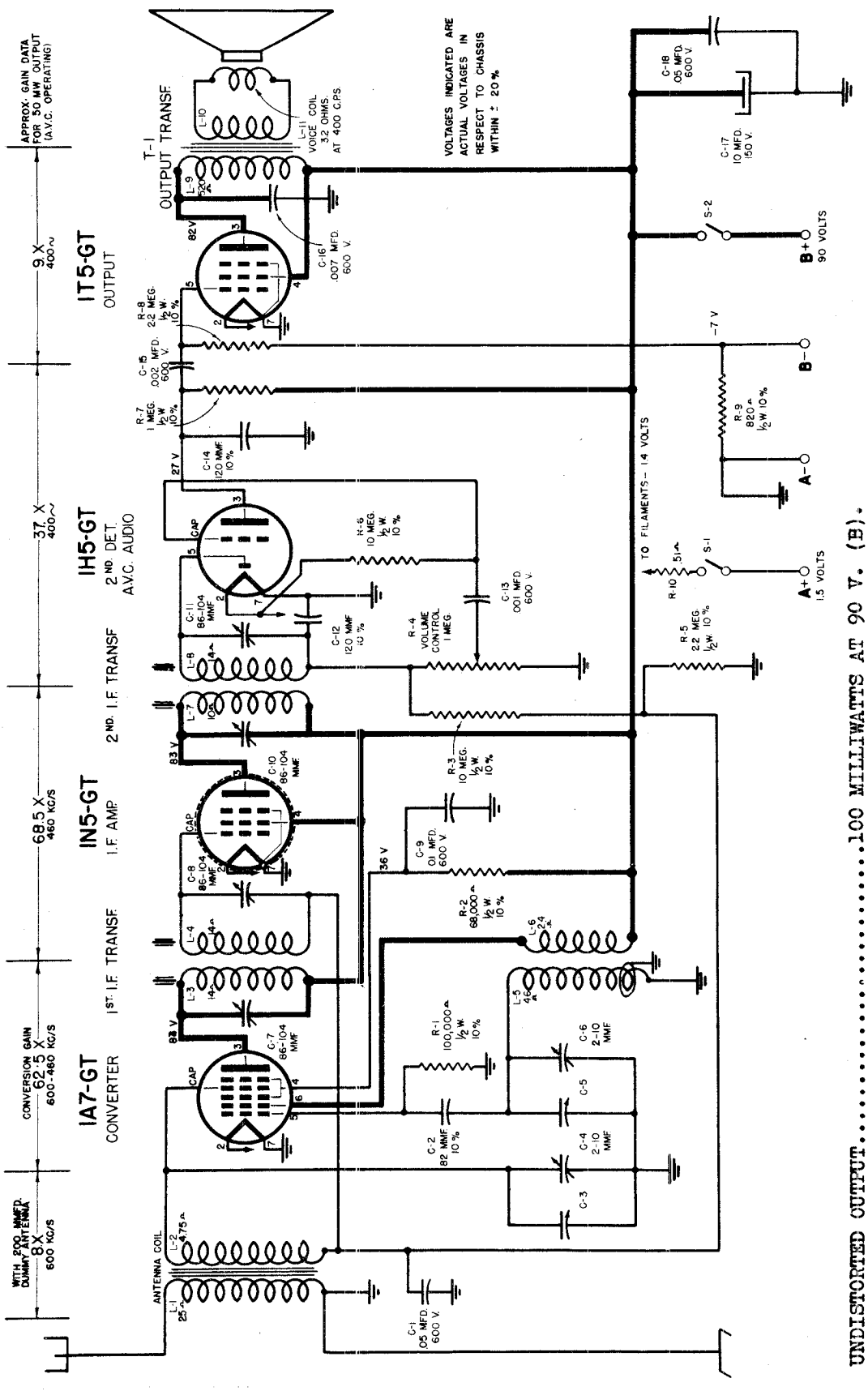


Where this change has been incorporated in the radio, voltages at the R.F. and converter tube sockets will differ slightly from the values given in the original Service Notes. Approximate voltages when the change is incorporated are as follows: 12SK7 screen grid 66 V., plate 30 V.; 12SA7 screen grid 66 V., plate 65 V.

Procurement difficulties with respect to certain components make the change advisable at this time.

WESTINGHOUSE ELEC. INTERNAT. CO.

MODELS B470-A, B470-B, B470-C, B470-D



APRIL 1946

UNDISTORTED OUTPUT.....100 MILLIWATTS AT 90 V. (B).

FREQUENCY RANGE.....530 TO 1735 KC/S.

DRIVE RATIO.....APPROX. 10 TO 1.

BATTERY DRAIN.....

"A" AT 1.4 VOLTS 200 ma.

"B" AT 90 VOLTS 8.5 ma.

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MODELS B470-A, B470-B, B470-C, B470-D

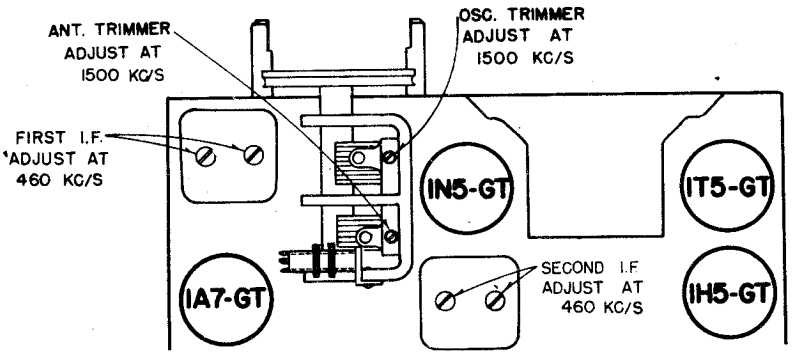
WESTINGHOUSE ELEC. INTERNAT. CO.

ALIGNMENT PROCEDURE

IF USING A CATHODE RAY OSCILLOGRAPH, THE VERTICAL "HIGH" TERMINAL IS TO BE CONNECTED TO THE 1H5GT GRID CAP WITH A 2.0 MEG. RESISTOR IN SERIES AT THE GRID END.

FOR THE I.F. ALIGNMENT USE A DUMMY ANTENNA CAPACITOR OF .01 MFD. AND COUPLE TEST SIGNAL TO GRID CAP OF THE 1A7GT.

FOR PRELIMINARY ADJUSTMENT OF THE OSCILLATOR CIRCUIT USE THE SAME DUMMY ANTENNA AND CONNECTION POINT. FEED THE TEST GENERATOR TO THE ANTENNA LEAD USING A 200 MMFD. CAPACITOR AS A DUMMY ANTENNA, ADJUST THE ANTENNA TRIMMER C-4 FOR MAXIMUM AT 1500 KC/S. THEN READJUST THE OSCILLATOR SHORTED LOOP FOR MAXIMUM AT 600 KC/S WHILE ROCKING THE GANG CAPACITOR. RECHECK AT 1500 KC/S.



PART	KEY No.	B470-A	B470-B	KEY No.	B470-C	B470-D
Cabinet - Mantel	.....	573092-1	574260-1	.....	1-L-96-1	1-L-96-2
Cable - Battery (Complete with Attachment).	.....	586709-505 1.95	586709-505 1.95	.....	586709-505 1.95	586709-505 1.95
Capacitor - 2 Gang Tuning	C3,C4 C5,C6	587265-1	587969-1	.....	.....	.....
Capacitor - 2 Gang Tuning with Drum	.....	.....	.....	C3,C4 C5,C6	2-M-275-2 2.75	2-M-275-2 2.75
Capacitor - Tubular 10 Mfd. 150 Volt	C17	595086-4 .80	595086-4 .80	C17	595086-4 .80	595086-4 .80
Clip - Control Grid..... Pkg. of 5	.....	#6011 .30	#6011 .30	.....	#6011 .30	#6011 .30
Clamp - To Hold Chassis to Cabinet	.....	595639-4 .15	595639-4 .15	L1,L2	595639-4 .15	595639-4 .15
Coil - Antenna	L9,L10	587256-503 .80	587256-503 .80	.....	587256-503 .80	587256-503 .80
Coil - Oscillator	L4,L5	587256-504 .80	587256-504 .80	L5,L6	587256-504 .80	587256-504 .80
Control - Volume Control with D.P.S.T. Switch	S1,S2 R4	595769-2 1.50	595769-2 1.50	S1,S2 R4	595769-2 1.50	595769-2 1.50
Cord - (35 lb. Black Prince 1/32 Dia.)	.....	.....	K-89811-504	.....	K-89811-504	K-89811-504
Dial - Calibrated	.....	K-89516-501 .25	.....	.....	.....	.....
Dial - Calibrated Glass Scale	.....	.....	595943-1 .40	.....	597038-1 .40	597038-1 .40
Indicator - Paper Disc	.....	.....	.....	.....	1-N-90-2 .05	1-N-90-2 .05
Knob - For Volume Control	.....	K-39008-6 .15	595170-4 .20	.....	595170-4 .20	595170-1 .20
Knob - For Tuning Condenser	.....	K-89515-502 .15	596370-1 .20	.....	596370-1 .20	596370-3 .20
Plug - "A" Battery	.....	595093-1 .15	595093-1 .15	.....	595093-1 .15	595093-1 .15
Plug - "B" Battery	.....	#60456 .10	#60456 .10	.....	#60456 .10	#60456 .10
Reproducer - Less Output Transformer	L8	572797-135 3.50	572797-135 3.50	L10	572797-135 3.50	572797-135 3.50
Reproducer - Complete	.....	572797-19	572797-19	L9,L10 L11	572797-19	572797-19
Shield - Goat Tube with Ground Clip	.....	H-40290 .20	H-40290 .20	.....	.....	.....
Shield - Goat Tube	.....	.....	.....	.....	#1222 .15	#1222 .15
Shield - Spira Shield for Wires 6" Long	.....	593969-15 .10	593969-15 .10	.....	593969-15 .10	593969-15 .10
Socket - 8 Contact (Tube)	.....	596185-2 .25	596185-2 .25	.....	596185-2 .25	596185-2 .25
Spring - Drive Cord Tension.... Pkg. of 5	.....	.....	594451-11 .15	.....	594451-11 .15	594451-11 .15
Spring - For Dial and Knob..... Pkg. of 5	.....	K-82890-2 .20	.....	.....	.....	.....
Spring - Knob..... Pkg. of 5	.....	K-87778-1 .20	H-40411 .10	.....	H-40411 .10	H-40411 .10
Transformer - 1st. I.F.	L2,L3 C8,C9	587174-503 1.60	587174-503 1.60	L3,L4 C7,C8	587989-501 1.60	587989-501 1.60
Transformer - 2nd. I.F.	L6,L7 C10,C18	587174-504 1.60	587174-504 1.60	L7,L8 C10,C11	587989-502 1.60	587989-502 1.60
Transformer - Reproducer Output	T1	572797-134 1.50	572797-134 1.50	T1	572797-134 1.50	572797-134 1.50
Tuning - Drum	.....	.....	596333-1 .30	.....	.....	.....
Tuning - Shaft Complete with Bearing	.....	.....	596331-502 .45	.....	.....	.....
Tuning - Shaft	.....	.....	.....	.....	1-N-61-3 .15	1-N-61-3 .15
Tuning - Shaft Bearing	.....	.....	.....	.....	1-N-68-3 .10	1-N-68-3 .10
Tuning - "C" Washer on Drive Shaft Pkg. of 5	.....	.....	.....	.....	K-61933-4 .10	K-61933-4 .10
Resistor Kit - 2 Volt D.C. Supply	.....	H-40291 1.25	H-40291 1.25	.....	H-40291 1.25	H-40291 1.25

All prices subject to change without notice.

These 1.4 Volt Battery Receivers may be used with a 2.0 Storage Cell if resistor kit H-40291 is installed.

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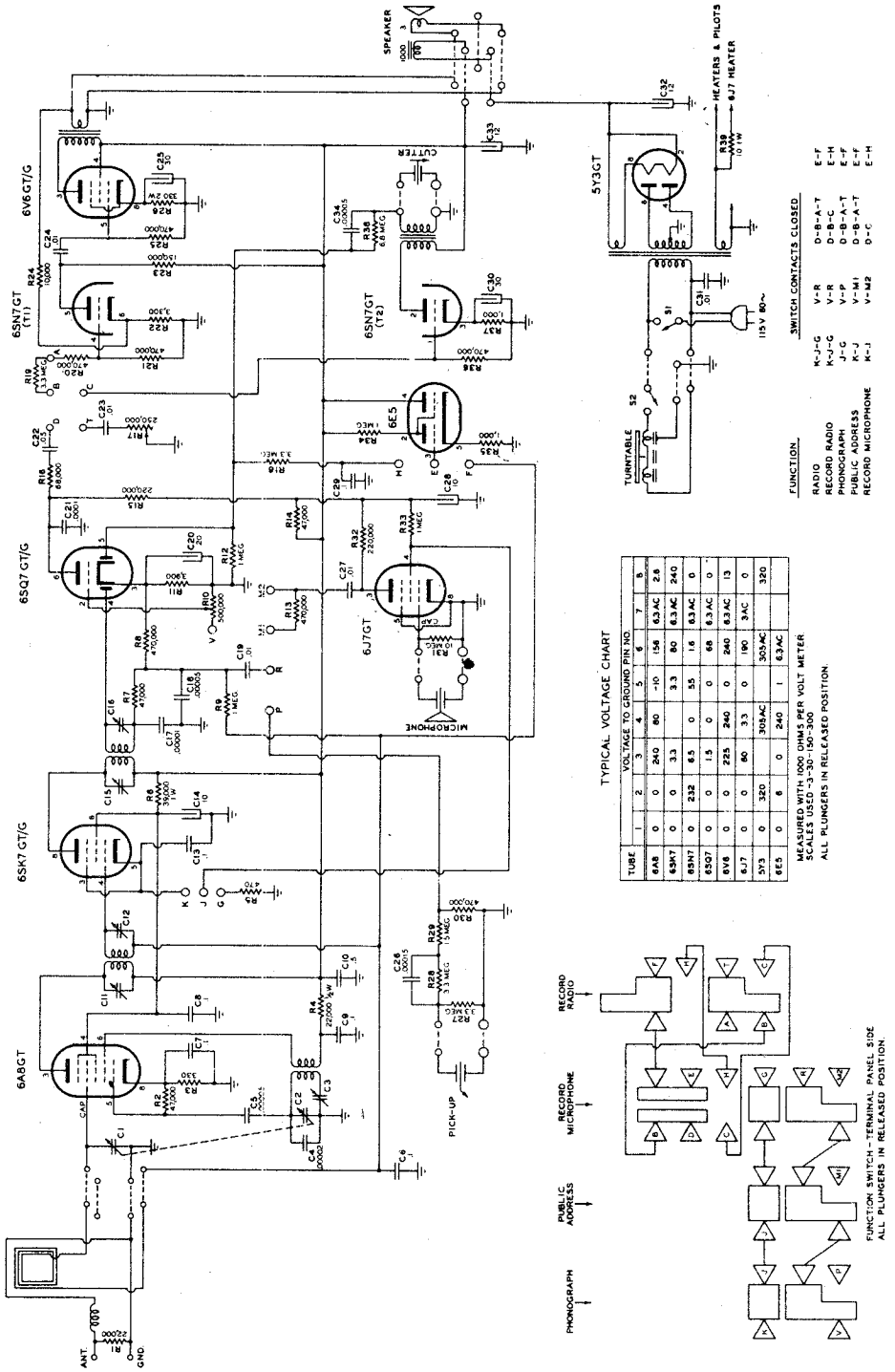
WILCOX GAY CORP.

MODELS 6B10,6B20,6B30, 6B32 Early. Serial Nos. 700,000 to 701,751



SWITCH CONTACTS CLOSED

FUNCTION			
RADIO	K-J-G	V-R	D-B-A-T	E-F
RECORD RADIO	K-J-G	V-R	D-B-C	E-H
PHONOGRAPH	J-G	V-P	D-B-A-T	E-F
PUBLIC ADDRESS	K-J	V-M1	D-B-A-T	E-F
RECORD MICROPHONE	K-J	V-M2	D-C	E-H

TYPICAL VOLTAGE CHART

TUBE	VOLTAGE TO GROUND PIN NO.							
	1	2	3	4	5	6	7	8
6A8	0	0	240	80	-10	158	6.3 AC	2.8
6SK7	0	0	3.3		3.3	80	6.3 AC	240
6SN7	0	232	6.5	0	55	16	6.3 AC	0
6SQ7	0	0	1.5	0	0	68	6.3 AC	0
6V6	0	0	225	240	0	240	6.3 AC	13
6J7	0	0	80	3.3	0	190	3 AC	0
5Y3	0	320		305 AC		305 AC		320
6E5	0	6	0	240	1	6.3 AC		

MEASURED WITH 1000 OHMS PER VOLT METER
SCALES USED -3-30-150-300
ALL PLUNGERS IN RELEASED POSITION

IF PEAK 456 KC

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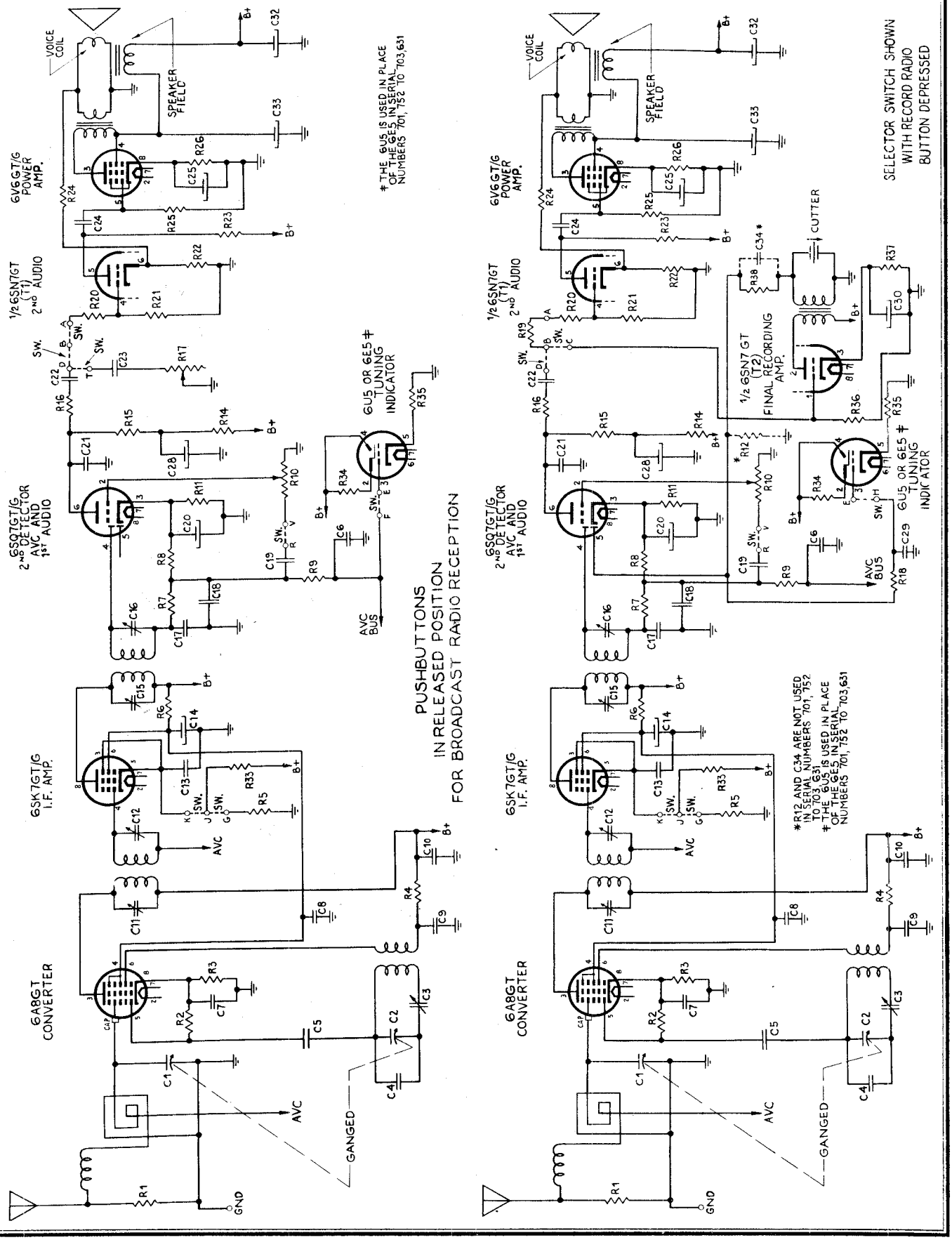
MODELS 6B10, 6B20, 6B30, 6B32, Early, Late

WILCOX GAY CORP.


6A8GT CONVERTER
6SK7GT/G I.F. AMP.
6SQ7GT/G 2ND DETECTOR AVC AND 1ST AUDIO
1/2 6SN7GT (T1) 2ND AUDIO
6V6GT/G POWER AMP.
6U5 OR 6E5 ‡ TUNING INDICATOR
1/2 6SN7 GT (T2) FINAL RECORDING AMP.
VOICE COIL
SPEAKER FIELD
CUTTER
AVC
AVC BUS
GANGED
GND
PUSHBUTTONS IN RELEASED POSITION FOR BROADCAST RADIO RECEPTION
SELECTOR SWITCH SHOWN WITH RECORD RADIO BUTTON DEPRESSED
* THE 6U5 IS USED IN PLACE OF THE 6E5 IN SERIAL NUMBERS 701, 752 TO 703,631
*R12 AND C34 ARE NOT USED IN SERIAL NUMBERS 701, 752 TO 703,631
‡ THE 6U5 IS USED IN PLACE OF THE 6E5 IN SERIAL NUMBERS 701, 752 TO 703,631

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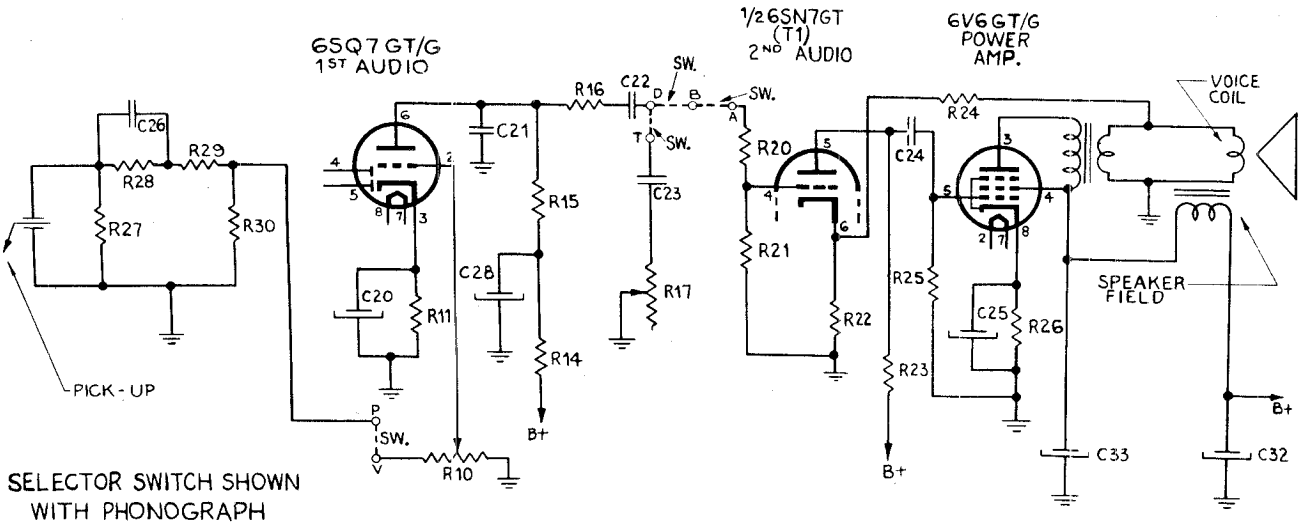
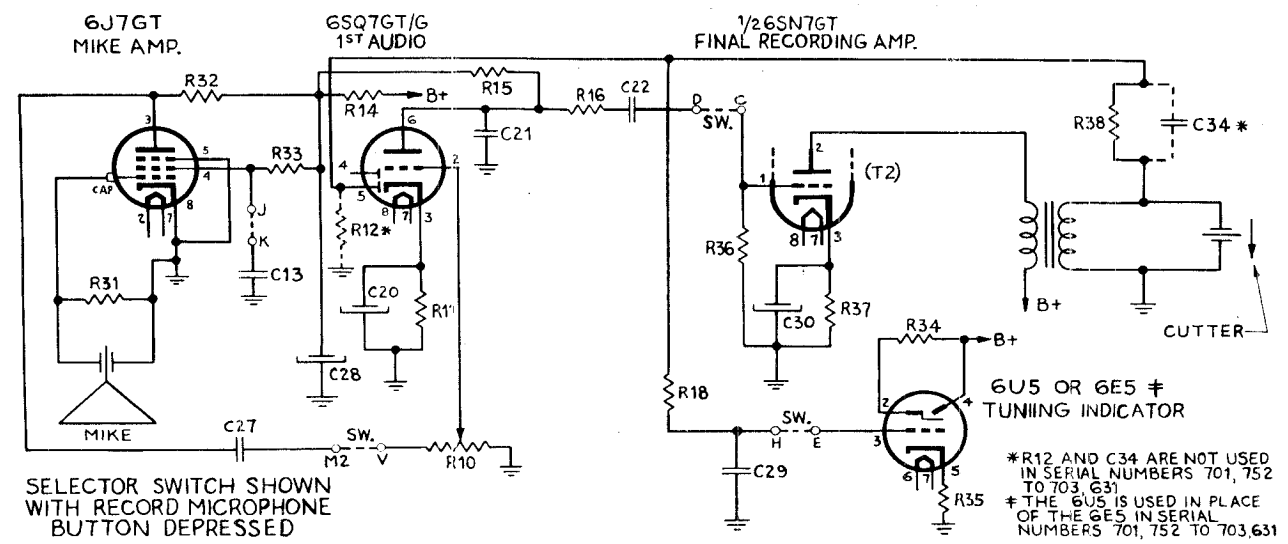
WILCOX GAY CORP.

MODELS 6B10, 6B20, 6B30, 6B32, Early, Late



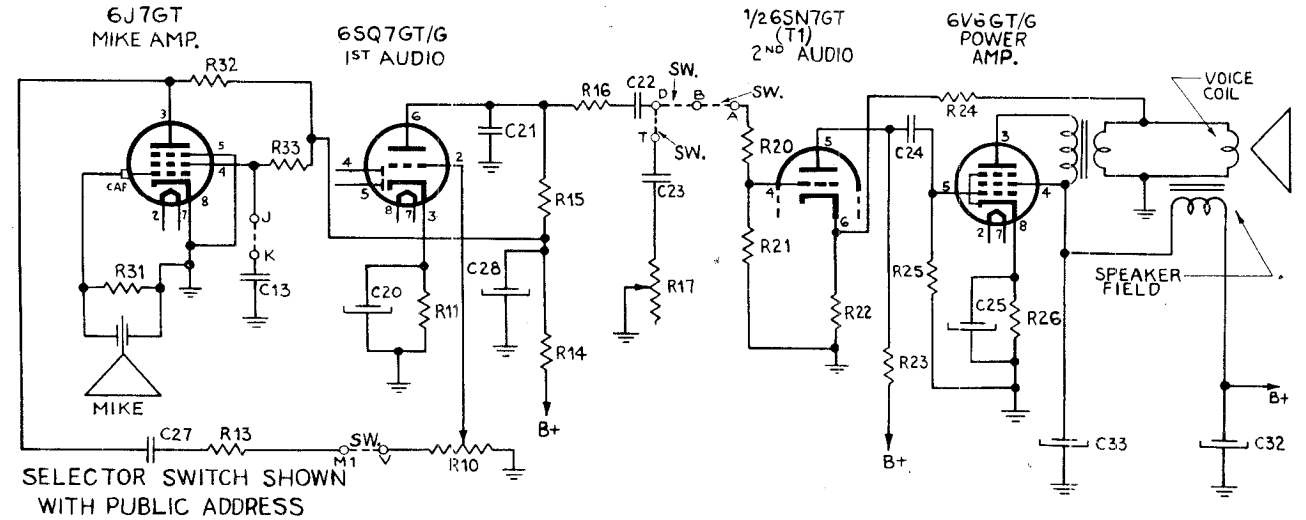
SELECTOR SWITCH SHOWN WITH PHONOGRAPH BUTTON DEPRESSED



SELECTOR SWITCH SHOWN WITH RECORD MICROPHONE BUTTON DEPRESSED

*R12 AND C34 ARE NOT USED IN SERIAL NUMBERS 701, 752 TO 703, 631

‡ THE 6U5 IS USED IN PLACE OF THE 6E5 IN SERIAL NUMBERS 701, 752 TO 703,631



SELECTOR SWITCH SHOWN WITH PUBLIC ADDRESS BUTTON DEPRESSED

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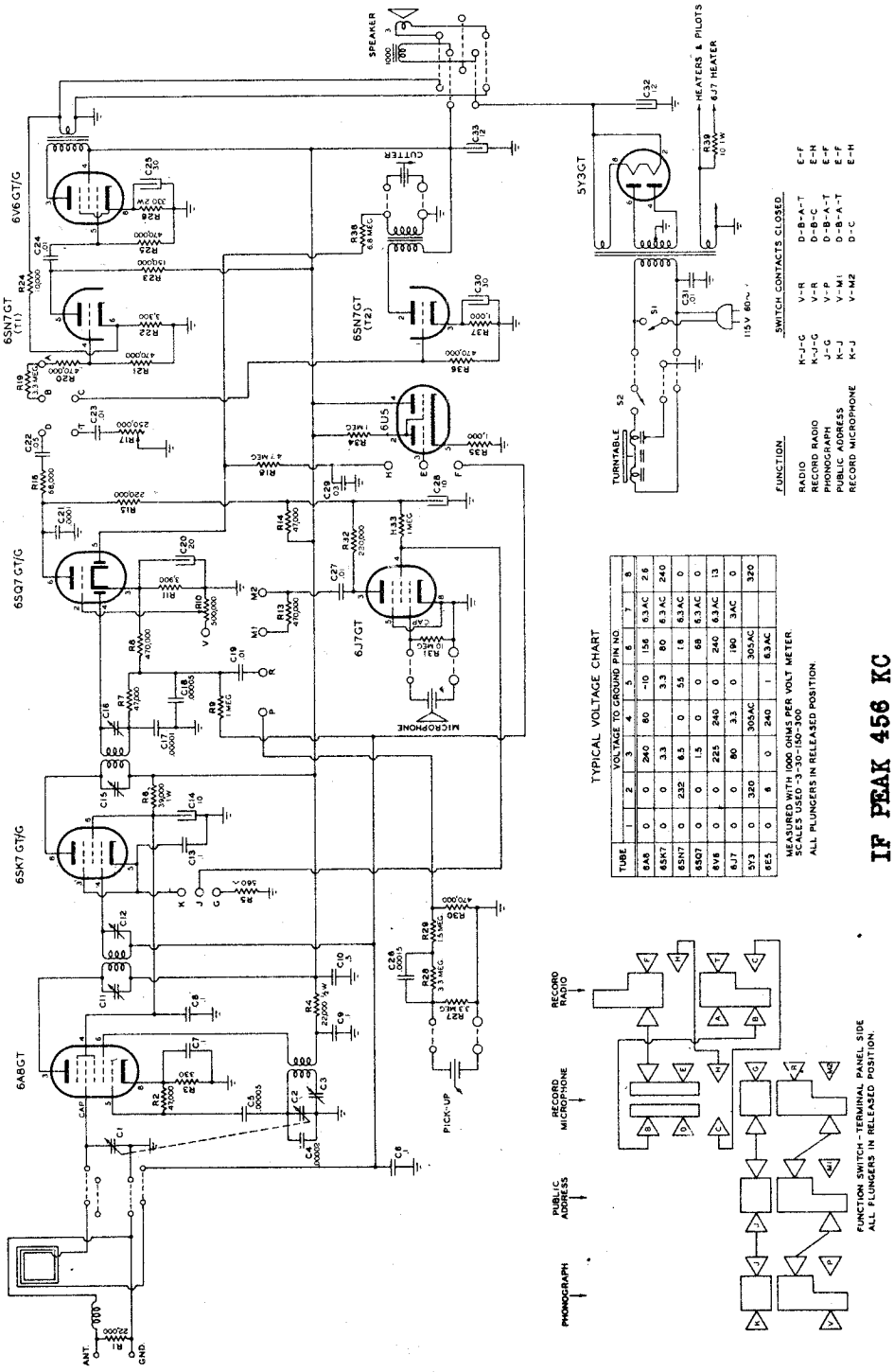
MODELS 6B10,6B20,6B30,
6B32,Late,Serial Nos.
701,752 to 703,631

WILCOX GAY CORP.



TYPICAL VOLTAGE CHART

TUBE	VOLTAGE TO GROUND PIN NO.								
	1	2	3	4	5	6	7	8	
6A6	0	0	240	80	-10	156	6.3AC	2.6	
6SK7	0	0	3.3		3.3	80	6.3AC	240	
6SN7	0	232	6.5	0	55	18	6.3AC	0	
6SQ7	0	0	1.5	0	0	68	6.3AC	0	
6V6	0	0	225	240	0	240	6.3AC	13	
6J7	0	0	80	3.3	0	180	3AC	0	
5Y3	0	320		305AC		305AC		320	
6E5	0	8	0	240	1	6.3AC			

MEASURED WITH 1000 OHMS PER VOLT METER.
SCALES USED 0-300-1000 VOLTS.
ALL PLUNGERS IN RELEASED POSITION.

IF PEAK 456 KC

FUNCTION SWITCH - TERMINAL PANEL SIDE
ALL PLUNGERS IN RELEASED POSITION.

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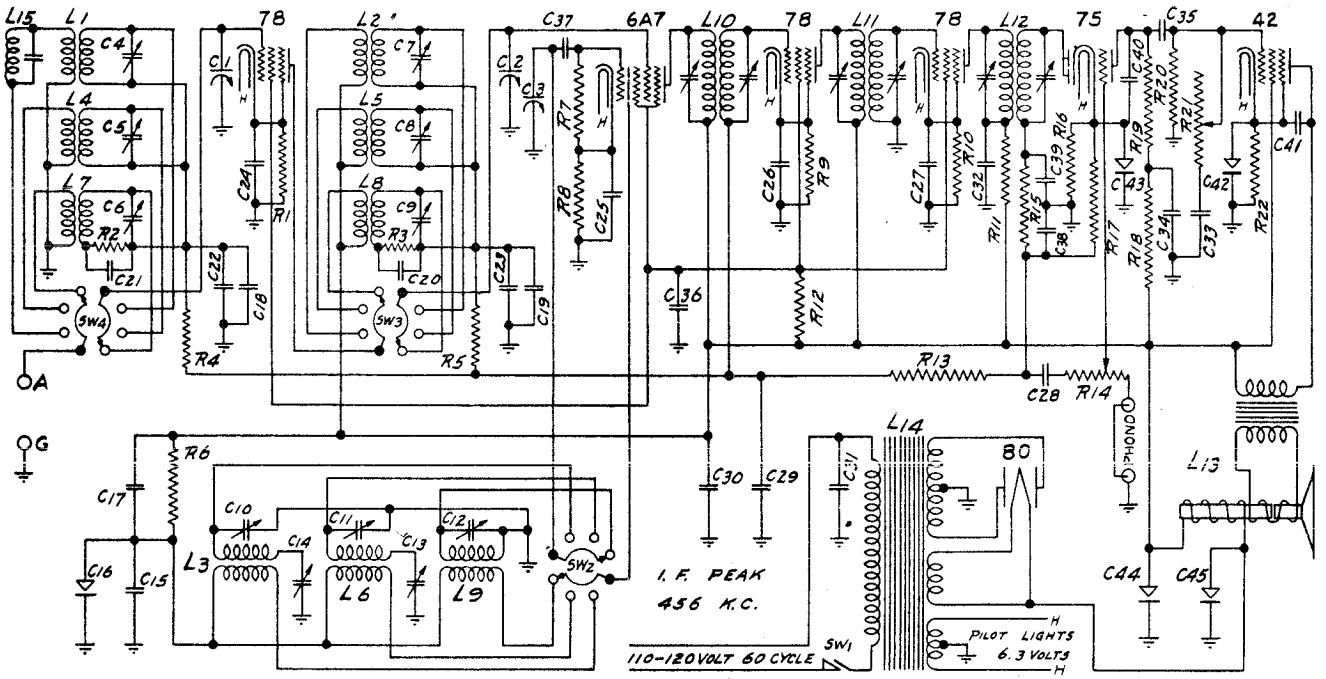


CODE	PART NO.	RESISTORS
R1	53-1063	500 Ohm Wirewound Resistor
R2	53-920	10,000 Ohm Type M Resistor
R3	53-920	10,000 Ohm Type M Resistor
R4	53-923	100,000 Ohm Type M Resistor
R5	53-923	100,000 Ohm Type M Resistor
R6	53-941	20,000 Ohm Type M Resistor
R7	53-941	20,000 Ohm Type M Resistor
R8	53-1062	250 Ohm Wirewound Resistor
R9	53-1063	500 Ohm Wirewound Resistor
R10	53-1063	500 Ohm Wirewound Resistor
R11	53-919	5,000 Ohm Type M Resistor
R12	53-195	25,000 Ohm Type J Resistor
R13	53-926	1 Meg Ohm Type M Resistor
R14	19-2008	500,000 Ohm Volume Control
R15	53-898	50,000 Ohm Type M Resistor
R16	53-925	500,000 Ohm Type M Resistor
R17	53-919	5,000 Ohm Type M Resistor
R18	53-923	100,000 Ohm Type M Resistor
R19	53-924	250,000 Ohm Type M Resistor
R20	53-925	500,000 Ohm Type M Resistor
R21	19-2009	250,000 Ohm Tone Control
R22	53-1063	500 Ohm Wirewound Resistor

		CONDENSERS
C1, C2, C3	77-2011	3 Gang Tuning Condenser
C4, C5, C6	78-2030	3-50 Mmfd. 3 Gang Trimmer Cond.
C7, C8, C9	78-2030	3-50 Mmfd. 3 Gang Trimmer Cond.
C10, C11, C12	78-2030	3-50 Mmfd. 3 Gang Trimmer Cond.
C13, C14	78-2028	600 & 1600 Mmfd. 2 Gang Trimmer Cond.
C15	75-2003	.01 Mfd. 400 V. Paper Condenser
C16	18-2004	4 Mfd. 450 W.V. Elect. Condenser
C17	76-662	.002 Mfd. Mica Condenser
C18	76-662	.002 Mfd. Mica Condenser
C19	76-662	.002 Mfd. Mica Condenser
C20	75-2002	.004 Mfd. 600 V. Paper Condenser
C21	75-2002	.004 Mfd. 600 V. Paper Condenser
C22	75-2005	.1 Mfd. 200 V. Paper Condenser
C23	75-2005	.1 Mfd. 200 V. Paper Condenser
C24	75-2005	.1 Mfd. 200 V. Paper Condenser
C25	75-2005	.1 Mfd. 200 V. Paper Condenser
C26	75-2005	.1 Mfd. 200 V. Paper Condenser
C27	75-2005	.1 Mfd. 200 V. Paper Condenser
C28	75-2005	.1 Mfd. 200 V. Paper Condenser
C29	75-2005	.1 Mfd. 200 V. Paper Condenser

CODE	PART NO.	CONDENSERS (Cont'd.)
C30	75-2012	.5 Mfd. 400 V. Paper Condenser
C31	75-2003	.01 Mfd. 400 V. Paper Condenser
C32	75-2003	.01 Mfd. 400 V. Paper Condenser
C33	75-2003	.01 Mfd. 400 V. Paper Condenser
C34	75-2007	.1 Mfd. 400 V. Paper Condenser
C35	75-2007	.1 Mfd. 400 V. Paper Condenser
C36	75-2007	.1 Mfd. 400 V. Paper Condenser
C37	76-2002	.00005 Mfd. Mica Condenser
C38	76-2001	.0001 Mfd. Mica Condenser
C39	76-2001	.0001 Mfd. Mica Condenser
C40	76-265	.001 Mfd. Mica Condenser
C41	75-2002	.004 Mfd. 600 V. Paper Condenser
C42	18-928	25 Mfd. 25 V. Elect. Condenser
C43	18-928	25 Mfd. 25 V. Elect. Condenser
C44	18-2005	12 Mfd. 325 W.V. Elect. Condenser
C45	18-721	8 Mfd. 450 W.V. Elect. Condenser

		INDUCTANCES
L1	17-2163	Broadcast Antenna Coil Assembly
L2	17-2165	Broadcast R.F. Coil Assembly
L3	17-2167	Broadcast Oscillator Coil Assembly
L4	17-2168	Police Band Antenna Coil Assembly
L5	17-2169	Police Band R.F. Coil Assembly
L6	17-2170	Police Band Oscillator Coil Assembly
L7	17-2171	Foreign Band Antenna Coil Assembly
L8	17-2172	Foreign Band R.F. Coil Assembly
L9	17-2173	Foreign Band Oscillator Coil Assembly
L10	68-2045	First I.F. Transformer Assembly
L11	68-2045	Second I.F. Transformer Assembly
L12	68-2046	Third I.F. Transformer Assembly
L13	64-2051	12" Speaker, 1000 Ohm Field, 42 Tube Trans.
L14	80-2022	110-120 V. 60 Cycle Power Transformer
L15	17-2180	Wave Trap Coil Assembly

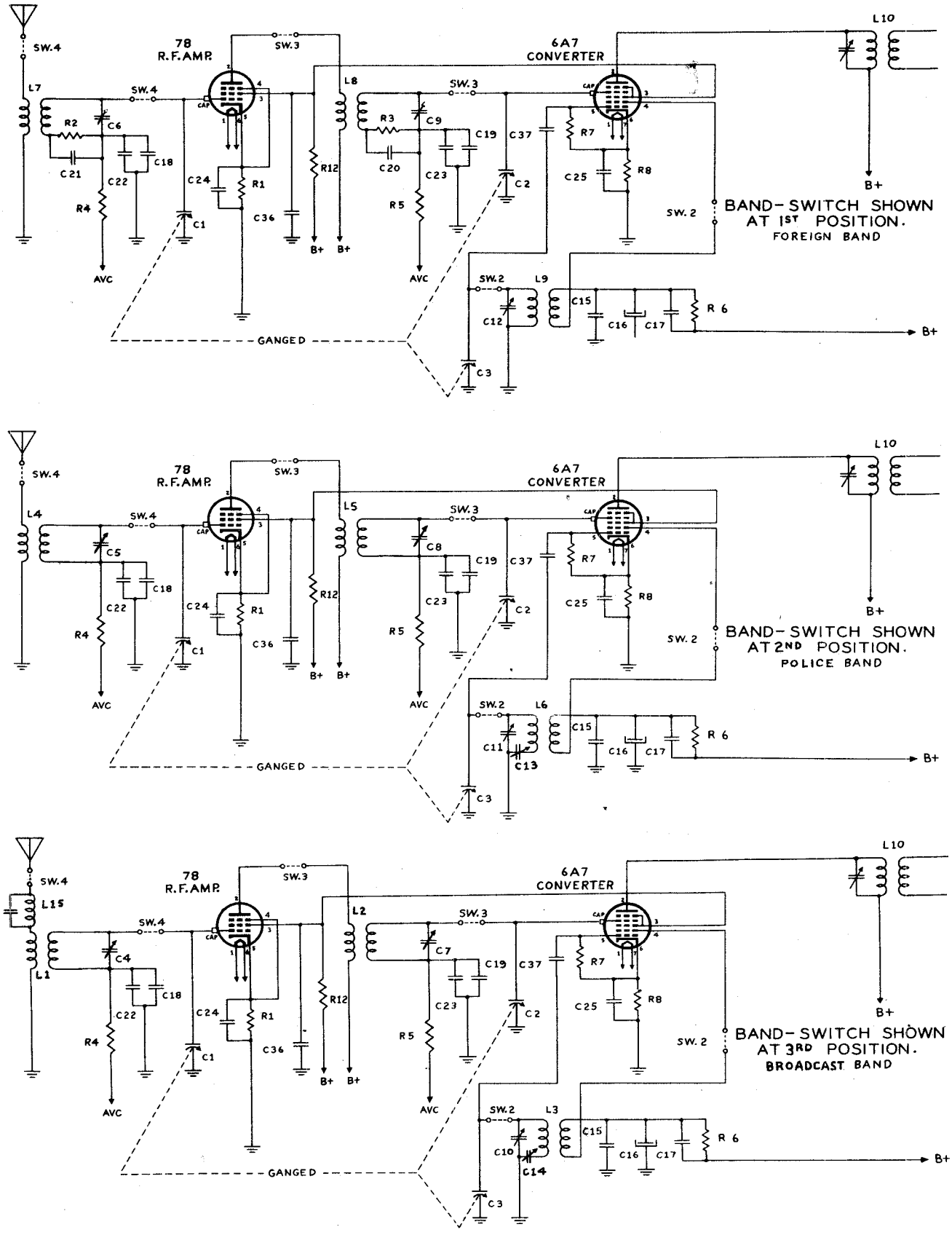
		SWITCHES
SW1	66-2014	Power Line Off-On Switch
SW2	66-2015	Front Panel of Band Switch
SW3	66-2015	Center Panel of Band Switch
SW4	66-2015	Rear Panel of Band Switch

WAVEBANDS

540 - 1750 KC
1.75 - 5.75 MC
5.5 - 18.5 MC

MODELS A-36, A-37

WILCOX GAY CORP.



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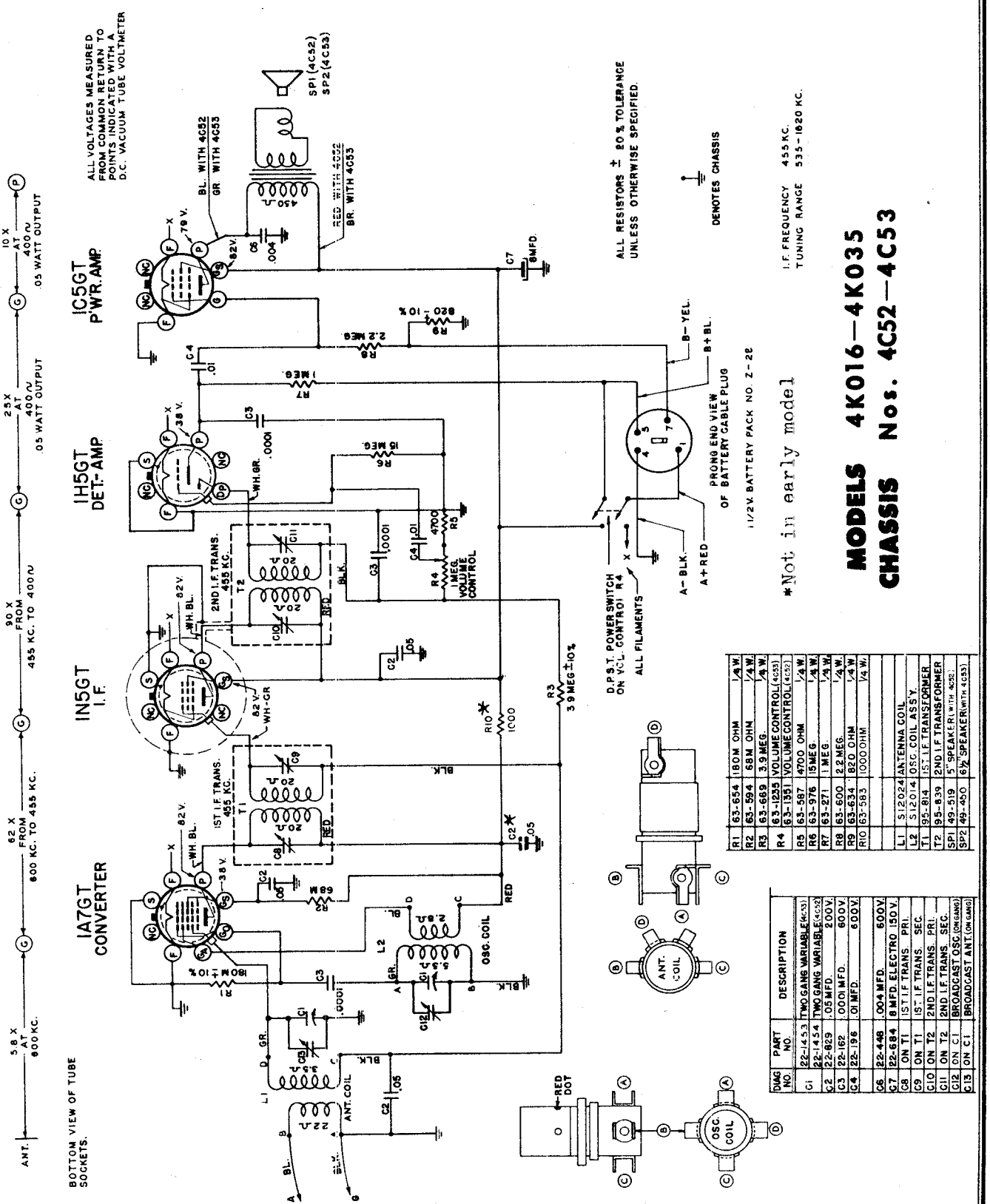
ZENITH RADIO CORP.

MODELS 4K016, Ch. 4C52,
4K035, Chas. 4C53


MODELS 4K016—4K035
CHASSIS Nos. 4C52—4C53
*Not in early model
I.F. FREQUENCY 455 KC.
TUNING RANGE 535-1620 KC.
1A7GT CONVERTER
1N5GT I.F.
1H5GT DET.-AMP.
1C5GT P'W'R.AMP.
ALL VOLTAGES MEASURED FROM COMMON RETURN TO POINTS INDICATED WITH A D.C. VACUUM TUBE VOLTMETER
ALL RESISTORS ± 20 % TOLERANCE UNLESS OTHERWISE SPECIFIED.
DENOTES CHASSIS
PRONG END VIEW OF BATTERY CABLE PLUG
1 1/2 V. BATTERY PACK NO. Z-28
D.P.S.T. POWER SWITCH ON VOL. CONTROL R4
ALL FILAMENTS
BOTTOM VIEW OF TUBE SOCKETS.
ANT.
5.8 X AT 600 KC.
62 X FROM 600 KC. TO 455 KC.
90 X FROM 455 KC. TO 400 KC.
25 X AT 400 Ω .05 WATT OUTPUT
10 X AT 400 Ω .05 WATT OUTPUT
1ST I.F. TRANS. 455 KC.
2ND I.F. TRANS. 455 KC.
VOLUME CONTROL
OSC. COIL
ANT. COIL
SP1 (4C52) SP2 (4C53)
BL. WITH 4C52 GR. WITH 4C53
RED WITH 4C52 BR. WITH 4C53
B- YEL.
B+ BL.
A- BLK.
A+ RED
RED DOT

DIAG NO.	PART NO.	DESCRIPTION
C1	22-145.3	TWO GANG VARIABLE (4C53)
	22-145.4	TWO GANG VARIABLE (4C52)
C2	22-629	.05 MFD. 200 V.
C3	22-162	.0001 MFD. 600 V.
C4	22-196	.01 MFD. 600 V.
C6	22-448	.004 MFD. 600 V.
C7	22-684	8 MFD. ELECTRO. 150 V.
C8	ON T1	1ST I.F. TRANS. PRI.
C9	ON T1	1ST I.F. TRANS. SEC.
C10	ON T2	2ND I.F. TRANS. PRI.
C11	ON T2	2ND I.F. TRANS. SEC.
C12	ON C1	BROADCAST OSC. (ON GANG)
C13	ON C1	BROADCAST ANT. (ON GANG)

R1	63-654	180 M OHM	1/4 W.
R2	63-594	68 M OHM	1/4 W.
R3	63-669	3.9 MEG.	1/4 W.
R4	63-1235	VOLUME CONTROL (4C53)	
	63-1351	VOLUME CONTROL (4C52)	
R5	63-587	4700 OHM	1/4 W.
R6	63-976	15 MEG.	1/4 W.
R7	63-271	1 MEG.	1/4 W.
R8	63-600	2.2 MEG.	1/4 W.
R9	63-634	820 OHM	1/4 W.
R10	63-583	1000 OHM	1/4 W.

L1	S12024	ANTENNA COIL
L2	S12014	OSC. COIL ASS'Y.
T1	95-814	1ST I.F. TRANSFORMER
T2	95-839	2ND I.F. TRANSFORMER
SP1	49-519	5" SPEAKER (WITH 4C52)
SP2	49-450	6½" SPEAKER (WITH 4C53)

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MODELS 4K016,4K035
MODELS 6D015,6D030

ZENITH RADIO CORP.

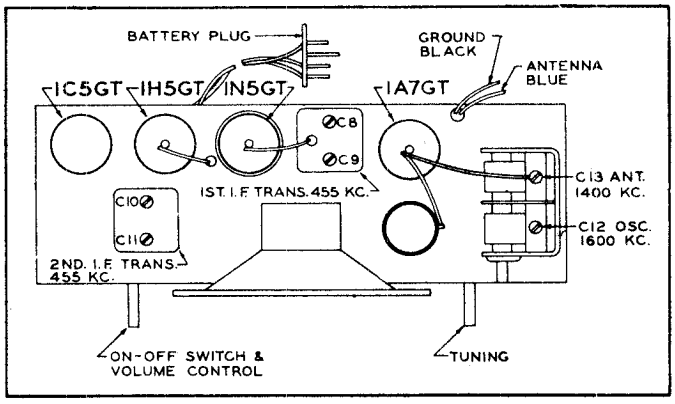
MODELS 4K016—4K035
CHASSIS Nos. 4C52—4C53

TO THE SERVICE MAN:

The alignment of this chassis is conventional.

A 4700 ohm resistor R5 between the low end of the volume control and ground allows some audio output with normal signal input when the volume control is in counter clockwise positions. This is the Guardian Reminder circuit.

If the audio output is objectionably high (with the volume control in counter clockwise position) resistor R5 may be reduced in value to 2500 ohms or removed from the circuit and the low end of the control grounded.



TUBE AND TRIMMER LOCATION

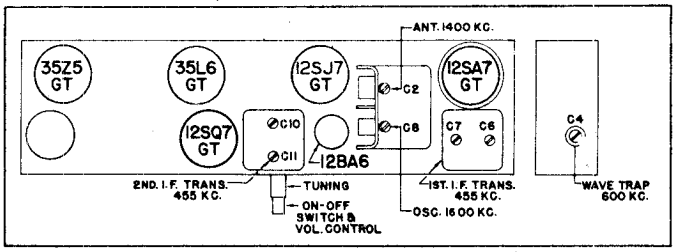
ALIGNMENT PROCEDURE

OPERATION	CONNECT OSCILLATOR TO	DUMMY ANTENNA	INPUT SIG. FREQUENCY	SET DIAL AT	TRIMMERS	PURPOSE
1	Converter Grid	.5 Mfd.	455 Kc	600 Kc.	C-8,C-9, C-10,C-11	Align I. F.
2	Antenna and Ground	200 mmfd.	1600 Kc.	1600 Kc.	C-12	Set Oscillator to Dial Scale.
3	Antenna and Ground	200 mmfd.	1400 Kc.	1400 Kc.	C-13	Align antenna stage.

MODELS 6D015—6D030
CHASSIS No. 6C05

TO THE SERVICE MAN:

The filter circuits of chassis 6C05 incorporate new features that should be well understood by the service man. An examination of the schematic drawing will show the output transformer tapped slightly off center. This tap is the B + connection from filter resistor R11 and capacitor C19 off the cathode of the rectifier 35Z5 to the 35L6 plate. The lower connection of the output transformer feeds B + to the rest of the tubes in the receiver. Current flowing through the upper windings of the output transformer to the 35L6 produces a magnetic field which is 180° out of phase with the magnetic field produced by current flowing in the opposite direction through the output transformer to the rest of the receiver, therefore, most of the AC hum is cancelled. Further reduction of hum is accomplished by filtering through resistor R10 and 12 and capacitors C17 and 18.



TUBE AND TRIMMER LOCATION

This development in filtering systems allows a higher effective plate voltage on the 35L6 for increased power output.

NOTE: The output transformer must be replaced with an exact duplicate, Part No. 206-547. Be sure to add the speaker code letter to the transformer part number.

ALIGNMENT PROCEDURE

OPERATION	CONNECT OSCILLATOR	DUMMY TO ANTENNA	INPUT SIG. FREQUENCY	SET DIAL AT	TRIMMERS	PURPOSE
1	Converter Grid	.5 Mfd.	455 Kc.	600 Kc.	C-6,C-7, C-10,C-11	I.F. Alignment
2	Single Turn Loosely Coupled to Wave Magnet		455 Kc.	600 Kc.	C-4	Adjust Wave Trap to minimum.
3			1600 Kc.	1600 Kc.	C-8	Set Oscillator to Dial Scale.
4			1400 Kc.	1400 Kc.	C-2	Antenna Alignment

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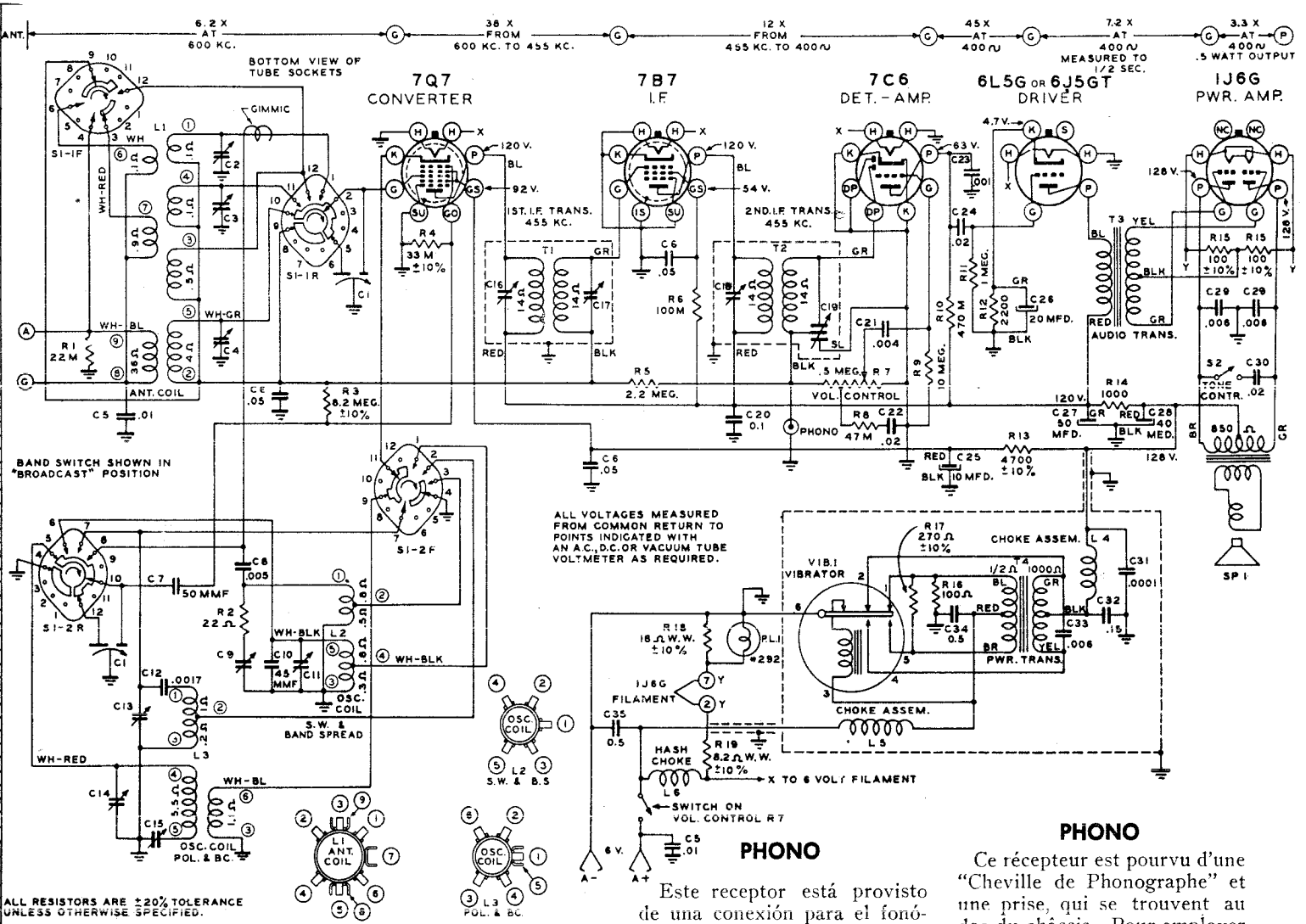
DIAG NO.	PART NO.	DESCRIPTION
C1	22-1250	2-GANG VARIABLE
C2	22-1252	SHORTWAVE ANT. TR.
C3	22-1254	25 METER ANT. TRIM.
C4		BROADCAST ANT. TR.
C5	22-810	.01 MFD. 400 V.
C6	22-818	.05 MFD. 400 V.
C7	22-289	50 MMFD. 600 V.
C8	22-1022	.005 MFD. 600 V.
C9	22-1090	SHORTWAVE OSC. TRIM.
C10	22-1264	45 MMFD. COMP.
C11	22-1090	25 METER OSC. TRIM.
C12	22-1258	.0017 MFD. 600 V.
C13	22-1090	S.W.2 OSC. TRIMMER
C14	22-1253	BROADCAST OSC. TR.
C15		BROADCAST PADDER TR
C16	ON T1	1ST. I.F. TRANS. PRI. TR.
C17	ON T1	1ST. I.F. TRANS. SEC. TR.
C18	ON T2	2ND. I.F. TRANS. PRI. TR.
C19	ON T2	2ND. I.F. TRANS. SEC. TR.
C20	22-821	.1 MFD. 400 V.
C21	22-805	.004 MFD. 600 V.
C22	22-813	.02 MFD. 200 V.
C23	22-1063	.001 MFD. 600 V.
C24	22-815	.02 MFD. 600 V.
C25	22-1266	10 MFD. ELECTRO 200 V.
C26		20 MFD. " 25 V.
C27	22-1058	50 MFD. " 200 V.
C28		40 MFD. " 250 V.
C29	22-808	.006 MFD. 600 V.
C30	22-816	.02 MFD. 600 V.
C31	22-162	.0001 MFD. 600 V.
C32	22-1021	.15 MFD. 400 V.
C33	22-1068	.006 MFD. 1600 V.
C34	22-824	.5 MFD. 200 V.
C35	22-1064	.5 MFD. 120 V.
R1	63-591	22 M OHM 1/4 W.
R2	63-573	22 OHM 1/4 W.
R3	63-673	6.2 MEGOHM 1/4 W.
R4	63-648	33 M OHM 1/4 W.
R5	63-722	2.2 MEGOHM 1/4 W.
R6	63-595	100 M OHM 1/4 W.
R7	63-1249	.5 MEG. VOL. CONTROL
R8	63-593	47 M OHM 1/4 W.
R9	63-604	10 MEGOHM 1/4 W.
R10	63-597	470 M OHM 1/4 W.
R11	63-271	1 MEGOHM 1/4 W.
R12	63-585	2200 OHM 1/4 W.
R13	63-1025	4700 OHM 1/2 W.
R14	63-583	1000 OHM 1/4 W.
R15	63-294	100 OHM 1/4 W.
R16	63-697	100 OHM 1/4 W
R17	63-1106	270 OHM 1/2 W.
R18	63-1066	18 OHM WIREW'D 1/2W.
R19	63-1451	8.2 OHM WIREW'D. 1 W.
L1	59962	ANTENNA COIL ASSY.
L2	S10040	OSC. COIL S.W. & B.S.
L3	S10039	OSC. COIL POL. & BC.
L4	58748	CHOKE ASSEMBLY
L5	S5043	CHOKE ASSEMBLY
L6	20-243	HASH CHOKE
PL1	100-39	PILOT LIGHT 2.9V. I7A
S1	85-298	BAND SELECTOR SW.
S2	85-134	TONE CONTROL SW.
SP1	49-529	6 1/2" P.M. SPEAKER
T1	95-716	1ST. I.F. TRANS.
T2	95-931	2 ND. I.F. TRANS.
T3	95-719	AUDIO TRANS.
T4	95-644	POWER TRANS.
VIB1	190-6	VIBRATOR

MISCELLANEOUS PARTS			
46-607	KNOBS (3 USED)	S10106	DIAL SCALE & EYELET ASSEMBLY
2-110	CABINET BACK	S11632	DIAL SCALE & BAND INDICATOR ASSEMBLY
14-942	TABLE CABINET	S11633	DIAL CORD & EYELET ASSEMBLY
192-95	DIAL CRYSTAL	26-345	DIAL SCALE
196-70	DIAL CRYSTAL GASKET	59-163	DIAL POINTER
		80-69	DIAL CORD TENSION SPRING

ALL RESISTORS ARE ±20% TOLERANCE UNLESS OTHERWISE SPECIFIED.

I.F. FREQUENCY 455 KC.
TUNING RANGE 540 - 1660 KC.
TUNING RANGE 2100 - 7300 KC.
TUNING RANGE 6600 - 22500 KC.
TUNING RANGE 9400 - 12,200 KC.



This receiver is equipped with a Phono Jack and Plug located on the rear of the chassis. To use the receiver with a record player, set the Band Switch to one of the short-wave bands and control the volume of the record reproduction with the receiver Volume Control.

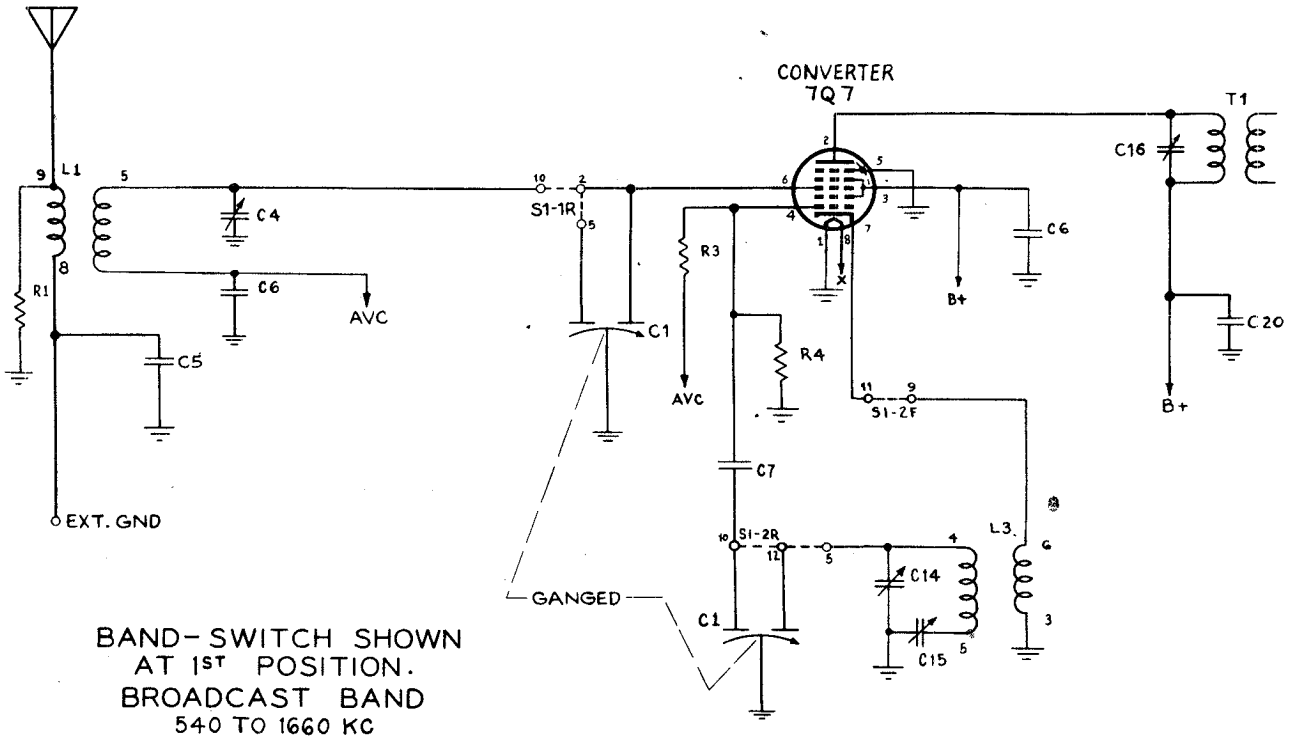
PHONO

Este receptor está provisto de una conexión para el fonógrafo, y una clavija o toma, situadas en la parte posterior del chásis. Para usar el receptor con un "Tocadiscos," ajuste el cambio de banda a una de las bandas de onda corte y cambie el volumen del sonido por medio del control de volumen del receptor.

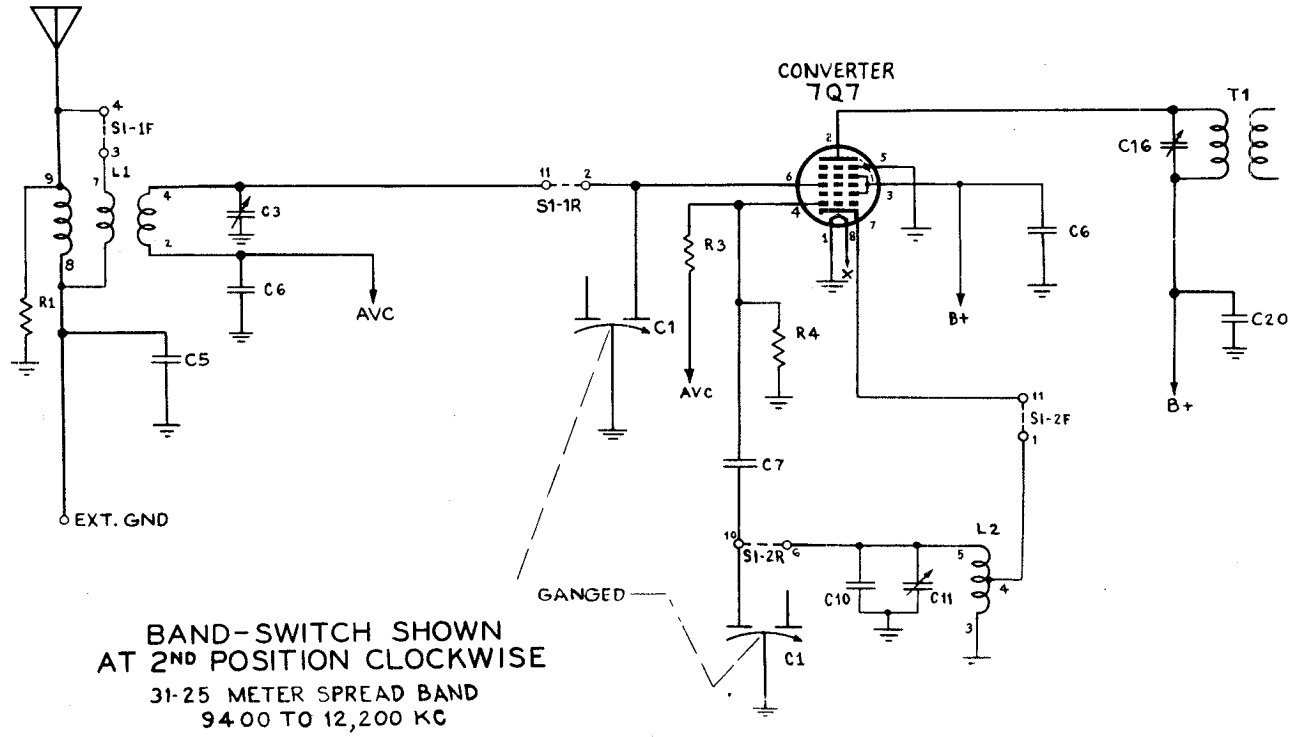
PHONO

Ce récepteur est pourvu d'une "Cheville de Phonographe" et une prise, qui se trouvent au dos du châssis. Pour employer le poste avec un appareil phonographique externe ("record player"), tournez le commutateur sélectionneur de bandes à une des bandes d'ondes courtes, et réglez le volume du son au moyen du contrôle du volume du poste.

ZENITH RADIO CORP.



BAND-SWITCH SHOWN
AT 1ST POSITION.
BROADCAST BAND
540 TO 1660 KC



BAND-SWITCH SHOWN
AT 2ND POSITION CLOCKWISE
31-25 METER SPREAD BAND
9400 TO 12,200 KC

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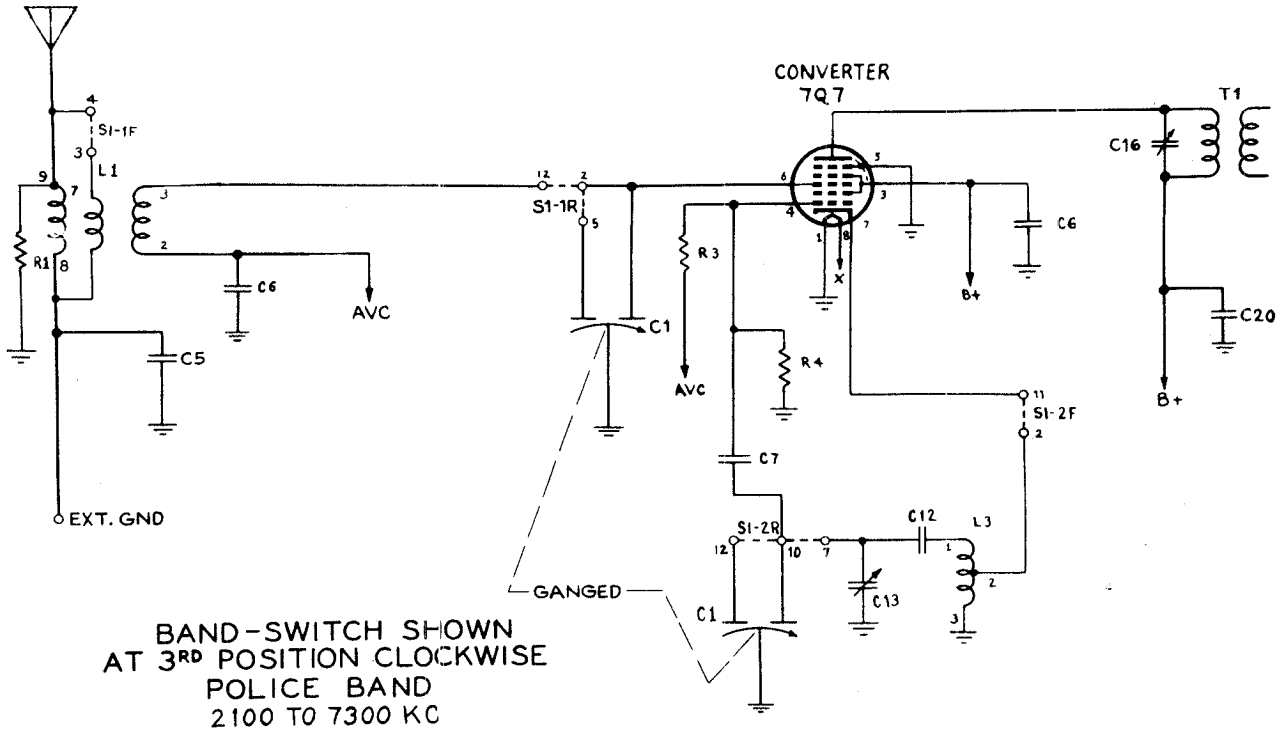
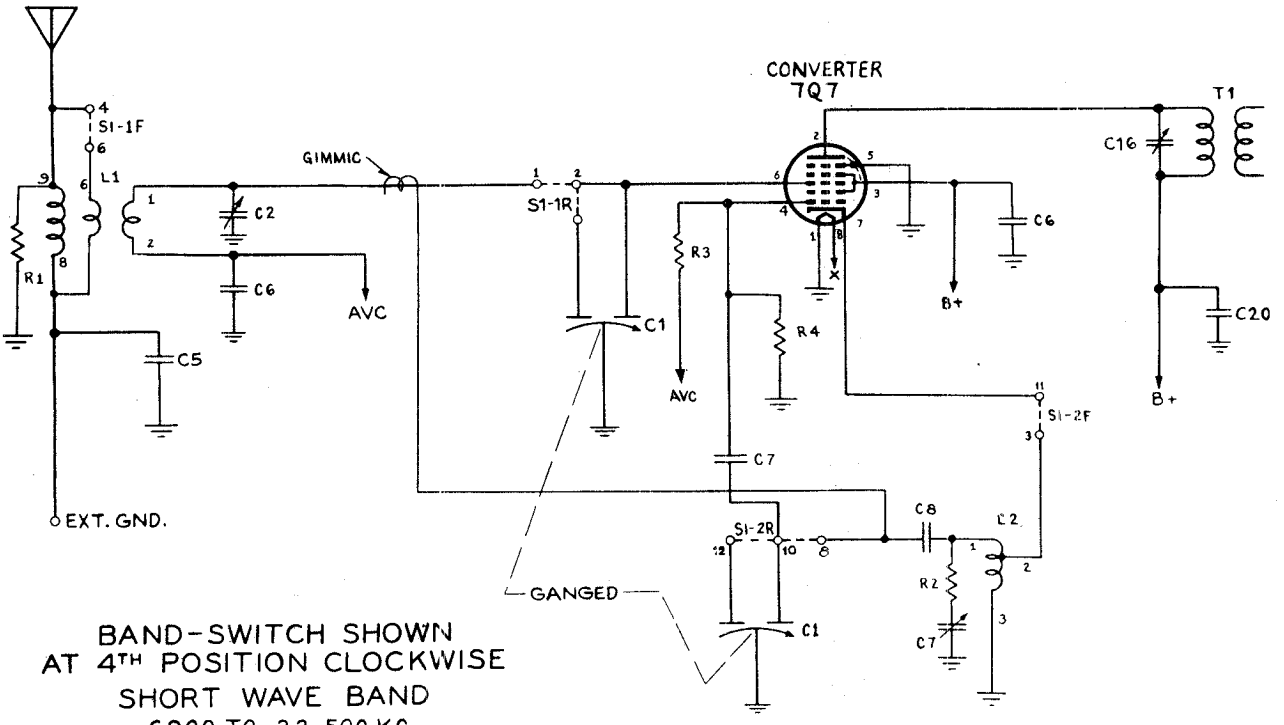
ZENITH RADIO CORP.



BAND-SWITCH SHOWN
AT 3RD POSITION CLOCKWISE
POLICE BAND
2100 TO 7300 KC



BAND-SWITCH SHOWN
AT 4TH POSITION CLOCKWISE
SHORT WAVE BAND
6800 TO 22,500 KC

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MODEL NO. 5B042

Chassis No. 5C62T

INSTRUCCIONES PARA LA INSTALACION Y FUNCIONAMIENTO

INFORMACION GENERAL

Después de desembalar el receptor, el papel engomado usado en embalaje y embarque, tiene que quitarse del chasis.

Este receptor es un moderno aparato superheterodino, de cinco tubos, que sintoniza las bandas de onda larga y corta, como sigue: 540 a 1660 Kc. (555 a 180 metros), 2100 a 7300 Kc. (143 a 41 metros), 6800 a 22,500 Kc. (44 a 13.3 metros) y una gama de ondas especial desde 9400 a 12,200 Kc. (31.9 a 24.6 metros) con ensanchamiento de banda en 25 y 31 metros.

El receptor está provisto de altoparlante de imán permanente del tipo electro-dinámico, y un regulador de tono de dos posiciones.

SUMINISTRO DE ENERGIA

Este receptor funciona con un acumulador de 6 voltios solamente.

Consumo de energía del chasis con altoparlante de imán permanente es de 2.2 amperios. El máximum de salida de fuerza es de 2.2 vatios.

INSTALLATION, OPERATING AND SERVICE INSTRUCTIONS

GENERAL

After the receiver has been unpacked from the carton, the paper tape used for packing and shipping must be removed from the chassis.

This receiver is a modern five tube superheterodyne, tuning over the following standard broadcast and short-wave bands: 540 to 1660 Kc (555 to 180 meters), 2100 to 7300 Kc (143 to 41 meters), 6800 to 22,500 Kc (44 to 13.3 meters), and a special range covering 9400 to 12,200 Kc (31.9 to 24.6 meters) with spread bands at 25 and 31 meters.

It is equipped with a permanent magnet dynamic type speaker and a two position tone control.

POWER SUPPLY

This receiver operates from a 6 volt storage battery only.

Power consumption of the receiver is 2.2 amperes. The maximum power output is 2.2 watts.

LES INSTRUCTIONS POUR L'INSTALLATION ET LE FONCTIONNEMENT

GENERAL

Après déballage du récepteur de la boite en carton, la bande de papier-cache employée pour l'emballage et l'expédition doit être enlevée du châssis.

Le présent poste est un récepteur superhétérodyne moderne à cinq lampes, dont l'accord englobe les bandes standard suivantes d'ondes moyennes et d'ondes courtes: 540 à 1660 Kc. (555 à 180 mètres), 2100 à 7300 Kc. (143 à 41 mètres), 6800 à 22,500 Kc. (44 à 13.3 mètres), et une échelle spéciale qui couvre de 9400 à 12,200 Kc. (31.9 à 24.6 mètres) avec épanouissement des bandes à 25 et 31 mètres.

Ce poste est équipé avec un haut parleur à aimant permanent du type électro-dynamique, et un contrôle de son à deux positions.

ALIMENTATION DE COURANT

Ce récepteur de TSF ne fonctionne qu'avec accu de six volts.

La consommation de courant du châssis utilisant le haut parleur à aimant permanent est de 2.2 ampères. Le débit maximum de puissance est de 2.2 watts.

¡OJO!
Es indispensable que las terminales del acumulador estén conectadas a la terminal positiva o negativa correspondientes. De lo contrario, no se puede obtener recepción y el vibrador puede dañarse.

CAUTION
Be certain that the battery clips are connected to the proper plus and minus terminals of the battery; otherwise reception cannot be obtained and the vibrator may be damaged.

PRECAUTION
S'assurer que les pattes d'attache sont connectées avec les propres bornes plus ou mois de l'accu, comme autrement on n'aura pas de réception et le vibrateur pourra s'avarier.

ANTENA

Una buena antena es indispensable para la recepción de radio. Una antena exterior de 13 a 20 metros instalada lo más alto posible es la más apropiada para uso general. Si se ha de suar una antena ya instalada, ésta debe examinarse minuciosamente para determinar su estado pues puede haber conexiones oxidadas o rotas, que nulifican la eficacia de la antena. Por otra parte si ha de instalarse una antena nueva hay que tomar las precauciones necesarias para que el alambre de bajada no haga contacto con la pared o con cualquier objeto que resulte en una conexión a tierra. Todas las conexiones deben estar correctamente soldadas para prevenir contra la oxidación y los ruidos que se producen a consecuencia de esto.

ANTENNA

A good antenna is necessary for satisfactory reception. An outside antenna from 40 to 60 feet in length and as high as possible will give good all around results. If your present antenna is to be used, a thorough examination should be made to determine its condition, as the connections may be corroded or broken thus rendering the antenna unfit for service. If a new antenna is to be constructed, care should be taken to prevent the lead-in wire from grounding to trees, walls or gutters and all connections should be properly soldered to prevent corrosion and resulting noise. Connect the antenna lead-in to the post marked "A" at the back of the chassis.

ANTENNE

Une bonne antenne s'impose pour obtenir une réception satisfaisante. Une antenne extérieure de 13 à 20 mètres de long et placé aussi haut que possible donnera d'excellents résultats pour tout service. Si vous vous proposez d'utiliser votre antenne actuelle, il conviendra d'en faire un examen approfondi pour en déterminer l'état car les connexions peuvent en être rouillées ou rompues, ce qui rendrait l'antenne impropre à l'emploi. Si on décide de construire une nouvelle antenne, il convient de veiller á ce que le fil d'entrée ne rejoigne pas la terre par des arbres, des murs ou des gouttières, et toutes les connexions devront être soudées avec soin pour prévenir la corrosion et les parasites qui en résulterai-

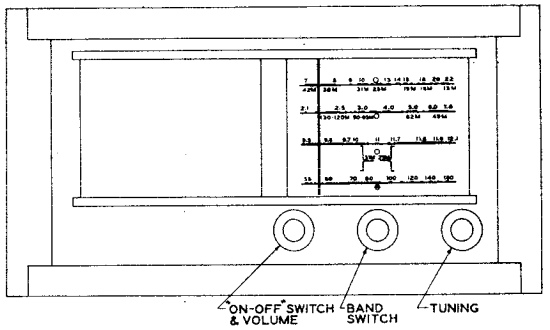

FIG. 1. CONTROLS.

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Conéctese el alambre de bajada de la antena a la terminal marcada "A" en la parte trasera del chasis.

TIERRA

Una conexión a tierra bién hecha mejorará considerablemente la recepción aumentando la fuerza de las señales de estaciones lejanas y reduciendo el ruido de fondo. La conexión de tierra más satisfactoria consiste en una sección de tubería de un metro a 1.50 metros de largo, colocada verticalmente y casi cubierta de tierra húmeda; un extremo de la conexión a tierra se conecta a la terminal marcada "G" en el chasis.

FUNCIONAMIENTO

(Véase la fig. 1). El grabado indica la posición y propósito de cada perilla. Haciendo girar la perilla combinada interruptor (ON-OFF) y regulador de volumen hacia la derecha, el receptor empieza a funcionar. Las válvulas requieren un minuto más o menos para calentarse. Para aumentar el volumen es necesario girar la perilla hacia la derecha. El volumen se reduce haciendo girar la perilla hacia la izquierda y el receptor se apaga cuando se oye el ruido del interruptor.

Para sintonizar una estación gírese la perilla selectora hasta que la aguja indique la frecuencia deseada. La sintonización debe hacerse en el centro de la frecuencia de la onda para obtener la mejor calidad de tono posible.

El tono se cambia por medio de un interruptor en la parte atrás del receptor, de "Treble" (alto) a "Bass" (bajo).

El receptor tiene cuatro gamas de onda, y cualquiera de ellas puede seleccionarse por medio del conmutador de bandas. La banda que se está usando estará indicada por medio de un punto rojo en el centro de la escala correspondiente.

GROUND

A good ground will aid reception materially by improving the signal strength of distant stations and reducing background noise. The best ground is a 4 to 6 foot pipe driven down to damp earth; the ground lead-in should be securely soldered to this.

A suitable ground may be obtained by making a good connection to a water pipe or radiator. Connect the ground lead-in to the post marked "G" at the rear of the chassis.

PLACING THE RECEIVER IN OPERATION

Note figure 1. This shows the position and purpose of each control. Turning the combination "ON-OFF" switch and volume control to the right will turn the receiver ON. Approximately one minute will be required for the tubes to heat to operating temperature. Continued rotation of this knob to the right increases the volume. Turning this control to the left decreases the volume and, when a click is heard, turns the receiver OFF.

When tuning in a station turn the tuning knob slowly to the desired station. Care should be taken to tune the receiver to the middle of the signal, otherwise the tone will be impaired.

The tone may be changed by means of the switch at the back of the radio from "Treble" to "Bass."

The receiver has four tuning ranges, any one of which may be selected by means of the band switch. The band in use will be indicated by a red dot in the center of the corresponding scale.

Daylight has a decided effect on the reception of short wave stations and different wave lengths are most effective at different times of the day. The following table may be used as a guide.

PRISE DE TERRE

Une bonne prise de terre aidera notablement la réception en améliorant la force du signal pour les stations distantes et en réduisant le bruit de fond. La meilleure prise de terre consiste d'un tuyau de 4 à 6 pieds qu'on enfonce dans le sol humide; la prise de terre devra y être solidement soudée.

On peut réaliser une prise de terre convenable en établissant une bonne connexion au tuyau d'eau ou à un radiateur. Reliez la prise de terre au montant marqué "G" à l'arrière du châssis.

MISE DU RECEPTEUR EN SERVICE

Notez la fig. 1. Elle montre la position et l'objet de chaque contrôle. En tournant le commutateur combinaison interrupteur "ON-OFF" et contrôle du volume, vers la droite, le récepteur sera mis en circuit. Il faut compter environ 1 minute pour que les lampes se chauffent à la tempèrature de fonctionnement. En continuant de tourner ce bouton vers la droite, le volume augmente en intensité. En tournant ce même contrôle vers la gauche, on diminue le volume de sonorité et; quand on entend un léger clic, c'est qu'on a mis le récepteur hors circuit.

Quand vous accordez une station, tournez le bouton de syntonisation lentement jusqu'à ce que vous ayez obtenu la station désirée. Il convient de veiller à accorder le poste au milieu de la fréquence d'onde correspondante; autrement le ton en sera affecté.

Le ton peut être modifié au moyen du commutateur qui se trouve à l'arrière du poste, et cela de la position "Treble" (haut) à "Bass" (bas).

Le récepteur possède quatre échelles d'accord parmi lesquelles on peut sélectionner l'une quelconque d'entre elles au moyen du commutateur sélectionneur de bandes. La bande en usage sera indiquée par un point rouge au centre de l'échelle correspondante.

La réception radiophonique sur ondes courtes est définitivement affectée par la lumière du jour et la réception sur différentes longueurs d'ondes est plus ou moins efficace à différents moments de la journée. Nous donnons à gauche un barème qui peut être suivi pour l'écoute des différentes stations pendant le jour ou la nuit.

LAMPES

Les lampes suivantes sont employées sur ce poste:

7Q7 – 7B7 – 7C6 – 6L5G et 1J6G.

La figure 2 montre la douille correcte pour chaque lampe.

La luz del día tiene una decidida influencia sobre la recepción de la onda corta y diferentes longitudes de onda alcanzan mayor eficacia a diferentes horas del día. El cuadro a la derecha puede ser usado como guía para sintonizar a diferentes horas del día y la noche.

VALVULAS

Este receptor usa las válvulas siguientes:

7Q7 – 7B7 – 7C6 – 6L5G y 1J6G.

La fig. 2 muestra la posición de las válvulas.

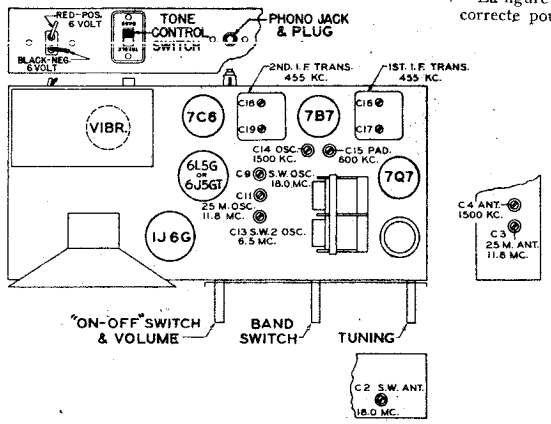
SHORT WAVE BAND	TIME OF BEST RECEPTION
16 meters and below	A.M. (Morning hours)
19 and 25 meters	P.M. (Afternoon)
25 and 31 meters	P.M. (Early evening)
31 and 49 meters	P.M. (Late evening)

TUBES

The following tubes are employed in this receiver:

7Q7 – 7B7 – 7C6 – 6L5G and 1J6G.

Figure 2 shows the correct socket for each tube.

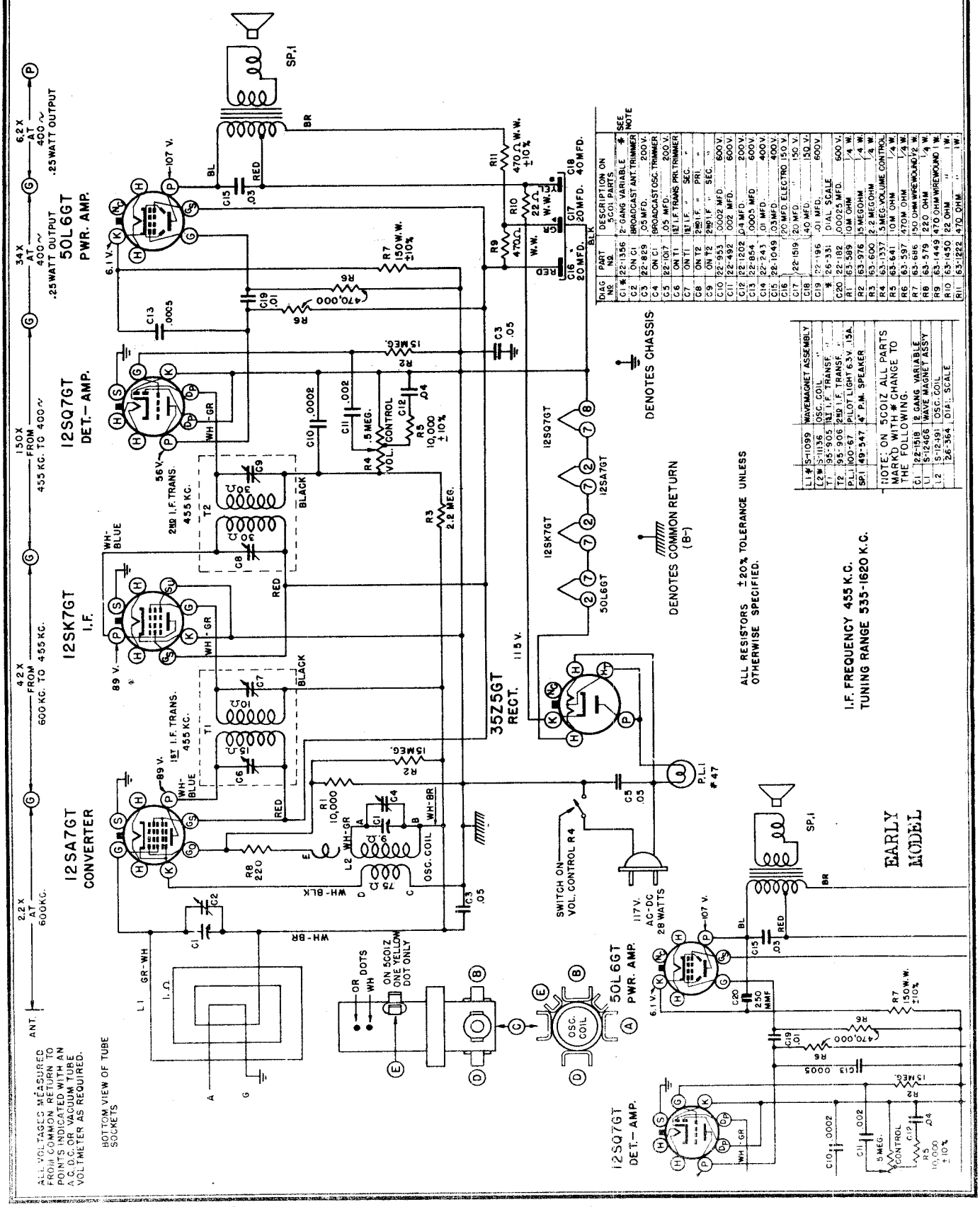


ALIGNMENT PROCEDURE

Opr.	Connect Osc. to	Dummy Ant.	Input Sig. Frequency	Band	Set Dial at	Trimmers	Purpose
1	1st Det Grid (Pin 6-7Q7)	.1 mfd.	455 kc.	BC	600 kc.	C16, 17, 18 and 19	Align I. F.
2	Antenna and Ground	200 mmfd.	1500 kc.	BC	1500 kc.	C14	Set Osc. to Dial Scale
3	Antenna and Ground	200 mmfd.	1500 kc.	BC	1500 kc.	C4	Align Antenna
4	Antenna and Ground	200 mmfd.	600 kc.	BC	Rock at 600 kc.	C15	Set Low Freq. Padder
5	Antenna and Ground	400 ohms	6.5 mc.	SW2	Rock at 6.5 mc.	C13	Align SW2
6	Antenna and Ground	400 ohms	18 mc.	SW1	18 mc.	C9	Set Osc. to Dial Scale
7	Antenna and Ground	400 ohms	18 mc.	SW1	18 mc.	C2	Align Antenna
8	Antenna and Ground	400 ohms	11.8 mc.	31-25 Meters	11.8 mc.	C11	Set Osc. to Dial Scale
9	Antenna and Ground	400 ohms	11.8 mc.	31-25 Meters	11.8 mc.	C3	Align Antenna

MODELS 5D011,5D011W,
5D011Y,5D027,Ch.5C01
5D011Z,5D011ZW,5D011ZY,
5D027Z,Early,Late
Chassis 5C01Z

ZENITH RADIO CORP.



DIAG NO.	PART NO.	DESCRIPTION ON 5C01 PARTS	* SEE NOTE
C1	* 22-1356	2-GANG VARIABLE	*
C2	ON C1	BROADCAST ANT. TRIMMER	
C3	22-829	.05 MFD. 200 V.	
C4	ON C1	BROADCAST OSC. TRIMMER	
C5	22-1017	.05 MFD. 200 V.	
C6	ON T1	1ST I.F. TRANS. PRI. TRIMMER	
C7	ON T1	1ST I.F. " SEC. "	
C8	ON T2	2ND I.F. " PRI. "	
C9	ON T2	2ND I.F. " SEC. "	
C10	22-953	.0002 MFD. 600 V.	
C11	22-492	.002 MFD. 600 V.	
C12	22-1202	.04 MFD. 200 V.	
C13	22-854	.0005 MFD. 600 V.	
C14	22-243	.01 MFD. 400 V.	
C15	22-1049	.03 MFD. 400 V.	
C16		20 MFD. ELECTRO 150 V.	
C17	22-1519	20 MFD. " 150 V.	
C18		40 MFD. " 150 V.	
C19	22-196	.01 MFD. 600 V.	
C20	* 26-331	DIAL SCALE	
R1	63-589	10M OHM 1/4 W.	
R2	63-976	1.5 MEGOHM 1/4 W.	
R3	63-600	2.2 MEGOHM 1/4 W.	
R4	63-1357	1.5 MEG. VOLUME CONTROL	
R5	63-641	10M OHM 1/4 W.	
R6	63-597	470M OHM 1/4 W.	
R7	63-686	150 OHM WIREWOUND 1/2 W.	
R8	63-579	220 OHM 1/4 W.	
R9	63-1449	470 OHM WIREWOUND 1 W.	
R10	63-1450	22 OHM " 1 W.	
R11	63-1222	470 OHM " 1 W.	

L1 *	5-11099	WAVEMAGNET ASSEMBLY
L2 *	5-11136	OSC. COIL " "
T1	95-905	1ST I.F. TRANSF. " "
T2	95-906	2ND I.F. TRANSF. " "
P.L.1	100-67	PILOT LIGHT 6.3 V. .15A.
SP.1	49-547	4" P.M. SPEAKER

NOTE: ON 5C01Z ALL PARTS MARKED WITH * CHANGE TO THE FOLLOWING.

C1	22-1518	2 GANG VARIABLE
L1	5-12466	WAVE MAGNET ASS'Y
L2	5-12491	OSC. COIL
T2	26-364	DIAL SCALE

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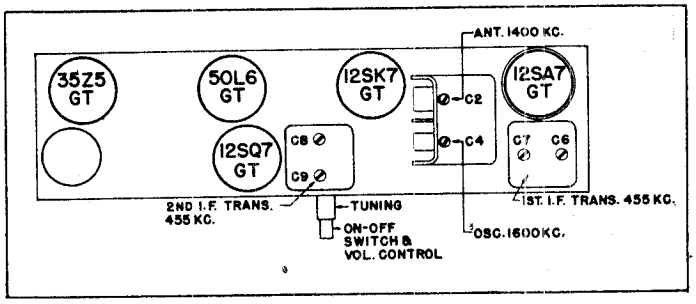
MODELS 5D011 Series,
5D011Z Series
MODELS 5R080, 5R086

TO THE SERVICE MAN:

The filter circuits of chassis 5C01 incorporate new features that should be well understood by the service man. An examination of the schematic drawing will show the output transformer tapped slightly off center. This tap is the B+ connection from filter resistor R10 and capacitor C18 off the cathode of the rectifier 35Z5 to the 50L6 plate. The lower connection of the output transformer feeds B+ to the rest of the tubes in the receiver. Current flowing through the upper windings of the output transformer to the 50L6 produces a magnetic field which is 180° out of phase with the magnetic field produced by current flowing in the opposite direction through the output transformer to the rest of the receiver, therefore, most of the AC hum is cancelled. Further reduction of hum is accomplished by filtering through resistor R9 and 11 and capacitors C16 and 17. Capacitor C15 across the primary of the output transformer by passes high frequency back to ground.



TUBE AND TRIMMER LOCATION

This development in filtering systems allows a higher effective plate voltage on the 50L6 for increased power output.

NOTE: The output transformer must be replaced with an exact duplicate Part No. 202-549. Be sure to add the speaker code letter to the transformer Part number.

MODELS 5D011—5D027
CHASSIS No. 5C01
ALIGNMENT PROCEDURE

OPERATION	CONNECT OSCILLATOR TO	DUMMY ANTENNA	INPUT SIG. FREQUENCY	SET DIAL AT	TRIMMERS	PURPOSE
1	Converter Grid	.5 Mfd.	455 Kc.	600 Kc.	C-6, C-7, C-8, C-9	Align I. F.
2	One Turn Loop Coupled Loosely to Wave Magnet	--	1600 Kc.	1600 Kc.	C-4	Set Oscillator to Dial Scale.
3		--	1400 Kc.	1400 Kc.	C-2	Align Antenna Stage

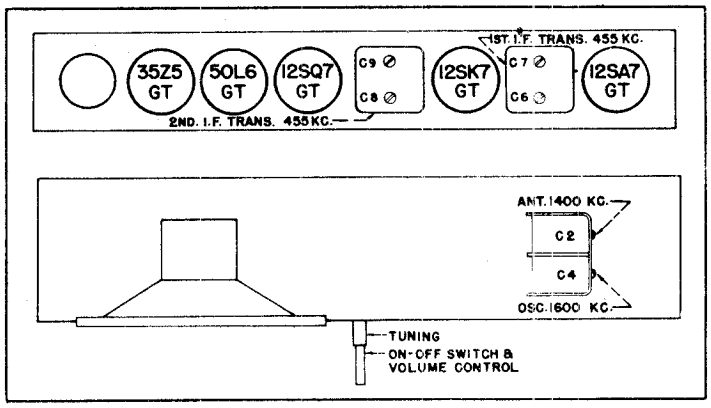
TO THE SERVICE MAN:

The 5C02 and 5C04 chassis are identical electrically. Chassis 5C02 has a Record Reject push button switch on the receiver control panel to reject records.

The socket P1 is used to connect the automatic record changer to the receiver.

The Phono-Radio switch is a two position double acting push-button switch and when in the "in" position connects the changer for playing records.

Chassis 5C04 has the same Phono-Radio switch arrangement. However, the 5C04 does not have socket P1 and the Record Reject switch. The record player is connected to the receiver by a shielded cable and socket arrangement.



TUBE AND TRIMMER LOCATION

MODELS 5R080—5R086
CHASSIS Nos. 5C02—5C04
ALIGNMENT PROCEDURE

OPERATION	CONNECT OSCILLATOR TO	DUMMY ANTENNA	INPUT SIG. FREQUENCY	SET DIAL AT	TRIMMERS	PURPOSE
1 1	Converter Grid	.5 Mfd.	455 Kc.	600 KC.	C-6, C-7, C-8, C-9	Align I. F.
2	Single Turn Loop Loosely Coupled to Wave magnet		1600 Kc.	1600 Kc.	C-4	Set Oscillator to Dial Scale.
3			1400 Kc.	1400 Kc.	C-2	Align Ant

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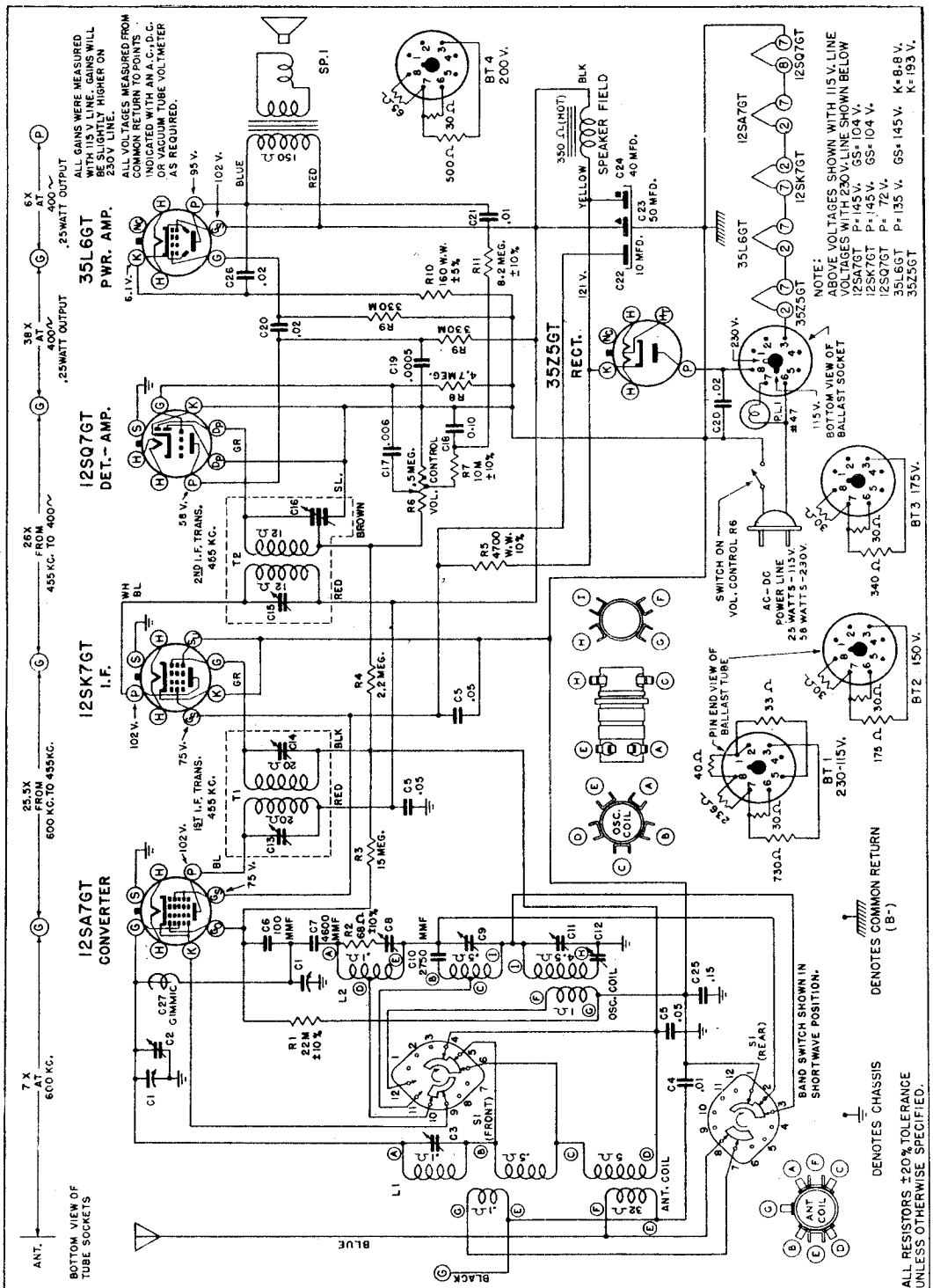
MODEL 5D012T
Chas.5C60T

ZENITH RADIO CORP.


12SA7GT CONVERTER
12SK7GT I.F.
12SQ7GT DET.-AMP.
35L6GT PWR. AMP.
35Z5GT RECT.
ANT.
BLUE
BLACK
7 X AT 600 KC.
25.5X FROM 600 KC. TO 455KC.
26X FROM 455 KC. TO 400~
38 X AT 400~ .25WATT OUTPUT
6X AT 400~ .25WATT OUTPUT
1ST I.F. TRANS. 455 KC.
2ND I.F. TRANS. 455 KC.
SP. 1
BT 4 200 V.
BT 3 175V.
BT2 150 V.
BT 1 230-115V.
SPEAKER FIELD
SWITCH ON VOL. CONTROL R6
AC-DC POWER LINE 25 WATTS-115V. 58 WATTS-230V.
BOTTOM VIEW OF TUBE SOCKETS
BOTTOM VIEW OF BALLAST SOCKET
PIN END VIEW OF BALLAST TUBE
OSC. COIL
ANT. COIL
OSC. COIL
BAND SWITCH SHOWN IN SHORTWAVE POSITION.
DENOTES CHASSIS
DENOTES COMMON RETURN (B-)
ALL RESISTORS ±20% TOLERANCE UNLESS OTHERWISE SPECIFIED.
ALL VOLTAGES MEASURED FROM COMMON RETURN TO POINTS INDICATED WITH AN A.C.-D.C. OR VACUUM TUBE VOLTMETER AS REQUIRED.
ALL GAINS WERE MEASURED WITH 115 V. LINE. GAINS WILL BE SLIGHTLY HIGHER ON 230 V. LINE.
NOTE: ABOVE VOLTAGES SHOWN WITH 115 V. LINE
VOLTAGES WITH 230 V. LINE SHOWN BELOW
12SA7GT P= 145 V. GS= 104 V.
12SK7GT P= 145 V. GS= 104 V.
12SQ7GT P= 72 V.
35L6GT P= 135 V. GS= 145 V. K= 8.8 V.
35Z5GT K= 193 V.

DIAG NO	PART NO	DESCRIPTION
C1	22-1411	2-GANG VARIABLE
C2	ON C1	BROADCAST ANTENNA TRIM.
C3	22-1424	SHORTWAVE ANTENNA TRIM.
C4	22-811	.01 MFD. 600 V.
C5	22-818	.05 MFD. 400 V.
C6	22-1442	100 MMFD 500 V.
C7	22-1432	4600 MMFD 500 V.
C8		SHORTWAVE OSC. TRIMMER
C9	22-1403	S.W. 2 OSC. TRIMMER
C10	22-1433	2750 MMFD. 600 V.
C11		BROADCAST OSC. TRIMMER
C12	22-1492	BROADCAST PADDER TRIM.
C13	ON T1	1ST I.F. TRANS. PRI. TRIM.
C14	ON T1	1ST I.F. TRANS. SEC. TRIM.
C15	ON T2	2ND I.F. TRANS. PRI. TRIM.
C16	ON T2	2ND I.F. TRANS. TRIM.
C17	22-808	.006 MFD. 600 V.
C18	22-1434	.10 MFD. 200 V.
C19	22-1117	.0005 MFD. 600 V.
C20	22-815	.02 MFD. 600 V.
C21	22-810	.01 MFD. 400 V.
C22		10 MFD. ELECTRO. 150 V.
C23	22-1414	50 MFD. ELECTRO. 150 V.
C24		40 MFD. ELECTRO. 250 V.
C25	22-1021	.15 MFD. 400 V.
C26	22-816	.02 MFD. 600 V.
C27	511900	GIMMIC
R1	63-763	22 M. OHM 1/4 W.
R2	63-737	68 OHM 1/4 W.
R3	63-1093	15 MEGOHM 1/4 W.
R4	63-722	2.2 MEGOHM 1/4 W.
R5	63-1140	4700 OHM W.W. 2 W.
R6	63-1354	.5 MEG. VOL. CONTROL
R7	63-641	10 M OHM 1/4 W.
R8	63-602	4.7 MEGOHM 1/4 W.
R9	63-596	330 M OHM 1/4 W.
R10	63-1068	160 OHM W.W. 2 W.
R11	63-673	8.2 MEGOHM 1/4 W.
L1	511539	ANTENNA COIL ASSEM.
L2	511540	OSCILLATOR " "
P.L.	100-67	PILOT LIGHT 6.3V. .15A.
S1	85-348	BAND SWITCH
SP	49-521	4 1/4" DYNAMIC SPEAKER
T1	95-924	1ST I.F. TRANS
T2	95-925	2ND I.F. TRANS
BT1	100-85	BALLAST TUBE 230-115 V.
BT2	100-87	BALLAST TUBE 150 V.
BT3	100-89	BALLAST TUBE 175 V.
BT4	100-91	BALLAST TUBE 200 V.

MISCELLANEOUS PARTS

	14-911	TABLE CABINET (5D012T)		117-93	BAND SWITCH LEVER
	14-911W	TABLE CABINET (5D012WT)		138-17	SPEAKER GRILLE
	14-911Y	TABLE CABINET (5D012YT)		192-84	DIAL CRYSTAL
	512546	GRILLE CLOTH & GRILLE ASSEMBLY		26-343	DIAL SCALE
	46-529	TUNING CONTROL KNOB		511737	DIAL CORD & EYELET ASSEMBLY
	46-530	VOLUME CONTROL KNOB		511812	DIAL SCALE & COIL MTG. BRACKET ASSEMBLY
	110-106	GRILLE CLOTH		59-153	DIAL POINTER
	2-108	CABINET BACK		80-160	DIAL CORD TENSION SPRING

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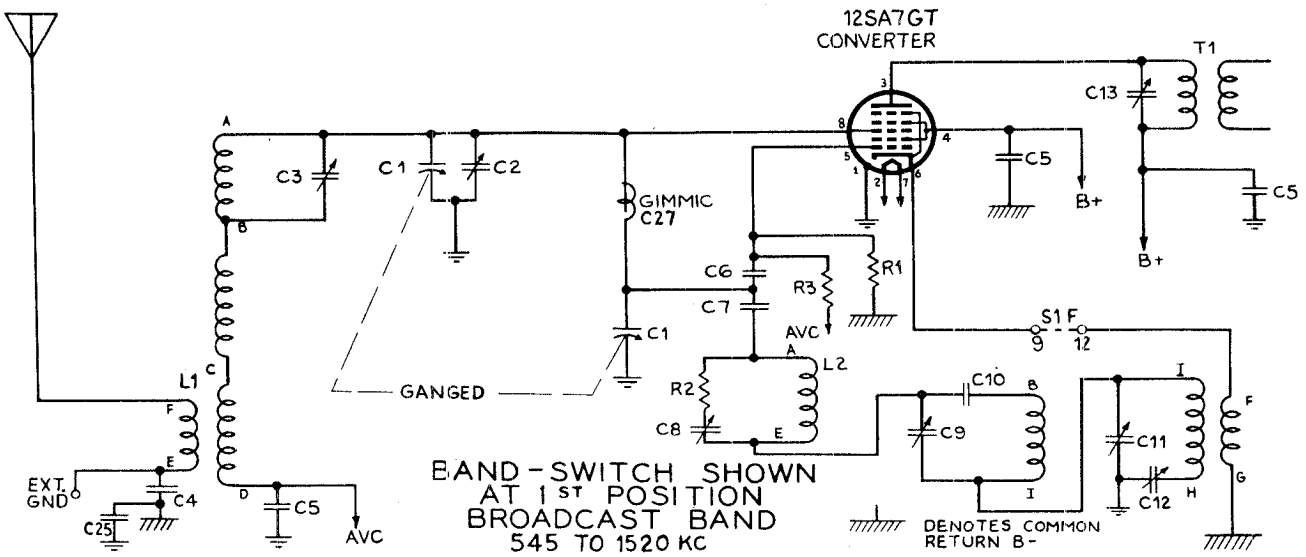
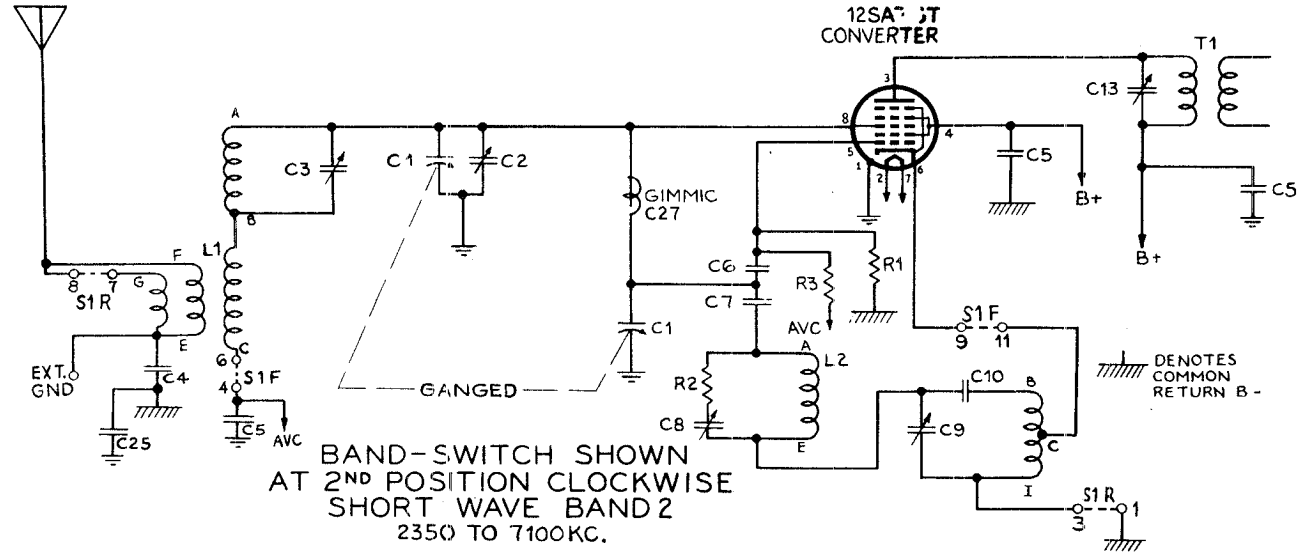
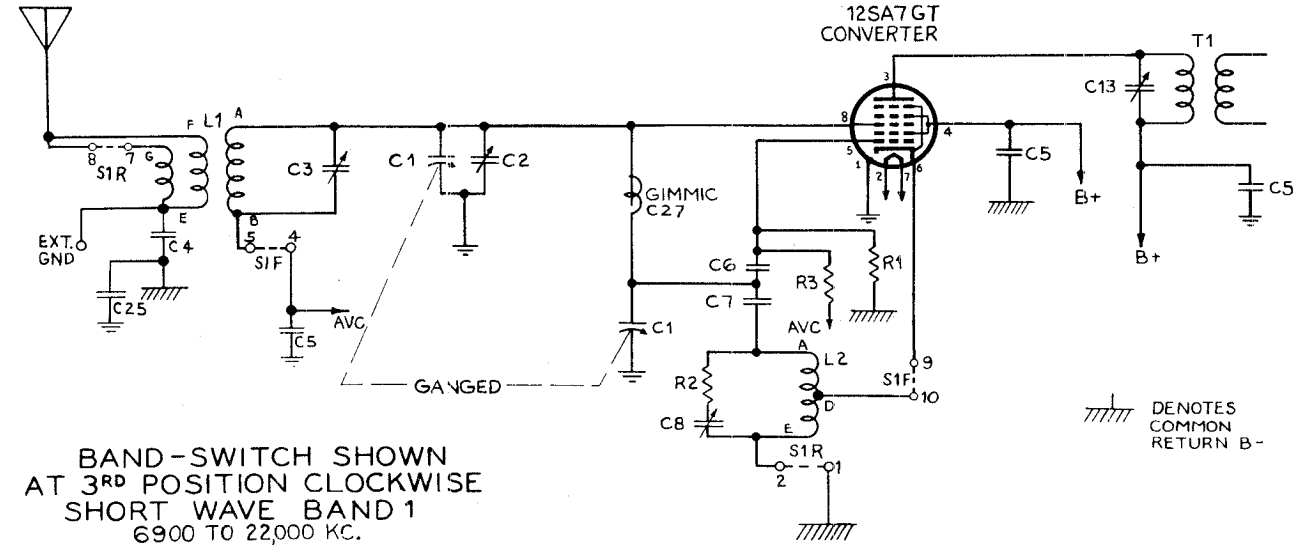


BAND-SWITCH SHOWN
AT 1ST POSITION
BROADCAST BAND
545 TO 1520 KC



BAND-SWITCH SHOWN
AT 2ND POSITION CLOCKWISE
SHORT WAVE BAND 2
2350 TO 7100 KC.



BAND-SWITCH SHOWN
AT 3RD POSITION CLOCKWISE
SHORT WAVE BAND 1
6900 TO 22,000 KC.

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MODEL NO. 5D012T

Chassis No. 5C60T

INSTRUCCIONES PARA INSTALACION, FUNCIONAMIENTO Y SERVICIO

GENERALIDADES

Después de desembalar el receptor de su caja de cartón, deberá quitarse del chasis las bandas de papel engomado usado para el empaque y embarque.

Este receptor es un superheterodino moderno que sintoniza sobre las siguientes escalas de onda larga y de onda corta: 545 a 1520 Kc. (550 a 197 metros), 2350 a 7100 Kc. (127.7 a 42.3 metros), 6900 a 22,000 Kc. (43.5 a 13.6 metros).

SUMINISTRO DE ENERGIA

El receptor puede ser usado ya sea conectado a corriente alterna (C.A.) de 25 a 60 ciclos, o a corriente continua (C.C.)

IMPORTANTE

Este receptor es enviado de la fábrica para ser usado sobre una corriente de 210-250 voltios. Para ajustar el receptor para una corriente de 115 voltios retire el tornillo de cierre del tubo de resistencia. Retire el tubo de su portatubo y vuelva a insertarlo en la posición 115 voltios, indicada sobre el chasis.

Si el receptor no comienza a funcionar dentro de un minuto cuando se le conecta a una corriente continua, la ficha de contacto debe ser invertida en el enchufe de la pared. Debe emplearse también este procedimiento en caso de escucharse un zumbido cuando el receptor funciona con corriente alterna.

El consumo total de energía cuando funciona con 115 voltios, es de 25 watios; y cuando funciona con 230 voltios, es de 58 watios.

La máxima producción de energía funcionando con 115 voltios es de 1.4 watios; y con 230 voltios, es de 3 watios.

IMPORTANTE

Se dispone de resistencias especiales para funcionar con suministros de energía de los siguientes voltajes:

150 Voltios. Parte No. 100-87
175 Voltios. Parte No. 100-89
200 Voltios. Parte No. 100-91

Estos tubos de resistencia deben ser insertados de tal manera que el alfiler de inserción esté en la posición de 220 voltios, de lo contrario no funcionará el receptor.

Es indispensable una buena antena para obtener una recepción satisfactoria. Una antena exterior de 13 a 20 metros de longitud y de la mayor altura posible, dará buenos resultados para uso general. Si ha de usar su antena actual, ésta debe ser minuciosamente examinada para determinar su estado, ya que las conexiones pueden estar oxidadas o interrumpidas, haciéndola inapropiada para el uso. Si se ha de instalar una nueva antena hay que tomar las precauciones necesarias para

ANTENNA

A good antenna is necessary for satisfactory reception. An outside antenna from 40 to 60 feet in length and as high as possible will give good all-around results. If your present antenna is to be used, a thorough examination should be made to determine its condition, as the connections may be corroded or broken, thus rendering the antenna unfit for service. If a new antenna is to be constructed, care should be taken to prevent the lead-in wire from grounding to trees, walls or gutters and all connections should be properly soldered to prevent corrosion and resulting noise. Connect on alternating current.

The total power consumption when operated on 115 volts is 25 watts, and when operated on 230 volts, 58 watts.

The maximum power output on 115 volts is 1.4 watts and on 230 volts is 3 watts.

IMPORTANT

Special ballasts are available for operation with power supplies of the following voltages:

150 Volt...Part No. 100-87
175 Volt...Part No. 100-89
200 Volt...Part No. 100-91

These ballast tubes must be inserted so the hold down bracket is in 220 volt position or the receiver will not operate.

INSTALLATION, OPERATING AND SERVICE INSTRUCTIONS

GENERAL

After the receiver has been unpacked from the carton, the paper tape used for packing and shipping must be removed from the chassis.

This receiver is a modern superheterodyne, tuning over the following standard broadcast and short-wave bands: 545 to 1520 Kc. (550 to 197 meters), 2350 to 7100 Kc. (127.7 to 42.3 meters), 6900 to 22,000 Kc. (43.5 to 13.6 meters).

POWER SUPPLY

The receiver may be used on either alternating current (A.C.) of 25 to 60 cycles or direct current (D.C.).

IMPORTANT

This receiver is shipped from the factory for use on 210-250 volt power supply. To adjust the receiver for 115 volt power supply, remove the locking screw on the ballast tube. Remove the tube from its socket and reinsert it in the 115 volt position as indicated on the chassis.

If the receiver does not operate within one minute when connected to direct current, the power plug should be reversed at the wall socket. This procedure should also be followed if a hum is apparent when the receiver is operated

INSTRUCTIONS POUR INSTALLATION, OPERATION ET SERVICE

GENERALITES

Après avoir déballé le poste-récepteur de son cartonnage, les bandes de papier utilisées pour l'empaquetage et le transport seront enlevées du chassis.

Ce poste est un superhétérodyne moderne dont la syntonisation couvre les échelles de réception des ondes longues et des ondes courtes suivantes: de 545 à 1520 Kc. (de 550 à 197 mètres), de 2350 à 7100 Kc. (de 127,7 à 42,3 mètres), de 6900 à 22,000 Kc. (43,5 à 13,6 mètres).

SOURCE DE PUISSANCE

On peut employer ce récepteur soit avec du courant alternatif (C.A.) de 25 à 60 cycles, soit avec du courant continu (C.C.).

AVIS

Ce récepteur a été prévu par la fabrique pour usage avec une source de puissance de 210 à 225 volts. Afin d'adapter le récepteur à une source de puissance de 115 volts, enlevez la vis d'attache du tube de résistance. Enlevez le tube de son support et remettez-la à la position de 115 volts indiquée sur le chassis.

Si le poste ne fonctionne pas dans une minute après avoir été connecté avec le courant continu, tournez la fiche en sens inverse, dans la prise du mur.

Ceci sera fait également si un bourdonnement se produit lorsque le poste fonctionne sur courant alternatif.

La consommation totale de puissance lorsque le poste est opéré sur 115 volts, est de 25 watts; et de 58 watts lorsqu'il fonctionne sur 230 volts.

Le débit de puissance maximum sur 115 volts est de 1,4 et sur 230 volts est de 3 watts.

AVIS

Des résistances spéciales peuvent être obtenues pour usage avec débits de puissance aux voltages suivants:

150 volts...Pièce No. 100-87
175 volts...Pièce No. 100-89
200 volts...Pièce No. 100-91

Ces tubes de résistance doivent être insérés de façon à ce que l'emboîture d'attache soit à la position de 220 volts ou le poste ne pourra pas être mis en jeu.

ANTENNE

Une bonne antenne est nécessaire pour obtenir une réception satisfaisante.

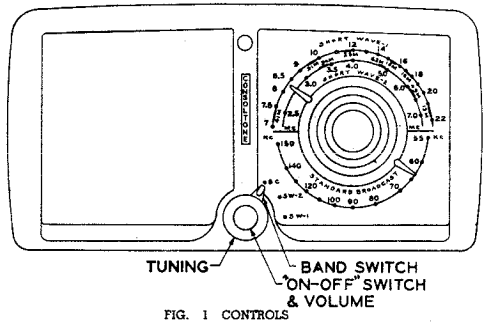

FIG. 1 CONTROLS

Une antenne extérieure de 40 à 60 pieds (13 à 20 mètres) de longueur et aussi éleveé que possible donnera de bons résultats pour l'usage général. Si vous devez employer votre antenne actuelle, examinez-la soigneusement afin d'en déterminer l'état. Les connections peuvent en être rouillées ou cassées, rendant l'antenne inutilisable. Si une nouvelle antenne doit être construite, soyez sûr

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que el alambre de bajada no haga contacto con las paredes, árboles o cualquier otre objeto. Todas las conexiones deberán ser correctamente soldadas para evitar la oxidación y la producción de ruido consiguiente. Conéctese el extremo del alambre de bajada de la antena a la terminal azul en la parte posterior del chasis.

TIERRA

Una buena conexión a tierra mejorará efectivamente la recepción, aumentando la fuerza de las señales de las estaciones lejanas y reduciendo el ruido de fondo. La mejor conexión a tierra es un caño de 1.50 mt. introducido en tierra húmeda. El alambre a tierra debe ser soldado al caño o asegurado cuidadosamente con una buena grapa de toma de tierra, limpiando previamente con cuidado el caño en este punto. Una buena conexión a tierra puede obtenerse haciendo una buena conexión a un caño de agua o a un radiador. Conecte el extremo de la bajada a tierra a la terminal del alambre negro situado en la parte posterior del chasis.

PUESTA DEL RECEPTOR EN FUNCIONAMIENTO

Estudie la Figura 1. Esta indica la posición y finalidad de cada control. Girando hacia la derecha la perilla de la combinación "OFF-ON" y del control de volumen, el receptor se pondrá en funcionamiento (ON), encendiéndose una luz piloto, roja. Se requiere aproximadamente 30 segundos para que los tubos se calienten a la temperatura de funcionamiento. Continuando la rotación de esta perilla a la derecha, aumenta el volumen. Girando esta perilla hacia la izquierda disminuye el volumen, y cuando se oye un ruido "clic" se desconecta el receptor. Cuando se está sintonizando una estación, gire la perilla de sintonización lentamente hacia la estación deseada. Deberá ponerse cuidado para sintonizar el receptor de-

the antenna lead-in to the blue lead at the back of the chassis.

GROUND

A good ground will aid reception materially by improving the signal strength of distant stations and reducing background noise. The best ground is a 4 to 6 foot pipe driven in moist earth. The ground wire should be soldered to the pipe or fastened securely with a good ground clamp, first thoroughly cleaning the pipe at that point.

A suitable ground may also bo obtained by making a good obtained by making a good connection to a water pipe or radiator. Connect the ground lead-in to the black wire at the rear of the chassis.

PLACING THE RECEIVER IN OPERATION

Study Figure 1. This shows the position and purpose of each control. Turning the combination "OFF-ON" switch and volume control to the right will turn the receiver ON and a red pilot will light up. Approximately 30 seconds will be required for the tubes to heat to operating temperature. Continued rotation of this knob to the right increases the volume. Turning this control to the left decreases the volume and, when a click is heard, turns the receiver OFF.

When tuning in a station turn the tuning knob slowly to the desired station. Care should be taken to tune the receiver properly, otherwise the tone will be impaired.

The receiver has three tuning ranges, any one of which may be selected by means of the band switch. The band in use will be indicated by the band switch lever pointing to one of three white dots marked BC, SW-2 and SW-1 on the dial face.

Daylight has a decided effect on the reception of short wave

que le fil de prise de terre ne fasse pas contact dans un arbre, un mur ou un fossé et que toutes les connections soient soudées convenablement afin d'éviter la rouille et les bruits parasites qui en sont le résultat. Attachez le fil d'entrée de l'antenne au terminal bleu au dos du chassis.

PRISE DE TERRE

Une bonne prise de terre favorisera beaucoup la réception en renforçant la puissance des signaux des stations éloignées et en diminuant les bruits parasites. La meilleure prise de sol se fait au moyen d'un tuyeau de 4 à 6 pieds (1,5 mètres) de longueur, placé dans une terre humide. Le fil de prise de terre devra être soudé au tuyeau ou attaché bien solidement avec un bon crampon de sol, le tuyeau ayant été nettoyé soigneusement à cet endroit au préalable.

Une bonne prise de terre peut aussi être effectué en attachant soigneusement le fil de prise de terre à un tuyeau d'eau ou à un radiateur. Attachez le fil d'entrée au terminal noir au dos du chassis.

MISE EN FONCTION

Etudiez la figure 1. Elle démontre la position et le rôle de chaque bouton de contrôle. Tournez le commutateur combinaison "Off-On" et le bouton de commande de volume vers la droite et le poste sera mis en fonction et allumera la lampe-pilote rouge. Environ 30 secondes seront nécessaires pour chauffer les tubes à la température d'opération. Pour augmenter le volume, continuez de tourner le bouton vers la droite. Si vous le tournez vers la gauche, le volume diminuera et pour cesser la réception, continuez de tourner vers la gauche jusqu'à la production d'un déclic.

Pour syntoniser une station, tournez lentement le bouton d'accord jusqu'à la station désirée. L'accord doit être mis au point soigneusement, autrement la qualité du son s'en ressentira.

Le poste a trois gammes d'accord, dont on peut choisir

bidamente, de lo contrario se desmejorará el tono.

El receptor tiene tres escalas de sintonización, pudiendo seleccionarse cualquiera por medio de una perilla de escalas. La escala en uso estará indicada por el indicador de la perilla de escala señalando a uno de los puntos blancos marcados BC, SW-2 y SW-1 en la superficie del dial.

La luz del día tiene una decidida influencia sobre la recepción de las estaciones de onda corta, teniendo las diferentes longitudes de onda mayor eficacia a distintas horas del día. El cuadro a la derecha puede ser usado como guía.

VALVULAS

En este aparato se emplean las siguientes válvulas:

12SA7GT	35L6GT
12SK7GT	35Z5GT
12SQ7GT	100-85

La Figura 2 indica la situación correcta del porta-válvula para cada válvula.

stations and different wave lengths are most effective at different times of the day. The table below may be used as a guide.

SHORT WAVE BAND	TIME OF BEST RECEPTION
16 meters and below	A.M. (Morning hours)
19 and 25 meters	P.M. (Afternoon)
25 and 31 meters	P.M. (Early evening)
31 and 49 meters	P.M. (Late evening)

TUBES

The following tubes are used in this set:

12SA7GT	35L6GT
12SK7GT	35Z5GT
12SQ7GT	100-85

Figure 2 shows the correct socket location for each tube.

n'importe laquelle au moyen du commutateur de bande. La bande en usage sera indiquée par l'aiguille de repère du commutateur de bande, indiquant l'un des trois points blancs marqués BC, SW-2 et SW-1 sur le cadran.

La lumière du jour joue un rôle incontestable quant à la réception des stations à ondes courtes; et les différentes longueurs d'ondes sont mieux reçues à des heures différentes. La table à la gauche peut être employée comme guide.

TUBES

Les tubes suivants sont employés avec cet appareil:

12SA7GT	35L6GT
12SK7GT	35Z5GT
12SQ7GT	100-85

La figure 2 montre la position correcte du support de chaque tube.

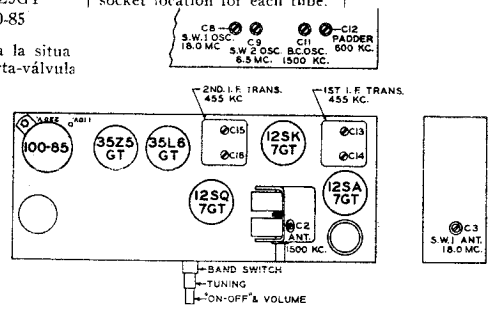


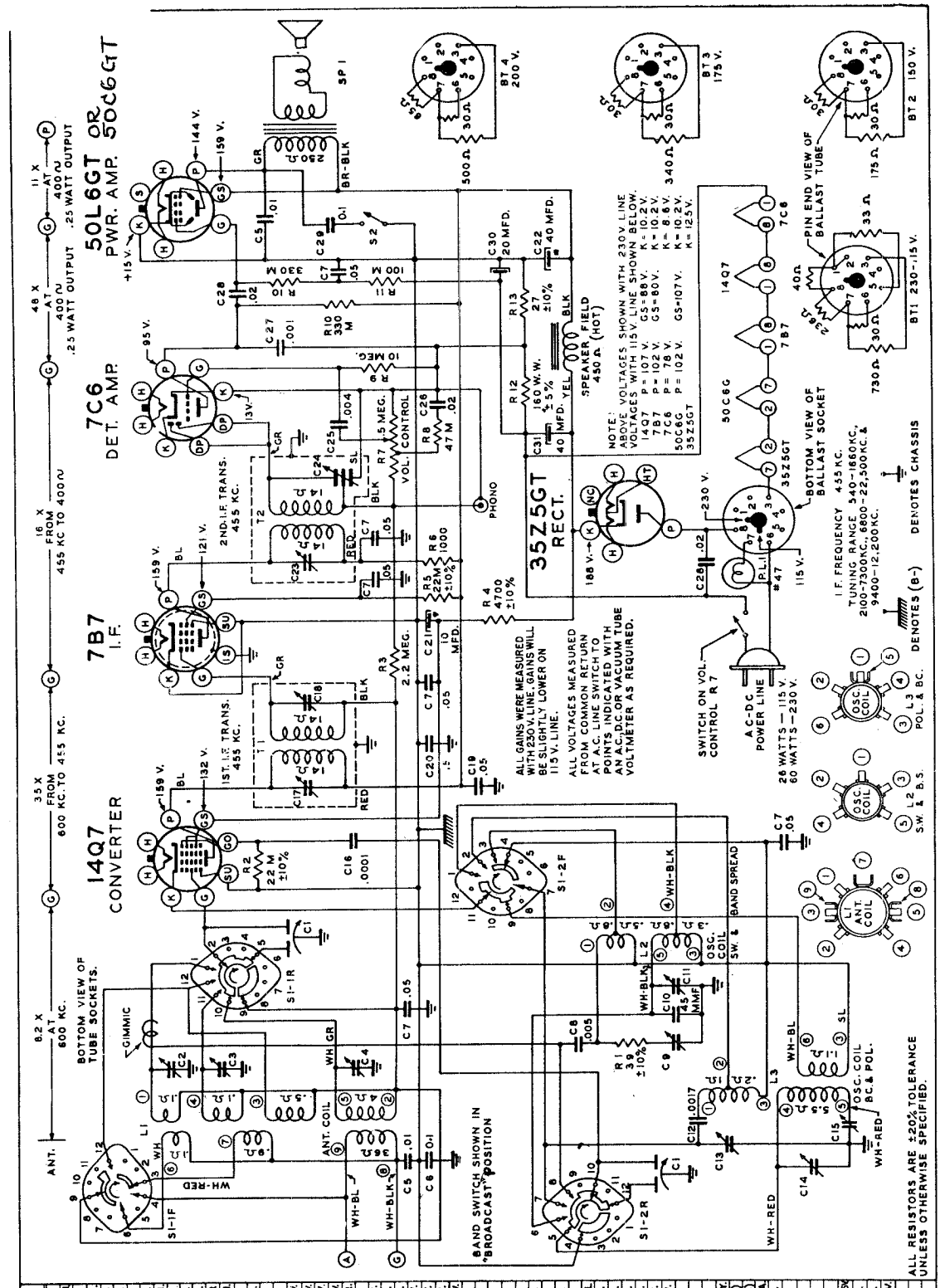
FIG. 2 TUBE AND TRIMMER POSITIONS

ALIGNMENT PROCEDURE

Opr.	Connect Osc. to	Dummy Ant.	Input Sig. Frequency	Band	Set Dial at	Trimmers	Purpose
1	1st Det. Grid	.1 mfd.	455 kc.	BC	600 kc.	C13, 14, 15 and 16	Align I.F.
2	Antenna and Ground	200 mmfd.	1500 kc.	BC	1500 kc.	C11	Set Osc. to Dial Scale
3	Antenna and Ground	200 mmfd.	1500 kc.	BC	1500 kc.	C2	Align Antenna
4	Antenna and Ground	200 mmfd.	600 kc.	BC	Rock at 600 kc.	C12	Padder
5	Antenna and Ground	400 ohms	6.5 mc.	SW1	Rock at 6.5 mc.	C9	Align SW2
6	Antenna and Ground	400 ohms	18 mc.	SW1	18 mc.	C8	Set Osc. to Dial Scale
7	Antenna and Ground	400 ohms	18 mc.	SW2	18 mc.	C3	Align Antenna

MODEL 5D042T
Chas. 5C64T

ZENITH RADIO CORP.


50L6GT OR 50C6GT
PWR. AMP.
7C6
DET. AMP.
7B7
I.F.
14Q7
CONVERTER
35Z5GT
RECT.
SPEAKER FIELD 450 Ω (HOT)
BOTTOM VIEW OF TUBE SOCKETS.
BOTTOM VIEW OF BALLAST SOCKET
PIN END VIEW OF BALLAST TUBE
BAND SWITCH SHOWN IN "BROADCAST" POSITION
ALL VOLTAGES MEASURED FROM COMMON RETURN AT A.C. LINE SWITCH TO POINTS INDICATED WITH AN A.C., D.C. OR VACUUM TUBE VOLTMETER AS REQUIRED.
ALL GAINS WERE MEASURED WITH 230 V. LINE. GAINS WILL BE SLIGHTLY LOWER ON 115 V. LINE.
ALL RESISTORS ARE ±20% TOLERANCE UNLESS OTHERWISE SPECIFIED.
I.F. FREQUENCY 455 KC.
TUNING RANGE 540-1660 KC., 2100-7300 KC., 6800-22,500 KC. & 9400-12,200 KC.
SWITCH ON VOL. CONTROL R 7
A.C.-D.C. POWER LINE
26 WATTS — 115 V.
60 WATTS — 230 V.
DENOTES CHASSIS
DENOTES (B-)

DIAG NO.	PART NO.	DESCRIPTION
C1	22-1250	2-GANG VARIABLE
C2	22-1252	SHORTWAVE ANT.TRIM.
C3	22-1254	25 METER ANT.TRIM.
C4	22-1254	BROADCAST ANT.TRIM.
C5	22-811	.01 MFD. 600 V.
C6	22-821	.1 MFD. 400 V.
C7	22-818	.05 MFD. 400 V.
C8	22-1022	.005 MFD. 600 V.
C9	22-1096	SHORTWAVE OSC. TRIM.
C10	22-1264	45 MMFD. COMP.
C11	22-1090	25 METER OSC. TRIM.
C12	22-1258	.0017 MFD. 600 V.
C13	22-1090	3, W.2 OSC. TRIMMER
C14	22-1253	BROADCAST OSC. TRIM.
C15	22-1253	BROADCAST PADDER"
C16	22-385	.0001 MFD. 600 V.
C17	ON T1	1ST. I.F. TRANS. PRI. TR.
C18	ON T1	1ST. I.F. TRANS. SEC. "
C19	22-819	.05 MFD. 600 V.
C20	22-824	.5 MFD. 200 V.
C21	22-1060	10 MFD. ELECTR. 250 V.
C22	22-1060	40 MFD. " 250 V.
C23	ON T2	2ND. I.F. TRANS. PRI. TR.
C24	ON T2	2ND. I.F. " SEC."
C25	22-805	.004 MFD. 600 V.
C26	22-813	.02 MFD. 200 V.
C27	22-1063	.001 MFD. 600 V.
C28	22-815	.02 MFD. 600 V.
C29	22-822	.1 MFD. 600 V.
C30	22-1065	20 MFD. ELECTR. 25 V.
C31	22-1059	40 MFD. " 300 V.
R1	63-621	39 OHM 1/4 W.
R2	63-644	22 M OHM 1/4 W.
R3	63-722	2.2 MEGOHM 1/4 W.
R4	63-943	4700 OHM 1 W.
R5	63-743	2.2 M OHM 1/4 W.
R6	63-583	1000 OHM 1/4 W.
R7	63-1249	.5 MEG. VOL. CONTROL
R8	63-713	47 M OHM 1/4 W.
R9	63-604	10 MEGOHM 1/4 W.
R10	63-596	330 M OHM 1/4 W.
R11	63-595	100 M OHM 1/4 W.
R12	63-1068	160 OHM W.W. 2 W.
R13	63-619	27 OHM 1/4 W.
L1	39962	ANTENNA COIL ASSY.
L2	39064	OSC. COIL (S.W.& B.S.)
L3	39983	OSC. COIL (B.C.& POL.)
P.L.1	100-67	PILOT LIGHT 6.3 V. .15 A.
S1	85-298	BAND SELECTOR SW.
S2	85-134	TONE CONTROL SW.
SP1	49-530	6 1/2" DYNAMIC SPK.
T1	95-716	1ST. I.F. TRANSF.
T2	95-931	2ND. I.F. "
BT1	100-65	BALLAST TUBE 230-150
BT2	100-87	BALLAST TUBE 150 V.
BT3	100-89	BALLAST TUBE 175 V.
BT4	100-91	BALLAST TUBE 200 V.

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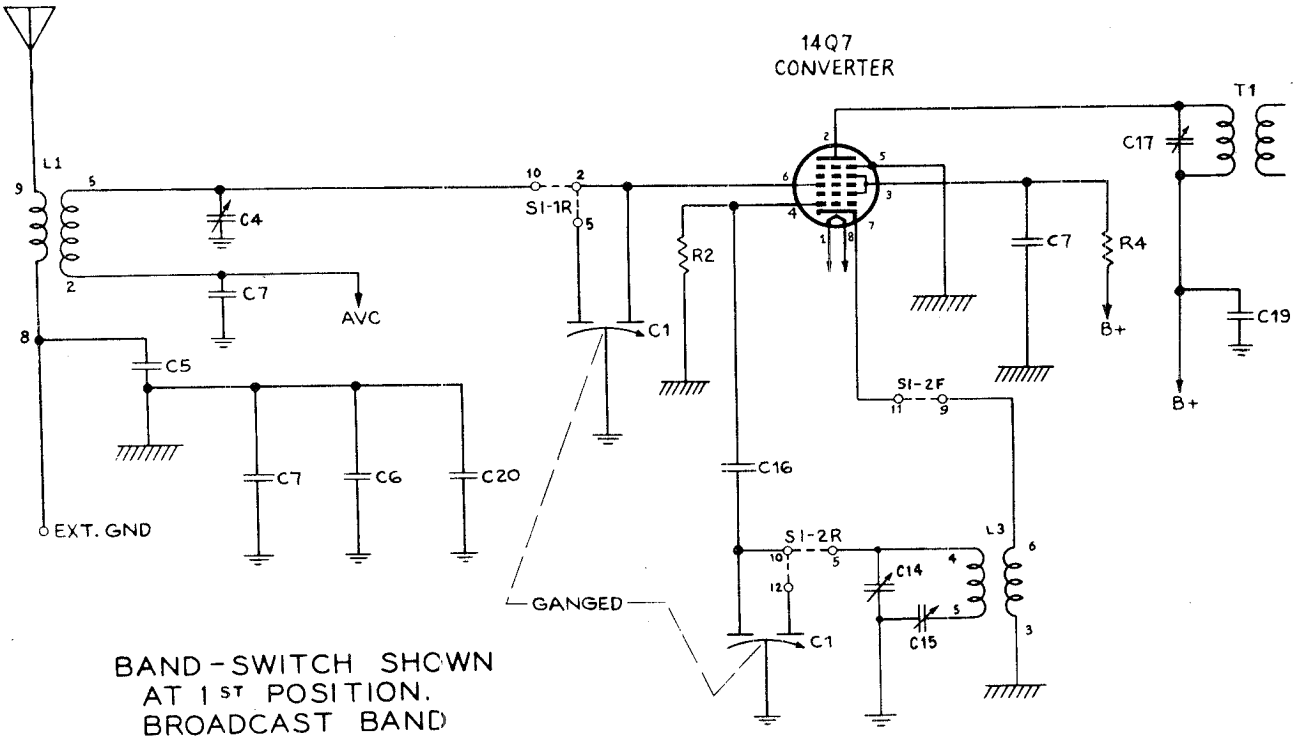
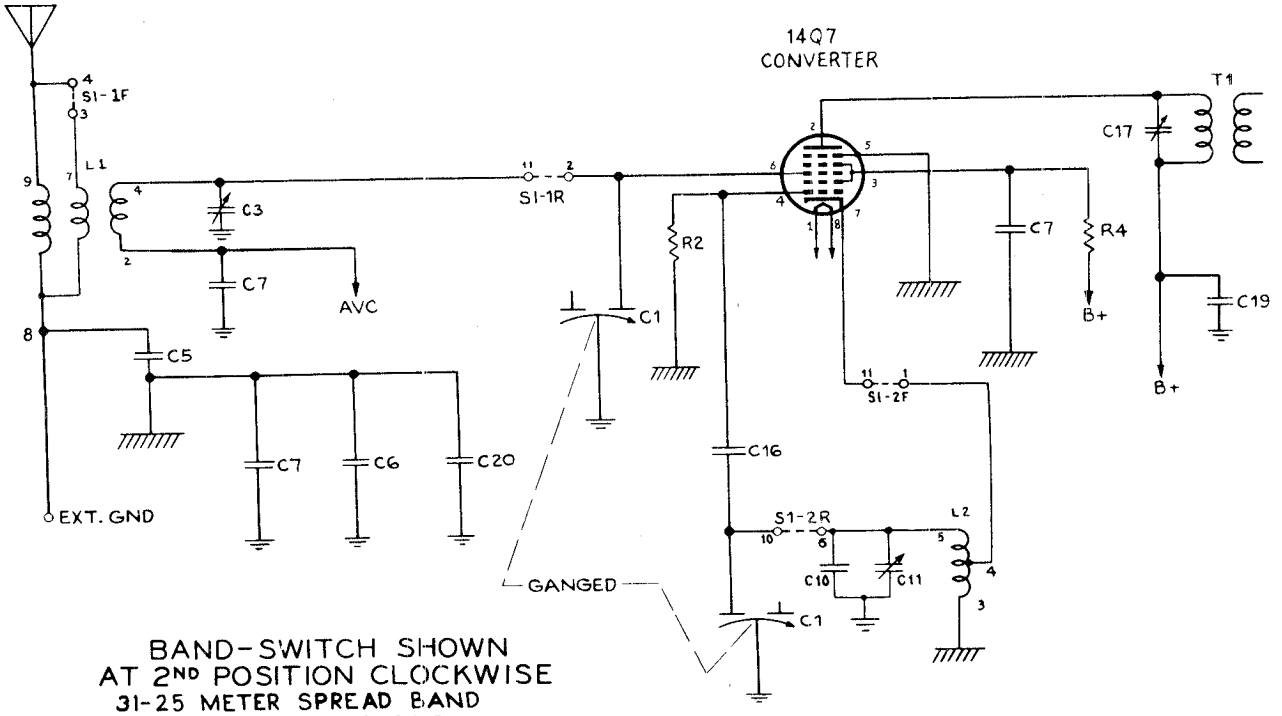
ZENITH RADIO CORP.



BAND-SWITCH SHOWN
AT 1ST POSITION.
BROADCAST BAND
540 TO 1660 KC



BAND-SWITCH SHOWN
AT 2ND POSITION CLOCKWISE
31-25 METER SPREAD BAND
9400 TO 12,200 KC

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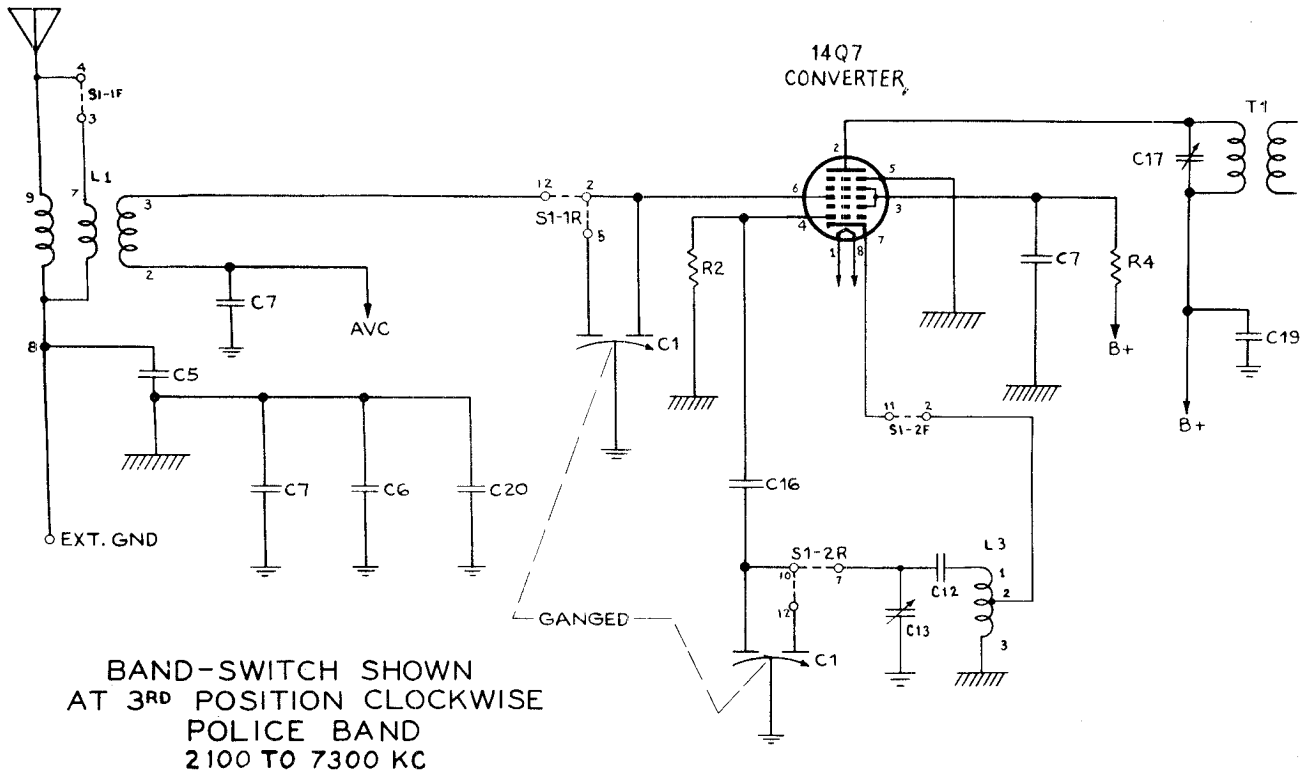
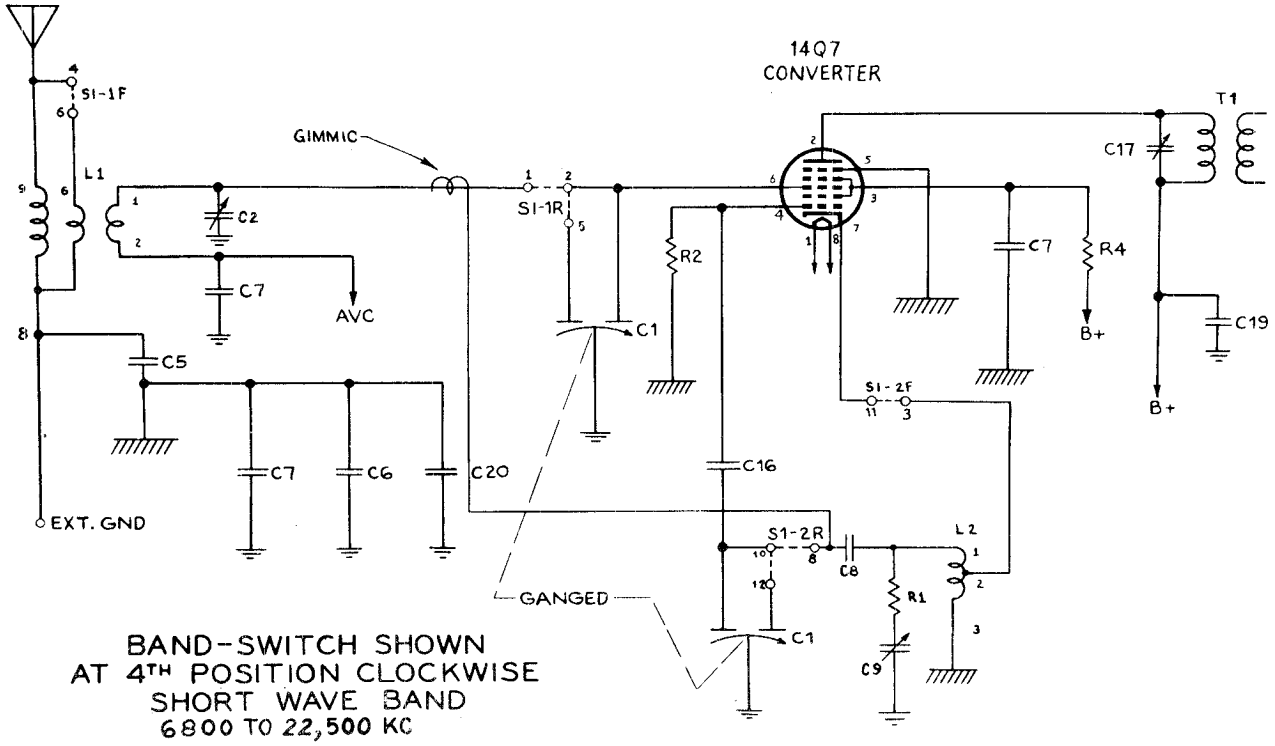
MODEL 5D042T

ZENITH RADIO CORP.



BAND-SWITCH SHOWN
AT 3RD POSITION CLOCKWISE
POLICE BAND
2100 TO 7300 KC



BAND-SWITCH SHOWN
AT 4TH POSITION CLOCKWISE
SHORT WAVE BAND
6800 TO 22,500 KC

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MODEL NO. 5D042T

Chassis No. 5C64T

INSTRUCCIONES PARA LA INSTALACION Y FUNCIONAMIENTO

INFORMACION GENERAL

Después de desembaiar el receptor, el papel engomado usado en embalaje y embarque, tiene que quitarse del chasis. La tabla de montajé, usada solamente en los receptores con gabinetes de material plástico, puede removerse siguiendo las instrucciones que se encuentran sobre dicha tabla. Radios con gabinetes de madera no requieren una tabla de montaje, y están listos para funcionar después de quitar el papel engomado.

Este receptor es un moderno aparato superheterodino, de seis válvulas, incluyendo una reguladora, que sintoniza las bandas de onda larga y corta, como sigue: 540 a 1660 Kc. (555 a 180 metros), 2100 a 7300 Kc. (143 a 41 metros), 6800 a 22,500 Kc. (44 a 13.3 metros) y una gama de ondas especial desde 9400 a 12,200 Kc. (31.9 a 24.6 metros) con ensanchamiento de banda en 25 y 31 metros.

Está equipado con altoparlante electrodinámico y un regulador de tono de dos posiciones.

SUMINISTRO DE ENERGIA

El receptor puede ser usado con corriente alternada (C.A.) de 50 á 60 períodos o con corriente contínua (C.C.). Sale de la fábrica ajustado para uso con 230 voltios y puede ser reajustado para funcionar con corriente de 115 voltios, removiendo el tornillo de cierre en la válvula reguladora ("Ballast"), quitando el tubo de su zócalo y volviendo a insertar este en el zócalo en la posición de 115 voltios tal como está indicado en el mismo.

Si el receptor no funciona después de estar conectado a la corriente contínua durante un minuto, el tomacorriente tiene que ponerse en posición opuesta en el enchufe. Este procedimiento tiene que seguirse también, si se siente un zumbido cuando el receptor está funcionando sobre corriente alternada.

El consumo total de energía cuando está operando en 115 voltios, es de 26 vatios, y cuando está operando en 230 de 60 vatios. La potencia de salida máxima en 115 voltios es de 2.1 vatios, y en 230 voltios es de 4.25 vatios.

Cuando se requiera, podemos suministrar tubos de resistencia especiales para funcionamiento con corrientes otras que de 115 ó 230 voltios, como sigue:

150 voltios—No. de ref. 100-87
175 voltios—No. de ref. 100-89
200 voltios—No. de ref. 100-91

Los tubos de resistencia deben colocarse en la posición de 230 voltios. De otra manera, el receptor no funcionará.

ANTENA

Una buena antena es indispensable para la recepción de radio y mientras más cuidadosa sea la instalación mejores serán

INSTALLATION, OPERATING AND SERVICE INSTRUCTIONS

GENERAL

After the receiver has been unpacked from the carton, the paper tape used for packing and shipping must be removed from the chassis. The mounting board, used only on receivers with plastic cabinets, may be removed by following the instructions placed on the board. Radios with wooden cabinets do not require a mounting board; they are ready for operation after removing the paper tape.

This receiver is a modern six tube (including ballast) superheterodyne, tuning over the following standard broadcast and short-wave bands: 540 to 1660 Kc (555 to 180 meters), 2100 to 7300 Kc (143 to 41 meters), 6800 to 22,500 Kc (44 to 13.3 meters), and a special range covering 9400 to 12,200 Kc (31,9 to 24.6 meters) with spread bands at 25 and 31 meter.

It is equipped with an electrodynamic speaker and a two position tone control.

POWER SUPPLY

The receiver may be used on either alternating current (A. C.) or 50 to 60 cycles or direct current D.C.) It leaves the factory adjusted for use on 230 volt power supply and may be readjusted to operate on 115 volt power lines by first removing the locking screw on the ballast tube, removing the tube from its socket, and reinserting in the socket in the 115 volt position as indicated on the socket.

If the receiver does not operate within one minute when connected to direct current, the power plug should be reversed at the wall socket. This procedure should also be followed if a hum is apparent when the receiver is operated on alternating current.

The total power consumption when operated on 115 volts is 26 watts, and when operated on 230 volts, 60 watts.

The maximum power output on 115 volts is 2.1 watts and on 230 volts is 4.25 watts.

Special ballast tubes are available for operation with mains other than 115 or 230 volts. They are as follows:

150 Volt....Part No. 100-87
175 Volt....Part No. 100-89
200 Volt....Part No. 100-91

These ballast tubes must be inserted so the hold-down bracket is in the 230 volt position; otherwise the receiver will not operate.

ANTENNA

A good antenna is necessary for satisfactory reception, and is well worth the effort expended in its construction. An outside antenna from 40 to 60 feet in length and as high as possible will give good all-around results. If your present antenna is to be used, a thorough examination should be made to determine its condi-

LES INSTRUCTIONS POUR L'INSTALLATION ET LE FONCTIONNEMENT

GENERAL

Après déballage du récepteur de la boite en carton, la bande de papier-cache employée pour l'emballage et l'expédition doit être enlevée du châssis. Le panneau de montage, usé seulement avec des récepteurs avec meubles en matière plastique, peut être enlevé en suivant les instructions données sur le panneau. Les récepteurs de TSF avec meubles en bois n'ont pas besoin d'un panneau de montage; ils sont prêts à fonctionner après que la bande de papier-cache a été enlevée.

Le present poste est un récepteur superhétérodyne moderne à six lampes, compris la lampe ballaste, dont l'accord englobe les bandes standard suivantes d'ondes moyennes et d'ondes courtes: 540 à 1660 Kc. (555 à 180 mètres), 2100 à 7300 Kc. (143 à 41 mètres), 6800 à 22,500 Kc. (44 à 13.3 mètres), et une échelle spéciale qui couvre de 9400 à 12,200 Kc. (31.9 à 24.6 mètres) avec épanouissement des bandes à 25 et 31 mètres.

Il est équipé d'un haut-parleur électrodynamique et d'une commande de ton a deux positions.

ALIMENTATION DE COURANT

On peut user le poste récepteur dans le courant alternatif (C.A.) 50 à 60 périodes ou le courant continu. (C.C.) Il est sorti de l'usine réglé pour fonctionner sur une provision d'énergie de 230 volts, et on peut rajuster pour l'opération sur courant de 115 volts en enlevant d'abord la vis de blocage dans la lampe ballaste, enlevant la lampe de sa douille, et remplaçant dans la douille dans la position 115 volts comme indiqué dans la douille.

Si le poste récepteur n'opère pas en dedans d'une minute quand il est relié au courant constant, on devrait renverser la prise de courant à la douille dans le mur. On devrait adapter cette procédure aussi si un murmure est apparent quand le poste récepteur est opéré dans le courant alternatif.

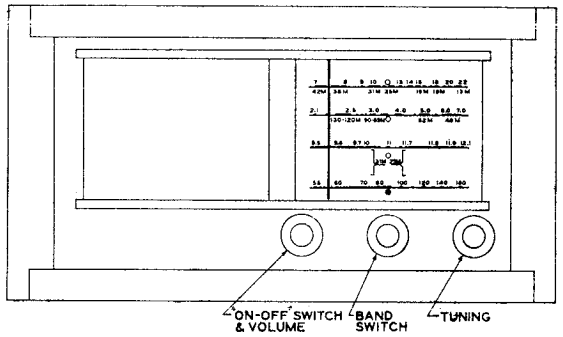

FIG. 1—CONTROLS

La consomption totale d'énergie quand en opération dans 115 volts est 26 watts, et quand en opération dans 230 volts est 60 watts.

Le maximum rendement d'énergie dans 115 volts est 2.1 watts et dans 230 volts est 4.25 watts.

Des valves spéciales (valves de résistance) sont disponibles pour des réseaux autres que de 115 ou 230 volts, comme suit:

150 volts—Pièce No. 100-87
175 volts—Pièce No. 100-89
200 volts—Pièce No. 100-91

Ces valves de résistance doivent être insérées de manière que la barre de serrage se trouve en position de 230 volts, autrement le récepteur ne fonctionnera pas.

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los resultados. Una antena exterior de 13 a 20 metros instalado lo más alto posible es la más apropiada para uso general. Si se ha de usar una antena ya instalada, ésta debe examinarse minuciosamente para determinar su estado pues puede haber conexiones óxidadas o rotas, que nulifican la eficacia de la antena. Por otra parte si ha de instalarse una antena nueva hay que tomar las precauciones necesarias para que el alambre de bajada no haga contacto con la pared o con cualquier objeto que resulte en una conexión a tierra. Todas las conexiones deben estar correctamente soldadas para prevenir contra la oxidación y los ruidos que se producen a consecuencia de esto. Conéctese el alambre de bajada de la antena a la terminal marcada "A" en la parte trasera del chasis.

TIERRA

Una conexión a tierra bién hecha mejorará considerablemente la recepción aumentando la fuerza de las señales de estaciones lejanas y reduciendo el ruido de fondo. La conexión tierra más satisfactoria consiste en una sección de tubería de un metro a 1.50 metros de largo, colocada verticalmente y casi cubierta de tierra húmeda; un extremo de la conexión a tierra se conecta a la terminal marcada "G" en el chasis.

FUNCIONAMIENTO

(Véase la fig. 1). El grabado indica la posición y propósito de cada parilla. Haciendo girar la perilla combinada interruptor (OFF-ON) y regulador de volumen hacia la derecha, el receptor empieza a funcionar. Las válvulas requieren un minuto más o menos para calentarse. Para aumentar el volumen es necesario girar la perilla hacia la derecha. El volúmen se reduce haciendo girar la perilla hacia la izquierda y el receptor se apaga cuando se oye el ruido del interruptor.

Para sintonizar una estación gírese la perilla selectora hasta que la aguja indique la frecuencia deseada. La sintonización debe hacerse en el centro exacto de la señal para obtener los resultados. Una antena exterior de 13 a 20 metros instalado lo más alto posible es la más apropiada para uso general. Si se ha de usar una antena ya instalada, ésta debe examinarse minuciosamente para determinar su estado pues puede haber conexiones óxidadas o rotas, que nulifican la eficacia de la antena. Por otra parte si ha de instalarse una antena nueva hay que tomar las precauciones necesarias para que el alambre de bajada no haga contacto con la pared o con cualquier objeto que resulte en una conexión a tierra. Todas las conexiones deben estar correctamente soldadas para prevenir contra la oxidación y los ruidos que se producen a consecuencia de esto. Conéctese el alambre de bajada de la antena a la terminal marcada "A" en la parte trasera del chasis.

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FUNCIONAMIENTO

(Véase la fig. 1). El grabado indica la posición y propósito de cada parilla. Haciendo girar la perilla combinada interruptor (OFF-ON) y regulador de volumen hacia la derecha, el receptor empieza a funcionar. Las válvulas requieren un minuto más o menos para calentarse. Para aumentar el volumen es necesario girar la perilla hacia la derecha. El volúmen se reduce haciendo girar la perilla hacia la izquierda y el receptor se apaga cuando se oye el ruido del interruptor.

Para sintonizar una estación gírese la perilla selectora hasta que la aguja indique la frecuencia deseada. La sintonización debe hacerse en el centro exacto de la señal para obtener

tion, as the connections may be corroded or broken, thus rendering the antenna unfit for service. If a new antenna is to be constructed, care should be taken to prevent the lead-in wire from grounding to trees, walls or gutters and all connections should be properly soldered to prevent corrosion and resulting noise. Connect the antenna lead-in to the post marked "A" at the back of the chassis.

GROUND

A good ground will aid reception materially by improving the signal strength of distant stations and reducing background noise. The best ground is a 4 to 6 foot pipe driven down to damp earth; the ground lead-in should be securely soldered to this.

A suitable ground may be obtained by making a good connection to a water pipe or radiator. Connect the ground lead-in to the post marked "G" at the rear of the chassis.

PLACING THE RECEIVER IN OPERATION

Note Fig. 1. This shows the position and purpose of each control. Turning the combination "Off-On" switch and volume control to the right will turn the receiver ON. Approximately one minute will be required for the tubes to heat to operating temperature. Continued rotation of this knob to the right increases the volume. Turning this control to the left decreases the volume and, when a click is heard, turns the receiver OFF.

When tuning in a station turn the tuning knob slowly to the desired station. Care should be taken to tune the receiver to the exact middle of the wave; otherwise the tone will be impaired.

The tone may be changed by means of the switch at the back of the radio from "High" to "Low."

The receiver has four tuning scales, any one of which may be selected by means of the

ANTENNE

Une bonne antenne s'impose pour obtenir une réception satisfaisante, et vaut bien l'effort nécessaire pour sa construction. Une antenne extérieure de 13 à 20 mètres de long et placée aussi haut que possible donnera d'excellents résultats pour tout service. Si vous vous proposez d'utiliser votre antenne actuelle, il conviendra d'en faire un examen approfondi pour en déterminer l'état car les connexions peuvent en être rouillées ou rompues, ce qui rendrait l'antenne impropre à l'emploi. Si on décide de construire une nouvelle antenne, il convient de veiller á ce que le fil d'entrée ne rejoigne pas la terre par des arbres, des murs ou des gouttières, et toutes les connexions devront être soudées avec soin pour prévenir la corrosion et les parasites qui en résulteraient. Reliez le fil d'entrée de l'antenne au montant marqué "A" à l'arriére du châssis.

PRISE DE TERRE

Une bonne prise de terre aidera notablement la réception en améliorant la force du signal pour les stattions distantes et en réduisant le bruit de fond. La meilleure prise de terre consiste d'un tuyau de 1 à 1.50 mètres qu'on enfonce dans le sol humide; la prise de terra devra y être solidement soudé.

On peut réaliser une prise de terre convenable en établissant une bonne connexion au tuyau d'eau ou à un radiateur. Reliez la prise de terre au montant marqué "G" à l'arrièrre du châssis.

MISE DU RECEPTEUR EN SERVICE

Notez la figure 1. Elle montre la position et l'objet de chaque contrôle. En tournant le commutateur combinaison interrupteur "OFF-ON" et contrôle du volume, vers la droite, le récepteur sera mis en circuit. Il faut compter environ 1 minute pour que les lampes se chauffent à la tempèrature de fonctionnement. En continuant de tourner ce bouton vers la droite, le volume augmente en intensité. En tournant ce même contrôle vers la gauche, on diminue le volume de so-

la mejor calidad de tono posible.

El tono se cambia por medio de un interruptor en la parte atrás del receptor, de "High" (alto) a "Low" (bajo).

El receptor tiene cuatro gamas de onda, y cualquiera de ellas puede seleccionarse por medio del conmutador de bandas. La banda que se esté usanda estará indicada por medio de un punto rojo en el centro de la escala correspondiente.

La luz del día tiene una decidida influencia sobre la recepción de la onda corta y diferentes longitudes de onda alcanzan mayor eficacia a diferentes horas del día. El cuadro a la derecha puede ser usado como guía para sintonizar a diferentes horas del día y la noche.

VALVULAS

Este receptor usa las válvulas siguientes:

14Q7 – 7B7 – 7C6 – 50C6G – 35Z5GT – 100-85. OR 50L6GT

La fig. 2 muestra la posición de las válvulas.

FONOGRAFO

Este receptor está equipado con un "jack" y una ficha de fonógrafo situada en la parte posterior del chasis. Para utilizar el receptor con un tocadiscos, coloque el conmutador de bandas en una de las bandas de onda corta y controle el volumen de la producción del disco con el Control de Volumen del receptor.

band switch. The scale in use will be indicated by a red dot in the center of the corresponding scale.

Daylight has a decided effect on the reception of short wave stations and different wave lengths are most effective at different times of the day. The following table may be used as a guide.

SHORT WAVE BAND	TIME OF BEST RECEPTION
16 meters and below	A.M. (Morning hours)
19 and 25 meters	P.M. (Afternoon)
25 and 31 meters	P.M. (Early evening)
31 and 49 meters	P.M. (Late evening)

TUBES

The following tubes are employed in this receiver.

14Q7 – 7B7 – 7C6 – 50C6G – 35Z5GT – 100-85. OR 50L6GT

Figure 2 shows the correct socket for each tube.

PHONO

This receiver is equipped with a phono jack and plug located on the rear of the chassis. To use the receiver with a record player, set the Band Switch to one of the short wave bands and control the volume of the record reproduction with the receiver Volume Control.

norité et, quand on entend un léger clic, c'est qu'on a mis le récepteur hors circuit.

Quand vous accordez une station, tournez le bouton de syntonisation lentement jusqu'a ce que vous ayez obtenu la station désirée. Il convient de veiller à accorder le poste exactement au milieu de la longueur d'onde correspondante; autrement le ton en sera affecté.

Le ton peut être modifié au moyen du commutateur qui se trouve à l'arrière du poste, et cela de la position "High" (haut) à "Low" (bas).

Le récepteur possède quatre échelles d'accord parmi lesquelles on peut sélectionner l'une quelconque d'entre elles au moyen du commutateur sélectionneur de bandes. La bande en usage sera indiquée par un point rouge au centre de l'échelle correspondante.

La réception radiophonique sur ondes courtes est définitivement affectée par la lumière du jour et la réception sur différentes longueurs d'ondes est plus ou moins efficace à différents moments de la journée. Nous donnons à gauche un barème qui peut être suivi pour l'écoute des différentes stations pendant le jour ou la nuit.

LAMPES

Les lampes suivantes sont employées sur ce poste:

14Q7 – 7B7 – 7C6 – 50C6G – 35Z5GT – 100-85.

La figure 2 montre la douille correcte pour chaque lampe.

PHONO

Ce récepteur est muni d'un "Phono Jack" et d'un Fiche placés au dos du Chassis. Pour faire fonctionner l'appareil avec le gramophone placez le Commutateur de Bandes à l'une des bandes d'ondes courtes et contrôlez le volume du son du disque par le bouon de contrôle de volume du récepteur.

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MODEL 5D042T Ch. 5C64T

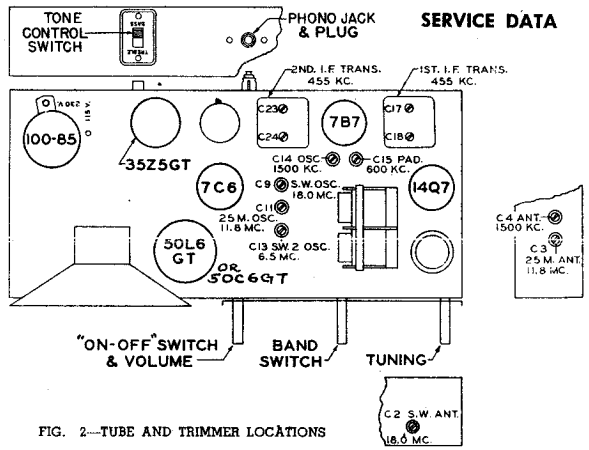


FIG. 2—TUBE AND TRIMMER LOCATIONS

ALIGNMENT PROCEDURE

Opr.	Connect Osc. to	Dummy Ant.	Input Sig. Frequency	Band	Set Dial at	Trimmers	Purpose
1	1st Det Grid (Pin 6-14Q7)	.1 mfd.	455 kc.	BC	600 kc.	C17, 18, 23 and 24	Align I. F.
2	Antenna and Ground	200 mmfd.	1500 kc.	BC	1500 kc.	C14	Set Osc. to Dial Scale
3	Antenna and Ground	200 mmfd.	1500 kc.	BC	1500 kc.	C4	Align Antenna
4	Antenna and Ground	200 mmfd.	600 kc.	BC	Rock at 600 kc.	C15	Set Low Freq. Padder
5	Antenna and Ground	400 ohms	6.5 mc.	SW2	Rock at 6.5 mc.	C13	Align SW2
6	Antenna and Ground	400 ohms	18 mc.	SW1	18 mc.	C9	Set Osc. to Dial Scale
7	Antenna and Ground	400 ohms	18 mc.	SW1	18 mc.	C2	Align Antenna
8	Antenna and Ground	400 ohms	11.8 mc.	31-25 Meters	11.8 mc.	C11	Set Osc. to Dial Scale
9	Antenna and Ground	400 ohms	11.8 mc.	31-25 Meters	11.8 mc.	C3	Align Antenna

MODEL 7J045T Ch. 7C61T

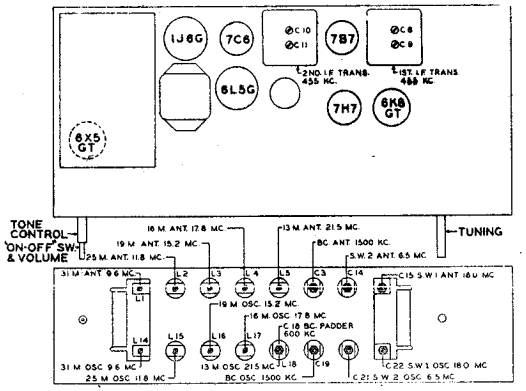


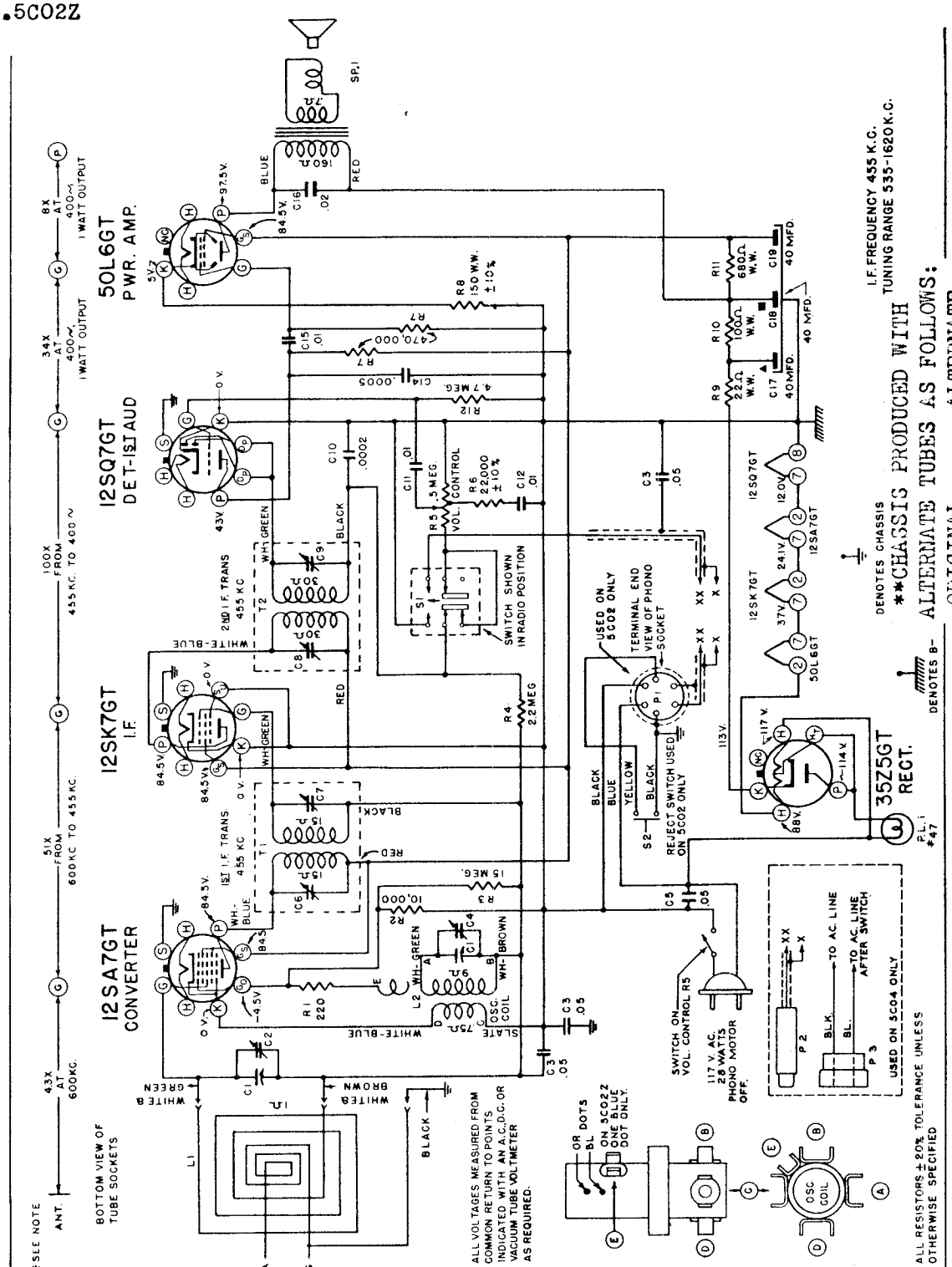
FIG. 2—Tube and Trimmer Positions

ALIGNMENT PROCEDURE

Operation	Connect test Osc. to	Dummy Ant.	Input Signal Freq.	Band	Set Dial	Adjust Trimmer	Purpose
1	1st Det. grid	.1 mfd.	455 kc.	EC	600 kc.	C8,9,10,11	Align IF
2	Ant.—Gnd.	200 mmf.	1500 kc.	EC	1500 kc.	C19	Set osc. to scale
3	"	"	"	EC	"	C3	Align antenna
4	"	"	600 kc.	EC	Rock at 600 kc.	C18	Adj. padder
5	"	400 ohm	6.5 mc.	SW2	6.5 mc.	C21	Set osc. to scale
6	"	"	"	"	"	C14	Align ant.
7	"	"	18.0 mc.	SW1	18.0 mc.	C22	Set osc. to scale
8	"	"	"	"	"	C15	Align ant.
9	"	"	21.5 mc.	13M	21.5 mc.	L18	Set osc. to scale
10	"	"	"	"	"	L5	Align ant.
11	"	"	17.8 mc.	16M	17.8 mc.	L17	Set osc. to scale
12	"	"	"	"	"	L4	Align ant.
13	"	"	15.2 mc.	19M	15.2 mc.	L16	Set osc. to scale
14	"	"	"	"	"	L3	Align ant.
15	"	"	11.8 mc.	25M	11.8 mc.	L15	Set osc. to scale
16	"	"	"	"	"	L2	Align ant.
17	"	"	9.6 mc.	31M	9.6 mc.	L14	Set osc. to scale
18	"	"	"	"	"	L1	Align ant.

MODELS 5R080, Ch. 5C04,
5R086, Ch. 5C02, 5R086Z,
Chas. 5C02Z

ZENITH RADIO CORP.



DIAG.	PART	DESCRIPTION
C1*	22-1419	2-GANG VARIABLE(5C02)
	22-1356	2-GANG VARIABLE(5C04)
C2	ON C1	BROADCAST ANT. TRIMMER
C3	22-829	.05 MFD. 200 V.
C4	ON C1	BROADCAST OSC. TRIMMER
C5	22-1017	.05 MFD. 200 V.
C6	ON T1	1ST I.F. TRANS. PRI. TRIMMER
C7	ON T1	1ST I.F. " SEC. "
C8	ON T2	2ND I.F. " PRI. "
C9	ON T2	2ND I.F. " SEC. "
C10	22-953	.0002 MFD. 600 V.
C11	22-669	.01 MFD. 600 V.
C12	22-826	.01 MFD. 200 V.
C14	22-854	.0005 MFD. 600 V.
C15	22-196	.01 MFD. 600 V.
C16	22-1379	.02 MFD. 400 V.
C17	22-1381	40 MFD. ELECTRO 150 V.
C18		40 MFD. " 150 V.
C19		40 MFD. " 150 V.
*	26-354	DIAL SCALE
R1	63-579	220 OHM ½ W.
R2	63-589	10 M OHM ½ W.
R3	63-976	15 MEGOHM ½ W.
R4	63-600	2.2 MEGOHM ½ W.
R5	63-1348	.5 MEG. VOLUME CONTROL
R6	63-644	22 M OHM ½ W.
R7	63-597	470 M OHM ½ W.
R8	63-686	150 OHM WIREWOUND 2 W.
R9	63-1219	22 OHM WIREWOUND ½ W.
R10	63-1220	100 OHM WIREWOUND 1 W.
R11	63-1221	680 OHM WIREWOUND 1 W.
R12	63-602	4.7 MEGOHM ½ W.
L1*	S11296	WAVEMAGNET ASSEMBLY
L2*	S11284	OSC. COIL "
T1	95-919	1ST I.F. TRANS. "
T2	95-906	2ND I.F. TRANS. "
P.L.	100-67	PILOTLIGHT 6.3V. .15A.
S1	85-337	PHONO-RADIO SWITCH
S2	85-338	REJECT SWITCH USED ON 5C02 & 5C02Z
P1	S11283	PHONO CABLE USED ON 5C02 & 5C02Z
P2	S11287	PHONO CABLE USED ON 5C04 ONLY
P3	52-188	AC. RECEPTACLE USED ON 5C04 ONLY
SP.1	49-518	5" SPEAKER P.M.

NOTE: ON 5C02Z ALL PARTS MARKED WITH * CHANGE TO THE FOLLOWING.

C1	22-1527	2 GANG VARIABLE
L1	S12677	WAVE MAGNET ASSEM.
L2	S12652	OSC. COIL "
	26-367	DIAL SCALE

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For Alignment, see P.15-9. Record Changer: Zenith Model S11468 used with Model 5R086

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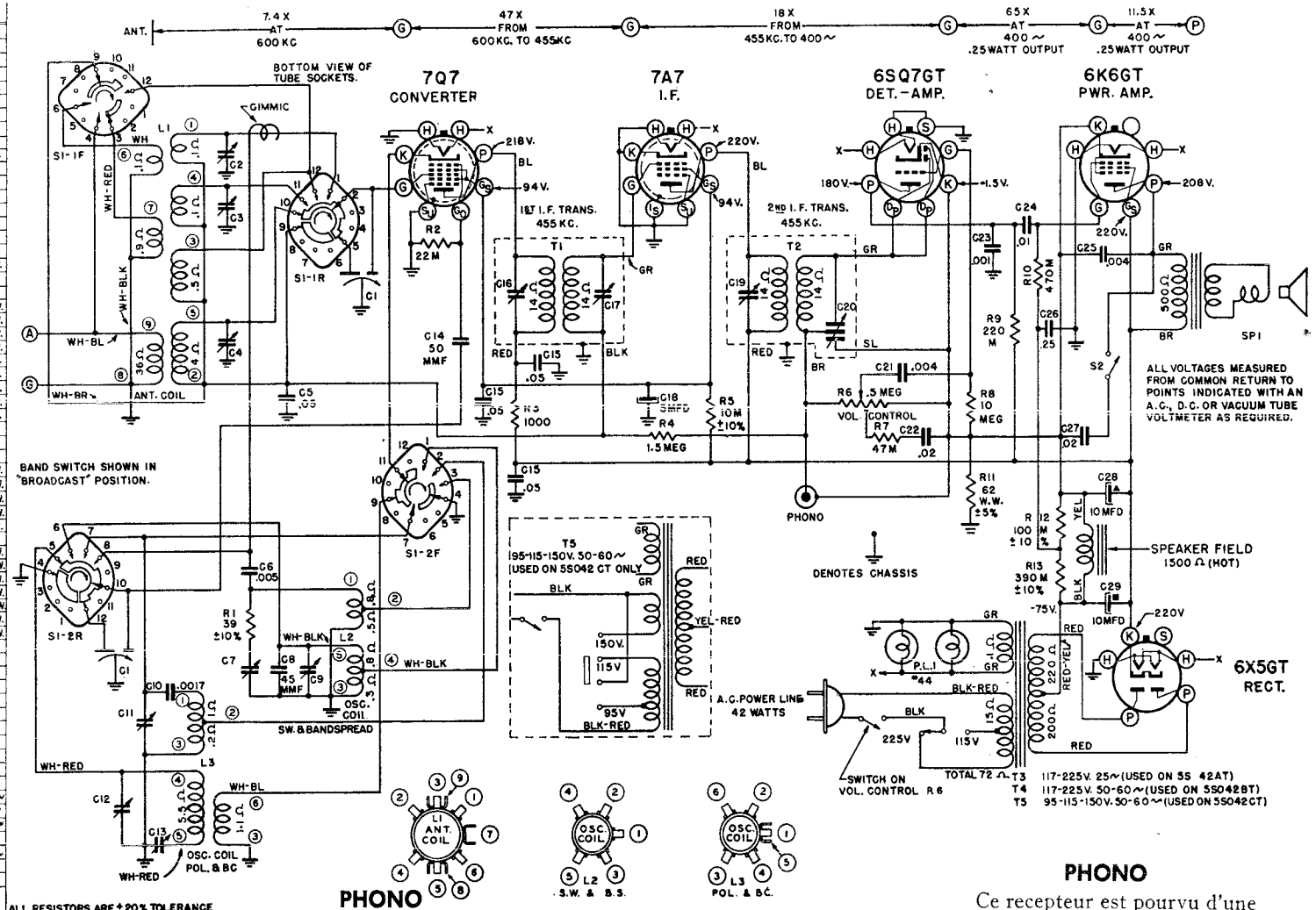
DIAG NO	PART NO	DESCRIPTION	
C1	22-1250	2-GANG VARIABLE	
C2	22-1252	SHORTWAVE ANT. TRIM,	
C3	22-1254	25 METER ANT. TRIM.	
C4		BROADCAST ANT. TRIM.	
C5	22-818	.05 MFD.	400 V.
C6	22-1022	.005 MFD.	600 V.
C7	22-1090	SHORTWAVE OSC. TRIM.	
C8	22-1264	45 MMFD. COMP.	
C9	22-1090	25 METER OSC. TRIM.	
C10	22-1258	.0017 MFD.	600 V.
C11	22-1090	S.W.2 OSC. TRIMMER	
C12	22-1253	BROADCAST OSC. TRIM.	
C13	22-1253	BROADCAST PADDER "	
C14	22-283	50 MMFD.	600 V.
C15	22-819	.05 MFD.	600 V.
C16	ON T1	1ST I.F. TRANS. PRI. TRIM.	
C17	ON T1	1ST I.F. " SEC. "	
C18	22-1123	5 MFD. ELECTRO	300 V.
C19	ON T2	2ND I.F. TRANS. PRI. TRIM	
C20	ON T2	2ND I.F. " SEC "	
C21	22-805	.004 MFD.	600 V.
C22	22-813	.02 MFD.	200 V.
C23	22-1063	.001 MFD.	600 V.
C24	22-811	.01 MFD.	600 V.
C25	22-806	.004 MFD.	1000 V.
C26	22-1199	.25 MFD.	400 V.
C27	22-816	.02 MFD	600 V.
C28	22-1056	10 MFD. ELECTRO.	350 V.
C29		10 MFD. "	450 V.
R1	63-621	39 OHM	1/4 W.
R2	63 591	22 M OHM	1/4 W.
R3	63-583	1000 OHM	1/4 W.
R4	63-721	1.5 MEGOHM	1/4 W.
R5	63-1198	10 M OHM	2 W.
R6	63-1249	.5 MEG. VOL. CONTROL	
R7	63-593	47 M OHM	1/4 W.
R8	63-604	10 MEGOHM	1/4 W.
R9	63-296	220 M OHM	1/4 W.
R10	63-597	470 M OHM	1/4 W.
R11	63-1090	62 OHM WIREWOUND	2 W.
R12	63-260	100 M OHM	1/4 W.
R13	63-658	390 M OHM	1/4 W.
L1	S9962	ANTENNA COIL ASSEM.	
L2	S10040	OSC. COIL (S.W. & B.S.)	
L3	S10039	OSC. COIL (B.C. & POL)	
P.L.	100-36	DIAL LIGHT 6.3V. .25A	
S1	85-298	BAND SELECTOR SWITCH	
S2	85-134	TONE CONTROL SWITCH	
T1	95-716	1ST I.F. TRANSFORMER	
T2	95-931	2ND I.F. "	
T3	95-851	PWR. TRANS. 117-225V. 25~ USED ON 5S042 AT ONLY	
T4	95-836	PWR. TRANS. 117-225V. 50-60~ USED ON 5S042 BT ONLY	
T5	95-852	PWR. TRANS. 95-115-150V. 50-60~ USED ON 5S042 CT ONLY	
SPI	49-842	6 1/2" SPEAKER	


ANT.
7.4 X AT 600 KC
47 X FROM 600KC. TO 455KC
18 X FROM 455KC. TO 400~
65 X AT 400~ .25 WATT OUTPUT
11.5 X AT 400~ .25 WATT OUTPUT
BOTTOM VIEW OF TUBE SOCKETS.
7Q7 CONVERTER
7A7 I.F.
6SQ7GT DET.-AMP.
6K6GT PWR. AMP.
GIMMIC
1ST I.F. TRANS. 455 KC.
2ND I.F. TRANS. 455 KC.
ANT. COIL
BAND SWITCH SHOWN IN "BROADCAST" POSITION.
ALL VOLTAGES MEASURED FROM COMMON RETURN TO POINTS INDICATED WITH AN A.C., D.C. OR VACUUM TUBE VOLTMETER AS REQUIRED.
PHONO
DENOTES CHASSIS
SPEAKER FIELD 1500 Ω (HOT)
VOL. CONTROL
T5 95-115-150V. 50-60~ USED ON 5S042 CT ONLY
A.C. POWER LINE 42 WATTS
SW. & BANDSPREAD
OSC. COIL
POL. & BC.
6X5GT RECT.
SWITCH ON VOL. CONTROL R6
T3 117-225V. 25~ (USED ON 5S 42AT)
T4 117-225V. 50-60~ (USED ON 5S042BT)
T5 95-115-150V. 50-60~ (USED ON 5S042CT)
ALL RESISTORS ARE ± 20% TOLERANCE UNLESS OTHERWISE SPECIFIED

I.F. FREQUENCY 455 KC.
TUNING RANGE 540-1660 KC.
TUNING RANGE 2100-7300 KC.
TUNING RANGE 6800-22,500 KC.
TUNING RANGE 9400-12,200 KC.

PHONO

Este receptor esta provisto de una conexión para el fonógrafo, y una clavija o toma, situadas en la parte posterior del chasis. Para usar el receptor con un "Tocadiscos," ajuste el cambio de banda a una de las bandas de onda corta y controle el volumen del sonido con el control de volumen del receptor.

PHONO

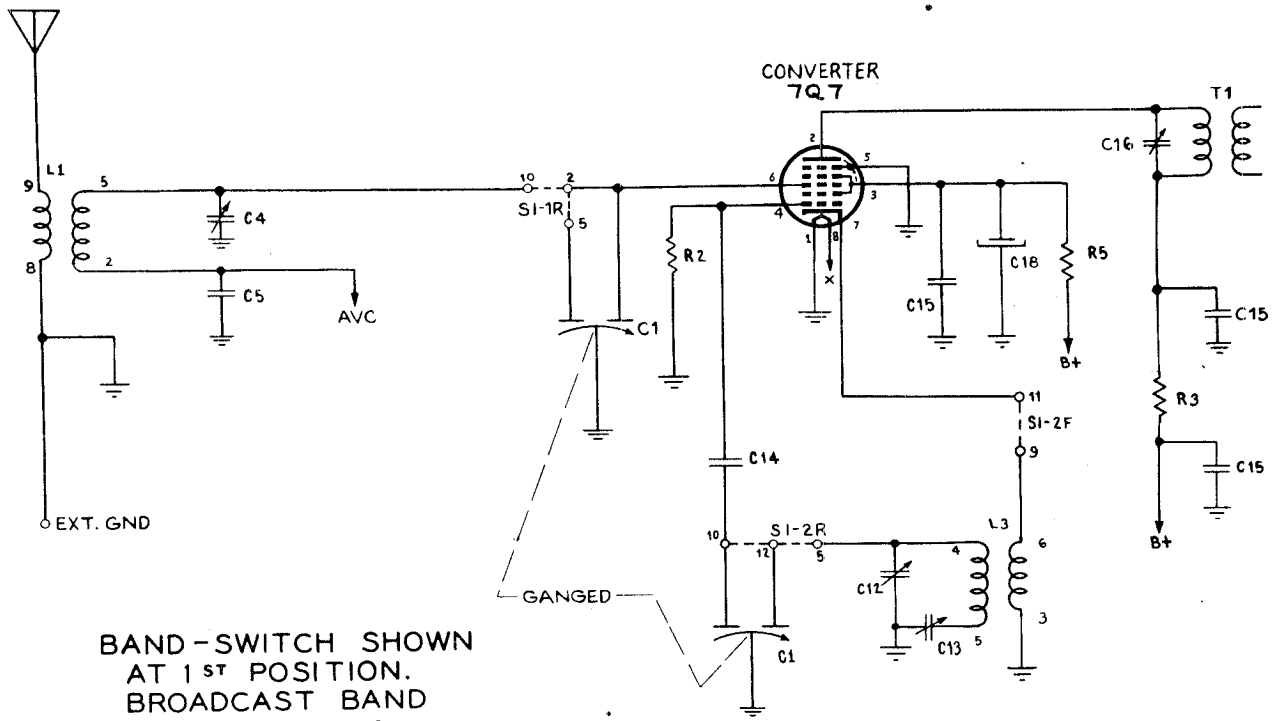
The Phono Jack and Plug is located on the rear of the receiver chassis. When using a record player with this receiver set the band switch to one of the short wave bands. Control the phono volume with the receiver Volume Control.

PHONO

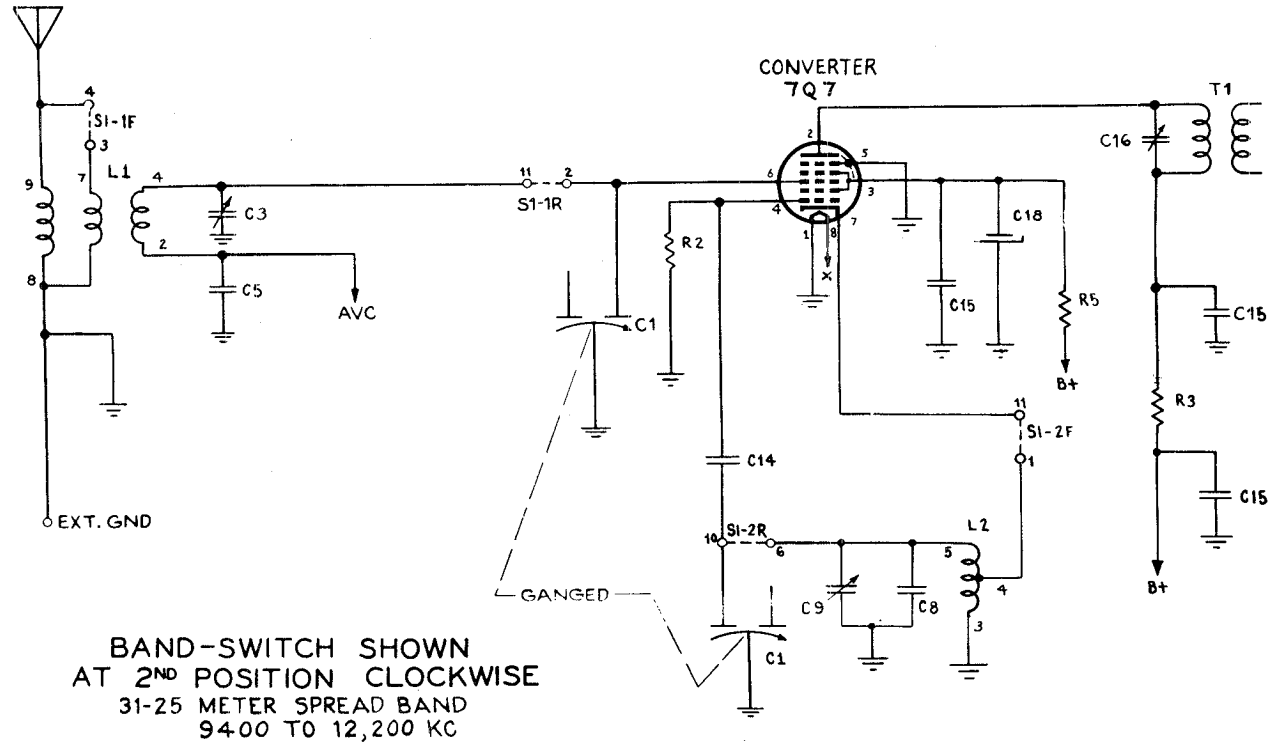
Ce recepteur est pourvu d'une "Cheville de Phonographe" et une prise, qui se trouvent au dos du châssis. Pour employer le poste avec un appareil phonographique externe ("record player"), tournez le commutateur sélectionneur de bandes à une des bandes d'ondes courtes, et réglez le volume du son au moyen du controle du volume du poste.

MODELS 5S042AT, 5S042BT, 5S042CT

ZENITH RADIO CORP.



BAND-SWITCH SHOWN AT 1ST POSITION. BROADCAST BAND 540 TO 1660 KC



BAND-SWITCH SHOWN AT 2ND POSITION CLOCKWISE
31-25 METER SPREAD BAND
9400 TO 12,200 KC

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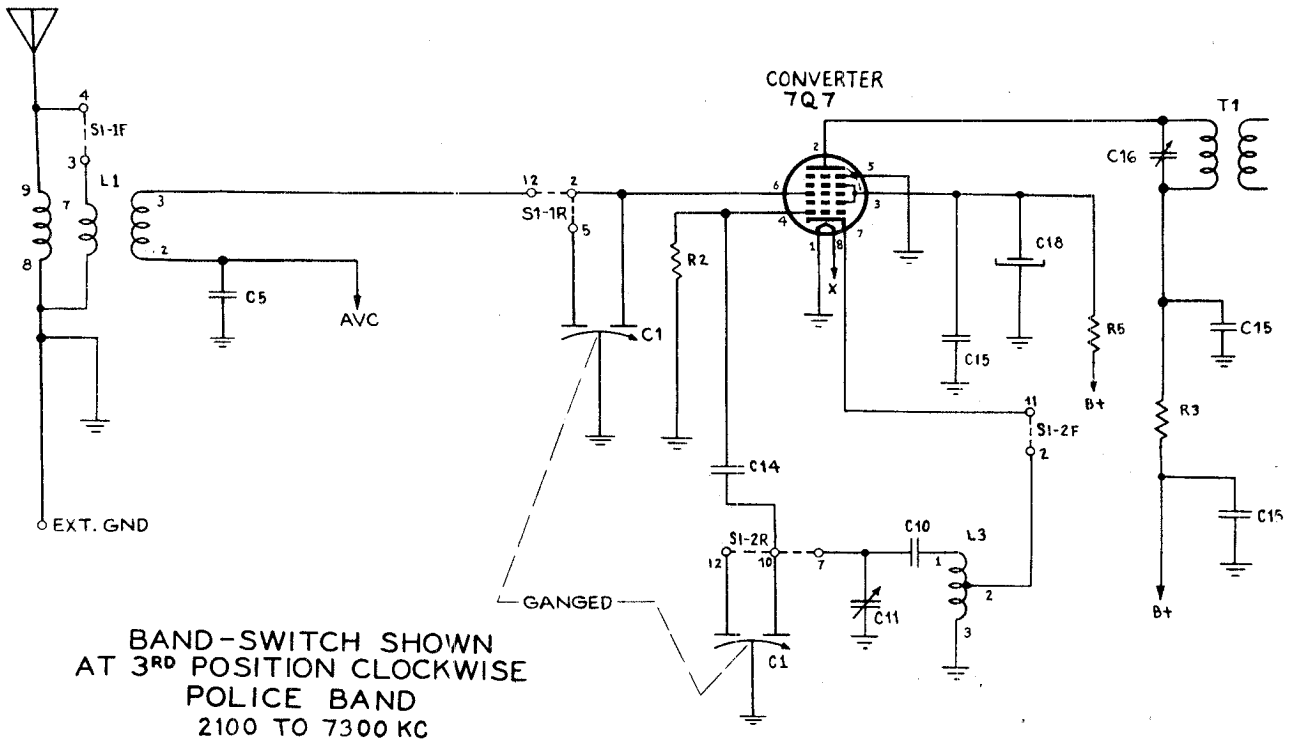
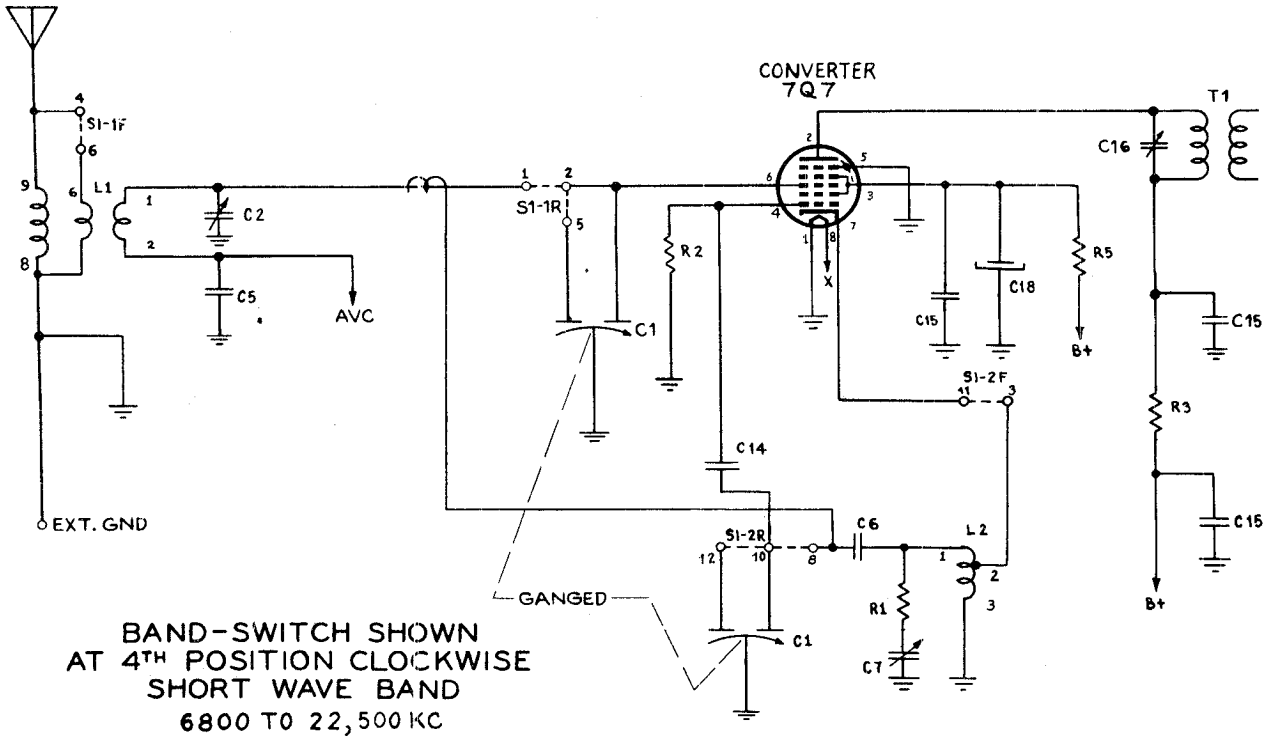
ZENITH RADIO CORP.

MODELS 5S042AT, 5S042BT, 5S042CT



BAND-SWITCH SHOWN
AT 3RD POSITION CLOCKWISE
POLICE BAND
2100 TO 7300 KC



BAND-SWITCH SHOWN
AT 4TH POSITION CLOCKWISE
SHORT WAVE BAND
6800 TO 22,500 KC

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MODEL NO. 5S042AT, 5S042BT, 5S042CT

Chassis No. 5C63

INSTRUCCIONES PARA LA INSTALACION Y FUNCIONAMIENTO

INFORMACION GENERAL

Despues de desembalar el receptor el papel engomado usado en embalaje y embarque, tiene que quitarse del chasis.

Este receptor es un moderno aparato superheterodino, de cinco tubos, que sintoniza las bandas de onda larga y corta siguientes: 540 a 1660 Kc. (555 a 180 metros), 2100 a 7300 Kc. (143 a 41 metros), 6800 a 22,500 Kc. (44 a 13.3 metros) y una escala especial de ondas desde 9400 a 12,200 Kc. (31.9 a 24.6 metros) con ensanchamiento de banda en 25 y 31 metros.

SUMINISTRO DE ENERGIA

PRECAUCION! ESTE RECEPTOR NO DEBE CONECTARSE A CORRIENTE CONTINUA (C.C.)

El transformador de fuerza fué ajustado en la fábrica a un voltaje máximo, y puede ajustarse al voltaje deseado mediante el conmutador graduado que se encuentra en el transformador.

El chasís 5C63BT ha sido diseñado para funcionar con 115 ó 225 voltios, de 50 ó 60 períodos.

INSTALLATION, OPERATING AND SERVICE INSTRUCTIONS

GENERAL

After the receiver has been unpacked from the carton, the paper tape used for packing and shipping must be removed from the chassis.

This receiver is a modern five tube superheterodyne, tuning over the following standard broadcast and short-wave bands: 540 to 1660 Kc. (555 to 180 meters), 2100 to 7300 Kc. (143 to 41 meters), 6800 to 22,500 Kc. (44 to 13.3 meters), and a special range covering 9400 to 12,200 Kc. (31.9 to 24.6 meters) with spread bands at 25 and 31 meters.

POWER SUPPLY

CAUTION: DO NOT CONNECT THIS RECEIVER TO DIRECT CURRENT (D.C.)

This radio was shipped from the factory with the power transformer adjusted for high voltage operation and may be changed for low voltage operation by means of the switch located on the power transformer.

The 5C63BT chassis is designed to operate on 115 or 225 volts, 50 to 60 cycles.

LES INSTRUCTIONS POUR LA INSTALLATION ET FONCTIONNEMENT

GENERAL

Après déballage du récepteur de la boite en carton, la bande de papier-cache employée pour l'emballage et l'expédition doit être enlevée du châssis.

Le présent poste est un récepteur superhétérodyne moderne à cinq lampes, dont l'accord englobe les bandes standard suivantes d'ondes longues et d'ondes courtes: 540 à 1660 Kc. (555 à 180 mètres), 2100 à 7300 Kc. (143 à 41 mètres), 6800 à 22,500 Kc. (44 à 1.3 mèters), et une échelle spéciale qui couvre de 9400 à 12,200 Kc. (31.9 à 24.6 mètres) avec épanouissement des bandes à 25 et 31 mètres.

ALIMENTATION DE COURANT

ATTENTION: NE PAS BRANCHER CE POSTE SUR COURANT CONTINU (C.C.)

Le poste a été expédié de l'usine avec son transformateur de courant réglé pour mise en service sur haut voltage et peut être changé pour emploi sur bas voltage au moyen du commutateur situé sur le transformateur de courant.

El chasís 5C63AT ha sido diseñado para funcionar con 115 ó 225 voltios, de 25 a 100 períodos.

El chasís 5C63CT ha sido diseñado para funcionar con 95, 115, ó 150 voltios, de 50 a 60 períodos.

Para cerciorarse de las características exactas del servicio eléctrico en su localidad, consulte a la Compañía de Luz Eléctrica o pregunte a su agente Zenith; ajústese el conmutador del transformador de fuerza al voltaje correcto si fuere necesario.

El consumo total de energía es de 40 vatios y la salida máxima es de 3.5 vatios.

The 5C63AT chassis is designed to operate on 115 or 225 volts, 25 to 100 cycles.

The 5C63CT chassis is designed to operate on 95, 115 or 150 volts, 50 to 60 cycles.

Ascertain your line voltage and frequency, preferably by consulting your dealer or local power company and if necessary reset the power switch to conform to the local power source.

Total power consumption is 40 watts. Maximum power output is 3½ watts.

ANTENNA

A good antenna is necessary for satisfactory reception. An outside antenna from 40 to 60 feet in length and as high as possible will give good all around results. If your present antenna is to be used, a thorough examination should be made to determine its condition, as the connections may be corroded or broken thus rendering the antenna unfit for service. If a new antenna is to be constructed, care should be taken to prevent the lead-in wire from grounding to trees, walls or gutters and all connections should be properly soldered to prevent corrosion and resulting noise. Connect the antenna lead-in to the post marked "A" at the back of the chassis.

Le châssis 5C63BT est prévu pour emploi sur courant de 115 ou 225 volts, 50 à 60 périodes.

Le châssis 5C63AT est prévu pour emploi sur courant de 115 ou 225 volts, 25 à 100 periodes.

Le châssis 5C63CT est prévu pour mise en service sur courant de 95, 115 ou 150 volts, 50 à 60 périodes.

Assurez-vous du voltage et de la fréquence de votre courant, de préférence en consultant votre revendeur ou votre compagnie électrique locale, et, s'il y a lieu, ajustez le commutateur de courant en conformité avec la source électrique locale.

La consommation total de courant est de 40 watts. Le débit maximum de courant est de 3½ watts.

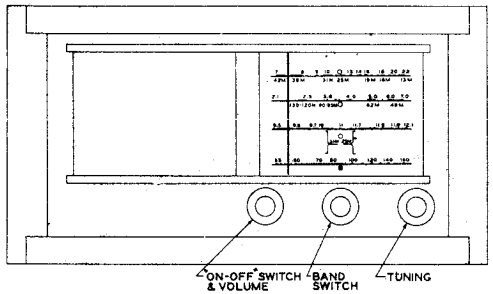

FIG. 1—CONTROLS

ANTENA

Una buena antena es indispensable para la recepción satisfactoria. Una antena exterior de 13 to 20 metros de longitud instalada lo más alto posible es la más apropiada para uso general. Si ha de usar una antena ya instalada, ésta debe examinarse minuciosamente para determinar su estado pues puede haber conexiones oxidadas o rotas, que nulifican la eficacia de la antena. Por otra parte si ha de instalarse una antena nueva hay que tomar las precauciones necesarias para que el alambre de bajada no haga contacto con la pared o con cualquier objeto

ANTENNE

Une bonne antenne s'impose pour obtenir une réception satisfaisante. Une antenne extérieure de 13 à 20 mètres de longueur et placée aussi haut que possible donnera d'excellents résultats pour tout service. Si vous vous proposez d'utiliser votre antenne actuelle il conviendra d'en faire un examen approfondi pour en déterminer l'état car les connexions peuvent en être rouillées ou rompues, ce qui rendrait l'antenne impropre à l'emploi. Si on décide de construire une nouvelle antenne, il convient de veiller á ce que le fil d'entrée ne rejoigne pas la terre par des arbres, des murs ou des gouttières, et toutes les connexions

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que resulte en una conexión a tierra. Todas las conexiones deben estar correctamente soldadas para prevenir contra la oxidación y los ruidos que se producen a consecuencia de esto. Conéctese el alambre de bajada de la antena a la terminal marcada "A" en la parte trasera del chasis.

TIERRA

Una conexión a tierra bien hecha mejorará considerablemente la recepción aumentando la fuerza de las señales de estaciones lejanas y reduciendo el ruido de fondo. La conexión a tierra más satisfactoria consiste en una sección de tubería de un metro a 1.50 metros de largo, introducida verticalmente en tierra húmeda; un extremo de la conexión a tierra se conecta a la terminal marcada "G" en el chasis

FUNCIONAMIENTO

(Véase la fig. 1). El grabado indica la posición y propósito de cada perilla. Haciendo girar la perilla combinada del interruptor (ON-OFF) y regulador de volumen hacia la derecha, el receptor empieza a funcionar. Las válvulas requieren 30 segundos más o menos para calentarse. Para aumentar el volumen es necesario girar la perilla hacia la derecha. El volumen se reduce haciendo girar la perilla hacia la izquierda y el receptor se apaga cuando se oye el ruido del interruptor.

Para sintonizar una estación gírese la perilla selectora hasta que la aguja indique la frecuencia deseada. La sintonización debe hacerse en el centro de la frecuencia para obtener la mejor calidad de tono posible.

El tono se cambia por medio de un interruptor en la parte posterior del receptor, de "Alto" a "Bajo."

El receptor tiene cuatro escalas de onda, y cualquiera de ellas puede seleccionarse por medio del conmutador de bandas. La banda que se esté usando estará indicada por medio de un punto rojo en el centro de la escala correspondiente.

GROUND

A good ground will aid reception materially by improving the signal strength of distant stations and reducing background noise. The best ground is a 4 to 6 foot pipe driven down to damp earth; the ground lead-in should be securely soldered to this.

A suitable ground may be obtained by making a good connection to a water pipe or radiator. Connect the ground lead-in to the post marked 'G" at the rear of the chassis.

PLACING THE RECEIVER IN OPERATION

Note figure 1. This shows the position and purpose of each control. Turning the combination "ON-OFF" switch and volume control to the right will turn the receiver ON. Approximately 30 seconds will be required for the tubes to heat to operating temperature. Continued rotation of his knob to the right increases the volume. Turning this control to the left decreases the volume and, when a click is heard, turns the receiver OFF.

When tuning in a station turn the tuning knob slowly to the desired station. Care should be taken to tune the receiver to the middle of the signal; otherwise the tone will be impaired.

The tone may be changed by means of the switch at the back of the radio from "Treble" to "Bass."

If a hum is apparent, reverse the power plug in the wall outlet.

The receiver has four tuning ranges, any one of which may be selected by means of the band switch. The band in use will be indicated by a red dot in the center of the corresponding scale.

Daylight has a decided effect on the reception of short wave stations and different wave lengths are most effective at different times of the day. The following table may be used as a guide.

SHORT WAVE BAND	TIME OF BEST RECEPTION
16 meters and below	A.M. (Morning hours)
19 and 25 meters	P.M. (Afternoon)
25 and 31 meters	P.M. (Early evening)
31 and 49 meters	P.M. (Late evening)

VALVULAS

Este receptor usa las válvulas siguientes:

7Q7 6X5GT
7A7 6K6GT
6SQ7GT

La fig. 2 muestra la posición de las válvulas.

TUBES

The following tubes are employed in this receiver:

7Q7 6X5GT
7A7 6K6GT
6SQ7GT

Figure 2 shows the correct socket location for each tube.

PRISE DE TERRE

Une bonne prise de terre aidera notablement la réception en améliorant la force du signal pour les stations distantes et en réduisant le bruit de fond La meilleure prise de terre consiste d'un tuyau de 4 à 6 pieds qu'on enfonce dans le sol humide; la prise de terre devra y être solidement soudé.

On peut réaliser une prise de terre convenable en établissant une bonne connexion au tuyau d'eau ou radiateur. Connectez la prise de terre au montant marqué "G" à l'arrière du châssis.

MISE DU RECEPTEUR EN SERVICE

Notez la fig. 1. Elle montre la position et l'objet de chaque contrôle. En tournant le commutateur combinaison interrupteur "ON-OFF" et contrôle du volume, vers la droite, le recepteur sera mis en circuit. Il faut compter environ 30 secondes pour que les lampes se chauffent à la température de fonctionnement. En continuant de tourner ce bouton vers la droite, le volume augmente en intensité. En tournant ce même contrôle vers la gauche, on diminue le volume de sonorité et, quand on entend un léger clic, c'est qu'on a mis le récepteur hors circuit.

Quand vous accordez une station, tournez le bouton de syntonisation lentement jusqu'a ce que vous ayez obtenu la station désirée. Il convient de veiller à accorder le poste au milieu de la fréquence d'onde correspondante; autrement le ton en sera affecté.

Le ton peut être modifié au moyen du commutateur qui se trouve à l'arrière du poste, et cela de la position "Haut" à "Bas."

Le récepteur possède quatre échelles d'accord parmi lesquelles on peut selectionner l'une quelconque d'entre elles au moyen du commutateur sélectionneur de bandes. La bande en usage sera indiquée par un point rouge au centre de l'echelle correspondante.

La réception radiophonique sur ondes courtes est définitivement affectée par la lumière du jour et la réception sur différentes longueurs d'ondes est plus ou moins efficace à différents moments de la journée. Nous donnons à gauche un barème qui peut être suivi pour l'ecoute des différentes stations pendant le jour ou la nuit.

LAMPES

Les lampes suivantes sont employées sur ce poste:

7Q7 6X5GT
7A7 6K6GT
6SQ7GT

La figure 2 montre la douille correcte pour chaque lampe.

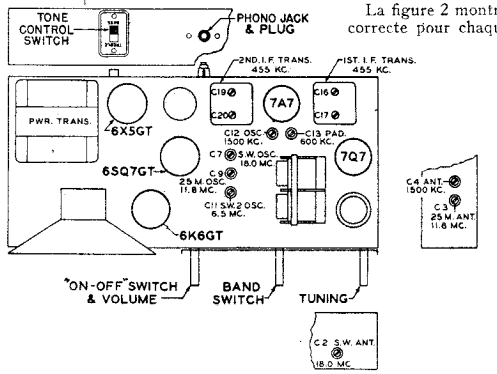


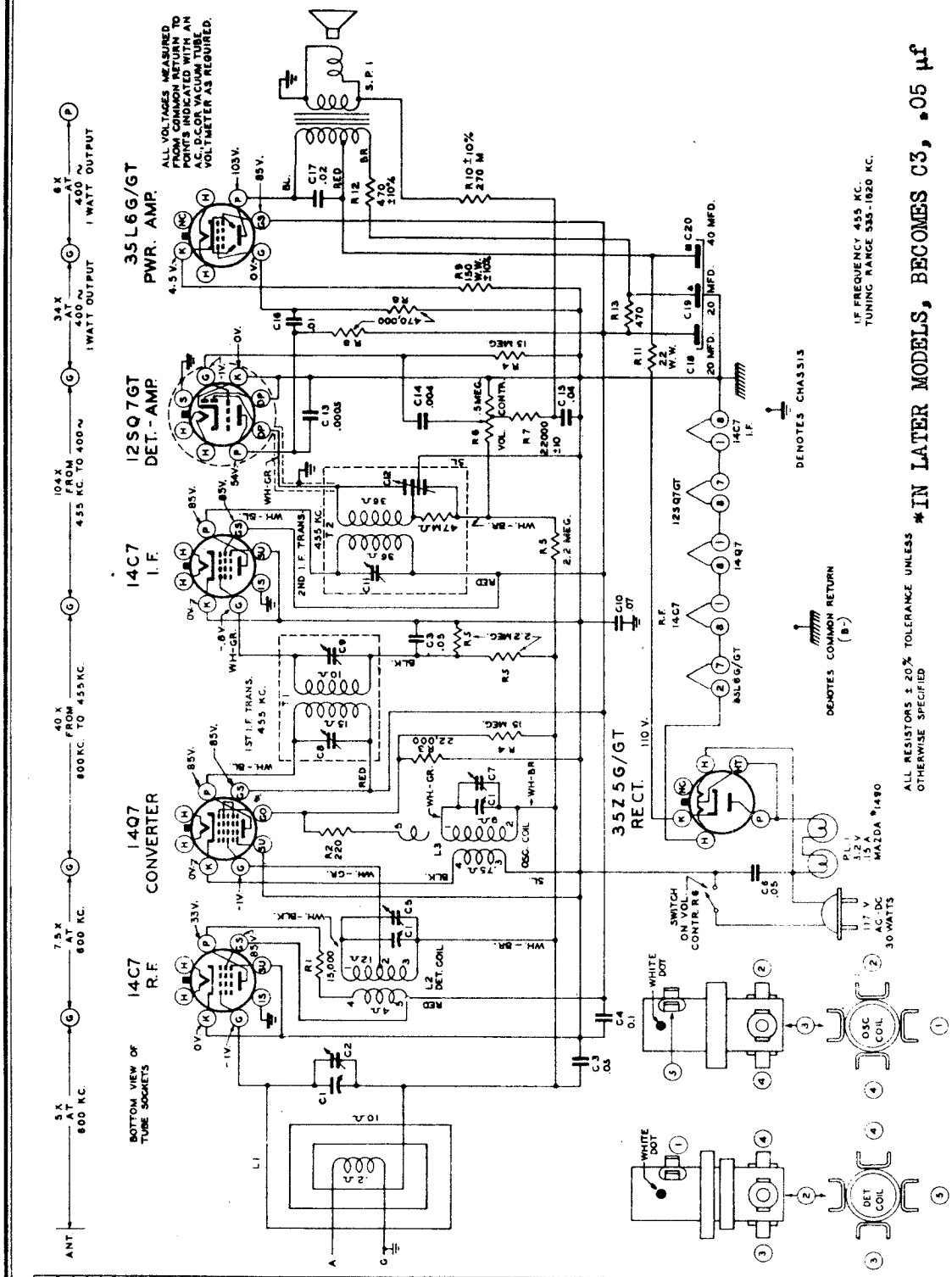
FIG. 2—TUBE SOCKETS & TRIMMER POSITIONS

ALIGNMENT PROCEDURE

Operation	Connect Osc. to	Dummy Ant.	Input Sig. Freq.	Band	Set Dial at	Trimmer	Purpose
1	1st Det. Grid	.1 mfd.	455 kc.	BC	600 kc.	C16,17,19,20	Align I.F.
2	Ant.-Gnd.	200 m.m.f.	1500 kc.	BC	1500 kc.	C12	Set Osc. to Scale
3	Ant.-Gnd.	200 m.m.f.	1500 kc.	BC	1500 kc.	C4	Align Ant.
4	Ant.-Gnd.	200 m.m.f.	600 kc.	BC	Rock at 600 kc.	C13	Set Padder
5	Ant.-Gnd.	400 ohm	6.5 mc.	SW2	Rock at 6.5 mc.	C11	Align SW2
6	Ant.-Gnd.	400 ohm	18.0 mc.	SW1	18 mc.	C7	Set Osc. to Scale
7	Ant.-Gnd.	400 ohm	18.0 mc.	SW1	18 mc.	C2	Align Ant.
8	Ant.-Gnd.	400 ohm	11.8 mc.	31-25 meter	11.8 mc.	C9	Set Osc. to Scale
9	Ant.-Gnd.	400 ohm	11.8 mc.	31-25 meter	11.8 mc.	C3	Align Ant.

MODELS 6D014, 6D029
Chassis 6C01

ZENITH RADIO CORP.



DIAG. NO.	PART NO.	DESCRIPTION
C1	22-1358	3-GANG VARIABLE
C2	ON C1	BROADCAST ANT TRIM.
C3	22-829	.05 MFD. 200 V.
C4	22-827	.1 MFD. 200 V.
C5	ON C1	BROADCAST DET TRIM.
C6	22-1017	.05 MFD. 200 V.
C7	ON C1	BROADCAST OSC. TRIM.
C8	ON T1	1ST I.F. TRANS. PRI. TRIM.
C9	ON T1	1ST I.F. " SEC. "
C10	22-1207	.07 MFD. 200 V.
C11	ON T2	2ND I.F. TRANS. PRI. TRIM.
C12	ON T2	2ND I.F. " SEC. "
C13	22-854	.0005 MFD. 600 V.
C14	22-1362	.004 MFD. 600 V.
C15	22-1361	.04 MFD. 400 V.
C16	22-198	.01 MFD. 600 V.
C17	22-1379	.02 MFD. 400 V.
C18	22-1519 OR	20 MFD. ELECTRO 150 V.
C19	22-1551	40 MFD. " "
C20		
R1	63-590	15 M. OHM ½ W.
R2	63-579	220 OHM ½ W.
R3	63-581	2.2 M. OHM ½ W.
R4	63-976	15 MEGOHM ½ W.
R5	63-600	2.2 MEGOHM ½ W.
R6	63-1335	.5 MEG. VOL. CONTROL
R7	63-644	22 M. OHM ½ W.
R8	63-597	470 M. OHM ½ W.
R9	63-1237	150 OHM. WIREW'D 2 W.
R10	63-775	270 M. ½ W.
R11	63-1450	22 OHM W. W. 1 W.
R12	63-1222	470 OHM 1 W.
R13	63-1449	470 OHM 1 W.
L1	5-11124	WAVEMAGNET ASS'Y.
L2	5-9581	DET. COIL "
L3	5-9578	OSC. COIL "
T1	95-811	1ST I.F. TRANS. "
T2	95-958	2ND I.F. " "
PL.	100-90	PILOTLIGHT 3.2V., .15A.
SP1	49-549	5" P. M. SPEAKER

DISTORTION AND POOR SENSITIVITY: Distortion and poor sensitivity caused by a short between turns on the wavemagnet.
Poor sensitivity and set fails to operate on low frequency end of dial--replace oscillator coil.
UNCONTROLLED OSCILLATION: A 470,000 ohm carbon resistor soldered across the secondary of the first i-f transformer will correct this condition.

*IN LATER MODELS, BECOMES C3, .05 µf

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MODELS 6D014—6D029
CHASSIS No. 6C01

TO THE SERVICE MAN:

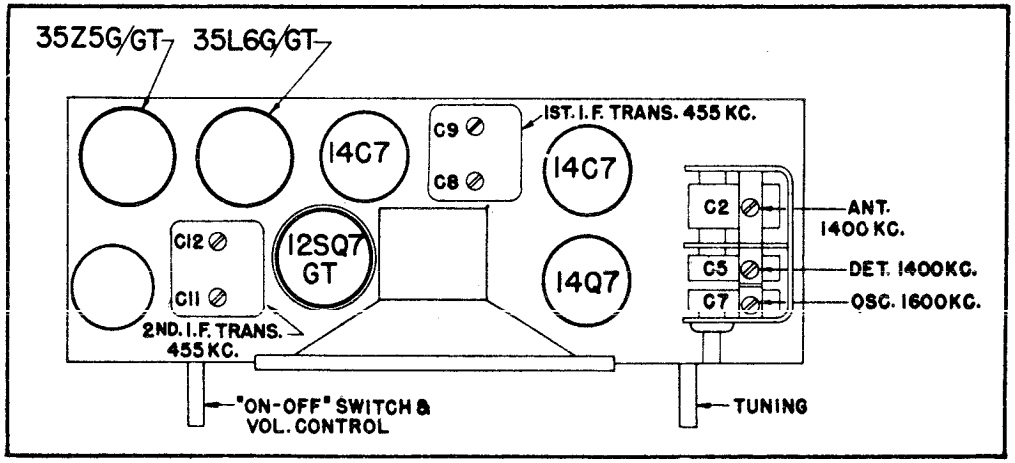
Chassis 6C01 features a high gain tuned R.F. circuit ahead of a conventional superheterodyne circuit, with feedback in the audio circuit, and a new filter circuit to reduce hum to a minimum.

Part of the audio voltage from the voice coil is fed back to the first audio grid(12SQ7) in phase through resistor R10 and R7 to a tap on the volume control R6. Capacitor C15 bypasses highs to ground. One side of the output transformer secondary is grounded. The side grounded determines the phase relationship of the feedback voltage, therefore, when replacing the output transformer be certain the proper end of the secondary is grounded or degeneration will result. The overall result of this arrangement is to boost the bass tones.

The filter circuits of chassis 6C01 incorporate new features that should be well understood by the service man. An examination of the schematic drawing will show the output transformer tapped slightly off center. This tap is the B+ connection from filter resistor R11 and capacitor C20 off the cathode of the rectifier 35Z5 to the 35L6 plate. The lower connection of the output transformer feeds B+ to the rest of the tubes in the receiver. Current flowing through the upper windings of the output transformer to the 35L6 produces a magnetic field which is 180° out of phase with the magnetic field produced by current flowing in the opposite direction through the output transformer to the rest of the receiver, therefore, most of the AC hum is cancelled. Further reduction of hum is accomplished by filtering through resistors R12 and R13 and capacitors C18 and C19.

This development in filtering systems allows a higher effective plate voltage on the 35L6 for increased power output.

NOTE: The output transformer must be replaced with an exact duplicate, Part No. 206-549 be sure to add the speaker code letter to the transformer Part Number.



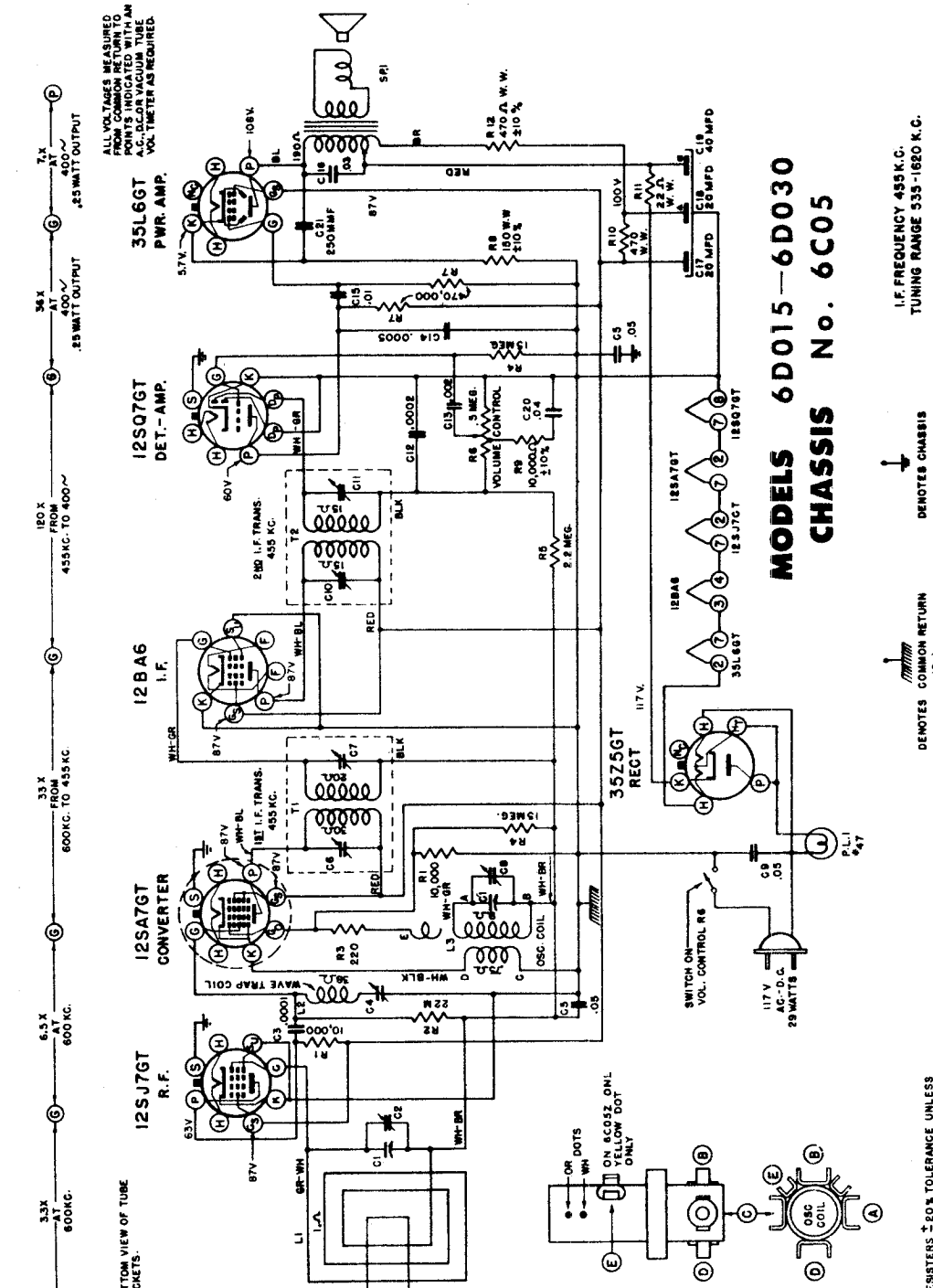
TUBE AND TRIMMER LOCATION

ALIGNMENT PROCEDURE

OPERATOR	CONNECT OSCILLATOR TO	DUMMY ANTENNA	INPUT SIG. FREQUENCY	SET DIAL AT	TRIMMERS	PURPOSE
1	Converter Grid	.5 Mfd.	455 Kc.	600 Kc.	C-8,C-9, C-11,C-12	Align I. F.
2	One Turn Loop Coupled Locsely to Wave Magnet	--	1600 Kc.	1600 Kc.	C-7	Set Oscillator to Dial Scale.
3		--	1400 Kc.	1400 Kc.	C-5	Align detector
4		--	1400 Kc.	1400 Kc.	C-2	Align antenna stage

MODELS 6D015,6D030
Chassis 6C05,Early

ZENITH RADIO CORP.



DIAG NO	PART NO	DESCRIPTION OF 6C05 PARTS
C1®	22-1419	C-GANG VAR-SEE NOTE
C2	ON C1	BROADCAST ANT. TRIMMER
C3	22-162	.0001 MFD. 600 V.
C4	22-1045	WAVE TRAP TRIMMER
C5	22-825	.05 MFD 200 V.
C6	ON T1	1ST I.F. TRANS. PRI. TRIMMER
C7	ON T1	1ST I.F. " SEC. "
C8	ON C1	BROADCAST OSC. "
C9	22-197	.05 MFD. 200 V.
C10	ON T2	2ND I.F. TRANS. PRI. TRIMMER
C11	ON T2	2ND I.F. " SEC. "
C12	22-853	.0002 MFD. 600 V.
C13	22-492	.008 MFD. 600 V.
C14	22-854	.0005 MFD. 600 V.
C15	22-196	.01 MFD. 600 V.
C16	22-1048	.03 MFD. 400 V.
C17	22-1519	20 MFD. ELECTRO. 150 V.
C18		20 MFD. " 150 V.
C19		40 MFD. " 600 V.
C20	22-1202	.04 MFD.
R1	63-1222	470 OHM WIRE WD. 1 W.
R2	63-580	10M OHM 1/4 W.
R3	63-591	22M OHM 1/4 W.
R4	63-579	220 OHM 1/4 W.
R5	63-976	.15 MEGOHM 1/4 W.
R6	63-600	2.2 MEGOHM 1/4 W.
R7	63-1037	.5 MEG. VOLUME CONTROL
R8	63-597	470 OHM 1/4 W.
R9	63-688	150 OHM WIREWOUND 2 W.
R10	63-641	110 Ω OHM 1/4 W.
R11	63-1449	470 OHM WIRE WD. 1 W.
R12	63-1450	22 OHM " 1 W.
L1®	S 110199	WAVEMAGNET ASSEMBLY
L2	S 93326	WAVE TRAP COIL "
L3®	S 111136	OSC. COIL "
T1	95-929	1ST I.F. TRANSFORMER "
T2	95-930	2ND I.F. " "
P.L.1	100-67	PILOT LIGHT 6.3V. .15A
SP1	49-347	4" P.M. SPEAKER
®	24-344	DIAL SCALE
	24-345	DIAL SCALE
C21	22-182	250 MMF 600 V.

NOTE:- ON 6C05Z ALL PARTS WITH ® CHANGE TO THE FOLLOWING

C1	22-1521	2 GANG VARIABLE
L1	S-12486	WAVE MAGNET ASSY.
L3	S-12491	OSC. COIL "
	24-345	DIAL SCALE "

DISTORTION AND POOR SENSITIVITY: Distortion and poor sensitivity caused by a short between turns on the wavemagnet.
Poor sensitivity and set fails to operate on low-frequency end of dial--replace oscillator coil.

UNCONTROLLED OSCILLATION: A 470,000 ohm resistor soldered across the secondary of the first i-f transformer will correct this condition.

For Alignment, see P.15-2

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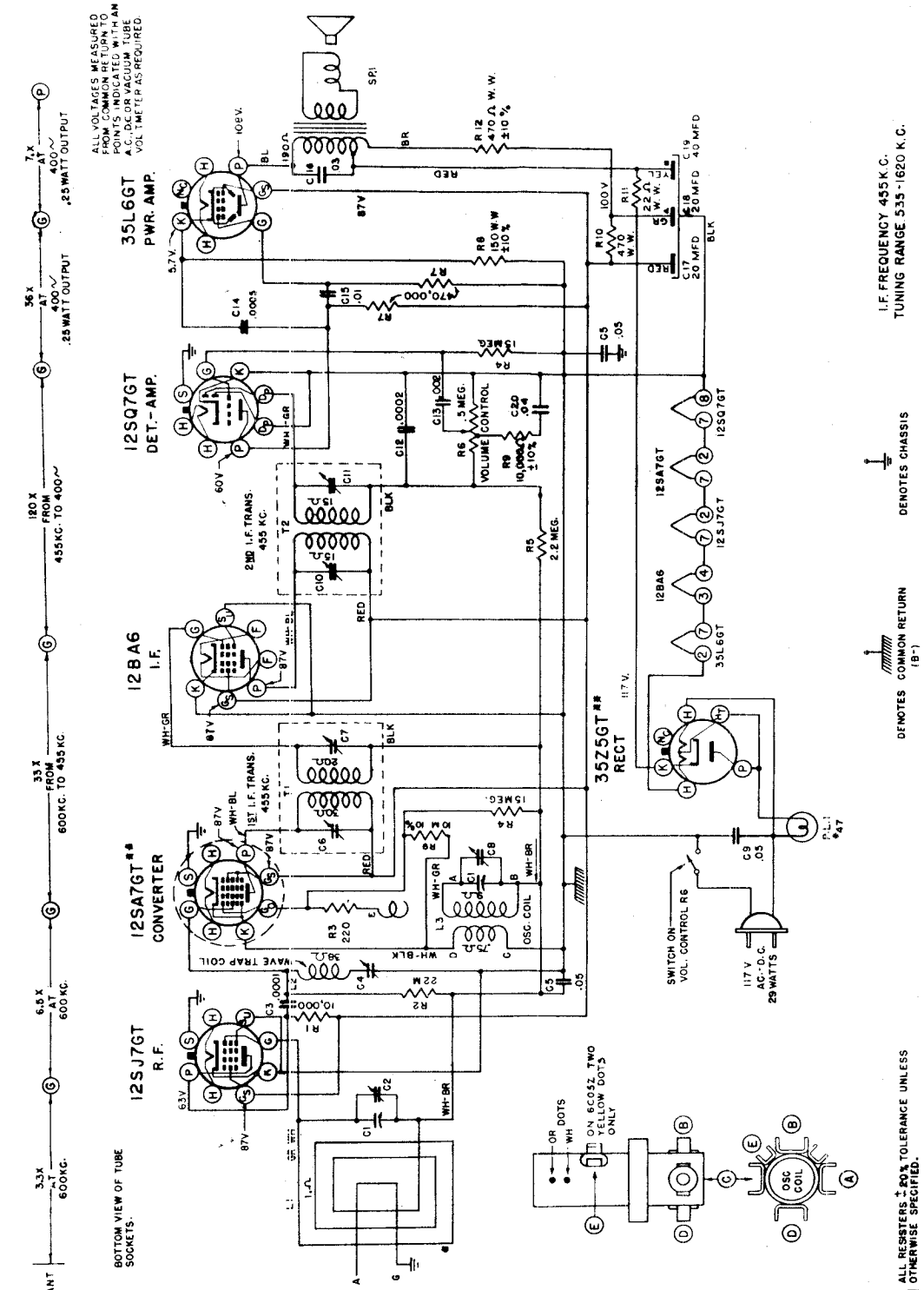
ZENITH RADIO CORP.

MODELS 6D015, 6D030
Chassis 6C05, Late



Symbol No.	Part No.	DESCRIPTION OF 6C05 PARTS
C1#	22-1419	2-GANG, VAR SEE NOTE
C2	ON C1	BROADCAST ANT. TRIMMER
C3	22-162	.0001 MFD. 600 V.
C4	22-1368	WAVE TRAP TRIMMER
C5	22-829	.05 MFD. 200 V.
C6	ON T1	1ST I.F. TRANS. PRI TRIMMER
C7	ON T1	1ST I.F. " SEC.
C8	ON C1	BROADCAST OSC. "
C9	22-1017	.05 MFD. 200 V.
C10	ON T2	2ND I.F. TRANS. PRI TRIMMER
C11	ON T2	2ND I.F. " SEC.
C12	22-935	.0002 MFD. 600 V.
C13	22-492	.002 MFD. 600 V.
C14	22-854	.0005 MFD. 600 V.
C15	22-196	.01 MFD. 600 V.
C16	22-1049	.03 MFD. 400 V.
C17	22-1519	20 MFD ELECTRO. 150 V.
C18	OR	20 MFD. " 150 V.
C19	22-1551	40 MFD. " 150 V.
CR1	22-1282	CAMFU " 200 V.
R1	63-1222	470 OHM WIREWD. ½ W.
R2	63-569	10M OHM ¼ W.
R3	63-591	22M OHM ¼ W.
R4	63-579	220 OHM ¼ W.
R5	63-976	15 MEGOHM ¼ W.
R6	63-600	2.2 MEGOHM ¼ W.
R7	63-1337	.5 MEG. VOLUME CONTROL
R8	63-597	470M OHM ¼ W.
R9	63-686	150 OHM WIREWOUND 2 W.
R10	63-641	10 W OHM ¼ W.
R11	63-1441	470 OHM WIREWD 1 W.
R12	63-1450	2.2 OHM " 1 W.
L1#	S 11099	WAVEMAGNET ASSEMBLY
L2	S 8326	WAVETRAP COIL "
L3#	S11136	OSC. COIL "
T1	95-929	1ST I.F. TRANSFORMER
T2	95-930	2ND I.F. "
PL1	100-67	PILOT LIGHT 6.3V .15A
SPI	49-547	4" P.M. SPEAKER
#	28-346	DIAL SCALE

NOTE:- ON 6C05Z ALL PARTS WITH # CHANGE TO THE FOLLOWING

C1	22-1527	2 GANG VARIABLE
L3	15-12466	WAVE MAGNET ASSY
	15-12491	OSC COIL
	26-385	DIAL SCALE

REPLACING PRODUCED WITH ALTERNATE TUBES AS FOLLOWS:

ORIGINAL	ALTERNATE
12SA7GT.	12BE6
12SA7GT	14Q7
35Z5GT	35W4

For Alignment, see P.15-2

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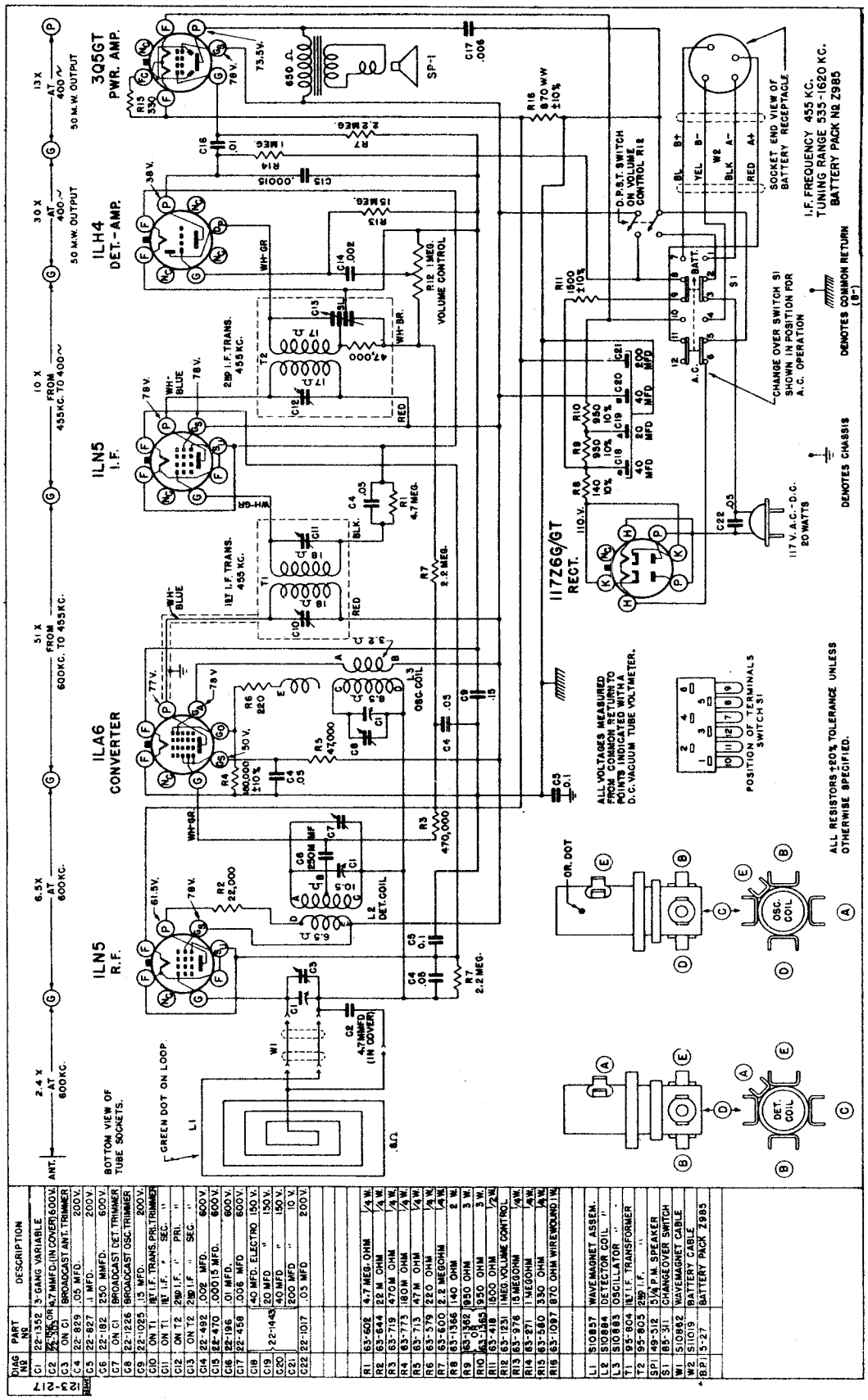
MODEL 6G001
Chassis 6C40

ZENITH RADIO CORP.

BLOCKING: The a-c plug being inserted in the battery saver switch socket while the on-off switch is on may cause the set to block and become dead. Switching the set off and on will relieve this blocked condition and return the set to normal operation.


ILN5 R.F.
ILA6 CONVERTER
ILN5 I.F.
ILH4 DET.-AMP.
3Q5GT PWR. AMP.
117Z6G/GT RECT.
455 KC.
SP-1
650 Ω
50 M.W. OUTPUT
VOLUME CONTROL
D.P.S.T. SWITCH ON VOLUME CONTROL R12
CHANGE OVER SWITCH S1 SHOWN IN POSITION FOR A.C. OPERATION
SOCKET END VIEW OF BATTERY RECEPTACLE
I.F. FREQUENCY 455 KC. TUNING RANGE 535-1620 KC. BATTERY PACK NO 2985
117 V. A.C.-D.C. 20 WATTS
DENOTES CHASSIS
DENOTES COMMON RETURN (B-)
ALL VOLTAGES MEASURED FROM COMMON RETURN TO POINTS INDICATED WITH A D.C. VACUUM TUBE VOLTMETER.
POSITION OF TERMINALS SWITCH S1
ALL RESISTORS ±20% TOLERANCE UNLESS OTHERWISE SPECIFIED.
GREEN DOT ON LOOP
BOTTOM VIEW OF TUBE SOCKETS.
OSC. COIL
DET. COIL
OR. DOT

DIAG NO	PART NO	DESCRIPTION
C1	22-1352	3-GANG VARIABLE
C2	22-1016	4.7 MMFD. (IN COVER) 600 V.
C3	ON C1	BROADCAST ANT. TRIMMER
C4	22-829	.05 MFD. 200 V.
C5	22-827	.1 MFD. 200 V.
C6	22-182	250 MMFD. 600 V.
C7	ON C1	BROADCAST DET. TRIMMER
C8	22-1226	BROADCAST OSC. TRIMMER
C9	22-1025	.15 MFD. 200 V.
C10	ON T1	INT. I.F. TRANS. PRI. TRIMMER
C11	ON T1	INT. I.F. " SEC. "
C12	ON T2	2ND I.F. " PRI. "
C13	ON T2	2ND I.F. " SEC. "
C14	22-492	.002 MFD. 600 V.
C15	22-470	.00015 MFD. 600 V.
C16	22-196	.01 MFD. 600 V.
C17	22-458	.006 MFD 600 V.
C18	22-1443	40 MFD. ELECTRO 150 V.
C19		20 MFD " 150 V.
C20		40 MFD " 150 V.
C21	22-1017	200 MFD " 10 V.
C22	22-1017	.05 MFD 200 V.
R1	63-602	4.7 MEG. OHM 1/4 W.
R2	63-644	22 M. OHM 1/4 W.
R3	63-719	470 M. OHM 1/4 W.
R4	63-773	180 M. OHM 1/4 W.
R5	63-713	47 M. OHM 1/4 W.
R6	63-579	22 O. OHM 1/4 W.
R7	63-600	2.2 MEGOHM 1/4 W.
R8	63-1366	140 OHM 2 W.
R9	63-1382	930 OHM 5 W.
R10	63-1365	950 OHM 5 W.
R11	63-418	1800 OHM 2 W.
R12	63-1231	1 MEG. VOLUME CONTROL
R13	63-976	15 MEGOHM 1/4 W.
R14	63-271	1 MEGOHM 1/4 W.
R15	63-560	330 OHM 1/4 W.
R16	63-1097	870 OHM WIREWOUND 1 W.
L1	510857	WAVEMAGNET ASSEM.
L2	510884	DETECTOR COIL "
L3	510883	OSCILLATOR "
T1	95-804	INT. I.F. TRANSFORMER
T2	95-805	2ND I.F. "
SP1	49-312	5 1/4 P.M. SPEAKER
S1	85-311	CHANGEOVER SWITCH
W1	510862	WAVEMAGNET CABLE
W2	51019	BATTERY CABLE
B.P.	3-27	BATTERY PACK 2985

MODEL 6G001
CHASSIS No. 6C40

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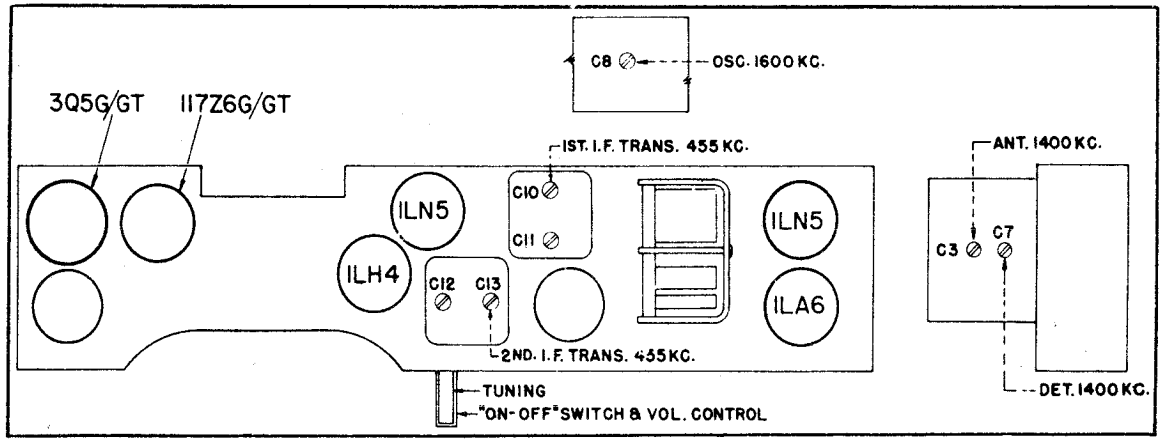
TO THE SERVICE MAN:

The 6C40 chassis is an AC, DC or battery operated superheterodyne circuit with a stage of RF amplification. The chassis is isolated from the DC circuit, and all measurements must be made from a common negative point. The most convenient place to reach this negative point is the terminal strip to which C5 is connected. The DC resistance from chassis to any circuit must be almost infinite. If any circuit becomes grounded a hum will appear. Microphonic tubes will cause audio howl. Check 1LA6.

The wavemagnet is connected to the chassis through the hinges in the cabinet, snaps and flexible leads. If the RF becomes weak or dead, check resistance of wavemagnet at condenser gang. The DC resistance across the two leads should be approximately 1 ohm. If the circuit is open, remove the two screws that hold the handle and top panel. When the top is removed, the wavemagnet connecting leads will be visible for inspection. Also loosen the snap-on socket and check for shorted or broken leads.



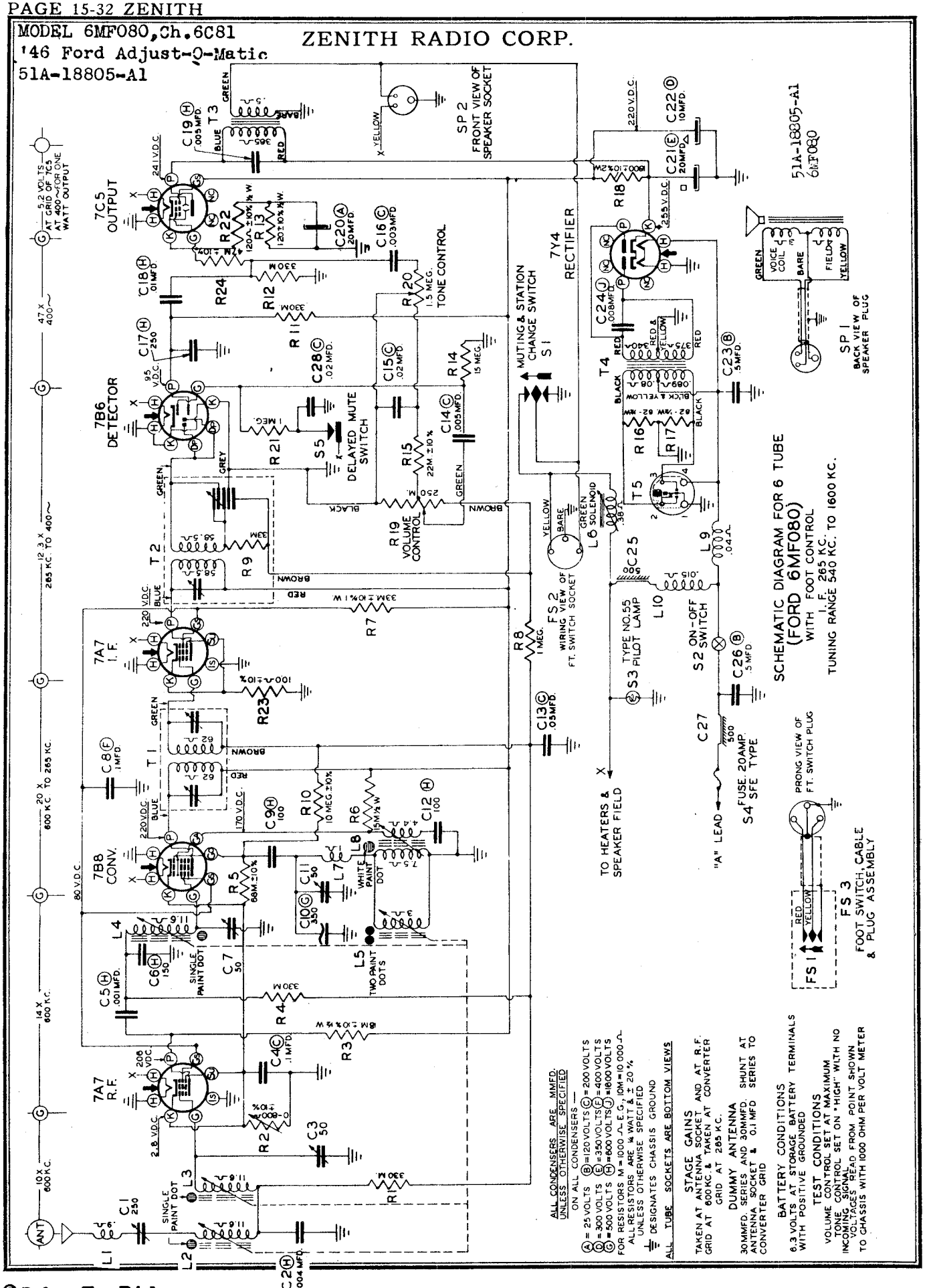
TUBE AND TRIMMER LOCATION

IF Alignment: Remove the chassis from the cabinet and arrange the units so that the wavemagnet can be plugged in. All the connections and adjustments can be made from the top of the chassis. Connect a signal generator, through a .1 mfd. dummy antenna, to the lug on top of the center section of the gang condenser (converter grid) and condenser gang frame. Connect an output meter across the voice coil of the speaker (two lugs provided). Set the signal generator to 455Kc. and adjust C10, C11, C12 and C13 for maximum indication on the output meter. Always keep the signal output from the generator just high enough to get an indication, otherwise excessive loading may result. Remove the signal generator leads from the gang.

RF Alignment: Connect a two turn loop across the leads of the signal generator, loosely couple this loop to the wavemagnet. Set the signal generator and the dial pointer of the receiver to 1600 Kc. and adjust C8 to resonance. Set the signal generator and dial pointer to 1400 and adjust C7 (detector) and C3 (RF) to resonance. These trimmers are on the side of gang condenser. Check operation and re-install set in cabinet. Tune in a weak station near 1400 Kc. or use background noise and readjust C3 through the hole in the side of the cabinet for maximum sensitivity.

ALIGNMENT PROCEDURE

Operation	Connect Osc. To	Dummy Antenna	Input Signal Frequency	Band	Set Dial To	Trimmers	Purpose
1	Converter Grid	.1 MFD	455KC	BC	600KC	C-10-11-12 13	IF alignment
2	Two turns loosely coupled to Wave Magnet		1600KC	BC	1600KC	C8	Set oscillator to scale
3	Two turns loosely coupled to Wave Magnet		1400KC	BC	1400KC	C7	Align Det.
4	Two turns loosely coupled to Wave Magnet		1400KC	BC	1400KC	C3	Align Wave magnet


MODEL 6MF080, Ch. 6C81
'46 Ford Adjust-O-Matic
51A-18805-A1
ZENITH RADIO CORP.
SCHEMATIC DIAGRAM FOR 6 TUBE
(FORD 6MF080)
WITH FOOT CONTROL
I. F. 265 K.C.
TUNING RANGE 540 KC. TO 1600 KC.
7C5 OUTPUT
7B6 DETECTOR
7A7 I.F.
7B8 CONV.
7A7 R.F.
7Y4 RECTIFIER
DELAYED MUTE SWITCH
MUTING & STATION CHANGE SWITCH
VOLUME CONTROL
TONE CONTROL
ON-OFF SWITCH
TYPE NO.55 PILOT LAMP
FUSE, 20AMP SFE TYPE
FOOT SWITCH, CABLE & PLUG ASSEMBLY
FRONT VIEW OF SPEAKER SOCKET
BACK VIEW OF SPEAKER PLUG
WIRING VIEW OF FT. SWITCH SOCKET
PRONG VIEW OF FT. SWITCH PLUG
TO HEATERS & SPEAKER FIELD
"A" LEAD
ALL CONDENSERS ARE MMFD. UNLESS OTHERWISE SPECIFIED
ON ALL CONDENSERS —
Ⓐ = 25 VOLTS Ⓑ = 120 VOLTS Ⓒ = 200 VOLTS
Ⓓ = 300 VOLTS Ⓔ = 350 VOLTS Ⓕ = 400 VOLTS
Ⓖ = 500 VOLTS Ⓗ = 600 VOLTS Ⓙ = 1600 VOLTS
FOR RESISTORS M = 1000 Ω, E.G., 10M = 10 000 Ω
ALL RESISTORS ARE ½ WATT ± 20 % UNLESS OTHERWISE SPECIFIED
DESIGNATES CHASSIS GROUND
ALL TUBE SOCKETS ARE BOTTOM VIEWS
STAGE GAINS
TAKEN AT ANTENNA SOCKET AND AT R.F. GRID AT 600 KC. & TAKEN AT CONVERTER GRID AT 265 K.C.
DUMMY ANTENNA
30MMFD. SERIES AND 30MMFD. SHUNT AT ANTENNA SOCKET & 0.1 MFD SERIES TO CONVERTER GRID
BATTERY CONDITIONS
6.3 VOLTS AT STORAGE BATTERY TERMINALS WITH POSITIVE GROUNDED
TEST CONDITIONS
VOLUME CONTROL SET AT MAXIMUM
TONE CONTROL SET ON "HIGH" WITH NO INCOMING SIGNAL
VOLTAGES READ FROM POINT SHOWN TO CHASSIS WITH 1000 OHM PER VOLT METER
51A-18805-A1
6MF080

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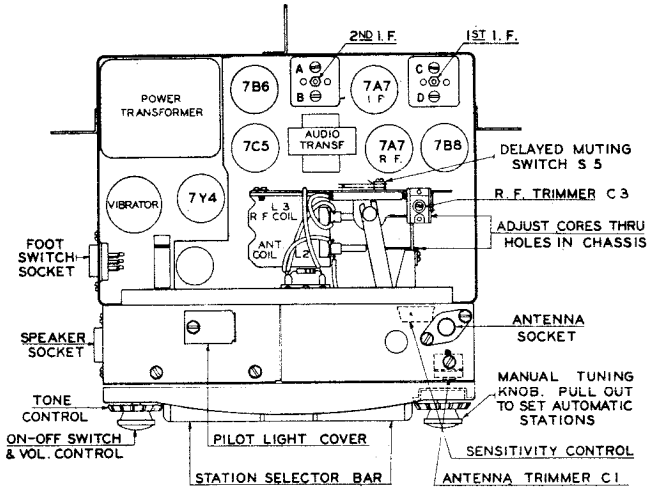

Fig. 7. Top View of Chassis

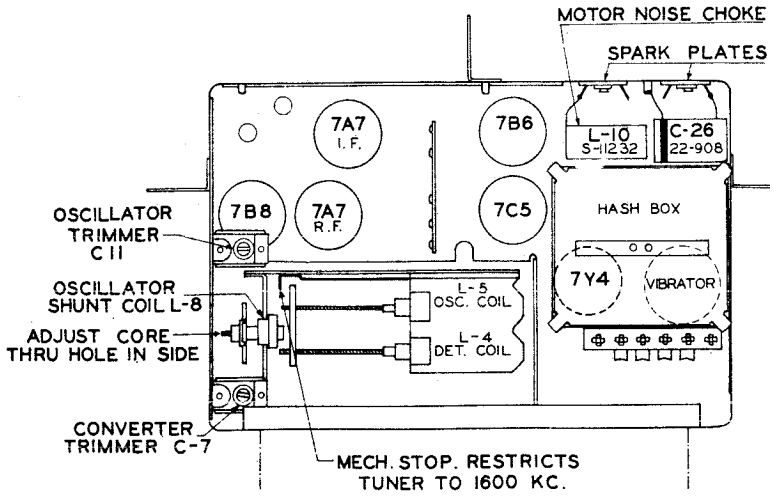

Fig. 8. Bottom View of Chassis

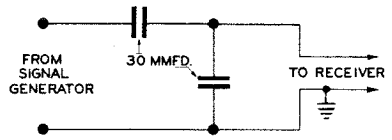

Fig. 9. Dummy Antenna

Fig. 9 shows the schematic of a recommended dummy antenna, closely resembling actual antenna capacity, to be used in series with signal generator leads when aligning the R.F. section of the receiver.

ALIGNMENT

Maximum performance depends on accurate alignment of the receiver; therefore follow these instructions carefully.

CAUTION: Make all alignment adjustments to the receiver with the volume control set at maximum, and the tone control in the treble position. Reduce the signal intensity as much as possible at the signal generator. Connect the output meter across the voice coil.

I.F. ALIGNMENT PROCEDURE

1—Remove top and bottom covers from receiver.

2—Set signal generator to 265 Kc.

3—Apply signal from generator through a .1 Mfd. dummy to 7B8 converter grid. (Pin No. 6 on socket.)

4—Adjust I.F. trimmers A, B, C and D (Fig. 7) in the order named for maximum output. Repeat the operation to assure accurate alignment.

R.F. AND OSCILLATOR ALIGNMENT

1—Connect signal generator leads through dummy, illustrated in Fig. 9, to antenna lead in socket on receiver.

2—Set signal generator to 535 Kc.

3—Place set in manual tuning position and set dial to 535 Kc.

4—Adjust oscillator trimmer C-11 (Fig. 8) for maximum response.

5—Set signal generator to 1200 Kc.

6—Tune set to 1200 Kc.

7—Adjust converter trimmer C-7 (Fig. 8) and R.F. trimmer C-3 (Fig. 7) for maximum response.

8—If dial calibration is off after making above adjustments, a correction can be made by loosening dial scale mounting screws and sliding scale to desired position.

CORE OR COIL REPLACEMENT ONLY

WARNING: The following adjustments are to be made ONLY if a core or coil is replaced.

1—Replace coil or core.

2—Set signal generator to 1700 Kc.

3—Connect signal generator leads through dummy, illustrated in Figure 9, to antenna receptacle on the receiver.

4—Set receiver dial to 1600 Kc. (maximum high frequency end of dial.)

5—Screw the core completely out of the antenna coil, the R.F. coil, the converter coil, and the oscillator coil.

6—Adjust oscillator trimmer C-11 (Fig. 8) at 1700 Kc.

7—Adjust converter trimmer C-7, R.F. trimmer C-3, and antenna trimmer C-1 (Fig. 7 and 8) for maximum output reading.

8—Replace cores to their approximate original position.

9—Set generator dial and receiver dial to 1200 Kc.

10—Adjust oscillator core L-5 (Fig. 8) to scale at 1200 Kc.

11—Adjust the antenna core, R.F. core, and converter core (Fig. 7 and 8) for maximum output reading.

12—Set signal generator to 600 Kc.

3—"Rock in" shunt oscillator coil L-8 (Fig. 8) for maximum output reading. This should be done only as a last resort. This is the same as rocking in the padder condenser on a ganged condenser receiver.

14—Check receiver at 1200 Kc. for calibration and gain. If the receiver is off scale or weak, repeat operations 9, 10 and 11.

15—After alignment is complete, the maximum high frequency tuning range should be checked. If the range is greater or less than 1605 Kc., the mechanical stop for the tuner cross arm should be bent to limit the frequency coverage to 1605 Kc.

After all adjustments have been made, glue core screws with speaker cement.

IMPORTANT: After reinstalling the receiver in the car, allow it to operate for approximately 15 minutes to reach normal operating temperature. Extend antenna to maximum. Check the antenna trimmer alignment on a weak station at approximately 1200 Kc.

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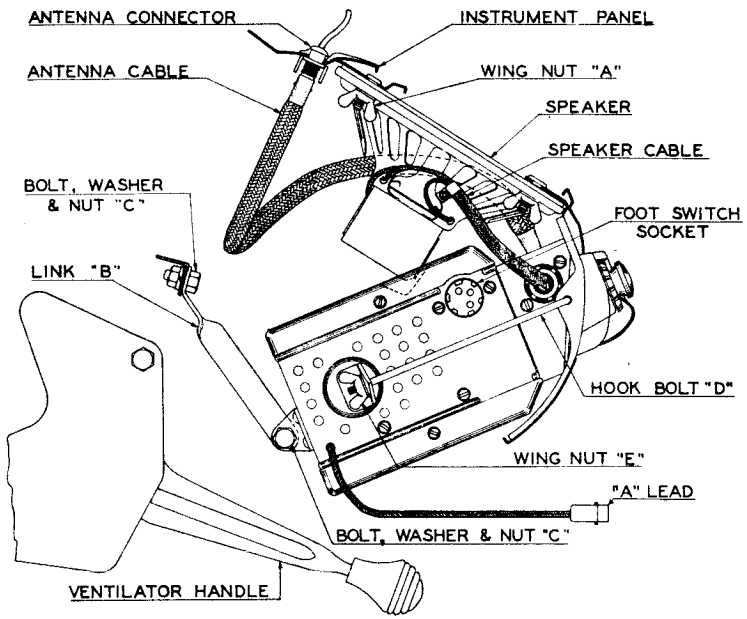

Fig. 1. Set Installed, Cut Away View.

RECEIVER INSTALLATION

Figures 1 and 2, illustrating the installed receiver, the escutcheon plate, and the control knobs, are given here to facilitate removal and reinstallation of this receiver when service or repair is necessary. To take the receiver from the car, remove the link "B" and loosen the hook bolts "D."

MANUAL TUNING

1. Press station selector touch bar (Fig. 2) several times or until the letter "M" appears in indicator window.
2. Pull manual tuning control knob (right hand) outward and turn to tune in desired station. Be sure to tune to exact frequency to assure the best tone quality.

VOLUME—Adjust left hand control knob for desired volume.

TONE CONTROL—The tone control is located behind the volume control knob. Turn in either direction for most pleasing tone.

ADJUST-O-MATIC TUNING

There are five automatic tuning positions which may be adjusted to five desired stations. If these positions have not been previously adjusted proceed as follows:

1. Press station selector touch bar until number 1 appears in station indicator window.

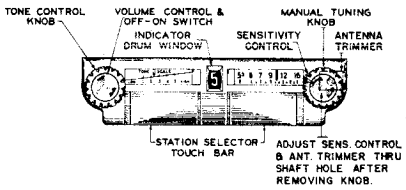
TONE CONTROL KNOB
VOLUME CONTROL & OFF-ON SWITCH
INDICATOR DRUM WINDOW
MANUAL TUNING KNOB
SENSITIVITY CONTROL
ANTENNA TRIMMER
STATION SELECTOR TOUCH BAR
ADJUST SENS. CONTROL & ANT. TRIMMER THRU SHAFT HOLE AFTER REMOVING KNOB.

Fig. 2. Front Panel View

2. Pull manual tuning knob outward to engage the adjust-o-matic mechanism.
3. Select the station desired and tune to its frequency by turning the tuning knob. Tune very carefully for clearest reception.
4. Press station selector bar, pull manual tuning knob outward and tune in station desired for No. 2 position. Use same procedure for positions No. 3, 4 and 5.

When the five adjust-o-matic positions have been adjusted to the five desired stations as instructed, it is only necessary to press the station selector bar to return to dial tuning, or to only one of the stations set up on the Adjust-o-Matic.

DELAYED AUTOMATIC MUTING CIRCUIT

Pressing either the touch-bar or the foot control switch automatically mutes the receiver for the duration of the change cycle. This action is accomplished by applying 6 volts negative to the 7B6 first audio grid through the 1 megohm resistor R-21. (See schematic diagram.) This negative voltage blocks the grid of the 7B6 until the voltage bleeds off through the 15 megohm resistor R-14. Then the receiver will again operate normally.

NOTE: If the battery polarity is reversed the receiver will not mute and it may become distorted during the change cycle. Always connect the positive (+) terminal of the storage battery or power supply to the receiver case when checking the receiver.

INTERFERENCE SUPPRESSION

There should be no motor noise or interference from the ignition system if the receiver has been installed in the car according to the instructions furnished with it. The interference suppression equipment may be checked for proper installation by referring to the following illustrations:

The circuit breaker condenser No. 22-1148 should be installed as shown in Figure 3.

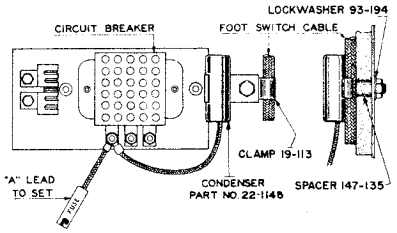

Fig. 3

The voltage regulator condenser No. 22-1148 and the ground strap should be installed as shown in Figure 4 below.

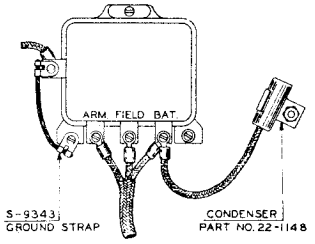

Fig. 4

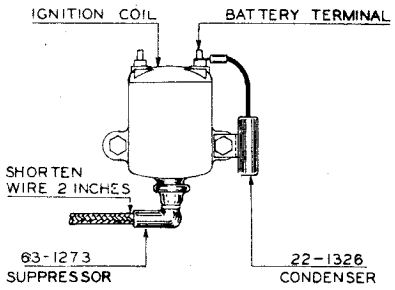

Fig. 5

The ignition coil condenser No. 22-1326 and suppressor with rubber nipple No. S-10408 should be installed as shown above in Figure 5. The oil gauge condenser No. 22-1326 should be installed as shown in Figure 6. Note the different locations for 6 and 8 cylinder cars.

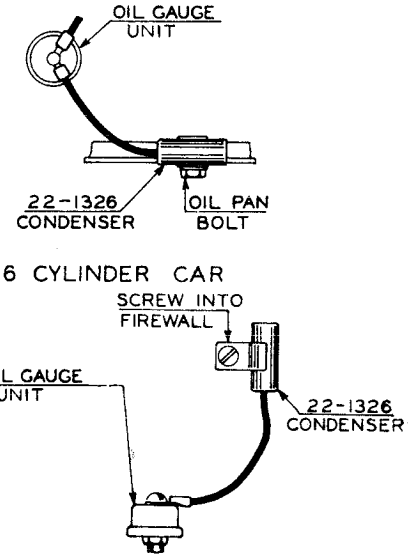

Fig. 6

Be sure the inside windshield divider trim strip, the antenna connector and all the instrument panel bolts are tight in order to make a good ground contact with the car body.

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PARTS LIST MODEL 6MF080 (CHASSIS 6C81)

1946 FORD ADJUST-O-MATIC 51A-18805-A1

COILS AND CHOKES

Diagram No.	Part No.	Description
L 9	20-213	Main hash choke
T 1	95-916	1st I.F. transformer
T 2	95-942	2nd I.F. transformer
L 1	S8819	Antenna motor noise choke assem.
L 7	S11229	Oscillator series coil assem.
L 8	S11231	Oscillator shunt coil assem.
L10	S11232	Motor noise choke coil assem.
L 5	S12053*	Oscillator tuning coil assem.
L 2	S12060*	Antenna tuning coil assem.
L 3	S12060*	R.F. tuning coil assem.
L 4	S12060*	Converter tuning coil assem.

Note: In ordering coils marked *, be sure to give color code information.

CONDENSERS

C 9, C12	22-162	100 mmfd.	600 volt
C 8	22-170	.1 mfd.	400 volt
C17	22-182	250 mmfd.	600 volt
C 4	22-190	.1 mfd.	200 volt
C13	22-250	.05 mfd.	200 volt
C19	22-838	.005 mfd.	600 volt
C14	22-906	.005 mfd.	200 volt
C23, C26	22-908	.5 mfd.	120 volt
C 6	22-1137	150 mmfd.	600 volt
C 5	22-1169	.001 mfd.	600 volt
C18	22-1170	.01 mfd.	600 volt
C16	22-1180	.003 mfd.	200 volt
C 2	22-1244	.004 mfd.	600 volt
C15, C28	22-1270	.02 mfd.	200 volt
C 1	22-1375	Antenna trimmer	
C 3	22-1376	R.F. trimmer	
C 7	22-1377	Detector trimmer	
C11	22-1378	Oscillator trimmer	
C20	22-1387	20 MFD. 25 W.V. Electrolytic	
C21		20 MFD. 350 W.V. Electrolytic	
C22		10 MFD. 300 W.V. Electrolytic	
C24	22-1448	.008 mfd.	1600 volt
C10	22-1478	350 mmfd. compensator	

RESISTORS

Diagram No.	Part No.	Description	
R19, R20, S 2	63-1333	Tone control, vol. control & sw.	
R16	63-1368	1800 ohm 2 watt W.W.	
R 2	63-1379	Sensitivity control	
R 8, R21	63-1390	1 megohm	¼ watt
R 1, R 4, R11, R12	63-1392	330 M ohm	¼ watt
R15	63-1395	22 M ohm	¼ watt
R 5	63-1396	68 M ohm	¼ watt
R 7	63-1398	33 M ohm	1 watt
R16, R17	63-1399	82 ohm	½ watt
R14	63-1400	15 megohm	¼ watt
R 6	63-1401	15 M ohm	½ watt
R22, R13	63-1410	120 ohm	½ watt
R 3	63-1411	1800 ohm	½ watt
R10	63-1413	10 meg.	¼ watt
R23	63-1414	100 ohm	¼ watt
R24	63-1417	47,000 ohm	¼ watt

MISCELLANEOUS

SP1	49-539	6" x 9" dynamic speaker
	52-200	Battery cable (fuse to ammeter)
	52-251	Antenna cable
	52-284	Battery cable (set to fuse)
	78-251	Antenna connector socket
	78-281	Vibrator socket
	78-596	Tube socket—Loktal base (8 cont.)
SP2	78-645	Speaker plug socket
FS2	78-646	Foot switch cable plug socket
	93-456	Vibrator cushion washer
T4	95-914	Power transformer
T3	95-915	Output transformer
S4	136-12	Fuse—20 amp.
	159-54	Plug button
T5	190-20	Vibrator
	196-54	Speaker gasket and screen
	202-374	Instruction book
S1	S11270	Hand selector & muting switch assem.
FS3	S12040	Foot switch, cable & plug assem.
	208-539	Cone and voice coil assembly

DIAL AND TUNING MECHANISM ASSEMBLY

	26-330	Dial scale (manual tuning)
	34-132	Indexing disc
	34-133	Ratchet gear
	34-140	Volume control gear
	34-141	Idler gear
	46-524	Tone control knob
	46-527	Volume control knob
	46-528	Selector knob—L.H.
	46-583	Selector knob—R.H.
	57-1029	Escutcheon
	59-151	Dial pointer
	59-169	Tone control pointer
	73-02	No. 6-32 x 3/16 headless set screw
	80-232	Knob retaining spring
	80-329	Gear indexing spring
	80-331	Cross arm return spring
	80-332	Cam lever spring
	80-336	Ratchet gear return spring

Note: When ordering cone and voice coil assembly marked*, be sure to give manufacturer's code letter that follows base number printed on cone.

DIAL AND TUNING MECHANISM ASSEMBLY (Continued)

Diagram No.	Part No.	Description
	80-341	Kick-off spring
	80-342	Tuning shaft spring
	80-343	Solenoid switch spring
	80-344	Solenoid switch contact spring
	80-378	Selector knob spring
	80-379	Pointer return spring
	80-426	Pointer drive tension spring
	80-442	Selector knob spring
S3	100-31	Dial light bulb
	126-481	Dial glass shield
	149-44*	Adjusting spring and core
	188-45	Turret screw lock ring
	192-82	Dial glass (2 used)
	S10826	Solenoid end plug & bracket assem.
L6	S10829	Solenoid and terminal assem.
	S10831	Ratchet and bracket assem.
	S10834	Mounting plate & lever assem.
	S10836	Cross arm assem.
	S11031	Dial drum and bracket assem.
	S11033	Tuning & trim knob assem. (46-525 & 526)
	S11051	Tuning shaft and gear assem.
	S11082	Turret assem.
	S11971	Dial light socket & wire assem.
	S11972	Selector knobs, housing & clamp assem.
	S12050	Tone control dial & pulley assem. (26-351)
	S12120	Dial cord and eyelet assem.

Note: In ordering adjusting spring and core marked *, be sure to give color code information.

MOTOR NOISE SUPPRESSION KIT

Diagram No.	Part No.	Description
	S11278	Motor noise suppression kit complete
	22-1148	Voltage regulater & circuit breaker condenser
	22-1326	Distributor & oil gauge condenser
	54-68	5/16 - 18 x 9/16 x 7/32 hex nut
	63-1273	Distributor suppressor
	93-194	5/16 internal shakeproof lockwasher
	112-323	No. 12 x ½ R.H. S.T. screw
	114-249	5/16 x 18 x 1¾ hex Hd. M.S.
	147-135	Spacer

INSTALLATION PARTS

	S11279	Set installation kit complete
	19-112	Foot switch cable retaining clip
	19-114	Foot switch cable retaining clip
	54-123	No. 10-24 wing nut
	54-157	¼-20 x 7/16 x 3/32 hex nut
	54-189	No. 8-32 wing nut
	93-43	Ground strap
	93-161	¼" ext. shakeproof lockwasher
	112-310	No. 10 x ½ R.H. S.M. screw
	112-360	Set installation screw
	114-175	¼-20 x ½ hex. Hd. M.S.
	118-30	Set installation link used on first 1500 sets only
	118-36	Set installation link

TUNING RANGE: ..... 540-1600 Kc

INTERMEDIATE FREQUENCY: ..... 265 Kc

SENSITIVITY: ..... 6 microvolts at one watt output.

UNDISTORTED POWER OUTPUT: ..... 2.5 watts measured at the voice coil.

MAXIMUM POWER OUTPUT: ..... 4.5 watts measured at the voice coil.

SPEAKER: ..... 6" x 9" oval, instrument panel mounting.

CURRENT CONSUMPTION: ..... 7.5 amperes

INSTANTANEOUS CURRENT COMSUMPTION DURING AUTOMATIC CHANGE CYCLE: ..... 20 amperes

TUBE COMPLEMENT: ..... 7A7 R.F., 7B8 converter, 7A7 I.F., 7B6 detector and 1st audio, 7C5 power output, 7Y4 rectifier.

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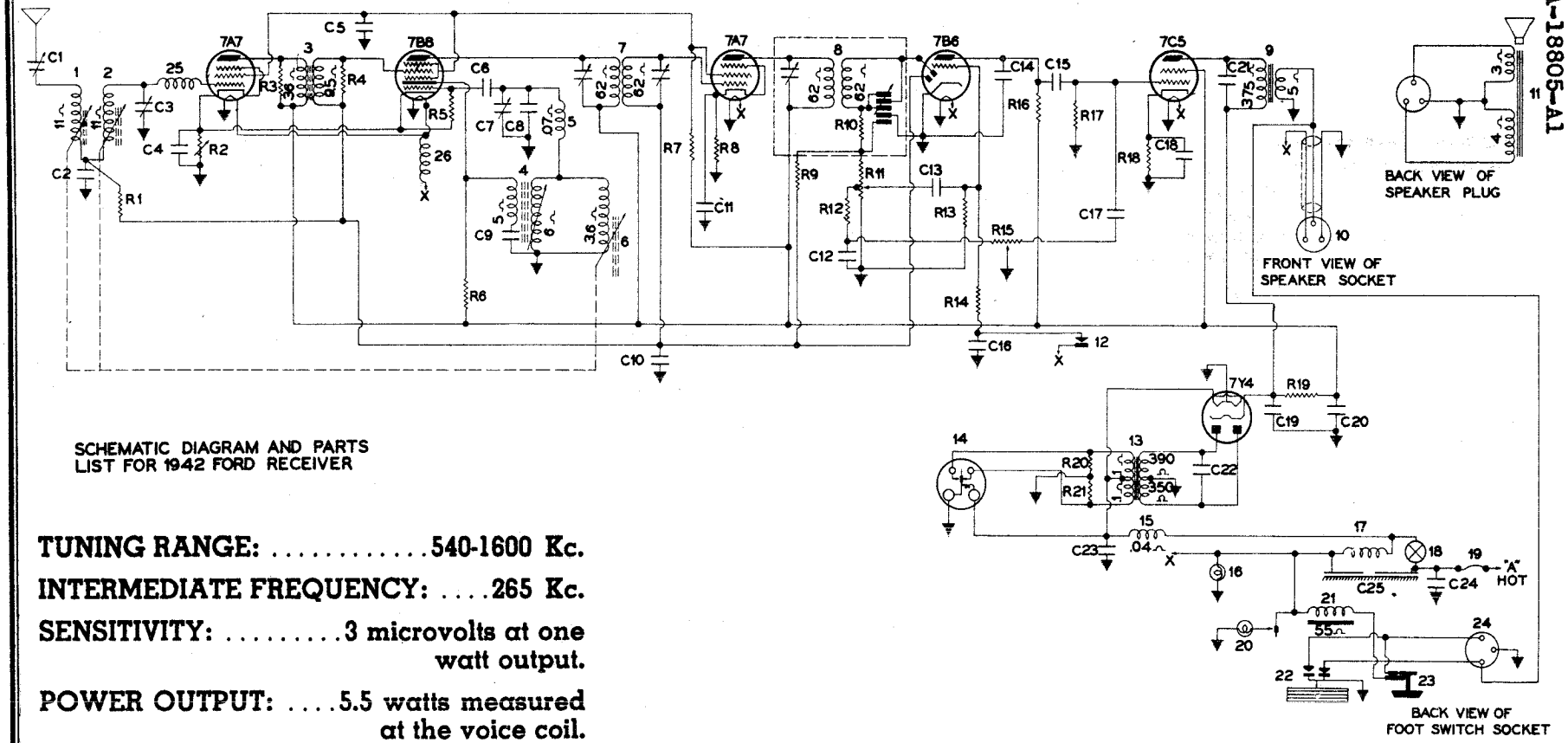

SCHEMATIC DIAGRAM AND PARTS LIST FOR 1942 FORD RECEIVER

TUNING RANGE: .....540-1600 Kc.

INTERMEDIATE FREQUENCY: ....265 Kc.

SENSITIVITY: .....3 microvolts at one watt output.

POWER OUTPUT: ....5.5 watts measured at the voice coil.

SPEAKER: .....6" x 9" oval, instrument panel mounting.

CURRENT CONSUMPTION: ..7.5 amperes

INSTANTANEOUS CURRENT CONSUMPTION DURING AUTOMATIC CHANGE CYCLE: .....16.5 amperes

TUBE COMPLEMENT: .....7A7 R.F., 7B8 converter, 7A7 I.F., 7B6 Detector and 1st Audio, 7C5 Power Output, 7Y4 Rectifier.

DIAG. NO.	PART NO.	CONDENSERS
C1	22-1277	ANT. TRIM. 6 PLATE 250MMF
2	22-1244	.004 MFD. ± 10% MICA
3	22-1236	R.F. TRIM. 3 PLATE 50MMF
4	22-190	.1 MFD. +50% -10% 200V
5	22-170	.1 MFD. +50% -10% 400V
6	22-162	100MMF +50% 20% MICA
7	22-1235	OSC. TRIM. 2 PLATE 50MMF
8	22-1248	350MMF 2½% COMPENSATOR
9	22-162	100MMF +50% 20% MICA
10	22-250	.05 MFD. +50% -10% 200V
11	22-250	.05 MFD. +50% -10% 200V
12	22-1270	.02 MFD. +20% -10% 200V
13	22-906	.005 MFD. +20% -10% 200V
14	22-182	250MMF +50% -10% MICA
15	22-1170	.01 MFD. +50% -10% 600V
16	22-1270	.02 MFD. +20% -10% 200V
17	22-1180	.003 MFD. +20% -10% 200V
18		20 MFD. 25WV
19	22-1305	20 MFD. 350WV
20		.10 MFD. 300WV
21	22-912	.002 MFD. +50% -10% 600V
22	22-1247	.008 MFD. +20% -10% 1600V
23	22-1238	5 MFD. +50% -10% 120V
24	22-908	5 MFD. +50% -10% 120V
25	22-1076	LOW REACTOR DUAL 250MMF

DIAG. NO.	PART NO.	RESISTORS
R1	63-718	330000 OHMS 1/4W ±20%
2	63-1267	SENSITIVITY CONTROL
3	63-644	22000 OHMS 1/4W ±10%
4	63-646	33000 OHMS 1/4W ±10%
5	63-594	68000 OHMS 1/4W ±10%
6	63-1180	15000 OHMS 1/2W 20%
7	63-957	33000 OHMS 1W ±10%
8	63-294	100 OHMS 1/4W ±20%
9	63-271	1 MEG. 1/4W ±20%
10	63-721	33000 OHMS 1/4W ±20%
11	63-1258	250000Ω C. TAP AT 75000Ω
12	63-763	22000 OHMS 1/4W ±10%
13	63-976	15 MEG. 1/4W ±20%
14	63-271	1 MEG. 1/4W ±20%
15	63-1258	1 MEG. TONE CONTROL
16	63-596	330000 OHMS 1/4W ±20%
17	63-596	330000 OHMS 1/4W ±20%
18	63-1203	270 OHMS 1W ±10%
19	63-1170	1500 OHMS 2W ±10%
20	63-1197	82 OHMS 1/2W ±20%
21	63-1197	82 OHMS 1/2W ±20%

DIAG. NO.	PART NO.	MISCELLANEOUS
1	S-10064	ANTENNA COIL
2	S-10064	R.F. COIL
3	S-9763	UNTUNED R.F. TRANSFORMER
4	S-10095	OSC. SHUNT COIL
5	20-242	OSC. SERIES COIL
6	S-10063	OSC. TUNING COIL
7	95-819	1st I.F. TRANSFORMER
8	95-820	DIODE TRANSFORMER
9	95-887	OUTPUT TRANSFORMER
10	52-241	SPEAKER CABLE & SOCKET
11	49-491	SPEAKER & PLUG
12		DELAYED MUTING SWITCH
13	95-880	VIBRATOR POWER TRANSFORMER
14	190-19	VIBRATOR
15	20-213	HASH CHOKE
16	100-31	PILOT LIGHT "55"
17	S-10393	MOTOR NOISE CHOKE
18	63-1258	ON-OFF SWITCH ON VOL. CONTROL
19	136-12	FUSE - 20 AMPS.
20	100-36	MANUAL DIAL LIGHT "44"
21	S-10127	SOLENOID
22	85-308	HAND SELECTOR & MUTING SWITCH
23	S-10411	SAFETY SWITCH & AUTOMATIC SETUP
24	78-406	FOOT SWITCH SOCKET
25	S-8819	ANT. MOTOR NOISE CHOKE
26	S-9841	HEATER LINE CHOKE

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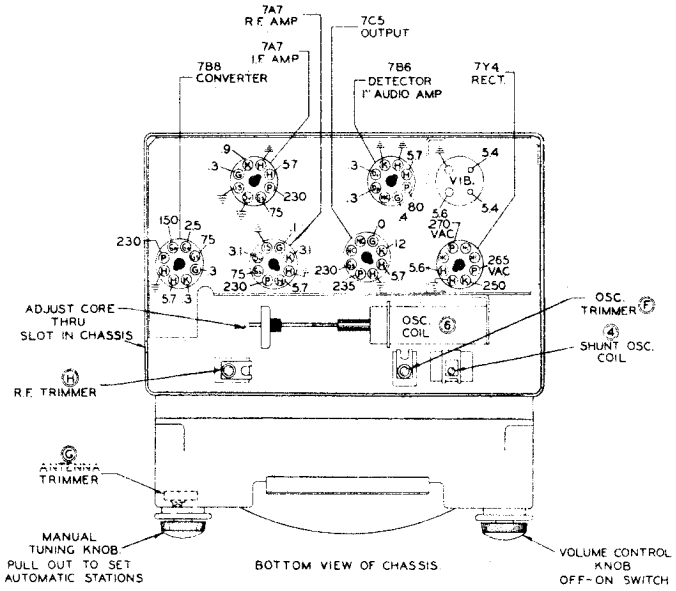

FIG. 8

Figure 8 shows the approximate voltages as measured with a 1000 ohm per volt meter measured between the socket terminals and the chassis. Volume control set at maximum with no signal. Battery Voltage—6.3.

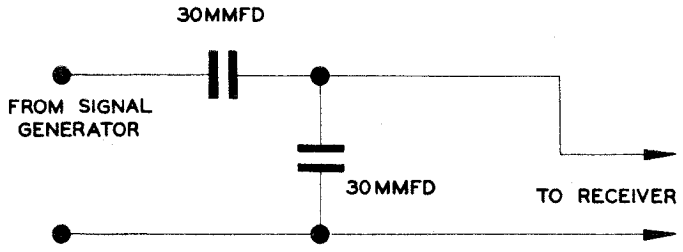

FIG. 9

Schematic of a recommended dummy antenna, closely resembling actual antenna capacity, to be used in series with signal generator leads when aligning the R. F. section of the receiver.

IMPORTANT: When reinstalling the receiver in the car, allow it to operate for approximately 15 minutes to reach normal operating temperature before checking the antenna trimmer alignment on a weak station at approximately 1200 Kc.

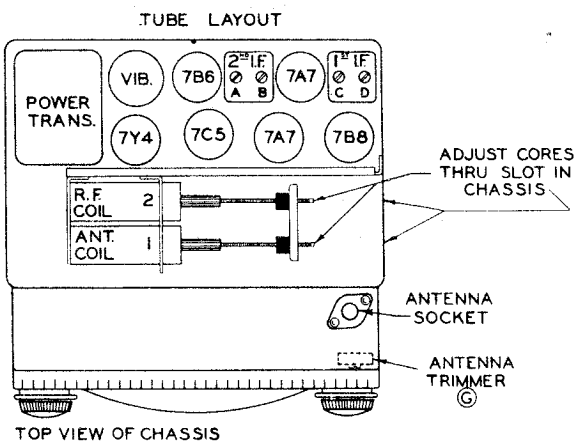

FIG. 7

Maximum performance is dependent upon the accurate alignment of the receiver, so follow the alignment instructions carefully.

CAUTION: Make all alignment adjustments to the receiver with the volume control turned full on. Reduce the signal intensity, if necessary, at the signal generator. Connect the output meter across the voice coil

I.F. ALIGNMENT PROCEDURE

1—Remove the top and bottom covers from the receiver.

2—Place the receiver in the Manual tuning position and set the pointer at the low frequency end of the dial. (540 Kc.)

3—Set the signal generator at 265 Kc.

4—Apply the signal from the generator through a .1 mfd. dummy to the 7B8 converter grid.

5—Adjust trimmers A-B-C and D (Fig. 7) for maximum output. Repeat the operation to assure accurate alignment.

R. F. AND OSCILLATOR ALIGNMENT

1—Set the signal generator at 1640 Kc.

2—Connect the signal generator leads, through the dummy as illustrated in Figure 9, to the antenna receptacle on the receiver.

3—Set the receiver dial at 1640 Kc. (Maximum high frequency end of dial.)

4—Screw the cores completely out of the antenna, R.F. and oscillator coils.

5—Set the oscillator trimmer (F—Fig. 8) at 1640 Kc.

6—Peak the R.F. and antenna trimmers (G and H—Fig. 8) for maximum output reading.

7—Replace the cores to their approximate original positions in the antenna, R.F. and oscillator coils.

8—Set the generator and the receiver dial at 1200 Kc.

9—Adjust the oscillator core (6—Fig. 8) to scale at 1200 Kc.

10—Adjust the antenna and R.F. cores (1 and 2—Fig. 7) for maximum output reading.

11—Set the signal generator at 600 Kc.

12—"Rock in" the Shunt oscillator core (4—Fig. 8) for maximum output reading. (Same as rocking in the padder condenser on a ganged condenser receiver.)

13—Check the receiver at 1200 Kc. for calibration and gain. If the receiver is off scale or weak, repeat operations 9 and 10.

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RECEIVER INSTALLATION:

Figures 1 and 2, illustrating the escutcheon plate, control knobs and the installed receiver are given here to facilitate removal and reinstallation of the receiver when service or repairs are necessary.

Remove the Link "B" and loosen the hook bolts "D" to remove the receiver from the car.

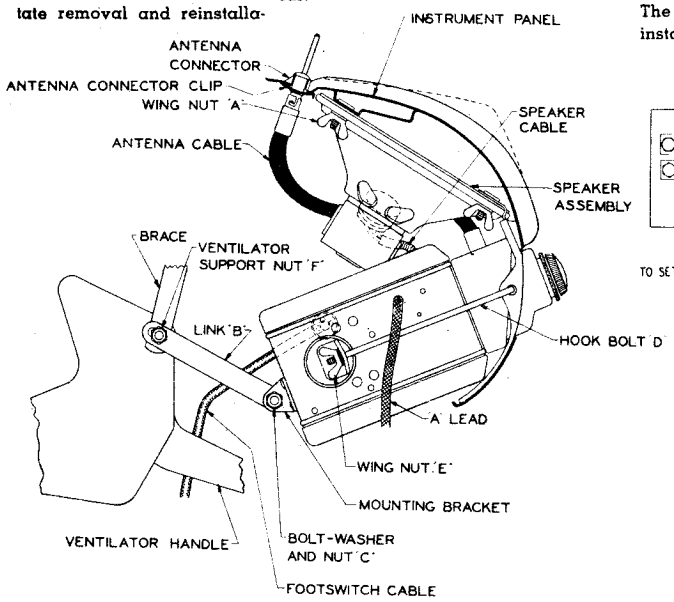

FIG. 1

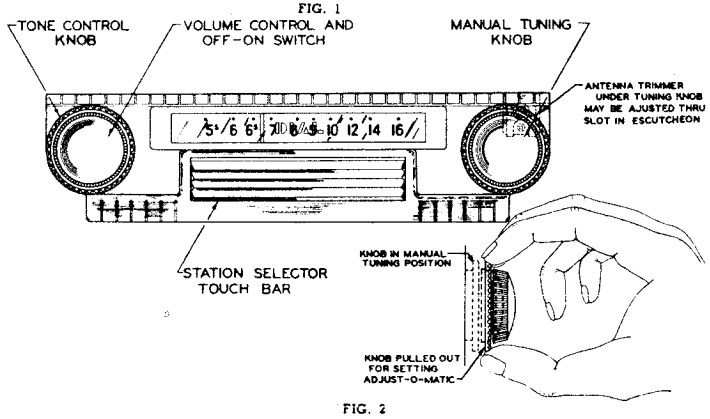
TONE CONTROL KNOB
VOLUME CONTROL AND OFF-ON SWITCH
MANUAL TUNING KNOB
ANTENNA TRIMMER UNDER TUNING KNOB MAY BE AJUSTED THRU SLOT IN ESCUTCHEON
STATION SELECTOR TOUCH BAR
KNOB IN MANUAL TUNING POSITION
KNOB PULLED OUT FOR SETTING ADJUST-O-MATIC

FIG. 2

INTERFERENCE SUPPRESSION

There should be no motornoise or interferences from the ignition circuit, if the receiver has been installed in the car according to the instructions furnished with it. The interference suppression equipment may be checked for proper installation by referring to the following illustrations:

The circuit breaker condenser No. 22-1148 should be installed as shown in Figure 3.

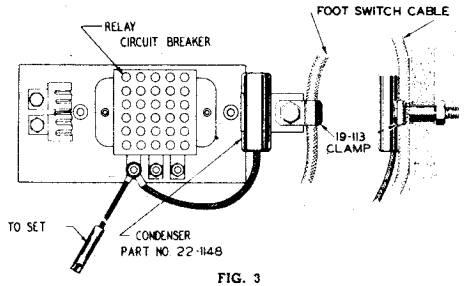

FIG. 3

NOTE: To set up a station on any automatic position, pull the tuning knob out and tune the receiver as in manual tuning. Press the tuning knob in to its original position after the station has been accurately tuned in.

The voltage regulator condenser No. 22-1148 and the ground strap No. S-9343 should be installed as shown in Figure 4 below.

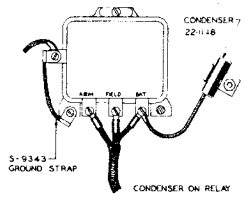

FIG. 4

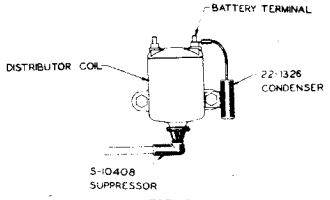

FIG. 5

The distributor primary condenser No. 22-1326 and suppressor with rubber nipple No. S-10408 should be installed as shown above in Figure 5.

The oil gauge condenser No. 22-1326 should be installed as shown in Figure 6.

Note the different locations for 6 and 8 cylinder cars.

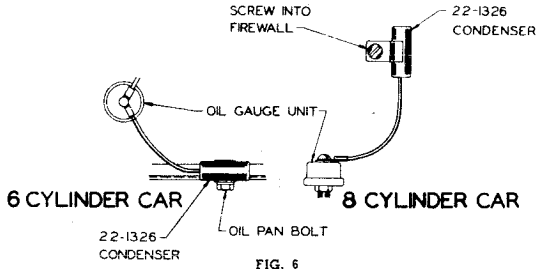

FIG. 6

Check the inside windshield divider trim strip, the antenna connector, and all the instrument panel bolts so they make a good ground contact with the body.

DELAYED AUTOMATIC MUTING CIRCUIT

Pressing either the Touch-bar or the foot control switch automatically mutes the receiver for the duration of the change cycle. This action is accomplished by applying 6 volts negative to the 7B6 first audio grid through the 1 megohm resistor R-14. (See schematic diagram.) This negative voltage blocks the grid of the 7B6 until the voltage bleeds off through the 15 megohm resistor R-13, when the receiver will again operate normally. NOTE: The storage battery in the car must be properly polarized to apply the negative muting voltage to the receiver. If the battery polarity is reversed the receiver will not mute and it may become distorted during the change cycle. Always connect the positive (+) terminal of the storage battery or power supply to the receiver case when checking the receiver.

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DIAL AND TUNING MECHANISM

12-894	Rear magnet mounting bracket	$ .15
19-127	Dial scale mounting clip	.01
26-313	Dial scale	.90
34-106	Ratchet	.25
46-470	Station selector bar	.15
46-472	Tone control knob	.15
46-474	Volume control knob	.10
57-962	Escutcheon plate	1.35
80-232	Knob retaining spring	.01
80-272	Ratchet lever spring	.02
80-274	Tuning coil return spring	.05
80-300	Gear indexing spring	.03
83-998	Light beam conductor strip	.70
85-308	Station selector switch	.60
100-31	Dial light bulb	.07
100-36	Dial light bulb (manual)	.09
114-102	No. 6 x 3/8" Hex acorn Hd. S.T. screw (escutcheon mounting)	.50C
114-174	No. 4/40 x 1/4" Hex Hd. S.H. screw (dial scale mounting)	.50C
126-433	Manual dial light shield	.01
147-118	Manual automatic bakelite breaker collar	.04
188-34	Tuning shaft retaining ring	.01
188-39	Turret screw lock ring	.02
188-43	Retaining ring (dial pointer)	.01
S10110	Front magnet mounting bracket & detent lever spring assembly	.20
S10120	Tuning adjustment screw & grommet assembly	.40
S10127	Magnet coil & terminal assembly	1.00
S10149	Tuning control shaft & gear assembly	.30
S10394	Tuning & trim knob assembly (46-471 & 46-473)	.65
S10409	Ratchet drive lever & spring assembly	.35
S10411	Manual automatic selector switch assembly	.25
S10412	Tuning drive bushing & bracket assembly	.40
S10415	Turret shaft, screw & stop assembly	2.00
S10418	Cross arm, magnet core, pointer drive bracket & stud assembly	.65
S10426	Manual dial light socket & wire assembly	.40
S10427	Light switch, bracket & stud assembly	.25
S10430	Dial pointer & tip assembly	.75
S10433	Dial scale background plate, shield & strip assembly	.40
S10584	Dial light socket & wire assembly	.35
S10657	Selector bar retaining plate & spring assembly	.25

RESISTORS

63-271	1 megohm 1/4 watt	.07
63-294	100 ohm 1/4 watt	.07
63-594	68M ohm 1/4 watt	.07
63-596	330M ohm 1/4 watt	.07
63-644	22M ohm 1/4 watt	.07
63-646	33M ohm 1/4 watt	.07
63-718	330M ohm 1/4 watt insulated	.15
63-763	22M ohm 1/4 watt insulated	.15
63-957	33M ohm 1 watt insulated	.20
63-976	15 megohm 1/4 watt	.07
63-1170	1500 ohm W.W. 2 watt insulated	.30
63-1180	15M ohm 1/2 watt insulated	.17
63-1197	82 ohm 1/2 watt	.08
63-1203	270 ohm W.W. 1 watt insulated	.20
63-1258	Tone control, volume control & switch	2.50
63-1267	Sensitivity control	.30
S10408	Distributor suppressor assembly (63-1271)	.50

MISCELLANEOUS

49-491	Dynamic speaker (6" x 9" oval)	5.00
	207-491 Field coil (not replaceable)	
	208-491 Cone & voice coil assembly	2.00
52-200	Battery cable—fuse to ammeter	.20
52-202	Battery cable—set to fuse	.15
52-241	Speaker cable & plug	.40
52-251	Antenna cable	1.00
78-251	Socket—antenna connector	.10
78-406	Socket—foot switch	.10
78-454	Socket—loktal tube (8 contact)	.15
78-455	Socket—loktal tube (6 contact)	.15
78-467	Socket—loktal tube (5 contact)	.15
78-477	Socket—vibrator	.10
80-291	Muting switch spring	.03
83-1002	Sponge rubber strip (on top cover)	.03
95-880	Power transformer	4.25
95-887	Output transformer	1.25
114-63	No. 6 32 x 3 16" Hex acorn Hd. M.S.-N.P.	.25C
114-118	No. 6 x 3/16" Hex acorn Hd. S.T. screw (statuary bronze)	.45C
114-150	No. 6/32 x 5 32" Hex acorn Hd. MS.	.35C
126-421	Tube shield	.10
136-12	Fuse—20 ampere	.10
190-19	Vibrator	2.95
196-54	Speaker gasket & screen	.65
202-321	Instruction book	.05
S10317	Foot control switch & cable assembly	2.00

All Prices List—Subject to Regular Discount and Change Without Notice—9 15 41.

COILS AND CHOKES

20-213	Main hash choke coil	.25
20-242	Oscillator series coil	.20
95-819	1st I.F. transformer	1.10
95-820	2nd I.F. transformer	1.10
S8819	Antenna motor noise choke assembly	.20
S9762	Untuned R.F. coil & core assembly	.50
S9841	Heater line choke assembly	.20
S10063	Oscillator coil & shield assembly	1.10
S10064	R.F. coil & shield assembly	1.40
S10095	Oscillator shunt coil assembly	.60
S10393	Motor noise choke coil assembly	.15

CONDENSERS

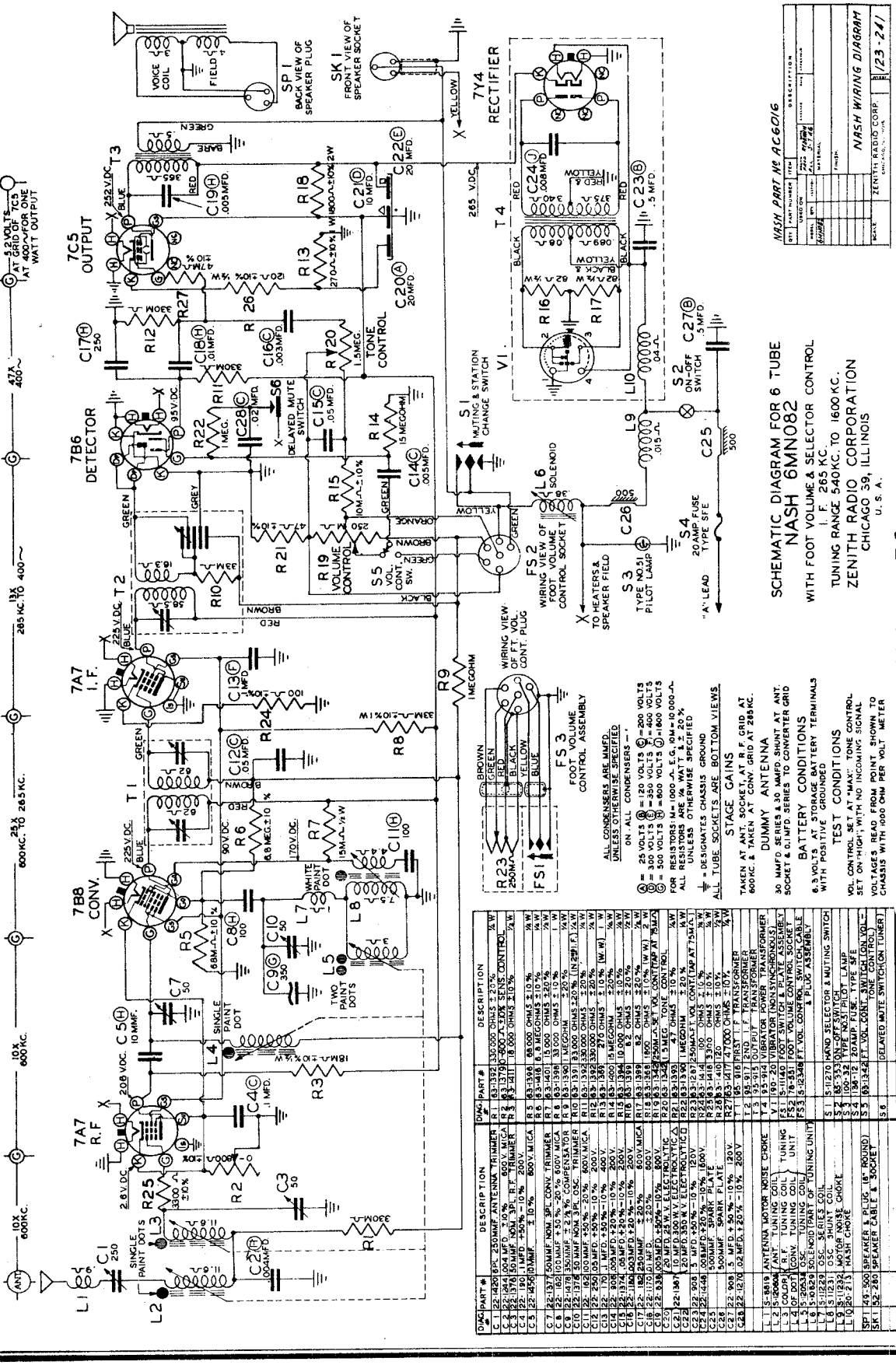
22-162	.0001 mfd. 600 volt	.15
22-170	.1 mfd. 400 volt	.20
22-182	.00025 mfd. 600 volt	.20
22-190	.1 mfd. 200 volt	.18
22-250	.05 mfd. 200 volt	.15
22-906	.005 mfd. 200 volt	.15
22-908	.5 mfd. 120 volt	.25
22-912	.002 mfd. 600 volt	.15
22-1076	Dual spark plate condenser	.20
22-1148	Voltage regulator & circuit breaker cond.	.50
22-1170	.01 mfd. 600 volt	.15
22-1180	.003 mfd. 200 volt	.15
22-1233	20 mfd. 25 volt x 10 mfd. 300 volt x 20 mfd. 350 volt Dry Electrolytic	1.25
22-1235	Single section ceramic trimmer	.15
22-1236	Single section ceramic trimmer	.20
22-1238	.5 mfd. 120 volt	.25
22-1244	.004 mfd. 600 volt	.20
22-1247	.008 mfd. 1600 volt	.20
22-1248	350 mmfd. compensator	.40
22-1270	.02 mfd. 200 volt	.15
22-1277	Antenna trimmer	.35
22-1326	Distributor & oil gauge condenser	.45

MOTOR NOISE SUPPRESSION KIT

S10446	Motor noise suppression kit complete	2.60
S9343	Regulator ground lead assembly	.05
S10408	Distributor suppressor assembly	.50
22-1148	Voltage regulator & circuit breaker cond.	.50
22-1326	Distributor & oil gauge condenser	.45
54-68	5/16-18 Hex nut	.01
93-194	5 16" internal shakeproof lockwasher	.50C
112-323	No. 12 x 1/2" R.H.S.T. screw	1.50C
114-152	5 16-18 Hex Hd. M.S.	.04
147-108	Spacer	.02

MODEL 6MN082
Chassis 6C82
Nash

ZENITH RADIO CORP.



DIAG. #	PART #	DESCRIPTION	
C 1	22-1456	6PF. 250 MMF. ANTENNA TRIMMER	
C 2	22-1244	.004 MFD. ±10% 600 V. MICA	
C 3	22-1376	50 MMF. NOM. 3PF. R.F. TRIMMER	
C 4	22-190	1 MFD +50% -10% 200 V.	
C 5	22-1458	10 MMF. ±10% 500 V. MICA	
C 7	22-1377	50 MMF. NOM. 3PF. CONV. TRIMMER	
C 8	22-162	100 MMF. +50% -20% 600 V. MICA	
C 9	22-1478	350 MMF. ±2.5% COMPENSATOR	
C 10	22-1378	50 MMF. NOM. 3PF. OSC. TRIMMER	
C 11	22-162	100 MMF. +50% -20% 600 V. MICA	
C 12	22-190	.05 MFD. +50% -10% 200 V.	
C 13	22-1459	.1 MFD. +50% -10% 400 V.	
C 14	22-908	.005 MFD. +20% -10% 200 V.	
C 15	22-1374	.05 MFD. +20% -10% 200 V.	
C 16	22-1180	.003 MFD. ±20% 200 V.	
C 17	22-162	100 MMF. ±20% 600 V. MICA	
C 18	22-1179	001 MFD. ±20% 600 V. MICA	
C 19	22-1460	.005 MFD. +50% -10% 400 V.	
C 20		20 MFD. 25 W.V. ELECTROLYTIC	
C 21	22-1387	10 MFD. 300 W.V. ELECTROLYTIC △	
C 22		20 MFD. 350 W.V. ELECTROLYTIC △	
C 23	22-908	.5 MFD. +50% -10% 200 V.	
C 24	22-1446	.008 MFD. +50% -10% 600 V.	
C 25		500 MMF. SPARK PLATE	
C 26		500 MMF. SPARK PLATE	
C 27	22-908	.5 MFD. +50% -10% 120 V.	
C 28	22-1270	.02 MFD. ± 20% -10% 200 V.	
L 1	15-2619	ANTENNA MOTOR NOISE CHOKE	
L 2	15-2068	ANT. TUNING COIL	
L 3	COLOR OF DOT	R.F. TUNING COIL UNIT	
L 4		CONV. TUNING COIL UNIT	
L 5	15-2063	OSC. NOTCHING COIL	
L 6	15-1229	OSC. SERIES COIL	
L 7	15-1231	OSC. SHUNT COIL	
L 9	15-1232	MOTOR NOISE CHOKE	
L 10	20-213	HASH CHOKE	
SP 1	44-300	SPEAKER & PLUG (8" ROUND)	
SK 1	52-280	SPEAKER CABLE & SOCKET	

DIAG. #	PART #	DESCRIPTION	
R 1	63-1352	330,000 OHMS ± 20%	½ W
R 2	63-1379	10-300-1-10% SENS. CONTROL	½ W
R 3	63-1411	18,000 OHMS ±10%	½ W
R 5	63-1398	68,000 OHMS ± 10%	½ W
R 6	63-1416	6.8 MEGOHMS ±10%	½ W
R 7	63-1401	15,000 OHMS ±20%	½ W
R 8	63-1398	33,000 OHMS ± 10%	1 W
R 9	63-1390	1 MEGOHM ±20%	½ W
R 10	63-1391	33,000 OHMS ±20% (IN 2ND LEAD)	½ W
R 11	63-1342	330,000 OHMS ±20%	½ W
R 12	63-1382	330,000 OHMS ±20%	½ W
R 13	63-1385	270 OHMS ± 10% (W. W.)	1 W
R 14	63-1400	15 MEGOHM ±20%	½ W
R 15	63-1394	10,000 OHMS ±10%	½ W
R 16	63-1391	82,000 OHMS ±20%	½ W
R 17	63-1398	82 OHMS ±10% (W.W.)	2 W
R 18	63-1399	1500 OHMS ±10% (W. W.)	2 W
R 19	63-1342	250M.A. SET VOL. CONTROL AT 15M.A.	
R 20	63-1343	1.5 MEG. TONE CONTROL	½ W
R 21	63-1393	4.7 OHMS ± 10%	½ W
R 22	63-1390	1 MEGOHM ± 20%	½ W
R 23	63-1428	250-0-250 OHMS ± 10% CENTER TAP AT 75M.A.	
R 24	63-1421	100 OHMS ± 10%	½ W
R 25	63-1410	120 OHMS ±10%	½ W
R 26	63-1418	3300 OHMS ± 10%	½ W
R 27	63-1411	47,000 OHMS ±10%	½ W
R 28	63-1428	250-0-250 OHMS ± 10% CENTER TAP AT 75M.A.	
T 1	95-916	FIRST I. F. TRANSFORMER	
T 2	95-915	SECOND I. F. TRANSFORMER	
T 3	95-915	OUTPUT TRANSFORMER	
T 4	95-914	VIBRATOR POWER TRANSFORMER	
V 1	190-20	VIBRATOR (NON SYNCHRONOUS)	
FS 1	5-11140	FOOT SWITCH & PLATE ASSEMBLY	
FS 2	78-351	FOOT VOL. CONTROL SOCKET	
FS 3	5-12348	FT. VOL. CONTROL SWITCH CABLE & PLUG ASSEMBLY	
S 1	5-11270	HAND SELECTOR & MUTING SWITCH	
S 2	80-353	ON-OFF SWITCH	
S 3	100-32	PILOT LAMP	
S 4	100-38	20 AMP. FUSE TYPE 5FE	
S 5	66-1342	FT. VOL. CONT. SWITCH (ON VOL.-TONE CONTROL)	
S 6		DELAYED MUTE SWITCH (ON TUNER)	

STAGE GAINS

TAKEN AT ANT. SOCKET, AT R.F. GRID AT 600KC. & TAKEN AT CONV. GRID AT 265KC.

DUMMY ANTENNA

.30 MMFD. SERIES & .30 MMFD. SHUNT AT ANT. SOCKET & .01 MFD. SERIES TO CONVERTER GRID

BATTERY CONDITIONS

6.3 VOLTS AT STORAGE BATTERY TERMINALS WITH POSITIVE GROUNDED

TEST CONDITIONS

VOL. CONTROL SET AT "MAX." TONE CONTROL SET ON "HIGH"; WITH NO INCOMING SIGNAL

VOLTAGES READ FROM POINT SHOWN TO CHASSIS WITH 1000 OHM PER VOLT METER

ALL CONDENSERS ARE MMFD. UNLESS OTHERWISE SPECIFIED ON ALL CONDENSERS —

- ⓐ = 25 VOLTS ⓑ = 120 VOLTS ⓒ = 200 VOLTS
- ⓓ = 300 VOLTS ⓔ = 350 VOLTS ⓕ = 400 VOLTS
- ⓖ = 500 VOLTS ⓗ = 600 VOLTS ⓘ = 1000 VOLTS

FOR RESISTORS: M = 1,000 Δ, E.G. 10M = 10,000 Δ. ALL RESISTORS ARE ½ WATT ± 5% UNLESS OTHERWISE SPECIFIED

⏚ = DESIGNATES CHASSIS GROUND

ALL TUBE SOCKETS ARE BOTTOM VIEWS.

SCHEMATIC DIAGRAM FOR 6 TUBE
NASH 6MN082
WITH FOOT VOLUME & SELECTOR CONTROL
I. F. 265 KC.
TUNING RANGE 540KC. TO 1600 KC.
ZENITH RADIO CORPORATION
CHICAGO 39, ILLINOIS
U. S. A.

NASH PART Nº AC6016

NASH WIRING DIAGRAM
ZENITH RADIO CORP. 8/23-24/

TUNING RANGE: ..... 540-1600 Kc. **CURRENT CONSUMPTION:** ..... 7.5 amperes **POWER OUTPUT:** ..... 5.5 watts measured at the voice coil.

INTERMEDIATE FREQUENCY: ..... 265 Kc. **INSTANTANEOUS CURRENT CONSUMPTION DURING AUTOMATIC CHANGE CYCLE:** ..... 20 amperes **SPEAKER:** ..... 8" round, instrument panel mounting.

SENSITIVITY: ..... 4 microvolts at one watt output.

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DELAYED AUTOMATIC MUTING CIRCUIT

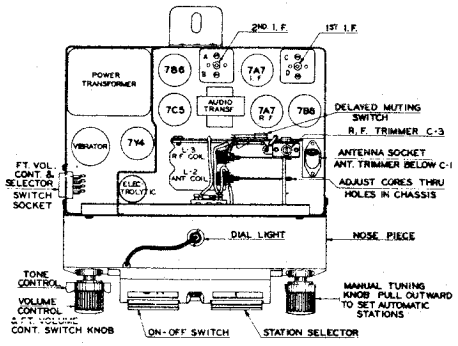

Fig. 10. Top View of Chassis.

Pressing either the Push-bar or the foot control switch automatically mutes the receiver for the duration of the change cycle. This action is accomplished by applying 6 volts negative to the 7B6 first audio grid through the 1 megohm resistor R-22. (See schematic diagram.) This negative voltage blocks off the grid of the 7B6 until the voltage bleeds off through the 15 megohm resistor R-14. Then the receiver will again operate normally. NOTE: If the battery polarity is reversed the receiver will not mute and it may become distorted during the change cycle. Always connect the positive (+) terminal of the storage battery or power supply to the receiver case when checking the receiver.

ALIGNMENT

Maximum performance depends on accurate alignment of the receiver; therefore follow these instructions carefully.

CAUTION: Make all adjustments on the receiver with volume control turned full on and foot volume control cable plugged into its socket. Reduce signal intensity as much as possible at signal generator. Connect output meter across voice coil.

I.F. ALIGNMENT PROCEDURE

1. Remove top and bottom covers from receiver.
2. Set signal generator to 265 Kc.
3. Apply signal from generator through a .1 Mfd. dummy to 7B8 converter grid. (Pin No. 6 on socket.)
4. Adjust I.F. trimmers A, B, C, and D (Fig. 10), in the order named for maximum output. Repeat the operation to assure accurate alignment.

R.F. AND OSCILLATOR ALIGNMENT

1. Connect signal generator leads through dummy illustrated in Fig. 12 to antenna lead in socket on receiver.
2. Set signal generator to 535 Kc.
3. Place set in manual tuning position and set dial to 535 Kc.
4. Adjust oscillator trimmer C-11 (Fig. 11), for maximum response.

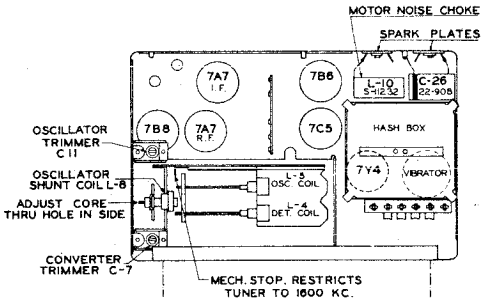

Fig. 11. Bottom View of Chassis.

5. Set signal generator to 1200 Kc.
6. Tune set to 1200 Kc.
7. Adjust converter trimmer C-7 (Fig. 11) and R.F. trimmer C-3 (Fig. 10) for maximum response.
8. If dial calibration is off after making above adjustments, a correction can be made by loosening dial scale mounting screws and sliding scale to desired position.

CORE OR COIL REPLACEMENT ONLY

WARNING: The following adjustments are to be made ONLY if a core or coil is replaced.

1. Replace coil or core.
2. Set signal generator to 1700 Kc.
3. Connect signal generator leads through dummy illustrated in Figure 12 to antenna receptacle on the receiver.
4. Set receiver dial to 1600 Kc. (Maximum high frequency end of dial.)
5. Screw the core completely out of the antenna coil, the R. F. Coil, the converter coil, and the oscillator coil.
6. Adjust oscillator trimmer C-11 (Fig. 11), at 1700 Kc.
7. Adjust converter trimmer C-7, R.F. trimmer C-3, and antenna trimmer C-1 (Fig. 10 and 11) for maximum output reading.
8. Replace cores to their approximate original positions
9. Set generator dial and receiver dial to 1200 Kc.
10. Adjust oscillator core (Figure 10) to scale at 1200 Kc.
11. Adjust the antenna core, R.F. core, and converter core (Fig. 10 and 11), for maximum output reading.
12. Set signal generator to 600 Kc.
13. "Rock in" shunt oscillator coil (Fig. 10) for maximum output reading. (This should only be done as a last resort.) This is the same as rocking in the padder condenser on a ganged condenser receiver.
14. Check receiver at 1200 Kc. for calibration and gain. If the receiver is off scale or weak, repeat operations 9, 10 and 11.
15. After alignment is complete, the maximum high frequency tuning range should be checked. If the range is greater or less than 1605 Kc. the mechanical stop for the tuner cross arm should be bent to limit the frequency coverage to 1605 Kc.

After all adjustments have been made, glue core screws with speaker cement.

IMPORTANT: After reinstalling the receiver in the car, allow it to operate for approximately 15 minutes to reach normal operating temperature. Check the antenna trimmer alignment on a weak station at approximately 1200 Kc. Extend antenna to maximum before adjusting the antenna trimmer.

The approximate voltages are measured with a 1000 ohm per volt meter between the socket terminals and the chassis as shown on the circuit diagram. The Volume Control is set at maximum with no signal. Battery voltage is 6.3

AUTOMATIC TUNING

There are five automatic tuning positions which may be adjusted to five desired stations. If these positions have not been previously adjusted proceed as follows:

1. Press station selector bar until number 1 appears in station indicator window.
2. Pull manual tuning knob outward to engage the automatic mechanism.
3. Select the station desired and tune to its frequency by turning tuning knob. Tune very carefully for clearest reception.
4. Press station selector bar, pull manual tuning knob outward, and tune in station desired for No. 2 position. Use same procedure for positions No. 3, 4 and 5.

When the five automatic positions have been adjusted to the five desired stations as instructed, it is only necessary to press the station selector bar to return to dial tuning, or any one of the stations adjusted on the Automatic.

MANUAL TUNING

1. Press Automatic Tuning Station Selector (Fig. 2) several times or until the letter "M" appears in indicator window.
2. Pull Manual tuning control knob (right hand) outward and turn to tune in desired station. Be sure to tune to exact frequency to assure the best tone quality.

VOLUME—Adjust left hand control knob for desired volume.

TONE CONTROL—The tone control is located behind the volume control knob. Turn in either direction for most pleasing tone.

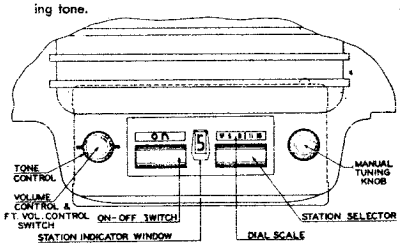

Fig. 2. Front View

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INTERFERENCE SUPRESSION

There should be no motor noise or interference from the ignition circuit if the receiver has been installed in the car according to the instructions furnished with it. The interference suppression equipment may be checked for proper installation by referring to the following illustrations:

The generator condenser No. 22-920 should be installed as shown below in Figure 3.

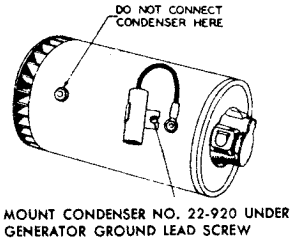

Fig. 3

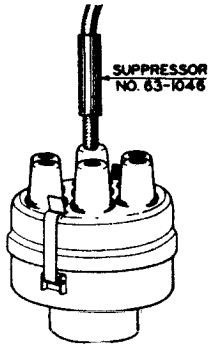

Fig. 4

The distributor supressor No. 63-1046 should be connected as shown above in Figure 4.

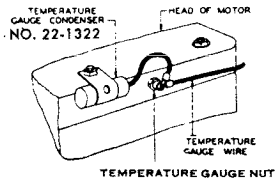

Fig. 5

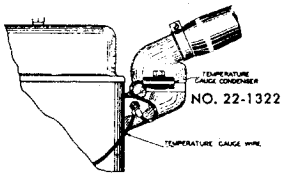

Fig. 6

The No. 22-1322 temperature gauge condenser should be installed as shown in Figure 5 for Nash 600 series cars and Figure 6 for Ambassador cars.

The ammeter and fuel gauge condensers No. 22-919 should be installed as shown in Figure 7.

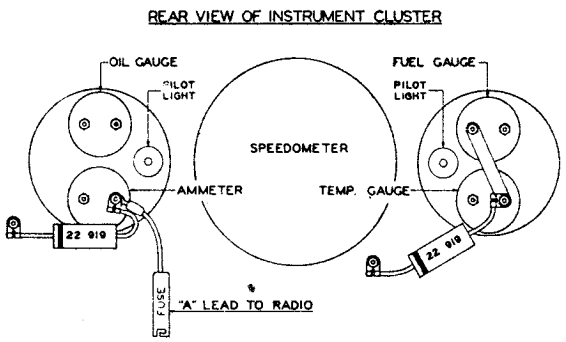

Fig. 7

The motor hood bond spring No. 80-145 should be installed as shown in Figure 8. Note that the sharp extrusions are facing down toward the front of the car before the hood grounding strip is bent back. Make sure the instrument panel bolts and chassis mounting bolts are tight.

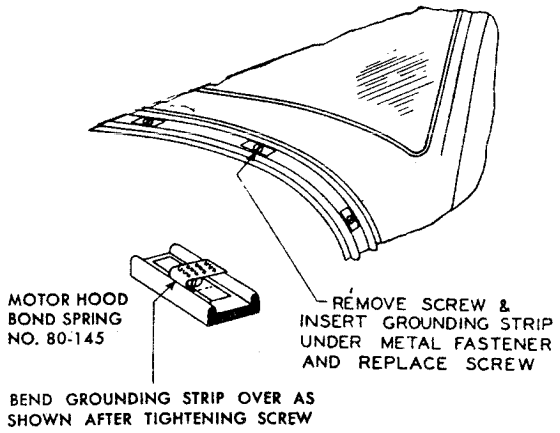
MOTOR HOOD BOND SPRING NO. 80-145
REMOVE SCREW & INSERT GROUNDING STRIP UNDER METAL FASTENER AND REPLACE SCREW
BEND GROUNDING STRIP OVER AS SHOWN AFTER TIGHTENING SCREW

Fig. 8

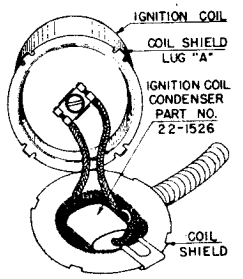

Fig. 9. Ign. Coil Cond.

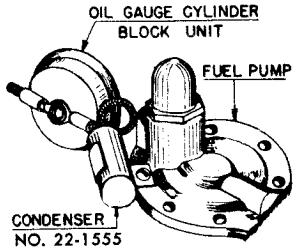

Fig. 9A. Oil Gauge Cond.

Straighten coil shield lugs "A" on back of ignition coil. Remove shield. Condenser should be installed as shown in Fig. 9. When replacing shield be sure to bend lugs down tightly to insure good connection between shield and coil. The oil gauge condenser should be installed as shown in Fig. 9A.

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PARTS LIST MODEL 6MN082 (CHASSIS 6C82)

1946 NASH LONG DISTANCE RADIO AC-6016

COILS AND CHOKES

Diagram No.	Part No.	
L10	20-213	Main hash choke
T 1	95-916	1st I.F. transformer
T 2	95-917	2nd I.F. transformer
L 1	S8819	Antenna motor noise choke assem.
L 7	S11229	Oscillator series coil assem.
L 8	S11231	Oscillator shunt coil assem.
L 9	S11232	Motor noise choke coil assem.
L 5	S12053*	Oscillator tuning coil assem.
L 2	S12060*	Antenna tuning coil assem.
L 3	S12060*	R.F. tuning coil assem.
L 4	S12060*	Converter tuning coil assem.

Note: In ordering coils marked *, be sure to give color code information.

CONDENSERS

C 8, C11	22-162	100 mmfd. 600 volt
C13	22-170	.1 mfd. 400 volt
C17	22-182	250 mmfd. 600 volt
C 4	22-190	.1 mfd. 200 volt
C12	22-250	.05 mfd. 200 volt
C19	22-838	.005 mfd. 600 volt
C14	22-906	.005 mfd. 200 volt
C27, C23	22-908	.5 mfd. 120 volt
C18	22-1170	.01 mfd. 600 volt
C16	22-1180	.003 mfd. 200 volt
C 2	22-1244	.004 mfd. 600 volt
C28	22-1270	.02 mfd. 200 volt
C15	22-1374	.05 mfd. 200 volt
C 3	22-1376	R.F. trimmer
C 7	22-1377	Detector trimmer
C10	22-1378	Oscillator trimmer
C20	22-1387	20MFD. 25 W.V. Electrolytic
C21		20 MFD. 350 W.V. Electrolytic
C22		10 MFD. 300 W.V. Electrolytic
C 1	22-1420	Antenna trimmer
C24	22-1448	.008 mfd. 1600 volt
C 5	22-1456	10 mmfd. 600 volt mica
C 9	22-1478	350 mmfd. compensator

RESISTORS

R19, R20, S 5	63-1342	Tone control vol. control & sw.
R18	63-1368	1800 ohm 2 watt W.W.
R13	63-1369	270 ohm 1 watt W.W.
R 8, R22	63-1390	1 megohm ¼ watt
R10	63-1391	33M ohm ¼ watt
R 1, R11, R12	63-1392	330M ohm ¼ watt
R21	63-1393	47 ohm ¼ watt
R15	63-1394	10M ohm ¼ watt
R 5	63-1396	68M ohm ¼ watt
R 8	63-1398	33M ohm 1 watt
R16, R17	63-1399	82 ohm ½ watt
R14	63-1400	15 megohm ¼ watt
R 7	63-1401	15M ohm ½ watt
R26	63-1410	120 ohm ½ watt
R 3	63-1411	18M ohm ½ watt
R24	63-1414	100 ohm ¼ watt
R 6	63-1416	6.8 megohm ¼ watt
R27	63-1417	47,000 ohm ¼ watt
R25	63-1418	3300 Ohm ¼ watt

MISCELLANEOUS

SK1	52-280	Speaker cable & socket
	52-311	Battery cable (set to fuse)
	52-312	Battery cable (fuse to ammeter)
	78-281	Vibrator socket
FS2	78-551	Foot switch cable plug socket
	78-596	Tube socket—Loktal base (8 contact)
	80-374	Knob spring—L.H.
	80-375	Knob spring—R.H.
S2	85-353	On-off switch
	93-456	Vibrator cushion washer
T4	95-914	Power transformer
T3	95-915	Output transformer
S4	136-12	Fuse—20 amp.
V1	190-20	Vibrator
	192-86	Dial crystal
	202-406	Instruction book
S1	S11270	Hand selector & muting switch assem.
	S11391	Antenna connector socket & bracket assem.
	S11395	Escutcheon dial crystal & key plate assem.
FS3	S12348	Foot switch, vol. control, cable & plug assem.
	63-1287	Foot vol. control
	S11922	Foot switch rubber cap assembly

SPEAKER AND SPEAKER MOUNTING PARTS

SP1	49-500	8" dynamic speaker & plug
	54-30	No. 8/32 x 5/16 x 7/64 Hex nut
	57-862	Speaker mounting plate
	112-298	No. 8/32 x ½ B.H. M.S.
	147-102	Speaker mounting spacer
	196-38	Speaker gasket
	208-500*	Cone & voice coil assem.

Note: When ordering cone and voice coil marked * be sure to add manufacturers' code letter that follows base part number.

DIAL AND TUNING MECHANISM ASSEMBLY

Diagram No.	Part No.	
S3	100-32	Dial light bulb
L6	S10829	Solenoid & terminal assem.
	26-333	Dial scale (manual tuning)
	34-132	Indexing disc
	34-154	Ratchet gear
	34-135	Volume control gear
	46-533	Selector, knob (2 used)
	57-1045	Escutcheon
	57-1046	Key plate (4 used)
	59-154	Dial pointer
	59-168	On-off indicator
	80-329	Gear indexing spring
	80-331	Cross arm return spring
	80-332	Cam lever spring
	80-336	Ratchet gear return spring
	80-340	Lever spring
	80-341	Kick-off spring
	80-342	Tuning shaft spring
	80-343	Solenoid switch spring
	80-344	Solenoid switch contact spring
	149-44*	Adjusting spring & core
	188-45	Turret screw lock ring
	S10826	Solenoid end (plug & bracket assem.)
	S10831	Ratchet & bracket assem.
	S10834	Mounting plate & lever asssem.
	S10836	Cross arm assem.
	S11053	Tuning shaft & gear assem.
	S11082	Turret assem.
	S11179	Dial drum & bracket assem.
	S11627	Dial light socket & wire assem.

Note: In ordering Adjusting Spring & Core marked *, be sure to give color code information.

MOTOR NOISE SUPPRESSION KIT

Part No.	
S11399	Motor noise suppression kit complete
22-919	Ammeter & fuel gauge condenser
22-290	Generatot condenser
22-1322	Temperature gauge condenser
22-1526	Ignition coil condenser
22-1555	Oil gauge condenser
63-1046	Distributor suppressor
80-145	Motor hood bond spring

KNOBS AND INSTALLATION PARTS

S11400	Set installation kit complete
S11394	Tuning knob trim knob & set screw (46-536 & 537)
46-485	Volume control knob
46-534	Tone control knob
54-146	No. 10/32 wing nut
54-148	¼-20 x ½ x ¼ Hex nut
54-153	7/16-28 x .120 hex. nut
80-232	Knob retaining spring
93-127	No. 10 internal shakeproof lockwasher
93-173	¼ internal shakeproof lockwasher
93-416	1/32 x 13/64 x 5/8 steel washer
112-310	Foot switch mounting screw
144-20	Set mounting bolt
147-101	Set mounting spacer
188-41	Spacer ring

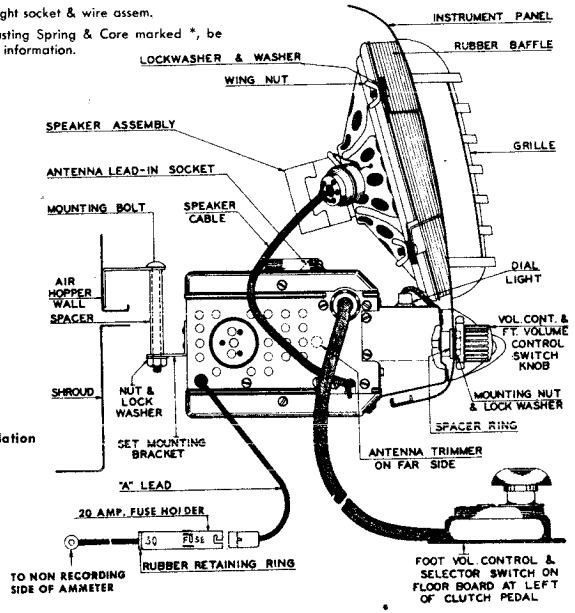
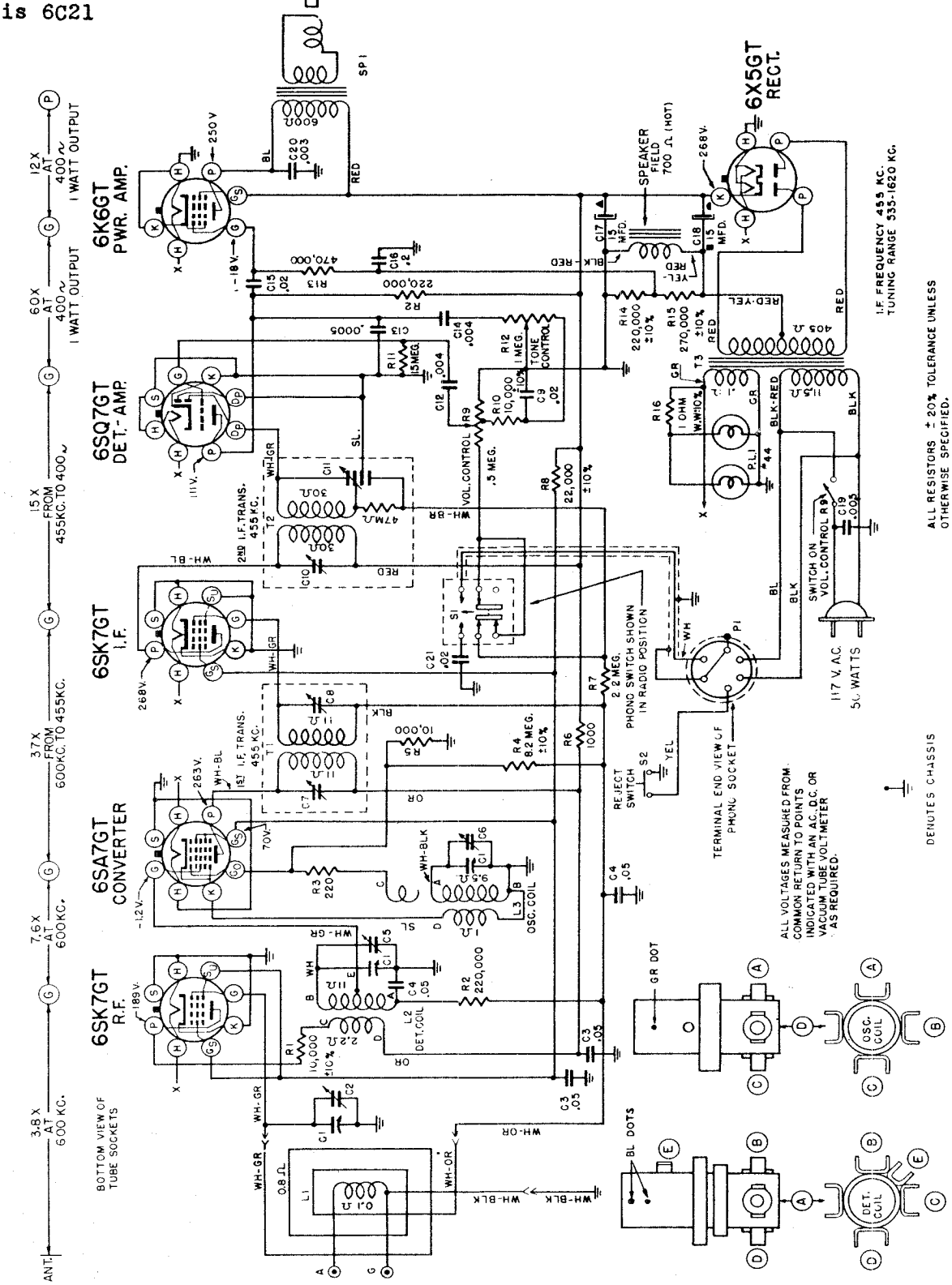


Fig. 1. Installation

ZENITH RADIO CORP.
ZENITH PAGE 15-43
MODEL 6MN082

MODEL 6R084
Chassis 6C21

ZENITH RADIO CORP.


6K6GT PWR. AMP.
6SQ7GT DET.-AMP.
6SK7GT I.F.
6SA7GT CONVERTER
6SK7GT R.F.
6X5GT RECT.
SP1
SPEAKER FIELD 700 Ω (HOT)
I.F. FREQUENCY 455 KC. TUNING RANGE 535-1620 KC.
ALL RESISTORS ± 20% TOLERANCE UNLESS OTHERWISE SPECIFIED.
MODEL 6R084
CHASSIS No. 6C21
DENOTES CHASSIS
ALL VOLTAGES MEASURED FROM COMMON RETURN TO POINTS INDICATED WITH AN A.C.-D.C. OR VACUUM TUBE VOLTMETER AS REQUIRED.
TERMINAL END VIEW OF PHONO SOCKET
BOTTOM VIEW OF TUBE SOCKETS
PHONO SWITCH SHOWN IN RADIO POSITION
REJECT SWITCH
SWITCH ON VOL. CONTROL
117 V. A.C. 54 WATTS
ANT.
3.8 X AT 600 KC.
7.6 X AT 600KC.
37 X FROM 600KC. TO 455KC.
15 X FROM 455KC. TO 400~
60 X AT 400~ 1 WATT OUTPUT
12 X AT 400~ 1 WATT OUTPUT
1ST I.F. TRANS. 455 KC.
2ND I.F. TRANS. 455 KC.
VOL. CONTROL .5 MEG.
TONE CONTROL
GR DOT
BL DOTS
OSC. COIL
DET. COIL

DIAG NO.	PART NO.	DESCRIPTION	
C1	22-1369	3-GANG VARIABLE	
C2	ON C1	BROADCAST ANT. TRIMMER	
C3	22-171	.05 MFD.	600 V.
C4	22-829	.05 MFD.	200 V.
C5	ON C1	BROADCAST DET. TRIMMER	
C6	ON C1	BROADCAST OSC. TRIMMER	
C7	ON T1	1ST I.F. TRANS. PRI. TRIMMER	
C8	ON T1	1ST I.F. " SEC. "	
C9	22-327	.02 MFD.	200 V.
C10	ON T2	2ND I.F. TRANS. PRI. TRIMMER	
C11	ON T2	2ND I.F. " SEC. "	
C12	22-1362	.004 MFD.	600 V.
C13	22-854	.0005 MFD.	600 V.
C14	22-448	.004 MFD.	600 V.
C15	22-830	.02 MFD.	600 V.
C16	22-138	.2 MFD.	200 V.
C17	22-1372	15 MFD. ELECTRO	350 V.
C18	22-1372	15 MFD. "	450 V.
C19	22-1041	.005 MFD.	400 V.
C20	22-288	.003 MFD.	600 V.
C21	22-1386	.02 MFD.	200 V.
R1	63-156	10M OHM	1 W.
R2	63-295	220 M OHM	¼ W.
R3	63-579	220 OHM	¼ W.
R4	63-673	8.2 MEGOHM	¼ W.
R5	63-589	10 M OHM	¼ W.
R6	63-605	1000 OHM	½ W.
R7	63-600	2.2 MEGOHM	¼ W.
R8	63-1058	22 M OHM	2 W.
R9	63-1340	.5 MEG VOLUME CONTROL	
R10	63-641	10 M OHM	¼ W.
R11	63-976	1.5 MEGOHM	¼ W.
R12	63-1341	1 MEG. TONE CONTROL	
R13	63-597	470 M OHM	¼ W.
R14	63-655	220 M OHM	¼ W.
R15	63-656	270 M OHM	¼ W.
R16	63-1223	1 OHM WIREWOUND	2 W.
L1	S-11382	WAVEMAGNET	
L2	S-11163	DET. COIL ASSEMBLY	
L3	S-11164	OSC. "	
T1	95-909	1ST I.F. TRANSFORMER	
T2	95-910	2ND I.F. "	
T3	95-911	PWR. TRANS. 117 V. 50-60~	
PL1	100-36	DIAL LIGHT 6.3 V. .25 A.	
S1	85-337	PHONO-RADIO SWITCH	
S2	85-349	REJECT SWITCH	
SP1	49-515	5" DYNAMIC SPEAKER	
P1	S-11167	PHONO CABLE ASSEMBLY	

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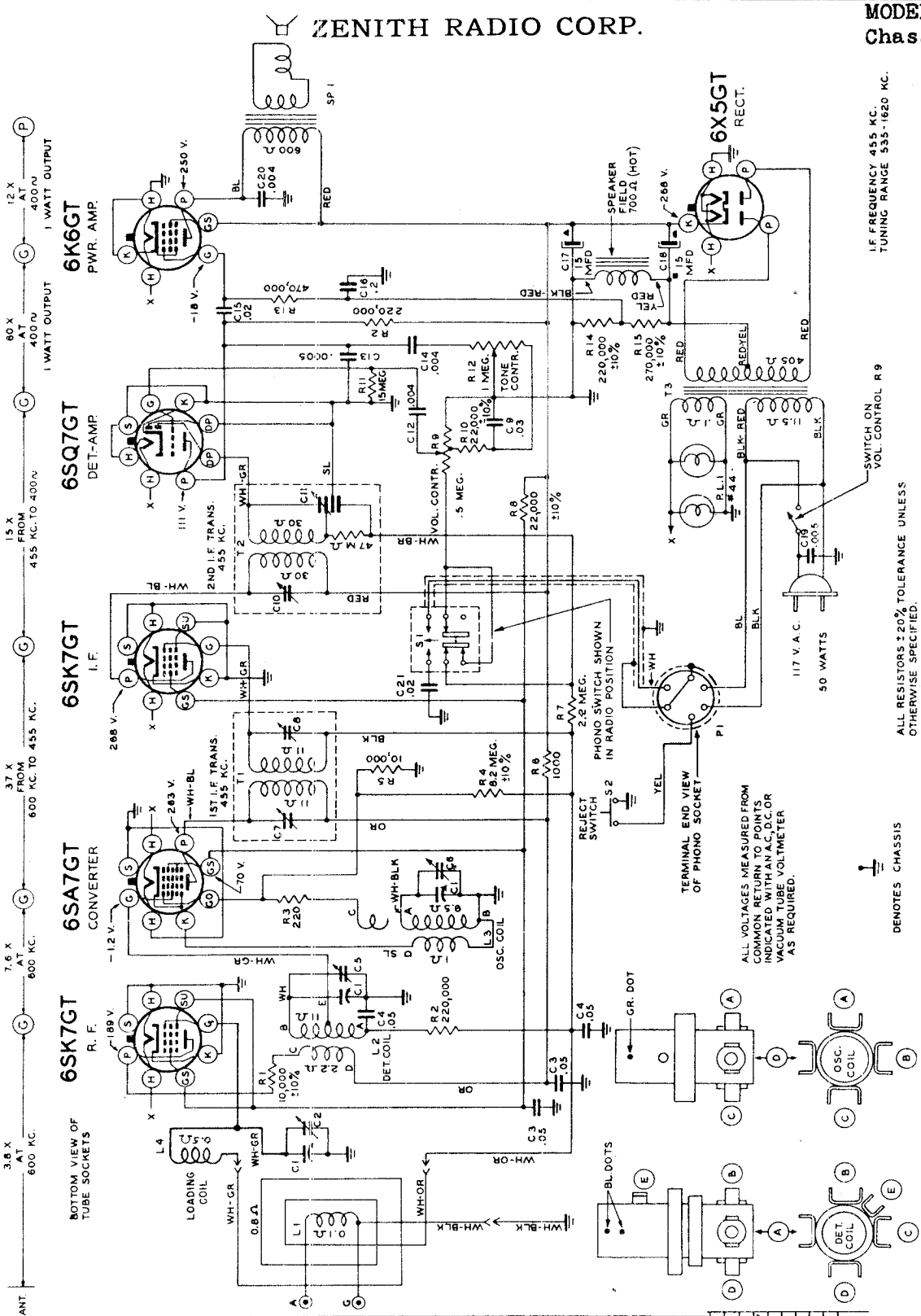
Record Changer: Zenith Model S11468



DIAG. NO.	PART NO.	DESCRIPTION
C1	22-1369	3-GANG VARIABLE
C2	ON C1	BROADCAST ANT. TRIM.
C3	22-171	.05 MFD 600 V.
C4	22-829	.05 MFD 200 V.
C5	ON C1	BROADCAST DET. TRIM.
C6	ON C1	BROADCAST OSC. TRIM.
C7	ON T1	1ST I.F. TRANS. PRI. TR.
C8	ON T1	1ST I.F. " SEC. TRIM.
C9	22-1157	.03 MFD 200 V.
C10	ON T2	2ND I.F. TRANS. PRI. TRIM.
C11	ON T2	2ND I.F. " SEC. TRIM.
C12	22-1362	.004 MFD 600 V.
C13	22-854	.0005 MFD 600 V.
C14	22-448	.004 MFD 600 V.
C15	22-830	.02 MFD 600 V.
C16	22-138	.2 MFD 200 V.
C17	22-1372	15 MFD ELECTRO. 350 V.
C18	22-1372	15 MFD " 450 V.
C19	22-1041	.005 MFD 400 V.
C20	22-448	.004 MFD 600 V.
C21	22-1386	.02 MFD 200 V.
R1	63-156	10 M OHM 1 W.
R2	63-296	2.20 M OHM ¼ W.
R3	63-579	220 OHM ¼ W.
R4	63-673	8.2 MEGOHM ¼ W.
R5	63-589	10 M OHM ¼ W.
R6	63-605	1000 OHM ½ W.
R7	63-600	2.2 MEGOHM ¼ W.
R8	63-1058	22 M OHM 2 W.
R9	63-1340	.5 MEG. VOL. CONTR.
R10	63-591	22M OHM ¼ W.
R11	63-976	15 MEGOHM ¼ W.
R12	63-1341	1 MEG. TONE CONTR.
R13	63-597	470 M OHM ¼ W.
R14	63-655	220 M OHM ¼ W.
R15	63-656	270 M OHM ¼ W.
L4	S-11896	LOADING COIL
L1	S-11450	WAVEMAGNET
L2	S-11163	DET. COIL ASSY.
L3	S-11164	OSC. " "
T1	95-909	1ST I.F. TRANS.
T2	95-910	2ND I.F. "
T3	95-911	PWR. TRS. 117 V. 50-60 ~
PL1	100-36	DIAL LIGHT 6.3 V. .25 A.
S1	85-337	PHONO-RADIO SW.
S2	85-349	REJECT SWITCH
SP1	49-526	10" DYNAMIC SPEAKER OR
SP1 WITH S2-377	49-563	10" DYNAMIC SPEAKER SPEAKER CABLE ASS'Y
P1	78-623	PHONO SOCKET

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Record Changer: Zenith Model S11468

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TO THE SERVICE MAN:

A feature of chassis 6C21 is a high gain tuned R.F. stage ahead of the conventional superheterodyne circuit.

When making repairs or adjustments on the chassis be sure to have the Phono-Radio switch in Radio position (button out).

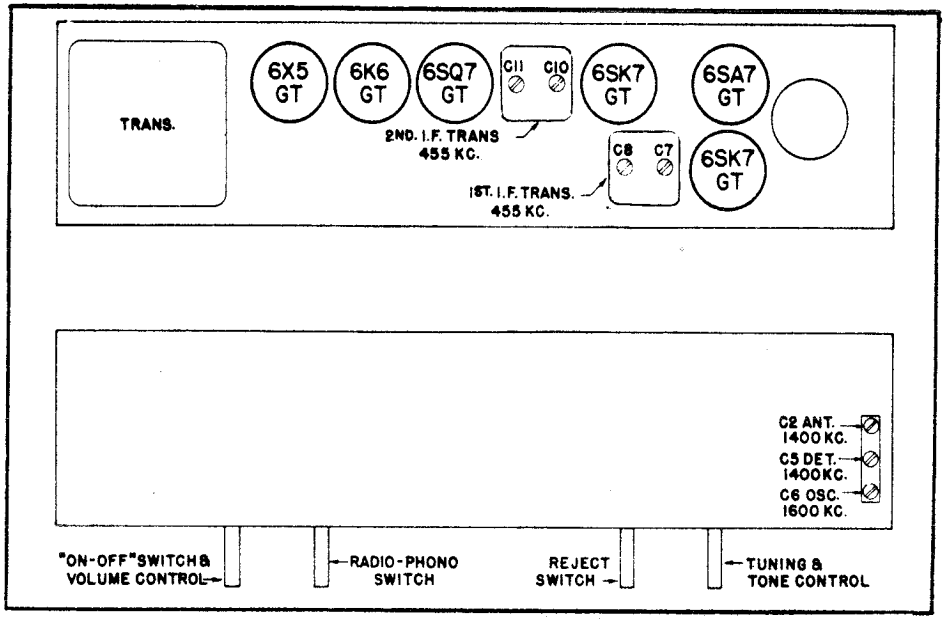
The Tone Control circuit used in chassis 6C21 is unusual. Attenuation or control occurs in both the grid and plate circuit of the triode section of the 6SQ7 tube. To increase the bass response Resistor R10 and Capacitor C9 boost the bass in the grid circuit.

Capacitor C14 and the Variable Tone Control R12 attenuate the highs in the plate circuit.

When the tone control R12 is in the treble position attenuation to highs are greatly reduced in the plate circuit and minimum bass boost takes place in the grid circuit.

When the tone control is in bass position, attenuation to the highs takes place in the plate circuit with maximum bass boost in the grid circuit.

The result of this arrangement allows a smooth tone control over the audio frequency range.



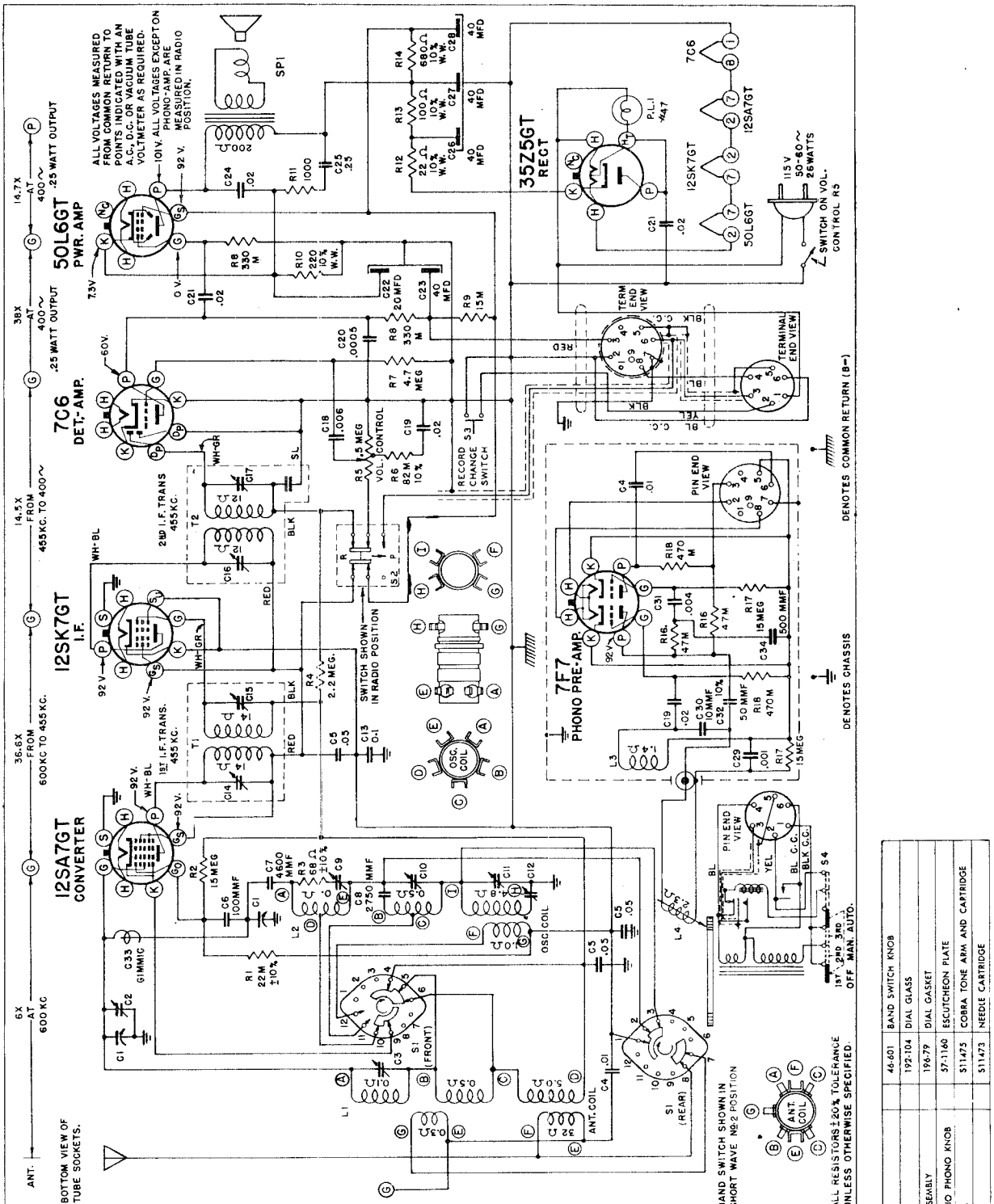
TUBE AND TRIMMER LOCATION

MODELS 6R084—6R087
CHASSIS Nos. 6C21—6C22 ALIGNMENT PROCEDURE

OPERATION	CONNECT OSCILLATOR TO	DUMMY ANTENNA	INPUT SIG. FREQUENCY	SET DIAL AT	TRIMMERS	PURPOSE
1	Converter Grid	5 Mfd.	455 Kc.	600 Kc.	C-7-,C-8, C-10,C-11	Align I F
2	One Turn Loop Coupled Loosely to Wave Magnet	--	1600 Kc	1600 Kc	C-6	Set Oscillator to Dial Scale
3		--	1400 Kc.	1400 Kc.	C-5	Align det.
4		--	1400 Kc.	1400 Kc.	C-2	Align Ant.

ZENITH RADIO CORP.

MODEL 6S071T
Chassis 5C61T



DIAG NO.	PART NO.	DESCRIPTION	
C1	22-1411	2-GANG VARIABLE	
C2	ON C1	BROADCAST ANT. TRIM	
C3	22-1424	SHORTWAVE " "	
C4	22-811	.01 MFD.	600 V.
C5	22-818	.05 MFD.	400 V.
C6	22-1442	100 MMFD	500 V.
C7	22-1432	4600 MMFD	300 V.
C8	22-1433	2750 MMFD	600 V.
C9		S.W. 2 OSC. TRIM.	
C10	22-1435	S.W. 1 " "	
C11		BROADCAST " "	
C12		BC. PADDER " "	
C13	22-821	.1 MFD	400 V.
C14	ON T1	1ST I.F. TRANS. PRI. TRIM.	
C15	ON T1	1ST I.F. " SEC. "	
C16	ON T2	2ND I.F. " PRI. "	
C17	ON T2	2ND I.F. " SEC. "	
C18	22-808	.006 MFD.	600 V.
C19	22-813	.02 MFD.	200 V.
C20	22-1117	.0005 MFD.	600 V.
C21	22-815	.02 MFD.	600 V.
C22	22-1441	20 MFD. ELECTRO.	25 V.
C23		40 MFD. "	150 V.
C24	22-816	.02 MFD.	600 V.
C25	22-1440	.25 MFD.	400 V.
C26		40 MFD. ELECTRO	150 V.
C27	22-1381	40 MFD. "	150 V.
C28		40 MFD. "	150 V.
C29	22-1063	.001 MFD.	600 V.
C30	22-1456	10 MMFD	600 V.
C31	22-805	.004 MFD.	600 V.
C32	22-1532	50 MMFD	500 V.
C33	S11900	GIMMIC	
C34	22-716	500 MMFD	600 V.
R1	63-763	22 M OHM	½ W.
R2	63-1093	.15 MEGOHM	½ W.
R3	63-737	68 OHM	½ W.
R4	63-600	2.2 MEGOHM	½ W.
R5	63-1357	.5 MEG. VOL. CONTROL	
R6	63-651	82 M OHM	½ W.
R7	63-602	4.7 MEGOHM	½ W.
R8	63-596	330 M OHM	½ W.
R9	63-590	1.5 M OHM	½ W.
R10	63-1227	220 OHM W.W.	1 W.
R11	63-238	1000 OHM	½ W.
R12	63-1228	22 OHM WIREWOUND	1 W.
R13	63-1229	100 OHM "	1 W.
R14	63-1070	680 OHM "	1 W.
R16	63-593	47 M OHM	½ W.
R17	63-976	.15 MEGOHM	½ W.
R18	63-597	470 M OHM	½ W.
L4	SI2580	PHONO CARTRIDGE ASSY	
L1	S11844	ANT. COIL ASSEMBLY	
L2	S11843	OSC. COIL ASSEMBLY	
L3	S11637	PHONO OSC. COIL "	
S1	85-348	BAND SWITCH	
S2	85-337	PHONO-RADIO SWITCH	
S3	85-338	RECORD CHANGE "	
S4	85-371	3 POSITION SWITCH	
T1	95-932	1ST I.F. TRANS.	
T2	95-933	2ND I.F. "	
SP1	40-532	5" P.M. SPEAKER	
P.L.	1100-67	DIAL LIGHT 6.3V. .15A.	

MISCELLANEOUS PARTS			
14-971	CABINET	46-601	BAND SWITCH KNOB
S11281	DIAL CORD & EYELET ASSEMBLY	192-104	DIAL GLASS
46-548	RECORD CHANGE & RADIO PHONO KNOB	196-79	DIAL GASKET
46-599	VOLUME CONTROL KNOB	57-1160	ESCUTCHEON PLATE
46-600	TUNING KNOB	S11475	COBRA TONE ARM AND CARTRIDGE
		S11473	NEEDLE CARTRIDGE

Record Changer: Zenith Model S-11680

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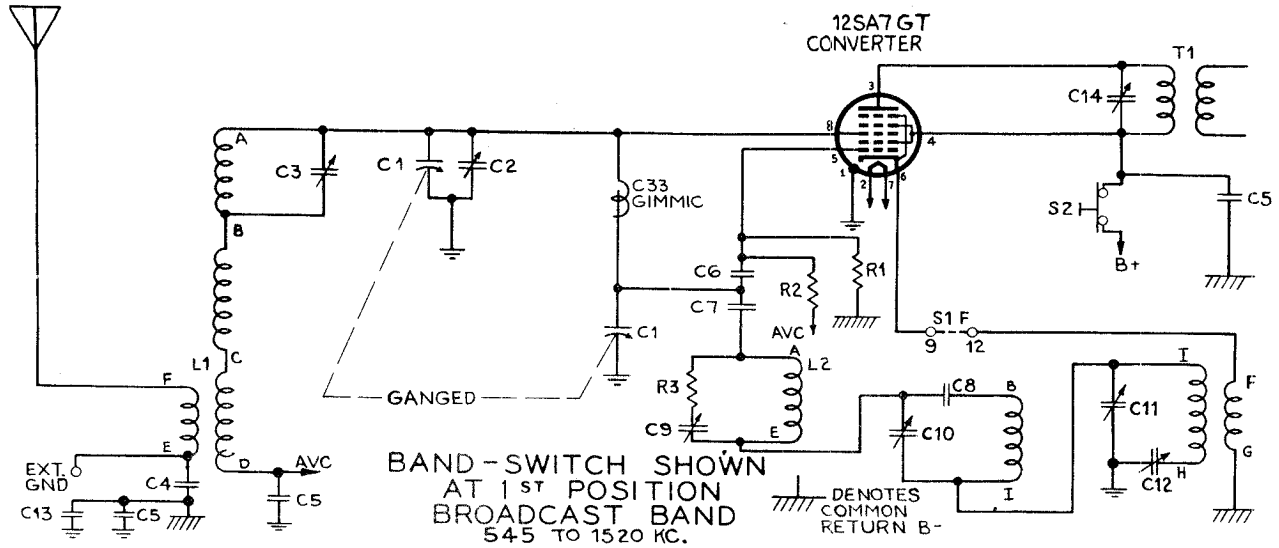
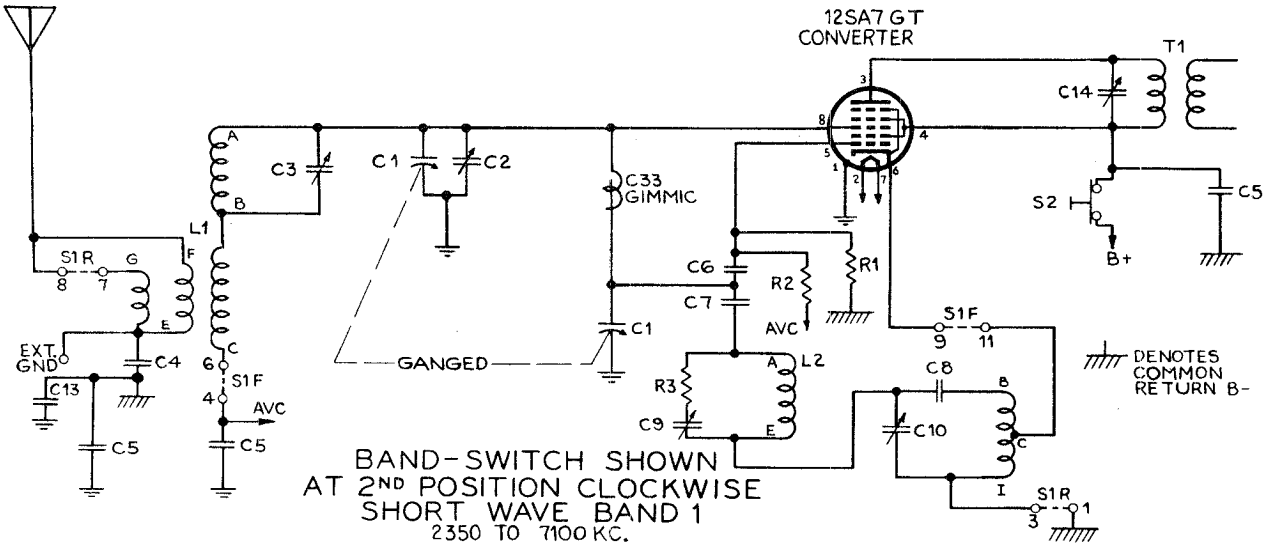
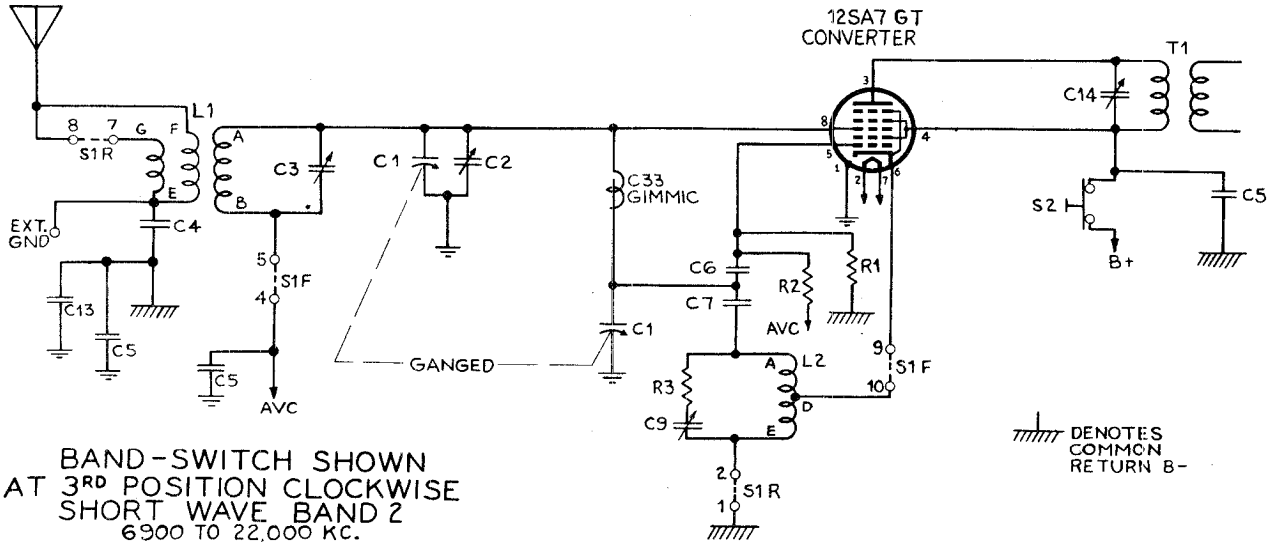
MODEL 6S071T

ZENITH RADIO CORP.







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MODEL NO. 6S071T

Chassis No. 5C61T

INSTRUCCIONES PARA LA INSTALACION, FUNCIONAMIENTO Y SERVICIO

GENERAL

Después de desembalar la combinación, quítese el papel engomado usado para la protección del chasis durante el embarque.

El receptor emplea un circuito superheterodino de sintonización altamente desarrollada sobre las siguientes bandas de onda larga y corta: 545 a 1520 kilociclos (550 a 197 metros), 2350 a 7100 kilociclos (127.7 a 42.3 metros) y 6900 a 22000 kilociclos (43.5 a 13.6 metros).

SUMINISTRO DE ENERGIA

Esta combinación está diseñada para funcionar ya sea en 50 ó 60 períodos de una corriente alterna (C.A.) de 105 a 120 voltios. El consumo total de corriente de las líneas de suministro es de 46 vatios.

PRECAUCION

No intente usar esta combinación con corriente contínua (C.C.) o con ninguna fuente de corriente fuera de la especificada previamente para evitar daño serio. Un transformador especial que puede obtener de su vendedor permitirá usarlo en 200 a 250 voltios de C.A.

INSTALLATION, OPERATING AND SERVICE INSTRUCTIONS

GENERAL

After the combination has been unpacked, remove the paper tape used for protection of the chassis in shipment.

The receiver employs a highly developed superheterodyne circuit tuning over the following standard broadcast and shortwave bands: 545 to 1520 kilocycles (550 to 197 meters) 2350 to 7100 kilocycles (127.7 to 42.3 meters) and 6900 to 22000 kilocycles (43.5 to 13.6 meters).

POWER SUPPLY

This combination is designed for operation on either 50 or 60 cycle 105-120 volt alternating current (A.C.)

Total current consumption from the power lines is 46 watts.

CAUTION:

Do not attempt to use this combination on direct current D.C. or any current source other than that specified above otherwise serious damage will result. A special transformer obtainable from your dealer will permit use on 200 to 250 volt A.C. lines.

METHODE D'INSTALLATION, OPERATION ET SERVICE

GENERALITES

Après avoir déballé le poste-combinaison, les bandes de papier utilisées pour la protection du chassis durant le transport devront être enlevées.

Le poste emploie un circuit hautement développé superhétérodyne dont la bande de sélection couvre les rangées de radiodiffusion normales et les ondes courtes suivantes: de 545 à 1520 kilocycles (de 550 à 197 mètres), de 2350 à 7100 kilocycles (de 127,7 à 42,3 mètres) et 6900 à 22000 kilocycles (de 43,5 à 13,6 mètres).

SOURCE DE PUISSANCE

Cette combinaison fonctionne sur courant alternatif de 50 ou 60 cycles, 105-120 volts.

La consommation totale des lignes de puissance est de 46 watts.

PRECAUTION

N'essayez pas d'employer cette combinaison sur courant continu ou sur courant autre que celui mentionné plus haut, sinon de sérieux dégâts résulteront. Un transformateur spécial, à obtenir chez votre fournisseur, en permettra l'usage sur les lignes A.C. de 200 à 250 volts.

ANTENA

Es indispensable una buena antena para obtener la recepción satisfactoria. Una antena exterior de 13 a 20 metros de longitud y de la mayor altura posible dará buenos resultados para uso general. Si ha de usar su antena actual, ésta debe ser minuciosamente examinada para determinar su estado pues las conexiones pueden estar oxidadas o rotas haciéndola inapropiada para el uso. Si se ha de instalar una nueva antena hay que tomar las precauciones necesarias para que el alambre de bajada no haga contacto con las paredes, árboles o cualquier otro objeto en la conexión a tierra. Todas las conexiones deberán ser correctamente soldadas para evitar la oxidación y el ruido que se produciría. Conecte el alambre de bajada de la antena al alambre terminal marcado "Ant" en la parte posterior del chasis.

TIERRA

Una buena conexión a tierra mejorará efectivamente la recepción, aumentando la fuerza de las señales de las estaciones lejanas y reduciendo el ruido de fondo. La mejor conexión a tierra es un caño de un metro a 1.50 metros introducido en tierra húmeda.

El alambre a tierra debe ser soldado al caño o asegurado cuidadosamente con una buena grapa de tierra, previa limpieza cuidadosa del caño en ese punto. Una tierra conveniente

ANTENNA

A good antenna is necessary for satisfactory reception. An outside antenna from 40 to 60 feet in length and as high as possible will give good all-around results. If your present antenna is to be used, a thorough examination should be made to determine its condition. The connections may be corroded or broken, thus rendering the antenna unfit for service. If a new antenna is to be constructed, care should be taken to prevent the lead-in wire from grounding to trees, walls or gutters and all connections should be securely soldered to prevent corrosion and resulting noise. Connect the antenna lead-in to the wire marked "Ant" at the back of the chassis.

GROUND

A good ground will aid reception materially by improving the signal strength of distant stations and reducing background noise. The best ground is a 4 to 6 foot pipe driven in moist earth.

The ground wire should be soldered to the pipe or fastened securely with a good ground clamp, first thoroughly clean-

ANTENNE

Une bonne antenne est nécessaire pour obtenir une réception satisfaisante. Une antenne extérieure de 40 à 60 pieds (12-18 m) de long et aussi élevée que possible donne de bons résultats généraux. Si votre antenne actuelle devra être utilisée, elle devra subir un examen minutieux afin d'en déterminer l'état. Les couplages en peuvent être corrodés ou cassés, rendant par là l'antenne inutilisable. Si une nouvelle antenne est construite, prenez soin que la prise de terre n'aie pas lieu dans un arbre, sur un mur ou dans un fossé et tous les couplages devront être soudés avec soin afin d'éviter la corrosion et les bruits parasites Attachez le fil conducteur de l'antenne au fil marqué "Ant" au dos du chassis.

PRISE DE TERRE

Une bonne prise de terre aide considérablement à augmenter la puissance des stations distantes et diminuera les parasites. La meilleure prise de terre est un tuyeau de 4 à 6 pieds (1,25 à 2 mètres) enfoncé dans un sol humide.

Le fil de prise devra être soudé au tuyeau ou bien attaché fermement avec une bonne attache de prise, le tuyeau étant nettoyé soigneusement à cet endroit. Une prise de terre satisfaisante peut être obtenue en attachant solidement le fil de prise à un tuyeau

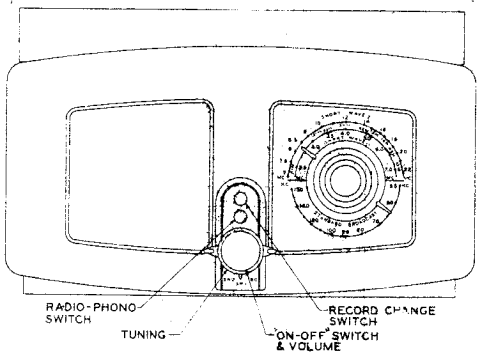

FIG. 1 PANEL CONTROLS

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puede ser obtenida haciendo una buena conexión a un caño de agua o radiador. Conecte la bajada a tierra al alambre marcado "Gnd" en la parte posterior del chasis.

INTERRUPTOR FONOGRAFO-RADIO

El interruptor Fono-Radio es del tipo de botón de presión de doble acción.

Para tocar discos el botón debe ser introducido por presión. Presionando el botón una segunda vez lo volverá a la posición de Radio. (Vea la figura 1.)

SINTONIZACION

La figura 1 indica la posición de las perillas del control de sintonización y de volumen. Para poner el instrumento en funcionamiento, gire la perilla del control de volumen hacia la derecha. Esto pondrá en funcionamiento el aparato. Espere unos 30 segundos para que las válvulas alcancen la temperatura de funcionamiento.

Para sintonizar el aparato, gire la perilla de Control de Volumen lentamente a la estación deseada. Reajuste la perilla de Control de Volumen hacia la derecha o hacia la izquierda hasta alcanzar el volumen deseado. Para desconectar el receptor (OFF) gire la perilla de Control de Volumen todo lo que pueda hacia la izquierda, o hasta que oiga un ruido "clic."

El receptor tiene tres escalas de sintonización, cualquiera de los cuales puede ser seleccionada por medio del Interruptor de Banda (Vea la Fig. 1). La banda en uso estará indicada por el indicador del Interruptor de Banda.

Las estaciones de onda corta deberán ser sintonizadas girando la Perilla de Sintonización muy lentamente. El receptor es muy selectivo a las frecuencias más altas (ondas cortas).

La luz del día tiene una decidida influencia sobre la recepción de las estaciones de onda corta. Las diferentes longitudes de onda tienen mayor eficacia a diferentes horas del dia. Usese la tabla siguiente de guía para sintonizar.

ing the pipe at that point. A suitable ground may also be obtained by making a good connection to a water pipe or radiator. Connect the ground lead-in to the wire marked "Gnd" at the rear of chassis.

PHONO-RADIO SWITCH

The Phono-Radio switch is of the double acting push button type.

To play records the button must be pushed in. Pushing the button a second time will return it to the Radio position. (See Figure 1.)

TUNING

Figure 1 shows the position of Tuning and Volume Control knobs. To place the instrument in operation, turn the Volume Control knob to the right. This will turn on the set. Allow about 30 seconds for the tubes to reach operating temperature.

To tune the set, turn the Tuning Control knob slowly to the desired station. Readjust the Volume Control knob to the right or left for the desired volume. To turn the receiver OFF rotate the Volume Control knob as far as it will go to the left, or until a "click" is heard.

The receiver has three tuning ranges, any one of which may be selected by means of the Band Switch (see Fig. 1). The band in use will be indicated by the Band Switch pointer.

Short wave stations must be tuned in by turning the Tuning Knob very slowly. The receiver is very selective at the higher frequencies (short waves).

Daylight has a decided effect on the reception of short wave stations. Different wave lengths are most effective at different times of the day. Use the following table as a guide in tuning.

SHORT WAVE BAND	TIME OF BEST RECEPTION
16 meters and below	A.M. (Morning hours)
19 and 25 meters	P.M. (Afternoon)
25 and 31 meters	P.M. (Early evening)
31 and 49 meters	P.M. (Late evening)

d'eau ou à un radiateur. Branchez le fil de prise au fil marqué "Gnd" au dos du chassis.

COMMUTATEUR PHONO-RADIO.

Le commutateur Phono-Radio est du type bouton-poussoir à action double. Pour faire jouer les disques, appuyez sur le bouton. Appuyez une seconde fois et le poste sera remis à la position Radio. (Voyez la figure 1).

ACCORD

La figure 1 montre la position des boutons d'accord et de régulateur d'amplification. Pour mettre l'appareil en fonction, tournez le bouton du régulateur d'amplification vers la droite. Ceci mettra le poste en opération. Laissez les tubes se chauffer 30 secondes environ afin d'arriver à température de réception.

Pour obtenir la station voulue, tournez le bouton d'accord lentement jusqu'au point désiré. Ajustez à nouveau le bouton du régulateur d'amplification vers la droite ou la gauche jusqu'au volume convenable. Pour en cesser l'usage, tournez le bouton du régulateur d'amplification autant que possible, jusqu'à provoquer un déclic.

Ce poste a trois échelles d'accord; chacune d'entre elles peut être choisie par moyen du commutateur de bande (voir figure 1). La bande en usage est indiquée par l'aiguille du commutateur de bande.

La réception des stations à ondes courtes se fera en tournant le bouton d'accord très lentement. Le récepteur est très sélectif aux plus hautes fréquences (ondes courtes).

La lumière du jour a un effet décidé quant à la réception des stations à ondes courtes. Les longueurs d'ondes diverses auront leur meilleure réception à des heures diverses. Employez la table suivante comme guide pour la syntonisation.

TUBES

Les tubes suivants sont employés pour cette combinaison:

12SA7GT	50L6GT
12SK7GT	35Z5GT
7C6	7F7

VALVULAS

Las siguientes válvulas se emplean en esta combinación

12SA7GT	50L6GT
12SK7GT	35Z5GT
7C6	7F7

La figure 4 indica la posición correcta de cada válvula en su respectivo porta válvulas.

INSTRUCCIONES PARA EL FUNCIONAMIENTO DEL CAMBIA-DISCOS AUTOMATICO ZENITH CON BRAZO DE TONO COBRA

GENERALIDADES

Su Cambia-Discos Automático Zenith es un mecanismo nuevo muy mejorado equipado con el "pickup" revolucionario Cobra, una característica exclusiva de Zenith producida como resultado de muchos años de investigación y de desarrollo. Controles eléctricos ponen en funcionamiento su mecanismo de Comienzo-Detención con una velocidad relámpago (3½ segundos), por medio de un botón de presión situado en el tablero de control de recepción.

El sensacional Pickup Radiónico Cobra tiene un "Fila-

TUBES

The following tubes are employed in this combination:

12SA7GT	50L6GT
12SK7GT	35Z5GT
7C6	7F7

Figure 4 shows the correct position of each tube in its respective socket.

OPERATING INSTRUCTIONS FOR ZENITH AUTOMATIC RECORD CHANGER WITH COBRA TONE ARM

GENERAL

Your Zenith Automatic Record Changer is a new, highly improved mechanism equipped with the new revolutionary Cobra pickup, an exclusive Zenith feature, produced as the result of many years of research and development. Electric controls trip its Start-Stop mechanism with lightning speed (3½ seconds) by a push button on the receiver control panel.

La figure 4 montre la position propre à chaque tube dans son support respectif.

INSTRUCTIONS POUR L'EMPLOI DU CHANGE-DISQUES AUTOMATIQUE ZENITH AVEC BRAS-ACOUSTIQUE A SONORITE COBRA

GENERALITES

Votre Change-Disques Automatique Zénith est un nouvel appareil, beaucoup amélioré, muni du nouveau pick-up Cobra, un perfectionnement révolutionnaire produit exclusivement par Zenith après de nombreuses années de recherches et de développement. Des commandes électriques déclanchent son mécanisme d'appel Start-Stop avec la rapidité de l'éclair (3 secondes et demie) au moyen d'un bouton sur le panneau de contrôle du récepteur.

Ce pick-up radionique Cobra a le nouveau "Filament Flottant" qui allonge la durée d'usage d'un disque par mille pour cent et révèle une beauté de ton inconnue jusqu'ici et qui

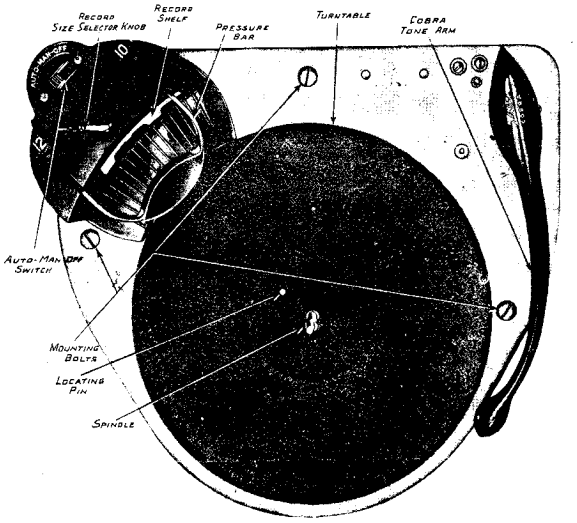

Fig. 2. Record Changer Top View

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mento Flotante" nuevo que extiende la duración del disco más del 1000 por ciento, revela bellezas de tono no escuchadas hasta el presente y no es afectado por los cambios de temperatura y de humedad. El cambia-discos tocará automáticamente doce discos de 10 pulgadas ó diez discos de 12 pulgadas. Es posible un programa contínuo de su propia selección de 45 minutos de duración con una sola carga del cambia-discos.

El cambia-discos está equipado con un motor sincrónico de comienzo automático que impulsa la placa giratoria porta discos a 78 rpm. El cambia-discos puede hacerse funcionar con una corriente alterna (C.A.) de 50 ó 60 ciclos cambiando el manguito de la impulsión del motor.

PUESTA DEL CAMBIA-DISCOS EN FUNCIONAMIENTO

El Cambia-Discos ha sido embalado cuidadosamente para evitar ser dañado durante el embarque, debiéndose retirar todo el material de embalar antes de intentar ponerlo en funcionamiento. Asegúrese de leer todos los rótulos y remueva todas las cintas de embalar, pernos, etc.

Utilice un destornillador de hoja ancha y rote los pernos de montaje (Fig. 2) en el sentido de las agujas del reloj hasta que las cabezas estén parejas con la plancha de montaje. Esto permite que el cambiador "flote" montado contra sacudidas.

No deje de remover la banda de empaque para permitir que el pre-amplificador fono flote libremente montado sobre caucho; de lo contrario será oído el chillido del audio y microfónico cuando funcione el cambia discos.

PRECAUCION

El Cambia-Discos es expedido con el manguito del motor del fonógrafo instalado para 60 ciclos. El manguito de 50 ciclos está unido al Cambia-Discos debiendo ser instalado antes de intentarse hacerlo funcionar con una corriente de 50 ciclos.

The sensational Radionic Cobra Pickup has the new "Floating Filament" that lengthens record life over 1000 per cent, detects tone beauty unheard of before and is not affected by humidity and temperature changes. The changer will automatically play either twelve 10 inch records or ten 12 inch records. A continuous program of your own selection with a playing time of 45 minutes is possible with one loading of the changer.

The changer is equipped with a synchronous self-starting motor which drives the turntable at 78 RPM. The changer may be operated on 50 or 60 cycle alternating current (A.C.) by changing the motor drive bushing.

PLACING THE RECORD CHANGER IN OPERATION

The Record Changer has been securely packed to avoid damage in shipment and all packing material must be removed before an attempt to operate it is made. Be sure to read all tags and remove packing strips, bolts, etc.

Use a wide blade screwdriver and turn the three mounting bolts (see Fig ?) clockwise until the heads are flush with the mounting plate. This allows the changer to "float" on its shock mounts.

Do not fail to remove the packing strip to allow the phono preamplifier to float freely on its rubber mounts or audio howl and microphonics will be heard when playing the Record Changer.

CAUTION

The Changer is shipped with the 60 cycle phono motor bushing installed. The 50 cycle bushing is attached to the Changer and must be installed before operation on 50 cycle current is attempted.

n'est affectée ni par l'humidite, ni par les hausses et baisses de température. L Change-Disques jouera automatiquement soit douze disques de 25 cms., soit 10 disques de 30 cms. Un programme continu de votre propre choix d'une durée de jeu de 45 minutes est désormais possible avec une seule mise de disques.

Le Change-Disques est muni d'un moteur synchrone à déclanchement autonome qui donne au plateau tourne-disques une vitesse de 78 RPM. Le change-disques peut être utilisé sur un courant alterna-soit de 50, soit de 60 cycles en changeant la douille du moteur.

FONCTIONNEMENT DU CHANGE-DISQUES

Le Change-Disques a été empaqueté avec soin afin d'éviter d'être endommagé durant le transport et les papiers et autres matériaux d'emballage en seront enlevés avant d'essayer de faire fonctionner l'appareil. Lisez attentivement toutes les étiquettes et enlevez les bandes d'emballage, les boulons, etc.

Servez-vous d'un tournevis à large lame et tournez les trois boulons de montage (voyez figure 2) dans la même direction que les aiguilles d'une montre jusquà ce que les têtes des boulons soient à ras de la plaque de montage. Ceci permettra au Change-Disques de "flotter" sur son support anti-choc.

Ne pas omettre d'enlever les bandes d'emballage afin que le pré-amplificateur-phono puisse être balancé sans entraves sur sa monture de caoutchouc; sinon des audio-cris et des parasites microphoniques se feront entendre pendant la mise en jeu du Change-disques.

IMPORTANT

Le Change-Disques est expédié avec la douille phono-moteur de 60 cycles en place. La douille à 50 cycles est attachée au Change-Disques et doit être installée avant d'essayer de faire fonctionner l'appareil sur un courant de 50 cycles.

MANERA DE HACERLO FUNCIONAR

A. Cargamento para Funcionamiento Automatico

1. Colóquese la Perilla Selectora de Tamaño de Discos ya sea en 10 ó en 12, dependiendo del tamaño del disco que desee tocar. NO MEZCLE DISCOS DE 10 PULGADAS CON DISCOS DE 12 PULGADAS.

2. Elévese la Varilla de Presión lo más que sea posible.

3. Presiónese ligeramente y gírese el Vástago en sentido contrario al movimiento de las agujas de reloj hacia la posición de CARGA.

Posicion de Carga

4. Colóquese la pila de discos (hasta doce de 10 pulgadas ó diez de 12 pulgadas) sobre el vástago.

5. Colóquese la Varilla de Presión sobre la pila de discos.

B. Modo de Poner en Marcha el Cambia-Discos

1. Empújese el botón FONO-RADIO situado en el tablero de recepción.

2. Colóquese el interruptor AUTO-MAN-OFF en el Cambia-Discos en posición AUTO.

3. Empújese el botón del CAMBIA-DISCOS situado en el tablero de recepción. Si quisiera suprimir un disco, sólo es necesario empujar el botón del CAMBIA-DISCOS situado en el tablero de recepción. Esto permitirá que sea tocado el disco siguiente.

C. Detencion del Cambia-Discos

1. Cerciórese que la aguja esté en la posición de tocar (en contacto con el disco).

2. Colóquese el interruptor AUTO-MAN-OFF en posición OFF.

3. Elévese el brazo de tono y muévalo hacia la posición de descanzo (es decir, hacia la derecha de la placa giratoria).

HOW TO OPERATE

A. Loading for Automatic Operation

1. Set RECORD SIZE SELECTOR KNOB to either 10 or 12, depending on the size of record you wish to play. DO NOT INTERMIX 10 INCH AND 12 INCH RECORDS.

2. Raise the PRESSURE BAR up as far as it will go.

3. Press lightly and turn the SPINDLE counterclockwise to the LOAD position.

Load Position

4. Place the stack of records (up to twelve 10 inch or ten 12 inch) over the spindle.

5. Set the PRESSURE BAR down on the record stack.

B. Starting the Changer

1. Push PHONO-RADIO button on the receiver panel.

2. Set the AUTO - MAN - OFF switch on the Record Changer to AUTO.

3. Push the RECORD CHANGE button on the receiver panel. Should you desire to reject a record, it is only necessary to push the RECORD CHANGE button on the radio receiver panel. This will allow the next record to be played.

C. Turning the Changer Off

1. See that the needle cartridge is in the playing position (in contact with the record).

2. Set the AUTO - MAN - OFF switch to OFF.

3. Lift the tone arm and move it to the rest position (that is, to the right of the turntable).

COMMENT FAIRE FONCTIONNER L'APPAREIL

A. Mise de Disques Pour Fonctionnement Automatique

1. Placez le BOUTON SELECTEUR DE GRANDEUR DE DISQUES soit à 10, soit à 12 d'après la taille des disques que vous allez jouer. Ne mêlez pas de disques de grandeurs différentes.

2. Elevez la BARRE D'APPUI aussi haut que possible.

3. Appuyez légèrement et tournez le fuseau dans la direction opposée à celle des aiguilles d'une montre jusqu'à la position "LOAD" (MISE).

Position "Load"

4. Placez la pile de disques (jusqu'à 12 disques de 25 cms —ou 10 disques de 30 cms) sur le fuseau.

5. Remettez la BARRE D'APPUI sur la pile de disques.

B. Mise en Fonction du Change-Disques

1. Appuyez sur le bouton PHONO-RADIO au panneau du récepteur.

2. Placez le commutateur "AUTO - MAN - OFF" du Change-Disques à la position AUTO.

3. Appuyez sur le bouton CHANGE-DISQUES sur le panneau du récepteur. Quand vous voudrez rejeter un disque, vous n'aurez qu'à appuyer sur le bouton CHANGE-DISQUES au panneau du récepteur. Ceci mettra le disque suivant en jeu.

C. Arret du Change-Disques.

1. Il faut que l'aiguille soit en position pour le jeu (en contact avec le disque).

2. Placez le commutateur AUTO-MAN-OFF a la position OFF.

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D. Descarga

Para retirar la pila de discos de la placa giratoria después que haya sido tocado el último disco, procédase de la siguiente manera:

1. Detóngase el Cambia-Discos de la manera descrita en el párrafo C.

2. Elévese la VARILLA DE PRESION lo más alto posible.

Posicion de Descarga

3. Presiónese ligeramente y gírese el VASTAGO en el sentido de las agujas de reloj hacia la posición de DESCARGA.

4. Levántese VERTICALMENTE toda la pila de discos o todos los discos que puede manipular convenientemente, hasta retirar los discos del vástago.

E. Funcionamiento Manual

Las grabaciones hechas en la casa no son para uso automático, debiendo ser tocadas manualmente; es decir, por separado, como se hace en un tocadiscos no automático. Para funcionamiento manual colóquese el interruptor AUTO-MAN-OFF en posición MAN (véase la Fig. 2). El brazo de tono queda libre, pudiendo ser movido a voluntad. Se suministra una aguja de ubicación sobre la placa giratoria para las grabaciones hechas en la casa.

F. Si se Deja el Cambia-Discos Funcianando

No se producirá daño alguno si olvida de detener el Cambia-Discos después que haya tocado toda la selección de discos. Repetirá el último disco hasta ser detenido o vuelto a cargar.

DISCOS RUIDOSOS

Si bien una tonalidad mala es ocasionada por una aguja gastada, el ruido de rayado y de fondo indica por lo general, un disco gastado. La cantidad de ruido de desgaste y de fondo en los discos nuevos variará de acuerdo con la calidad de fabricación, tipo de música grabada y el cuidado que se le presta a los discos. La colocación de una capa muy ligera de cera sobre el vástago eliminará el chillido causado por la fricción entre el vástago y los discos, toda vez que se presente este inconveniente.

D. Unloading

To remove the record stack from the turntable after the last record has been played, proceed as follows:

1. Turn the Record Changer OFF as described in paragraph C.

2. Raise the PRESSURE BAR as far up as it will go.

3. Press lightly and turn the SPINDLE clockwise to the UNLOAD position.

Unload Position

4. Raise the record stack, or as many records as you can conveniently handle STRAIGHT UP until the records are entirely clear of the spindle.

E. Manual Operation

Home recordings are not intended for automatic use and must be played manually, that is, singly as on a non-automatic record player. For manual operation set the AUTO-MAN-OFF switch to the MAN position (see Fig. 2). The tone arm is now free and may be moved at will. A locating pin is provided on the turntable for home recordings.

F. If the Changer Is Left Running

No damage will be done if you forget to turn off the Changer after it has played the entire selection of records. It will repeat the last record until stopped or reloaded.

NOISY RECORDS

Poor tone is usually caused by a worn needle cartridge, however, scratch and background noise usually indicates a worn record. The amount of wear and background noise on new records will vary depending on the quality of manufacture, type of music recorded and care given the records. A very thin coat of wax on the spindle will eliminate squeaking caused by friction between the spindle and records (should this condition exist).

CUIDADO DE LOS DISCOS

Un pequeño esfuerzo hecho por usted les asegurará una larga duración a sus discos. No los exponga al calor solar, de los radiadores o de las estufas. Guarde sus discos en álbumes en un sitio fresco y seco, en posición vertical u horizontal. Retírese el polvo y la suciedad con un paño suave, empleando un movimiento circular. Mismo una fina película de polvo contiene frecuentemente partículas abrasivas, que cuando se muelen contra la superficie del disco por la aguja pueden ocasionar desgaste muy rápido.

Importante

Nunca deje permanecer a los discos sobre el vástago cuando no está en uso el Cambia-Discos pues podría ocasionar la combadura y la falla del Cambia-Discos para tocar tales discos.

CAMBIO DEL CARTUCHO DE AGUJAS

En caso de que se haga necesario cambiar el Cartucho de Agujas debido a desgaste o cuidado inapropiado, estúdiese la Fig. 3 y procédase de la manera siguiente:

3. Levez le bras acoustique et mettez-le à la position de repos, c'est-à-dire à la droite du plateau tourne-disques.

D. Pour Enlever

Pour enlever la pile de disques du plateau après avoir joué le dernier disque, faites ce qui suit:

1. Tournez le commutateur à la position OFF, comme on l'a décrit plus haut au paragraphe C.

2. Levez la BARRE D'APPUI aussi haut que possible.

3. Appuyez légèrement et tournez le fuseau dans la même direction que les aiguilles d'une montre jusqu'à la position UNLOAD.

Position "Unload"

4. Levez la pile de disques, ou autant d'entre eux que vous voulez soulever facilement, tout droit jusqu'à ce que les disques soient entièrement dégagés du fuseau.

E. Fonctionnement Manuel.

Les disques faits chez soi ne sont pas prévus pour le jeu automatique et doivent être employés manuellement, c'est-à-dire, séparément, comme sur un gramophone ordinaire, non-automatique. Pour ce fonctionnment manuel, tournez le commutateur AUTO-MAN-OFF à la position MAN (voyez la figure 2).

Le bras acoustique est maintenant libre et vous pouvez le mouvoir à votre gré. Une aiguille de repère est placée sur le plateau tourne-disques pour les disques faits chez soi.

F. Cas Dans Lesquels le Change-Disques est Oublie en Action

Aucun dégât ne résultera si vous oubliez d'interrompre le Change-Disques après avoir joué tous vos disques. Il répétera le dernier jusqu'à ce que vous l'arrêtiez ou le remplaciez.

DISQUES BRUYANTS

Une sonorité défectueuse est causée d'habitude par une aiguille usagée. Un bruit de râclage ou des ronflements parasites indiquent d'ordinaire que le disque a été endommagé par l'usage. Une rapide usure de disques neufs et la présence de bruits parasites dépendra de la qualité de la manufacture, du type de musique enregistrée et du soin que l'on aura pris du disque. Une couche de cire très mince sur le fuseau éliminera le grincement causé par le frottement du disque contre le fuseau si cette condition existe.

CARE OF RECORDS

Small effort on your part will insure long life for your records. Do not expose them to heat from the sun, radiators or stoves. Store your records in albums in a cool, dry place resting vertically or horizontally. Remove dust and dirt with a soft cloth using a light circular motion. Even a fine film of dust often contains abrasive particles which, when ground against the record surface by the needle can cause very rapid wear.

Important

Never allow records to remain on the spindle when the Record Changer is not in use. To do so may result in warping and failure of the Changer to play such records.

CHANGING THE NEEDLE CARTRIDGE

If it becomes necessary to change the Needle Cartridge due to wear or mishandling, study Fig. 3 and proceed as follows.

SOIN DE DISQUES

Très peu d'effort de votre part vous assurera d'une longue durée pour vos disques. Ne les exposez pas à la chaleur du soleil, des radiateurs ou des fourneaux. Gardez vos disques dans des albums en un endroit frais et sec et placez-les, soit horizontalement, soit verticalement. Epoussetez-les avec un chiffon fin et un léger mouvement circulaire. Une couche de poussière, quelque légère qu'elle soit, contient souvent des particles abrasives, qui, lorsqu'elles sont écrasées sur la surface du disque par l'action de l'aiguille, l'endommageront rapidement.

Important

Ne laissez jamais les disques sur le fuseau lorsque vous n'employez pas le Change-Disques. Cela pourrait faire gauchir et fausser les disques et démonter le Change-Disques.

CHANGEMENT DE LA CARTOUCHE A AIGUILLE

S'il est nécessaire de changer la cartouche à aiguilles, soit qu'elle soit usée ou qu'elle ait été endommagée, étudiez la figure 3 et faites ce qui suit:

Needle Cartridge Out — Inserting Needle Cartridge

Fig. 3. Replacing the Needle Cartridge

1. Colóquese el interruptor OFF-MAN-AUTO en posición OFF.

2. Elévese el BRAZO DE TONO.

3. Tómese el CARTUCHO DE AGUJAS rojo con la punta de los dedos y retíresela suavemente hacia fuera en línea recta.

4. Insértese un nuevo CARTUCHO DE AGUJAS y empújela hacia adentro suavemente con el pulgar. El Cartucho es graduado, pudiendo sólo ser insertado en un sentido. Póngase cuidado, pues forzando el cartucho en un ángulo inapropiado dañará la ranura.

1. Set the OFF - MAN - AUTO switch to OFF.

2. Raise the TONE ARM.

3. Grasp the red NEEDLE CARTRIDGE with the finger tips and gently pull it straight out.

4. Insert a new Needle Cartridge and push it in gently with the thumb. The Cartridge is indexed and can only be inserted one way. Use care — forcing the cartridge in at the wrong angle will damage the socket.

1. Tournez le commutateur AUTO-MAN-OFF à position OFF.

2. Levez le bras acoustique.

3. Saisissez la cartouche à aiguilles rouge entre le bout des doigts et tirez doucement tout droit.

4. Insérez une nouvelle cartouche et enfoncez-la lentement avec le pouce.

La cartouche est marquée et ne peut être mise en place que d'une seule façon. Faites-le avec soin. Si vous enfoncez la cartouche de biais avec force le porte-aiguille sera endommagé.

SERVICE DATA

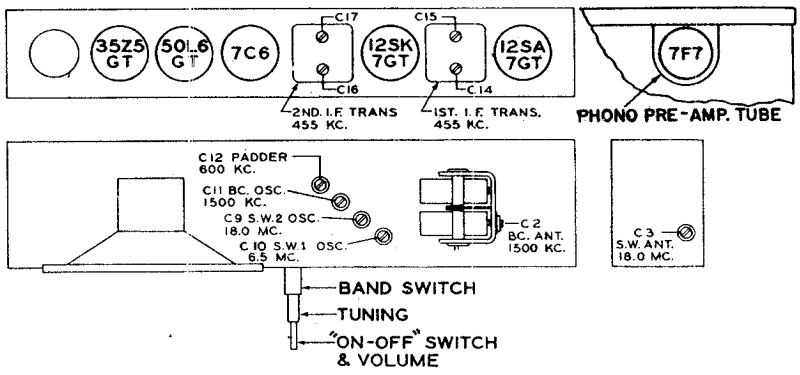

Fig. 4. Tube and Trimmer Positions

ALIGNMENT PROCEDURE

Opr.	Connect Osc. to	Dummy Ant.	Input Sig. Frequency	Band	Set Dial at	Trimmers	Purpose
1	1st Det. Grid	.1 mfd.	455 kc.	BC	600 kc.	C14, 15, 16 and 17	Align I.F.
2	Antenna and Ground	200 mmfd.	1500 kc.	BC	1500 kc.	C11	Set Osc. to Dial Scale
3	Antenna and Ground	200 mmfd.	1500 kc.	BC	1500 kc.	C2	Align Antenna
4	Antenna and Ground	200 mmfd.	600 kc.	BC	Rock at 600 kc.	C12	Padder
5	Antenna and Ground	400 ohms	6.5 mc.	SW1	6.5 mc.	C10	Align SW2
6	Antenna and Ground	400 ohms	18 mc.	SW2	18 mc.	C9	Set Osc. to Dial Scale
7	Antenna and Ground	400 ohms	18 mc.	SW2	18 mc.	C3	Align Antenna

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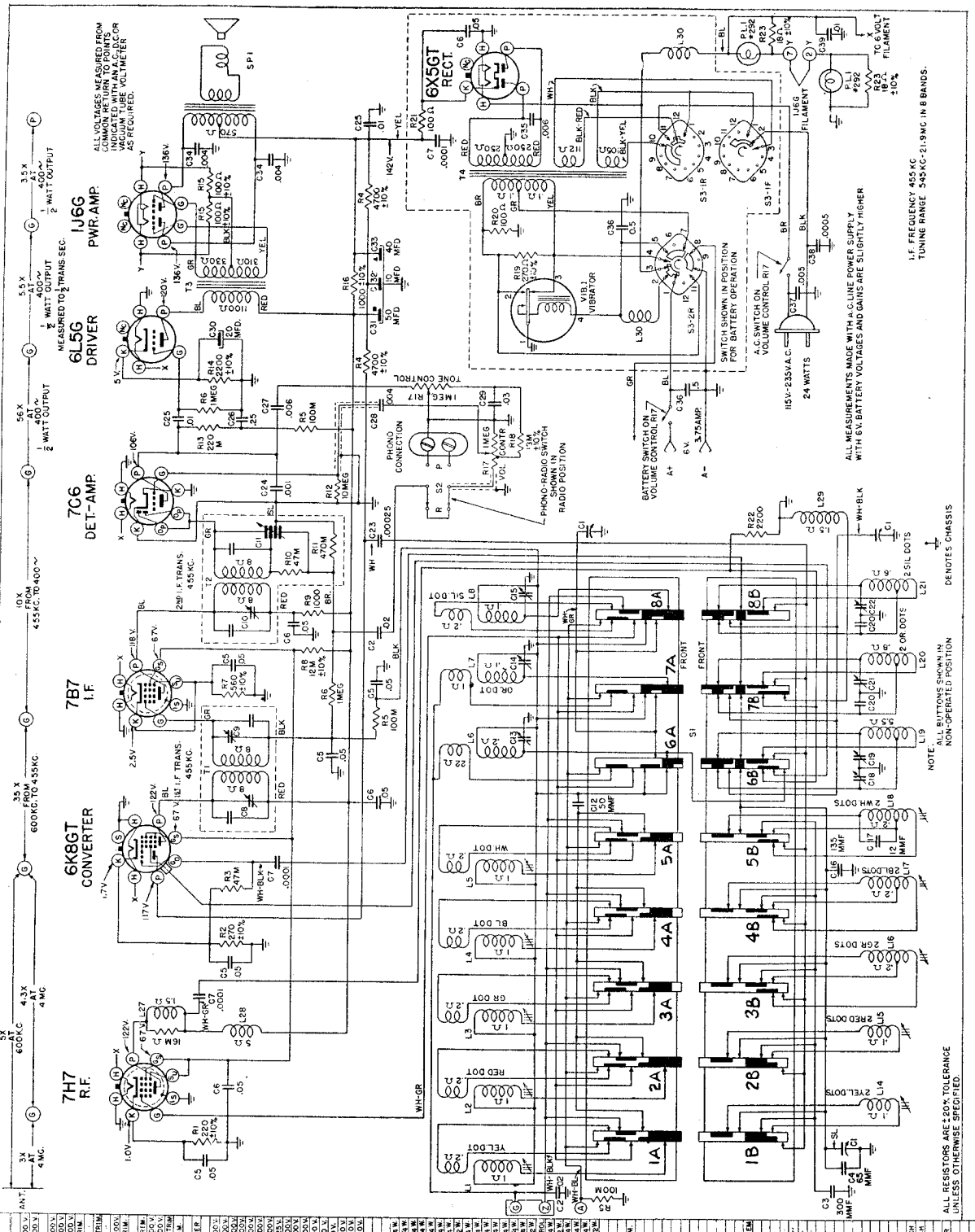
MODEL 7J045T
Chassis 7C61T

ZENITH RADIO CORP.


6K8GT CONVERTER
7H7 R.F.
7B7 I.F.
7C6 DET-AMP
6L5G DRIVER
1J6G PWR.AMP.
6X5GT RECT.
ALL VOLTAGES MEASURED FROM COMMON RETURN TO POINTS INDICATED WITH AN A.C.-D.C. OR VAGUUM TUBE VOLTMETER AS REQUIRED.
PUSHBUTTON SWITCH LABLED 1A, 1B, ETC. FOR REFERENCE TO CLARIFIED SCHEMATICS
NOTE ALL BUTTONS SHOWN IN NON-OPERATED POSITION
DENOTES CHASSIS
ALL RESISTORS ARE ±20% TOLERANCE UNLESS OTHERWISE SPECIFIED.
ALL MEASUREMENTS MADE WITH A.C. LINE POWER SUPPLY WITH 6 V. BATTERY VOLTAGES AND GAINS ARE SLIGHTLY HIGHER
I.F. FREQUENCY 455 KC
TUNING RANGE 545KC-21.9MC IN 8 BANDS.
SWITCH SHOWN IN POSITION FOR BATTERY OPERATION
A.C. SWITCH ON VOLUME CONTROL R17
115V-235V A.C. 24 WATTS
BATTERY SWITCH ON VOLUME CONTROL R17
PHONO-RADIO SWITCH SHOWN IN RADIO POSITION
PHONO CONNECTION
TONE CONTROL
VIB.1 VIBRATOR
S3-1R
S3-1F
S3-2R
1J6G FILAMENT
TO 6.3 VOLT FILAMENT
SP1

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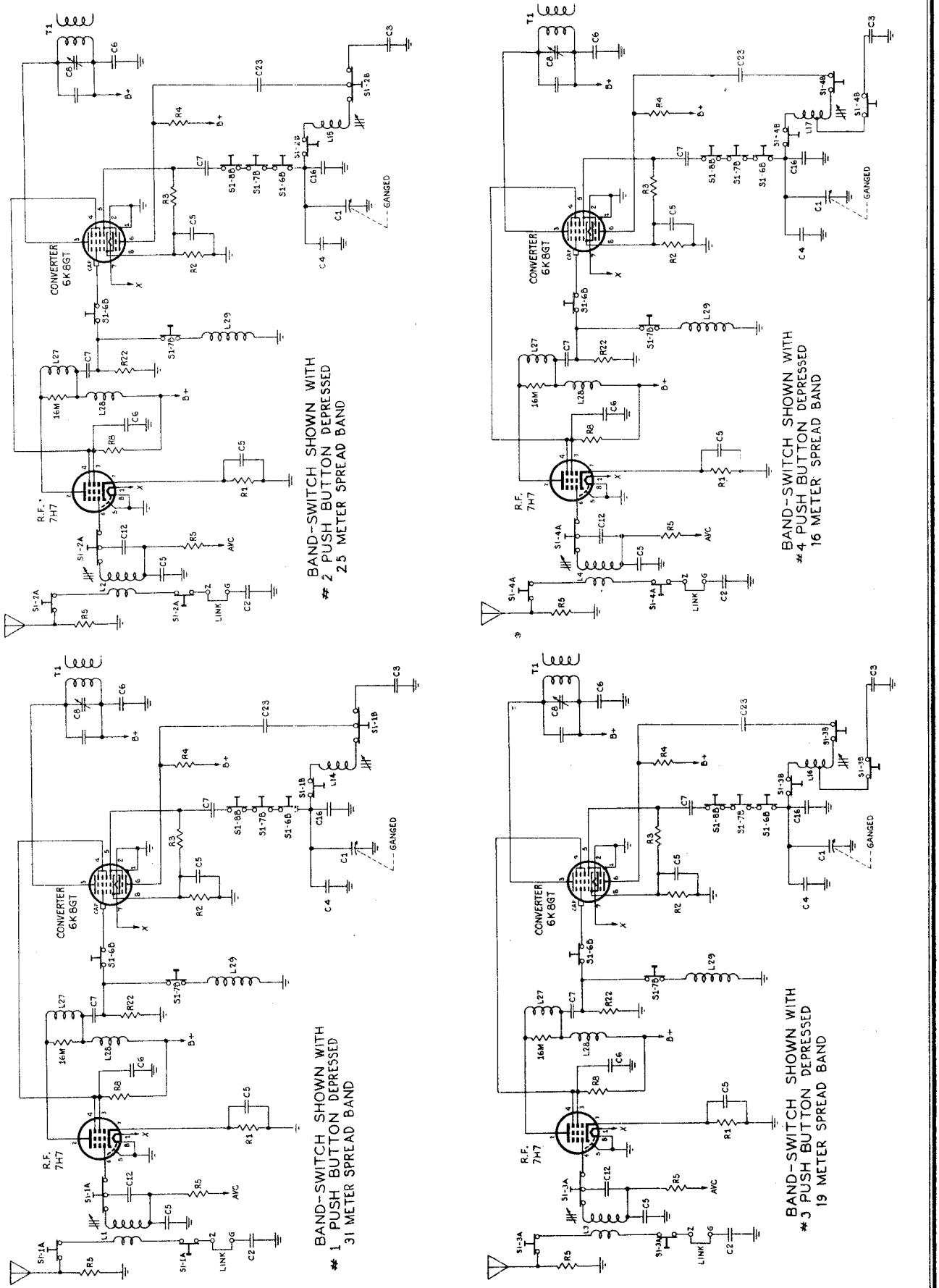
For Alignment, see P.15-19

ZENITH RADIO CORP.



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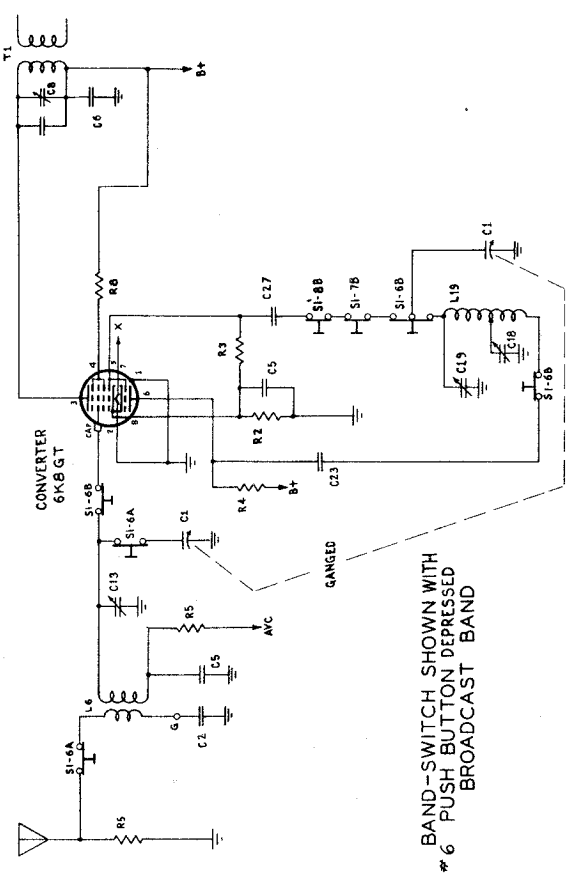
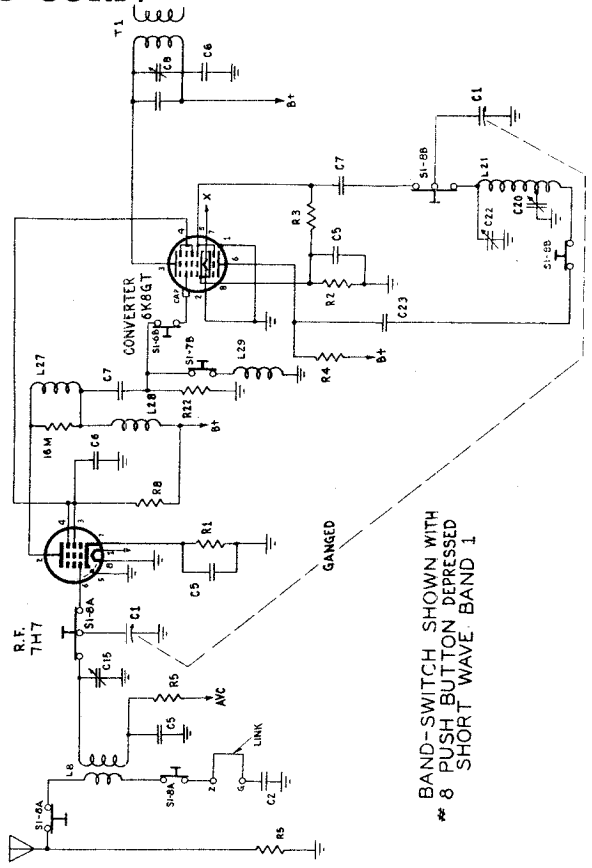
MODEL 7J045T

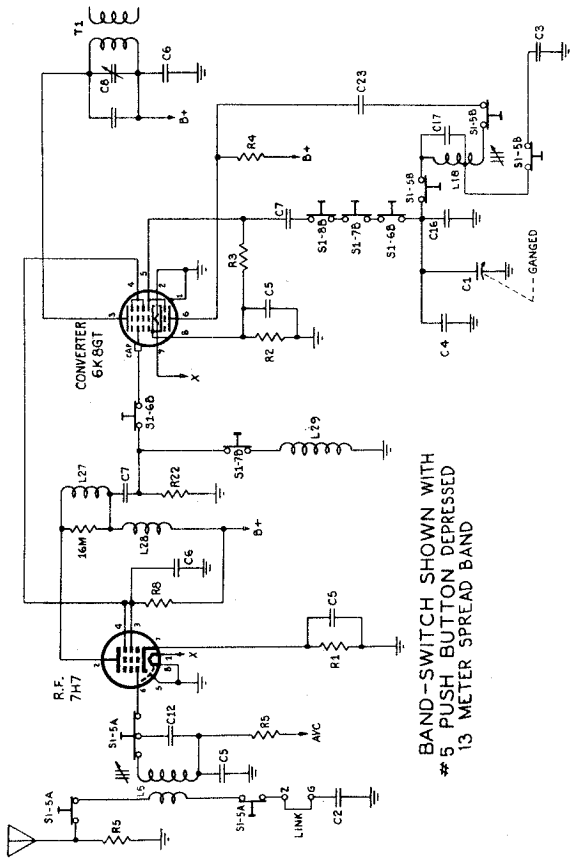
ZENITH RADIO CORP.



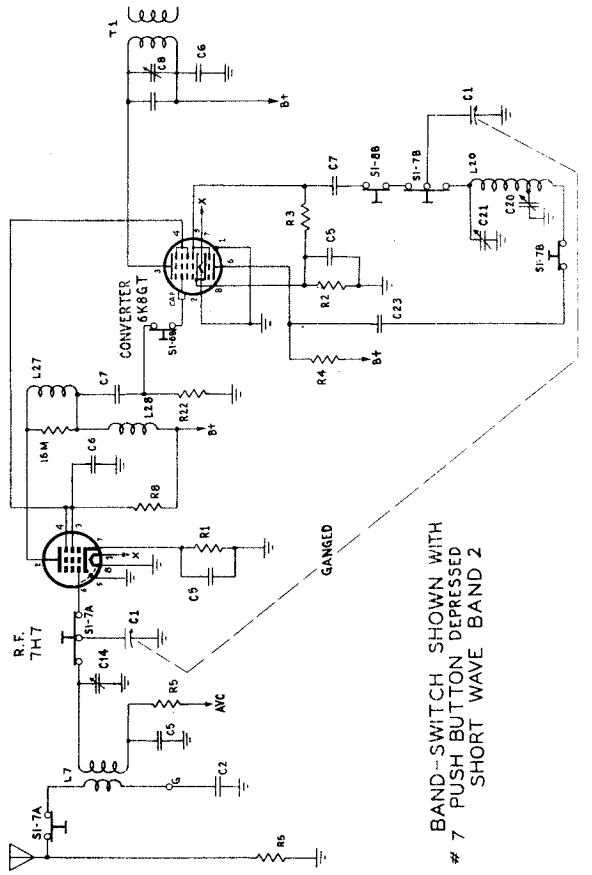
BAND-SWITCH SHOWN WITH
6 PUSH BUTTON DEPRESSED
BROADCAST BAND



BAND-SWITCH SHOWN WITH
8 PUSH BUTTON DEPRESSED
SHORT WAVE BAND 1



BAND-SWITCH SHOWN WITH
5 PUSH BUTTON DEPRESSED
13 METER SPREAD BAND



BAND-SWITCH SHOWN WITH
7 PUSH BUTTON DEPRESSED
SHORT WAVE BAND 2

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MODEL NO. 7J045T

Chassis No. 7C61T

INSTRUCCIONES PARA LA INSTALACION Y FUNCIONAMIENTO

INFORMACION GENERAL

Este receptor es un moderno aparato superheterodino de 7 válvulas, con una gama de ondas comprendiendo frecuencias entre 545 y 21,900 Kilociclos. Esta gama de ondas está dividida en tres bandas, marcadas en el cuadrante como sigue: "Broadcast" — "Short Wave 1" — "Short Wave 2." La mayor facilidad de sintonización en la onda corta en las cinco escalas adicionales, incorporando las bandas de 13, 16, 19, 25 y 31 metros, se obtiene por medio de ampliación de banda, la cual permite que las estaciones de onda corta se sintonicen con la misma facilidad que las estaciones locales.

¡OJO! Asegúrese que los pernos que soportan el chasís durante el embarque estén suficientemente flojos para premitir que el chasís flote libremente antes de que el receptor se ponga a funcionar.

SUMINISTRO DE ENERGIA

Este radio receptor puede ajustarse para ser operado con una fuente de energía de 115 voltios, 40 a 60 períodos, o con 235 voltios, 40 a 60 periodos, así como con un acumulador de 6 voltios, por medio del conmutador que se encuentra en la parte posterior del chasis.

Cuando se utiliza un acumulador como fuente de energía conéctese el alambre ROJO del receptor al polo positivo (+) del acumulador, y el alambre NEGRO del receptor al polo negativo (—).

Si el receptor produce un zumbido constante cuando está conectado con corriente alterna, inviértase el tomacorriente en el zócalo de la pared.

¡OJO! BAJO NINGUNA CIRCUNSTANCIA HA DE CONECTARSE ESTE RECEPTOR A CORRIENTE CONTINUA (C.C.) POR CAUSAR ESTO DAÑOS IRREPARABLES.

INSTALLATION, OPERATING AND SERVICE INSTRUCTIONS

GENERAL

This receiver is a modern 7-tube superheterodyne with tuning ranges covering frequencies between 545 k.c. and 21,900 k.c. This tuning range is divided into three bands which are labeled on the dial scale "Broadcast" — "Short Wave 1" and "Short Wave 2." Extreme ease of tuning over the short wave band is provided by means of five additional tuning ranges covering the 13, 16, 19, 25 and 31 meter bands with a band spread arrangement which allows short wave stations to be tuned in as easily as stations on the broadcast band.

CAUTION: Make sure that the bolts supporting the chassis during shipment are loosened sufficiently to allow the chassis to float freely before the receiver is placed in operation.

POWER SUPPLY

This receiver may be adjusted for use on either a 115 volt, 40 to 60 cycle power supply, 235 volt 40 to 60 cycle power supply, or a 6-volt storage battery by means of the switch on the rear of the chassis.

When a storage battery is used as the source of power, care should be taken that the RED battery lead of the receiver is connected to the positive (+) terminal of the battery, and the BLACK lead to the negative (—) terminal of the battery.

If the receiver has a constant hum when connected to an alternating current power supply reverse the power plug in the wall socket.

CAUTION: UNDER NO CIRCUMSTANCES SHOULD THE POWER CORD BE CONNECTED TO DIRECT CURRENT AS SEVERE DAMAGE WILL RESULT.

TUBES

The following tubes are used (See Fig. 2)

7H7	7C6
6K8GT	6L5G
7B7	1J6G
	6X5G

INSTRUCTIONS POUR INSTALLATION ET FONCTIONNEMENT

GENERALITES

Poste de T.S.F. superhétérodyne de 7 lampes avec rangées couvrant les périodes entre 545 et 21,900 k.c. L'échelle de sélection est divisée en trois rangées marquées sur le vernier "Broadcast" — "Ondes courtes 1" et "Ondes courtes 2." La sélection des stations en ondes courtes se fait aussi facilement que celle sur ondes longues, grâce à 5 échelles différentes pourvues d'une extension, couvrant les rangées de 13, 16, 19, 25 et 31 mètres.

PRECAUTION: Assurez-vous que les boulons qui supportent le châssis en route soient suffisamment lâches pour permettre qu'il flotte librement avant que le poste soit mis en fonction.

SOURCE D'ALIMENTATION

Ce poste récepteur peut être ajusté pour être utilisé sur une source d'alimentation de 115 volts, de 40 à 60 périodes, ou sur une de 235 volts de 40 à 60 périodes ou encore sur un accu de 6 volts, au moyen du commutateur qui se trouve au dos du chassis.

Quand on utilise un accumulateur comme source d'alimentation, on doit faire attention que le fil rouge au dos du récepteur soit branché à la borne positive (+) de l'accumulateur, et le fil noir, à la borne négative (—).

Si un grondement se produit dans le récepteur après qu'il ait été branché à une source d'alimentation de courant alternatif, changez la position de la fiche dans le réceptacle monté dans la cloison.

PRECAUTION: CE RECEPTEUR DE T.S.F. NE DOIT SOUS AUCUN PRETEXTE ETRE BRANCHE A UNE SOURCE DE COURANT CONTINU (C.C.) POUR EVITER DES DOMMAGES SERIEUX.

LAMPES

Il emploie les lampes suivantes (Voir Fig. 2):

7H7	7C6
6K8GT	6L5G
7B7	1J6G
	6X5G

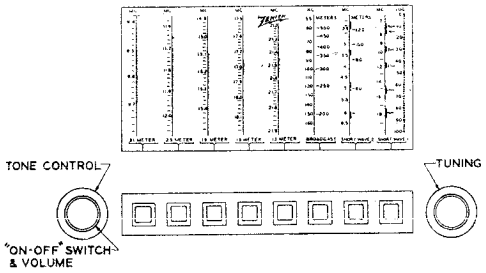

FIG. 1. Controls

VALVULAS

Las siguientes válvulas son usadas (Véase Fig. 2)

7H7	7C6
6K8GT	6L5G
7B7	1J6G
	6X5G

Cuando se usa una antena "doublet," el alambre doble tiene que conectarse a las terminales A y Z en la parte de atrás del chasis, y el anillo que conecta las terminales Z y G tiene que ser removido.

Cuando se usa una antena de un solo alambre, éste se conecta a la terminal A, y el anillo que conecta las terminales Z y G se deja donde está, y una buena conexión tierra tiene que hacerse a la terminal G. La antena tiene que ser de 15 a 30

When using a doublet antenna the twisted pair should be connected to terminals A and Z on the rear of the chassis, and the connecting link between terminals Z and G should be removed.

When using a single wire antenna, the lead-in is connected to terminal A, the connecting link between terminals Z and G is left in place and a good ground connection should be connected to terminal G. The antenna should be from 50 to 100 feet in length, and placed as high as possible. Too long an antenna may cause interference between stations, while too

Quand on emploie une antenne "Doublet" les fils doivent être branchés aux bornes A et Z au dos du châssis, et le contacteur entre les bornes Z et G doit être enlevé.

Quand l'antenne que l'on utilise a un seul fil, il doit être branché à la borne A, le contacteur entre Z et G laissé en place et une bonne prise de terre faite à la borne G. L'antenne doit avoir de 50 à 100 pieds de long et installée aussi haut que possible. Une antenne trop longue peut causer des interférences entre les stations, tandis qu'une trop courte donnera une réception

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metros de largo y tiene que colocarse tan alto fuera del edificio como sea posible. Una antena demasiado larga puede causar interferencia entre estaciones, mientras que una antena demasiado pequeña dará como resultado una recepción defectuosa de las estaciones más débiles. Nunca debe conectarse el receptor a una antena vieja sin antes haberla examinado cuidadosamente para determinar su condición, porque las conexiones pueden estar rotas u oxidadas, reduciendo así el rendimiento del receptor.

FUNCIONAMIENTO

La posición y el nombre de cada perilla de control está señalado en la Fig. 1. El uso de estas perillas es como sigue:

Interruptor de Fuerza y Regulador de Volumen — Gírese la perilla a la derecha. Se requieren aproximadamente 30 segundos para que las válvulas se calienten y el receptor esté en condiciones para funcionar. Siguiendo la rotación de esta perilla se aumenta el volumen.

Conmutador de Ondas — Los ocho botones debajo del cuadrante determinan la banda que ha de usarse. Solamente apriete el botón correspondiente a la banda que se desea sintonizar. La escala del cuadrante que se encuentra directamente encima del botón que se usa, automáticamente entra en función.

Sintonización—La perilla situada a la derecha se utiliza para sintonizar las diferentes escalas del cuadrante. La sintonización ha de hacerse lenta y cuidadosamente para evitar que las estaciones más lejanas y débiles pasen desapercibidas; un arreglo de volante interior se usa para pasar fácil y rapidamente dé un extremo al otro. Solamente hágase girar la perilla en la dirección deseada, y el volante continuará la rotación hasta el sitio deseado en la escala, donde el indicador se detiene por medio de una ligera presión en la perilla.

small an antenna will result in poor reception from the weaker stations. Never connect an old antenna to your receiver without a thorough examination first being made to determine its condition, as the connecions may be broken or corroded and cause very unsatisfactory reception.

OPERATION

The position and purpose of the control knobs are shown in Fig. 1. The use of each is as follows:

Volume and On-Off Switch — Rotation to the right turns the receiver on. Approximately 30 seconds is required for the tubes to heat before reception will be obtained. Continued rotation of this control regulates the volume.

Band Switches. — The 8 push buttons at the bottom of the escutcheon determine which tuning range is in use. Merely press the button corresponding to the wave band over which tuning is desired. The dial scale immediately above the button which has been pressed will then be in use.

Tuning — The right hand knob is used to tune over the various dial scales. All tuning should be very slowly and carefully done so as not to pass over the weaker more distant stations. The internal fly wheel arrangement is used to provide an easy means of moving rapidly from one portion of the scale to another. Merely spin the knob in the direction required, the fly wheel will keep it in rotation until the desired portion of the scale is reached after which a slight pressure on the knob will stop further rotation.

When tuning for a station move the pointer over the signal in both directions and set it at the point of maximum volume, least noise and clearest tone. Daylight has a decided effect on the reception of short wave stations and different wave lengths are most effective at different times of the day. The following table may be used as a

piètre dans les stations faibles. Il ne faut jamais brancher le récepteur à une vielle antenne sans en faire l'examen complet de sa condition, car les connections peuvent être cassées ou corrodées et donner par là un mauvais rendement.

FONCTIONNEMENT

La position et le but des boutouns de commande sont montrés sur la Fig. 1. et leur utilisation est comme suit:

Commutateur Marche-Arrêt et de Volume — Le récepteur est branché quand le bouton est tourné vers la droite. Trente secondes suffisent approximativement pour que les lampes puissent être chauffées avant que l'on obtienne une réception. On contrôle le volume en tournant le bouton davantage vers la droite.

Commutateur d'échelles — Les 8 bouton-poussoirs au bas de l'écusson indiquent l'échelle utilisée. Pressez simplement sur un bouton pour obtenir l'échelle que l'on désire. Immédiatement le vernier qui se trouve au-dessus du bouton sera mis en utilisation.

Sélection — Le bouton à droite sert à faire la sélection des diverses échelles sur le vernier. La sélection doit être faite doucement et soigneusement pour ne pas passer les stations faibles et lointaines. Une combinaison de roues à engrenages procure le moyen de faire le déplacement d'un bout à l'autre du vernier rapidement. Faites simplement tourner le bouton dans la direction voulue et le système de roues à engrenages continuera à tourner jusqu'à ce que l'on atteigne la partie du vernier que l'on désire, après quoi une légère pression sur le bouton arrêtera la rotation de ce dernier.

Quand on fait la sélection d'une station, placez l'aiguille-repère des deux cotés de la démarcation jusqu'à ce que l'on obtienne le volume maximum, le moindre bruit, et la tonalité la plus claire. La réception sur

Cuando se esté sintonizando una estación, muévase la aguja sobre la señal en ambas direcciones hasta encontrar el punto de mayor intensidad, menor ruido y mayor claridad de tono. La luz del día tiene una decidida influencia sobre la recepción de la onda corta, y diferentes longitudes de onda alcanzan mayor eficacia a diferentes horas del día. El cuadro a la derecha puede ser usado como guia para sintonizar a diferentes horas del día y la noche.

REGULADOR DE TONO

El regulador de tono proporciona un medio para variar la proporción de tonos altos y bajos y permite que el tono del receptor se cambie a gusto del radio-escucha.

Rotación a la izquierda aumenta la proporción de notas bajas y rotación a la derecha aumenta las notas altas.

FONOGRAFO

Este receptor puede ser usado como un excelente amplificador de fonógrafo conectando cualquier tocadiscos con un brazo acústico de alta impedancia a las terminales de fonógrafo en la parte posterior de chasis y poniendo el conmutador de fono-radio en la posición "phono." Los reguladores de volumen y tono del receptor se usan para regular la reproducción de discos.

guide for listening at different times during the day or night.

SHORT WAVE BAND	TIME OF BEST RECEPTION
15 meters and below	A.M. (Morning hours)
19 and 25 meters	P.M. (Afternoon)
25 and 31 meters	P.M. (Early evening)
31 and 49 meters	P.M. (Late evening)

TONE CONTROL

The tone control provides a means of varying the proportion of bass and treble notes and allows the tone of the receiver to be changed to suit the user's taste.

Rotation to the left increases the proportion of bass or low notes and rotation to the right increases the treble notes.

PHONO

The receiver may be used as an excellent phono amplifier by connecting any good high impedance type phono pickup to the phono terminals on the rear of the chassis and placing the phono-radio switch on the rear of the chassis in the "phono" position. The volume and tone controls of the receiver will be effective on record reproduction.

ondes courtes est affectée définitivement par le jour, de même que celle sur différentes longueurs d'ondes est plus ou moins efficace à divers moments de la journée. Le graphique à gauche peut être utilisé comme guide d'écoute pour la réception à différents moments pendant le jour ou la nuit.

COMMANDE DE TONALITE

La commande de tonalité procure un moyen de combiner les notes basses avec les aigües et permet aussi de changer la tonalité du récepteur à son goût

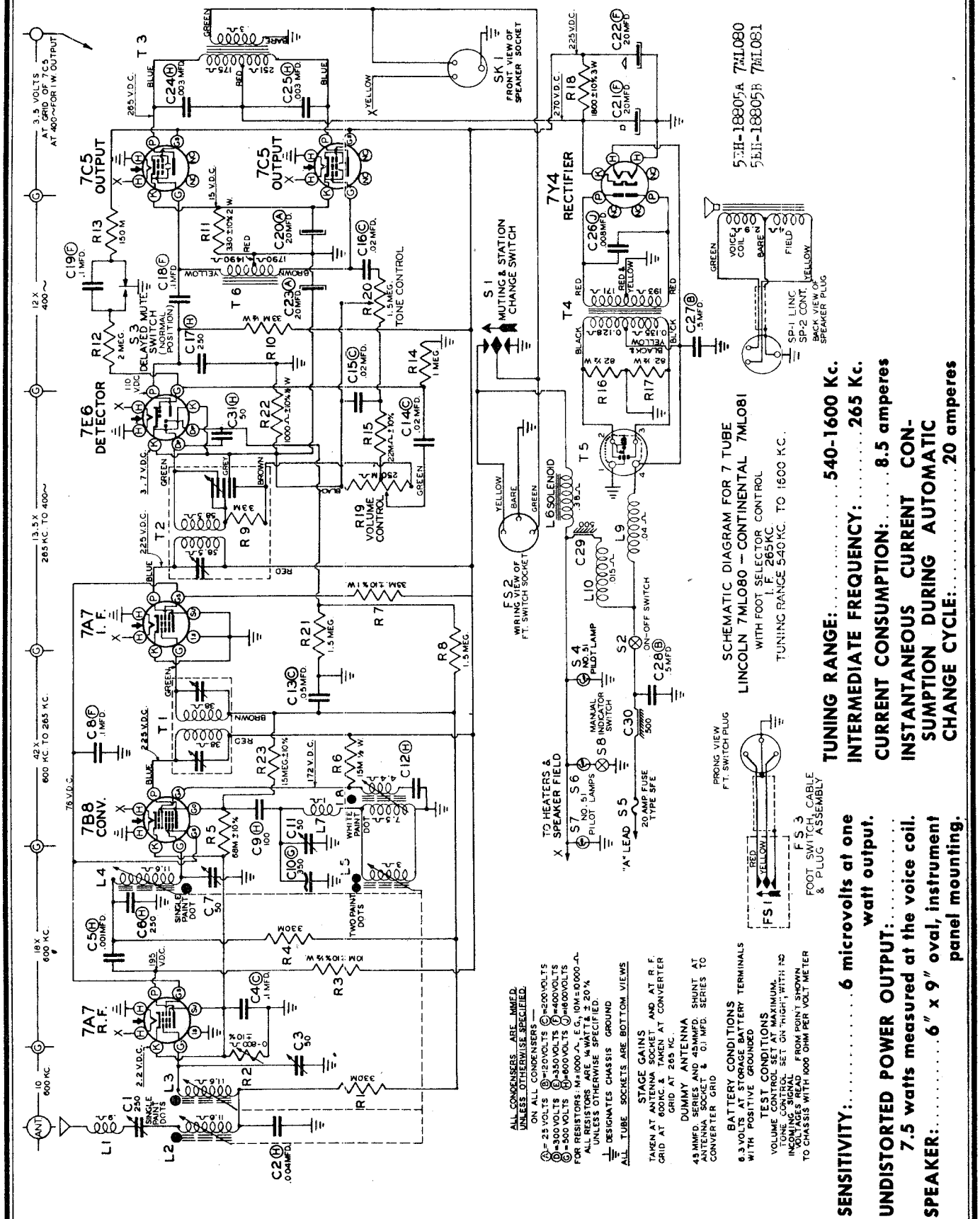
La rotation du bouton vers la gauche augmente les notes basses et vers la droite les notes aigües.

PHONO

Le récepteur peut être utilisé comme un excellent amplificateur de phono en branchant le pickup de bonne impédance aux bornes du phono au dos du châssis et en plaçant le commutateur radio-phono qui se trouve aussi au dos du châssis dans la position "phono." Les commandes de volume et de tonalité sont très efficaces dans la reproduction phonographique.

ZENITH RADIO CORP.

MODELS 7ML080 Lincoln,
7ML081 Continental,
Chassis 7C80



ALL CONDENSERS ARE MMFD. UNLESS OTHERWISE SPECIFIED

ON ALL CONDENSERS
(A)= 25 VOLTS (B)=120 VOLTS (C)=200 VOLTS
(D)=300 VOLTS (E)=350 VOLTS (F)=400 VOLTS
(G)=500 VOLTS (H)=600 VOLTS (I)=800 VOLTS

FOR RESISTORS: M=1000 Λ, E.G., 10M=10000 Λ.
ALL RESISTORS ARE ½ WATT & ± 20% UNLESS OTHERWISE SPECIFIED.

⏚ DESIGNATES CHASSIS GROUND

ALL TUBE SOCKETS ARE BOTTOM VIEWS

STAGE GAINS
TAKEN AT ANTENNA SOCKET AND AT R.F. GRID AT 600KC & TAKEN AT CONVERTER GRID AT 265 KC.

DUMMY ANTENNA
45 MMFD. SERIES AND 45MMFD. SHUNT AT ANTENNA SOCKET & 0.1 MFD. SERIES TO CONVERTER GRID

BATTERY CONDITIONS
6.3 VOLTS AT STORAGE BATTERY TERMINALS WITH POSITIVE GROUNDED

TEST CONDITIONS
VOLUME CONTROL SET AT MAXIMUM.
TONE CONTROL SET ON "HIGH"; WITH NO INCOMING SIGNAL.
VOLTAGES READ FROM POINT SHOWN TO CHASSIS WITH 1000 OHM PER VOLT METER

SCHEMATIC DIAGRAM FOR 7 TUBE
LINCOLN 7ML080 — CONTINENTAL 7ML081
WITH FOOT SELECTOR CONTROL
I. F. 265KC
TUNING RANGE 540 KC. TO 1600 K.C.

TUNING RANGE: ..... 540-1600 Kc.
INTERMEDIATE FREQUENCY: ..... 265 Kc.
CURRENT CONSUMPTION: ..... 8.5 amperes
INSTANTANEOUS CURRENT CONSUMPTION DURING AUTOMATIC CHANGE CYCLE: ..... 20 amperes

SENSITIVITY: ..... 6 microvolts at one watt output.
UNDISTORTED POWER OUTPUT: .....
7.5 watts measured at the voice coil.
SPEAKER: ..... 6" x 9" oval, instrument panel mounting.

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DELAYED AUTOMATIC MUTING CIRCUIT

Pressing the touch-bar or the foot control switch automatically mutes the receiver during the station changing cycle. After the hand or foot pressure is removed, the noise of tuning through stations on the return stroke is eliminated automatically. This special circuit applies a large negative voltage to the 1st audio grid to bias it beyond cut off. When the tuner is operated, the delayed muting switch S3 on the back of the tuner connects the grid side of the condenser C19 to ground and charges it positively. As soon as the tuner starts its return stroke, the switch grounds the positive terminal of the condenser and ungrounds the grid side. The grid side now becomes negative with respect to ground and cuts off the 1st audio tube. The charge rapidly leaks off through R12 and R14, and the receiver operates normally after the change cycle.

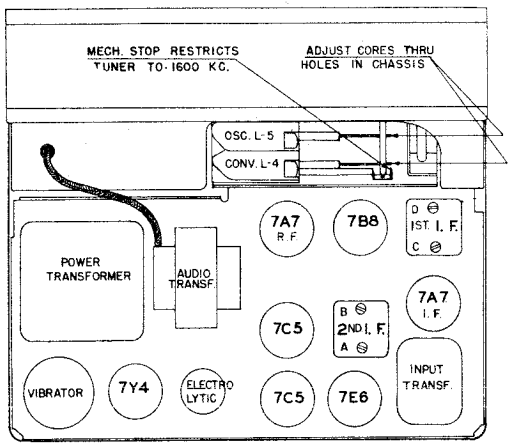

Fig. 9. Top View of Chassis

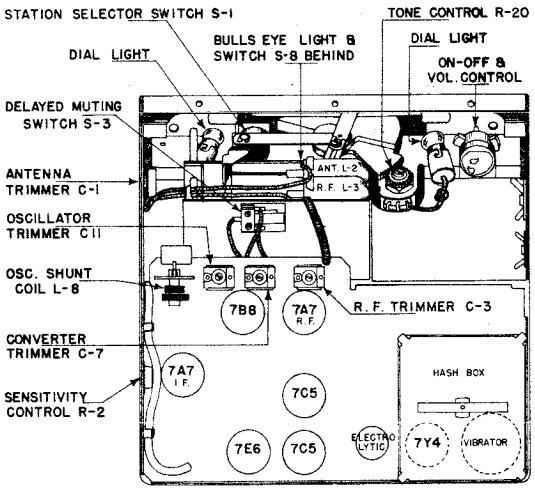

Fig. 10. Bottom View of Chassis

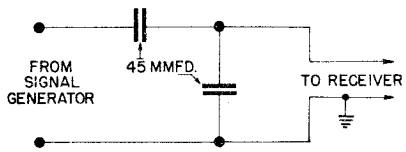

Fig. 11

Figure 11 shows the schematic of a recommended dummy antenna, closely resembling actual antenna capacity, to be used in series with signal generator leads when aligning the R.F. section of the receiver.

ALIGNMENT

Maximum performance depends on accurate alignment of the receiver; therefore follow these instructions carefully.

CAUTION: Make all alignment adjustments to the receiver with the volume control set at maximum and the tone control in the treble position. Reduce the signal intensity as much as possible at the signal generator. Connect the output meter across the voice coil.

I.F. ALIGNMENT PROCEDURE

1. Remove top and bottom covers from receiver.
2. Set signal generator to 465 Kc.
3. Apply signal from generator through a .1 Mfd. dummy to 7B8 converter grid. (Pin No. 6 on socket.)
4. Adjust I.F. trimmers A, B, C and D (Fig. 9) in the order named for maximum output. Repeat the operation to assure accurate alignment.

R.F. AND OSCILLATOR ALIGNMENT

1. Connect signal generator leads through dummy illustrated in Fig. 11 to antenna lead in socket on receiver.
2. Set signal generator to 535 Kc.
3. Place set in manual tuning position and set dial to 535 Kc.
4. Adjust oscillator trimmer C-11 (Fig. 10) for maximum response.
5. Set signal generator to 1200 Kc.
6. Tune set to 1200 Kc.
7. Adjust converter trimmer C-7 (Fig. 10) and R.F. trimmer C-3 (Fig. 10) for maximum response.
8. If dial calibration is off after making above adjustments, a correction can be made by turning eccentric screw at fulcrum of dial pointer.

CORE OR COIL REPLACEMENT ONLY

WARNING: The following adjustments are to be made ONLY if a core or coil is replaced.

1. Replace coil or core.
2. Set signal generator to 1700 Kc.
3. Connect signal generator leads through dummy illustrated in Figure 11 to antenna receptacle on the receiver.
4. Set receiver dial to 1600 Kc. (Maximum high frequency end of dial.)
5. Screw the core complete out of the antenna coil, the R.F. coil, the converter coil, and the oscillator coil.
6. Adjust oscillator trimmer C-11 Fig. 10 at 1700 Kc.
7. Adjust converter trimmer C-7, R.F. trimmer C-3, and antenna trimmer C-1 (Fig. 10) for maximum output reading.
8. Replace cores to their approximate original positions.
9. Set generator dial and receiver dial to 1200 Kc.
10. Adjust oscillator core L5 (Figure 9) to scale at 1200 Kc.
11. Adjust antenna, R.F. and converter cores (Figures 9 and 10) for maximum output reading.
12. Set signal generator to 600 Kc.
13. "Rock in" shunt oscillator coil L8 (Fig. 10) for maximum output reading. This should be done only as a last resort. This is the same as rocking in the padder condenser on a ganged condenser receiver.
14. Check receiver at 1200 Kc. for calibration and gain. If the receiver is off scale or weak, repeat operations 9, 10 and 11.
15. After alignment is complete, the maximum high frequency tuning range should be checked. If the range is greater or less than 1605 Kc., the mechanical stop for the tuner cross arm should be bent to limit the frequency coverage to 1605 Kc.

After all adjustments have been made, glue core screws with speaker cement.

IMPORTANT: After reinstalling the receiver in the car, allow it to operate for approximately 15 minutes to reach normal operating temperature. Extend antenna to maximum. Check the antenna trimmer alignment on a weak station at approximately 1200 Kc.

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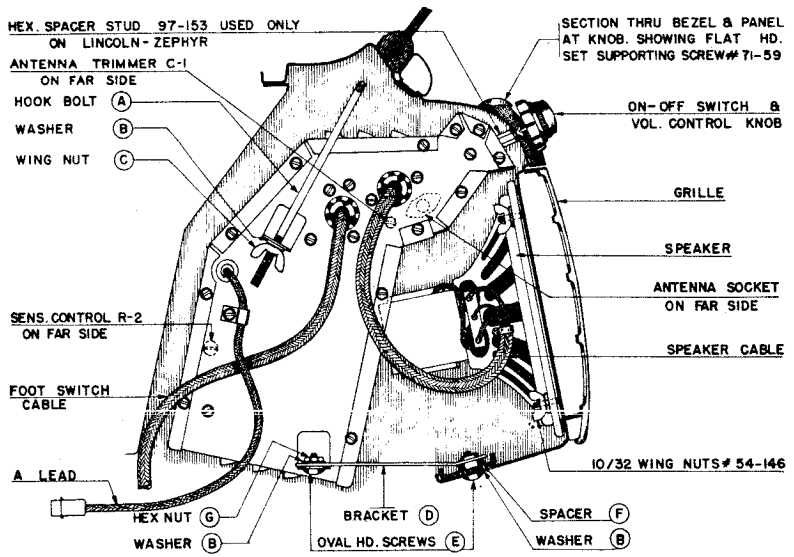

Fig. 2. Lincoln

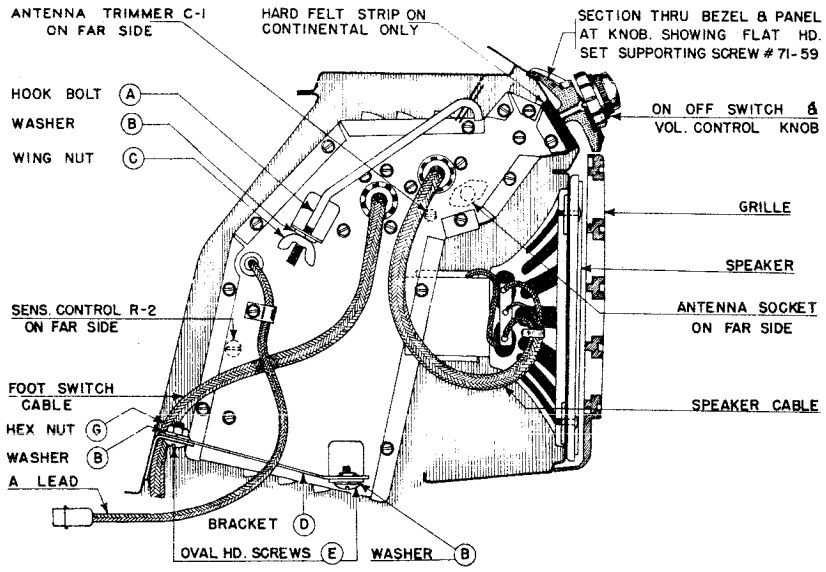

Fig. 2A. Continental

RECEIVER INSTALLATIONS

Figures 1, 1A, 2 and 2A, illustrating the escutcheon plates, control knobs and the installed receivers, are given here to facilitate removal and reinstallation of the receivers when service or repair is necessary.

To take the receiver from the car, remove the tuning and volume control knobs. Remove the 8-32 flathead screws that support the receiver at the top. Remove the lower support brackets "D" and finally loosen the hook bolts "A."

To remove the Continental speaker, remove grille (held in place by four nuts on back side of instrument panel). Then remove four machine screws No. 69-84 holding the speaker to the front of the instrument panel. (Fig. 2A.)

The Lincoln speaker is held to the rear of the panel by four wing nuts No. 54-146. (Fig. 2.)

MANUAL TUNING

1. Press station selector touch-bar (Fig. 1) several times or until the green dot appears in the back ground of the dial.

2. Pull manual tuning (right hand) control knob outward and turn to tune in desired station. Be sure to tune to exact frequency to assure the best tone quality.

VOLUME—Adjust left hand control knob for desired volume.

TONE CONTROL—The tone control is located under dial cale. (Fig. 1.) Turn in either direction for most pleasing one.

ADJUST-O-MATIC TUNING

If not previously set up for Adjust-O-Matic operation, proceed as follows:

1. Press station selector touch bar (Fig. 1) until green dot appears in dial scale background. Press the touch bar once more to advance Adjust-O-Matic mechanism to the No. 1 position.

2. Pull manual tuning knob outward to engage the Adjust-O-Matic mechanism.

3. Select the station desired and tune to its frequency by turning the tuning knob. Tune very carefully for clearest reception.

4. Press station selector bar, pull tuning knob outward and tune in station desired for No. 2 position. Use same procedure for positions No. 3, 4 and 5.

When the five Adjust-O-Matic positions have been adjusted to the five desired stations as instructed, it is only necessary to press the selector bar to return to dial tuning or to any one of the stations selected on the Adjust-O-Matic.

INTERFERENCE SUPPRESSION

There should be no motor noise or interference from the ignition circuit if the receiver has been installed in the car according to the instructions furnished with it. The interference suppression equipment may be checked for proper installation by referring to the following illustrations:

The two ignition coil condensers No. 22-1147 should be installed as shown in Figure 3 below.

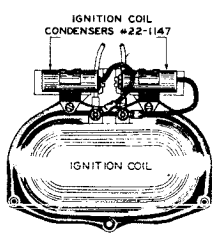

Fig. 3

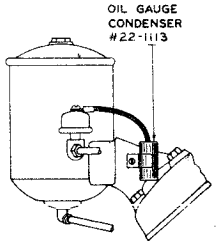

Fig. 4

The oil gauge condenser No. 22-1113 should be installed as shown in Figure 4.

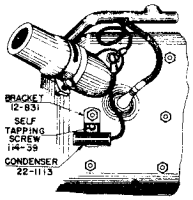

Fig. 5

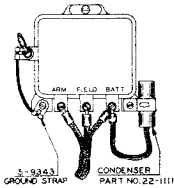

Fig. 6

The temperature gauge condenser No. 22-1113 should be installed with its bracket fastened under one of the cylinder head nuts as shown in Figure 5.

The voltage regulator condenser and ground strap should be installed as shown in Figure 6.

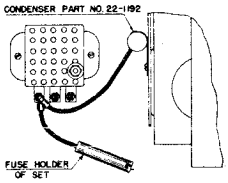

Fig. 7

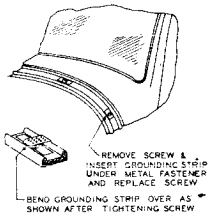
REMOVE SCREW & INSERT GROUNDING STRIP UNDER METAL FASTENER AND REPLACE SCREW
BEND GROUNDING STRIP OVER AS SHOWN AFTER TIGHTENING SCREW

Fig. 8

The No. 22-1192 condenser and the "A" lead should be connected together at the circuit breaker inside the car above the steering column as shown in Figure 7.

The No. 80-145 motor hood bond spring should be installed as illustrated in Figure 8.

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PARTS LIST LINCOLN MODEL 7ML080 (CHASSIS 7C80)

1946 ADJUST-O-MATIC RADIO

COILS AND CHOKES

Diagram No.	Part No.	Description
L 9	20-313	Main hash choke
T 1	95-944	1st I.F. transformer
T 2	95-945	2nd I.F. transformer
L 1	S8819	Antenna motor noise choke assem.
L 7	S11229	Oscillator series coil assem.
L 5	S12053*	Oscillator tuning coil assem.
L 2	S12060*	Antenna tuning coil assem.
L 3	S12060*	R.F. tuning coil assem.
L 4	S12060*	Converter tuning coil assem.
L 8	S11231*	Oscillator shunt coil assem.
L10	S12233	Motor noise choke coil assem.

Note: In ordering coils marked *, be sure to give color code information.

CONDENSERS

C 9, C12	22-162	100 mmfd.	600 volt
C 8, C19	22-170	.1 mfd.	400 volt
C-17	22-182	250 mmfd.	600 volt
C- 4	22-190	.1 mfd.	200 volt
C-13	22-250	.05 mfd.	200 volt
C-31	22-289	50 mmfd.	600 volt
C-27, C-28	22-908	.5 mfd.	120 volt
C- 6	22-1136	250 mmfd.	600 volt
C- 5	22-1169	.001 mfd.	600 volt
C 2	22-1244	.004 mfd.	600 volt
C14, C15, C16	22-1270	.02 mfd.	200 volt
C 1	22-1420	Antenna trimmer	
C26	22-1448	.008 mfd.	1600 volt
C10	22-1478	350 mmfd. compensator	
C 7, C11	22-1479	Oscillator and converter trimmer	
C 3	22-1480	R.F. trimmer	
C24, C25	22-1481	.003 mfd.	600 volt
C18	22-1482	.1 mfd.	400 volt
C23	22-1483	Dry electrolytic—20 mfd.—25 volt	
C20, C21, C22	22-1484	Dry electrolytic 20 mfd.—25 V. x 20 mfd.-400 V. x 20 mfd.-400 V.	

RESISTORS

R18	63-1370	1800 ohm	3 watt
R11	63-1371	330 ohm	2 watt
R 2	63-1379	Sensitivity control	
R20	63-1384	Tone control	
R19, S 2	63-1385	Volume control and switch	
R14	63-1390	1 megohm	¼ watt
R 1, R 4	63-1392	330M ohm	¼ watt
R15	63-1395	22M ohm	¼ watt
R 5	63-1396	68M ohm	¼ watt
R 7	63-1398	33M ohm	1 watt
R16, R17	63-1399	82 ohm	½ watt
R 6	63-1401	15M ohm	½ watt
R 3	63-1402	10M ohm	½ watt
R10	63-1404	33M ohm	½ watt
R12	63-1405	2 megohm	¼ watt
R23	63-1406	15 megohm	¼ watt
R 8, R21	63-1407	1.5 megohm	¼ watt
R13	63-1408	150M ohm	¼ watt
R22	63-1409	1M ohm	½ watt

MISCELLANEOUS

	19-87	Cable clip
SP1	49-543	6" x 9" dynamic speaker
	52-200	Battery cable fuse to ammeter
	52-350	Battery cable set to fuse
	78-477	Vibrator socket
	78-596	Tube socket—Loktal base (8 cont.)
SK1	78-645	Speaker plug socket
FS2	78-646	Foot switch cable plug socket
	78-251	Antenna connector socket
	93-456	Vibrator cushion washer
T 6	95-946	Input transformer
T 3	95-947	Output transformer
T 4	95-948	Power transformer
	97-235	Set installition mounting stud
S 5	136-12	Fuse—20 amp.
T 5	190-22	Vibrator
	202-418	Instruction book
S 1	S11269	Hand selector & muting switch assem.
FS3	S12041	Foot switch cable & plug assem.
	208-543*	Cone and voice coil assembly

DIAL AND TUNING MECHANISM ASSEMBLY

	12-970	Selector bar support bracket
	12-1160	Light rod retaining bracket
	26-353	Dial scale
	34-122	Tone control gear
	34-132	Indexing disc
	34-133	Ratchet gear
	57-1132	Dial scale back plate
	57-1133	Escutcheon
	73-69	No. 6-32 x 5/16 Allen head set screw
	80-329	Gear indexing spring
	80-331	Cross arm return spring
	80-332	Cam lever spring

DIAL AND TUNING MECHANISM ASSEMBLY (Continued)

Diagram No.	Part No.	Description
	80-336	Ratcher gear return spring
	80-340	Lever spring
	80-341	Kick-off spring
	80-342	Tuning shaft spring
	80-343	Solenoid switch spring
	80-344	Solenoid switch contact spring
	80-429	Indicator switch contact spring
	80-430	Indicator switch contact spring
	80-431	Selector bar tension spring
	97-156	Tone control knob retaining stud
S 4, S 6, S 7	100-32	Dial light bulb (3 used)
	118-34	Pointer drive link
	126-497	Manual indicator light shield
	126-498	Dial light shield
	128-22	Indicator cam
	149-44*	Adjusting spring and core
	187-7	Manual indicator light rod
	188-43	Retaining ring
	188-45	Turret screw lock ring
	S10826	Solenoid end plug & bracket assem.
L 6	S10829	Solenoid and terminal assem.
	S10831	Ratchet and bracket assem.
	S10836	Cross arm assem.
	S11054	Tuning shaft and gear assem.
	S11084	Turret assem.
	S12068	Tuning & volume control knob assem.
	S12069 (46-588)	Selector key bar & bracket assem.
	S12073	Pointer and stud assem. (59-170)
	S12075	Pointer drive bracket & stud assem.
	S12183	Mounting plate and lever assem.
	S12195	Dial light socket & wire assem.—L.H.
	S12196	Dial light socket & wire assem.—R.H.
	S12197	Dial light socket & wire assem.—Manual ind.
	S12232 (46-589)	Tone control knob & bushing assem.

Note: In ordering Adjusting Spring and Core marked *, be sure to give color code information.

MOTOR NOISE SUPPRESSION KIT

S12125	Motor noise suppression kit complete
S-9343	Ground strap
12-831	Suppressor condenser mtg. bracket
22-1111	Voltage regulator condenser
22-1113	Water gauge & oil gauge condenser
22-1147	Ignition coil condenser
22-1192	"A" lead condenser
80-145	Motor hood bond spring
114-39	No. 8 x ¼ hex head S.T. screw

INSTALLATION PARTS

S12126	Set installation kit complete
12-972	Set installation bracket
19-114	Foot switch cable clip
54-99	No. 12-24 x 7/16 hex nut
54-146	No. 10-32 wing nut (4 used)
54-151	No. 12-24 wing nut (2 used)
64-141	Foot switch installation eyelet
68-4	No. 6 Allen head set screw wrench
71-59	No. 8-32 x ½ flat head M.S.
93-340	3/32 x .255 x ½ washer (steel)
93-372	No. 12 int. shakeproof lockwasher
93-524	Foot switch installation washer
112-310	No. 10 x 2 R.H. S.M. screw
112-342	No. 12-24 x 5/8 B.H. M.S.
112-348	Set installation screw

PARTS LIST CONTINENTAL MODEL 7ML081 (CHASSIS 7C80)

1946 ADJUST-O-MATIC RADIO

The parts list for Model 7ML081 is the same as for Model 7ML080 with the following parts omitted and added:

ADD

Diagram No.	Part No.	Description
SP2	49-539	6" x 9" dynamic speaker
	112-545	Set installition screw L.H.
	112-546	Set installation screw R.H.
	69-84	10/32 x ¼ R.H. M.S.
	71-29	8/32 x 7/8 F.H M.S.
	93-369	No. 10 internal shakeproof lock-washer
	93-593	7/16 external shakeproof lock-washer
	208-539*	Cone and voice coil

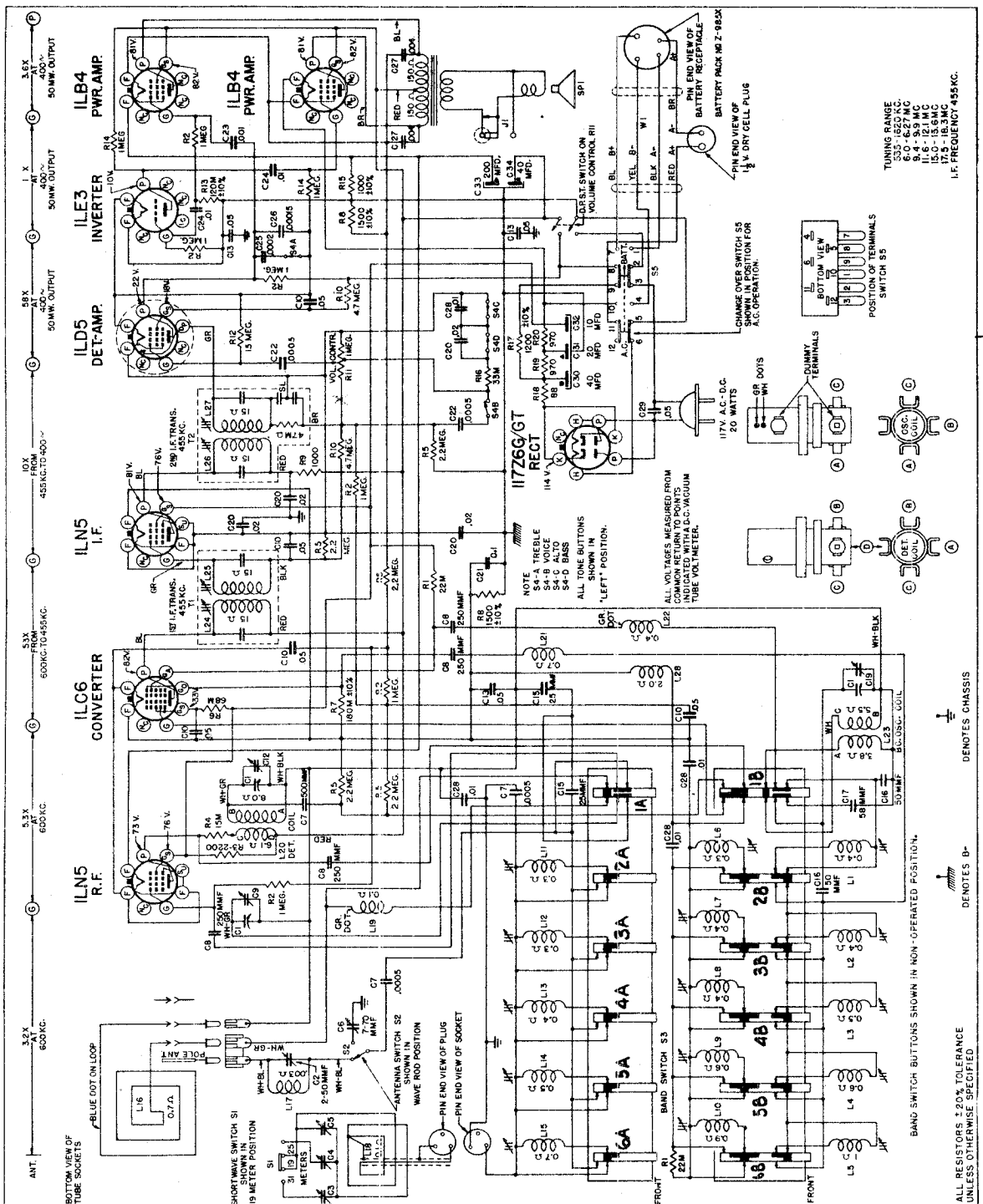
OMIT

Diagram No.	Part No.	Description
SP1	49-543	6" x 9" dynamic speaker
	97-235	Set installation mounting stud
	54-146	10/32 wing nut (4 used)
	71-59	8/32 x ½ flat head M.S.
	112-348	Set installation screw
	208-543	Cone and voice coil

When ordering cone and voice coil assembly marked*, be sure to give manufacturer's code letter that follows base number.

ZENITH RADIO CORP.

MODEL 8G005, Ch. 8C40


ILN5 R.F.
ILC6 CONVERTER
ILN5 I.F.
ILD5 DET-AMP.
ILE3 INVERTER
ILB4 PWR. AMP.
ILB4 PWR. AMP.
117Z6G/GT RECT
3.2X 600KC.
5.3X 600KC.
53X FROM 600KC. TO 455KC.
10X FROM 455KC. TO 600 ~
58X 400 ~ 50MW. OUTPUT
1 X 400 ~ 50MW. OUTPUT
3.6X 400 ~ 50MW. OUTPUT
1ST I.F. TRANS. 455KC. T1
2ND I.F. TRANS. 455KC. T2
ANT.
BLUE DOT ON LOOP
POLE ANT
L16 0.7 Ω
BOTTOM VIEW OF TUBE SOCKETS
SHORTWAVE SWITCH S1
19 METER POSITION
ANTENNA SWITCH S2
WAVE ROD POSITION
PIN END VIEW OF PLUG
PIN END VIEW OF SOCKET
BAND SWITCH S3
BAND SWITCH BUTTONS SHOWN IN NON-OPERATED POSITION.
FRONT
NOTE S4-A TREBLE S4-B VOICE S4-C ALTO S4-D BASS
ALL TONE BUTTONS SHOWN IN 'LEFT' POSITION.
ALL VOLTAGES MEASURED FROM COMMON RETURN TO POINTS INDICATED WITH A 1000 OHMS/VOLT TUBE VOLTMETER.
DRSST. SWITCH ON VOLUME CONTROL R11
CHANGE OVER SWITCH S5 SHOWN IN POSITION FOR A.C. OPERATION
117V A.C. D.C. 20 WATTS
DUMMY TERMINALS
BOTTOM VIEW S5
POSITION OF TERMINALS SWITCH S5
PIN END VIEW OF BATTERY PACK NO. Z-985X
1½ V DRY CELL PLUG
TUNING RANGE USING R.F.C.
5.5 - 12.5 MC
6.0 - 6.27 MC
9.4 - 9.9 MC
11.6 - 12.1 MC
15.0 - 15.3 MC
17.7 - 18.3 MC
I.F. FREQUENCY 455KC.
DENOTES B+
DENOTES CHASSIS
ALL RESISTORS ±20% TOLERANCE UNLESS OTHERWISE SPECIFIED

PUSHBUTTON SWITCH LABLED 1A, 1B, ETC. FOR REFERENCE TO CLARIFIED SCHEMATICS

MICROPHONICS: Howl caused by a microphonic 1LD5 tube. These tubes have been improved, and all tubes after F6E (June '46) are non-microphonic and should replace the older type.

For alignment see pp. 15-69 and 15-70.

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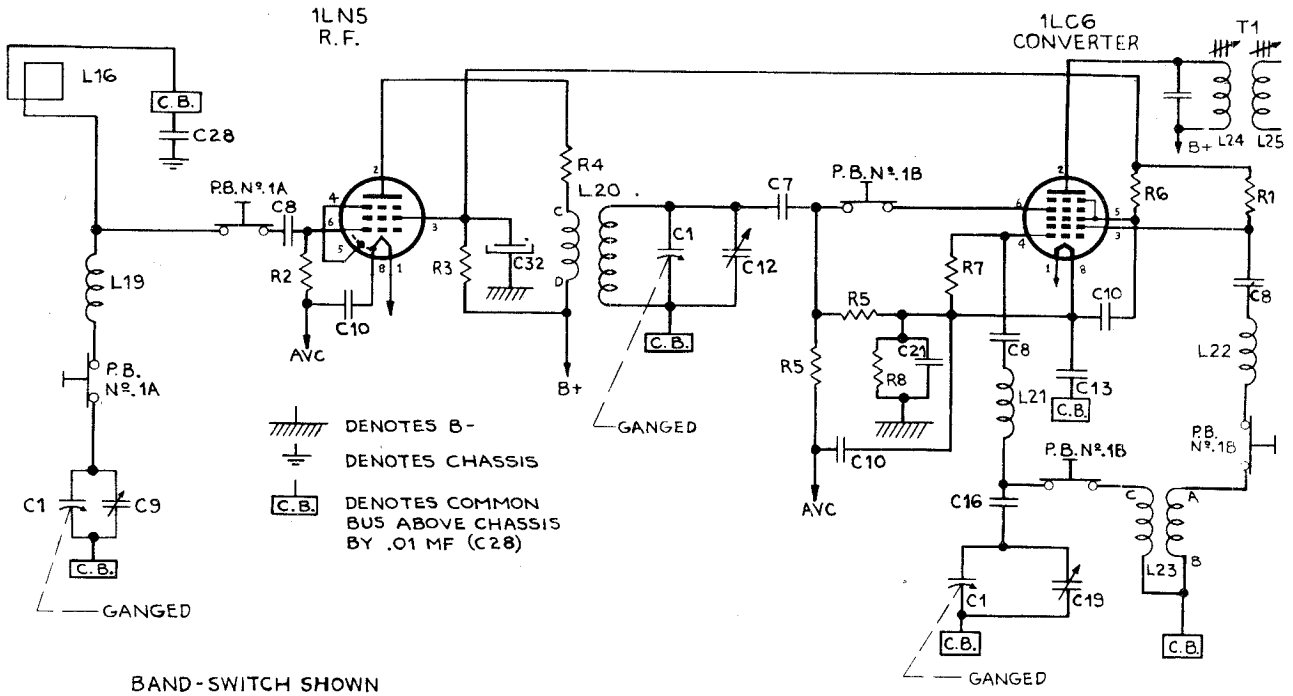
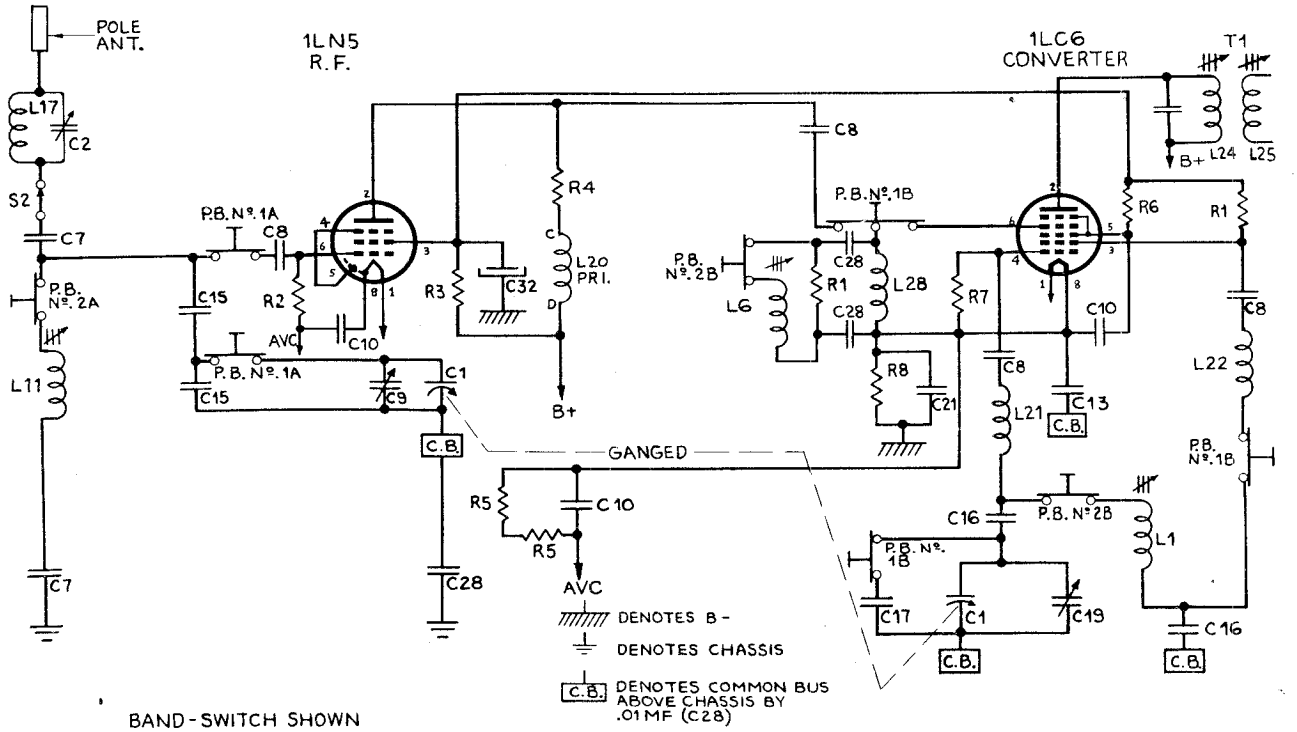
MODEL 8G005
MODEL 8G005BT

ZENITH RADIO CORP.



BAND-SWITCH SHOWN
WITH PUSHBUTTON Nº.1 OF S3 DEPRESSED
BROADCAST BAND
535 - 1620 KC.



BAND-SWITCH SHOWN
WITH PUSHBUTTON Nº 2 OF S3 DEPRESSED
16 METER BAND
17.5-18.3 MC.

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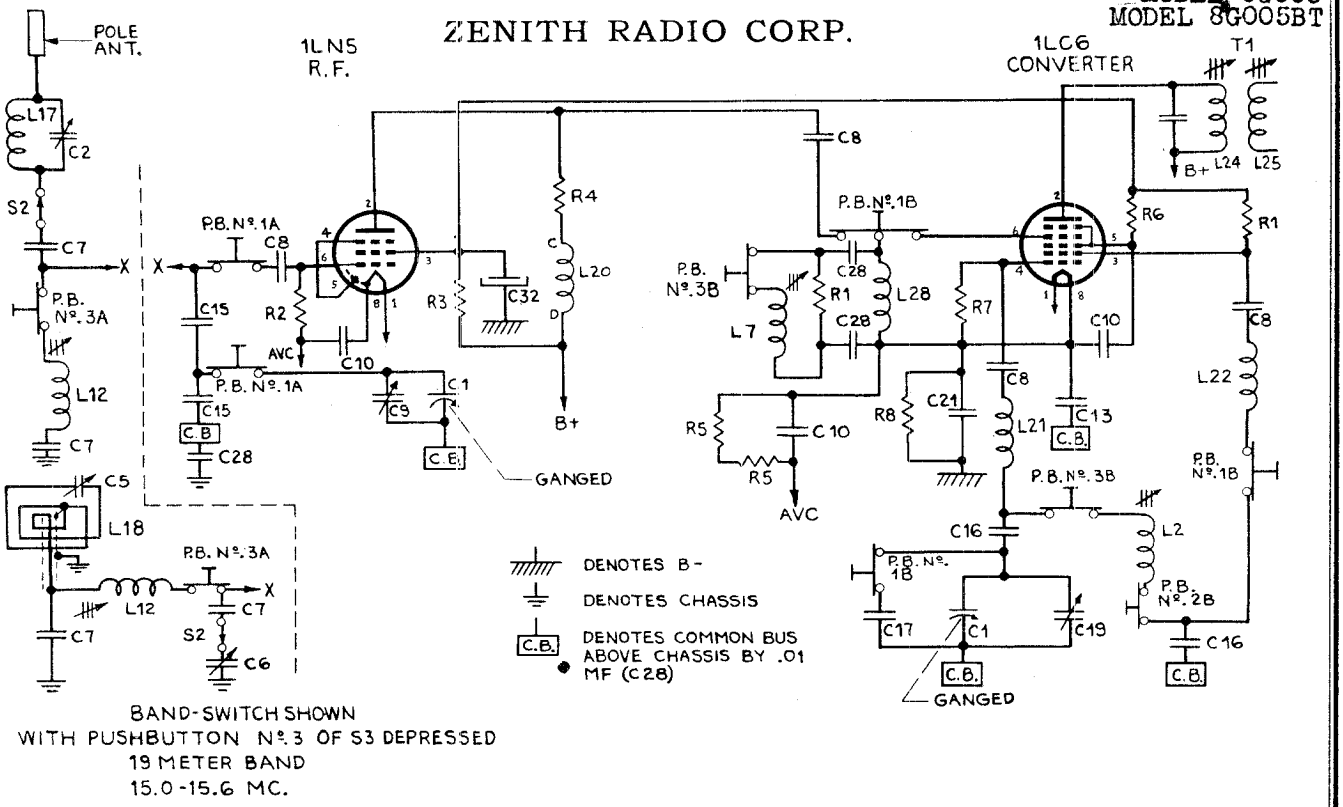
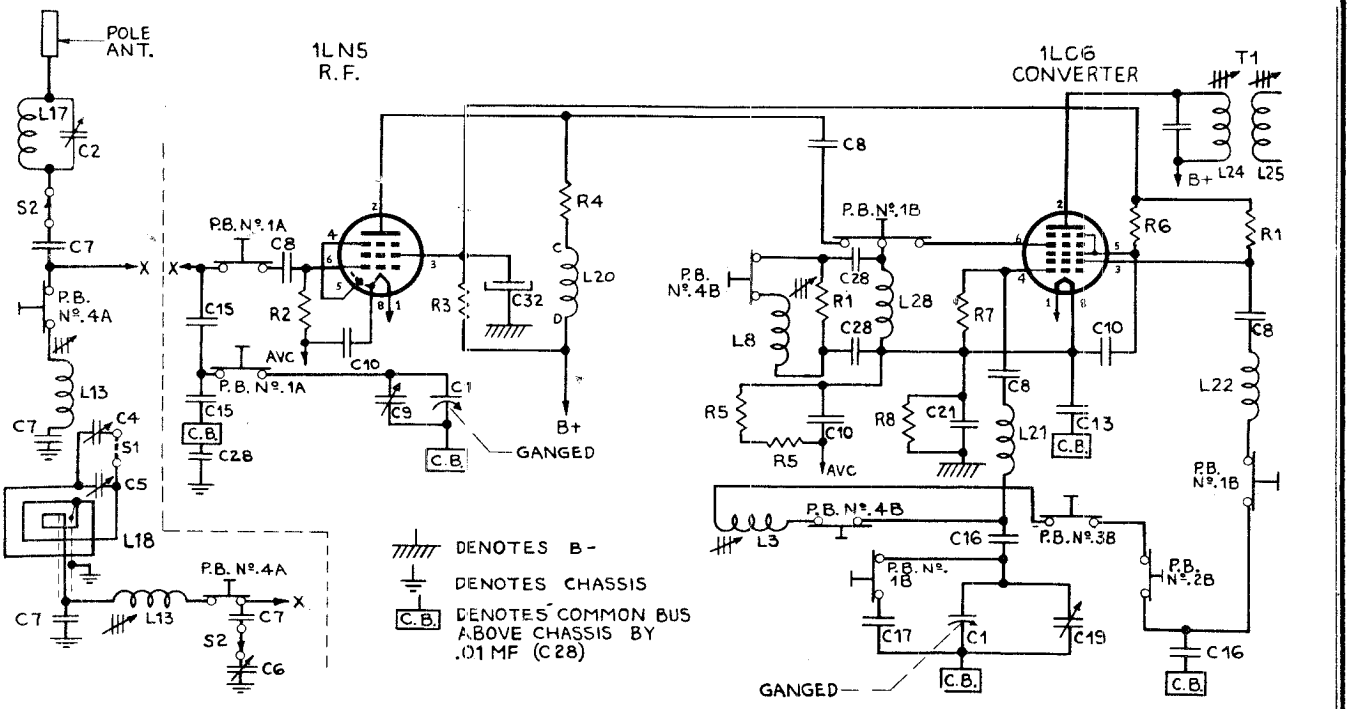
MODEL 8G005
MODEL 8G005BT

ZENITH RADIO CORP.



BAND-SWITCH SHOWN
WITH PUSHBUTTON Nº.3 OF S3 DEPRESSED
19 METER BAND
15.0 - 15.6 MC.

NOTE: Where the pole antenna is not effective, such as on steel buildings, trains automobiles, etc., the shortwave wavemagnet is then used and placed in a corner of the window. The shortwave wavemagnet is equipped with a plug which, when inserted into the receptacle on the rear of the set, automatically disconnects the pole antenna by operating switch S2 in the circuit. It is simply pulled out and switch S2 then automatically reconnects the pole antenna.



BAND-SWITCH SHOWN
WITH PUSHBUTTON Nº. 4 OF S3 DEPRESSED
25 METER BAND
11.6 - 12.1 MC.

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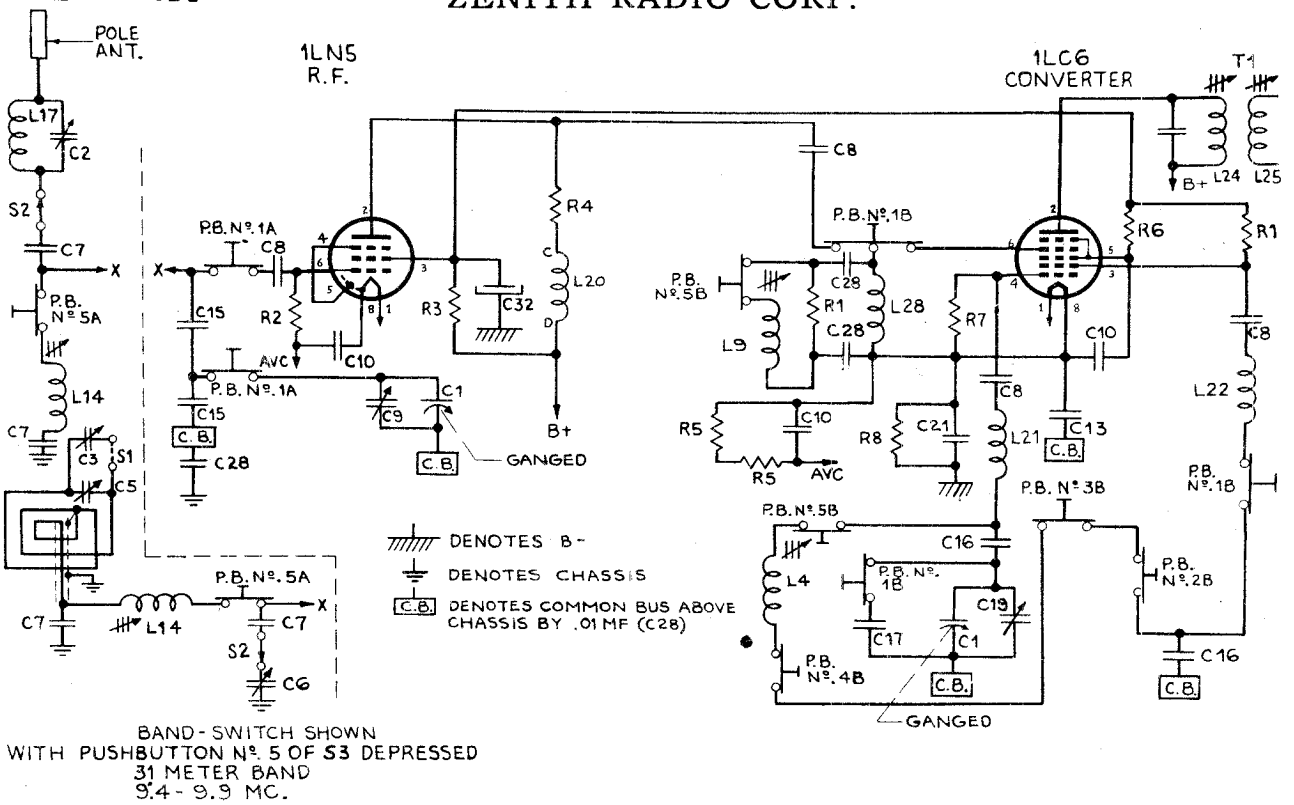
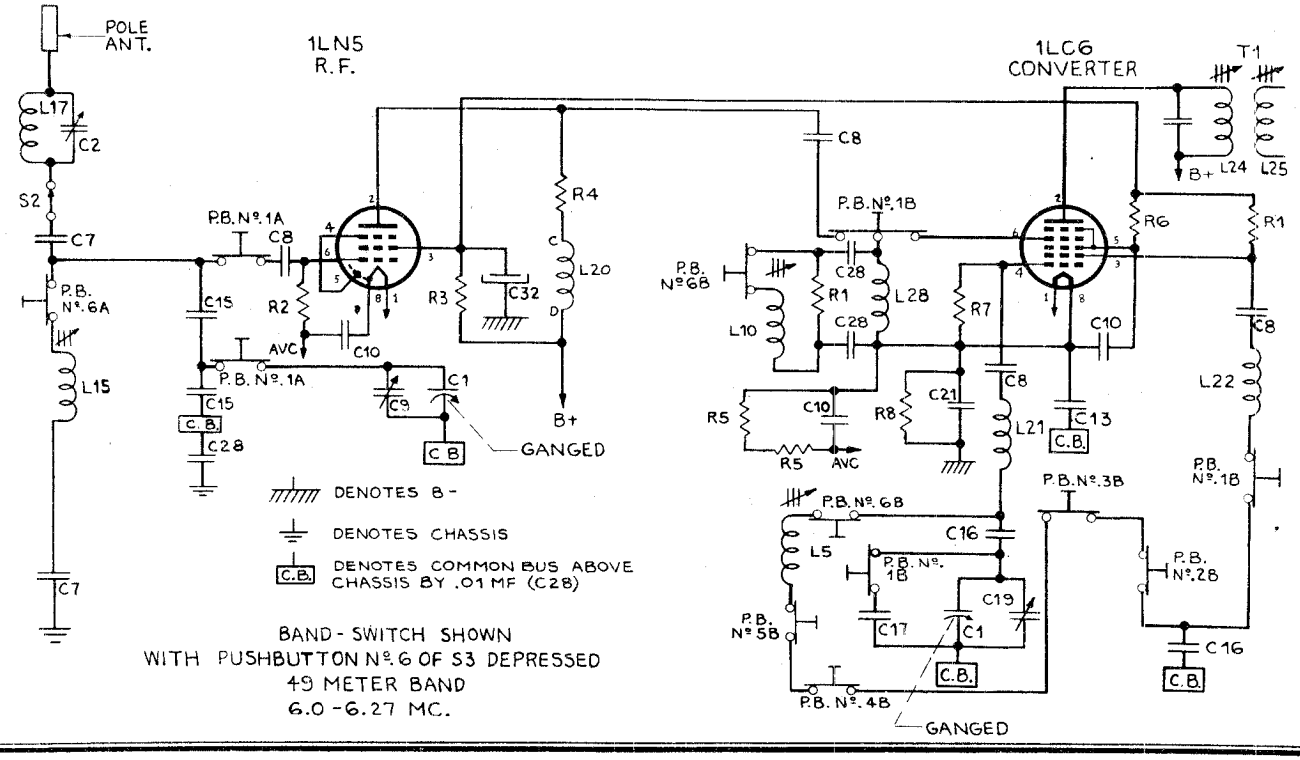
MODEL 8G005
MODEL 8G005BT

ZENITH RADIO CORP.



BAND-SWITCH SHOWN
WITH PUSHBUTTON Nº. 5 OF S3 DEPRESSED
31 METER BAND
9.4 - 9.9 MC.

NOTE: Where the pole antenna is not effective, such as on steel buildings, trains, automobiles, etc., the shortwave wavemagnet is then used and placed in a corner of the window. The shortwave wavemagnet is equipped with a plug which, when inserted into the receptacle on the rear of the set, automatically disconnects the pole antenna by operating switch S2 in the circuit. It is simply pulled out and switch S2 then automatically reconnects the pole antenna.



BAND-SWITCH SHOWN
WITH PUSHBUTTON Nº. 6 OF S3 DEPRESSED
49 METER BAND
6.0 - 6.27 MC.

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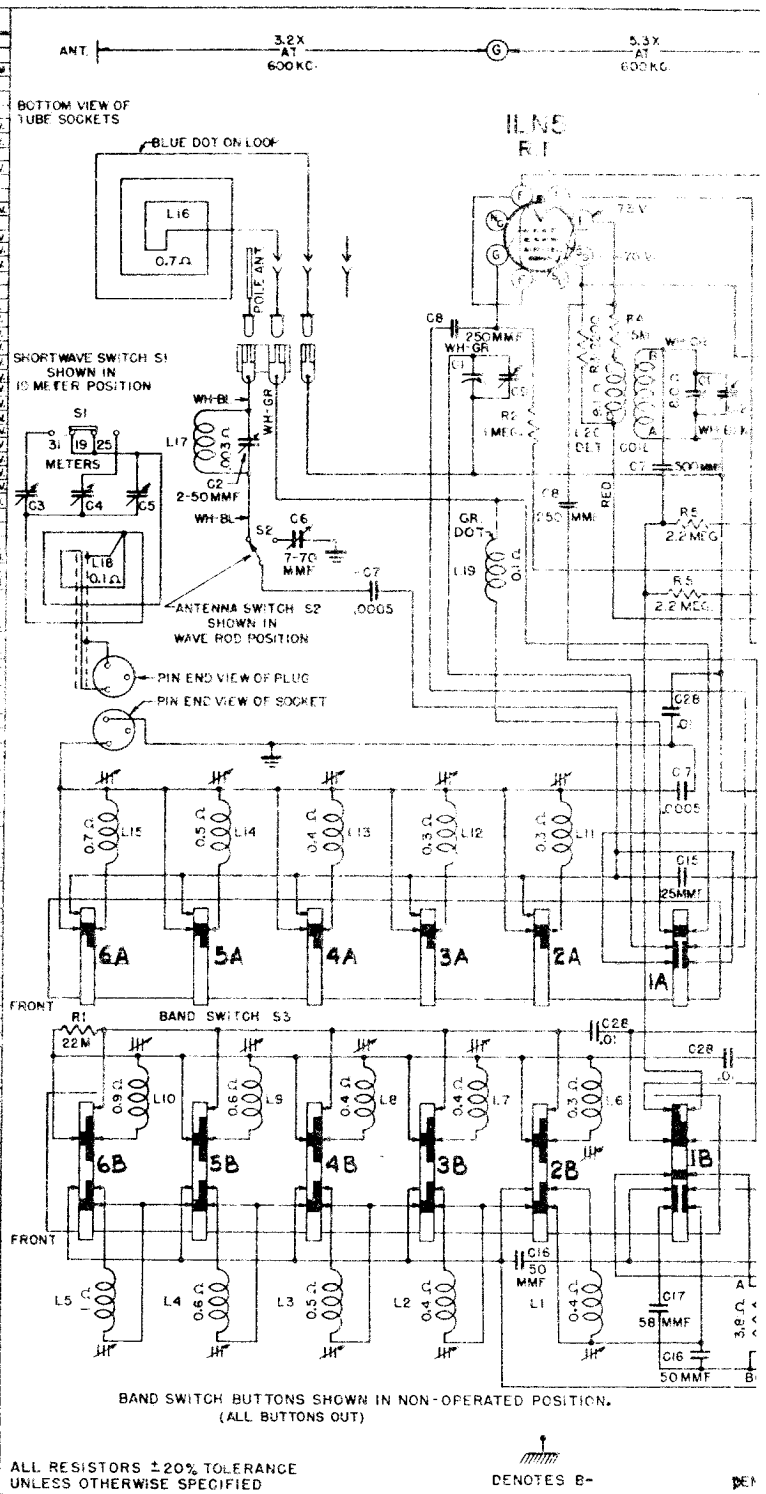
PART NO.	DESCRIPTION
	MISCELLANEOUS PARTS
76-325	Dial Scale
59-155	Dial Pointer
59-59	"On-Off" Indicator
76-415	Tuning Control Shaft
80-209	Drive Cord Tension Spring
80-327	Tension Spring
188-82	Retaining Ring
61S11202	Drive Pulley & Rivet Assem. (On Gang)
11S11204	Dial Drive Cord & Eyelet Assem.
11S11205	Pointer Pulley Cord & Eyelet Assem.
76S11206	Pointer Drive Shaft & Pulley Assem.
11S11207	Indicator Lever & Bushing Assem.
11-66	Line Cord & Plug
15-30	Battery Cable Plug Cap
44-17	Phone Jack
49-517	6½" P. M. Speaker
	206-517 Output Transformer
	208-517 Cone & Voice Coil
73-8	Set Screw (Gang Drive Pulley)
78-220	Socket Electrolytic
78-396	Socket - Female Battery (3 Contact)
78-548	Socket - Octal (1½Dia.)
78-549	Socket - Loktal (1¼Dia.)
78-597	Socket - Loktal (1¼Dia.)
78-598	Socket - Loktal (1¼Dia.)
78-625	Socket - Loktal (1¼Dia.)
78-626	Socket - Loktal (1¼Dia.)
82-332	Tone Control Switch
85-324	Power Change - Over Switch
118-82	Tube Shield
119-905	Model 6067 Cabinet (Less Ea. & Front Panel)
127-61	Shoulder Tube Ret. Clamp (2 Used)
127-67	Tube Shield Ant. Rod Retaining Clamp (2 Used)
38-27	Cabinet Panel (Includes 33-28 Dial)
40-23	Back Cover Hinge (2 Used)
40S1237	Front Cover Hinge (Right)
40S1238	Front Cover Hinge (Left)
46-539	Band Sw. Knob (16M)
46-540	Band Sw. Knob (19M)
46-541	Band Sw. Knob (25M)
46-542	Band Sw. Knob (31M)
46-543	Band Sw. Knob (49M)
46-544	Band Sw. Knob (BP)
46-545	Telescopic Ant. Knob
46-546	Tuning & Vol. Control Knob
57-1052	Cabinet Front Panel
57-1058	Front Panel Escutcheon (Black - Process)
58-131	Thirty Front Pins (5 M. M. Wavemagnet)
83-1122	Push Button Felt Strip
93-684	Black Felt Washer (Large) (For Vol. & Tun. Knobs)
93-721	Black Felt Washer (Small) (For Vol. & Tun. Knobs)
110-107	Cloth Cloth
111-167	Arm & Hex Washer Nut, Slotted 8-32 Screw
139-57	Baffle Board
156-22	Door Latch - Upper Half
156-23	Door Latch - Lower Half
157-7	Strike Fastener - Rear Door (Male)
157-8	Strike Fastener - Rear Door
159-48	Snap Button (2 used) (Also used on S10862)
159-49	Snap Button (2 used) (Also used on S10862 & S11246)
188-47	Handle Ring (2 used)
192-87	Dial Crystal
202-372	Instruction & Log Book
52S10862	Wavemagnet Cable Assem. (9. C.)
S10869	Wavemagnet Suction Cup Assem. (or S12528)
S10867	Wavemagnet Snap Fastener (Front Cover) (Small)
S12362	Wavemagnet Snap Fastener (Front Cover) (Large)
S11246	Broadcast Wavemagnet Assem. (Type 27A)
S11251	Telescopic Antenna Assem. (Complete)
S11562	Short Wave Wavemagnet Assem.
S11585	Release Assem. for Telescopic Ant.

DIAG NO.	PART NO.	DESCRIPTION	
L1	22-1375	3 GANG VARIABLE	
L2	22-1425	ANT. WAVE TRAP TRIM.	
L3		31M SHORT WAVE ANT. TRIM	
L4	22-1329	25M " " "	
L5		WAVE BOOSTER	
L6	22-1415	7-70 MMFD TRIMMER	
L7	22-1390	.0005 MFD. 600 V.	
L8	22-1391	250 MMFD 600 V.	
L9	ON C1	BROADCAST ANT. TRIM.	
L10	22-817	.05 MFD 200 V.	
L12	ON C1	BROADCAST DET. TRIM.	
L15	22-1430	.05 MFD 200 V.	
C15	22-1392	25 MMFD 500 V.	
C16	22-1393	50 MMFD 500 V.	
C17	22-1394	58 MMFD 500 V.	
C19	ON C1	BROADCAST OSC. TRIM.	
C20	22-813	.02 MFD 200 V.	
C21	22-820	.1 MFD 200 V.	
C22	22-147	.0005 MFD 600 V.	
C23	22-1063	.001 MFD 600 V.	
C24	22-811	.01 MFD 600 V.	
C25	22-953	.0002 MFD 600 V.	
C26	22-470	.00015 MFD 600 V.	
C27	22-805	.004 MFD 600 V.	
C28	22-1437	.01 MFD 200 V.	
C29	22-818	.05 MFD 400 V.	
C30		40 MFD ELECTRO 150 V.	
C31	22-1428	20 " " 150 V.	
C33		10 " " 150 V.	
C34	22-1234	200 " " 10 V.	
		40 " " 150 V.	
R1	63-591	22M OHM	½ W.
R2	63-271	1 MEGOHM	½ W.
R3	63-583	220Ω OHM	½ W.
R4	63-590	15M OHM	½ W.
R5	63-600	2.2 MEGOHM	½ W.
R6	63-594	68M OHM	½ W.
R7	63-654	180M OHM	½ W.
R8	63-645	1500 OHM	½ W.
R9	63-583	100Ω OHM	½ W.
R10	63-602	4.7 MEGOHM	½ W.
R11	63-1344	MFG. VOL. CONTROL	
R12	63-1093	15 MEGOHM	½ W.
R13	63-721	12M OHM	½ W.
R14	63-1142	1 MEGOHM	½ W.
R15	63-234	100Ω OHM	½ W.
R16	63-592	33M OHM	½ W.
R17	63-1226	1200 OHM	1 W.
R18	63-561	98 OHM	2 W.
R19	63-1343	370 OHM	3 W.
R20	63-1350	970 OHM	3 W.
FOR	R21, R22	R23 SEE BELOW	
S1	85-225	SHORT WAVE SWITCH	
S2	85-335	ANTENNA SWITCH	
S3	85-334	BAND SELECTOR SWITCH	
S4	85-332	TONE CONTROL SWITCH	
S5	85-333	CHANGE OVER SWITCH	
T1	95-912	1ST I.F. TRANSFORMER	
T2	95-913	2ND I.F. "	
J1	44-17	PHONE JACK	
SP	49-517	5¼ DYNAMIC SPEAKER	
L1	S11212	18 MC OSC. COIL	
L2	S11213	15 MC. "	
L3	S11214	12 MC. "	
L4	S11215	9 MC. "	
L5	S11216	6 MC. "	
L6	S11217	18 MC. DET. COIL	
L7	S11218	15 MC. "	
L8	S11219	12 MC. "	
L9	S11220	9 MC. "	
L10	S11221	6 MC. "	
L11	S11222	18 MC. ANT. COIL	
L12	S11223	15 MC. "	
L13	S11224	12 MC. "	
L14	S11225	9 MC. "	
L15	S11226	6 MC. "	
L16	S11246	BROADCAST WAVEMAGNET	
L17	S11821	WAVE TRAP COIL	
L18	S11562	SHORT WAVE WAVEMAGNET	
L19	S11559	ANT. LOADING COIL	
L20	S11210	DETECTOR COIL	
L21	S11823	R.F. CHOKE "	
L22	S11822	R.F. CHOKE "	
L23	S11211	B.C. OSC. "	
L24	ON T1	1ST I.F. TRANS. PRI. TRIM.	
L25	ON T1	1ST I.F. " SEC. "	
L26	ON T2	2ND I.F. " PRI. "	
L27	ON T2	2ND I.F. " SEC. "	
L28	S11952	R.F. CHOKE	
W1	S11809	BATTERY CABLE	
W2	S12369	BRACKET & CABLE ASSEM.	
SS	83-380	LINE VOLTAGE SWITCH	
R21	83-1445	560 OHM	3 W.
R22	83-1444	475 OHM	13 W.
R23		365 OHM	8 W.

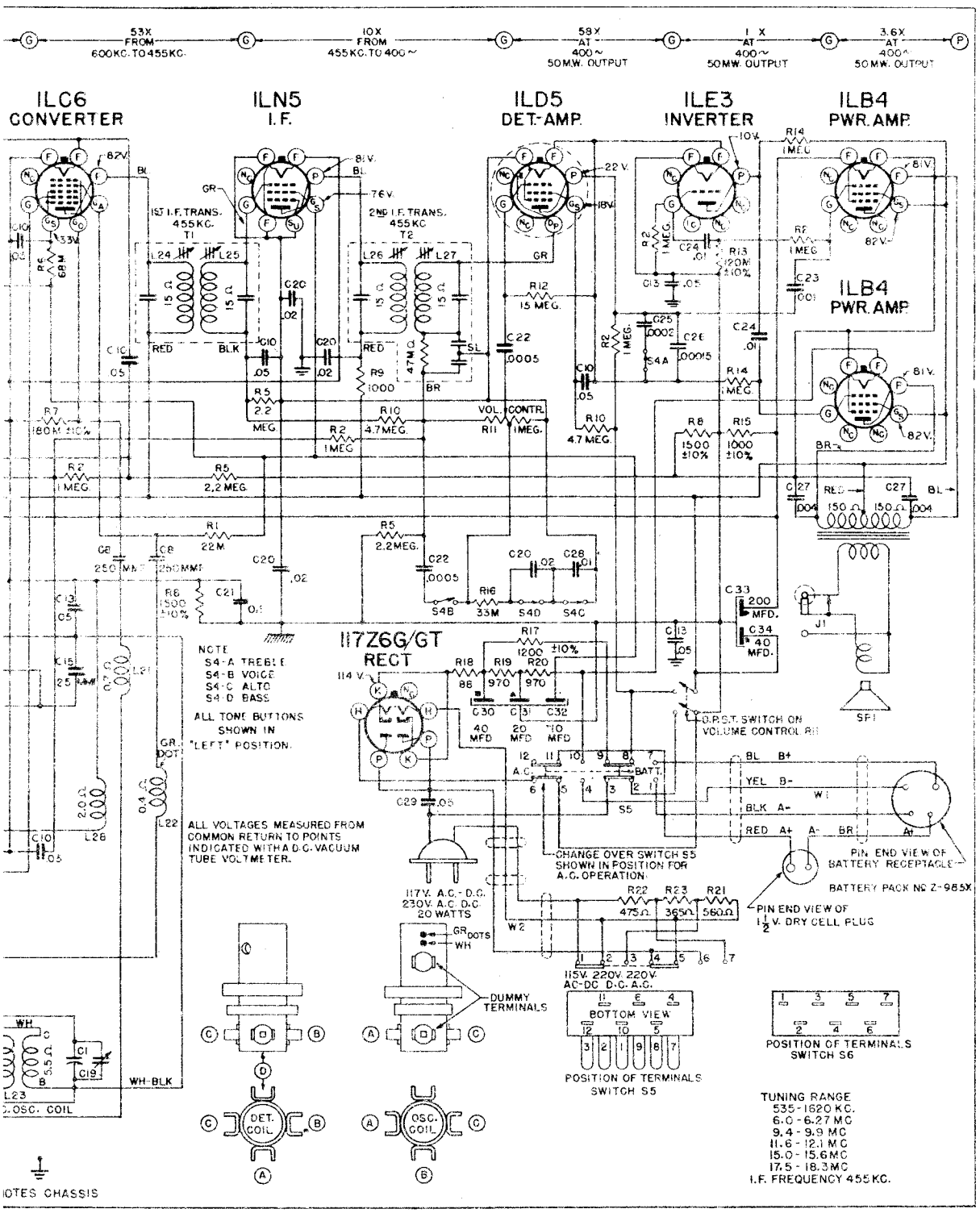


PUSHBUTTON SWITCH LABLED 1A, 1B, ETC. FOR REFERENCE TO CLARIFIED SCHEMATICS

MODEL CHASSIS

IO CORP.

MODEL 8G005BT, Chassis 8C40BT


53X FROM 600KC. TO 455KC.
10X FROM 455KC. TO 400~
58X AT 400~ 50MW. OUTPUT
1X AT 400~ 50MW. OUTPUT
3.6X AT 400~ 50MW. OUTPUT
ILC6 CONVERTER
ILN5 I.F.
ILD5 DET.-AMP.
ILE3 INVERTER
ILB4 PWR. AMP.
1ST I.F. TRANS. 455KC. T1
2ND I.F. TRANS. 455KC T2
VOL. CONTR. R11 1MEG.
S4A S4B S4C S4D
NOTE S4-A TREBLE S4-B VOICE S4-C ALTO S4-D BASS
ALL TONE BUTTONS SHOWN IN "LEFT" POSITION.
117Z6G/GT RECT
D.P.S.T. SWITCH ON VOLUME CONTROL R11
CHANGE OVER SWITCH S5 SHOWN IN POSITION FOR A.C. OPERATION
ALL VOLTAGES MEASURED FROM COMMON RETURN TO POINTS INDICATED WITH A D.C. VACUUM TUBE VOLTMETER.
117 V. A.C.-D.C. 230V. A.C. D.C. 20 WATTS
PIN END VIEW OF BATTERY RECEPTACLE
BATTERY PACK NO Z-985X
PIN END VIEW OF 1½ V. DRY CELL PLUG
DUMMY TERMINALS
115V. 220V. 220V. AC-DC D.C. A.C.
BOTTOM VIEW
POSITION OF TERMINALS SWITCH S5
POSITION OF TERMINALS SWITCH S6
TUNING RANGE
535-1620 KC.
6.0-6.27 MC
9.4-9.9 MC
11.6-12.1 MC
15.0-15.6 MC
17.5-18.3 MC
I.F. FREQUENCY 455 KC.
DET. COIL
OSC. COIL
OSC. COIL
NOTES CHASSIS

8G005BT
8C40BT

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MODELS 8G005, 8G005BT
CHASSIS 8C40, 8C40BT

TO THE SERVICE MAN:

CAUTION—Before attempting to operate this receiver, make certain that the Line Voltage Switch is properly set.

1. For 110-125 V. AC or DC operation set the Line Voltage Switch to 115 V. AC-DC.

2. For 210-240 V. AC operation, set the switch to the 220 V. AC position.

3. For 210-240 V. DC operation, set the switch to the 220 V. DC position.

The 8C40BT chassis is an AC, DC or battery operated superheterodyne circuit with a stage of tuned radio frequency amplification and band spread tuning over the 49, 31, 25, 19, and 16 meter bands.

The audio amplifier used in chassis 8C40BT features phase inversion and push-pull power output.

If removal of the chassis from the cabinet becomes necessary, great care must be exercised so that the coil assembly is not damaged.

The 8C40BT chassis is isolated from the DC circuits, and all measurements must be from a common negative point. The most convenient place to reach this point is at the junction where C13 is connected to the filter condenser. The DC resistance from the chassis to any circuit must be almost infinite. If any circuit becomes grounded to the chassis, a hum will appear. Microphonic tubes will cause an audio howl. Check the 1LD5 and 1LC6 tubes.

The wavemagnet is connected to the chassis through the hinges in the cabinet, snaps and flexible leads. If the RF becomes weak or dead, check resistance of wavemagnet at the condenser gang. The DC resistance across the two leads should be approximately 1 ohm. If the circuit is open, unscrew the four wood screws and the two screws which hold the handle. The top can now be removed and connecting leads will be visible for inspection. Also loosen the snap-on socket and check for broken or shorted leads.

The alignment of chassis 8C40BT is conventional. However, care must be exercised when making adjustments, and the alignment procedure must be followed exactly. Set the chassis over a metal plate approximately the same distance the battery pack is from the bottom of the chassis when it is in the cabinet. This procedure will introduce the approximate amount of metal in the field of the RF and oscillator coils as when the chassis is in the cabinet. A signal generator of reasonable accuracy and good attenuation must be used. An output meter (AC) of the copper oxide rectified type with a range of 1 to 30 volts in several steps is necessary to get accurate output readings. Alignment wrenches should be of the non-metallic type, especially when making adjustments at the higher frequencies.

When reinstalling the chassis in the cabinet be careful not to disturb the cabling between the short wave coil assembly and chassis. Tune in a weak broadcast signal near 1400 Kc., and touch up trimmer C9. This will insure maximum performance after alignment.

A LOS MECANICOS

PRECAUCION: Antes de empezar el funcionamiento de este receptor, cerciórese de que el interruptor del Voltaje de la Linea esté debidamente ajustado.

1. Para corriente de 110-125 voltios, corriente continua o corriente alterna, adjústese el interruptor del Voltaje de la Linea a 115 voltios C.C. o C.A.

2. Para corriente de 210-240 v. C.A., ajústese el interruptor a 220 v. C.A.

3. Para corriente de 210-240 v. C.C., ajústese el interruptor en la posición de 220 v. C.C.

El bastidor 8C40BT es un circuito superheterodino que funciona por corriente alterna o corriente continua o por batería de acumuladores con una etapa de amplificación de radiofrecuencia sintonizada y un ensanche de banda que sintoniza con las bandas de 49, 31, 25, y 16 metros.

La válvula amplificadora de audofrecuencia que se usa en el bastidor 8C40BT da importancia a la inversión de fases y a la salida simétrica de la energía.

Si se hace necesario quitar el bastidor del armario, deberá ejercerse gran cuidado para evitar que se dañe el embobinado.

El bastidor 8C40BT está aislado de los circuitos de corriente continua, y todas las medidas deben hacerse desde un punto negativo común. El lugar más conveniente para alcanzar este punto está en la unión donde C13 está conectado al condensador del filtro. La resistencia de la corriente continua procedente del bastidor a cualquier circuito deberá ser casi infinita. Si uno de los circuitos está a masa (cortocircuito) con el bastidor, se oirá un zumbido. Las válvulas microfónicas producirán un aullido de audio. Examínense las válvulas 1LD5 y 1LC6.

El imán de ondas está conectado al badtidor por medio de las bisagras en el armario, garras, y conductores (plomos) flexibles. Si la energía radiofrecuente se debilita o no existe. inspecciónese la resistencia del imán de ondas en el múltiple del condensador. La resistencia de la C.C. a través de los dos conductores (plomos) deberá sera aproximadamente de 1 ohm. Si el circuito está abierto, afíjense los cuatro tornillos de madera y los dos tornillos que sostienen el mango. Ahora, la tapa se puede quitar, quedando visibles para su inspección los conductores conectadores. Afíjese también el casquillo de resorte y exáminese para ver si hay conductores rotos o en cortocircuito.

El alieamiento del armazón 8C40BT es convencional; sinembargo, debe tenerse cuidado al hacerse ajustes o composturas, y es imperativo hacer el alineamiento siguiendo el procedimiento exactamente. Colóquese el armazón sobre una plancha de metal aproximadamente a la misma distancia que el paquete de los acumuladores está del armazón cuando éste está en el armario. Este procedimiento introduciró en el campo de las bobinas de R.F. y del oscilador la cantidad aproximada de metal que hay cuando el armazón está en el armario. Hay que usar un generador de señales que funcione con exactitud y buena atenuación. Se necesita un medidor de rendimiento de C.A. del tipo rectificado de óxido de cobre, con una amplitud de 1 a 30 voltios en varias etapas, para obtener medidas correctas del rendimiento. Hay que usar llaves de alineamiento que no sean de metal, especialmente cuando se hagan ajustes o reparaciones en las frecuencias altas.

Cuando se instale otra vez el armazón en el armario, téngase cuidado de no desarreglar las posicion de los cables que se extienden entre el conjunto de la bobina de onda corta y el armazón. Sintonícese con una señal de radiodifusión débil cerca de 1400 Kc., y tóquese la pieza C9 (trimmer). Así se obtendrá en funcionamiento máximo después del alineamiento.

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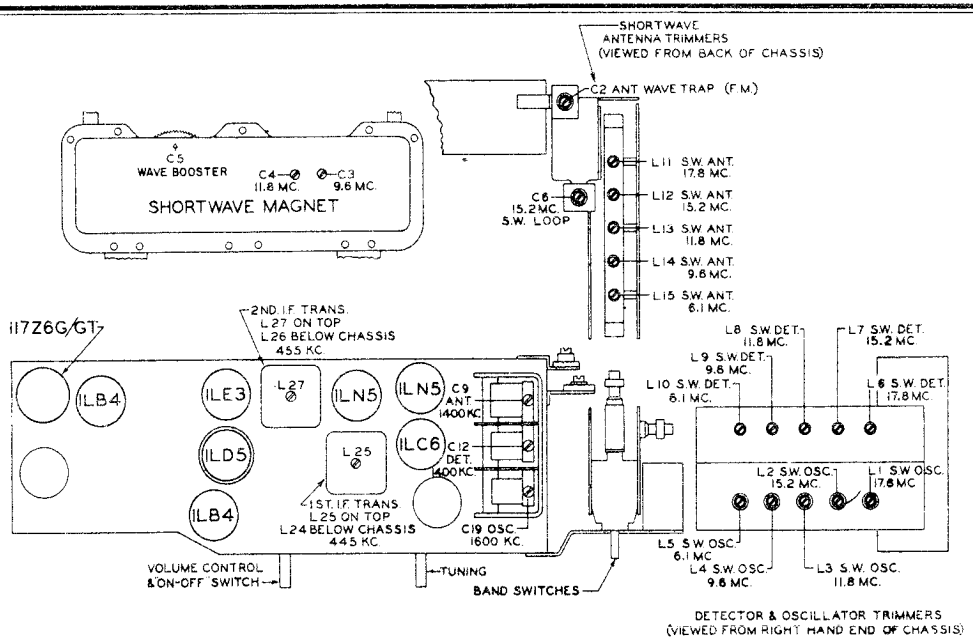
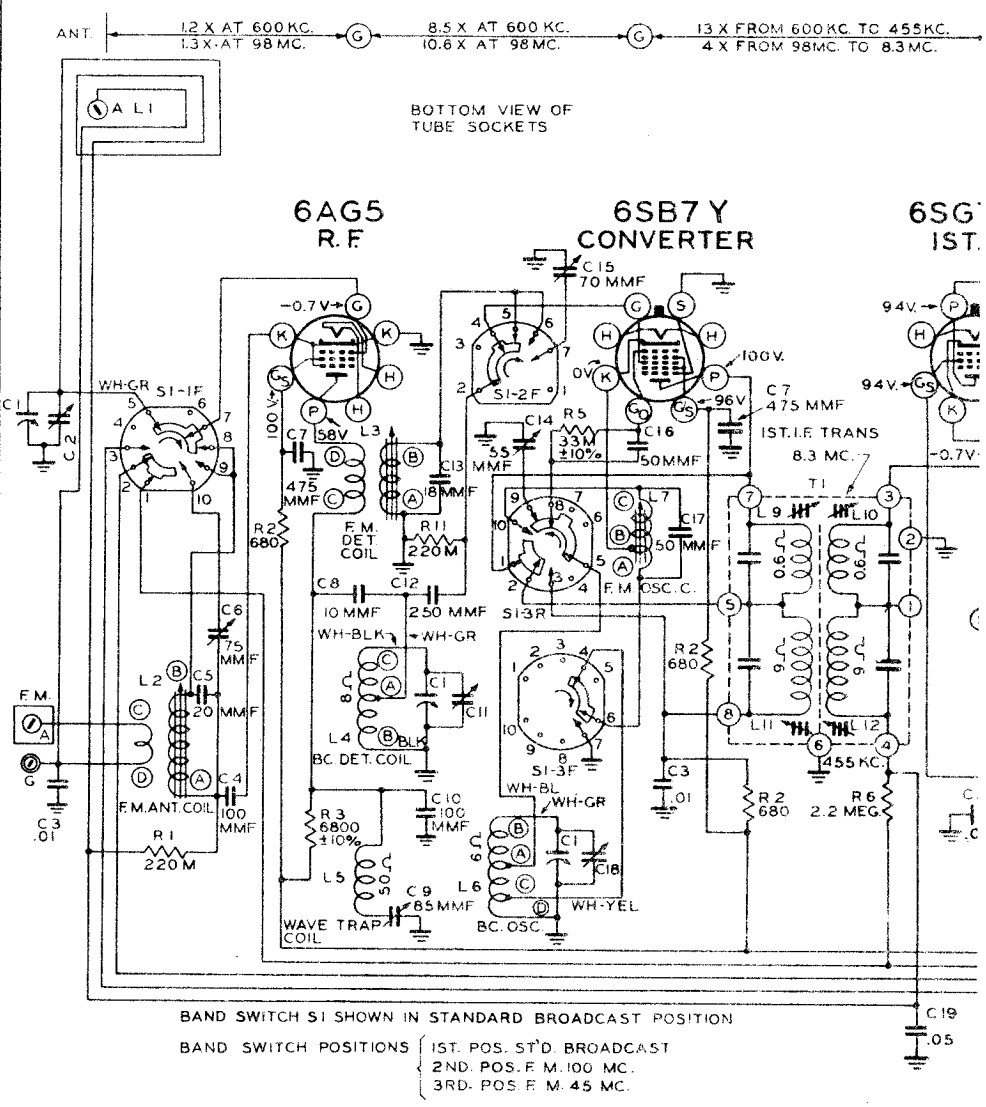

SHORTWAVE ANTENNA TRIMMERS (VIEWED FROM BACK OF CHASSIS)
C2 ANT. WAVE TRAP (F.M.)
C5 WAVE BOOSTER
C4 11.8 MC.
C3 9.6 MC.
SHORTWAVE MAGNET
C6 15.2 MC. S.W. LOOP
L11 S.W. ANT. 17.8 MC.
L12 S.W. ANT. 15.2 MC.
L13 S.W. ANT. 11.8 MC.
L14 S.W. ANT. 9.6 MC.
L15 S.W. ANT. 6.1 MC.
2ND I.F. TRANS. L27 ON TOP L26 BELOW CHASSIS 455 KC.
117Z6G/GT
1LB4
1LE3
L27
1LN5
1LN5
C9 ANT. 1400 KC.
1LD5
1LC6
C12 DET. 1400 KC.
L25
1LB4
1ST. I.F. TRANS. L25 ON TOP L24 BELOW CHASSIS 445 KC.
C19 OSC. 1600 KC.
VOLUME CONTROL & ON-OFF SWITCH
TUNING
BAND SWITCHES
L8 S.W. DET. 11.8 MC.
L7 S.W. DET. 15.2 MC.
L9 S.W. DET. 9.6 MC.
L10 S.W. DET. 6.1 MC.
L6 S.W. DET. 17.8 MC.
L2 S.W. OSC. 15.2 MC.
L1 S.W. OSC. 17.8 MC.
L5 S.W. OSC. 6.1 MC.
L4 S.W. OSC. 9.6 MC.
L3 S.W. OSC. 11.8 MC.
DETECTOR & OSCILLATOR TRIMMERS (VIEWED FROM RIGHT HAND END OF CHASSIS)

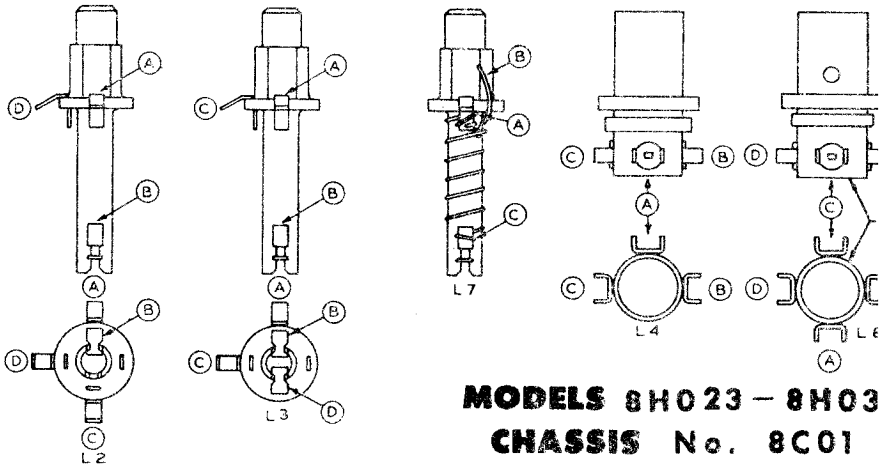
ALIGNMENT PROCEDURE

OPERATION	CONNECT OSCILLATOR TO	DUMMY ANTENNA	INPUT SIG. FREQUENCY	BAND	SET DIAL AT	TRIMMERS	PURPOSE
1	Converter Grid (Pin 6-1LC6)	.1 mfd.	455 Kc.	BC	600 Kc.	L-24, 25, 26, 27	Align I.F.
2	One Turn Loop Coupled Loosely to Broadcast Wavemagnet		1600 Kc.	BC	1600 Kc.	C-19	Set Oscillator to Scale
3			1400 Kc.	BC	1400 Kc.	C-12	Alignment of Detector Sec.
4			1400 Kc.	BC	1400 Kc.	C-9	Alignment of B.C. Wavemagnet
5*	3 Feet of Wire Approx. 1 foot from Extended Waverod		6.1 Mc.	49 Met.	6.1 Mc.	L-5, L-10, L-15	Alignment of S.W. Antenna, Detector and Oscillator
6*			9.6 Mc.	31 Met.	9.6 Mc.	L-4, L-9, L-14	
7*			11.8 Mc.	25 Met.	11.8 Mc.	L-3, L-8, L-13	
8*			15.2 Mc.	19 Met.	15.2 Mc.	L-2, L-7, L-12	
9*			17.8 Mc.	16 Met.	17.8 Mc.	L-1, L-6, L-11	
10	One Turn Loop Coupled Loosely to Shortwave Magnet, Waverod Collapsed		15.2 Mc.	19 Met.	15.2 Mc.	C-5, C-6	Alignment of Shortwave Magnet
11			11.8 Mc.	25 Met.	11.8 Mc.	C-4	
12			9.6 Mc.	31 Met.	9.6 Mc.	C-3	
13	When Receiving Normal Transmission on the 49, 31, 25, 19 or 16 Meter Bands, If FM Interference Is Experienced Adjust Wave Trap Trimmer C-2 for Minimum Response of the Interfering Signal.						

*Note: Rock Tuning Condenser When Making Alignment Under Operations 5, 6, 7, 8 and 9.

DIAG. NO.	PART NO.	DESCRIPTION
C1	22-1359	3 GANG VARIABLE
C2	ON C1	BROADCAST ANT. TR.
C3	22-1385	.01 MFD. 200 V.
C4	22-1488	100 MMF. MICA 300 V.
C5	22-1491	20 MMF. CER. COND.
C6	22-1485	F. M. ANT. TRIM.
C7	27-87	475 MMF. MICA DISC.
C8	22-1489	10 MMF. CER. COND.
C9	ON L5	TRIMMER WAVE TR.
C10	22-162	100 MMF. MICA 500 V.
C11	ON C1	BROADCAST DET. TR.
C12	22-182	250 MMF. COND. MICA
C13	22-1490	18 MMF. CER. COND.
C14	22-1571	F. M. OSC. TRIM.
C15	22-1486	F. M. DET. TRIM.
C16	22-1367	50 MMF. CER. COND.
C17	22-1492	50 MMF. CER. COND.
C18	ON C1	BROADCAST OSC. TR.
C19	22-829	.05 MFD. 200 V.
C20	22-1386	.02 MFD. 200 V.
C21	22-1439	.001 MFD. 200 V.
C22	22-196	.01 MFD. 600 V.
C24	22-1138	500 MMFD. 600 V.
C25	22-830	.02 MFD. 600 V.
C26	22-1531	0.2 MFD. 200 V.
C27	22-1127	.02 MFD. 400 V.
C28	22-288	.003 MFD 600 V.
C29		40 MFD. ELECT. 150 V.
C30	22-1366	40 MFD " 25 V.
C31		40 MFD " 150 V.
C32	22-1017	.05 MFD. 200 V.
R1	63-717	220 M 1/4 W.
R2	63-582	680 OHM 1/4 W.
R3	63-639	6800 Ω 1/4 W.
R4	63-1339	30-67 OHM CANDOHM
	63-1464	30-67 OHM "
R5	63-765	33 M 1/4 W.
R6	63-722	2.2 MEGOHM 1/4 W.
R7	63-579	220 OHM 1/4 W.
R8	63-593	47 M OHM 1/4 W.
R9	63-586	3300 OHM 1/4 W.
R10	63-1218	10 M OHM 1 W.
R11	63-296	220 M 1/4 W.
R12	63-445	100 M OHM 1/4 W.
R13	63-1336	2.5 MEG. VOL. CONT.
R14	63-767	47 M OHM 1/4 W.
R15	63-602	4.7 MEGOHM 1/4 W.
R16	63-674	10 MEGOHM 1/4 W.
R17	63-597	470 M OHM 1/4 W.
R18	63-1237	150 OHM WIRE WD. 1/2 W.
R19	83-719	470 M OHM 1/4 W.
* R20	63-1450	22 OHM 1 W.
L1	S11135	WAVEMAGNET ASS'Y.
L2	S12257	F.M. ANT. COIL "
L3	S12258	F.M. DET. COIL "
L4	S13117	B.C. DET. COIL "
L5	S12520	WAVE TRAP COIL & TR.
L6	S11157	BC. OSC. COIL ASSY.
L7	S12259	F.M. OSC. " "
L8	S12256	A.C. CHOKE LINE " "
L9	ON T1	IST. I.F. TR. PRI. F.M.
L10	ON T1	IST. I.F. " " F.M.
L11	ON T1	IST. I.F. " PRI.
L12	ON T1	IST. I.F. " SEC.
L13	ON T2	2ND. I.F. TR. PRI. F.M.
L14	ON T2	2ND. I.F. " SEC. F.M.
L15	ON T2	2ND. I.F. " PRI.
L16	ON T2	2ND. I.F. " SEC.
L17	ON T3	3RD. I.F. TR. PRI. F.M.
L18	ON T3	3RD. I.F. " SEC. F.M.
L19	ON T3	3RD. I.F. " PRI.
L20	ON T3	3RD. I.F. " SEC.
L21	ON T4	4TH I.F. TR. PRI. F.M.
L22	ON T4	4TH I.F. " SEC. F.M.
T1	S12249	IST. I.F. TRANS. ASSY.
T2	S12250	2ND. I.F. " "
T3	S12488	3RD. I.F. " "
T4	S12252	DISC I.F.
PL1	100-67	PILOT LIGHT 6.3V. .15A.
S1	85-384	BAND SWITCH
S2	85-365	TONE SWITCH
SP1	49-518	5" DYNAMIC SPEAKER





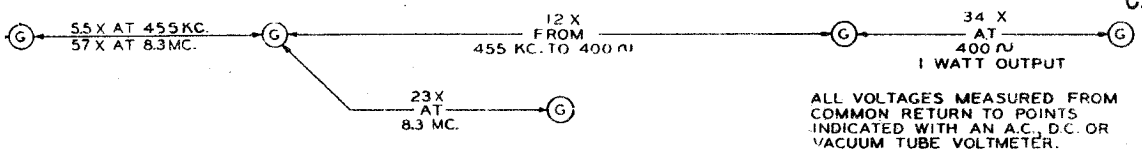
MODELS 8H023 – 8H03
CHASSIS No. 8C01

AUDIO HOWL ON FM:

1. 83-1328 plastic spacer installed between the centers o slug shafts. This prevents the slugs from vibrating.
2. Float speaker on rubber grommets.
3. 166-36 felt cushion placed between the back of the gan
4. To improve floating of the gang, remove the support sc

ADIO CORP.

MODELS 8H023, 8H034
Chassis 8C01



ALL VOLTAGES MEASURED FROM COMMON RETURN TO POINTS INDICATED WITH AN A.C. D.C. OR VACUUM TUBE VOLTMETER.

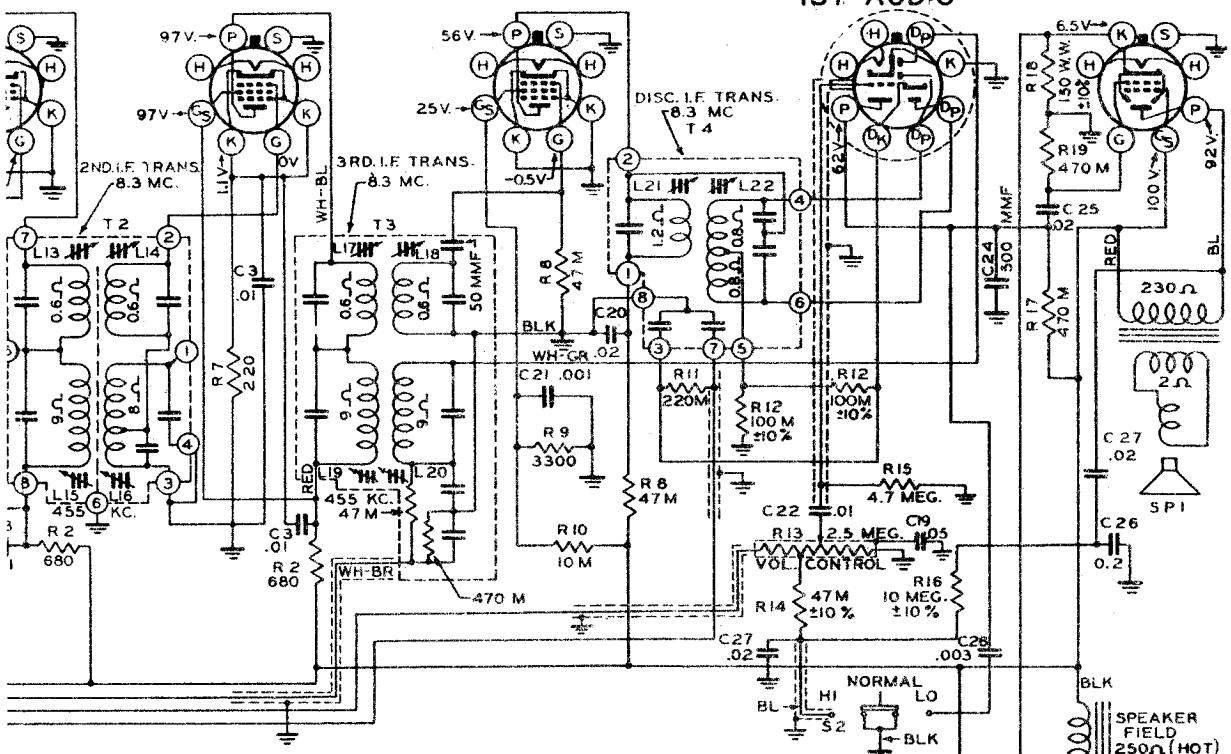
7/GT
I.F.

6SH7
2ND. I.F.

6SH7
LIMITER

6S8GT
DISCRIMINATOR DET.
1ST. AUDIO

25L6 GT
PWR. AMP.



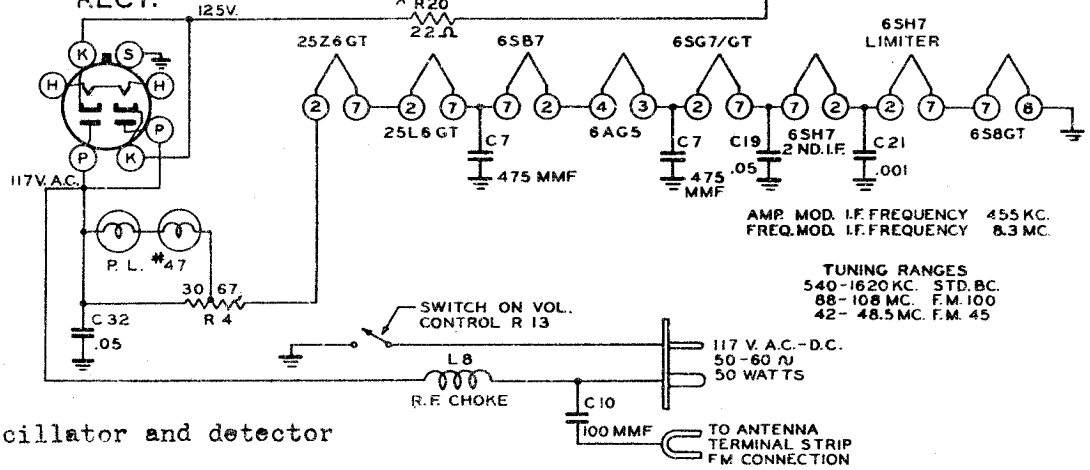
ALL RESISTORS ±20% TOLERANCE UNLESS OTHERWISE SPECIFIED.

ALL VOLTAGES ARE D.C. UNLESS OTHERWISE SPECIFIED.

DENOTES CHASSIS

25Z6GT
RECT.

*Not in early model



AMP. MOD. I.F. FREQUENCY 455 KC.
FREQ. MOD. I.F. FREQUENCY 8.3 MC.

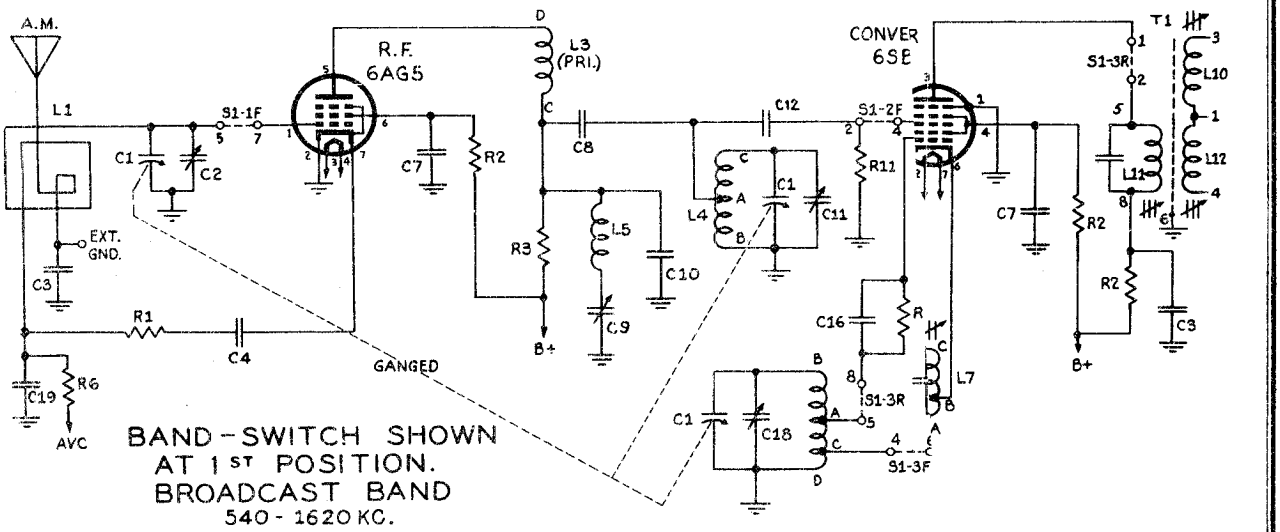
TUNING RANGES
540-1620 KC. STD. BC.
88-108 MC. F.M. 100
42-48.5 MC. F.M. 45

RIM PAINTED WHITE

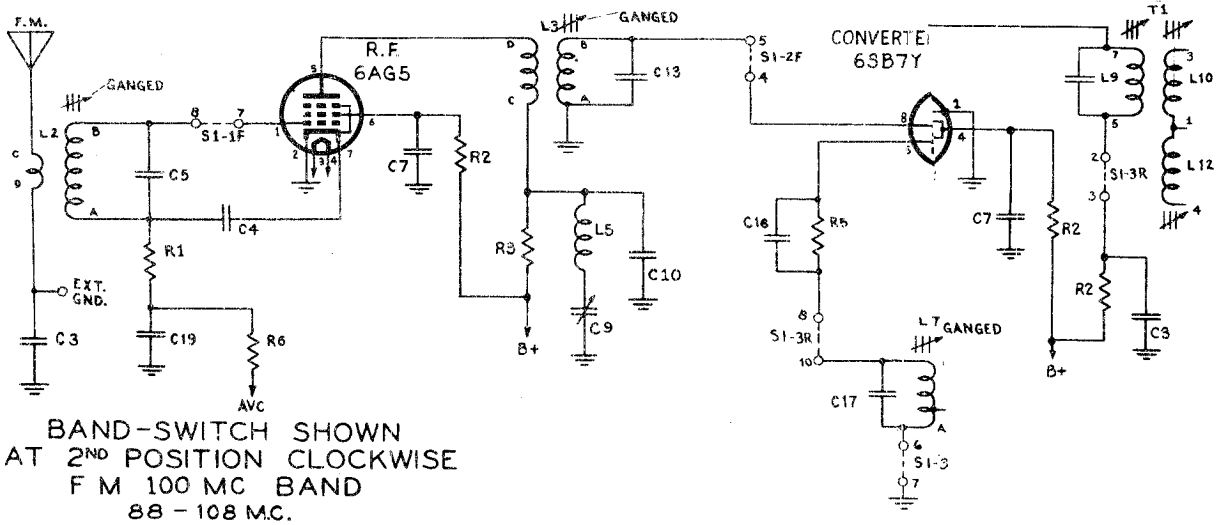
f the oscillator and detector

g and i-f transformer.
rew nearest the dial.

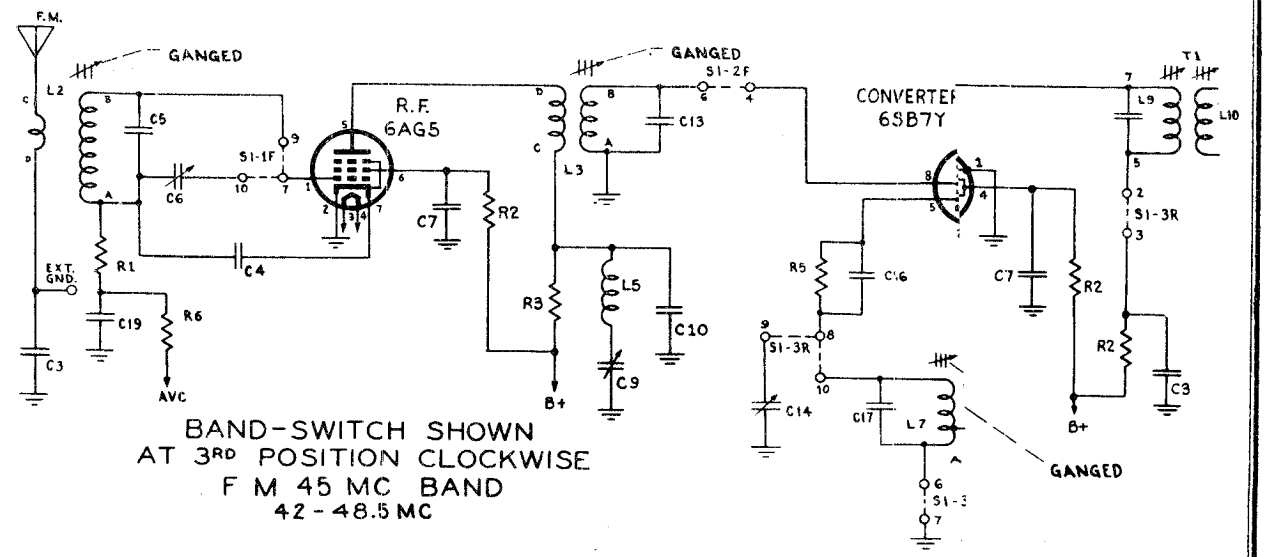
ZENITH RADIO CORP.



BAND-SWITCH SHOWN
AT 1ST POSITION.
BROADCAST BAND
540 - 1620 KC.



BAND-SWITCH SHOWN
AT 2ND POSITION CLOCKWISE
F M 100 MC BAND
88 - 108 M.C.



BAND-SWITCH SHOWN
AT 3RD POSITION CLOCKWISE
F M 45 MC BAND
42 - 48.5 MC

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MODULATION HUM: Under humid conditions, the insulating material inside the a-c plug, and the back cover would absorb moisture and if the solder lug was in contact with this material, some of the a-c voltage would leak into the back cover. Since this back cover was next to the loop, hum modulation would be evident.
To remedy this condition, remove the back from the receiver, and open the a-c connector, and bend the solder lug away from the insulating wall. A vinylite sleeve over the solder lugs will insure good insulation.

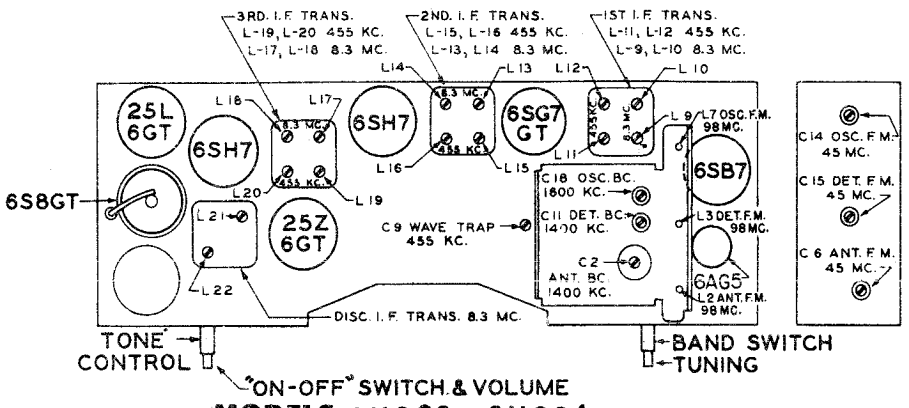
HUM COMES UP AS VOLUME CONTROL IS ADVANCED: Hum in the 8C01 chassis may be caused by an open .05-200v condenser which is connected between the metal shell of the volume control and chassis.

TO THE SERVICE MAN:

The 8C01 chassis incorporates a superheterodyne circuit with two stages of IF, and one stage of RF amplification on all bands.

When adjustments are made on the 8C01 or any AC-DC chassis, a line isolation transformer (110 V input to 110 V output) is recommended in order to avoid a "hot" chassis. If an isolation transformer is not available, check the AC voltage between chassis and bench ground, and if there is any indication of voltage, reverse the plug before handling the set.

AM Alignment: The alignment of this chassis on the standard broadcast band is conventional. The alignment slugs in the IF transformers are threaded and screw into the coil forms. The slugs are slotted for a small size fiber screw driver. Do not press hard on the aligning tool(fiber screw driver) or the threads in the coil forms will strip and adjustment will be impossible.



MODELS 8H023 – 8H034
CHASSIS No. 8C01
TUBE AND TRIMMER LOCATION

FM RF Alignment: The same coil slug arrangement which tunes the 100 MC FM band also tunes the 45 MC band. However, on 45 MC the band switch connects trimmer condensers in parallel and padding wires in series with the 100 MC coils. The tuning slugs are attached to threaded shafts and the slugs are varied in the field of the coils by turning the shafts clockwise or counter-clockwise. After adjustments the shafts must be secured with a drop of speaker cement.

FM IF Alignment: The same type of tuning slugs for aligning the AM IF Amplifier are used for the FM I.F.'s. Observe the same precautions when making adjustments. The second 8.3 Mc If stage is overcoupled. Overcoupling gives a wide band pass with good sensitivity. When an overcoupled stage is aligned with an unmodulated signal, the stage must be loaded. A 300 ohm carbon resistor soldered across the secondary of the second IF transformer provides a satisfactory load for this circuit. The resistor leads must be kept short to reduce the distributed capacity of the circuit.

When aligning a loaded stage, it will be found that considerable signal from the generator will be required, and that it will tune broadly. THE LOAD RESISTOR MUST BE REMOVED AFTER ALIGNMENT.

If the signal generator used does not have sufficient output to overcome the temporary loss caused by the load resistor, the load resistance may be increased or the signal fed into the preceding stage.

FM Discriminator Alignment: When the secondary of the discriminator is aligned (operation 6) use sufficient signal input to get a good positive and negative indication before setting the slug for zero reading. A center zero indicating meter is recommended for this adjustment, but is not absolutely necessary. Reversing the leads of a non-zero center meter, or observing closely when this meter starts to go to the left (negative) of zero will give the same results.

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ALIGNMENT PROCEDURE

Operation	Connect Oscillator to	Dummy Antenna	Input Signal Frequency	Band	Set Dial To	Adj. Trimmers	Purpose
1	Pin 8 on Converter Tube 6SB7 Socket	.05 Mfd.	455 Kc. Modulated	BC	600 Kc.	L-11,12,15,16, 19 and 20	Align I.F. channel for maximum output
2	Pin 1 on R.F. tube 6AG5 socket	.05 Mfd.	455 Kc. Modulated	BC	600 Kc.	C9	Adjust wavetrap for minimum output
3	2 turns loosely cpld. to wavemagnet		1600 Kc. Modulated	BC	1600 Kc.	C18	Set oscillator to dial scale
4	2 turns loosely cpld. to wavemagnet	.05 Mfd.	1400 Kc. Modulated	BC	1400 Kc.	C11 & C2	Align det. and ant. stages.
5 (a)	Pin 4(grid)on 6SH7 limiter socket	.05 Mfd.	8.3 Mc. Unmodulated	FM 45		L21 coil slug Primary discr.	Align primary of discrimator for maximum reading
6 (b)	Pin 4(grid)on 6SH7 limiter socket	.05 Mfd.	8.3 Mc. Unmodulated	FM 45		L22 coil slug sec. of disc.	Adjust secondary of discriminator for zero reading
7 (c)	Pin 4 (grid) on 6SH7 2nd IF tube socket	.05 Mfd.	8.3 Mc. Unmodulated	FM 45		L17 & L18 Prim.&Sec.of 3rd IF trans.	Align 3rd IF transformer for maximum reading
8(c)(d	Pin 4 (grid) on 6SG7 1st IF tube socket	.05 Mfd.	8.3 Mc. Unmodulated	FM 45		L13 & L14 primary and sec. of 2nd IF transformer	Align 2nd IF transformer for maximum reading
9(c)(d	Pin 8(grid) on 6SB7 converter tube socket	.05 Mfd.	8.3 Mc. Unmodulated	FM 45		L9 & L10 Primary & Sec. of 1st IF transformer	Align 1st IF transformer for maximum reading
10 (c)	Antenna Post (Remove line ant.)	270 ohms	98 Mc. Unmodulated	FM 100	98 Mc.	L7 Osc. Coil slug	Set oscillator to dial scale
11 (c)	Antenna Post (Remove line ant.)	270 ohms	98 Mc. Unmodulated	FM 100	98 Mc.	L3 & L2 Det. and RF coil slugs	Align det. and ant. stages to maximum reading
12 (c)	Antenna Post (Remove line ant.)	270 ohms	45 Mc. Unmodulated	FM 45	45Mc.	C14	Set oscillator to dial scale
13 (c)	Antenna Post (Remove line ant.)	270 ohms	45 Mc. Unmodulated	FM 45	45 Mc.	C15 & C6	Align detector & ant. stages for maximum reading

IMPORTANT: Alignment of this chassis will in most cases be unnecessary unless an IF or RF transformer is replaced or the adjustments have been tampered with.

Correct alignment can only be made if the following procedure is followed:

A vacuum tube voltmeter with an isolation resistor of 200,000 ohms in series with the hot lead will serve for FM adjustments. This lead should be shielded.

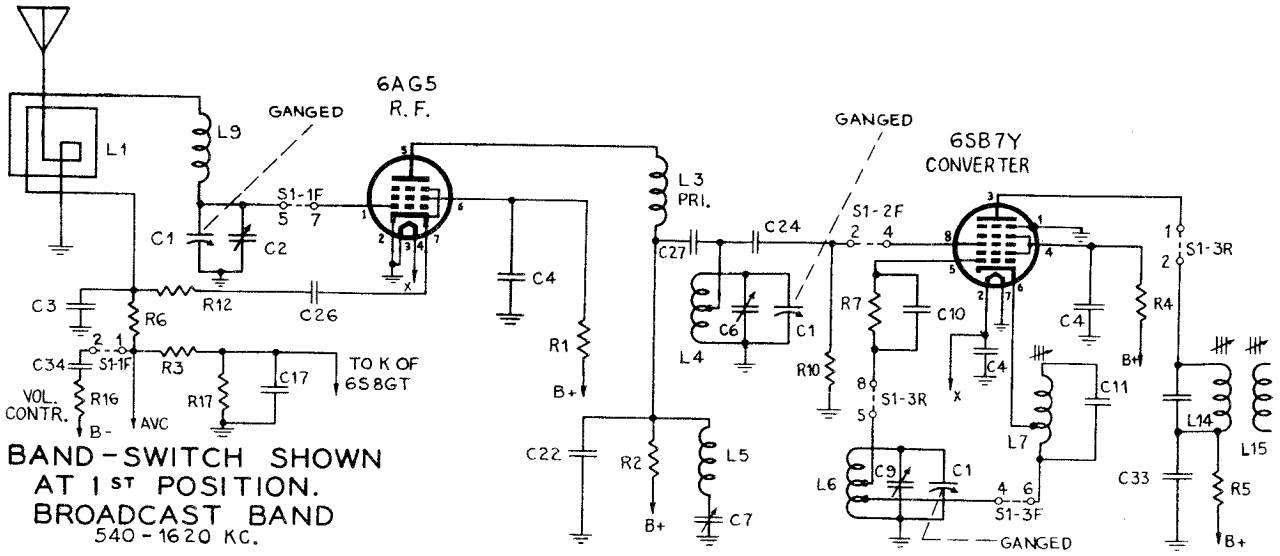
An AC output meter connected across the primary or secondary of the output transformer will be satisfactory for all AM adjustments.

The signal generator output should be kept just high enough to get an indication on the meter.

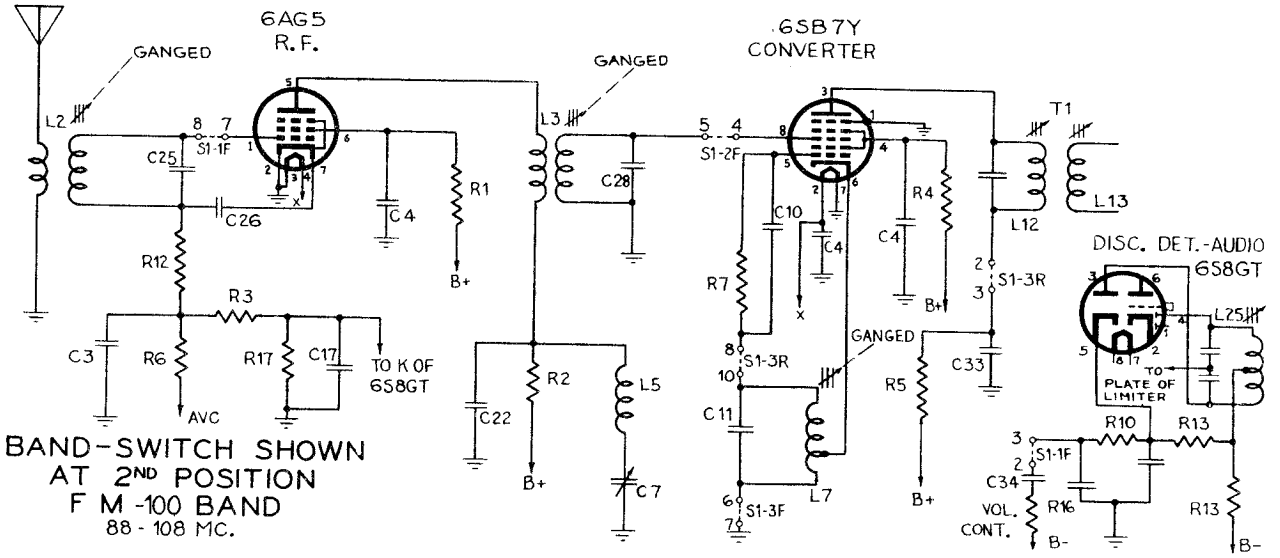
(a) Vacuum Tube Voltmeter pin 5 on discriminator transformer to chassis (half discriminator load.)
(b) Vacuum Tube Voltmeter pin 7 on discriminator transformer to chassis (full discriminator load.)
(c) Vacuum Tube Voltmeter 6SH7 limiter grid (pin 4) to chassis.
(d) 300 ohm $\frac{1}{2}$ watt carbon resistor soldered across the secondary L14 (pin 2 and 3 of 2nd, IF trans.). The leads to the resistor must be as short as possible and the resistor removed before operation 10 is started.

MODELS 8H032, 8H033, 8H050, 8H051, 8H052, 8H061
Chassis 8C20, Early, Late

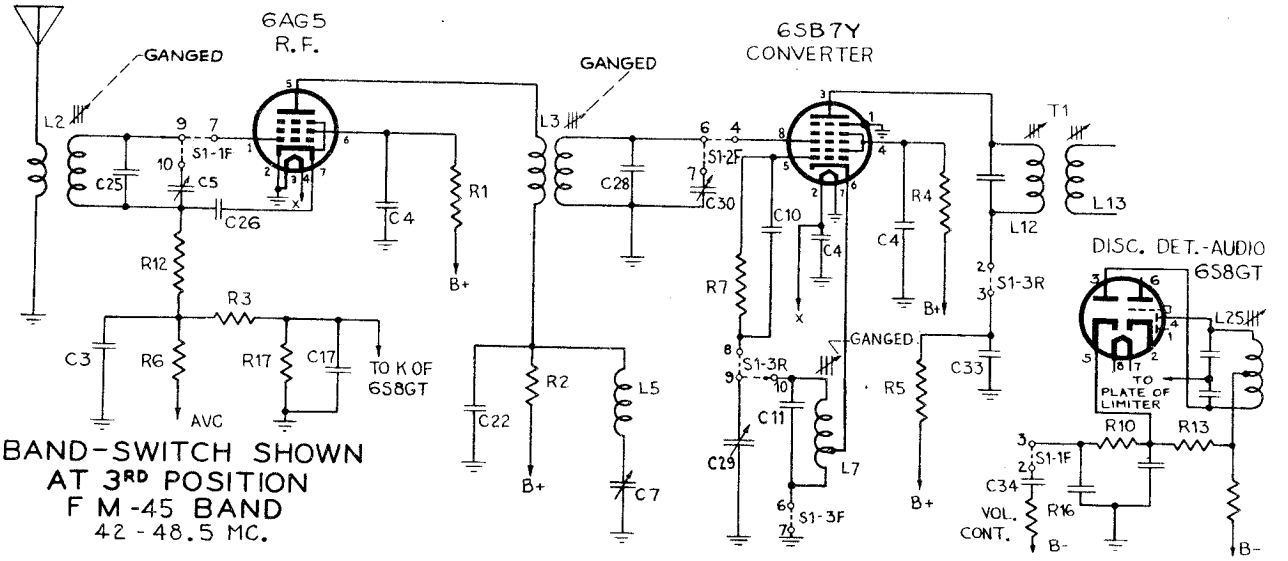
ZENITH RADIO CORP.



BAND-SWITCH SHOWN AT 1ST POSITION.
BROADCAST BAND
540 - 1620 KC.



BAND-SWITCH SHOWN AT 2ND POSITION
F M -100 BAND
88 - 108 MC.



BAND-SWITCH SHOWN AT 3RD POSITION
F M -45 BAND
42 - 48.5 MC.

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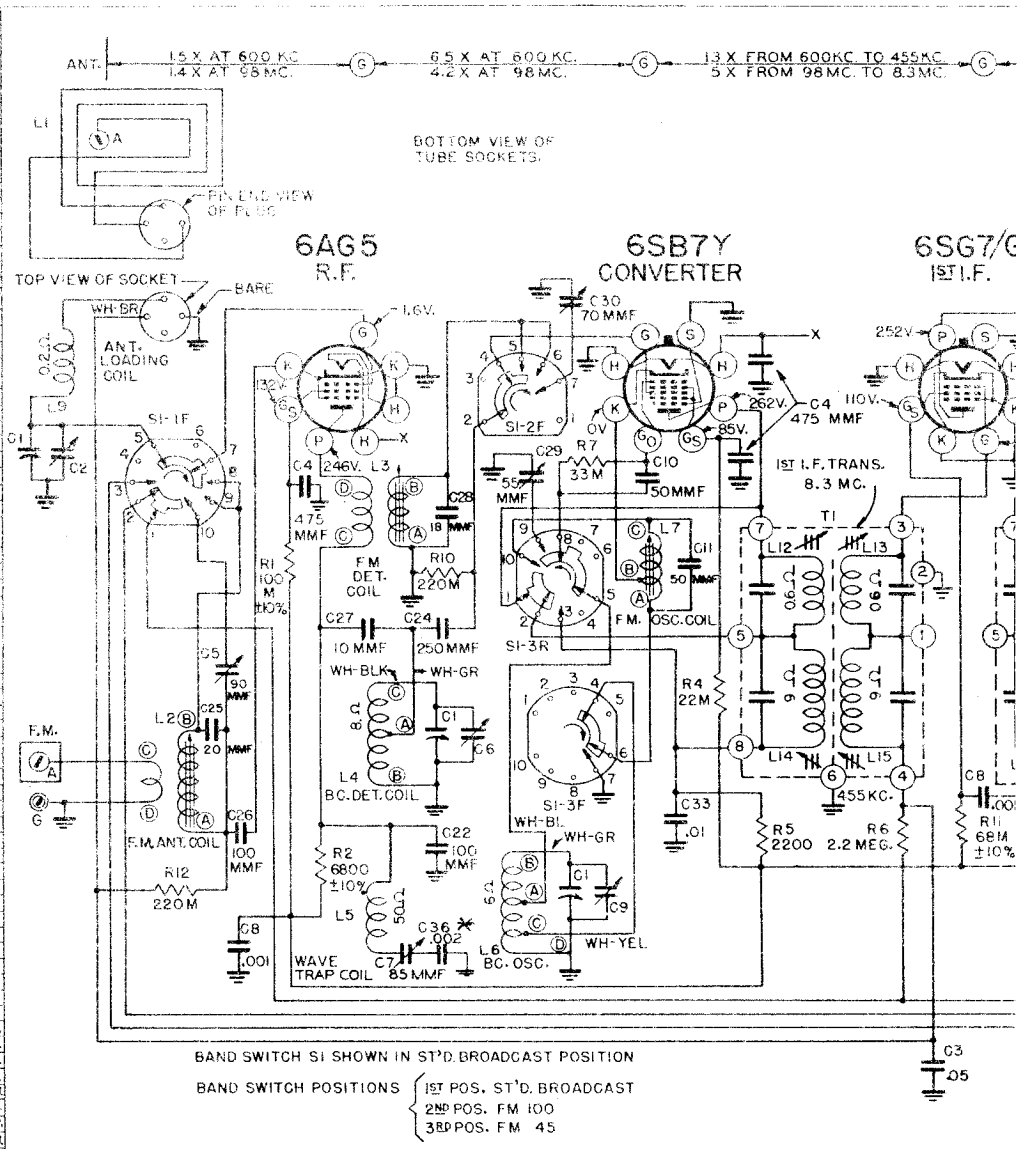
DIAG NO	PART NO	DESCRIPTION	
C1	22-1368	3-GANG VARIABLE	
C2	ON C1	BROADCAST ANT. TRIM.	
C3	22-629	.05 MFD.	200 V.
C4	27-87	475 MMFD. MICA DISC.	
C5	22-1485	90 MMF TRIMMER	
C6	ON C1	BROADCAST DET. TRIM.	
C7	ON L8	WAVETRAP TRIMMER	
C8	22-1431	.001 MFD.	600 V.
C9	ON C1	BROADCAST OSC. TRIM.	
C10	22-1367	50 MMFD.	500 V.
C11	22-1492	150 MMFD. CER.	
C12	22-470	150 MMFD.	600 V.
C13	22-830	.02 MFD.	600 V.
C14	22-1138	500 MMF.	600 V.
C15	22-1446	.002 MFD.	600 V.
C16	22-268	.003 MFD.	600 V.
C17	22-627	.1 MFD.	200 V.
C18	22-448	.004 MFD.	600 V.
C19		40 MFD. ELECTRO	25 V.
C20	22-1382	40 MFD. "	450 V.
C21		40 MFD. "	450 V.
C22	22-162	100 MMFD.	600 V.
C23	22-1041	.005 MFD.	400 V.
C24	22-182	250 MMFD.	600 V.
C25	22-1491	20 MMFD. CER.	
C26	22-1488	100 MMFD.	300 V.
C27	22-1489	10 MMFD. CER.	
C28	22-1490	18 MMFD. CER.	
C29	22-1571	55 MMF TRIMMER	
C30	22-1486	70 MMF "	
C31	22-1383	.01 MFD.	200 V.
C32	22-1137	150 MMFD.	600 V.
C33	22-196	.01 MFD.	600 V.
C34	22-188	.02 MFD.	400 V.
C35	22-1135	.005 MFD.	600 V.
C36	22-612	.002 MFD.	600 V.
CI	S-12461	WAVEMAGNET TYPE 350	
L1	S-12257	ANTENNA COIL ASS'Y	
L5	S-12259	F.M. DETECTOR "	
L6	S-11256	B.C. DETECTOR "	
L7	S-12253	WAVE TRAP COILS TRIM.	
L8	S-11291	B.C. OSCILLATOR COIL	
L7	S-12259	F.M. " "	
L8	S-12256	R.F. CHOKE ASSEMBLY	
L9	S-12389	ANT. LOADING COIL	
L12	ON T1	1ST I.F. TRANS. PRI. (F.M.)	
L13	ON T1	1ST I.F. " SEC. (F.M.)	
L14	ON T1	1ST I.F. " PRI.	
L15	ON T1	1ST I.F. " SEC.	
L16	ON T2	2ND I.F. TRANS. PRI. (F.M.)	
L17	ON T2	2ND I.F. " SEC. (F.M.)	
L18	ON T2	2ND I.F. " PRI.	
L19	ON T2	2ND I.F. " SEC.	
L20	ON T3	3RD I.F. TRANS. PRI. (F.M.)	
L21	ON T3	3RD I.F. " SEC. (F.M.)	
L22	ON T3	3RD I.F. " PRI.	
L23	ON T3	3RD I.F. " SEC.	
L24	ON T4	4TH I.F. TRANS. PRI. (F.M.)	
L25	ON T4	4TH I.F. " SEC. (F.M.)	
R1	63-160	100 M OHM	1/2 W.
R2	63-639	6800 OHM	1/4 W.
R3	63-587	470 M OHM	1/4 W.
R4	63-1056	22 M OHM	2 W.
R5	63-803	2200 OHM	1/2 W.
R6	63-722	2.2 MEGOHM	1/4 W.
R7	63-712	33M OHM	1/4 W.
R8	63-767	47 M OHM	1/4 W.
R9	63-593	47M OHM	1/4 W.
R10	63-295	220M OHM	1/4 W.
R11	63-1225	68M OHM	1/2 W.
R12	63-717	220M OHM	1/4 W.
R13	63-595	100M OHM	1/4 W.
R14	63-976	15 MEGOHM	1/4 W.
R15	63-246	150 OHM	1/4 W.
R16	63-1466	2.5 MEG. VOL. CONTROL	
R17	63-1099	33 OHM W.W.	1/2 W.
R18	63-1222	470 OHM W.W.	1 W.
R19	63-648	47M OHM	1/4 W.
R20	63-1172	100 OHM W.W.	1/2 W.
R21	63-445	100M OHM	1/4 W.
S1	65-378	BAND SWITCH	
S2	S-12510	TONE SWITCH ASSEM.	
SP1		SEE SPEAKER TABLE	
PL1	100-36	PILOT LIGHT 6-3V .25A	
T1	S-12249	1ST I.F. TRANS. ASSEM.	
T2	S-12250	2ND I.F. " "	
T3	S-12251	3RD I.F. " "	
T4	S-12252	DISC. I.F. " "	
T5	95-922	POWER TRANSFORMER	



SPI SPEAKER TA

CHASSIS	MODEL	
8C20	8H032	4
8C20	8H050R	4
8C20	8H051E	4
8C20	8H061	4
8C20	8H061G	4
8C20	8H052R	4

ALL RESISTORS ± 20% TOLERANCE UNLESS OTHERWISE SPECIFIED.

DENOTES CHASSIS

MODELS 8H032 – 8H033 – 8H050 – 8I

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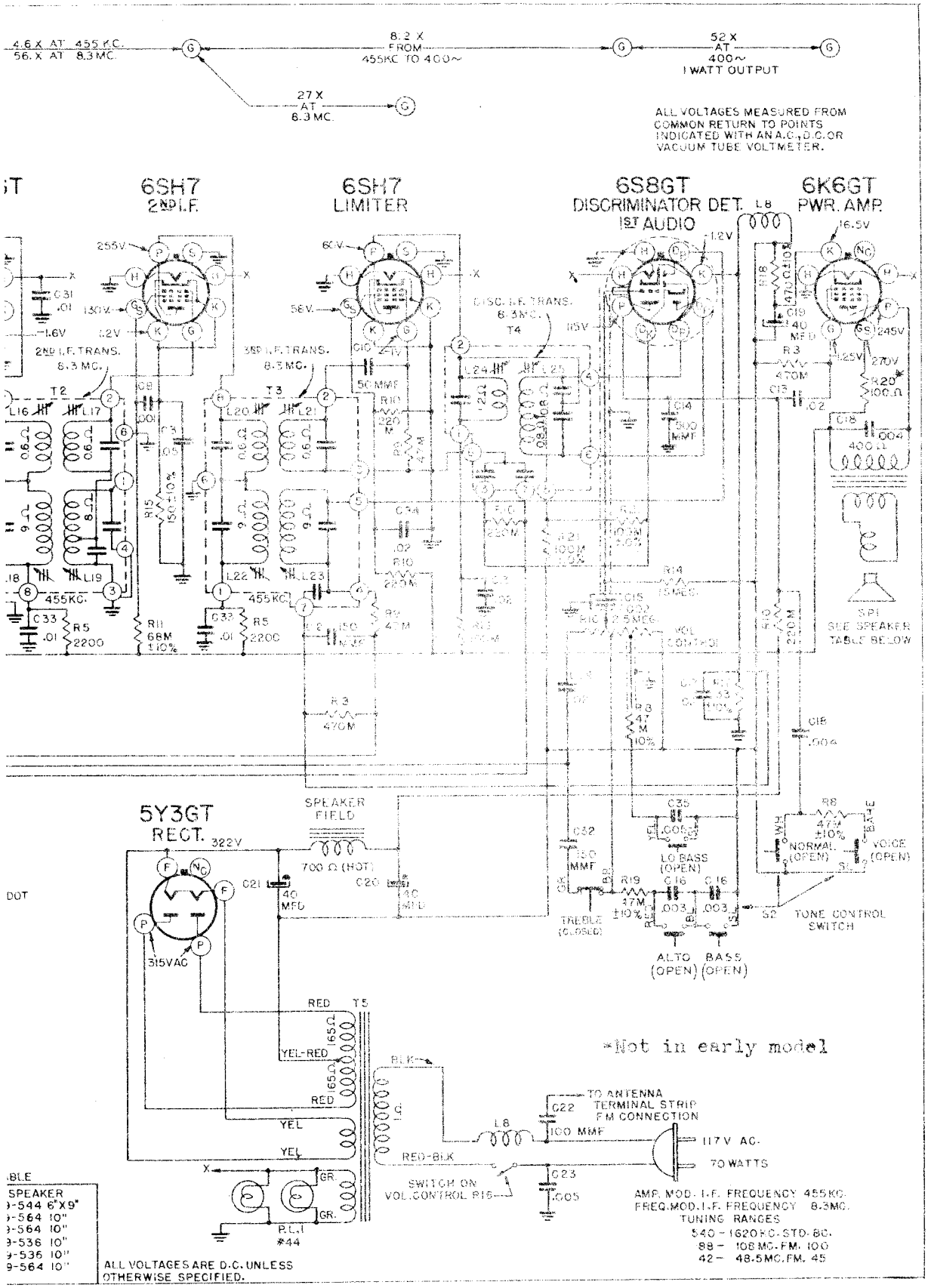
DIO CORP.

MODELS 8H032, 8H033, 8H050, 8H051,
8H052, 8H061, Ch. 8C20, Early, Late



SPEAKER
544 6"X9"
564 10"
564 10"
536 10"
536 10"
564 10"

1051 - 8H052 - 8H061 CHASSIS No. 8C20

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ALIGNMENT PROCEDURE

Operation	Connect Oscillator to	Dummy Antenna	Input Signal Frequency	Band	Set Dial To	Adj. Trimmers	Purpose
1	Pin 8 on Converter Tube 6SB7 socket	.05 Mfd.	455 Kc. Modulated	BC	600 Kc.	L-14,15,18,19 22 and 23	Align I.F. channel for maximum output
2	Pin 1 on R.F. tube 6AG5 socket	.05 Mfd.	455 Kc. Modulated	BC	600 Kc.	C7	Adjust wavetrap for minimum output
3	2 turns loosely cpld. to wavemagnet		1600 Kc. Modulated	BC	1600 Kc.	C9	Set oscillator to dial scale
4	2 turns loosely cpld. to wavemagnet		1400 Kc. Modulated	BC	1400 Kc.	C2 & C6	Align det. and ant. stages
5(a)	Pin 4 grid on 6SH7 limiter socket	.05 Mfd.	8.3 Mc. Unmodulated	FM 45		L24 coil slug primary discriminator	Align primary of discriminator for maximum reading
6(b)	Pin 4 grid on 6SH7 limiter socket	.05 Mfd.	8.3 Mc. Unmodulated	FM 45		L25 coil slug sec. of discriminator	Adjust secondary of discriminator for zero reading
7(c)	Pin 4 (grid) on 6SH7 2nd IF tube socket	.05 Mfd.	8.3 Mc. Unmodulated	FM 45		L20 & L21 Prim. & Sec. of 3rd IF transformer	Align 3rd IF transformer for maximum reading
8(c)(d)	Pin 4 (grid) on 6SG7 1st IF tube socket	.05 Mfd.	8.3 Mc. Unmodulated	FM 45		L16 & L17 Primary & Sec. of 2nd IF transformer	Align 2nd If transformer for maximum reading
9(c)(d)	Pin 8 grid on 6SB7 converter tube socket	.05 Mfd.	8.3 Mc. Unmodulated	FM 45		L12 & L13 Primary & Sec. of 1st IF transformer	Align 1st IF transformer for maximum reading
10(c)	Antenna Post (Remove line ant.)	270 Ohms	98 Mc. Unmodulated	FM 100	98 Mc.	L7 Oscillator coil slug	Set oscillator to dial scale
11(c)	Antenna Post (Remove line ant.)	270 ohms	98 Mc. Unmodulated	FM 100	98 Mc.	L2 and L3 Det. and RF coil slugs	Align det. and ant. stages to maximum reading
12(c)	Antenna Post (Remove line ant.)	270 ohms	45 Mc. Unmodulated	FM 45	45 MC.	C29	Set oscillator to dial scale
13(c)	Antenna Post (Remove line ant.)	270 ohms	45 Mc. Unmodulated	FM 45	45 Mc.	C5 and C30	Align detector & ant. stages for maximum reading

IMPORTANT: Alignment of this chassis will in most cases be unnecessary unless an IF or RF transformer is replaced or the adjustments have been tampered with.

Correct alignment can only be made if the following procedure is followed:

A vacuum tube voltmeter with an isolation resistor of 200,000 ohms in series with the hot lead will serve for FM adjustments. This lead should be shielded.

An AC output meter connected across the primary or secondary of the output transformer will be satisfactory for all AM adjustments.

The signal generator output should be kept just high enough to get an indication on the meter.

(a) Vacuum Tube Voltmeter pin 5 on discriminator transformer to chassis (half discriminator load.)

(b) Vacuum Tube Voltmeter pin 7 on discriminator transformer to chassis (full discriminator load.)

(c) Vacuum Tube Voltmeter 6SH7 limiter grid (pin 4) to chassis.

(d) 300 ohm $\frac{1}{2}$ watt carbon resistor soldered across the secondary L17 (pin 2 and 3 of 2nd, IF transformer. The leads to the resistor must be as short as possible and the resistor removed before operation 10 is started.

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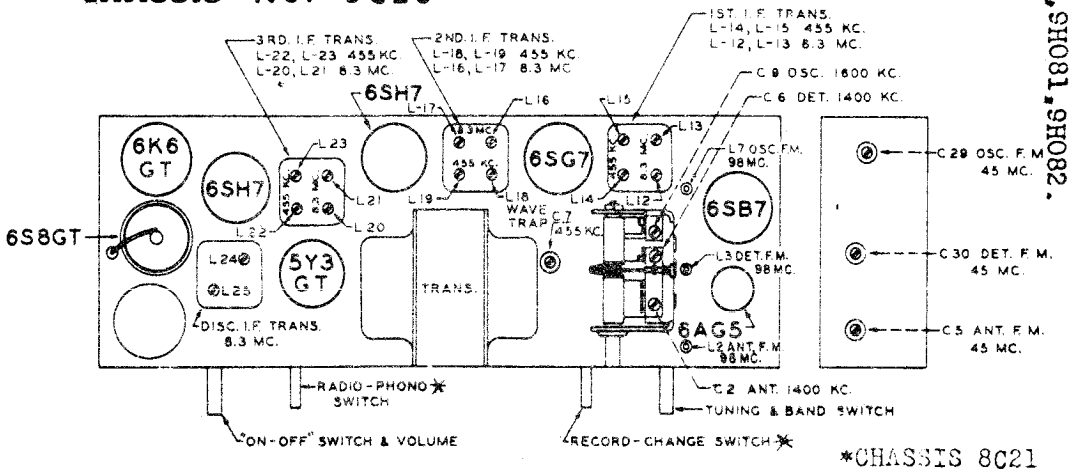
MODELS 9H079 – 9H081 – 9H082 – 9H085 – 9H088
CHASSIS No. 8C21
MODELS 8H032 – 8H033 – 8H050 – 8H051 – 8H052 – 8H061
CHASSIS No. 8C20

TO THE SERVICE MAN:

The 8C21, 20 chassis incorporates a superheterodyne circuit with two stages of IF, and one stage of RF amplification on all bands.

AM Alignment: The alignment of this chassis on the standard broadcast band is conventional. The alignment slugs in the IF transformers are threaded and screw into the coil forms. The slugs are slotted for a small size fiber screw driver. Do not press hard on the aligning tool (fiber screw driver) or the threads in the coil forms will strip and adjustment will be impossible.


3RD. I.F. TRANS. L-22, L-23 455 KC. L-20, L-21 8.3 MC.
2ND. I.F. TRANS. L-18, L-19 455 KC. L-16, L-17 8.3 MC.
1ST. I.F. TRANS. L-14, L-15 455 KC. L-12, L-13 8.3 MC.
C 8 OSC. 1600 KC.
C 6 DET. 1400 KC.
6SH7
6K6 GT
6SH7
6SG7
6SB7
6S8GT
5Y3 GT
6AG5
L7 OSC. F.M. 98 MC.
L3 DET. F.M. 98 MC.
L2 ANT. F.M. 98 MC.
C 29 OSC. F.M. 45 MC.
C 30 DET. F.M. 45 MC.
C 5 ANT. F.M. 45 MC.
C 7 455 KC.
WAVE TRAP
TRANS.
DISC. I.F. TRANS. 8.3 MC.
C 2 ANT. 1400 KC.
RADIO-PHONO SWITCH
TUNING & BAND SWITCH
"ON-OFF" SWITCH & VOLUME
RECORD-CHANGE SWITCH

*CHASSIS 8C21

TUBE AND TRIMMER LOCATION

FM RF Alignment: The same coil slug arrangement which tunes the 100 MC FM band also tunes the 45 MC band. However, on 45 MC the band switch connects trimmer condensers in parallel and padding wires in series with the 100 MC coils. The tuning slugs are attached to threaded shafts and the slugs are varied in the field of the coils by turning the shafts clockwise or counter-clockwise. After adjustments the shafts must be secured with a drop of speaker cement.

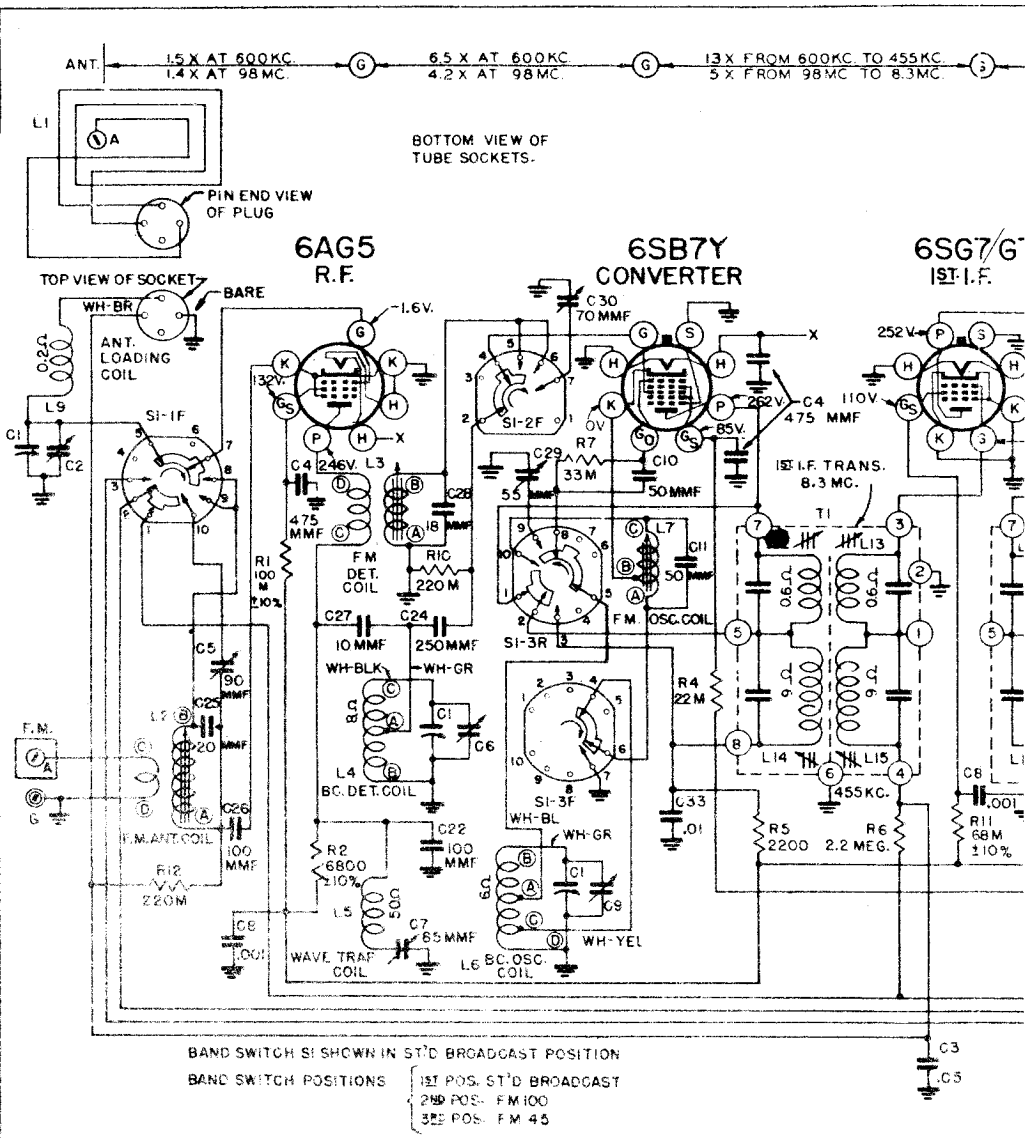
FM IF Alignment: The same type of tuning slugs for aligning the AM IF Amplifier are used for the FM I.F.'s. Observe the same precautions when making adjustments. The second 8.3 Mc IF stage is overcoupled. Overcoupling gives a wide band pass with good sensitivity. When an overcoupled stage is aligned with an unmodulated signal, the stage must be loaded. A 300 ohm carbon resistor soldered across the secondary of the second IF transformer provides a satisfactory load for this circuit. The resistor leads must be kept short to reduce the distributed capacity of the circuit.

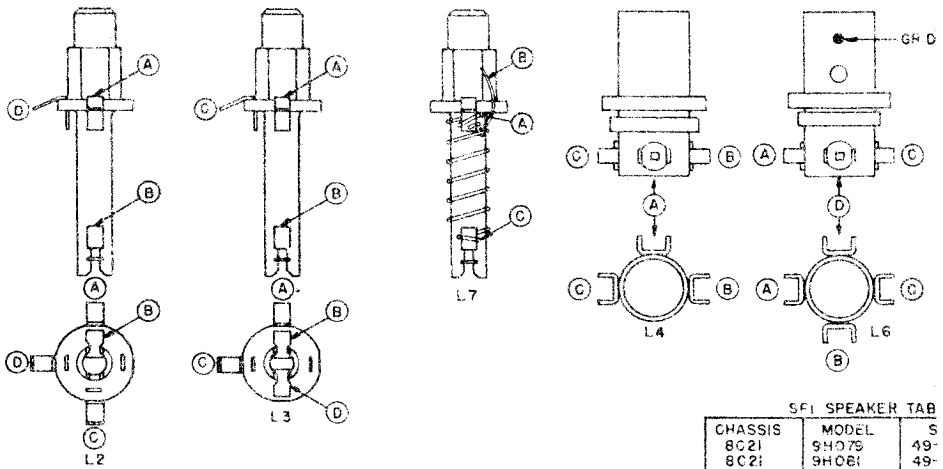
When aligning a loaded stage, it will be found that considerable signal from the generator will be required, and that it will tune broadly. THE LOAD RESISTOR MUST BE REMOVED AFTER ALIGNMENT.

If the signal generator used does not have sufficient output to overcome the temporary loss caused by the load resistor, the load resistance may be increased or the signal fed into the preceding stage.

FM Discriminator Alignment: When the secondary of the discriminator is aligned (operation 6) use sufficient signal input to get a good positive and negative indication before setting the slug for zero reading. A center zero indicating meter is recommended for this adjustment, but is not absolutely necessary. Reversing the leads of a non-zero center meter, or observing closely when this meter starts to go to the left (negative) of zero will give the same results.

DIAG NO.	PART NO.	DESCRIPTION
C1	22-1368	3-GANG VARIABLE
C2	ON C1	BROADCAST ANT. TRIM.
C3	22-829	.05 MFD. 200 V.
C4	27-87	475 MMFD. MICA DISC
C5	22-1485	90 MMF TRIMMER
C6	ON C1	BROADCAST DET. TRIM.
C7	ON L5	WAVE TRAP TRIMMER
C8	22-1431	.001 MFD. 600 V.
C9	ON C1	BROADCAST OSC. TRIM.
C10	22-1307	50 MMFD 500 V.
C11	22-1492	50 MMFD CER.
C12	22-470	150 MMFD. 600 V.
C13	22-830	.02 MFD 600 V.
C14	22-1138	500 MMF 600 V.
C15	22-1445	.002 MFD. 600 V.
C16	22-288	.003 MFD 600 V.
C17	22-827	.1 MFD. 200 V.
C18	22-448	.004 MFD. 600 V.
C19		40 MFD. ELECTRO. 25 V.
C20	22-1382	40 MFD. " 450 V.
C21		40 MFD. " 450 V.
C22	22-160	100 MMFD 600 V.
C23	22-1041	.005 MFD. 400 V.
C24	22-182	250 MMFD. 600 V.
C25	22-1491	20 MMFD. CER.
C26	22-1488	100 MMFD 300 V.
C27	22-1489	10 MMFD CER.
R1	63-160	100 M OHM 1/2 W.
R2	63-436	6800 OHM 1/4 W.
R3	63-527	470 M OHM 1/4 W.
R4	63-1058	22 M OHM 2 W.
R5	63-6-3	2200 OHM 1/2 W.
R6	63-778	2.2 MEG OHM 1/4 W.
R7	63-7-2	33 M OHM 1/4 W.
R8	63-767	47 M OHM 1/4 W.
R9	63-583	47 M OHM 1/4 W.
R10	63-296	220 M OHM 1/4 W.
R11	63-1225	68 M OHM 1/2 W.
R12	63-717	220 M OHM 1/4 W.
R13	63-565	100 M OHM 1/4 W.
R14	63-876	15 MEGOHM 1/4 W.
R15	63-246	150 OHM 1/4 W.
R16	63-1466	2.5 MEG. VOL. CONTROL
R17	63-1095	33 OHM W.W. 1/2 W.
R18	63-1222	470 OHM W.W. 1 W.
R19	63-648	47 M OHM 1/4 W.
R20	63-1172	100 OHM 1/2 W.
L1	S-11461	WAVEMAGNET TYPE ANT.
L2	S-12257	FM ANTENNA COIL ASSY
L3	S-12258	FM DETECTOR " "
L4	S-11156	BC. DETECTOR " "
L5	S-12253	WAVE TRAP COIL & TRIM
L6	S-11291	BC. OSCILLATOR " "
L7	S-12259	FM " " "
L8	S-12256	R.F. CHOKE
L9	S-12389	ANT. LOADING COIL
T1	S-12249	1ST I.F. TRANS. ASSEM.
T2	S-12250	2ND I.F. " "
T3	S-12251	3RD I.F. " "
T4	S-12252	DISC. I.F. " "
T5	95-922	POWER TRANSFORMER
S1	85-378	BAND SWITCH
S2	S-12510	TONE SWITCH ASSEM.
S3	85-363	PHONO-RADIO SWITCH
S4	85-349	RECORD CHANGE SWITCH
W1	S-12265	PHONO CABLE ASSEM
PL1	100-36	PILOT LIGHT 6-3V, 25A
SP1		SEE SPEAKER TABLE
C28	22-1490	18 MMFD CER.
C29	22-1571	55 MMF TRIMMER
C30	22-1486	70 MMF "
C31	22-1385	.01 MFD. 200 V.
C32	22-1137	150 MMFD 600 V.
C33	22-196	.01 MFD. 600 V.
C36	22-1139	.005 MFD 600 V.
L12	ON T1	1ST I.F. TRANS. PRI. (F.M.)
L13	ON T1	1ST I.F. " SEC. (F.M.)
L14	ON T1	1ST I.F. " PRI.
L15	ON T1	1ST I.F. " SEC.
L16	ON T2	2ND I.F. TRANS. PRI. (F.M.)
L17	ON T2	2ND I.F. " SEC. (F.M.)
L18	ON T2	2ND I.F. " PRI.
L19	ON T2	2ND I.F. " SEC.
L20	ON T3	3RD I.F. TRANS. PRI. (F.M.)
L21	ON T3	3RD I.F. " SEC. (F.M.)
L22	ON T3	3RD I.F. " PRI.
L23	ON T3	3RD I.F. " SEC
L24	ON T4	4TH I.F. TRANS. PRI. (F.M.)
L25	ON T4	4TH I.F. " SEC. (F.M.)





SEE SPEAKER TAB

CHASSIS	MODEL	S
8C21	9H079	49-
8C21	9H081	49-
8C21	9H085R	49-
8C21	9H088R	49-
8C21	9H082R	49-

ALL RESISTORS ± 20% TOLERANCE UNLESS OTHERWISE SPECIFIED.

DENOTES CHASSIS

MODELS 9H079 – 9H081 – 9H082 –

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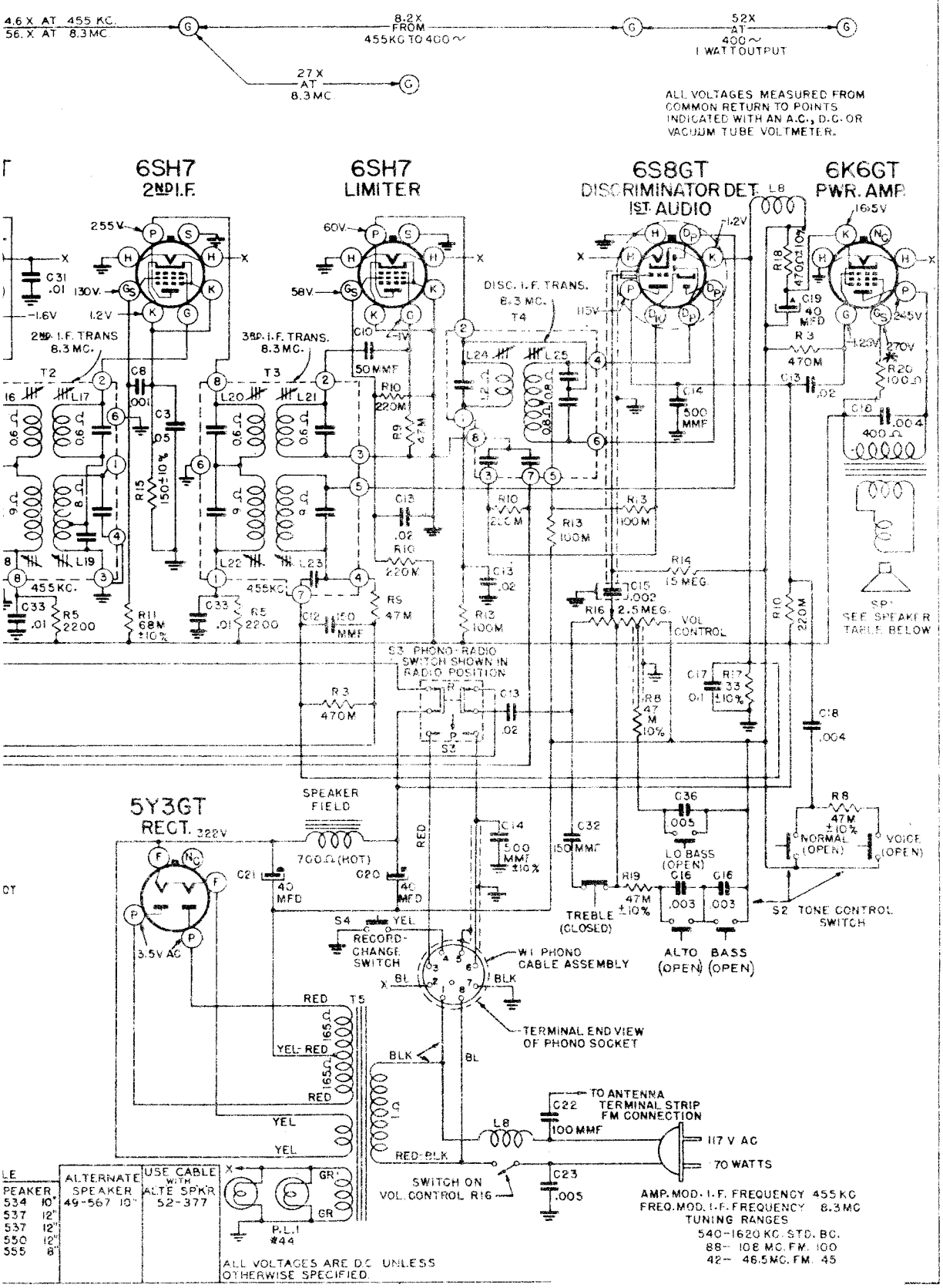
MODELS 9H079,9H081,9H082,9H085,
9H088, Chassis 8C21, Early, Revised


4.6 X AT 455 KC.
56. X AT 8.3MC.
8.2X FROM 455KC TO 400~
52X AT 400~ 1 WATT OUTPUT
27X AT 8.3MC.
ALL VOLTAGES MEASURED FROM COMMON RETURN TO POINTS INDICATED WITH AN A.C., D.C. OR VACUUM TUBE VOLTMETER.
6SH7 2ND I.F.
6SH7 LIMITER
6S8GT DISCRIMINATOR DET. 1ST AUDIO
6K6GT PWR. AMP
2ND I.F. TRANS 8.3 MC.
3RD I.F. TRANS. 8.3 MC.
DISC. I.F. TRANS. 8.3 MC.
455 KC.
VOL CONTROL
S3 PHONO-RADIO SWITCH SHOWN IN RADIO POSITION
SPKR SEE SPEAKER TABLE BELOW
5Y3GT RECT. 322V
SPEAKER FIELD
700Ω (HOT)
3.5V AC
S4 RECORD-CHANGE SWITCH
W1 PHONO CABLE ASSEMBLY
TERMINAL END VIEW OF PHONO SOCKET
TREBLE (CLOSED)
LO BASS (OPEN)
ALTO (OPEN)
BASS (OPEN)
S2 TONE CONTROL SWITCH
NORMAL (OPEN)
VOICE (OPEN)
TO ANTENNA TERMINAL STRIP FM CONNECTION
117 V AC
70 WATTS
SWITCH ON VOL. CONTROL R16
AMP. MOD.-I.F. FREQUENCY 455 KC
FREQ. MOD.-I.F. FREQUENCY 8.3 MC
TUNING RANGES
540-1620 KC. STD. BC.
88- 108 MC. FM. 100
42- 46.5 MC. FM. 45
ALL VOLTAGES ARE D.C. UNLESS OTHERWISE SPECIFIED.

SPEAKER	ALTERNATE SPEAKER	USE CABLE WITH ALTE SPKR
534 10"	49-567 10"	52-377
537 12"		
537 12"		
550 12"		
555 8"		

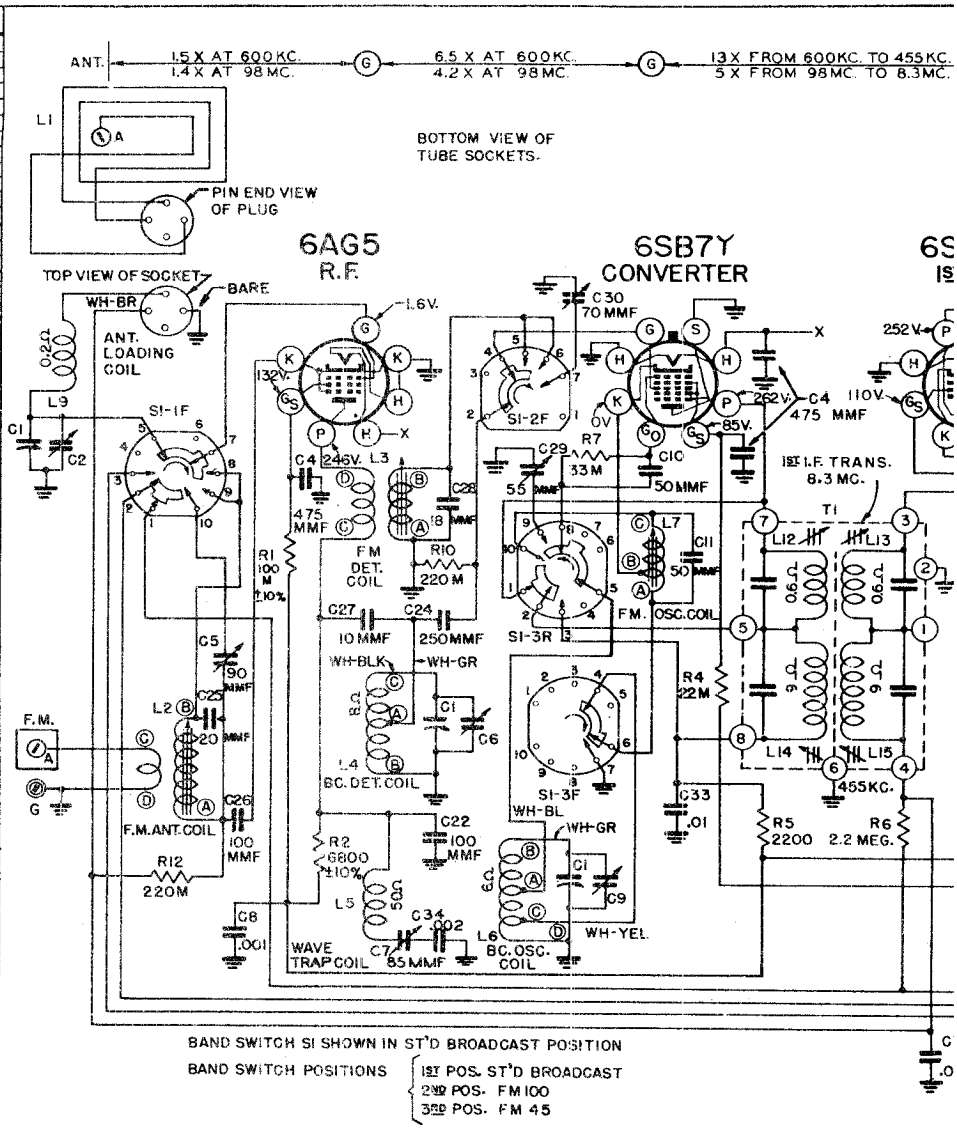
9H085 – 9H088 CHASSIS No. 8C21 * NOT IN EARLY MODEL

Record Changer: Zenith Model S-11680. For Alignment, see Pp. 15-79, 15-80 80

MODELS 9H079, 8H081, 9H082, 9H085, 9H088, Chassis 8C21 Late

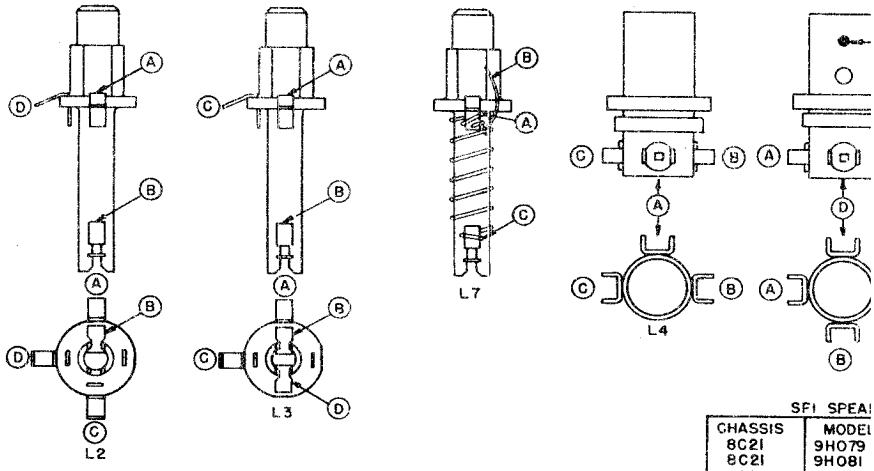
ZENITH

DIAG NO.	PART NO.	DESCRIPTION
C1	22-1368	3-GANG VARIABLE
C2	ON C1	BROADCAST ANT. TRIM.
C3	22-829	.05 MFD. 200V.
C4	27-87	475 MMFD. MICA DISC
C5	22-1485	90 MMF TRIMMER
C6	ON C1	BROADCAST DET. TRIM
C7	ON L5	WAVE TRAP TRIMMER
C8	22-1431	.001 MFD. 600V.
C9	ON C1	BROADCAST OSC. TRIM.
C10	22-1367	50 MMFD. 500V.
C11	22-1492	50 MMFD. CER.
C12	22-470	150 MMFD. 600 V.
C13	22-830	.02 MFD 600 V.
C14	22-1138	500 MMF 600 V.
C15	22-1445	.002 MFD. 600 V.
C16	22-288	.003 MFD. 600 V.
C17	22-827	.1 MFD. 200 V.
C18	22-448	.004 MFD. 600 V.
C19		40 MFD. ELECTRO. 25 V.
C20	22-1382	40 MFD. " 450 V.
C21		40 MFD. " 450 V.
C22	22-162	100 MMFD. 600 V.
C23	22-1041	.005 MFD. 400 V.
C24	22-182	250 MMFD. 600 V.
C25	22-1491	20 MMFD. CER.
C26	22-1488	100 MMFD. 300 V.
C27	22-1489	10 MMFD CER.
R1	63-160	100 M OHM 1/2 W.
R2	63-639	6800 OHM 1/4 W.
R3	63-597	470 M OHM 1/4 W.
R4	63-1058	22 M OHM 2 W.
R5	63-803	2200 OHM 1/2 W.
R6	63-722	2.2 MEGOHM 1/4 W.
R7	63-712	33 M OHM 1/4 W.
R8	63-767	47 M OHM 1/4 W.
R9	63-593	47 M OHM 1/2 W.
R10	63-296	220 M OHM 1/4 W.
R11	63-1225	68 M OHM 1/2 W.
R12	63-717	220 M OHM 1/4 W.
R13	63-595	100 M OHM 1/4 W.
R14	63-976	15 MEGOHM 1/4 W.
R15	63-246	150 OHM 1/4 W.
R16	63-1466	2.5 MEG. VOL. CONTROL
R17	63-1099	33 OHM W.W. 1/2 W.
R18	63-1222	470 OHM W.W. 1 W
R19	63-648	47 M OHM 1/4 W.
R20	63-1172	100 OHM 1/2 W.
R21	63-445	100 OHM 1/4 W.
L1	S-11461	WAVEMAGNET TYPE 300
L2	S-12257	F.M. ANTENNA COIL ASSY
L3	S-12258	F.M. DETECTOR " "
L4	S-11156	B.C. DETECTOR " "
L5	S-12253	WAVE TRAP COIL & TRIM.
L6	S-11291	B.C. OSCILLATOR " "
L7	S-12259	F.M. " " "
L8	S-12256	R.F. CHOKE
L9	S-12529	ANT. LOADING COIL
T1	S-12245	1ST I.F. TRANS. ASSEM.
T2	S-12250	2ND I.F. " "
T3	S12251	3RD I.F. " "
T4	S12252	DISC. I.F. " "
T5	95-922	POWER TRANSFORMER
S1	85-378	BAND SWITCH
S2	S-12510	TONE SWITCH ASSEM.
S3	85-363	PHONO-RADIO SWITCH
S4	85-349	RECORD-CHANGE SWITCH
W1	S-12265	PHONO CABLE ASSEM
PL1	100-36	PILOT LIGHT 6-3V. 25A
SP1		SEE SPEAKER TABLE
C28	22-1490	18 MMFD CER.
C29	22-1571	55 MMF TRIMMER
C30	22-1486	70 MMF "
C31	22-1385	.01 MFD. 200 V.
C32	22-1137	150 MMFD 600 V.
C33	22-196	.01 MFD. 600 V.
C34	22-912	.002 MFD. 600 V.
C35	22-188	.02 MFD. 400 V.
C36	22-1135	.005 MFD. 600 V.
L12	ON T1	1ST I.F. TRANS. PRI. (F.M.)
L13	ON T1	1ST I.F. " SEC. (F.M.)
L14	ON T1	1ST I.F. " PRI.
L15	ON T1	1ST I.F. " SEC.
L16	ON T2	2ND I.F. TRANS. PRI. (F.M.)
L17	ON T2	2ND I.F. " SEC. (F.M.)
L18	ON T2	2ND I.F. " PRI.
L19	ON T2	2ND I.F. " SEC.
L20	ON T3	3RD I.F. TRANS. PRI. (F.M.)
L21	ON T3	3RD I.F. " SEC. (F.M.)
L22	ON T3	3RD I.F. " PRI.
L23	ON T3	3RD I.F. " SEC
L24	ON T4	4TH I.F. TRANS. PRI. (F.M.)
L25	ON T4	4TH I.F. " SEC. (F.M.)



BAND SWITCH S1 SHOWN IN ST'D BROADCAST POSITION

BAND SWITCH POSITIONS { 1ST POS. ST'D BROADCAST; 2ND POS. FM 100; 3RD POS. FM 45



ALL RESISTORS ± 20% TOLERANCE UNLESS OTHERWISE SPECIFIED.

DENOTES CHASSIS

SPI SPEA

CHASSIS	MODEL
8C21	9H079
8C21	9H081
8C21	9H085
8C21	9H088
8C21	9H082

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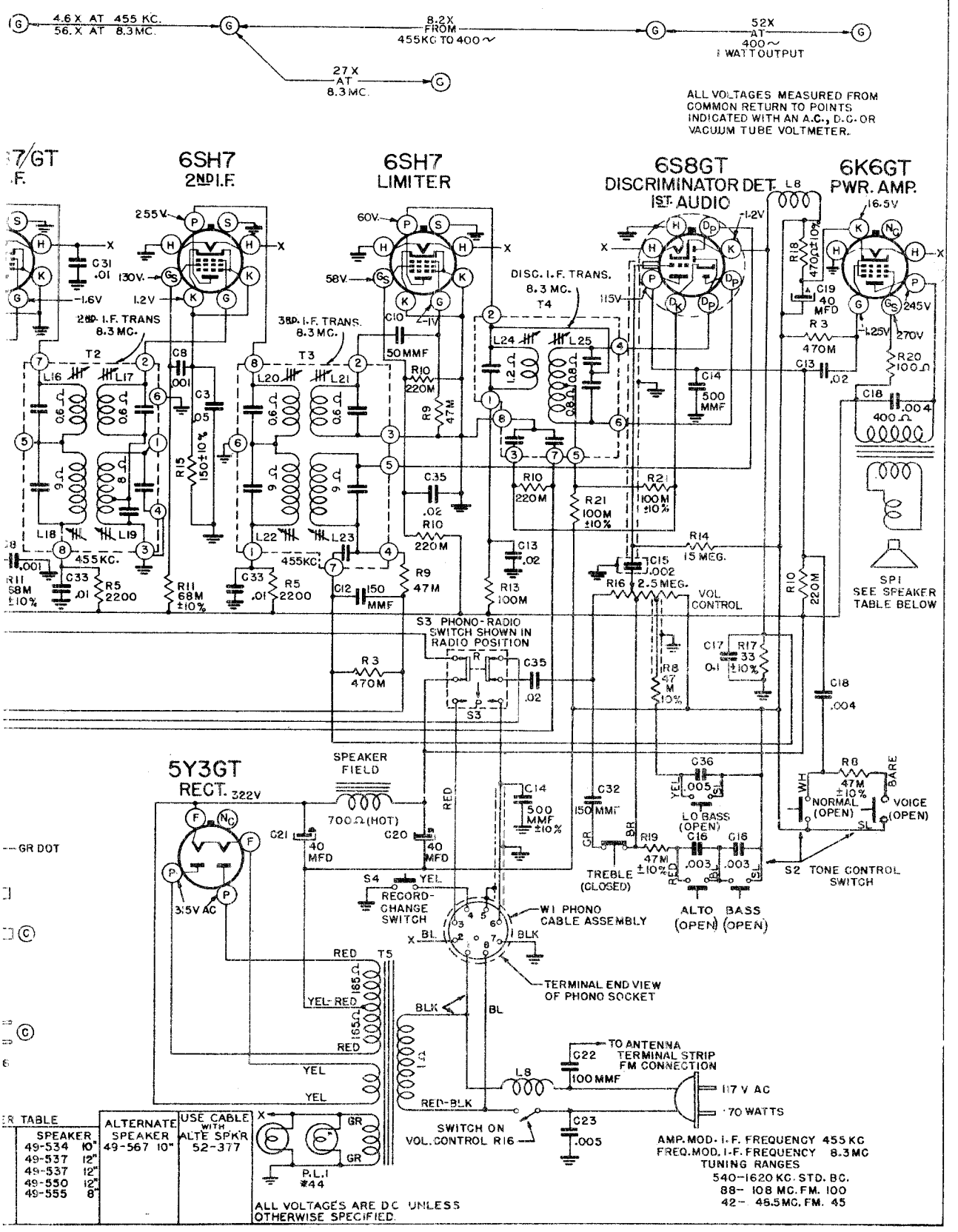

4.6 X AT 455 KC.
56. X AT 8.3MC.
8.2X FROM 455KC TO 400~
52X AT 400~ 1 WATT OUTPUT
27 X AT 8.3 MC.
ALL VOLTAGES MEASURED FROM COMMON RETURN TO POINTS INDICATED WITH AN A.C., D.C. OR VACUUM TUBE VOLTMETER.
7/6T
6SH7 2ND I.F.
6SH7 LIMITER
6S8GT DISCRIMINATOR DET. 1ST AUDIO
6K6GT PWR. AMP.
2ND I.F. TRANS 8.3 MC.
3RD I.F. TRANS. 8.3 MC.
DISC. I.F. TRANS. 8.3 MC. T4
S3 PHONO-RADIO SWITCH SHOWN IN RADIO POSITION
VOL. CONTROL
SPI SEE SPEAKER TABLE BELOW
5Y3GT RECT. 322V
SPEAKER FIELD
700Ω (HOT)
S4 RECORD-CHANGE SWITCH
W1 PHONO CABLE ASSEMBLY
TERMINAL END VIEW OF PHONO SOCKET
TREBLE (CLOSED)
LO BASS (OPEN)
ALTO (OPEN)
BASS (OPEN)
S2 TONE CONTROL SWITCH
NORMAL (OPEN)
VOICE (OPEN)
TO ANTENNA TERMINAL STRIP FM CONNECTION
SWITCH ON VOL. CONTROL R16
117 V AC
70 WATTS
AMP. MOD. I.F. FREQUENCY 455 KC
FREQ. MOD. I.F. FREQUENCY 8.3 MC
TUNING RANGES
540-1620 KC. STD. BC.
88- 108 MC. FM. 100
42- 46.5 MC. FM. 45
P.L.I #44
ALL VOLTAGES ARE DC UNLESS OTHERWISE SPECIFIED.
GR DOT

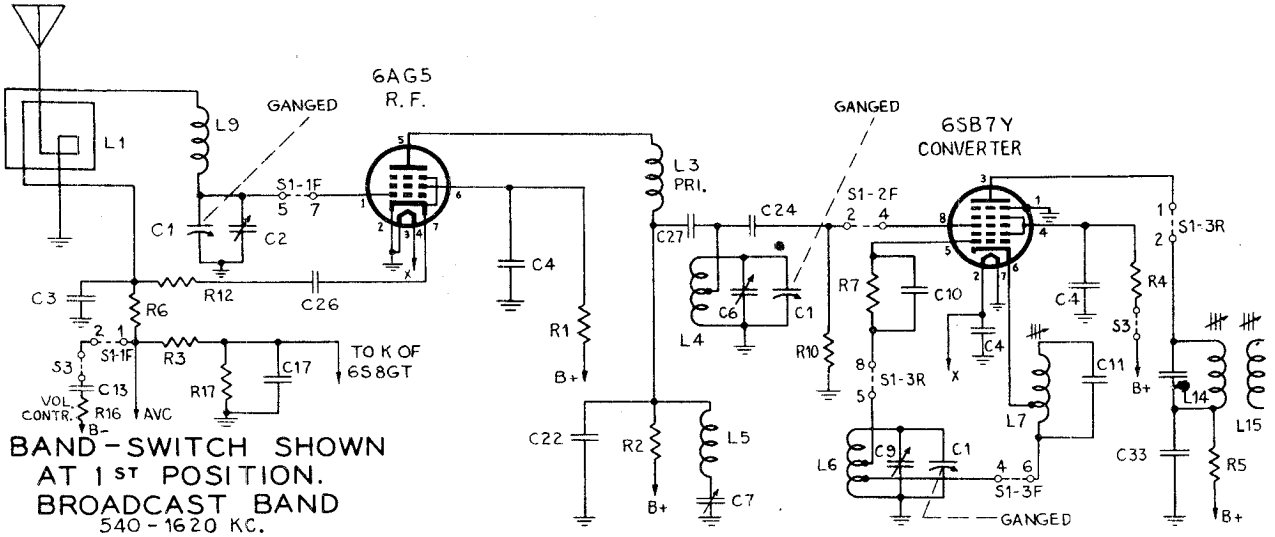
SPEAKER TABLE		ALTERNATE SPEAKER	USE CABLE WITH ALTE SPK'R
SPEAKER		49-567 10"	52-377
49-534	10"		
49-537	12"		
49-537	12"		
49-550	12"		
49-555	8"		

9H085 – 9H088 CHASSIS No. 8C21

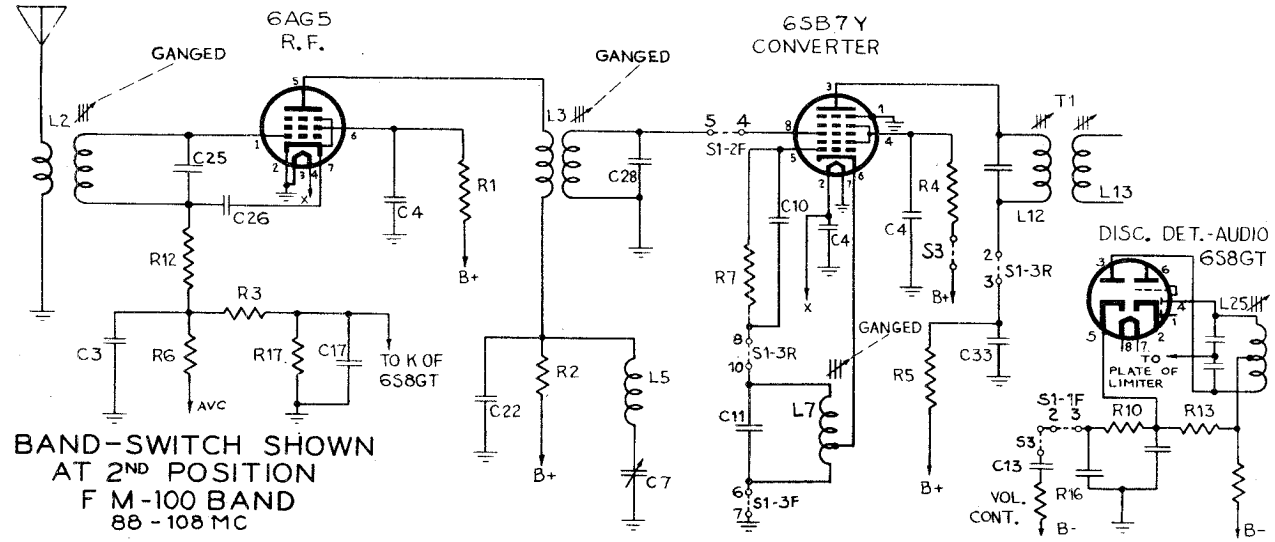
Record Changer: Zenith Model S-11680 For Alignment, see Pp. 15-79, 15-80

ZENITH RADIO CORP.

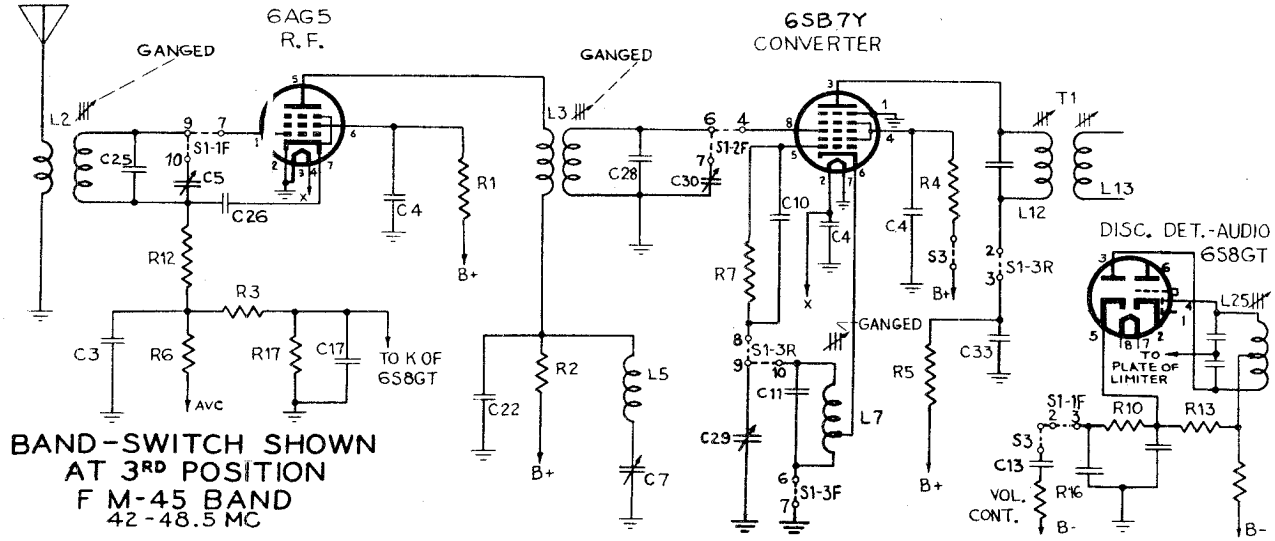
MODELS 9H079, 9H081, 9H082, 9H085, 9H088, Early, Late



BAND-SWITCH SHOWN AT 1ST POSITION. BROADCAST BAND 540-1620 KC.



BAND-SWITCH SHOWN AT 2ND POSITION F M-100 BAND 88-108 MC



BAND-SWITCH SHOWN AT 3RD POSITION F M-45 BAND 42-48.5 MC

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MODELS 8HO32,8HO33,8HO50, 8HO51,8HO52,8HO61

ZENITH RADIO CORP.

MODELS 9HO79,9HO81,9HO82, 9HO85,9HO88

CHASSIS 8C20-8C21-8HO-9HO-SERIES

HUM COMPLAINT ON 9HO SERIES:

Check audio and a-c leads to the volume control. The leads from the tone control must be dressed away from the a-c leads. The high voltage secondary leads from the power transformer must be dressed away and close to the chassis from the 47,000 resistor on the tap points.

HOWL ON AM 8HO SERIES:

Howl due to vibrations transmitted into the oscillator sections of the gang condenser by the speaker. To remedy this condition, a felt strip can be placed between the rear of the gang, and the first i-f transformer. It may also be necessary to move the oscillator section lead underneath the gang slightly to reduce tension.

STRIPPED IF SLUG INSERTS:

Damaged i-f slug thread inserts may be replaced by unscrewing the slug and pushing out the old insert.
Two types of inserts are used, 83-1063 short and 83-1069 long.

FM SPEAKERS 8HO AND 9HO SERIES:

Some of the earlier 8C20-21 chassis are wired for electro-dynamic speakers only. Later production sets are wired for either electro-dynamic or PM speakers which have the filter unit attached to the speaker frame. These chassis are identified by a dot of black paint on or near the speaker socket. To use the PM speakers on the earlier sets, it will be necessary to run a lead from B-(center tap of high-voltage winding) to a lug on the speaker socket which connects to the negative side of the filter on the speaker.

BUZZ IN DIAL ESCUTHEON 8HO AND 9HO SERIES:

If the dial assembly comes in contact with the power transformer a buzz will result and a 83-1331 felt spacer should be added between the dial and transformer.

INCREASING BASS RESPONSE OF PHONO:

To increase the bass response on records, the value of R5 in the phono preamplifier may be increased. Do not increase the value to over 10,000 ohms or audio howl may be heard.

IMPROVING FM RECEPTION ON 8HO AND 9HO SERIES:

In FM Consoles, a cabinet FM antenna may be added in addition to the line antenna. This antenna is made up of two 28 inch lengths of wire. One wire is connected to the FM antenna post, the other to chassis. The two wires are then tacked in the cabinet in opposite directions, and should not come in contact with ground.

WAVE TRAP TRIMMER SHORTING OUT:

A .002 mfd 600 volt condenser has been added in series with the wave trap. This condenser removes the d-c potential from the trap and eliminates the possibility of breakdown.

AUDIO HOWL AS VOLUME CONTROL IS ADVANCED (FM RECEPTION):
FM howl may be caused by the speaker vibrating the oscillator slug. A fiber spacer between the oscillator, and detector slug shafts in the FM tuner will eliminate vibration. A thin rubber band tied to the center of the oscillator slug shaft and upper frame will also eliminate the howl.

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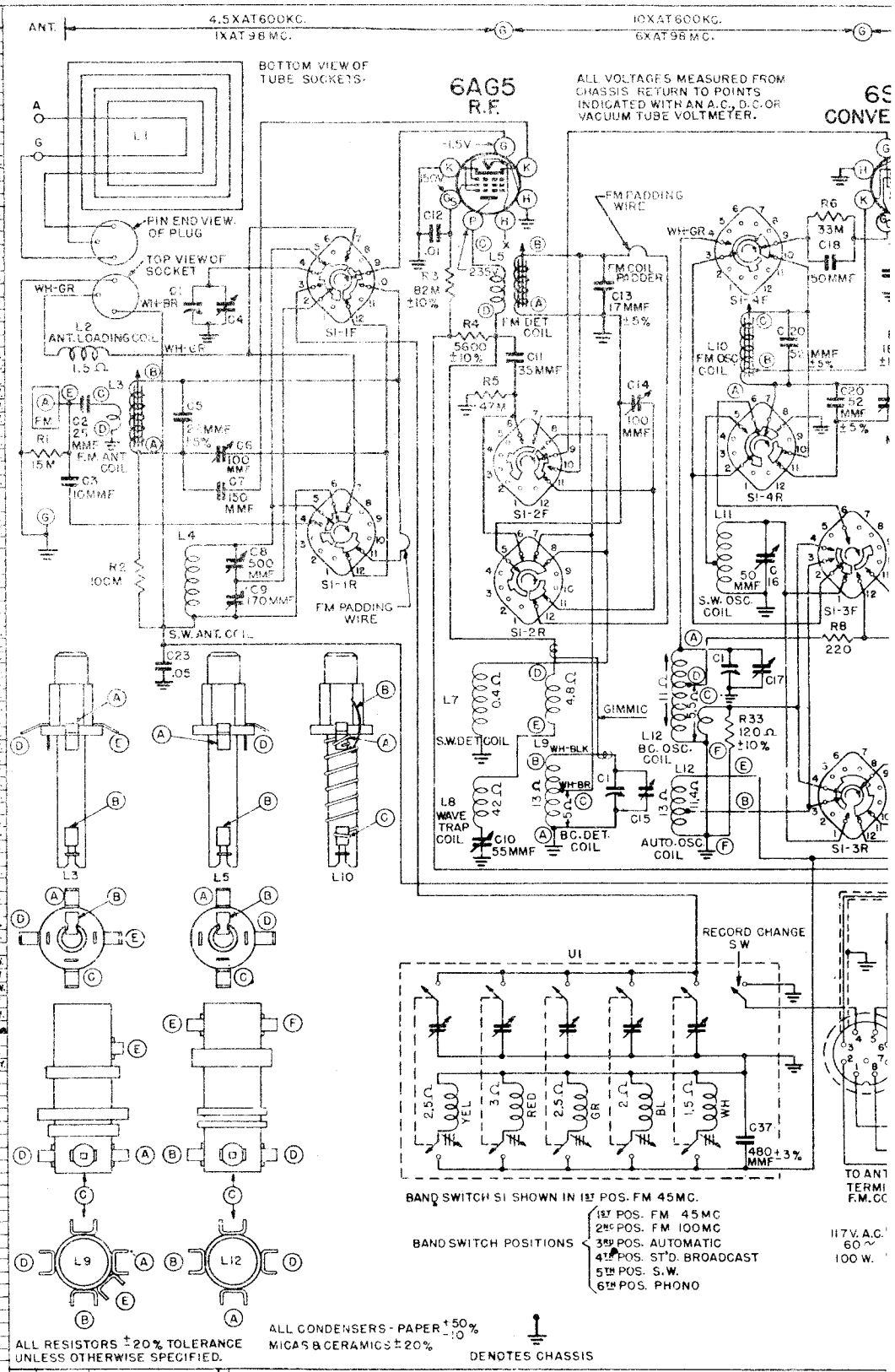
DIAG NO	PART NO	DESCRIPTION
C1	22-1363	3-GANG VARIABLE
C2	22-1507	25 MMFD. CER. 500 V.
C3	22-1504	10 MMFD. CER. 500 V.
C4	ON C1	BROADCAST ANT. TRIM.
C5	22-1506	22 MMFD. CER. 500 V.
C6	22-1493	FM ANTENNA TRIM.
C7	22-1503	150 MMFD. 500 V.
C8	22-1497	S.W. ANT. TRIM.
C9		S.W. ANT. TRIM.
C10		WAVE TRAP TRIMMER
C11	22-1508	35 MMFD CER. 500 V.
C12	22-196	.01 MFD. 600 V.
C13	22-1505	17 MMFD CER. 500 V.
C14	22-1494	FM DET. TRIMMER
C15	ON C1	BROADCAST DET. TRIM.
C16	22-1502	S.W. OSC. TRIMMER
C17	ON C1	BROADCAST OSC. TRIM.
C18	22-1367	50 MMFD. CER. 500 V.
C19	22-1169	.001 MFD. MICA 600 V.
C20	22-1509	52 MMFD CER 500 V.
C21	27-87	475 MMFD. MICA DISC.
C22	22-1514	F.M. OSC. TRIMMER
C23	22-829	.05 MFD. 200 V.
C24	22-162	100 MMFD. MICA 600 V.
C25	22-830	.02 MFD. 600 V.
C26	22-1138	500 MMFD MICA 600 V.
C27	22-365	100 MMFD MICA 600 V.
C28	22-17	.05 MFD 600 V.
C29	22-1362	.004 MFD. 600 V.
C30	22-448	.004 MFD ±10% 600 V.
C31	22-1127	.02 MFD 400 V.
C32	22-126	.01 MFD 400 V.
C33	22-289	50 MMFD MICA 600 V.
C34	22-319	.005 MFD 200 V.
C36	22-242	750 MMFD MICA 500 V.
C37	22-638	480 MMFD SILVER MICA
C38	22-1041	.005 MFD 400 V.
C39	22-1257	.005 MFD 1000 V.
C40	22-1496	30 MFD. ELECTRO 450 V.
C41		30 MFD. " 450 V.
C42	22-1386	.02 MFD. 200 V.
R1	63-507	5M OHM ½ W.
R2	63-715	100M OHM ¼ W.
R3	63-385	82M OHM ½ W.
R4	63-1448	5600 OHM ½ W.
R5	63-593	47M OHM ½ W.
R6	63-712	33M OHM ¼ W.
R7	63-510	1M OHM 2 W.
R8	63-575	220 OHM ¼ W.
R9	63-605	1000 OHM ½ W.
R10	63-600	2.2 MEGOHM ½ W.
R11	63-950	68M OHM ½ W.
R12	63-1486	1200 OHM ½ W.
R13	63-592	33M OHM ¼ W.
R14	63-1447	120 M OHM ½ W.
R15	63-803	2200 OHM ½ W.
R16	63-296	220M OHM ¼ W.
R17	63-580	100M OHM 1 W.
R18	63-960	100M OHM ¼ W.
R19	63-976	15 MEGOHM ¼ W.
R20	63-595	100M OHM ¼ W.
R21	63-1349	0.5 MEG-VOL. CONTROL
R22	63-65	82M OHM ¼ W.
R23	63-503	15M OHM ¼ W.
R24	63-441	1 MEGOHM ¼ W.
R25	63-586	3300 OHM ¼ W.
R26	63-585	2200 OHM ¼ W.
R27	63-648	47M OHM ¼ W.
R28	63-1187	47 M OHM 1 W.
R29	63-657	330 M OHM ¼ W.
R30	63-597	470 M OHM ¼ W.
R31	63-1189	200 OHM WIREWOUND 2 W.
R32	63-620	33 OHM ¼ W.
R33	63-628	120 OHM ¼ W.
L1	S12301	WAVEMAGNET TYPE 30E
L2	S12529	ANT. LOADING COIL ASSY.
L3	S12301	F.M. ANT. COIL ASSEM.
L4	S12282	S.W. ANT. " "
L5	S12302	F.M. DET. " "
L7	S12291	S.W. DET. COIL ASSEM
L8	S12281	WAVE TRAP " "
L9	S12293	B.C. DET. " "
L10	S12303	F.M. OSC. " "
L11	S12292	S.W. OSC. " "
L12	S12344	BC. & AUTO. OSC. " "
L13	ON T1	1ST I.F. TRANS. PRI. FM
L14	ON T1	1ST I.F. " SEC. FM.
L15	ON T1	1ST I.F. " PRI.
L16	ON T1	1ST I.F. " SEC.
L17	ON T2	2ND I.F. TRANS. PRI. FM.
L18	ON T2	2ND I.F. " SEC. FM.
L19	ON T2	2ND I.F. " PRI.
L20	ON T2	2ND I.F. " SEC.
L21	ON T3	3RD I.F. TRANS. PRI. FM
L22	ON T3	3RD I.F. " SEC. FM
L23	ON T3	3RD I.F. " PRI.
L24	ON T3	3RD I.F. " SEC.
L25	ON T4	DISC. I.F. TRANS. PRI.
L26	ON T4	DISC. I.F. " SEC.
L27	S12256	A.C. LINE CHOKE COIL ASSY.
PL1	100-36	PILOT LIGHT 6.3V. .25A
S1	S12356	BAND SWITCH ASSEM.
S2	S11242	TONE " "
SP1	49-535	14" DYNAMIC SPEAKER

T1	S12249	1ST I.F. TRANS.
T2	S12250	2ND I.F. TRANS.
T3	S12251	3RD I.F. TRANS.
T4	S12252	DISC. I.F. TRANS.
T5	95-928	POWER TRANSFORMER
U1	S12331	AUTOMATIC TUNING UNIT
SP1	49-535	10" DYNAMIC SPEAKER



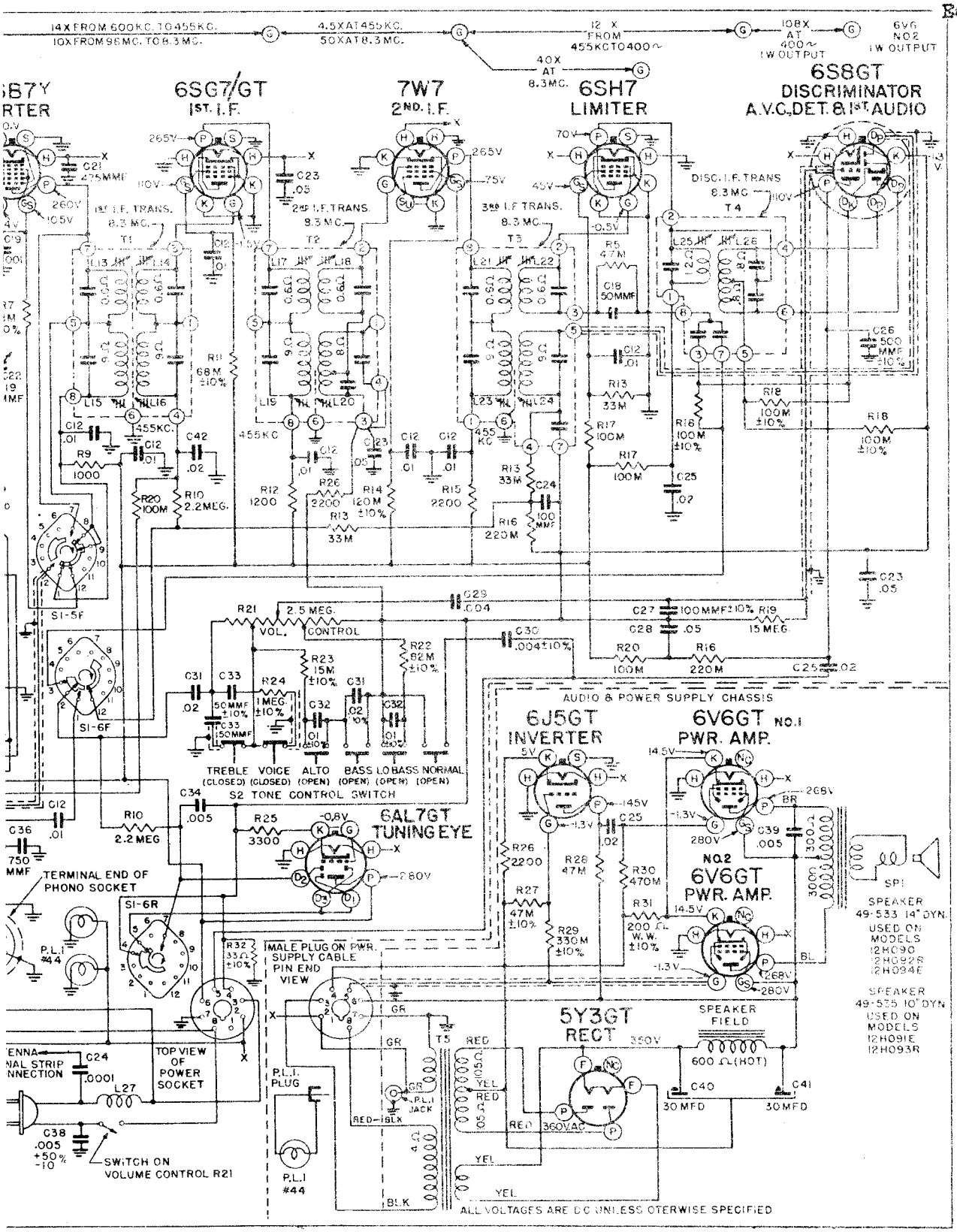
MODELS 12H090 – 12H0

CHASSI

© John F. Rider

CORP.

MODELS 12H090,12H091,12H092,
12H093,12H094,Chassis 11C21
Early

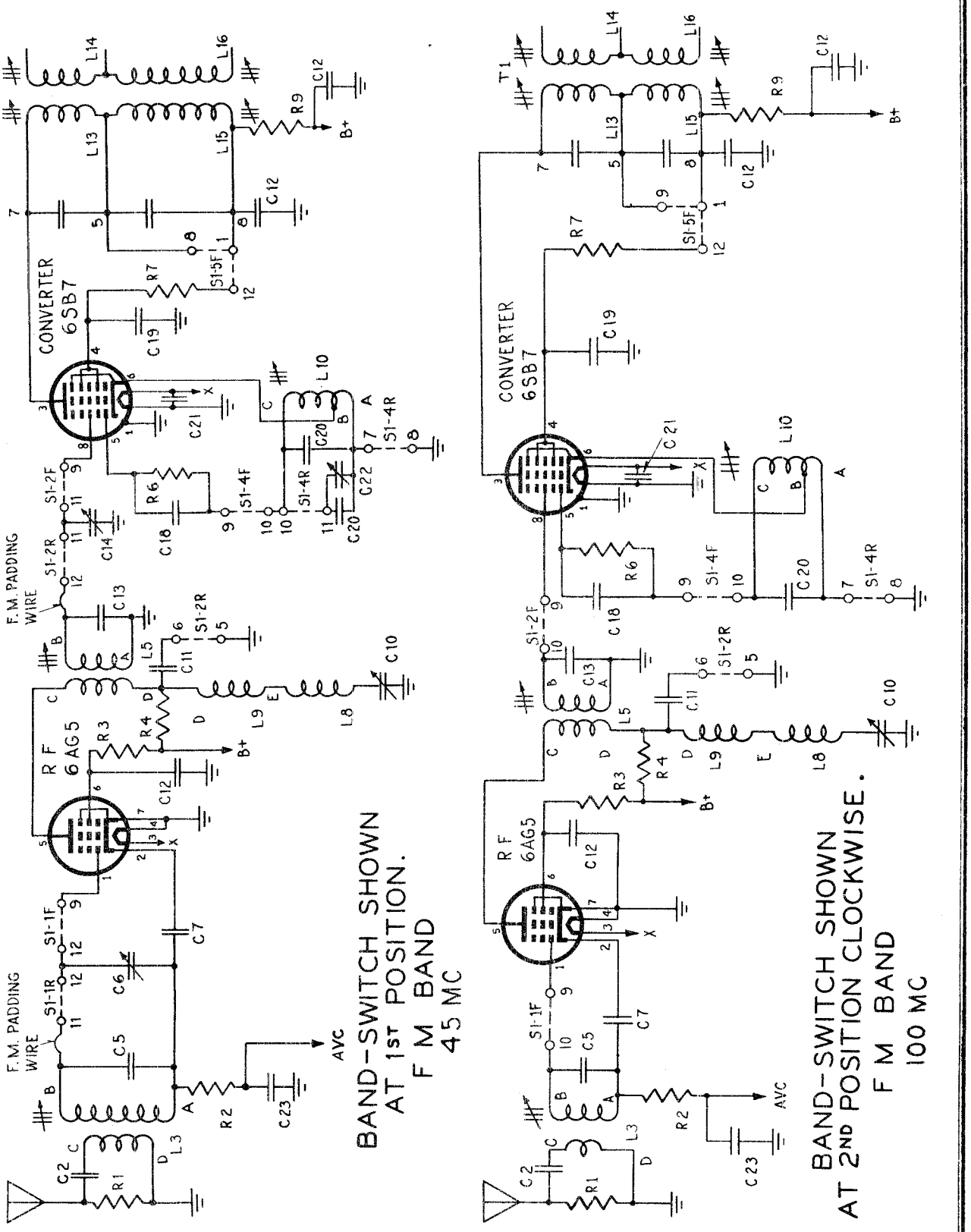


91 – 12H092 – 12H093 – 12H094

S No. 11C21

ZENITH RADIO CORP.

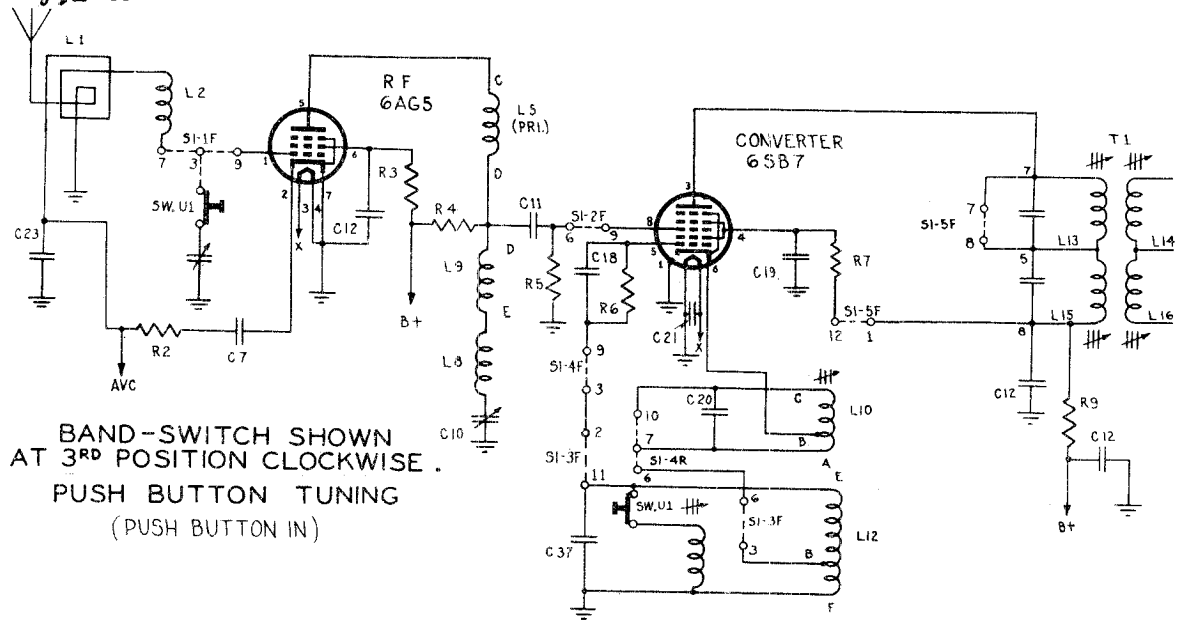
MODELS 12H090,12H091,
12H092,12H093,12H094
Early,Late


CONVERTER 6SB7
RF 6AG5
F.M. PADDING WIRE
AVC
B+
BAND-SWITCH SHOWN AT 1ST POSITION. F M BAND 45 MC
BAND-SWITCH SHOWN AT 2ND POSITION CLOCKWISE. F M BAND 100 MC

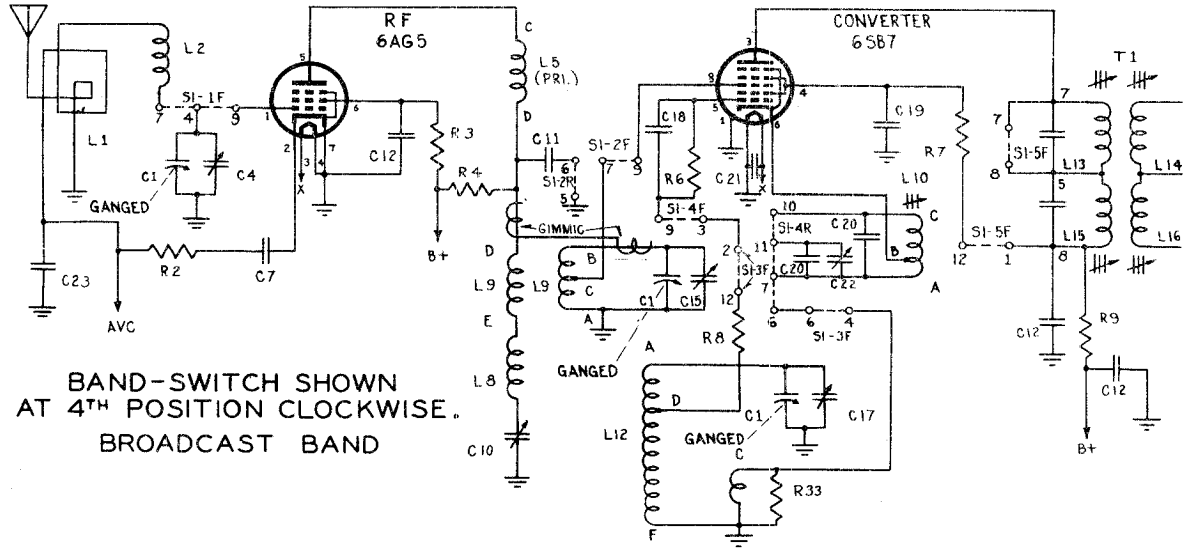
©John F. Rider

MODELS 12H090,12H091,
12H092,12H093,12H094
Early,Late

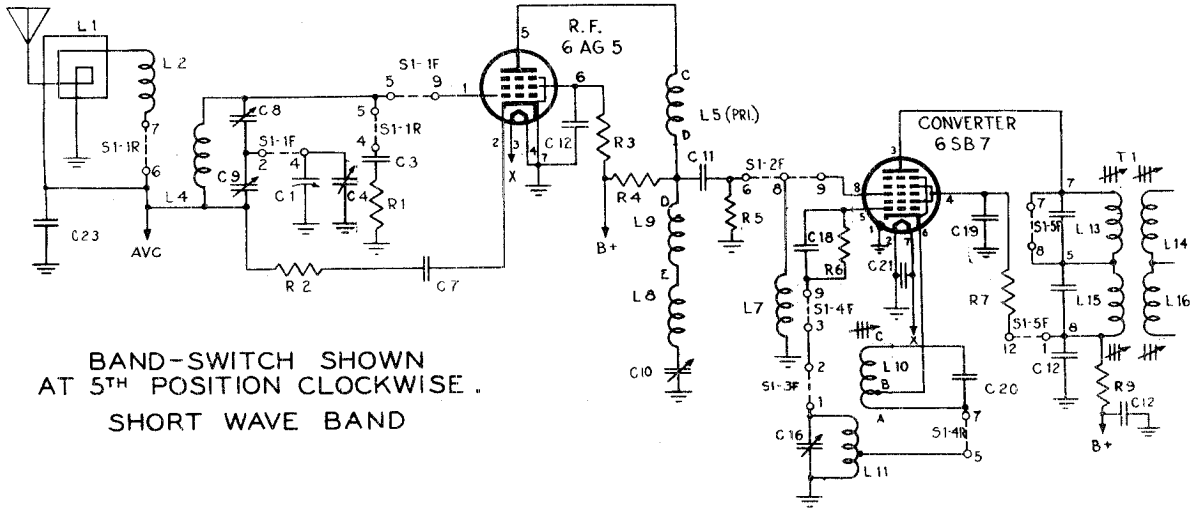
ZENITH RADIO CORP.



BAND-SWITCH SHOWN
AT 3RD POSITION CLOCKWISE.
PUSH BUTTON TUNING
(PUSH BUTTON IN)



BAND-SWITCH SHOWN
AT 4TH POSITION CLOCKWISE.
BROADCAST BAND



BAND-SWITCH SHOWN
AT 5TH POSITION CLOCKWISE.
SHORT WAVE BAND

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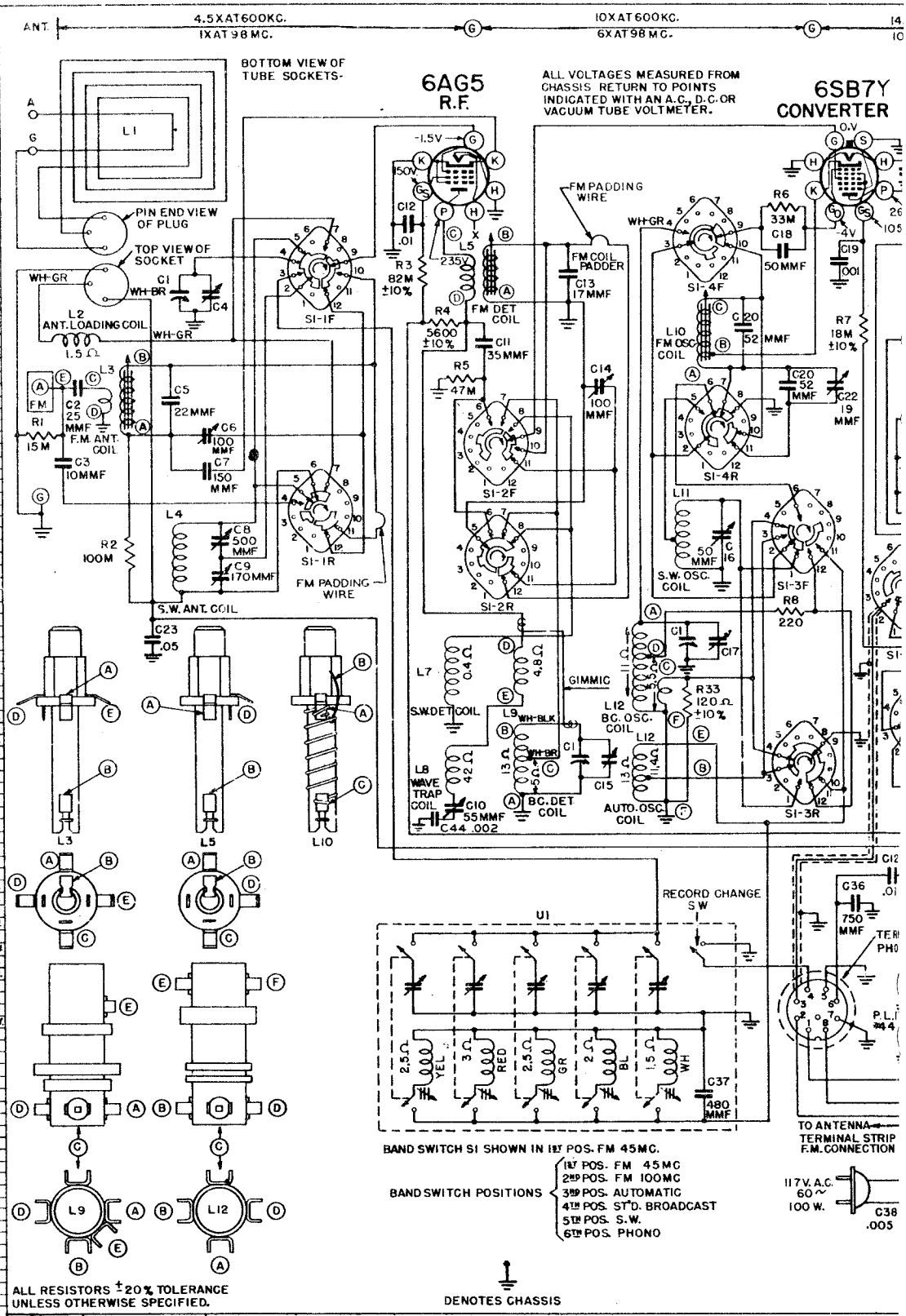
CIRC. NO.	PART NO.	DESCRIPTION	
C1	22-1363	3 GANG VARIABLE	
C2	22-1507	25 MMFD. CER.	500 V.
C3	22-1504	10 MMFD. CER.	500 V.
C4	ON C1	BROADCAST ANT. TRIM.	
C5	22-1506	22 MMFD. CER.	500 V.
C6	22-1483	FM ANTENNA TRIM.	
C7	22-1503	150 MMFD.	300 V.
C8	22-1497	S.W. ANT.	TRIM.
C9		S.W. ANT.	TRIM.
C10		WAVE TRAP TRIMMER	
C11	22-1508	35 MMFD CER.	500V.
C12	22-196	.01 MFD.	600V.
C13	22-1505	17 MMFD CER.	500V
C14	22-1494	FM DET. TRIMMER	
C15	ON C1	BROADCAST DET. TRIM.	
C16	22-1502	S.W. OSC. TRIMMER	
C17	ON C1	BROADCAST OSC. TRIM.	
C18	22-1367	50 MMFD. CER.	500 V.
C19	22-1169	.001 MFD. MICA	600 V.
C20	22-1503	52 MMFD CER.	500 V.
C21	27-87	475 MMFD. MICA DISC.	
C22	22-1514	F.M. OSC. TRIMMER	
C23	22-829	.05 MFD.	200 V.
C24	22-162	100 MMFD. MICA	600 V.
C25	22-830	.02 MFD.	600V.
C26	22-1138	500 MMFD MICA	600V.
C27	22-365	100 MMFD MICA	600V.
C28	22-171	.05 MFD	600V.
C29	22-1362	.004 MFD.	600V.
C30	22-448	.004 MFD ±10%	600V.
C31	22-1127	.02 MFD.	400V.
C32	22-1126	.01 MFD.	400V.
C33	22-289	50 MMFD MICA	600V.
C34	22-319	.005 MFD	200 V.
C35	22-1135	.005 MFD.	600 V.
C36	22-242	750 MMFD MICA	500V.
C37	22-868	480 MMFD SILVER MICA	
C38	22-1041	.005 MFD	400 V
C39	22-1257	.005 MFD	1000 V.
C40	22-1496	30 MFD. ELECTRO	450 V.
C41		30 MFD. "	450 V.
C42	22-1386	.02 MFD.	200 V
C43	22-188	.02 MFD.	400 V.
C44	22-912	.002 MFD.	600 V.
C45	22-492	.002 MFD.	600 V.
R1	63-607	15 M OHM	½ W.
R2	63-715	100 M OHM	¼ W.
R3	63-885	82 M OHM	½ W.
R4	63-1448	5600 OHM	½ W.
R5	63-593	47 M OHM	¼ W.
R6	63-712	33 M OHM	¼ W.
R7	63-510	18 M OHM	2 W.
R8	63-579	220 OHM	¼ W.
R9	63-605	1000 OHM	½ W.
R10	63-600	2.2 MEGOHM	¼ W.
R11	63-960	68 M OHM	½ W.
R12	63-1446	1200 OHM	½ W.
R13	63-592	33 M OHM	¼ W.
R14	63-1447	120 M OHM	½ W.
R15	63-803	2200 OHM	½ W.
R16	63-296	220 M OHM	¼ W.
R17	63-380	100 M OHM	1 W.
R18	63-260	100 M OHM	¼ W.
R19	63-976	15 MEGOHM	¼ W.
R20	63-595	100 M OHM	¼ W.
R21	63-1349	2.5 MEG-VOL. CONTROL	
R22	63-651	82 M OHM	¼ W.
R23	63-503	15 M OHM	¼ W.
R24	63-586	3300 OHM	¼ W.
R25	63-585	2200 OHM	¼ W.
R27	63-643	47 M OHM	¼ W.
R28	63-1187	47 M OHM	1 W.
R29	63-657	330 M OHM	¼ W.
R30	63-597	470 M OHM	¼ W.
R31	63-1189	200 OHM WIREWOUND	2 W.
R32	63-620	33 OHM	¼ W.
R33	63-626	120 OHM	¼ W.
L1	S12111	WAVEMAGNET TYPE 30E	
L2	S12529	ANT. LOADING COIL ASSY.	
L3	S12301	F.M. ANT. COIL ASSEM.	
L4	S12282	S.W. ANT. " "	
L5	S12302	F.M. DET. " "	
L7	S12291	S.W DET. COIL ASSEM	
L8	S12281	WAVE TRAP " "	
L9	S12293	B.C. DET. " "	
L10	S12303	F.M. OSC. " "	
L11	S12292	S.W. OSC. " "	
L12	S11344	BC-S AUTO. OSC. " "	
L13	ON T1	1ST I.F. TRANS. PRI. FM.	
L14	ON T1	1ST I.F. " SEC. FM.	
L15	ON T1	1ST I.F. " PRI.	
L16	ON T1	1ST I.F. " SEC.	
L17	ON T2	2ND I.F. TRANS. PRI. FM.	
L18	ON T2	2ND I.F. " SEC. FM.	
L19	ON T2	2ND I.F. " PRI.	
L20	ON T2	2ND I.F. " SEC.	
L21	ON T3	3RD I.F. TRANS. PRI. FM	
L22	ON T3	3RD I.F. " SEC. FM	
L23	ON T3	3RD I.F. " PRI	
L24	ON T3	3RD I.F. " SEC.	
L25	ON T4	DISC. I.F. TRANS. PRI.	
L26	ON T4	DISC. I.F. SEC.	
L27	S12256	A.C. LINE CHOKE COIL ASSY.	
PL1	100-36	PILOT LIGHT 6.3V .25A	
S1	S12356	BAND SWITCH ASSEM.	
S2	S11242	TONE " "	
SP1	49-533	14" DYNAMIC SPEAKER	

T1	S12249	1ST I.F. TRANS.
T2	S12250	2ND I.F. TRANS.
T3	S12251	3RD I.F. TRANS
T4	S12252	DISC. I.F. TRANS.
T5	95-921	POWER TRANSFORMER
U1	S12331	AUTOMATIC TUNING UNIT
SP1	49-535	10" DYNAMIC SPEAKER



MODELS 12H090-1

CH

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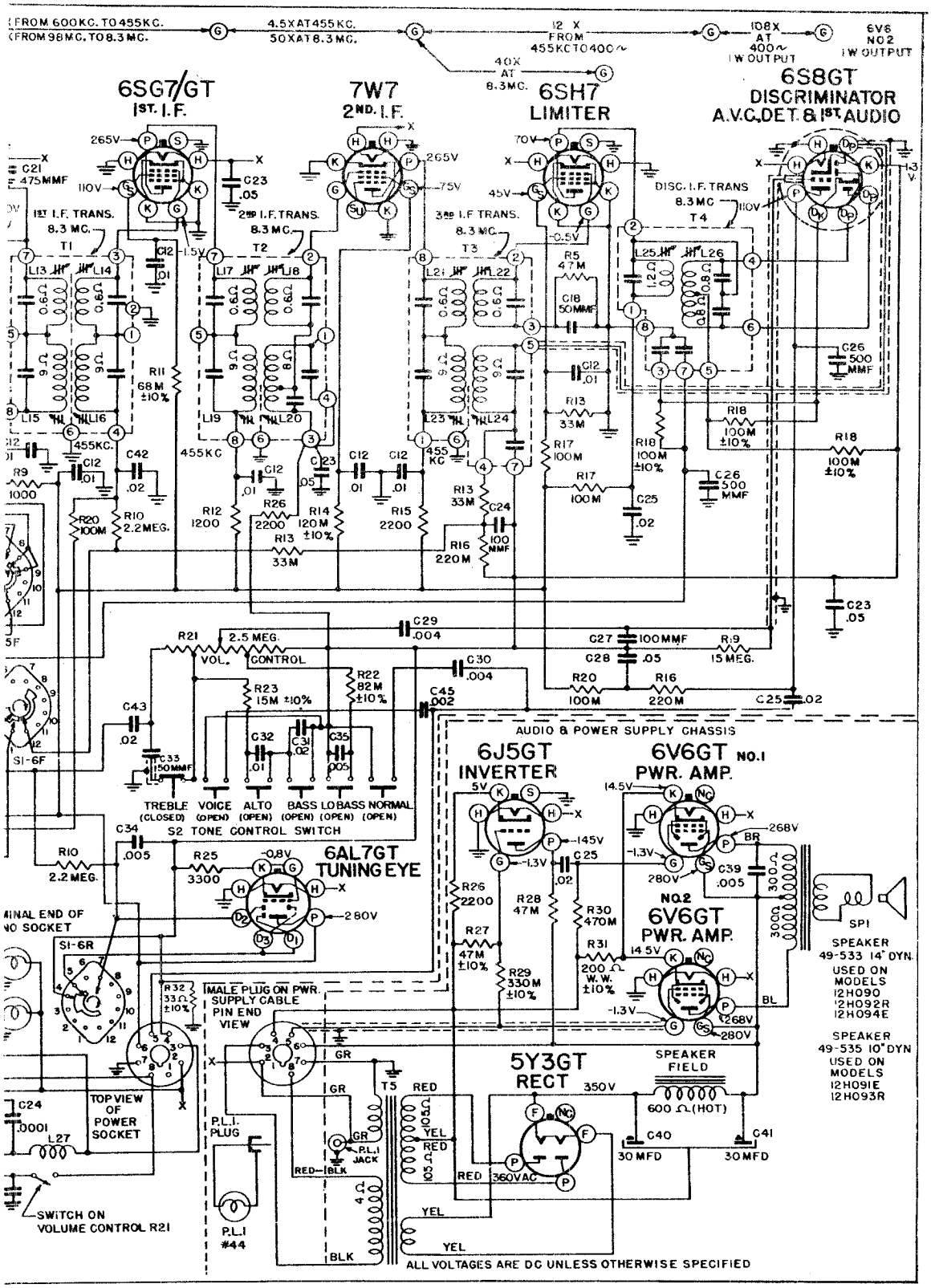
CORP.

MODELS 12H090,12H091,12H092,12H093, 12H094, Chassis 11C21 Late



12H091 – 12H092 – 12H093 – 12H094

CHASSIS No. 11C21

Record Changer: Zenith Model S-11680

ZENITH RADIO CORP.

MODELS 12H090,12H091, 12H092,12H093,12H094
Early
Late

TO THE SERVICE MAN:

The 11C21 chassis incorporates a superheterodyne circuit with two stages of IF, and one stage of RF amplification on all bands.

AM Alignment: The alignment of this chassis on the short wave and standard broadcast band is conventional. The alignment slugs in the IF transformers are threaded and screw into the coil forms. The slugs are slotted for a small size fiber screw driver. Do not press hard on the aligning tool (fiber screw driver) or the threads in the coil forms will strip and adjustment will be impossible.

FM RF Alignment: The same coil slug arrangement which tunes the 100 MC FM band also tunes the 45 MC band. However, on 45 MC the band switch connects trimmer condensers in parallel and padding wires in series with the 100 MC coils. The tuning slugs are attached to threaded shafts and the slugs are varied in the field of the coils by turning the shafts clockwise or counter-clockwise. After adjustments the shafts must be secured with a drop of speaker cement.

FM IF Alignment: The same type of tuning slugs for aligning the AM IF Amplifier are used for the FM I.F.'s. Observe the same precautions when making adjustments. The second 8.3 Mc IF stage is overcoupled. Overcoupling gives a wide band pass with good sensitivity. When an overcoupled stage is aligned with an unmodulated signal, the stage must be loaded. A 300 ohm carbon resistor soldered across the secondary of the second IF transformer provides a satisfactory load for this circuit. The resistor leads must be kept short to reduce the distributed capacity of the circuit.

When aligning a loaded stage, it will be found that considerable signal from the generator will be required, and that it will tune broadly. THE LOAD RESISTOR MUST BE REMOVED AFTER ALIGNMENT.

If the signal generator used does not have sufficient output to overcome the temporary loss caused by the load resistor, the load resistance may be increased or the signal fed into the preceding stage.

FM Discriminator Alignment: When the secondary of the discriminator is aligned (operation 9) use sufficient signal input to get a good positive and negative indication before setting the slug for zero reading. A center zero indicating meter is recommended for this adjustment, but is not absolutely necessary. Reversing the leads of a non-zero center meter, or observing closely when this meter starts to go to the left (negative) of zero will give the same results.

HUM COMPLAINT: Check for excessive length of the a-c line cord inside the main chassis between the point of entrance and the solder lugs. This slack may be in close proximity of the tone control leads.

DIFFERENCES IN 11C21-11C21Z CHASSIS: Sets using chassis 11C21Z are equipped with FM speakers. FM speakers cannot be used on 11C21 chassis. When ordering speaker replacements specify 11C21 or 11C21Z chassis.

IMPROVING FM RECEPTION: In FM Consoles a cabinet FM antenna may be added in addition to the line antenna. This antenna is made up of two 28-inch lengths of wire. One wire is connected to the FM antenna post, the other to chassis. The two wires are then tacked in the cabinet in opposite directions, and should not come in contact with ground.

HOWL ON FM: FM howl may be caused by the speaker vibrating the oscillator slug. A fiber spacer between the oscillator, and detector slug shafts in the FM tuner will eliminate vibration. A thin rubber band tied to the center of the oscillator slug shaft and upper frame will also eliminate the howl.

INCREASING BASS RESPONSE ON PHONO: To increase the bass response on records, the value of R5 in the phono-preamplifier may be increased. Do not increase the value to over 10,000 ohms or audio howl may be heard.

STRIPPED IF THREAD INSERTS: Damaged IF slug thread inserts may be replaced by unscrewing the slug, and pushing out the old insert. Two types of inserts are used, 83-1063 short, and 83-1069 long.

WAVE TRAP TRIMMER SHORTS OUT: A .002 mfd 600 volt condenser has been added in series with the grounded side of the wave trap.

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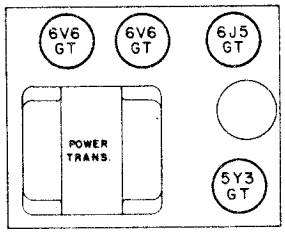
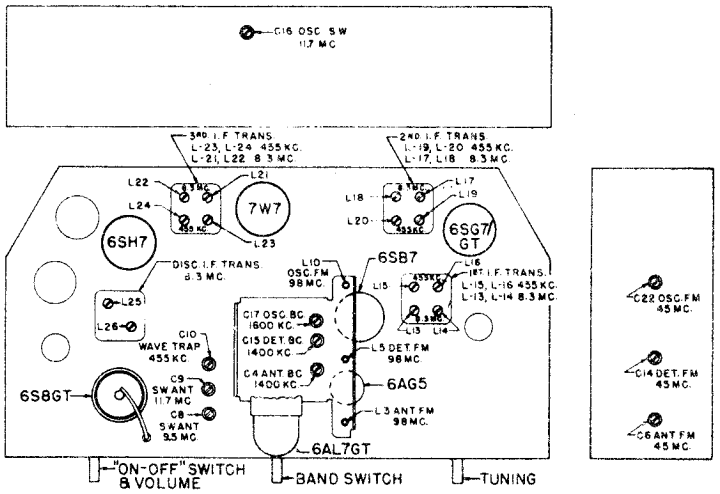
MODELS 12HO90,12HO91,
12HO92,12HO93,12HO94
Early, Late

ZENITH RADIO CORP.

ALIGNMENT PROCEDURE



AUDIO & POWER SUPPLY


C16 OSC. SW 11.7 MC
3RD I.F. TRANS. L-23, L-24 455 KC. L-21, L-22 8.3 MC.
2ND I.F. TRANS. L-19, L-20 455 KC. L-17, L-18 8.3 MC.
7W7
6SH7
6SG7 GT
6SB7
6S8GT
6AG5
6AL7GT
DISC. I.F. TRANS. 8.3 MC.
1ST I.F. TRANS. L-15, L-16 455 KC. L-13, L-14 8.3 MC.
C22 OSC. FM 45 MC.
C14 DET. FM 45 MC.
C6 ANT. FM 45 MC.
"ON-OFF" SWITCH & VOLUME
BAND SWITCH
TUNING

Operation	Connect Oscillator to	Dummy Antenna	Input Signal Frequency	Band	Set Dial To	Adj. Trimmers	Purpose
1	Pin 8 on Converter Tube 6SB7 socket	.05 Mfd.	455 Kc. Modulated	BC	600 Kc.	L15,16,19,20,23 and 24	Align I.F. channel for maximum output
2	Pin 1 on R.F. tube 6AG5 socket	.05 Mfd.	455 Kc. Modulated	Aut.	Press any button on Auto.	C10	Adjust wavetrap to minimum
3	2 Turns loosely coupled to wavemag.		1600 Kc. Modulated	BC	1600 Kc.	C17	Set oscillator to dial scale
4	2 turns loosely coupled to wavemag.		1400 Kc. Modulated	BC	1400 Kc.	C15 & C4	Align det. and ant. stages
5	Antenna Post (Remove line ant.)	400 ohms	11.7 Mc. Modulated	SW	11.7 Mc.	C16	Set oscillator to dial scale
6	Antenna Post (Remove line ant.)	400 ohms	11.7 Mc. Modulated	SW	11.7 Mc.	C9	Align ant. stage
7	Antenna Post (Remove line ant.)	400 ohms	9.7 Mc. Modulated	SW	9.7 Mc.	C8	Align ant. stage Repeat Oper. 6 for maximum output
8 (a)	Pin 4 grid on 6SH7 limiter socket	.05 Mfd.	8.3 Mc. Unmodulated	FM 45		L25 coil slug primary disc.	Align primary of discriminator for maximum reading
9 (b)	Pin 4 grid on 6SH7 limiter socket	.05 Mfd.	8.3 Mc. Unmodulated	FM 45		L26 coil slug sec. of discr.	Adjust secondary of discr. for zero reading
10 (c)	Pin 6 (grid) on 7W7 2nd IF tube socket	.05 Mfd.	8.3 Mc. Unmodulated	FM 45		L21 & L22 prim. & sec. of 3rd IF transformer	Align 3rd IF transformer for maximum reading
11 (c) (d)	Pin 4 (grid) on 6SG7 1st IF tube socket	.05 Mfd.	8.3 Mc. Unmodulated	FM 45		L17 & L18 prim. & sec. of 2nd IF transformer	Align 2nd IF transformer for maximum reading
12 (c) (d)	Pin 8(grid)on 6SB7 converter tube socket	.05 Mfd.	8.3 Mc. Unmodulated	FM 45		L13 & L14 prim. & sec. of 1st IF transformer	Align 1st IF transformer for maximum reading
13 (c)	Antenna Post (remove line ant.)	270 ohms	98 Mc. Unmodulated	FM 100	98 Mc.	L10 Osc. coil Slug	Set oscillator to dial scale
14 (c)	Antenna Post (Remove line ant.)	270 ohms	98 Mc. Unmodulated	FM 100	98 Mc.	L5 and L3 Det. and RF coil slugs	Align det. and Ant. stage to maximum reading
15 (c)	Antenna Post (remove line ant.)	270 ohms	45 Mc. Unmodulated	FM 45	45 Mc.	C22	Set oscillator to dial scale
16 (c)	Antenna Post (remove line ant.)	270 ohms	45 Mc. Unmodulated	FM 45	45 Mc.	C14 and C6	Align detector and ant. stages for maximum reading

IMPORTANT: Alignment of this chassis will in most cases be unnecessary unless an IF or RF transformer is replaced or the adjustments have been tampered with.

Correct alignment can only be made if the following procedure is followed:

A vacuum tube voltmeter with an isolation resistor of 200,000 ohms in series with the hot lead will serve for FM adjustments. This lead must be shielded.

An ordinary AC output meter connected across the primary or secondary of the output transformer will be satisfactory for all AM adjustments.

The signal generator output should be kept just high enough to get an indication on the meter.

(a) Vacuum Tube Voltmeter pin 5 on discriminator transformer to chassis (half discriminator load.)

(b) Vacuum Tube Voltmeter pin 7 on discriminator transformer to chassis (full discriminator load).

(c) Vacuum Tube Voltmeter 6SH7 limiter grid (pin 4 to chassis).

(d) 300 ohm ½ watt carbon resistor soldered across the secondary L18 (pin 2 and 3 of 2nd IF trans.). The leads to the resistor must be as short as possible and the resistor removed before operation 13 is started.

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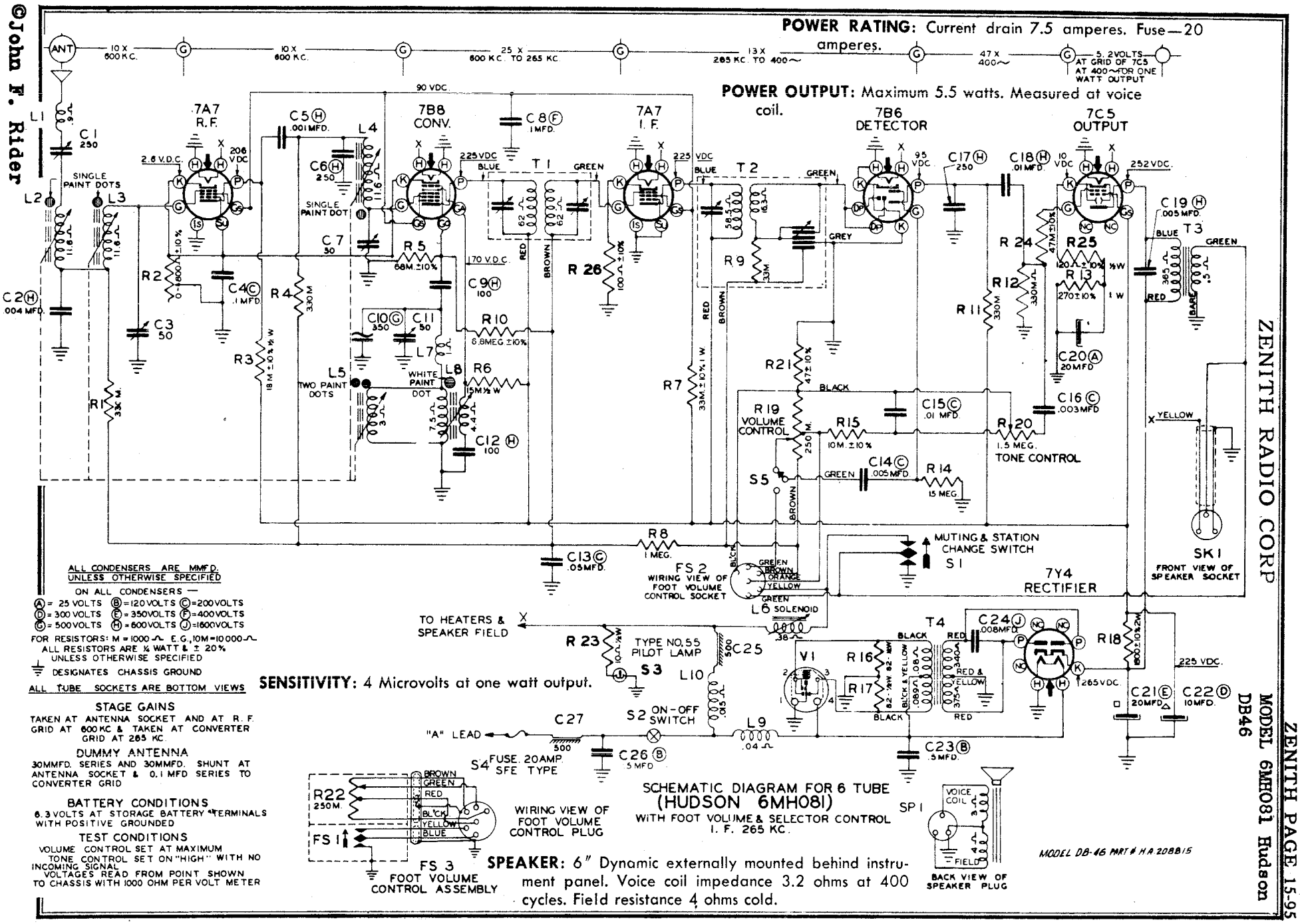
POWER RATING: Current drain 7.5 amperes. Fuse—20 amperes.
POWER OUTPUT: Maximum 5.5 watts. Measured at voice coil.
ANT
10 X 600 KC.
10 X 600 KC.
25 X 600 KC. TO 265 KC.
13 X 265 KC. TO 400~
47 X 400~
5.2 VOLTS AT GRID OF 7C5 AT 400~ FOR ONE WATT OUTPUT
7A7 R.F.
7B8 CONV.
7A7 I.F.
7B6 DETECTOR
7C5 OUTPUT
7Y4 RECTIFIER
90 VDC.
225 VDC
95 VDC
252 VDC.
206 VDC
2.6 V.D.C.
170 V.D.C.
L1
L2
L3
L4
L5
L6 SOLENOID
L7
L8
L9
L10
T1
T2
T3
T4
C1 290
C2 .004 MFD.
C3 50
C4 .1 MFD.
C5 .001 MFD.
C6 250
C7 50
C8 1 MFD.
C9 100
C10 350
C11 50
C12 100
C13 .05 MFD.
C14 .005 MFD.
C15 .01 MFD.
C16 .003 MFD.
C17 250
C18 .01 MFD.
C19 .005 MFD.
C20 20 MFD.
C21 20 MFD.
C22 10 MFD.
C23 .5 MFD.
C24 .008 MFD.
C25 500
C26 .5 MFD.
C27 500
R1 33K
R2 800
R3 18 M ±5% ½ W
R4 330 M
R5 .68 M ±10%
R6 .5 M ½ W
R7 33 M ±10% 1 W
R8 1 MEG.
R9 .33 M
R10 .68 MEG. ±10%
R11 330 M
R12 .33 M
R13 270 ±10% 1 W
R14 .15 MEG.
R15 10 M. ±10%
R16 82 1W
R17 82 1W
R18 800 ±10% 2W
R19 VOLUME CONTROL 250 M.
R20 1.5 MEG. TONE CONTROL
R21 47 ±10%
R22 250 M.
R23 10 ½W
R24 4.7 M ±5%
R25 20 ±10% ½W
R26 100 ±10%
S1 MUTING & STATION CHANGE SWITCH
S2 ON-OFF SWITCH
S3 TYPE NO. 55 PILOT LAMP
S4 FUSE. 20 AMP. SFE TYPE
S5
V1
SP1
SK1 FRONT VIEW OF SPEAKER SOCKET
FS 1 FOOT VOLUME CONTROL ASSEMBLY
FS 2 WIRING VIEW OF FOOT VOLUME CONTROL SOCKET
WIRING VIEW OF FOOT VOLUME CONTROL PLUG
BACK VIEW OF SPEAKER PLUG
TO HEATERS & SPEAKER FIELD
"A" LEAD
SINGLE PAINT DOTS
SINGLE PAINT DOT
TWO PAINT DOTS
WHITE PAINT DOT
ALL CONDENSERS ARE MMFD. UNLESS OTHERWISE SPECIFIED
ON ALL CONDENSERS —
(A) = 25 VOLTS (B) = 120 VOLTS (C) = 200 VOLTS
(D) = 300 VOLTS (E) = 350 VOLTS (F) = 400 VOLTS
(G) = 500 VOLTS (H) = 600 VOLTS (J) = 1600 VOLTS
FOR RESISTORS: M = 1000 Ω E.G., 10M = 10 000 Ω
ALL RESISTORS ARE ½ WATT & ± 20% UNLESS OTHERWISE SPECIFIED
DESIGNATES CHASSIS GROUND
ALL TUBE SOCKETS ARE BOTTOM VIEWS
STAGE GAINS
TAKEN AT ANTENNA SOCKET AND AT R. F. GRID AT 600 KC & TAKEN AT CONVERTER GRID AT 265 KC.
DUMMY ANTENNA
30 MMFD. SERIES AND 30 MMFD. SHUNT AT ANTENNA SOCKET & 0.1 MFD SERIES TO CONVERTER GRID
BATTERY CONDITIONS
6.3 VOLTS AT STORAGE BATTERY TERMINALS WITH POSITIVE GROUNDED
TEST CONDITIONS
VOLUME CONTROL SET AT MAXIMUM
TONE CONTROL SET ON "HIGH" WITH NO INCOMING SIGNAL
VOLTAGES READ FROM POINT SHOWN TO CHASSIS WITH 1000 OHM PER VOLT METER
SENSITIVITY: 4 Microvolts at one watt output.
SPEAKER: 6" Dynamic externally mounted behind instrument panel. Voice coil impedance 3.2 ohms at 400 cycles. Field resistance 4 ohms cold.
SCHEMATIC DIAGRAM FOR 6 TUBE (HUDSON 6MH081)
WITH FOOT VOLUME & SELECTOR CONTROL
I. F. 265 KC.
MODEL DB-46 PART # HA 208B15

ZENITH RADIO CORP
MODEL 6MH081 Hudson
DB46

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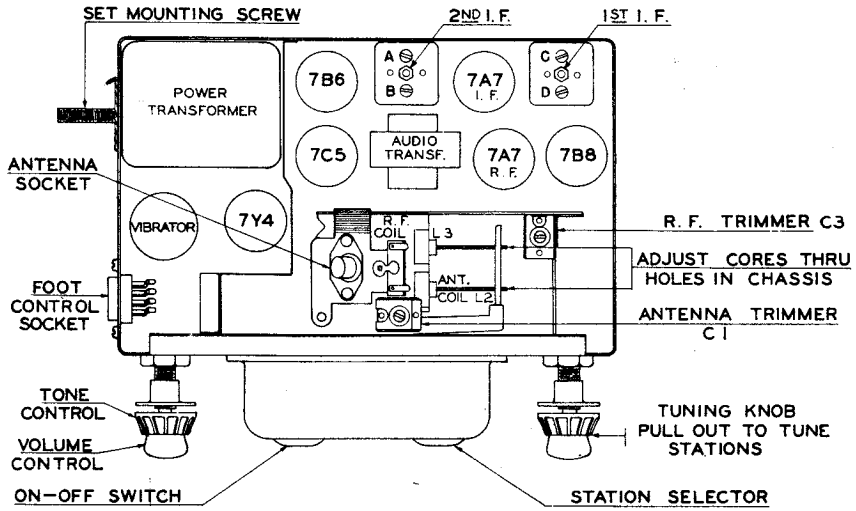

Fig. 10. Top View of Chassis

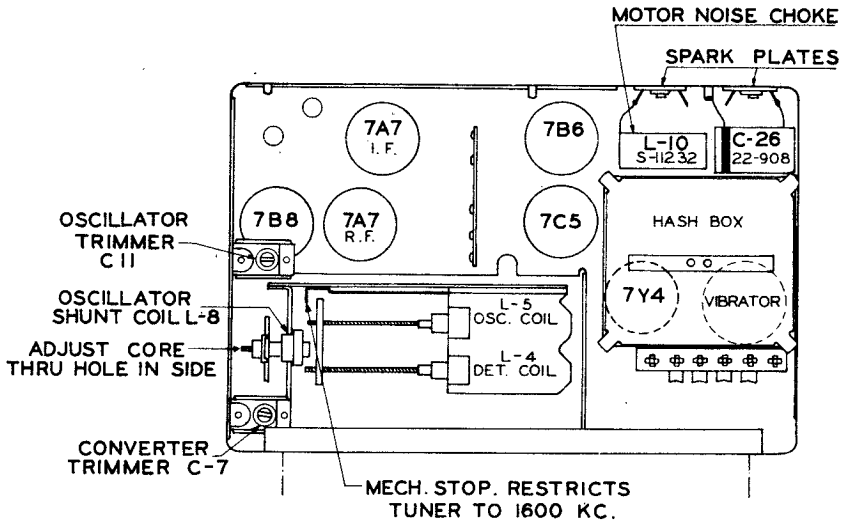

Fig. 11. Bottom View of Chassis

ALIGNMENT

Maximum performance depends on accurate alignment of the receiver; so follow these instructions carefully.

CAUTION: Make all adjustments on the receiver with volume control turned full on and foot volume control cable plugged into its socket. Reduce signal intensity as much as possible at signal generator. Connect output meter across voice coil.

I.F. ALIGNMENT PROCEDURE

1. Remove top and bottom covers from receiver.
2. Set signal generator to 265 Kc.
3. Apply signal from generator through a .1 Mfd. dummy to 7B8 converter grid. (Pin No. 6 on socket.)
4. Adjust I.F. trimmers A, B, C and D (Fig. 10), in the order named for maximum output. Repeat the operation to assure accurate alignment.

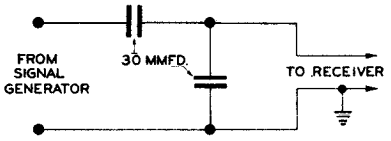

Figure 12. Dummy Antenna

Figure 12 shows the schematic of a recommended dummy antenna closely resembling actual antenna capacity to be used when aligning the R.F. section of the receiver.

R.F. AND OSCILLATOR ALIGNMENT

1. Connect signal generator leads through dummy illustrated in figure 12 to antenna lead in socket on receiver.
2. Set signal generator to 535 Kc.
3. Place set in manual tuning position and set dial to 535 Kc.
4. Adjust oscillator trimmer C-11 (Fig. 11) for maximum response.
5. Set signal generator to 1200 Kc.
6. Tune set to 1200 Kc.
7. Adjust converter trimmer C-7 (Fig. 11) and R.F. trimmer C-3 (Fig. 10) for maximum response.
8. If dial calibration is off after making above adjustments, a correction can be made by loosening dial scale mounting screws and sliding scale to desired position.

CORE OR COIL REPLACEMENT ONLY

WARNING: The following adjustments are to be made ONLY if a core or coil is replaced.

1. Replace coil or core.
2. Set signal generator to 1700 Kc.
3. Connect signal generator leads through dummy illustrated in figure 12 to antenna receptacle on the receiver.
4. Set receiver dial to 1600 KC. (Maximum high frequency end of dial.)
5. Screw the core completely out of the antenna coil, the R.F. Coil, the converter coil, and the oscillator coil.
6. Adjust oscillator trimmer C-11 (Fig. 11) at 1700 Kc.
7. Adjust converter trimmer C-7, R.F. trimmer C-3, and antenna trimmer C-1 (Fig. 10 and 11) for maximum output reading.
8. Replace cores to their approximate original positions.
9. Set generator dial and receiver dial to 1200 Kc.
10. Adjust oscillator core (Fig. 10) to scale at 1200 Kc.
11. Adjust the antenna core, R.F. core, and converter core (Fig. 10 and 11), for maximum output reading.
12. Set signal generator to 600 Kc.
13. "Rock in" Shunt oscillator coil (Fig. 10) for maximum output reading. (This should only be done as a last resort.) This is the same as rocking in the padder condenser on a ganged condenser receiver.
14. Check receiver at 1200 Kc. for calibration and gain. If receiver is off scale or weak, repeat operations 9, 10 and 11.
15. After alignment is complete, the maximum high frequency tuning range should be checked. If the range is greater or less than 1605 Kc. the mechanical stop for the tuner cross arm should be bent to limit the frequency coverage to 1605 Kc.

After all adjustments have been made, glue core screws with speaker cement.

IMPORTANT: After reinstalling the receiver in the car, allow it to operate for approximately 15 minutes to reach normal operating temperature. Check the antenna trimmer alignment on a weak station at approximately 1200 Kc. Extend antenna to maximum before adjusting the antenna trimmer.

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MANUAL TUNING

1. Press the automatic tuning push button on the left side beneath automatic indicator window several times or until the letter "M" appears on the automatic indicutor.
2. Pull manual tuning (right hand) control knob outward and turn to tune in desired stations. Tune to exact frequency for the best tone quality.

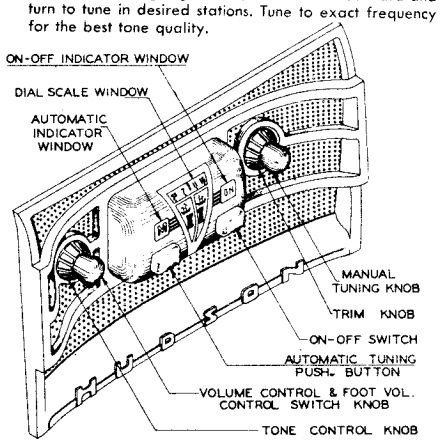

Fig. 1. Operating Controls.

AUTOMATIC TUNING

There are five automatic tuning positions which may be adjusted to five desired stations. If these positions have not been previously adjusted, proceed as follows:

1. Press the automatic tuning push button (on the left side) until Number 1 appears in the automatic indicator window.
2. Pull the manual tuning knob OUTWARD to engage the automatic mechanism.
3. Select the station desired and tune to its frequency by turning the tuning knob. Tune very carefully for clearest reception. CAUTION: DO NOT ATTEMPT TO FORCE TUNING KNOB IN. Knob will return to the "IN" position when the automatic tuning push-button is pressed.
4. Press the automatic station selector push button, pull manual tuning knob outward, and tune in station desired for No. 2 position. Use same procedure for positions No. 3, 4 and 5.

When the five automatic positions have been adjusted to the five desired stations as instructed, it is only necessary to press the AUTOMATIC button to return to MANUAL tuning, or to any one of the stations selected on the automatic.

FOOT CONTROL

The Foot Control provides a convenient means of selecting stations, controlling the volume, and muting the set without taking the hands off the steering wheel or the eyes from the road. Its function is identical to that of the station selector push button and the volume control knob combined. The foot control requires no set up or other adjustment. Press the foot control button all the way down to change stations. Press lightly to silence radio during conversation. Turn the knob with the shoe tip to adjust the volume to any desired point. When using the foot volume control feature turn the panel volume control fully to the left, or until it clicks.

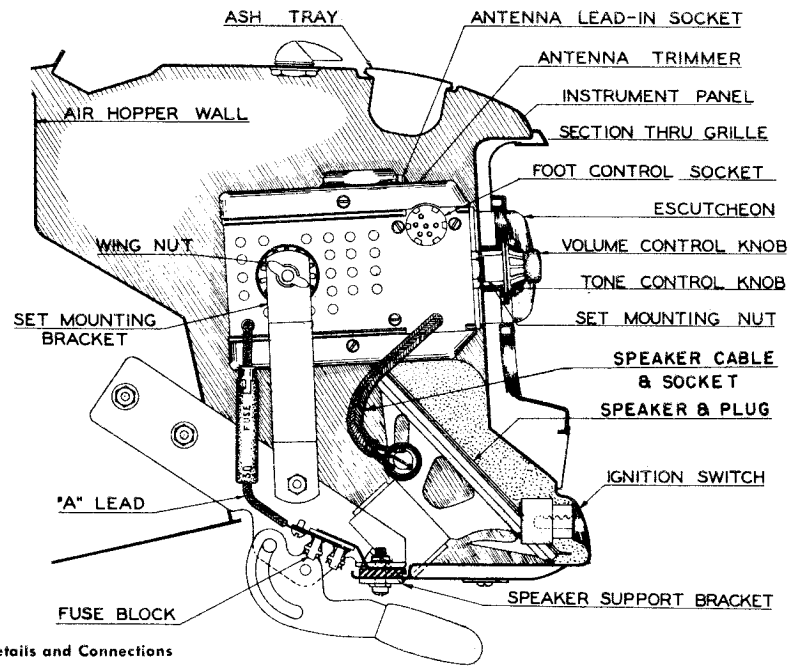

Fig. 2. Mounting Details and Connections

RADIO INSTALLATION INSTRUCTIONS

1. Install the antenna. Complete instructions are packed with each antenna kit.
2. Remove the decorative plate, in the center of the grille, covering the radio opening.
3. Remove the floor mat around the clutch and brake pedals. Place the foot control over the holes provided in the floor board. Fasten it with the three No. 8 R.H. self-tapping screws furnished in the installation kit (Fig. 3).
4. Dress the foot control lead to the left of the clutch pedal and up behind the fire wall pad.
5. Lift the cap from the foot control. Replace the floor mat and cut a hole for the foot control button. To replace the foot control cap, press it firmly and turn until the notches in the cap slip into the flanges on the foot control button.
6. Remove accessory switch bracket.
7. Plug the foot control cable into the socket provided on the left end of the receiver. With this end of the receiver down and the control shafts to the right, push the receiver up between the instrument panel and the air hopper as far as it will go. Turn the radio clockwise until the knob shafts point downward. Lift the front of the receiver up until the shafts slide through the slots provided below the shaft openings in the instrument panel. Bring the receiver forward so that the knob shafts protrude through the shaft openings.
8. Fit the knob shaft bushing nuts on the shafts and tighten as much as possible with the fingers. Place the tips of long nose pliers in the holes in the nuts and tighten securely.
9. Attach set mounting bracket by fastening one end to the side of the receiver case with the wing nut. Fasten the other end of the radio mounting bracket to the cowl ventilator handle bracket with ¼" x ¾" M.S., flat washer, and nut. (Fig. 2.)
10. Remove cardboard protector from speaker unit and fasten speaker and bracket assembly in place with two ¼" x ¾" M.S. flat washers, two lock washers, and two nuts provided. (Fig. 2.) Plug the speaker cable into the socket provided on the speaker frame.
11. Fasten the controls in place as shown in figure 1. NOTE: Tuning knob must be placed 3 16" away from the instrument panel in order to rotate freely in the automatic position.
12. Fasten the accessory switch bracket back in place.
13. Remove the ash tray assembly and plug the antenna lead into the socket provided on the top of the receiver.
14. Fasten the "A" lead to the fuse block as indicated in figure 2.
15. Turn the receiver on and allow it to operate for approximately fifteen minutes in order for it to reach normal operating temperature. Tune in a weak station near 1200 Kc. Reach through the ash tray opening with a small screw driver and adjust the antenna trimmer, located on the top of the receiver, for maximum volume. (Fig. 2.) Replace ash tray.

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INTERFERENCE ELIMINATION

IMPORTANT: Use the utmost care in the following operations to insure freedom from motor noise. Be sure that good ground contacts are made between the interference condensers and the car body. If necessary, clean away paint or dirt with emery paper. Tighten all nuts and bolts securely.

1. Remove the top mounting screw of the horn relay near the voltage regulator and under this screw mount the condenser No. 22-1537. Connect the lead to the voltage regulator battery terminal. (Fig. 4.)

2. Install suppressor in center hole of distributor cap. Place high tension lead in the top of suppressor. Be sure the suppressor and the lead are fastened securely. (Fig. 5.)

3. On the six cylinder car, remove the bolt, above the ignition coil, from the firewall. Mount the condenser No. 22-1537 under this bolt. Connect the lead to the coil terminal as shown in figure 6A.

   On the eight cylinder car, remove the bottom screw from the ignition coil mounting bracket. Install the condenser No. 22-1537 under the screw. Connect the lead to the coil terminal as shown in figure 6B.

4. Loosen the upper rear cap screw of the engine water jacket plate. **CAUTION: Do not REMOVE cap screw.** Slide the slotted bracket of the condenser No. 22-1260 under the head of this screw. Tighten the screw.

   Attach the condenser lead to the water temperature element in the head. (Fig. 7A.)

5. Remove the tape from the hole (located near the left rear cylinder head nut) in the dash. Fasten the flat ground strip to this hole with a sheet metal screw and lock washer. On the six cylinder car, place the other end of the strip on top of the regular stud nut, and fasten it in place with the special nut furnished in the installation kit. (Fig. 7A.) On the eight cylinder cars, bolt the other end of the strap under the regular stud nut. (Fig. 7B.)

6. Install the motor hood bond spring No. 80-145 as shown in Figure 8. Fasten with No. 8 sheet metal screw. Part No. 112-365.

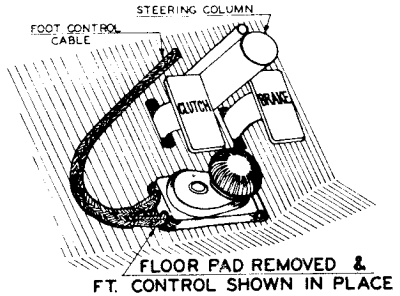

Fig. 3.

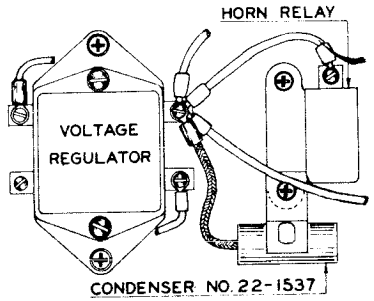

Fig. 4.

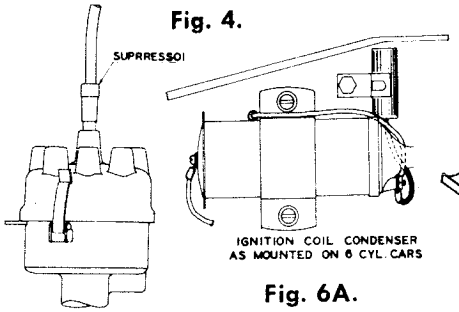

Fig. 6A.

Fig. 5.

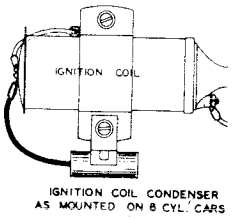

Fig. 6B.

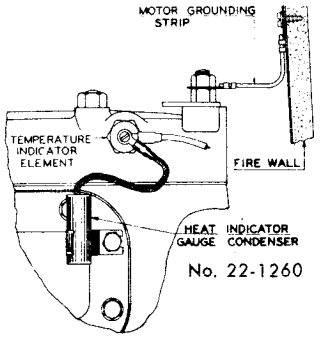

Fig. 7A.

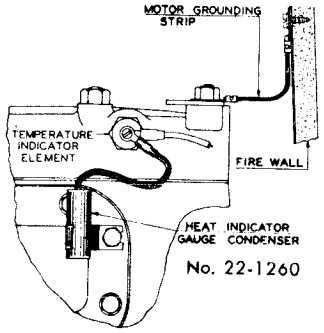

Fig. 7B.

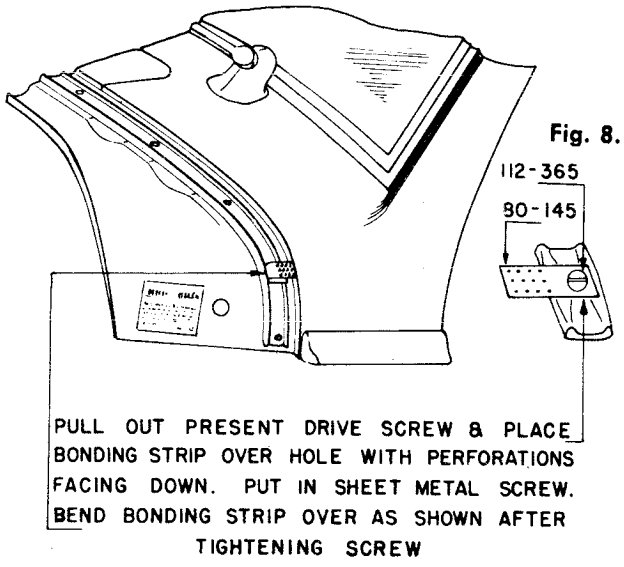
112-365
80-145
PULL OUT PRESENT DRIVE SCREW & PLACE BONDING STRIP OVER HOLE WITH PERFORATIONS FACING DOWN. PUT IN SHEET METAL SCREW. BEND BONDING STRIP OVER AS SHOWN AFTER TIGHTENING SCREW

Fig. 8.

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PARTS LIST

• 1946 RADIO RECEIVER KIT *
Model DB 46 (Part Number 208815)

Items included in kit are:

- Radio receiver
- Mounting bracket, screws, lockwashers, knobs
- Speaker and bracket assembly
- Foot volume control and switch assembly
- Distributor suppressor
- Temperature gauge condenser
- Ignition coil and generator condenser
- Motor hood bonding spring
- Motor bond strap
- Sheet metal screw
- Nut for 6 cyl. cars
- Lockwasher

RADIO ANTENNA KITS *

Part No. 209558—66" Telescopic Antenna including all installation parts.

Part No. 209762—92" Telescopic Antenna including all installation parts.

Part No. 205451—Vacuum Operated Antenna including all installation parts.

(See antenna kits for full installation instructions.)

NOTE: Kits marked * are not available from the radio manufacturer. See your Hudson dealer.

COILS AND CHOKES

Diag. No.	Zenith Part No.	Hudson Part No.	Description
L9	20-213	204890	Main hash choke
T1	95-916	209569	1st I.F. transformer
T2	95-917	209570	2nd I.F. transformer
L1	S8819	209741	Antenna motor noise choke assembly
L7	S11229	209568	Oscillator series coil assembly
L8	S11231	209576	Oscillator shunt coil assembly
L10	S11232	209571	Motor noise choke coil assembly
L5	S12053*	209574	Oscillator tuning coil assembly
L2	S12060*	209572	Antenna tuning coil assem.
L3	S12060*	209572	R.F. tuning coil assembly
L4	S12060*	209572	Detector tuning coil assem.

Note: In ordering coils marked (*), be sure to give color code information.

CONDENSERS

C 9, C12	22-162	204900	100 mmfd.	600 V.
C 8	22-170	204901	.1 mfd.	400 V.
C17	22-182	204902	250 mmfd.	600 V.
C 4	22-190	209577	.1 mfd.	200 V.
C13	22-250	204904	.05 mfd.	200 V.
C19	22-838	204905	.005 mfd.	600 V.
C14	22-906	204906	.005 mfd.	200 V.
C23, C26, C25, C27	22-908	204907	.5 mfd.	120 V.
C 6	22-1136	209585	250 mmfd.	600 V.
C 5	22-1169	209584	.001 mfd.	600 V.
C18	22-1170	204910	.01 mfd.	600 V.
C16	22-1180	209587	.003 mfd.	200 V.
C 2	22-1244	204915	.004 mfd.	600 V.
C 3	22-1376	209583	R.F. trimmer	
C 7	22-1377	209582	Detector trimmer	
C11	22-1378	209581	Oscillator trimmer	
C20, C21, C22	22-1387	209578	Dry electrolytic - 20 mfd. - 25 V. x 10 mfd. - 300 V. x 20 mfd. - 350 V.	
C24	22-1448	209579	.008 mfd.	1600 V.
C 1	22-1462	209580	Antenna trimmer	
C15	22-1466	209754	.01 mfd.	200 V.
C10	22-1478	209919	350 mmfd. compensator	

RESISTORS

R19, R20, S 5	63-1334	209672	Vol. control, and SW. tone control	
R18	63-1368	209920	1800 ohm 2 watt W.W.	
R2	63-1379	207877	Sensitivity control. 0-800 ohm	
R 8, R 1	63-1390	209922	1 megohm	¼ watt
R 4, R11, R12	63-1392	209923	330M ohm	¼ watt
R21	63-1393	209924	47 ohm	¼ watt
R15	63-1394	209925	10M ohm	¼ watt
R 5	63-1396	209926	68M ohm	¼ watt
R 7	63-1398	209928	33M ohm	¼ watt
R16, R17	63-1399	209929	82 ohm	½ watt
R14	63-1400	209930	15 megohm	¼ watt
R 6	63-1401	209931	15M ohm	½ watt
R13	63-1369	209921	270 ohm 1 watt W.W.	
R25	63-1410	208649	120 ohm ½ watt W.W.	
R26	63-1414	208709	100 ohm	¼ watt
R10	63-1416	207939	6.8 megohm	¼ watt
R24	63-1417	207940	47000 ohms	¼ watt
R23	63-1419	208591	10 ohm ½ watt W.W.	
R3	63-1411	208000	18000 ohm	¼ watt

MISCELLANEOUS

	52-202	204935	Battery cable (set to fuse)
	52-254	209551	Battery cable (fuse to fuse block)
SK1	52-279	209968	Speaker cable and plug
	78-281	209745	Vibrator socket
FS2	78-551	209683	Foot switch cable plug socket
	78-596	209746	Tube socket - loktal base (8 contact)
S2	85-339	209747	On-Off switch
	93-456	209748	Vibrator cushion washer
T4	95-914	209684	Power transformer
T3	95-915	209685	Output transformer
S4	136-12	18269	Fuse - 20 amp.
V1	190-20	209686	Vibrator

PARTS LIST (Continued)

Diag. No.	Zenith Part No.	Hudson Part No.	Description
	202-420	209749	Installation instruction book
S1	S11269	209566	Hand selector and muting switch assembly
	S11310	209934	Antenna socket, bracket & terminal assembly
FS3	S11758	208812	Foot switch, vol. control & cable assembly

SPEAKER AND MOUNTING COMPONENTS

	12-937	204020	Speaker support bracket
SP1	49-538	208826	6" dynamic speaker
	54-30	170567	No. 8/32 x 5/16 x 7/64 hex nut
	57-945	204022	Speaker cover plate
	114-88	205287	No. 8/32 x 1/2 hex hd. M.S.
	114-167	205288	No. 10/32 x 5/16 hex acorn hd. M.S.
	196-53	204024	Rubber speaker gasket
	208-538*	209751	Cone & voice coil assem.

Note: When ordering cone and voice coil assembly marked *, be sure to give manufacturer's code letter.

INSTALLATION PARTS AND KNOBS

	S11321	209753	Installation kit complete
	12-938	204021	Set mounting bracket
	22-1260	152021	Temperature gauge cond.
	22-1537	208592	Generator and ignition coil condenser
	46-459	205293	Tone control knob
	54-157	70874	1/4-20 x 7/16 x 3/16 hex nut
	54-173	205283	Set mounting nut
	54-174	205289	1/4-20 wing nut
	63-1252	205281	Distributor suppressor
	80-145	205282	Motor hood bond spring
	80-232	209752	Knob retaining spring
	112-310	170687	Foot Sw. mtg. screw
	112-365	170304	No. 8 x 1/2" B.H.S.M. screw
	114-168	70872	1/4-20 x 3/4 hex hd. M.S.
	S12271	209936	Tuning control & trim. knob assem. (46-550 & 584)
	S12272	209937	Volume control knob and spring assem. (46-549)
	93-577	12857	.062 x 17/64 x 3/4 steel washer
	83-986	204481	Motor bond strap
	112-361	71707	No. 8 self tapping screw
	93-575	170395	Lock washer
	54-188	170859	Hex nut (for 6 cyl. cars only)

DIAL AND TUNING MECHANISM ASSEMBLY

	26-337	209682	Dial scale (manual tuning)
	34-132	209691	Indexing disc
	34-133	209692	Ratchet gear
	34-135	209789	Volume control gear
	46-581	209553	Selector knob (2 used)
	57-1061	209560	Escutcheon
	57-1151	209694	Name plate
	59-158	204040	Dial pointer
	80-329	209695	Gear indexing spring
	80-331	209681	Cross arm return spring
	80-332	209696	Cam lever spring
	80-336	209697	Ratcher gear return spring
	80-340	209698	Lever spring
	80-341	209699	Kick-off spring
	80-342	209700	Tuning shaft spring
	80-343	209701	Solenoid switch spring
	80-344	209702	Solenoid switch contact spring
	80-425	209703	Knob return spring
S3	100-31	71550	Dial light bulb
	149-44*	209799	Adjusting spring & core
	188-45	209705	Turret screw lock ring
	S10826	209706	Solenoid end plug and bracket assembly
L6	S10829	209567	Solenoid and terminal assembly
	S10831	209707	Ratchet and bracket
	S10836	209708	Cross arm assembly
	S11052	204025	Tuning shaft and gear assembly
	S11082	209709	Turret assembly
	S11313	209738	Dial drum and bracket assembly
	S11494	209739	Mounting plate and lever assembly
	S11976	209740	Dial light socket and wire assembly

Note: In ordering Adjusting Spring and Core marked (*), be sure to give color code information.

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FORD MERCURY INTEGRAL AERIAL

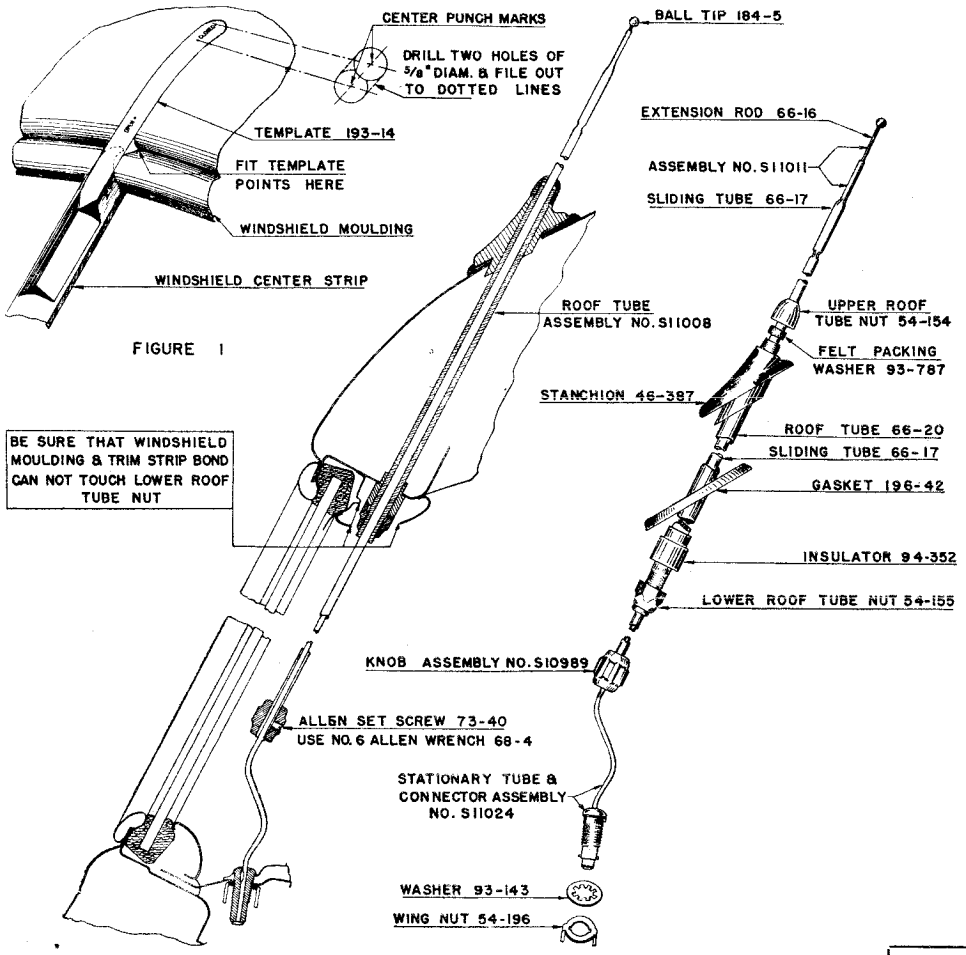
FOR 1946 CLOSED CARS

INSTALLATION INSTRUCTIONS

CAUTION — AERIAL SHOULD BE INSTALLED BEFORE RADIO IS INSTALLED

CENTER PUNCH MARKS
DRILL TWO HOLES OF 5/8" DIAM. & FILE OUT TO DOTTED LINES
TEMPLATE 193-14
FIT TEMPLATE POINTS HERE
WINDSHIELD MOULDING
WINDSHIELD CENTER STRIP

FIGURE 1


BALL TIP 184-5
EXTENSION ROD 66-16
ASSEMBLY NO. S11011
SLIDING TUBE 66-17
ROOF TUBE ASSEMBLY NO. S11008
UPPER ROOF TUBE NUT 54-154
FELT PACKING WASHER 93-787
STANCHION 46-387
ROOF TUBE 66-20
SLIDING TUBE 66-17
GASKET 196-42
BE SURE THAT WINDSHIELD MOULDING & TRIM STRIP BOND CAN NOT TOUCH LOWER ROOF TUBE NUT
INSULATOR 94-352
LOWER ROOF TUBE NUT 54-155
KNOB ASSEMBLY NO. S10989
ALLEN SET SCREW 73-40
USE NO. 6 ALLEN WRENCH 68-4
STATIONARY TUBE & CONNECTOR ASSEMBLY NO. S11024
WASHER 93-143
WING NUT 54-196

COMPLETED INSTALLATION
FIGURE 2

EXPLODED VIEW
FIGURE 3

1. Locate the roof hole by laying the metal template (furnished with the antenna kit) along the upper end of the windshield divider strip as shown in Fig. 1. Prick punch two holes at the word marked "Closed" on template as shown. Be careful not to allow the drill or cutter to punch a hole through the headlining. The accurate drilling of the lower edge of the bottom hole is important for the correct fitting of the roof tube and the smooth operation of the aerial. Cut out the metal between the lines as shown in Fig. 2.

2. Remove rear vision mirror bracket.

3. Remove plastic button from top center instrument board.

4. Loosen sliding tube knob and lower roof tube nut. (See Fig. 4.) (Caution: Upper roof tube nut is not to be loosened at any time!) Allow knob, nut and insulator to slip down and ride loosely on stationary tube. Next slip stationary tube out of the sliding tube and push upper end through hole in moulding behind rear vision mirror until the connector at the bottom of the tube can be dropped into hole in top of instrument panel. Assemble washer and wing nut from below panel.

5. From the outside of the car, thread the sliding tube (complete with roof tube, gasket, stanchion and upper roof tube nut) over the stationary tube which now extends through hole in roof, and lower the assembly into car. Rubber gasket and stanchion should be located properly around hole.

6. Working from the inside of the car, slide the insulator over the roof tube so that the shoulder of the insulator seats well into the hole. Make sure the roof tube does not raise out of the hole during this operation. The lower roof tube nut should be tightened only enough to assure a good moisture seal of exterior parts of aerial.

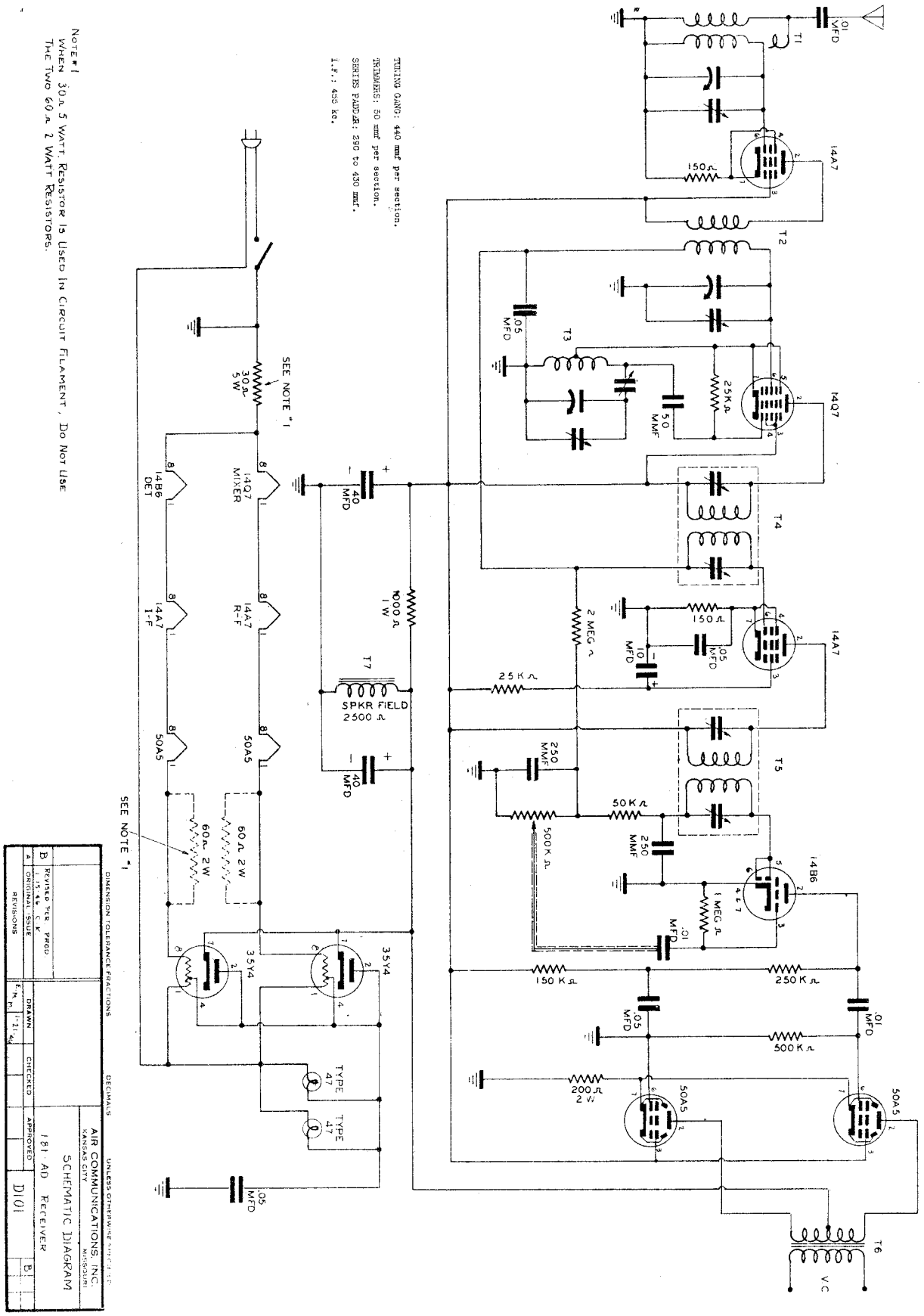
CAUTION: Be sure that neither the center trim strip bond nor the windshield moulding touches the lower roof tube nut (Fig. 2).

7. Align the sliding tube knob with the lower end of the sliding tube. Tighten using Allen Wrench.

IMPORTANT — KEEP THE INSULATORS FREE FROM OIL OR POLISHING WAX

MODEL 181-AD

AERMOTIVE EQUIPMENT CORP.



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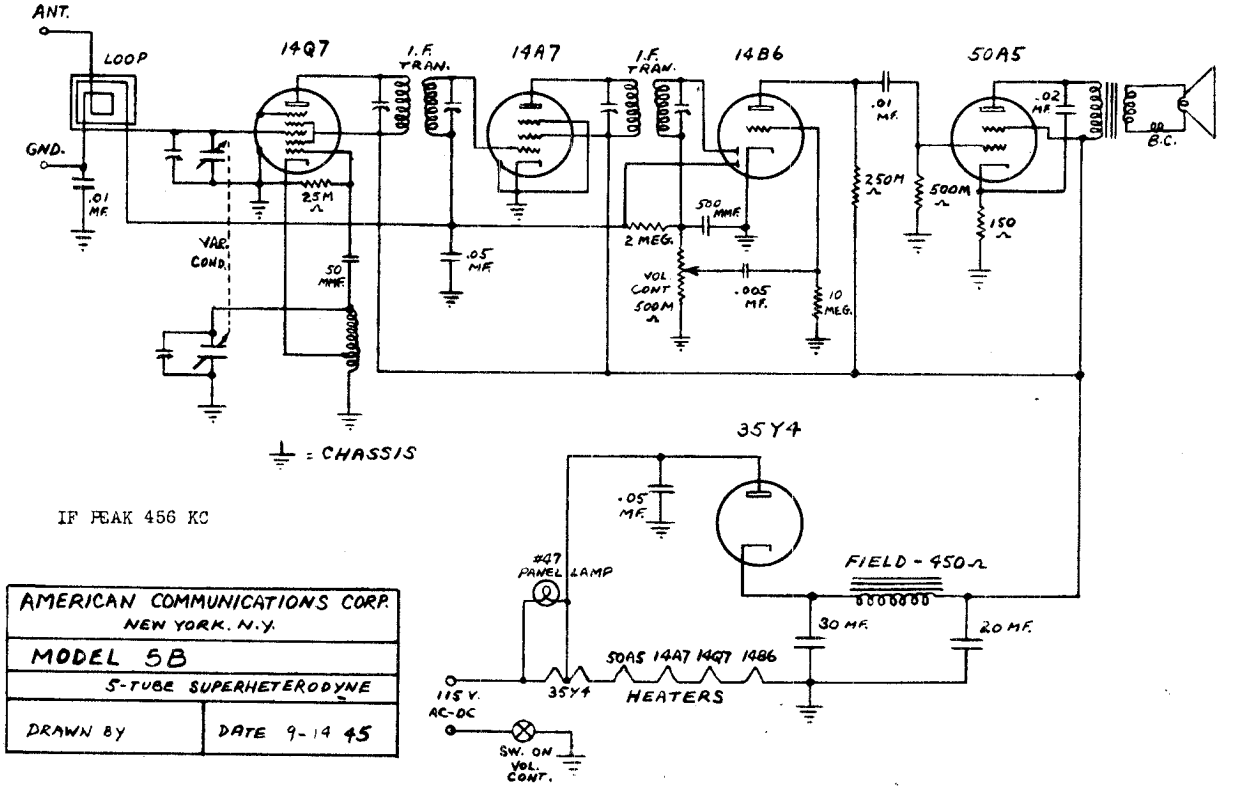
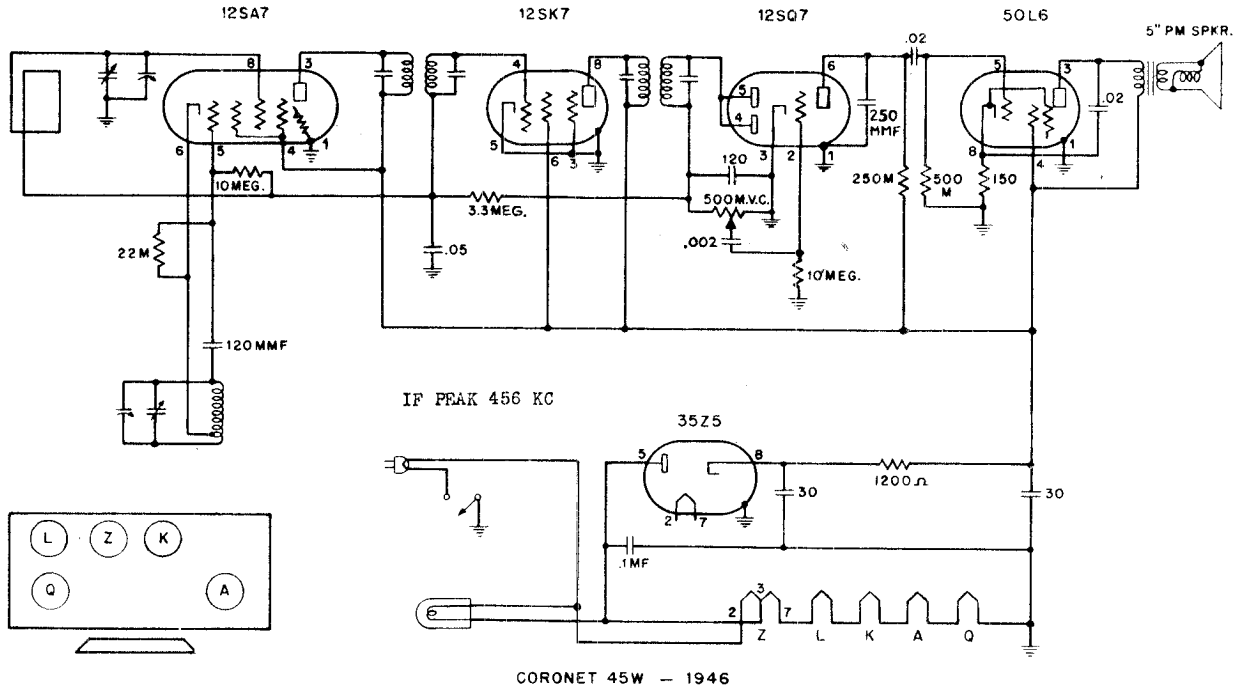
MODEL 5B
MODEL 45W

AMERICAN COMMUNICATIONS CORP.
CORONET RADIO & TELEV. CO.



AMERICAN COMMUNICATIONS CORP. NEW YORK, N.Y.	
MODEL 5B	
5-TUBE SUPERHETERODYNE	
DRAWN BY	DATE 9-14 45



CORONET 45W — 1946

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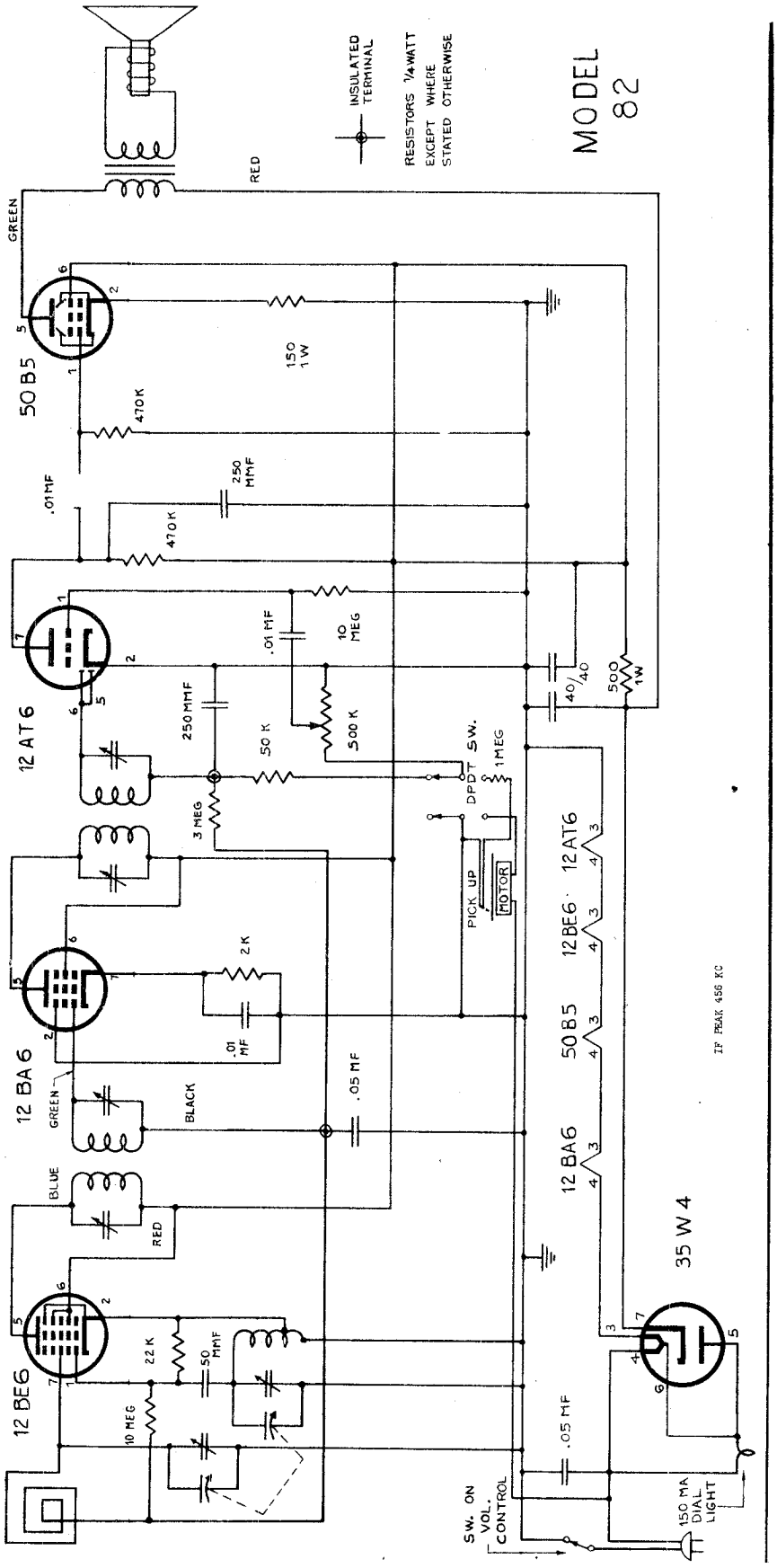
CONTINENTAL ELECTRONICS, LTD.



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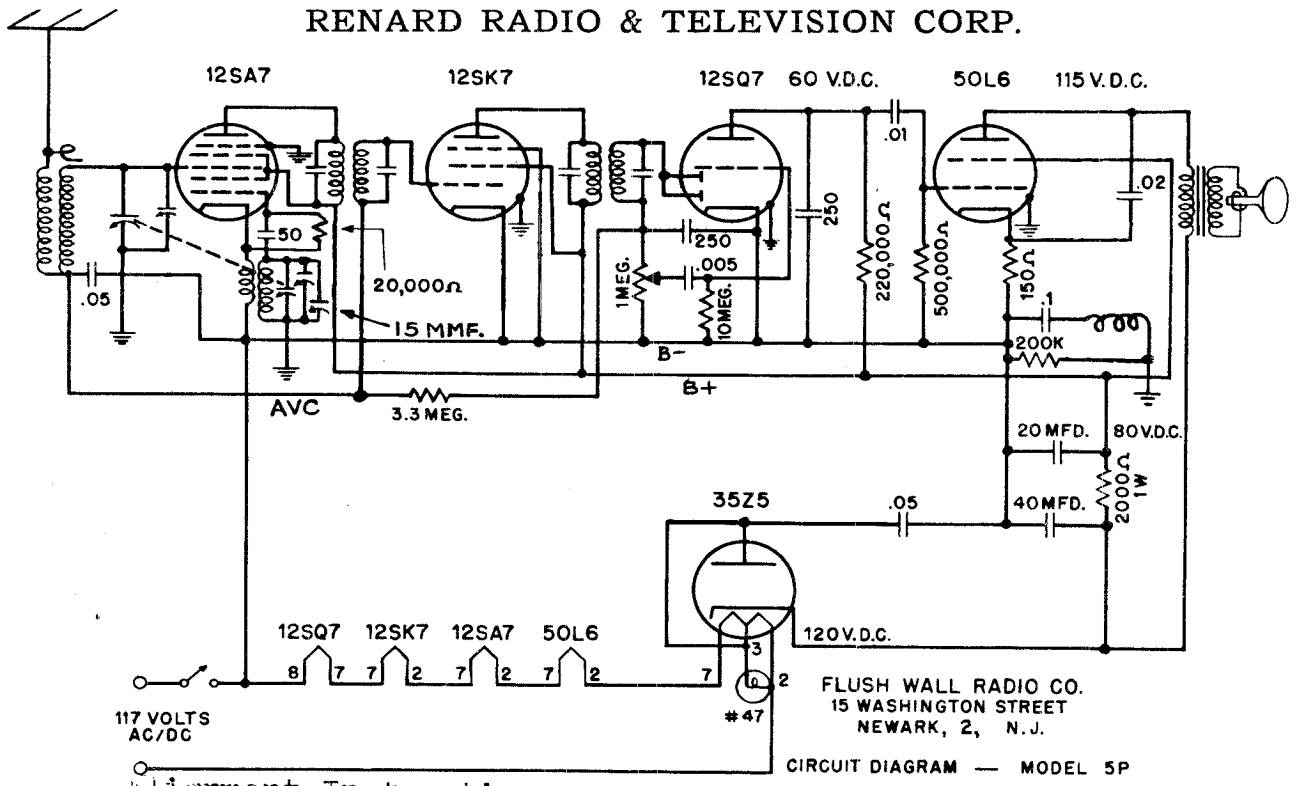
MODEL 5P

FLUSH WALL RADIO CO.
RENARD RADIO & TELEVISION CORP.

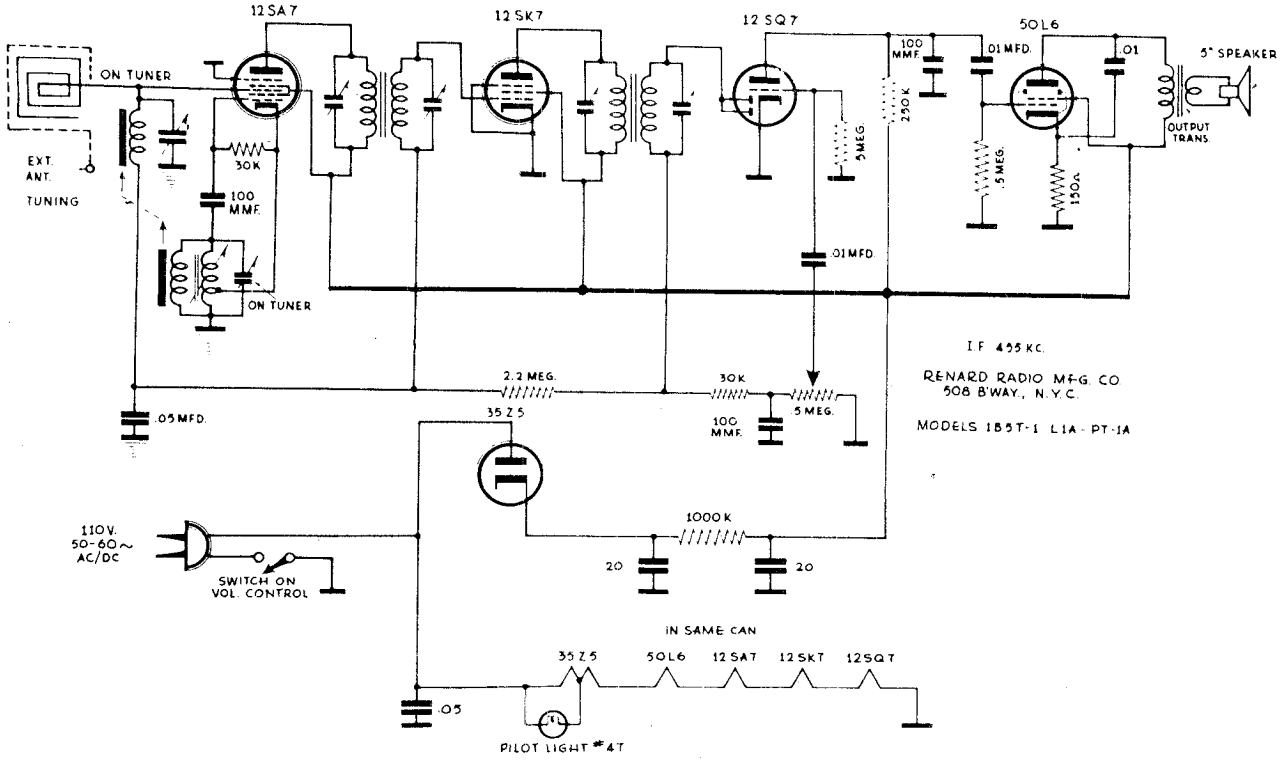
MODELS 1B5T-1, L1A-PT-1A



Alignment Instructions

Align I.F's. at 456 K.C., sig. gen. connected to antenna through 50 mmf cond.

Align osc. at 1620 K.C. Set signal generator at 1400 K.C., and align antenna timmer for max. output.



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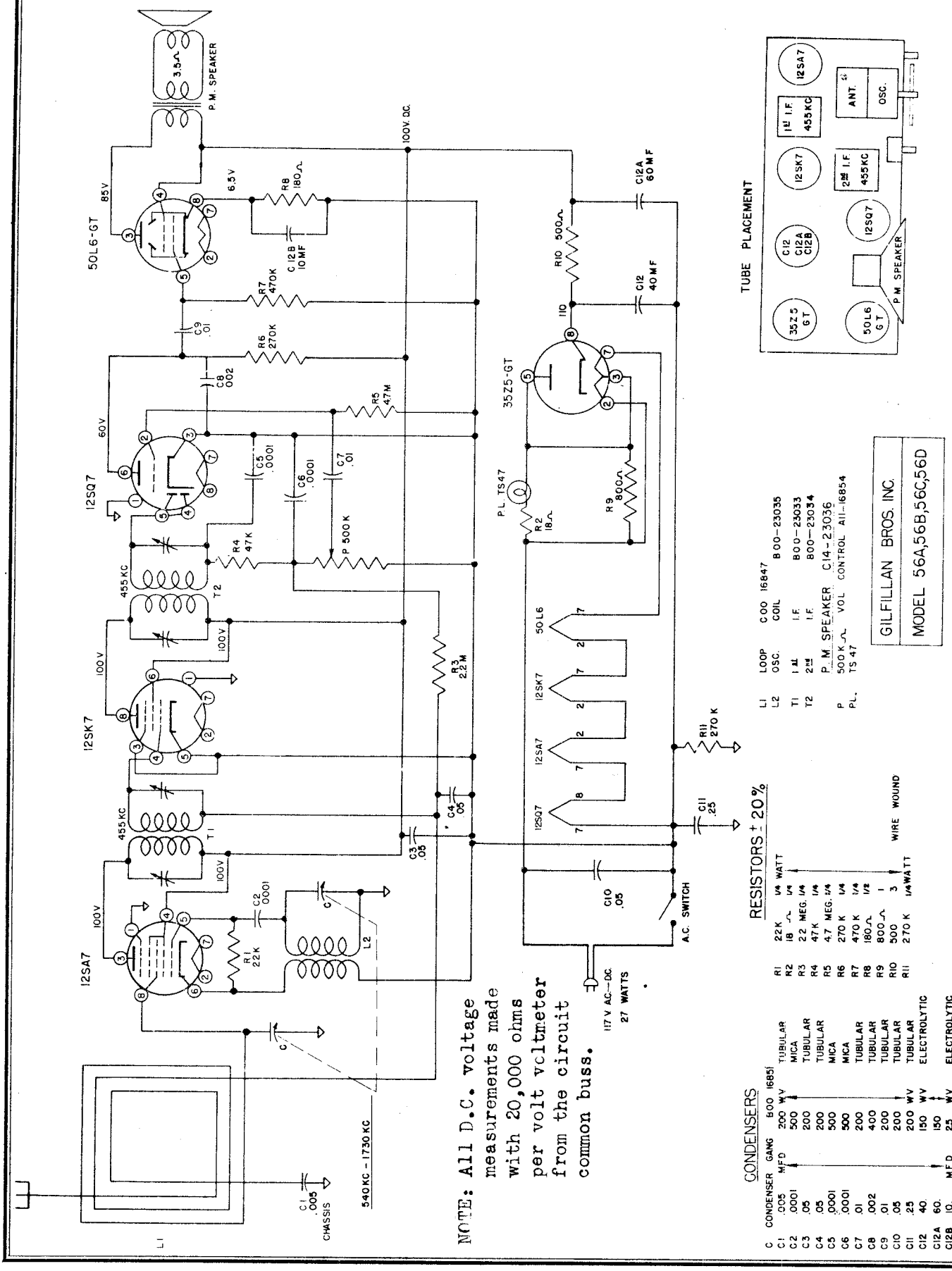
GILFILLAN BROS. INC.

MODELS 56A,56B,56C,56D



NOTE: All D.C. voltage measurements made with 20,000 ohms per volt voltmeter from the circuit common buss.

L1 LOOP C00 16847
L2 OSC. COIL 800-23035
T1 1st I.F. 800-23033
T2 2nd I.F. 800-23034
P M SPEAKER C14-23036
P 500 K VOL CONTROL A11-16854
PL. TS 47

RESISTORS ± 20%

R1	22K	1/4	WATT
R2	18 Ω	1/4	
R3	2.2 MEG.	1/4	
R4	47K	1/4	
R5	4.7 MEG.	1/4	
R6	270 K	1/4	
R7	470 K	1/4	
R8	180 Ω	1/2	
R9	800 Ω	1	WIRE WOUND
R10	500 Ω	3	WIRE WOUND
R11	270 K	1/4	WATT

CONDENSERS

C	CONDENSER	GANG	800 1685	
C1	.005	MFD	200 WV	TUBULAR
C2	.0001		500 WV	MICA
C3	.05		200	TUBULAR
C4	.05		200	TUBULAR
C5	.0001		500	MICA
C6	.0001		500	MICA
C7	.01		200	TUBULAR
C8	.002		400	TUBULAR
C9	.01		200	TUBULAR
C10	.05		200	TUBULAR
C11	.25		200 WV	TUBULAR
C12	40		150 WV	ELECTROLYTIC
C12A	60.		150	
C12B	10.	MFD	25 WV	ELECTROLYTIC

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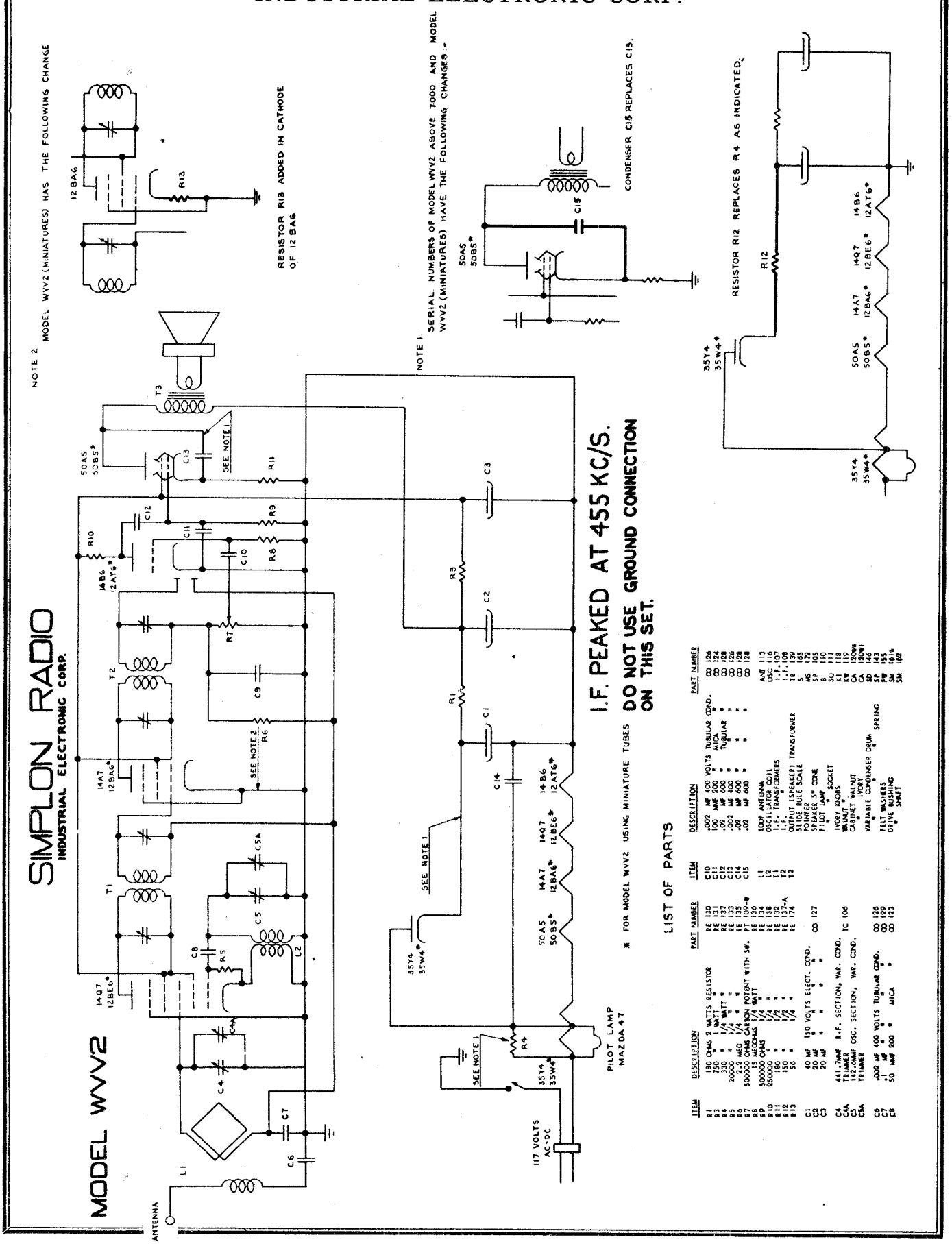
MODEL WVV2

INDUSTRIAL ELECTRONIC CORP.



LIST OF PARTS

ITEM	DESCRIPTION	PART NUMBER	ITEM	DESCRIPTION	PART NUMBER
R1	100 OHMS 2 WATTS RESISTOR	RE 130	C10	.002 MF 400 VOLTS TUBULAR COND.	126
R2	750 " 1 WATT "	RE 131	C11	.100 MF 400 " MICA "	124
R3	20000 " 1/4 WATT "	RE 133	C12	.002 MF 400 " TUBULAR "	128
R4	2.2 MEG 1/4 " "	RE 135	C13	.002 MF 600 " " "	128
R5	500000 OHMS CARBON POTENT WITH SW.	PT 109-W	C14	.02 MF 600 " " "	128
R6	15 MEGOHMS 1/4 WATT	RE 136	C15	.02 MF 600 " " "	128
R7	500000 OHMS 1/4 "	RE 134	L1	LOOP ANTENNA	ANT 113
R8	250000 " 1/4 "	RE 138	L2	OSCILLATOR COIL	OSC 110
R9	180 " 1/2 "	RE 132	T1	I.F. TRANSFORMERS	I.F. 107
R10	150 " 1/2 "	RE 137-A	T2	I.F. "	I.F. 108
R11	56 " 1/4 "	RE 174	T3	OUTPUT (SPEAKER) TRANSFORMER	P.T. 139
				SLIDE RULE SCALE	S 165
C1	40 MF 150 VOLTS ELECT. COND.	CO 127		POINTER	P 175
C2	20 MF " " " "			SPEAKER 5" CONE	S 105
C3	20 MF " " " "			PILOT LAMP SOCKET	S 110
				" "	S 111
C4	441.7MMF R.F. SECTION, VAR. COND.	TC 106		IVORY KNOBS	K 119
C4A	TRIMMER			WALNUT "	K 118
C5	142.6MMF OSC. SECTION, VAR. COND.			CABINET WALNUT	CA 120W
C5A	TRIMMER			IVORY	CA 120W1
				VARIABLE CONDENSER DRUM	SP 146
C6	.002 MF 400 VOLTS TUBULAR COND.	126		" SPRING	SP 147
C7	.1 " " " MICA "	129		FELT WASHERS	FW 183
C8	50 MMF 500 " "	123		DRIVE BUSHING	SM 101
				SHAFT	SM 102

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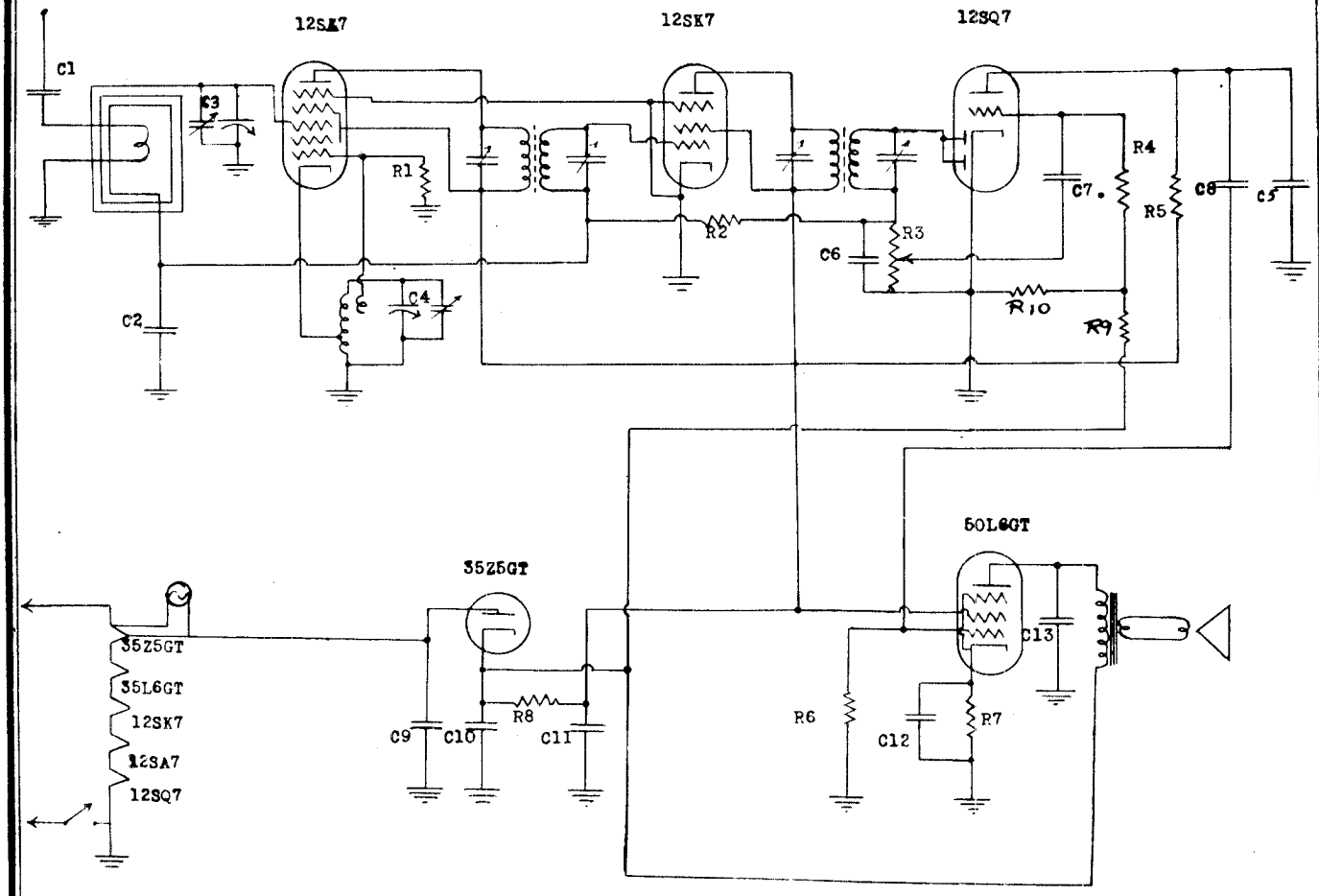
MODEL WS5146

KERNWOOD RADIO CORP.



*Voltage analysis

	Filament	Plate	Screen	Cathode
35Z5	35.0	117A.C.		122
50L6	50.0	117	90	7.5
12SQ7	12.6	55		0
12SK7	12.6	90	90	0
12SA7	12.6	90	90	0

Parts List

C1 --- .001 mfd 600 volt paper condenser
C2 --- .05 mfd 400 volt paper condenser
C3 --- Tuning condenser - antenna section
C4 --- " " - oscillator section
C5 --- 100 mmf Mica condenser
C6 --- " " " "
C7 --- .006 mfd 400 volt paper condenser
C8 --- .01 mfd 600 volt paper condenser
C9 .05 mfd 400 " " "
C10 -- 40 mfd 150 volt electrolytic condenser
C11 -- 20 mfd " " " "
C12 -- 10 mfd 35 " " "
C13 -- .02 mfd 400 " paper condenser
R1 --- 22M ohm 1/4 watt carbon resistor
R2 --- 2.2 megohm 1/4 watt carbon resistor
R3 --- .5 " volume control
R4 --- 10 megohm 1/4 watt carbon resistor
R5 --- 220M ohm 1/4 watt carbon resistor
R6 --- 470M " " " " "
R7 --- 150 " " " " "
R8 --- 2200 " " " " "
R9 --- 2.2 megohm 1/4 watt carbon resistor
R10 -- 65M ohm " " " "

Power Supply
110-125 volts A.C. or D.C.

Power Consumption
30 watts

Frequency Range
540-1700 K.C.

*All measurements except A.C. voltages made with V.T.V.M.

IF PEAK 456 KC

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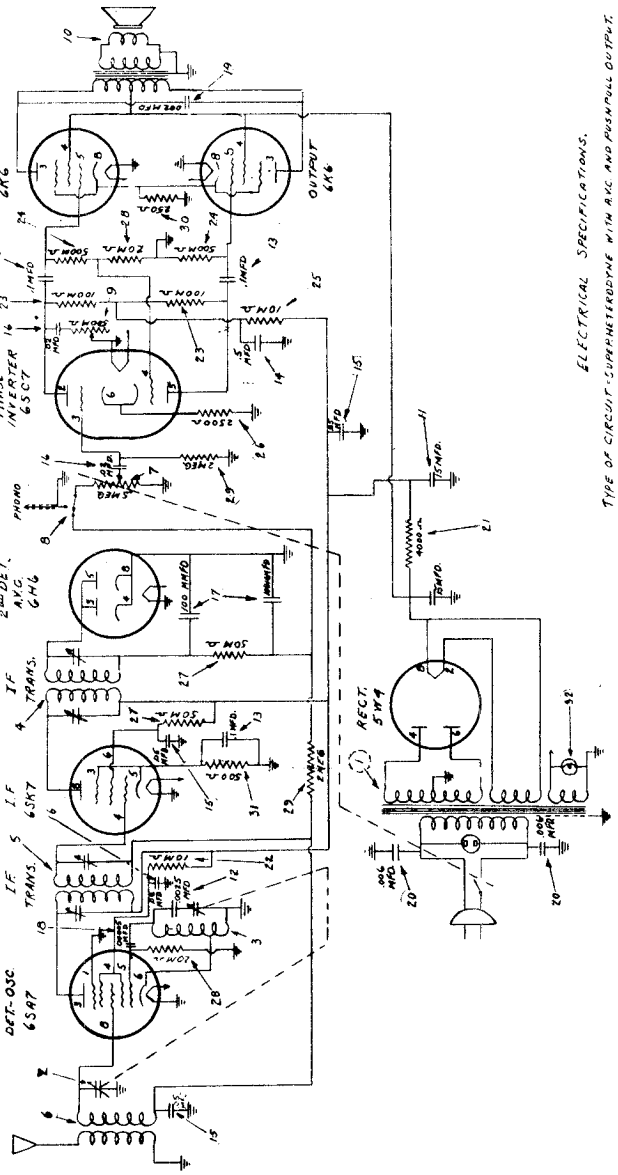
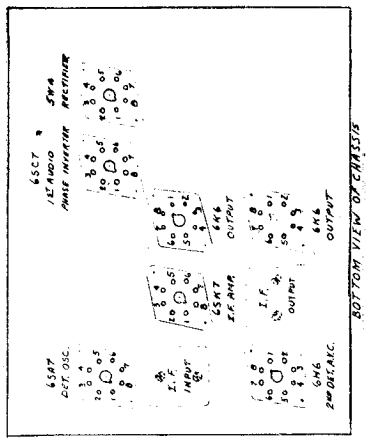
MODEL RP570T

KETAY MFG. CORP.





NORMAL VOLTAGE READINGS

TUBE	CIRCUIT	TERMINALS OF SOCKETS 1	2	3	4	5	6	7	8
6K6	OUTPUT	—	0	425	425	0	0	—	425
6K6	2ND DET. AVC.	0	0	0	0	0	0	—	425
6SK7	I.F. AMP.	0	0	315	315	0	315	425	425
6SA7	DET. OSC.	0	0	0	85	85	0	425	0
	MILLIAMMETER	0	AC	0	0	0	105	105	0
6SC7	PHASE INVERTER	0	125	—	125	0	125	0	125
SW4	RECTIFIER	0	125	—	125	125	125	125	125

1- ALL READINGS TAKEN WITH RECEIVER O/A ANTENNA GROUNDED TO CHASSIS (NO SIGNAL)
2- USE A LINE VOLTAGE OF 115 VOLTS OR MAKE ALLOWANCE FOR VARIATIONS.
3- USE A 1000 OHM RESISTANCE VOLTMETER HAVING A RESISTANCE OF AT LEAST 1000 OHMS PER VOLT.
4- TAKE ALL D.C. READINGS ON THE 500 VOLT SCALE.
5- READ FROM INDICATED TERMINALS TO CHASSIS BASE.
6- SEE LOCATION CHART ABOVE FOR POSITION OF TERMINALS

ELECTRICAL SPECIFICATIONS.

TYPE OF CIRCUIT - SUPERHETERODYNE WITH AVC AND PUSH-PULL OUTPUT.
POWER SUPPLY - 115 VOLTS 50-60 CYCLES 60 WATTS
INTERMEDIATE FREQUENCY - 456 K.C.
TUNING RANGE - 535 K.C. TO 1700 K.C.
OUTPUT - 5 WATTS
TUBES USED - ONE 6SA7 DET. OSC., ONE 6SK7 I.F. AMP., ONE 6K6 2ND DET. AVC., ONE 6SC7 1ST AUDIO & PHASE INVERTER, TWO 6K6 PUSH-PULL OUTPUT, ONE SW4 RECTIFIER.

ALIGNMENT OF COMPENSATORS.

1- CONNECT SIGNAL GENERATOR TO ANTENNA LEAD THRU A 100 MMFD CONDENSER. TURN VOLUME CONTROL TO FULL VOLUME POSITION. TURN TONE CONTROL TO TREBLE POSITION. CONNECT OUTPUT METER ACROSS VOICE COIL OF SPEAKER. THE OUTPUT METER SHOULD HAVE A 0-10 VOLT A.C. RANGE.
2- SET SIGNAL GENERATOR TO 456 K.C. ADJUST I.F. TRIMMERS TO MAX. OUTPUT DURING THIS OPERATION READJUST OUTPUT OF SIGNAL GENERATOR TO MAINTAIN METER READING NEAR CENTER OF SCALE OR HIGHER, AS TOO LOW AN OUTPUT METER READING MAY NOT ALLOW ACCURATE ALIGNMENT TO BE OBTAINED.
3- SET SIGNAL GENERATOR TO 1700 K.C. TUNE SET TO HIGH FREQUENCY END. THIS SHOULD LEAVE THE VARIABLE CONDENSER PLATES COMPLETELY UNMESHED. ADJUST OSCILLATOR TRIMMER TO THIS FREQUENCY. RESET SIGNAL GENERATOR TO 1500 K.C. ADJUST OSCILLATOR & R.F. TRIMMERS TO MAX. OUTPUT. THE SET SHOULD NOW TRACK PROPERLY.
4- THE OSCILLATOR CONDENSER-END PLATES HAVE BEEN BENT AT THE FACTORY TO GIVE 1700 K.C. COVERAGE AND TO INSURE CORRECT TRACKING. THESE PLATES NORMALLY WILL NOT REQUIRE ADJUSTMENT. HOWEVER IF THEY HAVE BEEN DISTURBED THROUGH HANDLING THEY WILL REQUIRE TOUCHING UP DURING ALIGNMENT.

NO.	DESCRIPTION	PART NO.
1	TRANSFORMER - POWER	A-10418
2	CONDENSER - VARIABLE	A-10411
3	OSCILLATOR COIL	A-10414
4	I.F. COIL - OUTPUT	A-10418
5	I.F. COIL - INPUT	A-10417
6	ANT. COIL	A-10419
7	POTENTIOMETER (VOLUME CONTROL & SWITCH)	A-10420-1
8	ROTARY TONE SWITCH (SW1)	A-10421
9	POTENTIOMETER (TONE)	A-10420-2
10	SPEAKER	A-10422
11	CONDENSER - DUAL 15 MFD ELECT.	A-10430
12	CONDENSER .005 MFD. MICA	A-10459
13	CONDENSER .1 MFD 400 V. PAPER	* 10452
14	CONDENSER .5 MFD 400 V. PAPER	A-10452-2
15	CONDENSER .05 MFD 400 V. PAPER	A-10452-3
16	CONDENSER .02 MFD 400 V. PAPER	A-10452-4
17	CONDENSER .001 MFD MICA PAPER	A-10445-5
18	CONDENSER .0005 MFD MICA	A-10445-6
19	CONDENSER .02 MFD 600 V. PAPER	A-10445-7
20	CONDENSER .1 MFD 400 V. PAPER	A-10445-8
21	RESISTOR - 400 OHMS 2W	A-10446-1
22	RESISTOR - 10 M OHM 1/2 W	A-10446-12
23	RESISTOR - 100 OHM 1/2 W	A-10446-2
24	RESISTOR - 500 OHM 1/2 W	A-10446-3
25	RESISTOR - 10 M OHM 1/2 W	A-10446-4

NO.	DESCRIPTION	PART NO.
26	RESISTOR - 2500 OHM 1/2 W	A-10446-11
27	RESISTOR - 500 OHM 1/2 W	A-10446-9
28	RESISTOR - 200 OHM 1/2 W.	A-10446-10
29	RESISTOR - 2 MEG OHM 1/2 W	A-10446-7
30	RESISTOR - 250 OHM 1W.	A-10446-5
31	RESISTOR - 300 OHM 1/2 W.	A-10446-6
32	PILOT LIGHT #40	A-10436
	KNOB	A-10405
	DIAL	A-10406
	TUBE SOCKET	A-10415
	DIAL ESCUTCHEON & LIGHT SOCKET	A-10403

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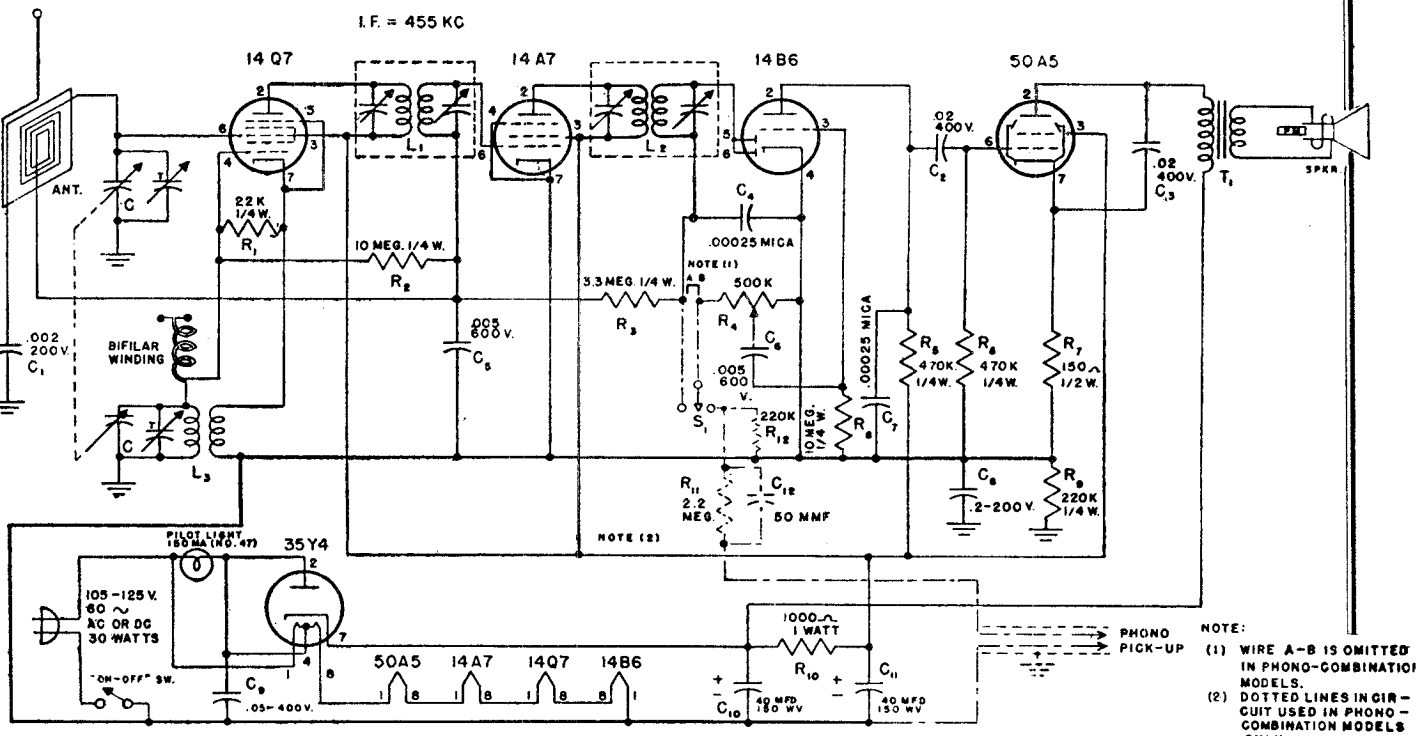
MODELS 651,653,6541, 6547,6545,6560

W. T. KNOTT CO.



NOTE:
(1) WIRE A-B IS OMITTED IN PHONO-COMBINATION MODELS.
(2) DOTTED LINES IN CIRCUIT USED IN PHONO-COMBINATION MODELS ONLY.

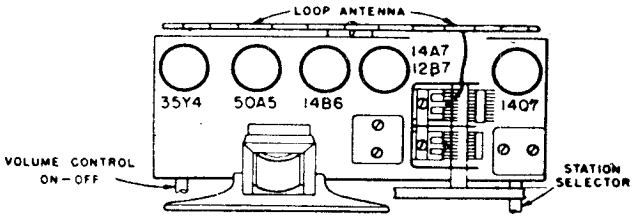
Alignment Procedure:

Steps	Connect output of oscillator to	Tune osc. to	Tune radio dial to	Adjust the following for max. peak output
1.	Tuning condenser stator (ant.) in series with .01 mfd.	455	Quiet point at high frequency end of dial.	1st and 2nd I. F. Transformers
2.	Antenna term. of Ant. loop in series with 100 mmf.	1720	Full clockwise (out of mesh)	Osc. trimmer
3.	Antenna term. of Ant. loop in series with 100 mmf.	1500	1500	Ant. trimmer

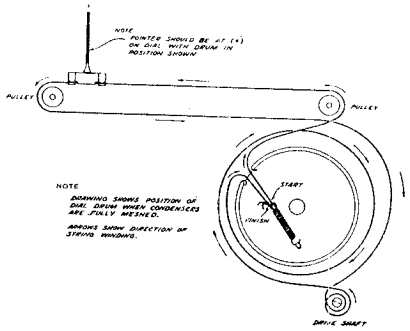
Output meter is connected across voice coil. Receiver volume is turned to maximum.

Tube Complement:

1 Type 14Q7—Oscillator—Converter.
1 Type 14A7—I. F. Amplifier.
1 Type 14B6—Det. A.V.C. and Amp.
1 Type 50A5—Power Amp.
1 Type 35Y4—Rectifier.



Nylon cord of the tuning and dial system may be replaced by following the diagram below.



Parts List:

C —Two gang variable cond. with trimmers. C-6.032
C 1—.002 Mfd., 200V paper
C 2—.02 Mfd., 400V paper
C 3—.02 Mfd., 400V paper
C 4—.00025 Mfd., mica
C 5—.005 Mfd., 600V paper
C 6—.005 Mfd., 400V (or 600V) paper
C 7—.00025 Mfd., mica
C 8—.25 Mfd. (or .20 Mfd.), 200V paper
C 9—.05 Mfd., 400V, molded bakelite
C10, 11—Dual 40 Mfd., 150V A-25.019
*C12—50 Mmf., 20%
R 1—22K, ¼W, 20%
R 2—10 meg, ¼W, 20%
R 3—3.3 meg, ¼W, 20%
R 4—500K variable, audio taper, with SPST A-9.066
R 5—470K, ¼W, 20%
R 6—470K, ¼W, 20%
R 7—150 ohms, ½W, 10%
R 8—10 meg, ¼W, 20%
R 9—220K, ¼W, 20%
R10—1000 ohms, 2W (or 1W), 20%
*R11—2.2 meg, ¼W, 20%
*R12—220K, ¼W, 20%
L 1—Transformer, IF input, 455KC C-2.191-1
L 2—Transformer, IF output 455KC C-2.191-2
L 3—Coil, oscillator B-2.192
Antenna, loop B-5.006
Loudspeaker, PM, 5", Transformer to match 50A5 B-11.037
Pilot light, Mazda No. 47, 150 Ma.
* Used in phono combinations only.

NOTE: TRIMMERS MAY BE LOCATED ON EITHER LONG OR SHORT SIDE OF VARIABLE CONDENSER.

Record Changer: Seeburg Model K

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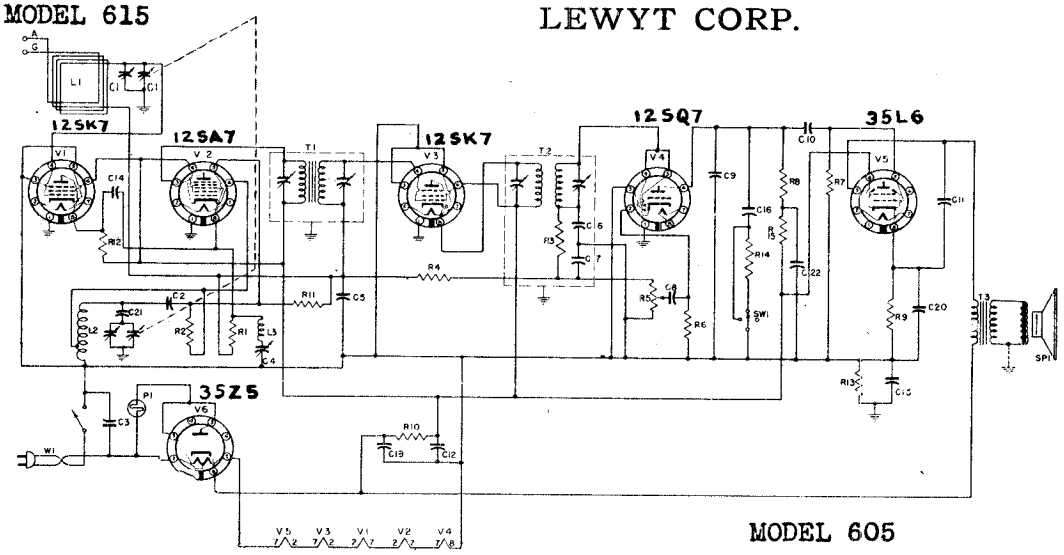
MODEL 605
MODEL 615

LEWYT CORP.

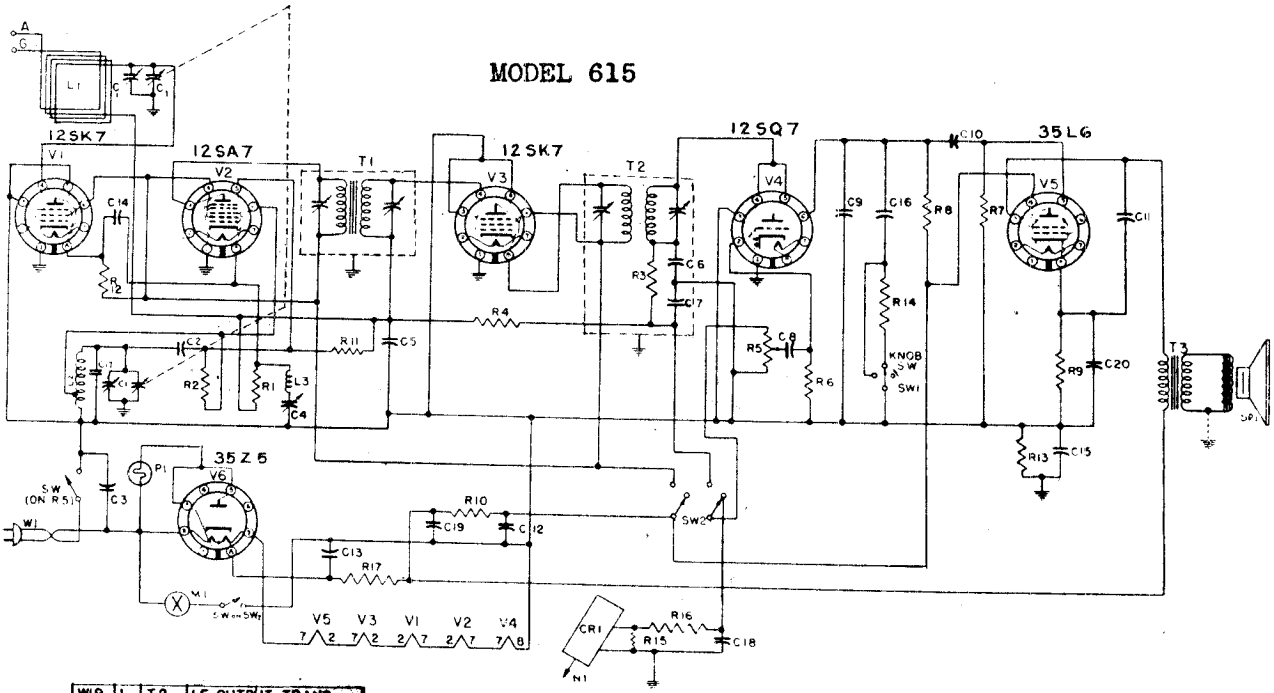


MODEL 605

	1	C22	.5 Mf ±10% 200 V
	1	R15	47KΩ ±20% 1/4 W
W35	1	SP1	4 1/2" PM SPEAKER
W19 ITEM 1	1	W1	LINE CORD
	1	T3	OUTPUT TRANS
W19	1	T2	I. F OUTPUT TRANS.
W21	1	T1	I. F. INPUT TRANS
W70	1	SW1	1 POLE, 3 POSITION
	1	R14	47 K Ω ±20% 1/4 W
	1	R13	470KΩ ±20% 1/4 W
	1	R12	4700 Ω ±20% 1/2 W
	1	R11	18 MEG. ±20% 1/2 W
	1	R10	1500 Ω ± 20% 1W
	1	R9	150 Ω ±20% 1/4 W
	1	R8	0.22 MEG. ± 20% 1/4 W
	1	R7	0.47 MEG. ±20% 1/4 W
	1	R6	4.7 MEG. ± 20% 1/4 W
	1	R5	0.5 MEG. V.C. & SW.
	1	R4	2.2 MEG. ±20% 1/4 W
	1	R3	(SEE T2 DWG. W19)
	1	R2	22 K ±20% 1/4 W
	1	R1	100 K ±20% 1/4 W
	1	P1	15 A PILOT BULB #47
W20	1	L2	OSCILLATOR COIL
	1	L1	LOOP
	1	C21	.05 µf ±10% 200V PAPER
	1	C1	20 µf ±10% 25V ELEC. FILTER
	1	C16	.005 µf ±10% 600V
	1	C15	0.1 µf ±10% 200V
	1	C14	100 µµf ±20% 200V
	1	C13	50 µf ELECT. FILTER
W6 ITEM 2	1	C12	30 µf ELECT. FILTER
	1	C11	.005 µf ±10% 600V
	1	C10	.005 µf ±10% 600V
	1	C9	250 µµf ±10% 200V MICA
	1	C8	.005 µf ±10% 600V
	1	C7	(SEE T2 DWG. W19)
	1	C6	(SEE T2 DWG. W19)
	1	C5	0.1 µf ±20% 200V
	1	C4	I.F. TRAP
	1	C3	.05 µf ±10% 400V
	1	C2	150 µµf ±20% 200V MICA
	1	C1	TUNING CAPACITOR
DWG NO	QTY	REF NO	DESCRIPTION

LIST OF MATERIALS

MODEL 615



W19	1	T2	I.F. OUTPUT TRANS.
W 21	1	T1	I.F. INPUT TRANS.
W 70	1	SW1	1 POLE, 3 POSITION
X123	1	SP1	6" PM SPEAKER
	1	R17	330 Ω ±20% 2 W.
	1	R16	1 MEG. ±20% 1/2 W.
	1	R15	2.2 MEG. Ω ±20% 1/2 W.
	1	R14	47 K Ω ± 20% 1/2 W.
	1	R13	470 K Ω ± 20% 1/2 W.
	1	R12	.4700 Ω ± 20% 1/2 W.
	1	R11	18 MEG. ±20% 1/2 W.
	1	R10	1500 Ω ±20% 1 W.
	1	R9	150 Ω ±20% 1/2 W.
	1	R8	0.22 MEG. ±20% 1/2 W.
	1	R7	0.47 MEG. ±20% 1/2 W.
	1	R6	4.7 MEG. ±20% 1/2 W.
W 4 ITEM 5	1	R5	0.5 MEG. V.C. & SW.
	1	R4	22 MEG. ±20% 1/2 W.
	1	R3	(SEE T2 DWG. W19)
	1	R2	22 K ±20% 1/2 W.
	1	R1	100 K ±20% 1/2 W.

	1	P1	15 A PILOT BULB #47
W80	1	MI	RECORD CHANGER
W 20	1	L2	COIL, OSC
X 75	1	L1	LOOP
W81	1	CR 1	CRYSTAL PICKUP
	1	C20	20 µf +100% -10% 25V. ELEC. FILTER
	1	C19	40 µf +100% -10% 150V. ELEC. FILTER
	1	C18	50 µµf ± 20, 200V. MICA
	1	C17	10 µµf ± 20, 200V.
	1	C16	.005 µf +80% -20% 600V.
	1	C15	0.1 µf +80% -20% 200V.
	1	C14	100 µµf ± 20 200V.
	1	C11	.005 µf +80% -20% 600V.

	1	C10	.005 µf +80% -20% 600V.
	1	C9	250 µµf +80% -20% 200V. MICA
	1	C8	.005 µf +80% -20% 600V.
	1	C7	(SEE T2 DWG. W19)
	1	C6	(SEE T2 DWG. W19)
	1	C5	0.1 µf +80% -20% 200V.
W 72	1	C4, L3	I. F. TRAP.
	1	C3	.05 µf +80% -20% 400V.
	1	C2	150 µµf ± 20, 200V. MICA
W23	1	C 1	TUNING CAPACITOR
W6	1	C13	50 µf ELEC. FILTER
ITEM 2	1	C12	30 µf ELEC. FILTER
DR. OR MAT. NO.	QTY.	REF. NO.	DESCRIPTION

LIST OF MATERIALS

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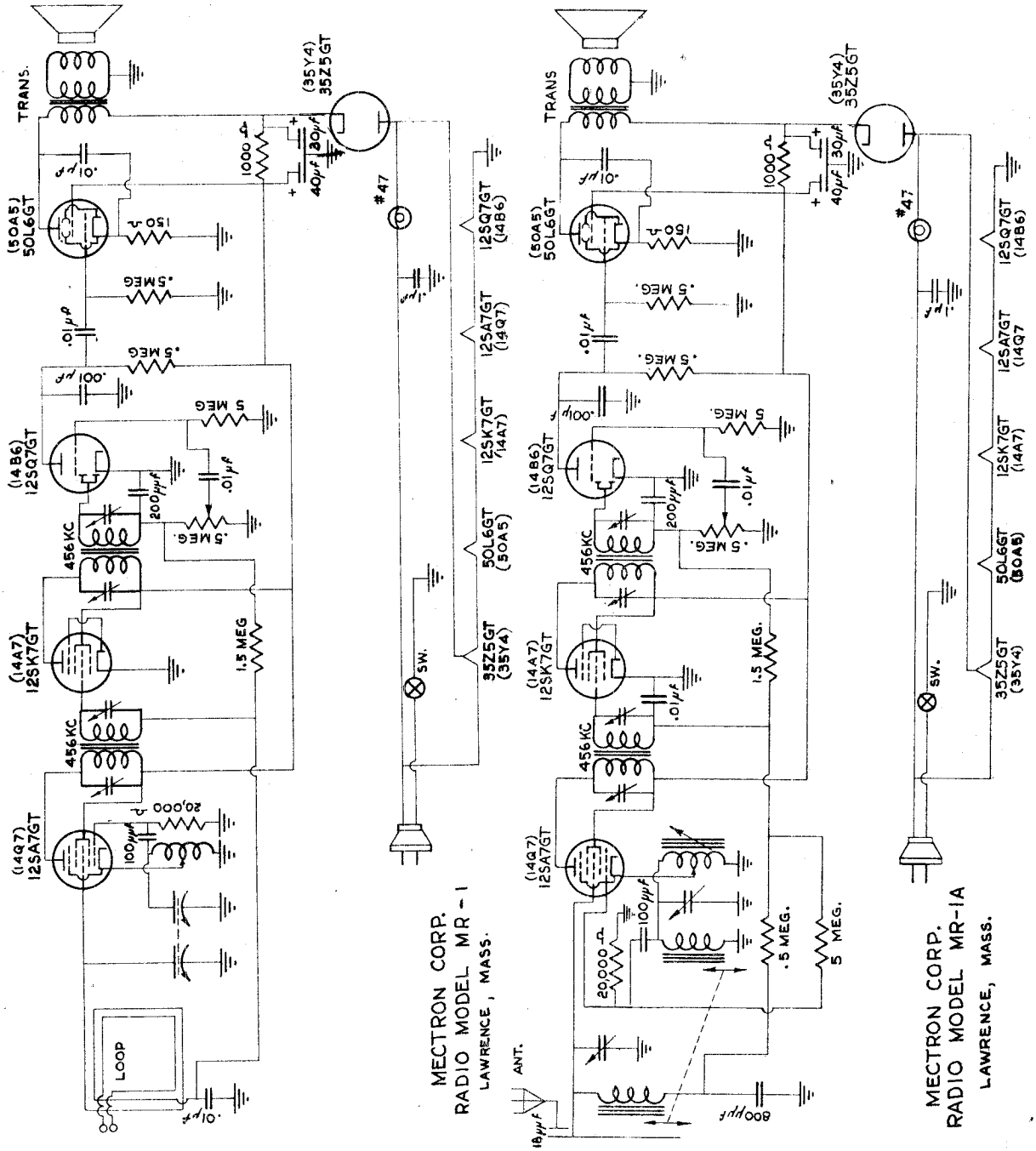
Record Changer: For Model 615, Webster 56

MECTRON CORP.

MODEL MR-1
MODEL MR-1A



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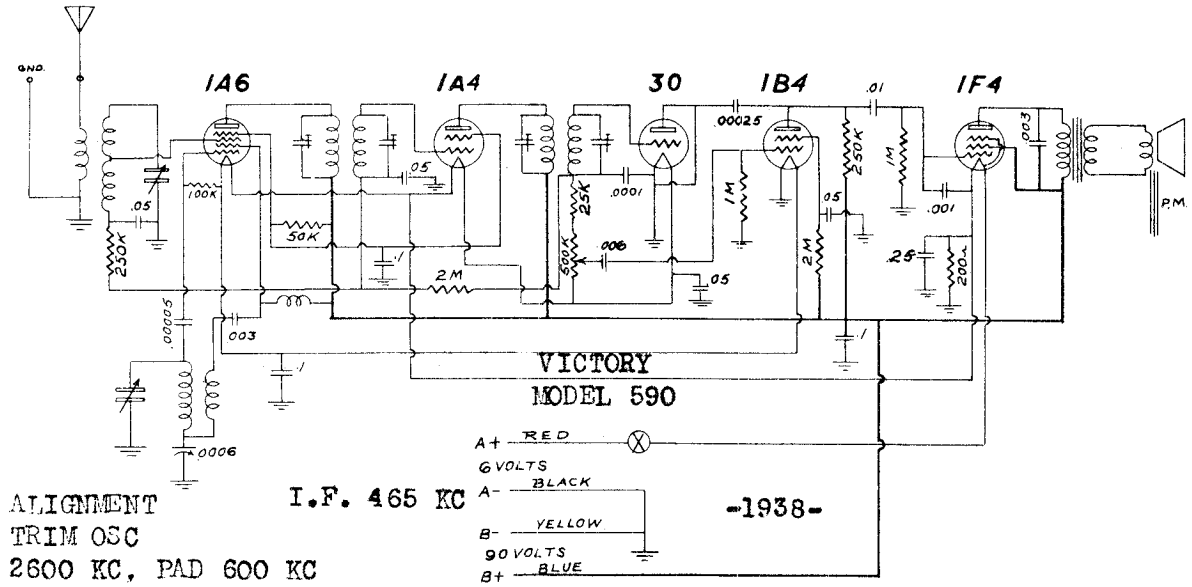
MODEL 590, Victory

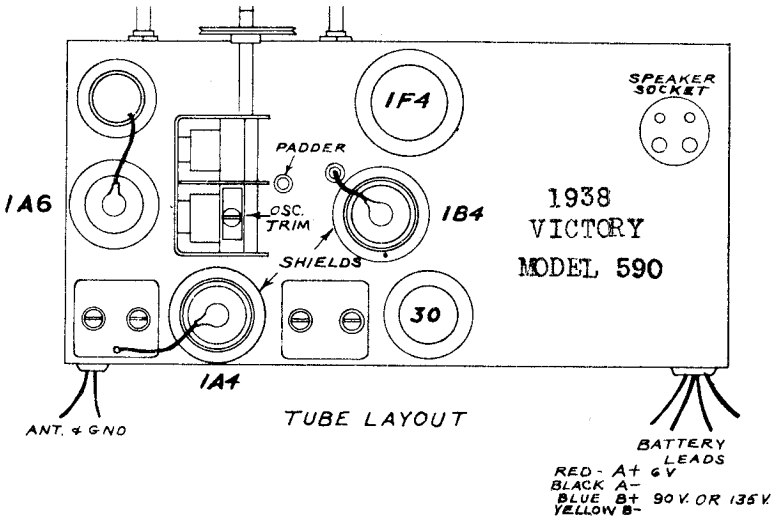
PARKER MCCRORY



ALIGNMENT
TRIM OSC
2600 KC, PAD 600 KC

I.F. 465 KC

-1938-



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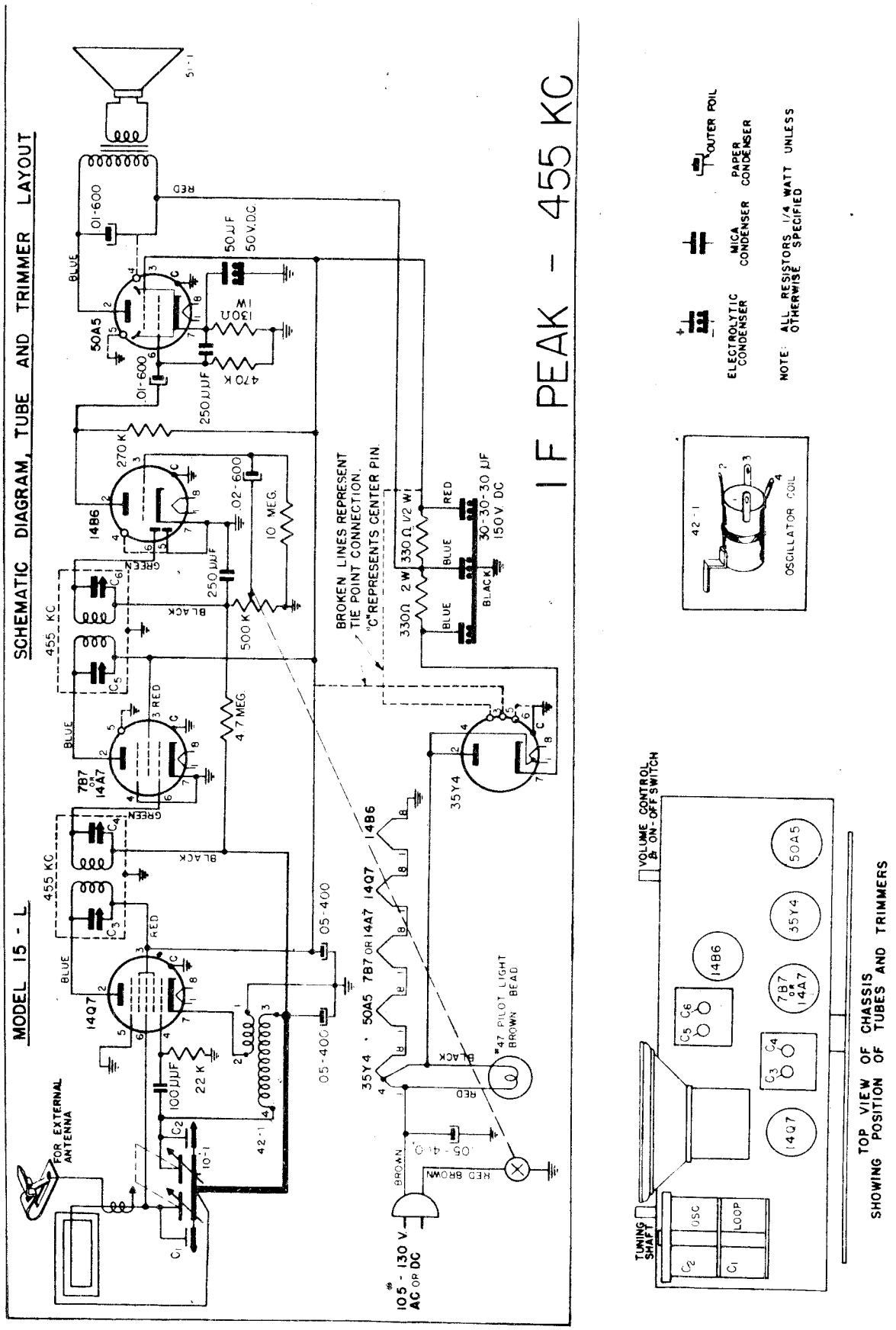
PREMIER CRYSTAL LABS. INC.


SCHEMATIC DIAGRAM, TUBE AND TRIMMER LAYOUT
MODEL 15 - L
IF PEAK - 455 KC
BROKEN LINES REPRESENT TIE POINT CONNECTION. "C" REPRESENTS CENTER PIN.
ELECTROLYTIC CONDENSER
MICA CONDENSER
PAPER CONDENSER
OUTER FOIL
NOTE: ALL RESISTORS 1/4 WATT UNLESS OTHERWISE SPECIFIED
OSCILLATOR COIL
VOLUME CONTROL & ON-OFF SWITCH
TUNING SHAFT
TOP VIEW OF CHASSIS SHOWING POSITION OF TUBES AND TRIMMERS

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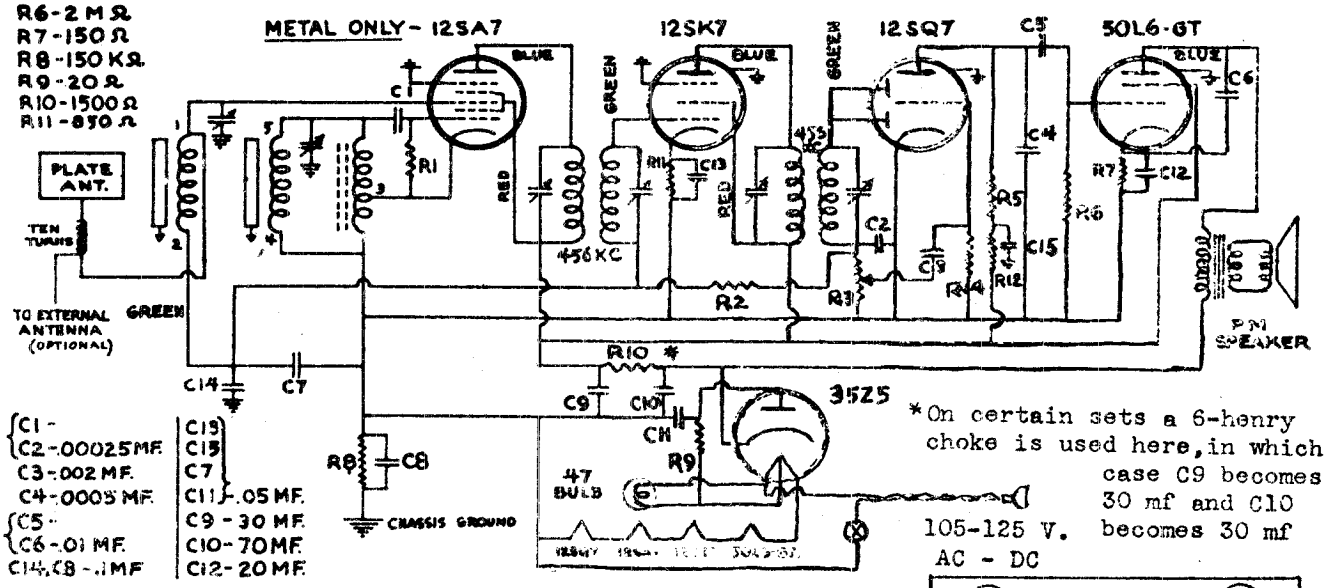
MODEL 501A

PROMENETTE RADIO & TELEV. CORP.

R1 - 20K Ω
R2 - 2M Ω
R3 - 500K Ω POT.
R4 - 470K Ω
R6 - 2 M Ω
R7 - 150 Ω
R8 - 150 KΩ
R9 - 20 Ω
R10 - 1500 Ω
R11 - 850 Ω
R5 - 1M Ω
R12 - 40K Ω



C1 -
C2 - .00025 MF.
C3 - .002 MF.
C4 - .0005 MF.
C5 -
C6 - .01 MF.
C14, C8 - .1 MF.
C13
C15
C7
C11 - .05 MF.
C9 - 30 MF.
C10 - 70 MF.
C12 - 20 MF.

*On certain sets a 6-henry choke is used here, in which case C9 becomes 30 mf and C10 becomes 30 mf

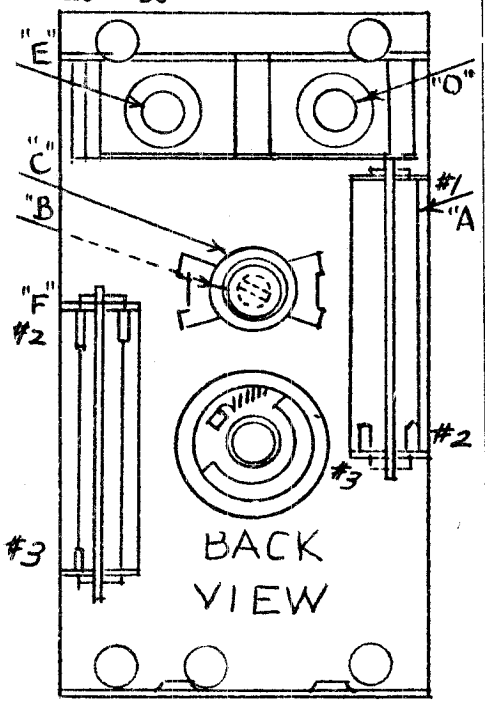
ALIGNMENT

Set volume control at maximum. Connect -B of chassis to ground post of signal generator through a 1-mf condenser. Connect output meter across output transformer secondary.

Dummy antenna --- 250-mmf condenser

Connect AVC diodes(4 and 5 on 12SQ7 tube base) to chassis ground through a 1-megohm resistor. Set signal generator to 456 kc. Feed signal to No.8 pin on 12SK7 through the dummy antenna.
Adjust trimmers on the output i-f transformer to maximum signal.
Remove signal from 12SK7 tube base and place on No.5 pin on 12SA7 socket.
Adjust trimmers on input i-f transformer for maximum signal.
For overall alignment of the i-f transformers, connect the signal generator to the external antenna and retune for maximum output.

For tracking of the oscillator and r-f coils and trimmers on the tuning assembly proper, proceed as follows:



Center pointer on the scale, making sure that it does not over-ride the scale on either end of the band.
Set pointer to 1400 kc on the dial scale. Set signal generator to 1400 kc.
Connect signal generator to external antenna lead. Do not use dummy antenna.
Adjust oscillator trimmer "E" until maximum output is obtained.
Adjust antenna trimmer "O" until maximum output is obtained.
Reset dial pointer to 750 kc and reset signal generator to 750 kc.
Adjust antenna coil "A"(by loosening screws and sliding the coil form either up or down) until maximum output is obtained.
Reset dial pointer and signal generator to 550 kc.
Adjust screw plunger "B" in the center oscillator coil "C".(Clockwise to raise frequency and counterclockwise to lower frequency.)

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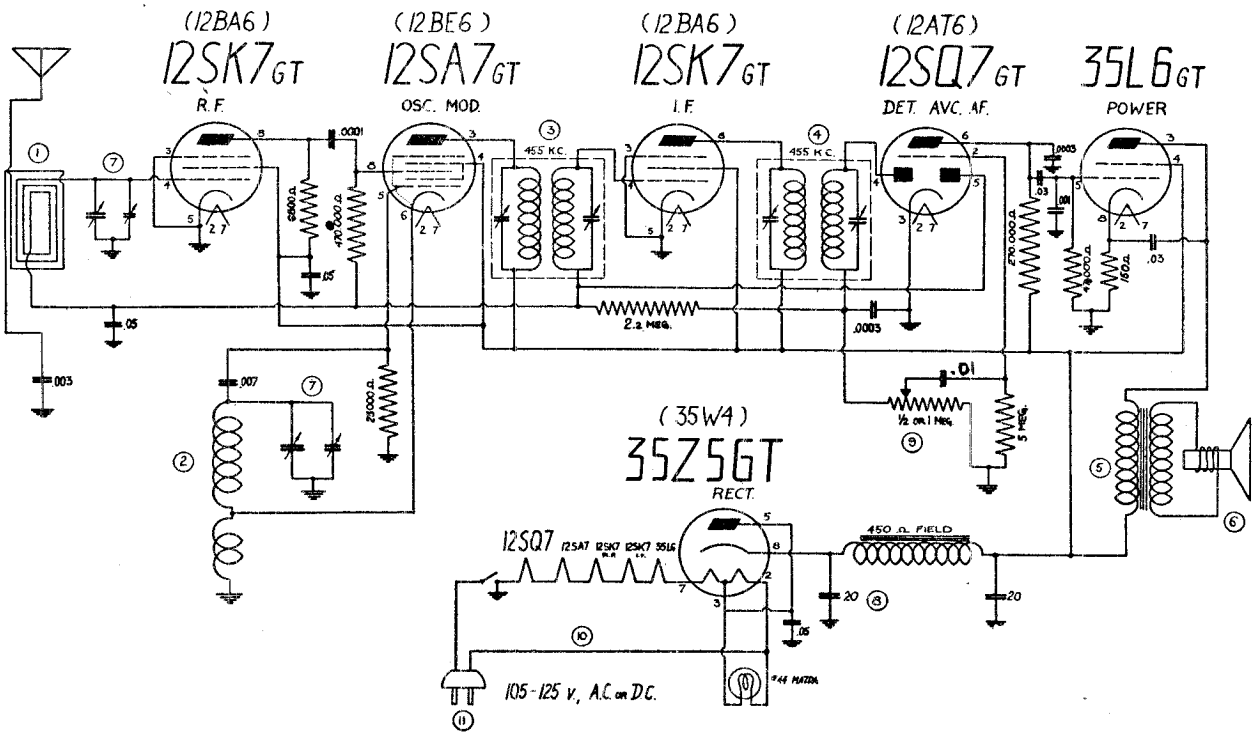
PURETONE RADIO CORP.



This model is a superheterodyne receiver for regular radio broadcast reception, using latest low drain tubes for low power consumption. A self-contained antenna loop is incorporated which makes the use of an outside antenna unnecessary in most localities. It will function on 105 to 125 volts, 40-60 cycles AC, or 105 to 125 volts DC. A range of 540 to 1600 kilocycles is covered by the receiver.

INSTALLATION

1. Make certain that all tubes are in their proper place and sit secure in their sockets. A sketch, showing their location will be found on this sheet. To exchange tubes, remove the antenna loop by unscrewing the 2 lower screws on the wooden bracket.

2. If found that additional radio signal pick-up is required than is obtained by the inbuilt antenna loop, it is advisable to attach an outdoor aerial to the flexible lead, extended from said loop antenna.

VOLUME CONTROL

The knob on the left hand side is the power switch and volume control. When the control is in the extreme counter-clockwise position the power is "off." From this position, a slight clockwise rotation turns the power "on," and rotating the knob in this direction will increase the volume until full output is obtained.

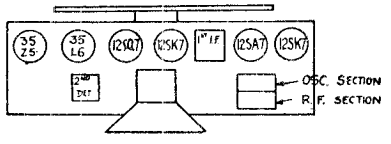
TUNING CONTROL

The knob on the right hand side is the tuning knob which operates the pointer and tuning condenser. A reduction drive insures easy and accurate selection of all stations within the range of the band. The pointer is phosphor luminous, and will maintain luminous power in the dark, when exposed regularly to bright daylight.

TO CALIBRATE RECEIVER

I. F. Connect antenna lead of the signal generator to R.F. section and ground lead of signal generator to receiver chassis. Connect an output meter across the voice coil. Rotate the volume control to maximum. Apply 455 K.C. signal to control grid of 12SK7 R.F. tube through a .05 capacitor. Second I.F. transformer to be aligned first, then 1st I.F. transformer, by adjusting trimmers.

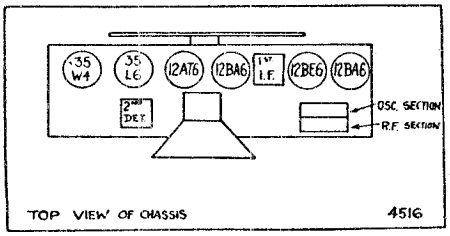
R.F. Connect antenna lead to antenna, and ground lead of signal generator to receiver chassis. Adjust both generator and receiver to 1600 K.C. Peak oscillator trimmer for maximum output. Set the signal and receiver dial to approximately 1300 K.C. Adjust the antenna trimmer for maximum output.



TOP VIEW OF CHASSIS 4506

LIST PRICES OF REPLACEMENT PARTS

Item NR.	Description	Price
4506-1	Antenna Loop	$1.10
4506-2	Oscillator Coil	.55
4506-3	First I.F. Transformer	.93
4506-4	Second I.F. Transformer	.93
4506-5	Output Transformer	1.50
4506-6	5 in. Dyn. Speaker, without output	3.50
4506-7	2 Gang Variable Condenser	2.50
4506-8	Condenser 20 MFD + 20 MFD, 150 V.	1.20
4506-9	Volume Control—Switch	1.25
4506-10	Line Cord without Plug	.25
4506-11	Plug	.20
4506-12	Cabinet Back Cover	.30
4506-13	Dial Scale	.45
4506-14	Pulley	.35
4506-15	Octal Socket	.15
4506-16	Pilot Lamp Socket	.40
4506-17	Knob (Walnut or Dark)	.20
4506-18	Bushing	.25
4506-19	Dial Pointer	.36
4506-20	Drive Spring and Cord	.25



TOP VIEW OF CHASSIS 4516

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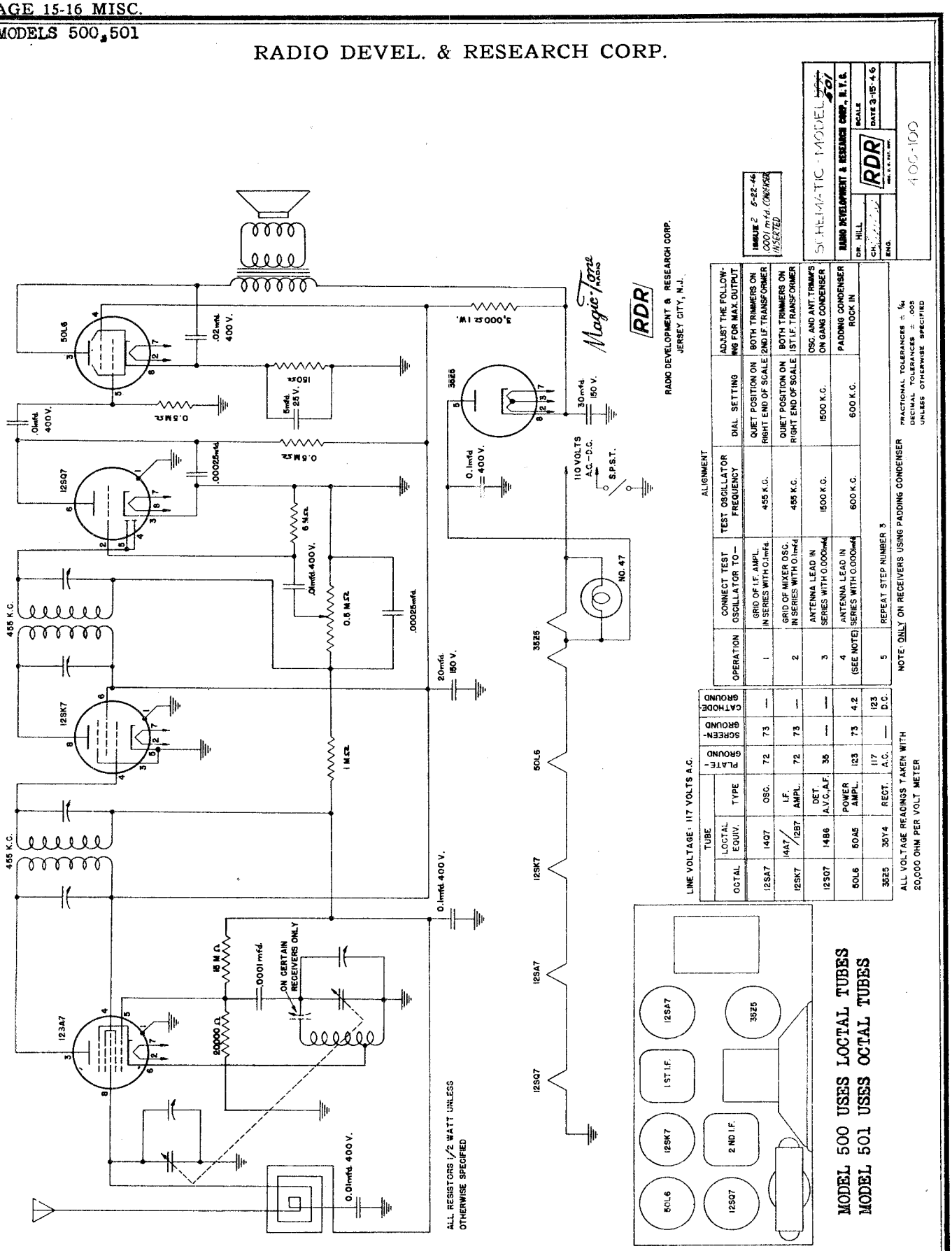
MODELS 500, 501

RADIO DEVEL. & RESEARCH CORP.



TUBE			PLATE-GROUND	SCREEN-GROUND	CATHODE-GROUND	OPERATION	CONNECT TEST OSCILLATOR TO—	TEST OSCILLATOR FREQUENCY	DIAL SETTING	ADJUST THE FOLLOWING FOR MAX. OUTPUT
OCTAL	LOCTAL EQUIV.	TYPE								
12SA7	1407	OSC.	72	73	—	1	GRID OF I.F. AMPL. IN SERIES WITH 0.1mfd.	455 K.C.	QUIET POSITION ON RIGHT END OF SCALE	BOTH TRIMMERS ON 2ND I.F. TRANSFORMER
12SK7	14A7/1287	I.F. AMPL.	72	73	—	2	GRID OF MIXER OSC. IN SERIES WITH 0.1mfd	455 K.C.	QUIET POSITION ON RIGHT END OF SCALE	BOTH TRIMMERS ON 1ST I.F. TRANSFORMER
12SQ7	1486	DET. A.V.C., A.F.	35	—	—	3	ANTENNA LEAD IN SERIES WITH 0.0001mfd	1500 K.C.	1500 K.C.	OSC. AND ANT. TRIMM'S ON GANG CONDENSER
50L6	50A5	POWER AMPL.	123	73	4.2	4 (SEE NOTE)	ANTENNA LEAD IN SERIES WITH 0.0001mfd	600 K.C.	600 K.C.	PADDING CONDENSER ROCK IN
3525	35Y4	RECT.	117 A.C.	—	123 D.C.	5	REPEAT STEP NUMBER 3			

ISSUE 2 5-22-46
.001 mfd. CONDENSER INSERTED

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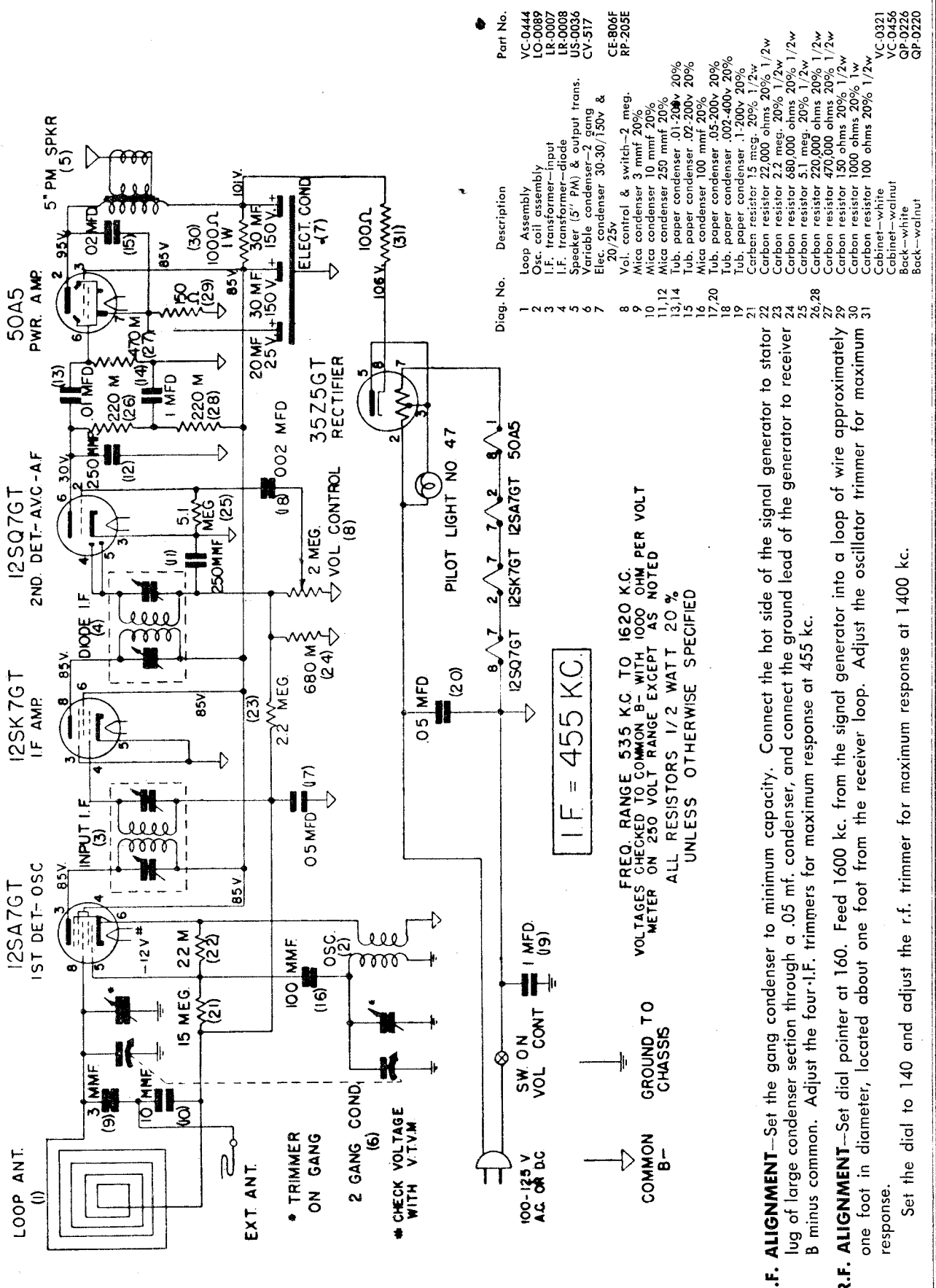
MODEL 546T

THE RAULAND CORP.


LOOP ANT. (1)
EXT. ANT.
* TRIMMER ON GANG
2 GANG COND. (6)
* CHECK VOLTAGE WITH V.T.V.M
100-125 V A.C. OR D.C.
SW. ON VOL CONT
COMMON B-
GROUND TO CHASSIS
12SA7GT 1ST DET- OSC
12SK7GT I.F. AMP.
12SQ7GT 2ND. DET- A.V.C.- A.F.
50A5 PWR. AMP.
35Z5GT RECTIFIER
5" PM SPKR (5)
ELECT. COND. (7)
VOL. CONTROL (8)
PILOT LIGHT NO 47
I.F. = 455 KC.
FREQ. RANGE 535 K.C. TO 1620 K.C.
VOLTAGES CHECKED TO COMMON B- WITH 1000 OHM PER VOLT METER ON 250 VOLT RANGE EXCEPT AS NOTED
ALL RESISTORS 1/2 WATT 20 % UNLESS OTHERWISE SPECIFIED

Diag. No.	Description	Part No.
1	Loop Assembly	VC-0444
2	Osc. coil assembly	LO-0089
3	I.F. transformer—input	LR-0007
4	I.F. transformer—diode	LR-0008
5	Speaker (5" PM) & output trans.	US-0036
6	Variable condenser—2 gang	CV-517
7	Elec. condenser 30-30/150v & 20/25v	CE-806F RP-205E
8	Vol. control & switch—2 meg.	
9	Mica condenser 3 mmf 20%	
10	Mica condenser 10 mmf 20%	
11,12	Mica condenser 250 mmf 20%	
13,14	Tub. paper condenser .01-200v 20%	
15	Tub. paper condenser .02-200v 20%	
16	Mica condenser 100 mmf 20%	
17,20	Tub. paper condenser .05-200v 20%	
18	Tub. paper condenser .002-400v 20%	
19	Tub. paper condenser .1-200v 20%	
21	Carbon resistor 15 mcg. 20% 1/2w	
22	Carbon resistor 22,000 ohms 20% 1/2w	
23	Carbon resistor 2.2 meg. 20% 1/2w	
24	Carbon resistor 680,000 ohms 20% 1/2w	
25	Carbon resistor 5.1 meg. 20% 1/2w	
26,28	Carbon resistor 220,000 ohms 20% 1/2w	
27	Carbon resistor 470,000 ohms 20% 1/2w	
29	Carbon resistor 150 ohms 20% 1/2w	
30	Carbon resistor 1000 ohms 20% 1w	
31	Carbon resistor 100 ohms 20% 1/2w	
	Cabinet—white	VC-0321
	Cabinet—walnut	VC-0456
	Back—white	QP-0226
	Back—walnut	QP-0220

I.F. ALIGNMENT—Set the gang condenser to minimum capacity. Connect the hot side of the signal generator to stator lug of large condenser section through a .05 mf. condenser, and connect the ground lead of the generator to receiver B minus common. Adjust the four I.F. trimmers for maximum response at 455 kc.

R.F. ALIGNMENT—Set dial pointer at 160. Feed 1600 kc. from the signal generator into a loop of wire approximately one foot in diameter, located about one foot from the receiver loop. Adjust the oscillator trimmer for maximum response.

Set the dial to 140 and adjust the r.f. trimmer for maximum response at 1400 kc.

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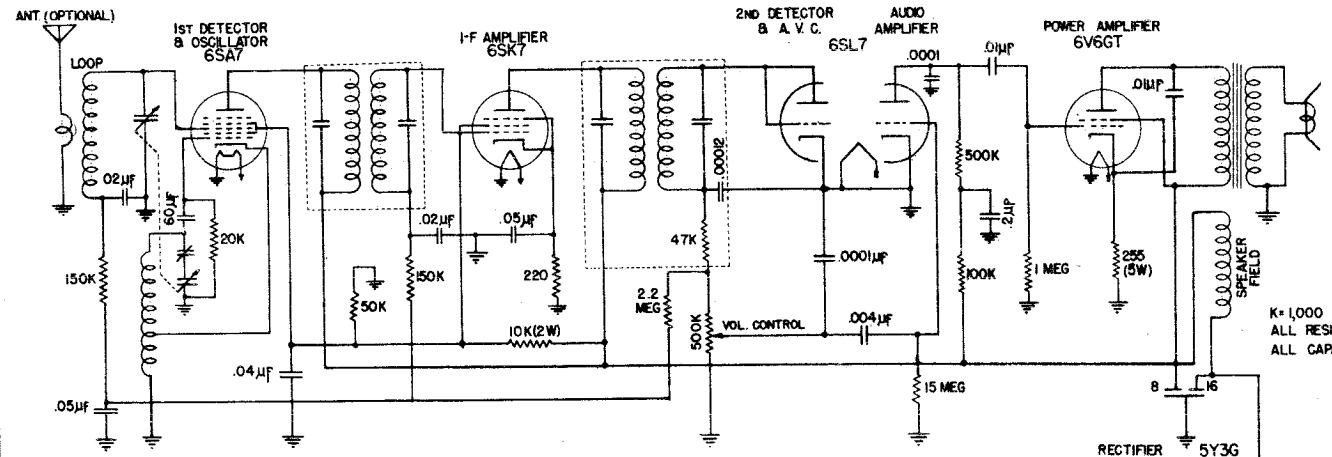
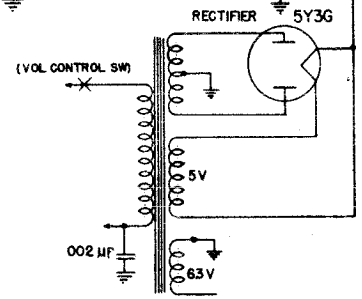




IF PEAK
455 KC

HOW TO SET PUSH BUTTONS TO FAVORITE STATIONS

1. Turn radio set on and allow it to warm up for at least 15 minutes. This is important.

2. Tune in one particular station carefully with tne tuning control. Reduce the volume with the volume control and make sure that the tuning control is set so that the station is as loud and clear as possible.

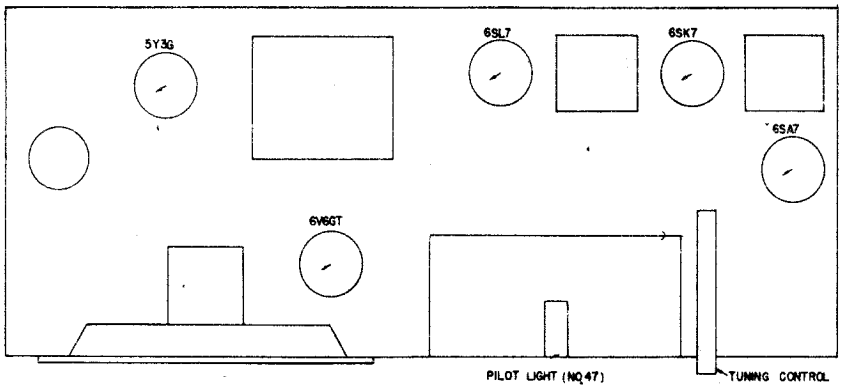
3. Unscrew the first button two full turns counterclockwise. Hold the tuning control in its exact position on the station.

4. Push the button all the way in and, while holding the tuning control rigidly, screw in the button clockwise tightening it securely.

5. Check as follows: Detune the station with the manual tuning control; then push the button all the way in to tune in the station.

6. If the station is not tuned as loudly and clearly as possible, readjust as indicated in steps 2, 3, 4, and 5.

7. Readjust the other buttons, each for a different station, in the same manner.



TUBE LOCATIONS

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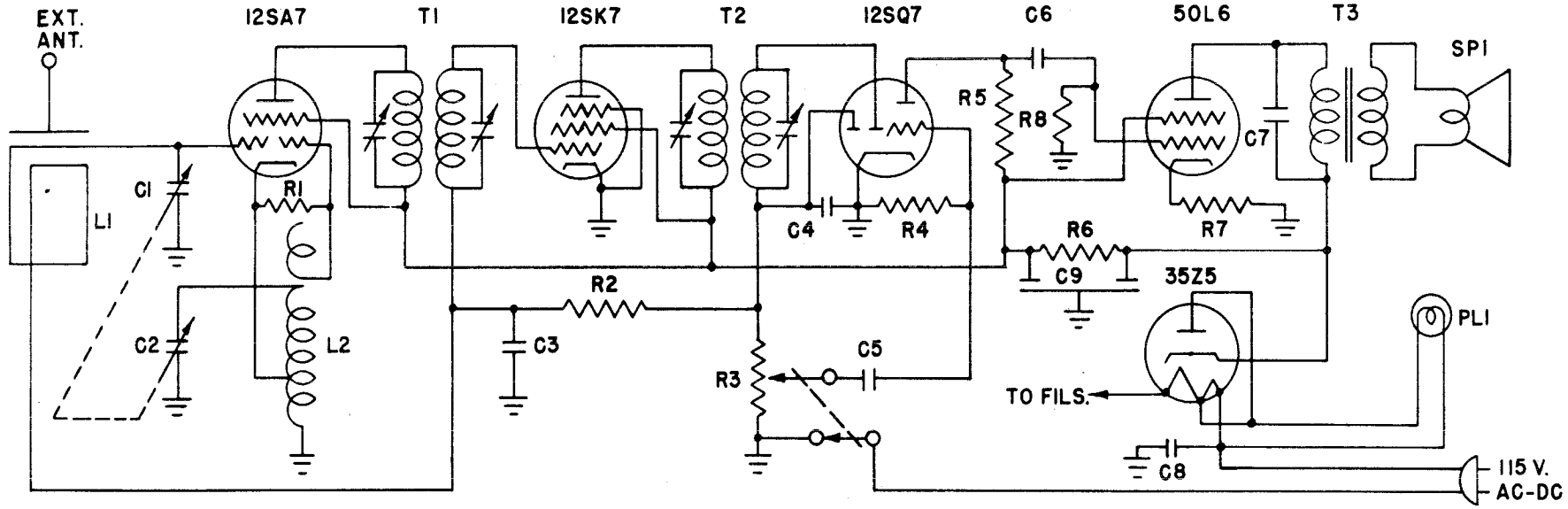
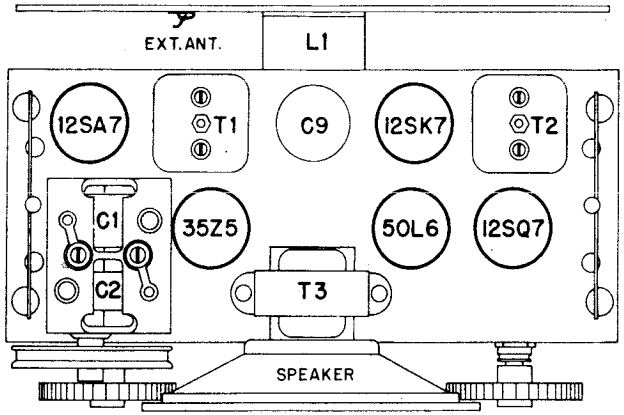


R 1 - 25M OHMS 1/3 WATT RESISTOR
R 2 - 5MEG " " " "
R 3 - 500M " POT. WITH SWITCH
R 4 - 5MEG " 1/3 WATT RESISTOR
R 5 - 200M " " " "
R 6 - 1200 " 1/2 " "
R 7 - 150 " " " "
R 8 - 500M " 1/3 " "

C 1 - ANT. SECTION GANG CONDENSER
C 2 - OSC. " " "
C 3 - .05 MFD. 200 V. CONDENSER
C 4 - .00025 MFD. 500 V. CONDENSER
C 5 - .006 MFD. 500 V. CONDENSER
C 6 - .01 " 400 V. "
C 7 - .02 " " "
C 8 - .05 " " "

C 9 - 50-50 MFD. 150 V. CONDENSER
L 1 - LOOP ANTENNA
L 2 - OSC. COIL
T 1 - 465KC. I. F. TRANSFORMER
T 2 - " " " "
T 3 - OUTPUT TRANSFORMER
PL1 - NO. 44 PILOT LIGHT
SP1 - 5" P.M. SPEAKER

IF PEAK 465 KC



SETCHELL-CARLSON, INC.
2233 UNIVERSITY AVE. ST. PAUL 4, MINN.

SCHEMATIC DIAGRAM MODEL NO. 416

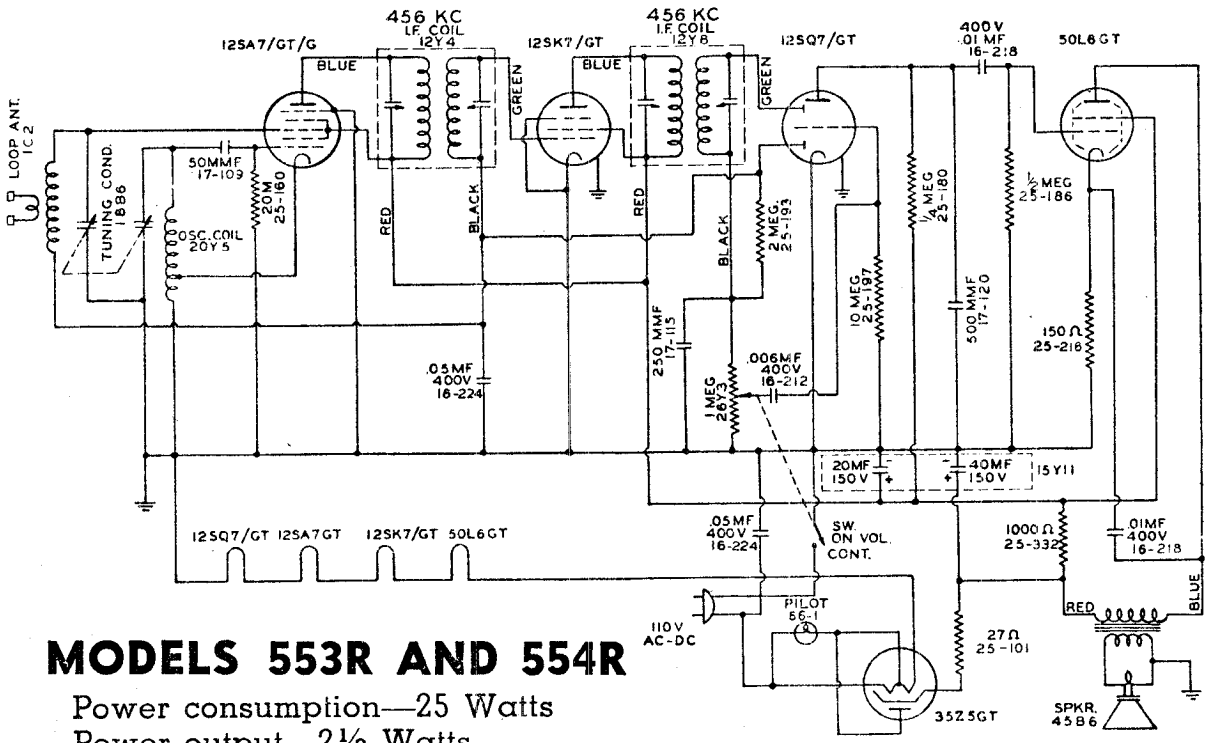
MATERIAL

DATE 11-21-45 DR. BY S.A.C.

SCALE NONE CKD. BY B.T.S.

SETCHELL CARLSON INC.

SHERIDAN ELECTRONICS CORP.

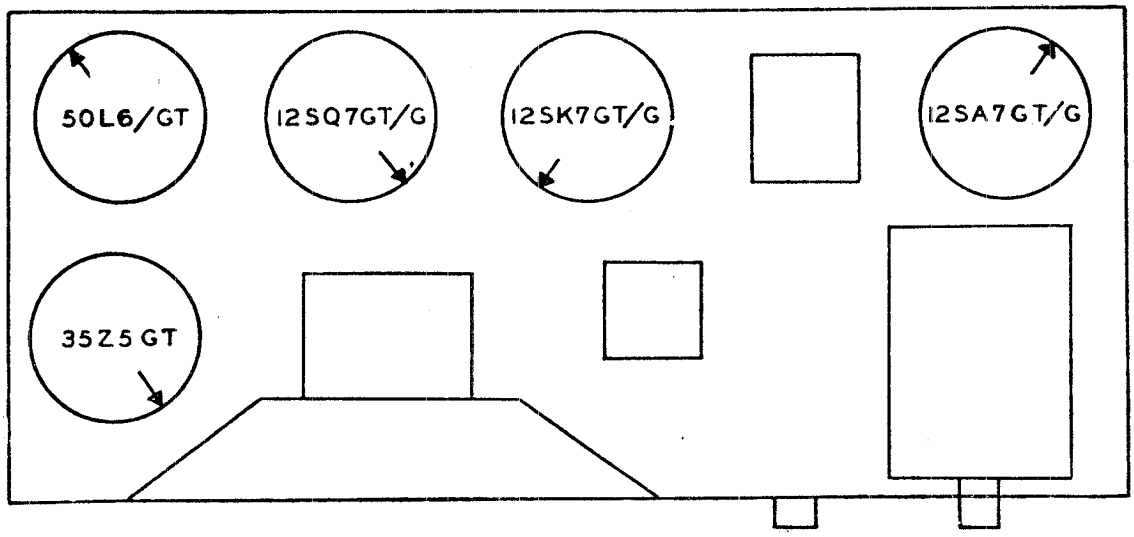


MODELS 553R AND 554R

Power consumption—25 Watts
Power output—2½ Watts
Intermediate frequency—456KC

PARTS LIST

PART NO.	DESCRIPTION	PART. NO.	DESCRIPTION
1C2	Loop antenna assembly	26Y3	Vol. cont. & Switch 1 megohm
18B6	Tuning gang condenser	20Y5	Oscillator coil
12Y4	1st I.F. transformer 456KC	45B6	5" PM dynamic speaker
12Y8	2nd I.F. transformer 456KC	66-1	Pilot lamp 6-8 volt type 47
15Y11	Two section electrolytic cond.		



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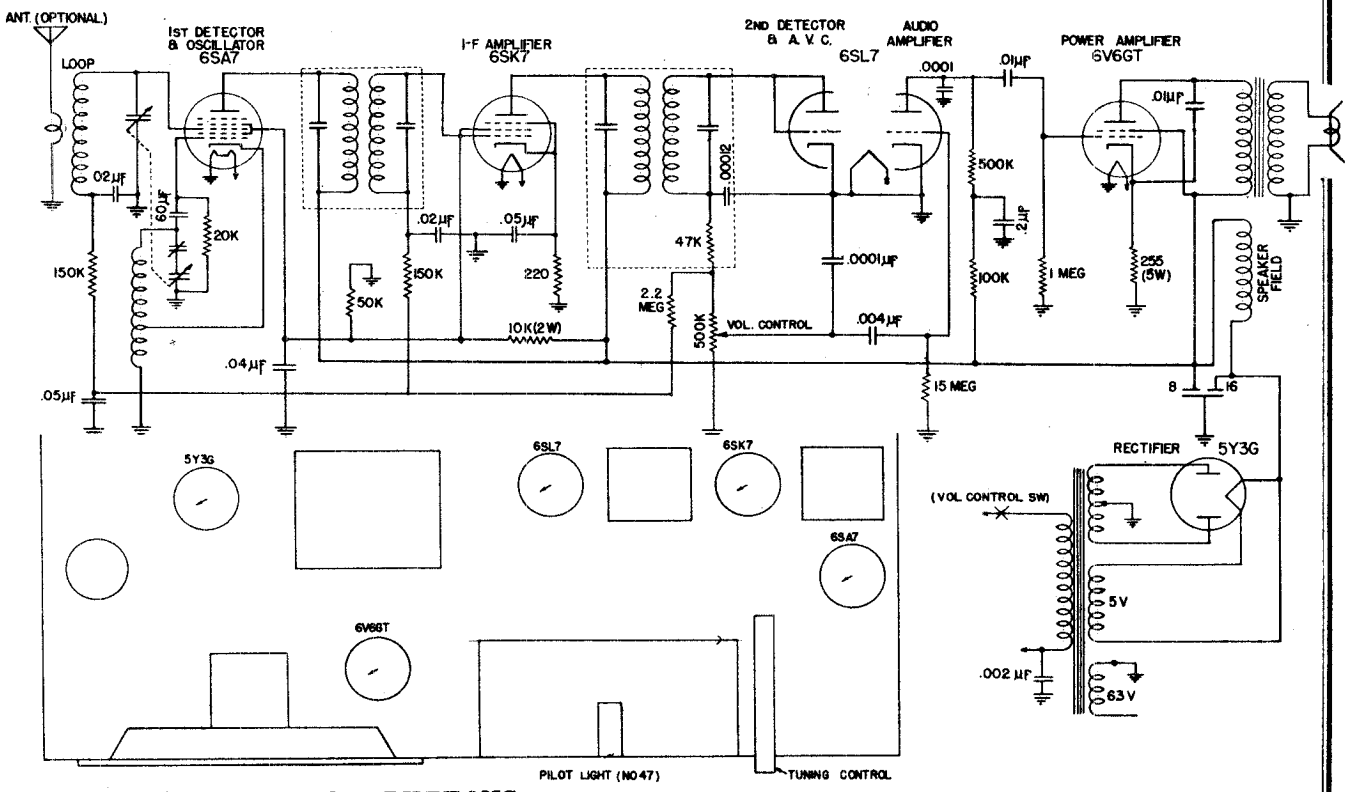
STANLEY SERVICE STATION



K= 1,000
ALL RESISTORS 1/3 WATT UNLESS OTHERWISE SPECIFIED
ALL CAPACITORS 400 VOLT RATING

HOW TO SET PUSH BUTTONS

1. Turn radio set on and allow it to warm up for at least 15 minutes. This is important.

2. Tune in one particular station carefully with the tuning control. Reduce the volume with the volume control and make sure that the tuning control is set so that the station is as loud and clear as possible.

IF PEAK
455 KC

3. Unscrew the first button two full turns counterclockwise. Hold the tuning control in its exact position on the station.

4. Push the button all the way in and, while holding the tuning control rigidly, screw in the button clockwise tightening it securely.

5. Check as follows: Detune the station with the manual tuning control; then push the button all the way in to tune in the station.

6. If the station is not tuned as loudly and clearly as possible, readjust as indicated in steps 2, 3, 4, and 5.

7. Readjust the other buttons, each for a different station, in the same manner.

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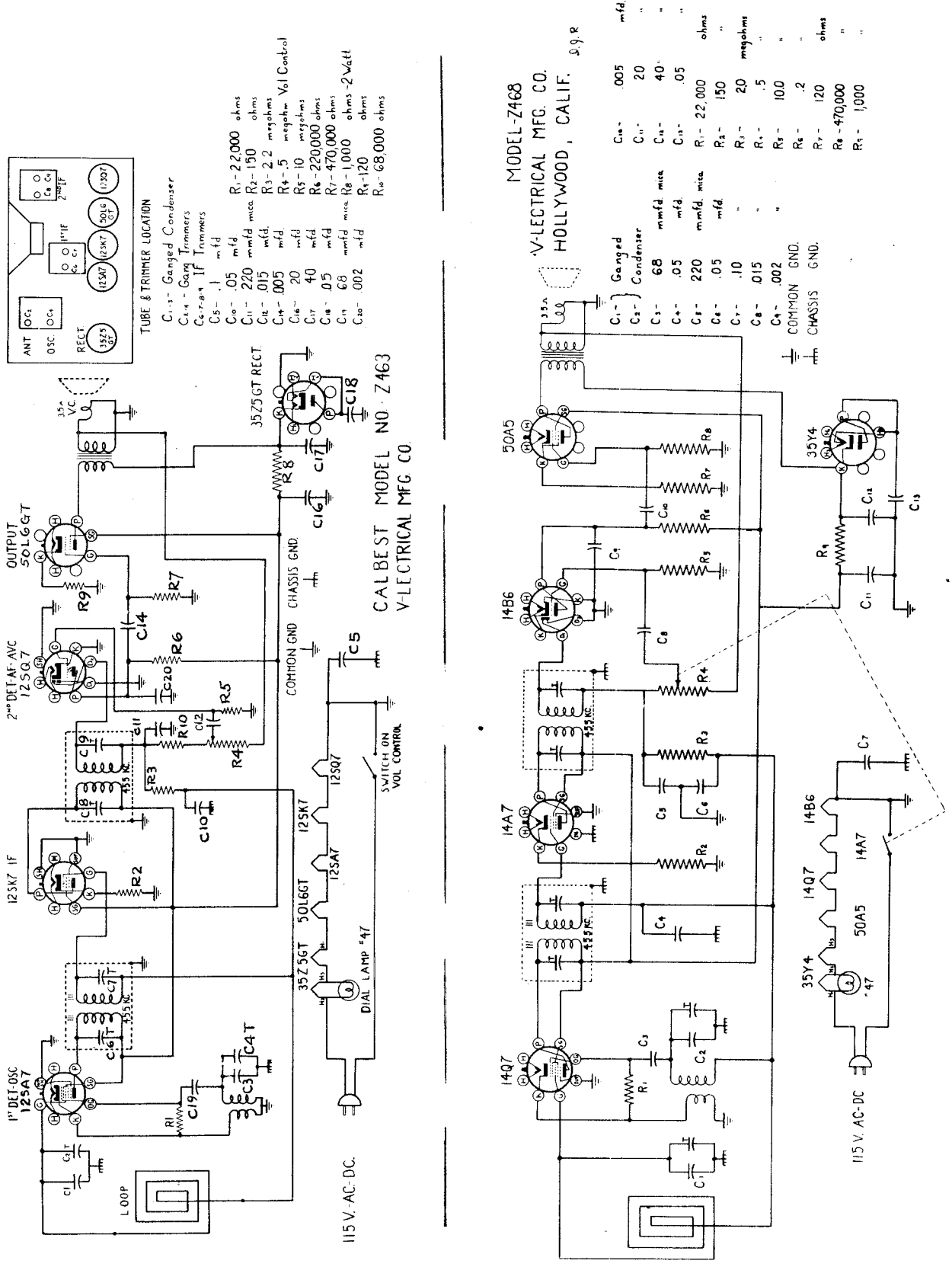
MODEL Z463
MODEL Z468

V-LECTRICAL MFG. CO.



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RC150 RECORD CHANGER

IMPORTANT: This manual does not apply to later Record Changers which are similar in appearance. The RC150 can be easily identified by removing the cover assembly (1) and noting the adjusting screws (10).

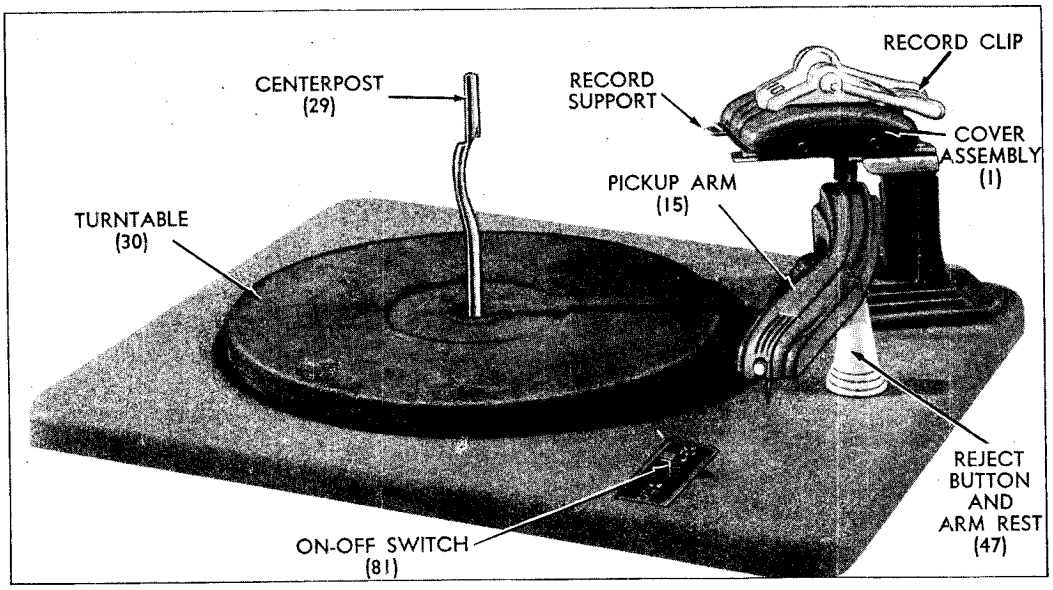

FIGURE 1. RECORD PLAYER, TOP VIEW

OPERATING INSTRUCTIONS

1. SETTING FOR SIZE OF RECORD.

The size of record for which the record changer is set to play is indicated by the number (on the top of the cover assembly) nearest the turntable. See Figure 1.

To change the setting, grasp the record support and cover assembly (1) and rotate it a half turn until it snaps into place with the correct record size toward the turntable. If the record support does not turn all the way around easily, return it to its previous position, and turn on the record changer until the pickup arm moves to its playing position. Turn the record changer off, and lift the pickup arm back to the arm rest. You should now be able to turn the record support to the correct position.

2. STARTING THE RECORD CHANGER.

Before starting the record changer, be sure to set the record clip so that it rests on the top record. Throw the switch to the "ON" position. Then firmly push down on the top of the pickup arm momentarily. This presses down on the reject button and starts a change cycle.

3. STOPPING AND UNLOADING.

(a) After you have finished playing the last record, allow the mechanism to go through its change cycle and begin playing the last record over again. Throw the switch to the "OFF" position and lift the pickup arm over to the arm rest. Turn the record clip to the position furthest away from the turntable.

(b) While holding the records loosely, lift the entire stack straight up, making sure the records are horizontal. This is important because tilting the records or holding them tightly may cause them to bind. The removal of records is made easier by rotating the record support a quarter turn.

CAUTIONS

1. **Never use force to stop the motor or turntable.**
2. **Do not turn off the record changer while it is going through its change cycle but wait until it is playing a record.**
3. **The record changer should always be level when in use.**
4. **When turning the record support, be sure to grip the entire record support and cover assembly and not just the plastic record clip.**

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MODEL RC150

ADMIRAL CORPORATION

SERVICE INSTRUCTIONS

IMPORTANT: After the record changer or player is repaired, press down the reject button to minimize the danger of damaging the equipment during shipment.

4. DESCRIPTION OF CHANGE CYCLE.

(See Figures 3, 4, 6.)

As the pickup arm moves toward the center of the record, the retaining lever roller (59A) on the end of the trip linkage assembly (59) [which is connected to the pickup arm through the guide pin assembly (25) and lift guide assembly (26)] is gradually withdrawn from behind the stop bracket (40) on the eccentric cam (39). The cam, which no longer is held in place by the retaining lever roller (59A) is pulled over by the eccentric cam spring (43) until the rubber tire makes contact with the knurled roller (66) on the turntable shaft (30A). This knurled roller, which is driven by the turntable shaft, rotates the eccentric cam. This, in turn, will force the riser-plate assembly (60) back along its guide rods (65A) away from the centerpost. As soon as the riser plate begins to move back, the lower lift rod (24) will ride up the inclined surface and cause the pickup arm to be raised clear of the record. Then the motion bracket (60A) on the riser plate contacts the stop arm (59B) of the trip linkage assembly and pushes it back away from the centerpost. This motion of the stop arm (a) carries the pickup arm away from the centerpost and clear of the edge of the turntable; and (b) rotates (counterclockwise) the guide pin assembly (25), which is coupled through the upper lift rod and guide plate assembly (14) to the push-off arm (5). This push-off arm, which has also been raised by the vertical motion of the lower lift rod (24) so that it is in line with the set-down point adjusting screw (10), will push against the screw and cause the push plate (7B) to move forward at the instant that the needle is over the set-down point. Then the push plate will begin to push off the bottom record to the turntable. The pressure of the push plate springs (8 or 8X) will return the push plate (7B) to its normal position and at the same time force the push-off arm (5) back. This, in turn, will move the pickup arm to its playing position directly above the record and return the trip linkage assembly (59) to its normal position. The riser-plate assembly (60) which is propelled toward the centerpost by the guide rod recoil spring (36), will continue to slide forward at the same time that the eccentric cam (39) is completing its revolution. As the riser plate approaches the end of its travel, the lower lift rod (24) slides back down the inclined surface and drops the pickup arm onto the record. As the eccentric cam aided by the eccentric cam spring (43) completes its revolution, the rubber tire of the cam moves away from the knurled roller (66) on the turntable shaft and the stop bracket (40) comes to rest against the retaining lever roller (59A) of the trip linkage assembly. The change cycle is completed.

When the reject button is pressed, the reject trigger wire (50) pulls the trigger (54), releasing the reject slide (51A). As the reject slide is pulled forward by its spring (52) it carries with it the stop arm (59B) of the trip linkage assembly. This starts a change cycle in exactly the same manner as if the pickup arm had been moved to the centerpost. During the next cycle, the reject slide (51A) is forced back by the riser plate motion bracket (60A) and again locked in position by the reject trigger (54).

TOOLS REQUIRED

(Order from your Admiral distributor only)

#6 Bristol Set Screw Wrench (Admiral Part No. P-5805. List Price $0.05)

#8 Bristol Set Screw Wrench (Admiral Part No. P-5806. List Price $0.05)

1/4 inch open end wrench } Two separate wrenches required. Can order
3/16 inch open end wrench } two Admiral Part No. P-5807. Net price $0.35 each.

CAUTION

1. **Do not remove the turntable unless it is absolutely necessary. If its removal is required, take out the centerpost and loosen the set screw in the knurled roller (66) before carefully lifting the turntable.**

2. **See that the drive pulley (73A) and rubber tires on the idler wheel (74) and eccentric cam are kept clean and free from oil, grease, dirt, or any foreign material. Carbona or carbon tetrachloride may be used for cleaning these parts.**

3. **If replacement of any parts requires the removal of the push-off arm (5) or guide pin assembly (25), be sure to re-position or replace these parts as directed in paragraphs 8 and 9 respectively.**

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ADJUSTMENTS

5. SET-DOWN POINT (See Figure 2).

Check paragraphs 12, 13 and 14 before making this adjustment.

Remove the cover assembly (1) by prying out the four round clips (2) at the lower edge of the cover. If the set screws in the push-off arm (5) are loose, see paragraph 8. If they are tight, adjust the set-down point for both ten-inch and twelve-inch records as follows:

(a) Turn the record support to the ten-inch position, place a ten-inch record on the turntable, and turn on the changer. Allow it to go through a change cycle by moving the pickup arm toward the center of the record. *Do not use the reject button.* Note the point on the record at which the needle first makes contact. This point should be 4⅝ inches from the side of the centerpost.

(b) If the set-down point is not correct, loosen the hex lock nut (9) on the set-down point adjusting screw (10) nearest the centerpost. Turn the screw clockwise if the set-down point is less than 4⅝ inches from the centerpost, and counterclockwise if the set-down point is more than 4⅝ inches from the centerpost. One full turn of the screw will move the set-down point about 7/32 inch.

(c) Tighten the hex nut (9), turn on the changer, and allow it to go through a change cycle, again noting the point at which the needle first touches the record.

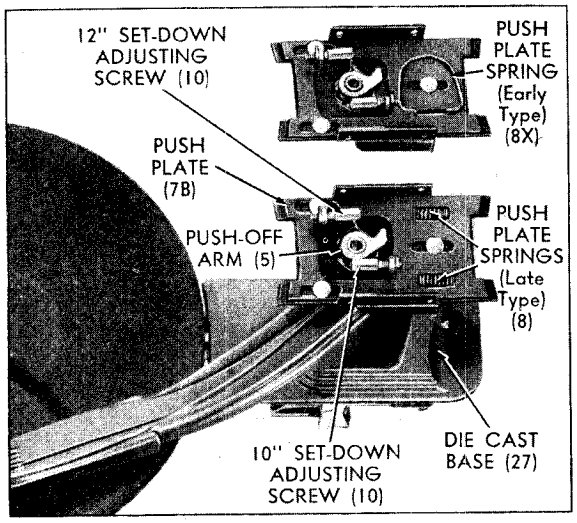
12" SET-DOWN ADJUSTING SCREW (10)
PUSH PLATE SPRING (Early Type) (8X)
PUSH PLATE (7B)
PUSH-OFF ARM (5)
PUSH PLATE SPRINGS (Late Type) (8)
10" SET-DOWN ADJUSTING SCREW (10)
DIE CAST BASE (27)

FIGURE 2. RECORD CHANGER, TOP VIEW SHOWING LOCATION OF PARTS

If the set-down point is still incorrect, repeat the above procedure.

(d) Rotate the record support to the twelve-inch position and place a twelve-inch record on the turntable. Repeat the above procedure to adjust the changer for the twelve-inch set-down point, using the other set-down point adjusting screw (10). Adjust it so that needle first touches the record 5⅝ inches from the side of the centerpost.

(e) Check the set-down points using the reject button. If satisfactory, seal the adjustments with a drop of speaker cement. If not, see paragraph 13.

NOTE

When replacing the cover assembly (1) be sure that the indicated record size corresponds to the size for which the record support is set.

6. PICKUP POINT (See Figure 3).

Adjust the pickup point by turning the pickup point adjusting screw (42) on the bottom of the eccentric cam (39). Turn the screw clockwise to delay the pickup point and counterclockwise to hasten it. The change cycle should start when the needle is 1⅝ inches from the side of the centerpost. After properly making this adjustment, seal it with speaker cement.

7. PICKUP ARM HEIGHT.

To vary the height of the pickup arm, adjust the knurled head adjusting screw (20) under the pickup arm (see figure 3). However, check and see if the needle (⅝ inch recommended) is set into the pickup cartridge as far as possible. The proper height of the needle, with the pickup arm hanging free, is 1/16 inch below the top of the turntable.

(a) If pickup arm is raised too high and does not properly make contact with a single record, turn the adjusting screw (20) in a clockwise direction until the pickup arm is at the proper height.

(b) If pickup arm is not raised high enough and results in either needle back-scratch or failure of the pickup arm to clear the arm rest (47), turn the knurled head adjusting screw (20) counterclockwise until the pickup arm is raised to the required height. Back-scratch may sometimes be eliminated by replacing an extra-long needle with a ⅝-inch needle.

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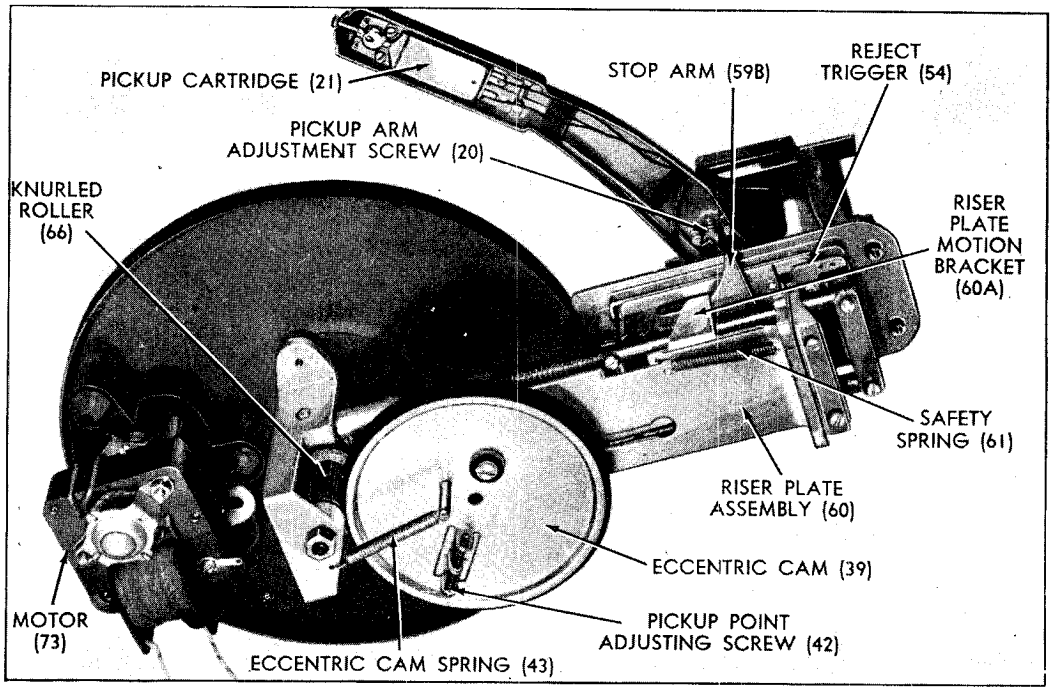

FIGURE 3. RECORD CHANGER, BOTTOM VIEW SHOWING LOCATION OF PARTS

SERVICING AND REPAIR

8. RE-POSITIONING PUSH-OFF ARM (Figures 2 and 4).

This must be carefully done if set screws are loose or push-off arm has been removed.

(a) Loosen the two set screws in the push-off arm (5) with the No. 6 Bristol wrench.

(b) Turn the record support to the 12-inch position.

(c) Place a 12-inch record on the turntable.

(d) Move the pickup arm to the centerpost. Rotate turntable by hand in its normal direction until the needle is directly over the point on the edge of the record at which it would set down at the beginning of the next playing cycle. Be sure the pickup arm is stopped when it is moving *away* from the centerpost.

(e) Set the point of the push-off arm (5) in light contact with and slightly below the center of the 12-inch set-down point adjusting screw (10). Now tighten both of the push-off arm set screws.

(f) Re-adjust the set-down points for both the 10-inch and 12-inch positions as outlined in paragraph 5.

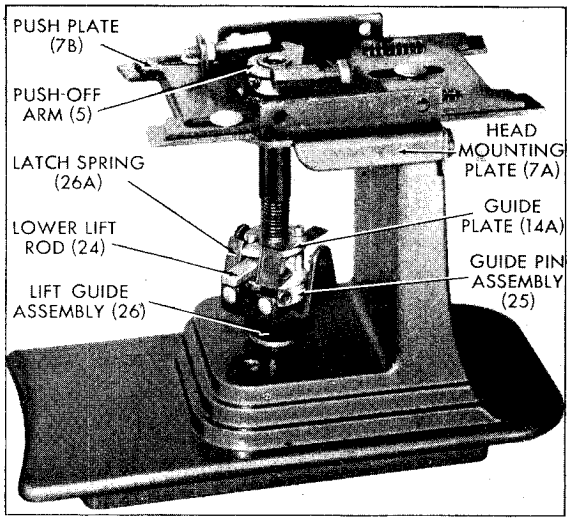

FIGURE 4. PUSH-OFF ARM, UPPER LIFT ROD, AND GUIDE PIN ASSEMBLY

9. RE-POSITIONING GUIDE PIN ASSEMBLY (Figure 5).

This must be carefully done if set screws are loose or guide pin assembly has been removed.

(a) Carefully remove the head assembly (7) as well as the upper lift rod and guide plate assembly (14) by taking out the two binder head screws (28) near the top of the die cast base (27).

(b) Remove the pickup arm by prying the pivot spring (17) away from the pins on the lift guide assembly (26).

(c) Press the reject button, and rotate turntable by hand in its normal direction until the riser plate assembly (60) underneath the changer (see figure 3) is moved to that point of its travel most distant from the centerpost. Rotate the turntable until the riser plate assembly goes back slightly (not over 1/32 inch).

(d) With the thumb of the left hand, push the stop arm (59B) as indicated at point "A" (figure 5) against the riser plate motion bracket (60A) and upward toward the base (27).

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SERVICING AND REPAIR (Continued)

(e) Rotate the lift guide assembly (26) counterclockwise until it strikes the stop pin (27A) projecting from the base. Also rotate the guide pin assembly (25) counterclockwise as far as it will go until it strikes against the lower lift rod assembly (24).

(f) Maintain these positions as well as that of the stop arm (59B) of the trip linkage assembly (step d). Now press down on the guide pin assembly (25) as indicated at points "B" (figure 5) with the index finger of the right hand so as to leave very little play between the lift guide assembly (26) and the die cast base (27), and tighten the set screw in the guide pin assembly with the thumb and second finger of the right hand. While tightening this set screw, exert pressure on the Bristol wrench in a counterclockwise direction as indicated at "C" (figure 5). Then tighten the other set screw.

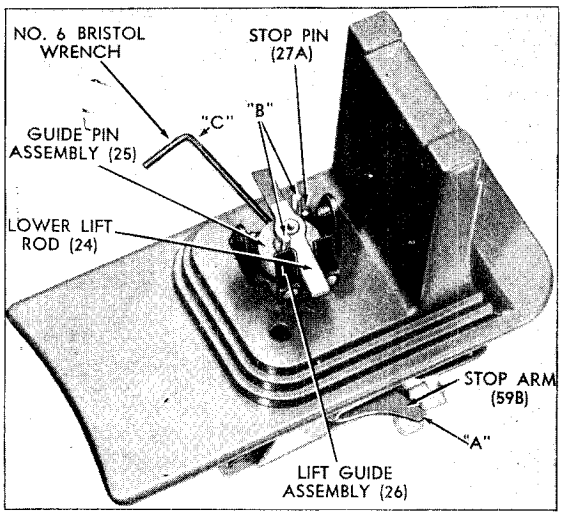

FIGURE 5. RE-POSITIONING GUIDE PIN ASSEMBLY

10. TURNTABLE FAILS TO ROTATE.

Check the following:

(a) Turntable may have worked up, allowing idler wheel (74) to slip out from under it. To correct this, press the idler wheel back in place with a screw-driver, and push the turntable down over it. To remove any play, loosen the set screw in the knurled roller (66), move the roller up on the turntable shaft (30A), and tighten the set screw.

(b) Changer may have been turned off during a change cycle. To start, rotate turntable by hand. Always allow the changer to complete a change cycle before turning it off.

(c) The motor mounting plate may be bent. Correct by removing motor and straightening plate; in some cases it may be necessary to install a new motor.

(d) The idler wheel mounting plate may be caught between the motor mounting plate and the top panel. It may be necessary to raise the motor by removing a shim washer from each of the three mounting screws (78).

(e) Motor may be stalled because its shaft is binding against the upper bearing. Due to some physical shock, the rotor has been forced against the upper bearing to the point where the tapered shoulder on the rotor shaft binds in the bearing itself. This condition may be corrected by dropping the entire changer gently to the surface of a table, thereby forcing the rotor away from the upper plate; or the rotor may be carefully pried down from the upper bearing with a screw-driver.

(f) Motor may be defective. Replace motor.

(g) Turntable shaft (30A) binds. Binding may result if the turntable has ever been removed. Check to see if a burr on the turntable shaft has scored the upper bearing in the turntable mounting (65).

Binding may also result if the turntable shaft (30A) fits too tightly into the bearing of the turntable mounting (65). To rectify this condition, remove turntable, clean the shaft with a piece of extremely fine emery cloth or polishing paper, and file off the burr left by the set screw. Also use a smooth blade of a pocket knife and carefully scrape out the bearing to remove loose zinc particles. Clean bearing and shaft with a solvent such as Carbona or lacquer thinner. Lubricate with a thin film of grease and re-assemble. DO NOT USE EMERY CLOTH OR ANY OTHER ABRASIVE ON THE BEARING.

11. PICKUP ARM REMAINS AT REST POSITION AFTER CHANGER BEGINS ITS CHANGE CYCLE OR REJECT BUTTON HAS BEEN PUSHED.

(a) If turntable is rotating, check for loose set screws in the push-off arm (5). To re-position the push-off arm follow the instructions given in paragraph 8.

(b) If the turntable is rotating, see if the brazed guide plate (14A) has come loose from the upper lift rod. If it has, replace the upper lift rod and guide plate assembly (14).

12. THE 12-INCH SET-DOWN POINT DIFFERS WITH COVER ASSEMBLY OFF AND ON.

The 12-inch set-down point adjusting screw (10) may be touching the cover assembly (1) during the change cycle. Correct by filing down the end of the screw until it clears.

13. PICKUP ARM SET-DOWN POINT DIFFERS FOR MANUAL REJECTION AND AUTOMATIC CYCLE.

(a) Latch spring (26A) requires adjustment. Raise the pickup arm and bend the left leg of flat "U"-shaped latch spring back as far as possible with a screw-driver so that the lip of the guide plate (14A) will engage the latch spring (26A). See figure 4.

(b) Loose or improperly set push-off arm (5). To re-position, see paragraph 8.

(c) Loose or improperly set guide pin assembly (25). To re-position, see paragraph 9.

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MODEL RC150

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SERVICING AND REPAIR (Continued)

14. SET-DOWN POINT IS ERRATIC ON BOTH 10-INCH AND 12-INCH RECORDS.

(a) Push plate springs (8 or 8X) may not provide sufficient tension. There should be no "slop" in the head assembly (7) between cycles. If there is any play, replace the push plate springs. See figure 2.

(b) Loose push-off arm (5). To re-position, see paragraph 8.

(c) Loose guide pin assembly (25). To re-position, see paragraph 9.

15. BOTTOM RECORD OF STACK FAILS TO DROP TO TURNTABLE.

(a) Check for a warped record and also see that the record clip (figure 1) is resting on the top record of the stack.

(b) If the record is not warped, and if the record clip is in the proper position, see if centerpost is bent toward the record support (see paragraph 16).

(c) Push plate (7B) may be inoperative. Check the push-off arm (5). If it is loose, re-position per instructions in paragraph 8.

16. CHECKING FOR A BENT CENTERPOST.

With a properly aligned centerpost, a new record (one whose center hole is not worn or enlarged), when pushed all the way into the offset on the centerpost, will rest on the record support and clear the push plate (7B) by 1/32 inch. This measurement should NOT be made during a change cycle because the push plate leaves its normal rest position and moves toward the centerpost to drop a record to the turntable.

If the clearance between the record and the pusher is not 1/32 inch or if the record rests unevenly on the record support, bend the centerpost until the proper clearance is obtained. When bending the centerpost, do not apply pressure above the offset or it may break.

17. RECORD SUPPORT CANNOT BE ROTATED FOR SIZE CHANGE.

Changer may have been turned off during a change cycle. Return the record support to its original position, start changer, and allow it to complete the change cycle. Turn the changer off and return the pickup arm to its rest position. The record support may now be rotated for size change.

18. CHANGER STARTS TO CYCLE WHEN RECORD SUPPORT IS ROTATED FOR SIZE CHANGE.

The push-off arm (5) is being tripped by the set-down point adjusting screw (10). This can be corrected by bending the adjusting screw upward until it clears the push-off arm, except during a change cycle. Now re-adjust set-down points as described in paragraph 5.

19. CHANGER WILL NOT GO INTO CHANGE CYCLE.

(a) Eccentric cam (39) may not be contacting knurled roller (66) on turntable shaft (30A). Eccentric cam spring (43) may be broken or have lost its tension; cam may be binding at its pivot. Correct by replacing spring or eliminating bind.

(b) Set screw on knurled roller (66) may be loose. Move up the knurled roller and tighten the set screw.

(c) Pickup point adjusting screw (42) is too far out of adjustment in a clockwise direction. Adjust the screw so that the change cycle starts when the needle is 1⅝ inches from the side of the centerpost.

20. CHANGER REPEATEDLY GOES INTO CHANGE CYCLE WITHOUT PLAYING RECORD.

Pickup point adjusting screw (42) is too far out of adjustment in a counterclockwise direction. Adjust the screw so that the change cycle starts when the needle is 1⅝ inches from the side of the centerpost.

21. WOBBLY PICKUP ARM.

The binder head screw on the rear of the pickup arm is loose and should be tightened. The more recent changers have eliminated this problem by replacing the screw with rivets (16).

22. NOISY OPERATION.

(a) The turntable may "ring" if the idler wheel tire is bumpy or slightly out of round. Replace the idler wheel (74).

(b) Changer may squeak when carrying a stack of records. Apply a coat of floor wax, furniture wax, paraffin or vaseline to the centerpost. Several applications may be necessary in order to eliminate the squeak.

(c) "Wow" may be due to a warped record, a sprung turntable, or a bumpy or out-of-round idler wheel tire. Replace defective part.

"Wow" may also be caused by an off-center or bent centerpost. If the centerpost is off-center in turntable hole, loosen hex nut (68) and re-position centerpost. If centerpost is bent, see paragraph 16.

(d) The metal of the eccentric cam may rub on the knurled roller (66). The rubber tire (44) on the cam should be replaced. The cam must be removed from the changer to make this replacement.

23. REPLACING DEFECTIVE PICKUP CARTRIDGE.

Before replacing a suspected defective pickup cartridge (21), check for a short or open circuit in the shielded output cable and output plug (79). Also check for an open or short circuit in the leads running from the pickup cartridge to the shielded cable.

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SERVICING AND REPAIR (Continued)

Some changers have a flat metal plate mounted between the pickup cartridge (21) and the pickup arm. When replacing a pickup cartridge, this plate should be removed since replacement cartridges are designed to be used without it. If it is necessary to remove the pickup arm to gain access to the pickup cartridge, follow the procedure as outlined in steps (a) and (b) under paragraph 9.

24. TILTED TURNTABLE.

A tilted turntable does not necessarily indicate a defective changer, since this was normal on early models.

25. IDLER WHEEL POSITION.

The idler wheel (74) should contact the turntable halfway up the rim of the latter. This point of contact was somewhat below center on early models. If necessary, the idler wheel may be raised or lowered by removing or adding shim washers (63) between the motor mounting plate and top panel.

The turntable may be raised or lowered by adding or removing washers between the turntable thrust bearing (32) and the turntable.

26. LUBRICATION.

Under normal operating conditions, the motor should never require oiling. The rest of the changer, however, should be lubricated with grease whenever it comes into the shop for repairs or adjustment. Care should be taken to prevent any of the lubricant from coming into contact with the drive pulley (73A), the idler wheel tire, or the eccentric cam tire.

27. REPLACEMENT OF 60-CYCLE, COIL SPRING DRIVE PULLEY ON MOTOR 407B3.

Only earlier changers used this part.

(a) Remove the motor from the top panel by unscrewing the 3 mounting screws (78).

(b) Remove the 60-cycle, coil spring drive pulley with a pair of pliers. Using a screw-driver, carefully pry off the 9/16 inch diameter washer beneath the pulley.

(c) Next place the new cylindrical drive pulley (73A) on the motor shaft. Set the pulley so that the two ears will line up with the slot on the top of the shaft.

(d) Push the drive pulley down with a Spintite wrench or a piece of hollow tubing. Tap the Spintite wrench or tubing to force the pulley down until it is flush with the end of the motor shaft.

(e) Bend the ears down into the slot on the end of the shaft.

28. CONVERTING MOTOR FOR 50-CYCLE OPERATION.

(Conversion springs are listed at end of Parts List.)

(a) Remove the motor from the top panel by removing 3 mounting screws (78).

(b) If motor shaft has a 60-cycle, coil spring drive pulley, remove the coil spring. After removing coil spring from motor 407B3, be sure to replace it with a cylindrical drive pulley (73A) as per paragraph 27.

(c) Hold the idler wheel (74) away from the drive pulley with the index finger of the left hand, and prevent the armature from turning by holding the motor fan with the left thumb. Now install the 50-cycle conversion spring by twisting it counterclockwise and pushing it down over the cylindrical drive pulley (73A) until its end is flush with the motor shaft. If the conversion spring has a projecting end—cut it off smoothly with a pair of side cutters.

NOTE

Care should be taken to prevent any grease or oil from coming into contact with the idler wheel tire or the eccentric cam tire.

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MODEL RC150

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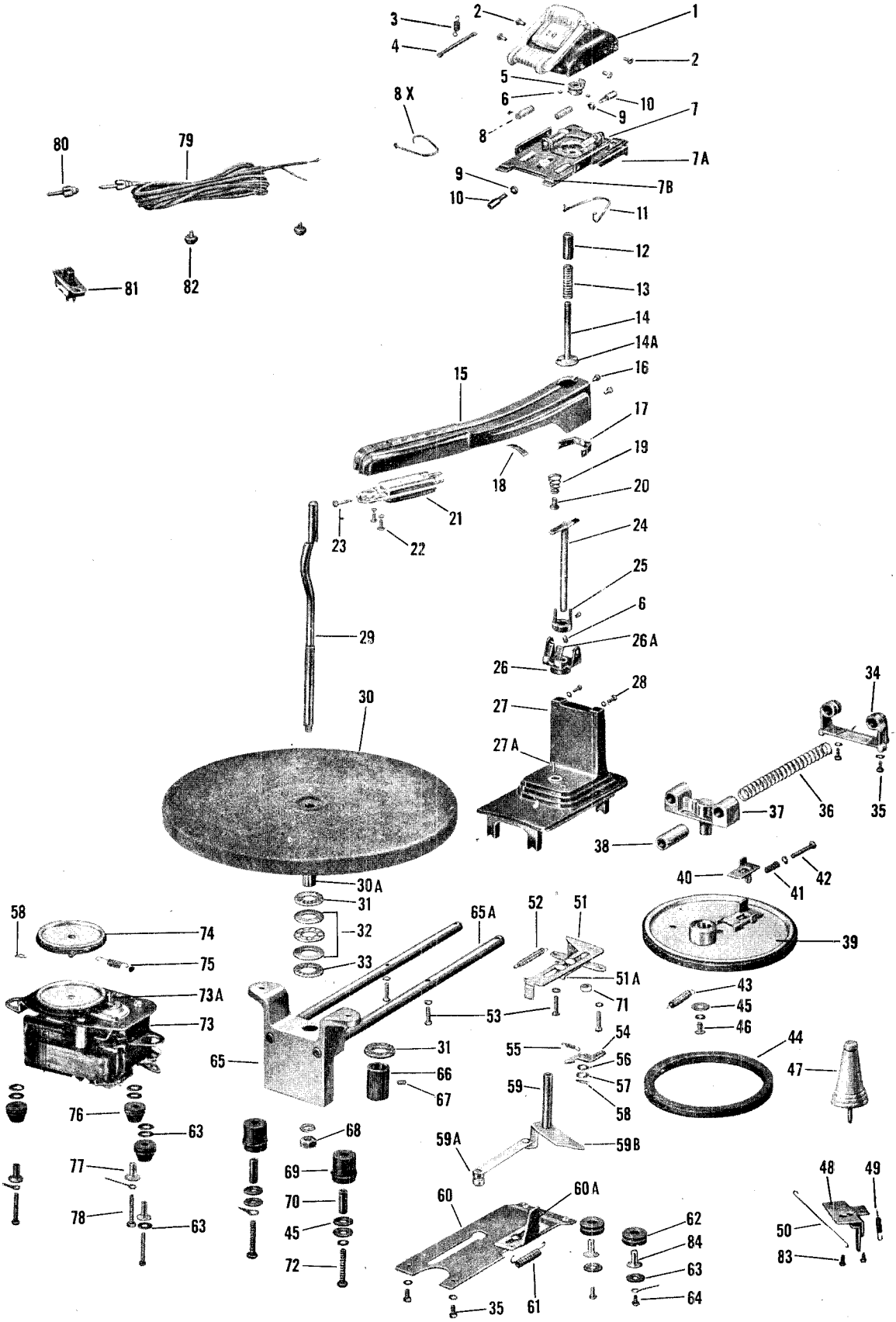

FIGURE 6. RECORD CHANGER, EXPLODED VIEW

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SERVICE PARTS LIST

RC150 RECORD CHANGER

See Exploded View, Figure 6, for Identification of Parts

Ref. No.	Part Number	Description
1	G400A13-B	Cover assembly (Includes 3 and 4)
2	13A1-4-57	Snap buttons (cover)
3	405A4	Spring, record clip
4	414A4	Spring rod (record clip)
5	G400A31	Push-off arm assembly (When replacing, refer to paragraph 8)
6	1A44-38	Set screw (Bristol Head #6-32x3/16")
7	G400B51	Head assembly (Includes 7A, 7B, 8, 9, 10 and 11)
7A	G400A30	Head mounting plate assembly (Also part of 7)
7B		Push plate (Part of 7)
8	405A33	Spring, push plate (Also see 8X)
8X	405A17	Spring, push plate (Early type; located on top of push plate)
9	2A1-10-47	Hex nut (#6-32)
10	402A32	Adjusting screw, set-down point
11	405B18	Spring, head mounting plate (Located on bottom of head mounting plate assembly)
12	402A40	Spacer, upper lift rod
13	405A20	Spring, upper lift rod
14	G400A35	Upper lift rod and guide plate assembly
14A		Guide plate (Part of 14)
15	G400A62	Pickup arm and pivot spring assembly (Does not include 18, 19, 20 or 21)
16	6B1-36-47	Rivet (pickup arm pivot spring)
17	405A2	Pivot spring (pickup arm)
18	405A13	Spring clip (pickup arm)
19	405A29	Lock spring, pickup arm adjustment
20	402A17	Screw, knurled head (#8-32x9/32"; pickup arm adjustment)
21	409A3 Pickup cartridge 409A2 Pickup cartridge 409A1 Pickup cartridge	Interchangeable (Before replacing, see paragraph 23)
22	42-250-C2-47	Screw (Fil.H.M.S. #4-40x1/4"; for mtg. cartridge)
23	402A43	Needle screw for cartridge
24	G400A34	Lower lift rod assembly
25	G400A32	Guide pin assembly (When replacing, see par. 9)
26	G400A10	Lift guide assembly
26A		Latch spring, pickup arm (Part of 26)
27	G400A64	Base (die cast)
27A		Stop pin (Part of 27)
28	65-312-C2-47	Screw (B.H.M.S. #6-32x5/16"; for mtg. assembly 7)
29	G400A12	Centerpost
30	G400B49	Turntable
30A		Turntable shaft (Part of 30)
31	412A1	Cork washer (3/32" thick)
32	415A2	Thrust bearing assembly (Replace as a unit)
33	412A9	Cork washer (3/64" thick)
34	404A1	Riser plate support
35	62-250-C2-21	Screw (Fil.H.M.S. #6-32x1/4"; for mtg. riser plate)
36	405A9	Spring, recoil
37	404A3	Support, eccentric cam
38	401A27	Ferrule, guide rod stop
39	G400A45	Eccentric cam and tire assembly
40	401A58	Stop bracket
41	405A10	Spring, stop bracket
42	60-1125-C2-21	Screw (R.H.M.S. #6-32x1 1/8"; for adj. pickup point)
43	405A8	Spring, eccentric cam
44	406A1	Rubber tire, eccentric cam
45	4B1-57-47	Flat washer (eccentric cam)
46	84-250-C2-21	Screw (R.H.M.S. #8-32x1/4"; for mtg. eccentric cam)
47	G400A46-1 Reject housing assembly (For metal base) G400A46-2 Reject housing assembly (For wood or plastic base)	
48	G400A61	Reject lever assembly
49	405A25	Spring, reject lever
50	414A8	Reject trigger wire
51	G400A54	Reject bracket assembly
51A		Reject slide (Part of 51)
52	405A23	Spring, reject slide
53	62-500-C2-21	Screw (Fil.H.M.S. #6-32x1/4"; for mtg. guide rod)
54	401A70	Reject trigger
55	405A24	Spring, reject trigger
56	405A22	Spring washer (reject trigger)
57	4B1-68-47	Flat washer (reject trigger)
58	405A15	Spring, hairpin
59	G400A4	Trip linkage assembly (Some early models were furnished with a flat washer. Omit washer only if new part is installed.)
59A		Roller, retaining lever (Part of 59)
59B		Stop arm (Part of 59)
60	G400A9	Riser plate assembly
60A		Riser plate motion bracket (Part of 60)
61	405A7	Spring, safety
62	406A6 Rubber grommet (Small; used with metal base) 406A2 Rubber grommet (Used with wood or plastic base)	
63	4B1-36-47	Flat washer
64	60-250-C2-47 Screw (R.H.M.S. #6-32x1/4"; used for mounting record changer on metal base) 260-687-C2-2 Screw (R.H.M.S. Sems #6-32x11/16"; used for mounting record changer on wood or plastic base)	
65	G400B56	Turntable mounting and guide rod assembly
65A		Guide rods (Part of 65)
66	402A5	Knurled roller, turntable shaft (Two lengths are used: 29/32" and 31/32". Omit the cork washer above the roller when using the 31/32" roller.)
67	1A44-13	Set screw (Bristol #8-32x1/8"; for knurled roller)
68	402A41	Hex nut (1/4"-20; used on centerpost)
69	406A5 Rubber grommet (Large; used with metal base) 406A2 Rubber grommet (Used with wood or plastic base)	
70	402A36 Spacer, mounting (Used with metal base) 29A2-4-21 Spacer, mounting (Used with wood or plastic base)	
71	401A75	Spacer, reject trigger
72	80-1000-C2-47 Screw (R.H.M.S. #8-32x1"; used for mounting record changer on metal base) 280-875-C2-2 Screw (R.M.H.S. Sems #8-32x7/8"; used for mounting record changer on wood or plastic base)	
73	407B3	Motor; 105-125 volts, 60 cycle (Motors 407B1 and 407B2 are interchangeable with 407B3)
73A	401A48	Drive pulley (Part of 73. For motor 407B3 only.)
74	G400A23 Idler wheel assembly (Used with motor 407B3 only) G400A57 Idler wheel assembly (Used with motor 407B1 only) G400A59 Idler wheel assembly (Used with motor 407B2 only)	
75	405A14 Spring, idler wheel (Used with motor 407B3 only) 405A35 Spring, idler wheel (Used with motor 407B1 only) 405A36 Spring, idler wheel (Used with motor 407B2 only)	
76	406A4 Rubber grommet (motor mounting; for motor 407B3) 406A9 Rubber grommet (motor mounting; for motor 407B1) 406A10 Rubber grommet (motor mounting; for motor 407B2)	
77	401A53 Spacer, grommet (Used with motor 407B3) 402A44 Spacer, grommet (Used with motor 407B1) 402A45 Spacer, grommet (Used with motor 407B2)	
78	60-875-C2-4 Screw (R.H.M.S. #6-32x7/8"; used for mounting motor on metal base) 60-1125-C2-21 Screw (R.H.M.S. #6-32x1 1/8"; used for mounting motor on wood or plastic base)	
79	89A5-9	Shielded output cable and plug (Used on models 5RP47, 6RC45 and 6RC46 only)
80	88A2-1	Plug (output)
81	77A1-15	Switch, On-Off (Used on model 5RP47 only)
82	12A3-4	Rubber bumper (Used on model 5RP47 only)
83	1A20-14-21 Screw (#6x3/8" drive screw; used for reject lever mounting on metal base) 1A20-18-21 Screw (#6x7/8" drive screw; used for reject lever mounting on wood or plastic base)	
84	29A2-6-21	Spacer, mounting (Used with wood or plastic base)
	405A30	50 cycle conversion spring (For motor 407B1)
	405A31	50 cycle conversion spring (For motor 407B2)
	405A32	50 cycle conversion spring (For motor 407B3)

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MODEL RC150

ADMIRAL CORPORATION
TROUBLE CHART

TROUBLE	CAUSE	REMEDY
Pickup arm sets down at wrong point on record even though the changer is reasonably level.	The set-down point requires adjustment.	See paragraph 5.
Pickup arm lifts at wrong point on record (change cycle starts too soon or too late).	Pickup point requires adjustment.	See paragraph 6.
Needle does not make contact when in playing position over a single record.	Pickup arm raised too high. Knurled adjusting screw (20) needs adjustment.	See paragraph 7(a).
Pickup arm does not clear arm rest.	Knurled adjusting screw (20) needs adjustment.	See paragraph 7(b).
Needle back-scratch.	Needle may be too long.	Use 5/8 inch needle.
	Pickup arm does not raise high enough.	See paragraph 7(b).
Push-off arm (5) in wrong position.	Loose or improperly set push-off arm.	See paragraph 8.
Guide pin assembly (25) in wrong position.	Loose or improperly set guide pin assembly.	See paragraph 9.
Turntable fails to rotate.	Various causes.	See paragraph 10.
Changer slows up while playing records.	Turntable shaft binds.	See paragraph 10(g).
	Centerpost is off-center or bent.	See paragraph 16.
Pickup arm remains at rest position after changer begins its change cycle or reject button has been pushed.	If turntable is rotating, look for loose set screws in the push-off arm (5).	See paragraph 8.
	Guide plate (14A) has come loose from upper lift rod.	Replace upper lift rod and guide plate assembly (14).
The 12-inch set-down point differs with cover assembly (1) off and on.	The 12-inch set-down adjusting screw may be touching cover assembly (1) during change cycle.	File down the end of the screw until it clears.
Pickup arm set-down point differs for manual rejection and automatic cycle.	Latch spring (26A) requires adjustment.	See paragraph 13.
	Loose or improperly set push-off arm (5).	See paragraph 8.
	Loose or improperly set guide pin assembly (25).	See paragraph 9.
Set-down point is erratic on both 10-inch and 12-inch records.	Push plate springs (8) may not provide sufficient tension.	See paragraph 14(a).
	Loose push-off arm (5).	See paragraph 8.
	Loose guide pin assembly (25).	See paragraph 9.
Bottom record of stack fails to drop to turntable.	Push-off arm may be loose.	See paragraph 8.
	Warped record. Record clip in wrong position.	See paragraph 15.
	Centerpost may be bent toward record support.	See paragraph 16.
Centerpost and record support too far apart.	Centerpost bent away from record support.	See paragraph 16.
Record support cannot be rotated for size change.	Changer turned off during a change cycle.	See paragraph 17.
Changer starts to cycle when record support is rotated for size change.	Push-off arm (5) is being tripped by the set-down point adjusting screw.	See paragraph 18.
Changer will not go into change cycle.	Eccentric cam may not be contacting knurled roller on turntable shaft.	See paragraph 19(a).
	Set screw on knurled roller may be loose.	See paragraph 19(b).
	Pickup point adjusting screw (42) is too far out of adjustment in a clockwise direction.	See paragraph 19(c).
Changer repeatedly goes into change cycle without playing record.	Pickup point adjusting screw (42) is too far out of adjustment in a counterclockwise direction.	See paragraph 20.
Wobbly pickup arm.	Binder head screw on rear of pickup arm is loose. (The later changers have eliminated this problem by using rivets (16) in place of this screw.)	Tighten screw.
Turntable "rings".	Idler wheel (74) bumpy or out-of-round.	Replace idler wheel.
Changer squeaks.	Centerpost needs lubrication.	See paragraph 22(b).
"Wow".	Warped record; sprung turntable; bumpy or out-of-round idler wheel.	Replace defective part.
	Centerpost off-center or bent.	See paragraph 22(c).
Hum.	Open shield lead of output cable (79).	Replace cable.
Changer operates mechanically but has weak or no electrical output.	Shorted or open pickup leads or shielded cable.	Replace defective part.
	Defective pickup cartridge.	See paragraph 23.
	Open shield lead of output cable (79).	Replace cable.
	High-resistance connection due to improper soldering.	Re-solder.
	Leakage through output plug (80).	Replace plug.
Changer operates mechanically but has a distorted electrical output.	Defective pickup cartridge.	See paragarph 23.

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ADMIRAL CORPORATION

RC160 RECORD CHANGER

IMPORTANT

The RC160 Record Changer is similar in appearance to other Admiral changers. To be certain which model changer you are servicing, look for the changer model number which appears on the small label attached to the underside of the changer mechanism. The changer can be further identified by comparing Figures 3 and 5 with the actual changer.

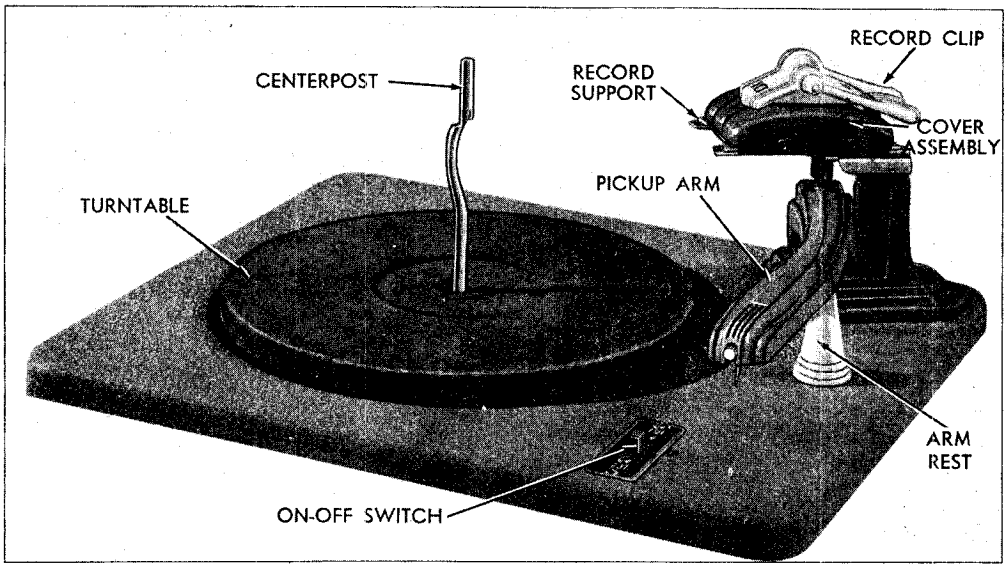

FIGURE 1. RECORD PLAYER, TOP VIEW

OPERATING INSTRUCTIONS

1. SETTING FOR SIZE OF RECORD.

The size of record for which the record changer is set to play is indicated by the number (on the top of the cover assembly) nearest the turntable. See Figure 1.

To change the setting, grasp the record support and cover assembly and rotate it a half turn until it snaps into place with the correct record size toward the turntable. **In changing the setting from 10-inch to 12-inch, rotate the assembly counterclockwise only; in changing from the 12-inch to the 10-inch setting, rotate the assembly clockwise only.**

2. STARTING THE RECORD CHANGER.

Load the record changer and set the record clip so that it rests on the top record. Before turning on the ON-OFF switch, firmly grasp the pickup arm, move it slightly to the right of the arm rest and then return the pickup arm to a point near the edge of the turntable before releasing it. While moving the arm, it should be held firmly enough to prevent it from snapping back and causing possible damage to the needle.

Now turn on the ON-OFF switch. The entire stack of records will then be played automatically.

3. REJECTING A RECORD.

To reject a record at any time and start playing the next one, firmly grasp the pickup arm, move it above and slightly to the right of the arm rest and return the pickup arm to a point near the edge of the record before releasing it. While moving the arm, it should be held firmly enough to prevent it from snapping back.

4. UNLOADING RECORDS.

To remove the records, it is advisable to have the changer mechanism out of cycle. However, it is possible to unload the changer while it is in cycle so long as the pickup arm is clear of the records.

Turn off the ON-OFF switch before lifting pickup arm to arm rest and removing records.

It is normal for early production RC160 changers to cycle if the pickup arm is moved to the arm rest while the turntable is rotating.

When removing records, hold them lightly and lift straight up.

CAUTIONS

1. **Never use force to stop the motor or turntable.**
2. **When turning the record support, be sure to grip the entire record support and cover assembly and not just the plastic record clip.**

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ADMIRAL CORPORATION

THE CHANGE CYCLE

5. DESCRIPTION OF CHANGE CYCLE. (See Figures 2, 5, and 6.)

While a record is playing and as the pickup arm moves toward the center of the record, the arm control pin (31A) on the arm control assembly (31) moves along the portion of the arm control track (36B) as indicated at "P", figure 2. As the record reaches the pickup or trip point, the pin reaches point "T" on the track. As it moves into the recessed position in which it it shown in the illustration, it permits the trip spring (35) to pull the arm control plate (36) forward towards the centerpost (27). As the arm control plate is drawn forward, the stop tab (36A) on the arm control plate (36) is withdrawn from behind the stop bracket (43A) on the eccentric cam (43). The cam, which no longer is held in place by the stop tab (36A), is pulled over by the eccentric cam spring (44) until the rubber tire makes contact with the knurled roller (53) on the turntable shaft (28A). This knurled roller, which rotates with the turntable shaft, rotates the eccentric cam. In turn, this forces the riser plate assembly (37) back along its guide rods (51A) away from the centerpost (27). As soon as the riser plate begins to move, the push-off cam and shaft assembly (42) rides along the inclined track (37C) of the riser plate (37). This action causes the push-off cam and shaft assembly (42) to be drawn downward; as a result the pickup arm lift (19) presses down on the arm lift bearing pin (14) causing the pickup arm to be raised clear of the record. Then the riser plate tab (37B) contacts and moves the arm control assembly (31) which, since it is coupled to the pickup arm support assembly (22), carries the pickup arm away from the centerpost and clear of the edge of the turntable. As the riser plate (37) continues to travel further along the guide rods (51A), the riser plate motion bracket (37A) contacts and rotates the push-off cam and shaft assembly (42); as a result, the push-off arm (5), [which is coupled to the push-off cam and shaft assembly (42)] causes the push plate (7C) to drop a record to the turntable.

During the second half of the change cycle, the pressure of the push plate spring starts to return the push plate (7C) and push-off arm (5) back to their normal position. At the same time, the motion of the eccentric cam (43) and the guide rod recoil spring (38) propel the riser plate (37) toward the centerpost. The arm control assembly (31), and hence the pickup arm, are drawn back by the tension in the set-down spring (30). After the arm reaches this point directly above the set-down point, the riser plate (37) has moved far enough back towards the centerpost (27) to allow the push-off cam and shaft assembly (42) to ride down the inclined track (37C) of the riser plate (37). This lowers the pickup arm onto the record. (The following paragraph describes how the set-down point is determined for the 10-inch and 12-inch settings.) As the eccentric cam (43), aided by the eccentric cam spring (44) completes its revolution, the rubber tire of the cam moves away from the knurled roller (53) on the turntable shaft and the stop bracket (43A) comes to rest against the stop tab (36A) of the arm control plate (36). The change cycle is completed.

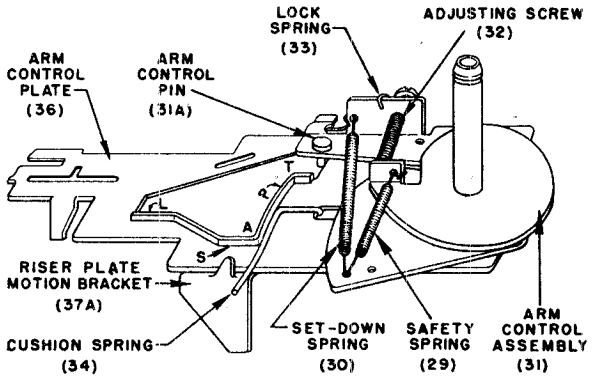

FIGURE 2.

6. DESCRIPTION OF DETERMINATION OF 10-INCH AND 12-INCH SET-DOWN POINTS.

During the early part of the change cycle, the arm control plate (36) has traveled (in a direction away from the centerpost) until the size change stop (36C) reaches the cam (42B) of the push-off cam and shaft assembly. The distance traveled by the arm control plate (36) will depend on the size of the record being played; the distance is less for a 12-inch setting than for a 10-inch setting. (This is true because the push-off cam (42B) presents its short radius to the size change stop (36C) for the 10-inch setting and presents its long radius to the size change stop for a 12-inch setting.) This variation in distance traveled means that the arm control track (36B) will be in a position closer to the centerpost for the 12-inch setting than for the 10-inch setting. This in turn means that during the change cycle the arm control pin (31A) [whose path is determined by the motion of the arm control assembly (31)] will leave its recessed position, and will ride along the "S" portion of the arm control track for the 12-inch setting and along the "L" portion for the 10-inch setting. (See Figure 2.)

As the pickup arm moves back towards the record during the second half of the change cycle, it will be stopped when the bracket (31C) reaches the adjusting screw (32). How far the arm returns before being stopped depends on whether the arm control pin (31A) has been riding in the "S" or "L" portion of the arm control track. If the pin has been riding in the "S" or 12-inch portion of the track, the arm will be stopped at a point directly above the 12-inch set-down point; if the pin has been riding in the "L" or 10-inch portion, the arm will be stopped at a point directly above the 10-inch set-down point.

7. REJECTING A RECORD.

When rejecting a record, the motion of the pickup arm moves the arm control assembly (31) so that the trip spring (35) tension is now permitted to move the arm control plate (36) slightly forward. This movement releases the stop bracket (43A) on the eccentric cam which was engaged by the stop tab (36A) on the arm control plate. The eccentric cam (43) then falls against the knurled roller (53) and the change cycle begins as if a record had just finished playing.

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ADMIRAL CORPORATION

ADJUSTMENTS

CAUTIONS

1. **See that the drive pulley (60A), and the rubber tires on both the idler wheel (57) and the eccentric cam (43) are kept clean and free from oil, grease, dirt, or any foreign material. Carbona or carbon tetrachloride may be used for cleaning these parts.**
2. **If replacement of any parts requires the removal of the lift adjusting collar (10), pickup arm support assembly (22) or the push-off arm (5), be sure to re-position or replace these parts as directed in paragraphs 9, 10, and 11 respectively.**

TOOLS REQUIRED

#6 Bristol Set Screw Wrench. (Admiral Part No. P-5805. List Price $0.05.)
#8 Bristol Set Screw Wrench. (Admiral Part No. P-5806. List Price $0.05.)

8. SET-DOWN POINTS AND PICKUP OR TRIP POINT.

(If the pickup arm support assembly (22) has been removed or if its set screws are loose, it must be re-positioned as described in paragraph 10 before adjusting the set-down points and pickup or trip point.)

This changer is designed so that the 10-inch set-down point, the 12-inch set-down point, and the pickup or trip point are simultaneously adjusted in a single operation. It is recommended that you make the adjustment at either of the set-down points. This adjustment is made by means of the adjusting screw (32) shown in figure 1. Turning this screw counter-clockwise will cause the arm to set down closer to the centerpost; turning it clockwise will cause the arm to set down further away from the centerpost. One complete turn on the screw will move the arm about ¼ inch.

If the adjusting screw (32) will not change the setting sufficiently, the pickup arm support assembly (22) may be out of position. (See paragraph 10.)

The set-down points when using a straight-shank needle will differ slightly than when using an offset-shank needle such as the Admiral Lifetime Needle. If you do not know which type of needle is to be used by the customer, we suggest the following settings *when tested with a straight needle:* measuring from the side of the centerpost, 4⅝" for the 10-inch set-down point, 5⅝" for the 12-inch set-down point, and 1-19/32" for the pickup or trip point.

If you know which type of needle will be used by the customer, and test with that type of needle, the following settings are recommended: measuring from the side of the centerpost, 4-21/32" for the 10-inch set-down point, 5-21/32" for the 12-inch set-down point, and 1⅝" for the pickup or trip point.

When using an offset-shank needle, slight variations in set-down point can often be corrected by loosening the needle screw and rotating the needle slightly.

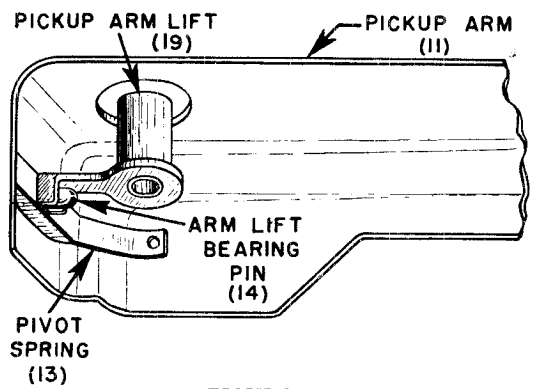

FIGURE 4.

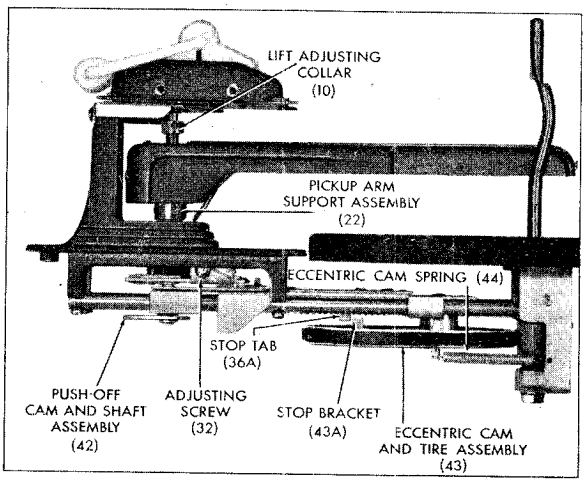
LIFT ADJUSTING COLLAR (10)
PICKUP ARM SUPPORT ASSEMBLY (22)
ECCENTRIC CAM SPRING (44)
STOP TAB (36A)
PUSH-OFF CAM AND SHAFT ASSEMBLY (42)
ADJUSTING SCREW (32)
STOP BRACKET (43A)
ECCENTRIC CAM AND TIRE ASSEMBLY (43)

FIGURE 3.

9. PICKUP ARM HEIGHT.

When properly adjusted, the pickup arm height should be such that, without a needle and with a single record on the turntable, the arm should be about 1/32" above the record. The arm height depends on the location of the lift adjusting collar (10). As the collar is moved down, the arm is raised, and vice versa. When necessary, the pickup arm height may be adjusted by re-positioning the lift adjusting collar (10) as follows:

(a) The changer should be out of cycle.
(b) Lift the pickup arm and check to see that the pickup arm lift (19) is positioned properly over arm lift bearing pin (14). (See Fig. 4.)
(c) Remove needle and place pickup arm on turntable close to its edge.
(d) Loosen set screw in lift adjusting collar (10).
(e) Remove slack by pushing up on push-off cam and shaft assembly (42). Do not compress the arm lift shaft spring (41).
(f) Using a #6-32 Bristol wrench, place it in the set screw and slide the lift adjusting collar (10) down until it is snug against the pickup arm lift (19).
(g) Tighten set screw in the lift adjusting collar.
(h) Check height.

If height is still incorrect, it may be necessary to repeat the adjustment. Before doing so, it may be advisable to examine the shaft (42A) of the push-off cam and shaft assembly for nicks and burrs caused by the set-screws. Smooth shaft with file if necessary. The upper portion of the shaft is accessible if the push-off arm (5), head assembly (7) and lift adjusting collar (10) are removed. To prevent shaft from falling out through bottom, keep in place with masking tape. When replacing the lift adjusting collar (10) and push-off arm (5), see paragraphs 9 and 11 respectively.

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ADMIRAL CORPORATION

SERVICING AND REPAIR

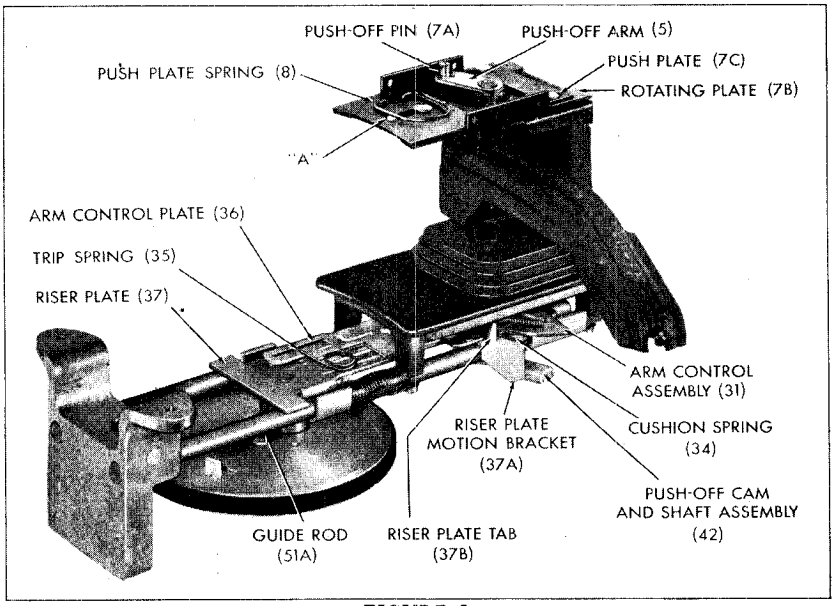

FIGURE 5.

10. RE-POSITIONING PICKUP ARM SUPPORT ASSEMBLY (22).

To assure proper set-down adjustment, this must be done carefully as follows if set screws are loose or if pickup arm support assembly (22) has been removed.

(a) Turn adjusting screw (32) (see paragraph 1) clockwise as far as it will go, then turn back counter-clockwise for 2 full turns.

(b) Place a 12" record on the turntable.

(c) With the changer out of cycle, manually move the arm control assembly (31) outwards as far as it moves freely. In this position, the arm control pin (31A) will be located as indicated at "A" in figure 2.

(d) Place pickup arm so that needle rests in first playing groove on the 12" record.

(e) Tighten the two set screws in pickup arm support assembly (22).

(f) Make the final set-down adjustment as described in paragraph 1.

11. RE-POSITIONING PUSH-OFF ARM (5).

This must be carefully done if set screws are loose or push-off arm (5) has been removed.

(a) Rotate the record support to the 10-inch position. Remove push-off arm (5).

(b) Manually slide the push plate (7C) over the rotating plate (7B) until a piece of metal 3/32 inch in diameter or a #8-32 Bristol wrench can be inserted into the opening at the front of the center slot in the push plate (see "A", figure 5). If the 12-inch push-off is faulty with this setting, try using a 1/16" piece of metal or a #6-32 Bristol wrench.

(c) Put the changer into cycle and manually rotate the turntable until the riser plate (37) has traveled along the guide rods (51A) to a position furthest away from the turntable.

(d) Now position push-off cam and shaft assembly (42) so that it is held tightly against riser plate motion bracket (37A).

(e) Put push-off arm in position, leaving about 1/16" clearance between the top of the push plate and the push-off arm.

(f) Tighten set screws in push-off arm.

12. CHANGER REPEATEDLY GOES THROUGH CHANGE CYCLE WITHOUT PLAYING RECORD.

(a) Mounting screw on eccentric cam (43) may be loose. Tighten.

(b) Cushion spring (34) has slipped out of position and is on wrong side of riser plate tab (37B). Re-position spring. (See figure 5.)

(c) In normal operation, the trip spring (35) holds the arm control plate (36) against the riser plate (37). If the trip spring is faulty, it permits the arm control plate to rise too high above the riser plate. This causes the stop bracket (43A) to pass underneath the stop tab (36A). To correct, bend the legs of the trip spring closer together. If necessary, replace trip spring.

(d) Eccentric cam (43) is bent so that stop bracket (43A) passes underneath stop tab (36A) on the arm control plate (36). To correct, straighten cam by putting changer out of cycle and pressing upward on cam near stop bracket.

(e) The stop bracket (43A) on the eccentric cam (43) is not properly bent and is failing to engage stop tap (36A) on arm control plate (36). To correct, bend stop bracket (43A) until it is at right angles to disc of eccentric cam.

13. NEEDLE SLIDES ACROSS PORTION OF RECORD AFTER SET-DOWN ON 12-INCH RECORD.

Cushion spring (34) has slipped out of position and is on wrong side of riser plate tab (37B). Re-position spring. (See figure 5.)

14. CHANGER CYCLES WHEN PICKUP ARM IS MOVED TO ARM REST.

It is normal for early production RC160 changers to cycle if the pickup arm is moved to the arm rest while the turntable is rotating. Turn off the ON-OFF switch before lifting pickup arm to arm rest.

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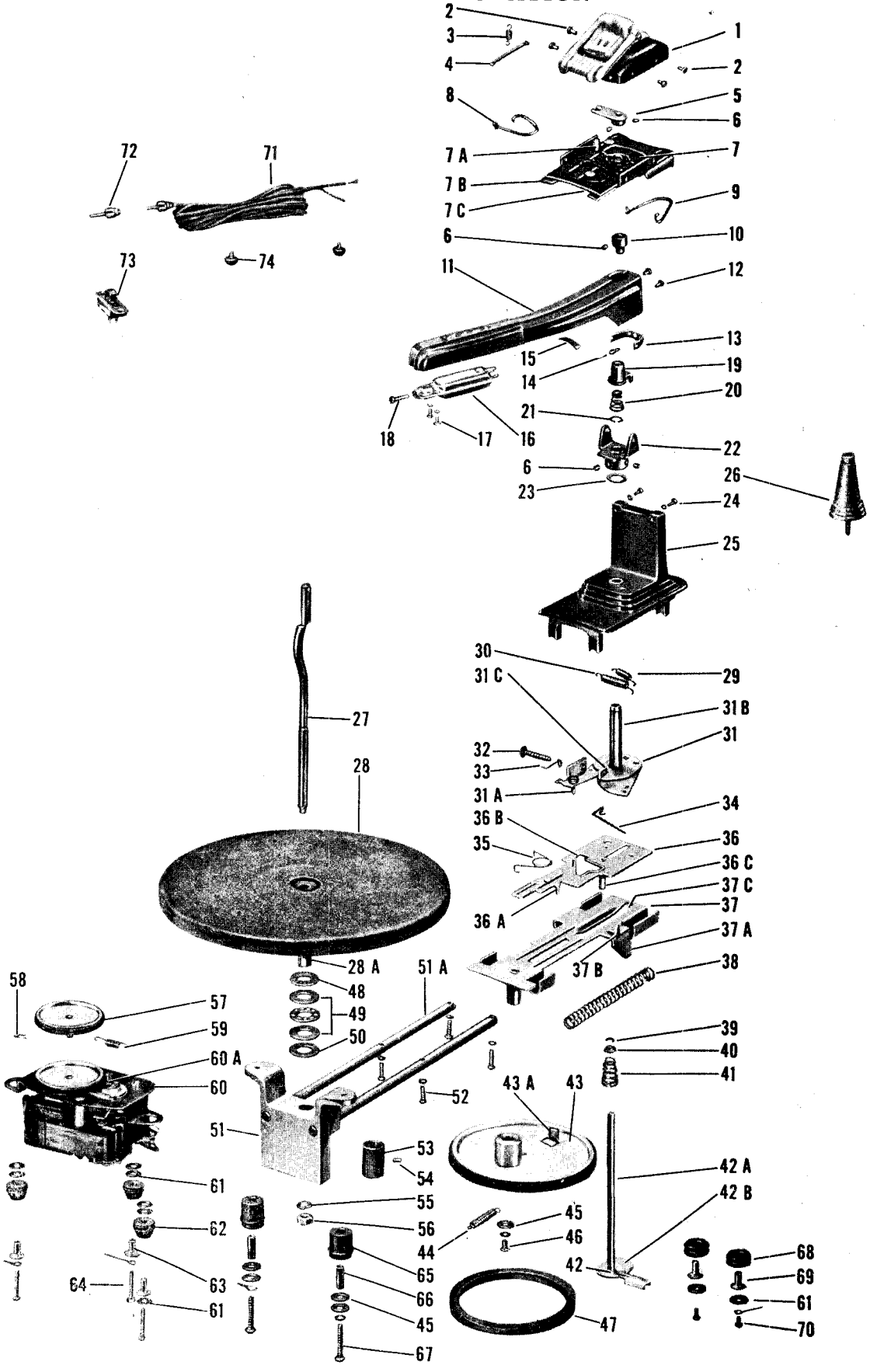

FIGURE 6. RECORD CHANGER, EXPLODED VIEW

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MODEL RC160

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SERVICE PARTS LIST

RC160 RECORD CHANGER

See Exploded View, Figure 6, for Identification of Parts.

Ref. No.	Part Number	Description
1	G400A109	Cover assembly (Includes 3 and 4)
2	13A1-3-57	Snap buttons (cover)
3	405A4	Spring, record clip
4	414A4	Spring rod (record clip)
5	G400A66	Push-off arm assembly (When replacing, refer to paragraph 11)
6	1A44-38	Set screw (Bristol Head #6-32x3/16")
7	G400B68	Head assembly (Includes 7A, 7B, 7C, 7D, 8 and 9)
7A		Push plate pin (Part of 7)
7B		Rotating plate (Part of 7)
7C		Push plate (Part of 7)
7D		Head mounting plate (Part of 7)
8	405A38	Spring, push plate (Located on top of push plate)
9	405B18	Spring, head mounting plate (Located on bottom of head mounting plate assembly)
10	402A57	Lift adjusting collar (When replacing, refer to paragraph 9)
11	G400A91	Pickup arm, pivot spring and arm lift bearing pin assembly (Does not include 15 and 16)
12		Rivet (pickup arm pivot spring) } Supplied as a group only; order part number 98A1
13		Pivot spring (pickup arm) } Supplied as a group only; order part number 98A1
14		Arm lift bearing pin } Supplied as a group only; order part number 98A1
15	405A13	Spring clip (pickup arm)
16	409A3	Pickup cartridge } Interchangeable
	409A2	Pickup cartridge } Interchangeable
	409A1	Pickup cartridge } Interchangeable
17	42-250-C2-47	Screw (Fil.H.M.S. #4-40x1/4"; for mtg. cartridge)
18	402A43	Needle screw for cartridge
19	G400A86	Pickup arm lift assembly
20	405A46	Brake spring (5 turns)
21	405A37	Retaining ring (Used on arm support tube 31B)
22	G400A73	Pickup arm support assembly (When replacing, refer to paragraph 10)
23	405A27	Washer, spring
24	65-312-C2-47	Screw (B.H.M.S. #6-32x5/16"; for mtg. assembly 7)
25	G400B80	Base (die cast)
26	G400A46-1	Arm rest
27	G400A12	Centerpost
28	G400B49	Turntable
28A		Turntable shaft (Part of 30)
29	405A41	Safety spring
30	405A42	Set-down spring
31	G400A84	Arm control assembly
31A		Arm control pin (Part of 31)
31B		Arm support tube (Part of 31)
31C		Bracket (Part of 31)
32	60-875-C2-21	Adjusting screw
33	405A44	Lock spring (set-down adjustment)
34	405A45	Cushion spring
35	405A43	Trip spring
36	G400A112	Arm control plate
36A		Stop tab (Part of 36)
36B		Track (Part of 36)
36C		Size change stop (Part of 36)
37	G400A88	Riser plate assembly
37A		Riser plate motion bracket (Part of 37)
37B		Riser plate tab (Part of 37)
37C		Inclined track (Part of 37)
38	405A9	Spring, recoil
39		Retaining ring (arm lift shaft) } Furnished as an assembly only; order part number G400A98
40		Safety collar (arm lift shaft) } Furnished as an assembly only; order part number G400A98
41		Spring (arm lift shaft) } Furnished as an assembly only; order part number G400A98
42		Push-off cam and shaft assembly } Furnished as an assembly only; order part number G400A98
42A		Arm lift shaft (Part of 42)
42B		Push-off cam (Part of 42)
43	G400A78	Eccentric cam and tire assembly
43A		Stop bracket (Part of 43)
44	405A47	Spring, eccentric cam
45	4B1-57-47	Flat washer (eccentric cam)
46	84-250-C2-21	Screw (R.H.M. #8-32x1/4"; for mtg. eccentric cam)
47	406A1	Rubber tire, eccentric cam
48	412A1	Cork washer (3/32" thick)
49	415A2	Thrust bearing assembly (Replace as a unit)
50	412A9	Cork washer (3/64" thick)
51	G400B56	Turntable mounting and guide rod assembly
51A		Guide rods (Part of 51)
52	62-500-C2-21	Screw (Fil.H.M.S. #6-32x1/4"; for mtg. guide rod)
53	402A5	Knurled roller, turntable shaft
54	1A44-13	Set screw (Bristol #8-32x1/8"; for knurled roller)
55	3A2-S-47	Lockwasher, split (1/4" diameter)
56	402A41	Hex nut (1/4"-20; used on centerpost)
57	G400A23	Idler wheel assembly (Used with motor 407B3 only)
	G400A57	Idler wheel assembly (Used with motor 407B1 only)
	G400A59	Idler wheel assembly (Used with motor 407B2 only)
58	405A15	Spring, hairpin
59	405A14	Spring, idler wheel (Used with motor 407B3 only)
	405A35	Spring, idler wheel (Used with motor 407B1 only)
	405A36	Spring, idler wheel (Used with motor 407B2 only)
60	407B3	Motor, complete with idler wheel; 105-125 volts, 60 cycle (Motors 407B1 and 407B2 are interchangeable with 407B3)
60A	401A48	Drive pulley (Part of 73. For motor 407B3 only.)
61	4B1-36-47	Flat washer
62	406A4	Rubber grommet (motor mounting; for motor 407B3)
	406A9	Rubber grommet (motor mounting; for motor 407B1)
*	406A10	Rubber grommet (motor mounting; for motor 407B2)
63	401A53	Spacer, grommet (Used with motor 407B3)
	402A44	Spacer, grommet (Used with motor 407B1)
	402A45	Spacer, grommet (Used with motor 407B2)
64	60-875-C2-2	Screw (R.H.M.S. #6-32x7/8"; used for mounting motor on metal base)
	60-1125-C2-21	Screw (R.H.M.S. #6-32x1 1/8"; used for mounting motor on wood or plastic base)
65	406A5	Rubber grommet (Large; used with metal base)
	406A2	Rubber grommet (Used with wood or plastic base)
66	402A36	Spacer, mounting (Used with metal base)
	29A2-4-21	Spacer, mounting (Used with wood or plastic base)
67	80-1000-C2-47	Screw (R.H.M.S. #8-32x1"; used for mounting record changer on metal base)
	280-875-C2-2	Screw (R.M.H.S. Sems #8-32x7/8"; used for mounting record changer on wood or plastic base)
68	406A6	Rubber grommet (Small; used with metal base)
	406A2	Rubber grommet (Used with wood or plastic base)
69	29A2-6-21	Spacer, mounting (Used with wood or plastic base)
70	60-250-C2-47	Screw (R.H.M.S. #6-32x1/4"; used for mounting record changer on metal base)
	260-687-C2-2	Screw (R.H.M.S. Sems #6-32x11/16"; used for mounting record changer on wood or plastic base)
71	89A5-9	Shielded output cable and plug (Used on models 5RP47, 6RC45 and 6RC46 only)
72	88A2-1	Plug (output)
73	77A1-15	Switch, On-Off (Used on model 5RP47 only)
74	12A3-4	Rubber bumper (Used on model 5RP47 only)
	405A30	50 cycle conversion spring (For motor 407B1)
	405A31	50 cycle conversion spring (For motor 407B2)
	405A32	50 cycle conversion spring (For motor 407B3)

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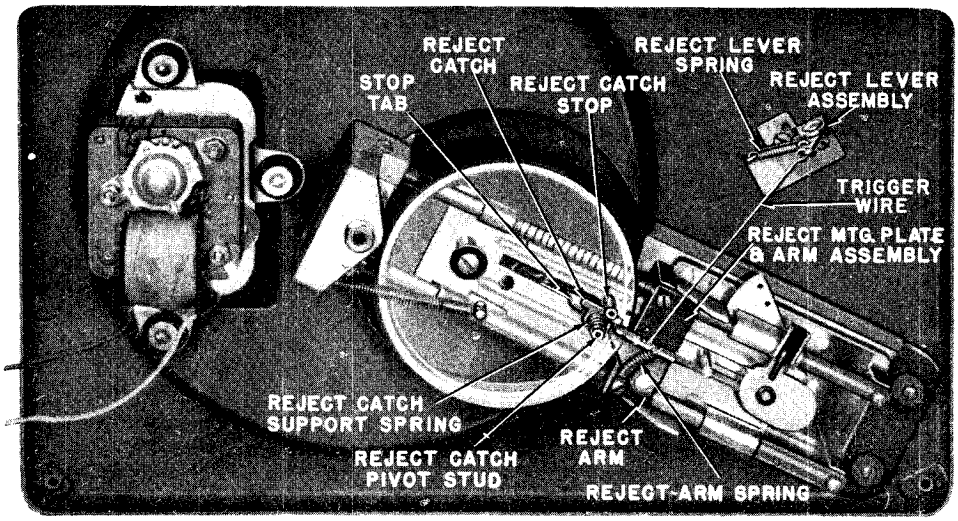
ADMIRAL CORPORATION

RC160A RECORD CHANGER

When servicing the RC160A, use this supplement with the RC160 Service Manual

IMPORTANT

The RC160A Record Changer is similar in appearance to other Admiral changers. To be certain which model changer you are servicing, look for the changer model number which appears on the small label attached to the underside of the changer mechanism.



ECCENTRIC CAM IN PHANTOM TO SHOW REJECT CATCH

The RC160A is a modification of the RC160 Record Changer. Hence, the Service Manual for the RC160 Record Changer may be used for servicing the RC160A if the following changes are noted:

THE REJECT MECHANISM

A push-button reject mechanism has been provided in the RC160A Record Changer.

The reject button is located on the top of the arm rest. The additional parts used to provide push-button rejection are shown in the illustration above; part numbers are listed below under "Service Parts List".

The illustration above shows the changer out of cycle, that is, when a record is playing. Note that the reject catch engages both the stop tab on the arm control plate, and the reject arm. If the changer is allowed to finish playing the record, the stop tab on the arm control plate is withdrawn from behind the reject catch; the eccentric cam is then pulled against the knurled roller and the change cycle begins. However, when the reject button is pressed, the reject trigger wire pulls the reject arm from behind the catch; the eccentric cam is pulled against the knurled roller and the change cycle begins.

TURNTABLE MOUNTING

The RC160A also features an improved turntable shaft bearing arrangement. Self-lubricating porous bronze bearings are now pressed into the turntable mount casting. This feature was also added to the later RC160 changers.

OPERATING INSTRUCTIONS

To start the RC160A Record Changer, load the record changer, set the record clip, and turn on the On-Off switch. Now press down on the reject button directly or push down on the pickup arm momentarily if it is setting on the arm rest. The entire stack of records will be played automatically.

To reject a record, merely press down on the reject button.

SERVICE PARTS LIST

(All parts not listed below are the same as in the RC160 and should be ordered from RC160 Service Manual)

Part Number	Description
G400A115	Reject lever assembly
405A25	Spring, reject lever
414A12	Reject trigger wire
G400A116	Reject mounting plate and arm assembly
	Reject arm (part of reject mtg. plate and arm assembly)
405A25	Reject arm spring
401A97	Reject catch
405A15	Hairpin spring (reject catch)
405A50	Reject catch support spring

Part Number	Description
G400A117	*Eccentric cam and tire assembly (Does not include reject catch support spring or hairpin spring)
	Reject catch pivot stud (part of cam)
	Reject catch stop (part of cam)
G400A111	*Turntable mounting and guide rod assembly
402A62	*Knurled roller
G400A46-1	Arm rest assembly (Mounted on metal only)
G400A46-2	*Arm rest assembly (Mounted on wood or plastic)

*These parts are not interchangeable with RC160 parts having same description but different part numbers.

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Illustration 1

OPERATING INSTRUCTIONS

This changer is a simple, gearless, foolproof mechanism (See Illustration 3), designed to give the maximum convenience and pleasure with a minimum of attention and care. For the fullest enjoyment of your recordings and carefree operation of your changer, the following instructions should be observed.

This machine operates on 115 volt, 60 cycle alternating current only.

FOR AUTOMATIC OPERATION

This machine will play and automatically change a series of up to twelve 10-inch records or ten 12-inch records of the 78 r.p.m. type having an eccentric stopping groove. Recordings sold today for home use are of this type. Very old records that do not have an eccentric stopping groove can be played semi-automatically by operating the reject lever at the conclusion of each selection.

1. Raise the tone arm, loosen the needle thumb screw and insert the needle with the flat on the needle shaft toward the screw; tighten the screw. Sapphire point needles are recommended, but any long-wearing alloy-tip needle will give satisfactory performance. Ordinary steel needles are not advisable as they do not play more than a few records per needle. (See Illustration 2.)

2. On the tone arm hub are two detents (grooves) marked A and H. By holding the hub and moving the tone arm sidewise, these detents can be positively felt. Engage the detent marked A for automatic operation. (See Illustration 2.)

3. The record support shelf must be adjusted for 10-inch or 12-inch records. By firmly grasping the shelf and rotating it one-half revolution in either direction, positive detents can be felt. For 10-inch records the wider ledge should face the spindle. For 12-inch records rotate the shelf so that the narrower ledge is toward the spindle. (See Illustration 2.)

4. The toggle plate, which hinges between the 10-inch and 12-inch positions on the record shelf, should be flipped toward the back, away from the spindle. (See Illustration 2.)

5. Place the load of records on the changer; they should be supported at the center on the spindle, and at one side on the record shelf. (See Illustration 1.)

6. Flip the toggle plate over on to the top of the record stack. This must be done to provide the necessary tension to allow records to drop correctly. (See Illustration 1.)

7. Push the control lever to the "ON" position. If the changing action does not start at once, push the lever to the reject position and release. The changer will now automatically play the load of records.

If you should forget to turn the machine off after the last record has played, no harm will come to the mechanism, as the last record will continue to play until turned off.

TO REMOVE RECORDS

1. Move the control lever to the "OFF" position while the needle is still on the record. If the tone arm is lifting off the record, wait a moment until it moves back down onto the record before turning off the machine.

2. Lift the tone arm from the records and place on the tone arm rest.

3. Flip the toggle plate toward the back, away from the spindle.

4. Lift the records off the turntable until they completely clear the spindle.

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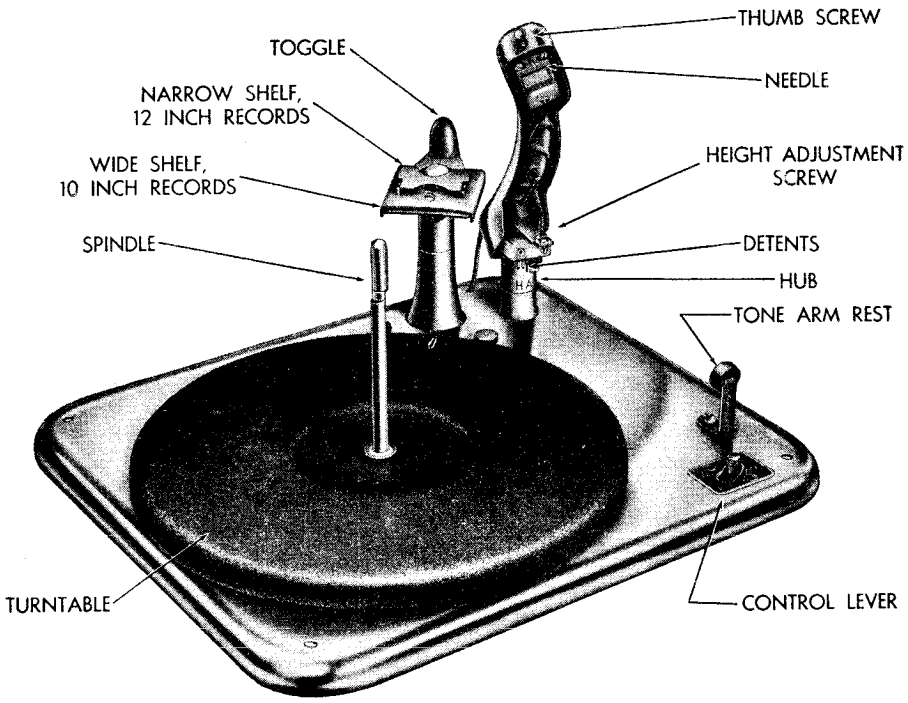

Illustration 2

The spindle used on this record changer is completely automatic. When removing the records from the turntable, the pressure of the records under the top section of the spindle causes it to rotate, automatically, into the correct position for removal of the records. As soon as the records are free of the spindle, the top section drops back into the correct position for reloading.

TO REJECT RECORDS

A record may be rejected at any time during playing by simply pushing the control lever momentarily to the reject position.

NON-STANDARD RECORDS

This machine has been designed to give excellent performance as a completely automatic record changer. Records, such as home recordings, children's records, etc., which are not intended for automatic playing, may be played manually. For satisfactory operation, carefully observe the following instructions:

1. Move the tone arm into "H" detent on the hub.
2. Rotate the record shelf to the 12-inch position.
3. Flip the toggle plate toward the back.
4. Put the selected record over the spindle and down onto the turntable.
5. Move the control lever to the "ON" position.
6. Wait a moment until the tone arm raises and completely lowers; the tone arm will then be free to be placed by hand on the starting edge of any size record on the turntable.
7. At the conclusion of the record, move the control lever to the "OFF" position and place the tone arm on the rest.

SPECIAL INSTRUCTIONS

Do not oil any part of the changer as it has been permanently lubricated at the factory.

Changer should be level as any tilt would cause the tone arm to fall in the direction of the tilt.

To adjust the height of the tone arm from the record: (If needle does not set down on record, or if it does not raise high enough to clear the top of the last record of a stack) Raise the tone arm and turn the height adjustment screw counterclockwise to increase the height of the tone arm, or turn clockwise to lower the tone arm. (Loosen the nut to adjust the screw; tighten again after resetting the screw.)

Do not attempt to make any other adjustment as mechanism has been adjusted at the factory.

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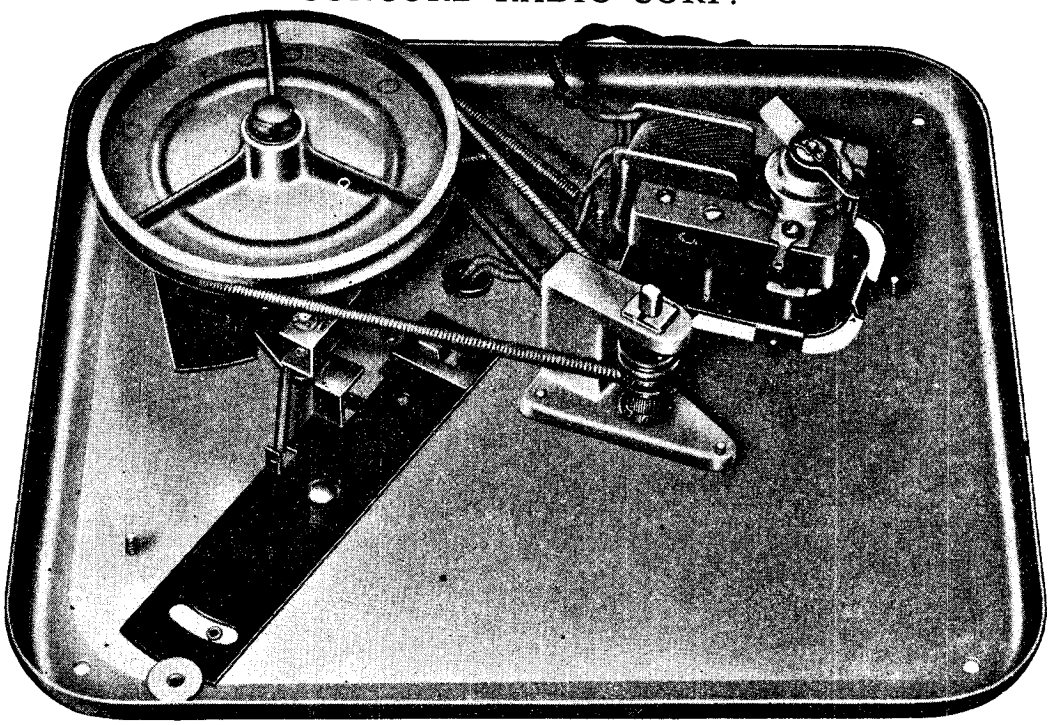

Illustration 3

SERVICE PARTS LIST

RECORD CHANGER

Part No.	Description
A-25121	Washer .625 O.D. x .375 I.D. x .010 brass (Tone Arm Trip Assy., and Cam and Drum Assembly)
A-50002	Cam, Record Ejector
A-50005	Washer, Cam Cover
A-50009	Washer, 5/16 O.D.x.156 I.D.x.025 brass (Ratchet Release Assy., and Index Arm on Ejector and Tone Arm Assy.)
C-50030	Spindle Bearing Assembly
A-25076	Screw, Set
A-50010	Turntable Bearing Assembly
A-50019	Ball Bearing, Thrust
A-50046	Clip
A-50053	Washer, Flat
A-50088	Washer, Felt
B-50127	Spindle Assembly
B-50181	Strut
A-50198	Pulley Bearing
BH1A1100	Tinnerman Fastener
BS014D05	Screw, No. 8-32 x 5/16
A-50032	Spring, Index
A-50035	Grommet (Tone Arm Lead)
A-50040	Spring, Toggle Plate
A-50055	Spring, Ejector
A-50066	Nut, Acorn
A-50069	Spring, Tone Arm Counterbalance
A-50076	Spring, Tone Arm Lead-in, and Reject
B-50085-1	Rest Assembly, Tone Arm
A-50187	Screw No. 8-32 x 5/16 Thread Cutting
C-50100	Motor Board Assembly
A-50097	Cover, Switch
A-50102	Switch
A-50104	Washer, Cup
B-50140	Lever, On-Off
A-50153	Escutcheon
A-50301	Rivet, Shoulder (On-off lever)
BV321E13	Rivet, Tubular 1/8 x 3/16
A-50110	Toggle Plate and Bumper Assembly
A-50015	Plate, Toggle
A-50025	Bumper

Part No.	Description
A-50162	Plate, Ejector
A-50176	Ejector Shelf Casting
C-50180	Cam and Drum Assembly
A-50058	Pad, Friction
A-50059	Stud
B-50060	Cam Assembly
B-50700	Drum Drive Wheel
B-50190	Plate Assy., Ejector and Tone Arm
BS014B05	Screw No. 8-32 x 3/16
A-50200	Ejector Shaft Assembly
B-50300	Tone Arm Trip Assembly
B-50400	Release Bracket Assembly
A-50406	Spring, Dog
A-50500	Lift Assembly, Tone Arm
B-50600	Hub Assembly, Tone Arm
B-50820	Tone Arm Assembly
A-50802	Crystal Pickup and Thumb Screw
A-50803	Insert
A-50804	Screw No. 4-40 x 1/4
A-50806	Lead, Shielded
A-50807	Clip
D-50808	Tone Arm
C-50910	Turntable
A-51163	Clip (Ratchet Release Assembly)
A-50136	Clip "C" (Index Arm and Tone Arm Trip Lever Assembly)
B-50137	Belt, Drive
A-50150	Record Adjustment Shaft Assembly
C-50154	Motor (for 60 cycle, 105-125 volts)
A-50186	Grommet
A-50038	Spacer
A-50188	Screw, No. 6-32 x 5/8 thread cutting hex washer head

Order parts not listed by specifying (1) Part Name, (2) Model Number and (3) Run Number.

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Due to the fact that a thorough understanding of the proper operation of a record changer is necessary before any attempt be made to repair or effect service adjustments, a description of the change cycle of the P-51 Record Changer is given.

The Record Shelf is set for the size record to be played by turning the Shelf to the position having the shortest distance from the Spindle for 10 inch records and to the position having the greatest distance from the Spindle for 12 inch records. Then the correct number of records should be placed on the shelf. (Twelve 10" or ten 12" but not mixed). Do not turn the Record Shelf until the changer has stopped automatically after all the records are dropped or removed from the Record Shelves.

Badly chipped records or records with breaks should not be used.

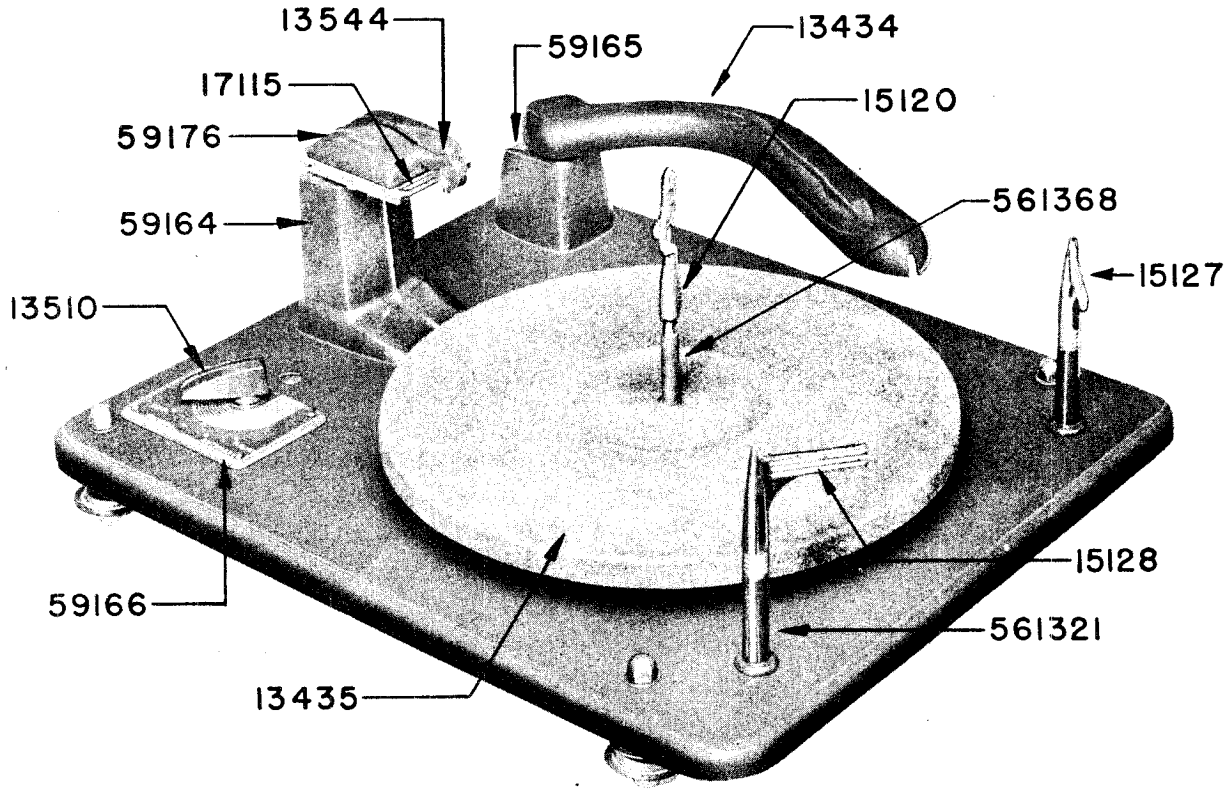

FIGURE 1

TOP VIEW OF P-51 RECORD CHANGER

13434	Tone Arm Assembly
13435	Turntable
13510	Control Knob Assembly
13544	Shelf Cover and Record Hold-Down Rubber Assembly
15120	Spindle Assembly
15127	Record Support and Crank Assembly(R.H.)
15128	Record Support and Crank Assembly(L.H.)
17115	Plunger and Shelf Assembly
59164	Record Support Post
59165	Tone Arm Support
59166	Escutcheon
59176	Shelf Cover
561321	Shelf Post
561368	Turntable Drive Shaft

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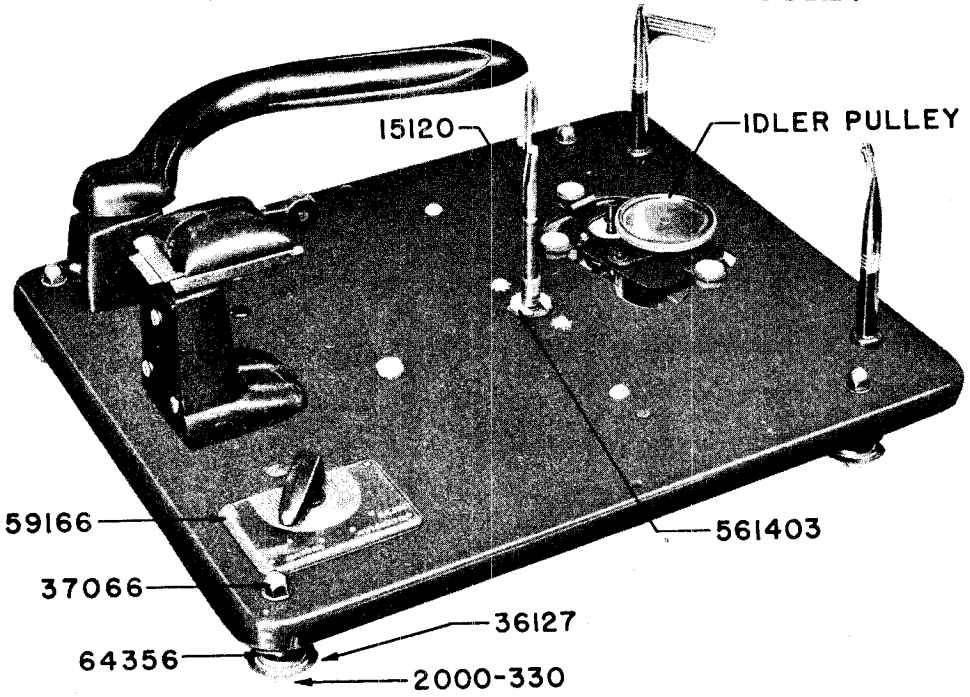

FIGURE 2

TOP VIEW WITH TURNTABLE REMOVED

09217 Mounting Spring Assembly
36127 Cup
36137 Retainer Nut
64014 Upper Spring
64356 Lower Spring
2000-330 #10-32 x 1 7/8" Rd. Hd. M. S.
15120 Spindle Asssembly
37066 Acorn Palnut
59166 Escutcheon
561403 Turntable "C" Stop Washer

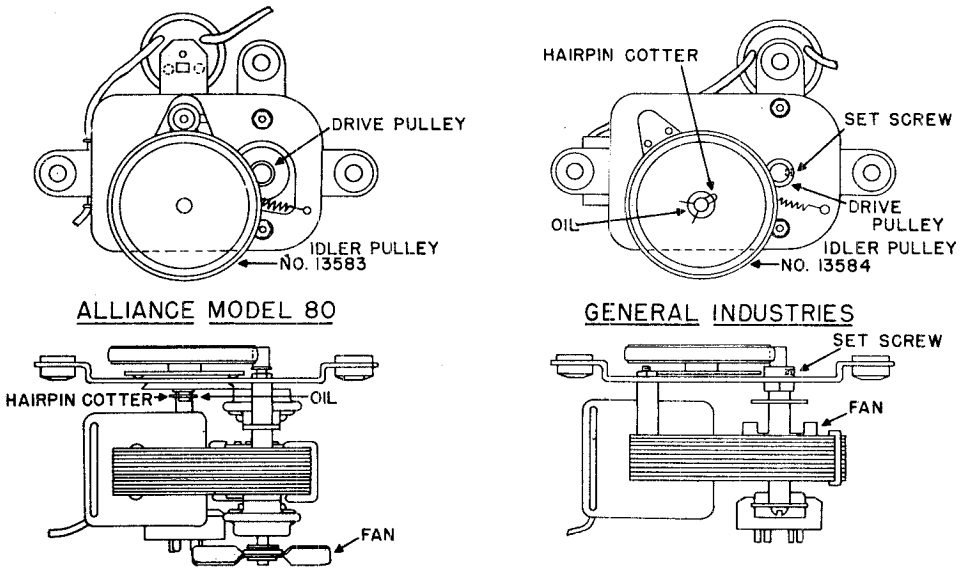

FIGURE 3

The Two makes of motors used on the P-51 Automatic Record Changers are the Alliance Motor and the General Industries Motor. The complete motors are interchangeable, but it is necessary to identify the make of motor when ordering an Idler Pulley. Either make may readily be distinguished by noting the location of the fan on the motor and the location of the hair pin cotter holding the Idler pulley as shown in above figure 3.

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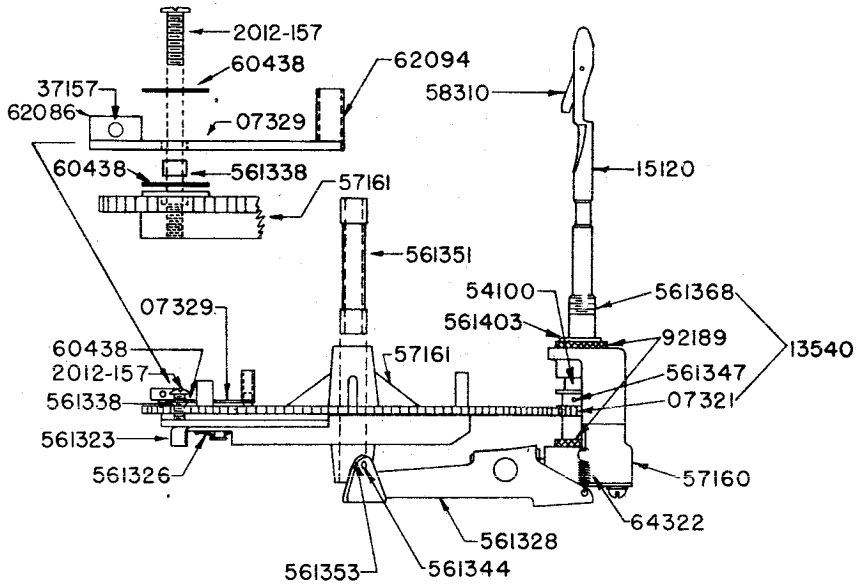
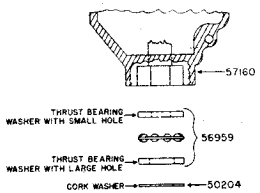


FIGURE 4
MAIN CAM AND SPINDLE SUPPORT BRACKET ASSEMBLY

Part No.	Description
07321	Spindle Gear Assembly
07329	Starting Lever Assembly
13540	Drive Shaft and Gear Assembly (561368 and 07321 assembled)
15120	Turntable Spindle Assembly
37157	Tubular Rivet .085" x ¼"
50204	Cork Washer ¾" O.D.
54100	Spacer
56959	Thrust Bearing
57160	Bracket
57161**	Main Cam
58310*	Automatic Record Latch
60438	Paper Washer
62086	Starting Lever Bumper
62094	Starting Lever Sleeve
64322	Record Lift Lever Spring
92189	Felt Washer
561311*	Tone Arm Lift Lever Rivet
561323*	Automatic Stop Pawl
561326*	Spring Washer
561328*	Record Lift Lever
561338	Spacer



561344*	Pin
561346*	Record Lift Lever Rivet
561347	Pin
561351	Main Cam Tube
561353*	Record Lift Lever Roller
561368	Turntable Drive Shaft
561403	Turntable Stop Washer
2012-157	#6-32 x 5/16" Bdg. HMS

* Not Sold Separately.
**Order Main Cam by Assembly No. 07332.

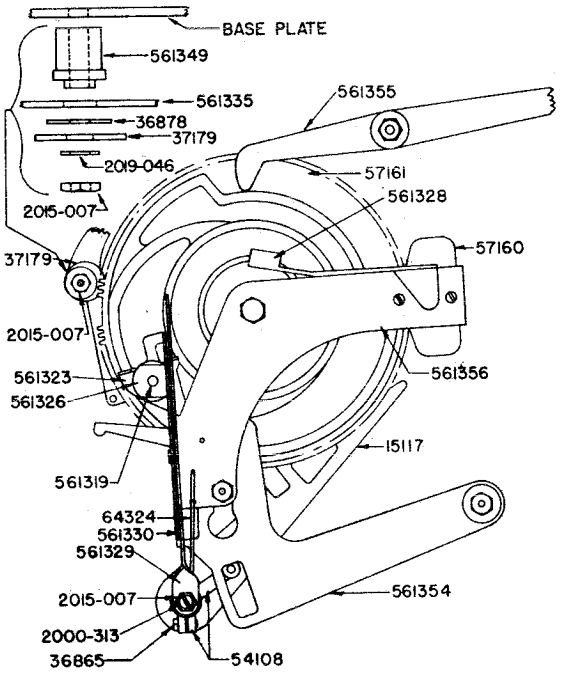
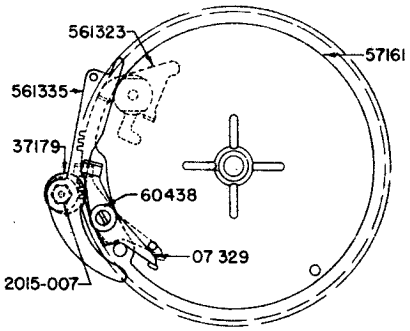


FIGURE 5

MAIN CAM AND ASSOCIATED ASSEMBLIES

07329	Starting Lever Assembly
15117	Trip Finger Assembly
36865	#10-24 x ½" HHMS
36878	Flat Washer
37179	Flat Washer 7/8 O. D. x 1/16 Th.
54108	Tone Arm Crank
57160	Spindle Support Bracket
57161**	Main Cam
60438	Paper Washer
64324	Spring
561319**	Stud
561323**	Automatic Stop Pawl
561326**	Spring Washer
561328*	Record Lift Lever
561329*	Tone Arm Lift Rocker
561330*	Tone Arm Stop Lever
561335	Record Ejector Lever
561349	Spacer
561354	Tone Arm Return Lever



561355*	Shelf Lever
561356*	Tie Plate
2000-313	#10-32 x ½" RHMS
2015-007	#10-32 Std. Hex Nut
2019-046	#10 SP Ext. Lockwasher

* Not Sold Separately. See Page 7
**Order by Assembly No. 07332.

MODEL P-51

FARNSWORTH TELEV. & RADIO CORP.

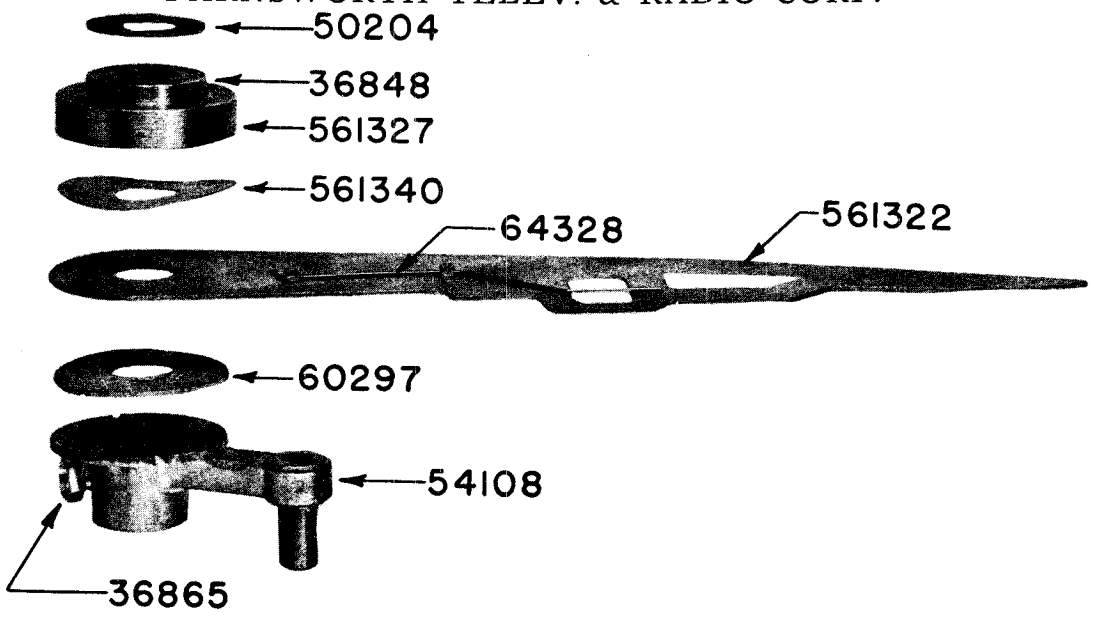


FIGURE 6

FRICTION TRIP ASSEMBLY

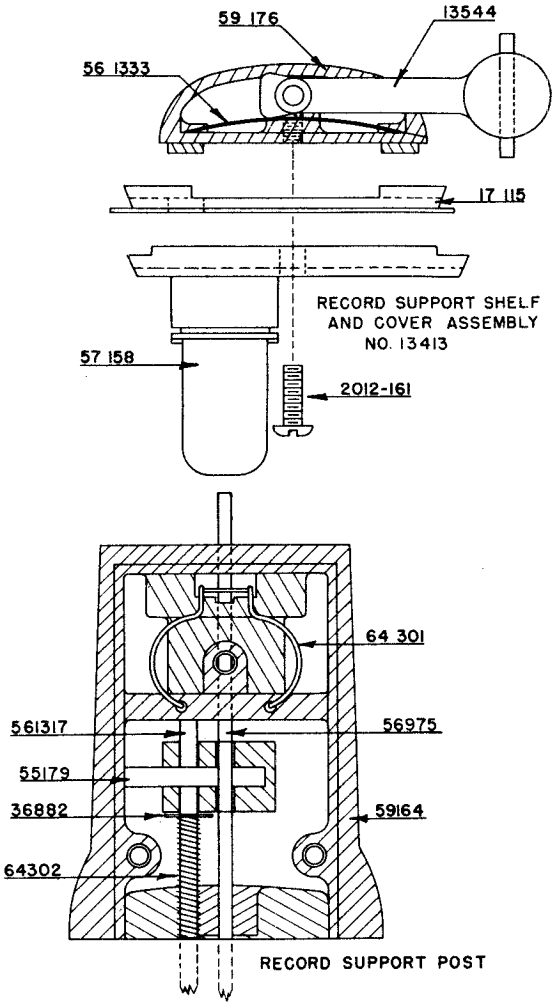


FIGURE 7

Part No.	Description
36848	6-32 x 3/8" Bristol Set Screw
36865	#10-24 x 1/2" HHMS
50204	Cork Washer 3/4" O. D.
54108	Tone Arm Crank
60297	Cork Washer
64328**	Spring
561322**	Trip Finger
561327	Trip Finger Spacer
561340	Wave Washer

**Order by Assembly No. 15117.

FIGURE 7

RECORD SUPPORT POST AND SHELF

Part No.	Description
13544	Shelf Cover Arm & Record Hold Down Rubber Assembly
17115	Plunger and Shelf Assembly
36882	Hairpin Cotter
55179	Pin
56975	Record Plunger Rocker Arm
57158	Record Support Shelf
59164	Record Support Post
59176	Shelf Cover
64301	Record Support Post Hold Down Spring
64302	Interceptor Shaft Spring
561317	Interceptor Shaft
561333	Shelf Cover Spring
2012-161	#6-32 x 7/16" Bdg. HMS

NOTE:—Record Plunger Rocker Arm 56975 is inserted in the elongated hole in Ejector Plunger No. 17115.

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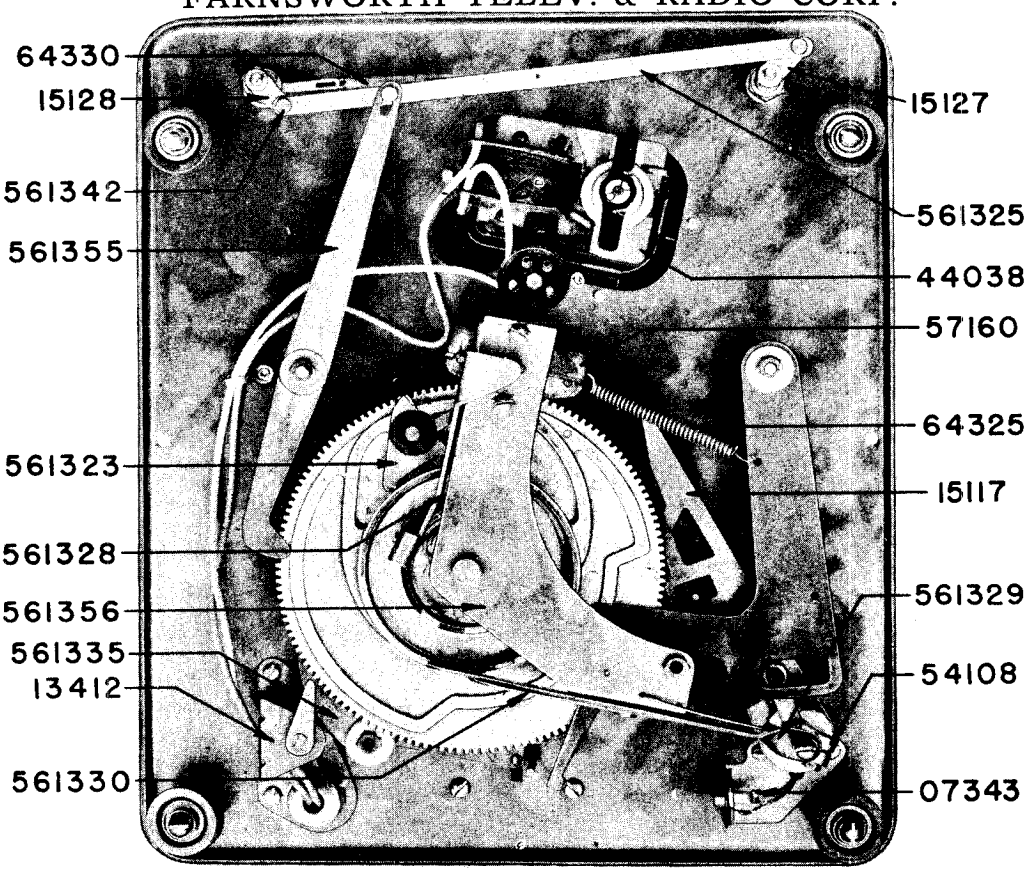

FIGURE 8

BOTTOM VIEW

07343	P. U. Socket Assembly
13412	Auto. Stop Switch and Bracket Assembly
15117	Trip Finger and Spring
15127	Record Shelf and Crank Assembly (R.H.)
15128	Record Shelf and Crank Assembly (L.H.)
44038	Phono Motor
54108	Tone Arm Crank
56975	Record Plunger Rocker Arm
57160	Bracket
57161**	Main Cam
64325	Tone Arm Return Lever Spring
64330	Shelf Link Spring
561323**	Automatic Stop Pawl
561325*	Shelf Crank Lever
561328*	Record Lift Lever
561329*	Tone Arm Lift Rocker
561330*	Tone Arm Stop Lever
561335	Record Ejector Lever
561342	Shelf Crank Rivet
561355*	Shelf Lever
561356*	Tie Plate

*Not sold separately. Part numbers 561325, 561355 with R.H. and L.H. crank sold as assembly #07330. Part numbers 561328, 561329, 561330 and 561356 sold as assembly #13414.

**Order by assembly No. 07332 which includes 57161 and 561323.

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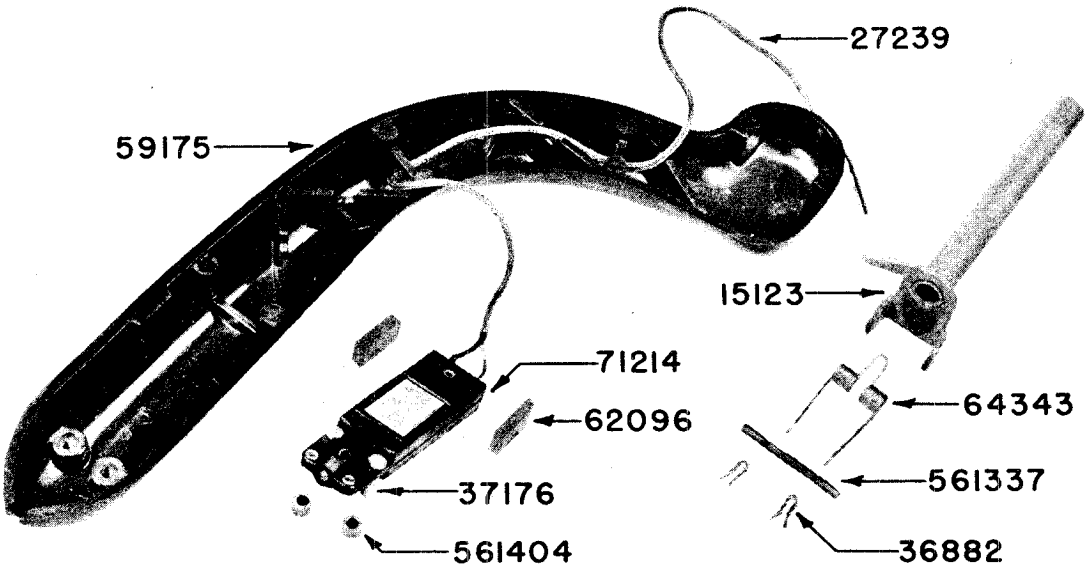

FIGURE 9 TONE ARM ASSEMBLY No. 13434

15123	Tone Arm Bracket and Support Tube Assembly	62096	P. U. Damping Shim
27239	Shielded P. U. Conductor	64343	Tone Arm Spring
36882	Hairpin Cotter Hubbard #111 x .026"	71214	Cartridge, Webster or Astatic
37176	#4-36 x 13/32 RHMS	561337	Hinge Pin
59175	Tone Arm Housing	561404	P. U. Spacer

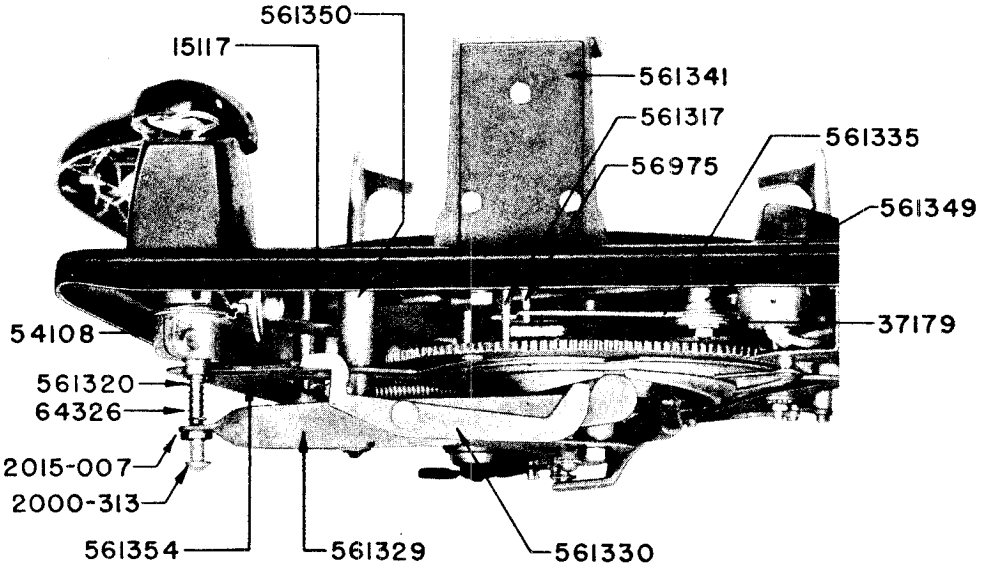

FIGURE 10 TONE ARM LIFT LEVER

15117	Trip Finger Assembly	561335	Record Ejector Lever
54108	Tone Arm Crank	561341	Record Support Post Cover
37179	Flat Washer	561349	Spacer
56975	Record Plunger Rocker Arm	561350	Tie Plate Mounting Spacer
64326	Tone Arm Brake Spring	561354	Tone Arm Return Lever
561317	Interceptor Shaft	2000-313	#10-32 x ½" RHMS
561320	Tone Arm Lift Rod	2015-007	#10-32 Std. Hex Nut
561329*	Tone Arm Lift Rocker		
561330*	Tone Arm Stop Lever		

* Sold only as part of assembly 13414.

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DO NOT LUBRICATE THE FOLLOWING PARTS:

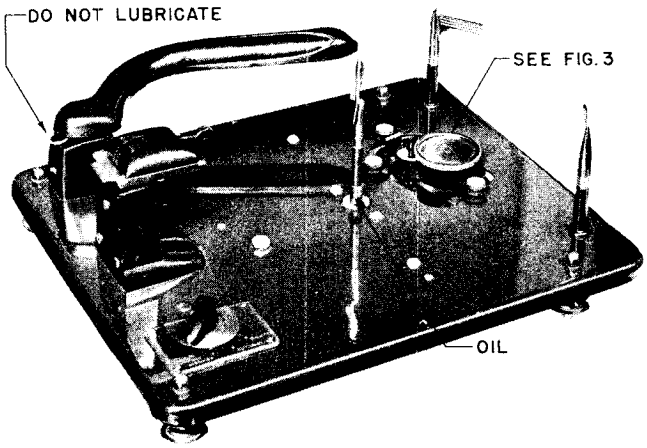
Friction Trip Assembly
Tone Arm Support Tube No. 15123
Starting Lever Assembly No. 07329
Tone Arm Hinge Pin No. 561337

LUBRICATION POINTS

(FIGURE 11)

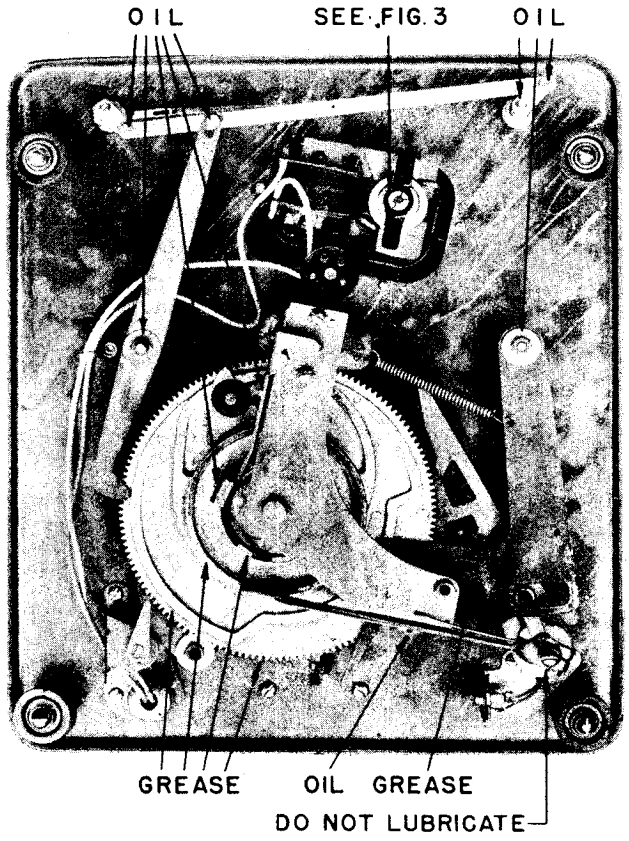
USE LIGHT MACHINE OIL ON FOLLOWING PARTS:

Turntable Drive Shaft Felts No. 92189
Tone Arm Lift Lever Rivet
Record Lift Lever Rivet and Roller Pin
Tone Arm Return Lever No. 561354 at the Spacer No. 561350
Phono Motor (one drop on felt at each end of shaft)
Idler Pulley (see fig. 3 page 3)
Crank Link Lever at Pivot Point
12" Interceptor Shaft at bearing in baseplate



USE LIGHT GREASE OF VASELINE TYPE AT FOLLOWING POINTS:

Very light film at Spindle and tube bearing surface
Main Cam Tube or Stud
Main Cam at Gear Teeth and Cam Track
Tone Arm Return Lever at Guide Spacer
At Record Lift Lever and Spindle Ball



LUBRICATION

The record changer should be lubricated and cleaned periodically or when a major part or assembly is replaced. Dirt, old oil or grease may be removed with carbon tetrachloride or other similar cleaning fluid.

Use only a good grade of machine oil with a viscosity of SAE 10.

Care should be exercised to prevent an excess of oil being used on any part and that no oil gets on the motor pulley, idler pulley or turntable rim.

Every six months or once a year a thin coat of light grease of the vaseline type may be applied to all surfaces of the main cam that contact lift levers and tone arm lift lever.

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MODEL P-51

FARNSWORTH TELEV. & RADIO CORP.

CYCLE OF OPERATION

Turn on the control which starts the phonograph and move the Control Knob to reject position and hold until the Tone Arm begins to move toward the Turntable, then release the knob. The changer will go into cycle. The Tone Arm should swing clear of the stack, a record should drop to the Record Ejector Plunger, pause, then gently settle to the Turntable. The Tone Arm should swing over the record and be lowered to the starting groove on the record. When the record is played the above cycle is repeated until there are no records remaining on the Record Shelf. After the last selection has been played the changer will automatically stop.

The above cycle of operation for the P-51 Changer is explained in the following description and illustrations.

When the Control Knob is moved to reject position, the Reject Lever pulls the Starting Lever against the Starting Pawl on the Spindle Gear and Pawl Assembly, which makes the Main Cam mesh with the Spindle Gear.

Figure A. The Turntable is screwed onto the Spindle Gear and both are driven through the Idler Pulley by the motor. When the cycle is completed the Main Cam disengages from the Spindle Gear because several teeth are left off the Main Cam Gear . This is called the playing position.

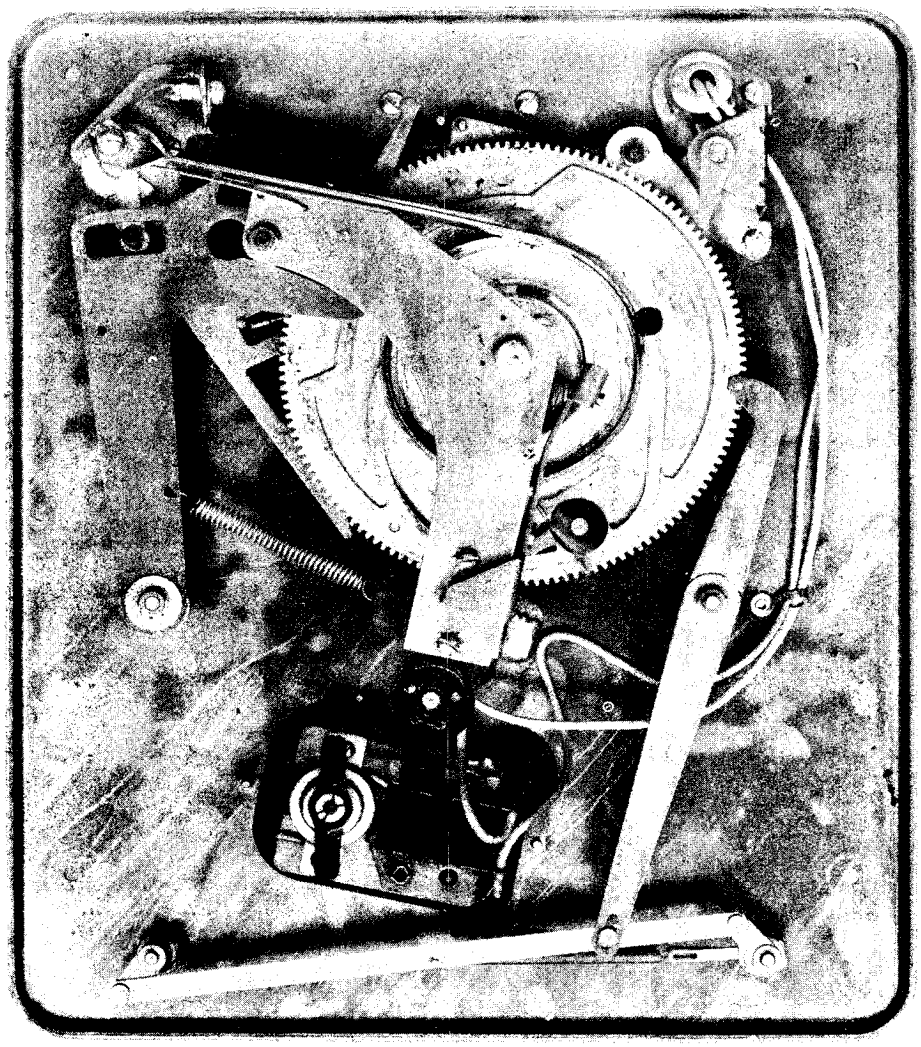

FIGURE A

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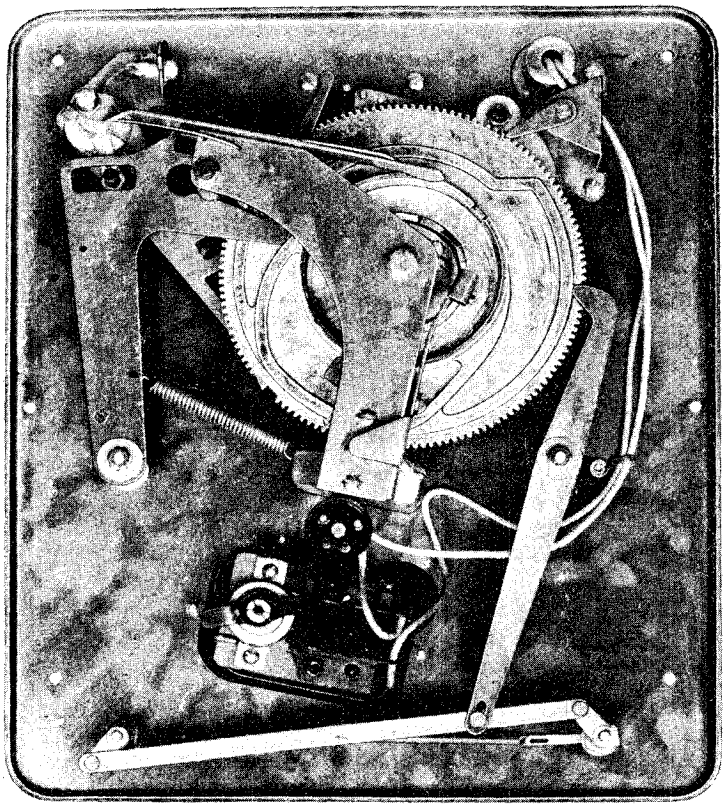

FIGURE B

Figure B. The change cycle has just started. The Tone Arm Lift Lever has raised the Tone Arm from the record and the Tone Arm Return Lever has started to move the Tone Arm away from the Turntable. The Record Lift Lever Assembly has started to raise the Spindle and stack of records resting on it.

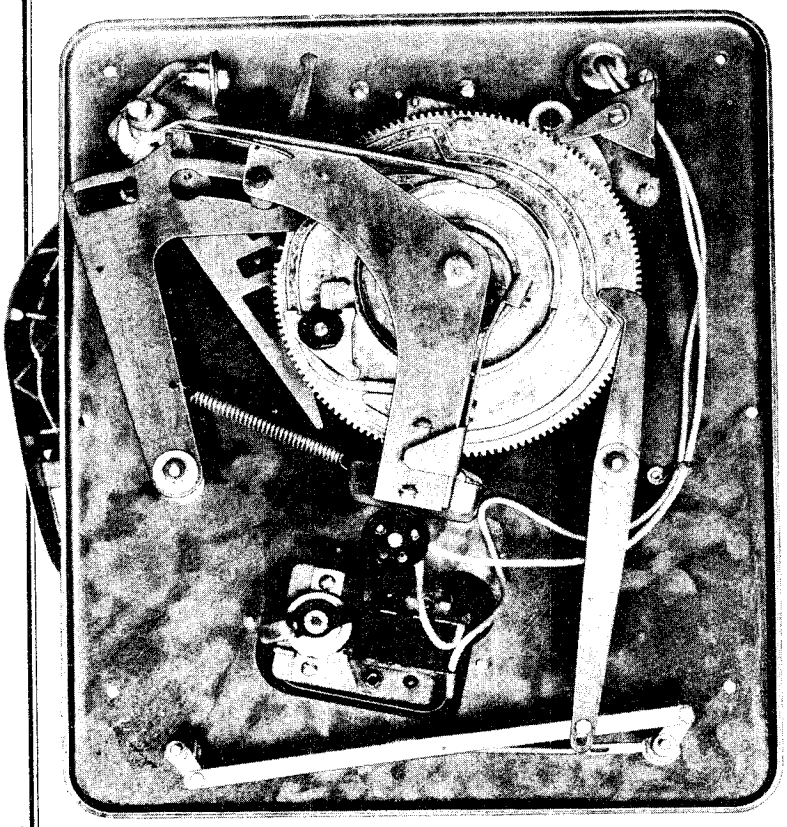

FIGURE C

Figure C. The Shelf Lever has moved in toward the center of the Main Cam which moves the Support Shelves in under the record stack. At the same time the Record Lift Lever has started to lower the Spindle and the stack of records.

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MODEL P-51

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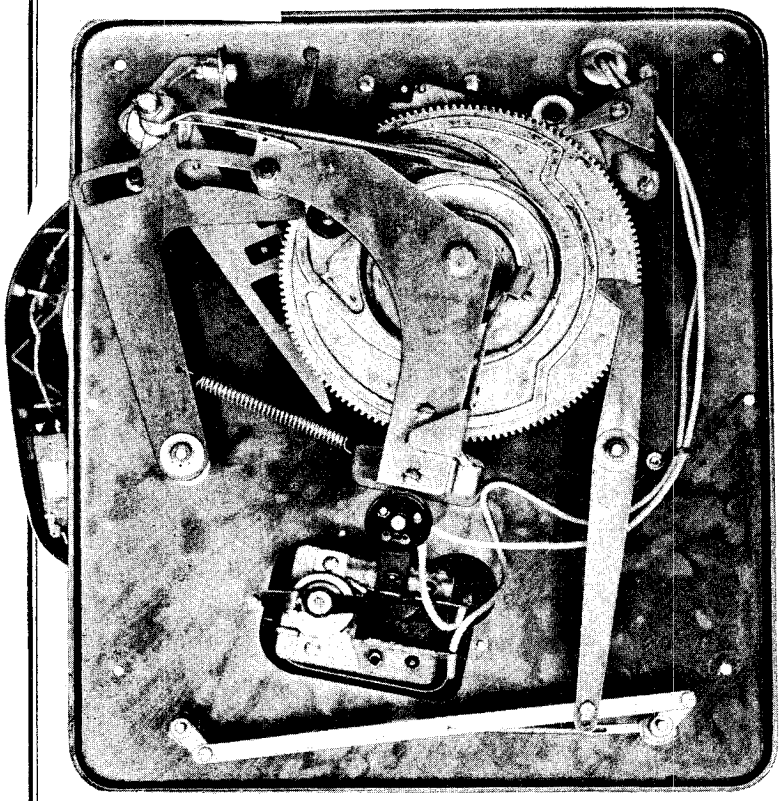

FIGURE D

Figure D. The record stack has been lowered to the Record Support Shelves. Simultaneously the bottom record has been pushed off the stationary shelf and rests on the Record Ejector Plunger.

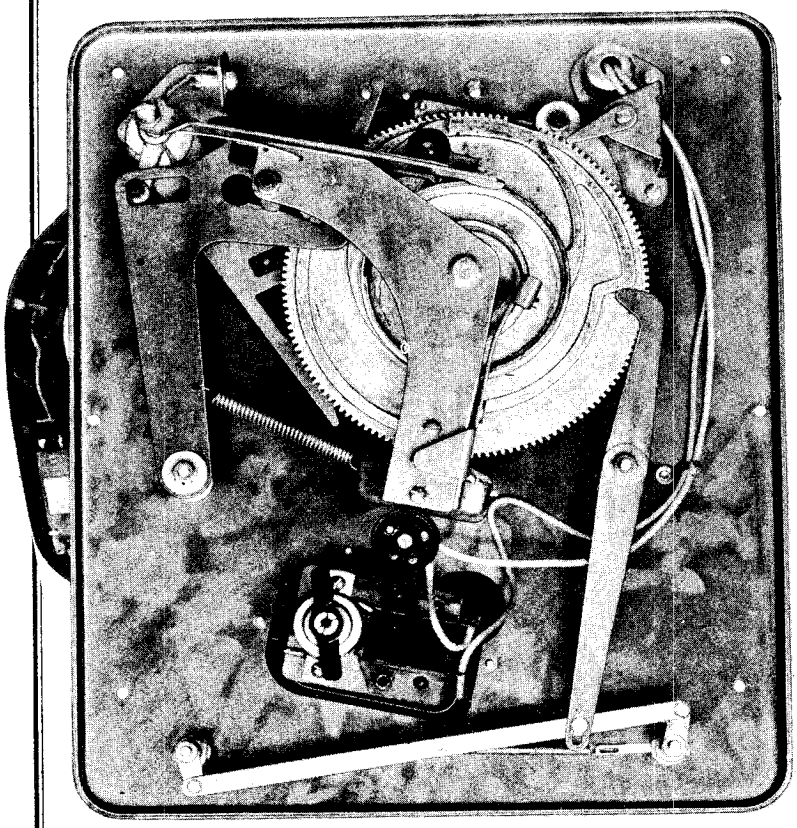

FIGURE E

Figure E. The Record Ejector Plunger retracts at the same time both of the Record Support Shelves move out from under the bottom record which then drops to the Turntable.

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1. TO REMOVE TURNTABLE 13435.

See figure 1.

The Spindle Gear may be wedged by a wooden block or a wrapped screw driver between it and the Main Cam, to prevent it from turning while the Turntable is being unscrewed from the Spindle, (by rotating counter-clockwise). When replacing Turntable, see that the "C" Washer (No. 561403) remains fully inserted in the Turntable shaft and make sure the Turntable does not bind on the Idler Pulley. The Turntable may then be properly tightened. The Record Latch must be entirely in the recess in the Spindle to permit the Turntable to be replaced. NEVER USE GAS PLIERS TO HOLD SPINDLE.

2. TO REMOVE IDLER PULLEY.

See figure 3.

After the Turntable has been removed, the Idler Pulley can be removed by slipping off the small hairpin cotter on the end of the Idler Pulley shaft.

When replacing the Pulley a single drop of oil should be used on the pulley shaft.

CAUTION: Do not allow oil to get on either the Idler Pulley or the Turntable Rim.

3. FRICTION TRIP ASSEMBLY

See Figure 5.

The Trip Finger Spacer, part No. 56137, is set on the Tone Arm Support Tube (15123) with an allowance of eight thousandths of an inch clearance between the Cork Washer (50204) and the Baseplate. No attempt should be made to adjust the Friction Tip by changing this clearance. The Friction Trip is adjusted by raising or lowering the Tone Arm Crank (54108) on the Tone Arm Support Tube, after loosening Tone Arm Crank set screw.

4. STARTING TRIP ASSEMBLY

The Starting Lever (07329) is a part of the Main Cam Assembly (See fig. 4). This Lever is changed from trip position to play position by striking washer No. 37179 (see fig. 5) during the change cycle. If the washer does not move the Starting Lever far enough, the changer will trip again as soon as the change cycle is completed. To correct adjustment, loosen Lock Nut 2015-007 and move Washer 37179 in toward the Main Cam. Tighten Lock Nut securely after proper adjustment has been made.

5. TONE ARM DROP AND NEEDLE LANDING

The Needle should drop on the record at a position equi-distance from the outer edge and the first playing groove of a standard record. Make sure the changer is in playing position; that is, the Tone Arm has moved over so the Needle is on the record. To make adjustment for 10-inch records, loosen the Tone Arm Crank set screw and move the Tone Arm Crank (54108) clockwise to move the needle out. When making this adjustment, be careful not to disturb Friction Trip adjustment. After the 10-inch setting has been properly made and the set screw tightened, the 12-inch landing will usually be correct. If not it will be necessary to slightly bend the Tone Arm Return Lever (561354) near the point where it touches the 12-inch interceptor Shaft (561317), see fig. 10. In both adjustments, the Record Shelf must be in the corresponding 10-inch or 12-inch position.

6. TONE ARM HEIGHT See Fig. 10

The Tone Arm height during change cycle is adjusted by raising or lowering screw (2000-313) on the Tone Arm Lift Lever. With records on the Shelf and Spindle, the top of the Tone Arm at the highest point during change cycle should be 3/16" below the bottom of the lowest record of the record stack.

7. RECORD LATCH CHATTER

Any chatter developing in the Record Latch (56130) Figure 4, may be corrected by applying a drop of light oil between the moving part of the Turntable Drive Shaft (561368 and the stationary spindle, (15120).

8. When repairs are being made a careful check should be made of all moving parts in order to make sure that no binding occurs. Check all moving parts for binding before springs are connected.

All levers which operate on shoulder studs should be assembled with the burred side of the retaining washer away from the lever. This method is necesary to prevent the washer from binding on the lever.

9. CHECKING CHANGER IN CABINET

Before checking any P-51 record changer in the cabinet, make sure the mounting bolts are released and the cardboard spacers are removed; otherwise the changer will not properly feed records from the record support shelf and the tone arm will not position properly on the record. If any adjustments are made with the changer bolted down and the mounting bolts then released these adjustments will have to be remade.

When setting up a P-51 changer it should be checked for a needle landing with a full stack of records, both 10-inch and 12-inch. This is done by loading the record support shelf with 12 ten-inch records and moving the control knob to reject, allow the record to play through and trip, check the landing on the second record, then trip records up to and including eleven. Allow the eleventh record to play through and feed number twelve automatically, observe needle landing and automatic trip. Repeat above using ten 12-inch records, only instead of records eleven and twelve, substitute records nine and ten in the preceding section.

10. CAUTION: The use of force in an effort to raise the Tone Arm to a greater height than permitted by the Tone Arm Support may result in breaking of the Tone Arm.

11. REPLACING THRUST BEARING

When replacing Thrust Bearing 56959, see fig. 4, the thrust bearing washer having the smaller hole must be placed in the turntable drive shaft bracket 57160 first, that the shoulder on the turntable drive shaft may rest on the washer.

12. REPLACING INDEXING SPRING

Move control knob to Automatic position and pull off knob. Remove the two screws holding switch assembly to baseplate. Push the reject rod from hole and remove switch assembly. Remove the hairpin cotter from shaft and pull shaft forward so that pawl will not interfere with spring. Replace spring. Hold the spring against bracket away from pawl and push shaft into place. Be sure the lip on the pawl enters the slot in the switch. Replace hairpin cotter and assembly is ready to be replaced.

50 CYCLE CONVERSION

The Service Department will, upon request furnish information pertaining to the conversion of 60 cycle operated changers to 50 cycle operation.

PARTS PRICE LIST
P-51

Part No.	DESCRIPTION	List Price
05087	Shipping Shim Assembly	$ .10
07321	Spindle Gear Assembly	.35
07329	Starting Lever Assembly	.30
07330	Shelf Crank and Link Assembly	.75
07332	Main Cam Rivet Assembly	2.60
07343	P. U. Socket Assembly	.30
09217	Mounting Spring Assembly	.30
13410	Turntable Drive Shaft and Bracket Assembly	1.95
13412	Auto Stop Switch and Bracket Assembly	1.10
13413	Record Support Shelf and Cover Assembly	2.05
13414	Tie plate Assembly	1.05
13434	Tone Arm Assembly	7.55
13435	Turntable	2.15
13510	Control Knob Assembly	.20
13540	Drive Shaft and Gear Assembly	1.60
13544	Shelf Cover Arm & Record Hold-Down Rubber Assembly	.45
13583	Idler Pulley used with Alliance Motor (see Fig. 3 page 3)	
13584	Idler Pulley used with General Ind. Motor (see Fig. 3 page 3)	
13613	Adjustable Changer Rack	11.95
15117	Trip Finger Assembly	.10
15120	Spindle Assembly	2.25
15123	Tone Arm Support Tube & Bracket Assembly	.45
15127	Record Support and Crank (R. H.)	1.30
15128	Record Support and Crank (L. H.)	1.30
17115	Plunger and Shelf Assembly	2.95
27239	Shielded P. U. Lead Wire	.10
36127	Mounting Spring Cup	.10
36137	Mounting Spring Retainer Nut	.10
36347	#0 x ¼" Drive Screw	.10
36843	¼-28 x 2⅜ HHM Bolt	.10
36844	¼"-28 Hex Half Nut	.10
36845	#10 Flat Washer ¾ OD	.10
36847	Driv-Lok Pin Type B 5/64" Dia x 7/16" Lg	.10
36848	6-32 x ⅜" Bristol Set Screw	.10
36849	H. P. Cotter	.10
36865	#10-24 x ½" HHMS	.10
36878	Flat Washer	.10
36882	H. P. Cotter	.10
36888	#10-32 x 1" Bolt	.10
36914	#10-32 x 2¼ Carriage Bolt	.10
36934	H. P. Cotter	.10
36949	⅜-24 Std. Hex Nut	.10
37066	10-32 Acorn Palnut	.10
37067	Flat Washer	.10
37157	Tubular Rivet .085 x ¼"	.05
37176	4-32 x 13/32 RHMS	.10
37179	Flat Washer ⅞ OD x 1/16 thick	.10
41107	Record Changer Mounting and Shipping Kit	1.55
41117	Kit of 12 Paper Washers #60438	.25
44038	Phono Motor for 60 cycles	7.15
50204	Cork Washer ¾" OD	.10
54100	Spacer	.10
54108	Tone Arm Crank	.30
55179	Pin	.10
56959	Thrust Bearing	.50
56975	Record Plunger Rocker Arm	.15
57158	Record Support Shelf	.65
57160	Bracket	.15
59164	Record Support Post	1.00
59165	Tone Arm Support	.55
59166	Escutcheon	.85
59175	Tone Arm Housing	.70
59176	Shelf Cover	.25
60297	Cork Washer	.10

PARTS PRICE LIST
P-51

Part No.	DESCRIPTION	List Price
60438	Order by Kit (see #41117)	
62086	Starting Lever Bumper	.10
62094	Starting Lever Sleeve	.10
62096	P. U. Damping Shim	.10
64014	Upper Mounting Spring	.10
64298	Tone Arm Lift Lever Spring	.10
64301	Hold-Down Spring Record Support Post	.10
64302	Interceptor Shaft Spring	.10
64322	Record Lift Lever Spring	.10
64324	Spring	.10
64325	Tone Arm Return Lever Spring	.10
64326	Tone Arm Brake Spring	.10
64327	Reject Rod	.10
64329	Plunger Rocker Spring	.10
64330	Shelf Link Spring	.10
64343	Tone Arm Spring	.10
64356	Lower Mounting Spring	.10
71214	Crystal Astatic	5.20
90145	Switch	.30
92189	Felt Washer	.10
561312	Spring	.10
561317	Interceptor Shaft	.10
561320	Tone Arm Lift Rod	.20
561321	Shelf Post	.55
561327	Trip Finger Spacer	.30
561331	Indexing Spring	.10
561332	Shelf Lever, Spacer	.15
561333	Shelf Cover Spring	.10
561335	Record Ejector Lever	.20
561337	Tone Arm Hinge Pin	.10
561338	Spacer	.10
561340	Wave Washer	.10
561341	Record Support Post Cover	.15
561342	Shelf Crank Rivet	.05
561347	Pin	.10
561348	Spacer	.10
561349	Spacer	.10
561350	Tie Plate Mtg. Spacer	.15
561351	Main Cam Tube	.55
561354	Tone Arm Return Lever	.30
561368	Turntable Drive Shaft	1.10
561402	Auto Stop Switch Cover	.15
561403	Turntable Stop Washer	.15
561404	P. U. Spacer	.10
2000-209	#8-32 x ⅜" RHMS	.10
2000-313	#10-32 x ½" RHMS	.10
2000-327	#10-32 x 1½" RHMS	.10
2000-329	#10-32 x 1¾" RHMS	.10
2000-330	#10-32 x 1⅞" RHMS	.10
2012-151	#6-32 x ⅛ Bdg. HMS	.10
2012-157	#6-32 x 5/16" Bdg. HMS	.10
2012-161	#6-32 x 7/16" Bdg. HMS	.10
2012-209	#8-32 x ⅜ Bdg. HMS	.10
2015-007	#10-32 Std. Hex Nut	.10
2017-005	#10 Std. Flat Washer	.10
2019-007	¼" SP Int. Lockwasher	.10
2019-045	#8 SP Ext. Lockwasher	.10
2019-046	#10 SP Ext. Lockwasher	.10

Special prices on hardware ordered in gross lots.

Prices subject to change without notice.

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GALVIN MFG. CORP.

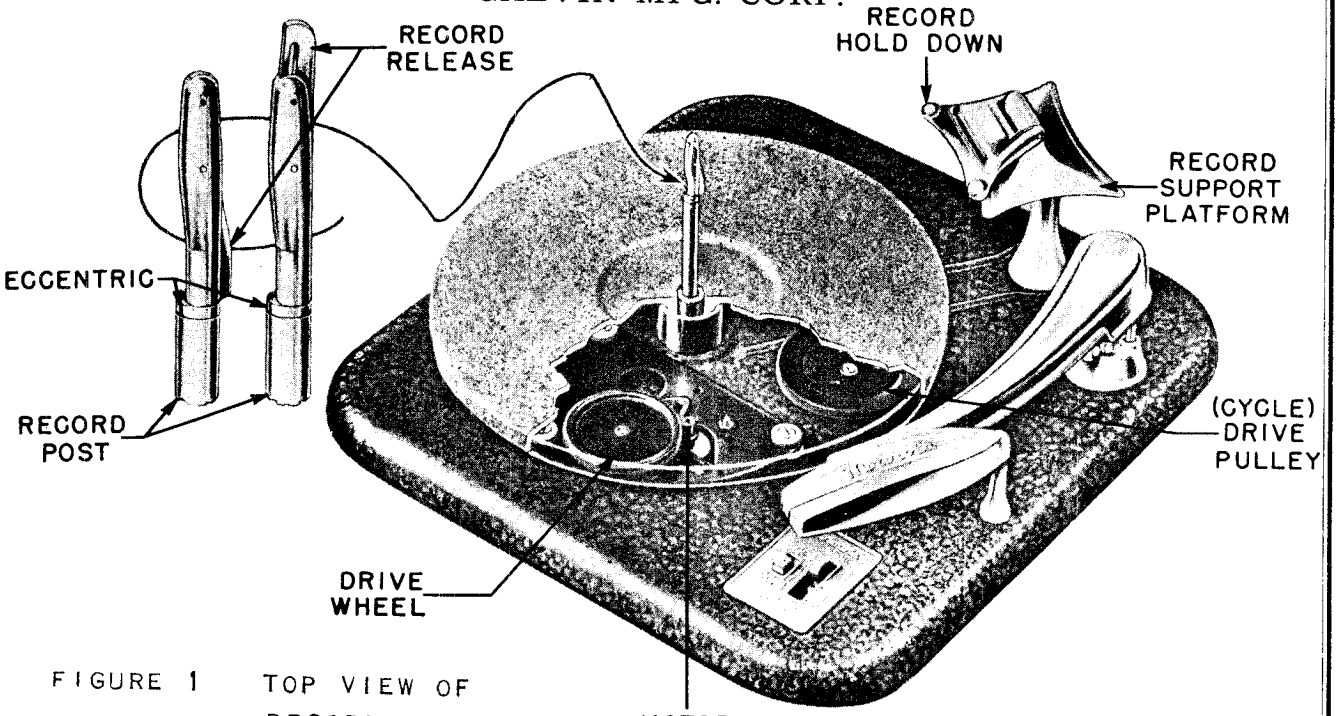

FIGURE 1 TOP VIEW OF RECORD CHANGER

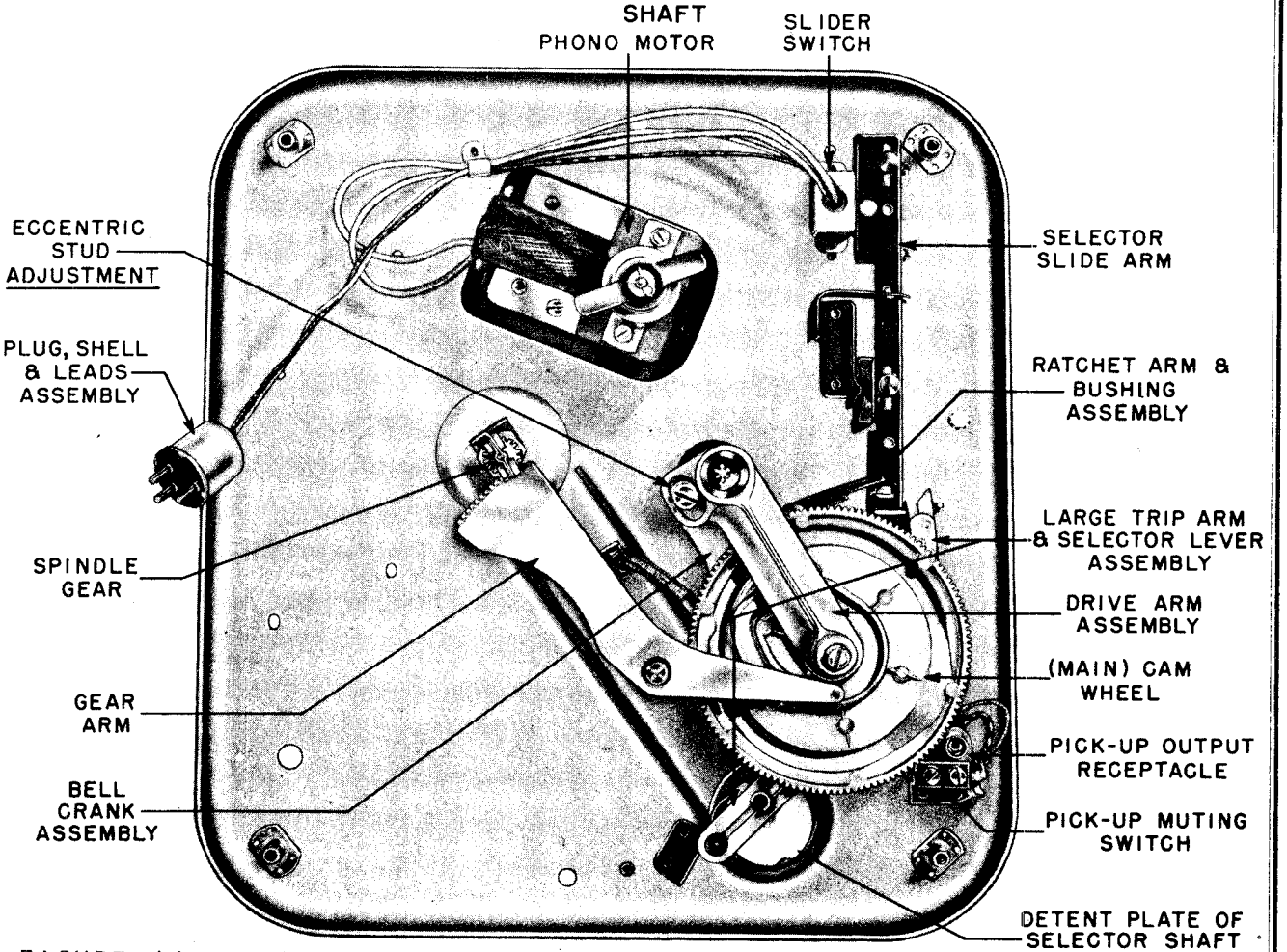

FIGURE 1A BOTTOM VIEW OF RECORD CHANGER

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MODEL B-24RC

GALVIN MFG. CORP.

All service adjustments on Motorola Record Changers should be made with the instrument in a normal operating position.

Therefore, the instrument should be supported in such a manner that parts underneath are accessible. A jig consisting of four corner support posts would be helpful. A mirror would also permit the service man to make observations and adjustments without getting into awkward positions.

CHECK THE RECORD FIRST

Before attempting to service or adjust the record changer check the records first to make sure they are not causing the trouble. This instrument will handle most of the 10 or 12 inch records available on the market, but it is not guaranteed to handle all of them. Records must be in good mechanical condition and should not be chipped, particularly around the center hole. Do not try to play automatically records that are too thick, too thin, or that are oversized or undersized, in regard to the diameter of record or center hole. Do not mix 10 and 12 inch records on the changer.

Warped records can slip on the turntable and introduce 'WOWS'. Such records may be flattened by placing between two pieces of flat plate glass and then heating in the sun or oven. Do not overheat. Allow record to cool for several hours before removing glass.

Old records made before the days of automatic record changers may not change automatically, due to the difference in thickness, or to lack of the proper eccentric groove at the finish. Most of the old records, however, may be played one at a time.

RECORD CHANGER OPERATION

SUMMARY OF OPERATION INSTRUCTIONS

As many as 10 ten-inch or 8 twelve-inch records may be loaded and played automatically on this record changer at one time.

Set the record support for the size records to be used and place records on spindle. Records will be supported above turntable by the small ledge formed by the off-set in the spindle and the record support. Steady the stack with the record hold down plate.

The left hand button will start the motor. Momentarily push the right hand button to the reject position to start the cycle. Last record will be repeated until the machine is stopped. When playing records automatically, never touch the pick-up arm when the instrument is in a changing cycle. Lift up the pick-up arm only while it is resting on the record.

To play records manually, push right hand button to MANUAL position and load records one at a time. When loading, hold the record at a slight angle so that the edge is under the lip of the record support. The record support should be turned to the 12" position to allow more room for loading and unloading records.

THEORY OF OPERATION

By referring to the various photographs and figures which will be found in the service manual, you can readily follow through the changing cycle from the continuity given hereafter:

The turntable is rim driven. Power is transmitted to it from the motor shaft by means of a rubber tired drive wheel. The record spindle does not revolve; it is fixed to the record changer base.

The heart of the record changer is the main cam wheel. On it are cast all the cams, extrusions etc., required to perform all the operations during the changing cycle. See Figure 2.

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The only mechanism that operates during the playing of a record is the motor and turntable. The changing mechanism is entirely disengaged until the change cycle starts.

In explaining the theory of operation, let us begin from the point where the record changer is just finishing a record.

The needle in the pick-up finishes the record and enters the eccentric groove. This imparts an oscillating motion to the pick-up arm, which in turn causes the trip pawl to release the trigger through its action against the ratchet arm. See Figures 3A & B. If the record does not have an eccentric groove, the limit stop will trip the trigger when the pick-up needle reaches a point 1-7/8" of the spindle center. See Figure 3C.

Tripping the trigger, releases the bell crank assembly, allowing its tension spring to push the cycle drive pulley up against the inside rim of the revolving turntable, starting the changing cycle. See Figures 3B & C. With the same motion of the bell crank, its roller leaves the detent notch in the rim of the main cam wheel and the main cam wheel revolves. The roller now rides on the rim of the main cam wheel and in this manner holdsthe cycle drive pulley firmly against the turntable.

As the main cam wheel revolves, the pick-up rod rides out of the inclined section, raising the pick-up clear of the record. See Figure 4. After the pick-up arm is elevated, continued rotation of the main cam wheel swings the pick-up arm outward, clear off the record. The lateral movement of the pick-up arm is controlled by the selector stud which rides in a specially shaped groove in the main cam wheel. See Figure 4.

At the same time the pick-up arm was being lifted and swung clear, the record release cam was rotated through 180° by the gear segment arm to pick up a record and then back to its normal position in line with the record post, to drop the record on the turntable. The movement of the segment gear is controlled by the specially shaped groove on the bottom of the main cam wheel. See Figure 5.

Continued rotation of the main cam wheel swings the pick-up arm (by the action of the selector stud riding in the top groove of the main cam wheel) back over the first groove in the record and the arm is gently lowered onto the record when the inclined section of the main cam wheel reaches the pick-up rod. See Figure 4.

As the main cam wheel approaches the full 360 degree point of its rotation, the trigger reset extrustion pushes against the trigger reset stud of the small trip arm, causing the trigger to be "cocked" ready for the next cycle, and in the same motion applies spring tension through the torsion spring to the bell crank lever so that when the main cam wheel detent notch reaches the bell crank lever roller, the roller falls into it, pulling the cycle drive pulley away from the turntable, causing the main cam wheel to stop, thus ending the cycle. See Figure 6.

A shorting switch, operated by the straight and inclined sections of the main cam wheel, shorts the pick-up cartridge whenever the record changer is in cycle. This keeps all unwanted noises from reaching the speaker.

Turning the record support post, to accommodate the size record being used, automatically sets the mechanism so the pick-up needle will come down in the middle of the blank area between the outer edge and the first groove of the record. Turning the record post, positions the large trip arm so that the attached pick-up arm will swing out farther for 12 inch records and closer in for 10 inch records. See Figure 4.

The right hand button controls a three position mechanical switch. Through it, it is possible to start the changing cycle at any time regardless of whether or not the record has been completely played. By this means a record can be rejected. This lever can also be pushed into the manual position at any time without damage to the mechanism. Figure 7 shows the mechanics behind the switch.

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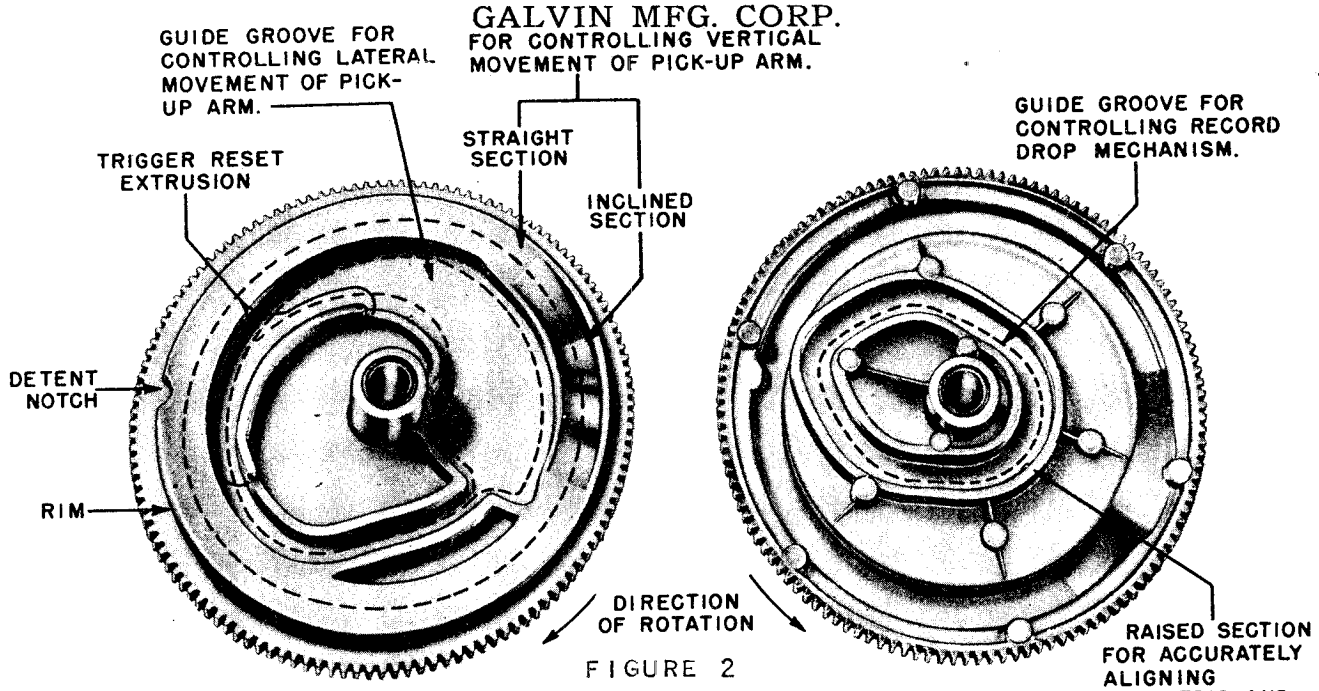
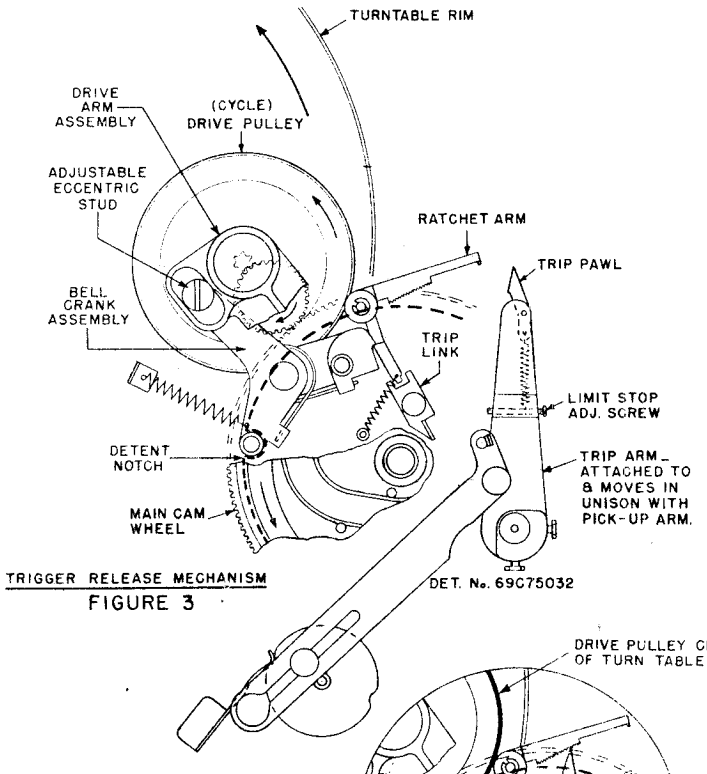
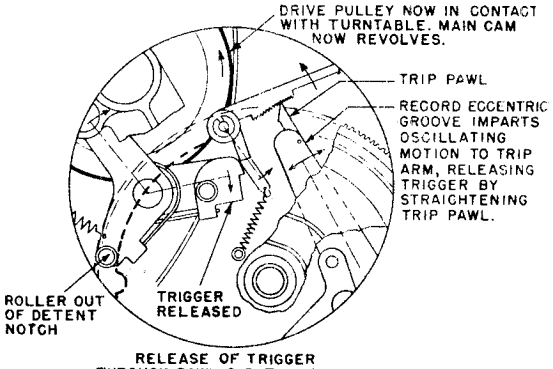

GUIDE GROOVE FOR CONTROLLING LATERAL MOVEMENT OF PICK-UP ARM.
FOR CONTROLLING VERTICAL MOVEMENT OF PICK-UP ARM.
STRAIGHT SECTION
INCLINED SECTION
TRIGGER RESET EXTRUSION
DETENT NOTCH
RIM
DIRECTION OF ROTATION
GUIDE GROOVE FOR CONTROLLING RECORD DROP MECHANISM.
RAISED SECTION FOR ACCURATELY ALIGNING ECCENTRIC AND RECORD POST.

FIGURE 2

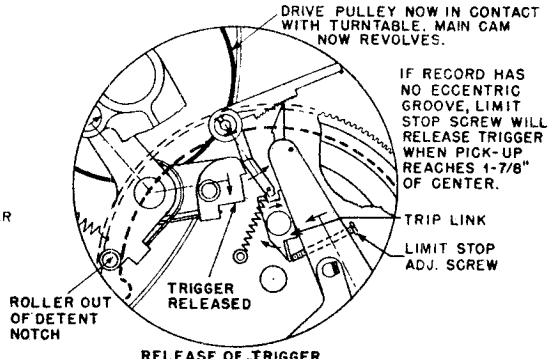
TOP VIEW MAIN CAM WHEEL BOTTOM VIEW



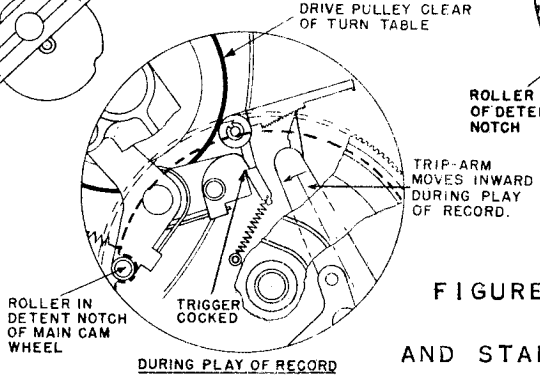
TRIGGER RELEASE MECHANISM
FIGURE 3


DRIVE PULLEY NOW IN CONTACT WITH TURNTABLE. MAIN CAM NOW REVOLVES.
TRIP PAWL
RECORD ECCENTRIC GROOVE IMPARTS OSCILLATING MOTION TO TRIP ARM, RELEASING TRIGGER BY STRAIGHTENING TRIP PAWL.
ROLLER OUT OF DETENT NOTCH
TRIGGER RELEASED

RELEASE OF TRIGGER THROUGH PAWL & RATCHET ARM
FIGURE 3B


DRIVE PULLEY NOW IN CONTACT WITH TURNTABLE. MAIN CAM NOW REVOLVES.
IF RECORD HAS NO ECCENTRIC GROOVE, LIMIT STOP SCREW WILL RELEASE TRIGGER WHEN PICK-UP REACHES 1-7/8" OF CENTER.
TRIP LINK
LIMIT STOP ADJ. SCREW
ROLLER OUT OF DETENT NOTCH
TRIGGER RELEASED

RELEASE OF TRIGGER THROUGH LIMIT STOP
FIGURE 3C


DRIVE PULLEY CLEAR OF TURN TABLE
TRIP-ARM MOVES INWARD DURING PLAY OF RECORD.
ROLLER IN DETENT NOTCH OF MAIN CAM WHEEL
TRIGGER COCKED

DURING PLAY OF RECORD
FIGURE 3A

FIGURE 3 RELEASE OF TRIGGER AND START OF CYCLE (BOTTOM VIEW)

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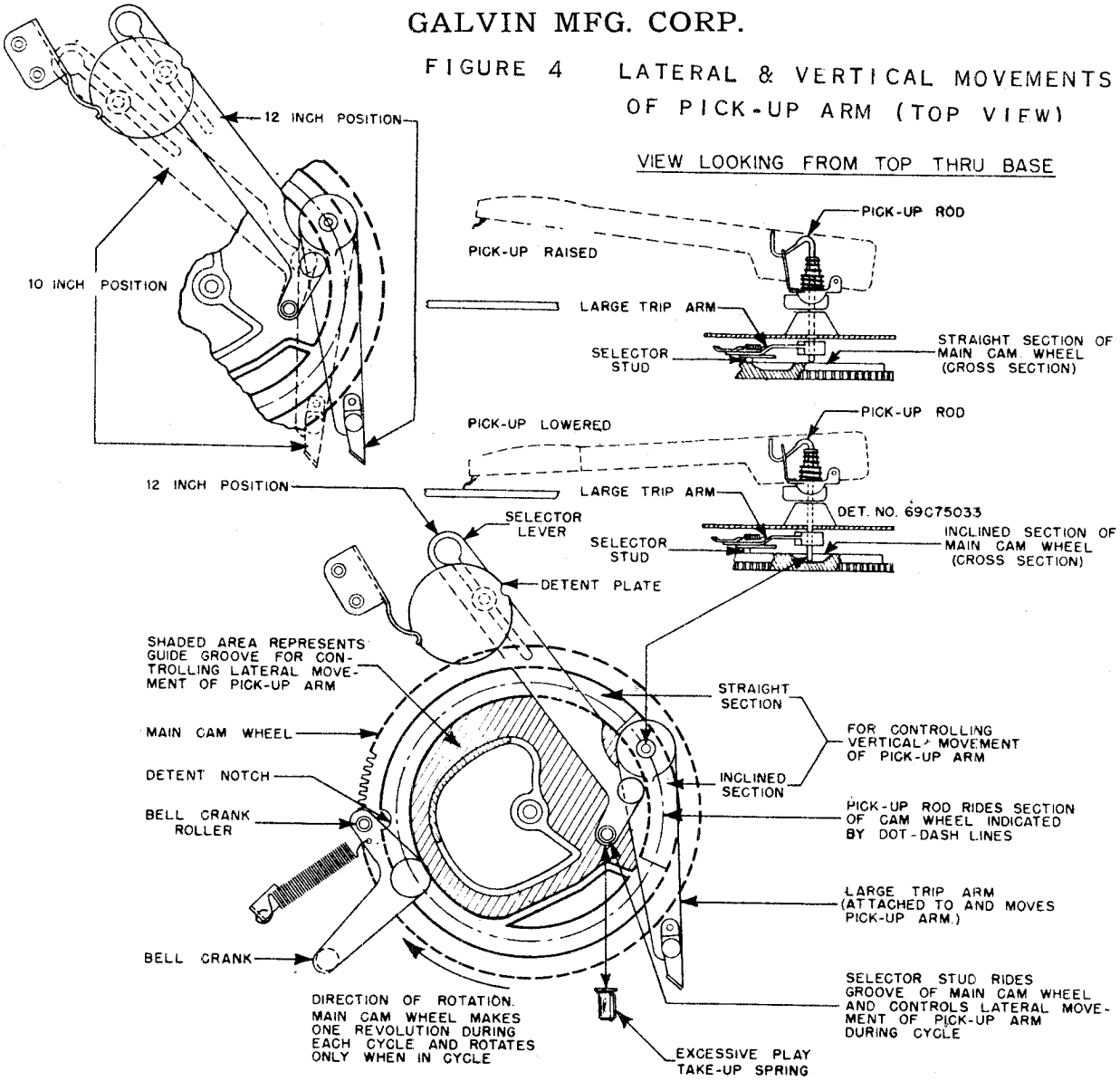
FIGURE 4 LATERAL & VERTICAL MOVEMENTS OF PICK-UP ARM (TOP VIEW)


VIEW LOOKING FROM TOP THRU BASE
12 INCH POSITION
10 INCH POSITION
PICK-UP ROD
PICK-UP RAISED
LARGE TRIP ARM
SELECTOR STUD
STRAIGHT SECTION OF MAIN CAM WHEEL (CROSS SECTION)
PICK-UP ROD
PICK-UP LOWERED
12 INCH POSITION
LARGE TRIP ARM
SELECTOR LEVER
SELECTOR STUD
DET. NO. 69C75033
INCLINED SECTION OF MAIN CAM WHEEL (CROSS SECTION)
DETENT PLATE
SHADED AREA REPRESENTS GUIDE GROOVE FOR CONTROLLING LATERAL MOVEMENT OF PICK-UP ARM
STRAIGHT SECTION
FOR CONTROLLING VERTICAL MOVEMENT OF PICK-UP ARM
MAIN CAM WHEEL
DETENT NOTCH
INCLINED SECTION
BELL CRANK ROLLER
PICK-UP ROD RIDES SECTION OF CAM WHEEL INDICATED BY DOT-DASH LINES
LARGE TRIP ARM (ATTACHED TO AND MOVES PICK-UP ARM.)
BELL CRANK
SELECTOR STUD RIDES GROOVE OF MAIN CAM WHEEL AND CONTROLS LATERAL MOVEMENT OF PICK-UP ARM DURING CYCLE
DIRECTION OF ROTATION. MAIN CAM WHEEL MAKES ONE REVOLUTION DURING EACH CYCLE AND ROTATES ONLY WHEN IN CYCLE
EXCESSIVE PLAY TAKE-UP SPRING

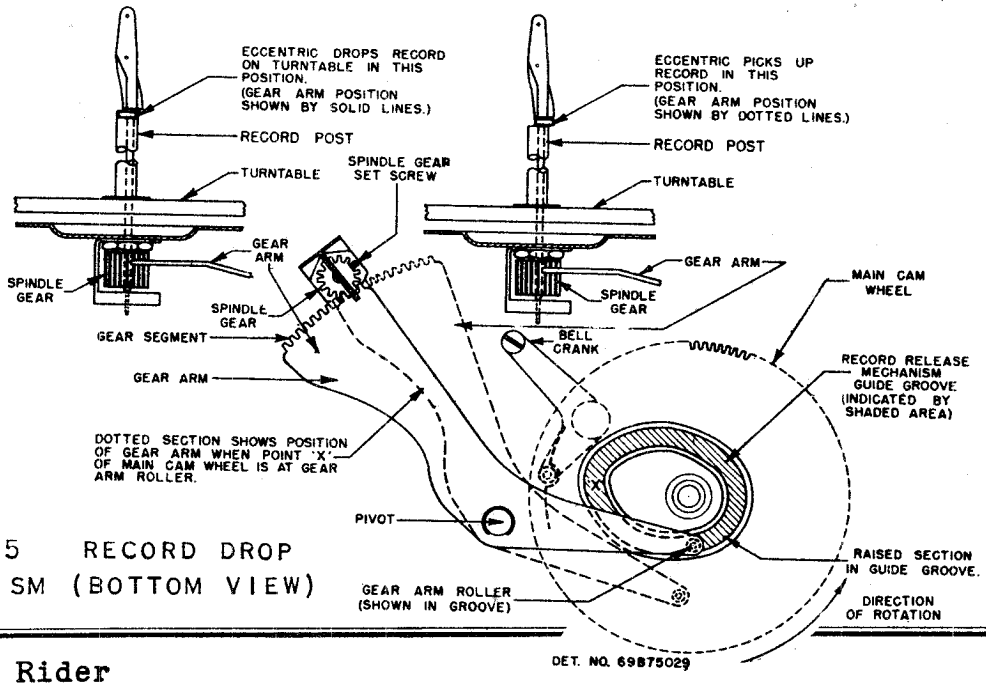

ECCENTRIC DROPS RECORD ON TURNTABLE IN THIS POSITION. (GEAR ARM POSITION SHOWN BY SOLID LINES.)
RECORD POST
TURNTABLE
SPINDLE GEAR SET SCREW
GEAR ARM
SPINDLE GEAR
SPINDLE GEAR
GEAR SEGMENT
GEAR ARM
DOTTED SECTION SHOWS POSITION OF GEAR ARM WHEN POINT 'X' OF MAIN CAM WHEEL IS AT GEAR ARM ROLLER.
ECCENTRIC PICKS UP RECORD IN THIS POSITION. (GEAR ARM POSITION SHOWN BY DOTTED LINES.)
RECORD POST
TURNTABLE
GEAR ARM
SPINDLE GEAR
MAIN CAM WHEEL
BELL CRANK
RECORD RELEASE MECHANISM GUIDE GROOVE (INDICATED BY SHADED AREA)
PIVOT
RAISED SECTION IN GUIDE GROOVE.
GEAR ARM ROLLER (SHOWN IN GROOVE)
DIRECTION OF ROTATION
DET. NO. 69B75029

FIGURE 5 RECORD DROP MECHANISM (BOTTOM VIEW)

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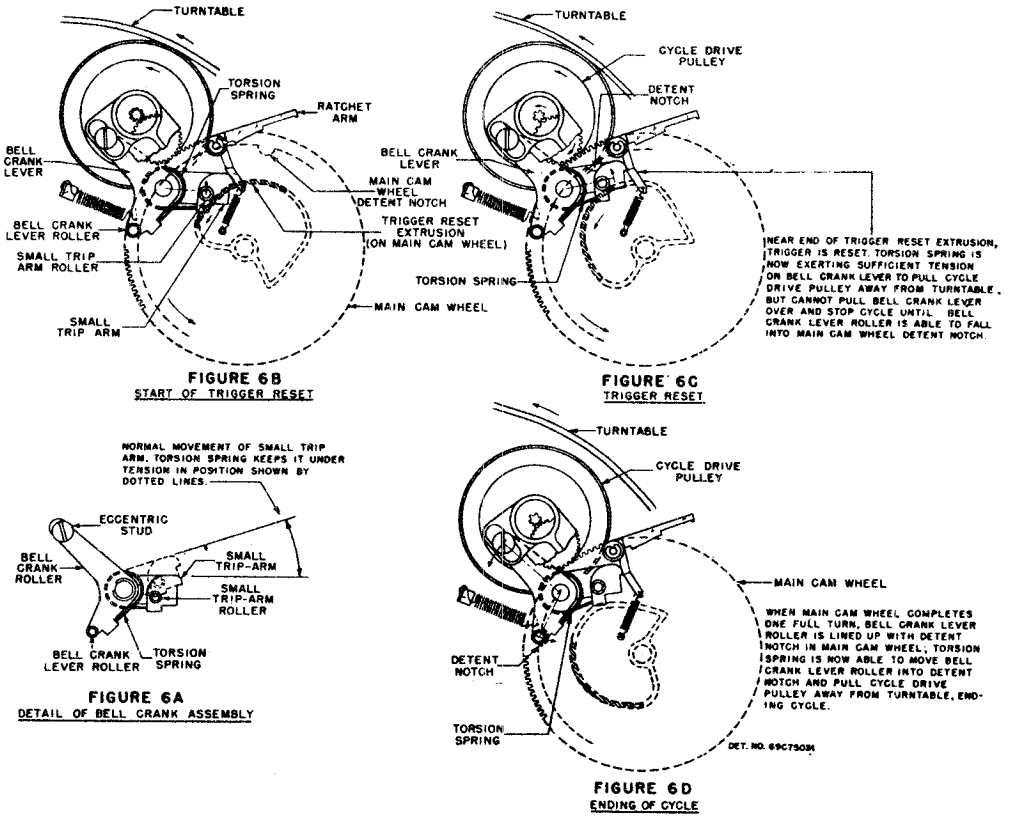
TURNTABLE
TORSION SPRING
RATCHET ARM
BELL CRANK LEVER
MAIN CAM WHEEL DETENT NOTCH
BELL CRANK LEVER ROLLER
TRIGGER RESET EXTRUSION (ON MAIN CAM WHEEL)
SMALL TRIP ARM ROLLER
SMALL TRIP ARM
MAIN CAM WHEEL
FIGURE 6B
START OF TRIGGER RESET
TURNTABLE
CYCLE DRIVE PULLEY
DETENT NOTCH
BELL CRANK LEVER
TORSION SPRING
NEAR END OF TRIGGER RESET EXTRUSION, TRIGGER IS RESET. TORSION SPRING IS NOW EXERTING SUFFICIENT TENSION ON BELL CRANK LEVER TO PULL CYCLE DRIVE PULLEY AWAY FROM TURNTABLE, BUT CANNOT PULL BELL CRANK LEVER OVER AND STOP CYCLE UNTIL BELL CRANK LEVER ROLLER IS ABLE TO FALL INTO MAIN CAM WHEEL DETENT NOTCH.
FIGURE 6C
TRIGGER RESET
NORMAL MOVEMENT OF SMALL TRIP ARM. TORSION SPRING KEEPS IT UNDER TENSION IN POSITION SHOWN BY DOTTED LINES.
ECCENTRIC STUD
BELL CRANK ROLLER
SMALL TRIP-ARM
SMALL TRIP-ARM ROLLER
BELL CRANK LEVER ROLLER
TORSION SPRING
FIGURE 6A
DETAIL OF BELL CRANK ASSEMBLY
TURNTABLE
CYCLE DRIVE PULLEY
MAIN CAM WHEEL
WHEN MAIN CAM WHEEL COMPLETES ONE FULL TURN, BELL CRANK LEVER ROLLER IS LINED UP WITH DETENT NOTCH IN MAIN CAM WHEEL; TORSION SPRING IS NOW ABLE TO MOVE BELL CRANK LEVER ROLLER INTO DETENT NOTCH AND PULL CYCLE DRIVE PULLEY AWAY FROM TURNTABLE, ENDING CYCLE.
DETENT NOTCH
TORSION SPRING
DET. NO. 69C75031
FIGURE 6D
ENDING OF CYCLE

FIGURE 6 TRIGGER RESET AND CYCLE STOPPING MECHANISM (BOTTOM VIEW)

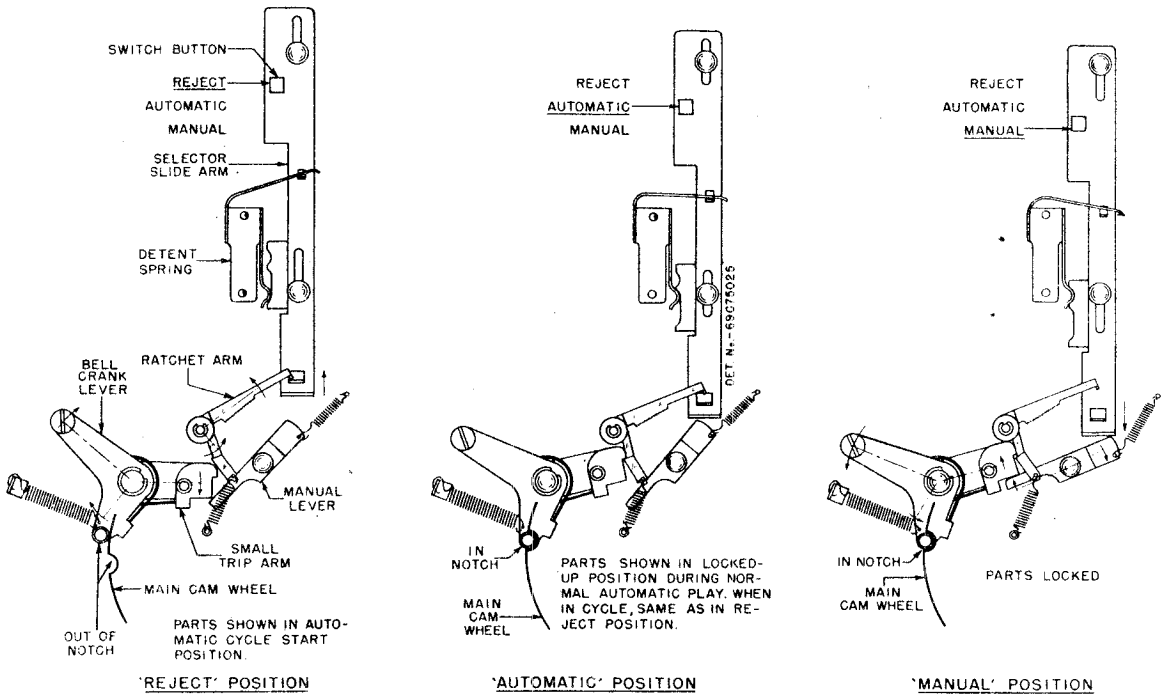

FIGURE 7 MECHANICS BEHIND REJECT-AUTOMATIC-MANUAL SWITCH (BOTTOM VIEW)

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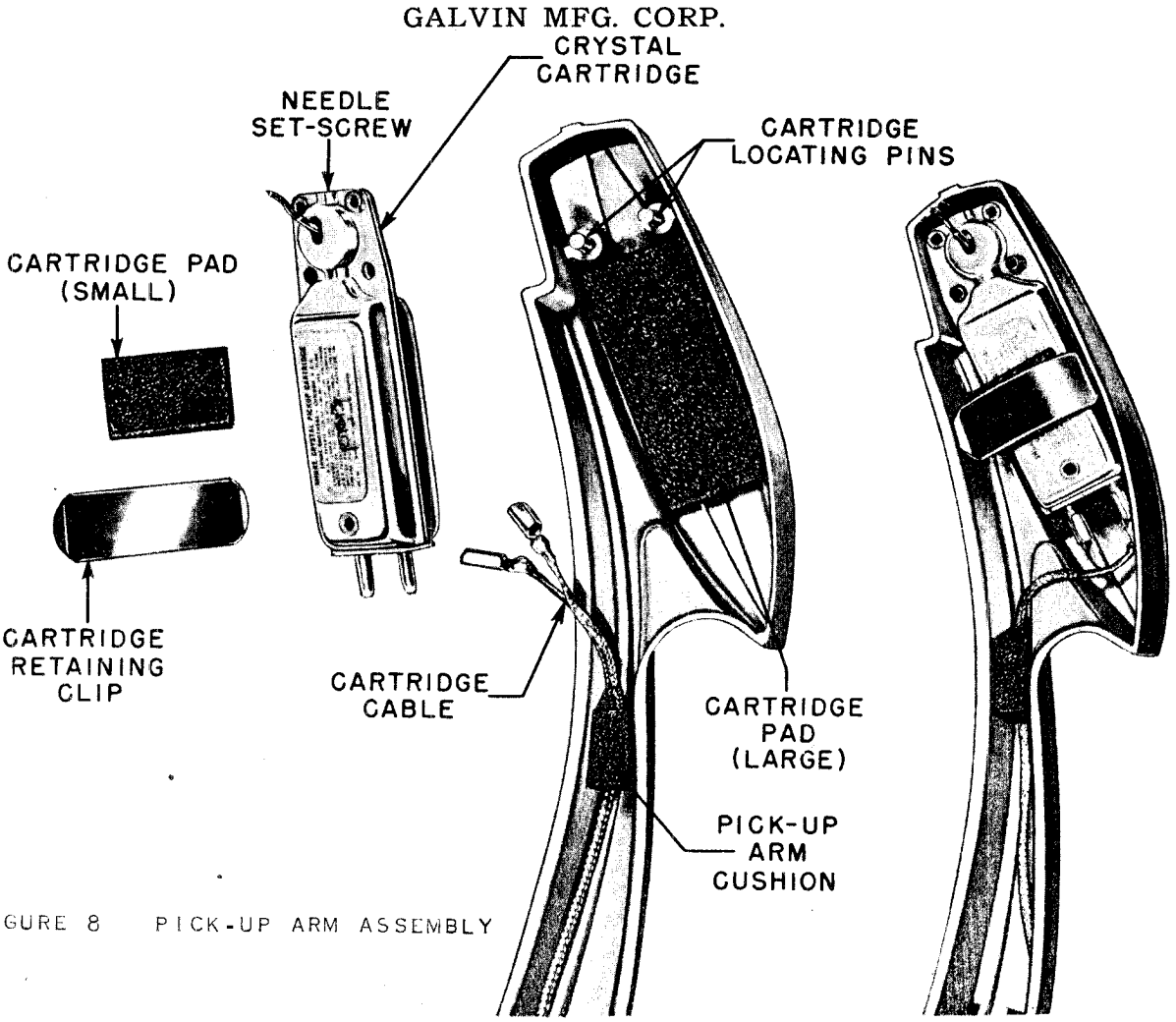

FIGURE 8 PICK-UP ARM ASSEMBLY

This changer is equipped with a permanent point (Sapphire or precious metal) long life needle and is good for several thousand plays, unless damaged by dropping or mishandling. For best results, use Motorola phonograph needles; they have been specially designed for use in these changers.

HOW TO REPLACE PHONOGRAPH NEEDLE

1. Models with external thumbscrew. - Obvious.
2. Models without thumbscrew. - Proceed as follows: Refer to Figure 8.
   a. Raise pick-up arm to a vertical position.
   b. With a pair of long nose pliers, remove the cartridge retaining clip.
   c. Lift the cartridge off the two rubber cartridge locating pins far enough to expose the setscrew on the end of the cartridge.
   d. Loosen setscrew and remove the old needle.
   e. Insert new needle, retighten setscrew, and reset cartridge on the two rubber locating pins.
   f. Place the rubber pad on the cartridge and replace the cartridge retaining clip. Use a pair of long nose pliers with which to replace clip.
   g. Lower pick-up arm to its original playing position.

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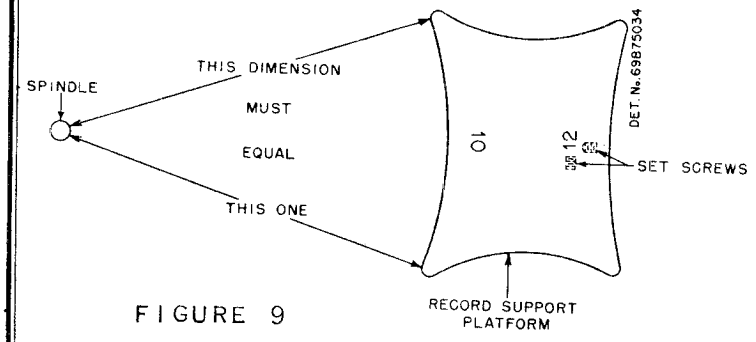

FIGURE 9

LINING UP THE RECORD SUPPORT PLATFORM

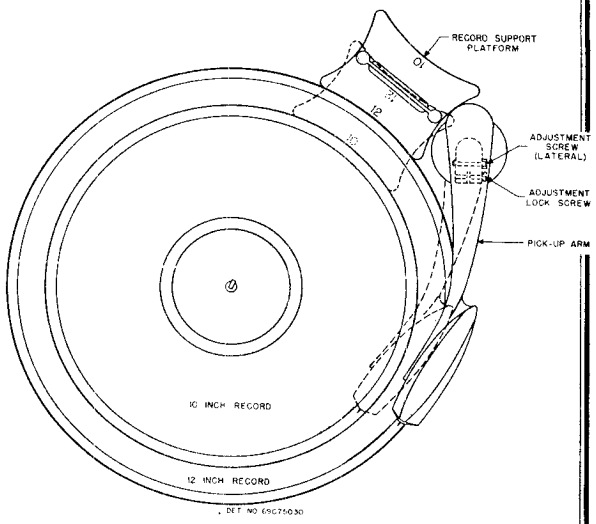

FIGURE 10 LATERAL ADJUSTMENT OF PICK-UP ARM

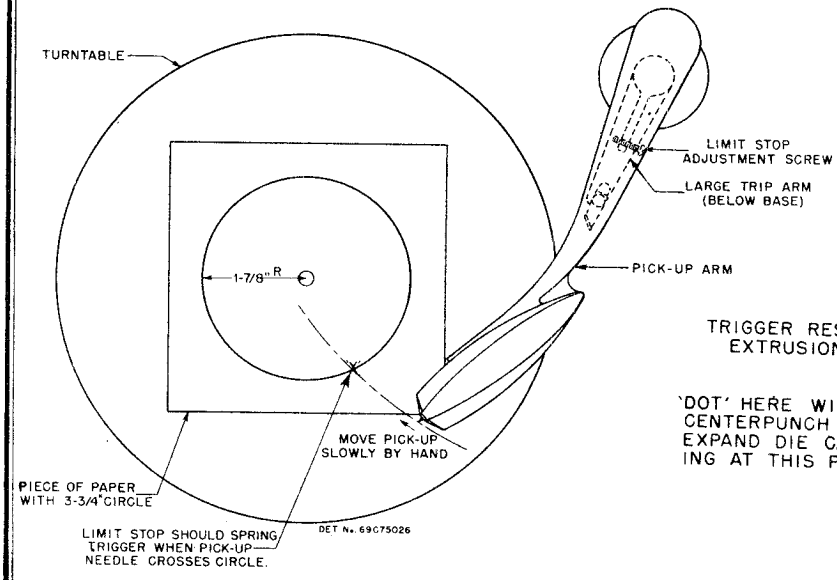
TURNTABLE
LIMIT STOP ADJUSTMENT SCREW
LARGE TRIP ARM (BELOW BASE)
PICK-UP ARM
1-7/8" R
MOVE PICK-UP SLOWLY BY HAND
PIECE OF PAPER WITH 3-3/4" CIRCLE
LIMIT STOP SHOULD SPRING TRIGGER WHEN PICK-UP NEEDLE CROSSES CIRCLE.
DET No. 69075026

FIGURE 11 ADJUSTMENT OF LIMIT STOP

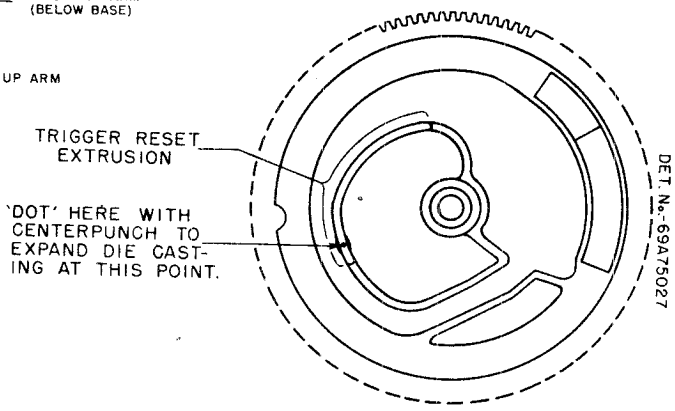

FIGURE 13

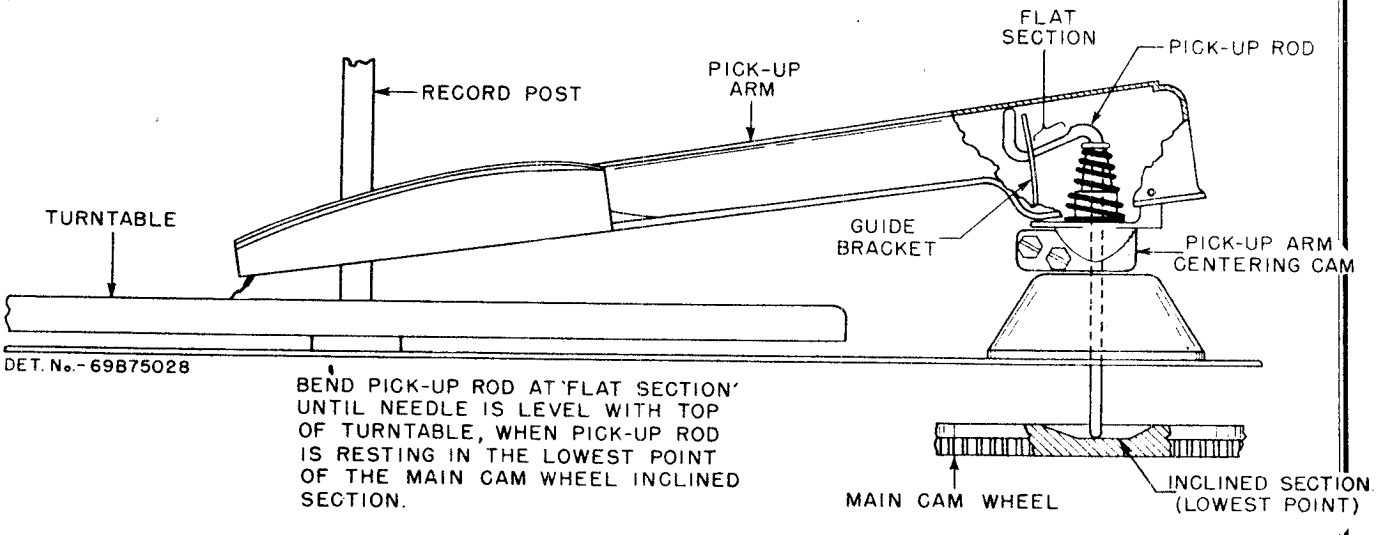
FLAT SECTION
PICK-UP ROD
RECORD POST
PICK-UP ARM
TURNTABLE
GUIDE BRACKET
PICK-UP ARM CENTERING CAM
DET. No.-69875028
BEND PICK-UP ROD AT 'FLAT SECTION' UNTIL NEEDLE IS LEVEL WITH TOP OF TURNTABLE, WHEN PICK-UP ROD IS RESTING IN THE LOWEST POINT OF THE MAIN CAM WHEEL INCLINED SECTION.
MAIN CAM WHEEL
INCLINED SECTION (LOWEST POINT)

FIGURE 12 VERTICAL ADJUSTMENT OF PICK-UP ARM

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ROUTINE CHECKS AND ADJUSTMENTS

LINING UP THE RECORD SUPPORT PLATFORM

It is important that all points on the "lip" of the record support platform be equidistant from the center point of the spindle. This will assure that all points of the record will leave the platform at the same time. If the record support is too far out of alignment, the record would actually hang on the point nearest the spindle and fail to drop properly. See Figure 9.

TO CHECK ADJUSTMENT OF RECORD SUPPORT PLATFORM

1. Turn the record support platform to the ten-inch position making sure it is turned so that the selector spring falls into the detent notch.
2. The record release eccentric should be perfectly aligned with the record post. If it isn't aligned, cycle the record player. If at the end of the cycle it still isn't aligned, adjust as described in ADJUSTMENT OF RECORD DROP MECHANISM.
3. Slip a standard 10 inch record over the spindle and cycle the record changer once to allow the record to fall on the turntable; then stop the changer.
4. Lift the record so it is in line with the record release eccentric and check to make sure it clears the lip of the record support platform equally at all points.

TO ADJUST RECORD SUPPORT PLATFORM

1. If one point of the record support platform lip is nearer the record than the other, the position of the support may be adjusted after loosening the two allen head set screws, located directly under the record support platform.
2. TEST: After tightening the set screws, test the adjustment by running a ten-inch record through a complete cycle and check the point where the needle falls. If the needle misses the record by one inch, the record support platform is 180 degrees out of line with the detent plate and should be turned one half turn without turning the detent plate.

ADJUSTMENT OF RECORD DROP MECHANISM

For minimum wear around the centerhole of records and proper automatic dropping of records, it is important that the record release eccentric and record post line up perfectly at the end of each change cycle.

TO CHECK ADJUSTMENT OF RECORD DROP MECHANISM

1. Cycle the record changer once, by pulling the reject button.
2. At the end of the cycle, stop changer and carefully observe the position of the eccentric with respect to the record post. It should line up perfectly with the record post.
3. If at the end of a cycle the eccentric does not line up perfectly with the record post, re-adjust as described below.

TO ADJUST THE RECORD DROP MECHANISM

1. Pull the reject button and slowly revolve the turntable by hand until the gear arm roller is resting on the raised section of the record release guide groove. See Figure 5 for its location. The raised section of the groove is very small and resembles what is often taken for flash on castings. It serves to narrow down the guide groove at this point and in this manner insures closer alignment of eccentric and record post.
2. Loosen the slab head set screw in the spindle gear. The eccentric will now turn freely. See Figure 5.
3. Turn the eccentric so it is in perfect alignment with the record post.
4. Tighten slab head set screw in spindle gear.

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LATERAL ADJUSTMENT OF PICK-UP ARM

This adjustment is made to cause the needle to drop between the edge of the record and the first groove of the record as the changer completes a changing cycle.

TO CHECK & MAKE LATERAL ADJUSTMENT OF PICK-UP ARM

1. Turn the record support to the twelve-inch position.
2. Place a standard twelve-inch record on the turntable and a ten-inch record on top of it.
3. Start the changer and allow it to go through its cycle.
4. Note point at which the needle contacts record. It should fall into the middle of the area between the first groove and the edge of the record.
5. If it doesn't fall into the area, recycle the changer and stop the machine just as the pick-up comes down and is about to touch the record.
6. With a screwdriver, loosen the adjustment lockscrew (See Figure 10) and then turn the adjustment screw until pick-up is positioned correctly over the middle of the area between the edge and the first groove in the record. Turn the adjustment screw in a counter-clockwise direction to move the pick-up arm farther from center and in a clockwise direction to move it towards center of record.
7. Tighten the adjustment lockscrew. *Use care in locking, as too much pressure may crack the casting.*
8. Check the adjustment by putting the changer through its cycle.
9. If further adjustment is required, repeat above steps 1 through 7.
10. Turn the record support to the ten-inch position and cycle the changer. The needle should come down into the area between the first groove and the edge of the ten-inch record. If necessary, make minor compromise adjustment so needle will come down properly on both ten and twelve-inch records.

ADJUSTMENT OF THE LIMIT STOP

The limit stop mechanism permits the record changer to operate even though the record may not have an eccentric groove or if the eccentric groove is too close to the center hole.

Before checking or making adjustment on the limit stop, make sure the lateral adjustment is O.K.

TO CHECK LIMIT STOP ADJUSTMENT

1. Scribe a 3-3/4" diameter circle on a piece of stiff paper. Cut out a 1/4" hole at the center of the circle and slip the paper over the record post of the record player. See Figure 11.
2. Set up the record changer for twelve-inch records.
3. Turn on the record player, momentarily push the button to the reject position and allow the changer to complete one cycle. Stop the changer; the pick-up arm should now move freely.
4. Grasp the pick-up arm and slowly move it towards the record post. As the pick-up needle crosses the scribed circle line, the trigger should be heard to "click over".
5. Should the trigger mechanism be actuated before or after crossing the scribed line, readjust as described below.

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TO ADJUST THE LIMIT STOP

1. Move the pick-up arm to its resting post.

2. Reset the trigger mechanism by moving the button momentarily to the **MANUAL** position and then back to **AUTOMATIC** (center position).

3. With a screwdriver, adjust the limit stop adjustment screw, which is located on the trip arm. See Figure 11. Turn the screw clockwise if the trigger is tripped after the needle crosses the scribed line, and counter-clockwise if it trips too soon.

4. Check adjustment by moving the arm manually across the scribed line.

5. If the adjustment is still not correct, repeat above steps 1, 2, 3, 4 and 5 until it is correct.

VERTICAL ADJUSTMENT OF PICK-UP ARM

This adjustment assures that:

1. The pick-up arm rests properly on the first record.

2. The pick-up arm will clear a full stack of records (10 ten-inch or 8 twelve-inch) on the turntable, during the changing cycle.

3. There will be sufficient clearance between the top of the pick-up arm and a record in position on the record support, during the changing cycle.

4. There will be sufficient clearance between the pick-up arm and the pick-up resting post during the changing cycle.

TO CHECK VERTICAL ADJUSTMENT OF PICK-UP ARM

1. Turn the record support to the twelve-inch record position and cycle the record changer. As soon as the changing cycle is complete, turn off the changer by means of the left hand button. The pick-up arm should now be resting alongside the turntable. Correct adjustment is indicated if the pick-up needle is exactly level with the top of the turntable.

2. Fully load the record changer with records. Use 10 ten-inch or 8 twelve-inch records of standard manufacture only. Start the changer and drop one record on the turntable. The pick-up should come down and rest normally in the playing position on the record.

3. Push the left hand button to the **REJECT** position momentarily and release. Now as the pick-up is lifted off the record, carefully note that there is clearance between the top of the pick-up arm and the bottom record on the record support.

4. Drop the full load of records (10 ten-inch or 8 twelve-inch) on the turntable. As the record changer is cycled, note the clearance between the pick-up needle and the top record.

ADJUSTMENT OF VERTICAL TRAVEL OF PICK-UP ARM

The pick-up rod (Figure 12) controls the vertical movement of the pick-up arm.

1. After the changer has completed its cycle and pick-up arm is resting in playing position, stop the changer by pushing the left hand switch to **OFF**. The pick-up rod will now be resting on the bottom of the inclined section of the main cam wheel and the pick-up arm will be at its lowest point of vertical travel.

2. Lift the pick-up arm straight up, exposing the pick-up rod. With long nose pliers, bend the pick-up rod (along its straight portion) in the required direction till the pick-up needle point is level with the top of the turntable. See Figure 12.

3. Re-check as shown under TO CHECK VERTICAL ADJUSTMENT OF PICK-UP ARM. In some cases minor compromise adjustment will be required.

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MODEL B-24RC

GALVIN MFG. CORP.

ECCENTRIC STUD ADJUSTMENT

This adjustment varies the amount of pressure with which the drive pulley bears against the turntable rim, when the changer is in cycle. It is located on the bell crank arm; see figure 1A for location.

If this adjustment is too loose, the record changer may not cycle; if too tight, it may keep cycling continuously or lock in cycle.

CHECK AND ADJUSTMENT OF ECCENTRIC STUD

1. Turn eccentric stud to minimum throw position.
2. Pull reject button and revolve turntable.
3. Slowly increase adjustment until drive wheel contacts inside rim of turntable for one complete revolution of turntable.
4. Then increase adjustment almost 1/8 turn to compensate for wear, etc.

SERVICE INFORMATION

MECHANISM IS SLOW IN STARTING OR MOTOR HEATS UP:

1. Check lubrication.
2. Dirt in bearings. - Wash dirt out with carbon tetrachloride or similar solvent and re-lubricate. Use a #10 motor oil in the phono motor and turntable bearings and Lubriplate #105 grease on all other bearings and moving parts.
3. Check line voltage and frequency.
4. Motor damaged. If found damaged, remove motor and return it to factory for repair or replacement.
5. Room temperature abnormally low.
6. Eccentric stud adjustment set at maximum throw causing cycle drive wheel to drag on turntable rim. Correct by setting eccentric stud per instructions under ECCENTRIC STUD ADJUSTMENT.
7. Loose sleeve on motor drive shaft. - Replace motor.
8. Slow motor. - Replace motor.
9. Turntable retaining washer too tight against turntable.
10. Defective turntable bearing. - Replace.
11. Grease on rubber rim idler wheel and/or inner rim of turntable. - Clean off with carbon tetrachloride.

MOTOR FAILS TO RUN:

1. Check to see that ON-OFF switch is OK and that power is being supplied to motor.
2. Trouble in motor winding. If easily seen, repair; otherwise, replace.
3. Damaged or frozen bearings. - Replace motor.
4. Gummed oil or foreign material between armature and pole-piece. - Clean out.

SQUEAKS OR OTHER NOISES, DURING PLAYING OF RECORDS

1. Check lubrication (if squeeks are heard, they will usually be found to come from the records - not from mechanism).
2. Compare the squeak with and without a load of records. If squeak disappears when records are removed, then noise is obviously from records. Correct by rubbing a little wax on the turntable record post.

CHANGER IS NOISY WHEN IN CYCLE:

1. Check lubrication.
2. See if any part has become loose or bent and is rubbing against a moving part.
3. Check center post eccentric shaft lubrication.

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"WOW" IN RECORD REPRODUCTION:

1. Record is warped or otherwise defective, or the instrument is not being operated at normal room temperature (70° F).

See CHECK THE RECORD FIRST on page 2.

2. May be caused by slippage due to grease on idler wheel or inside rim of turntable.

PICK-UP ARM TRIPS OUT OF OSCILLATING GROOVES.

1. Record changer not level.

2. Rough surface on catch surface of small trip arm. - Repolish.

3. Ratchet arm bent too close to trip pawl. - Bend away slightly.

4. Pick-up arm main shaft binding in bearing.

(a) Ream out the hole. (b) Sometimes the trip arm may be too close to the base, causing a bind. - To remedy loosen its two setscrews and space lightly.

5. Selector lever may be bent out of shape and binding against detent plate. - Straighten.

6. Selector lever slot or retaining rivet on detent plate may be undersize or oversize respectively, effectively causing a binding feeling on the pick-up arm. - Correct by spreading slot in selector lever.

7. Record may have oscillating groove covered with paper nameplate. - Remove paper from oscillating groove.

8. Needle may be chipped. Replace.

CHANGER KEEPS CYCLING.

1. Eccentric stud adjustment set too tight. - Correct per instructions found under ECCENTRIC STUD ADJUSTMENT.

2. Catch surface of small trip arm or ratchet arm worn to improper angle causing slipping apart of mating surfaces. - Correct by replacing parts.

3. Bell crank torsion spring may be too weak. - Replace.

4. Small trip arm may not be lifted far enough by the trigger reset extrusion to reset the trigger and end the cycle. - Correct by "doting", with a center punch, the trigger reset extrusion of the main cam wheel as shown in Figure 13. This operation expands the die cast cam at that point and gives a greater lifting movement to the small trip arm during the trigger reset portion of the cycle.

5. Manual lever wedges itself between small trip arm and base. - Correct by slightly bending the manual lever away from the record changer base.

CHANGER WILL NOT CYCLE.

1. Weak pawl spring causing non-mating of pawl on ratchet arm teeth. - Replace spring.

2. Pawl frozen on trip arm. Check for cause; if other than due to dirt or grease, replace entire trip arm and selector lever assembly.

3. Binding drive arm or main cam wheel on shaft. - Replace parts or remove burrs.

4. Eccentric adjustment stud set at minimum throw. Cycling drive wheel is not against inner rim of turntable. - Correct by setting up as shown under ECCENTRIC STUD ADJUSTMENT.

5. Weak bell crank arm spring. - Bend bracket to tighten spring.

6. Bell crank arm binding on shaft.

NEEDLE SETS DOWN ON RECORD WITH A WHIP MOTION

1. Pick-up arm centering cam not seating properly during cycle caused by pick-up arm rod pushing against its guide bracket. Correct by bending guide bracket forward to relieve pressure. See Figure 12.

RECORD WILL NOT DROP WHILE CYCLING:

1. The record release in the spindle assembly may not be protruding out enough from the spindle assembly. It should stick out as far as the eccentric does when the eccentric is picking up a record. If it doesn't and trouble persists, replace spindle assembly.

2. Eccentric out of line with record post. - Correct as shown in ADJUSTMENT OF RECORD DROP MECHANISM.

3. Set screw loose on spindle gear. - Tighten.

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MODEL B-24RC

GALVIN MFG. CORP.

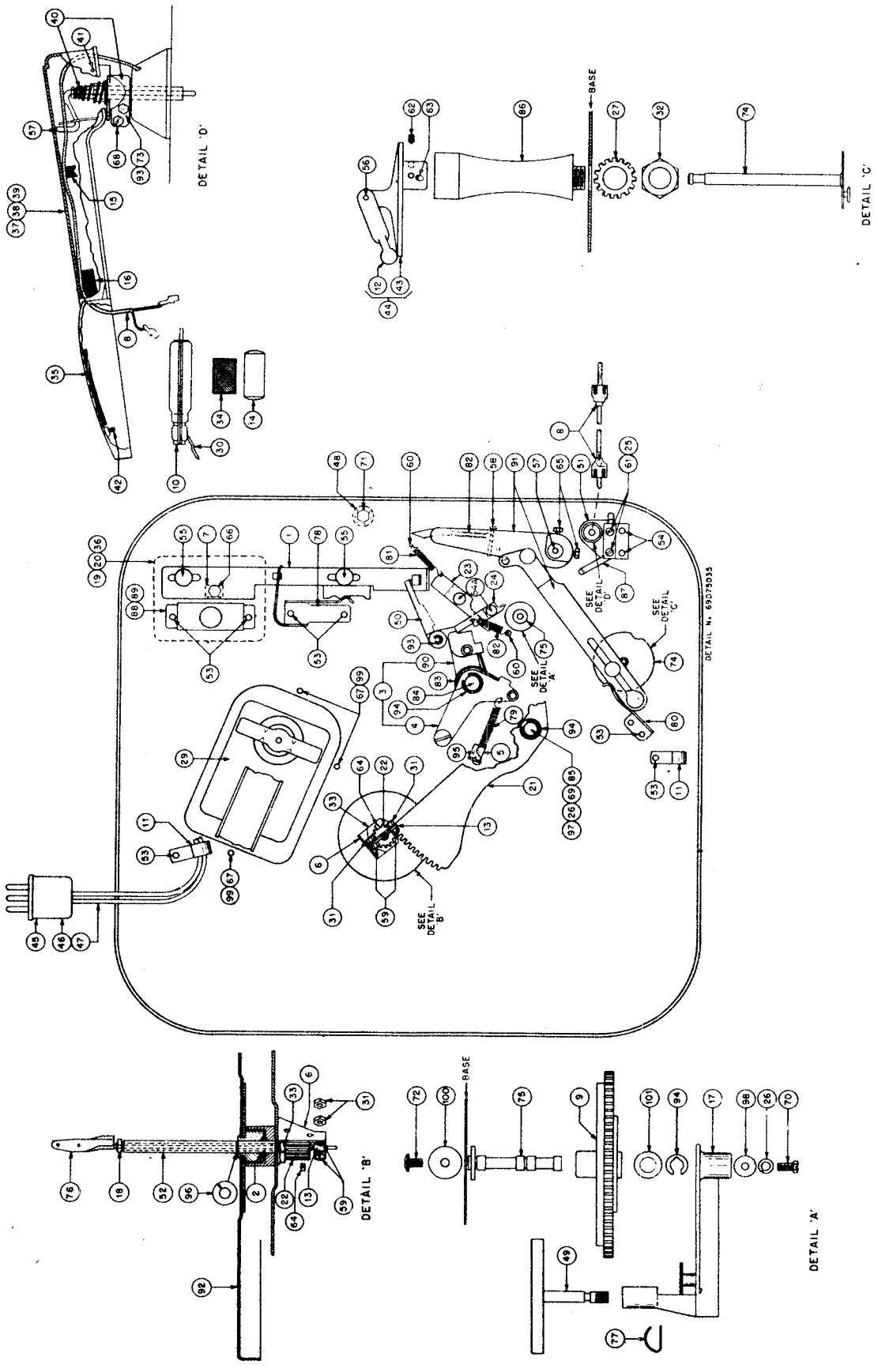

FIGURE 14 RECORD CHANGER B-24-RC PARTS LOCATION DETAIL

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PARTS PRICE LIST

B-24-RC

REF. NO.	PART NO.	DESCRIPTION	LIST
1	45B27543	Arm, selector slide	.10
2	43X4554	Bearing, ball: .062 dia. (16 used in turntable bearing)	doz. .15
3	1B71785	Bell crank assembly: includes bell crank lever with eccentric stud and roller, torsion spring, and small trip arm	1.20
4	1X71786	Bell crank lever assembly: consists of bell crank lever with eccentric stud and roller.	.60
5	7A72465	Bracket, mounting (holds bell crank spring)	doz. .25
6	7A71688	Bracket, spindle	.10
7	38A27564	Button, switch	.05
8	1X72672	Cable & Pin Terminal Assembly (pick-up connecting lead)	.42
9	1B71679	Cam Wheel & Bearing Assembly: die cast cam wheel with pressed in oilite bearing.	.85
10	59A71616 or 59A74887	Cartridge, crystal	4.50
11	42K13135	Clamp, cable: 1/2"; Cad. Pl. (cable support)	doz. .15
12	42B71643	Clamp, record: polished chrome finished	1.00
13	42A71690	Clamp, spindle	.05
14	42A75809	Clip, cartridge retainer: spring steel	doz. .25
15	42A72314	Clip, retainer: steel, 7/8 long (holds pick-up lead inside pick-up arm)	doz. .25
16	35A72628	Cushion, pick-up arm: sponge rubber, 19/64 x 3/8 x 1/2 long.	doz. .15
17	1X71794	Drive arm assembly: die cast; includes brass idler gear	.65
18	47A72662	Eccentric & Tube Assembly: antique copper finish.	.70
19	13A27714	Escutcheon, switch (B-24-RC)	.40
20	13A27526	Escutcheon, switch (B-25-RC)	.25
21	1X71798	Gear arm assembly: includes roller and bushing	.45
22	44B71634	Gear, spindle	.35
23	45A27549	Lever, manual	doz. .30
24	45A74582	Link, trip	.05
25	4S7695	Lockwasher, steel: #5 internal; Cad. Pl. (muting switch mounting)	doz. .45
26	4S7671	Lockwasher, steel: #8 split; Cad.Pl. (gear arm stud mtg.-drive arm mtg.)	per/c .25
27	4S8441	Lockwasher, steel: 1/2 external; Cad.Pl. (record support mtg.)	per/c..95
28	11M8605	Lubricant: Metal Lubriplate #105 (general lubricant)	per 2 oz. jar .30
29	59C71678 or 59C75524	Motor, Phono: complete; 117 V,60 c.	9.40
30	47X72643 or 47X74920	Needle, phonograph: sapphire tipped Needle, phonograph: precious metal tipped	1.60 1.05
31	2S7019	Nut, steel: 4-40 x 1/4 Hex; Cad.Pl. (spindle clamp mtg.)	per/c .35
32	2S8397	Nut, steel: 1/2-28 x 5/8 Hex; Wht. Zinc Pl. (record support mtg.)	doz. .30
33	2A72311	Nut, special (record post mtg.)	.08
34	35A74665	Pad, cartridge (small): sponge rubber: 1/2 x 3/4 x 1/16 thk.	
	or 35K74908	Pad, cartridge (small): sponge rubber: 1/2 x 3/4 x 1/8 thk. (cushion between cartridge retainer clip and cartridge. 1/16 pad used with Shure cartridge; 1/8" pad is used with Webster cartridge.)	doz. .20
35	35A74664	Pad, cartridge (large): sponge rubber; 3/4 x 1-1/2 x 1/8 thick (Pad between pick-up arm and pick-up cartridge)	doz. .35
36	32A27776	Pad, escutcheon: paper	.05
37	1X76313	Pick-up Arm Assembly (less needle): complete with crystal cartridge, cable, shaft, pick-up rod, guide bracket and cam assembly.	9.15
38	1X71792	Pick-Up Arm, Shaft & Arm Cam Assembly: complete, less crystal cartridge, lead and cartridge retaining parts.	4.00
39	45D71605	Pick-up Arm (only): less cartridge and all other parts	1.35
40	1X72338	Pick-up Shaft & Cam Assembly	2.60
41	47A71685	Pin, pick-up arm: steel (hinges pick-up arm to shaft & cam assembly)	doz. .30
42	47A74668	Pin, cartridge locating: rubber 7/64 dia. 5/16 long.	doz. .55
43	64B71647	Plate, record support	.70
44	1X71797	Platform & Flipper Assembly	1.80
45	28A27573	Plug: 3 pin	.05
46	1X72351	Plug, Shell & Leads Assembly: 3 pin plug with two leads. (B-24-RC)	.30
47	1X72498	Plug, Shell & Leads Assembly: 3 pin plug with three leads. (B-25-RC).	.30
48	46A27563	Post, pick-up resting: tenite	.10
49	1X71795	Pulley & Shaft Assembly	1.00
50	1X75569	Ratchet Arm & Bushing Assembly	.25
51	1X75267	Receptacle, Bracket & Switch Assembly (pick-up output receptacle & muting switch on bracket).	1.85
52	47A71702	Record Post & Bearing Assembly: antique copper finish; powdered iron bearing	1.50
53	5S7716	Rivet, steel: .122 x 5/32; antique cop. (selector spring, selector slide arm, spring mounting bracket, slider switch, cable clamp)	per/c .45
54	5S7718	Rivet, steel: .122 x 3/16; antique cop. (output receptacle & muting switch bracket mtg.)	per/c .55
54A	5K21337	Rivet shoulder (trip link & manual lever mtg.)	Per/c .50
*55	5K72597	Rivet, shoulder (selector slide arm mtg.)	doz. .25
56	47A71627	Rod, record clamp: steel, .062 dia. x 1-3/8 long	.05
57	47A71633	Rod, pick-up (pick-up arm elevating rod)	.30
58	3S2697	Screw, steel: #2 x 5/8 PKZ Sl Rnd H; Cad. Pl. (limit stop adj.)	per/c .50
59	3S2286	Screw, steel: lockscrew, 4-40 x 3/16 Lk HHMS; Cad. Pl. (spindle clamp)	per/c .85
60	3S2689	Screw, steel: #4 x 5/16 PKZ Ph BH; antique cop. (spring studs)	doz. .25
61	3S1443	Screw, steel: 5-40 x 5/16 Sl BH MS; Nkl. Pl. (muting switch mtg.)	doz. .25
62	3S2672	Setscrew, steel: 6-32 x 3/16 Allen Hd, cone point (record support mtg.)	doz. .25
63	3S7900	Setscrew, steel: 6-32 x 3/16 Allen Hd. cup point; (record support mtg.)	doz. .25
64	3S7119	Setscrew, steel: 6-32 x 1/4 Slab HD MS; Cad. Pl. (spindle gear)	doz. .35

Prices Subject to Change Without Notice

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REF. NO.	PART NO.	DESCRIPTION	LIST
65	3S7152	Screw, steel: 6-32 x 1/4 Sl HH MS; Cad. pl. (large trip arm mtg. setscrews)	per/c .95
66	3S7606	Screw, steel: #6 x 1/4 PKZ Pl HH; Cad. Pl. (switch button mtg.)	per/c .50
67	3S7342	Screw, steel: 6-32 x 5/8 Sl BHMS; Cad.Pl. (motor mtg.)	per/c .45
68	3S2288	Screw, steel: 6-32 x 3/4 Sl HHMS: Cad. Pl. (pick-up arm lateral adjustment lockscrew)	per/c .50
69	3S2291	Screw, steel: 8-32 x 5/16 Sl HHMS, antique cop. (gear arm stud mtg.)	per/c .60
70	3S7374	Screw, steel: 8-32 x 5/16 Sl HHMS; Cad. Pl. (drive arm mtg.)	per/c .50
71	3S2678	Screw, steel: #8 x 5/8 Pl Lk HH; Cad. Pl. (Pick-up resting post mtg.)	doz. .15
72	3S2287	Screw, steel: 12-24 x 1/4 Sl BHMS; antique cop. (cam shaft mtg.)	per/c .60
73	3A71612	Screw, adjustment: special; Cad. Pl. (pick-up arm lateral adj.)	.05
74	1X71788	Selector shaft & plate assembly: (10-12 inch record selector detent plate and shaft	.25
75	47A21298	Shaft, cam (For main cam wheel)	.35
76	1B71709	Spindle assembly	1.45
77	41A72568	Spring, clip (pulley retainer)	per/c .95
78	41B71660	Spring, detent (For selector slide arm)	.15
79	41A72337	Spring, drive arm tension	.05
80	41A71635	Spring, selector (For 10-12 inch selector detent plate)	.10
81	41A27775	Spring, tension (manual lever)	doz. .60
82	41A27491	Spring, tension (ratchet arm & pawl springs)	doz. .60
83	41A71676	Spring, torsion (used in bell crank assembly)	doz. .25
84	46A71620	Stud, bell crank lever	.10
85	46A71631	Stud, shoulder (Gear arm mtg. stud)	.22
86	46B71653	Support, record	.80
87	40A72571	Switch, pickup muting.	.40
88	40A27846	Switch, slider & shell: 2 position (B-24-RC)	.25
89	40A27545	Switch, slider & shell: 3 position (B-25-RC)	.40
90	1X71787	Trip arm assembly (small): small trip arm with roller	1.15
91	1X71789	Trip arm & selector lever assembly (large); Large trip arm and pawl with selector lever and stud attached; less trip pawl spring and all screws.	1.60
92	59C71664	Turntable, phono.	1.25
93	4K24125	Washer, "C" Spring (holds pick-up arm lateral adjustment screw in position and ratchet arm retainer)	per/c .85
94	4A21941	Washer, "C" spring (Bell crank retainer, main cam retainer & gear arm retainer)	per/c .90
95	4A19199	Washer, spring (used between mounting bracket that holds bell crank spring, and chassis base)	per/c .55
96	4A74846	Washer, spring steel: special (turntable retainer)	doz. .30
97	4S7623	Washer, steel: 3/8 x 11/64 x .033 thick; antique cop. (gear arm stud mtg.)	per/c .90
98	4S7597	Washer, steel: 7/16 x .171 x .033 thick; Cad. Pl. (drive arm retainer)	per/c .35
99	4S1765	Washer, steel: 1/2 x .147 x 1/64 thick; Cad. Pl. (motor mtg.)	per/c .60
100	4S7643	Washer, steel: 11/16 x 15/64 x .021 thick; antique cop. (on cam wheel shaft mtg. screw)	doz. .20
101	4A21491	Washer, thrust (Main cam wheel shaft.)	doz. .20

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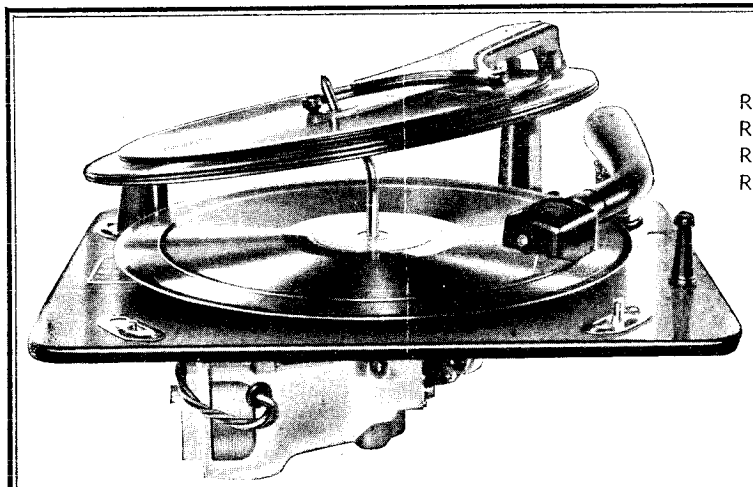
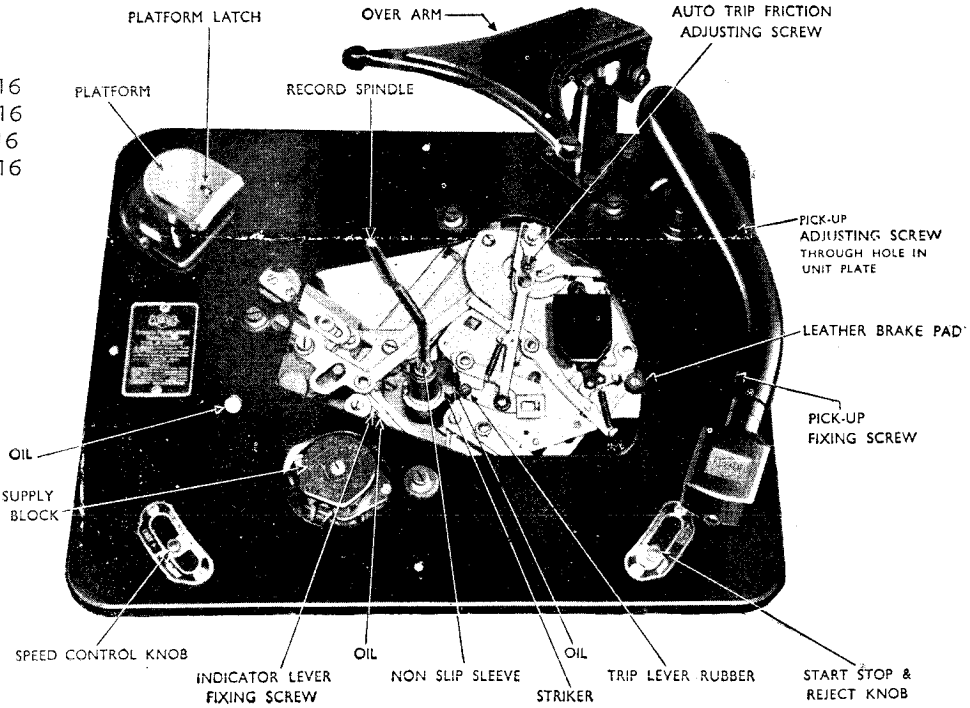


Types:

RC 60/D16
RC 60/H16
RC 60/L16
RC 60/U16



OPERATING INSTRUCTIONS.

The Garrard Model RC 60 Record Changer will play any number of records up to eight 10″ and 12″ mixed in any order.

To operate proceed in the following order:

1. If a permanent needle is not used insert a needle—the type that will play 10 or more records—in the pick-up; turn head to do this.
2. Place the record spindle in position, the sloping part leaning towards the record platform, raise overarm, and place any number up to eight records on the record spindle, their lower edge resting on the record platform, then lower overarm.
3. Move the right hand knob to "start". The motor will start and the changer operate. When the last record has been played the changer will automatically stop.

To remove records, raise overarm and withdraw the record spindle.

To reject a record, move the right hand knob to the reject position.

The Record Changer can be stopped by moving the right hand knob to the "stop" position.

Connected to the "start" and "stop" knob is the reject mechanism. If the changer is switched off while playing a record, the reject comes into operation when switching on again, the pick-up returning to its rest position.

NOTE.

If the Record Changer has been stopped for any reason, with the pick-up arm not on the rest, the arm should not be interfered with but the motor restarted and the arm allowed to return to the rest.

INSTALLATION.

DIMENSIONS.

The cabinet space required for fitting is 15½in. long by 13in. wide with 5½in. clearance above and 4½in. clearance below unit plate.

FITTING TO CABINET.

The "GARRARD" Model R.C.60 Record Changer is supplied with spring mounting to prevent mechanical feed-back occuring between the loudspeaker and the pick-up, and clearance should be left between the unit plate edges and the cabinet to allow the changer to float freely.

A template is supplied with each Record Changer and the instructions on it should be carefully followed.

After installing, see that the Changer is level by placing a spirit level on a record on the turntable. If not level, adjust by means of the spring mounting fixing screws. Finally, the nuts and threads of the spring mounting fixing screws should be coated with a locking paint such as shellac varnish to prevent the nuts working loose due to vibration.

VOLTAGE.

The "GARRARD" Model R.C.60 Record Changer is supplied in the following types:—

R.C.60/D16 Dual Voltage Range 100/130 and 200/250 volts 40/60 cycles.
R.C.60/H16 High Voltage Range 200/250 volts 40/60 cycles.
R.C.60/L16 Low Voltage Range 100/130 volts 40/60 cycles.
R.C.60/U16 Universal Voltage Range 100/130 and 200/250 volts D.C. and A.C. 25/60 cycles.

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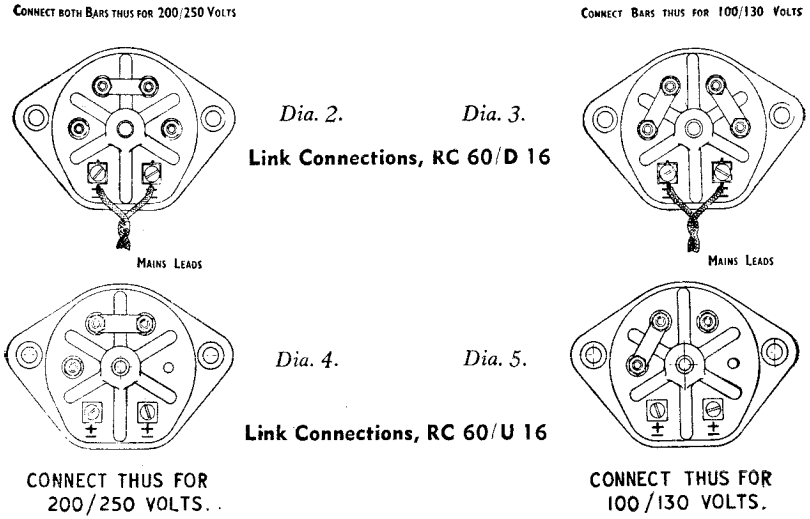
On installation, the links in the terminal block on types D16 and U16 should be set to the correct position to correspond with the voltage of the power supply, as shown in diagrams 2 to 5.


CONNECT BOTH BARS THUS FOR 200/250 VOLTS
CONNECT BARS THUS FOR 100/130 VOLTS
MAINS LEADS
MAINS LEADS
CONNECT THUS FOR 200/250 VOLTS.
CONNECT THUS FOR 100/130 VOLTS.

Dia. 2. *Dia. 3.*

Link Connections, RC 60/D 16

Dia. 4. *Dia. 5.*

Link Connections, RC 60/U 16

On types H16 and L16 connect the leads from the power supply to the terminals, taking care that the voltage is correct for the motor.

A red terminal block cover is fitted to the Universal type (R.C.60/U16).

A brown terminal block cover is fitted to the A.C. types (R.C.60/D16, R.C.60/H16 and R.C.60/L16.)

The motor should be earthed by connecting a lead from the earthing tag, located under one of the motor end cover screws and a good earth connection.

When adapting an AC/DC (Universal) Radio Receiver, Amplifier or one using a D.C. Power Pack for the reproduction of gramophone records, a pick-up transformer or condensers in series with the pick-up leads should be fitted, otherwise the pick-up circuit becomes alive. Also, the leads from the radio set or amplifier to the pick-up should be as short as possible in every case.

MAINTENANCE.

The motor only requires occasional lubrication at intervals, depending upon the length of time the Record Changer is used. Lift off the turntable and the oil holes (diagram 1) are accessible. A few drops of "GARRARD" or thin lubricating oil are sufficient.

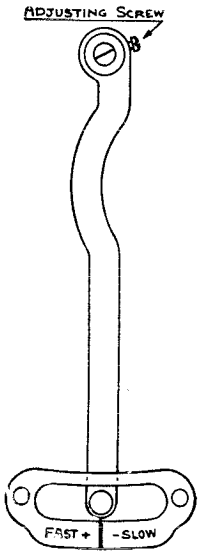
RECORDS should be reasonably flat and clean to obtain good reproduction. Care should be taken in storing to prevent contact with dirt and dust which sets up abrasive action and causes rapid wear.

RC 60/U 16 MOTOR.

Periodical examination of the carbon brushes should be made. If they are allowed to become dirty or worn, brush noise will occur. The brushes can be cleaned by lightly scraping the contact surface with a pen-knife. It is essential that the brushes be replaced in the same holder and the same way round New brushes are 9/16in. long under the springs. When worn down to 3/8in. they should be replaced. To remove the brushes, unscrew the brush caps and the brushes can be withdrawn.

SERVICE ADJUSTMENTS.

SPEED SETTING.



Due to the wide voltage range of the motors it may be necessary on some power supplies to make a slight re-adjustment of the speed indicator lever so that the speed of the turntable corresponds with that shown on the indicator scale.

To set the speed on alternating current power supply, 40/60 cycles, use the "GARRARD" Stroboscopic Speed Indicator enclosed with each Record Changer. To set speed on direct current power supply the turntable speed should be checked with a watch. Set speed so that turntable revolves at 78 r.p.m., remove the turntable and carefully loosen the screw holding the indicator lever to the vertical brake shaft, move the indicator lever to the centre position on the indicator plate and tighten up the screw. The speed should now be correct.

NOTE. One side of the stroboscopic speed indicator is designed for use in adjusting speed on a 50 cycle, and the other side a 60 cycle power supply.

MOTORS. If the motor fails to start when the control knob is turned to "start", first check the power supply and ascertain if current is reaching the motor terminals.

Next examine the terminal block and see that the leads and screws are tight; also examine the switch contacts, clean and adjust if necessary.

If a thick oil has been used to lubricate the motor bearings the motor will appear weak or will not start. It will be necessary to dismantle the motor and clean away all traces of the thick oil It is, therefore, essential to lubricate the motor bearings with a good quality thin oil.

Should the motor get too hot, first see that the voltage change-over links are set correctly to correspond with the voltage of the power supply.

To check the motor windings insert a milliameter in either motor lead. The maximum current consumption should not exceed:—

R.C.60/D16 { R.C.60/H16 200/250 volts 0.11 amp.
R.C.60/L16 { 100/130 volts 0.22 amp.
110 volts 60 cycles 0.24 amp.

If readings in excess of the above figures are obtained, the motor unit or coils should be returned for examination.

Wavy or watery reproduction from records is often due to dry governor pads. These should be lubricated by saturating the felt pads with oil.

To cure governor rattle, put a little thick oil on the shaft where the governor sleeve slides.

REMOVING MOTOR.

If the motor has to be removed from the Record Changer, disconnect the switch leads from the switch and remove the clips holding the leads, then remove the motor fixing screws and the motor can be withdrawn.

PICK-UP DROPPING POSITION.

The pick-up arm has been finely adjusted so that the needle comes on to 10in. records in a 9⅝in. diameter circle and 12in. records in a 11⅝in. diameter circle These positions were arrived at after checking a very wide selection of records of various makes.

There may be a few records where the record track starts further away from the centre, (i.e., nearer the edge), and in these exceptional cases the

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needle may alight on the record a few grooves from the start of the record. If the pick-up dropping position were set for these exceptional records it would not be suitable for average records.

Should the dropping position of the pick-up require adjustment the pick-up adjusting screw—accessible through a hole in the unit plate—should be turned with the Changer in its start position; that is, with the pick-up arm on its rest.

The pick-up adjusting screw should be turned either to the right or left, according to requirements. A quarter of a turn in either direction will give you the maximum adjustment. After adjustment, switch on, check the dropping position and re-adjust if necessary.

PICK-UP HEIGHT.

If desired the pick-up height can be adjusted by removing the screw in the collar at the bottom of the pick-up arm lifting spindle and turning the collar, whilst holding the spindle. Replace screw and tighten after adjustment.

CAUTION. When making any adjustments to the pick-up arm, it should NEVER on any account be forced into position. If the turntable is turned by hand it should NOT be turned backwards.

If the pick-up does not run into the record grooves after alighting on the record edge, see that the record changer is level by placing a spirit level on a record on the turntable. Also make sure that the flexible wire leading to the pick-up is not twisted or held in such a manner as to prevent the free movement of the pick-up arm; also see that the associated levers are free.

AUTO TRIP MECHANISM.

The satisfactory operation of the Record Changer depends upon the operation of the auto. trip. Occasional adjustment of the auto. trip friction spring may, therefore, be necessary.

If, at the end of a record, the auto. trip does not operate—that is, the pick-up remains at the end of a record—first see that the record has a run off groove in its centre, as only records with run off grooves can be played automatically on Record Changers. If the record is in order, increase the tension of the friction spring by turning the friction adjusting screw (on diagram 1) in a counter-clockwise direction; about half a turn is all that should be necessary. This screw is accessible on removing the turntable.

When the changer operates before the end of a record or a bumping or tapping noise is audible, first examine the trip lever rubber and, if worn, give it a half turn to present a new surface to the striker. If badly worn, renew. If trip lever rubber is in good condition then reduce the tension of the friction spring by giving the auto trip friction adjusting screw (diagram 1) half a turn in a clockwise direction.

RECORD PLATFORM ADJUSTMENT.

When despatched from our works the record platform is set to accommodate records of average dimensions. Occasionally, however, records may be found outside the normal limits; if necessary, therefore, the platform may be adjusted to take them.

To control the platform movement are two adjustable links, each fitted with two screws. One link, with its pivot at the bottom of the platform lever, controls the platform lift, whilst the other controls the distance the platform moves inward.

It is this latter link which may be adjusted to accept records differing from the normal in diameter. To do this, loosen the screw further away from the platform and remove the other screw.

Now refit this screw in an adjacent hole according to the adjustment required. Moving the screw to a hole nearer the platform lengthens the link and increases the inward movement of the platform. By moving the screw in the opposite direction the link is shortened and the outward movement of the platform increased. The permissible adjustment is one hole in either side of existing position of the screw.

PICK-UP.

"GARRARD" Magnetic types of pick-up are interchangeable with the Crystal type or vice-versa without alteration to the pick-up arm on these Record Changers, provided the pick-up is fitted in a "GARRARD" head.

All "GARRARD" pick-up heads are of the plug-in type, connections being made by two plugs and sockets at the back of pick-up head.

To remove the pick-up head, unscrew the pick-up fixing screw, withdraw the pick-up, easing the pick-up lead under the arm, and remove the two plug connections from back of pick-up.

If reproduction ceases, or becomes distorted when fitted with a "GARRARD" standard magnetic pick-up, first make sure that the amplifier is in order. Should this be found satisfactory, a slight adjustment to the pick-up may be necessary or the damping rubber may need renewing.

To examine pick-up proceed as follows:—Remove the pick-up cover, and by viewing the front of the pick-up, examine armature to see that it is in the centre of the gap between the pole pieces.

If it is touching one of the pole pieces it must be re-centred. To do this, loosen the two screws holding the adjusting plate, sliding the latter until the armature is in the centre, then tighten the screws.

If the armature will not retain its centre position, it will be necessary to renew the damping rubber. This can be done by removing the adjusting plate, replacing the rubber and re-assembling the plate.

Adjust the plate until armature is centred before tightening the screws.

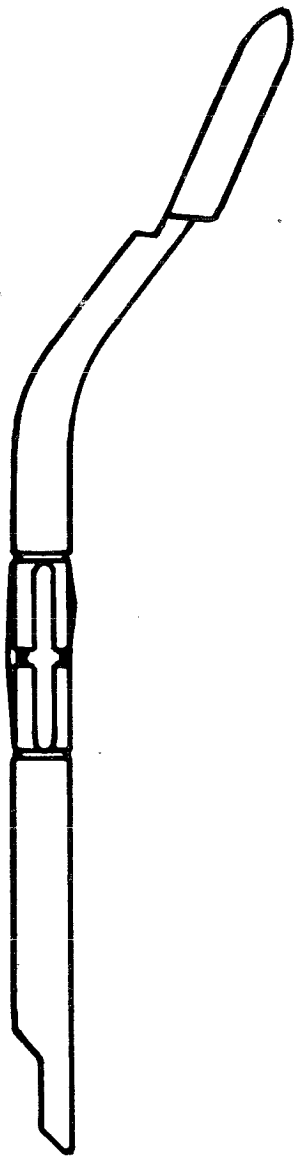
The top damping rubber tends to perish in time. It should, therefore, be replaced whenever it appears that the needle stiffness has increased, otherwise excessive record wear may occur.

Distortion can be caused by dirt or foreign matter in the gap between the pole pieces. To remedy, remove the adjusting plate and damping rubber and clean gap

The pick-up coil winding can be checked for continuity with an ohmmeter.

If a Crystal or High Fidelity pick-up is suspect the pick-up head should be returned for examination. A continuity test cannot be carried out on Crystal pick-ups with an ohmmeter.

Crystal Cartridges or High Fidelity pick-ups must not be opened or the Manufacturers will disclaim all responsibility.



TEMPLATE FOR RC 60 RECORD SPINDLE.

Should the record spindle be accidentally bent out of position through being dropped or other reasons, the record dropping will be affected. If trouble is experienced with erratic record dropping, lay the record spindle on template and check that it conforms to the shape thereof.

MODEL RC60

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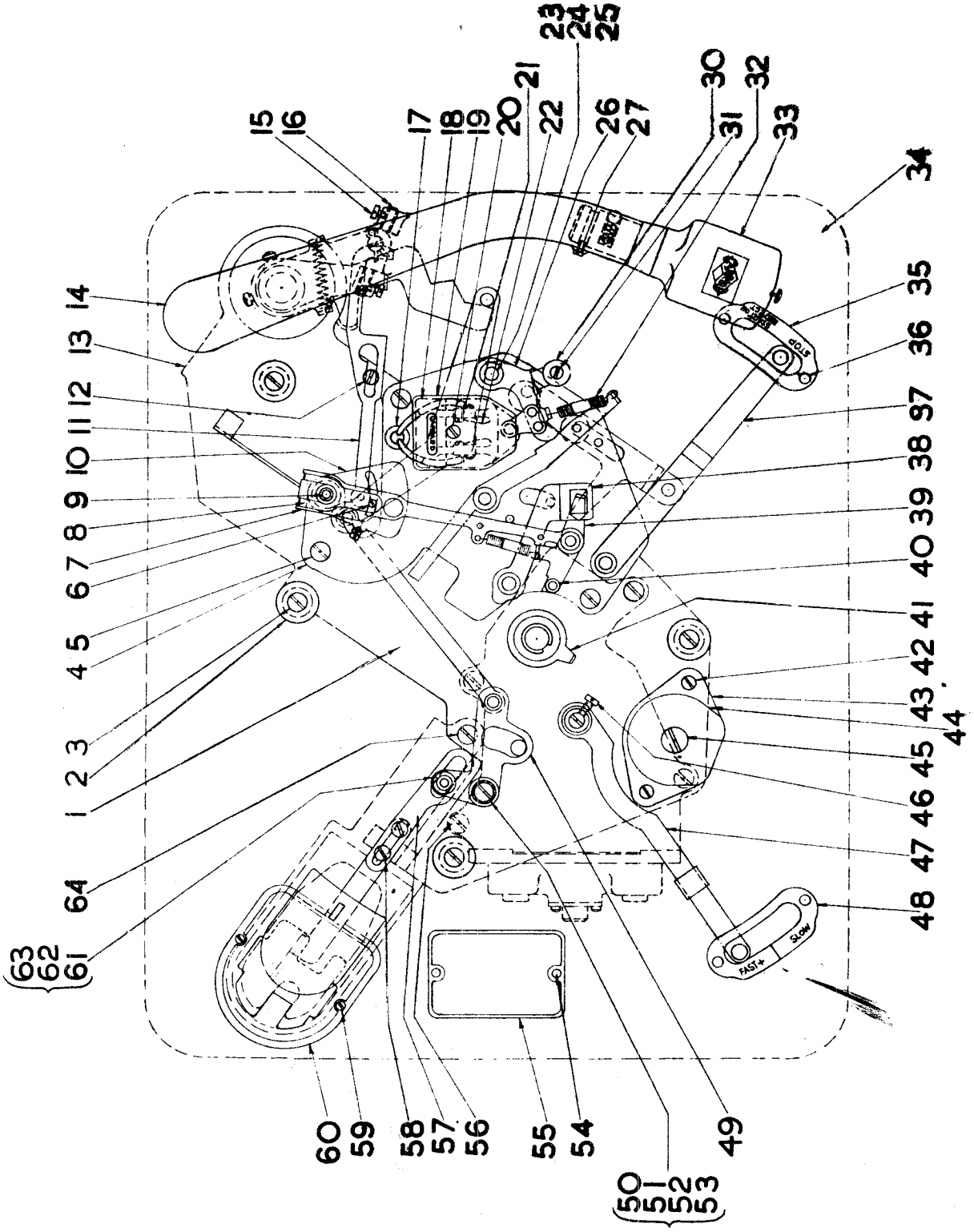

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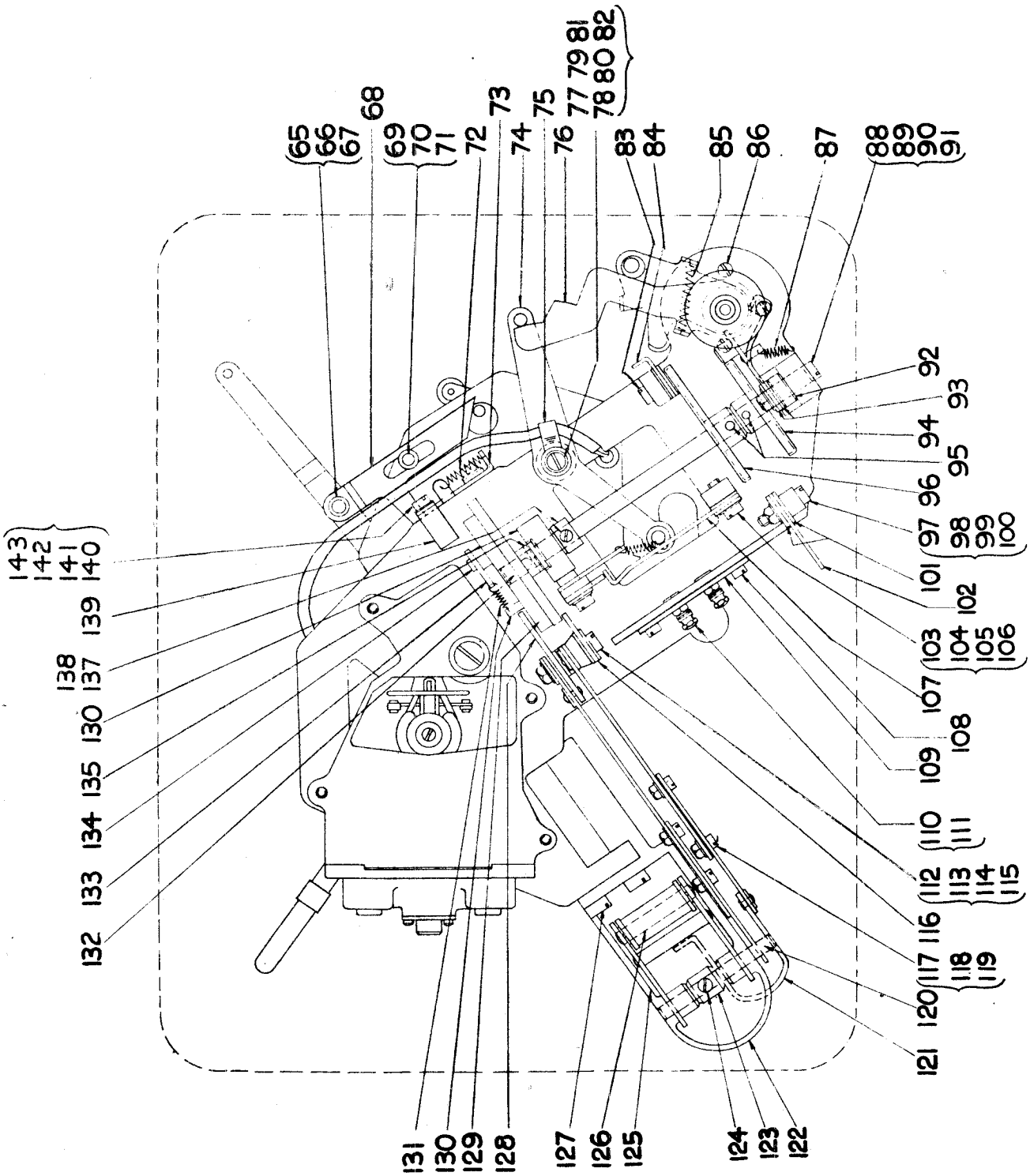

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MODEL RC60

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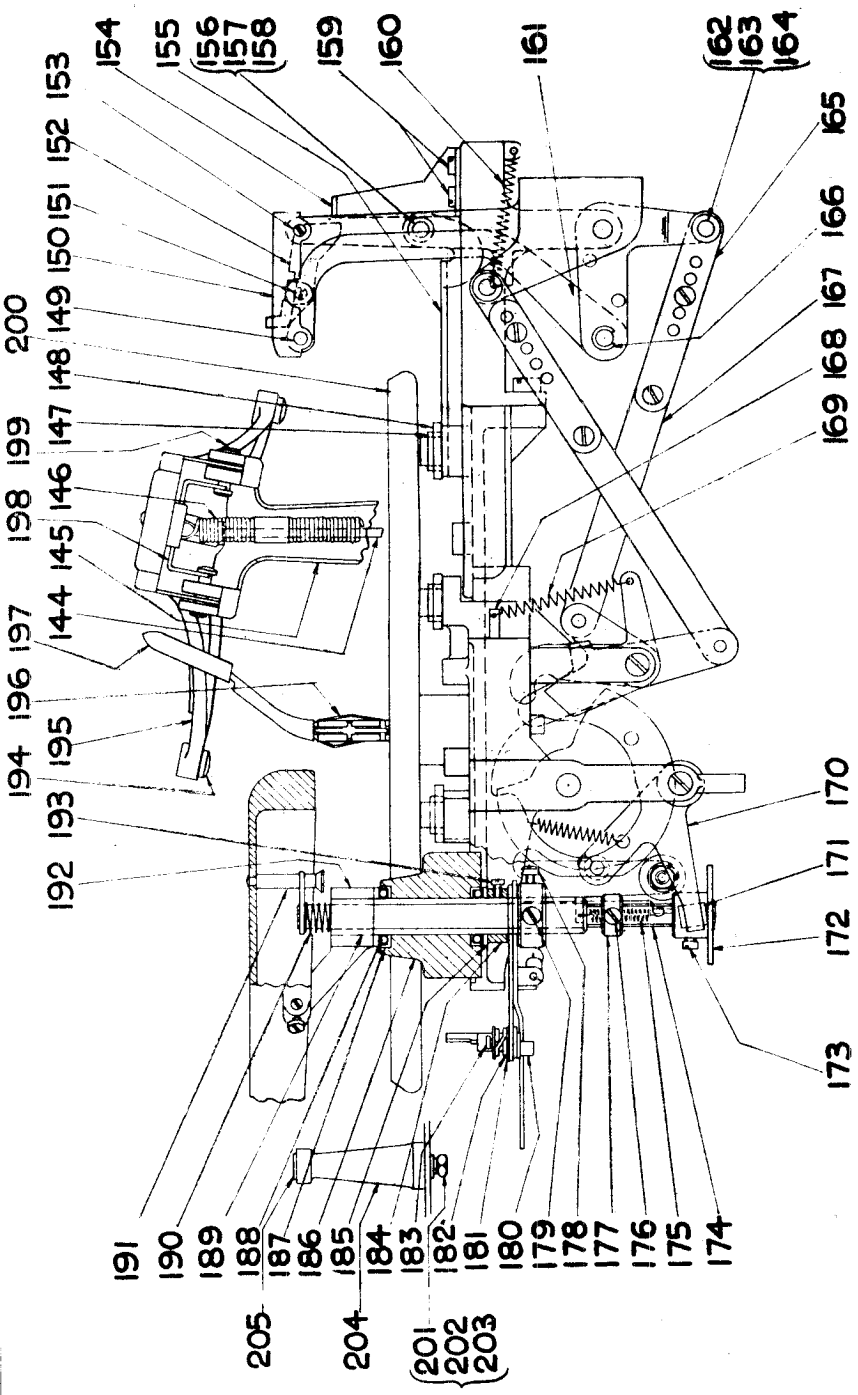

1.	SELECTOR LINK	45234	8.	FRICTION SPRING	A41513
2.	STEEL WASHER	A40508	9.	BASE PLATE SPRING PIN	A45208
3.	SCREW	A40018	10.	FRICTION PLATE	A45516
4.	BASE PLATE	A45172	11.	AUTO STOP LINK	A45184
5.	SCREW	A40033	12.	SCREW A40034 OR Screww A40130 COLLAR A47103 WASHER A40509	
6.	SCREW	A40035			
7.	OPERATION LEVER UNIT	A45173	13.	BASE CASTING	A45256

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14.	PICK UP ARM COMPLETE WITH PIN	A45125
15.	LOCKING SCREW	A40020
16.	PIVOT SCREW	A40019
17.	GROMMET	A43101
18.	COVER	A45203
19.	SWITCH BLOCK	A45201
20.	COVER SCREW	A40036
21.	SCREW OR RIVET	A40003 A42009
22.	CONTACT SPRING	A41514
23.	A45210-COLLAR	
24.	A40514-WASHER	
25.	A42006-RIVET	
26.	SWITCH LEVER UNIT	A45193
27.	STOP SCREW	A40022
28.		
29.		
30.	BRAKE PAD	A45199
31.	SCREW	A40031
32.	SPRING	A41506
33.	PICK UP HEAD - 2,000 OHMS 6,000 OHMS. OR 700 OHMS FOR DETAILS SEE SEPARATE SHEET	
34.	UNIT PLATE	C45102
35.	SWITCH PLATE	A45105
36.	RIVET	A42002
37.	SWITCH CONTROL LEVER & KNOB.	A45189
38.	CLUTCH RELEASE LEVER WITH PIN	A45185
39.	TRIP LEVER & PIN.	A45521
40.	RUBBER PAD	A45179
41.	STRIKER ASSEMBLY	A45376
42.	SCREW FIXING CHANGE OVER BLOCK	A40002
43.	CHANGE OVER BLOCK	FOR DETAILS OF INTERNAL PARTS SEE SEPARATE SHEET.
44.	CHANGE OVER COVER	
45.	SCREW	
46.	FIXING SCREW FOR REGULATOR LEVER	A40020
47.	REGULATOR LEVER WITH KNOB & RUBBER SLEEVE	A45387
48.	INDICATOR PLATE	A45104
49.	INTER. SELECTOR LEVER	A45235
50.	SCREW	A40018
51.	SPRING WASHER	A42504
52.	WASHER	A40504
53.	COLLAR	A45283
54.	RIVET	A42002
55.	INSTRUCTION PLATE	L. 16 45103 H.16 45429 U. 16 45430 D. 16 45431
56.	SCREW FIXING MOTOR	A40018
57.	DELAY LEVER	A45236
58.	SCREW	A40031
59.	SCREW A40038 & NUT A41008	
60.	PLATFORM COVER	A45263
61.	COLLAR	A45161
62.	WASHER	A40514
63.	RIVET	A42005
64.	SCREW A40177	
65.	COLLAR	A45161
66.	WASHER	A40514
67.	RIVET	A42005
68.	SWITCH LINK	A45192
69.	COLLAR	A45161
70.	WASHER	A40514
71.	RIVET	A42005
72.	SPRING	A41503
73.	K.O. CLUTCH LEVER	A45261
74.	SELECTOR LEVER WITH PIN	A45231
75.	LEAD CLIP	A45399
76.	PICK UP ARM LEVER UNIT	A45241
77.	SCREW	A40018
78.	WASHER	A40504
79.	COLLAR	A45420
80.	SPRING WASHER	A42504
81.	SHAKEPROOF WASHER	A42520
82.		
83.	SCREW	A40018
84.	PICK UP CAM LEVER UNIT.	A45258
85.	SPRING	A41506
86.	SCREW FIXING PICK UP BASE	A40023
87.	SPRING	A41503
88.	SCREW	A40025
89.	SHAKE PROOF WASHER	A42520
90.	NUT	A41006
91.	COLLAR	A45161
92.	DISTANCE COLLAR	A45274
93.	WASHER	A40512
94.	LIFTING CAM UNIT	A45223
95.	GROOVED PIN	A43301
96.	SWING CAM UNIT	A45227
97.	SCREW	A40025
98.	NUT	A41006
99.	SHAKEPROOF WASHER	A42520
100.	COLLAR	A45161
101.	WASHER	A40512
102.	OVERTHROW LEVER	A45257
103.	SCREW	A40025
104.	SHAKE PROOF WASHER	A42520
105.	WASHER	A40512
106.	COLLAR	A45161
107.	K.O. RELEASE LEVER	A45260
108.	SCREW FIXING TERMINAL STRIP	A40021
109.	TERMINAL STRIP UNIT	A45253
110.	TERMINAL NUT	A41009
111.	TERMINAL WASHER	A40519
112.	SCREW	A40025
113.	WASHER	A40512
114.	COLLAR	A45161
115.	SHAKE PROOF WASHER NUT	A42520 A41006
116.	SUB. ASSEM. PLATFORM CAM LEVER	A45246
117.	SCREW	A40023
118.	SPRING WASHER	A42501
119.	NUT	A41012
120.	BOTTOM SPINDLE	A45165
121.	PLATFORM LEVER	B45163

122. PLATFORM BRACKET	B45168
123. OPERATING COLLAR	A45168
124. SCREW	A40024
125. TILTING LEVER UNIT	A45155
126. BOTTOM SPINDLE	A45165
127. SCREW FIXING PLATFORM BRACKET	A40028
128. SUB. ASSEM. TILTING CAM LEVER	A45150
129. PLATFORM CAM UNIT	A45213
130. SPRING PIN	A45218
131. SPRING	A41506
132. CAM SHAFT	A45219
133. CLUTCH LEVER	A45216
134. CLUTCH LEVER PIN	A45217
135. PIN	A43301
136. CAM SHAFT BEARING	A45221
137. CAM SHAFT COLLAR	A45222
138. FIXING SCREW	A40024
139. K.O. CATCH LEVER	A45262
140. SCREW	A40183
141. SHAKEPROOF WASHER	A42520
142. WASHER	A40504
143. COLLAR	A45161
144. K.O. SPINDLE UNIT	A45116
145. BRACKET	A45115
146. OVERARM SPRING UNIT	A45119
147. RUBBER SLEEVE	A45278
148. RUBBER COLLAR	A45279
149. RIVET	A42004
150. PLATFORM	A45150
151. SCREW	A40030
152. PAWL	A45169
153. SCREW	A40030
154. PLATFORM STOP	A45170
155. SELECTOR OPERATION LEVER	A45164
156. RIVET	A42005
157. WASHER	A40514
158. COLLAR	A45161
159. SCREW FIXING PLATFORM STOP	A40029
160. SPRING	A41508
161. PLATFORM SUPPORT UNIT	A45151
162. RIVET	A42005
163. WASHER	A40514
164. COLLAR	A45161
165. COUPLING LINK (SHORT)	A45160
166. RETAINING CLIP	A45166
167. COUPLING LINK (LONG)	A45249
168. ANCHOR PIN	A45282
169. SPRING	A41503
170. LIFTING LEVER UNIT	A45268
171. LIFTING LEVER PAD	A45858
172. FRICTION DISC UNIT	A45265
173. FIXING SCREW	A40021
174. LIFTING TUBE UNIT	A45134
175. SPRING	A41503
176. SCREW	A40021
177. STOP COLLAR	A45264
178. SCREW	A40000
179. SCREW	A40026
180. Eccentric Pin	A45245
181. WASHER	A40503
182. SPRING WASHER	A42502
183. SPLIT PIN	A43300
184. RETAINING COLLAR	A45145
185. THRUST WASHER	A40510
186. PICK UP BASE	A45143
187. BALL RACE	A45144
188. THRUST BALLS	A43200
189. PICK UP ARM SPINDLE	A45130
190. SPRING	A41504
197. RECORD SPINDLE	A45380
198. SPRING LEVER	A45121
199. PIVOT SPINDLE	A45123
200. TURN TABLE	A45390
201. NUT	A41012
20.2 WASHER	A40514
203. SPRING WASHER	A42501
204. RUBBER PAD	A45277
205. PICK UP REST	A45276

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MODELS D,H,
L16 Motors

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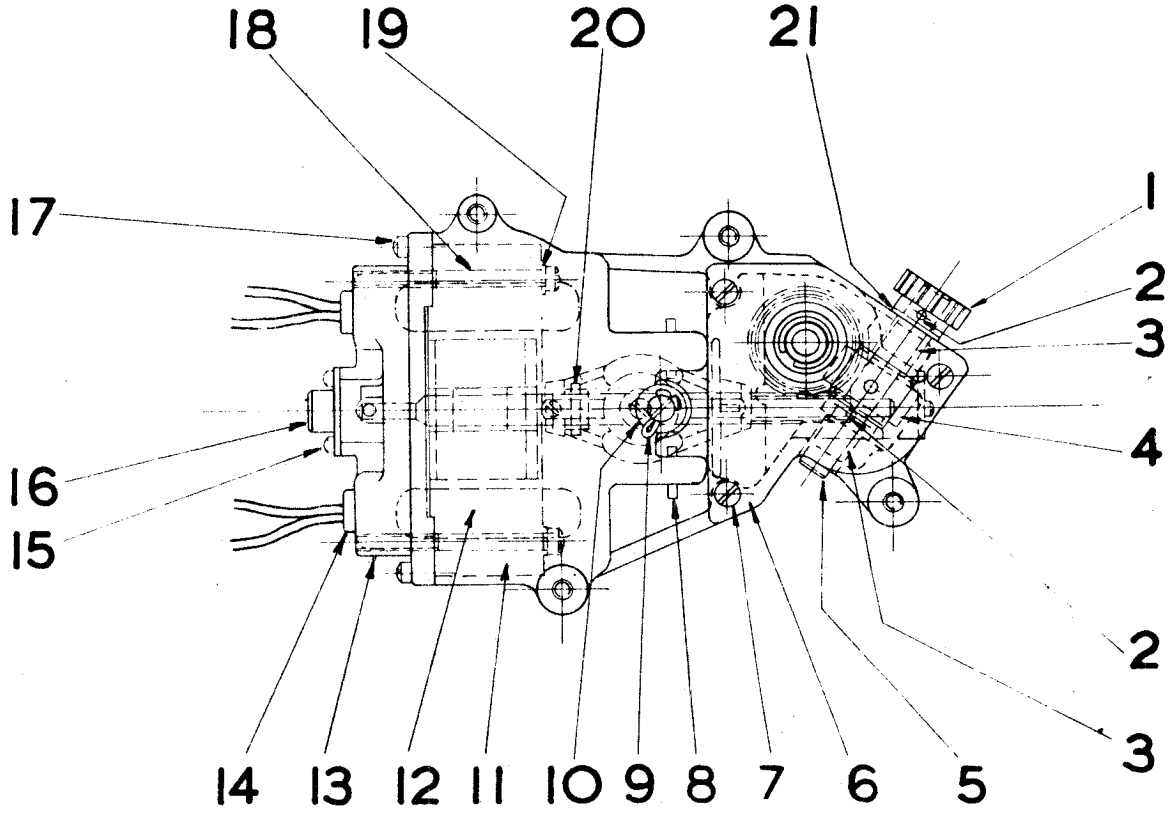

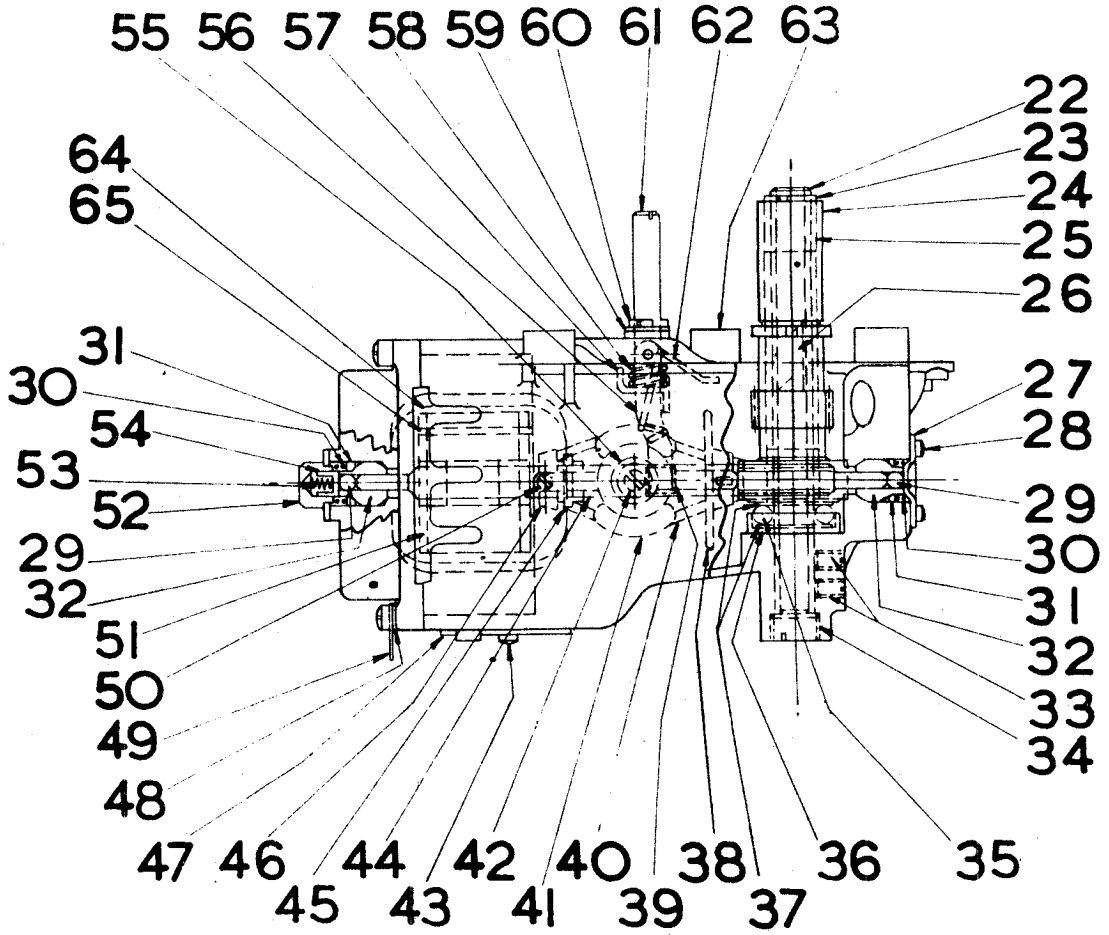

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1. A45318 Clutch	23. A45493 Retaining Coil	45. A43307 Spring Pin
2. A43303 Pin Fixing, Clutch	24. A45363 Main Spindle	46. A45480 Collar
3. A45315 Cross Shaft Bearings	25. A45364 Bush	47. A45419 Name Plate
4. A45317 Gear	26. A45371 Fixed Spindle Insert	48. A40501 Washer
5. A45316 Cross Shaft	27. A45484 Bearing Plate (Frame)	49. A43000 Earthing Tag
6. A45375 Top Plate	28. A40040 Fixing Screw Bearing plate	50. A40010 Screw for Collar
7. A40029 Screw Fixing Top Plate	29. A43205 Thrust Ball	51. A45339 Rotor Assembly
8. A45324 Pivot Pin	30. A41510 Spring	52. A45349 Bush
9. A43300 Split Pin	31. A45328 Cone	53. A41517 Spring
10. A40503 Washer	32. A45469 Rotor Bearing	54. A45350 Plunger
11. A45539 Stator Pack	33. A40043 Fixing Screw for fixed Spindle	55. A40502 Washer
12. A45687 Coils (with leads)	34. A45326 Screwed Plug	56. A45323 Regulating Brake
13. B45346 End Cover	35. A43203 Thrust Ball	57. A45321 Cam
14. A43101 Grommet	36. A45373 Ball Race	58. A41528 Spring
15. A40040 Fixing Screw for Bearing Cover	37. A40521 Thrust Washer	59. A40503 Washer
16. A45347 Bearing Place Assem: (Cover)	38. A45481 Gov: Sleeve Assem:	60. A43300 Split Pin
17. A40002 Fixing Screw End Cover	39. A45684 Felt Pad	61. A45320 Regulating Shaft
18. A40118 Fixing Screw for Stator	40. A41520 Spring	62. A41518 Spring
19. A42501 Spring Washer	41. A45056 Gov: Ball	63. C45314 Frame
20. A43307 Spring Pin fixing, Governor	42. A40010 Fixing Screw for Ball & Collar	64. A45361 & A46605 Coil Insulation
21. A40520 Washer	43. A40042 Fixing Screw for Name Plate	65. A45359 Leakage Pins
22. A45370 Fixed Spindle	44. A45338 Rotor Shaft	

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GENERAL INSTRUMENT CORP.

AUTOMATIC RECORD CHANGER SERVICE INSTRUCTIONS

MODEL 204

The Model 204 Record Changer is an automatic cam type changer, featuring Single Button Control, Automatic Shut-Off, and Eccentric Spindle Record Selection.

OPERATION

Single Button Control . . . Initial depression of the Single Button Control (6) not only actuates the Mercury Switch (13) but at the same time contacts the Automatic Trip Bar (14). The motion of the Automatic Trip Bar (14) causes the Carrier Lever (31) and its attached Drive Wheel (10) to swing outward until the Drive Wheel (10) comes in contact with the rim of the turntable. The consequent revolving motion of the Drive Wheel (10) is transmitted to the Main Cam (15) through a Drive Spring (16) and Worm Drive (17) assembly.

Cycling . . . A single revolution of the Main Cam (15) results in complete automatic cycling of the changer. This includes selection of record from stack, lifting Pick-Up Arm (1) from rest position and setting needle on edge of record. Upon completion of the revolution, the Automatic Trip Cam (24) engages with the block on the Trip Lever (43) and pulls the Carrier Lever (31) back to its original position so that the Drive Wheel (10) is no longer engaged with the turntable rim.

Record Feed . . . The lower side of the Main Cam (15) controls record selection. Motion of the Feed Cam Roller (36) about the cam results in a backward and forward movement of the Feed Sector Lever (19) thus engaging the Record Feed Pinion (20). This in turn causes the Eccentric (35) to first rotate to proper position for record selection and to then return, allowing record to drop over Spindle (3).

Pick-Up Arm Movement . . . The upper side of the Main Cam (15) controls Pick-Up Arm (1) movement. *Lift* is effected by motion of the Lift Pin (25) along the vertical edge of the cam as the latter rotates. *Direction* is controlled by the engagement of the Main Cam (15) with the Sweep Lever Pinion (26). The Sweep Lever (27) is attached to the Pick-Up Arm (1) by means of a Clamp (28) around the Pick-Up Arm Pivot Sleeve (29). A boss projecting from the upper side of the Main Cam (15) displaces the Stop Lever (30) at the end of the change cycle, thus permitting the Pick-Up Arm (1) to proceed across the record.

Positive Trip Action . . . As the Pick-Up Arm (1) approaches the spindle assembly, the Sweep Lever (27) hits the Positive Trip Screw (37) mounted on the Trip Lever Assembly (43). This action re-engages the Drive Wheel (10) with the turntable rim and starts a new cycle.

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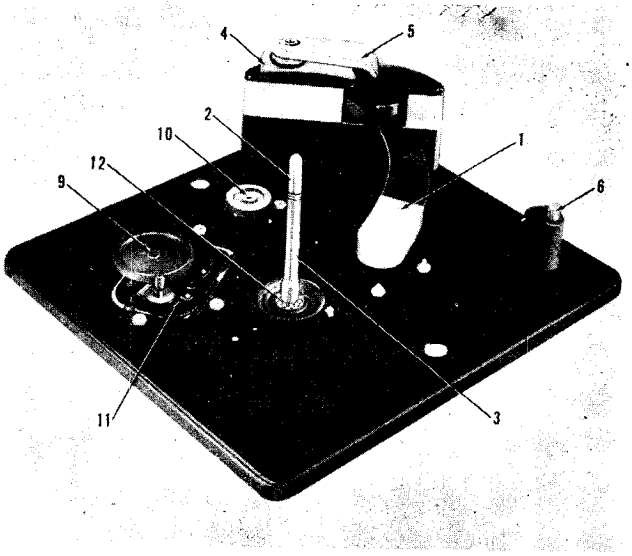


FIGURE 1

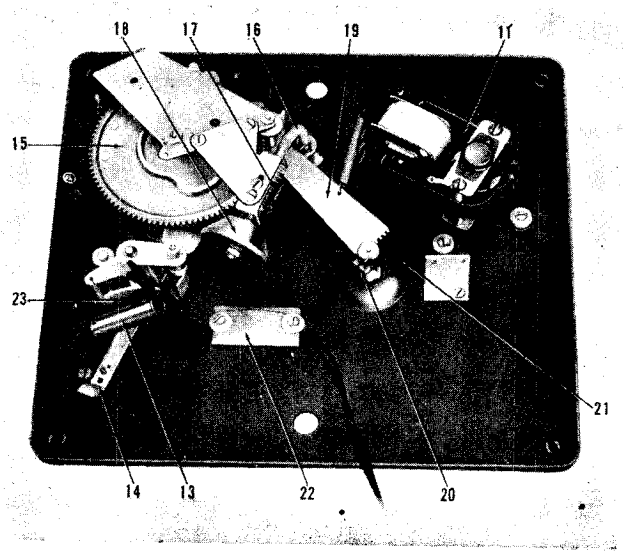


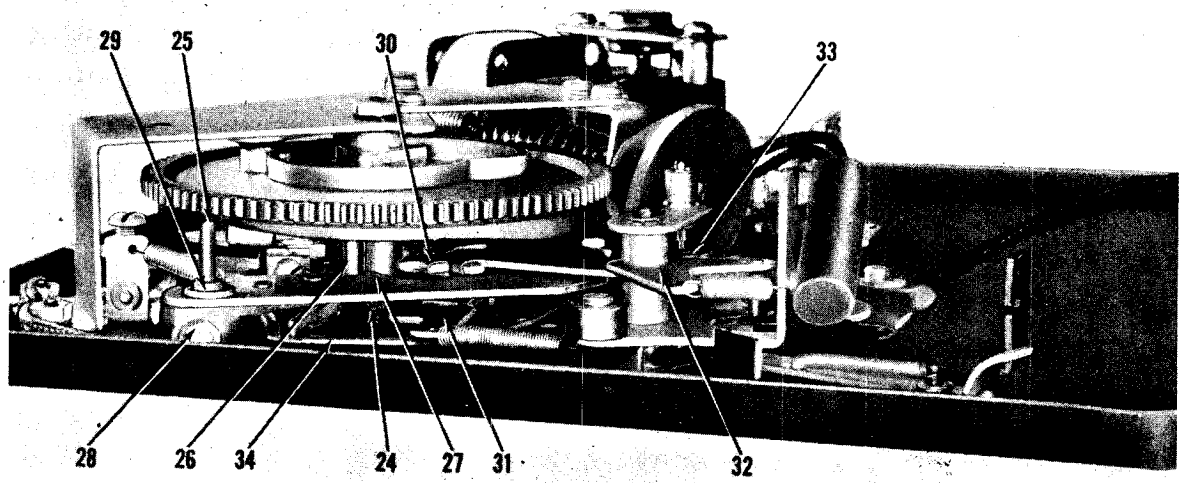
FIGURE 2

Pawl Trip Action . . . Any reversal of the direction of the Sweep Lever (27) travel before positive trip action takes place causes the Sweep Lever (27) to push forward the Pawl (38) mounted on the Auxiliary Trip Lever (34). This movement also has the effect of re-engaging the Drive Wheel (10) to start a new cycle. *(Pawl trip action is effective only after the Pick-Up Arm (1) reaches a distance of not more than four inches from Spindle (3).)*

Ten Inch or Twelve Inch Operation . . . Adjusting the Record Support (4) to the ten inch or twelve inch position lowers the Selector Rod (39) a definite degree. The length of the extension of this rod determines the position of the Stop Selector Lever (40) which in turn controls the Stop Lever (30). The latter is the means of regulating the distance the Sweep Lever (27) and its attached Pick-Up Arm (1) travel before the Pick-Up Arm (1) is lowered to the edge of the record. (Operation of this feature is dependent on proper positioning of Record Support (4). *Always turn Record Support (4) to full stop.)*

Automatic Shut-Off . . . Release of the Record Stabilizer Finger (5) lowers the Shut-Off Rod (41) and forces the Stop Selector Lever (40) completely clear of the Stop Lever (30). The latter is then able to move into a position which completely blocks any forward motion of the Sweep Lever (27). Consequently, the Sweep Lever (27) cannot perform its usual function of actuating the Switch Lever (32). Thus the Switch Lever Roller (33) remains in the path of the Stop Lever (30). On completion of the cycle, the Stop Lever (30), in returning to home position, hits the Switch Lever Roller (33) and forces the Mercury Switch (13) to the OFF position.

FIGURE 3



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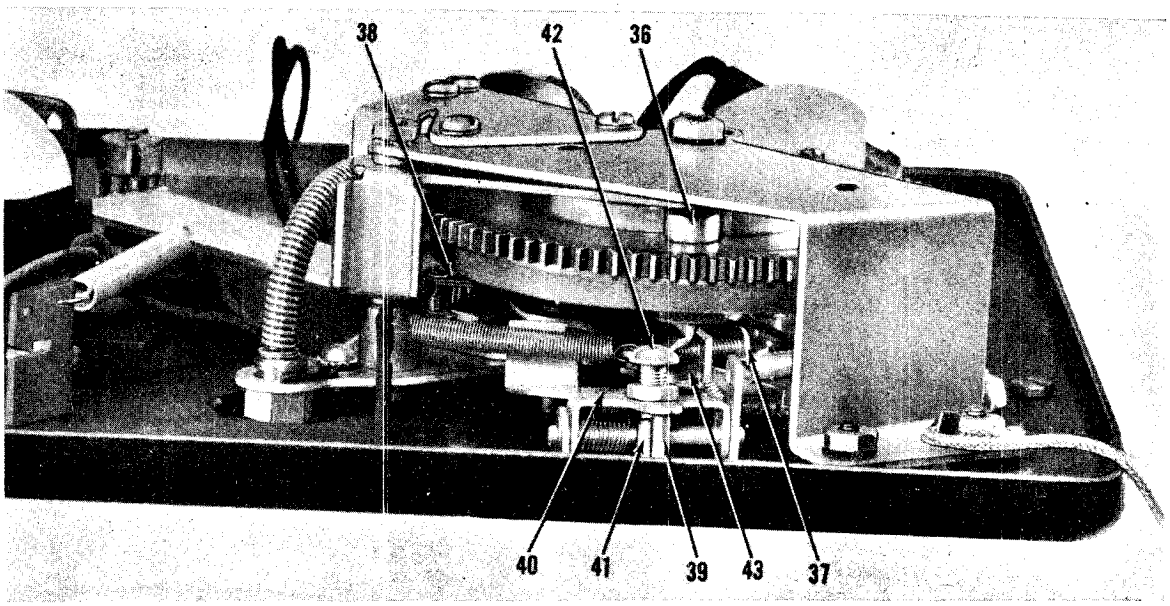

FIGURE 4

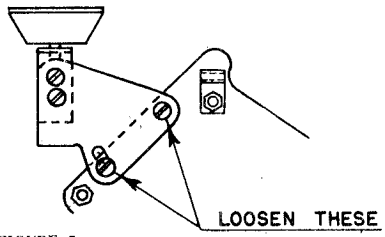

FIGURE 5

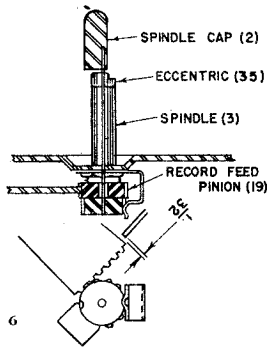

FIGURE 6

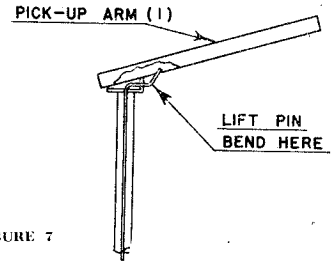

FIGURE 7

MISCELLANEOUS SERVICE ADJUSTMENTS

Changer trips before completion of record:

Turn Positive Trip Screw (37) clockwise.

Changer fails to trip after completion of record:

Turn Positive Trip Screw (37) counterclockwise.

Drop point of Pick-up Arm is not at proper point on record:

Loosen screw on Sweep Lever Clamp (28) slightly and reposition Pick-up Arm (1) with respect to Sweep Lever (27).

Slow turntable speed:

Make sure Drive Wheel (10) does not strike rim of turntable. If necessary, readjust eccentric bushing on Drive Wheel (10). (Note: This adjustment should be exceedingly slight as a large movement may cause continuous trip.)

Check for grease or oil on Idler Wheel (9) of Motor (11) and inside of turntable. Wipe with carbon tetrachloride.

Check for sticky Idler Wheel (9) plate on Motor (11). Free with screw driver.

Stalls in cycle:

Remove any grease on Drive Wheel (10) or inside of turntable with carbon tetrachloride.

Check mesh of Worm Drive (17) and Main Cam (15) for proper clearance. Loosen screws on main bracket and tighten. (See Figure 5.)

Check for bind in Spindle Assembly (See Figure 6). Disassemble index collar and Record Feed Pinion (20), remove Spindle Cap (2), Eccentric (35) and eccentric rod.

Check for freeness and remove binds.

The following cautions should be observed in reassembling Spindle Assembly:

(a) Reassemble with a maximum end play of .005 between Eccentric (35) and Spindle Cap (2).

(b) The Eccentric (35) should be in line with the Spindle (3) when the changer has completed its cycle.

(c) The Feed Sector Lever (19) should mesh with the Record Feed Pinion (20) as shown in Figure 6.

(d) Align Spindle Cap (2) with Spindle (3) in detent position.

Records fail to drop:

Check meshing of Feed Sector Lever (19) with Record Feed Pinion (20). Reset as shown in Figure 6.

First record does not play:

Readjust end of Lift Pin (25) so that needle will play first record. (See Figure 7.)

(Note: Do not bend Lift Pin (25) too much as this will prevent playing of top record on full stack.)

Make certain that pick-up lead does not hit top of Lift Pin (25) or hinge.

Automatic Shut-Off fails to operate:

Make certain that the Automatic Shut-Off Adjusting Screw (42) mounted on Stop Selector Lever (40) makes contact with the Shut-Off Adjusting Rod (41) when the Stabilizer Finger (5) is released. Adjust as required. Check leads on Mercury Switch (13) for interference with Switch Lever (32) motion. Check Mercury Switch (13) continuity.

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GENERAL INSTRUMENT CORP.
TABLE OF REPLACEABLE PARTS
MODEL 204

Ref. Symbol	*Description*	*Part No.*
1	Pickup Arm Assembly (with Pickup Cartridge Assy.)	69A71907
	Pickup Arm Assembly (minus Pickup Cartridge Assy.)	69A71970
	Steel Balls (9)	36-80656
	Pickup Cartridge	Specify Model
25	Lift Pin	12-72687
	Spindle Kit	19A72912
3	Spindle and Bearing Assembly	19A71536
35	Eccentric Assembly	43A71646
2	Spindle Cap Assembly	21A71637
12	Thrust Bearing Assembly	30A72491
20	Pinion Assembly	28A71289
	Stabilizing Finger Assembly	55A71627
	Finger and Rod Assembly	55A71628
5	Record Stabilizer Finger	55-71604
17, 18	Drive Assembly (with Vibration Dampener)	29A71376
17	Worm Assembly	29A71377
16	Drive Spring Assembly	33A71196
10	Drive Wheel Assembly	19A71206
36	Feed Cam Roller	65-70566
4	Record Support Housing Assembly	21A71867
not shown	Motor and Lead Assembly (External Fan Type)	56-72092
	Idler Wheel	28A72833
	Fan	37-72839
	Spring	33-72841
	Pin	12-72851
11	Motor and Lead Assembly (Internal Fan Type)	56-72092
9	Idler Wheel	28A72869
	Spring	33-72879
	Drive Pinion Spring	33-72873
	Pin	12-72877
13	Housing and Mercury Switch Assembly	21A72762
14	Trip Bar	41A71263
19	Feed Sector Assembly	27A71293
22	Terminal Assembly	78A72777
	Terminal Board	78-72774
	Terminal Cover	58-72780
32	Switch Lever Assembly	55A72543
23	Switch Bracket Assembly	58A72555
30	Stop Lever Assembly	55A71298
40	Stop Selector Lever Assembly	55A71328
39	Stop Selector Rod Assembly	12A71623
	Carrier Trip Lever Assembly	55A71395
43	Trip Lever Assembly	55A71394
31	Carrier Lever Assembly	55A71379
	Turntable	Specify Model and Color
34	Auxiliary Trip Lever Assembly	55A72653
15	Cam Assembly	43A71301
	Indexing Spring Assembly	59A71305
	Sweep Lever Assembly	55A71295
28	Clamp Lever Assembly	55A71176
27	Sweep Lever Sub-Assembly	55A71296
	Mounting Spring	33-70582
	Lead Retainer Spring	33-71183
	Pawl Spring	33-71172
	Switch Lever Roller Spring	33-71256
	Stop Lever Spring	33-71316
	Control Button Spring	33-71317
	Trip Bar Spring	33-71318
	Trip Spring	33-71173
	Auxiliary Trip Spring	33-72578
	Record Feed Spring	33-71341
	Carrier Lever Spring	33-71342
	Mercury Switch Spring	33-72699
	Finger Spring	33-71613
	Stop Selector Lever Spring	33-71768
	Sweep Lever Spring	33-72210
	Pickup Arm Spring	33-71611
	"C" Washer (5/16")	32-16901
	"C" Washer (9/32")	32-50745

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AUTOMATIC RECORD CHANGER SERVICE INSTRUCTIONS

MODEL 205

The Model 205 Record Changer is an automatic cam type changer, featuring Single Button Control and Eccentric Spindle Record Selection.

OPERATION

Starting . . . After the Switch Button Control (6) has been turned ON, thus supplying power to rotate the turntable, automatic cycling may be started by depressing the button. This movement pushes the Trip Bar (14) forward, causing engagement with the Carrier Lever (27) and its attached Drive Wheel (10). The latter thus contacts the rim of the turntable and rotates with it. This motion is transmitted through the Drive Spring (16) to the Worm Drive (17), which in turn drives the Main Cam (15).

Cycling . . . A single revolution of the Main Cam (15) results in complete automatic cycling of the changer. This includes selection of record from stack, lifting Pick-Up Arm (1) from rest position and setting needle on edge of record. Upon completion of the revolution. the Automatic Trip Cam (26) engages with the block on the Trip Lever (34) and pulls the Carrier Lever (27) back to its original position so that the Drive Wheel (10) is no longer engaged with turntable rim.

Record Feed . . . The lower side of the Main Cam (15) controls record selection. Motion of the Feed Cam Roller (32) about the cam results in a backward and forward movement of the Feed Sector Lever (19) thus engaging the Record Feed Pinion (20). This in turn causes the Eccentric (35) to first rotate to the proper position for record selection and to then return, allowing record to drop over Spindle (3).

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MODEL 205

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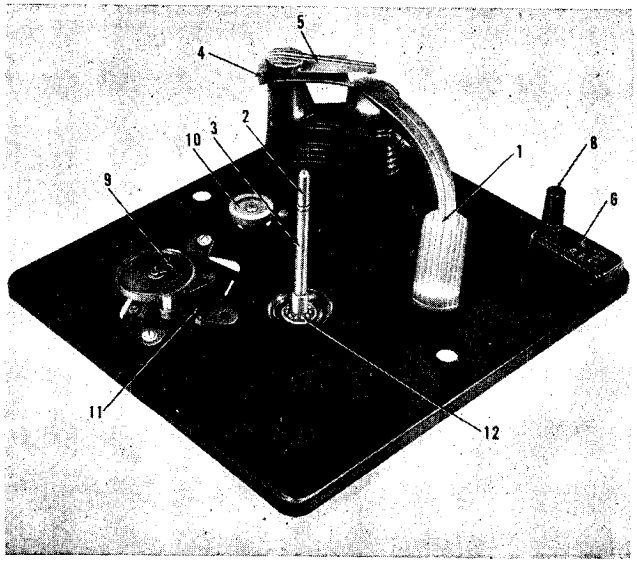


FIGURE 1

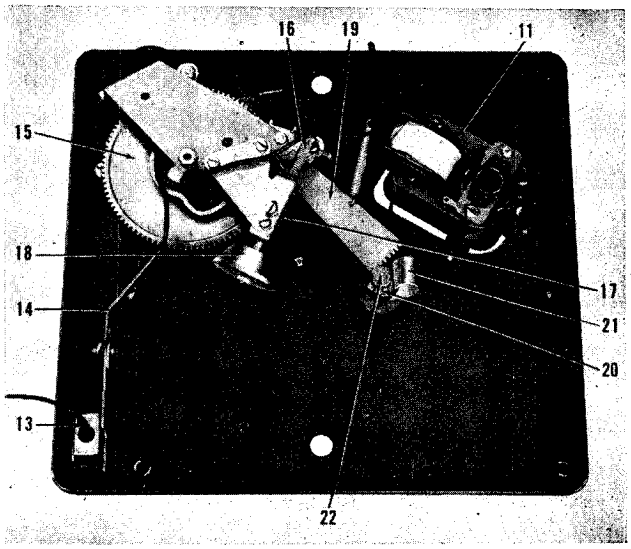


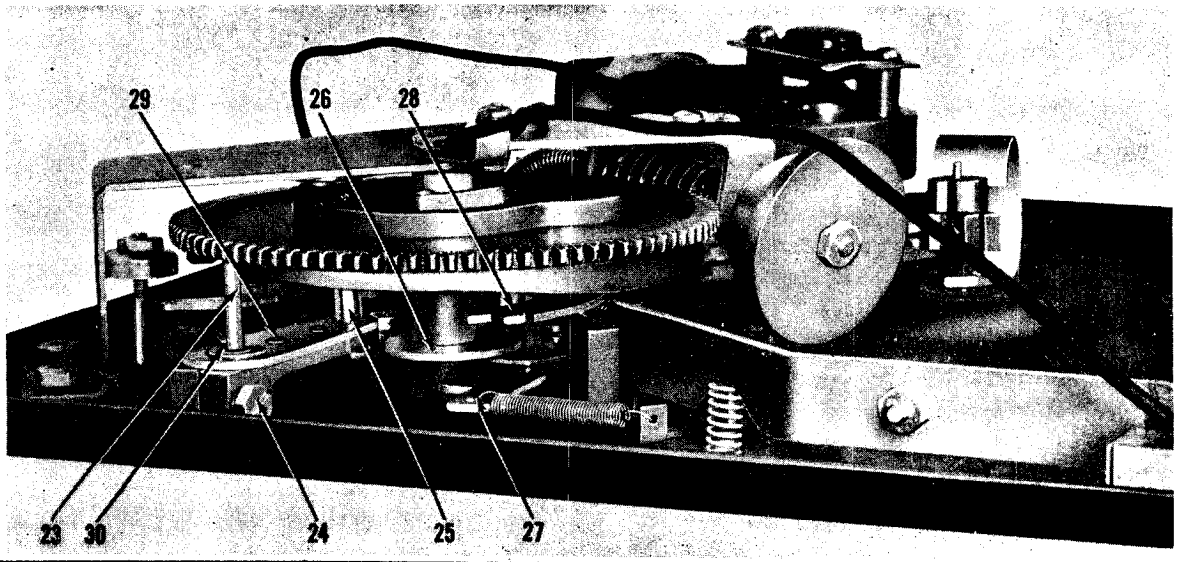
FIGURE 2

Pick-Up Arm Movement . . . The upper side of the Main Cam (15) controls Pick-Up Arm (1) movement. *Lift* is effected by motion of the Lift Pin (23) along the vertical edge of the cam as the latter rotates. *Direction* is controlled by engagement of the Main Cam (15) with the Sweep Lever Pinion (25). The Sweep Lever (29) is attached to the Pick-Up Arm (1) by means of a Clamp (24) around Pick-Up Arm Pivot Sleeve (30). A boss projecting from the upper side of the Main Cam (15) displaces the Stop Lever (28) at the end of the change cycle, thus permitting the Pick-Up Arm to proceed across the record.

Positive Trip Action . . . As the Pick-Up Arm approaches the Spindle (3), the Sweep Lever (29) hits the Positive Trip Screw (31) mounted on the Trip Lever (34). This action re-engages the drive wheel with the turntable rim and starts a new cycle.

Ten Inch or Twelve Inch Operation . . . Adjusting the Record Support (4) to the ten inch or twelve inch position lowers the Selector Rod (33) a definite degree. The length of the extension of this rod determines the positioning of the Stop Lever (28). The latter is the means of regulating the distance the Sweep Lever (29) and its attached Pick-Up Arm (1) travel before the Pick-Up Arm (1) is lowered to the edge of the record. (Operation of this feature is dependent on proper positioning of Record Support (4). *Always turn Record Support (4) to full stop.)*

FIGURE 3



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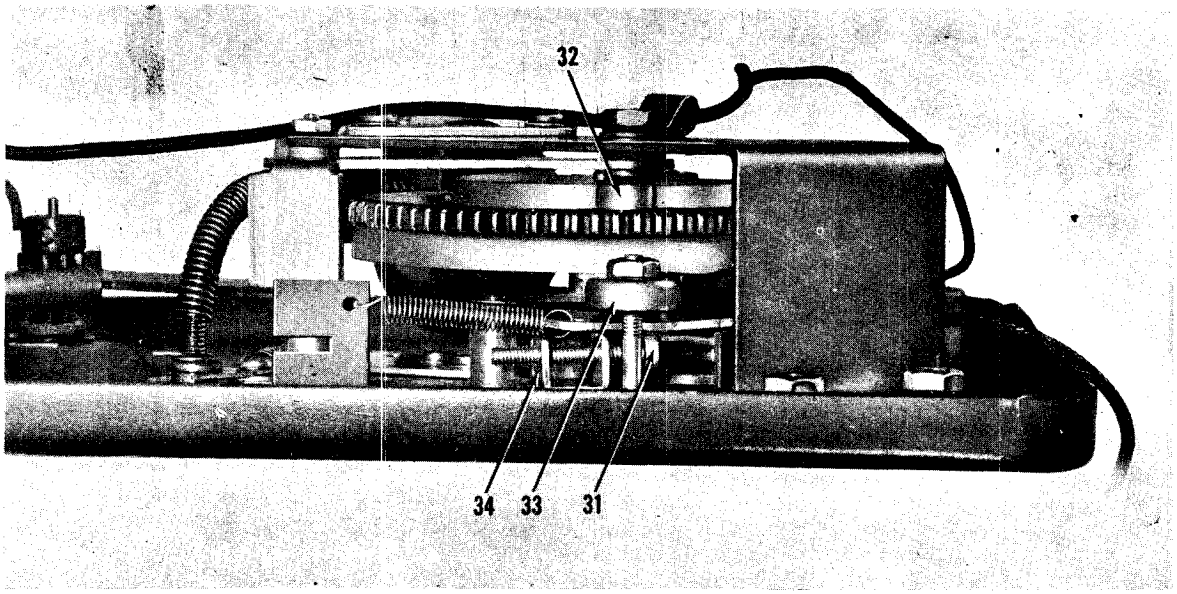

FIGURE 4

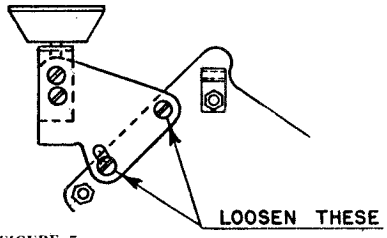

FIGURE 5

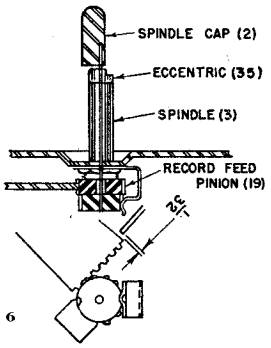

FIGURE 6

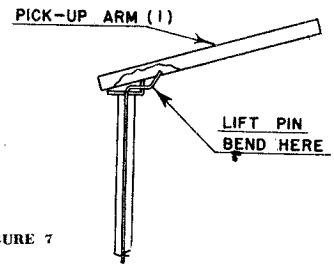

FIGURE 7

MISCELLANEOUS SERVICE ADJUSTMENTS

Changer trips before completion of record:

Turn Positive Trip Screw (31) clockwise.

Changer fails to trip after completion of record:

Turn Positive Trip Screw (31) counter-clockwise.

Drop point of Pick-Up Arm (1) is not at proper point on record:

Loosen screw on Sweep Lever Clamp (24) slightly and reposition Pick-Up Arm (1) with respect to Sweep Lever (29).

Slow turntable speed:

Make sure Drive Wheel (10) does not strike rim of turntable. If necessary, re-adjust eccentric bushing on Drive Wheel (10). (Note: this adjustment should be exceedingly slight as a large movement may cause continuous trip.)

Check for grease or oil on Idler Wheel (9) of Motor (11) and inside of turntable. Wipe with carbon tetrachloride.

Check for sticky Idler Wheel (9) plate on Motor (11). Free with screw driver.

Stalls in Cycle:

Remove any grease on Drive Wheel (10) or inside of turntable with carbon tetrachloride.

Check mesh of Worm Drive (17) and Main Cam (15) for proper clearance. Loosen screws on main bracket and tighten. (See Figure 5.)

Check for bind in Spindle Assembly (See Figure 6). Disassemble Index Collar (22) and Record Feed Pinion (20), remove Spindle Cap (2), Eccentric (35) and eccentric rod. Check for freeness and remove binds.

The following cautions should be observed in reassembling Spindle Assembly:

(a) Reassemble with a maximum end play of .005 between Eccentric (35) and Spindle Cap (2).

(b) The Eccentric (35) should be in line with the Spindle (3) when the changer has completed its cycle.

(c) The Feed Sector Lever (19) nould mesh with the Record Feed Pinion (20) as shown in Figure 6.

(d) Align the Spindle Cap (2) with the Spindle (3) in detent position.

Records fail to drop:

Check meshing of Feed Sector Lever (19) with Record Feed Pinion (20). Reset as shown in Figure 6.

First Record does not play:

Readjust end of Lift Pin (23) so that needle will play first record. (See Figure 7.) (Note: Do not bend Lift Pin (23) too much as this will prevent playing of top record on full stack.)

Make certain that pick-up lead does not hit top of Lift Pin (23) or hinge.

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TABLE OF REPLACEABLE PARTS

MODEL 205

Ref. Symbol	*Description*	*Part No.*
1	Pick-Up Arm Assy. (With Pickup Cartridge)	69A72000
	Pick-Up Arm Assy. (Minus Pickup Cartridge)	69A71995
	Steel Balls (9)	36-80656
	Lift Pin	12-71406
	Pickup Cartridge	Specify Model
	Spindle Kit	19A72912
3	Spindle and Bearing Assy.	19A71536
35	Eccentric Assy.	43A71646
2	Spindle Cap Assy.	21A71637
	Stabilizer Finger Rod Assy.	12A72696
5	Stabilizer Finger	55-72021
4	Record Support Housing Assy.	21A72035
17, 18	Drive Assy. (With Vibration Dampener)	29A71516
17	Worm Assy.	29A71377
16	Drive Spring Assy.	39A71196
	Turntable	Specify Model and Color
20	Pinion Assy.	28A71289
10	Drive Wheel Assy.	19A71206
32	Feed Cam Roller	65-70566
Not Shown	Motor and Lead Assy. (External Fan Type)	56-72092
	Idler Wheel	28A72833
	Fan	37-72839
	Spring	33-72841
	Pin	12-72851
11	Motor and Lead Assy. (Internal Fan Type)	56-72092
9	Idler Wheel	28A72869
	Spring	33-72879
	Drive Pinion Spring	33-72873
12	Thrust Bearing Assy.	30A72491
	Carrier-Trip Lever Assy.	55A71395
27	Carrier Lever Assy.	55A71379
34	Trip Lever Assy.	55A71394
33	Selector Rod Assy.	12A71510
	Trip Bar Assy.	41A71512
14	Manual Trip Bar	41-71483
13	Switch	58-71435
19	Feed Sector Assy.	27A71293
28	Stop Lever Assy.	55A71513
	Sweep Lever Assy.	55A71400
29	Sweep Lever Sub-Assy.	55A71399
24	Clamp Lever Assy.	55A71176
15	Cam Assy.	43A71301
21	Indexing Spring Assy.	59A71305
	Mounting Spring	33-70582
	Trip Lever Spring	33-71173
	Spring Retainer	33-71183
	Pull-In Spring	33-71205
	Record Feed Spring	33-71341
	Carrier Lever Spring	33-71342
	Finger Spring	33-71388
	Counter Balance Spring	33-71405
	Trip Bar Return Spring	33-71438
	Selector Rod Spring	33-71511
	"C" Washers (5/16")	32-50745
	"C" Washers (9/32")	32-16901

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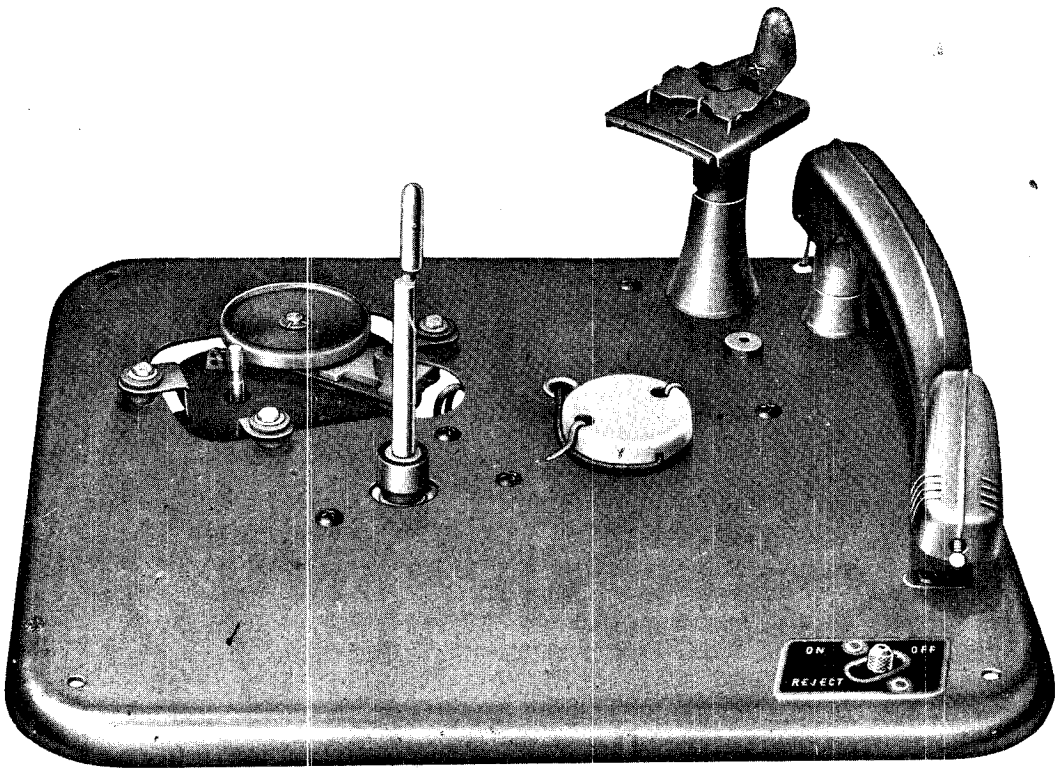
INTERNATIONAL DETROLA CORP.

GENERAL

This manual may be used for all versions of the Model 550 Automatic Record Changer. Some models require an insulated tone arm lead, readily identified on the unit. Model 550D has an extra lead to the switch. Models 550E and 550H have a special crystal cartridge, listed in the replacement parts list. Models 550F, 550G and 550H may be used on line current other than specified in this manual, by using a special motor. This changer is designed to operate on 105 to 125 volts, 60 cycle alternating current. It will play and automatically change twelve 10-inch or ten 12-inch records, not mixed. It is designed to have a minimum of moving parts, all readily accessible for adjustment and service.



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OPERATING INSTRUCTIONS

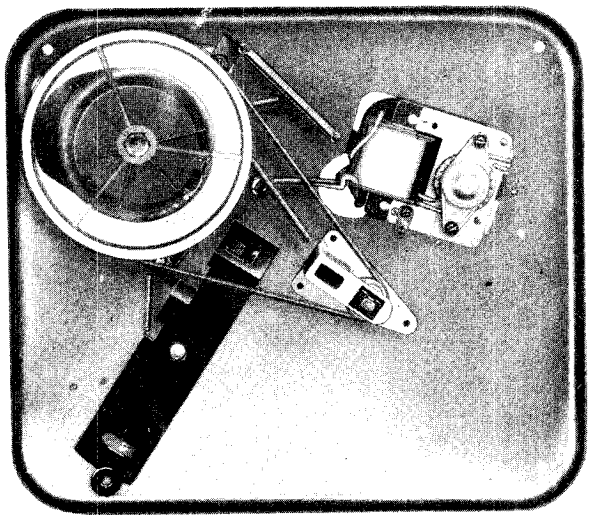
A brief summary of the Operating Instructions Manual, as supplied to the customer, is included below:

For automatic operation, engage the detent "A" on the tone arm hub. Position the record support shelf for the size records selected. (The wide ledge should be toward the spindle for 10-inch records; rotate 180° for 12-inch records.) Place a load of records on the support shelf and spindle; flip the toggle plate onto the stack of records. Push the control lever to the "On" position. After the conclusion of the last record, while the tone arm is still on the record, push the control lever to the "Off" position, place the tone arm on the rest.

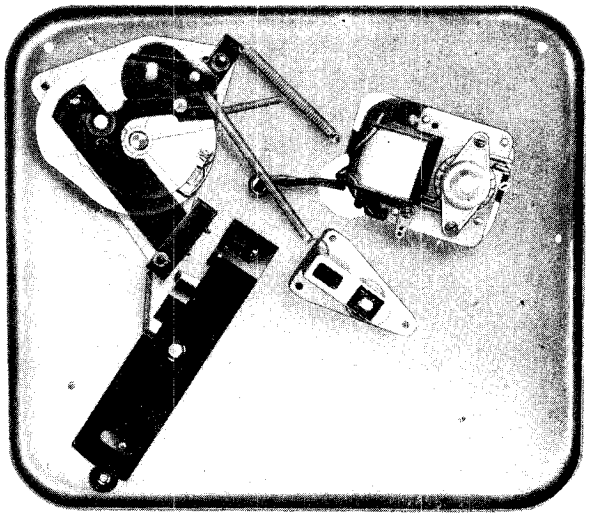
For playing single records, engage detent "H" on the tone arm hub; the record shelf should be in the 12″ position. Turn the control to "On", allowing the tone arm to raise and lower. Then place the tone arm by hand on the edge of the record.

Note: This changer has been designed to operate automatically, using all standard commercial records with an eccentric stopping groove, even those with an unusually large diameter stopping groove.

Manual operation is a secondary function of the unit and is included solely for playing home recordings or other non-standard records. Each time such a record is played, the tone arm must be allowed to raise and lower before it is positioned by hand on the record.



Bottom View—Cam phantomed through Drum.



Bottom View—Drum and Spring removed. Mechanism phantomed through Cam.

THE CHANGE CYCLE

An understanding of the methods used to accomplish the necessary mechanical motions will aid greatly in the diagnosis of any disorders of the mechanism. A careful study of the following outline should prove extremely valuable.

The mechanical functions of the change cycle, raising, moving and lowering the tone arm, and the ejection of records, are controlled by a cam. This cam is driven, during the change cycle only, by a drive dog on the cam engaging one of the bosses on the constantly revolving drum wheel. This wheel is driven from the turntable bearing by means of a belt. The turntable is rim driven from the motor.

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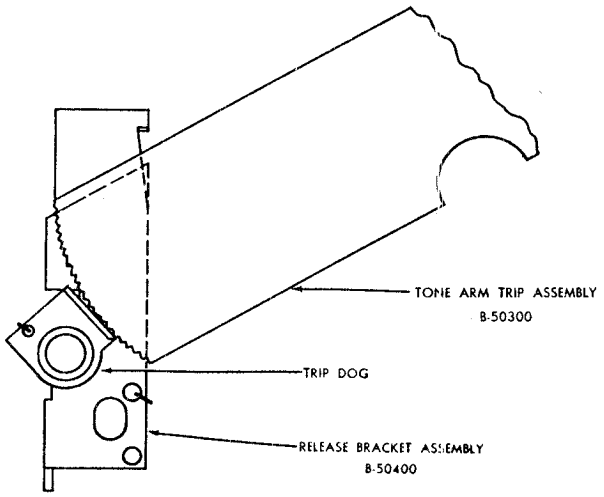
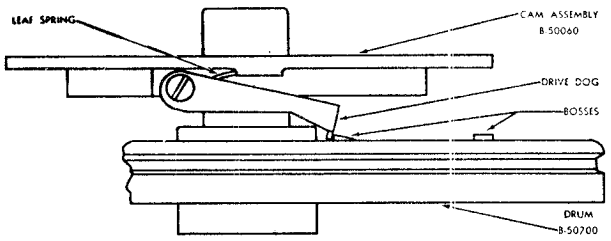


The Change Cycle Sequence is as follows:

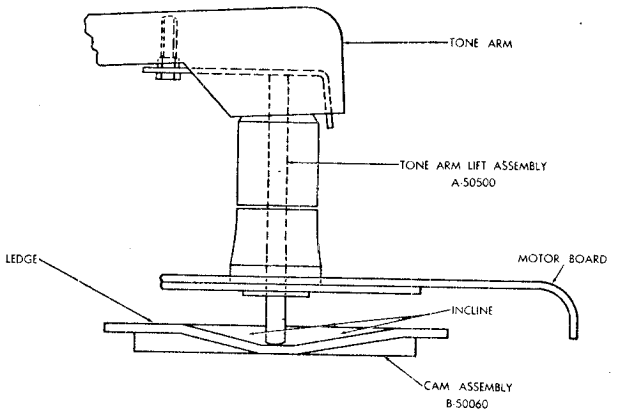
1. As the needle in the tone arm nears the end of a record, a lever with a serrated end moves with the tone arm and engages a trip dog pivoted on a release bracket.

2. The eccentric groove in the record causes the tone arm to oscillate. The backward motion of the tone arm and lever causes the trip dog to push against its pivot point, thus moving the release bracket away from the cam.

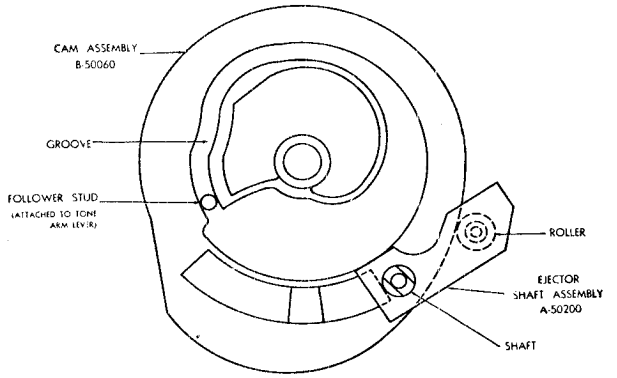


3. This allows the drive dog on the cam (which had been held by the release bracket) to drop down onto the drum and engage one of the bosses; the cam then rotates with the drum.

4. As the cam turns, the tone arm lift shaft rides up an incline to a ledge on the periphery of the cam, and thus raises the tone arm off the record. During most of the remainder of the cycle, the lift shaft rides this ledge, keeping the tone arm elevated.



5. A follower stud on the tone arm lever is pulled into a groove on the cam. As the cam rotates, this stud follows the groove and causes the tone arm to swing out beyond the edge of the record.



6. The shape of the cam is elliptical at one portion of the outer periphery. A roller attached to an ejector lever and shaft follows the outside periphery of the cam. As the cam revolves, the elliptical portion begins to push against the roller, causing the lever to move, thereby turning the shaft.

7. This shaft extends up through a casting to the record ejector shelf. A small record ejector cam, turned by this shaft, moves the ejector plate, pushing a record off the shelf.

8. The main cam continues to revolve; the roller rides around the elliptical portion of the cam, back to its original position, returning the lever, shaft, small cam and ejector plate to their original position.

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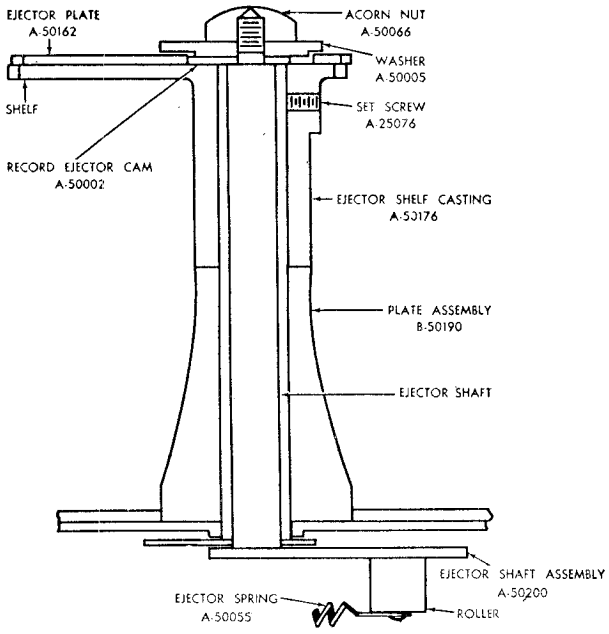
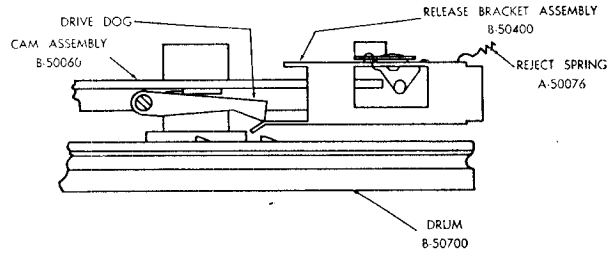


9. The tone arm follower stud, still riding in the groove on the cam, causes the tone arm to return to a position over the outside edge of a record.

10. The tone arm lift shaft now rides down an incline from the ledge to a flat, thus lowering the tone arm to the record.



11. At this point, the drive dog on the cam is lifted off the boss on the drum by the release bracket, the cam ceases rotating and the change cycle is completed. The tone arm is now in position for reproduction of the record.

CAUTIONS

1. Before attempting to make any adjustments or replacements of parts on a changer, examine the records being used. Faulty records are frequently the source of trouble in these mechanisms. The machine will handle satisfactorily all standard 10-inch and 12-inch records in reasonable condition, but it cannot function properly with records that are too large or too small on their outer diameter, too thick or too thin, or which are chipped, especially around the center hole.

Standard specifications for 12-inch records are: diameter—11-27/32 to 11-29/32; thickness—1/16 minimum to 3/32 maximum; starting groove—11-1/2 diameter.

Standard specifications for 10-inch records: diameter—9-27/32 to 9-29/32; thickness—1/16 minimum to 3/32 maximum; starting groove—9-1/2 diameter.

2. Check all parts and springs to see if they are in place and in good condition before attempting any adjustments. Springs may suddenly go dead despite all factory precautions; set screws may work loose; rivets may have loosened, or parts may be damaged due to external tampering.

3. Never use force on any part of the changer. It is essential that all parts be straight and square for the proper operation of this mechanism. It is advisable to replace a bent part rather than to attempt to straighten it.

4. Factory lubrication of this changer is adequate for the normal life of the unit. However, if it is subjected to severe operating conditions, it is well to clean and relubricate the moving parts. A fine, light oil should be used on all bearing surfaces, except the main cam, which should be heavily lubricated with Lubriplate 105. AVOID "GUMMING" THE PRECISION FITTED PARTS. DO NOT APPLY TOO MUCH, OR TOO VISCOUS A LUBRICANT.

5. Exercise care when removing the cam and drum assembly, as the stud which holds this assembly to the plate assembly has a LEFT HAND THREAD.

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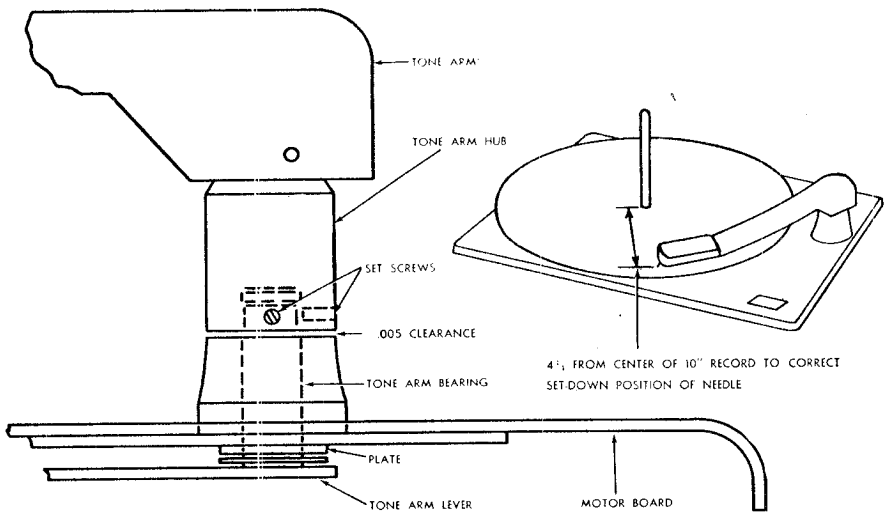
ADJUSTMENTS



A—PICKUP POSITION

This adjustment is for correct positioning of the tone arm needle in the first groove of a record. The needle should set down at approximately 4-3/4 inches from the center of the spindle on 10-inch records. (Adjustment for 12-inch records is automatic when the 10-inch adjustment is made. Also see Note under Paragraph C

1. Position the record shelf for 10-inch records.

2. Place a standard 10-inch record on the turntable and start the change cycle.

3. Stop the mechanism while still in cycle, just as the tone arm begins its descent onto the record. At this point the tone arm follower stud will still be securely held by the groove in the cam, thus retaining all the working parts in their correct relationship.

4. Loosen the two set screws on the tone arm hub. The tone arm can now be moved carefully sideways, without disturbing any part of the mechanism.

5. Push upwards on the tone arm lever (near the bearing) from beneath the motor board, and hold it tightly against the plate.

6. On the top, insert a .005 shim between the tone arm hub and the boss on which it rests to obtain the necessary clearance.

7. Place the tone arm in its correct position above the record. (Be sure to hold the lever firmly against the plate.) Tighten one set screw on the hub.

8. Run the changer through a few cycles, using several records to check the adjustment. Make a minor correction if necessary.

9. Tighten the other set screw on the hub and remove the shim.

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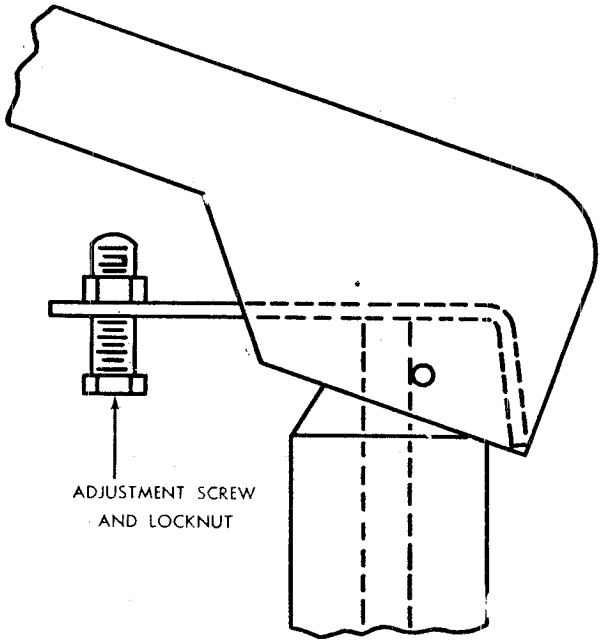

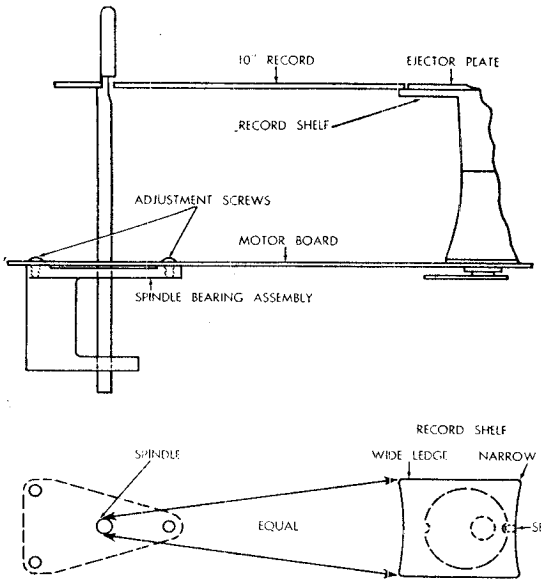

B—HEIGHT OF TONE ARM

This adjustment is made so that the tone arm will clear a stack of records when in cycle, yet will set down properly on the first record of a stack.

1. To increase the rise of the tone arm, lift the tone arm and loosen the nut on the tone arm lift assembly. Turn the screw counter-clockwise. Tighten the nut.

2. To decrease the rise, turn the adjustment screw clockwise.

C—RECORD SHELF POSITION

This shelf must be adjusted for the correct distance from the spindle as well as for correct alignment with the spindle.

(I) To Adjust the Distance

1. Remove the turntable by lifting upward. Loosen the three Phillips head screws that hold the spindle assembly to the motor board. Remove the drive-spring belt from the turntable bearing and the drum wheel.

2. With the record shelf in the 10-inch position (wide ledge toward spindle), carefully place a standard 10-inch record so that it rests on the shelf and on the ledge on the spindle.

3. Adjust the distance by sliding the spindle assembly toward or away from the shelf. The position should be such that the record will not fall off of either the spindle or the shelf, nor jam when the ejector plate pushes it, and when ejected, will fall clear of both shelf and spindle ledge. (See the Standards for record sizes listed under "Cautions'

4. Carefully tighten the screws and check the adjustment again, using several records. Replace the turntable, being careful to push the idler wheel of the motor under the edge of the turntable. Replace the belt.

(II) To Adjust Alignment

1. Loosen the set screw beneath the 12-inch shelf (narrow ledge). Have the 10-inch shelf toward the spindle.

2. Place a 10-inch record over the spindle, allowing it to rest on the spindle ledge and record shelf.

3. Rotate the shelf slightly in either direction to line up the record edge and the shelf. Tighten the set screw.

Note: Be sure the record shelf is in the correct position in relation to the adjustment cam which is under the motor board. When the 10-inch ledge is toward the spindle, the wider section of the adjustment cam should also be toward the spindle.

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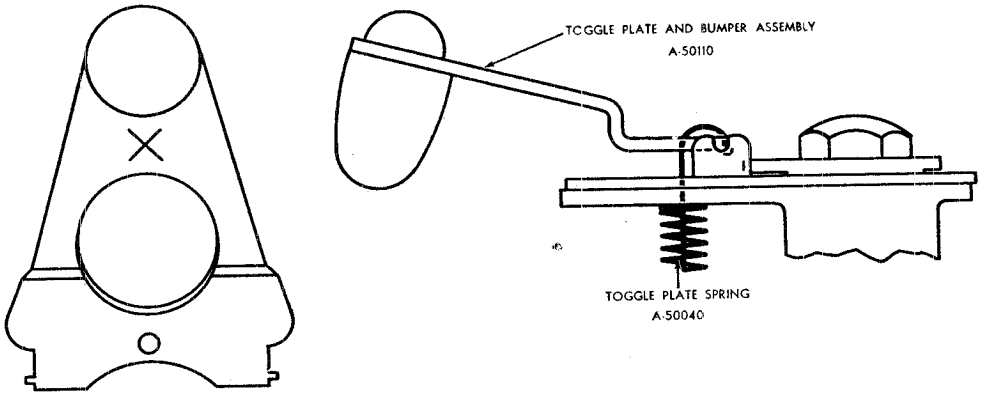


D—TOGGLE PLATE

The toggle plate is held to the ejector shelf by a spring; this spring also exerts tension on the toggle plate to keep the records in place on the shelf. If too much tension is exerted the spring should be distorted slightly.

The rubber bumper should be assembled to the plate with the large side of the bumper on the side of the plate marked with an "X" or an "O".

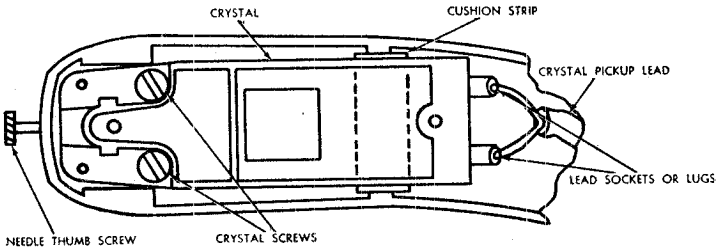
Put the assembly on the ejector shelf, locating the tabs on the plate in the bosses on the shelf. Push the end of the spring through the slot in the shelf with the open end of the spring toward the nut. (The spring will have to compress.) Fasten the end of the spring in the small center hole on the plate. The large side of the bumper is to be placed over the 10-inch records.

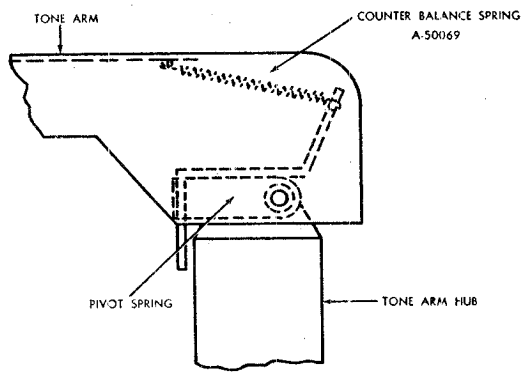
E—THE TONE ARM

The pressure of the tone arm at the needle point should be 1-1/4 ounces. The counter balance spring, which is fastened to the tone arm and to the hub, should be adjusted to secure this tension.

The tone arm may be removed to facilitate changing the crystal cartridge. Simply squeeze the pivot spring and lift off the tone arm. To change the crystal, remove the needle thumb screw and the two screws which hold the crystal to the tone arm. Slip the lead sockets off the plugs on the crystal or unsolder the leads if there are lugs on the crystal. (Caution: Crystals become damaged by excessive heat.) Remove the crystal and replace with a new one in the same manner. Be sure the rubber or plastic cushion strip is placed under the crystal.

The lead which emerges from the tone arm at the back, should have some slack at all times, or it will bind the tone arm and prevent its free movement across the record.





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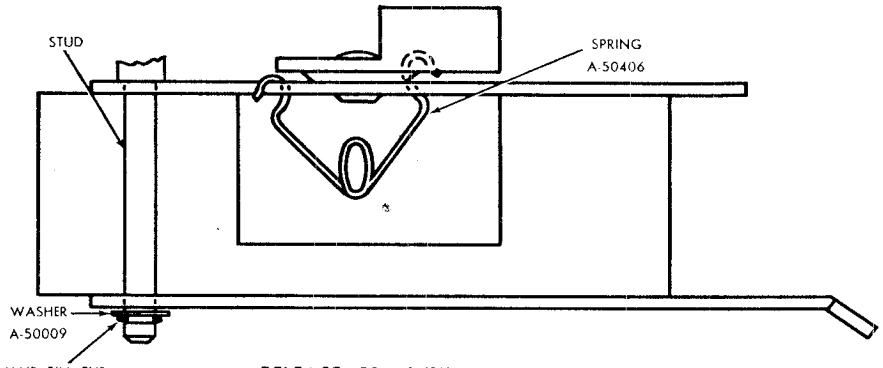
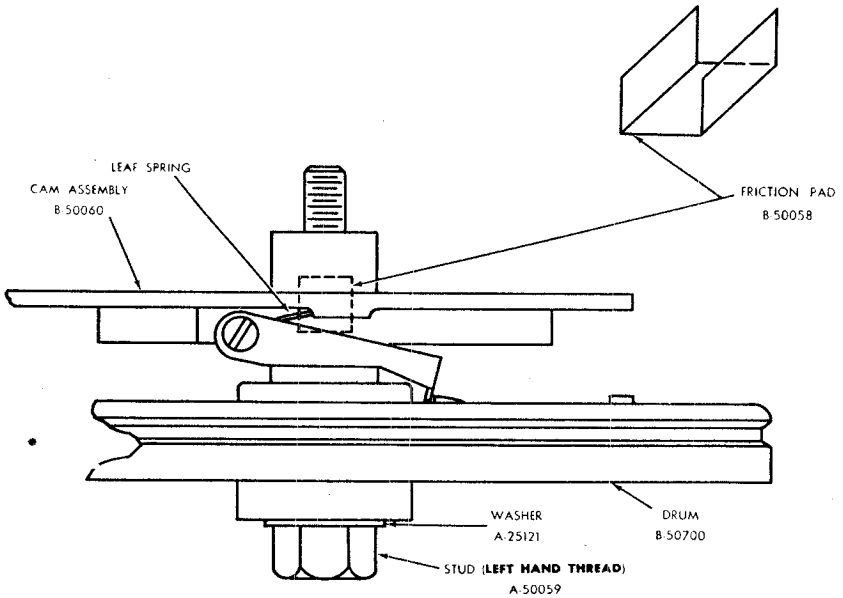


RELEASE BRACKET ASSEMBLY
B-50400

F—RELEASE BRACKET ASSEMBLY

This bracket, with the dog and grasshopper spring assembled to it, is one of the critical items in the unit. It should pivot freely on the stud to which it is assembled. It may be easily removed by slipping the hairpin clip and washer off the stud, and carefully turning the bracket so it will clear the main cam and drum drive wheel.

The dog should pivot very freely. If it does not, clean and relubricate with fine oil. If it is still sluggish, replace the entire assembly.



G—CAM AND DRIVE WHEEL ASSEMBLY

This assembly consists of a stud which screws into the main motor board assembly. (NOTE: THIS STUD HAS A LEFT HAND THREAD), a washer, a drive wheel, a main cam and a friction pad. The pad is necessary to provide some drag on the cam for smooth action. It must be assembled carefully so as to prevent deforming. The center holes of the drum and cam are counter sunk for easier assembly of the friction pad.

The drive dog on the cam should pivot freely; the leaf spring exerts a downward pressure on the drive dog into contact with the bosses on the drum. Exerted pressure of the leaf spring should not exceed 2 grams. Deform slightly if required.

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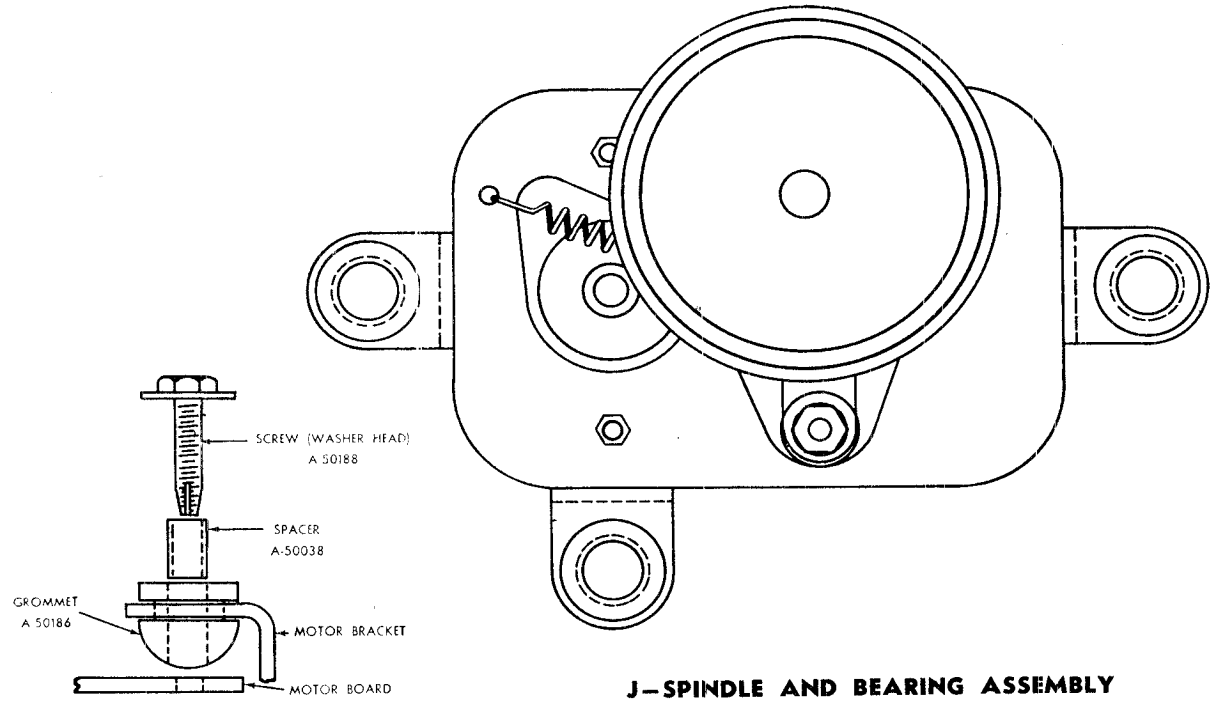


MOTOR MOUNTING DETAIL

J—SPINDLE AND BEARING ASSEMBLY

This should always be replaced as an assembly, as it is a precision assembly carefully put together at the factory. See Paragraph C for adjustment after assembly.

H—MOTOR

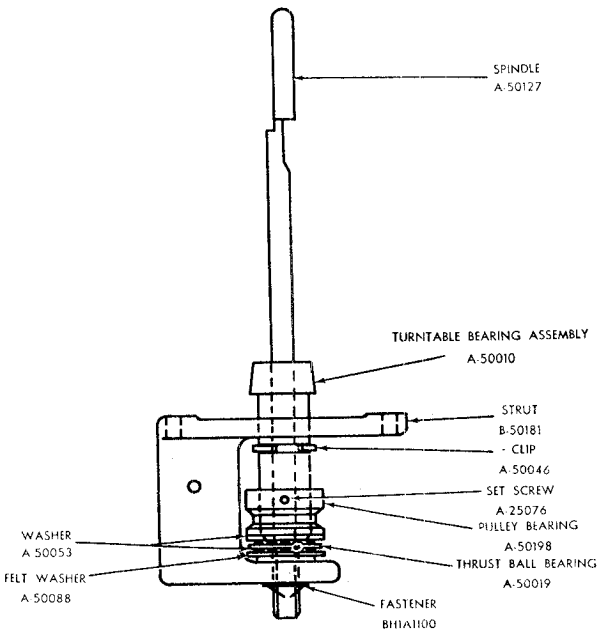
The speed of the turntable should be within the limits of 76 to 81 R.P.M.

If the changer runs slow, and after careful examination there is no evidence of binding of any mechanical parts, the motor should be checked. (Low line voltage should also be considered.)

It is better to order a new motor if it should prove defective. Replacement of pulleys, or rewinding of coils is never very satisfactory.

After a new motor has been assembled to the motor board with its screws, washers, spacers and grommets, and wired to the switch and line cord, be sure to fasten the index spring over one of the mounting screws. Attach the other end of the spring to the index lever.

Caution: Check for the correct relationship of the adjustment cam and record shelf when fastening the spring. In the 10-inch position, the larger side of the cam should be toward the spindle.



(HALF SIZE)

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TROUBLE SYMPTOMS and ADJUSTMENTS

SYMPTOM	ADJUSTMENT
(a) Changer fails to trip at end of record.	(a) See Adjustment F, Lubrication on tone arm bearing may be gummy. Clean and relubricate. Tone arm may be in "H" detent. Put in proper "A" detent. Tone arm lead may be too tight. Pull up to allow some slack.
(b) Changer cycles continuously, i.e., tone arm lifts immediately from record without playing.	(b) See Adjustment F, and G, Spring from release bracket to tab on "On-Off" lever may be missing or loose. Replace. Drive dog on cam may be stuck or stiff. Relubricate, and check leaf spring.
(c) Tone arm drops too far in on record, or misses record.	(c) See Adjustment A, Tone arm may be in "H" detent. Change to "A" detent. Adjustment cam may be out of phase with record shelf. See Adjustment 3,
(d) Tone arm fails to clear top record of stack, or does not set down on first record.	(d) See Adjustment B, Tone arm lift lever may be bent. Straighten carefully.
(e) Record jams between shelf and spindle.	(e) See Adjustment C,
(f) Record fails to drop from shelf.	(f) Toggle plate may not be flipped onto records. This must be done to provide tension on records. See item "g" below.
(g) Unit stalls when ejecting a record.	(g) See Adjustment C, Spring belt may be weak. Replace. Motor torque may be low. Replace motor.
(h) Turntable speed is slow, or not constant.	(h) See Adjustment H, Turntable bearing may be frozen. Clean and relubricate or replace bearing. See Adjustment G,
(j) Action of unit is very jerky during cycle.	(j) Belt damping core may be worn. Replace with new belt. Friction pad in cam and drum assembly may be deformed. Replace.
(k) Tone arm may be loose in detents on hub.	(k) Flat spring for retaining ball in detent in hub may be deformed. Replace the hub assembly.

SERVICE PARTS LIST

Part No.	Description
A-25121	Washer .625 O.D. x .375 I.D. x .010 brass (Tone Arm Trip Assy., and Cam and Drum Assembly)
A-50002	Cam, Record Ejector
A-50005	Washer, Cam Cover
A-50009	Washer, 5/16 O.D. x .156 I.D. x .025 brass (Ratchet Release Assy., and Index Arm on Ejector and Tone Arm Assy.)
C-50030	Spindle Bearing Assy.
A-25076	Screw, Set
A-50010	Turntable Bearing Assembly
A-50019	Ball Bearing, Thrust
A-50046	Clip
A-50053	Washer, Flat
A-50088	Washer, Felt
B-50127	Spindle Assembly
B-50181	Strut
A-50198	Pulley Bearing
BH1A1100	Tinnerman Fastener
BS014D05	Screw, No. 8-32 x 5/16
A-50032	Spring, Index
A-50035	Grommet (Tone Arm Lead)
A-50040	Spring, Toggle Plate
A-50055	Spring, Ejector
A-50066	Nut, Acorn
A-50069	Spring, Tone Arm Counterbalance
A-50076	Spring, Tone Arm Lead-in, and Reject
B-50085-1	Rest Assembly, Tone Arm
A-50187	Screw No. 8-32 x 5/16 Thread Cutting
C-50100	Motor Board Assembly
A-50097	Cover, Switch
A-50102	Switch
A-50104	Washer, Cup
B-50140	Lever, On-Off
A-50153	Escutcheon
A-50301	Rivet, Shoulder (On-off lever)
BV321E13	Rivet, Tubular 1/8 x 3/16

Part No.	Description
A-50110	Toggle Plate and Bumper Assy.
A-50015	Plate, Toggle
A-50025	Bumper
A-50136	Clip "C" (Index Arm and Tone Arm Trip Lever Assembly)
B-50137	Belt, Drive
A-50150	Record Adjustment Shaft Assy.
C-50154	Motor (For 60 cycle, 105-125 v.)
A-50186	Grommet
A-50038	Spacer
A-50188	Screw, No. 6-32 x 5/8 thread cutting, hex washer head
A-50162	Plate, Ejector
A-50176	Ejector Shelf Casting
C-50180	Cam and Drum Assembly
A-50058	Pad, Friction
A-50059	Stud
B-50060	Cam Assembly
B-50700	Drum Drive Wheel
B-50190	Plate Assy., Ejector and Tone Arm
BS014B05	Screw No. 8-32 x 3/16
A-50200	Ejector Shaft Assembly
B-50300	Tone Arm Trip Assembly
B-50400	Release Bracket Assembly
A-50406	Spring, Dog
A-50500	Lift Assembly, Tone Arm
B-50600	Hub Assembly, Tone Arm
B-50820	Tone Arm Assembly
A-50802	Crystal Pickup and Thumb Screw or
A-50812	Crystal Pickup for 550E & 550H
A-50803	Insert
A-50804	Screw No. 4-40 x 1/4
A-50806	Lead, Shielded or
A-50197	Lead, Insulated
A-50807	Clip
D-50808	Tone Arm
C-50910	Turntable
A-51163	Clip (Ratchet Release Assembly)

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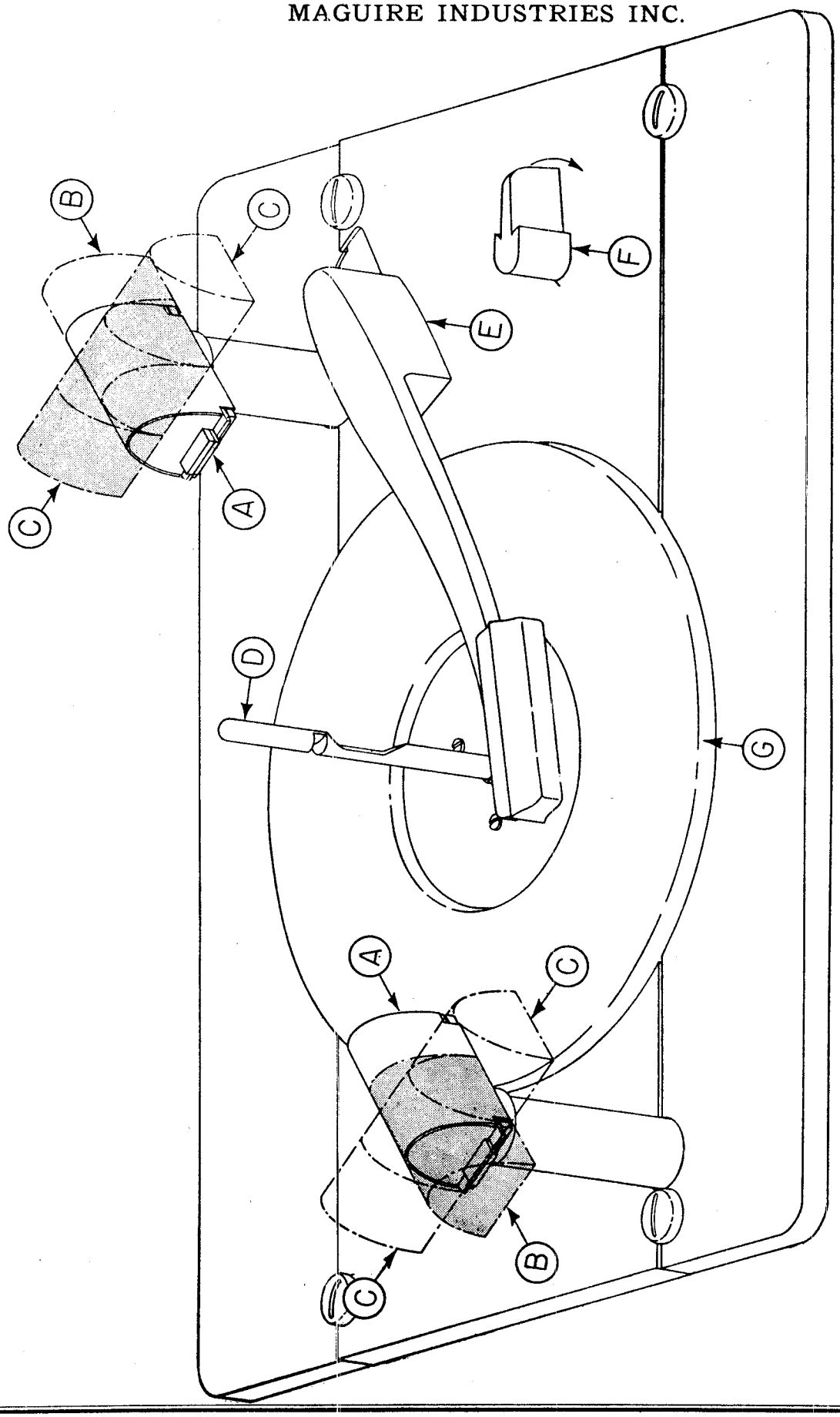

A—10 Inch Position
B—12 Inch Position
C—Unloading Position
D—Spindle
E—Pickup Arm
F—Start-Reject Switch
Turn in Direction of Arrow
G—Turntable

Figure 1

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MODEL ARC-1

MAGUIRE INDUSTRIES INC.
PARTS MUST MOVE FREELY

The following parts must move freely:

a. Slide (53) check friction by removing turntable and turntable hub and relieve pressure produced by springs. Slide should then move freely along top mounting plate (54). If slide binds, clean off any dirt that is present and check that slide or top plate is not bent. Relubricate between slide and top plate, and slide shafts with Houghton's stayput #320 oil. If not available use SAE 30 or 40 motor oil.

b. Automatic stop lever (40) - remove friction washer (41) and see that lever does not bind.

c. Cranks (32 and 39) in support posts (28 and 51) - check that cranks are not bent. Pushers (80 and 77) should be flush with record guides (58 and 68) when machine is out of cycle. Right pusher, crank, and pusher control lever must move freely when slide is ½ way through cycle.

d. Pickup lifting lever (8) - check for binding in bearing.

e. Pickup actuating lever (50) - check for binding in bearing.

f. Pickup return lever (43) - check for binding in bearing.

g. Trip lever must move freely.

h. Dog must fall freely.

i. Idler plate must slide freely, wheel must rotate freely.

j. Turntable hub - be sure cam does not rub slide. If necessary add a shim washer

k. Motor must turn freely.

In cases where levers are controlled by springs remove springs before checking for binding.

CYCLE OF OPERATION

CAUTION: In any adjustment which requires that the turntable be removed, be careful not to strike the trip lever (52) or dog (30), either when removing or replacing turntable.

Remove cover plates (55 and 72) and turntable (74). The Changer can then be rotated manually through a change cycle by pushing Start-Reject knob (F) and rotating the turntable hub (79) clockwise by hand.

NOTE: Alphabetical references are to figure 1, numerical to figure 5.

	FUNCTION	EXPLANATION
OPERATOR	Turn Record Supports to 10″ or 12″ Positions (A or B).	Record support posts (56 and 71) automatically align themselves by means of index springs (23).
	Place Records on Posts (see figures 2 and 3).	Records rest on support shelves (78) in position to be separated.
	Turn the Start-Reject Knob (F).	Pickup arm (E) rises, releasing pressure on switch (11); circuit of turntable motor (21) is closed and motor starts. Tripping link (47) is pushed in and moves dog trip lever (52) permitting dog (30) to fall. Cam on turntable hub (79) pushes dog (30), moving slide (53) forward and engaging gear.
CHANGE CYCLE	Pickup Arm (E) Rises.	Incline on slide (53) rotates pickup lifting lever (8) through stud, raising pickup arm (66 or E).
	Bottom Record Is Separated.	Left hand pusher (80) pushes record off shelf (78) on to spindle shelf (34). Record pushes right hand pusher (77) which moves crank (39), rotating automatic stop lever (40). Right hand pusher (77) pushes record off spindle shelf (34) on to turntable (74).

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FUNCTION	EXPLANATION
Pickup Arm (65) Moves in.	Pickup actuating lever (50) rotates and latch engages pin on pickup return lever (43). Slide (53) starts back rotating pickup arm (66) to 10" or 12" position.
Pickup Arm Lowers Stylus on to Record.	Pickup return lever (43) moves against index stop lug on index plate (71) to insure correct landing position. Pickup lifting lever (8) rotates counter-clockwise lowering pickup arm; this frees pickup latch (50) allowing arm to feed into music. Pushers (77 and 80) return to original position permitting next record to rest on record shelves (78). Slide (53) moves dog (30) along edge of dog trip lever (52). Dog trip lever (52) raises dog (30) permitting cam on turntable hub (79) to revolve without contacting dog (30).
Pickup Arm Rises at End of Record.	Stylus enters fast spiral at center of record and moves in at rate of 1/8" or more per turntable revolution. Pickup lifting pin (part of 65) moves friction finger (part of 52). Friction finger moves dog trip lever (52). Vertical cam on turntable hub (79) drives trip lever (52) back once per revolution. When the pickup (65) moves in at a rate exceeding 3/32" per revolution, the trip lever will move far enough to allow the dog (30) to fall. Dog (30) drops in path of cam on turntable hub (79). Cam on hub (79) pushes slide (53) into gear. Incline on slide (53) rotates pickup lifting lever (8) by means of stud.
Next Record Drops on to Turntable.	Left hand pusher (80) moves next record on to spindle shelf. Record pushes right hand pusher, which through crank rotates automatic stop lever (40) out of path of pickup actuating lever latch (part of 50). Pickup actuating lever (50) rotates pickup arm outwards. Right hand pusher (77) moves record off spindle shelf.
Automatic Stop.	After last record pickup arm rises as above. Left hand pusher (80) moves out. Absence of record prevents actuation of right hand pusher (77). Automatic stop lever (40) remains in path of pickup return lever latch (43). Pickup arm is lowered not on to record but on to Start-Reject. Pickup arm stud (part of (65) opens turntable motor switch (11) shutting off machine.

LOADING: The record changer will play up to ten 12 inch records or twelve 10 inch records. Load as follows:

1. Turn record support posts to 10 or 12 inch position as desired. See figure 1.

2. Place records (any number up to 10-12's or 12-10's) on the small shelves on record support posts, with the turntable shaft through the holes. Make sure all records rest flat on top of shelves.

Do not attempt to force oversize records between record support posts, as machine may jam. Home recordings or other SPECIAL records should not be played automatically as they or the machine may be damaged.

OPERATION: Start the machine by pulling the "Start-Reject" knob towards the front of the machine. Hold knob for a second. The pickup arm will lift, the first record will drop to the turntable, the pickup arm will land near the edge of the record and start to play.

TRIPPING: At the end of a record a fast leadout or eccentric groove will trip the machine automatically, and a change cycle will follow, dropping the next record.

AUTOMATIC STOP: After the last record has played, the pickup arm will land on the "Start-Reject" knob, thus shutting off machine.

REMOVING RECORDS: Turn record support posts one-quarter turn either direction; remove records by lifting straight up from turntable.

MANUAL OPERATION: To play special records (home recordings, etc.) turn record support posts to unloading position, place record on turntable. Lift pickup arm from "Start-Reject" knob, starting turnatble. Place pickup on record.

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TROUBLES AND ADJUSTMENTS

RECORD JAMMING CAUSED BY FAULTY RECORD LOADING OR ODD-SIZED RECORD

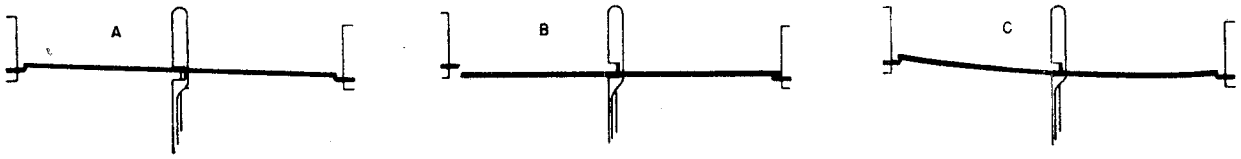

Figure 2

EXPLANATION

a. Correct record loading procedure: record rests on left and right hand support.

b. If records are loaded improperly the machine may jam. When the record rests on spindle and right hand support (78) and not on left hand support (78), as shown in figure, left hand pusher (80) will push second record against right hand guide (68).

c. If record is warped so badly that center hole lies below spindle shelf, record cannot be pushed by left hand pusher (80) and machine will jam.

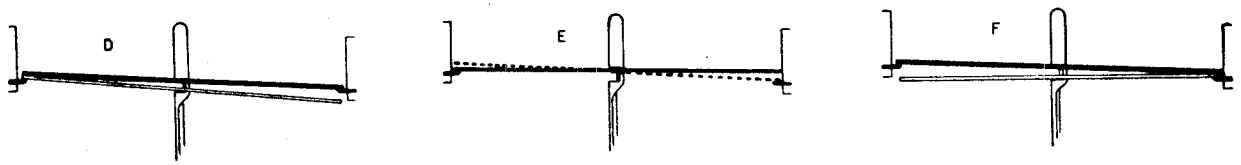

Figure 3

EXPLANATION

d. If record is loaded below right hand support (78) it will not be dropped from spindle shelf.

e. If record is oversized it may not fit between guides (58 and 68) or right hand pusher (77) may not move far enough to allow record to clear left hand shelf (78).

f. If center hole of record is undersized, record will be pinned against spindle. If second record is undersized or if cycle is very slow, second record will drop in front of right hand pusher (77) and machine will jam. This should not occur if cycle speed is more than approximately 40 rpm (normal speed is approximately 80 rpm). Cycle speed is normally 2-4 rpm less than no load speed.

NOTE: Edges of Records badly damaged or highly irregular will also cause jamming.

TROUBLE	CAUSE	REMEDY
Record Jamming Can be Caused by Friction.	1. Friction in right hand pusher (77), plunger (75), etc.	NOTE: Record will not drop from left hand shelf to spindle shelf. When machine is about half way through cycle right hand pusher should move in and out freely. 1. Clean any dirt. 2. Check if crank is bent. 3. Check alignment of record guide. 4. Retaining ring holding crank may be turned. Crank should fit in gap.

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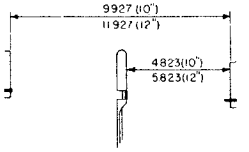
TROUBLE	CAUSE	REMEDY
Failure To Trip (Con't)	5. Record does not have eccentric groove or fast leadout spiral of 1/8" per turn.	1. Use Start-Reject to trip.
Pre-tripping.	1. Friction too great.	1. Relieve friction on friction finger by loosening screw (part of 52).
	2. Spring (38) on trip clutch finger too weak.	1. Adjust spring to six ounces tension. Shorten or replace if necessary.
	3. Trip clutch finger on trip lever should be pushed outward by turntable hub so that there is no play at shoulder with dog.	1. Adjust vertical tab on trip lever.
Continuous Cycling.	1. Tripping link finger (47) bent too far toward trip lever (52).	1. Adjust to proper position.
	2. Pickup actuating lever stop stud may touch trip lever.	1. Bend away.
Pickup Arm Moves Too High or Low in Cycle.	1. Pickup lifting pin (part of 65) bent.	1. Straighten as necessary.
Pickup Latch (part of 50) Fails to Engage Pin in Pickup Return Lever (43).	1. Pickup return lever (43) bent.	1. Straighten as necessary.
	3. Actuating lever (50) not rotated far enough.	1. Twist tail end of slide. 2. Rotate stop lever (40) out of way of pickup latch (50). Actuating lever and pickup return lever (43) when latched should be parallel; there should be minimum of play between these and pickup lifting pin. Twist end of return lever to obtain minimum play.
Sloppy or Indefinite Landing of Pickup Arm.	1. Play between actuating lever (50) and pickup return lever (43).	1. Twist end of return lever. 2. Make sure there is no friction and minimum play between pivot shaft assembly (66) and pickup arm. Adjust pivot screw if necessary.
Incorrect Landing.	1. Lug on record shelf assembly (71) needs adjusting.	1. Bend lugs in or out as required.
Failure to Play More Than One Record.	1. Stop lever (40) not moved properly.	1. Check play between crank (39) and lever. Maximum of 1/16" 2. Right hand pusher (77) not flush with record guide (69) (note: by flush is meant flush to 1/32" maximum back of flush). Bend crank if necessary. 3. See "Pickup Latch Fails to Engage Pin," above.
Failure to Stop After Last Record.	1. Lack of play between crank (39) and stop lever (40).	1. Jars during cycle may move stop lever.
	2. Stop lever (40) bent.	1. Slide does not return stop lever to proper position at end of cycle. Decrease stop lever angle by bending.

TROUBLE	CAUSE	REMEDY
Record Jamming Can Be Caused By Friction (Con't)	2. Friction in pusher control (10) or stop lever (40).	1. Clean out any dirt. 2. Check for bent parts.
	3. Record posts or guides out of alignment (56, 71, 58, 68)	1 Align and space record guides (58 and 68) as in figure.  Figure 4 A line of sight can be drawn from center of record guide through spindle to center of opposite record guide when posts and spindle are correctly aligned. NOTE: Make sure notch on spindle is in right place and spindle shelf is at correct height, i.e., record is horizontal when resting on spindle and right shelf.
Slow, Stalling or Failure to Start.	1. On-off motor switch.	1. Disengage idler (18) and lift pickup arm off switch (11). 2. Check wiring to and from switch. 3. Replace switch.
	2. Slippage between idler (18) and turntable (74).	1. When turntable is stopped manually, motor should stop (with power on). If motor does not stop, clean oil from turntable and the idler wheel with carbon tetrachloride.
	3. Idler does not contact turntable firmly.	1. Idler plate (19) should not hit either side of T slot in motor bracket when wheel is touching turntable. Bend motor bracket if necessary.
	4. Turntable bearing stiff.	1. Push idler plate back so tire does not touch turntable. If turntable does not spin freely, lubricate; look for a bent spindle. Make sure hub does not drag on slide.
	5. Idler bearing stiff.	1. Check lubrication.
	6. Motor bearings stiff.	1. Motor bearings are self-aligning type; if motor turns stiffly by hand, tap motor lightly with hammer on side of stator. 2. Lubricate with 3 in 1 oil.
	7. Defective motor coils.	1. Replace motor if motor smokes or smells.
	8. Low voltage.	1. Check voltage; 100 volts satisfactory. 2. If voltage is low turntable can be pushed by hand to help start.
Failure to Trip.	1. Dog sticks.	1. Dog bent, dirt, dog cover out of adjustment.
	2. Friction on friction finger (part of 52) out of adjustment.	1. Adjust screw on trip lever for just enough friction to move assembly as a unit when pushing fan shaped friction finger.
	3. Insufficient friction.	1. Friction spring bent or trip lever (52) bent.
	4. Slide (53) failed to return to out of cycle position after preceding cycle.	1. Check for friction between slide (53) and top plate (54), or pusher control levers (9 and 10) and slide post; or tail on slide binds ridge on top plate. 2. Tampering with springs is a cause of this. Replace springs. 3. Lubricate slide, top plate and slide latch shafts (7) (Houghton's Stayput #320 or SAE 30 motor oil). 4. If stop lever (40) is bent, there may be friction between slide and stop lever. If machine trips automatically but not with reject knob, check finger on tripping link (47).

MODEL ARC-1

MAGUIRE INDUSTRIES INC.

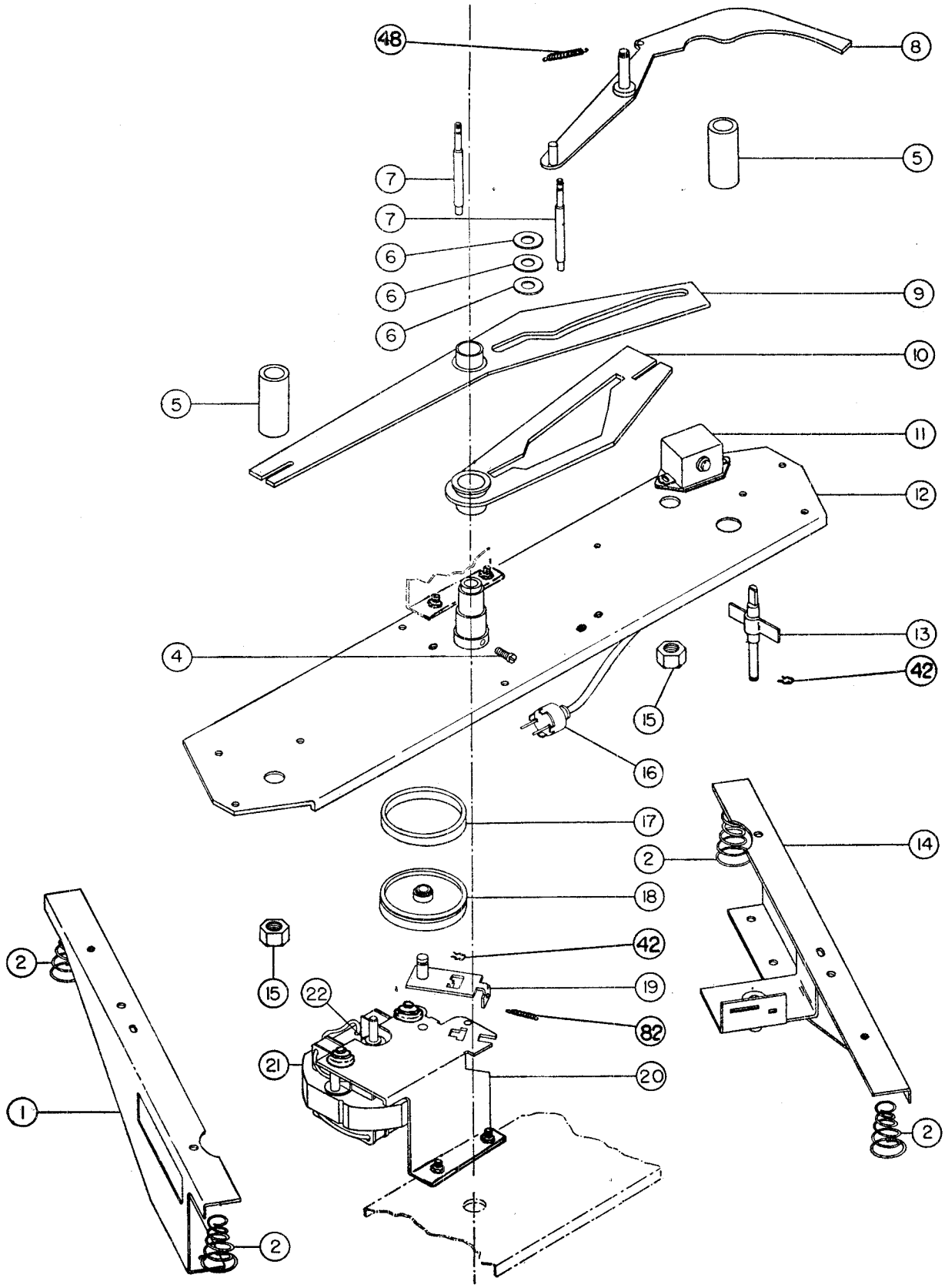


FIGURE 5

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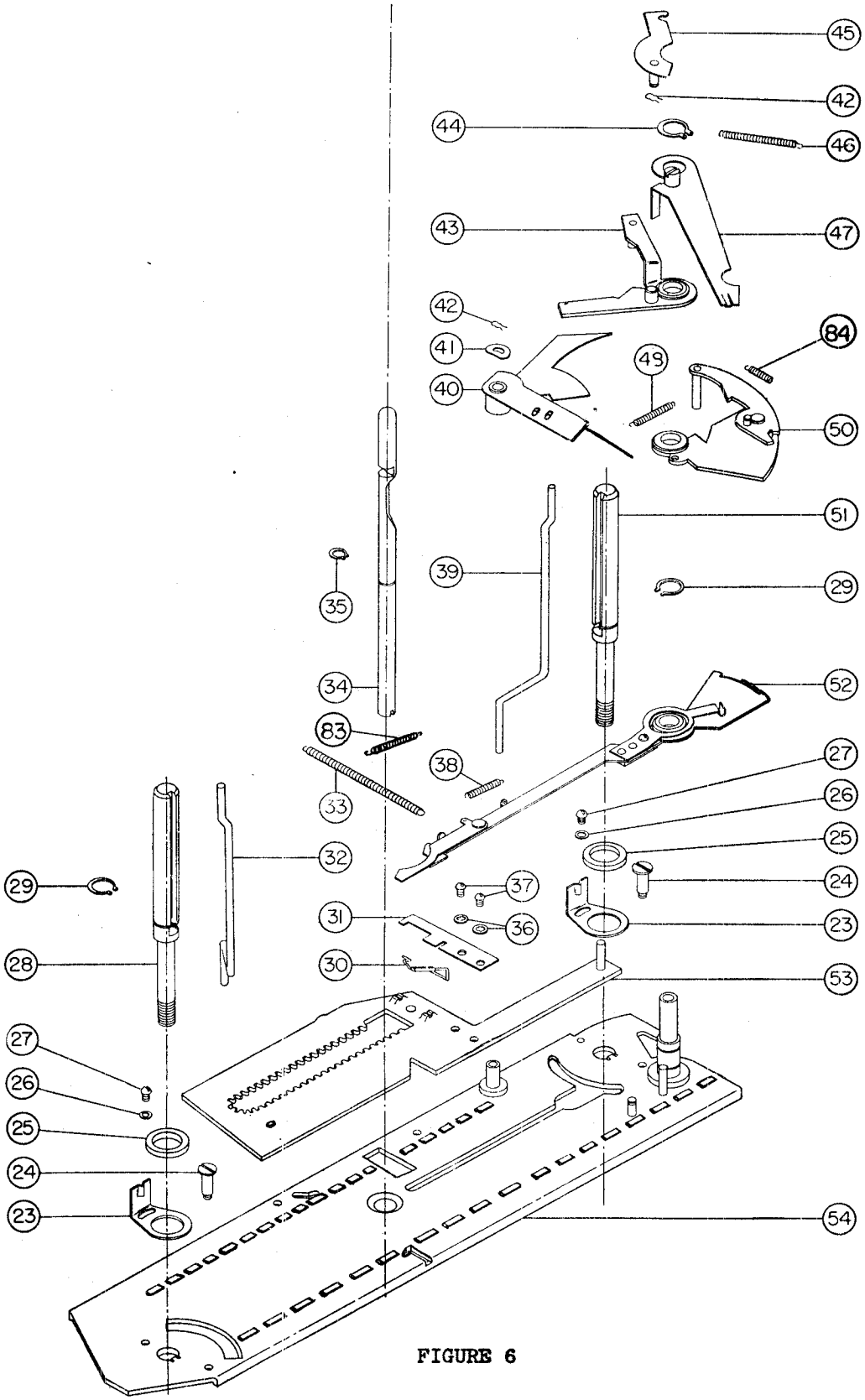

FIGURE 6

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MODEL ARC-1

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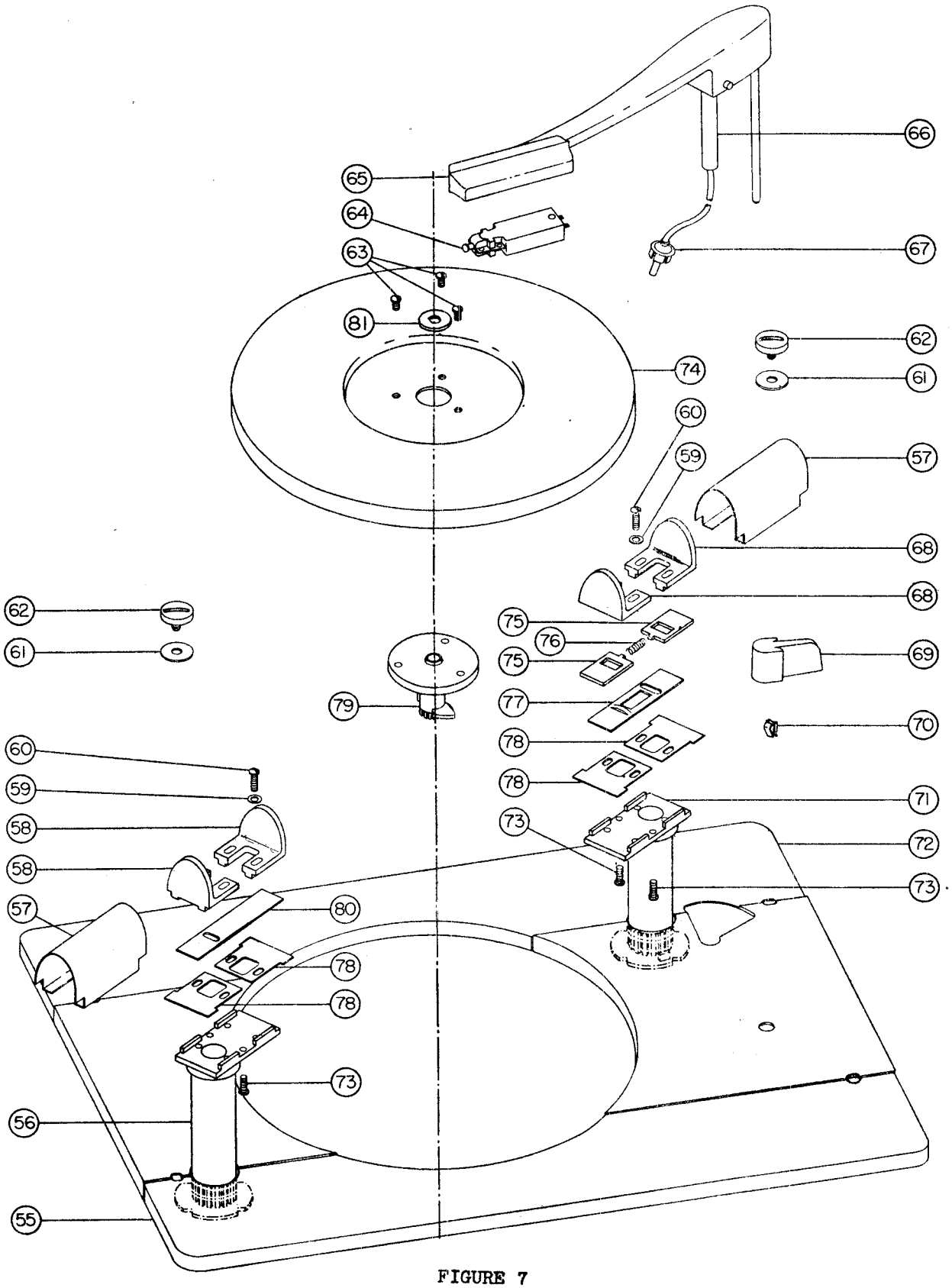

FIGURE 7

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MAGUIRE INDUSTRIES INC.

LIST OF REPLACEABLE PARTS

FOR EXPLODED VIEWS OF THESE PARTS SEE FIGURES 5, 6, and 7.

Assem. No.	Name of Part	Maguire's Dwg. No.
1.	Left hand cover support assembly	C-14050-2
2.	Suspension spring	A-20176-1
3.		
4.	Screw (for clamping spindle) No. 6-32 x 5/16" fil. hd.	A-10109-64
5.	Spacer	A-20177-2
6.	Turntable thrust washer—.01"	A-20178-3
	Shim washer—.005"	A-20178-7
	Shim washer—.010"	A?20178-8
7.	Slide latch shaft	A-20171-1
8.	Pickup lifting lever assembly	A-14048-1
9.	Left pusher control lever assembly	B-14051-1
10.	Right pusher control lever assembly	B-14052-1
11.	Switch assembly	C-14271-1
12.	Bottom mtg. plate assembly	C-14044-1
13.	Knob shaft assembly	A-14047-1
14.	Right hand cover support assembly	C-14050-1
15.	Hex. nut—7/16"	A-10209-1
16.	Motor plug assembly	A-20638-1 / A-20638-2
17.	Idler tire	A-40007-1
18.	Idler wheel assembly	A-14038-1
19.	Idler plate assembly	A-14079-1
20.	Motor mounting bracket	C-20285-1
21.	Motor	DL-10542-503
22.	Motor spring bushing—60 cycle	A-27014-1
	50 cycle	A-27014-2
23.	Index spring	A-20173-1
24.	Stop screw	A-20180-1
25.	Spacer (for stop screw)	A-20177-3
26.	Lock washer No. 4	A-10145-11
27.	Screw—bd. hd. No. 4—40 x 3/16"	A-10124-32
28.	Post left and	B-20165-1
29.	Retaining ring for posts	A-20184-3
30.	Dog	A-20135-1
31.	Dog cover	A-20136-1
32.	Record pusher crank, L.H.	A-20169-2
33.	Slide latch shaft spring	A-20213-1
34.	Spindle	A-20172-1
35.	Retaining ring (for spindle)	A-20184-1
36.	Lock washer (for dog) No. 4	A-10145-11
37.	Dog screw, bd. hd. No. 4-40 x 3/16"	A-10124-32
38.	Trip lever spring	A-20199-1
39.	Record pusher crank, R.H.	A-20169-1
40.	Stop lever assembly	A-14041-1
41.	Stop lever washer	A-20178-5
42.	Hairpin retainer	A-20183-1

Assem. No.	Name of Part	Maguire's Dwg. No.
43.	Pickup return lever assembly	A-14045-1
44.	Retaining ring (for pickup bearing)	A-20184-2
45.	Starting lever assembly	A-14342-1
46.	Tripping link spring	A-20211-1
47.	Tripping link assembly	A-14341-1
48.	Lifting lever spring	A-20216-1
49.	Actuating lever spring	A-20215-1
50.	Pickup actuating lever and latch assembly	A-14046-1
51.	Post right hand	B-20165-2
52.	Trip lever assembly	C-14039-1
53.	Slide assembly	C-14040-1
54.	Top plate assembly	C-14043-1
55.	Front cover plate	D-20179-1
56.	Record shelf assembly, L.H.	A-14042-2
57.	Record post cap	A-20170-1
58.	Record guide, L.H.	A-20166-2
59.	Record guide washer	A-20178-2
60.	Record guide screw No. 4-40 x 7/16"	A-10124-36
61.	Cover plate washer	A-20178-4
62.	Cover plate screw	A-20181-1
63.	Turntable screws	A-10124-63
64.	Pickup cartridge—ARC-ICB-11	A-28178-1
	ARC-ICA-11	A-28178-2
	ARC-IDB-11	A-28178-3
	ARC-IFA-11	A-28174-1
	ARC-IFB-11	A-28174-2
	ARC-IA, ARC-IB	A-20609-1
65.	Pickup arm assembly, less cartridge	C-14356-4
66.	Pivot shaft and collar assembly	A-14277-1
67.	Loudspeaker plug	A-10303-4
68.	Record guide, R.H.	A-20166-1
69.	Knob assembly	A-14056-1
70.	Knob spring	A-15082-1
71.	Record shelf assembly, R.H.	A-14042-1
72.	Back cover plate	D-20179-2
73.	Record post cap screw No. 4x40 x 3/16"	A-10124-32
74.	Turntable	C-20161-1
75.	Plunger	A-20168-1
76.	Plunger spring	A-20214-1
77.	Right and pusher	A-20167-1
78.	Record shelf	A-20163-1
79.	Hub assembly	A-15053
80.	Left and pusher	A-20164-1
81.	Washer 13/16" x 9/32"	A-20178-10
82.	Idler spring	A-20198-1
83.	Slide latch shaft spring	A-20216-1
84.	Latch spring	A-20192-1

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This Automatic Record Changer is a precision built, gearless, beltless, simple operating mechanism, designed to give you foolproof, trouble free record reproduction with minimum effort by means of a new, exclusively designed, operating mechanism. This machine is built to automatically change and play a maximum of twelve ten inch records or ten twelve inch records, with a minimum of needle and record wear. Will automatically play records of standard R.M.A. size and dimensions. Records not standard or without trip grooving can be played in manual operating position.

Machine designed to operate on 115 volt, 60 cycle alternating current unless otherwise specified on motor.

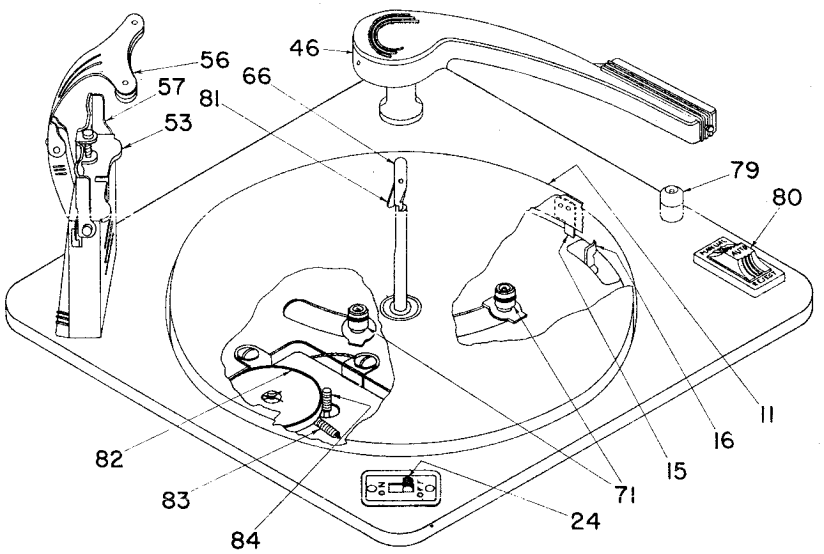

FIG. 1 TOP VIEW

OPERATING INSTRUCTIONS

For transportation and shipping purposes the changer plunger mechanism is locked in cycle or changing position. Push starting switch to "ON" position. If changer turntable does not rotate, push turntable clockwise until turntable rotates by motor power. Your changer now is in permanent operating position. Care must be taken to prevent pickup arm from dropping onto turntable in order to prevent needle from injuring surface of turntable.

Automatic Operation

1. Loading The Changer
   a. Before placing records onto changer be sure pickup arm is placed on pickup arm rest.
   b. If 10 inch records are to be played, lower hinged 10 inch record support to rest horizontally on ejector box. For 12 inch records raise the hinged 10 inch record support into vertical position and rest records on 12 inch record support ears on ejector box.
   c. Place stack not to exceed twelve 10 inch records or ten 12 inch records over center post supported in the center on the center post and at one side on the record support.
   d. Place balance arm to rest on top record, this steadies the records and assures correct dropping of records.
2. Starting The Changer
   a. Push starting switch to "ON" position.
   b. To bring pickup arm into playing position pull reject button into reject position and changer will automatically drop first record and enter playing cycle.
   c. If the machine has been stopped in cycle position and turntable does not rotate after above instructions have been followed, push turntable clockwise until machine returns into normal operating cycle.
3. Rejecting Records
   Records may be rejected any time during playing operation by pulling reject button into reject position.
4. Shutting Off The Changer
   a. Before removing records it is advisable to drop all unplayed records onto turntable by repeatedly pulling reject button into reject position until all unplayed records have dropped onto turntable.
   b. Lift pickup arm and place it on pickup arm rest while turntable and records are rotating. Push starting switch to "OFF" position
   c. Caution. If above procedure is not followed changer will replay last record.
5. Unloading The Changer
   a. Raise balance arm and 10 inch record

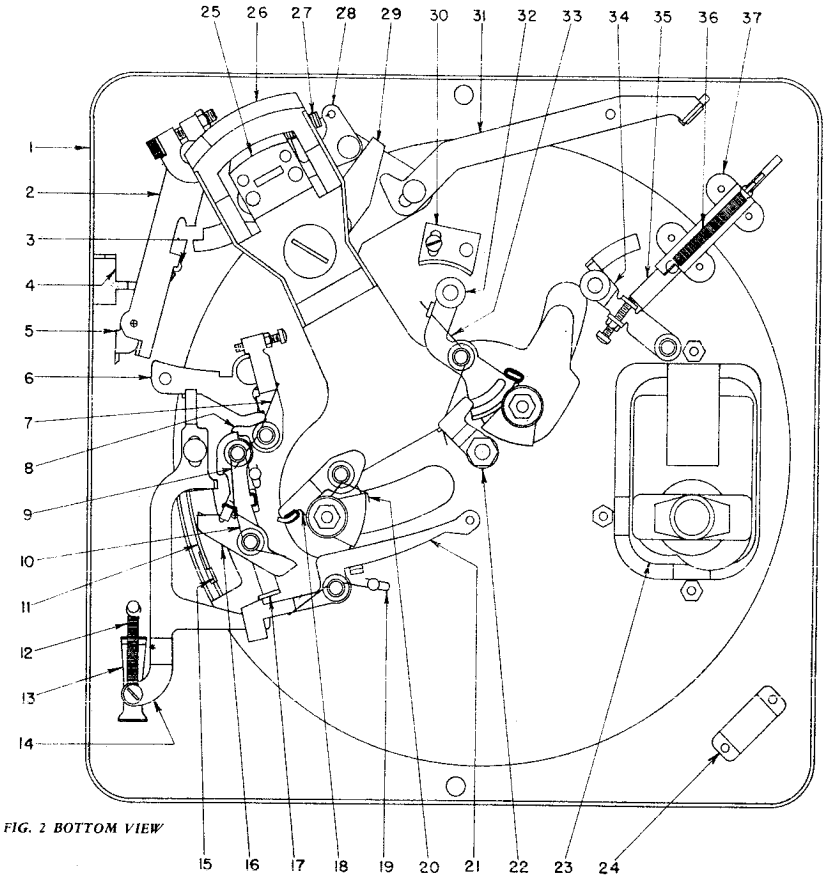

FIG. 2 BOTTOM VIEW

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support upward to permit easy record removal.

b. Lift played records from turntable.

Manual Operation

1. Raise hinged 10 inch record support into vertical position.
2. Place record over spindle onto the turntable.
3. Push starting switch to "ON" position.
4. Push reject button into manual playing position.
5. Place pickup arm at beginning of record to start playing operation.
6. When through playing place pickup arm on pickup arm rest and push starting switch to "OFF" position.

Cycle of Operation of Correctly Adjusted Mechanism

1. With pickup arm (46) on pickup arm rest (79) and center post dogs (81) and 10" record support down, place stack of 10" records on center post (66) and 10" record support (57) ears. See Fig. (1).
2. Place balance arm (56) on records. See Fig. (1).
3. Push motor switch (24) to "ON" position. See Fig. (1).
4. Pull reject button (80) to reject position and release. See Fig. (1).
   a. Drops 1st record.
   b. Places pickup arm (46) in playing position.
5. Play 1st record.
6. Needle approaches center grooves carrying ratchet arm (2) towards adjusting stop lever (8). See Fig. (2).
7. Contact of ratchet arm (2) and adjusting stop lever (8) disengages jaws of adjusting stop lever (8) & kickoff lever arm (17). (See Fig. (2).
8. Jaws release kickoff lever arm (17) assembly, rotating it into path of kickoff spring (15) which rotates on turntable (11). See Fig. (2).
9. Contact of kickoff spring (15) & kickoff lever (16) rotates kickoff lever arm (17) assembly into locked position with locking lever (21). See Fig. (2).
10. Further movement of turntable (11) causes kickoff lever (16) to disengage dropping lever (18). See Fig. (2).

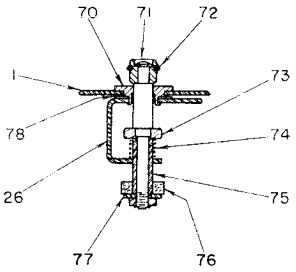
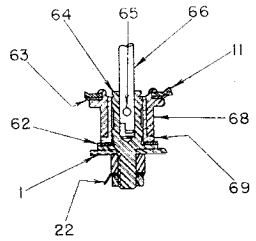


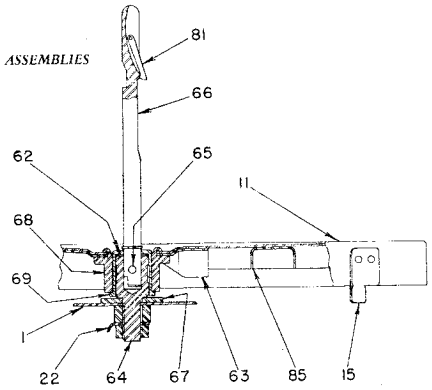
FIG. 3 LEAD OR RETURN DROPPING ROLLERS

11. Lead roller assembly Fig. (3) drops into turntable spiral (85). See Fig. (4).
12. Disengagement of kickoff spring (15) & kickoff lever (16) rotates kickoff lever to original position. See Fig. (2, 5).
13. Swing arm (26) assembly Fig. (2) is driven through first half of cycle by turntable spiral (85). See Fig. (4).
    a. Adjusting plunger pin (50), riding on swing arm (26) cam, elevates pickup arm (46). See Fig. (6).
    b. Assembly in Fig. (7) is set by arm cam (40) so as to position ratchet arm (2) Fig. (9) on return stroke for proper set down of needle.
    c. Ratchet arm friction springs (25) engage ratchet arm (2) rotating pickup arm (46) to clearance position. See Fig. (2).
    d. Ejector idler lever (34) driven by swing arm (26) Fig. (2) actuate recor ejector assembly Fig. (8). Dropping next record from stack.
    e. Swing arm (26) ear, cams locking lever (21) resetting kickoff lever assembly (17). See Fig. (2).
    f. Cammed dropping lever (32) Fig. (2) releases return roller assembly Fig. (3) dropping it into turntable spiral (85) Fig. (4).
    g. Inner spiral cam (63) Fig. (4) raises lead roller assembly Fig. (3) permitting dropping lever (18) to rotate to setting position. See Fig. (2).
14. Swing arm (26) assembly Fig. (2) is driven through second half of cycle by turntable spiral (85) Fig. (4).
    a. Pickup arm (46) is positioned for set down driven by engaged ratchet arm friction springs (25) and ratchet arm (2) and located by interference of ratchet arm lever (29). See Fig. (2, 9)
    b. Record ejector assembly Fig. (8) is reset to original position.
    c. Swing arm (26) ear releases locking lever (21) allowing it to assume original position. See Fig. (2).
    d. Operation of brake spring (22) prevents acceleration of swing arm (26) at completion of cycle. Gentle set down of pickup arm (46) is so effected. See Fig. (2).

FIG. 4 CENTER POST AND TURNTABLE ASSEMBLIES



ORIGINAL DESIGN



IMPROVED DESIGN

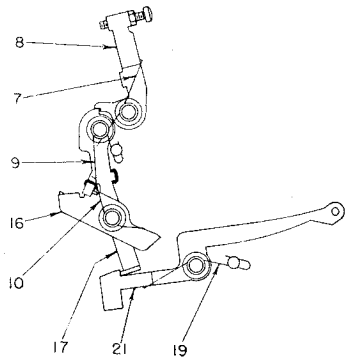


FIG. 5 TRIPPING LEVERS IN LOCKED POSITION

    e. Adjusting plunger pin (50) riding on swing arm (26) cam causes pickup arm (46) to descend to playing position. See Fig. (6).
    f. Assembly in Fig. (7) is released by arm cam (40) resetting ratchet arm lever (29) in clearance position as shown in Fig. (2).
    g. Inner spiral cam (63) Fig. (4) raises return roller assembly Fig. (3). Rotation of cammed dropping lever (32) Fig. (2) provides clearance between inner spiral cam and return roller assembly. This completes the change cycle.
15. Tripping of mechanism by eccentric grooves in center of record.
    a. As record is being played ratchet dog (5) and ratchet lever (6) make contact. See Fig. (2).
    b. Eccentric grooves in record produce oscillation of ratchet arm (2) and ratchet dog (5). See Fig. (2).
    c. Oscillation of ratchet dog (5) across ratchet lever (6) lengthens ratchet arm (2) assembly, rotating ratchet lever (6). See Fig. (2).
    d. Rotating ratchet lever (6), rotates adjusting stop lever (8) disengaging jaws of adjusting stop lever (8) and kickoff lever arm (17). See Fig. (2).
16. For remainder of cycle see parts 8 through 14 above.

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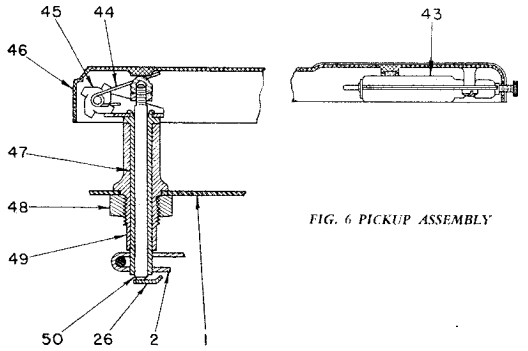

FIG. 6 PICKUP ASSEMBLY

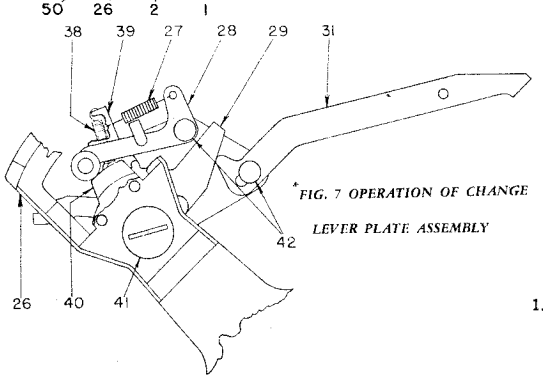

FIG. 7 OPERATION OF CHANGE LEVER PLATE ASSEMBLY

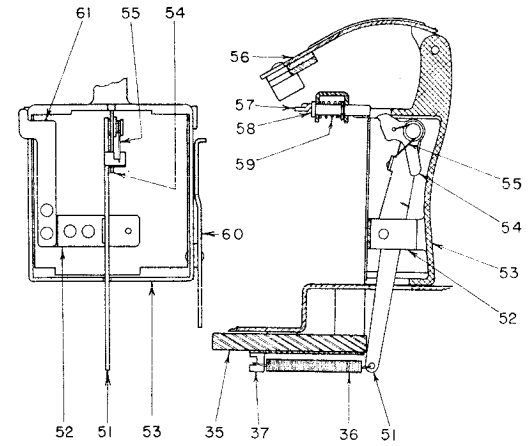

FIG. 8 EJECTOR BOX ASSEMBLY

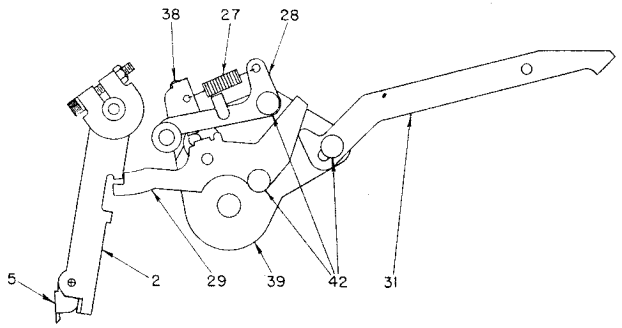

FIG. 9 POSITIONS OF LEVERS FOR NEEDLE SETDOWN

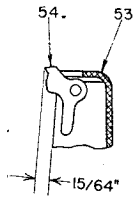

FIG. 10 FINGER TRAVEL OUT OF EJECTOR BOX

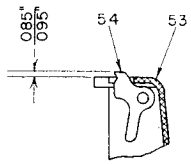

FIG. 11 FINGER TRAVEL ABOVE EJECTOR BOX

ADJUSTMENTS & PROCEDURES

1. Check power supply to motor. Motor operates at 115 volts 60 cycle alternating current unless otherwise specified on motor.
2. Remove turntable (11), move motor idler pulley (82) away from motor shaft (84) and check for motor performance Fig. (1).
3. Check for freedom of motion of motor idler pulley (82) and motor spring (83) tension on same. Fig. (1).
4. Check for grease or foreign matter on motor idler pulley (82) or turntable (11) rim which may cause slippage. Fig. (1).
5. Check for worn motor idler pulley (82) tire. Fig. (1).
6. Check for grease or foreign matter in bearing for turntable collar (62) and mechanism plate center stud (64). Fig. (4).
7. Check for absence of adjusting plunger pin (50). Fig. (6).
8. Adjusting plunger pin (50) incorrect length. Place pickup arm (46) in upright position and remove adjusting plunger pin (50) with acorn nut. Adjust overall length of pin assembly to give approximately ¼" clearance between top of pickup arm and bottom record of stack of unplayed records when unit is in change cycle. Fig. (6).
9. Trip mechanism and rotate turntable (11) by hand until swing arm (26) completes half of its cycle. Loosen screw in cam trip bracket (30) and rotate bracket until there is .012" to .014" clearance between leading edge of cam dropping lever (32) all in Fig. (2) and bearing pin shoulder nut (73) Fig. (3) of dropping roller. Return swing arm to original position. Retighten screw. Recheck this setting by tripping mechanism and rotating turntable by hand observing whether return roller assembly Fig. (3) enters turntable spiral (85) Fig. (4) at formed flat on turntable spiral at completion of half of swing arm cycle.
10. Back up turntable (11) turning it counter clockwise slightly and remove turntable. Push both rollers (71) of swing arm (26) down and push rollers (71) towards reject button (80) to the end of their travel. Replace turntable and rotate by hand for at least one revolution. Fig. (1).
11. Check drop lever torsion spring (20) and cammed dropping lever torsion spring (33) for adequate tension. Fig. (2).
12. Check for worn or frayed rubber on dropping lever (18), replace if necessary. Grease rubber sleeve after installation. Fig. (2). This sleeve, above (73) Fig. 3, may be eliminated entirely for better operation.
13. Check for defective ratchet arm friction springs (25). Fig. (2). If found to be loose or weak, return changer to factory for adjustment.
14. Check ratchet arm (2) for tight engagement with pickup arm swing post (47). Fig. (2,6).
15. Trip mechanism and rotate turntable (11) by hand until swing arm (26) completes half of its cycle. Loosen lock nut on ejector idler lever (34) Fig. (2). Adjust screw until finger (54) protrudes outside of ejector box (53) 15/64". See Fig. (10). Tighten lock nut.
16. Check proper height from ejector box (53) ears to maximum rise of finger (54) top is .085" to .095". See Fig. (11). File to give proper dimension.
17. Check 10" record support (57) Fig. (8) for height differential between ears of 10" record support (57) and top of pusher pin (58). Pin should engage record by .080" to .090". Bend to suit.
18. Put a 10" record on turntable (11), loosen screw on ratchet arm (2) and place pickup needle approximately ⅛" from outside edge of record. Rotate by hand ratchet arm lever (29) and ratchet arm (2) to position shown on Fig. (9) and retighten screw. This setting will automatically set needle down correctly for 12" records also.
19. Move swing arm (26) away from reject button (80) for about 1" of its travel. Check movement of ratchet arm lever (29) which should assume position shown on Fig. (7 or 9) when 10" record support (57) is in down position. Hampered movement may be caused by defective ratchet arm extension spring (38) or excess friction.

20. Remove brake spring (22) and inspect for possible fracture. Replace fractured spring, use two springs if necessary. Fig. (2).
21. Check for defective cam lever extension spring (27) and possible excess friction in parts. Fig. (7).
22. Check for adequate freedom of pickup cartridge wire.
23. Pickup arm (46) should weigh 1¼ oz. when scale is applied at set screw. To adjust weight rotate ratchet for pickup arm (45) so to decrease or increase tension on pickup arm balance spring (44). See Fig. (6).
24. Needle may be worn beyond use.
25. Check to see that changer is level.
26. Check freedom of movement of adjusting stop lever (8) Fig. (2 or 5).
27. Check for presence of all springs See Fig. (2).
28. Tripping levers may assume position shown in Fig. (5). Reset levers by pulling reject button (80). If occurance is frequent observe for extreme wear of nib at point where kickoff spring (15) contacts kickoff lever (16). Fig. (2). Replace kickoff lever arm (17) assembly, and remove 1/32" of mechanism plate (1) increasing size of hole which limits outward travel of kickoff lever arm (17). Remove material from farthest edge from center post (66) allowing greater movement of kickoff lever arm (17) assembly.
29. Set pickup needle at a point 1⅞" from center of record, loosen lock nut and turn screw on adjusting stop lever (8) Fig. (2) until kickoff lever arm (17) releases allowing 1/64" clearance between jaws of adjusting stop lever (8) and kickoff lever arm (17). See Fig. (12). Tighten lock nut.
30. Check for distorted or fractured kickoff spring (15) Fig. (4).
31. Records not manufactured under R.M.A. specifications may not trip changer.
32. Bend the ear on the adjusting stop lever (8) slightly towards heel of ratchet lever (6), to produce increased interference of ratchet dog (5) and teeth of ratchet lever (6). Fig. (2).

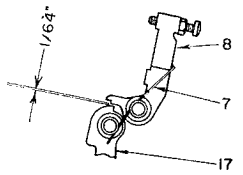

FIG. 12 ADJUSTMENT FOR TRIPPING

33. Apply force with pliers to bend ratchet arm stop bracket (4) away from reject button (80), until pickup arm (46) will rotate to a position allowing 12" record to drop without interference. Fig. (2).
34. Check cabinet cutout for adequate clearance of ratchet arm (2). Fig. (2).
35. Check for worn roller tires (72). Fig. (3).
36. Remove friction spring washer (62) and replace with .010" friction spring washer (62) or eliminate if necessary. Fig. (4).
37. With starting switch (24) "OFF", trip mechanism and rotate turntable (11) by hand. Check that lead roller assembly and return roller assembly Fig. (3) drops into turntable spiral (85) Fig. (4) without touching flange of turntable spiral. Check for foreign matter which would prevent roller assembly from dropping full extent of travel.
38. Lubricate bearing for turntable collar (69). Fig. (4). Use very light machine oil, 3 in 1 or equivalent.
39. Check for foreign matter between turntable (11) and mechanism plate (1). Fig. (1).
40. Defective records.
41. Defective cartridge and amplifier circuit.

Instructions

When ordering parts for Model #10700 Record Changer, specify changer serial number, item number, part number, and description. When ordering motor parts be sure to specify the motor number stamped on each motor. Order special rivets from respective part numbers.

Item No.	Description	Part Number
1.	Mechanism Plate	10701
2.	Ratchet Arm	10759
3.	Ratchet Extension Spring	10761
4.	Ratchet Arm Stop Bracket	10843
5.	Ratchet Dog	10760
6.	Ratchet Lever	10777
7.	Adjusting Stop Lever Spring	10783
8.	Adjusting Stop Lever	10780
9.	Kickoff Lever Arm Spring	10789
10.	Kickoff Lever Spring	10790
11.	Turntable	10702
12.	Reject Arm Tension Spring	10826
13.	Reject Arm Spring	10814
14.	Reject Arm	10812
15.	Kickoff Spring	10707
16.	Kickoff Lever	10786
17.	Kickoff Lever Arm	10785
18.	Dropping Lever	10731
19.	Locking Lever Spring	10795
20.	Drop Lever Torsion Spring	10734
21.	Locking Lever	10793
22.	Brake Spring	10741
23.	Motor	10825
24.	Motor Switch	10824
25.	Ratchet Arm Friction Spring	10791
26.	Swing Arm	10729
27.	Cam Lever Extension Spring	10774
28.	Cam Lever	10769
29.	Ratchet Arm Lever	10772
30.	Cam Trip Bracket	10811
31.	Change Lever	10767
32.	Cammed Dropping Lever	10730
33.	Cammed Dropping Lever Torsion Spring	10733
34.	Ejector Idler Lever	10813
35.	Record Ejector Lower Push Pin	10804
36.	Ejector Arm Extension Spring	10728
37.	Ejector Pin Guide	10724
38.	Ratchet Arm Extension Spring	10775
39.	Change Lever Plate	10768
40.	Arm Cam	10737
41.	Fulcrum Bearing Nut	10738
42.	Change Lever Fulcrum Pin	10773
43.	Pickup Cartridge	10753
44.	Spring for Pickup Arm Balance	10764
45.	Ratchet for Pickup Arm Balance	10766
46.	Pickup Arm	10752
47.	Pickup Arm Swing Post	10755
48.	5/8"-18 Light Jam Nut	10835
49.	Pickup Arm Stationary Post	10756
50.	Adjusting Plunger Pin	10757
51.	Finger Lever for Ejector	10718
52.	Lever Pivot	10719
53.	Ejector Box	10708
54.	Finger	10717
55.	Finger Torsion Spring	10721
56.	Balance Arm	10712
57.	10"Record Support	10713
58.	Pusher Pin for 10" Ejector	10714
59.	Ejector Compression Spring	10715
60.	Change Lever—Ejector	10722
61.	Pressure Spring—Ejector	10720
62.	Friction Spring Washer	10823
63.	Inner Spiral & Cam	10703
64.	Mechanism Plate Center Stud	10821
65.	Center Stud Taper Pin	10822
66.	Center Post	10820
67.	Reinforcement Washer for Center Stud	10828
68.	Turntable Collar	10705
69.	Bearing for Turntable Collar	10706
70.	Swing Arm Clamp	10745
71.	Roller Pin Assembly	10743
72.	Roller Tire	10748
73.	Bearing Pin Shoulder Nut	10742
74.	Compression Spring for Arm	10750
75.	Bearing Pin Spacer	10751
76.	Roller Cushion Washer	10744
77.	Washer for Bearing Pin	10801
78.	Swing Arm Slide Washer	10747
79.	Pickup Arm Rest	10803
80.	Reject Button	10816
81.	Center Post Dog	10802
82.	Motor Idler Pulley	10825
83.	Motor Spring	10825
84.	Motor Shaft	10825
85.	Turntable Outer Spiral	10704

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Servicing Procedure

1. The following procedure, when followed, will provide the service man with a method of repair which will save him much unnecessary time and effort. Start servicing the changer by performing adjustment #10. This will assure the service man that the changer is in the correct position for proper operation.

2. With pickup arm (46) on pickup arm rest (79) and center post dogs (81) down, place stack of 12 new 10″ records on center post (66) and 10″ record support (5() ears. See Fig. (1).
3. Push starting switch (24) to "ON" position. See Fig. (1).

4. Pull reject button (80) Fig. (1) to reject position and release, observing changer action for any of following possible difficulties. Difficulties encountered may be corrected by following the respective procedure and adjustments indicated.

Procedure & Adjustments	
a. Turntable does not rotate.	#1,2,3,4,5,6
b. Pickup arm does not rise.	#7,8
c. Pickup arm rises but does not rotate into playing position and remains suspended in air. Turntable continues to turn. Click heard on each revolution.	#9
d. Pickup arm rises but does not rotate into playing position and remains suspended in air. Turntable comes to a dead stop cannot be turned by hand.	#10,9,11,12
e. Pickup arm rises but does not rotate into playing position, then sets to rest on pickup arm rest.	#13,14
f. Bottom record does not drop off of supporting ears of 10″ record support (57) and center post (66) Fig. (1).	#15,16,17
g. Pickup arm hits bottom record of not played records.	#8
h. Needle does not set down correctly for 10″ or 12″ records.	#18,19
i. Pickup arm drops fast when setting needle on record.	#20
j. Pickup arm needle does not track in groove.	#21,22,23,24,25
k. Pickup arm needle jumps out of recording grooves and doesn't trip mechanism.	#22,23,24,25,26
l. Mechanism does not trip at end of record.	#26,27,28,29,30,31
m. Eccentric groove on 10″ records does not trip mechanism.	#31,32
n. Changer does not play entire record.	#29
o. Pickup arm does not lift high enough to clear stack of 12-10″ records on turntable.	#8

5. With pickup arm (46) on pickup arm rest (79) and center post dogs (81) down, place stock of 10 new 12″ records on center post (66) and 12″ record support ears of ejector box (53). Fig. (1).

6. Push starting switch (24) to "ON" position. See Fig. (1).

7. Pull reject button (80) Fig. (1) to reject position and release, observing changer action for any of following possible difficulties.

a. Bottom record does not drop off of supporting ears of ejector box (53) and center post (66).	#15,16
b. 12″ record hits pickup arm when record drops to playing position.	#33,34
c. Eccentric groove on 12″ records does not trip mechanism.	#31,32

8. Play any record. Observe and listen for noises which not not seriously hamper operation of changer but detract from performance of changer.

a. Click is encountered on each revolution of turntable during playing cycle.	#11
b. Apparent growl or scroll noise caused by improper operation of roller (71) Fig. (3) on turntable spiral (85) Fig. (4) during change cycle.	#8,12,35,36,37
c. Extreme variation of turntable speed.	#3,4,5,6,38,39
d. Distortion of tone quality of recording.	#3,4,5,6,24,38,39,40,41
e. Excessive wear of records.	#23,24
f. Turntable vibrates or chatters.	#38

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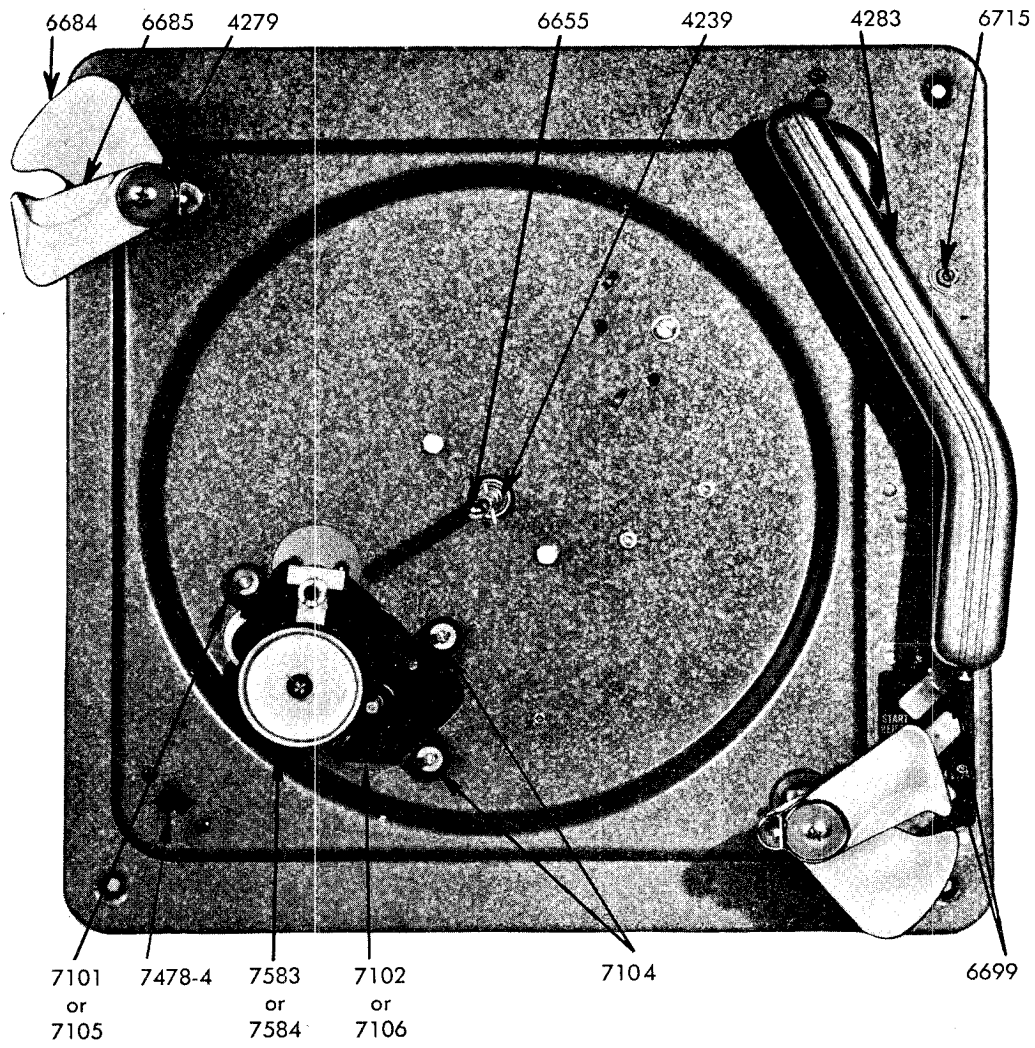

TOP VIEW, COMPLETE CHANGER, TURNTABLE REMOVED.

This changer automatically plays ten 12″ records or twelve 10″ records. Service information contained in this bulletin covers the operation, care, and adjustments that may be necessary if the mechanism fails to operate properly.

OPERATION

The motor shaft presses against its idler wheel which turns the turnable (7103 or 7107) from the inside rim. The turntable rests on a pin through the turntable shaft 6655 and causes the turntable shaft to turn. The pinion 4246 at the base of the turntable shaft turns in a notch in the drive cam 4207 while records are playing. When the pickup arm 4283 reaches the inside groove of a record the bracket 6697 on the pickup crank 6694 presses against the trip screw 7555 which is mounted in the pawl latch assembly 7809. The opposite end of the pawl latch assembly releases the starting pawl 6643 allowing the starting pawl to engage the pinion. This starts the drive cam 4207 and the change mechanism.

As the cam begins to turn, the lift pin 6876 is forced upward by the raised portion of the cam. This lifts the tone arm off the record. The cam follower 6695 then rides its groove on the cam and swings the tone arm outward. During this outward swing the indexing pin 6862 slides off the index stop 6856 and is pushed upward by the indexing pin spring 4272. While the tone arm is all the way out, the starting pawl 6643 is cocked into position by the bracket 6697 on the pickup crank 6694.

The cam follower swings the tone arm in until the index pin 6862 contacts the index pin stop thus getting the proper needle drop position.

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MODEL 6666

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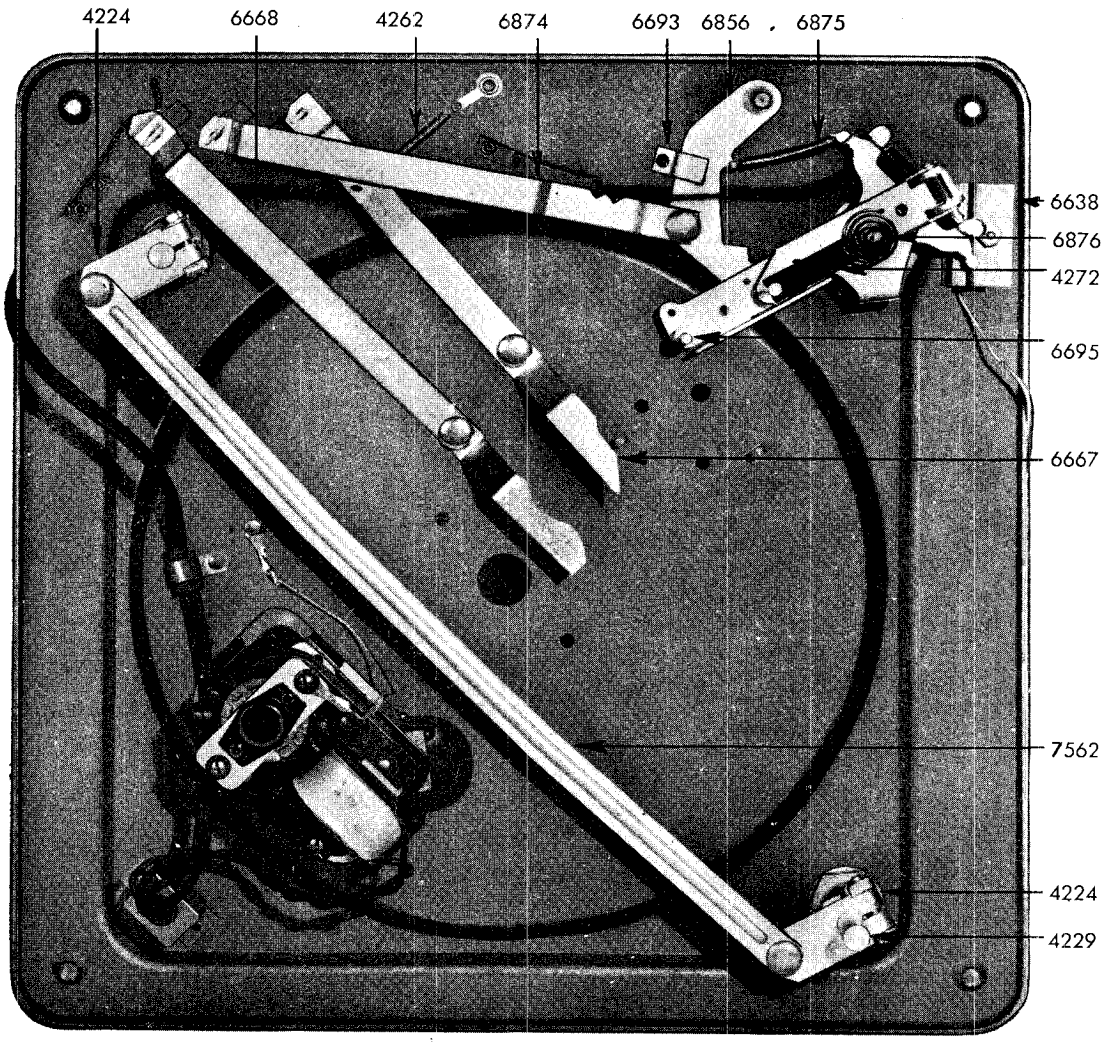

BOTTOM VIEW, LESS MAIN GEAR ASSEMBLY.

While the cam is turning the eccentric 6645 turns the changer blades thru the action of the eccentric arm 7144 and the tie bar 7562 which connects the changer shafts 4229 and 4232 together.

When the cam again comes to rest it is held in position by the cam stop lever 6659 and cam stop roller 6660.

MANUAL OPERATION

In manual operation the manual link 6668 holds the starting pawl 6643 in the cocked position at all times.

REJECT

The reject link 6667 releases the pawl latch assembly 7309 allowing the starting pawl 6643 to engage the pinion 4246 and start the change cycle.

ADJUSTMENTS

These adjustments are made correctly at the factory and ordinarily need never be altered. Should it become necessary to readjust, due to accident or tampering, proceed as follows:

A. Adjusting The Needle Landing Position

The needle drop adjusting screw 6715 is readily accessible from the top of the changer. To adjust, loosen the nut and turn the screw with a screwdriver. Maximum adjustment is obtained from one complete turn of the screw—any more than one turn merely repeats itself. At the factory the needle drop is adjusted to $4\frac{13}{16}$ inches from center for a ten inch record and $5\frac{13}{16}$ inches from center for a twelve inch record. Both landing positions are governed by

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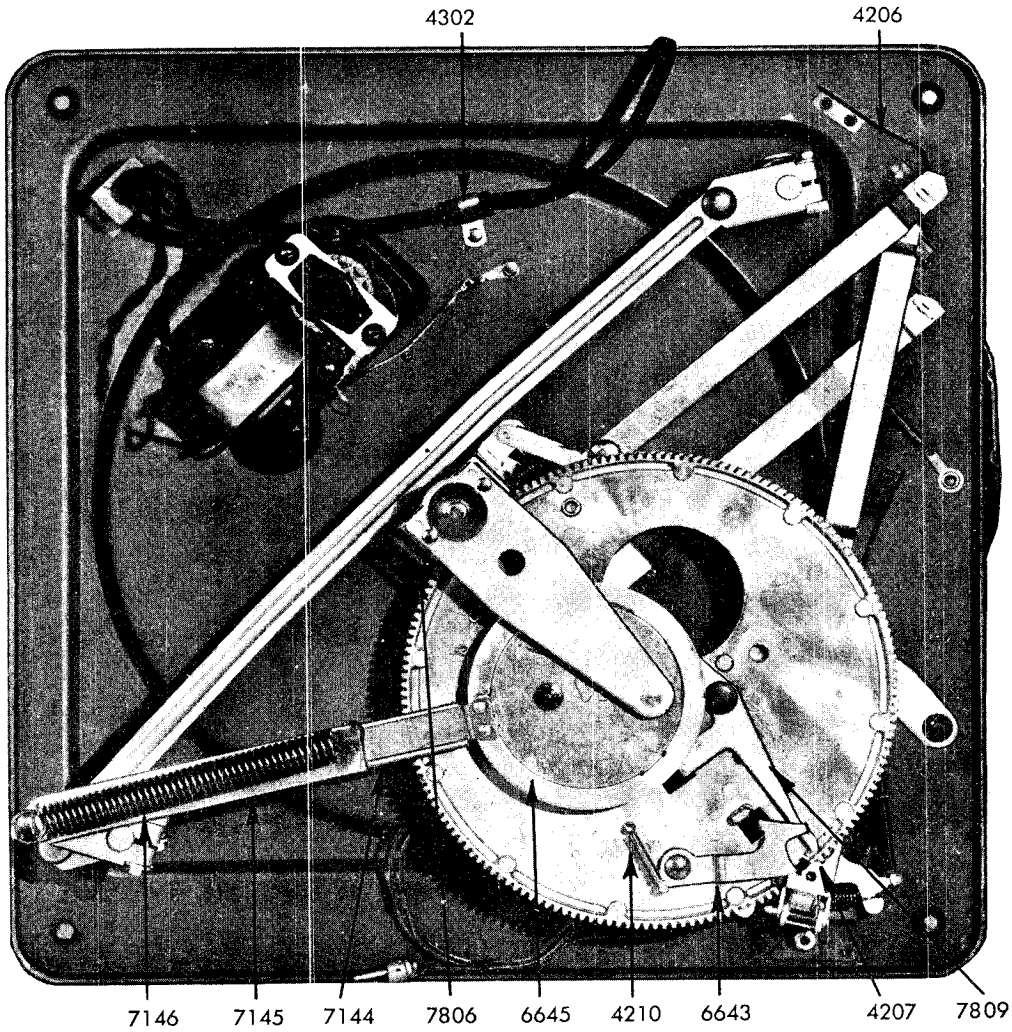

BOTTOM VIEW, ONE HALF CHANGE CYCLE.

the the same screw so adjusting for one or the other should be sufficient. When completed, tighten locking nut.

If the landing position is out of range for the adjusting screw, the clamp 6858 may have loosened. With the drive cam 4207 in the rest position, move the cam follower 6695 in towards center as far as possible. Then move the tone arm in approximately 1½ inches from center and tighten the clamp 6858. For fine adjustment, readjust the needle drop adjustment screw.

If the tone arm is bent it may require straightening. After straightening, run the changer through a change cycle manually and make sure the tone arm has proper height. (For height adjustment see paragraph B.)

B. Adjusting the Tone Arm Height

The needle should clear the turntable by 1¼ inches when at maximum height during change cycle. Adjustments can be made by turning the lift adjusting screw 4245. Before the power switch is turned on the changer should be run through its cycle manually to make sure that the tone arm passes underneath the lower change blade and does not jam.

If this adjustment is correct and the tone arm doesn't drop low enough to play the bottom record, inspect the main cam and see that the tone arm lift pin 6876 is all the way down in the hollow on the cam. If not, inspect the cam stop roller 6660 and see that it is in the proper position. Grasping the eccentric arm 7144 and pulling downward may help if the trouble is due to binding.

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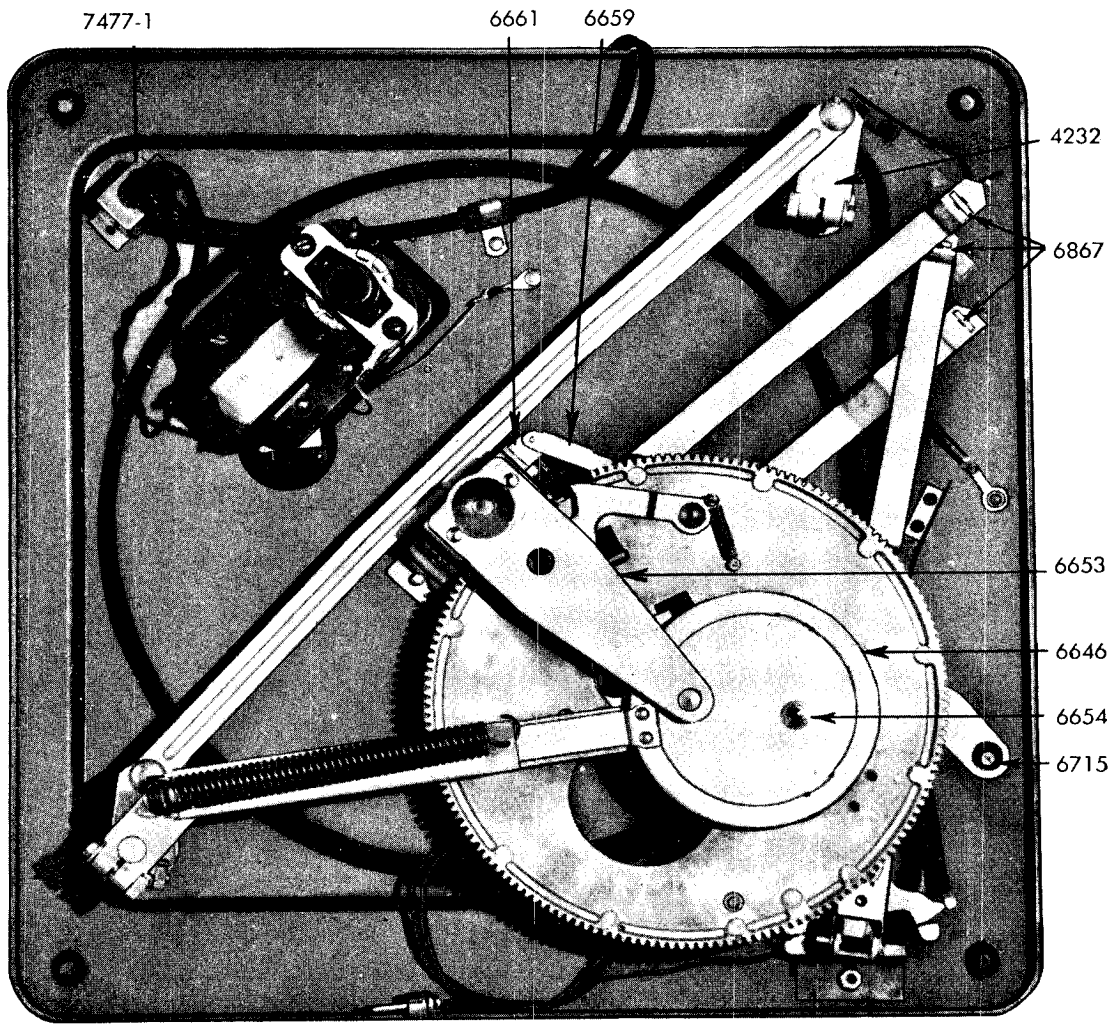

BOTTOM VIEW, IN OPERATION.

C. Adjusting the Position of Trip

The change mechanism should start when the tone arm is approximately 1 3/16 inches from center. The trip occurs when the tone arm lever presses against the trip screw 7555 on the pawl latch assembly 7809. This screw can be adjusted to change the trip position.

D. Adjusting the Record Drop

Both lower change blades are adjusted to drop a record simultaneously. A loosened driving crank 4224 would allow a record to drop on one side before the other. To reset, turn the turntable manually until the record is just about to drop, loosen the the driving crank 4224 and adjust change blades so they are even. Then tighten clamp.

E. Adjusting Needle Pressure

The needle pressure can be adjusted by turning the pickup spring adjusting washer 4308-1 which changes the pressure of the pickup spring 7818. This adjustment is made for the particular cartridge being used and adjustment may be advisable if a substitute cartridge is used.

TROUBLE SHOOTING

SQUEAKS & NOISES

Squeaks sometimes occur due to friction between the unplayed stack of records and the spindle. This may be eliminated by applying a thin coat of wax or vaseline to the spindle at the point of contact.

Check the oil wick 4228 on the main cam, perhaps it needs oil. If the wick appears dirty or gummy it

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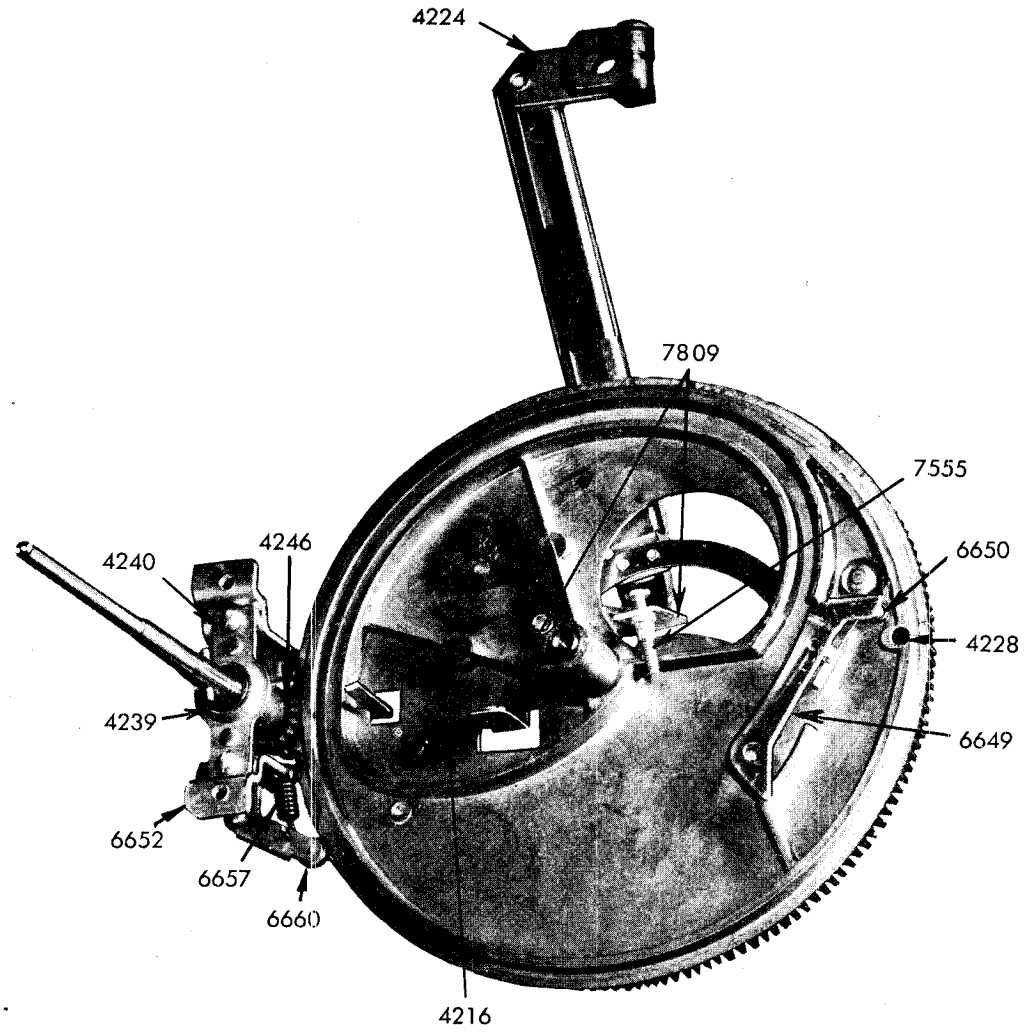

MAIN GEAR ASSEMBLY.

should be removed, thoroughly cleaned, and replaced.

WEAK OR NO OUTPUT

Check the pickup lead from the pickup to the amplifier.

If the amplifier is O.K. replace crystal pickup.

TURNTABLE WILL NOT TURN

No power applied to the changer.
Faulty switch 7478-4.
Burned out motor winding. (See replacing motor.)
Idler wheel spring disconnected.
Foreign material jamming motor armature.

If in change cycle—cam jammed or tie bar 7562 rubbing against the sub frame assembly 7806.

IMPROPER SPEED

Improper voltage or frequency.
Drag on turntable or motor.
Motor or turntable bearings binding.

FAILS TO TRIP

Starting pawl spring disconnected.
Trip screw missing or set improper.
Bent starting pawl or pawl latch.
Dirt binding starting pawl or pawl latch rivets.
Tone arm lever loosened. (See adjustment A.)

The pickup lead wire which emerges from the rear of the tone arm and goes down through the metal base is so placed that it will not hinder the movement of the tone arm. This lead should be free at all times, do not attempt to push excess wire through the base.

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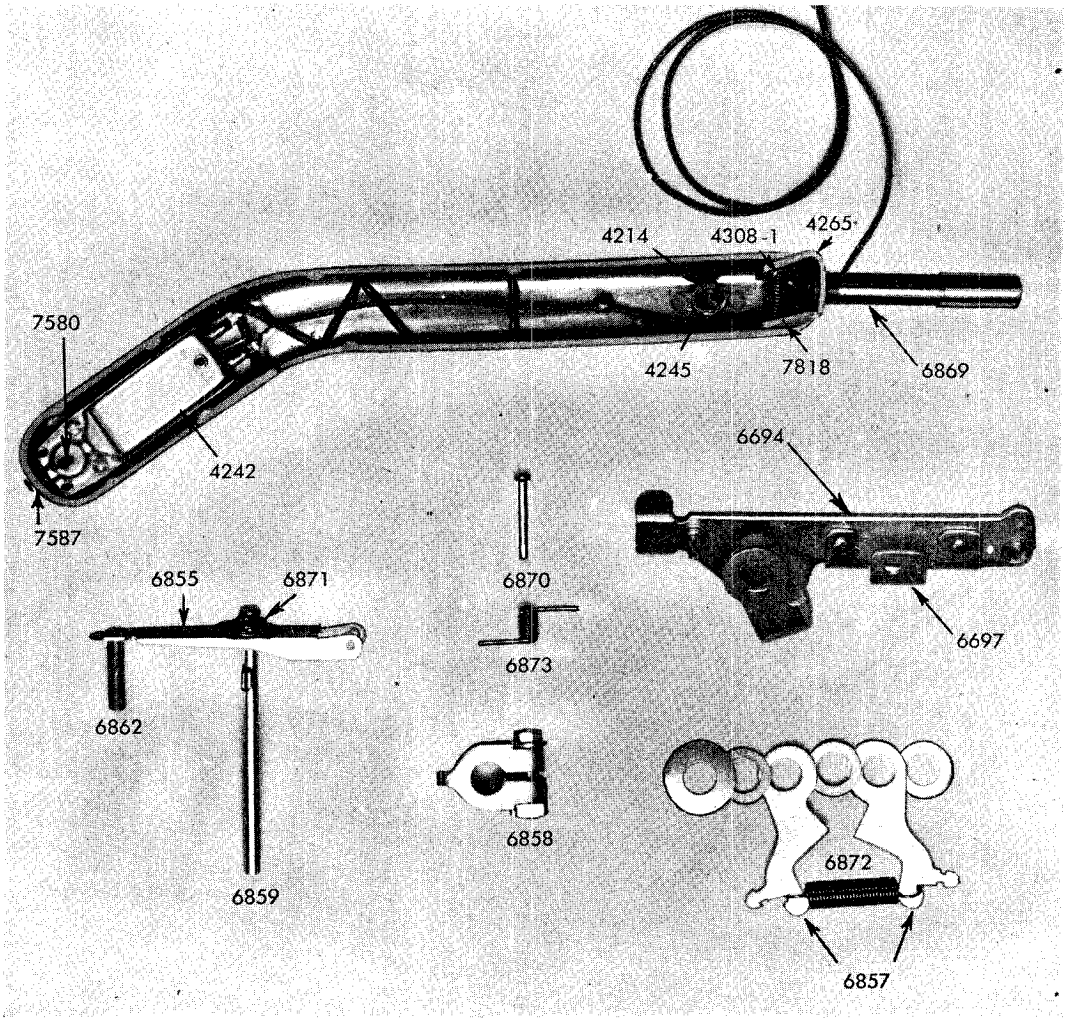

TONE ARM ASSEMBLY WITH BRACKET, WASHERS, ETC.

CHIPS RECORDS

Warped records are the most common cause for jamming or chipping records. Should the change blades chip flat records they should be bent to have a .06" clearance between them.

RECORDS DROP ON ONE SIDE ONLY

This is most likely due to the driving crank 4224 having loosened. For resetting instructions see Adjustment D.

REPLACING A MOTOR

Remove the turntable by lifting and giving the spindle a sharp tap to release it. Remove the power switch by taking out the two Phillips screws. Remove the switch cover and disconnect the motor wires. Disconnect the motor ground connection, remove motor and replace with a new one.

LUBRICATION

Normally, this mechanism should require no additional lubrication. However, a drop of any good machine oil on the turntable shaft bearings, motor bearings, and frictional surfaces once a year will do no harm.

CAUTION: Do not lubricate the trip mechanism or allow any oil to come in contact with the idler wheel.

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SERVICE PARTS LIST

Part No.	Description
1842-3	Steel Ball $\frac{3}{16}$" Diameter
4206	Control Spring
4207	Drive Cam
4210	Starting Pawl Spring
4214	Pickup Adjusting Spring
4215-37	# 10-24 x $\frac{3}{8}$" Phillips Oval Hd. M. Sc. (Chrome Plate)
4216	Latch Spring
4224	Driving Crank
4228	Oil Wick
4229	Changer Blade Driving Shaft
4231	Pickup Hinge Pin
4232	Changer Blade Driven Shaft
4239	Turntable Bearing
4240	Bearing Support
4241	Bearing Support
4242	Pickup Cartridge
4245	Lift Adjusting Screw
4246	Pinion
4251	Mounting Clip
4252	Mounting Screw
4253	Mounting Spring
4262	Reject Spring
4265-2	Pickup Hinge
4272	Indexing Pin Spring
4279	Changer Shaft Cap
4283	Pickup Arm
4292	Pickup Rest Bumper
4302	Motor Cord Clamp
4308-1	Pickup Spring Adjusting Washer
6630-1	Base
6638	Cable Clamp
6641-1	Post
6641-2	Post
6642	Pickup Rest
6643	Starting Pawl
6645	Eccentric
6646	Eccentric Ring
6649	Cam Extension
6650	Cam Extension Spring
6652	Sub Frame
6653	Sub Frame Bracket
6654	Cam Shaft
6655	Turntable Shaft
6657	Cam Stop Spring
6659	Cam Stop Lever
6660	Cam Stop Roller
6661	Bracket
6667	Reject Link
6668	Manual Link
6683	Escutcheon
6684	Lower Change Blade
6685	Upper Change Blade
6693	Guide, Index Lever

Part No.	Description
6694	Pickup Crank
6695	Cam Follower
6697	Bracket
6699	Control Button
6715	Index Bushing Assembly
6855	Indexing Lever
6856	Indexing Stop
6857	Scissors Arm
6858	Clamp
6859	Tube
6862	Indexing Pin
6867	Knob Insert
6869	Pickup Shaft
6870	Pin
6871	Spring
6872	Spring
6873	Spring
6874	Index Link
6875	Spring (Pickup Crank)
6876	Lift Pin
6877	Pickup Hinge Pin Tube
7101	Rubber Grommet
7102	Phonomotor
7103	Turntable
7104	"C" Washer
7105	Rubber Grommet
7106	Phonomotor
7107	Turntable
7144	Eccentric Arm
7145	Eccentric Arm Slide
7146	Slide Spring
7477-1	Switch Cover Assembly
7478-4	Slider Switch Assembly
7555	6-32 Hex. Hd. Mach. Screw
7562	Tie Bar
7563	Trust Bearing Disc
7580	Needle
7583	Idler Pulley Kit (For 7102 Motor)
7584	Idler Pulley Kit (For 7106 Motor)
7587	Needle Screw
7800	Base Assembly
7801	Index Stop and Link Assembly
7802	Pickup Crank Assembly
7803	Pickup Arm and Shaft Assembly
7804	Index Lever Assembly
7805	Tie Bar Assembly
7806	Sub-Frame Assembly
7807	Eccentric Arm Assembly
7808	Drive Cam Assembly
7809	Pawl Latch Assembly
7810	Changer Blade Assembly
7818	Spring Pickup Crank)

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AUTOMATIC RECORD CHANGER — RECORDER COMBINATION

GENERAL INFORMATION

LEVELING OF INSTRUMENT

Keeping the record changer-recorder in a level position is of maximum importance. If the floor under the cabinet is not level, shims should be placed under the feet of the cabinet until the base plate of the instrument is level.

Failure to level the instrument may result in improper feed-in of the pick-up arm when the automatic record changer is in use, and during recording, the proper balance of the cutter head would be disturbed.

LUBRICATION

Frequent lubrication of the record changer is not required, however, certain points should receive attention at least two or three times a year. Lubricate with SAE 20 automobile engine oil the following points: Motor bearings (52) and (53), turntable shaft bearing under cam (16) and idler bearing (51) CAUTION: MAKE SURE THAT NO OIL, GREASE, OR SOLVENT GETS ON THE RUBBER TREAD OF IDLER (54). Oil other parts of the mechanism whenever advisable. Keep the working surfaces of cam (16) and the various cams on cam shaft (19) covered with a thin film of petroleum jelly (vaseline).

Whenever the follower arm post (56) shows any tendency to stick or bind in the pivot post bushing (57), apply petroleum jelly to the follower arm post above and below the pivot post bushing. Work the lubricant in by alternately raising and lowering the recording arm (58). Never oil the follower arm post. Work petroleum jelly into the bearing surfaces between the straddle plate (59) and the pivot post bushing (57). This can best be done by raising the recording arm (58) until it is free of the feed screw after which it can be swung from side to side until the lubricant is well worked into place.

It is quite possible that threads or shavings resulting from the recording process will gather on the various components of the instrument. This debris should, of course, be removed. Particular care should be given to cleaning the threads of the feed screw (60). A brush is recommended for this process. At no time use a sharp instrument to clean the threads of the lead screw. Scratches on this component would have a detrimental effect.

AUTOMATIC RECORD CHANGER MECHANISM

ADJUSTMENT OF SPIRAL TRIP MECHANISM

(1) To adjust the spiral trip to operate farther from the center of the record, loosen the set screw (46) holding dog (7) away from the end of the trip rod (45). (Read paragraph 2 before making adjustment).

(2) Dog (7) is set at the factory to trip when the pick-up needle is 1¾" from the edge of the hole in the record center. This standard setting is correct for all late recordings and all but a very few of the older ones. To facilitate the location of dog (7) it is best to hold a scale with the end touching the turntable pin (5) and in such a manner that the pick-up needle will swing directly above the scale graduations. As noted above, the trip should release when the pick-up needle reaches the 1¾" graduation. NOTE: If for any reason the position of the pick-up arm (13) with relation to the pick-up base becomes changed, the trip dog (7) may require resetting. For this reason always make certain the pick-up is being lowered correctly onto the edge of the record before adjusting dog (7). (This pick-up adjustment is covered in paragraph 16).

MECHANISM FAILS TO TRIP

(3) If the mechanism fails to trip always examine the trip grooves on the record first before attempting to make any adjustments. The record grooves may be badly worn or scratched in such a manner as to cause the pick-up needle to jump the grooves. Also examine the pick-up needle for damage.

(4) The trip rod (45) is held in contact with trip latch (24) by the trip rod tension spring (6). If the eccentric trip fails to operate, it may be necessary to increase the pressure of spring (6) against trip rod (45). Before changing this adjustment, make sure the trip rod does not bind in the bearing where it is linked to the pick-up base. Now, make certain the trip rod floats freely. Examine the serration at (11) making certain the sharp edges have not been damaged. Remove any dirt that may be embedded in the serrations that would prevent the trip latch (24) from being engaged. Examine the knife edge of the trip latch (24) to see if it has become damaged. Inspect the spring (6) to see that its long leg clears that part of supporting bracket (36) on which rests trip rod (45). Make sure the

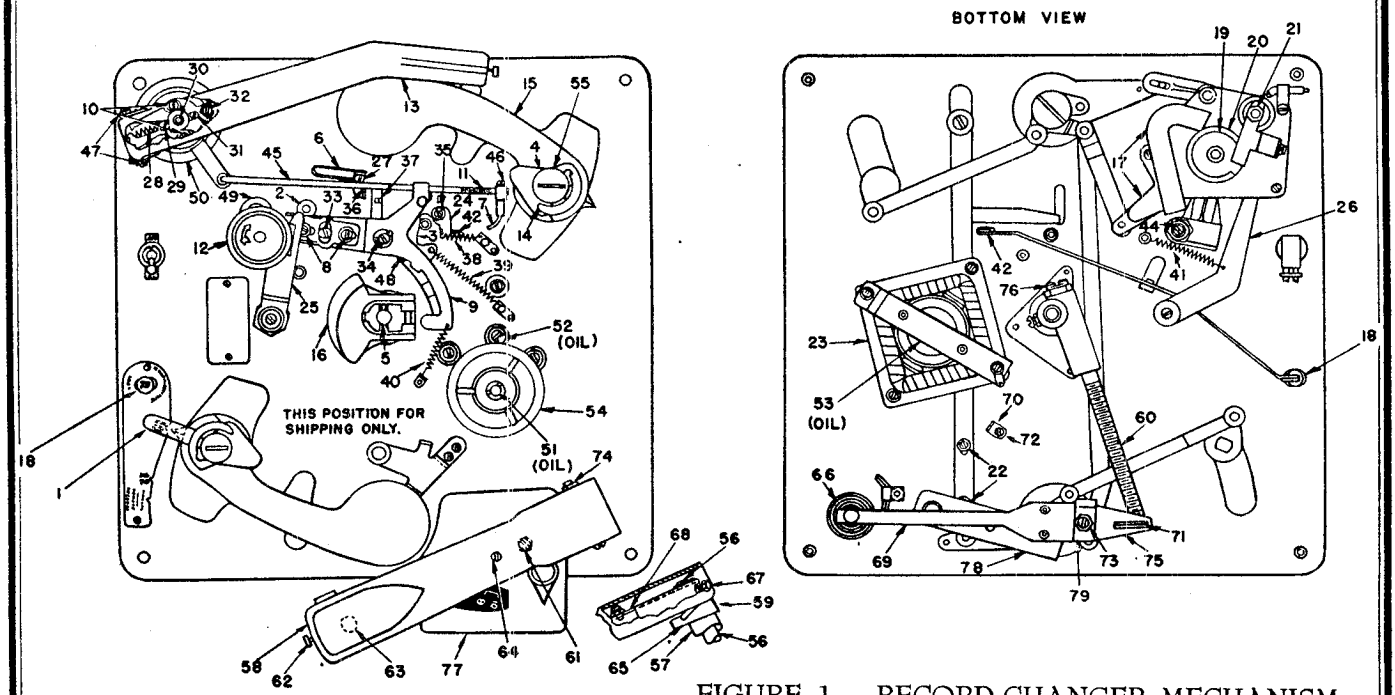

FIGURE 1 --- RECORD-CHANGER MECHANISM

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MODEL 58004-B

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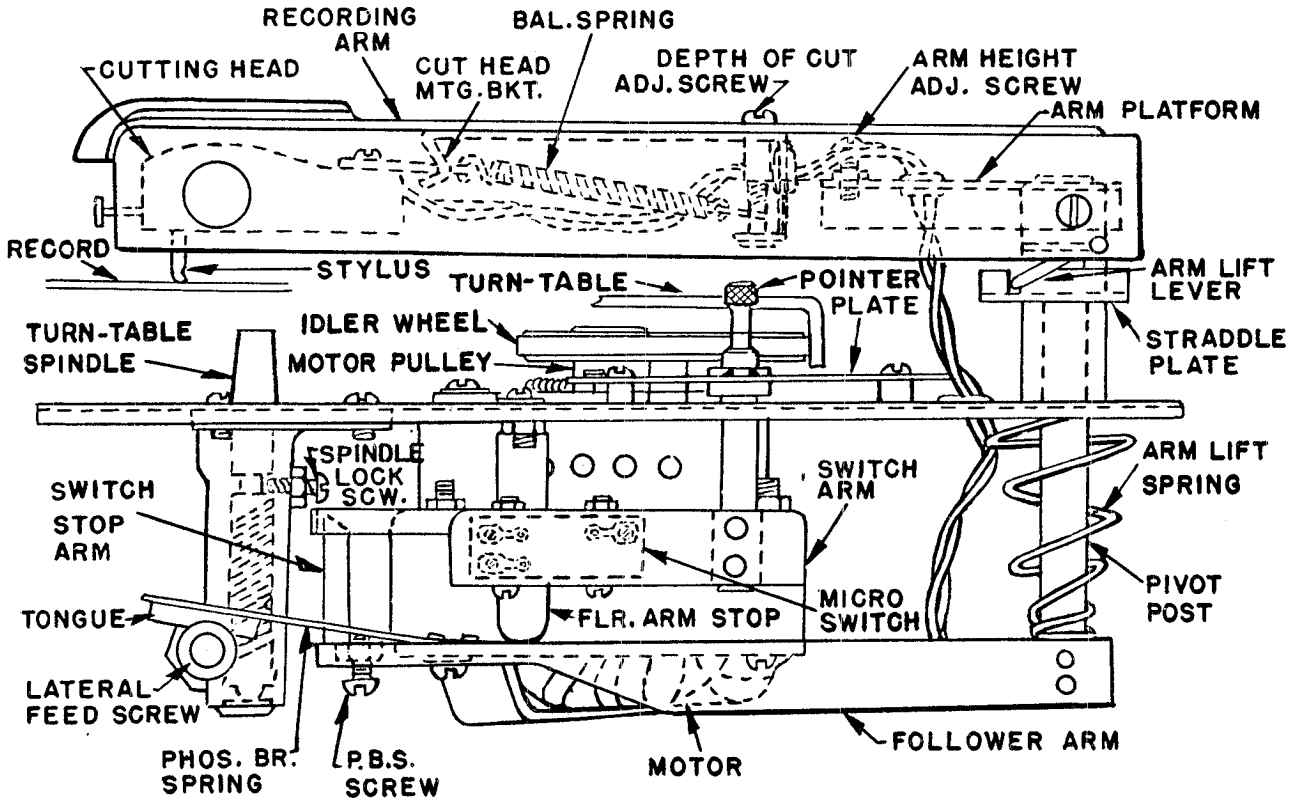
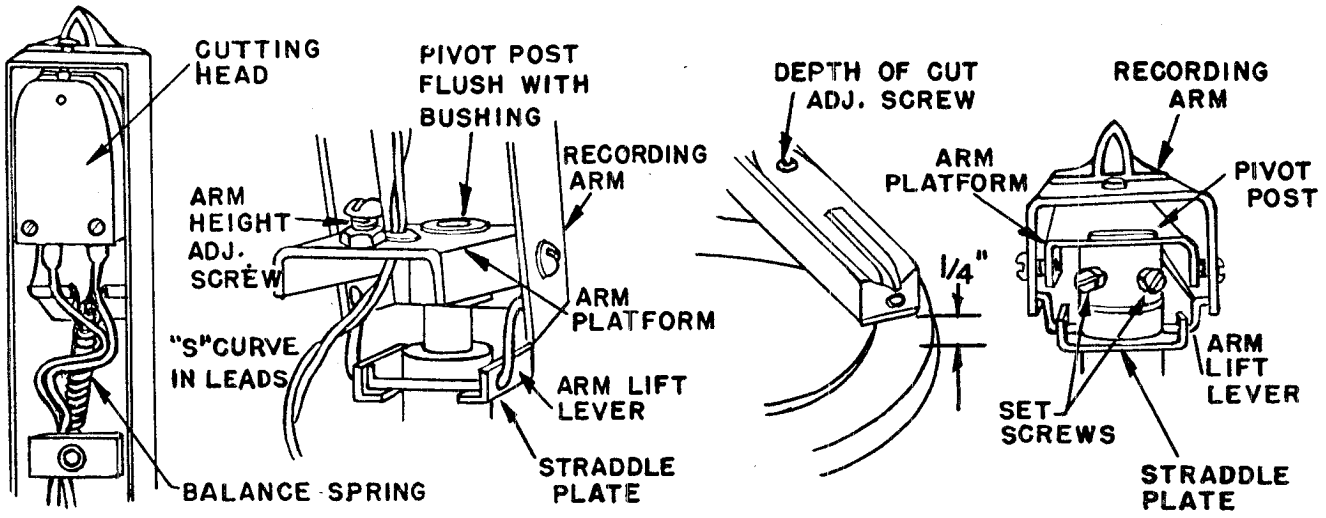


FIGURE 2

OUTLINE DRAWINGS of RECORDER MECHANISM



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pick-up needle is not jumping out of the trip grooves on the record. Hold pick-up base firmly with one hand, then press gently sideways on head of pick-up arm (13) to detect any unusual amount of lost motion or play which might be caused by lock screws (10) not holding firmly, or pivot screws (47) not being correctly adjusted. Sight along the length of the trip rod (45) to make sure it is not bent. This would seriously interfere with adjustment of spring (6). If trip rod (45) is found to be bent, always disassemble it before attempting to straighten it. NOTE: Do not increase the pressure of spring (6) against trip rod (45) any more than is necessary to insure operation of the eccentric trip, because excessive spring pressure will cause the pick-up needle to jump the record grooves. To increase the tension of spring (6) against trip rod (45), loosen screw (27) and turn spring bracket (36) in a clockwise direction.

(5) If the pick-up needle shows a tendency to jump grooves on all records and fails to trip, make sure the pick-up arm (13) swings freely. Next check the pressure of the pick-up needle against the record to make sure that counter balance spring (28) is properly adjusted. The needle pressure should be 1½ Oz. To correct insufficient needle pressure, loosen lock nut on adjusting screw (29) and turn adjusting screw (29) in a clockwise direction until needle pressure is correct. CAUTION: Before changing adjusting screw (29) make certain that push rod (30) moves up and down freely and is not supporting the pick-up arm (13) while the needle is apparently resting on the record. Also make sure that pick-up arm (13) is not resting on the head of screw (32). If the pick-up needle only jumps grooves when one record is on the turntable, pick-up arm (13) is almost certainly resting on push rod (30) or screw (32) SEE PARAGRAPH 15. As a final precaution, make sure pivot screws (47) are not too tight; this would interfere with the free vertical motion of pick-up arm (13).

(6) If the trip mechanism still operates in a faulty manner, check the trip latch (24) and the trip cam lever (3) to make sure they are operating freely and do not bind on studs (35) and (48). If either of these levers are scraping on the base plate, make sure the studs have not worked loose.

(7) If lever (3) moves freely when it clears the trip latch (24) but does not swing into the path of the trip cam (16). Spring (39) which connects to lever (3) is either stretched or missing. If lever (3) makes a loud click when it drops in. The rubber bumper, against which it should strike, has worked up and should be pressed back into place.

NOTE: Do not attempt to make the trip mechanism operate from home recorded discs.

CHANGE MECHANISM DRIVE PULLEY FAILS TO ENGAGE

(8) If the trip mechanism functions in a satisfactory manner and pulley (12) is latched in position to engage the turntable rim, but does not contact the turntable rim with sufficient pressure to insure operation, loosen two lock screws (8) and turn eccentric (33) so as to move the pulley control lever extension (49) outwardly a distance which will bring pulley (12) into positive frictional engagement with the turntable rim.

CAUTION: This adjustment is very critical and should be carefully made. If pulley (12) is forced too tightly against turntable rim, the latch (25) will stick at the completion of the change cycle and prevent the pulley from becoming disengaged from the turntable rim. Before making any adjustment it is also advisable to check the set screw in pulley (12) to make sure that pulley (12) is tight and not turning on the shaft which carries it.

(9) If latch (25) fails to hold pulley (12) in position, check the latch to make sure the latch fingers have not been bent. Next, check spring (41) on lever (26) to make sure the spring is not defective or missing. If pulley (12) is riding off the lower edge of the turntable rim or so high as to cause it to scrape against the underside of the turntable, the height of pulley (12) may be adjusted by means of thrust screw (44). Before trying to turn screw (44) always loosen the provided lock nut.

MECHANISM REPEATS

(10) If the mechanism repeats (continues to change records without playing them), the pulley (12) may not be disengaging from the turntable rim. This failure to disengage may be due to the following: Faulty action of the latch (25). (See "Caution" in paragraph 8). A defective or missing return spring (40) on pulley control lever (9). A defective or missing spring (41) on lever (26). Lever (26) may be bent so that it is not contacting the pulley release cam. See paragraph 17).

((1) If pulley (12) disengages at the completion of the change cycle and immediately re-engages, the trip mechanism is at fault and it is suggested that the following be checked: Reject lever (42) may be bearing against trip latch (24) or it might be caught under trip latch (24). Pulley control lever (9) may be bent down so that it engages cam (16) even when cam (16) is not elevated by lift lever (3). Cam (16) may be sticking in the raised position. The re-set spring (38) on trip latch (24) may be defective or missing. The stud (34) on which pulley control lever (9) is mounted may have worked loose and should be tightened.

MECHANISM TRIPS DURING PLAYING CYCLE

(12) If the mechanism trips during the playing of a record and before the pick-up arm has swung inwardly to the point where the trip is adjusted to operate on spiral trip groove records, the following conditions should be checked: Weak or missing re-set spring (38) on latch (24). Defective shoulder on trip latch (24) or rounded corner on cam lift lever (3), permitting lever (3) to slip off the shoulder on trip latch (24). If the mechanism trips when the pick-up is moved by hand to the outside edge of the turntable and beyond, the trip rod (45) may be bent.

MECHANISM TRIPS OR PICK-UP ARM BINDS IN MANUAL POSITION

(13 When lever (1) is moved to the manual position, the pick-up arm (13) should be capable of free motion between the normal limits of its travel without tripping the mechanism. If the pick-up arm binds or trips the mechanism under these conditions check the following: Trip rod (45) may be bent or disengagement finger (37) bent or broken. If rubber bumper (2) becomes pushed up away from the base plate, this will permit lever (9) to overtravel and may jam trip rod (45).

RECORDS FAIL TO DROP PROPERLY FROM RECORD SUPPORTS

(14) If two or more records are dropped at the same time or one edge of the record drops and the other edge does not, then the rear record support (15) may not be correctly adjusted or record separating fingers (14) may be bent. Also check the records to make sure they are of standard diameter or thickness. Should record separating fingers (14) be bent, refer to paragraph 17 for corrective measures. An examination of the unit will disclose that the front record support has fixed positions determined by dedents which are located by lever (1). The rear record support (15) however is adjustable. If the record supports are not the correct distance apart, loosen screws (22) and move the rear record support (15) to the proper position.

CAUTION: Before making this adjustment always make sure the lever (1) is firmly located in the proper dedent.

NOTE: Due to the fact that home recording discs differ from standard records in thickness and diameter, they cannot be handled by the record supports.

PICK-UP ARM LIFT AND REST ADJUSTMENTS

(15) The height to which pick-up arm (13) is lifted during the change cycle may be adjusted by screw (21). In making this adjustment make sure it will not lift high enough to strike bottom record on the record supports. Also make sure that the pick-up needle drops low enough to rest properly on the record on the turntable. If the pick-up arm (13) is in contact with the push rod (30) or the pick-up rest (32) when the pick-up needle is resting on one record on the turntable, the needle will not exert sufficient pressure against the record for proper operation. Before adjusting the pick-up lift the pick-up rest (32) should be checked to see that it is correctly adjusted. Pick-up rest (32) is correctly adjusted when the pick-up needle just touches the top of the turntable. As a final check be sure

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that the pick-up will track properly when reproducing the thinnest home recorded disc likely to be used.

ADJUSTMENT OF PICK-UP LOWERING POINT

(16) To adjust the pick-up arm (13) so that it will be lowered to the correct point on the outside of the record: First shift lever (1) to the 10" position and then stop the mechanism with the pick-up positioning cam follower at the point of maximum rise of the pick-up positioning cam. Now raise the pick-up arm to the vertical position and loosen two screws (10) so that the arm (13) can be moved with relation to the pick-up base (50). Next holding the pick-up base (50) so that it will not turn, force the pick-up arm (13) toward the record centering pin (5). Now place a scale under the pick-up needle with the end of the scale touching the record centering pin (5). Next, carefully pull the pick-up arm outwardly until the pick-up needle is 4-45/64" from the pin (5). Raise the pick-up arm (13) and tighten the two locking screws (10), being careful not to move arm (13) outwardly past the correct setting before tightening the screws. This adjustment will automatically take care of 12" records as well as 10". This will be seen by moving lever (10) to the 12" position and running the unit through its cycle. If the pick-up arm (13) always lowers in the 12" position, regardless of the position of lever (1), the pick-up positioning cam follower is sticking in the down position. Some pick-ups are equipped with an eccentric (31) for rotating the pick-up arm (13) with relation to the pick-up base (50). On such units the two locking screws (10) are loosened, and eccentric (31) turned a small amount at a time until the pick-up needle is lowered to the correct point on the record.

CHIPPING OF RECORDS

(17) The record supports (4) and the record separating fingers (14) are so designed that no chipping of standard records will take place, unless, through rough handling the fingers (14) become bent. For proper operation the fingers (14) must be perfectly flat. To straighten the fingers (14) it is necessary to remove the large headed screws (55) that hold the fingers in place, after which the fingers (14) can be disassembled. Ordinarily, straightening can be accomplished by holding the main part of finger (14) through which the clamping screw passes with one hand, and then taking hold of the sickle shaped part of (14) with the fingers of the other hand, bending the sickle shaped part until it is lined up with the main body. After bending, lay the finger (14) on a flat surface to make sure the straightening has been properly done.

RECORDER MECHANISM

GENERAL INFORMATION

(18) This model is designed to utilize the "Short Shank" cutting stylus. The overall length of the "Short Shank" stylus is 9/16" to 5/8". Do not attempt to use the "Long Shank" stylus under any circumstances, because it will be found impossible to adjust the "Stylus Angle".

CUTTING HEAD ADJUSTMENTS

(19) The cutter head pressure may be adjusted by screw (64). This adjustment should be made carefully in quarter or half turns. The screw (64) is turned clockwise to increase the cutting depth and counter-clockwise to decrease the cutting depth. The proper cutting pressure is one and one-quarter ounces. To assure that the correct cutting depth has been attained, make a trial cut. The shaving left by the cutting stylus will be continuous and slightly elastic, and its thickness will be about the same as a human hair.

STYLUS ANGLE ADJUSTMENT

(20) The stylus angle is controlled by the length of the stylus and the distance from the top of the recording blank to the recording arm (58). Referring to Figure — it will be noted that this distance is approximately one-quarter inch. This distance may be regulated by raising or lowering stylus angle screw (61). Keep in mind, when making this adjustment, that the stylus must be inserted as far as possible into the stylus chuck.

(21) CAUTION: Because of the wide variation of the thickness of record blanks (.020" to .100"), the variation of the length of cutting stylii (9/16" to 5/8") and the possibility of warped or bent recording blanks, be sure that the stylus clamping screw (62) does not strike the bottom of the slot in the end of the recording arm as the stylus follows the surface of the recording blank.

(22) WARNING: Never allow the stylus to rest on a stationary recording blank if energy is being fed into the cutting head. The stylus will dig through the record coating and damage its cutting edges.

PROPER ENGAGEMENT OF FEED SCREW

(23) Engagement between the knife edge (71) and the feed screw (60) usually starts to take place when the nose of the recording arm is around two inches above the turntable. When the recording arm (58) is raised to a greater height than this, unhampered horizontal motion of the recording arm is possible between the normal limits of its travel. To permit disengagement of the recording arm from the feed screw at a minimum height above the turntable, stop screw (73) has been provided. Adjustment of screw (73) should be made with the recording arm in lowered position and with the feed screw engaged. Adjust screw (73) so that it barely touches spring blade (75) when the knife edge (71) is engaged at any point in the length of feed screw (60).

(24) Normally the full pressure of knife edge (71) against feed screw (60) is desirable. If this pressure is sufficient to cause uneven turntable speed, the pressure of knife edge (71) can be reduced by turning screw (73) in a clockwise direction. Great care should be used in reducing the blade pressure, as uneven groove spacing may result.

UNEVEN SPACING OF RECORD GROOVES

(25) If screw (73) is turned too far in a clockwise direction, it will reduce the pressure of the knife blade (71) against feed screw (60), to where the knife blade (71) will climb the sides of the thread in the feed screw and cause uneven spacing of the recorded grooves. Always be sure that the threads of feed screw (60) are free of dirt or other foreign matter, as these particles will cause uneven spacing of record grooves. Excessive end play in the feed screw will also cause uneven groove spacing.

(26) Thrust screw (76) is provided to keep the end play out of feed screw (60). Care must be used in adjusting screw (76) to prevent binding feed screw (60) between the end thrusts, as this would put an excessive load on the motor and cause speed variations on the turntable.

(27) Lost motion or play between the follower arm (69) and recording arm (58) in the horizontal direction, will prevent the recording arm from accurately following the follower arm. This play should be eliminated.

HOW TO REPLACE CUTTER HEAD

(28)
1. Remove stylus screw (62).
2. With the arm (58) in the vertical position, press the balance spring against the top of the arm which will throw the cutter head out where it can be firmly grasped.
3. Pull the cutter head upwards until the knife edge at the back of cutter clears its seat in the arm.
4. Unhook the balance spring from the cutter head.
5. Hook the balance spring to the new cutter head and extend the spring sufficiently so that the cutter head knife can be placed in its seat in the arm.
6. Replace stylus screw.
7. Thread the cutter leads through the arm and the arm platform. Clamp the leads on the underside of the base plate and arrange them exactly as before.

AUTOMATIC CUTTER STOP FAILS TO OPERATE

(29) The automatic cutter stop (77) is almost completely devoid of parts that are likely to fail. The only part that is at all likely to fail is the micro-switch (78). Since this micro-switch is completely sealed in, it must be replaced in its entirety.

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MODELS 960001-1,960001-2
960001-3

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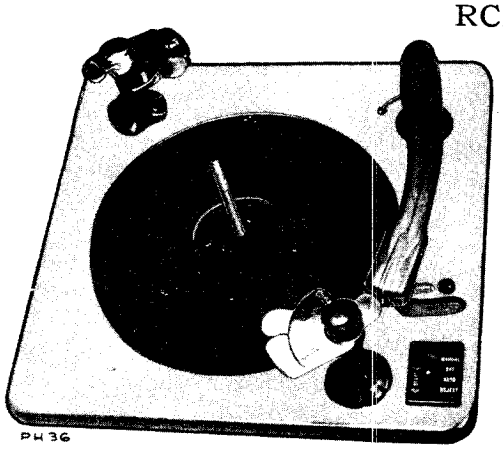

Model Nos. 960001-1, 960001-2, 960001-3

Automatic Record Changer

SERVICE DATA

—1945 No. 12—

RADIO CORPORATION OF AMERICA
RCA VICTOR DIVISION
CAMDEN, N. J., U. S. A.

Pickup Cartridge Data

Model	Cartridge
960001-1	39851
960001-2	70332
960001-3	39851

96000-2 and 96000-3 have an additional pickup shorting switch which contacts roller on tone arm lever (17) and shorts out pickup while tone arm is in the rest position.

Manual Operation

Old, odd sized and home recording records should be played in "Manual" position.

1. Lift and turn selector arm until selector arms point outward as for unloading records.
2. Place records to be played on turntable and move control knob to "Manual" position.
3. Place pickup on record.
4. When selection is finished playing, return the tone arm to rest position and move control knob to "off" position.

Note: Do not move control knob to "off" position before placing tone arm in rest position, or cycling will result. If this should occur do not handle tone arm. Place control knob in automatic position and allow cycle to continue until tone arm comes to rest before continuing with manual operation.

Cautions

1. Never use force to stop or rotate turntable or any other part of the mechanism.
2. Do not play a chipped or cracked record as damage to sapphire may result.
3. Warped records may slide upon one another while playing and cause unsatisfactory reproduction.
4. Do not attempt to handle tone arm while mechanism is in cycle.
5. Do not allow records to remain on selector arms when not in use, particularly in warm climate.
6. Do not allow oil or grease to come in contact with the rubber tire on drive idler or any other rubber parts.
7. Do not attempt to move the tone arm horizontally when in the rest position, unless control knob is in the manual position.

Lubrication

1. **GREASE**—Gears, all cams on large gear, tapered end of tone arm latch and tone arm lever with LUBRIPLATE #105 (Lubriplate Corp., 3211 South Wood St., Chicago).
2. **OIL**—All shafts before inserting into bearing and all moving parts, except those to be greased, with AIRCRAFT INSTRUMENT AND MACHINE GUN OIL, SPEC. 2-27E (Delta Oil Products, Milwaukee, Wis.).

Note: Keep grease and oil away from rubber parts such as drive idler, bumpers, etc.

Do not oil or grease clutch engagement lever.

Features

1. This record changer is a two post drop type, non-intermixing mechanism designed to play automatically a series of twelve 10-inch or ten 12-inch records of the standard 78 RPM type.
2. The mechanism uses a light weight, low noise, crystal pickup cartridge, equipped with a long life sapphire point.
3. The tone arm is automatically returned to the rest position and the power removed from the drive motor, after the mechanism has finished playing the last selection of the stack.
4. The changer is equipped with an eccentric and closed circle tripping device.
5. A pickup shorting switch is incorporated which shorts out the pickup during record change cycle. This prevents noise from gears, cams and other moving parts from being amplified through the reproducing system.
6. The mechanical linkage between record support posts makes possible a single and simple operation on the part of the operator to change from 10 to 12-inch records or vice versa.
7. The changer can be used on either a 50 or 60 cycle power supply by the use of the proper spring sleeve slipped over the shaft of the drive motor.
8. All gears and cams are disconnected while the records are being played. This removes the load on the motor and eliminates excessive friction and noise from moving parts which otherwise have a tendency to produce wow or rumble.

Automatic Operation

1. Lift and turn the selector arm #1 in the front right-hand corner of the changer panel to a position engaging the slots in the selector sleeve. In so doing the arrows and numbers designating record size should be pointing toward the turntable spindle.
2. Load the records to be played on the separator arms with the desired selections upward and in the proper sequence. The last record should be on top.
3. Move control knob to "reject" position and release it. The changer will play the selections in the entire stack at which time the control knob will return to "off" position automatically.
4. Lift and turn the selector arm to facilitate the removal of records on turntable.

Note: To stop mechanism before the selections in the entire stack have been played, move the control knob to "off" position, remove records on selector arms and lift and move the tone arm to rest position.

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MODELS 960001-1,960001-2, 960001-3

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Functions of Main Parts

I. Motor

The function of the motor is to serve as a power source for the changer. Power is transmitted from motor to turntable through the rubber-tired idler wheel.

II. Control slide and associate parts

A. General function is to provide a single knob control for the various operations shown on the escutcheon plate through its interaction with the changer mechanism.

B. The power switch is mechanically operated by the control slide through a linkage to correspond to the various positions on the escutcheon plate.

C. Manual Reject Slide (27), fig. (3)

1. Manual position—With the control slide in the "manual" position the formed end of the reject slide (27) fig. (16) engages the clutch engagement lever (33) and holds it in an up position so that the trip mechanism is inoperative.
2. Reject position—The short formed end of the reject slide (27), near the mid-section, contacts part of trip lever (28) and trips the mechanism.

D. Tone Arm Latch (14), fig. (3)

1. Functions as a positive lock, fig. (12), for the tone arm whenever the latter is moved to the outside of the panel in all positions of the control slide other than "manual".
2. Also functions as a partial lock, fig. (12), or detent, for the tone arm lever (17) while the control slide is in "manual".

E. Manual Lock Out (4), fig. (3)

Function is to engage and retain the tone arm locator (16), fig. (15), in its outermost position while the control slide is set in the "manual" position.

F. 10 and 12-Inch Set Lever (19), fig. (3)

Function is to index the tone arm properly for 10 or 12-inch records, fig. (19).

III. Spindle Housing, Gear Assembly, and Associated Parts

These two main castings are assembled with other component parts into a major sub-assembly, which includes a spindle and pinion. The assembly operates only in a counter-clockwise direction (viewed from bottom side) and provides a clutching and driving action for all automatic operation. Large gear rotates in a clockwise direction (viewed from bottom). One revolution of this large gear carries the mechanism through a complete change cycle.

A. Pinion Gear (37), fig. (5)

1. Operates as part of the clutch.
2. Operates as a gear to drive the main gear through a change cycle.
3. Serves as a vertical stop for the spindle to which it is pinned.

B. Clutch Engagement Lever (33), fig. (5)

1. Function is to engage projection on pinion gear to start change cycle.

C. Trip Lever Assembly (28), fig. (4)

1. Function is to hold the clutch engagement lever (33), fig. (4) in a position such that it clears the pinion gear (37), fig. (5), except when tripping for cycling.

IV. Selector Arm and Blades

1. Function is to support the records and, together with the selector blades, to separate the lowest record of the stack and allow it to drop to the turntable during the change cycle.

V. Tone Arm Lever and Associated Parts

A. Tone Arm Lever (17), fig. (3)

Controls the horizontal movement of the tone arm.

B. Tone Arm Locator Lever (16), fig. (3)

Function is to control the tone arm lever in determining landing position of the pickup, fig. (8).

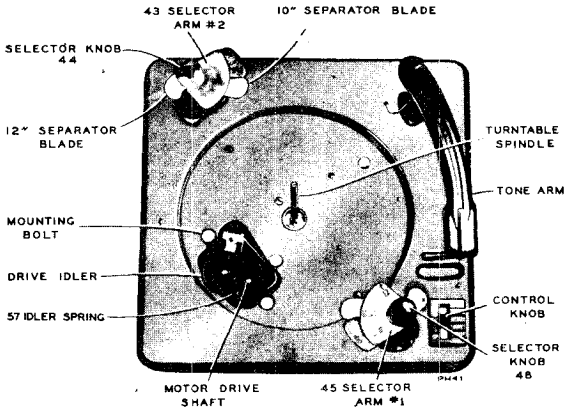

FIG. 1

C. Booster Spring (67), fig. (3)

A small piece of round spring wire which provides a limited amount of spring tension inward, tending to push the pickup into the starting groove.

VI. Tone Arm Lift Pin (51), fig. (24)

Function is to control vertical motion of tone arm.

VII. Selector or Support Arm Gears (35), (36), fig. (3)

Function is to transmit energy from drive mechanism to selector arm and knives.

VIII. Trip Plate (Knurled) (30), fig. (3)

Contacts trip dog (31), fig. (4), for eccentric tripping.

IX. Trip Shoe (29), fig. (3)

Functions as part of the closed circle tripping device.

X. Segments (23), (25) and Tie Plate (24), fig. (3)

Constitute the mechanical linkage between separator arms.

XI. Drive Gear Stop Lever (34), fig. (6)

Functions to stop and position drive gear after cycling.

XII. Tone Arm Retard Lever (26), fig. (4)

Stabilizes horizontal movement of tone arm while in cycle.

Miscellaneous Service Hints

1. Rumble

A. Remove turntable by lifting straight up and inspect the drive mechanism for a defective idler wheel. (Rough rubber tire or very sloppy bearing.)

B. Inspect the mounting of the changer to determine whether or not the mounting clamp nuts have been loosened.

C. Check and replace any microphonic tubes in the reproducing system.

2. "Wow" or Speed Variation

A. Make certain the turntable is free to rotate and not rubbing on motor board or portion of drive mechanism.

B. With the mechanism out of cycle remove the turntable by lifting straight up. The spindle being disengaged from all portions of the drive mechanism should rotate freely when turned by hand.

C. Check for badly worn idler as described in Item (1A).

D. Check for presence of grease on rubber tire of drive idler and the inner rim of the turntable. (Naphtha or carbontetrachloride will remove harmful grease.)

E. Bent turntable spindle.

F. Insufficient tension of drive idler spring (57), fig. (1).

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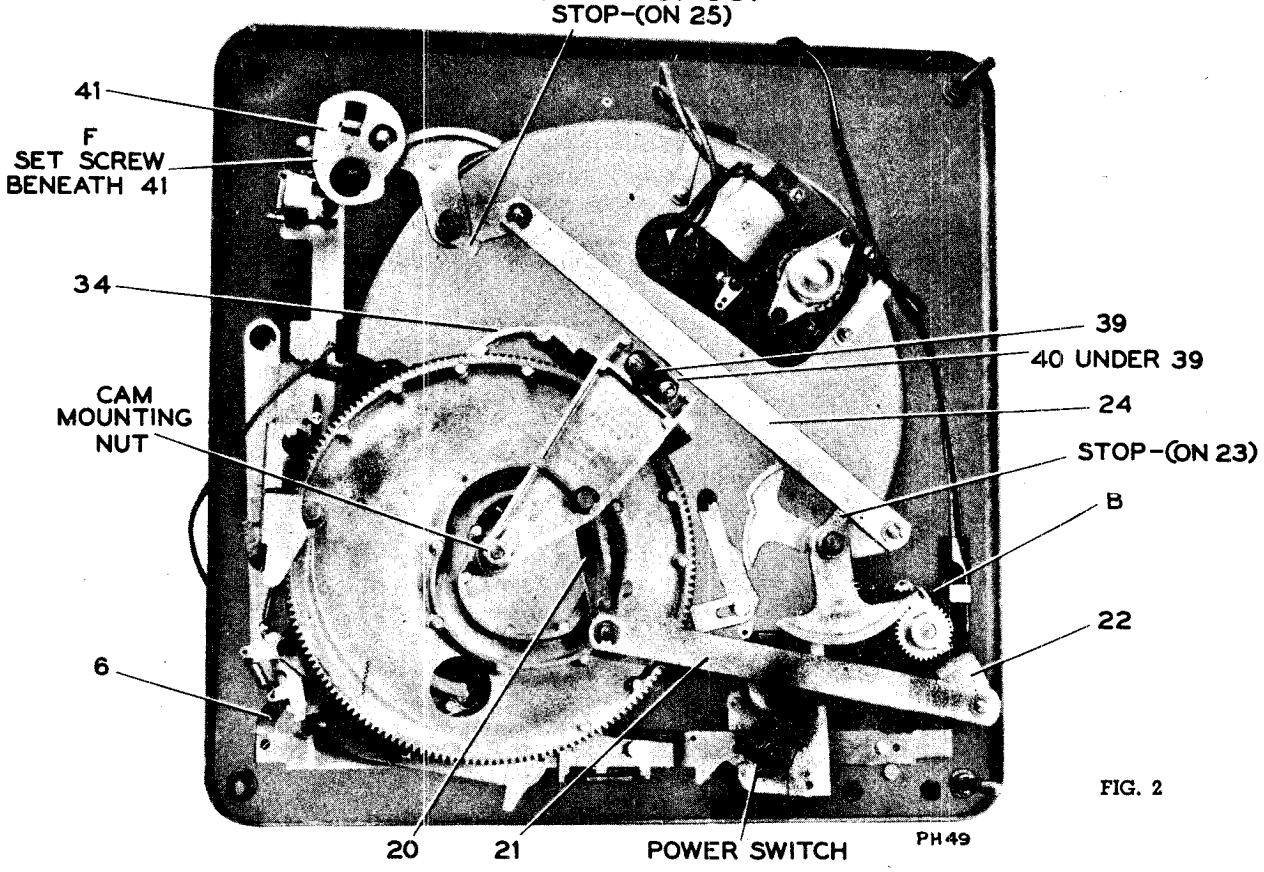


FIG. 2

3. Continuous Tripping (see sketches below)

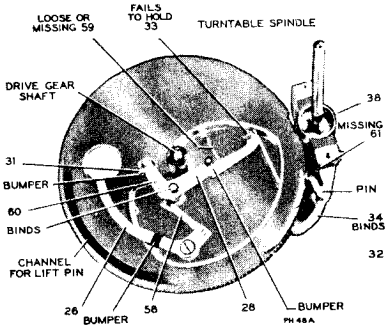
A. Trip lever (28) fails to hold clutch engagement lever (33).

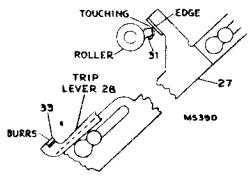
a. Loose or missing trip lever spring (59).
b. Bind in trip lever bearing.
c. Formed edge on manual reject slide (27) touching trip dog (31) (bend away).

B. Bind in stop lever (34), fig. (2).

C. Missing stop lever spring (61).

D. Control knob fails to return to automatic position due to bind in control slide, and associated parts. Missing spring (64), fig. (3).





4. Feed-back or Howl

This condition is caused by sound from the speaker getting back into the input of the amplifier.

A. Inspect motor board mounting to determine whether the clamp nuts have been loosened.

B. Make certain no portion of the mechanism is touching the cabinet. The mechanism should be free floating on mounting springs.

C. Check and replace any microphonic tube in reproducing system.

5. Failure to Trip (see sketches below)

A. Pickup jumping grooves due to improper pickup pressure, or foreign material clogging up sapphire guard.

B. Bind in trip dog (31), bearing or missing spring (60).

C. Tripping adjustments improperly set.

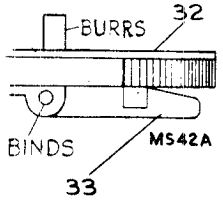
D. Trip lever spring (59) having too much tension.

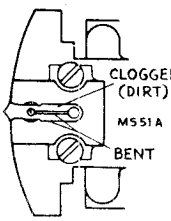
E. Burrs on trip lever (28).

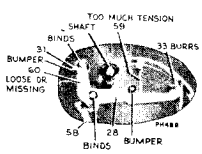
F. Bind in trip lever bearing.

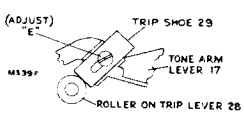
G. Bind in tone arm bearing.

H. Clutch engagement lever (33) bent or binding. (It should be free to drop under its own weight when disengaged from trip lever.)









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MODELS 960001-1, 960001-2, 960001-3

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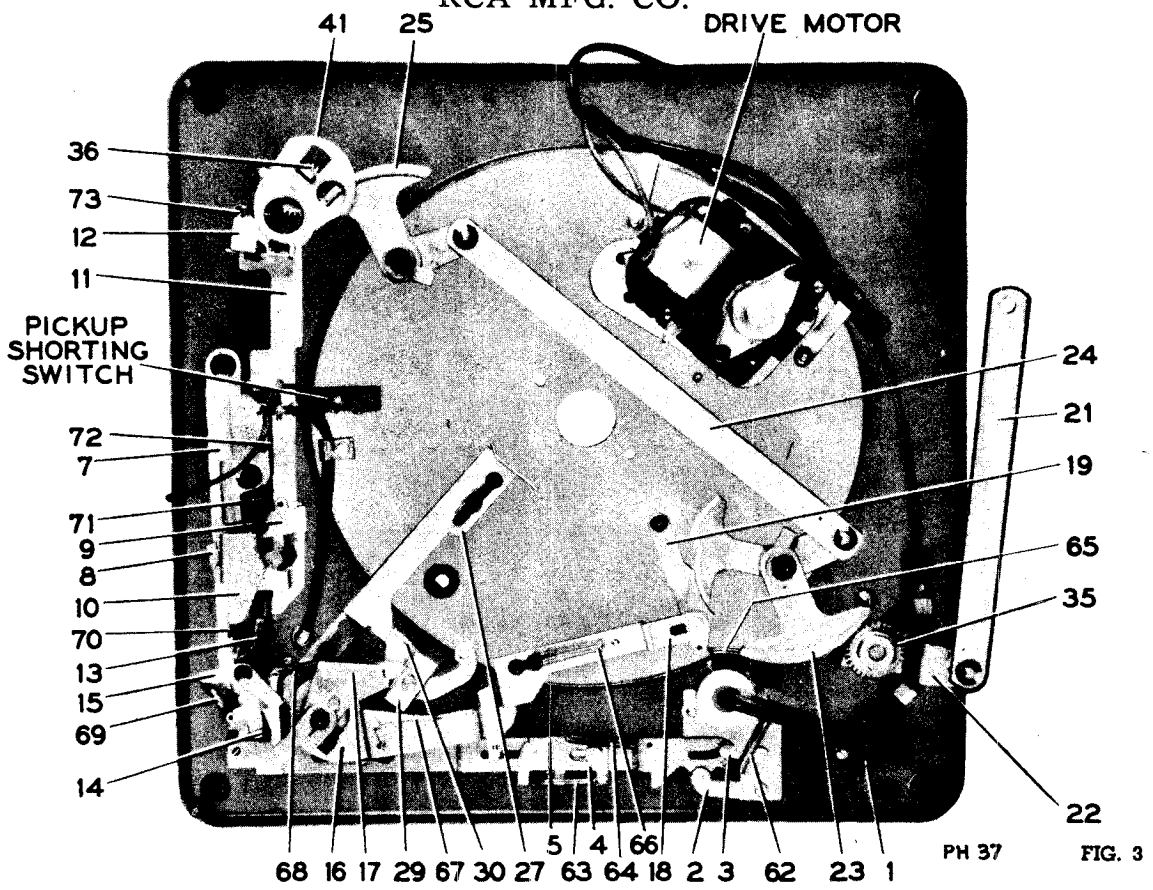


FIG. 3

6. Insufficient power to complete cycle.

A. Grease or oil on inner rim of turntable and rubber tire idler.

B. Insufficient tension of spring (57), fig. (1), on drive idler.

C. Defective drive motor.

D. Binding in series of levers, pivots, etc.

a. Drive link assembly (20), fig. (2).

b. Selector arm shaft assembly, fig. (1).

c. Drive gear (32), fig. (4), shaft.

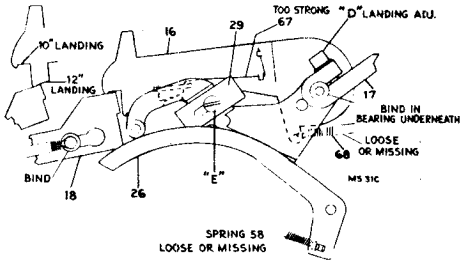
d. Poor gear mesh due to misalignment or defective teeth.

e. Bent record separator blades causing a jam, fig. (1).

G. Spring (66) having more tension than spring (65).

H. Spring (67) out of position causing false edge on lever (16).

I. Tone arm fails to move in because of bind in slide (4), or missing spring (64) keeping lever (16) latched.

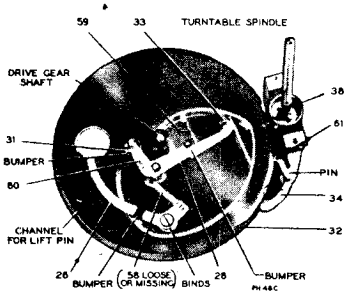


7. Records do not drop properly.

A. Separator arms improperly timed. (See timing adjustments.)

B. Bent separator blades.

C. Bent turntable spindle.



8. Improper pickup landing (adjacent sketches)

A. Landing adjustment improperly set.

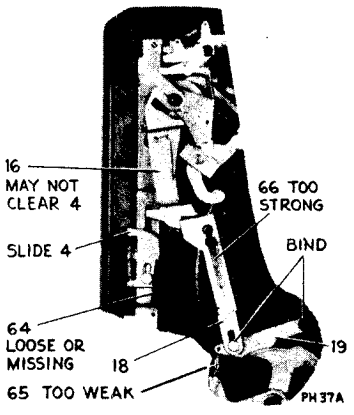
B. Bind in tone arm bearing.

C. Bind of slide (18) and lever (19) on studs.

D. Missing spring (65) or (66).

E. Bent or improperly shaped lever (16).

F. Missing or loose spring (68).



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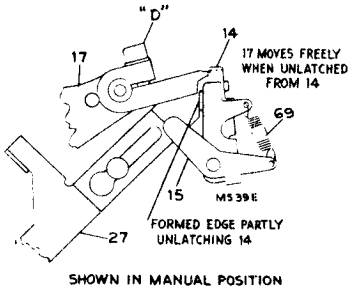
9. Repeating grooves (see sketches below)

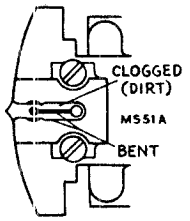
A. Insufficient pickup pressure.

B. Bind in tone arm pivot.
Place control knob in "manual" position and move tone arm in toward spindle and back. After the end of the tone arm lever (17) (functioning as a detent) leaves latch (14) the tone arm should have free and smooth action.
(If latch (14) is too positive, bend formed edge on manual reject slide (27) which contacts latch (14).)

C. Check for bind in tone arm lift pin (51).



SHOWN IN MANUAL POSITION



D. Sapphire shield filled with foreign material, preventing sapphire from setting into grooves.

E. Bent sapphire mounting thereby allowing sapphire guard to ride on record.

Tripping Adjustment

No eccentric tripping adjustment is necessary. It is automatically adjusted when landing adjustment is made.

For closed circle trip, loosen set screw "E" fig. (23), and set trip shoe (29) so as to contact roller on trip lever (28) when the sapphire is approximately 1⅝" from side of turntable spindle.

Tone Arm Height Adjustment

1. The height of the tone arm while in the rest position is that which will allow the bottom edge of the tone arm and cartridge to clear the turntable surface by 1/16".
   The height is adjusted by bending the formed edge on lower half of tone arm bracket fig. (24).
2. Tone arm height adjustment screw "A", fig. (24), should be so adjusted to allow a clearance of 1/16 inch between tone arm and record on selector arm while mechanism is in cycle.

Pickup Pressure Adjustment

By the use of a pocket postal scale hooked on the sapphire end of the tone arm, loosen set screw "G", fig. (24), and move slide until tension of spring (56) allows 1 to 1¼ oz. pickup force for model 960001-2 and 1½ to 1¾ oz. for models 960001-1 and 960001-3.

Landing Adjustment

1. With the power removed from the mechanism, place a 10-inch record on the turntable and turn the selector cam to 10-inch position.
2. Push selector knob to reject and release.
3. Push down on the small section of lever (50), fig. (20), which protrudes through selector arm #2 and rotate turntable by hand until the pickup is about to land.
4. Loosen set screw "D", fig. (25).
5. Hold tone arm lever (17) against tone arm locator (16) with just enough force so as not to have tone arm locator (16) move away from slide (18).
6. While holding the position as stated in "5," move pickup to the landing point on the record. Leave very little vertical play in tone arm bearing but just enough to have free motion of tone arm. Tighten set screw "D".
7. Apply power to mechanism and test by playing through a stack of records.

Note: Twelve-inch record landing will automatically be adjusted while adjusting 10-inch landing.

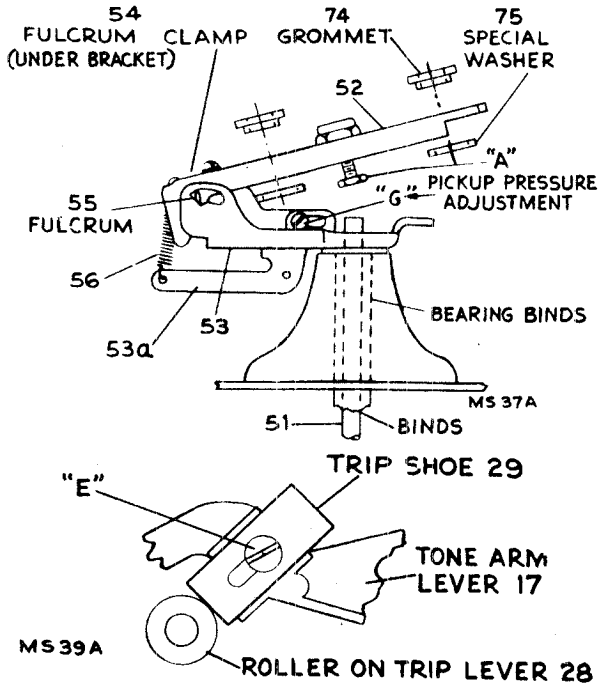


FIG. 23

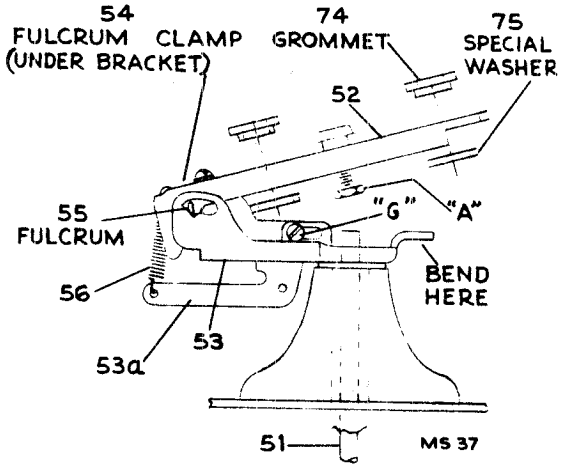


FIG. 24

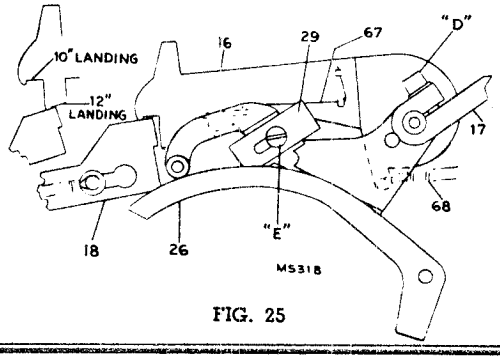


FIG. 25

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MODELS 960001-1, 960001-2, 960001-3

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10. Premature tripping.

A. Defective record.
B. Trip shoe (29), fig. (3), improperly set.
C. Trip lever spring (59), fig. (4), insufficient tension.
D. Bind in trip dog (31), fig. (4), pivot.

11. Noise coming from speaker during record change cycle.

Pickup shorting switch failing to short out pickup.

12. No output.

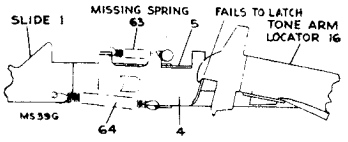
A. Defective crystal cartridge.
B. Broken or bent sapphire mounting.
C. Broken or shorted pickup cable.
D. Pickup shorting switch making contact.
E. Inoperative reproducing system.

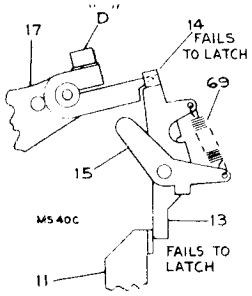
13. Distorted output.

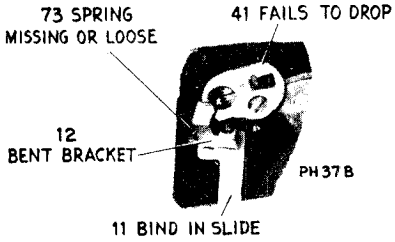
A. Defective pickup cartridge.
B. Bent or loose sapphire mounting, allowing sapphire to ride irregular in groove.
C. Sapphire guard filled with foreign material such as dust and lint which accumulates on the records while in storage.
(Remove with small brush.)

14. Tone arm fails to go to rest position at the finish of the last selection (see sketches below)

A. Control knob fails to return automatically to "off" position.
1. Cam (41) fails to drop down, thereby preventing stud on stop bracket (12) from contacting it.
2. Missing stop bracket spring (73).
3. Missing stud on bracket (12).
4. Bind in shut off dog (8), fig. (3), and trip (9).
5. Formed edge on slide (11) not locking tone arm latch (13).
6. Tone arm latch (14) bent thereby not locking tone arm and allowing it to be pushed in by lever (16).

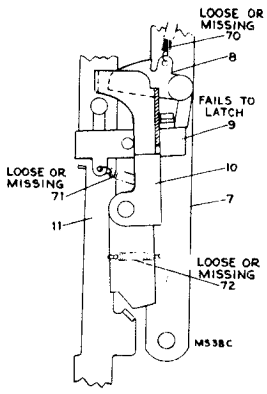


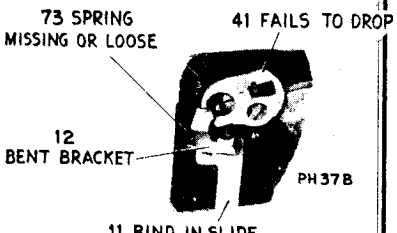


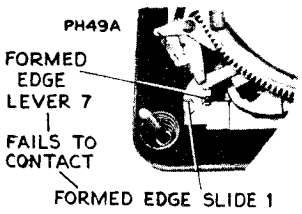


15. Turntable fails to stop at the end of the last selection (see sketches below)

A. Defective motor switch.
B. Bind in levers actuating drive motor power switch, fig. (2).
C. Control lever fails to move automatically to "off" position as described in 14A—one to five.
D. Small formed edge on lever (7) may fail to contact formed edge on slide (1) thereby not pulling slide (1) and not moving control to "off" position.

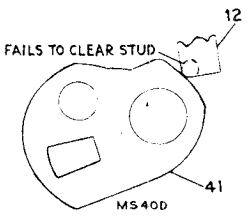


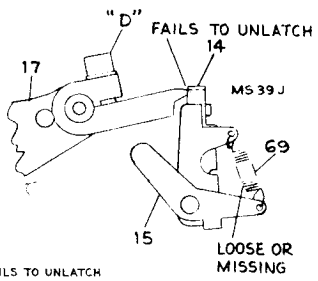


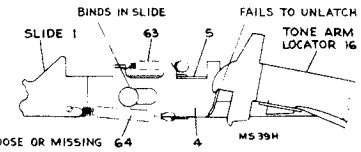


16. Pickup fails to move in for landing (see sketches below)

A. Tone arm locator (16) lever fails to unlatch from slide (4).
B. Tone arm lever (17) fails to unlatch from tone arm latch (14).
C. Missing spring (69).
D. Bent shut off slide bracket (12) which may allow cam (41) to contact at incorrect time.
E. Weak or missing spring (73), fig. (3), thus allowing slide (11) to move in and lock latch (13).







17. Power is removed from motor as pickup lands on record.

A. Shut off slide bracket (12), fig. (3), may be bent.
B. Low tension or missing spring (73), fig. (3).

Removing Main Assemblies

Removing Turntable

To remove turntable, lift straight up with a rotary motion.

Removing Separator Arms

To remove separator arm, loosen set screws and lift off.

Removing 12 in. Separator Blade

Remove Separator arm and by the use of a small screw driver remove the small screw up inside the separator sleeve (see fig. (21)). This removes the knob and 12 in. blade. The 10 in. blade is not removable.

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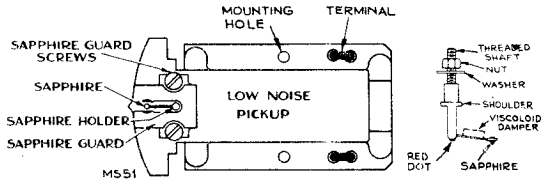
Removing Sub-assembly

To remove the large gear sub-assembly, remove the turntable and remove the two small screws on either side of the turntable spindle. Also remove the large nut holding the gear shaft. The entire gear bracket, etc., can be removed easily.

Removing Tone Arm

To remove the tone arm from the mounting bracket, it is necessary to remove the two screws located under the pivot end of the tone arm. These screws are more accessible if the bracket and shaft are removed by loosening bolt "D" as indicated in fig. (16).



LOW NOISE PICKUP

Note: Stock #39851 has red dot on bottom of sapphire holder, 13.5 mil. dia. sapphire mounting wire, but no viscoloid damper. Stock #70332 has viscoloid damper on sapphire mounting wire.

Repalcement of Sapphire

Caution: Never bend the sapphire support wire.

The nut on the sapphire holder assembly is locked by a light cement (such as Glyptal). Extreme care should be used when loosening the nut so that the twisting motion does not break the crystal.

Remove the two screws holding the sapphire guard in place and remove guard. Remove the small nut and washer on the threaded shaft of the sapphire holder and push the shaft through the hole in the mounting until the sapphire holder assembly comes free.

Use of a drop or two of acetone will facilitate the removal of the nut and shaft. Do not use force as the crystal may be broken.

Insert threaded shaft of replacement sapphire holder through mounting and replace the washer and nut. Make sure that the sapphire is in the correct position. Take hold at the lower end of the shaft with a pair of pliers while tightening the nut, being very careful so as not to strip the threads or break the crystal. Replace the sapphire guard, positioning it by means of the oversize screw slots. Make certain that the sapphire and its supporting wire are centered in the guard. Tighten the guard screws. Before using, check to see that the sapphire projects far enough (approx. .020) beyond the guard so that the guard will not strike the record. If necessary, bend the guard a little. Apply a drop of light cement (such as Glyptal) to the sapphire nut holder.

Replacement Parts

STOCK No.	DESCRIPTION
	PICKUP AND ARM ASSEMBLIES
71294	Arm—Pickup arm shell only
71311	Bracket—Hinge bracket and shaft assembly (53), fig. (24)
71327	Bracket—Tone arm bracket assembly (52), fig. (24)
71325	Clamp—Fulcrum clamp (54), fig. (24)
39851	Crystal—Pickup crystal cartridge for Models 960001-1 and 960001-3
70332	Crystal—Pickup crystal cartridge for Model 960001-2
71326	Fulcrum—Tone arm fulcrum (55), fig. (24)
31048	Plug—Pin plug for pickup cable
38449	Sapphire—Sapphire and holder for #70332
39863	Sapphire—Sapphire and holder for #39851
71312	Slide—Counter balance adjusting slide (53a), fig. (24)
71307	Spring—Counter balance spring (56), fig. (24)
	MOTOR ASSEMBLIES
	Stamped L230231
71139	Spring—Spring to convert 60 cycle motor stamped L230231 to 50 cycle
71391	Wheel—Idler wheel for motor L230231
	MOTOR ASSEMBLIES
	Stamped L230161
71410	Motor—Motor, 117 volt 60 cycle, complete
71412	Spring—Idler wheel tension spring for motor #L230161
71137	Spring—Spring to convert 60 cycle motor stamped L230161 to 50 cycle
71411	Wheel—Idler wheel for motor #L230161
	MOTOR ASSEMBLIES
	Stamped L230200
71414	Spring—Idler wheel tension spring for motor #L230200
71138	Spring—Spring to convert 60 cycle motor stamped #L230200 to 50 cycle
71413	Wheel—Idler wheel for motor #L230200
	OPERATING MECHANISM
71353	Arm—Detent arm assembly (2), fig. (3)
71375	Arm—Drive arm assembly (22), fig. (3)
71377	Arm—Selector arm #1 and blade (10 in.) assembly (45), fig. (1) (minus knob)
71381	Arm—Selector arm #2 and blade (10 in.) assembly (43), fig. (1) (minus knob)
71357	Blade—Pickup shorting switch blade assembly, fig. (3)
71379	Blade—Selector blade, 12 in. (49), fig. (20)
71344	Bracket—Shutoff bracket (10), fig. (3)
71383	Bracket—Shutoff selector bracket assembly (50), fig. (20)
71337	Bracket—Shutoff slide bracket assembly (12), fig. (3)
71314	Bumper—Retard lever rubber bumper (on lever 26), fig. (4)
71359	Bumper—Tone arm rubber bumper (on motor board)
71317	Bumper—Trip dog rubber bumper (on trip dog 31) fig. (4)
71318	Bumper—Trip lever rubber bumper, fig. (4)
71373	Cam—Shutoff cam shaft assembly (41), fig. (21) or fig. (3)
71330	Cover—Switch cover
71331	Escutcheon—Control escutcheon
71365	Gear—Pinion gear (37), fig. (5)
71386	Gear—#1 post gear (35), fig. (3)
71388	Gear—Drive gear sub-assembly (32), fig. (4)
71374	Gear—Post gear #2 (36), fig. (22) and fig. (3)
71328	Grommet—Rubber mounting grommet (motor) (3 required)
71321	Grommet—Tone arm mounting grommet (74), fig. (24)
71363	Housing—Spindle housing and bushing assembly (38), fig. (4)

STOCK No.	DESCRIPTION
71335	Hub—Tone arm locator hub (die cast hub bolted to motor board beneath tone arm bearing)
71329	Insulator—Switch cover insulator
71334	Knob—Control knob assembly
71378	Knob—Selector arm knob #1 assembly (48), fig. (1)
71382	Knob—Selector arm knob #2 (44), fig. (1)
71346	Latch—Tone arm latch (center) (13), fig. (12)
71347	Latch—Tone arm latch (inner) (14), fig. (12)
71348	Latch—Tone arm latch (outer) (15), fig. (12)
71350	Lever—Reset lever assembly (18 and 19), fig. (3)
71305	Lever—Drive gear stop lever assembly (34), fig. (4)
71340	Lever—Shutoff lever assembly (7), including shutoff dog (8), fig. (3)
71358	Lever—Tone arm lever assembly (17), including roller and knurled edge (30), fig. (3)
71369	Lever—Trip lever assembly (28), including trip dog (31) and roller, fig. (4)
71370	Lever—Tone arm retard lever (26), fig. (4)
71368	Lever—Clutch engagement lever (33), fig. (5)
71309	Link—Connecting link (6), fig. (2)
71367	Link—Drive link assembly (20), fig. (2)
71336	Locator—Tone arm locator (16), fig. (3)
71392	Lockout—Manual lockout assembly (4 and 5), including slide (1), fig. (3)
71319	Pin—Stop lever pivot pin (mounting pin), fig. (4)
71316	Pin—Tone arm lift pin (51), fig. (24)
71362	Plate—Segment tie plate (24), fig. (3)
71352	Plate—Switch plate assembly
71297	Plate—Thrust plate (39), fig. (2)
71376	Rod—Drive link connecting rod (21), fig. (2)
71315	Roller—Drive link roller on link (20), fig. (2)
71303	Screw—Retard lever screw (mounting screw for lever (26)), fig. (4)
71360	Segment—Segment #1 assembly (23), fig. (3)
71361	Segment—Segment #2 assembly (25), fig. (3)
71366	Shaft—Drive gear shaft, fig. (4)
71371	Shaft—Selector shaft #1 assembly (46), fig. (17)
71380	Shaft—Selector shaft #2 (42), fig. (21)
71313	Shoe—Trip shoe (29), fig. (3)
71372	Sleeve—Selector shaft sleeve (47), fig. (17)
71333	Slide—Manual reject slide (27), fig. (3)
71338	Slide—Shutoff slide (11), fig. (3)
71364	Spindle—Turntable spindle assembly
71355	Spring—Detent arm spring (62), fig. (3)
71308	Spring—Manual lockout spring (inner) (64), fig. (3)
71296	Spring—Manual lockout spring (outer) (63), fig. (3)
71399	Spring—12 in. reset slide spring (66), fig. (3)
71351	Spring—Reset lever spring (65), fig. (3)
71345	Spring—Shutoff bracket spring (72), fig. (3) or fig. (14)
71341	Spring—Shutoff lever spring (70), fig. (3)
71339	Spring—Shutoff slide spring (73), fig. (3)
71343	Spring—Shutoff trip spring (71), fig. (3)
71300	Spring—Stop lever spring (61), fig. (4)
71293	Spring—Tone arm booster spring (67), fig. (3)
71349	Spring—Tone arm latch spring (outer) (69), fig. (3) or fig. (12)
71306	Spring—Tone arm locator and latch spring (68), fig. (3)
71301	Spring—Trip dog spring (60), fig. (4)
71304	Spring—Trip lever spring (59), fig. (4)
71302	Spring—Retard lever spring (58), fig. (4)
71356	Strip—Contact mounting strip assembly (part of pickup shorting switch), fig. (3)
71320	Switch—Power switch, fig. (2)
71342	Trip—Shutoff trip assembly (9), fig. (3)
71385	Turntable—Turntable assembly
71322	Washer—Tone arm special washer (75), fig. (24)
71298	Wafer—Thrust wafer (40), fig. (2)
71292	Washer—"C" washer (large)
71295	Washer—"C" washer (small)

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MODELS 960001-1,960001-2, 960001-3

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Automatic Cycle of Operation

Function	Explanation
Lift and turn selector arm as required for 10- or 12-inch records. Place stack of records on arms.	1. The rotation of selector arm #1 moves selector arm #2 through the mechanical linkage of gear (35), fig. (19), segment (23), tie plate (24), segment (25) and gear (36). 2. Portion of segment (23), fig. (19), sildes against set lever (19) thereby determining the point of contact of slide (18), fig. (8), with tone arm locator (16), which in turn governs the pickup landing position.
Push control lever to reject position and release.	1. Control slide (1), fig. (3), actuates manual reject slide (27) through coupling link (6), fig. (2). 2. Manual reject slide (27), fig. (3), pushes against stud above small roller on trip lever (28), fig. (4). 3. The action of trip lever (28), fig. (4), unlatches clutch engagement lever (33) allowing it to drop and engage projection on pinion gear (37), fig. (5). This engagement between lever (33) and pinion gear (37) causes the teeth of drive gear (32) to engage the teeth of pinion gear (37) starting cycle.
Drive gear (32) rotates.	1. Gear (32), fig. (6), rotates with stop lever (34), leaving notch and at the same time pickup shorting switch leaving raised portion of gear causing it to close, shorting out the pickup. 2. Roller on drive link (20), fig. (19), follows channel in drive cam. 3. Energy is transferred from drive link (20) to separator arm #1 through drive link (21), arm (22) and sleeve (47), fig. (17). 4. Separator arm #1 connected to gear (35), fig. (19), starts rotating. 5. Separator arm #2 mechanically linked through gear (35), segment (23), tie plate (24), segment (25) and gear (36) follows in rotation.
Tone arm moves out.	1. As the channel cut in rotating gear (32), fig. (9), moves, lift pin (51) raises contacting adjustment screw "A", fig. (24), on tone arm and raising tone arm. 2. Roller located on end of tone arm lever (17), fig. (8), comes in contact with portion of cam on gear (32), fig. (4), and is pushed outward and against tone arm locator lever (16), fig. (8), which is held under tension of spring (68). 3. Tone arm is locked by tone arm latch (14), fig. (12), and held from being pushed in by locator lever (16), fig. (8). 4. As drive gear continues to rotate, clutch engagement lever (33), fig. (5), is returned to normal position by sliding against edge of tone arm lever (17), fig. (8), as gear supporting it passes by.
Separator arms rotate and drop record to turntable.	1. Blades separate lower record from stack and support the stack while the record is being dropped. 2. Record drops. 3. Tone arm lever (17) is unlatched from latch (14), fig. (7), due to latch (15) making a momentary contact with raised portion of gear.
Tone arm moves in.	1. Tone arm lever (17), fig. (8), which is connected to tone arm is being moved in by locator lever (16) which is working under the tension of spring (68). During this motion tone arm lever (17) is stabilized by tone arm retard lever (26) until locator lever (16) engages slide (18) to determine 10- or 12-inch landing position. 2. Pickup is lowered to the record by lift pin (51), fig. (9), moving into channel in gear. 3. An instant before rotating gear comes to the rest position and stop lever (34), fig. (4), engages notch in gear (32), the pickup shorting switch is opened due to the blade coming in contact with raised portion of gear (32). 4. As pickup is landing and gear is returning to normal position the stud located on underside of gear (32) pushes shut-off bracket (10), fig. (13), outward. The action at this point is not transferred since shut-off dog (8), fig. (10), and shut-off trip (9) are not latched thereby allowing shut-off bracket (10) to slip by over the curved portion of the shut-off dog (8). If shut-off bracket (10) should contact straight edge of shut-off dog (8) as it does when latched to shut-off trip (9), shut-off lever (7) would pull slide (1), fig. (3), and remove power from drive motor. 5. The instant pickup lands, feed-in spring (67), fig. (8), pushes pickup into starting groove.

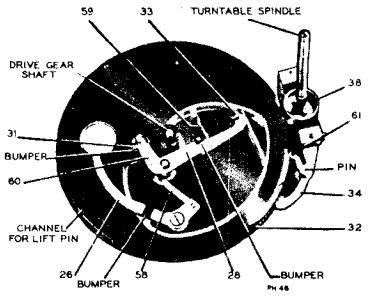

FIG. 4

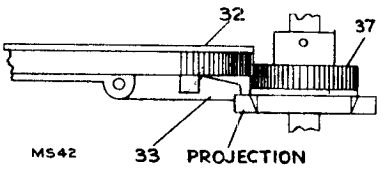

FIG. 5

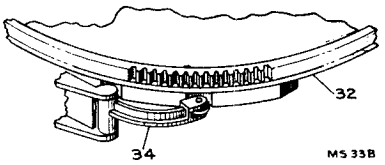

FIG. 6

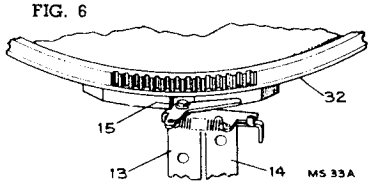

FIG. 7

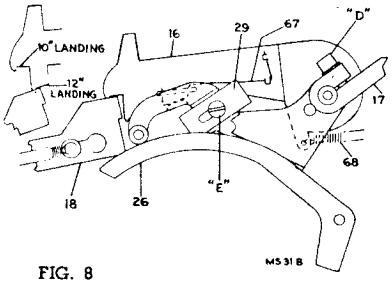

FIG. 8

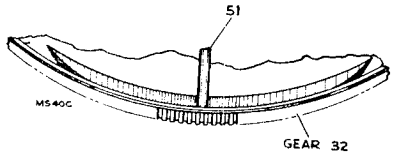

FIG. 9

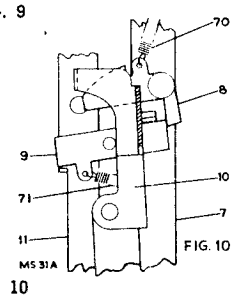

FIG. 10

FIG. 10

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MODELS 960001-1, 960001-2, 960001-3

Function	Explanation
Record plays.	1. Pickup moves toward center of record and into trip groove. 2. In the case of an eccentric groove the tone arm lever (17), fig. (3), moves in and the trip plate (30), fig. (4), engages trip dog (31) moving trip lever (28) and starting cycle. 3. In the case of a record with a closed circle trip the trip shoe (29), fig. (23), pushes against roller on trip lever (28), fig. (4), thus starting cycle.
Mechanism plays entire stack automatically.	Separating and dropping records, tripping, etc.
Last record has dropped and record plays.	1. Up to this time shut-off cam (41), fig. (21), located on bottom end of selector arm #2 has been held up by weight of records on selector arm applying pressure on the small raised portion of shut-off selector bracket (50), fig. (20), which is protruding through selector arm. 2. Pickup moves into trip, and drive gear (32), fig. (4), starts rotating. 3. Since cam (41), fig. (11), has dropped and is rotating with selector arm #2 its surface contacts stud on shut-off slide bracket (12). This transmits energy to shut-off slide (11), fig. (14), which permits shut-off dog (8) and shut-off trip (9) to latch. 4. Shut-off slide (11), fig. (12), locks tone arm latch (13) during the time, portion of the rotating drive gear is contacting tone arm latch (15), fig. (7), and tending to unlatch it. The tone arm remaining latched, prevents it from being pushed in by locator lever (16), fig. (8). 5. Tone arm is lowered to rest as lift pin (51), fig. (9), goes into channel in gear (32). 6. As gear (32) comes to rest stud, fig. (13), located on underside of gear (32) contacts and pushes shut-off bracket (10) outward. Since shut-off dog (8), fig. (14), and shut-off trip (9) are latched, shut-off bracket (10) contacts flat surface of shut-off dog (8) pushing shut-off lever (7) outward. 7. Shut-off lever (7) in its outward movement contacts lip on slide (1), fig. (3), pulling control knob to "off" position, cutting off the power to the drive motor. During this action, shut-off dog (8), fig. (14), and shut-off trip (9) are unlatched.

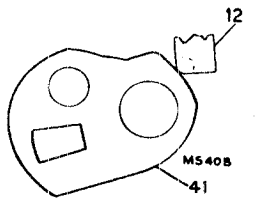

FIG. 11

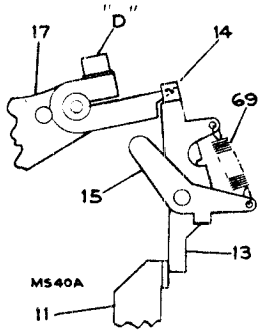

FIG. 12

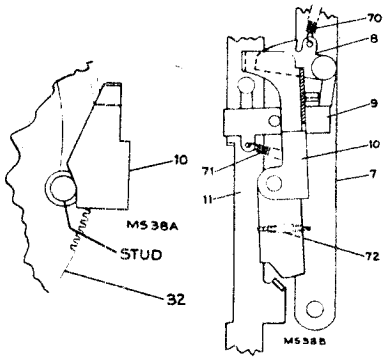

FIG. 13 FIG. 14

Manual Cycle

Function	Explanation
Push control knob to manual.	1. Slide (1), fig. (3), supporting control knob moves and positions "manual" lock-out slides (4) and (5), fig. 15), so as to have slide (4) engage and hold tone arm locator (16) and prevent it from pushing tone arm lever (17), fig. (8), in for pickup landing. 2. Slide (1), fig. (3), also energizing manual reject slide (27), fig. (16), so as to have the lip on slide (27) push against tone arm latch (14), moving the point of contact on tone arm lever (17) to the very edge. This permits tone arm lever (17) to slip by when tone arm is moved manually. 3. The movement of manual reject slide (27) has so positioned the slide so as to lock the clutch engagement lever (33) and prevent it from engaging offset in pinion gear (37), fig. (5), when trip lever (28), fig. (16), is moved. 4. All portions of the cycling mechanism are locked during manual operation and remain stationary with the pickup shorting switch in the off position at all times, excepting Models –2 and –3 which have an additional switch, shorting out pickup when tone arm is in the rest position. Note: When operating manually the tone arm should always be returned to rest position before moving control knob to the off position. If this procedure is not followed the trip lever (28) may not hold the clutch engagement lever (33) allowing it to drop and start cycle.
Allen wrenches required for adjustments.	3/32 in. between flats, for Allen wrenches required for adjustments on set screws #10 and 12, stock #22111. 5/32 in. between flats, for 5/16 in. set screws, stock #22113. 3/16 in. between flats, for ⅜ in. set screws, stock #26581.

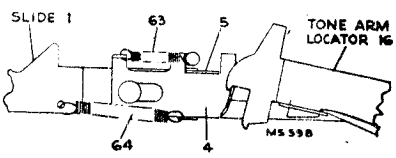

FIG. 15

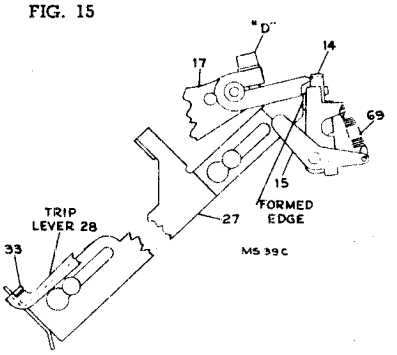

FIG. 16

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Check on Timing Adjustments

A quick check for correct timing of mechanism can be made by:

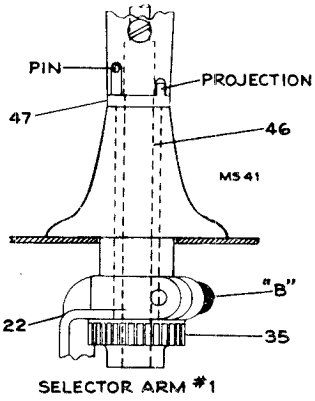
1. Have mechanism out of cycle.
2. Lift and turn separator arm #1 to 10 in. position and place a 10 in. record on arms.
3. The 10 in. separator blade should have a definite relation to record as illustrated in fig. (18) when segment (23) is against tie plate (24) as illustrated in fig. (19). If so, selector arm #1 is correctly timed.
4. If the 10 in. blades of both arms have the same distance from the record, remove record and lift and turn selector arm #1 counterclockwise as far as it will go (viewed from top).
5. Segment (25) should be against tie plate (24) when the teeth of segment (25) and gear (36) are meshed as shown in fig. (22). If this exists, timing of selector arm #2 is correct.

Timing Adjustments for Record Separators

1. Make certain mechanism is out of cycle and all parts in their proper place by comparing the mechanism with sketches and photographs.
2. Remove "C" washer on bearing of segment (23), fig. (19), and disengage the teeth of segment (23) and selector arm gear (35).
3. Selector arm #1, fig. (17), should be in place with the pin of selector shaft engaged in the large slot of selector arm and the small projection of selector arm sleeve (47) engaged in the small slot of the selector arm. Arm (22), fig. (19), should also be in place and connected to the drive link (20) and drive link connecting rod (21).
4. Loosen set screw "B", fig. (17), and wedge some object such as a screw driver in the clamp of arm (22) so as to allow free movement of selector arm sleeve (47).
5. Place 10-inch record on selector arms and turn selector arm #1, fig. (18), until the 10-inch blade is approximately ¼ inch from the edge of the record.
6. Tighten set screw "B", fig. (17).
7. Rotate the disengaged segment (23), fig. (19), clockwise until tie plate (24) comes against stop on segment (23). Hold in this position while engaging teeth of segment (23) and teeth of gear (35).
8. Replace "C" washer on segment (23).
9. Remove "C" washer on rod (41), fig. (21) (under selector arm #2) and remove cam and rod (41).
10. Remove "C" washer on bearing of segment (25), fig. (22), and disengage teeth of segment (25) and gear (36).
11. Lift and rotate selector arm #1, fig. (22), counter-clockwise until stop on segment (25) is against tie plate (24).
12. Engage teeth of segment (25) and gear (36) so as to have the first tooth of segment gear (25) engage the gear (36) between the first and second tooth next to slot as shown in sketch, fig. (22). Replace "C" washer or bearing of segment (25).
13. Loosen set screw "F" and rotate selector arm #2 until ten-inch separator blade is the same distance from the edge of the record as selector arm #1, fig. (18).
14. Tighten set screw "F", fig. (22).

    Note: Do not try to position separator arm #2 by loosening small set screws on arm proper. The factory has countersunk the shaft, seating the set screws.

15. Replace cam (41), fig. (21), with the end going up through hole in plate (50), fig. (20). Insert "C" washer, fig. (21), to hold in place.



SELECTOR ARM #1

FIG. 17

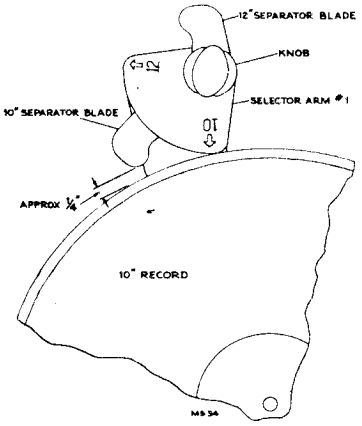


FIG. 18

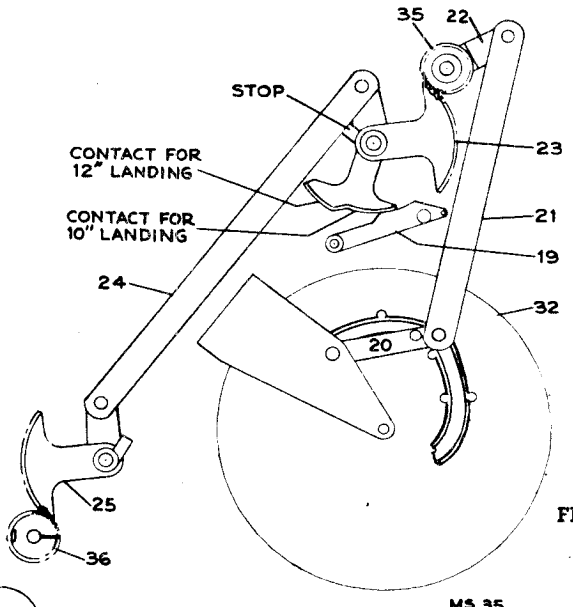


FIG. 19

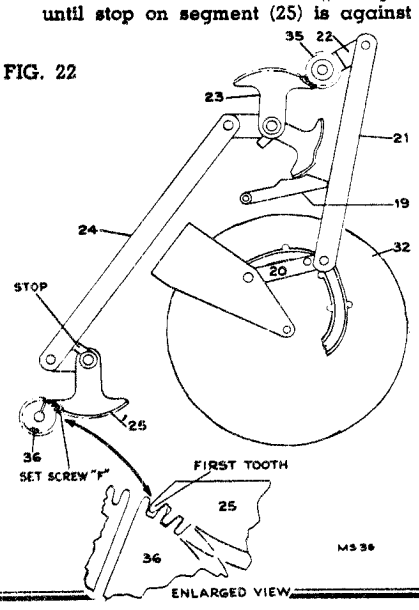
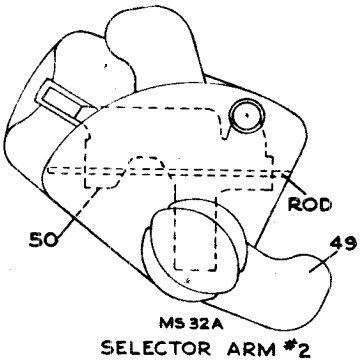
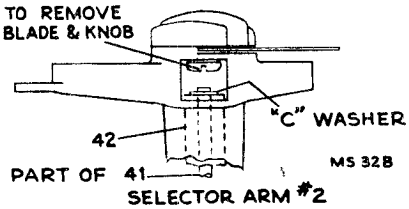


FIG. 22



SELECTOR ARM #2

FIG. 20



SELECTOR ARM #2

FIG. 21

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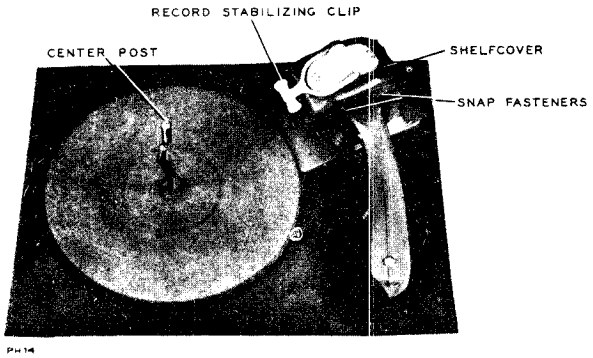

PH-14

Model No. 960015

Automatic Record Changer

SERVICE DATA

— 1945 No. 11 —

RADIO CORPORATION OF AMERICA
RCA VICTOR DIVISION
CAMDEN, N. J., U. S. A.

Alternate tone arm provided with a long life semi-permanent needle

Features

1. This mechanism is designed to play automatically a series of twelve 10-inch or ten 12-inch standard records of the 78 r.p.m. type.
2. It will play manually records up to 12 inches in diameter.
3. Tripping system is of "constant diameter" type, insuring reliable automatic operation on all records made to RMA proposed standards.
4. It is a simple operation of turning one record support to change from 10 to 12-inch records or vice versa.
5. Cycling mechanism is disconnected completely while records are being played. This reduces the load on the drive motor, thereby reducing the tendency for "wow" or rumble.
6. Mechanism can be adapted for 50 cycle operation by interchanging the spring sleeve slipped over the shaft of the drive motor.
   On motors provided with a solid sleeve on drive shaft, slip the correct conversion spring sleeve over solid sleeve.

Automatic Operation

1. With the power switch in the off position rotate the record support shelf as required for 10 or 12-inch records until the record size indicated on the support cover is pointing toward the center post.
2. Place the records to be played in a stack with desired selections upward and in proper sequence with the last record on top. Load them on the changer by placing them over the center post and resting on the record support shelf. Place record stabilizing clip on top of the record stack.
3. Turn power switch on and press down firmly but momentarily on the end of the tone arm and let go. The changer will continue to play the entire stack automatically.
   The tone arm can be moved to the rest position any time the mechanism is not in cycle.
4. Turn the power switch off and remove the stack from the turntable by placing fingers of both hands directly opposite and under the stack. Then lift straight up—"don't tilt" or squeeze stack. Turning the support shelf one-fourth turn facilitates removal of records.

   NOTE: DO NOT OPERATE MECHANISM WITH THE RECORD SEPARATOR SHELF TURNED TO ANY POSITION OTHER THAN THE NORMAL 10-INCH OR 12-INCH OPERATING POSITION.

   When the mechanism is not in use, it should be out of cycle and the tone arm on the rest.

   No attempt should be made to turn record separator shelf while mechanism is in cycle.

Manual Operation

1. Rotate the record separator shelf to 10 or 12-inch position (numerals 10 or 12 pointing towards center post).
2. Place the record to be played on the turntable and turn the power switch on.
3. Place the pickup on the start of the record.
   Note: The mechanism should be allowed to complete cycle before attempting to move tone arm to the rest position.
4. Turn power switch off manually.
5. Remove the record by raising straight up without tilting.

Cautions

1. Do not attempt to handle tone arm while mechanism is in cycle.
2. Never turn the power switch off, leaving the mechanism in cycle for an extended period of time.
3. Do not allow the records to remain on supports when not in use.
4. Do not allow oil or grease to come in contact with any rubber parts.
5. Do not install instrument near source of heat. Excessive heat may damage the pickup cartridge.
6. Do not pack and ship changer without first pushing down on reject button to release catch.
7. When replacing the needle do not tighten set screw excessively as the twisting may crack the crystal.

Functions of Principal Levers

Trip Lever (fig. 4)
When the pickup has moved beyond the end of the recorded section of the record, the trip lever pulls stud (15) past trip catch to start automatic cycle.
Cycling Drive Cam (fig. 5)
Transfers motion from turntable for cycling action.
Cycling Slide (fig. 5)
Provides mounting for cycling cam bearing and transfers energy to tone arm elevating rod and separator slide.
Tone Arm Lever (fig. 6)
Directs the horizontal movement of tone arm.
Tone Arm Locking Cam (fig. 3)
Locks tone arm to record slide actuating lever to provide landing movement.
Tone Arm Elevating Rod (fig. 1)
Transfers motion from cycling slide to elevate tone arm while cycling.
Actuating Lever Shaft (fig. 1)
Transfers motion to and from separator slide.
Record Separator Slide (fig. 2)
Pushes records off support notch on center post.
Center Post (fig. 7)
Main record support incorporating the separator latch.
Separator Latch (fig. 7)
Small slide set in a vertical keyway in the top end of the center post, provides means for separating the records.
Lubrication
Under normal operating conditions the motor should never require oiling.
On points of contact on slides and levers and on all bearing surfaces except the motor bearing use a light application of Lubriplate No. 107.

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MODEL 960015

RCA MFG. CO.

Preliminary Adjustments in Assembling Mechanism

1. Make certain the mechanism is out of cycle and all the levers, cams, springs, etc., on the underside of the mechanism are in place by comparing it with sketches and photographs.
2. Latch the reject actuating slide by pulling slide in guide until it engages the reject latch (fig. 4).
3. With the tone arm and record separator shelf removed, assemble the parts shown in fig. 3.
4. Rotate tone arm mounting bracket assembly counterclockwise against stop stud (16), (fig. 3).
5. Studs 17 should be in the position indicated in fig. 3, when the trip stud (15) (fig. 4) is pulled toward the record center post as far as it will go.
6. Tighten set screws "E" (fig. 3), allowing very little vertical play in tone arm pivot (but not binding).
7. Place record separator shelf in position, with the tone arm locking cam in the position indicated in fig. 3.
8. Mount separator shelf with mounting screws "i" (fig. 1).
9. Adjust record slide actuating lever to a position approximately 3/8 inch from bracket as indicated in sketch (fig 2). Tighten set screws "G." Slide actuating lever should be under adjustment studs (A or B) and have enough clearance to prevent touching.
10. When the foregoing adjustments have been made, remove record slide assembly by removing screws "i" and assemble tone arm by snapping mounting hinge over bearing studs.
11. Replace slide assembly by feeding tone arm locking cam, down through the hole in tone arm and engaging studs (17). Make certain all levers remain in correct position while engaging cams and studs (17) and replacing mounting screws "i."
12. Mechanism can now be turned by hand to check its action. It should require only minor adjustments for tone arm height, landing and tripping. A description of these adjustments may be found under their respective heading.

Adjustments

A—12" landing.
B—10" landing.
D—Tone arm height adjustment screw.
E—Locking (set screw) for positioning elevating rod in relation to tone arm.
F—Tripping adjustment.
G—Locking (set screw) for positioning record slide separator actuating lever and landing positioning lever.

Landing Adjustment

1. It is necessary to remove record support cover by prying out the four round clips at the lower edge of the cover.
2. Turn the record support to 10 or 12-inch position and place record on turntable.
3. With power removed from mechanism, push down on reject button and allow to cycle while rotating it by hand. Note where the needle lands.
4. Loosen lock nuts and adjust (B) for 10-inch landing and (A) for 12-inch landing. Turning studs counterclockwise moves the landing in, and turning clockwise moves the landing to the outer edge.
5. Turn power on and allow mechanism to cycle by pressing down on reject button. This should be repeated several times and adjusted until the pickup lands consistently at the beginning of the record.
6. Hold adjustment bolts with wrench and tighten lock nut. Test by playing through a stack of records.

Tripping Adjustment

Tripping should occur when the needle is approximately 1⅝ inches from the side of center post. If the mechanism fails to trip at the proper point, turn adjustment screw (F) clockwise to delay, and turn counterclockwise to advance the tripping point. Try a few standard records to determine whether tripping is properly adjusted.

Tone Arm Height Adjustment

1. Remove the power from the mechanism.
2. Place a stack of ten 12-inch or twelve 10-inch records on the turntable. With the mechanism in cycle, rotate the turntable by hand. The tone arm should clear the top record without touching the record on support post above.
3. Adjust screw (D) for this condition.

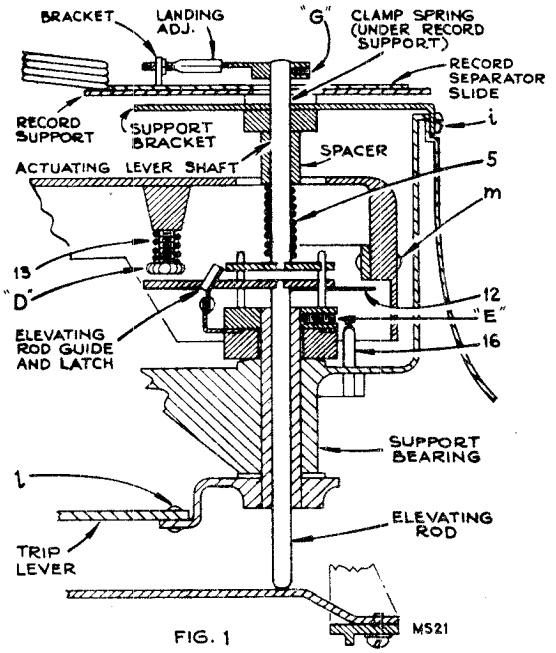

FIG. 1

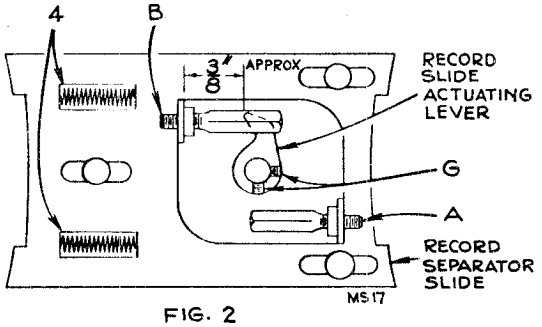

FIG. 2

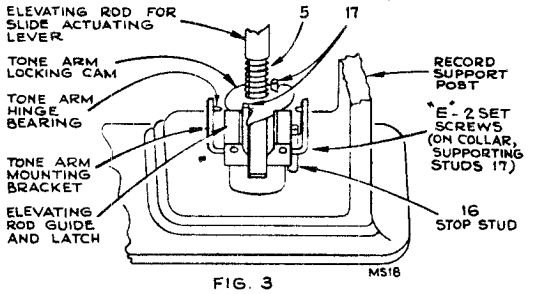

FIG. 3

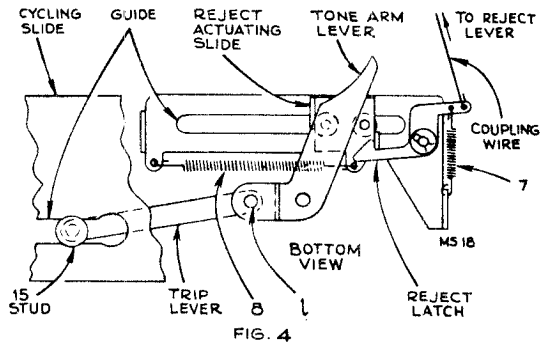

FIG. 4

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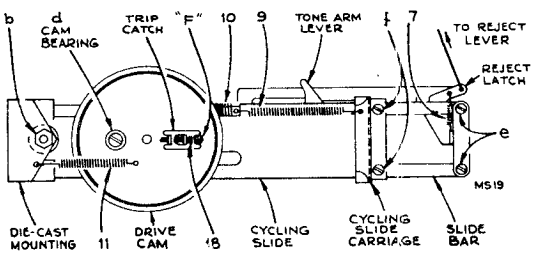

FIG-5

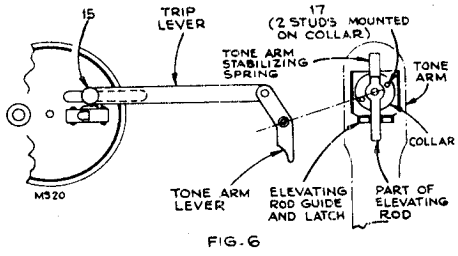

FIG-6

Cycle of Operation

FUNCTION	EXPLANATION
Power Switch.	1. Energizes drive motor, causing turntable to rotate.
Reject Button.	1. Tone arm is resting on reject button, therefore pushing down on arm actuates reject button. 2. Reject button pushes down on reject lever. 3. Reject lever transfers action to reject latch lever through coupling wire. 4. Reject actuating slide being unlatched, is pulled against tone arm lever by spring (8).
Trip lever moves away from center post.	1. Energy is transferred from tone arm lever to trip lever through hinge bearing (l). 2. Stud (15) slides in guide cut in cycling slide. 3. Stud (15) slides past trip catch.
Cycling cam rotates.	1. Trip catch being free, spring (11) pulls the eccentric drive cam around causing the rubber tire rim to contact the knurled drive roller. 2. The bearing of cycling cam is mounted on cycling slide, therefore rotation of the eccentric cam causes the slide to move on the slide bars, against the tension of spring (10) and away from center post.
Cycling Slide moves away from Conter Post. Tone arm raises.	1. Cycling slide being curved at the tone arm bearing end, it starts to push up on tone arm elevating rod. 2. Elevating rod in raising, pushes against adjustment screw (D) causing the tone arm to raise on hinge bearing. 3. Tone arm elevating rod in raising, pushes against record slide actuating lever rod, thus raising the record slide actuating lever. 4. Slide moving further, causes takeup safety slide to push against tone arm lever, thereby moving tone arm out and transferring energy through record slide actuating lever shaft to slide actuating lever. 5. Tone arm locking cam, latches on inner edge of tone arm elevating rod guide. This couples the tone arm to record slide actuating lever through record slide actuating lever shaft. 6. Record slide actuating lever pushes against stud (A or B) causing record slide to push record forward off the center post rest. 7. Record drops and springs (4) cause slide to return to normal position. 8. Stud (A or B) on record slide returning, pushes against slide actuating lever, transferring the motion to tone arm which moves the tone arm in for landing. 9. When cycling slide is moving away from center post towards its limits, slide takeup lever resets the reject actuating slide.
Slide returns and pickup lands.	1. Tension of spring (10) keeps cam in contact with rotating knurled roller, thereby causing cycling slide to return towards its normal position. 2. Cycling cam moving towards minimum diameter is pulled off center and away from knurled roller by spring (11). Stud (15) engages trip catch and holds cam from engaging knurled roller. 3. During operation (2) above, the tone arm elevating rod lowers, unlatching tone arm locking cam and allowing the pickup to land on the record.
Playing cycle.	1. Trip catch is held against stud (15), until pickup moves in close enough to center post for stud (15) to clear the trip catch, thereby starting a new cycle.

Record Separation
It is necessary that some provision be made to prevent the record adjacent to the record being released from dropping at the same time. This is accomplished by the separator latch located at the end of the center post. It may be found necessary to bend the center post if the records do not separate properly. There should be 1/32 to 1/16 inch clearance between the edge of the lower record and the end of the slide.

Removing Tone Arm
First it is necessary to remove the record support shelf by removing the two mounting screws (i). Then tilt and raise slowly.
The entire record slide actuating lever, bearing rod, and spring will come off with the record support assembly. The tone arm may then be removed by disengaging the hinge bearing. This may be done by prying with a screw driver through the opening in the top of the arm.

Removing Turntable
Remove the center post by removing nut (b) (fig. 7) and tapping end of center post. The turntable can then be removed by loosening set screw (c) on knurled roller and pulling upward with a rotary motion.

Removing Pickup Cartridge
Remove the two screws holding the cartridge and unsolder shielded leads.

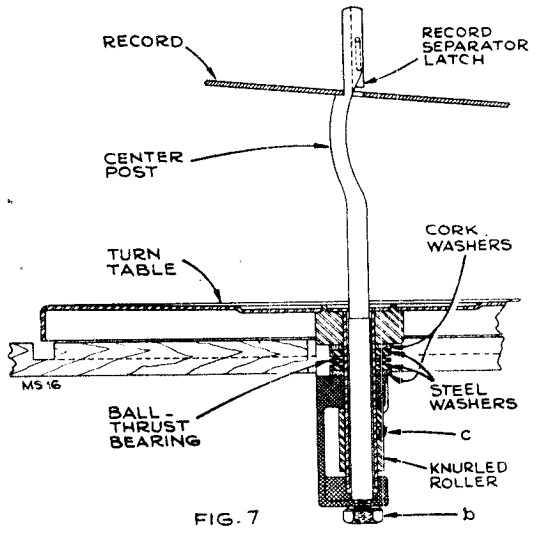

FIG. 7

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Miscellaneous Service Hints

(1) **Rumble**

(A) Remove motor assembly (mounting bolts "K," fig. 9) and inspect rubber tire idler for rough spots.

(B) Make certain rubber shock supports (a) on drive motor and mechanism are not drawn up too tight.

(C) Make certain cork washers are in place on turntable bearing (fig. 7).

(D) Check for microphonic tube in amplifier.

(2) **"Wow" or Speed Variation**

(A) With mechanism out of cycle remove motor assembly (bolts "K," fig. 9) and examine rubber drive idler and rim of turntable for grease or oil. (Oil or grease can be removed with carbontetrachloride or naphtha.)

(B) Check for bent motor shaft.

(C) Check for bent motor mounting plate.

(D) Check for irregularity in rubber tire idler.

(E) With the drive motor removed, the turntable should rotate freely when turned by hand. Bind in turntable may be caused by:

1. Burrs in bearing support casting.
2. Bent center post.
3. Improperly seated center post.
4. Gummed grease in thrust bearing.
5. Under side of turntable rubbing due to insufficient clearance. (It may be necessary to add an additional washer on turntable bearing to elevate it sufficiently to clear mounting bracket, etc.)
6. Cycling knurled drive roller set too low on turntable shaft thereby acting as a thrust bearing and making the ball thrust bearing ineffective. Loosen adjustment screw "C" and allow turntable to seat on thrust bearing making certain steel and cork washers aren't missing. In positioning the knurled roller about 1/32 inch vertical play should be allowed.
7. Friction between a stack of records and center post may cause squeaking. It may also place an additional load on drive motor, causing "wow." An application of wax on the center post should remedy this condition.

(3) **Continuous Tripping** may be caused by:

(A) Trip stud "15" not engaging trip catch.

(B) Reject button sticking.

(C) Reject latch lever spring (7) being loose or missing.

(D) Worn reject latch lever.

(E) Bent reject actuating lever at point of contact to latch. (Will not remain latched.)

(F) Missing or broken safey spring (9).

Special Tools Required for Servicing Mechanism

1. 5/16 Bristo set screw wrench.
2. 3/8 Bristo set screw wrench.
3. 5/16 inch open end wrench. } Two separate wrenches re-
4. 1/4 inch open end wrench. } quired.

(4) **"Feedback or Howl"**

This trouble is caused by energy from the speaker getting back into the input of the amplifier.
Check for:

(A) Microphonic tube.

(B) Gain control advanced too far.

(C) Mounting rubber "shocks" bolted down too tight.

(5) **Failure to Trip** may be caused by:

(A) Pickup not following grooves due to:

1. Bind in tone arm bearing. (Will also cause erratic landing.)
2. Improper adjustment of trip catch (F).
3. Binding in hinge bearing. (May also cause repeating of grooves.)
4. Bind in trip stud guide. (May also cause repeating of grooves.)
5. Tone arm height adjustment (D) set too high. (May cause tone arm to hit the records on support post.)

(6) **Improper Landing of Pickup**

(A) Landing adjustments (A or B) improperly set. (See landing adjustments.)

(B) Spring (9) loose or missing.

(C) Springs (4) out of position. (Separator slide will also fail to return.)

(D) Loose adjustment bolts (E or G). (Records will also fail to drop.)

(E) Broken or bent elevating rod guide. (Tone arm locking cam (fig. 3) should remain locked to elevating rod guide until the very instant before pickup lands.)

(F) Bind in tone arm support bearing.

(G) Tone arm locking cam may not engage catch.

(H) Tone arm locking cam may not disengage catch. (Bend elevating rod guide.)

(G) Tone arm mounting rivets loose.

(7) **Repeating Grooves on Record**

(A) Height adjustment (D) set too high.

(B) Bind in tone arm support bearing.

(C) Bind of trip stud (15) in guide.

(D) Bind in tone arm hinge bearing (1) (fig. 4).

(8) **Premature Tripping**

(A) Adjustment (F) improperly set. (See trip adjustment.)

(B) Loose trip stud (15).

(9) **Changer will not complete cycle**

(A) Worn rubber tire on drive cam.

(B) Loose cycling knurled drive gear or roller.

(C) Defective drive motor.

(D) Bent or improperly assembled parts.

(10) **Changer starts cycling when support post is rotated for size. May be caused by:**

Slide actuating lever contacting landing adjustment bolts. (Bend landing adjustment bolt bracket to allow clearance for lever when not in cycle.)

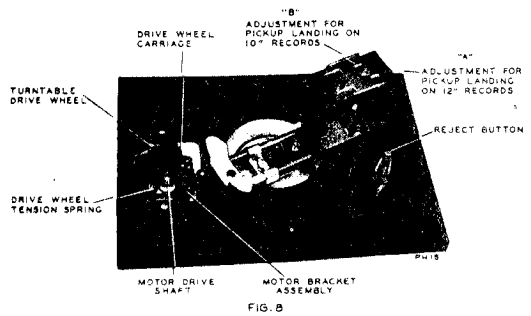

FIG. 8

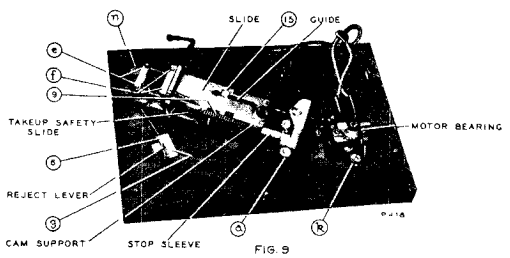

FIG. 9

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Functional Parts

(See illustrations for identification)

Drive wheel tension spring (1).
Record stabilizing clip spring (2).
Clamp spring to hold record separator support bracket to record separator (3).
Record separator slide return spring (4).
Lowering spring for record slide actuating lever (5).
Reject lever return spring (6).
Reject latch spring (7).
Reject actuating slide spring (8).
Cycling slide take-up safety spring (9).
Slide return spring (10).
Drive cam actuating spring (11).
Tone arm stabilizing spring (12).
Elevating adjustment screw locking spring (13).
Snap fasteners on support shelf cover (14).
Trip stud (15).
Tone arm stop stud (16).
Tone arm and slide actuating lever connecting studs (17).
Tripping adj. bolt, lock spring (18).

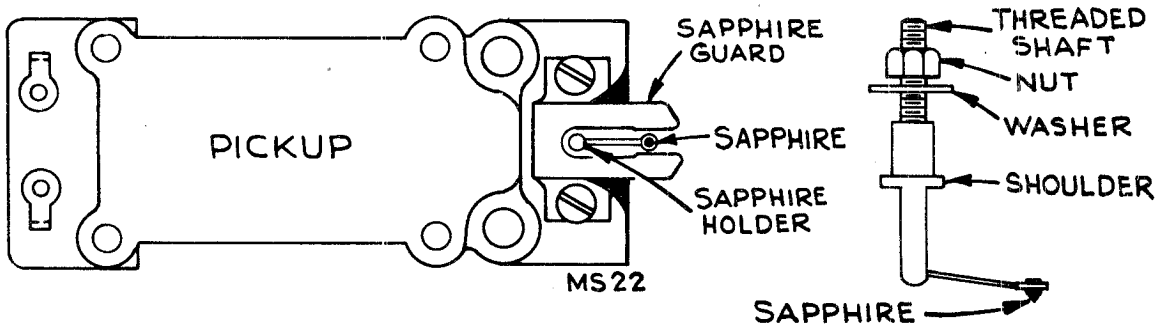
Small letter Part Designation:

a—Rubber shock mounts.
b—Center post mounting nut.
c—Knurled drive roller mounting screw.
d—Cycling drive gear mounting screw.
e—Slide rod mounting screws.
f—Cycling slide carriage mounting screws.
g—Reject lever mounting screws.
h—Reject button mounting nut.
i—Record support post mounting screws.
j—Pickup mounting screws.
k—Mounting bolts on motor.
l—Trip lever hinge bearing.
m—Tone arm mounting rivets.
n—Main assembly mounting bolts.

Names of Levers and Parts

Cycling slide carriage.
Cycling slide carriage stop sleeve.
Cycling slide bars.
Cycling drive cam bearing.
Cycling drive cam.
Turntable mounting support.
Turntable thrust bearings.
Steel washers (bearing race).
Cork cushioning washers.
Record separator latch (located on center post).
Cycling knurled drive roller.
Take-up safety slide for reject reset and tone arm levers.
Reject actuating slide.
Reject actuating slide guide.
Reject latch.
Reject lever coupling wire.
Reject lever.
Reject button.
Trip lever.
Trip lever stop stud (15). } All one lever, coupled together.
Tone arm lever.
Guide for trip stud.
Tone arm elevating rod.
Tone arm support bearing.
Tone arm hinge bearing.
Tone arm hinge.
Trip catch.
Turntable drivewheel carriage.
Motor bracket assembly.
Motor bearing.
Motor drive shaft.
Record stabilizing clip.
Record support.
Record separator slide.
Record support cover.
Elevating rod guide and tone arm lock catch.
Record separator slide actuating and landing positioning lever.
Tone arm locking cam.
Actuating lever shaft.

Replacing Sapphire in Pickup



Replacement of Sapphire

Caution: Never bend the sapphire support wire.

The nut on the sapphire holder assembly is locked by a light cement (such as Glyptal). Extreme care should be used when loosening the nut so that the twisting motion does not break the crystal.

Remove the two screws holding the sapphire guard in place and remove guard. Remove the small nut and washer on the threaded shaft of the sapphire holder and push the shaft through the hole in the viscoloid until the sapphire holder assembly comes free.

Use of a drop or two of acetone will facilitate the removal of the nut and shaft. Do not use force as the crystal may be broken.

Insert threaded shaft of replacement sapphire holder through viscoloid and replace the washer and nut. Make sure that the sapphire is in the correct position. Take hold at the lower end of the shaft with a pair of pliers while tightening the nut, being very careful so as not to strip the threads or break the crystal. Replace the sapphire guard, positioning it by means of the oversize screw slots. Make certain that the sapphire and its supporting wire are centered in the guard. Tighten the guard screws. Before using, check to see that the sapphire projects far enough (approx. .020) beyond the guard so that the guard will not strike the record. If necessary, bend the guard a little. Apply a drop of light cement (such as Glyptal) to the sapphire nut holder.

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Replacement Parts

STOCK No.	DESCRIPTION
	PICKUP AND ARM ASSEMBLIES
71172	Arm—Tone arm complete less crystal, shielded lead, height adjusting screw and spring
71169	Clamp—Spring clamp to hold pickup leads in arm
71173	Crystal—Pickup crystal cartridge
71170	Screw—Height adjusting screw (D) (fig. 1)
71174	Screw—Needle screw
71171	Spring—Lock spring for height adjusting screw (13) (fig. 1)
71283	Arm—Tone arm complete less crystal, shield lead, height adjusting screw and spring (used with crystal cartridge 70338 only)
70338	Crystal—Pickup crystal cartridge (permanent sapphire type used in arm 71283 only)
	MOTOR ASSEMBLIES Stamped 407B1
71177	Pin—Cotter pin (hairpin spring) for drive idler wheel for motor stamped 407B1
71178	Shim—Drive idler wheel thrust shim for motor stamped 407B1
71176	Spring—Drive idler wheel tension spring for motor stamped 407B1 (1)
71175	Wheel—Drive idler wheel for motor stamped 407B1
	MOTOR ASSEMBLIES Stamped 407B2
71181	Pin—Cotter pin (hairpin spring) for drive idler wheel for motor stamped 407B2
71182	Shim—Drive idler wheel thrust shim for motor stamped 407B2
71180	Spring—Drive idler wheel tension spring for motor stamped 407B2
71179	Wheel—Drive idler wheel for motor stamped 407B2
	MOTOR ASSEMBLIES Stamped 407B3
71186	Bushing—Motor shaft drive pulley for motor stamped 407B3
71183	Motor—Motor complete 117 volts 60 cycle
71226	Pin—Cotter pin (hairpin spring) for drive idler wheel for motor 407B3
71187	Shim—Drive idler wheel thrust shim for motor 407B3
71185	Spring—Drive idler wheel tension spring for motor stamped 407B3 (25 turns—1½" long x 5/32" O. D.)
71184	Wheel—Drive idler wheel for motor stamped 407B3
	MOTORBOARD ASSEMBLIES
71233	Bar—Record stablizing clip support bar
71203	Base—Operating mechanism mounting base and support bearing (fig. 1)
71238	Bearing—Turntable thrust bearing (fig. 7)
71210	Bracket—Record separator support bracket (fig. 1)
71218	Bracket—Tone arm mounting bracket (fig. 3)
71230	Button—Reject button and tone arm rest (fig. 8)
71240	Cable—Shielded output cable complete with plug
71194	Cam—Main cam complete (fig. 5)
71213	Cam—Tone arm locking cam (fig. 3)
71206	Carriage—Cycling slide carriage (fig. 5)
71195	Catch—Trip catch mounted on main cam (fig. 5)
71211	Clamp—Clamp spring to hold record separator support bracket to record separator (3) (fig. 1)
71219	Collar—Collar support for guide studs (17) (fig. 1)
14086	Cord—Power cord
71231	Cover—Shelf cover and record stablizing clip
71234	Fastener—Push fastener for record holder cover (4 req'd)
71245	Grommet—Rubber grommet to mount changer (4 rec'd)
71244	Grommet—Rubber grommet to mount motor (3 req'd)
71222	Latch—Reject latch (fig. 4)
71214	Lever—Record slide actuating lever—pushes adjusting screws mounted on record separator to drop records (fig. 2)
71227	Lever—Reject lever (fig. 9)
71229	Link—Reject lever (wire) link (fig. 4)
71202	Link—Trip link and tone arm lever assembly (fig. 4)
71236	Nut—Centre post locknut (b) (fig. 7)
71226	Pin—Cotter pin to mount reject latch (fig. 4)
31048	Plug—Plug for output cable
71235	Post—Centre post (fig. 7)
71189	Rail—Guide rail (cycling slide bar) (2 req'd) (fig. 5)
71217	Rod—Tone arm elevating rod
71199	Roller—Main cam drive roller (knurled) (fig. 7)
71201	Screw—No. 6-32 x 3/16" bristo head screw for mounting guide pin and collar assembly (2 req'd) or mounting the separator adjusting screws actuating rotor (2 req'd) G
71192	Screw—No. 6-32 x ½" fillister head screw to mount guide rails (4 req'd)
71200	Screw—No. 8-32 x ⅛" bristo head set screw for main cam drive roller (C)
71197	Screw—Adjusting screw—mounted on main cam—No. 6-32 x ⅛" round head machine screw (F)
71212	Screw—Adjusting screw and locknuts for tone arm landing (2 req'd) (A, B)
71208	Separator—Record separator (fig. 2)
71207	Slide—Cycling slide (fig. 5)
71220	Slide—Reject actuating slide and bracket—less reject latch and spring (fig. 4)
71216	Spacer—Lowering spring spacer (fig. 1)
71224	Spacer—Reject latch mounting spacer
71205	Spring—Drive cam actuating spring (11) (55 turns—1½" long x 7/32" O. D.)
71191	Spring—Guide rail recoil spring (10) (23 turns—4½" long x 13/32" I. D.)
71215	Spring—Lowering spring for record slide actuating lever (5) (10 turns—11/16" long x ¼" O. D.)
71209	Spring—Record separator return spring (2 req'd) (4) (10 turns—¾" long x .244" O. D.)
71232	Spring—Record stabilizing clip tension spring (2) (10 turns—½" long x 3/16" O. D.)
71223	Spring—Reject latch spring (7) (20 turns—11/16" long x ⅛" O. D.)
71228	Spring—Reject lever spring (25 turns—⅞" long x 5/32" O. D.)
71204	Spring—Safety spring (9) (30 turns—1 7/32" long x 7/32" I. D.)
71221	Spring—Spring for reject slide and bracket (8) (31 turns—⅝" long x 3/16" O. D.)
71140	Spring—Spring to convert motor stamped "407B1" from 60 to 50 cycle operation
71141	Spring—Spring to convert motors stamped "407B2" from 60 to 50 cycle operation
71142	Spring—Spring to convert motors stamped "407B3" from 60 to 50 cycle operation
71196	Spring—Tripping adjustment bolt lock spring mounted on main cam (18) (7 turns—23/32" long x .203" O. D.)
71190	Stop—Stop sleeve for guide rail (fig. 9)
71188	Support—Turntable mounting support and guide rails support (fig. 7)
71193	Support—Main cam support (fig. 9)
71198	Tire—Main cam rubber tire
71237	Turntable—Finished turntable plate
71225	Washer—Reject latch spring washer
71239	Washer—Cork washers (1 set) for turntable (fig. 7)

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MODELS 960260-1, 960260-2

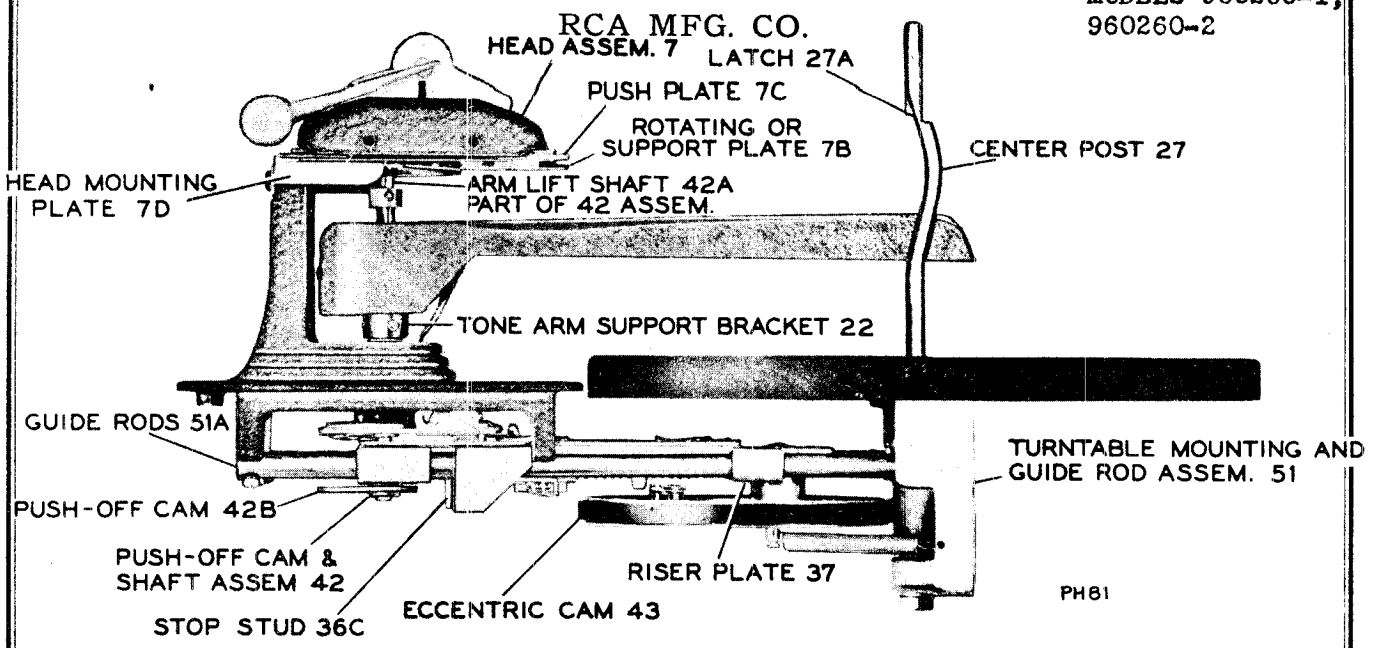

FIG. 1

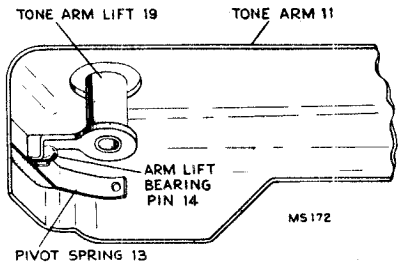

FIG. 3

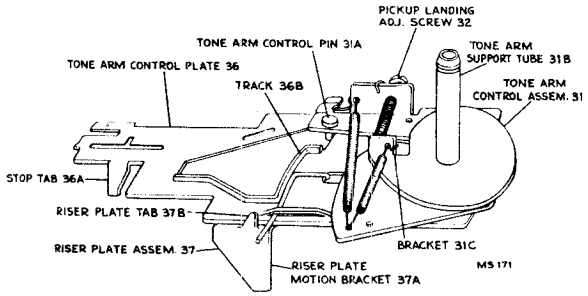

FIG. 2

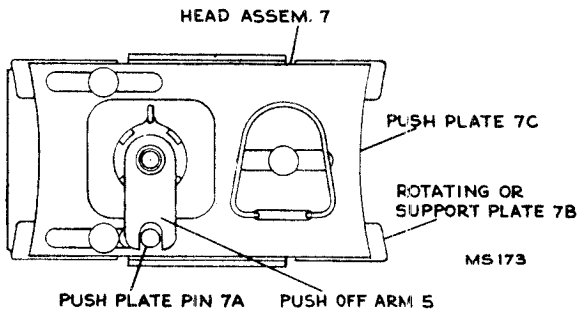

FIG. 4

FUNCTIONS OF PRINCIPAL PARTS

Head Assembly—7, 7A, 7B, 7C

Supports outer edge of record stack and pushes the record off notch in center post and allows it to drop to the turntable while the mechanism is going through cycle.

Center Post—27, 27A

Supports the entire stack of records, and together with the offset notch and latch in the center post, provides a means for separating records.

Tone Arm Lift Assembly—19

Couples tone arm to riser plate 37 through arm lift shaft 42A, thereby transferring the action for the vertical motion of the tone arm during change cycle.

Arm Control Assembly—31, 31A, 31B, 31C

Provides a tie between tube 31B, bracket 31C and tone arm support bracket 22, thereby directing the horizontal movement of the tone arm during change cycle. Arm control pin 31A slides along track in arm control plate 36, and in so doing, determines the point of landing of the pickup and the point of trip of the mechanism. It also incorporates landing adjusting screw 32.

Arm Control Plate Assembly—36, 36A 36B 36C

Incorporates a track 36B which controls the pickup landing and the tripping of the mechanism.
Stop tab 36A functions as portion of the tripping device, stud 36C, contacting push-off cam 42 controls, the point of landing for both 10- and 12-inch records.

Riser Plate Assembly—37, 37A, 37B, 37C

Provides mounting for eccentric cam 43, and incorporates an inclined track 37C, which controls the vertical movement of the tone arm.
Riser plate tab 37B pushes against curved portion of cam on arm control assembly 31, providing a control for the horizontal movement of tone arm during change cycle.
Riser plate bracket 37A contacting push-off arm 42B provides the necessary motion for push plate 7C.

Eccentric Cam—43

Transfers motion from turntable to riser plate 37 during cycling.

Push-Off Cam and Shaft Assembly—42, 42A, 42B

Provides a means of mechanically coupling tone arm lift 19 and push plate 7 assemblies to main cycling mechanism.
Cam 42B contacting stud 36C controls the position of arm control plate while in cycle, which determines the landing point of the pickup on 10- or 12-inch records.

Turntable Mounting and Guide Rod Assembly—51, 51A

Incorporates the main bearings for the turntable and provides a mounting for guide rods 51A.

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ADJUSTMENTS

Tone Arm Adjustment

The tone arm height should be so adjusted as to permit the sapphire to engage and ride in the grooves of one record placed on the turntable, but at the same time prevent the tone arm from touching the records on the supports while the mechanism is going through cycle, fig. 5.

1. With the mechanism out of cycle, lift tone arm and check and make certain tone arm lift 19 engages pin 14 as shown in fig. 6.
2. With the pickup near the edge of the record, loosen the set screw (with Bristo Wrench #6), holding collar 10, fig. 9, and moving it up or down on shaft 42A, so as to have the conditions indicated in sketch, fig. 5.

Preliminary Landing Adjustments

An accessible landing adjustment screw 32 is provided, but if for any reason the tone arm support bracket has become loose or removed, proceed as follows:

1. With the mechanism out of cycle, turn adjustment screw 32, fig. 8, clockwise as far as it will go, then turn counterclockwise two or three full turns.
2. Set head assembly for 12-inch position; place a 12-inch record on turntable.
3. Press down on the reject button and rotate the turntable by hand, causing the mechanism to cycle until the pickup is about to land on the record. In this position, the arm control pin 31A is in a position on track 36B as indicated by "s" and adjustment screw 32 remains against bracket 31C as indicated in fig. 8.
4. Loosen the two set screws holding the tone arm support bracket.
5. While holding this position, place the sapphire in the starting groove of the record, and tighten two set screws in the tone arm support bracket.

Final Landing Adjustment

The exact landing adjustment can be made by pressing the reject button and rotating the turntable by hand until the pickup is about to land. Then turn adjustment screw 32, fig. 8, until the sapphire is directly above the starting groove of the record. If the mechanism continues to land incorrectly after this adjustment has been made, compensate the difference by turning the screw 32 slightly. Turning screw counter-clockwise will move the landing towards the center post.

Positioning Push-off Arm

1. With the mechanism out of cycle, turn the push-off cam to such a position, so that the arm makes a 90° angle with the slide bars as shown in fig. 10. Make certain the large radius side of cam is toward the stud 36C when the support post is in the 12-inch position.
2. Place push-off arm 5 over push-off cam shaft 42A, and engage push-off plate pin 7A near the top edge, fig. 7. Tighten set screws.
3. Press down on reject button and rotate the turntable slowly by hand, making certain push plate does not reach its limit, or push-off arm does not come down against push plate when the riser plate is in its outermost position. If push plate should reach limit, or push-off arm should come down against push plate before riser plate reaches its outermost position, back-off either one until corrected.
4. Check this for both 10- and 12-inch setting.

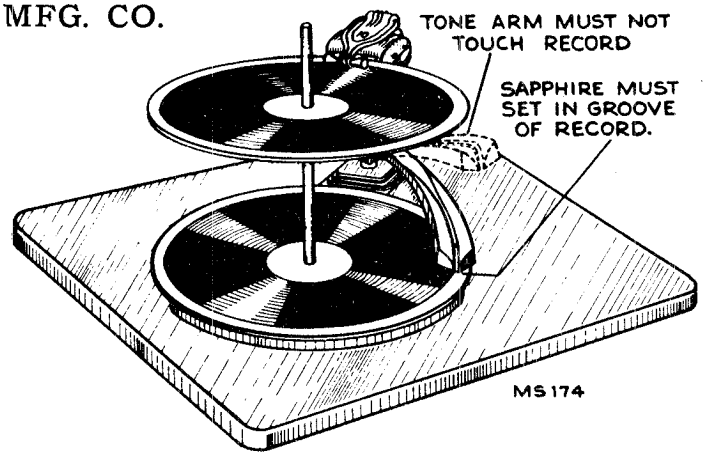

FIG. 5

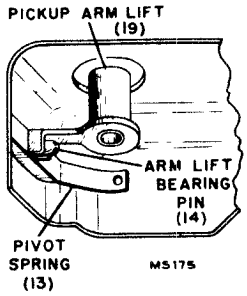

FIG. 6

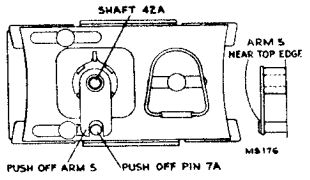

FIG. 7

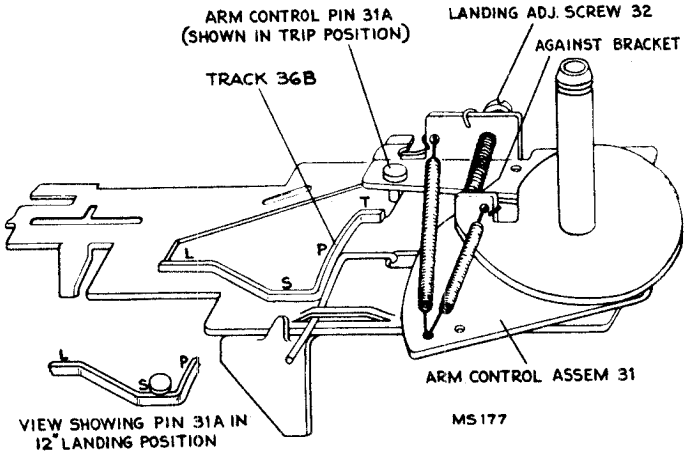
ARM CONTROL PIN 31A (SHOWN IN TRIP POSITION)
LANDING ADJ. SCREW 32 AGAINST BRACKET
TRACK 36B
ARM CONTROL ASSEM 31
VIEW SHOWING PIN 31A IN 12" LANDING POSITION
MS177

FIG. 8

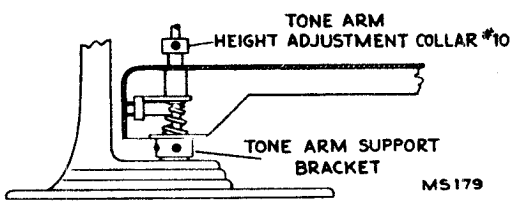

FIG. 9

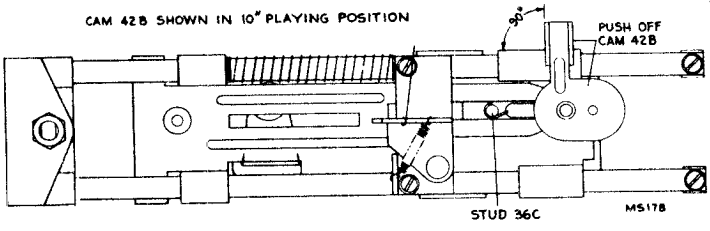

FIG. 10

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RCA MFG. CO.

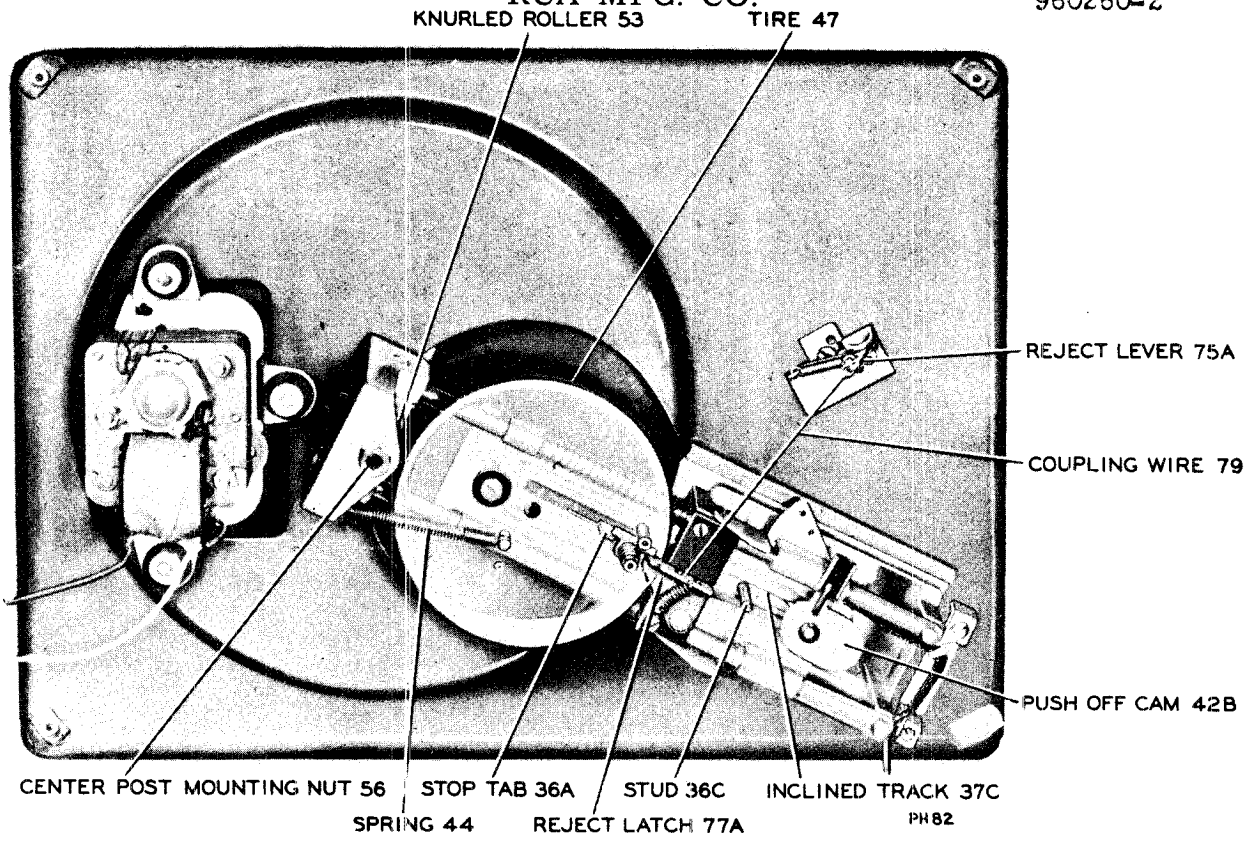

FIG. 11

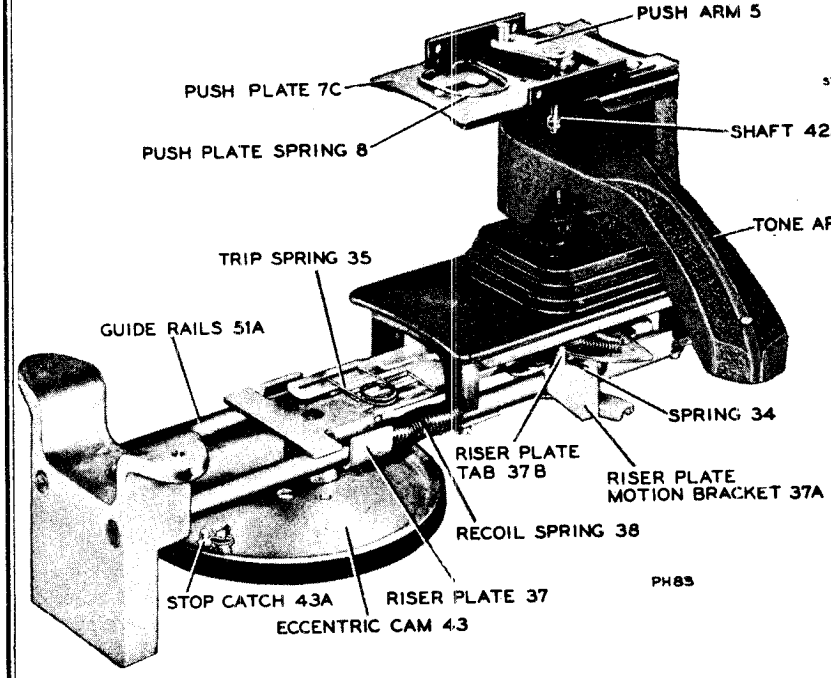

FIG. 12

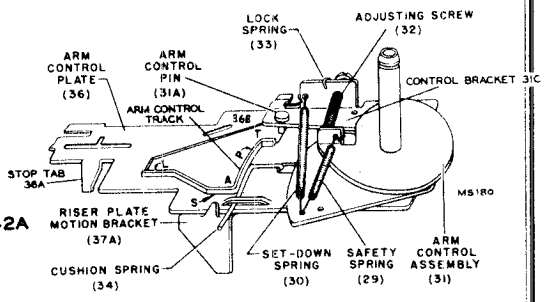

FIG. 13

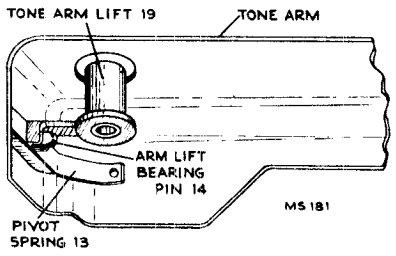

FIG. 14

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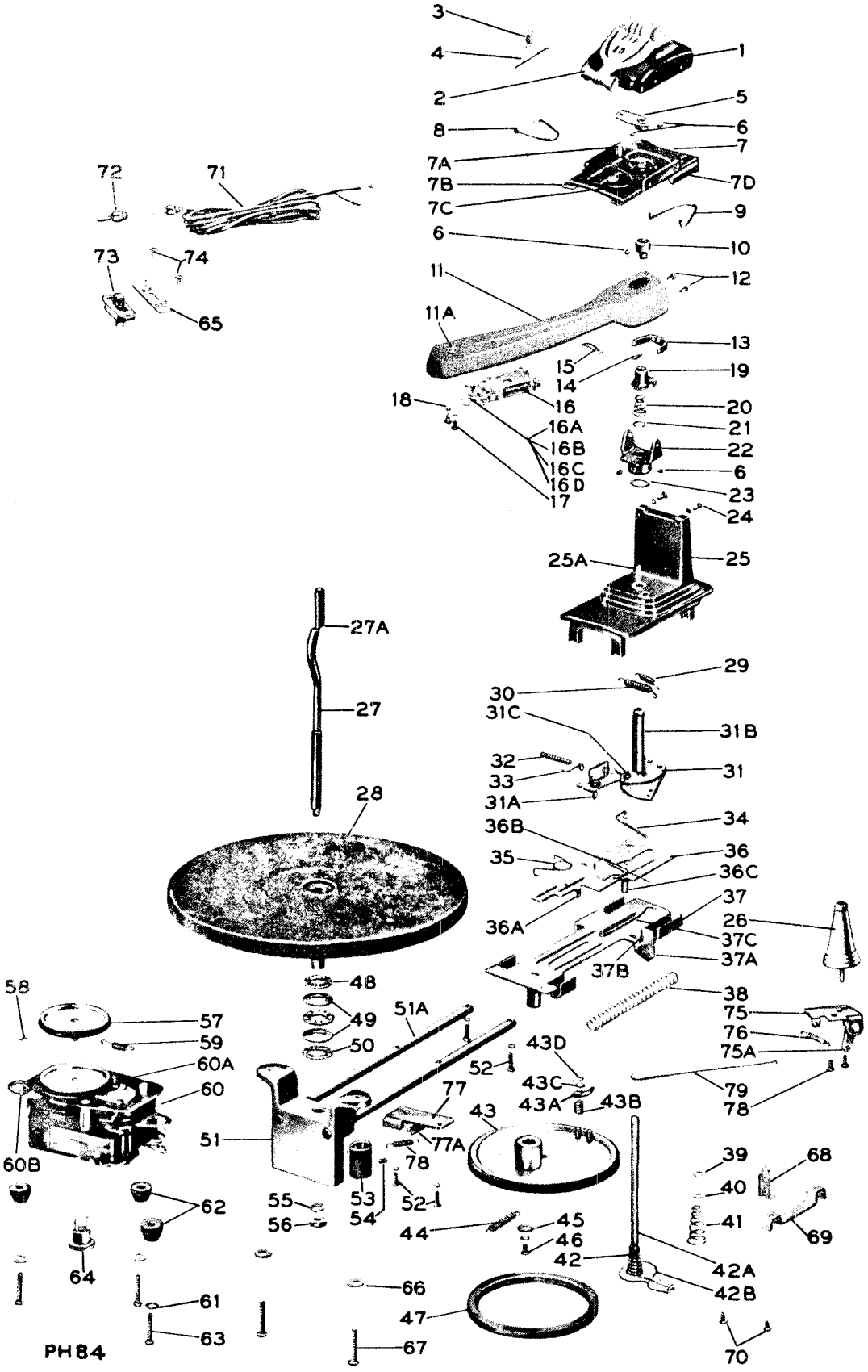
960260-2

RCA MFG. CO.



PHOTOGRAPH OF PARTS

FIG. 15

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Changer Will Not Complete Cycle

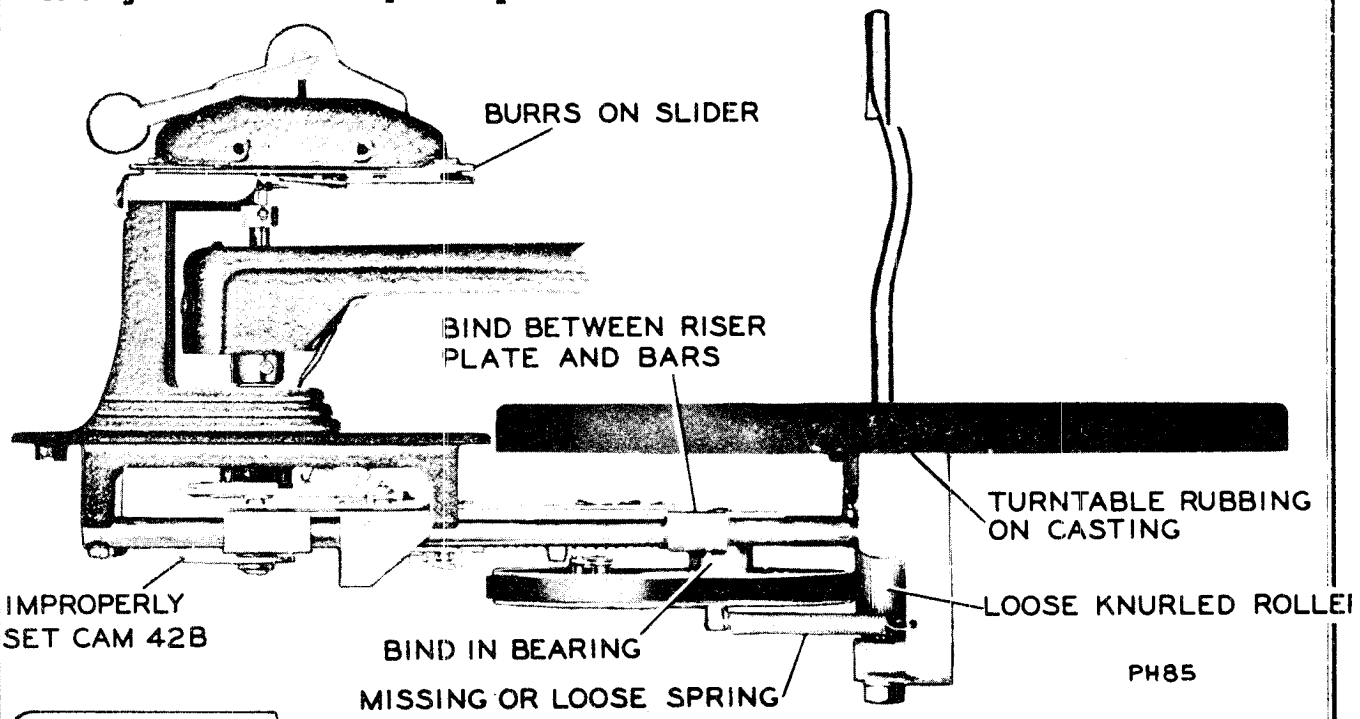

FIG. 16

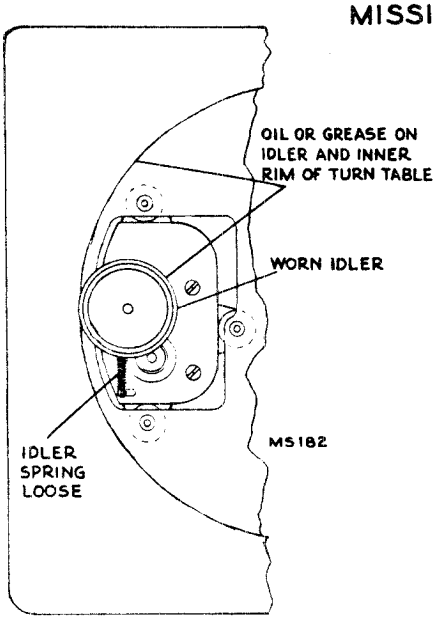

FIG. 17

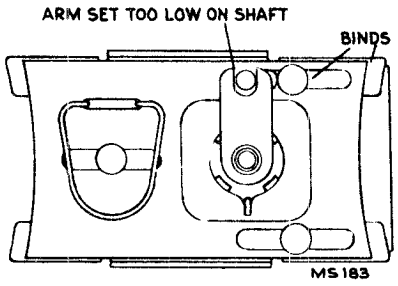

FIG. 18

Records Do Not Separate or Drop Properly

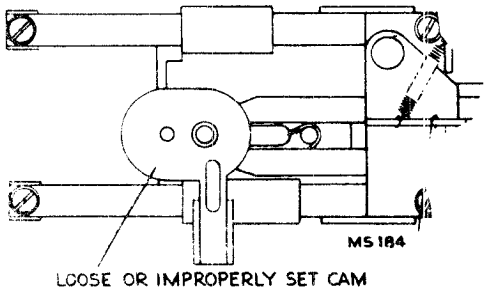

FIG. 19

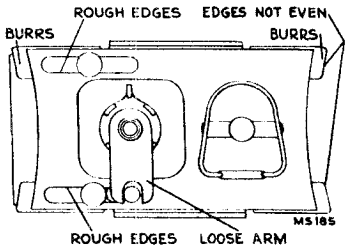

FIG. 20

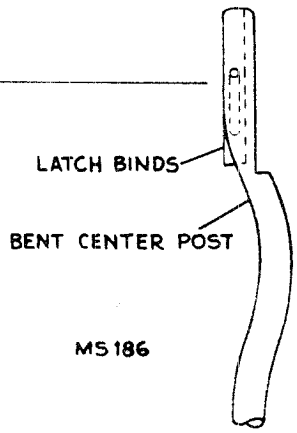

FIG. 21

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Pickup Repeats Grooves

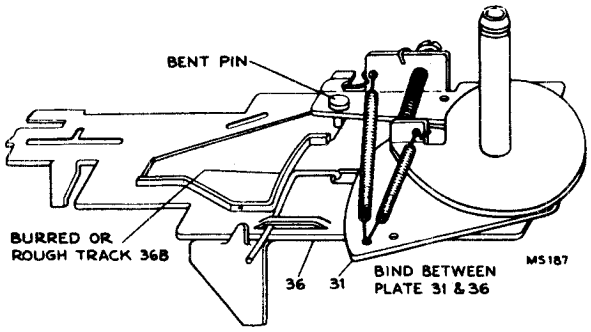

FIG. 22

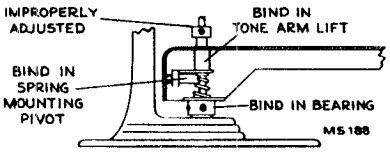

FIG. 23

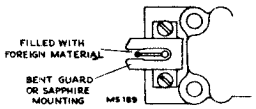

FIG. 24

"Wow" or Slow Turntable Speed

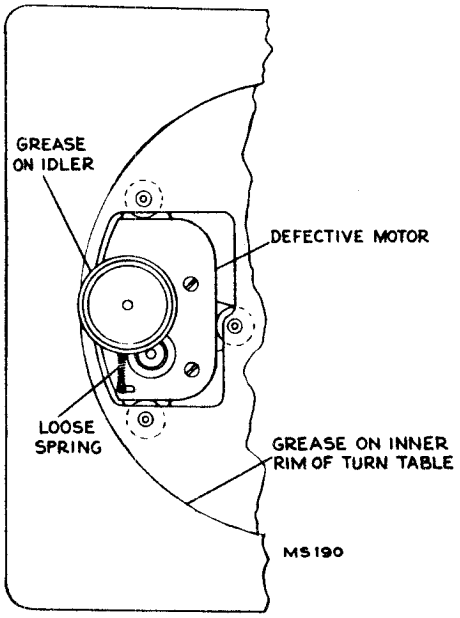

FIG. 25

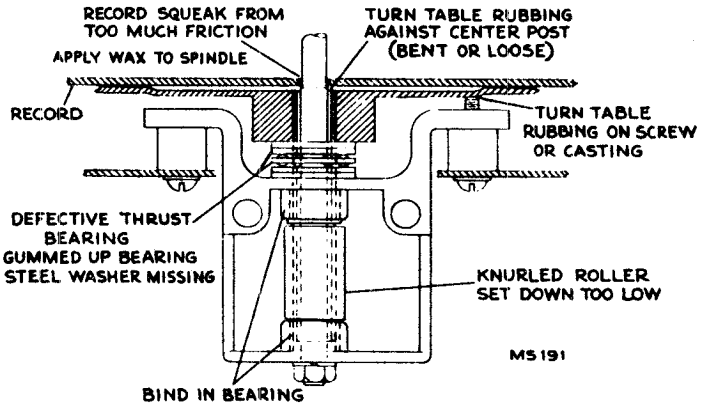
RECORD SQUEAK FROM TOO MUCH FRICTION
APPLY WAX TO SPINDLE
TURN TABLE RUBBING AGAINST CENTER POST (BENT OR LOOSE)
RECORD
TURN TABLE RUBBING ON SCREW OR CASTING
DEFECTIVE THRUST BEARING
GUMMED UP BEARING
STEEL WASHER MISSING
KNURLED ROLLER SET DOWN TOO LOW
MS191
BIND IN BEARING

FIG. 26

Continuous Tripping

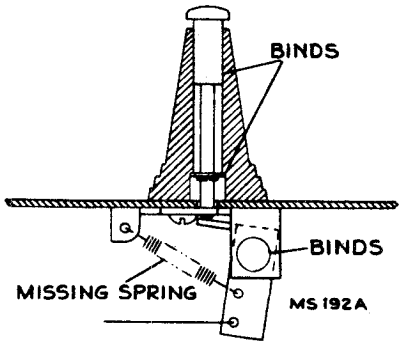

FIG. 27

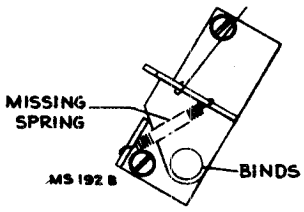

FIG. 28

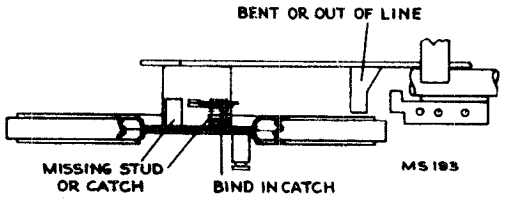

FIG 29

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960260-2

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Improper Pickup Landing

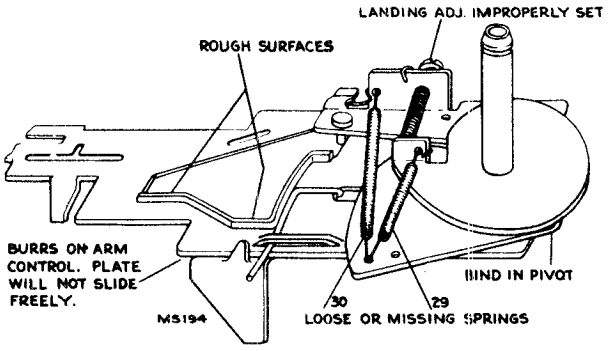

FIG. 30

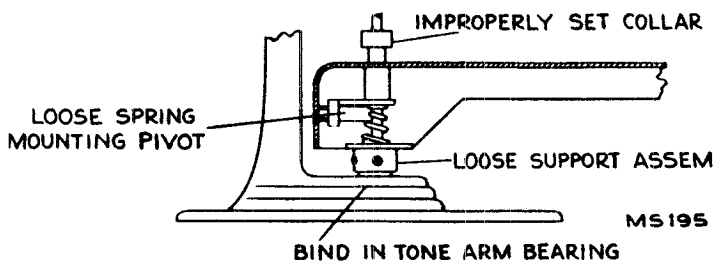

FIG. 31

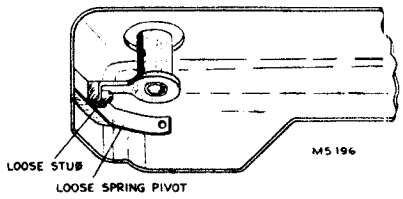

FIG. 32

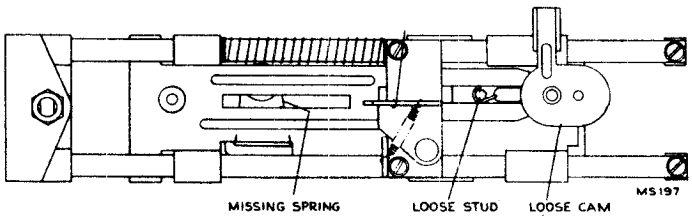

FIG. 33

Failure to Trip or Go into Cycle

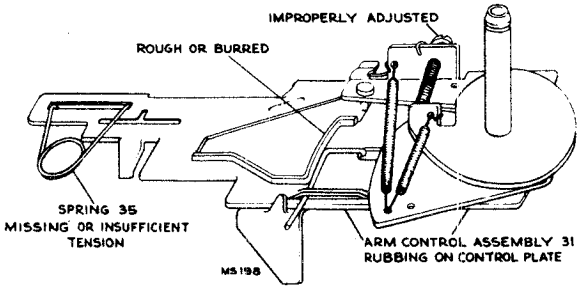
IMPROPERLY ADJUSTED
ROUGH OR BURRED
SPRING 35 MISSING OR INSUFFICIENT TENSION
ARM CONTROL ASSEMBLY 31 RUBBING ON CONTROL PLATE
MS198

FIG. 34

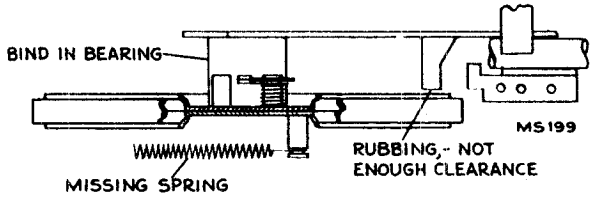

FIG. 35

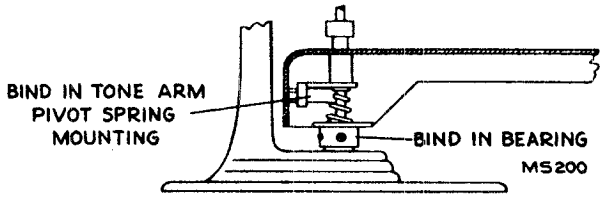

FIG. 36

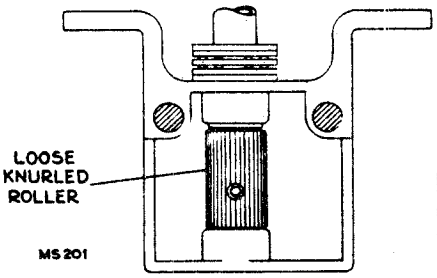

FIG. 37

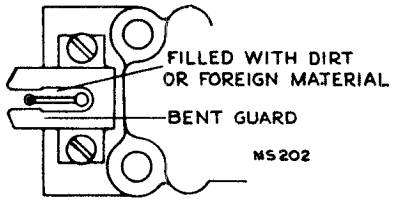

FIG. 38

Tone Arm Fails to Leave Rest Automatically

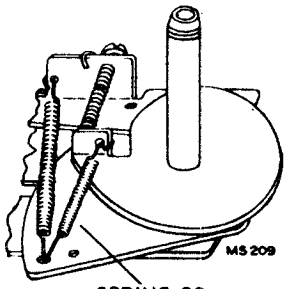

FIG. 39

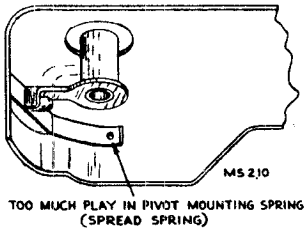

FIG. 39A

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Premature Tripping

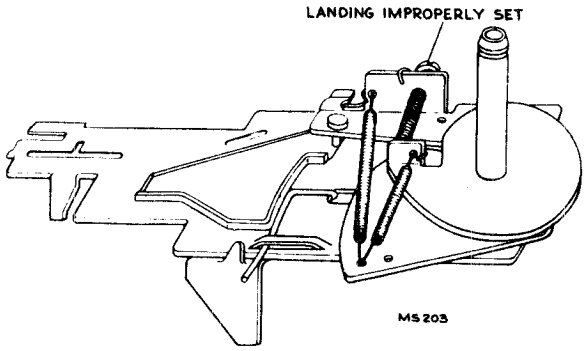

FIG. 40

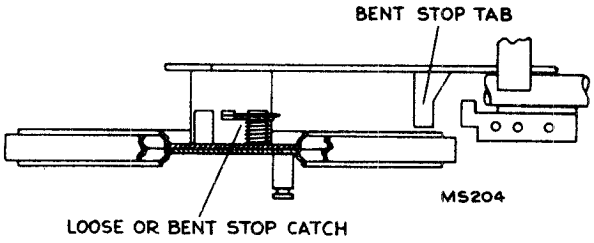

FIG. 41

Distorted or No Output

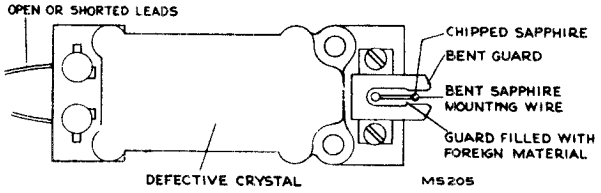

FIG. 42

Feedback or Howl

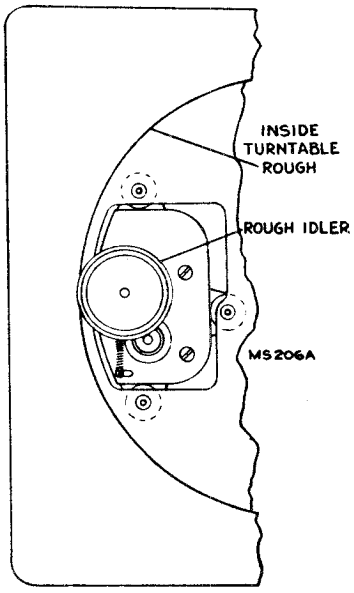

FIG. 43

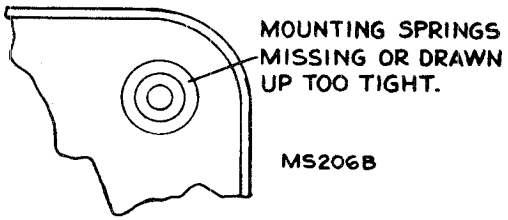

FIG. 44

Rumble

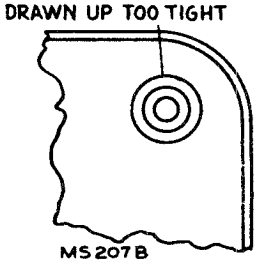

FIG. 45

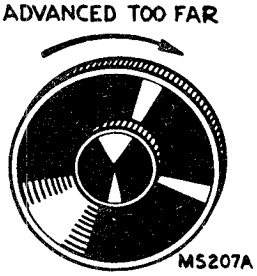

FIG. 46

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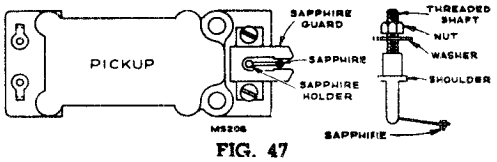


FIG. 47

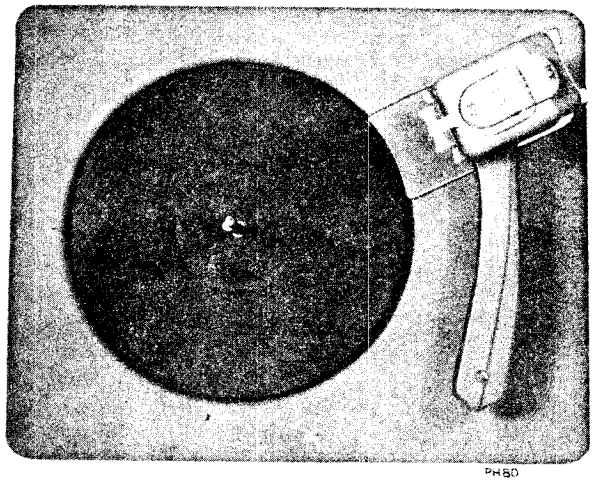
Caution: Never bend the sapphire support wire.

The nut on the sapphire holder assembly is locked by a light cement (such as Glyptal). Extreme care should be used when loosening the nut so that the twisting motion does not break the crystal.

Remove the two screws holding the sapphire guard in place and remove guard. Remove the small nut and washer on the threaded shaft of the sapphire holder and gently push the shaft through the hole in the armature shaft until the sapphire holder assembly comes free.

Use of a drop or two of acetone will facilitate the removal of the nut and shaft. Do not use force as the crystal may be broken.

Insert threaded shaft of replacement sapphire holder through armature shaft and replace the washer and nut. Make sure that the sapphire is in the correct position. Take hold at the lower end of the shaft with a pair of pliers while tightening the nut, being very careful so as not to strip the threads or break the crystal. Replace the sapphire guard, positioning it by means of the oversize screw slots. Make certain that the sapphire and its supporting wire are centered in the guard. Tighten the guard screws. Before using, check to see that the sapphire projects far enough (approx. .020) beyond the guard so that the guard will not strike the record. If necessary, bend the guard a little. Apply a drop of light cement (such as Glyptal) to the sapphire nut holder.


PH50

NOTE: The major difference between the two models is the addition of an "Off-On" switch on the motorboard on Model 960260-1.

Features

1. This mechanism is designed to play automatically a series of twelve 10-inch or ten 12-inch standard records of the 78 r.p.m. type.
2. It will play manually records up to 12 inches in diameter.
3. Tripping system is of "constant diameter" type, insuring reliable automatic operation on all records made to RMA proposed standards.
4. It is a simple operation of turning one record support to change from 10- to 12-inch records or vice versa.
5. Cycling mechanism is disconnected completely while records are being played. This reduces the load on the drive motor, thereby reducing the tendency for "wow" or rumble.

Manual Operation

1. Rotate the record separator shelf clockwise for 10-inch or counterclockwise for 12-inch position (numerals 10 or 12 pointing towards center post).
2. Place the record to be played on the turntable and turn the power switch on.
3. Place the pickup on the start of the record.

   Note: The mechanism should be allowed to complete cycle before attempting to move tone arm to the rest position.
4. Turn power switch off manually.
5. Remove the record by raising straight up without tilting.

Automatic Operation

1. With the power switch in the off position rotate the record support shelf as required for 10- or 12-inch records until the record size indicated on the support cover is pointing toward the center post. (Rotate clockwise for 10-inch and counterclockwise for 12-inch records.)
2. Place the records to be played in a stack with desired selections upward and in proper sequence with the last record on top. Load them on the changer by placing them over the center post and resting on the record support shelf. Place record stabilizing clip on top of the record stack.
3. Turn power switch on and press down firmly but momentarily on the end of the tone arm and let go. The changer will continue to play one side of the entire stack automatically.

   The tone arm can be moved to the rest position any time the mechanism is not in cycle.
4. Turn the power switch off and remove the stack from the turntable by placing fingers of both hands directly opposite and under the stack. Then lift straight up—"don't tilt" or squeeze stack. Turning the support shelf one-fourth turn facilitates removal of records.

Cautions

1. Avoid handling the tone arm or rotating record support assembly while mechanism is in cycle.
2. Never turn the power switch off, leaving the mechanism in cycle for an extended period of time.
3. Do not allow the records to remain on supports when not in use.
4. Do not allow oil or grease to come in contact with any rubber parts.
5. Do not install instrument near source of heat. Excessive heat may damage the pickup cartridge.

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Replacement Parts

REF. No.	STOCK No.	DESCRIPTION
		OPERATING ASSEMBLIES
1*	72456	Cover—Cover assembly, including record clip rod (4) and spring (3)
2†	—	Clip—Plastic clip, part of item (1)
3	71232	Spring—Record clip spring
4	71233	Rod—Record clip spring rod
5*	72458	Arm—Push-off arm
6†	—	Screw—Adjusting screw for collar (10) and arm (5)
7*	72459	Slide—Slide assembly, including push plate pin (7A), rotating plate (7B), push plate (7C), mounting plate (7D), push plate spring (8), mounting plate spring (9)
8*	72460	Spring—Push plate spring (located on top of push plate)
9	71211	Spring—Head mounting plate spring (located on bottom of mounting plate)
10*	72461	Collar—Lift adjusting collar
11	71283	Arm—Tone arm, including tone arm eye (11A), pivot spring (13), arm lift bearing pin (14)
12†	—	Rivets—Included in item (11)
13†	—	Spring—Spring pivot, included in item (11)
14†	—	Stud—Arm lift bearing pin, included in item (11)
15	71169	Clip—Spring clip to hold pickup leads in arm
16	70338	Crystal—Crystal cartridge complete with guard and sapphire
16A	72345	Sapphire—Sapphire and holder assembly
16B	38452	Guard—Sapphire guard
16C	37763	Screw—#2-56 x 1/8" screw for sapphire guard
16D	70341	Nut—Mounting washer and nut for sapphire
17†	—	Screw—Mounting screws for pickup
18†	—	Washer—Lockwasher for mounting pickup
19*	72462	Lift—Tone arm lift
20*	72463	Spring—Brake spring
21*	72464	Ring—Arm control support tube retaining ring
22*	72465	Support—Tone arm support
23*	72466	Washer—Spring washer
24†	—	Screw—Mounting screws for item (7)
25*	72467	Base—Operating mechanism mounting base, less all removable parts
26*	72468	Rest—Tone arm rest and reject button
27	71235	Centerpost
28	71237	Turntable
29*	72469	Spring—Safety spring
30*	72470	Spring—Landing tension spring
31*	72471	Control—Arm control comprising bracket (31C), support tube and arm (31B), control pin (31A)
32*	72472	Screw—Landing adjustment screw
33*	72473	Spring—Lock spring (for landing adjustment)
34*	72474	Spring—Cushion spring
35*	72475	Spring—Trip spring
36*	72476	Plate—Arm control plate, including stop tab (36A), track (36B), size change stop stud (36C)
37*	72477	Riser—Riser plate assembly, including motion bracket (37A), plate tab (37B), inclined track (37C)
38	71191	Spring—Recoil spring
39†	—	Washer—Included with item (42)
40†	—	Washer—Included with item (42)
41†	—	Spring—Included with item (42)
42*	72478	Cam—Push-off cam (42B) and shaft (42A)
43*	72479	Cam—Eccentric cam and tire, including 43A, B, C, D
43A*	72485	Catch—Reject catch

REF. No.	STOCK No.	DESCRIPTION
43B*	72486	Spring—Reject catch support spring
44*	72480	Spring—Eccentric cam spring
45†	—	Washer—Used for mounting eccentric cam
46†	—	Screw—Eccentric cam mounting screw
47	71198	Tire—Rubber tire only for eccentric cam
48	71239	Washer—One set of cork washers for turntable
49	71238	Bearing—Turntable thrust bearing
50†	—	Washer—Included with item (49)
51	71188	Support—Turntable mounting support, including guide rods
52†	—	Screw—Mounting screws for guide rods
53*	72481	Roller—Turntable shaft knurled roller
54	71200	Screw—#8-32 x 1/8" Bristol set screw for knurled roller
55†	—	Washer—Lockwasher for mounting center post
56	71236	Nut—Hex nut for centerpost
57	71175	Wheel—Drive idler wheel for motor stamped 407B1
	71179	Wheel—Drive idler wheel for motor stamped 407B2
	71184	Wheel—Drive idler wheel for motor stamped 407B3
58	71177	Pin—Cotter pin (hairpin spring) for drive idler wheel on motor stamped 407B1
	71181	Pin—Cotter pin (hairpin spring) for drive idler wheel on motor stamped 407B2
	71177	Pin—Cotter pin (hairpin spring) for drive idler wheel on motor stamped 407B3
59	71176	Spring—Drive idler wheel tension spring for motor stamped 407B1
	71180	Spring—Drive idler wheel tension spring for motor stamped 407B2
	71185	Spring—Drive idler wheel tension spring for motor stamped 407B3
		NOTE: When replacing complete motor, order RCA 71183
60	71183	Motor—Motor complete with drive idler (57), tension spring (59), mounting grommets (62), shaft bushing (60A), mounting bracket (60B), less power cord
60A	71186	Bushing—Motor shaft drive pulley for motor stamped 407B3
61†	—	Washer—Motor mounting washer
62†	—	Grommet—Motor mounting grommet
63†	—	Screw—Motor mounting screw
64	30870	Plug—2-prong male plug for motor cable
65*	72488	Escutcheon—"On-Off" switch escutcheon for 960260-1
66†	—	Washer—Used in mounting support (51)
67†	—	Screw—Used to mount support (51)
68†	—	Terminal—Pickup lead terminal strip
69†	—	Bracket—Base mounting bracket
70†	—	Screws—Mounting screws for bracket (69)
71	39386	Cable—Shielded output cable with pin plug
72	31048	Plug—Pin plug for pickup cable
73*	72487	Switch—"On-Off" switch for 960260-1
74†	—	Screw—Mounting screw for switch (73)
75*	72482	Lever—Reject lever
76†	—	Spring—Reject lever spring
77*	72484	Plate—Reject mounting plate and arm
78†	—	Screw—Reject lever mounting screws
79*	72483	Wire—Reject trigger wire

* This is the first time this Stock No. has appeared in Service Data.

† These parts are not stocked.

CYCLE OF OPERATION

Turn record support to 10- or 12-inch position as desired and place a stack of records on supports.	1. Turning record support positions the push-off cam 42B through the linkage of push-off arm 5 and push-off shaft 42A. In so doing it determines the distance of movement of control plate 36 which governs pickup landing.
Reject button.	1. Press down on tone arm; this actuates reject button on which it is resting. 2. Reject button actuates reject lever. 3. Reject lever transfers action to reject latch 77A through coupling wire 79. 4. The unlatching of reject latch allows eccentric cam 43 to be pulled against rotating knurled roller 53 which starts cycle.
Record plays.	1. While the record is being played and the tone arm moves toward the center of the record, the arm control pin 31A on arm control assembly 31 moves along track 36B as designated by "P," fig. 13. 2. As pickup moves into trip groove on record, tone arm control pin 31A moves into recess in control plate 36 at point indicated by "T," fig. 13. 3. Trip spring 35 pulls arm control plate 36 towards center post 27, and in so doing allows stop tab 36A on arm control plate 36 to stop catch 43A on eccentric cam 43.
Cycling starts.,	1. Spring 44 pulls eccentric cam 43, causing rubber tire 47 to engage rotating knurled roller 53. 2. Eccentric cam 43 mounted on riser plate transfers energy to force the riser plate assembly back along the guide rails 51A away from center post 27. 3. As riser plate moves, the push-off cam and shaft assembly 42 rides along the inclined track 37C of the riser plate 37. 4. This action results in the push-off cam and shaft assembly 42 being pulled down.
Tone arm raises and moves out.	1. The tone arm lift 19 sliding on shaft 42A is pulled downward, contacting lift bearing pin 14, and causing tone arm to raise and clear record. 2. The riser plate tab 37B contacting curved portion of arm control assembly 31, which is coupled to tone arm support bracket assembly, causes the tone arm to be moved outward away from, and clears the edge of the records. Arm control plate is also being carried along by tab 37B contacting spring 34.
Record is separated and drops to turntable.	1. As riser plate 37 continues to travel further along guide rods 51A, the riser plate motion bracket 37A contacts and rotates the push-off cam and shaft assembly 42. 2. Push-off arm 5, being coupled to push-off cam and shaft assembly 42, is rotated, causing push plate 7C to push record off of projection on center-post and dropping it to the turntable. **Note:** The small separator latch 27A in the end of the center post functions as a thickness gauge, allowing only one record to be pushed off the projection at one time.
Mechanism continues to cycle, returning tone arm and positioning it for landing.	1. As eccentric cam 43 is returning to minimum diameter (out of cycle position), riser plate is being pushed back to normal position by recoil spring 38. At the same time, the push plate spring 8 is pushing the push plate 7C and push-off arm 5 back to normal position. 2. The portion of arm control assembly mounting the control pin 31A, and the control bracket 31C, are hinged on the plate forming part of assembly 31. Since the pin 31A has followed the track 36B and the curved portion of bracket 31C was forced out by motion of tab 37B, the tension of spring 30 is tending to pull them together as the riser plate is returning to normal position. The governing factor in determining how far the bracket will be pulled in, is the setting of the landing adjustment screw 32.
Pickup lands.	1. During part of the change cycle when riser plate was in the outermost position, and carrying arm control plate along by tab 37B contacting spring 34, the stud 36C is stopped by cam 42B. This acts as a gauge to determine the point of contact of pin 31A on arm control track 36B. This cam having two different radii will govern the distance arm control plate can travel since this is set when the record size change is made. If the smaller radius side of cam 42B is toward stud 36C, the arm control pin 31A will ride portion of track 36B designated by "L", causing the pickup to land on 10-inch records. On the other hand, if the larger radius portion of cam is toward the stud, the pin will ride along track designated by "S", which determines landing point on 12-inch records.

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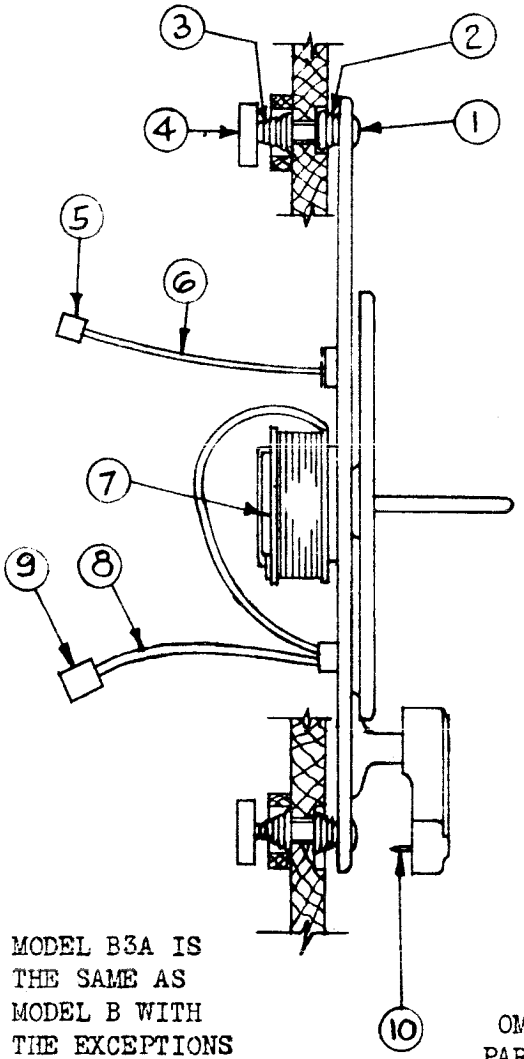
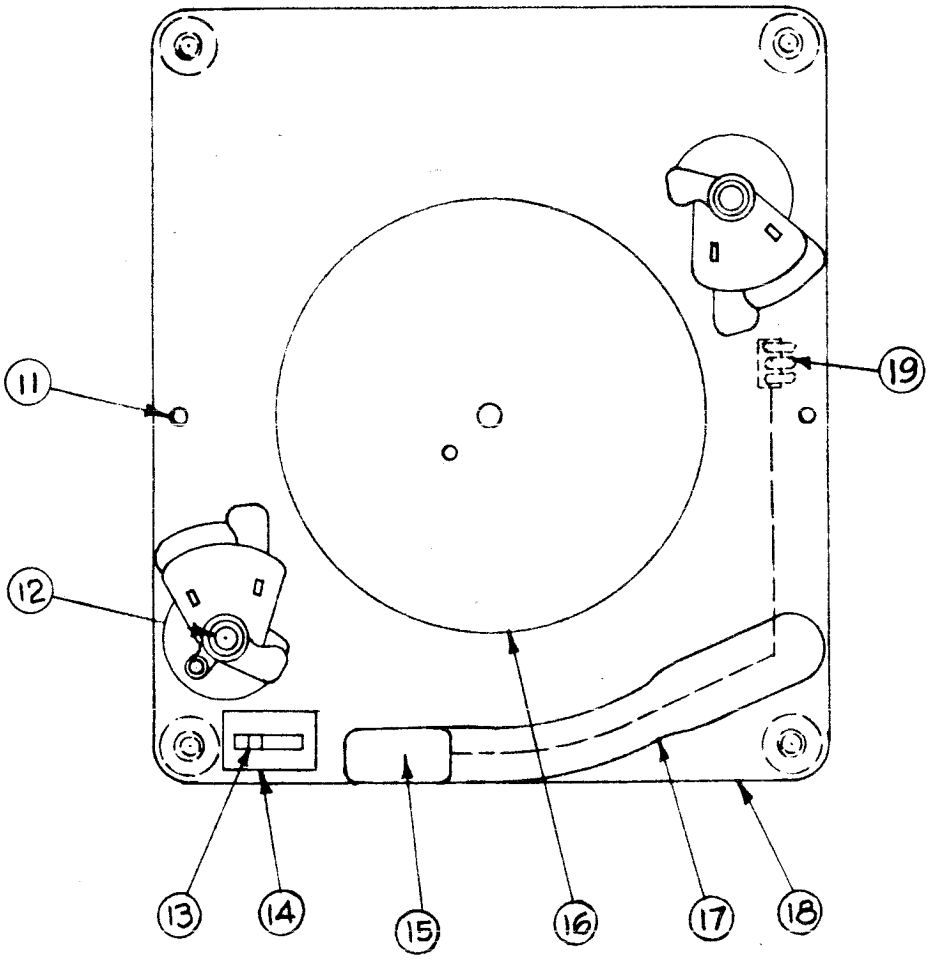




MODEL B3A IS THE SAME AS MODEL B WITH THE EXCEPTIONS SHOWN ON THE RIGHT. FOR COMPLETE DATA, SEE PAGES 551 TO 566 INCLUSIVE IN RIDER'S "AUTOMATIC RECORD CHANGERS AND RECORDERS".

OMIT THE FOLLOWING PARTS:

PART NO.	IDEN.	DESCRIPTION
B-27085	1	Panel Mtg.Stud
H-20198	3	Mtg.Spring(lower)
H-20199	4	Clamp nut
	5	Pickup plug
	9	Line plug
	10	Needle(see Pickup)
B-27090	15	Pickup cartridge

ADD THE FOLLOWING PARTS:

PART NO.	IDEN.	DESCRIPTION
B-27545	1	Spring Mtg.Stud
B-27404	6	Pickup lead-plug assembly
B-27415	8	Motor lead-plug assembly
J-22404	15	Pickup cartridge (LP-6)

MODEL K

J. P. SEEBURG CORP.

Instructions
AUTOMATIC RECORD CHANGER

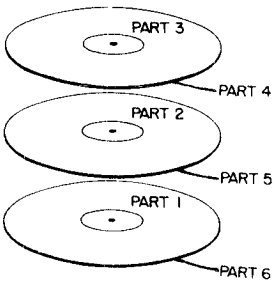
LOAD. Lift and turn both Selector Arms for 10 or 12 inch records as desired (Arrows pointing *directly* at spindle). Load changer with up to fourteen 10 inch records or up to ten 12 inch records, not intermixed.

START AND STOP. Turn radio switch "ON" and set Radio-Phono switch to "PHONO". Move Control Knob to "REJECT" and release it. The changer will now play the entire stack and keep repeating the last record until shut off. (To shut off before entire stack has been played move Control Knob to "OFF', lift Tone Arm and move out to Rest Position.)

UNLOAD. Move Control Knob to "OFF". Remove unplayed records on Selector Arms. Lift and turn Selector Knobs until Arms clear the records. Remove records from Turntable. The changer can now be reloaded as described above.

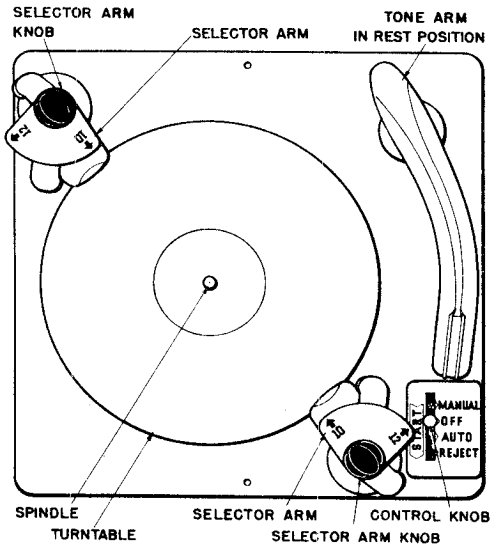
REJECTING A RECORD. To reject a record before it has finished, move Control Knob to "REJECT" and release it. The changer will reject that record and continue to play the remainder of the stack.

RECORD SEQUENCE (Automatic playing). Complete operatic or symphonic works usually require two or more records. When ordering such records, specify that they are for a "Drop Type" changer and arrange them in the sequence illustrated. Example:



A 3 record-6 part recording. After parts 1, 2 and 3 have been played, turn the stack over and the remaining half will be in proper sequence.

MANUAL OPERATION. Odd-sized or very old records and home recordings should be played manually. Lift and turn Selector Knobs as for unloading. Place record on turntable. Move Control Knob to "MANUAL" position. Place tone arm on record and when finished playing return by hand to rest position. To stop, move Control Knob to "OFF" position.



CARE OF RECORDS. Wherever possible, records should be kept in albums and away from domestic heating units. Remove records from changer when through playing. Remove dust with a soft, dry cloth.

PHONOGRAPH NEEDLES. Any needle that is designed to play fifteen or more records can be used. It is more economical to purchase a needle rated at 1,000 plays or more. Do not exceed the maximum allowable plays on such needles.

HELPFUL HINTS.

POOR TONE QUALITY—EXCESSIVE NEEDLE SCRATCH is usually due to a damaged or worn needle or record. Replacing either, or both, is the obvious remedy.

RECORD CATCHING ON SELECTOR ARMS may be caused by using defective or badly warped records. These should be played manually.

SLIPPING ON TURNTABLE is caused by a warped record that does not present enough contact surface to the record below it, producing an uneven sound.

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LUBRICATION applied at the time of manufacture is usually sufficient for several years of normal operation. If, after a prolonged period, there is reason to believe that further oiling is necessary, it is recommended that you consult your dealer.

SQUEAKS AND CHAFING NOISES can be corrected by aligning unplayed records on the spindle.

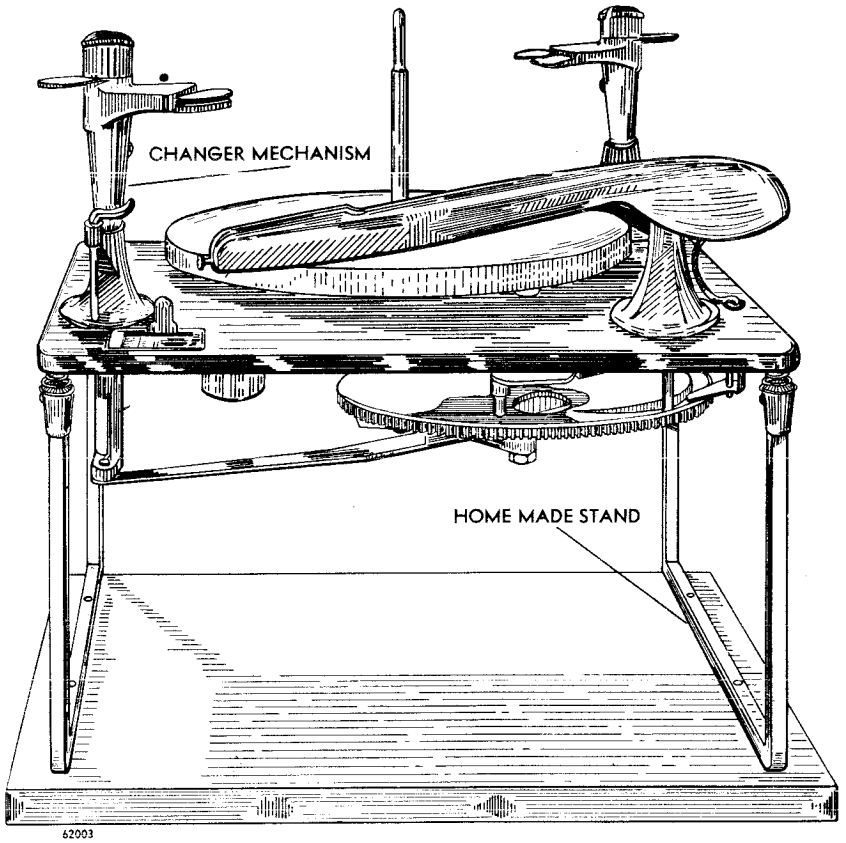

FIGURE 3.

A home-made work stand, indicated above, permits easy access to all parts of changer mechanism.

I CYCLE OF OPERATION

After placing changer in operating position, with records on the selector arm posts, the control knob governs all subsequent automatic operations.

A. CONTROL SLIDE—Moving the control slide from "OFF" to "REJECT" starts the changer into "AUTOMATIC" operation in three steps:

1. As the control slide moves from "OFF" past "AUTOMATIC", slot "a" in the control slide (1) turns on the power switch (2) starting the motor and turntable.

2. When the control knob reaches "reject", the changer is manually "tripped" as follows:

The control slide pushes connecting link (3), moving the reject slide (4) in direction of arrow. Surface "b" strikes trip lever stud "c". Trip lever (5) movement releases the clutch engagement lever (6). (Levers 5 & 6 are mounted on drive gear (8).

3. When the control knob is released, it returns from "REJECT" to "AUTOMATIC".

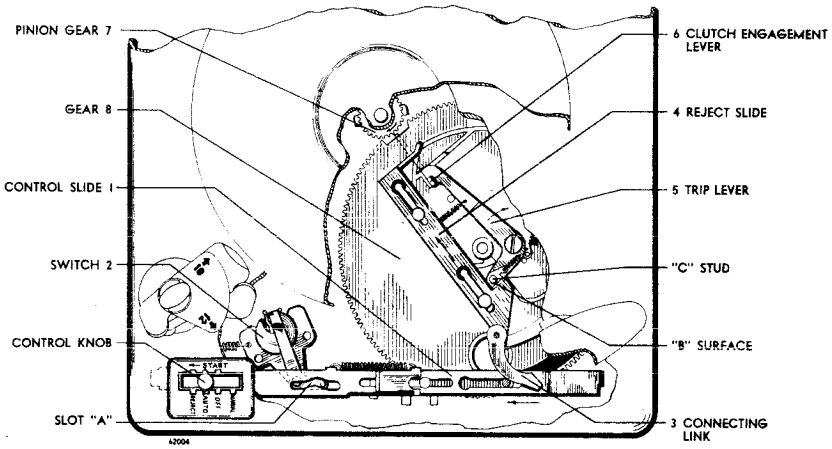

FIGURE 4. CUT AWAY TOP VIEW

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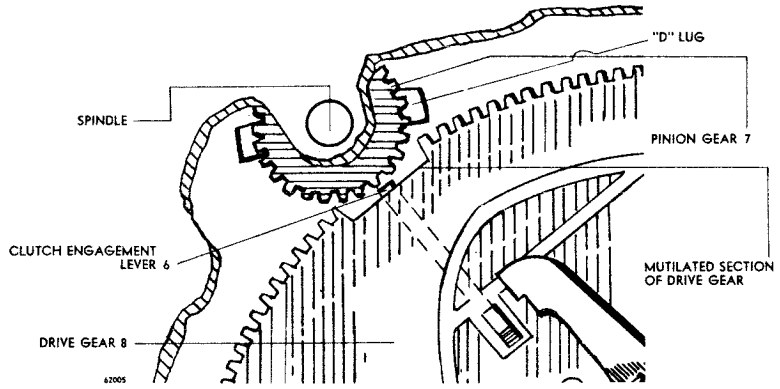

FIGURE 5. CUT AWAY TOP VIEW

B. CLUTCH ENGAGEMENT Lug "d" on the rotating pinion gear (7) strikes extended portion of clutch engagement lever (6) causing drive gear (8) to rotate and mesh with pinion gear (7). (Open tooth or "mutilated" section of drive gear (8) permits pinion gear (7) to rotate freely, EXCEPT during change cycle.)

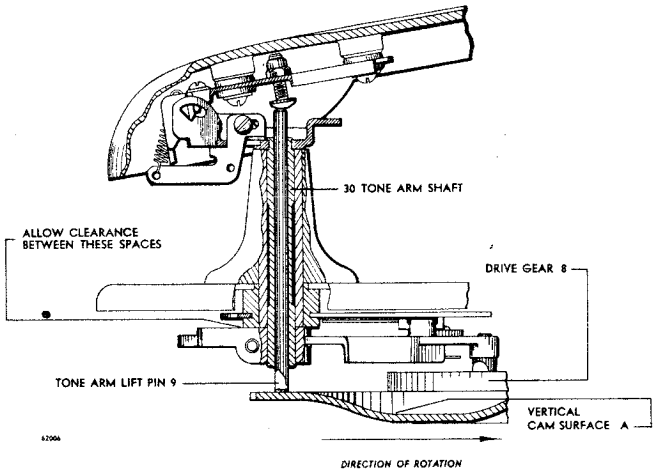

FIGURE 6. CUT AWAY SIDE VIEW

C. ROTATION OF DRIVE GEAR (8) results in the following cam actions:

1. Vertical cam "e" moves the tone arm lift pin (9) and raises the tone arm.

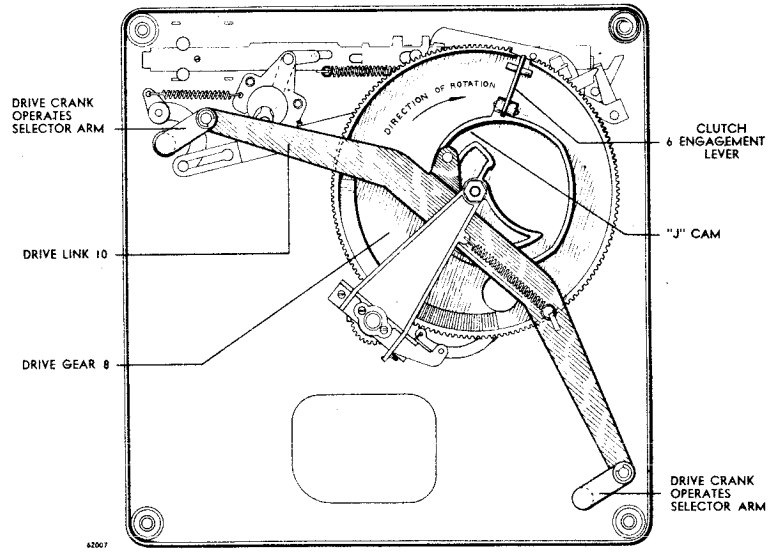

FIGURE 7. BOTTOM VIEW

2. Cam "J", (bottom surface of drive gear) actuates the drive link (10) that induces the quarter turn by which the selector arms release a record.

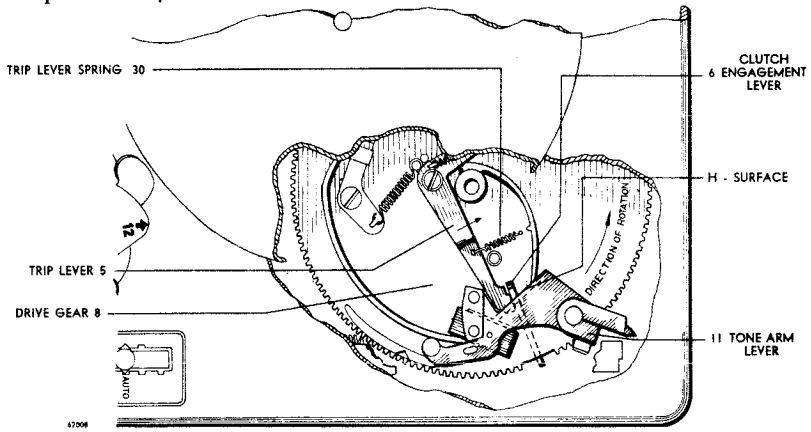

FIGURE 8. CUT AWAY TOP VIEW

3. Surface "h" on the locked tone arm lever (11) resets the trip by latching the clutch engagement lever (6) to the trip lever (5).

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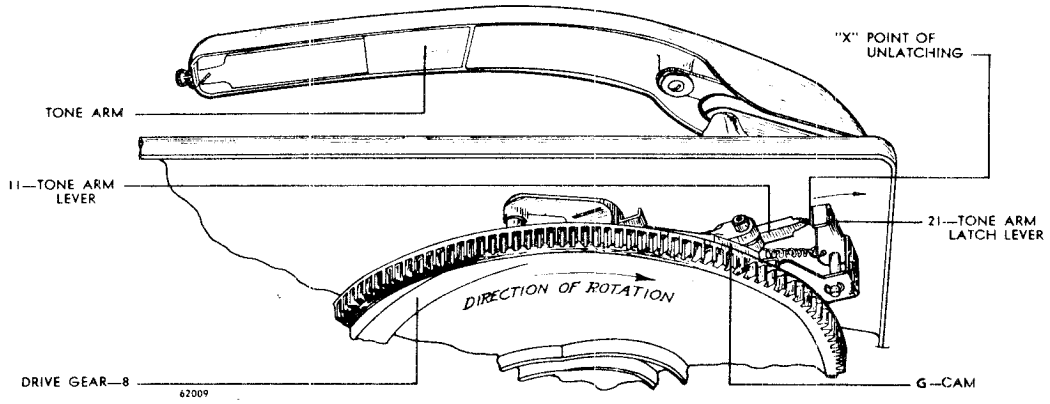


FIGURE 9. BOTTOM VIEW

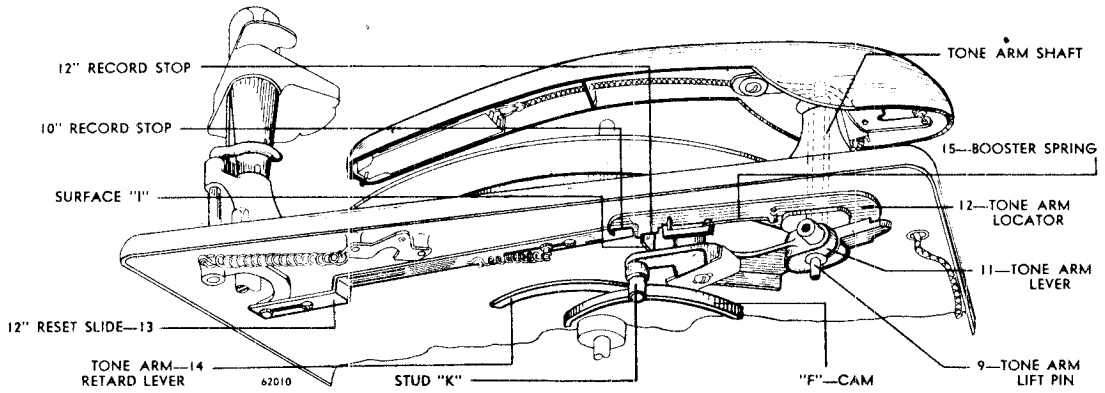


FIGURE 10. CUTAWAY BOTTOM VIEW DRIVE GEAR

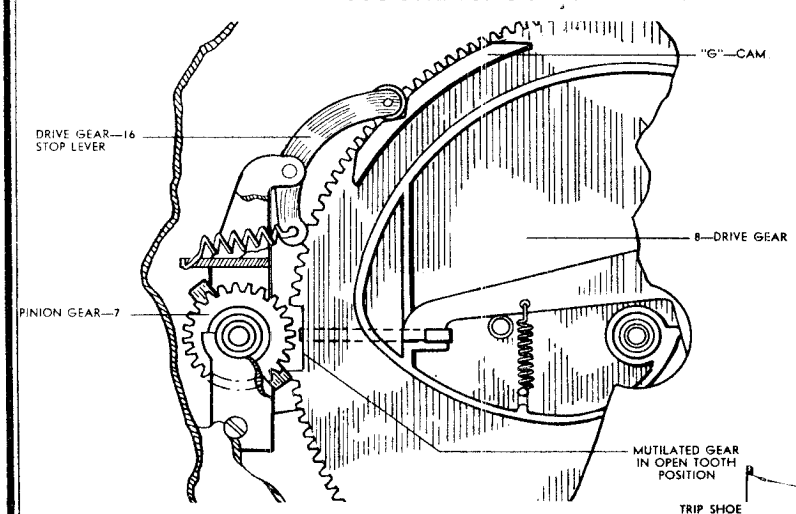
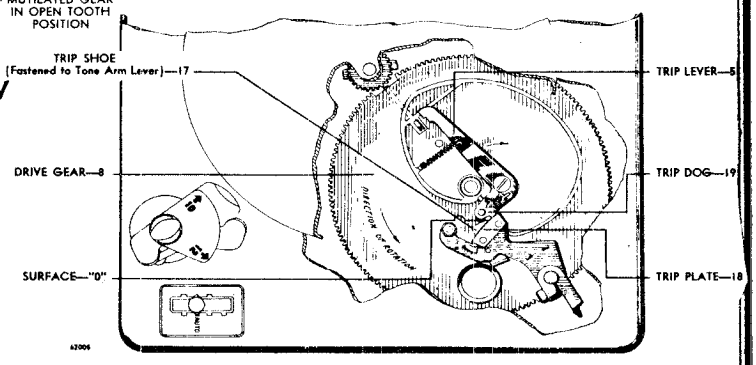


FIGURE 11. CUT AWAY TOP VIEW

FIGURE 12. CUT AWAY TOP VIEW



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4. Cam surface "g" moves the tone arm latch lever (21) so as to unlatch the tone arm lever (11) at point "x". Thereafter the stud "k" on the tone arm lever follows the receding cam "f", shown in figure 10.

5. Spring pressure from tone arm locator (12) moves the tone arm lever (11) and tone arm toward the record. Selector arm settings determine the point at which the tone arm locator (12) stops at surface "i" on the 12″ reset slide (13). Sketch above shows 10″ and 12″ record stops.

6. Stud "k" is contacted by the retard lever (14) holding it in position during the time of lowering the needle on the record. (See retard lever.)

7. Tone arm lift pin (9) follows vertical cam on drive gear and lowers tone arm to the record. After the needle has touched the record, booster spring (15) exerts a slight pressure, causing the needle to enter starting groove.

8. As the needle starts in the groove, drive gear (8) completes its rotation and is locked in open-tooth position by the drive gear stop lever (16) in detent in cam "g".

D. AUTOMATIC TRIPPING—At the end of a record, the needle enters the cut-off groove and a new change cycle is set in motion by either of two actions releasing the clutch engagement lever (6).

1. MINIMUM DIAMETER CUT-OFF occurs when trip shoe (17) strikes trip lever (5) at point "o".

2. ECCENTRIC GROOVE CUT-OFF occurs when the tone arm is moved away from the spindle. The sawtooth edge of the trip plate (18) engages and moves the trip dog (19), causing the trip lever (5) to function.

The changer has now completed one cycle of automatic operation.

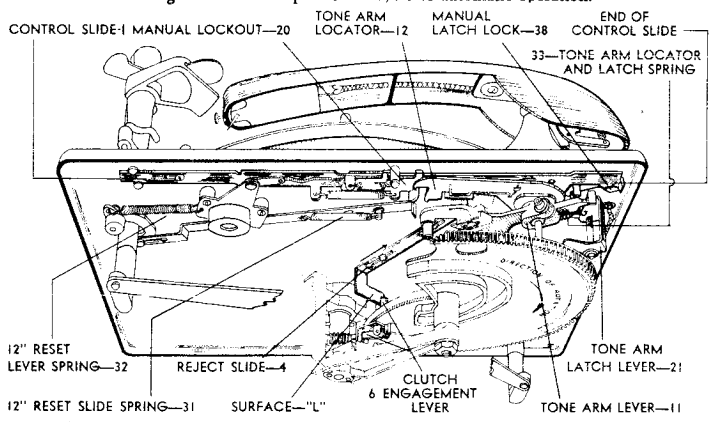

FIGURE 13. BOTTOM VIEW

II MANUAL OPERATION

With the control knob in "MANUAL", the control slide (1) sets up 4 conditions:

A. Motor switch is on.

B. The end of the control slide (acting through the manual latch lock (38) partially disengages the tone arm latch lever (21) from its locked position. It now serves as a detent for the tone arm while in rest position and prevents its movement due to accidental bumping.

C. The manual lockout (20) on the control slide prevents the tone arm locator (12) from moving inward, thereby permitting free movement of the tone arm by hand.

D. The reject slide (4) is in position so that surface "1" holds the clutch engagement lever (6) and prevents tripping.

III DETAILED DESCRIPTION OF CERTAIN FUNCTIONS AND PARTS

A. TONE ARM LATCH LEVER (21)

1. *Functions and Positions:*

a. A positive lock for the tone arm when the latter is swung to the outside of the panel in all positions of the control slide other than "MANUAL". This is brought about by the engagement between the tone arm lever (11) and the tone arm latch lever (21).

b. A partial lock, or detent, for the tone arm while the control slide is in "MANUAL". This results when the control slide is moved to the "MANUAL" position. The back edge of the control slide strikes the manual latch lock (38), which in turn moves the tone arm latch lever (21).

c. Complete disengagement results through the cam "g" on the outside edge of the drive gear during the Automatic change cycle. It is this unlatching action which puts the tone arm back into AUTOMATIC operation when the control slide is moved to the REJECT position.

2. *Actions*

a. When the tone arm is playing a record in "AUTOMATIC" position and is moved to the rest position, the tone arm latch lever (21) must positively lock the tone arm lever (11).

b. When the control slide is moved to "MANUAL" the turned down portion of the control slide must contact the manual latch lock (38) which pulls the tone arm latch lever (21) and changes its contact with the tone arm lever (11) from a positive lock to a partial lock, giving a light, smooth detent action when the tone arm is in the rest position. (See Fig. 13)

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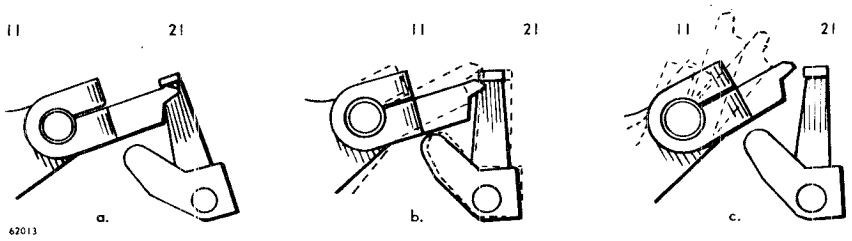

FIGURE 14.

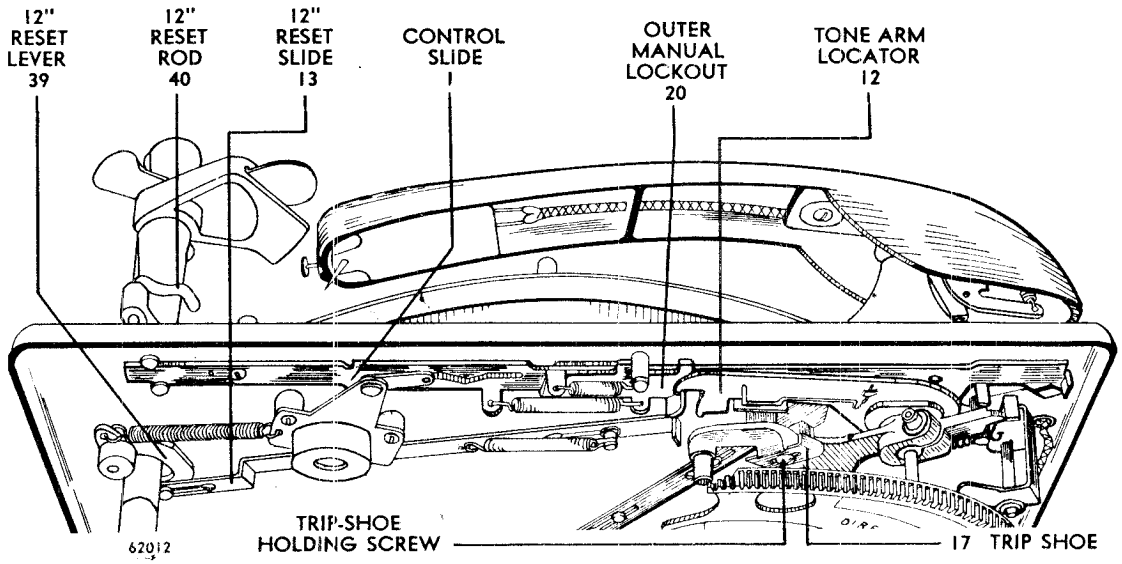

FIGURE 15. CUTAWAY BOTTOM VIEW

B. MANUAL LOCKOUT ASSEMBLY (20) engages and retains the tone arm locator (12) in its outermost position while the control slide is set in the "MANUAL" position. There are three actions involved:—

1. When the tone arm is in the rest position, and the control slide is moved into MANUAL, the outer manual lockout (20) moves to hold the tone arm locator from moving inward.

2. The manual lockout (20) and the tone arm locator (12) must remain engaged, while the control slide is moved into any other position, until automatically released by the Drive Gear Cam.

3. With the tone arm lever in "MANUAL" position the manual lockout will slide back and allow the lockout engagement described in "1" above if the tone arm is being moved into the rest position.

C. 12" RESET SLIDE (13), 12" RESET LEVER (39), AND 12" RESET ROD (40) indexes the tone arm properly for a 10" or 12" record, depending upon the setting of the selector arm. This is accomplished by transmitting the motion (due to the reset rod contacting the smooth surface or the rib) on the selector arm to the 12" Reset Lever. (See Fig. 14

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D. TONE ARM RETARD LEVER (14).

1. Maintains a light pressure outwards during that part of the cycle after tone arm lever (11) leaves the cam surface of the large gear. The purpose is to prevent overswinging of the tone arm and hold it at the radius previously determined by the locator lever (12) immediately prior to and during the time of lowering the needle on to the record.

2. Prevents action of the booster spring (15) until such time as the needle has actually landed on the margin of the record.

EXCESSIVE TENSION on the tone arm retard lever spring (26) would tend to cause a jerky motion of the tone arm during the part of the cycle described in "1" above. Extreme tension might even cause incorrect indexing by not allowing the tone arm to go into the proper diameter as determined by the locator lever (12).

INSUFFICIENT TENSION on the retard lever spring (26) would result in a premature booster spring (15) action so that the needle would land inside the margin of the record. Extremely weak pressure, or no spring pressure at all, would result in an overswing of the tone arm causing the needle to land some place in the middle of the record.

E. BOOSTER SPRING (15)—Its purpose is to move the needle into the first playing groove on records which do not have a lead-in groove. Booster spring pressure is correctly adjusted when it causes the needle to move from the index point to the starting groove and no further. Excess pressure may cause the needle to scrape across the first few grooves. See tie in with retard lever action.

F. TONE ARM KNIFE EDGE HINGE In order to reduce vertical friction of the tone arm to a minimum as required for best operation with light pressure pickups, the hinge bracket is of the knife edge type. A hardened steel knife edge "m" seats, under spring (24) pressure, into v's, "n", in the lower bracket.

1. The knife edge must not be broken or damaged.

2. There must be a slight amount of sidewise play between the bracket and the lower part of the knife edge shoulder, and also between the brackets themselves.

NOTE:

Side clearance of the knife edge shoulder "p" in its bracket will give correct performance during playing since the knife edge is held solidly seated in the bracket by a spring. Also the movement of the knife in the bracket, when the arm is handled manually, has no significance since the knife edge reseats itself due to the spring action when released.

3. INCORRECT SIDE PLAY OR CLEARANCE

a. Insufficient sidewise play will result in rubbing or vertical friction.

b. Excessive clearance will result in erratic tone arm landing and cut-off operation, since the whole arm may shift slightly during the change cycle.

G. HOW TO REMOVE TURNTABLE

It should be removed, by lifting *carefully*, tapping spindle *lightly* if necessary. This will expose top spindle bearing. When replacing turntable, slot in hub (28) must seat properly over spindle pin. (Rotate 180° for best fit). Push idler wheel in while lowering, so rubber rim will not be damaged by turntable edge.

IV ADJUSTMENTS

A. MOTOR FAILURE, *possible causes:*

1. Power supply off, worn or broken wire, or defective plug.

2. Faulty switch.

3. Linkage between switch and control slide.

CAUTION: The control slide must operate an over-center action of the switch when it is moved *slowly* in either of the positions adjacent to "OFF".

4. Burned out, or open motor coils.

B. MECHANICAL BINDS

1. During change cycle:

a. Rotate turntable by hand, clockwise.

b. If it seems to bind at one point only, examine the drive and pinion gears for foreign matter between the teeth.

c. Examine the turntable spindle and selector arm bearings for lack of lubrication.

2. During playing cycle: Idler wheel slide should move freely and its spring tension must be positive so that idler wheel maintains constant contact with turntable rim and motor shaft.

CAUTION: Excessive tension on this spring will cause rapid wear of idler wheel and "rumble" when playing.

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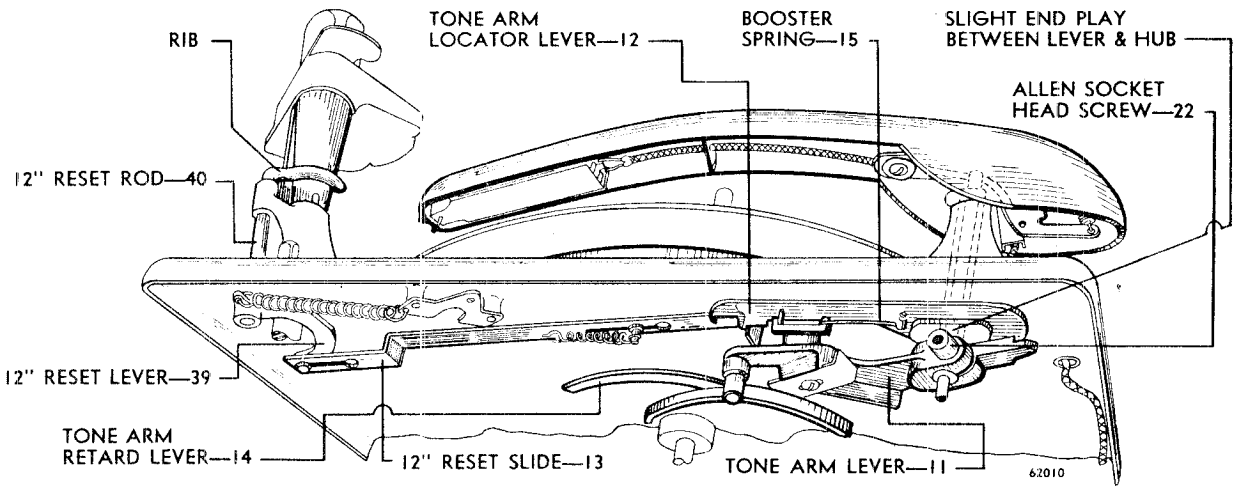

FIGURE 16. BOTTOM VIEW

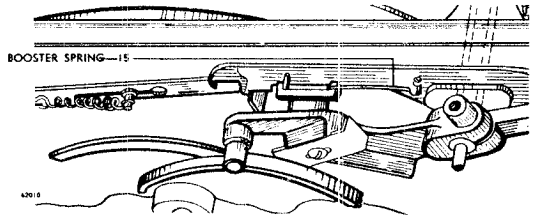

FIGURE 17. BOTTOM VIEW

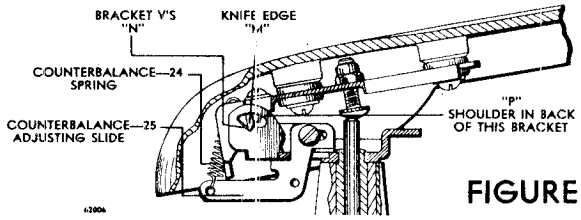

FIGURE 18. CUTAWAY END VIEW

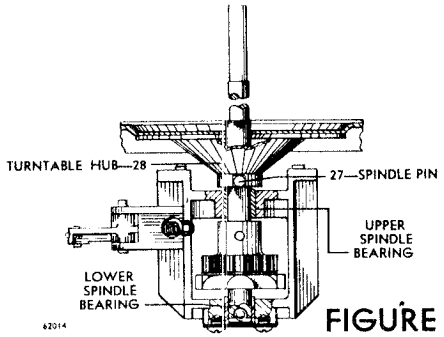

FIGURE 19. CUTAWAY SIDE VIEW

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C. MECHANICAL JAMS—Shut off power and proceed as follows:

1. Rotate the turntable counter-clockwise slightly. This should free it.
2. Examine the mechanism for loose, bent parts or foreign matter.
3. A bent clutch engagement lever (6) will cause a failure in the meshing of drive and pinion gear teeth at the start of a change cycle.
4. As a further aid, it is recommended that the text and sketches, starting with Fig.4, be studied.

D. RECORD JAMS *are caused by:*

1. Selector arms improperly set.
2. Odd-sized, badly warped or damaged records. Play these in "MANUAL" position.
3. Selector blades damaged or improperly adjusted. See next page.

E. RECORD DROPS ON ONE SIDE ONLY if it has an unusually large center hole or a broken edge. Also examine the mechanism for a bent spindle or selector arm post, due to rough handling.

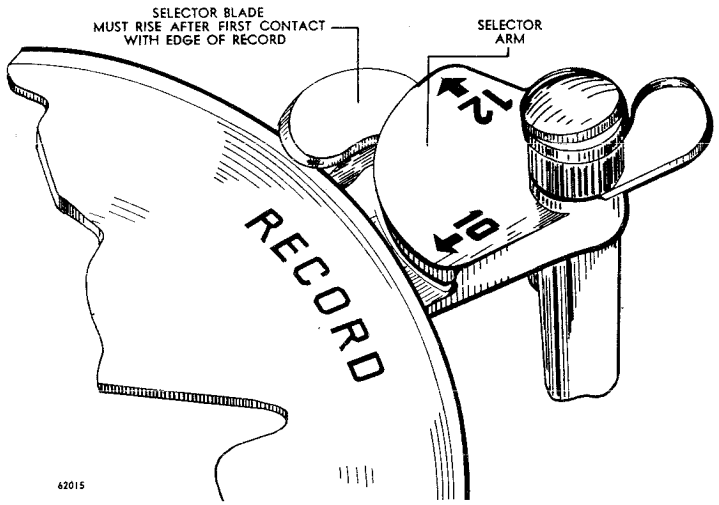

FIGURE 20. TOP VIEW

F. SELECTOR ARMS AND BLADES

1. BLADE ADJUSTMENT *(see fig. 20)*

a. If an adjustment is necessary, place a 10″ record of average thickness (.074″) on the selector arms and manually rotate the turntable clockwise until the selector blade contacts the record. The blade must rise after it first contacts the edge of the record. This rising cam action results whenever pressure is applied to the leading edge of the selector blade. The blade may be adjusted by bending, very slightly, to correct position (use pliers with tape lined jaws). The height to which blades are set must be less than the minimum record thickness, otherwise the blade will attempt to change two records at a time, due to the cam action which *always* operates in an *up direction*. When necessary, make the same adjustment on the 12″ selector blades, using a 12″ record (approximately .090″ thick).

b. The leading edge of blade must be smoothly rounded and well polished.

c. Blade must be very free in its mounting so that it will return to normal position by its own weight.

2. SELECTOR ARMS must be parallel with each other, and must be synchronized so that a record will drop evenly onto the turntable.

G. INCORRECT TONE ARM INDEXING

1. Study the text concerning Fig. 13. Examine the following two springs for being loose, of improper tension or missing: 12″ Reset Slide Spring (31), 12″ Reset Lever Spring (32).
2. Incorrect Locator Spring Tension (33)

a. Insufficient spring tension will produce erratic or incorrect tone arm landing since the locator will not seat in the fixed 10″ or 12″ indexing position. (See page 8) It will also result in a jerky action of the tone arm, since the tone arm lever will not accurately follow the cam surface of the large gear.

b. Excessive spring tension will result in a stiff, heavily loaded "feel" as the tone arm is moved into the rest position. It may also produce a stiff action of the control slide (when the manual lockout is engaged) and cause increased wear on moving parts.

3. Tone arm retard lever (14) binds. Examine its pivot point for foreign matter between gear casting and shoulder screw. Also, examine retard lever spring (26) for proper action. (See Fig. 16.)
4. EXCESSIVE CLEARANCE at tone arm hinge bracket. (See Fig. 18.)

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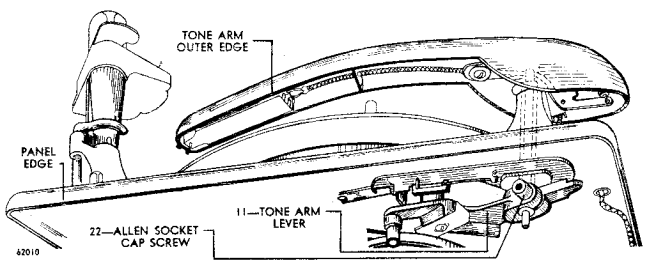

FIGURE 21. BOTTOM VIEW

H. TONE ARM POSITIONING *is as follows:*

Note: Before attempting the following procedure in order to correct tone arm landing, check previous page, since any one of these reasons may be the actual cause of incorrect landing.

1. Set the control knob in the "OFF" position (power plug out).
2. Place a 10" record on the turntable and set the selector arms (10" arrows pointing directly at the spindle).
3. Loosen the Allen socket cap screw (22) just enough to allow the tone arm lever to still hold its position.
4. Line up the tone arm's outer edge evenly with the panel edge. This gives the tone arm an approximate setting.
5. Push the control knob to "REJECT" and release it. Rotate the turntable clockwise and observe where the needle first touches the record. This should be about one-eighth inch from the edge. Variations should be corrected by slipping the tone arm lever (11) in the correct direction.

Caution: Before tightening the Allen screw, make certain that there is enough vertical clearance in the tone arm shaft to avoid binding while the tone arm swings.

6. Replace the 10" with a 12" record and set selector arms accordingly. If the 10" adjustment was made correctly, the 12" indexing should be automatically correct.

I. TONE ARM HEIGHT *adjustment:*

1. The height to which the tone arm rises is correct when there is an approximate 1/16" clearance between it and the bottom of a 10" record on the selector arms. This clearance is regulated by the tone arm adjusting screw (23).

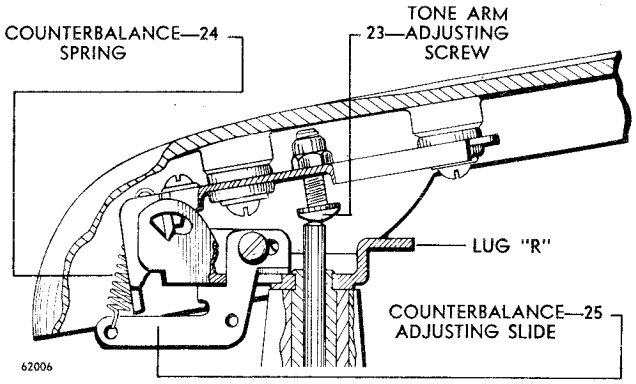

FIGURE 22. CUTAWAY SIDE VIEW

2. The down position of the tone arm is fixed by lug "r" on the tone arm hinge assembly. The correct height is that which will allow the bottom edge of the tone arm and cartridge to clear the turntable surface by approximately 1/16". This adjustment may be corrected by a slight bend of the lug "r".

J. NEEDLE PRESSURE is controlled by the counter-balance spring (24) in back of the tone arm. The pressure is variable through the counter-balance adjusting slide (25). The needle pressure should not be less than 1-1/8 oz.

K. FAILURE TO TRIP *may be caused by the following:*

1. Old style records without proper cut-off grooves. These should be played in "MANUAL" position.
2. Broken, worn or improper needle which does not follow cut-off groove.
3. Closed-circle trip is incorrectly set. The trip shoe (17) is moveable and loosening its holding screw allows it to be adjusted as required. This adjustment is correct when the needle is 1-7/8 inches from the record center and the trip shoe pushes the trip lever which releases the clutch engagement lever. (See Fig. 15)
4. Tight tone arm lead wire. The shielded wire emerging from the back of the tone arm should be draped so as to permit free movement of the tone arm. Never pull it tight or tie down.
5. The clutch engagement lever (6) not unlatching. This lever has a loose fit at its pivot point and operates by gravity. It is intended to operate dry and must never be lubricated. Keep free from dust and lint. Rotate drive gear 180° from rest position for detailed examination of lever (see fig. 7)
6. Trip lever (5) binding at its pivot point and failing to unlatch engagement lever. Examine for foreign matter between gear casting, lever and shoulder screw.
7. Tone arm binds when moved toward spindle as a result of insufficient vertical clearance for tone arm shaft (30). This is caused by tone arm lever (11) being too close to underside of panel; loosen Allen socket cap screw (22), reset and retighten. (See fig. 6)
8. Trip failure with eccentric cut-off groove records. This can best be analyzed by studying the text concerning Fig. 4.

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L. REPEATED TRIPPING IS *caused by:*

1. FAILURE OF CLUCH ENGAGEMENT LEVER (6) TO LATCH. With the mechanism stopped in the playing position (pinion in open tooth portion of drive gear), latch the clutch engagement lever with the aid of a pencil and unlatch by moving the control knob to "REJECT". Repeat this several times. If it fails to latch:

a. Examine the trip lever (5) for binds or insufficient tension in the trip lever spring (30). Replacement of a weak spring will give a positive latch-up. Do not increase tension to a point where it will cause a *trip failure.* (See fig. 8)

b. Control knob binding in "REJECT" position due to sticking control slide (1) or its associated levers and springs. Examine for loose or missing springs.

c. Manual reject slide incorrectly positioned so that it fails to clear the trip lever while in "AUTOMATIC" operation.

2. FAILURE OF STOP LEVER to properly detent drive gear. See Fig. 11 Examine for proper spring tension.

M. TURNTABLE SPEED should be checked with a stroboscopic disc under running conditions and with the needle on a record. Slow speed may be produced by lack of lubrication in the spindle bearings (35) or slipping of the idler wheel (36). In the latter case, examine for a weak idler spring (37) or for oil in the rubber rim which must be clean and dry. (See fig. 23)

V REPRODUCTION FAULTS

A. NO RESPONSE

1. Pickup cartridge dead.
2. Short in shielded lead circuit.
3. Failure of amplifier system.

B. POOR TONE QUALITY

1. Broken or worn needle. Replace with a new, approved needle.
2. Defective pickup cartridge (try a new cartridge).
3. Improper needle pressure. Adjust needle pressure to that recommended by the pick-up manufacturer and in no case less than 1-1/8 oz.
4. Vertical friction. Examine tone arm hinge (34) for binds while moving arm up and down. (See Fig.18) The shielded wire emerging from back of tone arm should be draped so as to allow free movement of the arm.

C. NEEDLE JUMPS GROOVES

1. Worn, broken or improper needle. Replace with new, approved needle.
2. Booster spring too strong. Relax booster spring (15) pressure slightly bending outward (fig. 17).
   NOTE: Booster spring does not operate after first 1/2" of record.
3. Vertical friction. Examine tone arm hinge (34) for binds while moving arm up and down. (See Fig.18) The shielded wire emerging from back of tone arm should be draped so as to allow free movement of the arm.
4. Lateral friction. Examine tone arm shaft (30) for insufficient vertical clearance and reset as required (See Fig.6) The shielded wire emerging from back of tone arm should be draped so as to allow free movement of the arm.

D. FEEDBACK or microphonism is produced if the changer is not floating freely on its four mounting springs or output volume is too high. (Hold down devices should have been loosened or removed as required.)

E. "QUAVER" OR "WOW" is usually due to quick variations in turntable speed. With the drive gear in open-tooth or playing position, remove turntable and check.

1. Rotation of spindle—examine for a bind at any point. Oil sparingly if required, after cleaning.
2. Idler wheel rubber rim should be undamaged and perfectly free from oil or grease.
3. Idler wheel mounting and slide should move freely. Spring tension on slide must be maintained. Oil slide sparingly if necessary.

F. RUMBLE *is caused by:*

1. Damaged or badly worn rubber rim on idler wheel.
2. Motor plate loose on panel, or motor loose on plate.
3. Damaged motor—rotor knocked out of alignment.

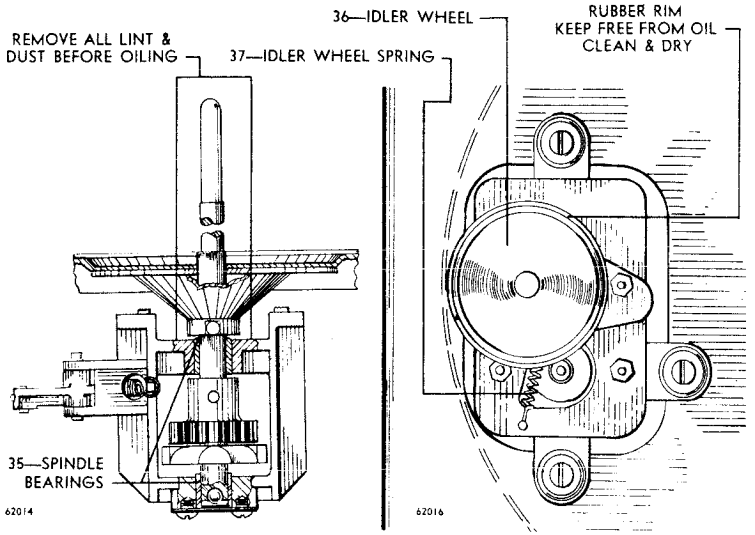

FIGURE 23.

CUTAWAY SIDE VIEW TOP VIEW—TURNTABLE REMOVED

VI LUBRICATION

A. DO NOT *lubricate*

1. Clutch engagement lever
2. Idler wheel rim and turntable rim

B. OIL, *if necessary*

1. All shafts
2. Turntable spindle

C. GREASE, *if necessary*

Cam surfaces and gear teeth

WIPE OFF all excess lubricants—over lubricatio ı is dangerous.

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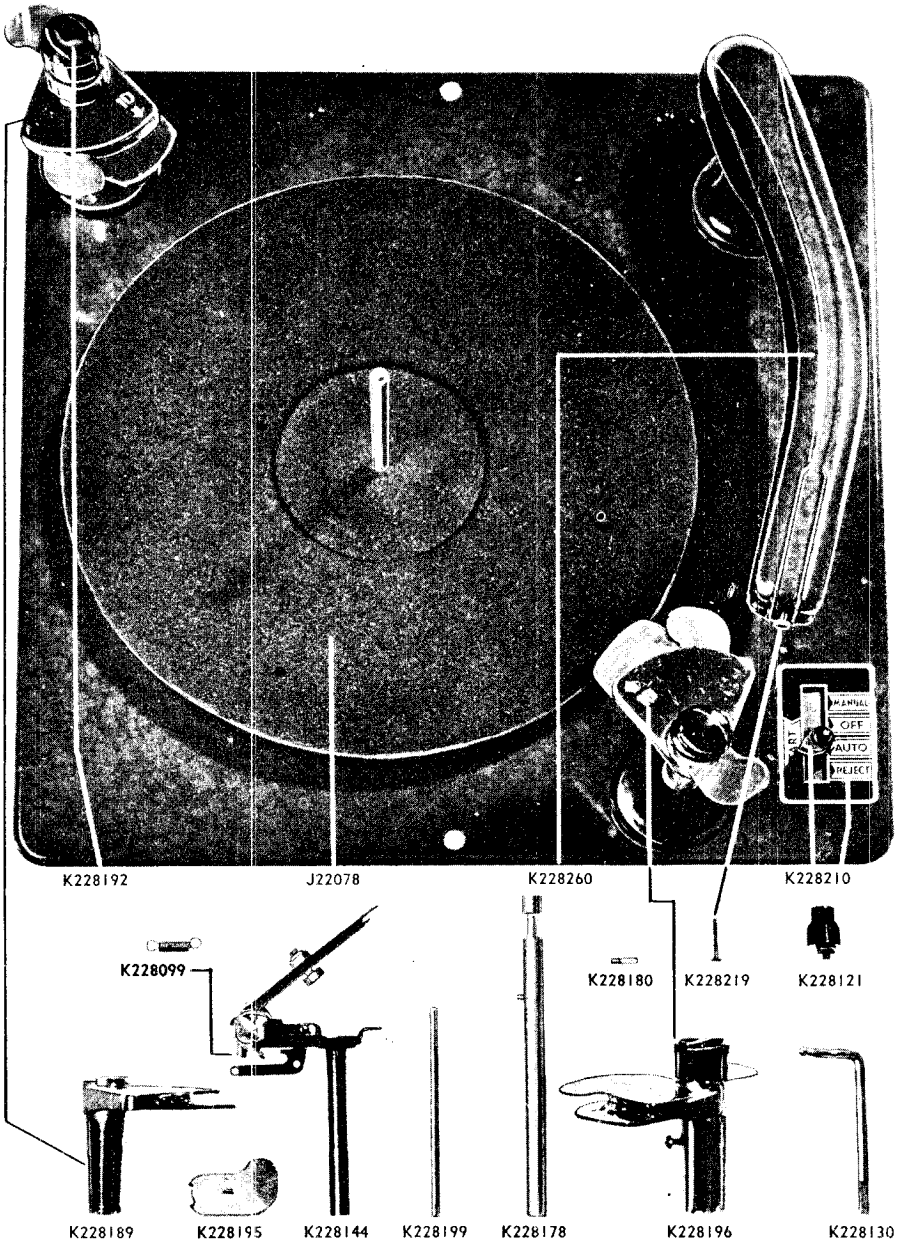

K228192 Selector Arm Knob Assembly
J22078 Turntable Assembly
K228260 Tone Arm
K228210 Control Escutcheon
K228099 Counterbalance Spring
K228180 Pin
K228219 Needle Screw
K228121 Control Knob Assembly
K228189 Selector Arm #1 & Blade Assembly
K228195 Selector Blade (12")
K228144 Tone Arm Hinge Assembly
K228199 Tone Arm Lift Pin
K228178 Selector Shaft #2 Assembly
K228196 Selector Arm #2 Assembly
K228130 12" Reset Rod

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MODEL K

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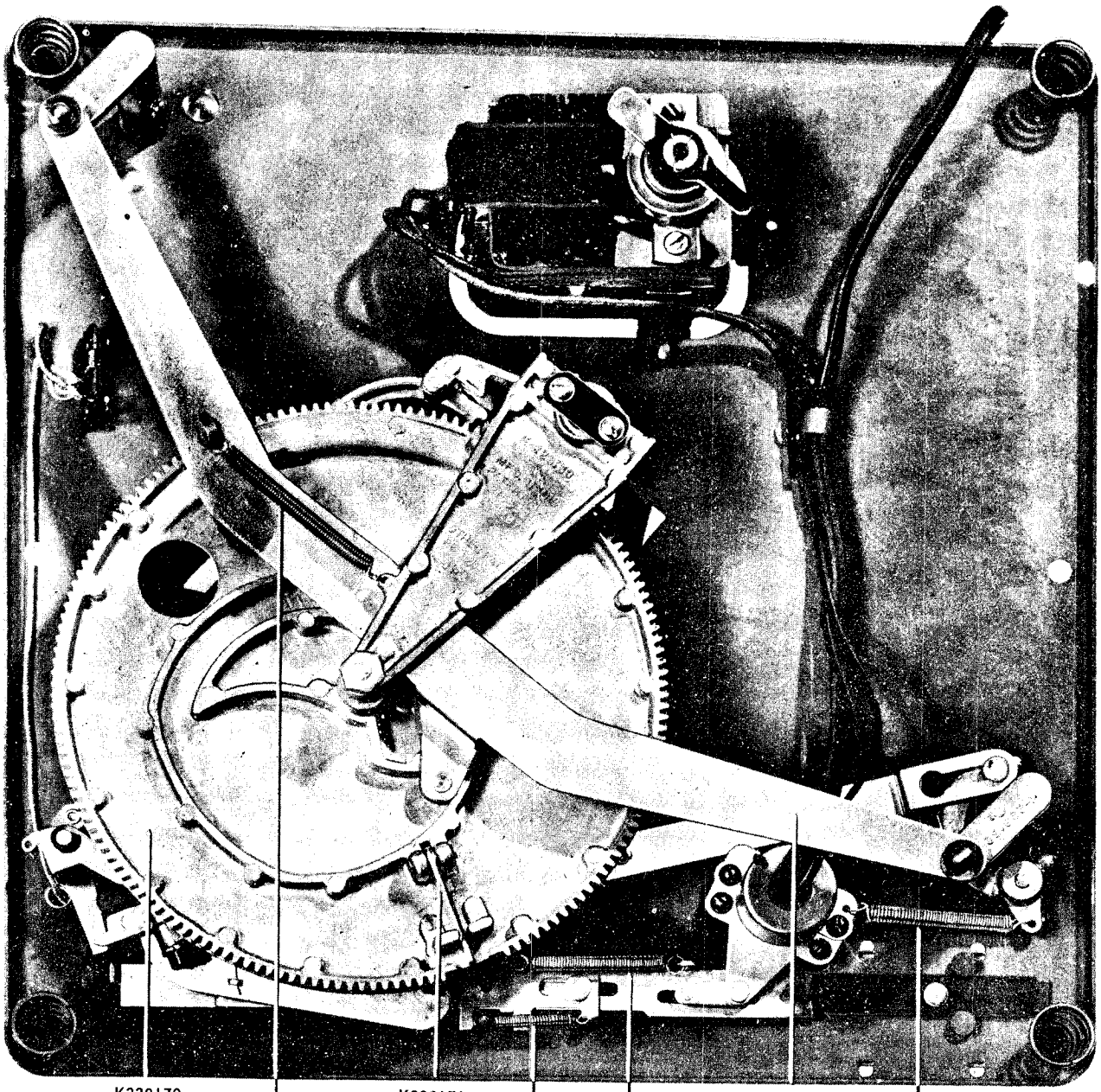

K228170 Drive Gear
K228171 Clutch Engagement Lever
K228184 Drive Link Assembly
K228201 Drive Link Spring
J22058 Manual Lockout Spring, Outer
K228118 Manual Lockout Spring, Inner
B27093 12" Reset Lever Spring

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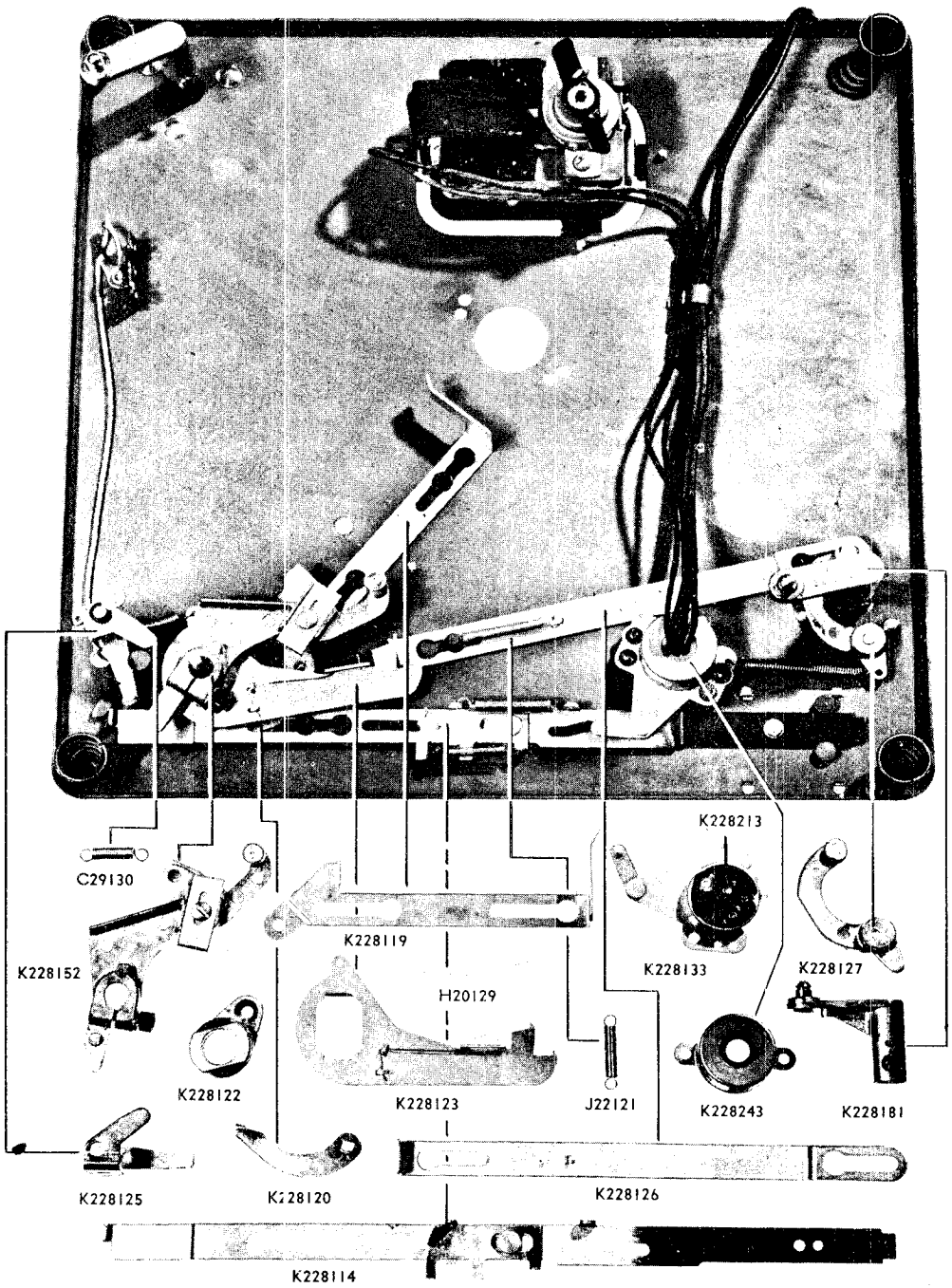

C29130 Tone Arm Locator and Latch Spring
K228119 Manual Reject Slide
H20129 Tone Arm Booster Spring
K228133 Switch Plate Assembly
K228127 Reset Lever Assembly
K228122 Tone Arm Locator Hub
K228123 Tone Arm Locator Assembly
J22121 12" Reset Slide Spring
K228243 Switch Cover
K228181 Drive Crank Assembly
K228125 Tone Arm Latch Lever
K228120 Connecting Link
K228126 12" Reset Slide
K228114 Manual Lockout Assembly
K228152 Tone Arm Lever Assembly
K228213 Switch

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MODEL K

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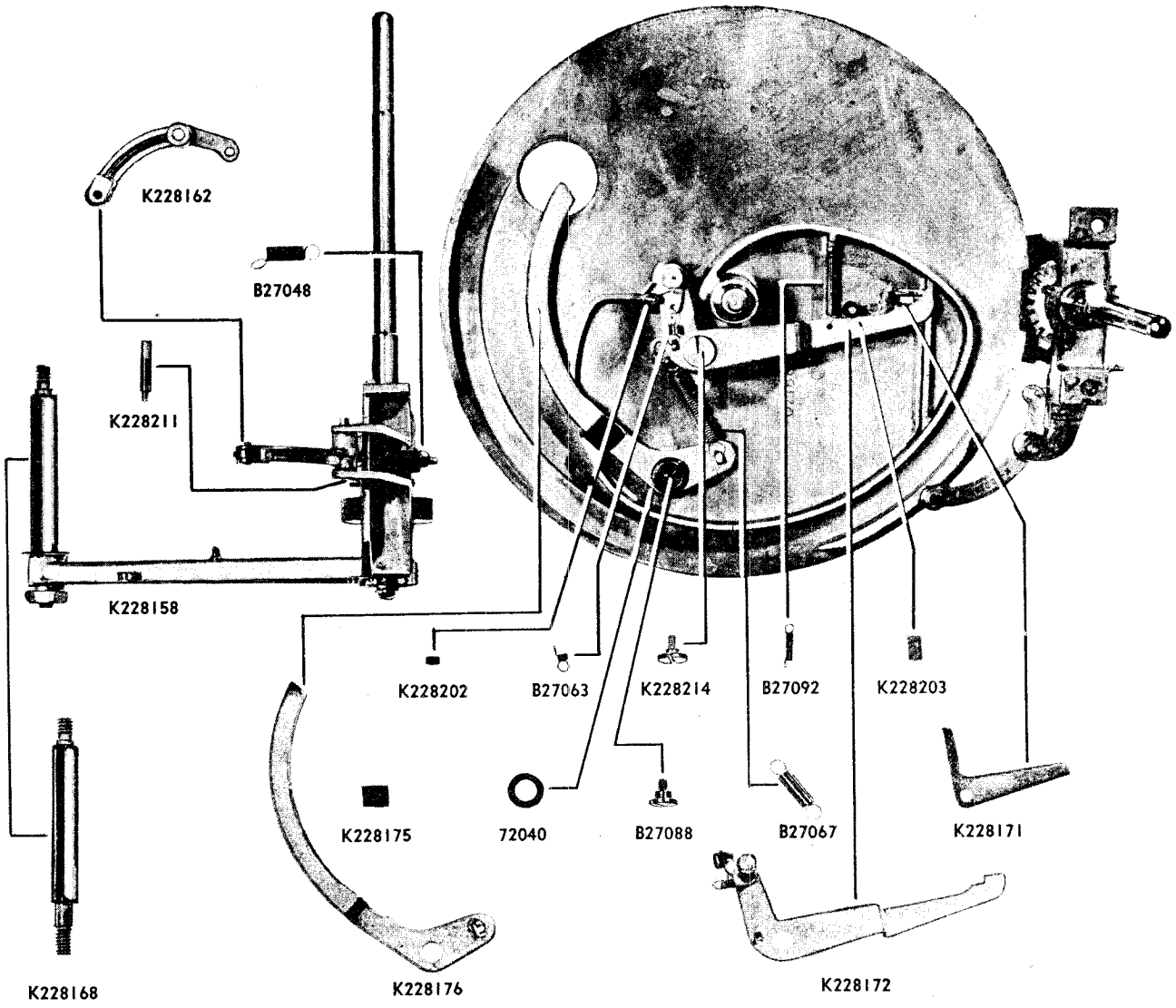

K228162 Drive Gear Stop Lever Assembly
B27048 Stop Lever Spring
K228211 Stop Lever Pivot Pin
K228158 Spindle and Housing Assembly
K228202 Trip Dog Bumper
B27063 Trip Dog Spring
K228214 Trip Lever Screw
B27092 Trip Lever Spring
K228203 Trip Lever Bumper
K228175 Retard Lever Bumper
72040 Retard Lever Spring Washer
B27088 Retard Lever Screw
B27067 Retard Lever Spring
K228171 Clutch Engagement Lever
K228168 Drive Gear Shaft
K228176 Tone Arm Retard Lever
K228172 Trip Lever Assembly

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CROSS REFERENCE OF PART NUMBERS REFERRED TO IN TEXT

ITEM NO.	DESCRIPTION	PART NUMBER
1.	Control Slide. Part of K228114 Manual Lockout Assembly	
2.	Switch	K228213
3.	Connecting Link	K228120
4.	Reject Slide	K228119
5.	Trip Lever Assembly	K228172
6.	Clutch Engagement Lever	K228171
7.	Pinion Gear, Part of K228158 Spindle & Housing Assembly	
8.	Drive Gear	K228170
9.	Tone Arm Lift Pin	K228199
10.	Drive Link Assembly	K228184
11.	Tone Arm Lever Assembly	K228152
12.	Tone Arm Locator Assembly	K228123
13.	12" Reset Slide	K228126
14.	Tone Arm Retard Lever	K228176
15.	Tone Arm Booster Spring	H20129
16.	Drive Gear Stop Lever Assembly	K228162
17.	Trip Shoe	K228156
18.	Trip Plate. Part of K228152 Tone Arm Lever Assembly	
19.	Trip Dog, Part of K228172 Trip Lever Assembly	
20.	Manual Lockout Assembly	K228114
21.	Tone Arm Latch Lever	K228125
22.	Allen Socket Cap Screw	75047
23.	Tone Arm Adjusting Screw	K228238
24.	Counter-balance Spring	K228099
25.	Counter-balance Adjusting Slide	K228150
26.	Retard Lever Spring	B27067
27.	Spindle Pin, Part of K228164 Turntable Spindle Assembly	
28.	Turntable Hub, Part of J22078 Turntable Assembly	
29.	Trip Lever Spring	B27092
30.	Tone Arm Shaft	K228147
31.	12" Reset Slide Spring	J22121
32.	12" Reset Lever Spring	B27093
33.	Tone Arm Locator and Latch Spring	C29130
34.	Tone Arm Hinge Assembly	K228144
35.	Spindle Bearings, Part of K228158 Spindle & Housing Assembly	
36.	Idler Wheel } See numerical parts list.	
37.	Idler Wheel Spring }	
38.	Manual Latch Lock	K228111
39.	12" Reset Lever	K228128
40.	12" Reset Rod	K228130

All part numbers shown are for a "Standard" Changer. Radio Companies which have used special pickup cartridges, tone arms, leads, or any other special parts should order them for their service stock instead of the Standard parts. Part numbers of the special items can be obtained from the Seeburg Service Dept. Motor Assemblies: Since each changer has alternate motor sources, it will be necessary to stock a quantity of service parts for each type. When ordering, be sure and give the motor assembly number stamped on the motor mounting plate.

MODEL "K" RECORD CHANGER PARTS LIST

SEEBURG PART NO.	ITEM
H-20065	"C" Washer
H-20129	Tone Arm Booster Spring
J-22021	Small "C" Washer
J-22058	Manual Lockout Spring—Outer
J-22078	Turntable Assembly
J-22096	Thrust Plate
J-22117	Thrust Wafer
J-22121	12" Reset Slide Spring
B-27048	Stop Lever Spring
B-27063	Trip Dog Spring
B-27067	Retard Lever Spring
B-27088	Retard Lever Screw
B-27093	12" Reset Lever Spring
B-27092	Trip Lever Spring
C-29130	Tone Arm Locator and Latch Spring
70069	7/16" x 12-24 Nut
71018	1/4 x 6-32 F.H.M.S.
71050	1/4 x 6-32 B.H.M.S.
71066	1/4 x 4-36 R.H.M.S.
71096	1/4 x 4-36 Oval. Fil. H.M.S.
71418	1/8 x 4-36 R.H.M.S.
71501	3/16 x 6-32 R.H.M.S.
71502	5/8 x 6-32 B.H.M.S.
71533	1/2 x 6-32 B.H.M.S.
71563	1/2 x 4-36 R.H.M.S.
71750	Shakeproof Sems (3/16 x 6-32 R.H.M.S.)
71752	Shakeproof Sems (3/16 x 4-36 R.H.M.S.)
71758	Shakeproof Sems (3/8 x 6-32 R.H.M.S.)
71759	Shakeproof Sems (1/4 x 6-32 R.H.M.S.)
71760	Shakeproof Sems (5/16 x 8-32 R.H.M.S.)
72040	Retard Lever Spring Washer
72117	Flatwasher 9/16 o.d. x .316 i.d. x .032 tk.
72138	Flatwasher 1/2 o.d. x 9/64 i.d. x .015 tk.
73076	#10 Kantlink lockwasher
73084	#1506 C'Sunk Shakeproof washer
73087	1/4 Kantlink Lockwasher
73094	#1104 Shakeproof lockwasher
75042	Allen Head Set Screw 1/4 x 10-32 Cup Point
75047	Allen Socket Head M.S. 5/8 x 10-32
79102	Tubular Rivet .125" dia. x 9/16
80036	Taper Pin 3/4 x 3/0
80061	Taper Pin 1/2 x 3/0
K228095	Selector Drive Crank Assembly
K228099	Counter Balance Spring
K228111	Manual Latch Lock
K228114	Manual lockout assembly
K228118	Manual Lockout Spring (Inner)

SEEBURG PART NO.	ITEM
K228119	Manual Reject Slide
K228120	Connecting Link
K228121	Control Knob Assembly
K228122	Tone Arm Locator Hub
K228123	Tone Arm Locator Assembly
K228125	Tone Arm Latch Lever
K228126	12" Reset Slide
K228127	Reset Lever Assembly
K228128	12" Reset Lever
K228130	12" Reset Rod
K228133	Switch Plate Assembly
K228143	Pickup Lead * See note #1
K228145	Hinge Bracket and Shaft Assembly
K228150	Counter Balance Adjusting Slide
K228152	Tone Arm Lever Assembly
K228156	Trip Shoe
K228158	Spindle & Housing Assembly
K228162	Drive Gear Stop Lever Assembly
K228164	Turntable Spindle Assembly
K228167	Pinion Gear
K228168	Drive Gear Shaft
K228170	Drive Gear
K228171	Clutch Engagement Lever
K228172	Trip Lever Assembly
K228175	Retard Lever Bumper (Rubber)
K228176	Tone Arm Retard Lever
K228177	.032 Fibre Thrust Washer
K228178	Selector Shaft Assembly
K228181	Drive Crank #1 Assembly
K228184	Drive Link Assembly
K228187	Drive Link Roller
K228189	Selector Arm #1 & Blade Assembly (10")
K228192	Selector Arm Knob Assembly
K228195	Selector Blade (12")
K228197	Selector Arm #2 & Blade Assembly (10")
K228199	Tone Arm Lift Pin
K228201	Drive Link Spring
K228202	Trip Dog Bumper (Rubber)
K228203	Trip Lever Bumper (Rubber)
K228210	Control Escutcheon
K228211	Stop Lever Pivot Pin
K228212	Wire Clip
K228213	Switch
K228214	Trip Lever Screw
K228215	Plug Button
K228216	Tone Arm Mounting Grommet
K228217	Tone Arm Special Washer
K228219	Needle Screw * See note #1
K228221	Pickup Cartridge Assembly * See note #1
K228223	Fulcrum Clamp
K228224	Tone Arm Fulcrum
K228225	Tone Arm Bracket Assembly
K228238	Tone Arm Adjusting Screw
K228239	Rubber Grommet
K228240	Brass Bushing
K228243	Switch Cover
K228244	Insulating Disc
K228260	Tone Arm * See note #1

60 cycle motors can be converted to 50 cycle by slipping a conversion spring over the motor shaft. These springs are listed below. Following is a list of motor parts showing the corresponding parts available for each type.

Motor	50 Cycle Conversion Spring	Idler Wheel	Idler Wheel Spring	Idler Wheel Fastener
K228231	K228229	J22143	K228237	L230244 Clip L230225 Washer
K228250	K228249	K228256	K228257	L230198 "C" Washer

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LOAD

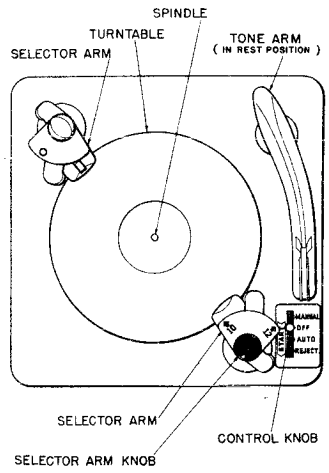
Lift and rotate Selector Knob for 10 or 12 inch records, as desired (Arrow pointing DIRECTLY at spindle). Load changer with up to fourteen 10 inch or up to ten 12 inch records. Do not intermix 10 and 12 inch records.

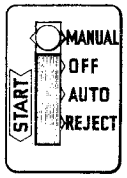
START AND STOP

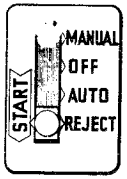
Turn radio switch "ON" and place RADIO-PHONO switch to "PHONO" setting. Move Control Knob to "REJECT" position and release it. The changer will now play the entire stack and shut off automatically. (To shut off the phonograph before entire stack has been played, move Control Knob to "OFF", lift Tone Arm and move out to Rest Position.)

UNLOAD

Control Knob at "OFF" position. Remove any remaining records on Selector Arms. Lift and turn Selector Knob until arms clear the records. Remove record stack from turntable. The changer can now be reloaded as described above.







REJECTING A RECORD

To reject a record before it has finished playing, move Control Knob to "REJECT" and release it. The changer will reject the record and then continue to play the remainder of the stack.

MANUAL OPERATION

Odd-sized or very old records and home recordings should be played in "MANUAL" position. Lift and turn Selector Knob as for unloading. Place record on turntable. Move control knob to "MANUAL" position. Place tone arm on record and when finished playing return by hand to rest position. To stop motor, move control knob to "OFF" position.

PHONOGRAPH NEEDLES

It is well to keep in mind that even though the amplifying system, speaker and tone arm are of the best quality, a faulty needle will result in poor reproduction of music.

Various types and kinds of needles are available for use in automatic phonographs. Any needle can be used that is designed to play fifteen or more selections. No attempt should be made to use ordinary steel or fibre needles, since continued use of a worn needle will damage the records being played.

There are a number of good semi-permanent types of needles on the market which are rated in number of plays. It is usually more economical to use one of these needles which is rated at 1,000 plays or more. It is also good economy from the standpoint of record wear not to exceed the maximum allowable plays on such needles.

Due to careless handling of the tone arm, needles are accidentally broken or chipped at the point. A chipped or broken needle will do far more damage to either commercial or home recordings than one which is badly worn.

The condition of the needle can sometimes be determined by the clarity of the reproduction of the higher tones. The needle should be replaced with the same type as originally supplied to insure the best tone quality and record life.

This manual presents the operational cycle of the "L" Changer. A comprehensive cross index permits reference to all parts illustrated.

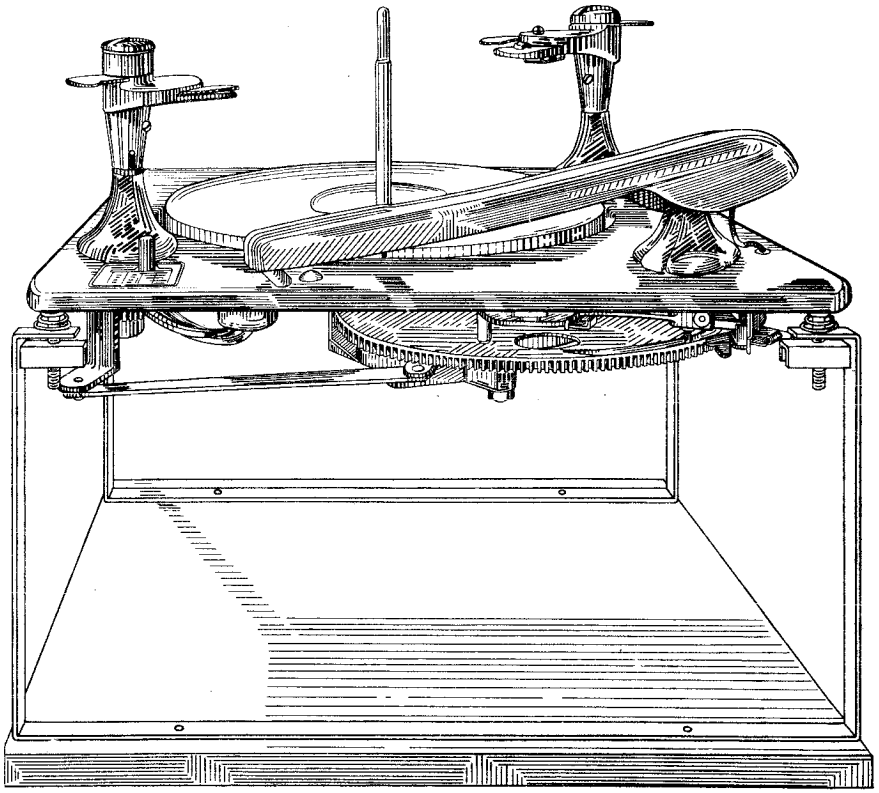


FIG. 1

A home made work stand, indicated above, permits easy access to all parts of the changer mechanism.

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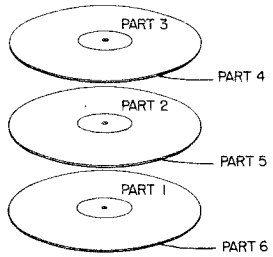
RECORD SEQUENCE

Automatic Playing



Complete operatic or symphonic works usually require two or more records. When ordering such records, specify that they are for a "Drop Type" changer and arrange them in the sequence illustrated. Example:

A 3 record - 6 part rendition;

After parts 1, 2 and 3 have been played, turn the stack over and the remaining half will be in proper sequence.

CARE OF RECORDS

It takes very little care to greatly increase the life of your records. Whenever possible they should be kept in albums made for that purpose, and when these are not available, the records should be kept in their envelopes and, if possible, standing vertically on edge. Keep them in a cool dry place, out of the sun and away from stoves, radiators, etc. Excessive heat will soon warp them. Do not leave records on the selector arms for prolonged periods and remove records from the turntable when through playing.

Keep records clean by wiping them occasionally with a soft dry cloth, using a circular motion. The use of oily preparations for cleaning is not recommended as this tends to collect dust which has an abrasive action when the needle is run through the grooves.

Occasionally records become warped due to incorrect storage; particularly in warm weather or if they have been left near a radiator. Such warped records will wear rapidly and cause undesirable needle noise when being played. These records can be straightened by placing them between two pieces of plate glass and leaving them for a day or two in a warm (not hot) place. Put a weight, such as a book, on top of the upper glass.

Very dirty records are cleaned best by using soap and water at room temperature with a hand brush. Scrub gently with a circular motion and rinse thoroughly with cool tap water and wipe dry.

HELPFUL HINTS

POOR TONE QUALITY EXCESSIVE NEEDLE SCRATCH

Usually due to a damaged or worn needle or record. Replacing either, or both, is the obvious remedy.

RECORD HANGING OR CATCHING ON SELECTOR ARMS

May be caused by using defective or badly warped records. These should be played manually.

SLIPPING ON TURNTABLE

Is caused by a warped record that does not present enough contact surface to the record below it and slips, producing an uneven sound.

SQUEAKS AND CHAFING NOISES

Can be corrected by aligning unplayed records on the spindle.

DO NOT STALL

The turntable by hand while it is in motion.

LUBRICATION

A. **DO NOT** lubricate:

1. Clutch engagement lever.
2. Idler wheel rim and turntable rim.

B. **OIL**, if necessary:

1. All shafts.
2. Spindle.

C. **GREASE**, if necessary:

Cam surfaces and gear teeth.

WIPE OFF ALL excess lubricant—over lubrication is dangerous.

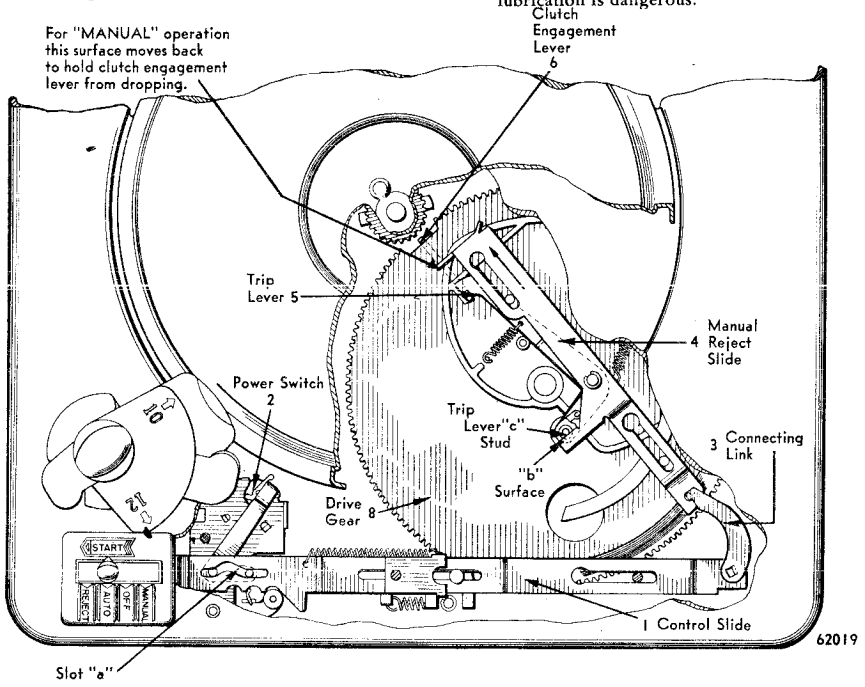


FIG. 2. CUTAWAY—TOP VIEW

1 CYCLE OF AUTOMATIC OPERATION—

After placing changer in operating position, with records on the selector arm posts, the control knob governs all subsequent automatic operations.

A. CONTROL SLIDE (1)—Moving the control slide from "OFF" to "REJECT" starts the changer into "AUTOMATIC" operation in three steps:

1. As the control slide moves from "OFF" past "AUTOMATIC", slot "a" in the control slide (1) turns on the power switch (2) starting the motor and turntable.
2. When the control knob reaches "REJECT," the changer is manually "tripped" as follows:

   The control slide pushes connecting link (3), moving the reject slide (4) in the direction of arrow. Surface "b" strikes trip lever stud "c." Trip lever (5) movement releases the clutch engagement lever. (6). Levers 5 & 6 are mounted on drive gear (8).
3. When the control knob is released, it returns from "REJECT" to "AUTOMATIC."

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B. CLUTCH ENGAGEMENT—

Lug "d" on the rotating pinion gear (7) strikes extended portion of clutch engagement lever (6) causing drive gear (8) to rotate and mesh with pinion gear (7). (Open tooth or "mutilated" section of drive gear (8) permits pinion gear (7) to rotate freely, EXCEPT during the change cycle). As the drive gear (8) rotates, the muting switch blade (58) leaves the cam "g," and shorts out the pick up lead.

C. ROTATION OF DRIVE GEAR (8)—results in the following cam actions:

1. Vertical cam "e" moves the tone arm lift pin (9) and raises the tone arm.

2. Cam "j" (bottom surface of drive gear) actuates the drive link (10) that induces the quarter turn by which the selector arms release a record.
The motion is transmitted from the gear to the selector arms through the following parts: connecting rod (11), drive crank (12), selector shaft sleeve (59), pin "z," selector shaft No. 1 (60), post gear No. 1 (13), segment No. 1 (14), segment tie plate (15), segment No. 2 (16), post gear No. 2 (17). (The sleeve and pin are shown in figure 8)

All of the parts listed above operate as a unit. Whenever the selector arm No. 1 is raised this action declutches the drive portion of the mechanism from the part which provides synchronism between the two arms.

3. Surface "h" on the locked tone arm lever (11) resets the trip by latching the clutch engagement lever (6) to the trip lever (5).

4. Cam surface "g" moves the tone arm latch lever assembly (18) so as to unlatch the tone arm lever (19) at point "m." Thereafter the stud "k" on the tone arm lever follows the receding cam "f," shown in Figure 8.

5. Spring pressure from tone arm locator (20) moves the tone arm lever (19) and tone arm in toward the record. Selector arm settings determine the point at which the tone arm locator (20) stops at surface "n" on the 12" reset slide (21). Sketch above shows 10" and 12" record stops

6. The retard lever (22) contacts stud "k" and holds it in position during the time of lowering the needle on the record.

7. Tone arm lift pin (9) follows vertical cam on drive gear and lowers tone arm to the record. After the needle has touched the record, booster spring (23) exerts a slight pressure, causing the needle to enter the starting groove.

8. As the needle starts in the groove, drive gear (8) completes its rotation and is locked in open-tooth position by the drive gear stop lever (24) in detent in cam "g." Cam "g" also engages the muting switch blade (58) and restores pick up lead circuit to normal position.

D. AUTOMATIC TRIPPING—at the end of a record, the needle enters the cut-off groove and a new change cycle is set in motion by either of two actions releasing the clutch engagement lever (6).

1. **MINIMUM DIAMETER CUTOFF** occurs when trip shoe (25) strikes trip lever (5) at point "o." This should take place at approximately 1⅞" radius on the record.

2. **ECCENTRIC GROOVE CUTOFF** occurs when the tone arm is moved away from the spindle. The sawtooth edge of the trip plate (26) engages and moves the trip dog (27), causing the trip lever (5) to function. This trip operates at all positions of the tone arm, after it has played approximately half of the record.

The changer has now completed one cycle of automatic operation.

II A. AUTOMATIC SHUTOFF is of the gravity triggered type and, upon completion of its cycle, has performed the following functions: (a) Moved the tone arm into a positive locked position at the outside edge of panel. (b) Moved the control knob to the "off" position. (c) Turned off the motor switch. After the last record has dropped from the selector arm posts, the following actions occur:

1. Release of weight of record from the selector bracket button (28) permits the shutoff cam shaft (29) and the shut-off cam (30) to drop down into position for engaging the shut-off slide bracket (31) through the rivet "p." The last record having finished, the drive gear is set in motion by automatic tripping action.

2. As the drive gear (8) rotates, the stud "r" leaves contact with the shutoff bracket (32), which moves in toward the drive gear (8) by the action of the shut-off bracket spring (57). Tone arm is moved out to the rest position, and locked there by the tone arm inner latch (33).

3. The segment tie plate (15) and segment No. 2 (16) move the No. 2 post gear (17), rotating the shut-off cam (30) against the rivet "p" attached to the shut-off slide bracket (31), permitting the shut-off slide (34) to be moved by the shut-off slide spring (35).

4. The shutoff slide (34) moves against the shut-off trip (36) at surface "s." This permits the shutoff dog (37) to align itself with the shut-off bracket (32). The end of the shutoff slide (34) moves behind the tone arm center latch (38), at point "t," preventing the tone arm from unlocking when the tone arm outer latch (39), is engaged by the cam on the outer edge of the drive gear.

After the cam has passed the outer latch (39) the shut-off slide moves back to its normal position.

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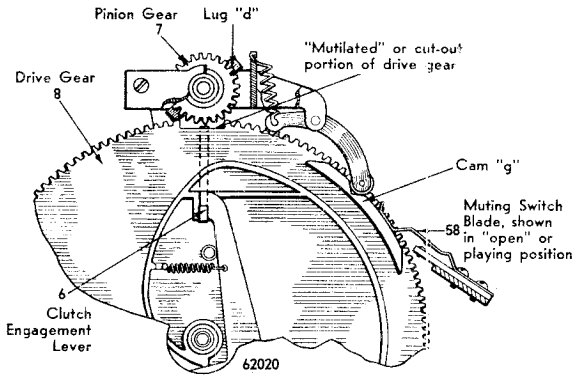
Pinion Gear 7
Lug "d"
"Mutilated" or cut-out portion of drive gear
Drive Gear 8
Cam "g"
Muting Switch Blade, shown in "open" or playing position 58
6 Clutch Engagement Lever
62020

FIG. 3. CUTAWAY—BOTTOM VIEW

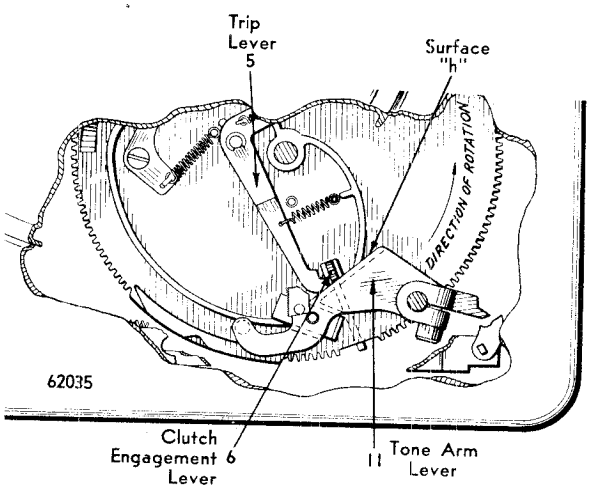

FIG. 6. CUTAWAY—BOTTOM VIEW

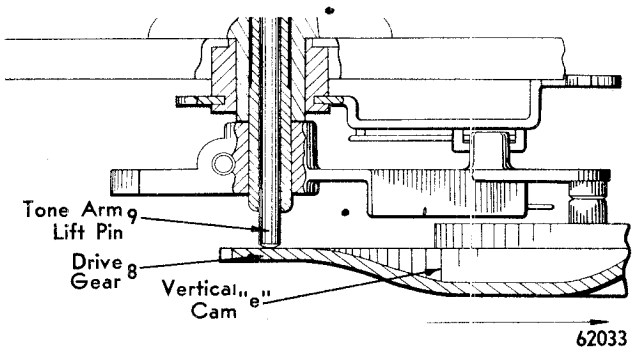

FIG. 4. CUTAWAY—SIDE VIEW

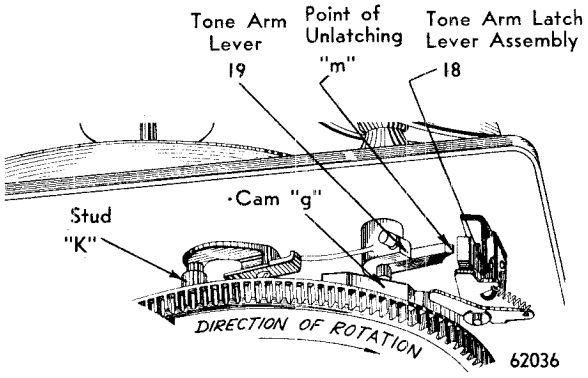

FIG. 7. CUTAWAY—SIDE VIEW

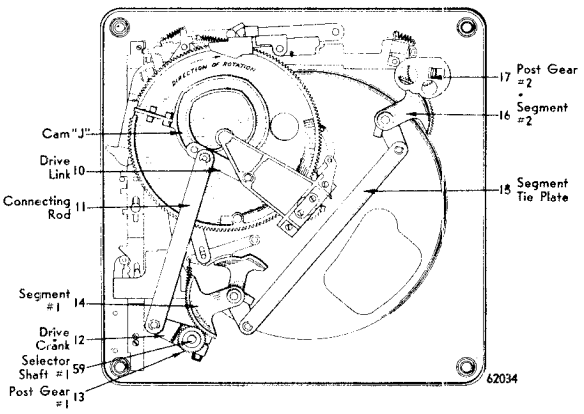

FIG. 5. BOTTOM VIEW

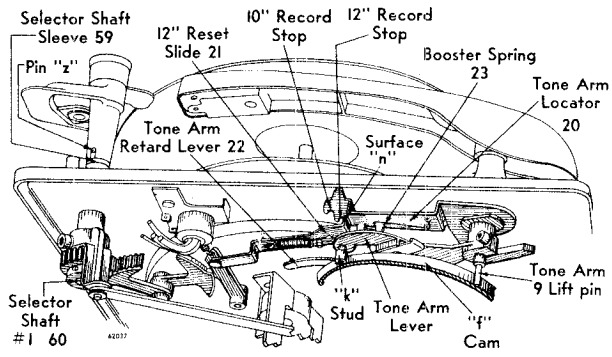

FIG. 8. CUTAWAY—BOTTOM VIEW

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5. Just at the end of the drive gear cycle, the stud "r" engages the shutoff bracket (32), moves the latter to its extreme outer position, and through the locked shut off dog (37), moves the shutoff lever (40). This latter movement forces the control slide (1) into the "OFF" position and turns off the power switch (2). The completion of the drive gear cycle permits the shutoff bracket (32) to resume its rest position. As the shutoff lever (40) moves to the rest position, the shutoff dog (37), pivoted thereon, is caught by the shutoff trip (36) and reset in its rest position.

B. SHUTOFF GUARD ACTION is necessary to prevent tripping the automatic shutoff mechanism when the selector arms are manually rotated.

When the shutoff cam (3) is manually operated, through the selector arm knob, while the drive gear is in the rest position, and there are no records on the selector arms, an important action takes place. The shutoff slide (34) moves forward and contacts the shut off bracket (32) at point "y," preventing the tripping of the shutoff dog (37) by action of the shutoff trip (36). The preceding motions prevent operation of the automatic shut off mechanism.

This guard action is cleared during an automatic shutoff cycle as soon as the shutoff bracket moves in, and disengages from the stud on the drive gear. The shutoff bracket moves in, until it is stopped by contact with the stud which acts as a bearing for the trip dog. Movement of the shutoff slide is then possible because the formed down tip on the shutoff slide can move until it strikes the tapered portion instead of the flat portion at the rear of the shutoff bracket.

C. CLEARANCE POINTS:

1. SHUTOFF CAM

a. Lateral clearance—There must be no side pressure between the shutoff cam and the stud on the shutoff slide bracket for either a 10″ or 12″ setting of the selector arms, otherwise the cam will rub against the stud with enough friction so as to prevent free up and down motion of the cam due to the weight of a record.

b. Vertical clearance—There must be sufficient vertical clearance when either a 10″ or 12″ record is placed on the selector arms. The cam must be raised above the stud on the shutoff slide bracket so that there is no engagement between the two as the changer starts into a change cycle (See fig. 11)

2. SHUTOFF SLIDE—(refer to part II-A-4 for action of the shutoff slide during normal automatic shutoff cycle, and to part II-B for the guard action of the shutoff slide). There are two clearance positions that must be checked at point 2.

a. The first of these occurs when the shutoff bracket is resting against the stud on the drive gear. Under this condition the tail of the shutoff bracket must clear the formed down portion of the slide if the bracket is moved manually, but this same clearance must be sufficiently small so that the slide cannot move forward far enough to take up the clearance at points 3 or 4 (the first of which would actuate the shutoff trip and the second of which would block the movement of the tone arm center latch).

b. The second condition under which this clearance point 2 must be checked occurs when the stud on the drive gear has rotated just far enough into a change cycle so as to move out of contact with the shutoff bracket and allow the bracket to rotate into its extreme position against the stud on the panel. Under this condition there is additional clearance at point 2. This additional clearance must *now* be sufficient to:

1. Allow the shutoff slide to actuate the shutoff trip at point 3. If the clearance at point 2 is too small to allow sufficient motion of the slide the shutoff trip may fail to operate (since it will not completely clear the shutoff dog and set up the mechanism for an automatic shutoff cycle). The shutoff slide must move far enough so that the shutoff trip completely clears the shutoff dog and the dog is free to rotate against the stop.

2. Block the tone arm center latch at point 4. Excessive clearance at this point will allow the inner latch lever to be partially disengaged by the rotation of the drive gear. Insufficient clearance might cause a wedging action which would prevent smooth operation of the shutoff slide.

C-3. SHUTOFF TRIP AND SHUTOFF DOG:

Point 5 is the point of contact between the shutoff bracket and the shutoff dog. As described above in Part II-C-2-B-1, the shutoff slide actuates the shutoff trip clearing the shutoff dog, and allowing it to rotate from the position shown in figure 16a to the position in figure 16b. At point 5 and in the position shown in figure 16b, it is necessary that there be sufficient clearance between the formed up end of the shutoff bracket and end of the shutoff dog at point ("ac") so that the dog can assume the position shown in figure 16b.

It should be understood that the shutoff trip is fastened to the changer panel and is spring loaded, while the shutoff dog is attached to the shutoff lever and is also spring loaded. As the automatic shutoff cycle progresses, the drive gear stud rotates until it strikes the shutoff bracket with the cam action forcing it out

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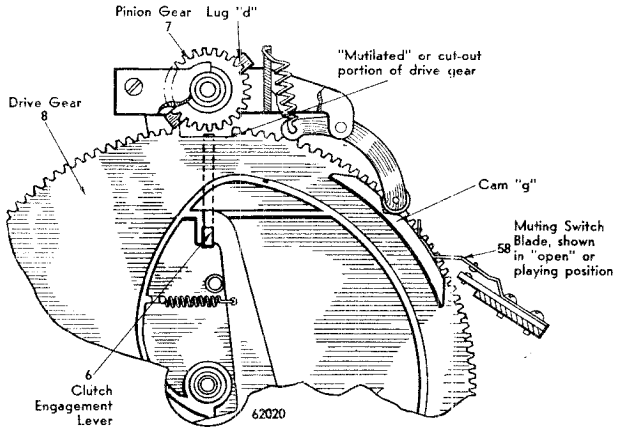

FIG. 9. CUTAWAY—BOTTOM VIEW

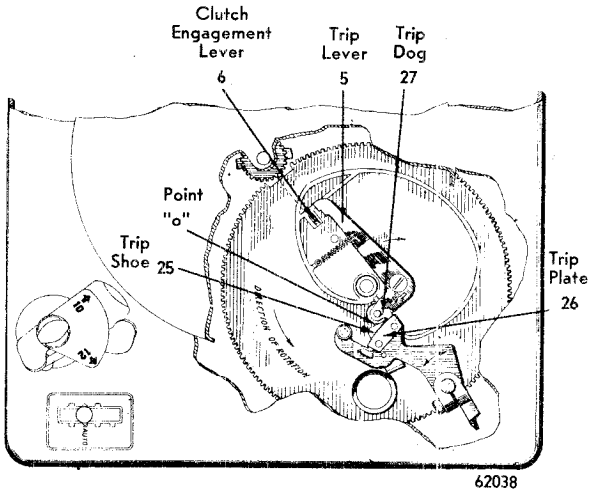

FIG. 10. CUTAWAY—TOP VIEW

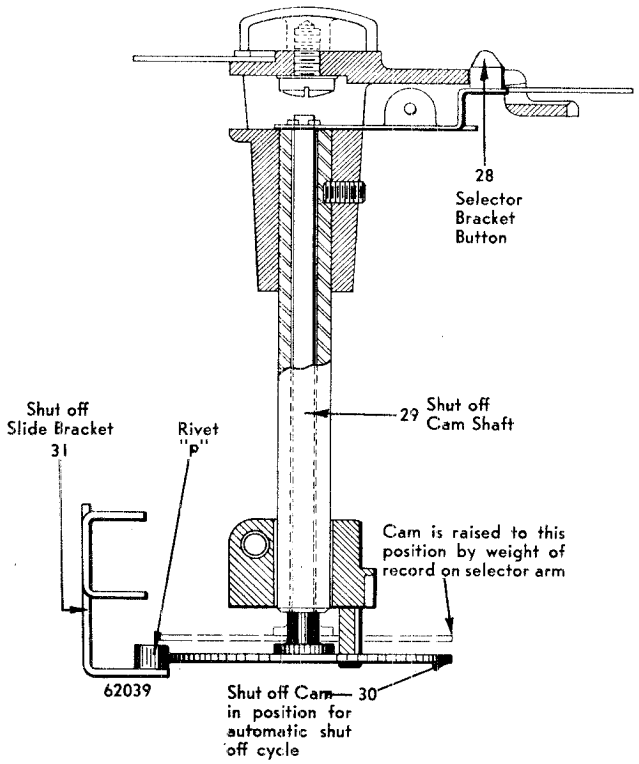

FIG. 11. CUTAWAY—SIDE VIEW

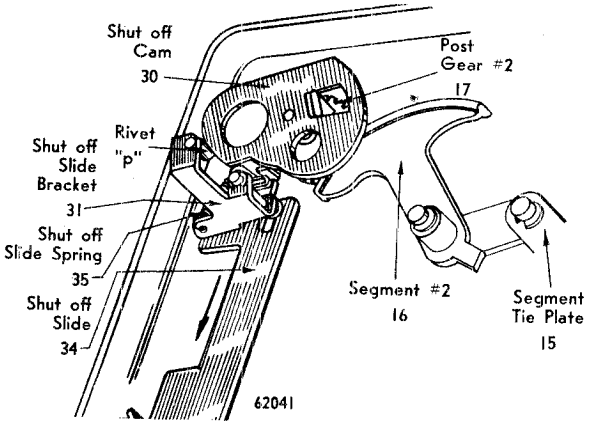

FIG. 13. CUTAWAY BOTTOM VIEW

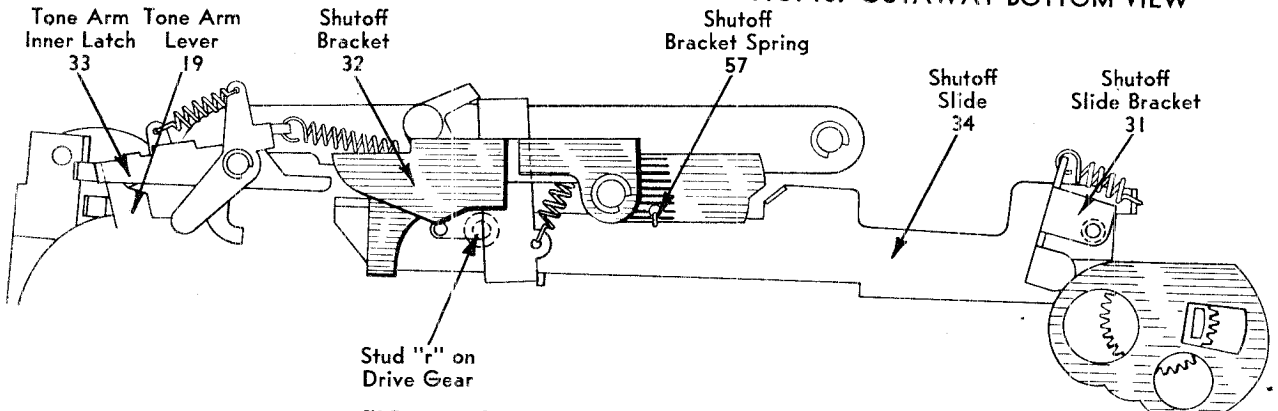

FIG. 12. CUTAWAY—BOTTOM VIEW

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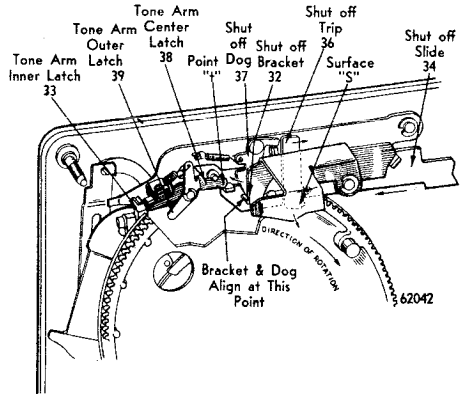

FIG. 14. CUTAWAY—BOTTOM VIEW

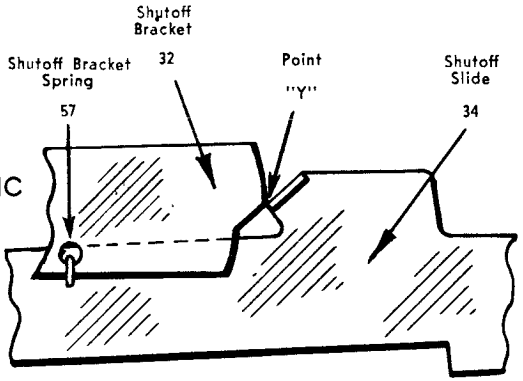

FIG. 16. DIAGRAMATIC

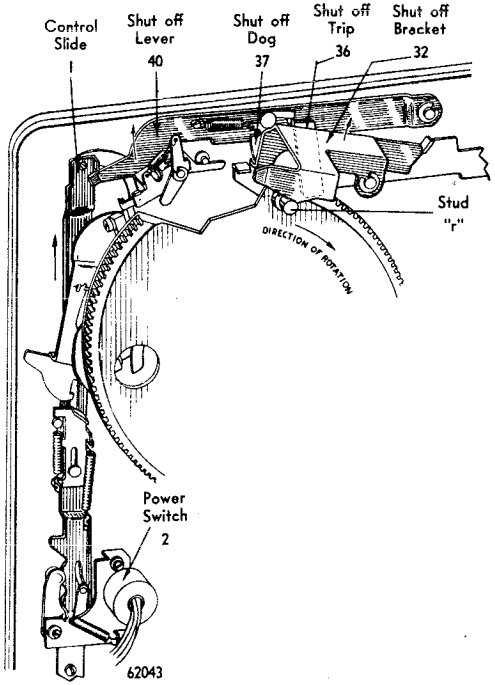

FIG. 15. CUTAWAY—BOTTOM VIEW

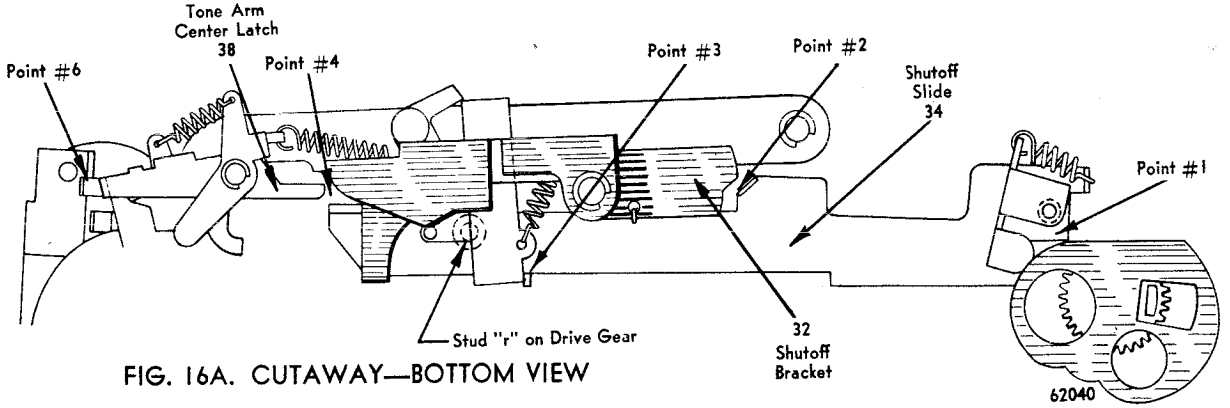

FIG. 16A. CUTAWAY—BOTTOM VIEW

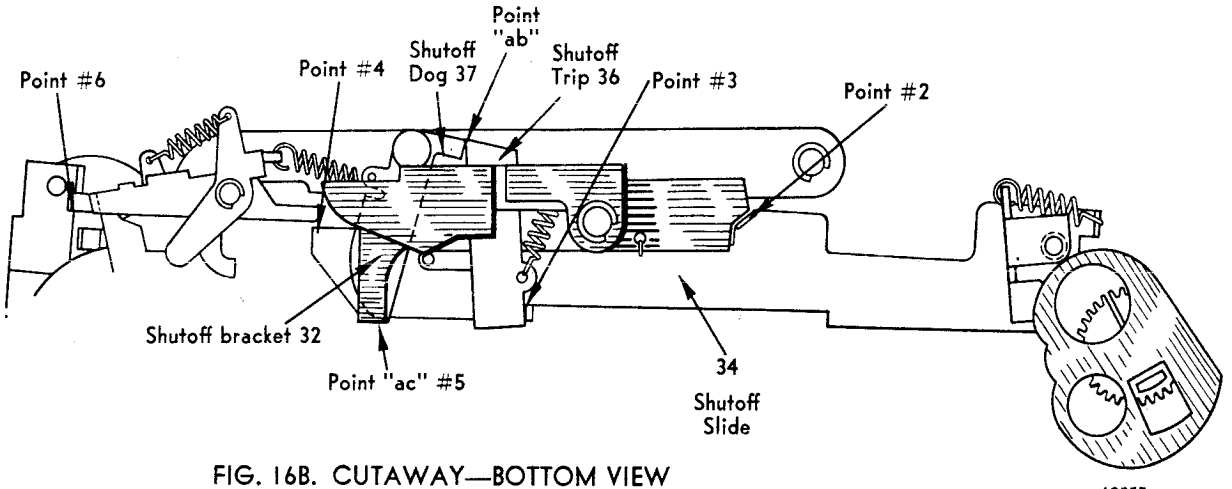

FIG. 16B. CUTAWAY—BOTTOM VIEW

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toward the edge of the panel. This outward motion of the shutoff bracket is transmitted to the shutoff lever because of the abutment shown in figure 16b at point ("ac".) (Remember that this alignment occurs only during an automatic shutoff cycle. At any other time, the shutoff dog does not engage the shutoff bracket.) Further movement of the shutoff bracket and the shutoff lever toward the outer edge of the panel will result in the shutoff dog completely clearing the shutoff trip. This position is shown in figure 16c. When this occurs the shutoff trip is free to rotate slightly so that when the shutoff bracket, shutoff lever and the shutoff dog return, the shutoff dog will engage the trip at point ("ab") and will return to the position in figure 16a. Until such a time as movement of the control slide again operates the shutoff trip, the automatic shutoff mechanism will remain inoperative since the shutoff dog is not in a position to line up with the shutoff bracket and engage it at point ("ac".) The maximum outward motion of the shutoff bracket and the shutoff lever must be sufficient so that the shutoff dog is carried far enough to completely clear the shutoff trip at point ("ab") in figure 16c.

Failure of the shutoff dog to return to the position shown in figure 16a will result in repeated automatic shutoff cycles. This condition may result from insufficient clearance at either point ("ab") or point ("ac").

4. SHUTOFF LEVER—CONTROL SLIDE:

Point 6 is the point of contact between the automatic shutoff mechanism and the control slide. It is through this contact that the control slide is moved to the "OFF" position (which also turns off the motor switch). This operation occurs when the automatic shutoff lever is moved toward the outside edge of the panel as described in the preceding paragraph.

The tip of the shutoff lever in normal position must permit free movement of the control slide into the "REJECT" position. During shutoff cycle the shutoff lever must move the control slide into "OFF." Incorrect clearance will result in:

1. Moving the control slide too far into "MANUAL" or
2. Moving slide not enough and leave it in "AUTO."

III MANUAL OPERATION—With the control knob in "MANUAL", the control slide (1) sets up four conditions:

a. The motor switch is on.

b. The end of the control slide (1) acting through the connecting link (see fig. 2) and the manual reject slide (4), partially disengages the tone arm inner latch (33) from its locked position. It now serves as a detent for the tone arm while in the rest position, and prevents its movement due to accidental bumping.

c. The manual lockout (42) on the control slide (1) prevents the tone arm locator (20) from moving inward, thereby permitting free movement of the tone arm by hand.

d. The manual reject slide (4) is pulled back so that the clutch engagement lever (6) is held, and prevented from engaging the pinion gear. (See fig. 2)

IV DETAILED DESCRIPTION OF CERTAIN FUNCTIONS AND PARTS

A. TONE ARM LATCH LEVER (also see fig. 14)

1. Functions and Positions:

a. A positive lock for the tone arm when the latter is swung to the outside of the panel, in all positions of the control slide other than "MANUAL." This is brought about by the engagement between the tone arm lever (19) and the tone arm inner latch (33).

b. A partial lock, or detent, for the tone arm while the control slide is in "MANUAL." This results when the control slide is moved to "MANUAL" position. The back end of the control slide moves the connecting link, which in turn moves the manual reject slide and the tone arm inner latch (33).

c. Complete disengagement results through the cam "g" on the outside edge of the drive gear, acting on the tone arm outer latch (39) during the AUTOMATIC change cycle. It is this unlatching action which puts the tone arm back into AUTOMATIC operation when the control slide is moved to the "REJECT" position.

IV-A-2 ACTIONS

a. When the tone arm is playing a record in AUTOMATIC position and is moved to the rest position, the tone arm inner latch (33) must positively lock the tone arm lever (19).

b. When the control slide is moved to "MANUAL," the end of the slide must work through the connecting link and the manual reject slide to move the tone arm inner latch (33), and change its contact with the tone arm lever (19) from a positive lock to a partial lock, giving a light smooth detent action when the tone arm is in rest position.

c. When the changer goes through an automatic shutoff cycle, the tone arm must remain latched in the outermost position. Normally, the tone arm would attempt to follow the cam surface of the drive gear after being unlatched, as described above.

MODEL L

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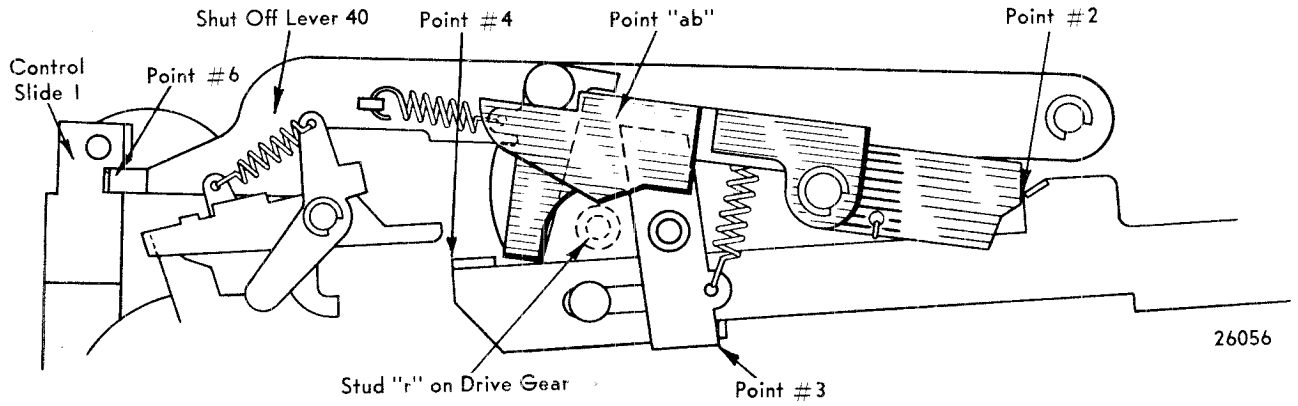

FIG. 16C. CUTAWAY—BOTTOM VIEW

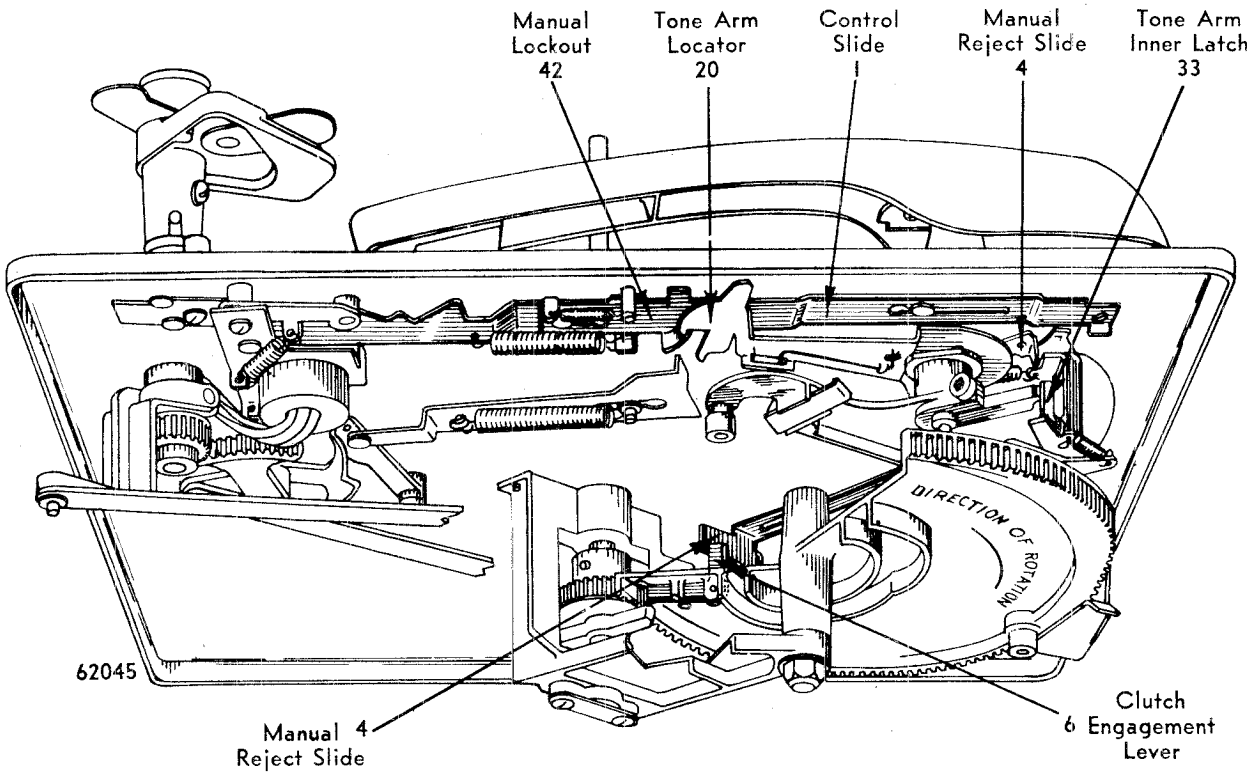

FIG. 17. CUTAWAY—BOTTOM VIEW

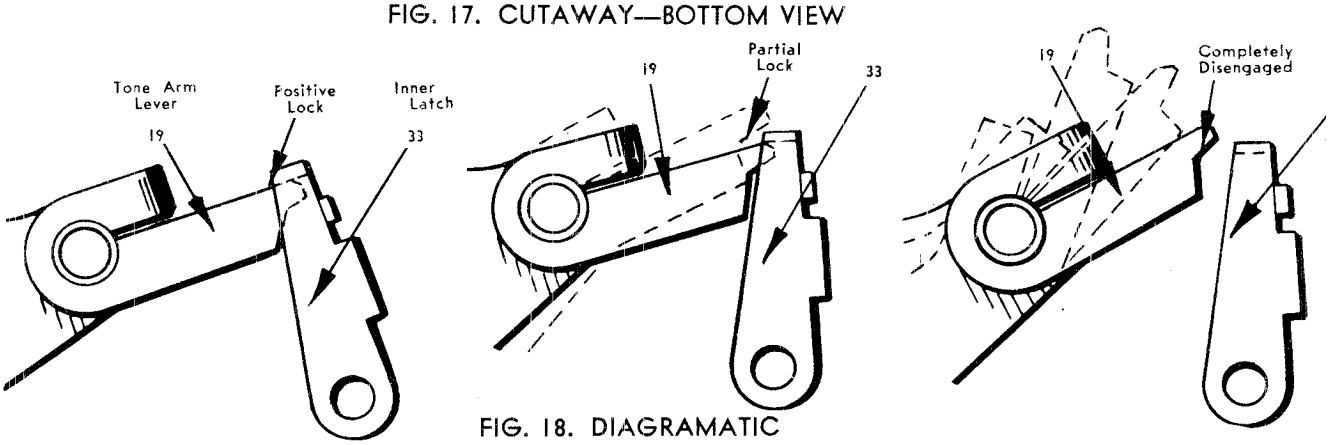

FIG. 18. DIAGRAMATIC

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During the automatic shutoff cycle, it is therefore necessary to prevent this automatic disengagement by allowing the outer tone arm latch lever to move with the cam surface of the drive gear but disengaging it from the inner latch lever (and hence maintaining the positive lock on the tone arm lever).

The disengagement between the outer and inner latch levers is accomplished by holding the center latch lever in position by blocking its movement with the shutoff slide. This blocking action allows:

1. The outer latch lever to move independently, its movement being absorbed by a spring.
2. Inner latch lever to operate as a "positive" tone arm latch.
3. The center tone arm latch lever to serve as a limit device and as a connecting linkage between the outer and inner latch levers.

CAUTION: The blocking action between the shutoff slide and the center latch lever during an automatic shutoff cycle must be such that the center latch lever cannot rotate enough to disengage the positive tone arm latch. The assembly of the inner and center tone arm latch levers is held against a stop stud by means of the tone arm latch lever spring.

B. MANUAL LOCKOUT ASSEMBLY (42) engages and retains the tone arm locator (20) in its outermost position while the control slide is set in the MANUAL position. There are three actions involved:

1. When the tone arm is in the rest position, and the control slide is moved into MANUAL, the outer manual lockout (42) moves to hold the tone arm locator from moving inward.
2. The outer manual lockout (42) and the tone arm locator (20) must remain engaged while the control slide is moved into any other position, until automatically released by the drive gear cam.
3. With the tone arm lever in "MANUAL" position the manual lockout will slide back and allow the lockout engagement described if the tone arm is being moved into the rest position.

C. 12″ RESET SLIDE (21), 10″ and 12″ SET LEVER (43) and GEAR SEGMENT No. 1 (14) index the tone arm properly for a 10″ or 12″ record, depending upon the setting of the selector arms. This is accomplished by transmitting the motion of the selector knob through segment No. 1, and the 10″ and 12″ set lever to the 12″ reset slide. The engagement of the 12″ reset slide with the tone arm locator, determines the indexing of the tone arm. (See fig. 19)

CAUTION: This engagement must be such that the hook on the tone arm locator prevents manual changing of the setting. All parts above must return freely.

D. TONE ARM RETARD LEVER (22) has two functions:

1. Maintains a light pressure outwards during that part of the cycle after tone arm lever (19) leaves the cam surface on the drive gear. The purpose is to prevent overswinging of the tone arm and, hold it at the radius previously determined by the tone arm locator (20), immediately prior to and during the time of lowering the needle on to the record.

2. To prevent action of the booster spring (23) until such a time that the needle has actually landed on the margin of the record. (See fig. 28)

EXCESSIVE TENSION—on the tone arm retard lever spring (56) would tend to cause a jerky motion of the tone arm during the part of the cycle described in "1" above. Extreme tension might even cause incorrect indexing by not allowing the tone arm to go into the proper diameter as determined by the tone arm locator (20).

INSUFFICIENT TENSION on the retard lever spring would result in a premature booster spring action so that the needle would land inside the margin of the record. Extremely weak pressure, or no pressure at all, would result in an overswing of the tone arm causing the needle to land some place in the middle of the record.

E. BOOSTER SPRING (23)—Its purpose is to move the needle into the first playing groove on records which do not have a lead-in groove. Booster spring pressure is correctly adjusted when it causes the needle to move from the index point to the starting groove and no further. Excess pressure may cause the needle to scrape across the first few grooves. See "D" for tie-in with retard lever action.

F. TONE ARM KNIFE EDGE HINGE:

In order to reduce vertical friction of the tone arm to a minimum, as required for best operation with light pressure pickups, the tone arm hinge bracket (41) is of the knife edge type. A hardened steel knife edge "u" seats, under spring (50) pressure, into "v's" in the lower bracket.

1. The knife edge must not be broken or damaged.

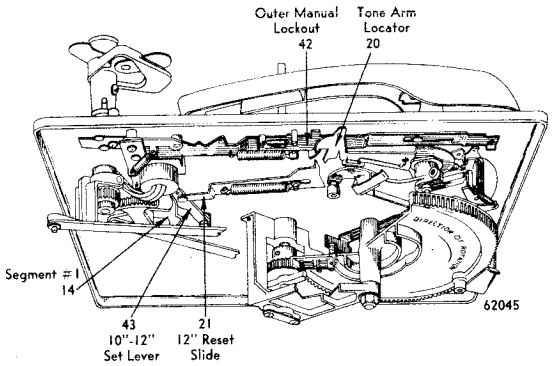

FIG. 19. CUTAWAY—BOTTOM VIEW

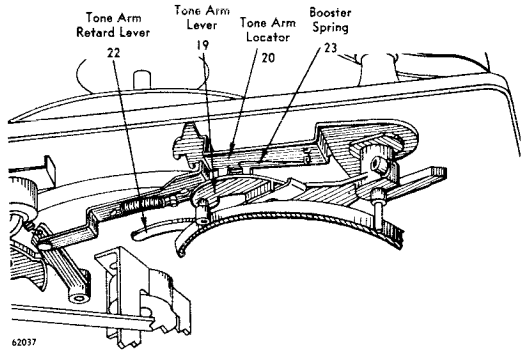

FIG. 20. CUTAWAY—BOTTOM VIEW

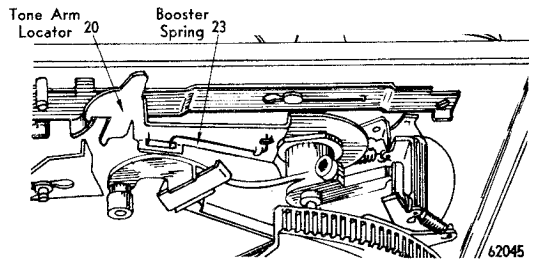

FIG. 21. CUTAWAY—BOTTOM VIEW

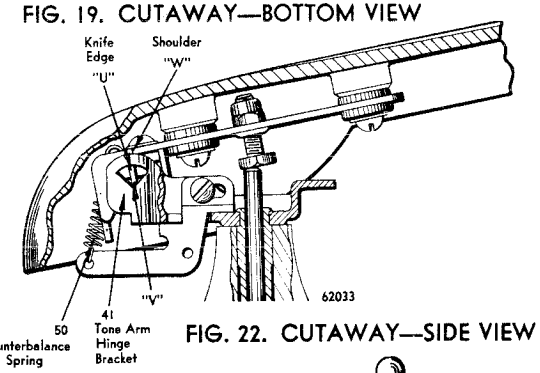

FIG. 22. CUTAWAY—SIDE VIEW

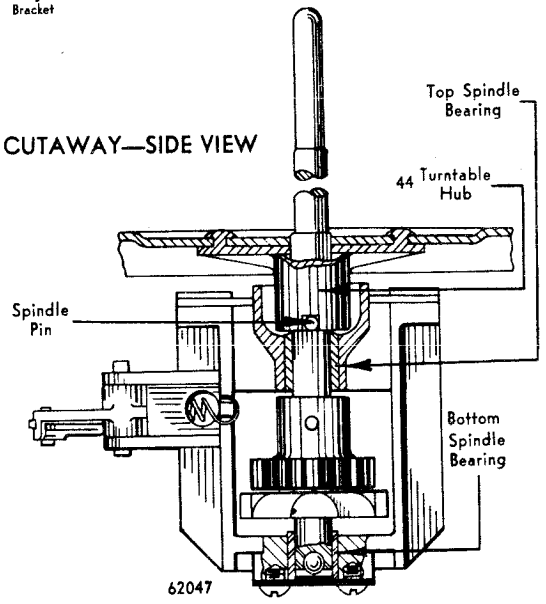

FIG. 23. CUTAWAY—SIDE VIEW

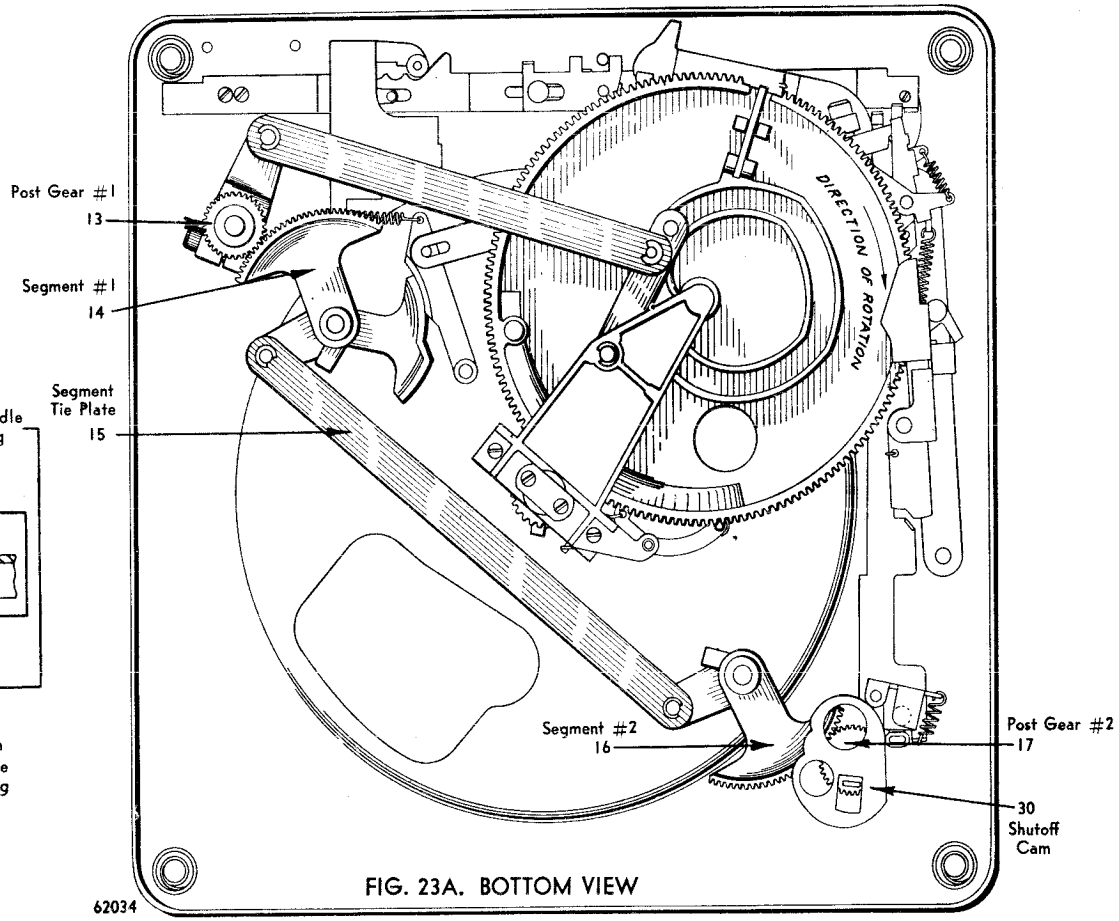

FIG. 23A. BOTTOM VIEW

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2. There must be a slight amount of sidewise play between the bracket and the lower part of the knife edge shoulder, and also between the brackets themselves.

NOTE: Side clearance of the knife edge shoulder "w" in its bracket will give correct performance during playing since the knife edge is held solidly seated in the bracket by a spring. Also, the movement of the knife in the bracket, when the arm is handled manually, has no significance since the knife edge reseats itself due to the spring action when released.

3. Incorrect side play or clearance.

a. Insufficient sidewise play will result in rubbing or vertical friction.

b. Excessive clearance will result in erratic tone arm landing and cut-off operation, since the whole arm may shift slightly during the change cycle.

G. HOW TO REMOVE TURNTABLE (45)

It should be removed, by lifting carefully, tapping spindle lightly if necessary. This will expose top spindle bearing. When replacing turntable, slit in hub (44) must seat properly over spindle pin. (Rotate 180° for best fit). Push idler wheel in while lowering, so rubber rim will not be damaged by turntable edge.

V. MECHANICAL ADJUSTMENTS

A. MOTOR FAILURE, possible causes:

1. Power supply off, worn or broken wire, or defective plug.
2. Faulty switch.
3. Linkage between switch and control slide.

CAUTION:

The control slide must operate an over-center action of the switch when it is moved *slowly* in either of the positions adjacent to "OFF".

4. Burned out, or open motor coils.

B. MECHANICAL BINDS

1. During change cycle:

a. Rotate turntable by hand, clockwise.

b. If it seems to bind at one point only, examine the drive and pinion gears for foreign matter between the teeth.

c. Examine the turntable spindle and selector arm bearings for lack of lubrication.

2. During playing cycle idler wheel slide should move freely and its spring tension must be positive so that idler wheel maintains constant contact with turntable rim and motor shaft. See fig. 27.

CAUTION:

Excessive tension on this spring will cause rapid wear of idler wheel and "rumble" when playing.

C. MECHANICAL JAMS

Shut off power and proceed as follows:

1. Rotate the turntable counterclockwise slightly. This should free it.

2. Examine the mechanism for loose or bent parts or foreign matter.

3. A bent clutch engagement lever (6) would cause a failure in the meshing of drive and pinion gear teeth at the start of a change cycle.

D. RECORD JAMS are caused by:

1. Selector arms improperly set.

2. Odd-sized, badly warped or damaged records. Play these in "MANUAL" position.

3. Selector blades damaged or improperly adjusted. See G.

E. RECORDS DROP ONE SIDE ONLY if it has an unusually large center hole or a broken edge. Also examine the mechanism for a bent spindle or selector arm post, due to rough handling.

F. SELECTOR ARMS must be parallel with each other, and must be synchronized so that a record will drop evenly onto the turntable.

a. Movement of selector arms is described in paragraph 2, (fig. 5).

b. Setting of Selector Arms, Gears, and Segments.

1. Set drive gear in neutral position. Set selector arms No. 1 for 10″ records, and align the sleeve with the proper notch in the arm, tighten the cap screw on the drive crank, to the sleeve.

2. With mechanism set as described above, segment No. 1 (14) and post gear No. 1 (13) are meshed so that stop on segment No. 1 just clears the segment tie plate (15). With segment No. 2 (16) connected to the segment tie plate, the position of segment No. 2 is fixed by dimensions of the parts.

Post gear No. 2 (17) must be properly related to the automatic shutoff cam (30). When rotated in the extreme counter-clockwise position, four teeth should remain disengaged between segment No. 2 (16) and the split in post gear No. 2 (17). Or, when rotated in the extreme clockwise position, one tooth remains between the end of segment No. 2 and the split in post gear No. 2.

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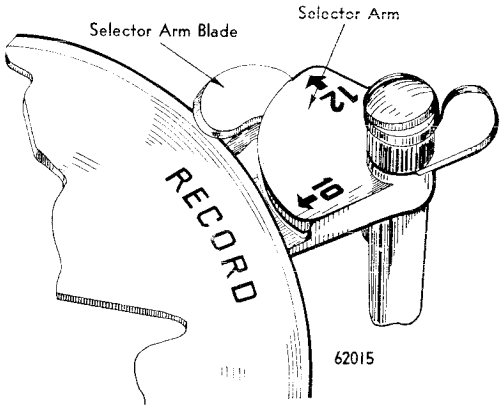
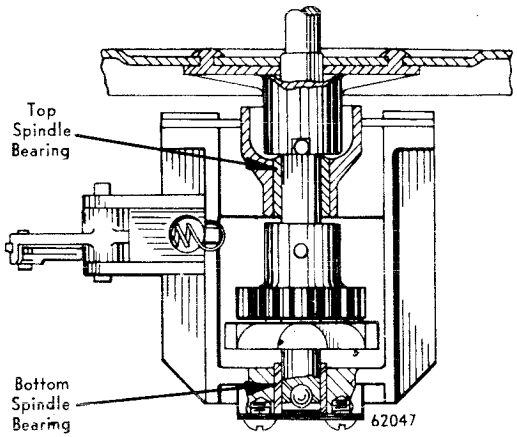


FIG. 24. TOP VIEW



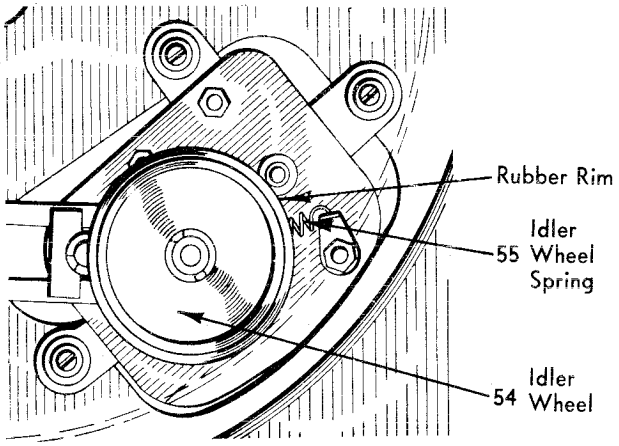


FIG. 27.

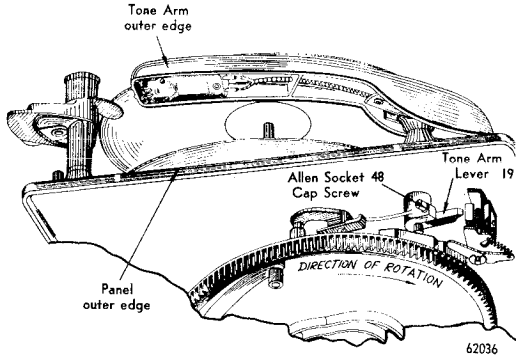


FIG. 25. CUTAWAY—BOTTOM VIEW

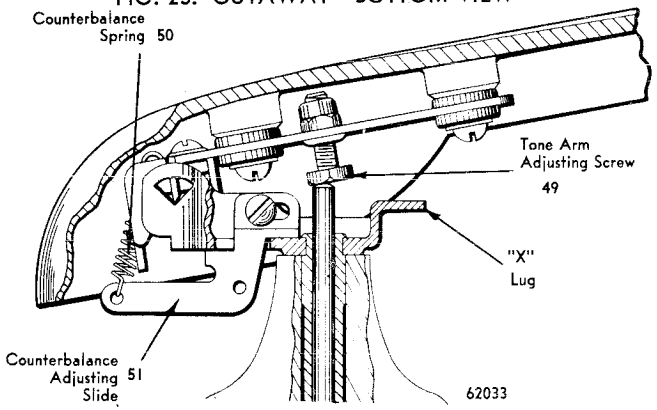


FIG. 26. CUTAWAY—SIDE VIEW

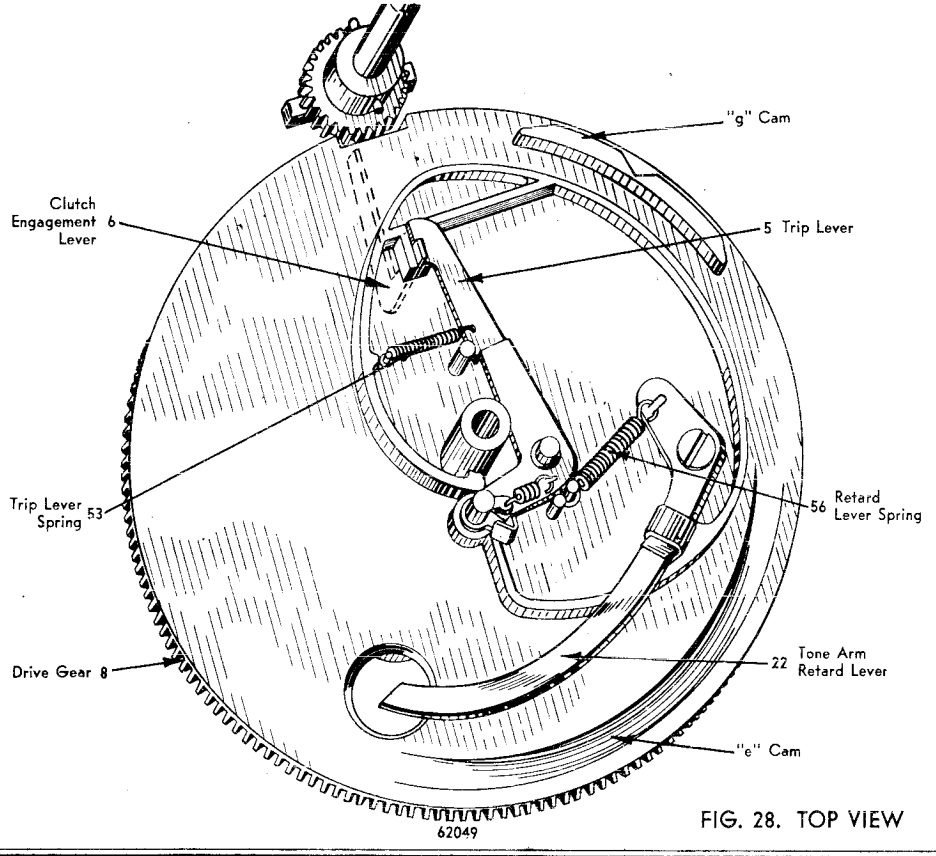


FIG. 28. TOP VIEW

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G. SELECTOR BLADES:

a. If an adjustment is necessary, place a 10″ record of average thickness (.074″) on the selector arms and manually rotate the turntable clockwise until the selector blade contacts the record. The blade must rise after it first contacts the edge of the record. This rising cam action, results whenever pressure is applied to the leading edge of the selector blade. The blade may be adjusted by bending, very slightly, to correct position (use pliers with tape lined jaws). The height to which blades are set must be less than the minimum record thickness, otherwise the blade will attempt to change two records at a time, due to the cam action which *always* operates in an *up direction.* When necessary, make the same adjustment on the 12″ selector blades, using a 12″ record (approx. .090″ tk.).

b. The leading edge of blade must be smoothly rounded and well polished.

c. Blade must be very free in its mounting so that it will return to normal position by its own weight.

H. INCORRECT TONE ARM INDEXING:

Examine the 12″ Reset Slide Spring (46) for being loose, of improper tension or missing.

2. Incorrect spring tension of locator spring (47).

a. Insufficient spring tension will produce erratic or incorrect tone arm landing since it will not seat in the fixed 10-12″ indexing position. It will also result in a jerky action of the tone arm, since the tone arm lever will not accurately follow the cam surface of the drive gear.

b. Excessive spring tension will result in a stiff, heavily loaded "feel" as the tone arm is moved into the rest position. It may also produce a stiff action of the control slide (when, the manual lockout is engaged) and cause increased wear on moving parts.

3. Tone arm retard lever (22) binds. Examine its pivot point for foreign matter between gear casting and shoulder screw. Also examine retard lever spring (56) for proper action. (Fig. 28

4. Excessive Clearance at tone arm hinge bracket.

I. TONE ARM POSITIONING is as follows:

NOTE: Before attempting the following procedure in order to correct tone arm landing, be sure to check section "H", since any one of those reasons may be the actual cause of incorrect landing.

1. Set the control knob in the "OFF" position (power plug out).

2. Place a 10″ record on the turntable and set the selector arms (10″ arrows pointing directly at the spindle).

3. Loosen the Allen socket cap screw (48) just enough to allow the tone arm lever to still hold its position.

4. Line up the tone arm's outer edge evenly with the panel edge. This gives the tone arm an approximate setting.

5. Push the control knob to "REJECT" and release it. Rotate the turntable clockwise and observe where the needle first touches the record. This should be about one-eighth inch from the edge. Variations should be corrected by slipping the tone arm lever (11) in correct direction.

CAUTION: Before tightening the Allen screw, make certain that there is enough vertical clearance in the tone arm shaft to avoid binding while the tone arm swings.

6. Replace the 10″ with a 12″ record and set selector arms accordingly. If the 10″ adjustment was made correctly, the 12″ indexing should be automatically correct.

J. TONE ARM HEIGHT adjustment:

1. The height to which the tone arm rises is correct when there is an approximate 1/16″ clearance between it and the bottom of a 10″ record on the selector arms. This clearance is regulated by the tone arm adjusting screw (49).

2. The down position of the tone arm is fixed by lug "x" on the tone arm hinge assembly. The correct height is that which will allow the bottom edge of the tone arm and cartridge to clear the turntable surface by approximately 1/16″. This adjustment may be corrected by a slight bending of lug "x."

K. NEEDLE PRESSURE is controlled by the counterbalance spring (50) in back of the tone arm. The pressure is variable through the counterbalance adjusting slide (51). The needle pressure should not be less than 1 1/8 oz.

L. FAILURE TO TRIP may be caused by the following:

1. Old style records without proper cut-off grooves. These should be played in "MANUAL" position.

2. Broken, worn or improper needle which does not follow cut-off groove.

3. Closed-circle trip is incorrectly set. The trip shoe (25) is moveable and loosening its holding screw allows it to be adjusted as required. This adjustment is correct when the needle is 1 7/8 inches from the record center and the trip shoe pushes the trip lever which releases the clutch engagement lever.

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4. Tight tone arm lead wire. The shielded wire emerging from the back of the arm should be draped so as to permit free movement of the tone arm. Never pull it tight or tie it down.

5. The clutch engagement lever (6) not unlatching. This lever has a loose fit at its pivot point and operates by gravity. It is intended to operate dry and must never be lubricated. Keep free from dust and lint. Rotate drive gear 180° from rest position for detailed examination of lever. (See fig. 5)

6. Trip lever (5) binding at its pivot point and failing to unlatch engagement lever. Examine for foreign matter between gear casting, lever and shoulder screw. (See fig. 28)

7. Tone arm binds when moved toward spindle as a result of insufficient vertical clearance for tone arm shaft (52). This is caused by tone arm lever (19) being too close to underside of panel; loosen Allen socket cap screw (48) reset and retighten. (See fig. 26.)

M. REPEATED TRIPPING IS caused by:

1. **FAILURE OF CLUTCH ENGAGEMENT LEVER (6) TO LATCH.** With the mechanism stopped in the playing position (pinion in open tooth portion of drive gear), latch the clutch engagement lever with the aid of a pencil and unlatch by moving the control knob to "REJECT." Repeat this several times. If it fails to latch:

   a. Examine the trip lever (5) for binds or insufficient tension in the trip lever spring (53). Replacement of a weak spring will give a positive latch-up. Do not increase tension to a point where it will cause a trip failure. (See fig. 28)

   b. Control knob binding in "REJECT" position due to sticking control slide (1) or its associated levers and springs. Examine for loose or missing springs.

   c. Manual reject slide incorrectly positioned so that it fails to clear and trip lever while in "AUTOMATIC" operation.

2. **FAILURE OF STOP LEVER** to properly detent drive gear. (See fig. 9) Examine for proper spring tension.

N. TURNTABLE SPEED should be checked with a stroboscopic disc under running conditions and with the needle on a record. Slow speed may be produced by lack of lubrication in the spindle bearings or slipping of idler wheel (54). In the latter case, examine for a weak idler wheel spring (55) or for oil on the rubber rim which must be clean and dry.

VI. REPRODUCTION FAULTS:

A. NO RESPONSE due to:

1. Pickup cartridge dead.
2. Short in shielded lead circuits.
3. Failure of amplifier system.

B. POOR TONE QUALITY

1. Broken or worn needle. Replace with a new, approved needle.
2. Defective pickup cartridge (try a new cartridge).
3. Improper needle pressure. Adjust needle pressure to that recommended by the pickup manufacturer and in no case less than 1⅛ oz.
4. Vertical friction. Examine tone arm hinge for binds while moving arm up and down. The shielded wire emerging from back of the tone arm should be draped so as to allow free movement of the arm.

C. NEEDLE JUMPS GROOVES due to:

1. Worn, broken or improper needle. Replace with new, approved needle.
2. Booster spring too strong. Relax booster spring (23) pressure slightly, by bending outward. (Fig. 21)
3. Vertical friction. Examine tone arm hinge for binds while moving arm up and down. The shielded wire emerging from back of the tone arm should be draped so as to allow free movement of arm.
4. Lateral friction. Examine tone arm shaft (52) for insufficient vertical clearance and reset as required. (See par. L-7) The shielded wire emerging from back of tone arm should be draped so as to allow free movement of the arm.

D. FEEDBACK or microphonism are produced if the changer is not floating freely on its four mounting springs, or output volume is too high. (Hold down devices should have been loosened or removed as required.)

E. "QUAVER" OR "WOW" is usually due to quick variations in turntable speed. With the drive gear in open tooth or playing position, remove turntable and check:

1. Rotation of spindle—examine for bind at any point, and oil sparingly if required, after cleaning.
2. Idler wheel rubber rim should be undamaged and perfectly free from oil and grease.
3. Idler wheel mounting and slide should move freely. Spring tension on slide must be maintained. Oil slide if necessary. (See fig. 27.)

F. RUMBLE is caused by:

1. Damaged or badly worn rubber rim on idler wheel.
2. Motor plate loose on panel, or motor loose on plate.

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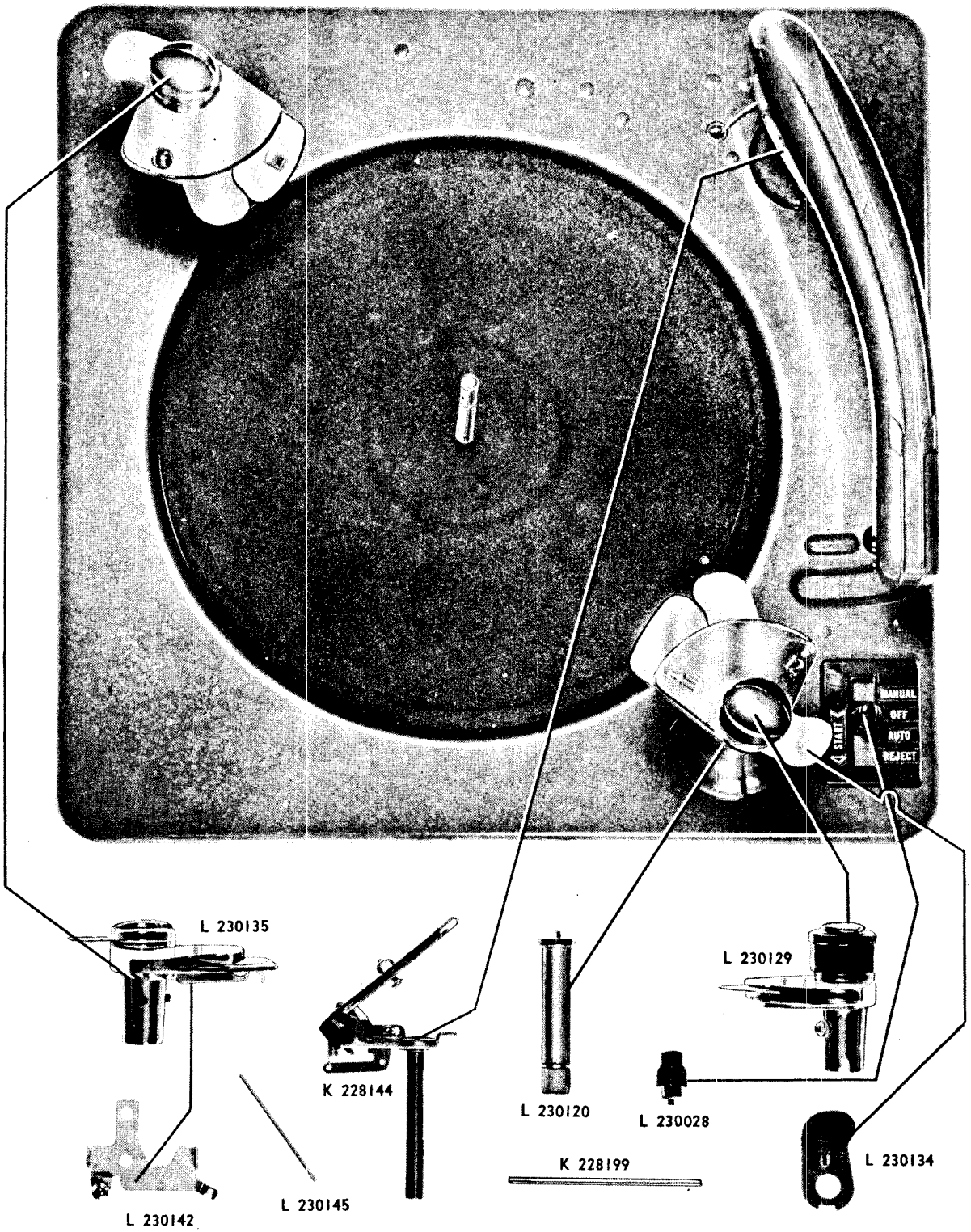

K-228144	Tone Arm Hinge Assembly	L-230134	12″ Blade
K-228199	Lift Pin	L-230135	Selector Arm No. 2 Assembly
L-228028	Control Knob Assembly	L-230142	Shut Off Selector Bracket Assembly
L-230120	Selector Shaft Sleeve	L-230145	Shut Off Selector Bracket Rod
L-230129	Selector Arm No. 1 Assembly		

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MODEL L

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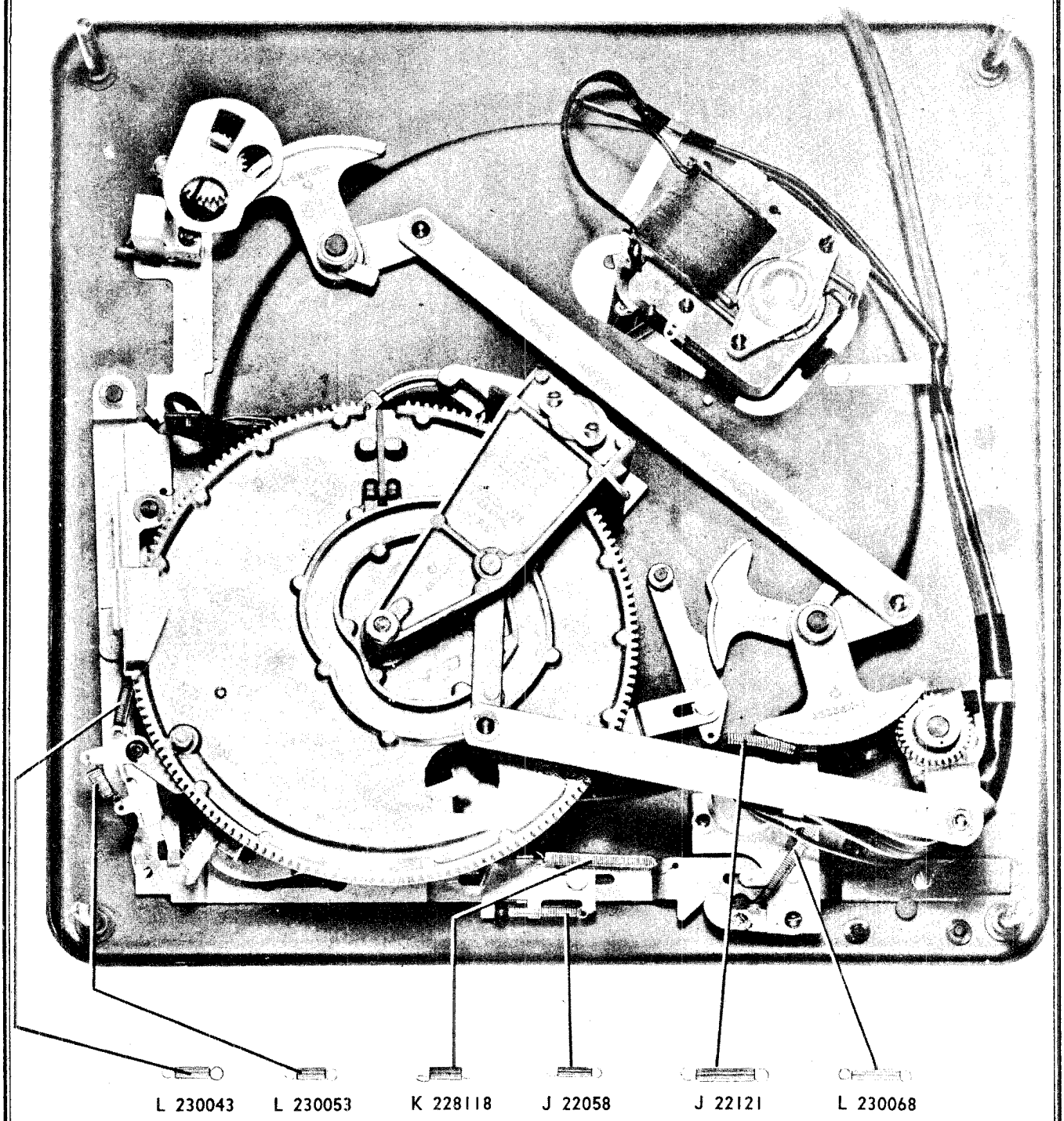

J-22058	Manual Lockout Outer Spring	L-230043	Shut Off Lever Spring
J-22121	12″ Reset Slide Spring	L-230053	Tone Arm Latch Spring (Outer)
K-228118	Manual Lockout Inner Spring	L-230068	Detent Arm Spring

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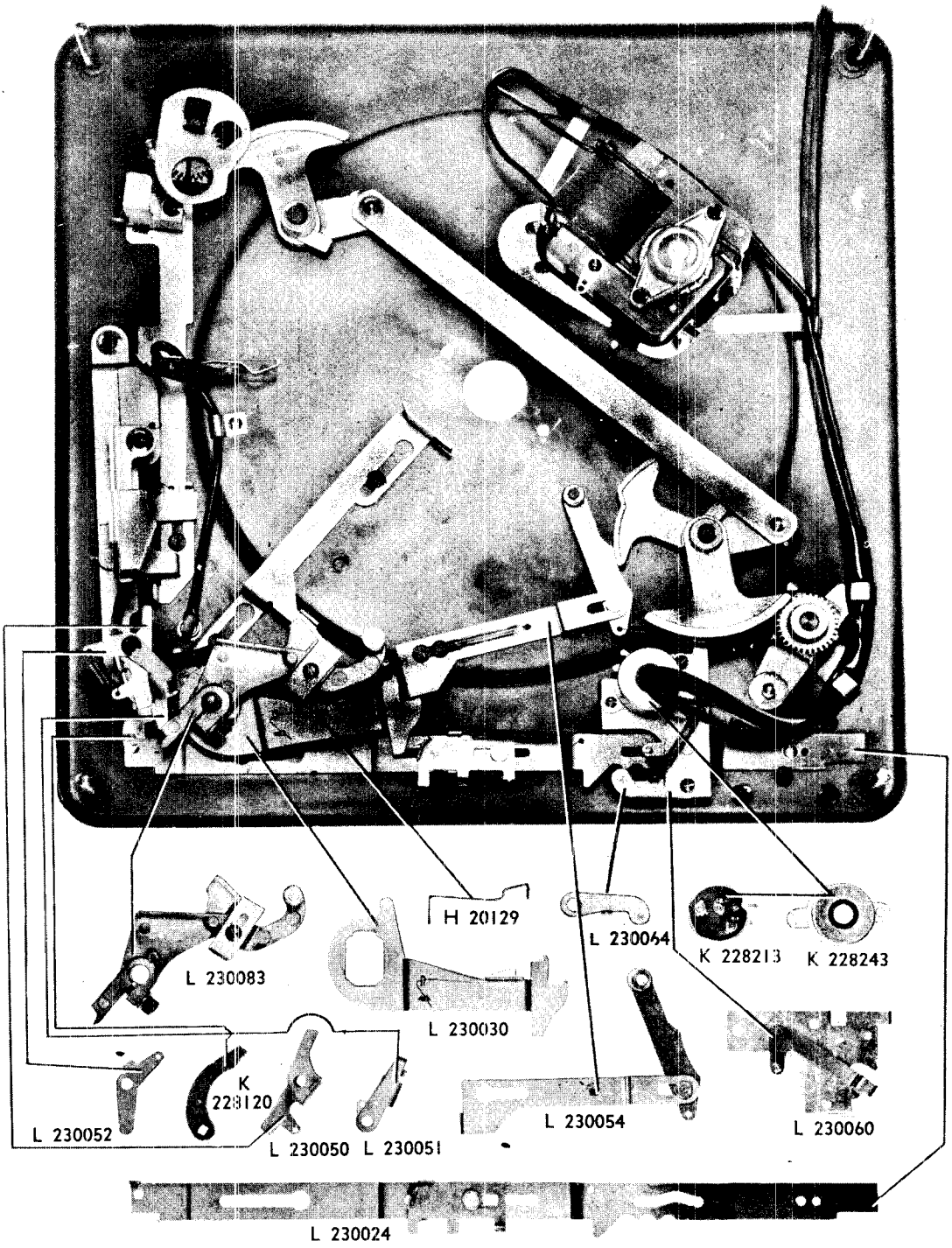

H-20129	Booster Spring
K-228120	Connecting Link
K-228213	Switch
K-228243	Switch Cover
L-230024	Manual Lockout Assembly
L-230030	Tone Arm Locator Assembly
L-230050	Tone Arm Center Latch
L-230051	Tone Arm Inner Latch
L-230052	Tone Arm Outer Latch
L-230054	Reset Lever Assembly
L-230060	Switch Plate Assembly
L-230064	Detent Arm Assembly
L-230083	Tone Arm Lever Assembly

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MODEL L

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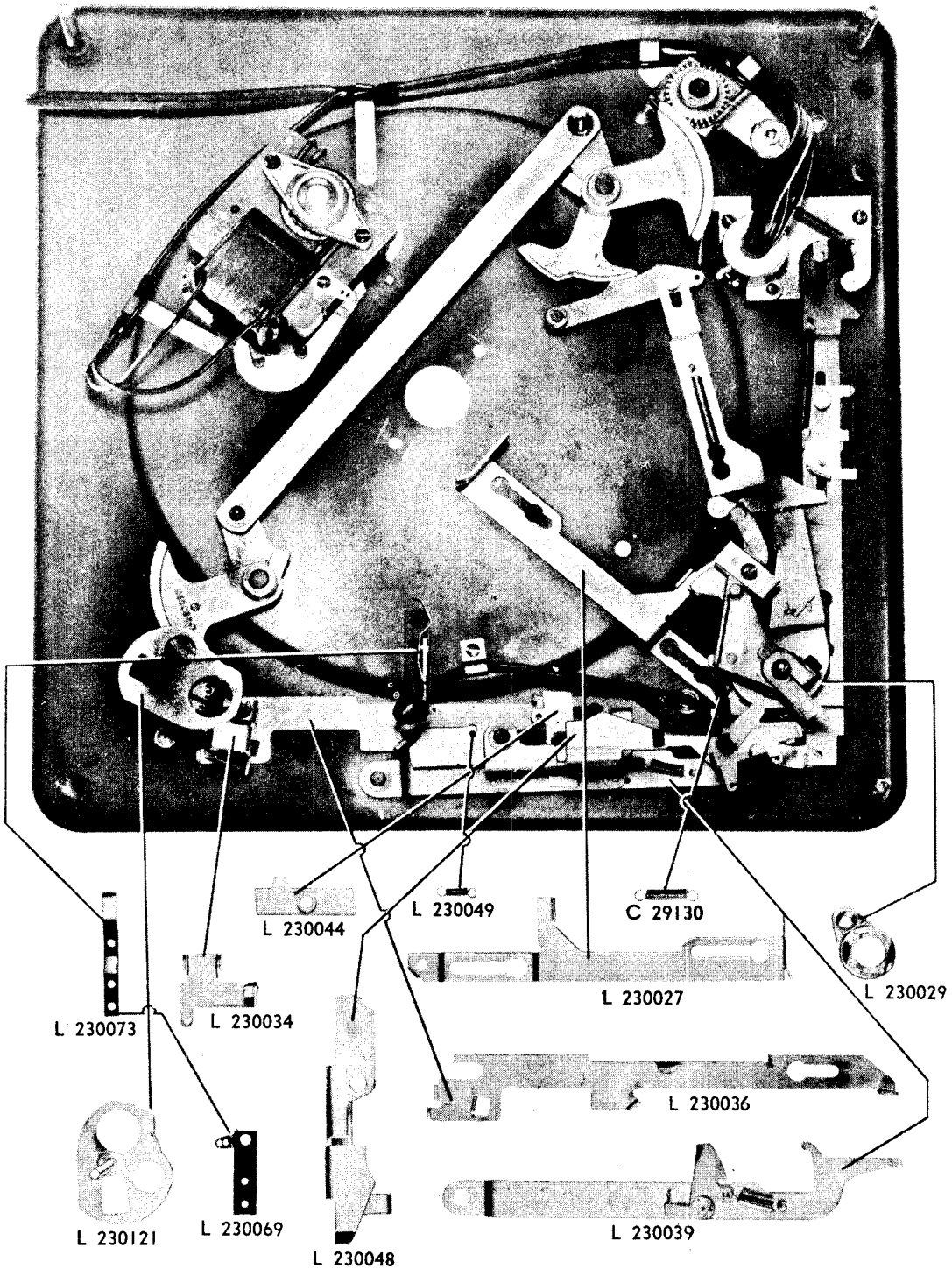

C-29130	Tone Arm Locator and Latch Spring	L-230044	Shut Off Trip Assembly
L-230027	Manual Reject Slide	L-230048	Shut Off Bracket
L-230029	Tone Arm Locator Hub	L-230049	Shut Off Bracket Spring
L-230036	Shut Off Slide	L-230069	Contact Mounting Strip Assembly
L-230034	Shut Off Slide Bracket	L-230073	Muting Switch Blade Assembly
L-230039	Shut Off Lever Assembly	L-230121	Shut Off Cam Shaft Assembly

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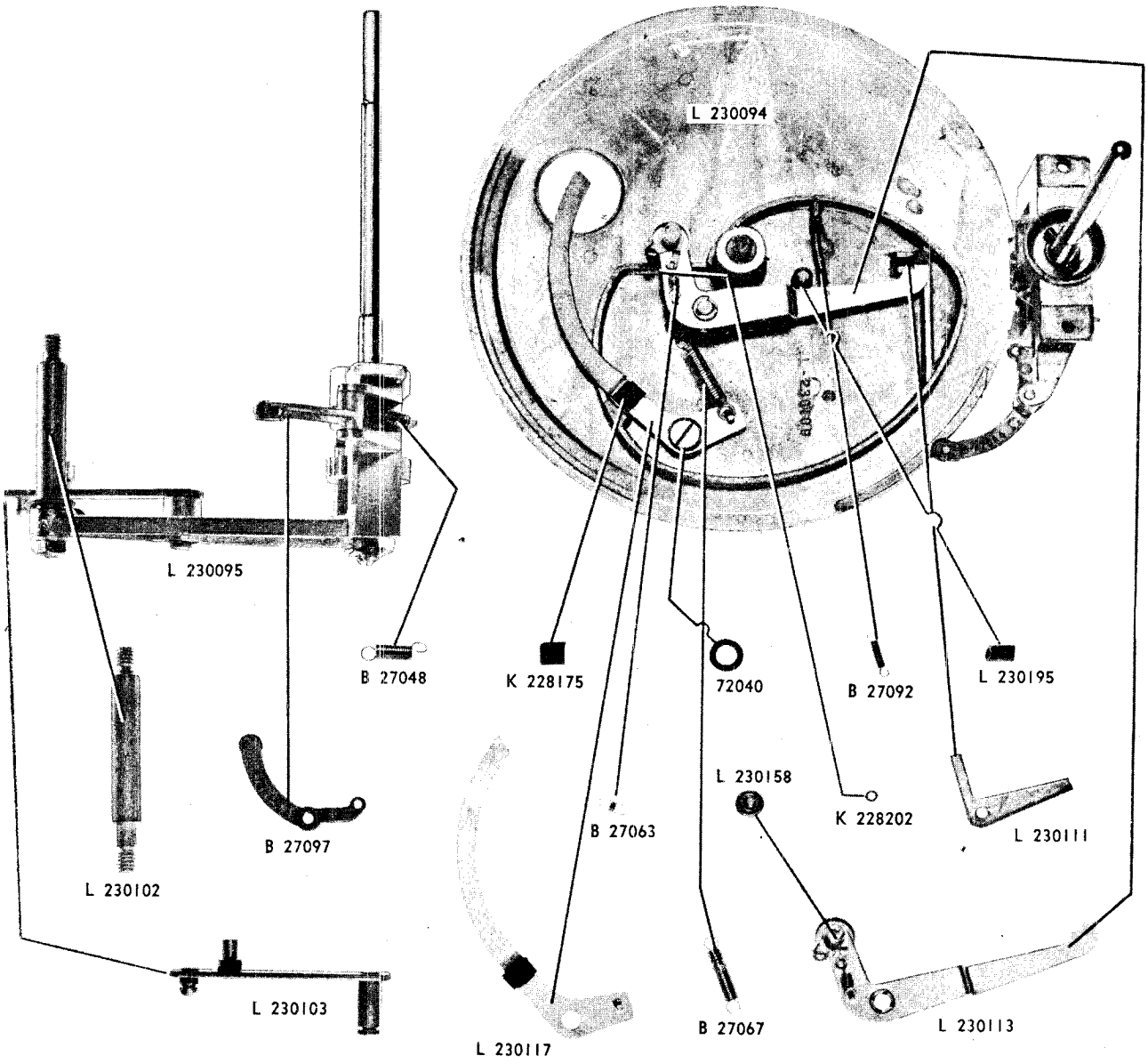

B-27048	Stop Lever Spring	L-230095	Spindle Housing Assembly
B-27063	Trip Dog Spring	L-230102	Drive Gear Shaft
B-27067	Retard Lever Spring	L-230103	Drive Link Assembly
B-27092	Trip Lever Spring	L-230111	Clutch Engagement Lever
B-27097	Drive Gear Stop Lever Assembly	L-230113	Trip Lever Assembly
72040	Retard Lever Spring Washer	L-230117	Retard Lever
K-228175	Retard Lever Bumper	L-230158	Trip Roller
K-228202	Trip Dog Bumper	L-230195	Trip Lever Bumper
L-230094	Drive Gear and Housing Assembly		

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CROSS REFERENCE TO PARTS IN FIGURES AND TEXT

Ref. No.	Description	Part No.	Ref. No.	Description	Part No.
1	Control slide assy.	230023	31	Shut off slide bracket assy.	230033
2	Power switch	K228213	32	Shut off bracket	230048
3	Connecting link	K228120	33	Tone arm inner latch	230051
4	Manual reject slide	230027	34	Shut off slide	230036
5	Trip lever assy.	230113	35	Shutoff slide spring	230038
6	Clutch engagement lever	230111	36	Shutoff trip	230045
7	Pinion gear	230101	37	Shutoff dog	230041
8	Drive gear	230109	38	Tone arm center latch	230050
9	Tone arm lift pin	230147	39	Tone arm outer latch	230052
10	Drive link	230104	40	Shutoff lever	230040
11	Drive link conn. rod	230128	41	Tone arm hinge bracket	K228146
12	Drive crank assy.	230126	42	Manual lockout (outer)	B27016
13	Post gear No. 1	230148	42	10″ & 12″ set lever	230056
14	Segment No. 1 assy.	230089	44	Turntable hub	230149
15	Segment tie plate	230093	45	Turntable assembly	230146
16	Segment No. 2 assy.	230091	46	12″ Reset slide spring	J22121
17	Post gear No. 2	230125	47	Tone arm locator spring	C29130
18	Tone arm latch lever assy.	230050, 1, 2	48	Allen socket cap screw	75047
19	Tone arm lever	230085	49	Tone arm adjusting screw	K228238
20	Tone arm locator	230031	50	Counterbalance spring	K228099
21	12″ reset slide	230055	51	Counterbalance adj. slide	K228150
22	Tone arm retard lever	230117	52	Tone arm shaft	K228147
23	Booster spring	H20129	53	Trip lever spring	B27092
24	Drive gear stop lever	B27097	54	Idler wheel assy. See numerical parts list.	
25	Trip shoe	K228156	55	Idler wheel spring. See numerical parts list.	
26	Trip plate	B27037	56	Retard lever spring	B27067
27	Trip dog	K228174	57	Shutoff brkt. spring	230049
28	Selector brkt. button assy	230142	58	Muting switch blade	230074
29	Shut off cam shaft assy.	230121	59	Selector shaft sleeve	L230120
30	Shut off cam assy.	230121	60	Selector shaft No. 1 assy.	L230118

PARTS LIST

Part Number	Item
H-20065	"C" Washer
H-20129	Tone Arm Booster Spring
H-20143	Panel Support Spring (Upper)
H-20199	Clamp Nut
J-22021	"C" Washer (Small)
J-22058	Manual Lockout Spring (Outer)
J-22096	Thrust Plate
J-22117	Thrust Wafer
J-22121	12″ Reset Slide Spring
B-27048	Stop Lever Spring
B-27050	Thrust Washer
B-27063	Trip Dog Spring
B-27067	Retard Lever Spring
B-27088	Retard Lever Screw
B-27092	Trip Lever Spring
B-27097	Drive Gear Stop Lever Assembly
C-29130	Tone Arm Locator & Latch Spring
70000	6-32 Nut
70077	¼-20 Nut
71018	¼x6-32 Flat Head Machine Screw
71036	3/16x6-32 Round Head Machine Screw
71050	¼x6-32 Round Head Machine Screw
71055	3/16x4-36 Round Head Machine Screw
71066	¼x4-36 Round Head Machine Screw
71096	¼x4-36 Oval Fil. Head Machine Screw

Part Number	Item
71418	1/8x4-36 Round Head Machine Screw
71468	¾x10-32 Allen Socket Head Cap Screw
71469	⅞x¼-20 Allen Socket Head Cap Screw
71502	5/8x6-32 Binding Head Machine Screw
71750	Shakeproof Sems (3/16x6-32 Round Head Machine Screw)
71752	Shakeproof Sems (3/16x4-36 Round Head Machine Screw)
71754	Shakeproof Sems (¼x6-32 Round Head Machine Screw)
71755	Shakeproof Sems (3/8x8-32 Round Head Machine Screw)
71760	Shakeproof Sems (5/16x8-32 Round Head Machine Screw)
71788	Shakeproof Sems (3/16x8-32 Binding Head Machine Screw)
71789	Shakeproof Sems (½x4-36 Round Head Machine Screws)
72040	Retard Lever Spring Washer
72130	Flatwasher (Steel)
72138	Flatwasher (Brass)
73076	No. 10 Kantlink Lockwasher
73084	Countersunk Lockwasher
73087	¼ Kantlink Lockwasher—Cadmium
73094	Shakeproof Lockwasher
73117	No. 10 Kantlink Lockwasher No. 1184 .040 thick
74058	Solder Lug
75042	¼x10-32 Allen Socket Set Screw Cup Point
75047	5/8x10-32 Allen Socket Head Cap Screw
75067	¼x8-32 Headless Set Screw Cup Point
80035	5/8x3/0 Taper Pin
80036	¾x3/0 Taper Pin

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PARTS LIST

Part Number	Item
K-228099	Counter Balance Spring
K-228118	Manual Lockout Spring (Inner)
K-228120	Connecting Link
K-228143	Shielded Pick Up Lead
K-228145	Hinge Bracket and Shaft Assembly
K-228150	Counter Balance Adjusting Slide
K-228156	Trip Shoe
K-228175	Retard Lever Rubber Bumper
K-228187	Drive Link Roller
K-228199	Tone Arm Lift Pin
K-228202	Trip Dog Rubber Bumper
K-228211	Stop Lever Pivot Pin
K-228212	Wire Clip
K-228213	Switch
K-228216	Tone Arm Mounting Grommet
K-228217	Tone Arm Special Washer
K-228221	Pick Up Cartridge Assembly
K-228223	Fulcrum Clamp
K-228224	Tone Arm Fulcrum
K-228225	Tone Arm Bracket Assembly
K-228238	Tone Arm Adjusting Screw
K-228239	Rubber Grommet (Motor)
K-228240	Bushing (Motor)
K-228242	Switch Cover Insulator
K-228243	Switch Cover

Part Number	Item
L-230021	Control Escutcheon
L-230022	Speed Nut
L-230023	Control Slide Assembly
L-230024	Manual Lockout Assembly
L-230027	Manual Reject Slide
L-230028	Control Knob Assembly
L-230029	Tone Arm Locator Hub
L-230031	Tone Arm Locator
L-230033	Shut Off Slide Bracket Assembly
L-230036	Shut Off Slide
L-230038	Shut Off Slide Spring
L-230039	Shut Off Lever Assembly
L-230043	Shut Off Lever Spring
L-230044	Shut Off Trip Assembly
L-230047	Shut Off Trip Spring
L-230048	Shut Off Bracket
L-230049	Shut Off Bracket Spring
L-230050	Tone Arm Latch (Center)
L-230051	Tone Arm Latch (Inner)
L-230052	Tone Arm Latch (Outer)
L-230053	Tone Arm Latch Spring (Outer)
L-230054	Reset Lever Assembly
L-230058	10-12" Set Lever Spring
L-230060	Switch Plate Assembly
L-230064	Detent Arm Assembly
L-230067	Clamp—Pickup Lead
L-230068	Detent Arm Spring
L-230069	Contact Mounting Strip Assembly
L-230073	Muting Switch Blade Assembly
L-230076	Clamp—Muting Switch

PARTS LIST

Part Number	Item
L-230084	Tone Arm Lever Plate Assembly
L-230087	Tone Arm Rubber Bumper
L-230089	Segment No. 1 Assembly
L-230091	Segment No. 2 Assembly
L-230093	Segment Tie Plate
L-230096	Housing and Bushing Assembly
L-230098	Turntable Spindle Assembly
L-230101	Pinion Gear
L-230102	Drive Gear Shaft
L-230103	Drive Link Assembly
L-230111	Clutch Engagement Lever
L-230113	Trip Lever Assembly
L-230117	Tone Arm Retard Lever
L-230118	Selector Shaft No. 1 Assembly
L-230120	Selector Shaft Sleeve
L-230121	Shut Off Cam Shaft Assembly
L-230125	Post Gear No. 2
L-230126	Drive Crank Assembly
L-230128	Drive Link Connecting Rod
L-230130	Selector Arm No. 1 & Blade (10") Assembly
L-230133	Selector Arm Knob No. 1 Assembly
L-230134	Selector Blade 12"
L-230136	Selector Shaft No. 2
L-230137	Selector Arm No. 2 & Blade (10") Assembly
L-230140	Selector Arm Knob No. 2
L-230142	Shut Off Selector Bracket Assembly
L-230145	Shut Off Selector Bracket Rod
L-230146	Turntable Assembly
L-230148	No. 1 Post Gear
**L-230161	Motor Assembly—60 cycle (See Note No. 2 below)
**L-230163	Idler Wheel Assembly (See Note No. 2 below)
L-230170	Double Wire Clamp
L-230189	Drive Gear Sub-Assembly
L-230193	Panel Retainer Spring
L-230195	Trip Lever Bumper
*L-230210	Tone Arm—Aluminum

NOTE 1. * All part numbers shown are for a standard changer. Companies ordering special parts should order them for their service stock instead of the standard parts. Part numbers of the special parts can be obtained from Seeburg Service Department.

NOTE 2. ** CONVERSION SPRINGS: a. 60 cycle motors can be converted for 50 cycle operation by the addition of a "conversion" spring. Since each changer has alternate motor sources it will be necessary to stock a quantity of conversion springs for each type motor; the motor used in any one changer can only be determined from the part number stamped on the motor mounting plate at the time the service man does the actual work.

b. Following is a list of the motor part numbers showing the corresponding conversion spring which must be used for that particular motor:

Motor	50 Cycle Conversion Spring	Idler Wheel	Idler Wheel Spring	Idler Wheel Fastener
L-230161	L-230221	L-230163	L-230223	L-230224 Clip & L-230228 Washer
L-230200	L-230222	L-230197	K-228257	L-230198 "C" Washer — L-230199 Washer
L-230231	L-230237	J-22143	K-228237	L-230225 Washer & L-230244 Clip

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I. Adjustment of pick-up

1. The pick-up lands too much outside or inside at the beginning of an audition:

a) Too much outside:
Turn the screw N° 1 very gently in a clockwise direction. This screw can be reached through the hole N° 2 of the unit plate when the pick-up is placed on the first groove of a 10" record.

b) Too much inside:
Turn the screw N° 1 very slightly in a counter clockwise direction.

2. The pick-up remains on the edge of a record:

This only happens when records have no running-in groove.

a) Verify that the Record Changer is mounted in a perfectly horizontal position. This can be adjusted by means of the suspension screws and nuts of the unit plate.

b) The small spring N° 3 should be slightly bent towards the interior of the aperture N° 4.

3. The pick-up lands too much inside but only for the first records:

a) Verify if the record changer is perfectly horizontal.

b) The spring N° 3 should be slightly bent towards the outside of the aperture N° 4.

4. The pick-up does not rise enough to play the last record of the pile:

Bend slightly upwards the steel wire N° 43 situated under the pick-up arm. The normal adjustment is reached when a medium needle touches the velvet of the turntable.

5. The pick-up lands and rises up immediately without playing a record:

a) Verify that the lever N° 5 turns perfectly free on its pivot, so that it is very vigorously brought into position by its spring N° 6. If this is not the case, clean the friction surfaces.

b) If this is insufficient, bend slightly upwards the arm N° 7 of lever N° 5 (hidden beneath the mounting plate) by means of a screw-driver. The arm is accessible through the hole N° 8.

6. The pick-up rises up before the end of a record:

a) This irregularity is due to the hole in the record being out of centre in relation to the grooves, or the hole is too large. Such records are not suitable for record changers.

b) If the auto-trip mechanism is considered too sensitive, bend slightly the free end of the trip lever N° 9 in a clockwise direction.

7. The pick-up does not operate immediately before being dropped on a record:

a) The tension of the flat spring N° 10 should be slightly increased so that it leans more on the cam.

b) The spiral spring N° 46 (fig. I) should be reinforced.

8. The pick-up remains on the record at the end of an a dition:

The record feeding mechanism is actioned by the auto-trip mechanism. If, at the end of an audition, the mechanism does not operate, i. e. the pick-up remains in the last groove, proceed as follows:

a) Verify if the record in question has a running-off groove. Only records with a running-off groove can be played automatically on a record changer.

b) Action the "reject" button:

1st case: The automatic cycle mechanism starts:

Remove the turntable and examine the leather of the striker N° 11. If this is worn, give it half a turn to present a new surface to the auto-trip lever N° 9 or replace it by a new one. If this leather is in good condition, then increase the tension of the friction spring by turning the adjusting screw N° 12 about half a turn in a counter-clockwise direction.

2nd case: The automatic cycle mechanism does not start:

This means that the record changer is blocked owing to the hardening of the grease on the cams, the presence of an erratic particle, or an important distortion of one of the organs. Clean the cams and gears and control the whole mechanism.

9. The 12" records rub the pick-up arm when dropping from the record spindle:

Verify the record feeding mechanism according to § II, 1 *a)* and *b)*. Adjust accordingly.

II. Record feeding mechanism

1. Records fail to drop from the record spindle:

a) Examine the thickness at the *centre* of the record. The standard thickness is between 1,5 and 2,6 mm. Thinner or thicker records do not drop correctly from the spindle. A too thin record can be played alone or on the top of the pile.

b) The correct adjustment of the push-lever N° 45 of the record spindle N° 44 is shown on fig. II. For this control, turn slowly the record changer turntable until the push-lever is out at its maximum point. If the dimension of 6,9 mm is not reached, give half a turn to the bolt N° 13 in a clockwise direction after having unscrewed nut N° 14. If the dimension of 7,1 mm is exceeded, turn in the opposite direction bolt N° 13.

2. Two records drop together from the record spindle:

In such a case, these two records are too thin at the centre or out of shape.

3. The record central hole enlarges or splits:

This only happens when the records are too thin at the centre.

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III. Turntable brake, auto switch and pause

1. The record changer does not stop after the last record:

a) Verify if the lever N° 15 is free in the loop N° 16. If such is not the case, adjust this lever until it is perfectly free to move.

b) If the trouble does not come from this, verify when there are no records on the platform N° 26 if the lever N° 15 abuts against the feeler N° 17. If this is not the case, lengthen the lever N° 15 by loosening the regulating screws.

c) The irregularity may also come from an erroneous oiling of the feelers 17 and 18. Remove the oil with benzine by means of a brush.

2. The starting button does not remain on "start":

a) The lever N° 15 is engaged on the extremity of the feeler N° 17, disengage it and adjust.

b) The lever N° 18 on which is the leather of the turntable stop strikes against the edge of the hole N° 19. — Adjust.

3. The last record cannot be repeated, the record changer stops:

Bend slightly the small tongue N° 20 by means of a screw-driver in the slot N° 21.

4. The pause lasts indefinitely:

Examine firstly if the pause spring N° 22 is broken. In such a case proceed as follows:

a) Remove the motor by unscrewing nuts N° 23, place the pause button on "pause" and turn the large toothed wheels until the pause spring is quite visible. Remove the fixing screw N° 24, the broken pause spring can then be removed and replaced.

b) If the pause spring is intact, the extremity of this spring should be slightly bent towards the outside of the large toothed wheel so that this extremity meshes more effectively to the star N° 25.

c) If that is not sufficient, increase the pressure of the flat spring N° 10 against the cam.

IV. Selecting mechanism for 10" and 12" records

When the pick-up does not land into a position corresponding to the diameter of the record placed on the turntable (this record should have previously fallen from the platform N° 26 and have actioned the feelers N°s 17 and 18) proceed as follows:

a) Verify the mechanism of the record feeding following § II, 1 *a)* and *b)*.

b) If the irregularity does not arise from a faulty adjustment of the record feeding mechanism, examine if the unit plate of the apparatus has been bent by a shock in the angle of the platform N° 26. Should such be the case, carefully adjust the unit plate.

c) Verify if the lever in the form of U N° 27 does not touch the mounting board. The aperture of this mounting board should be executed following the template supplied with each apparatus.

d) Verify that the elbowed lever N° 28 is not bent or twisted, it should be perfectly free in its two articulations.

e) The lever in the form of U N° 27 should not contact the lever N° 28, but must be free to follow the motion of feeler N° 18 when a 12" record descends on the record spindle.

f) The feeler N° 18 should be perfectly free at the time when the feeding mechanism is in action. This feeler should not be oiled.

g) If all the preceding points are in order, increase the tension of the friction spring N° 29, by means of the blocking nuts N° 30.

h) The position of the abutment 10"-12" N° 31 can be adjusted by means of the two screws N° 32 if its position does not correspond to the diameter of the record descending the spindle (only modify this adjustment if all the preceding points are in order).

V. Motor

1. The speed varies during the reproduction of certain records:

a) Control these records. Records that are not flat slip over each other and thus do not correctly follow the movement of the motor.
If this difficulty does not come from the records, verify the points 2., *b)* and 3.

2. The motor does not start when the button is placed on "Start":

a) The motor can only start by itself when the pick-up is on a record or if at rest outside the turntable. When the turntable is not stopped with sufficient force, the mechanism overruns the normal rest position and the motor does not start. Change the position of the leather N° 18 to present a new surface, or renew.

b) The record spindle N° 44 should be perfectly free in the hole N° 46 of the centre shaft. Control carefully this point when in the normal playing position. This hole should be oiled from time to time.

c) Verify the lubrication of the motor following § A.

d) The stator received a shock that put it out of centre, adjust accordingly.

3. The motor stops suddenly and remains blocked:

Verify firstly if it is really the motor that is blocked and not the record changer mechanism. The stoppage of the motor is often due to the friction of the principal bearing owing to lack of oil in the hole N° 33. It may be necessary to dismantle the motor (see § B & C) to liberate the bearing.

MODEL CD-40

THORENS INC.

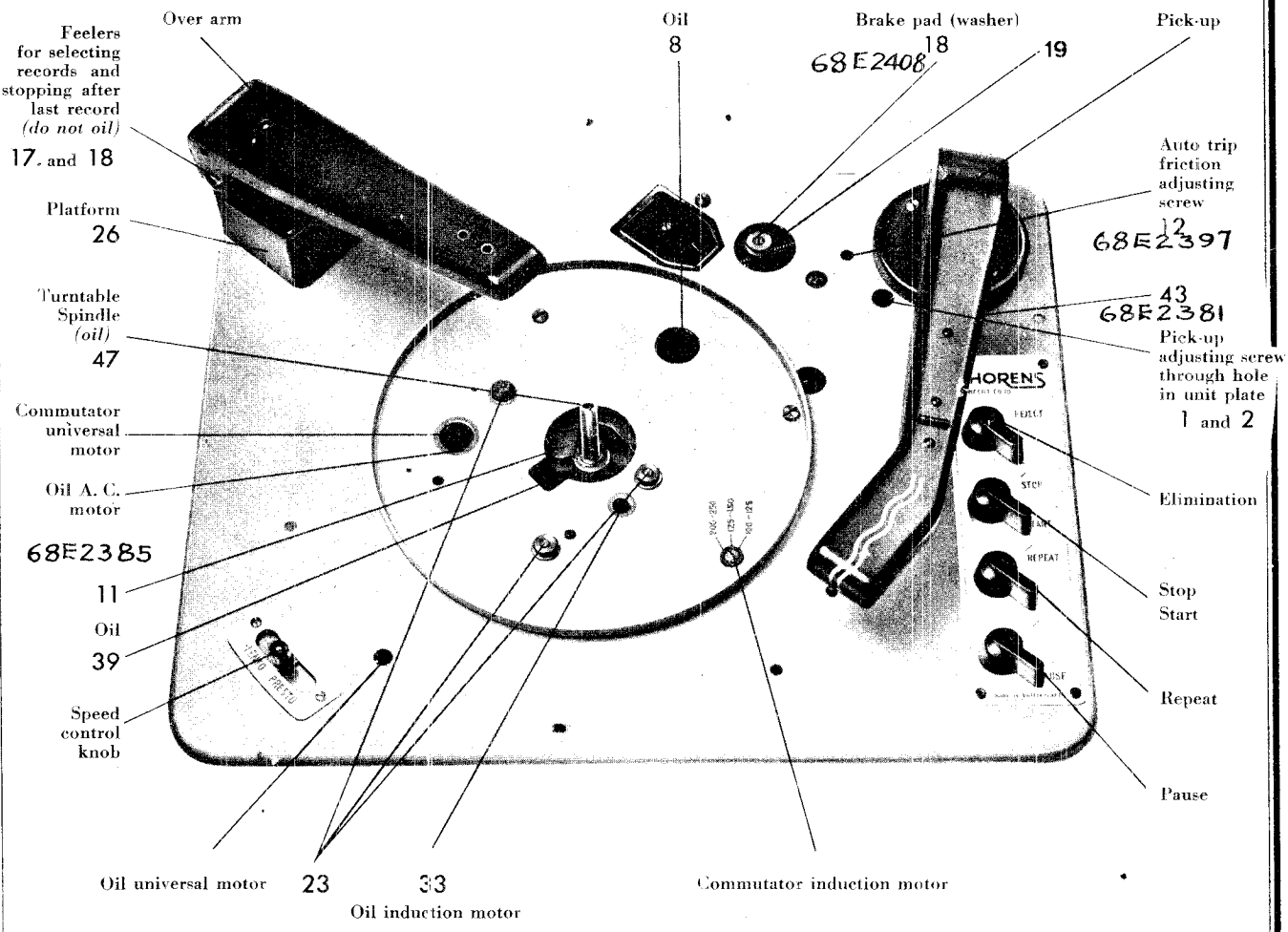

Fig. III

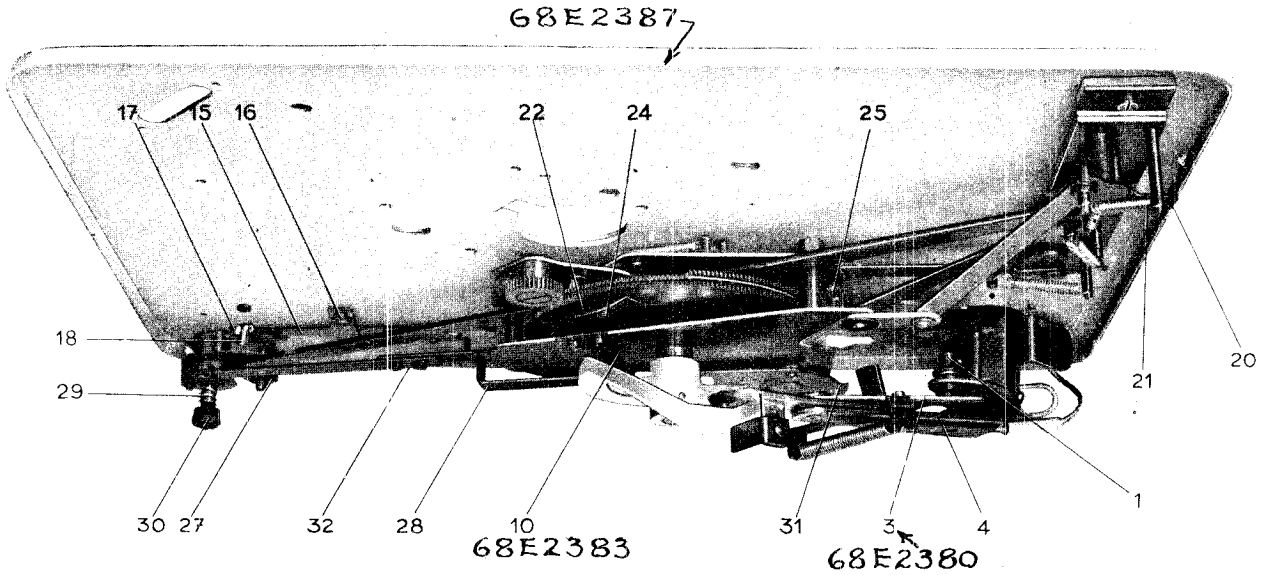

Fig. IV

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MODEL CD-40

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4. The motor is noisy (hissing):

a) Verify the point 2. *b)*.

b) The axial abutment ball N° 34 situated at the extremity of the rotor is worn also the steel plate N° 35 placed in the abutment N° 36 fixed to the motor casing. Dismantle the motor as shown under § B & C and replace the ball and metal plate. At the same time insert a small tube N° 37 furnished by the factory if not already supplied (see diagram N° V). The tube should be filled with vaseline or a graphite lubricant.

Remark : If the worn ball cannot be removed from the rotor with a magnet, it should be slightly ground and then removed with an awl. Do not grind the axle of the rotor.

5. The motor runs by fits and starts:

The motor should be dismantled following § B. Remove the top motor plate N° 38 by unscrewing the 3 screws. Verify if the fibre wheel is faulty (broken teeth). The centre shaft with the fibre wheel will be replaced by the factory. Lubricate before mounting the new shaft.

A. Lubrication of the motor:

The motor should be regularly lubricated generally after 100 hours use. To do this remove the turntable and introduce a few drops of good quality thin oil into the lubricating holes (coloured red), by means of an oil-can or a needle. Do not use consistent oil.

B. Dismantling of the motor from the unit plate of the record changer:

Remove the toothed wheel with the striker N° 11 by a simple pull. Loosen the 3 nuts N° 23 also the screw N° 39 of the speed regulator lever.

C. Dismantling the motor:

Unscrew the 4 fixing screws of the stator. Remove *the entire block* formed by the housing N° 41 and the stator N° 42. To reach the commutator and the abutment, *remove very carefully* the housing, leaving the block of the commutator with the stator. *Press against the commutator by the medium of the terminals to make it slide by pressure, out of the housing, which should be withdrawn at the same time.*

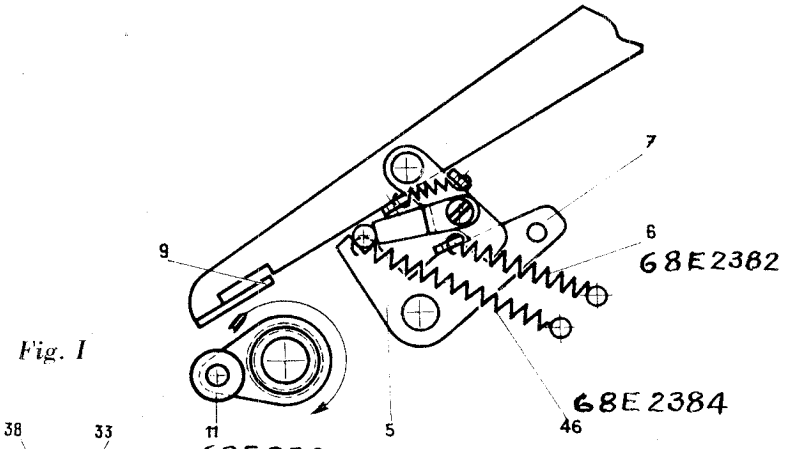

Fig. I

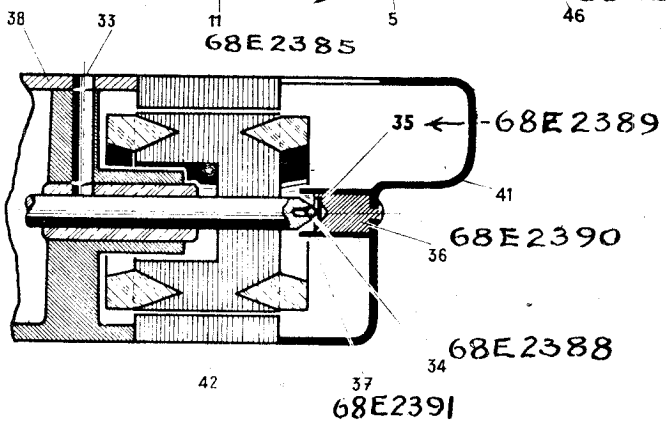

Fig. V

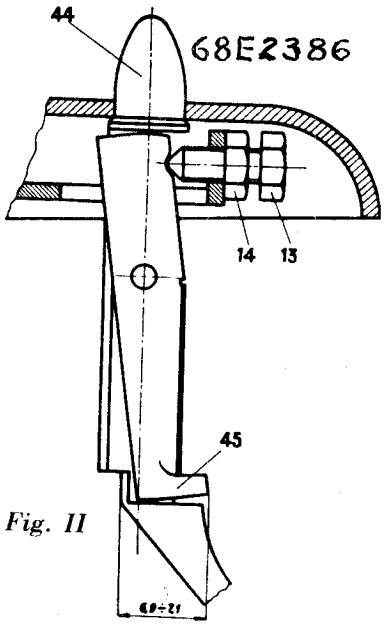

Fig. II

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THORENS AUTOMATIC MIXED RECORD CHANGER
Mod. „CONCERT" CD 40

DESCRIPTION, INSTALLATION AND SERVICE INSTRUCTIONS

General description

Dimensions

The unit plate is 15 in. (380 mm.) by 12 in. (300 mm.) wide. It requires a clearance of 16 1/2 in. (420 mm.) × 14 in. (350 mm.) surface, 6 in. (150 mm.) above the unit plate, 3 1/4 in. (80 mm.) below the unit plate. Minimum height required for placing the pile of records into position before the audition : 7 1/2 in. (190 mm.) above the unit plate.

Motor

The motor is fixed rigidly to the record unit. This prevents any interference with the pick-up and eliminates all vibrations. The Record Changer "Concert" is equipped with one of the following types :

1. AC motor. The AC motor is of the induction type entirely encased. Its high pulling capacity ensures perfect functioning of the changer mechanism and its silent operation as well as its patent regulator contribute to give a faultless reproduction of your records. It causes no interference on the pick-up and the heating is reduced to a minimum.

Commutator for adaptation to the following voltages :

100 - 125
125 - 150
200 - 250
} volts AC 50 to 60 cycles.

Consumption : 15 watts maximum.

2. DC motor. The universal motor for AC and DC current presents, with a particularly high pulling capacity, the same characteristics of regularity and silence.

Commutator for adaptation to the following voltages :

Model 950 100 - 130
130 - 160
200 - 250
} volts DC and AC 50 and 60 cycles.

Special Model 912 : 6 and 12 volts DC.

Consumption : 10 watts maximum.

Caution ! The universal motor must be connected to the earth as shown on the connection plan supplied with each record changer, otherwise noise will develop.

Speed

The turntable speed is normally set at 78 r.p.m. It can be varied by means of the indicator lever.

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Pick-up

The " Concert " record changer is equipped with the new highest precision Thorens pick-ups " Rondo ", " Gavotte ", " Fugue Special " or " Crystal Special types which guarantee the best audition and the minimum wear of your records.

" RONDO "	a good quality pick-up of electro-magnetic type with high impedance in arm made of stamped metal, light and rigid, which can be connected directly to radio receivers. Minimum impedance required for this connection : 50,000 ohms.
" GAVOTTE "	a high-class pick-up of electro-magnetic type with low impedance also in arm of stamped metal which must be connected to the radio receiver by the medium of its coupling transformer. Minimum impedance for this connection : 200,000 ohms.
" FUGUE SPECIAL "	a professional type pick-up, electro-dynamic with low impedance, also in arm made of stamped steel. This pick-up must be connected to the radio receiver by means of its coupling transformer. Minimum impedance for this connection : 0,5 megohms.
" CRYSTAL SPECIAL "	a high quality piezo-electric pick-up light and flexible which can be connected directly to the radio-receiver. Minimum impedance for this connection : 0,5 megohms.

These four models play with interchangeable needles.

When fixing the coupling transformer to the cabinet, see that a sufficient distance is left in relation to the motor (8 in. = 20 cm. minimum).

NOTE : Detailed technical characteristics of the above-mentioned pick-ups are described in special leaflets.

Installation

To ensure a perfect functioning of the record changer it is very important that the installation and mounting should be made in a correct manner.

A template is supplied with each apparatus. The aperture to be made in the mounting board must be executed with precision as also the drilling of the fixation holes so as to give the mechanism the necessary freedom and to obtain perfect operation. *Any effort to force or any torsion exercised on the unit plate may provoke a faulty functioning.*

The mounting on springs, following the mounting diagram, eliminates this risk and ensures a flexible and floating suspension of the unit plate. This prevents any interference with the pick-up and loud-speaker and eliminates all vibrations.

REMARK : If in the case of a very sensitive amplifier the hum level is considered too high, the apparatus should be mounted rigidly on the mounting plate. To avoid any flexion of the unit plate, it should be made rigid by means of suitable washers. If then interferences with loud-speaker do occur, this latter should be mounted on springs.

Adaptation to the tension of mains

For both types of motors the commutator permitting instantaneous adaptation to voltage of mains is placed under the turntable. After having removed the turntable, turn the commutator screw by means of a screw-driver until the slot corresponds with the desired voltage.

CAUTION. Do not proceed with any connecting or adjustment to the record changer before disconnecting mains current.

Maintenance

Motor and record changer mechanism

Motor and mechanism only need lubricating from time to time, generally after 100 to 150 hours use. To do this remove the turntable and introduce a few drops of good quality thin oil into the lubricating holes (coloured red). Do not use consistant oil which might block the motor. After a few years use it would be advisable to replace the hardened grease of the cams, gears and other rubbing surfaces by fresh and clean grease.

Do not oil the selecting feelers.

Record spindle

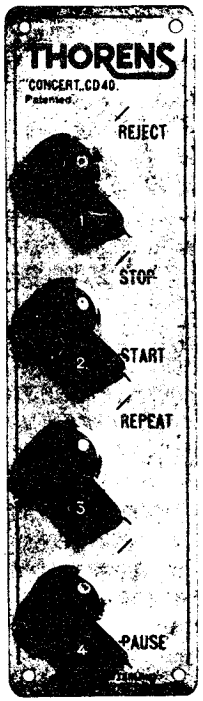
Apart from cleaning the push-lever periodically, it is necessary when oiling the motor *to introduce also a drop of oil into the hole of turntable spindle* where the record spindle pivots.

Pick-up

The pick-up being a high precision instrument, any repairs should be made through the competent services of Thorens Agencies.

Operating instructions

The " Concert " record changer CD 40 will play a maximum of ten 10 in. records or eight 10 in. and 12 in. mixed in any order. To operate, proceed in the following manner :



1. Raise overarm, place record spindle in position and place the records on the spindle shoulder. The lowest record of the pile will be played first.
2. Turn the record spindle on which the records are placed so that the lower edge of the pile of records rests on the platform. Lower the overarm, the hole in the free end then holds the top of record spindle into position in the direction of the platform. *Make sure that the overarm is completely lowered on to the record spindle.*
3. Insert needle in pick-up either a sapphire needle for record changers fitted with " GAVOTTE ", " FUGUE " and " CRYSTAL " pick-ups only, or a semi-permanent type needle that will play 10 or more records (reverse pick-up head to do this).
4. Move No. 2 knob to the position " start " From this moment, the changer functions automatically until all the records are played and at the end of last record it will stop automatically.

Any record not required to be played may be automatically *rejected* by moving knob No. 1 to position " reject ". The following record is then brought into playing position.

When the knob No. 3 is placed on position " repeat ", the record being played will be *repeated* once more as soon as the pick-up has reached the final groove.

A part only of record can be repeated if knob No. 3 being on position " repeat ", knob No. 1 is moved to position " reject ".

A *pause* of $2\frac{1}{2}$ minutes duration can be introduced between two records by placing knob No. 4 on position " Pause ".

The audition can be resumed at any moment by moving knob to its initial position.

The record changer can be stopped by moving knob No. 2 to position " stop ". It will start again if the knob is placed on position " start ", resuming playing at the place where it was interrupted.

Pause

Do not force the button into position when it resists. It can always be set going as soon as the record changing mechanism operates.

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Important remarks

Placing records on record spindle

Do not place roughly the pile of records on the record spindle. This risks to deteriorate their central holes.

Pick-up changing mechanism

The movements of the pick-up are actioned by the record changer mechanism. The pick-up should therefore never on any account be forced into position by hand. The overarm should not be raised from the record spindle while playing to avoid risk of deteriorating the records.

Record spindle

It is essential that the record spindle should fit perfectly free in the hole of the turn table spindle when the overarm is in playing position. This hole should be kept quite clean.

Records

The " Concert " record changer provides for standardized records in thickness and diameter. If a thinner record or one deteriorated at the centre is employed, it may happen that it will not drop from the record spindle, and cause it to lift up. In such a case it will suffice to change the position of the record in the reserve pile in order to ensure a normal feeding.

It may happen that new records have a slight burr around the centre hole; this burr may provoke jamming of the push-lever thus hindering the release of the records. To avoid this, care should be taken to pare off the burr.

The push-lever and record spindle should be cleaned from time to time.

It is recommended to play only flat and quite clean records. The records deteriorate and wear out quickly if not kept sheltered from the dust.

Transport of record changers

Care should be taken, when forwarding, to place the apparatus in the exact position in the special packing with all the securing wedges in their correct position. The turntable shaft and record spindle should be removed from their playing position and packed separately.

Adjustment

If the record changer does not function correctly verify in the first place that the unit plate is in no manner distorted by the mounting device and that the weight is equally distributed between the four fixing screws.

Pick-up landing position

The pick-up arm has been finely adjusted so that the needle comes on to the 10 " (25 cm.) record on a 9 9/16 " (245 mm.) diameter circle, and on a 12 " (30 cm.) record on 11 9/16 " (295 mm.) diameter circle. These positions were arrived at after checking a very wide selection of records of various makes.

However, if an adjustment becomes necessary, regulate by means of the special screw near the base of the pick-up arm. The pick-up should never on any account be forced into position.

Height of pick-up

The pick-up is adjusted in such a way that a medium needle arrives at level with the turntable velvet. If another adjustment is necessary it must be executed by bending slightly the extremity of the steel wire forming the vertical abutment. The pick-up should be raised for access to this abutment.

Auto-trip mechanism

The record feeding mechanism is actioned by the auto-trip mechanism. If at the end of a record, the auto-trip does not operate, that is the pick-up remains in the last groove, examine first of all, if the record in question has a run-off groove in its centre. Only records with run-off grooves can be played on a record changer. If this is not the cause, proceed as follows:

Operate the " reject " button.

Case No. 1. The record changing mechanism starts: Take off the turntable and examine the trip lever leather. If this is worn, give it half a turn to present a new surface to the striker. If badly worn renew entirely. If the leather is in good condition, then increase the tension of the friction spring by turning the friction adjusting screw in a counter-clockwise direction, about half a turn is sufficient.

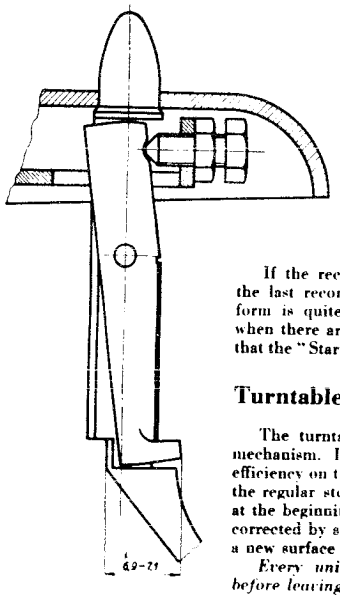
Case No. 2. The record changing mechanism remains immobile: This shows that the record changer is blocked owing to the hardening of the grease on the cams, or the presence of an erratic particle. Clean the cams and gearings and lubricate again.

Record feeding mechanism

If a record does not drop from the record spindle or drops late, examine first of all if its thickness at the *centre* is standard (1,5 to 2,6 mm.) and if the centre hole is in order and without a burr. Verify also if the record spindle is clean.

If the defect is not caused by this, remove the records, start the record changer mechanism and then stop it just at the moment when the push-lever is out at its maximum point. Then verify by means of a calibre that the course of the push-lever is in conformity to the dimensions indicated on the sketch beneath.

If the contrary is the case, adjust this course by means of the bolt situated in front of the overarm. To do this, raise the overarm, loosen the lock-nut and turn the bolt as far as necessary. Tighten up again by means of the lock-nut and verify if the course is correct.



Selecting mechanism for 10 " and 12 " records

If an error occurs when the pick-up lands on the edge of the mixed records, verify in the first place the record feeding mechanism as shown on the sketch. If the adjustment of this latter is correct, control the freedom of the smallest feeler of the platform during the feeding operation.

Last record stop

If the record changer does not stop after playing the last record, verify if the larger feeler on the platform is quite free and emerges to its proper extent when there are no records on the platform. Verify also that the " Start-Stop " button is quite free in all positions.

Turntable brake

The turntable brake is actioned by the auto-trip mechanism. If the brake does not work with sufficient efficiency on the turntable, the mechanism will overrun the regular stop position and the motor will not start at the beginning of a new pile of records. This can be corrected by slightly turning the leather pad to present a new surface to the turntable.

Every unit is thoroughly tested and lubricated before leaving the factory.

MODEL CD40

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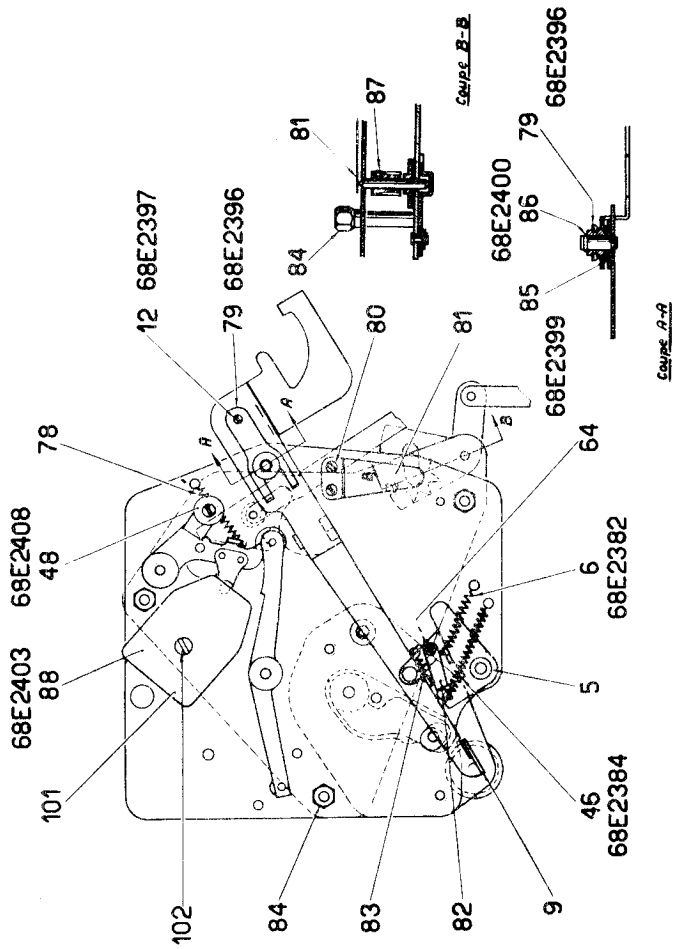


Fig. VIII

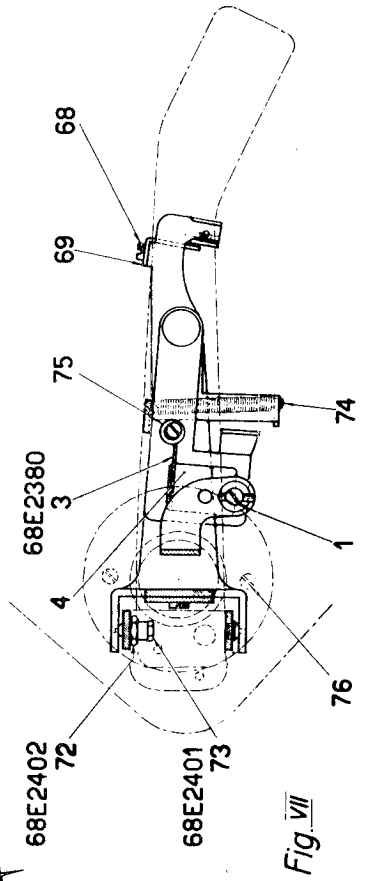
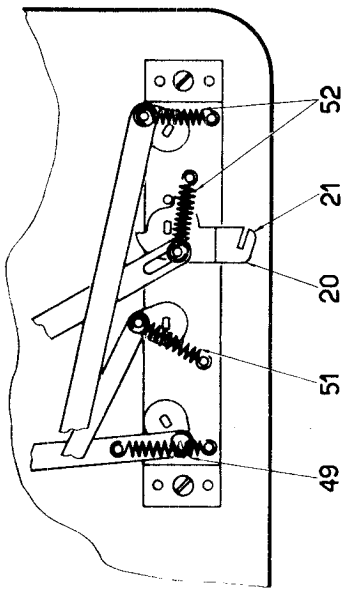


Fig. VIII



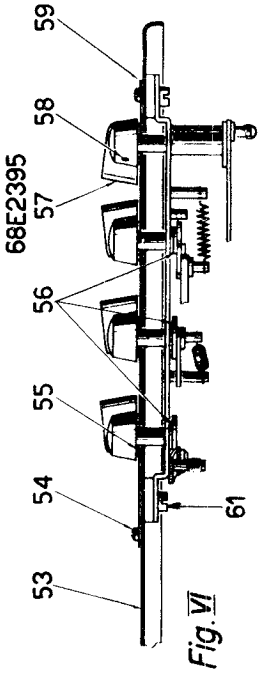
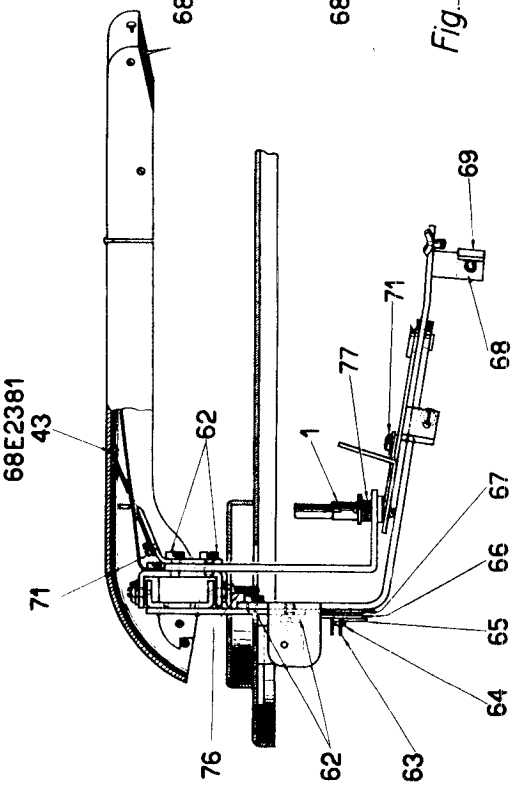


Fig. VII



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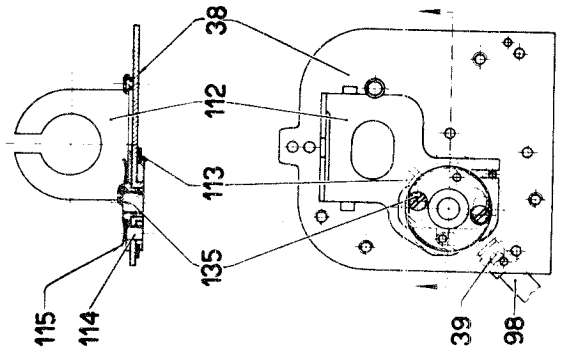


Fig. XI

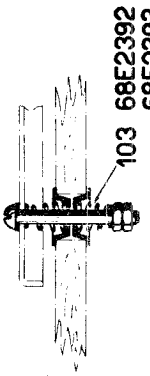


Fig. XIV

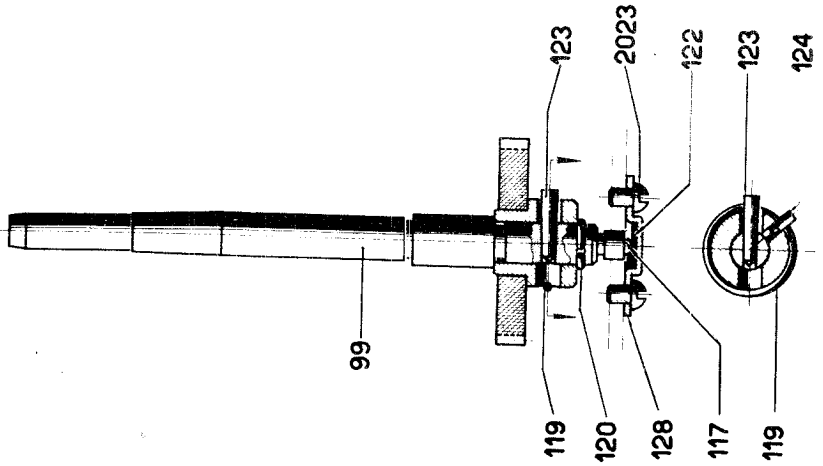


Fig. X

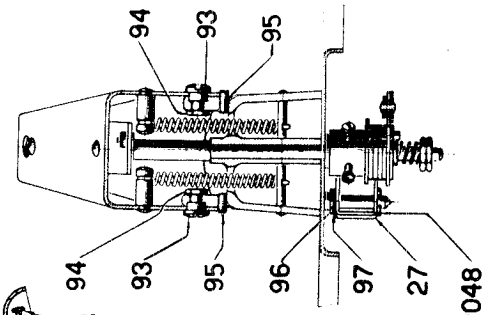


Fig. IX

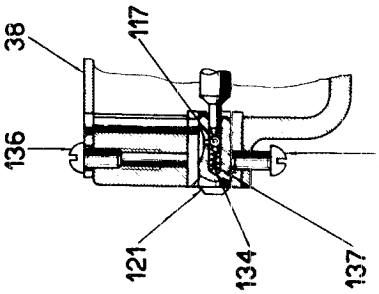
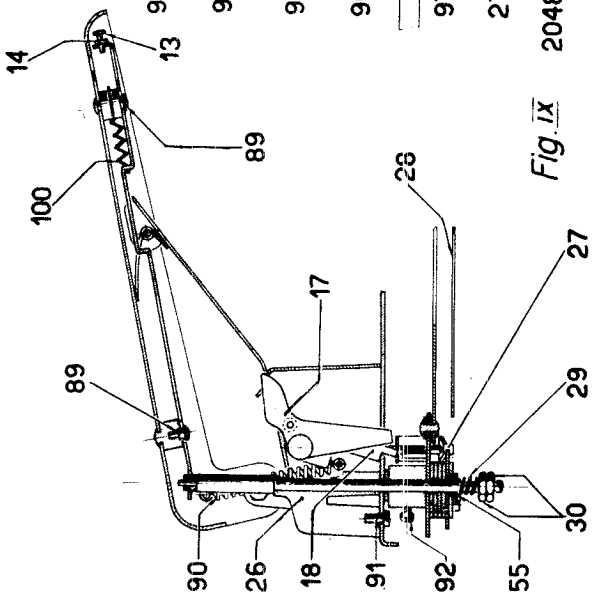


Fig. XIII



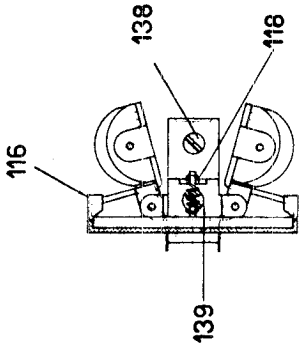


Fig. XII

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MODEL CD40

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SPARE PARTS LIST FOR THORENS RECORD CHANGER CD 40

Fig. No.	Reference No.	Description
III-IV-VII	1	Pick-up adjusting screw
IV-VII	3	Pick-up feed-in spring
I-VIII	5	Clutch stop lever
I-VIII	6	Spring for clutch stop lever
IV	10	Impulse spring
I-III	11	Striker leather pad
III-VIII	12	Auto trip adjusting screw
II-IX	13	Record feeding adjusting screw
II-IX	14	Record feeding adjusting nut
IV	15	Stop operating lever
IV	16	Loop for stop operating lever
IV-IX	17	Stop feeler
III-IX	18	Selecting feeler
IV-VI	20	Repeat lever
IV	22	Pause actuating spring
III	23	Motor fixing nut
IV	24	Screw for pause actuating spring
IV	25	Pause star wheel
III-IX	26	Platform
IV-IX	27	Selecting latch
IV-IX	28	Selecting link
IV-IX	29	Friction spring for selector
IV-IX	30	Selector friction adjusting nut
IV	31	Pick-up landing stop
IV	32	Screw for selecting link
III-VII	43	Pick-up rest spring
II	44	Record spindle complete
II	45	Record push lever
I-VIII	46	Clutch plate spring
III-VIII	48	Leather pad for turntable brake
VI	49	Reject lever spring
VI	51	Start lever spring
VI	52	Repeat and pause lever spring
VI	53	Unit plate
VI	54	Fixing screw for control plate
VI-IX	55	Control knob washer
VI	56	Control lever washer
VI	57	Control knob
VI	58	Control knob fixing screw
VI	59	Main control plate
VI	61	Screw for control knob bearing plate
VII	62	Pick-up fixing screw
VII	63	Pick-up connecting tag
VII-VIII	64	Connecting tag fixing screw
VII	65	Earthing tag
VII	66	Connecting plate
VII	67	Insulating plate
VII	68	Screw for retaining bracket
VII	69	Cam lever retaining bracket
VII	71	Screw for spring wire
VII	72	Pivot screw nut
VII	73	Pivot screw
VII	74	Pick-up lateral displacement spring
VII	75	Washer for spring wire
VII	76	Screw for pick-up base cover
VII	77	Spring for pick-up ajusting screw
VIII	78	Switch spring
VIII	79	Auto trip friction spring
VIII	80	Fixing screw for pause pinion spring
VIII	81	Spring for pause pinion
VIII	82	Stop for trip lever
VIII	83	Spring for trip lever
VIII	84	Assembling nut
VIII	85	Washer for operating lever
VIII	86	Stop spring for operating lever
VIII	87	Screw for pause pinion
VIII	88	Switch cover
IX	89	Screw for push-lever actuating link
IX	90	Overarm spring
IX	91	Platform fixing screw
IX	92	Fixing screw for feeding mechanism shaft
IX	93	Pivot screw for overarm
IX	94	Nut for overarm pivot screw
IX	95	Stop screw for overarm
IX	96	Spring washer for selecting latch
IX	97	Washer for selecting latch
XI	98	Speed indicator lever
IX	100	Spring for push lever actuating link
VIII	101	Switch block
VIII	102	Screw for switch block
XIV	103	Spring mounting
IX	2048	Pin for selecting latch

SPARE PARTS LIST FOR RS MOTOR FOR THORENS RECORD CHANGER CD 40

Fig. No	Reference No.	Description
V	34	2 mm thrust ball
V	35	Rotor shaft thrust plate
V	36	Bearing stud
V	37	Bearing lubrication tube
V-XI-XIII	38	Motor cover
III-XI	39	Fixing screw for regulator lever
V	41	Motor frame
V	42	Stator (complete with coils)
X	99	Motor main spindle
XI	112	Regulator brake
XI	113	Friction fork
XI	114	Adjusting ring
XI	115	Spring washer
XII	116	Governor complete
X - XIII	117	3/32" thrust ball for rotor shaft and main spindle
XII	118	Governor spring
X	119	Spring for elastic coupling
X	120	Stop spring for elastic coupling
X	121	Rotor shaft bearing
X	122	thrust plate for main spindle
X	123	Longer pin for elastic coupling
X	124	Shorter pin for elastic coupling
X	128	Cover plate for thrust bearing
XIII	134	Stop pin for rotor shaft bearing
XI	135	Fixing screw for spring washer
XIII	136	Screw for motor cover
XIII	137	Spring for rotor shaft bearing
XII	138	Governor fixing screw
XII	139	Governor mounting screw
X	2023	Cover plate fixing screw

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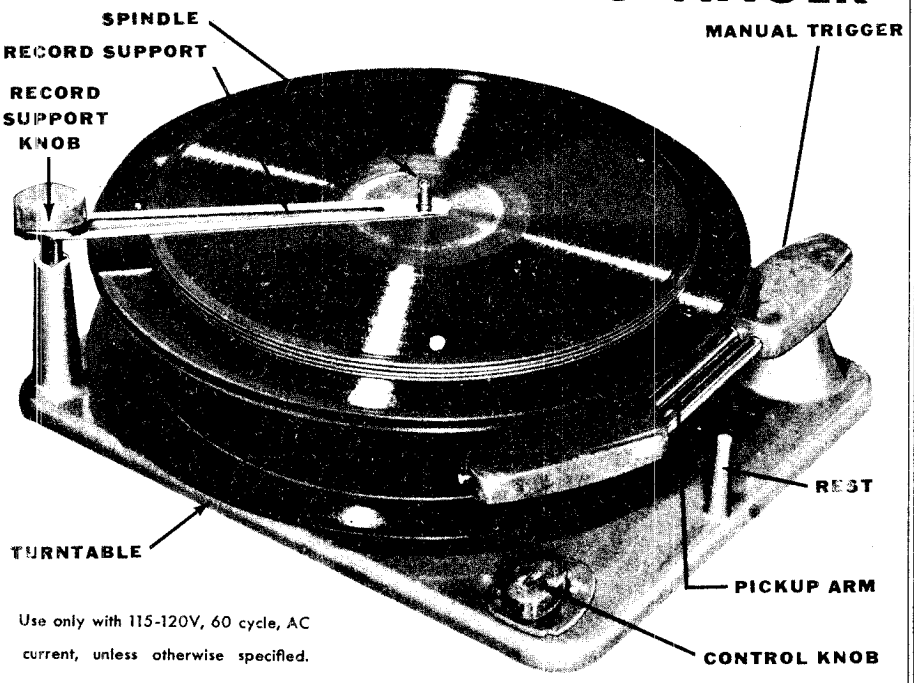
V-M CORP.

OPERATION PROCEDURE
MODEL 400 AUTOMATIC RECORD CHANGER



Use only with 115-120V, 60 cycle, AC current, unless otherwise specified.

LOADING

1. Pull straight up on RECORD SUPPORT KNOB until RECORD SUPPORT clears SPINDLE. Swing RECORD SUPPORT in either direction until pin in shaft drops into locating groove.
2. As many as ten 12 inch, twelve 10 inch or ten intermixed records may be loaded at one time. Arrange selected records in desired order.
3. Carefully place records on SPINDLE and lower to off-set shoulder. Steady records with one hand and replace RECORD SUPPORT over SPINDLE. Gently push down on RECORD SUPPORT KNOB until records are held parallel with TURNTABLE.

STARTING

To start operation of Record Changer, turn CONTROL KNOB clockwise to "REJ." and release. Changer will operate automatically until last record has been played. CONTROL KNOB then turns to "OFF" position, PICK-UP ARM returns to REST and machine automatically stops.

REJECTING

To reject a record at any time while it is playing, turn CONTROL KNOB to "REJ." and release.

UNLOADING

To remove records from TURNTABLE, lift up on RECORD SUPPORT KNOB and swing RECORD SUPPORT in either direction until pin in shaft drops in locating groove. Carefully lift entire stack of records straight up. Caution: When loading or unloading Changer use care to prevent bending SPINDLE. Records should never be left on the off-set portion of the SPINDLE as they may warp. If Changer is turned off before all records have been played, remove unplayed records from SPINDLE — or — operate "reject" until all records have dropped to TURNTABLE.

STOPPING

To turn off Changer before last record has been played, turn CONTROL KNOB to "OFF.," lift PICK-UP ARM from record and place on REST.

MANUAL OPERATION

To play single records or home recordings, pull straight up on RECORD SUPPORT KNOB until RECORD SUPPORT clears SPINDLE. Swing RECORD SUPPORT in either direction until pin in shaft drops into locating groove. Lower record to off-set shoulder of SPINDLE and tilt toward back of PICK-UP ARM. Carefully work record past off-set shoulder. Turn CONTROL KNOB to "ON" and push down on MANUAL TRIGGER located near back of PICK-UP ARM. Machine will then operate independently of cycling mechanism *provided* — PICK-UP ARM is moved all the way into the SPINDLE *before* it is returned to REST after record is played. When playing "inside-out" records, move PICK-UP ARM all the way into SPINDLE before setting it down on first playing grooves of record.

REPEATING

To repeat a record, any records remaining above off-set shoulder of SPINDLE must be removed. Pull straight up on RECORD SUPPORT KNOB until RECORD SUPPORT clears SPINDLE. Swing RECORD SUPPORT in either direction until pin in shaft drops into locating groove. Carefully lift records from SPINDLE. *Do not replace RECORD SUPPORT over SPINDLE.* Changer will repeat top record on TURNTABLE until CONTROL KNOB is turned to "OFF."

SUGGESTIONS

For best results use a good standard semi-permanent type needle.

Poor reproduction may be caused by a poor or damaged needle or worn, warped, dished or dirty records.

Records should be stored away from heat, in a record album or laid flat. Clean records periodically with a soft, lint-free cloth.

Avoid dropping PICK-UP ARM on record. Needle or record or both may be damaged.

Mechanism will operate automatically on all *standard* records. In case of records not having the standard "trip groove," (a spiral groove near center of record), when PICK-UP ARM reaches end of record, turn CONTROL KNOB to "REJ." to bring next record into playing position.

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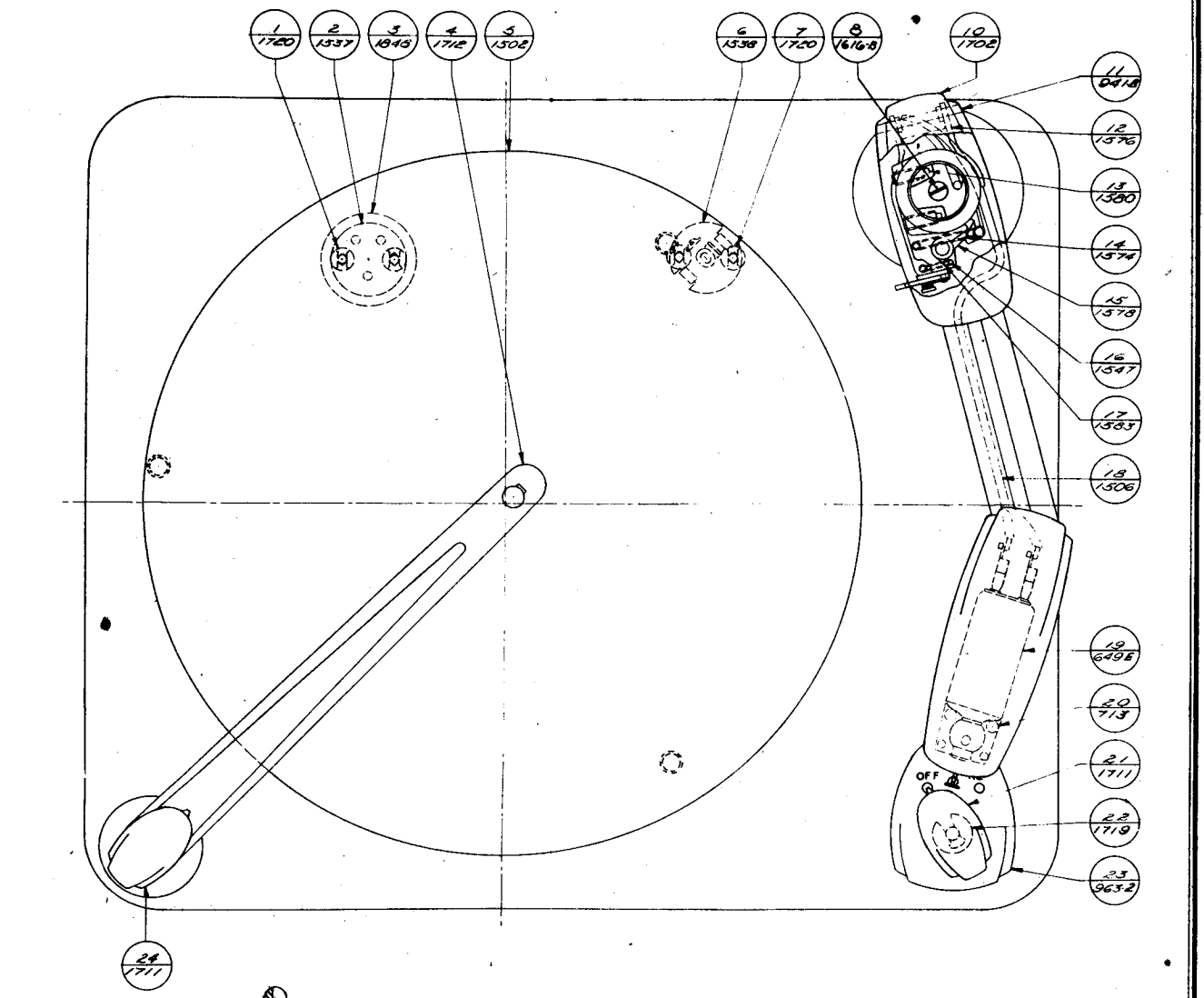
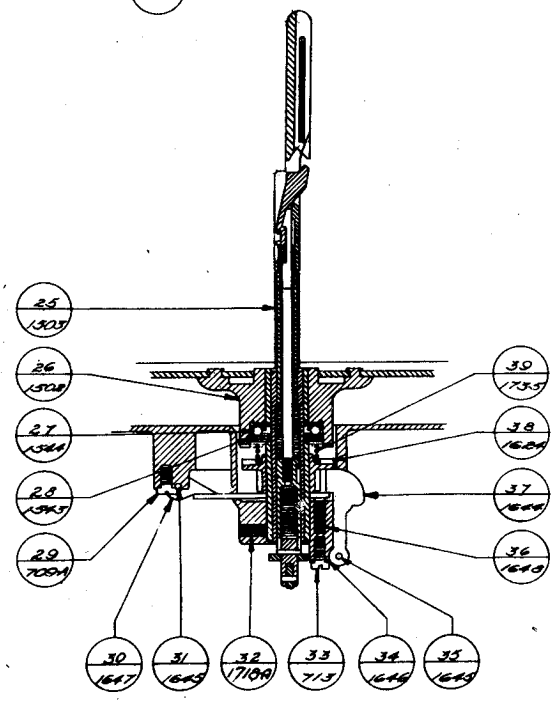
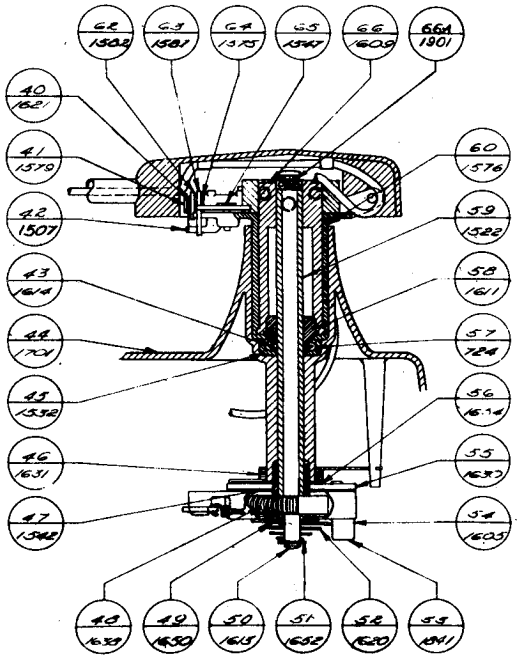
MODEL 400

V-M CORP.







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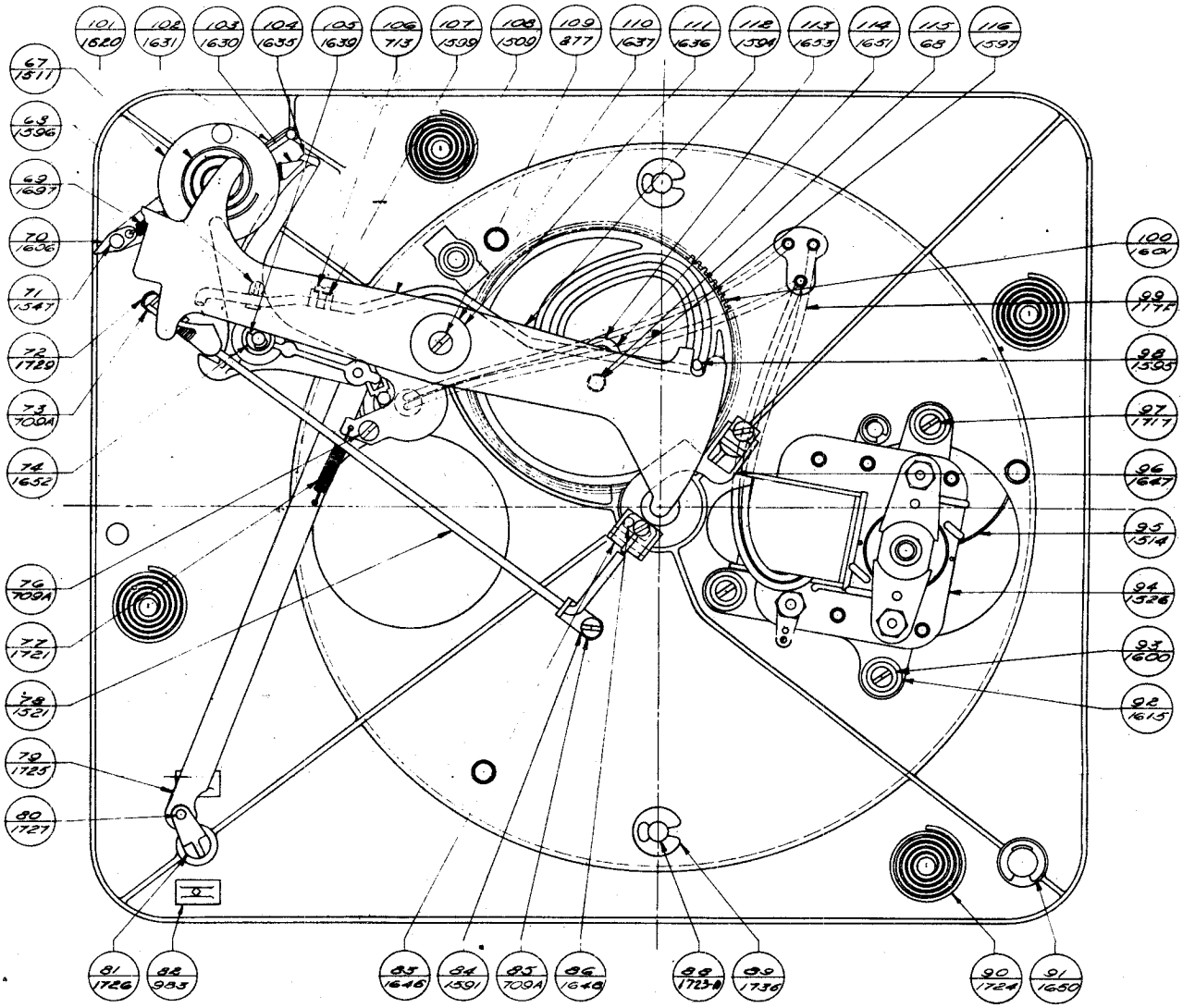
V-M CORP.



MODEL 400

REPLACEMENT PARTS LIST

PART NO.	LOCATION	DESCRIPTION
60	115	ROLLER DRIVE PIN
117F	99	A C WIRE
277	109	#8-32 x 3/8 BINDING HD. ST. SCR.
649-E	19	CRYSTAL CARTRIDGE
709-A	29,73,76,85	SCREW #6 x 1/4 TYPE "Z"
713	20,106,33	SCREW #4 x 1/4 TYPE "Z"
724	57	BEARING BALL
941-B	11	HINGE PIN
983-E	23	ESCUTCHEON
983	82	SPEED NUT
1502	5,86	TURNTABLE ASSY.
1503	25	SPINDLE ASSY.
1506	18	CABLE & CLIP ASSY
1507	42	HINGE ASSY.
1509	109	LIFT ARM ASSY.
1511	67	RATCHET ARM
1514	93	DRIVE DISC
1521	78	RATCHET ASSY.
1522	58	TONEARM LOCATOR ASSY
1526	34	MOTOR ASSY.
1532	45	BALL CUP
1537	2	A C OUTLET
1538	6	PICKUP SOCKET
1542	47	"C" WASHER
1543	88	TURNTABLE WASHER
1544	87	TURNTABLE BEARING
1547	16,65,71	DRIVE PIN
1574	14	RING SPRING
1575	64	CAM SPRING
1576	12,60	HINGE BODY
1578	15	CATCH
1579	41	DRIVE PIN
1580	13	ADJUSTING SCREW
1581	63	HINGE CAM
1582	62	TRIP LEVER
1583	17	CATCH SPRING
1591	84	TRIP ROD BEARING
1594	112	LIFT ARM
1593	98	CUT-OFF LEVER
1596	68	PIN
1597	116	ROLLER
1599	107	LEVER SPRING
1600	93	GROMMET SPACER
1601	100	CAM
1605	54	RATCHET ARM
1606	70	RATCHET PAWL
1609	66	HINGE BEARING
1611	38	BEARING CONE
1613	30	LIFT ROD
1614	43	BEARING SPACER
1615	92	GROMMET
*1620	32, 101	LIFT ROD SPRING
1621	40	LEVER RETURN SPRING
1624	33	PINION GEAR
1630	3,5, 103	SET DOWN LOCATOR
1631	4,8, 102	RETURN SPRING
1635	104	CONTROL LEVER
1636	111	LIFT ARM WASHER
1637	110	FIBRE WASHER
1638	48	SAFETY SPRING
1639	105	FIBRE WASHER
1644	37	CATCH
1645	31, 35	CATCH PIN
1646	36, 83	CATCH PLATE
1647	30, 96	LATCH
1648	36, 86	LATCH SPRING
1650	49, 91	"C" WASHER
1651	114	"C" WASHER
1658	51, 74	"C" WASHER
1653	113	FIBRE WASHER
1654	56	FIBRE WASHER
1697	69	PAWL SPRING
1701	4A	BASE PLATE ASSY.
1706	10	TONE ARM ASSY.
1711	21, 24	KNOB
1712	1	RECORD SUPPORT ASSY.
1717	97	#6 x 3/16 TYPE Z SCREW
1718-A	32	SPINDLE SET SCREW
1719	22	"C" WASHER
* 1616-B	8	SCREW, #5-40 x 1/4 BINDING HD.
1720	1,7	SPEED NUT
1721	77	REJECT SPRING
1723-A&B	8	SHIPPING BOLT
1724	90	MOUNTING SPRING
1725	79	CONTROL LINK
1726	81	CONTROL CRANK
1727	80	TUBULAR RIVET
1729	72	TRIP ROD BEARING
1735	39	PINION SPRING
1736	89	"C" WASHER
1841	53	RATCHET LOCATOR
1848	3	1/4" LIFT PIN ASSY
1901	66-A	INSULATOR
		LOCK SPRING

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FIG. 1 - MODEL 50 RECORD CHANGER

I MODEL 50 RECORD CHANGER

The Webster Model 50 is a single post, Spring cushioned Spindle, Automatic Record Changer. Simple in design and operation, it provides manual or automatic playing of standard ten or twelve inch records with a minimum of waiting time between records during automatic operation. Home recording or "Inside Out" records up to the 12 inch size may be played manually. This machine will change warped or rough-edge records, at the same time assuring maximum protection to the finest discs. When set for automatic operation, Model 50 will continue to repeat a single record placed on the turntable (or the last record of a stack) until the control knob is returned to the "STOP" position.

II OPERATION

A - MOTOR

Connect the motor cord to a source of 105-125 volt 60 cycle current only. For 105-125 volt 50 cycle operation, a special motor pulley (Part 17X412-4) must be used in place of the one supplied with the changer in order to drive the turntable at the required speed of 78 R.P.M.

Do not under any circumstances connect the motor to a source of direct current or alternating current of any other frequencies.

B - PICKUP

The pickup cartridge supplied with this unit is of the high impedance crystal type. This means that it may be connected to the average amplifier, radio set or public address system without using coupling transformers or impedance matching devices. Generally speaking, it is customary to connect the crystal from grid to ground of the first audio tube so that at least two stages of amplification are available. Most modern radio receivers have the volume control in the audio circuit and in such cases, the pickup may be connected directly across the volume control. In radio

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II OPERATION (Cont'd)

B - PICKUP - Cont'd.

receivers having other than the audio type control, an auxiliary control will be required to adjust the record volume.

The crystal supplied with this unit may be of the fixed permanent point or the removable needle type. If it is the latter, use a needle which is 11/16 inches long for most satisfactory results.

The choice of a needle is largely a matter of personal preference since all needles have their good features.

There are many types of permanent point needles available for use with automatic record players. These may be straight shank, offset, solid or hollow shank, floating point, sapphire or hard metal point types.

Some desirable qualities of a good needle are faithful reproduction, low surface scratch or hiss, long wearing qualities, minimum record wear and rugged construction.

Do not use single play or cactus needles for Automatic Operation.

C - OPERATION - Automatic

1.- Turn the Record Selector Post to TEN or TWELVE for ten or twelve inch records.

2 - With the Record Ballast Weight turned back, place up to ten 12" records or twelve 10" records on the Spindle so that the bottom record rests on the step of the Spindle and on the shelf of the Record Selector Post

3 - Turn the Record Ballast Weight forward to rest on the top record.

4 - Move the Control Knob from the STOP position (nearest the pickup arm rest) to the START-REJECT position (farthest from the pick-up arm rest) and release. The control will then drop back into the automatic playing position and the mechanism will continue to operate automatically until the control is returned to the STOP position.

5 - To reject any record while playing in the automatic position, move the control knob momentarily to the START-REJECT position and release.

NOTE: The mechanism may be turned off at any time or during any portion of the change cycle by moving the Control Knob to the STOP position. The pickup arm may be moved horizontally at any time without damage to the mechanism. However, the pickup arm cannot be returned to the pickup arm rest until the change cycle has been completed.

6 - After the last record has been played, the entire stack may be removed from the turntable at one time. The simplest procedure is as follows:

a - Place the Pickup Arm on the Pickup Arm Rest.

b - Turn the Record Ballast Weight back out of position.

c - Place the fingers of both hands under opposite edges of the bottom record.

d - Do not apply pressure to the top record. (Keep your thumbs free.)

e - Lift the stack of records straight up following the contours of the spindle. This permits the stack of records to follow the curve of the spindle without binding and greatly facilitates the removal of the stack.

D - OPERATION - Manual

1 - Turn the Record Selector Post to the TWELVE inch position (this is not essential but permits more clearance in loading and unloading records).

2 - Place a record on the turntable. It may facilitate this operation if the record is placed over the spindle at an angle, with one edge of the record held below the level of the record selector post shelf. Records may be removed in the same manner.

3 - Move the Control Knob from the STOP position to the MANUAL position (toward the spindle). No harm will result if the knob is accidently moved to the START-REJECT position while moving it from STOP to MANUAL. If a twelve inch record is on the turntable, the arm will automatically index to the edge of the record. If a ten inch record is on the turntable, the needle will be set down gently on the rubber pad and the arm may then be moved manually to the edge of the record.

4 - Place the needle gently on the edge of the record.

Particular care should be exercised if your pickup has a sapphire point needle. Although the sapphire is very hard and long wearing, it is extremely brittle and may be fractured or chipped if dropped on the record.

5 - To stop the mechanism at any time, move the Control Knob to the STOP position.

III SERVICE INFORMATION

This unit has been accurately adjusted, lubricated and tested at the factory and should require no further adjusting in the field. If service repairs become necessary, this bulletin should be studied carefully before making any adjustments or replacing parts.

Service parts are available at the factory. All parts must be ordered by Part Number, Model Number and Production Number stamped on the under side of the main plate.

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IV SERVICE REPAIRS

Service repairs and adjustment on the Model 50, listed by the apparent condition are as follows:

A - AUTOMATIC TRIP FAILS TO FUNCTION

When the movement of the pickup arm toward the spindle is greater then 1/8 inch in 1/2 revolution of the turntable, the Automatic Trip Arm trips the Velocity Trip and Roller Assembly. This releases the Actuating Pawl on the Main Cam Assembly, allowing it to engage the Main Cam Actuating Gear and driving the mechanism through the change cycle.

The automatic trip arm follows the movement of the pickup arm through a spring compression clutch. This clutch must be kept free of oil or grease.

Should it become necessary to clean the clutch, loosen the lock (Point "A" Figure 8) to relieve the spring tension and clean the clutch parts with carbon tetrachloride. Reset the clutch spring tension by setting the lock at least 1/4 inch below the main plate. This tension should be just sufficient to operate the trip mechanism without placing undue drag on the movement of the pickup arm.

Also check for:

1 - Velocity Trip and Roller assembly binding (Illus.44 Fig. 7)

2 - Actuating pawl stuck (Part of Main Cam assembly, Illus. 42 Fig.7, engaged by hook end of Velocity Trip and Roller Assembly.)

3 - Automatic Trip Arm (Illus. 26 Fig. 6) bent and not hitting the Velocity Trip and Roller Assembly.

4 - No velocity lead-in groove or eccentric groove in center of record.

5 - Foreign matter in record groove.

6 - Badly worn record.

7 - Badly worn or bent needle.

B - MANUAL TRIP FAILS TO FUNCTION

The manual trip is operated by the control knob. When the control knob is moved to the start-reject position, the Manual Trip Lever is actuated, tripping the Velocity Trip and Roller Assembly and putting the mechanism in cycle.

Check for:

1 - Manual Trip Lever (Illus. 29 Fig. 6) hair spring bent or broken.

2 - Velocity Trip and Roller Assembly binding (Illus. 44 Fig. 7.)

3 - Actuating pawl stuck.

C - NEEDLE SKIPS GROOVE

With the pickup arm in playing position, the arm is practically free-floating on its pivot. There is no lead-in spring which might drag the needle over the first few grooves of the record or minimum radius device to jam the arm on the inside grooves.

The pressure required to actuate the trip mechanism is negligible.

Should the needle skip grooves at any time, check for:

1 - Record Changer not level.

2 - Pickup Arm binding.

3 - Foreign matter in record groove.

4 - Badly worn record groove.

5 - Badly worn or bent needle.

6 - Pickup cord caught in hinge.

D - MECHANISM CONTINUES TO CYCLE

At the completion of the change cycle the actuating pawl is engaged by the hook end of the Velocity trip and Roller Assembly which has been returned to its normal position by the reset points on the main cam drive gear. This hook should be adjusted for about .005 - .015 clearance from the bottom of the main cam drive gear. Greater clearance may permit the pawl to bounce past the hook and re-engage. Also check for:

1 - Velocity Trip and Roller Assembly (Illus. 44 Fig. 7.) rubbing on Main Cam Actuating gear (Illus. 42 Fig. 7.)

2 - Manual Trip Lever (Illus. 29 Fig. 6.) binding.

3 - Disengage roller broken on Velocity Trip and Roller Assembly.

E - PICKUP ARM LIFT TOO HIGH OR TOO LOW

1 - The Needle should approach the top record of a full stack on the turntable with approximately 1/8 inch clearance. Adjust by bending the Pickup arm Raising Lever at Point C., Fig. 8. Do not attempt to move Pickup Arm Raising Disc up or down.

F - NEEDLE LET DOWN INDEXING INCORRECT

The eccentric screw, accessible through the top of the pickup arm, should take care of any normal adjustment. Turn this screw clockwise to index the needle in toward the spindle and counter-clockwise to index the needle out away from the spindle.

Should further adjustment be necessary, proceed as follows:

1 - Set the Record Selector Post to the TEN inch position.

2 - Operate the mechanism by revolving the turntable manually until the needle drops to within 1/8 inch of a ten inch record on the turntable.

3 - With a #8 Bristol wrench in each of the set screws (Points D and E, Fig. 8) alternately loosen one and tighten the other until the needle rests

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IV SERVICE REPAIRS (Cont'd)

F - NEEDLE LET DOWN INDEXING INCORRECT Cont'd.

above the record lead-in groove at the desired point.

4 - Turn the Record Selector Post to TWELVE and check the needle drop on a twelve inch record.

5 - Be sure that both set screws are tight when this adjustment is completed.

G - PICKUP ARMS DROPS OFF REST

When the Pickup Arm is moved to the Rest position, the lip of the Pickup Arm Raising Disc rests in the groove formed by the inside bevel of the lower Pickup Arm Pivot Shaft Bracket touching the Stud post. (Fig. 8) On units prior to Production No.375613 this function was performed by a chamfered and grooved collar on the stud post.

Adjust the position of the bracket (or collar) so that the lip of the Pickup Arm Raising Disc rests in the groove with the Pickup Arm Pivot Shaft touching the sub plate. When properly adjusted, there should be .010 clearance between the lip of the Pickup Arm Raising Disc and the bottom of the groove. The position of the Pickup Arm on the Pickup Arm Rest is adjusted by bending the lip of the Pickup Arm Raising Disc, so that when the Pickup Arm is resting on the Pickup Arm Rest Assembly, the lip of the Pickup Arm Disc rests in the groove formed by the bracket and stud. After making this adjustment, check the setdown of the needle on a 12" record to be certain that the lip of the Pickup Arm Raising Disc does not hit the beveled side of the bracket.

H - RECORD SELECTOR POST ANGLE INCORRECT

The Record Selector Post should be so adjusted that the curve of the shelf matches the curve of the record. To adjust this angle:

1 - Turn the Record Selector Post to the TEN inch position.

2 - Place a ten inch record on the spindle in the normal position for automatic playing.

3 - With a #8 Bristol wrench in each of the set screws (Point H and J, Fig. 8) alternately loosen one and tighten the other until the Record Selector post angle is correct. Be sure that both set screws are tight at the completion of this adjustment.

I - SPINDLE DROPS MORE THAN ONE RECORD

The floating latch at the top of the spindle is so spaced that only one record at a time can slide between the heel of the latch and the step of the spindle. The hole in the latch is elongated so that the latch can slip into the spindle recess when records are being removed.

If more than one record is dropped at a time, it will be found to be due to

1 - Foreign matter in spindle recess causing the latch to stick.

2 - Exceptionally thin records. Standard records are 0.070 to 0.100 in thickness.

J - RECORD DROPS ON PICKUP ARM

As the change cycle is started by the needle riding in the center lead-in groove of the record, the first motion of the cam causes the Record Selector Post to move toward the spindle about 3/32 inches. This position is maintained until the Pickup Arm has made its full lateral excursion at which time the Record Selector Post again moves toward the spindle, causing the bottom record to drop into playing position.

If the Record Selector Post has been bent back, away from the spindle, it is possible for a standard record to rest on the spindle step with its edge just over the edge of the Record Selector Post shelf. Then as the change cycle is started, the record is pushed off the spindle by the initial movement of the Record Selector Post, so that it drops on the Pickup Arm.

To correct this condition, The Rocker Arm Assembly must be bent so that the Record Selector Post is brought nearer to the spindle.

1 - With the mechanism at rest, wedge the Rocker Arm firmly by inserting a screwdriver between the Rocker Arm and the Sub Plate at a point between the Rocker Arm Pivot (Illus. 36 Fig. 5) and the stud.

2 - With the heel of the hand, press the Record Selector Post toward the spindle, so that a standard record rests at least half way over the Record Selector Post ledge when placed on the spindle step.

It is recommended that the distance between the edge of the record and the step of the Record Selector Post be held to 1/32 of an inch so that records with rough or sharply beveled edges will not catch on the outer edge of the Record Selector Post.

CAUTION: Be certain that a standard size record is used in making this adjustment. A standard 10" record measures 9-7/8" ± 1/32" dia. A standard 12" record measures 11-7/8" ± 1/32" dia.

V LUBRICATION

Model 50 Record Changer leaves the factory completely oiled and lubricated. Under normal conditions this should be sufficient for approximately one year or 1,000 hours of operation. When operated under extreme conditions of dust or heat, this operation should be performed more frequently as required.

NOTE: AVOID EXCESSIVE LUBRICATION

Do not permit any oil or grease to get on the rubber idler drive wheel or the Motor Sleeve (Illus. 11 and 21, Fig. 4), on turntable drive rim or on the automatic trip arm clutch. Any oil or grease on these points should be removed using Carbon Tetrachloride.

WEBSTER CHICAGO CORP.

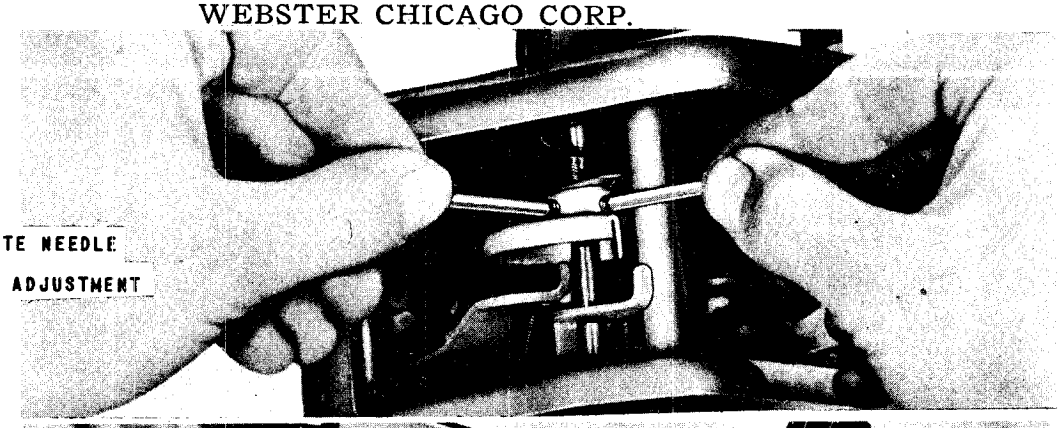


FIG. 2 - ALTERNATE NEEDLE LET DOWN INDEXING ADJUSTMENT

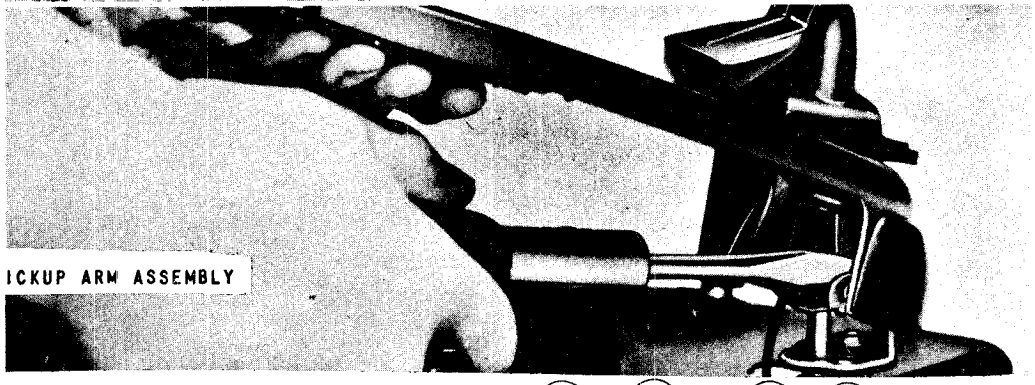
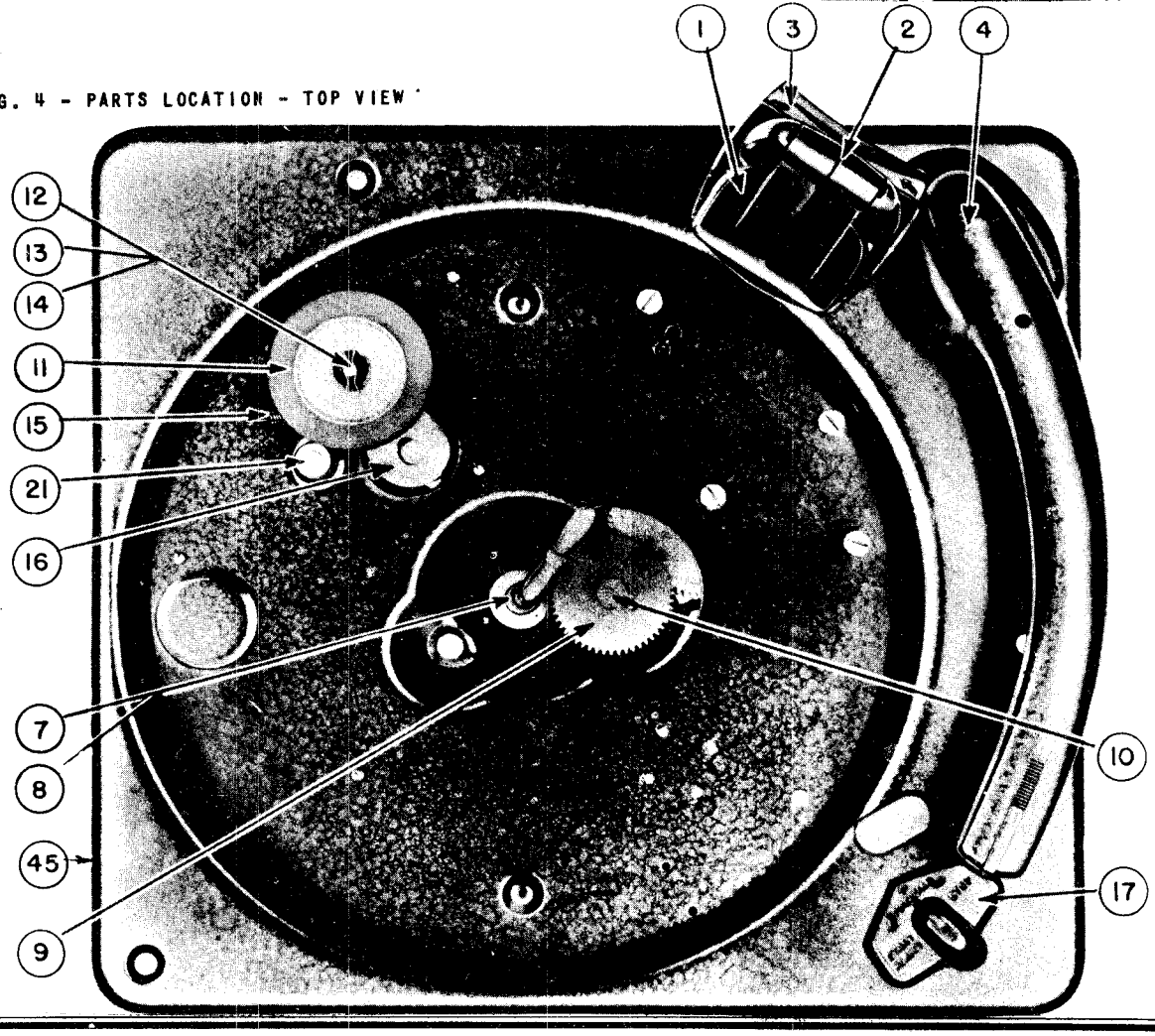


FIG. 3 - REMOVING PICKUP ARM ASSEMBLY

FIG. 4 - PARTS LOCATION - TOP VIEW



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V LUBRICATION (Cont'd)

The recommended lubricants and points of lubrication are as follows:

A - #10 oil (apply with small oil can or medicine dropper)

1 - Motor Bearings. Saturate top and bottom felts.

2 - Pickup Arm Shaft (Illus. 22 Fig. 6). Apply one drop each to bottom bearing point, bracket hole and hole through Main Base Plate.

3 - Ball Bearing Assembly (Illus. 7 Fig. 4).

4 - Idler Wheel Felt (Illus. 13 Fig. 4)

B - LUBRIPLATE (APPLY WITH SMALL BRUSH)

1 - Idler Wheel Link (Illus. 16 Fig. 4).

2 - Turntable Shaft Stud.

3 - Pickup Arm Hinge Pins.

4 - Knife edge of Raising Lever (Illus. 33 Fig. 7).

5 - Main Cam bearing. (It is necessary to remove the sub-plate assembly to lubriplate this bearing. See paragraph VI-C)

C - STA-PUT (APPLY WITH SMALL BRUSH)

1 - Teeth of Main Cam Actuating Gear (Illus. 43 Fig 7).

2 - Track of Main Cam Gear (Illus. 42. Fig. 7)

3 - Teeth of Large and Small idler Gears (Illus. 9 Fig. 4).

4 - Raising Lever Bracket bearing surfaces (Illus. 33 Fig. 7).

5 - Selector Lever Stop (Illus. 40 Fig. 5).

VI MECHANICAL REPAIRS

A - TO REPLACE A PICKUP CARTRIDGE

A Pickup cartridge can be most easily replaced by first removing the Pickup Arm.

1 - Hold the Pickup Arm firmly with left hand.

2 - Using a tool such as a screw-driver, press in on one of the blue steel Pickup Arm hinge brackets while lifting up on the arm. (Fig. 3). This will release the Pickup Arm Hinge pin.

On the models later than Production No. 375613 a spring is inserted between the pins of the Hinge Bracket. This spring must be removed before the hinge can be taken apart.

3 - Repeat on the other pickup arm bracket.

4 - The Pickup Arm, when released from the hinge brackets, may then be turned over and laid on the turntable for easy access to the cartridge.

B - TO REPLACE THE PICKUP ARM

The Pickup Arm may be replaced on its bracket as follows:

1 - Line up the guide slots in the Shaft Bracket, with the pins in the Pickup Arm Bracket.

2 - Hook the roller (on the rear of the hinge assembly) under the Pickup Arm Lift Stop Bracket keeping the guide slots and pins in line.

In performing this operation, be sure that the pickup cord lies outside of the hinge and does not become wedged in the bracket.

3 - Press down firmly on the Pick-up Arm base until the hinge pins fall into the bracket holes.

On models after Production No. 375613, the hinge should be re-assembled, using a pair of long-nosed pliers to place the Pickup Arm Hinge Bracket over the pins in the Shaft Bracket. The retaining spring need not be replaced unless the unit is to be reshipped.

C - TO REMOVE THE SUB-PLATE ASSEMBLY

In the event that it becomes necessary to replace any of the major parts in the sub-plate assembly (Fig. 7) the entire assembly should first be removed from the main plate.

1 - Remove the spindle which is held in by a cotter pin under the sub-plate.

2 - Remove the Turntable.

3 - Remove the Pickup Arm.

4 - Unhook the Rocker Arm Return Spring.

5 - Remove the Rocker Arm Pivot Pin.

6 - Remove the five #8 - 32x1/4 screws holding the sub-plate studs and the #8-32x3/8 screw holding the center post to the main plate.

D - TO REPLACE THE SUB-PLATE ASSEMBLY

Reverse the above procedure making certain that all parts fall into their proper positions. Particularly note The Selector Lever and Selector Lever Compression Spring to see that they are in position with the lever through the slot in the Pickup Arm Raising Lever Bracket.

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E - TO REMOVE THE RECORD POST AND ROCKER ARM ASSEMBLY

1 - Unhook the Rocker Arm Return Spring. (Illus. 37 Fig. 5).

2 - Remove the Rocker Arm Pivot Pivot Pin. (Illus 36 Fig. 5).

3 - Unfasten the Trim Plate

4 - Lift out the Selector Post, Rocker Arm and Trim Plate as a unit.

5 - In replacing the Rocker Arm assembly, note Paragraph VI, D "To Replace Sub-Plate Assembly."

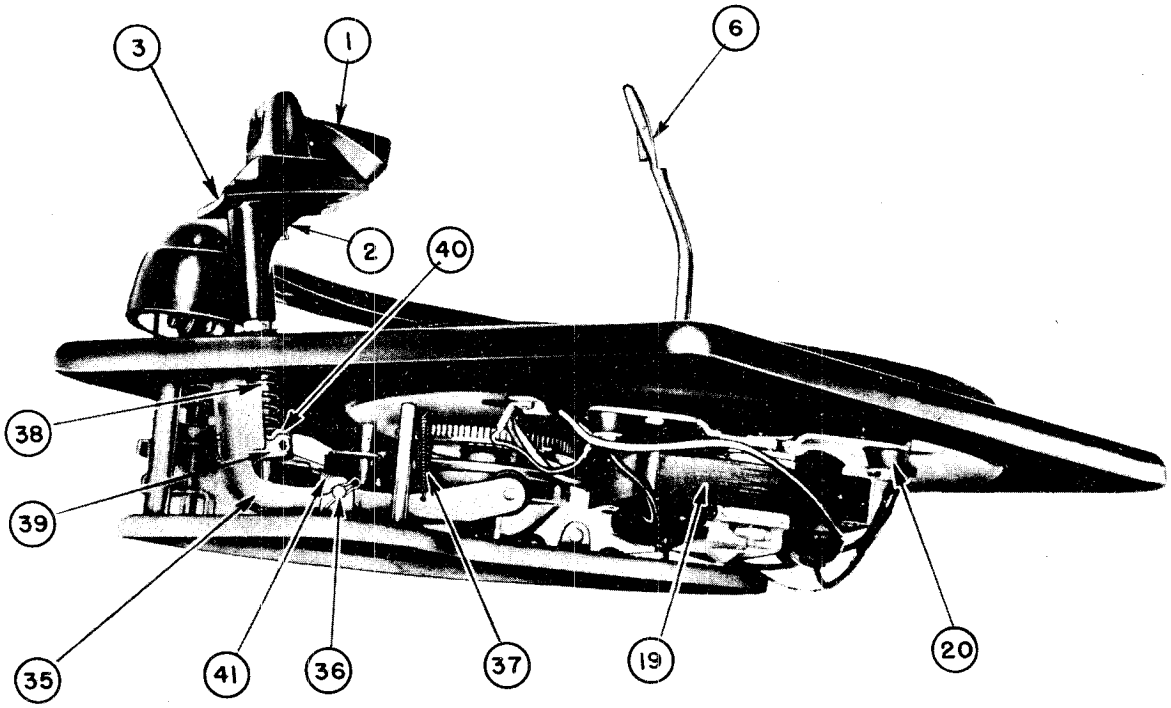

FIG. 5 - PARTS LOCATION -- LEFT SIDE VIEW

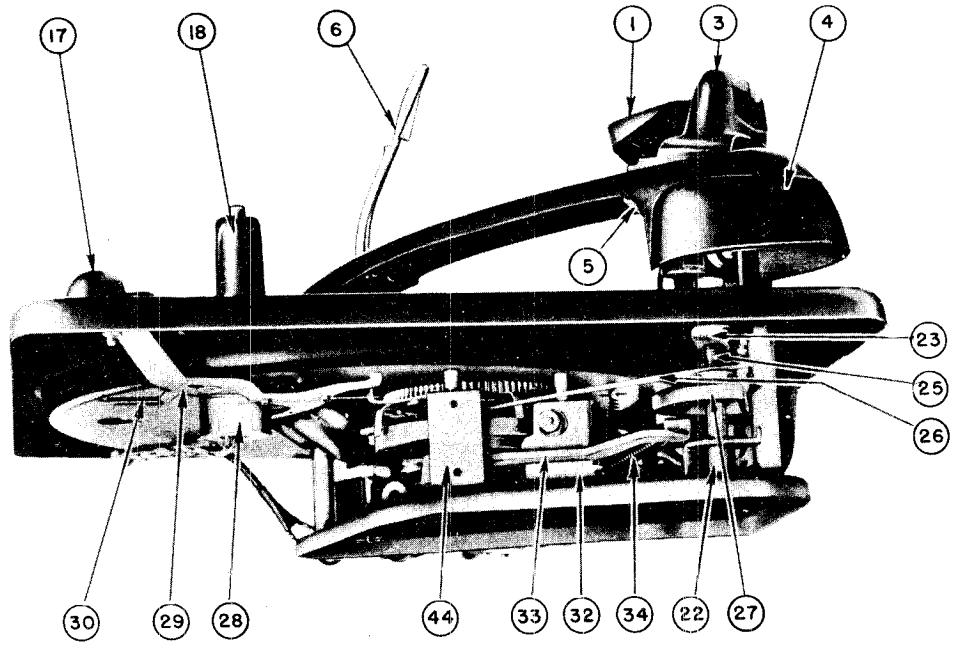

FIG. 6 - PARTS LOCATION -- RIGHT SIDE VIEW

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MODEL 50

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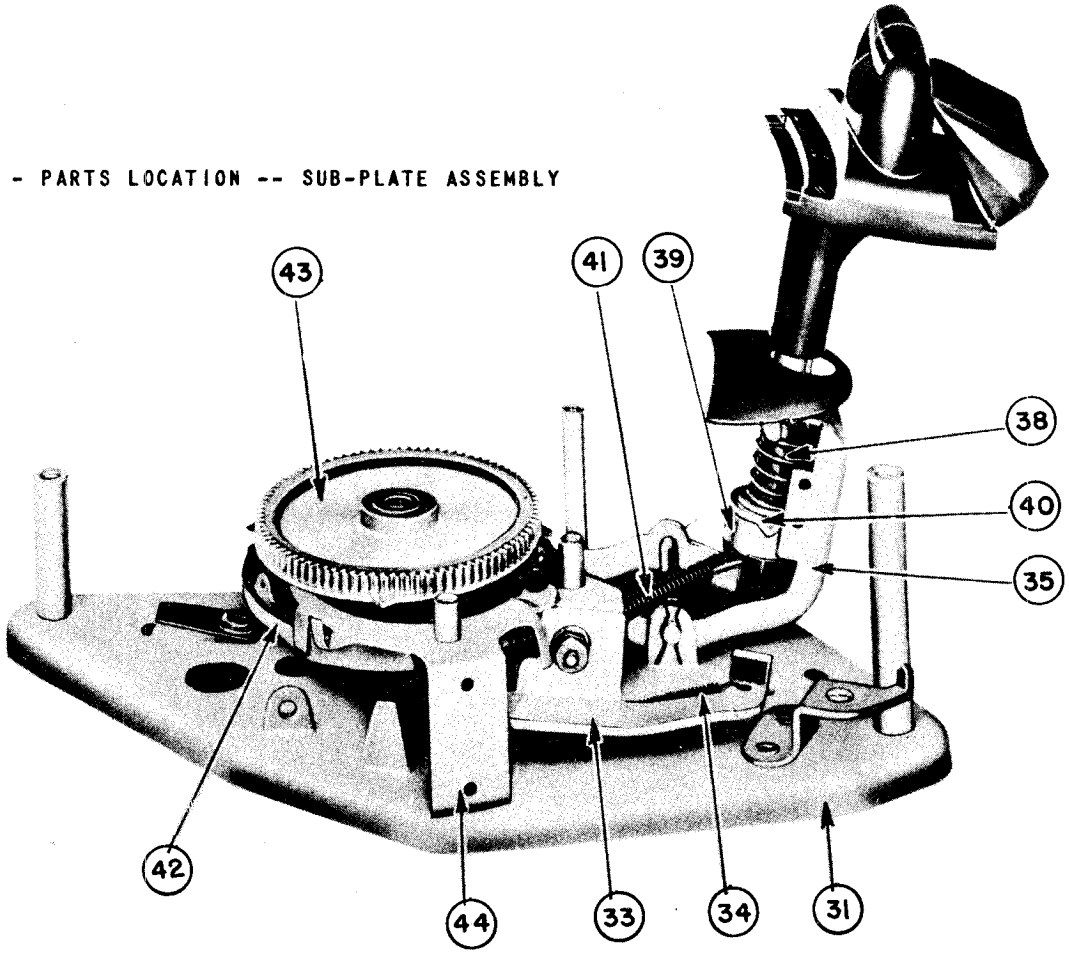
FIG. 7 - PARTS LOCATION -- SUB-PLATE ASSEMBLY



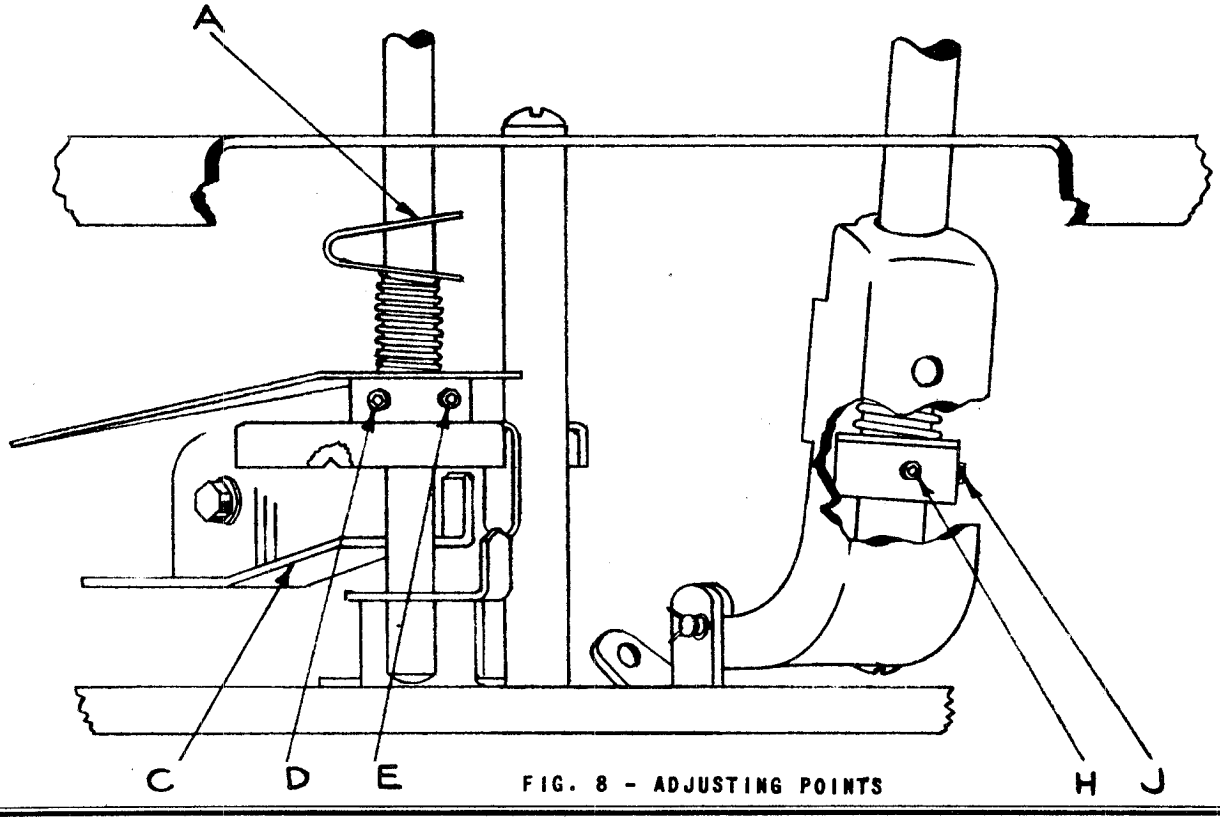


FIG. 8 - ADJUSTING POINTS

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VII SERVICE PARTS LIST

ILLUS. NO.	FIG.	PART NAME	DESCRIPTION	PART NO.
1	4-5-6	Ballast	Record Weight	49P037-C
2	4-5	Spring	Record Ballast Tension	46P126
3	4-5-6	Post assy.	Record Selector	49X035-C
4	4-6	Pickup Arm	Arm & Hinge Assy.	22G065
5	6	Hinge Assy.	Pickup Arm Mtg.	*
		Spring	Hinge Spacing	46P015**
		Cord	Pickup Cord 36"	20X256
		Cartridge	Pickup Crystal	Use Mfgr's No.
		Turntable	Turntable & Hub Assy.	11X138-C
6	6	Spindle	Spindle & Pawl Assy.	11X133
		Stud	Turntable Bearing	41P414
		Nut	Bearing Stud Mtg.	26P687
7	4	Bearing	Turntable Roller Assy.	11X058
8	4	Washer	Bearing Race	25P269
9	4	Gear	Fibre Idler (Large)	47P024
		Gear	Fibre Idler (Small)	47P023
10	4	Screw	Shoulder, Idler Mtg.	41P333
11	4	Idler	Idler Wheel Assy.	11X003
12	4	Clip	Idler Retaining	50P125
13	4	Washer	Idler Felt	25P030
14	4	Washer	Idler Fibre	25P046
15	4	Spring	Idler Tension	46P112
16	4	Link Assy.	Idler Mounting	*
17	4-6	Knob	Control	49X036-C
18	6	Rest	Pickup Arm Rest	42P144-C
19	5	Motor	105-125 Volt	15X084-12
20	5	Grommet	Motor Mounting	25P281
		Sleeve	Motor Mounting	41P530
		Screw	Motor Mounting	26P241
21	4	Sleeve	Turntable Drive (60 cycle)	17X412-1
		Sleeve	Turntable Drive (50 cycle)	17X412-4
22	6	Shaft Assy.	Pickup Arm Pivot	42X074
		Shaft Assy.	Pickup Arm Pivot	11X136**
		Bracket	Pickup Arm Lift Stop	45P191
23	6	Lock	Clutch Spring Tension	45P436
25	6	Spring	Clutch Compression	46P127
26	6	Lever	Automatic Trip	45P345
27	6	Disc	Pickup Arm Raising	11X031
28	6	Switch	A.C. Power	32P036
29	6	Lever	Manual Trip Assy.	11X083
30	6	Spring	Manual Trip Tension	46P117
31	7	Sub Plate	Sub Plate & Stud Assy.	*
32	6	Bracket	Raising Lever Pivot	11X044
33	6-7	Lever	Pickup Arm Raising	11X045
34	6-7	Spring	Raising Lever Tension	46P044
35	5-7	Arm	Rocker Arm & Roller Assy.	11X086
36	5	Pin	Rocker Arm Pivot	41P421
		Clip	Pivot Retaining	50P125
37	5	Spring	Rocker Arm Tension	46P122
38	5-7	Spring	Selector Shaft Compression	46P012
39	5-7	Collar Assy.	Selector Lever	11X049
40	5-7	Stop	Selector Lever	45P194
41	5-7	Spring	Selector Lever Compression	46P011
42	7	Cam	Main Cam Assy.	11X033
43	7	Gear	Main Cam Actuating	11X032
44	6-7	Trip Assy.	Velocity Trip & Roller	11X047
45	4	Main Plate	Main Base Plate	*

NOTE: All parts must be ordered by Part Number, Name, Model Number and Production Number stamped on the under side of the Main Plate.

* - Not Stocked for Service

** - Used after Production #375613

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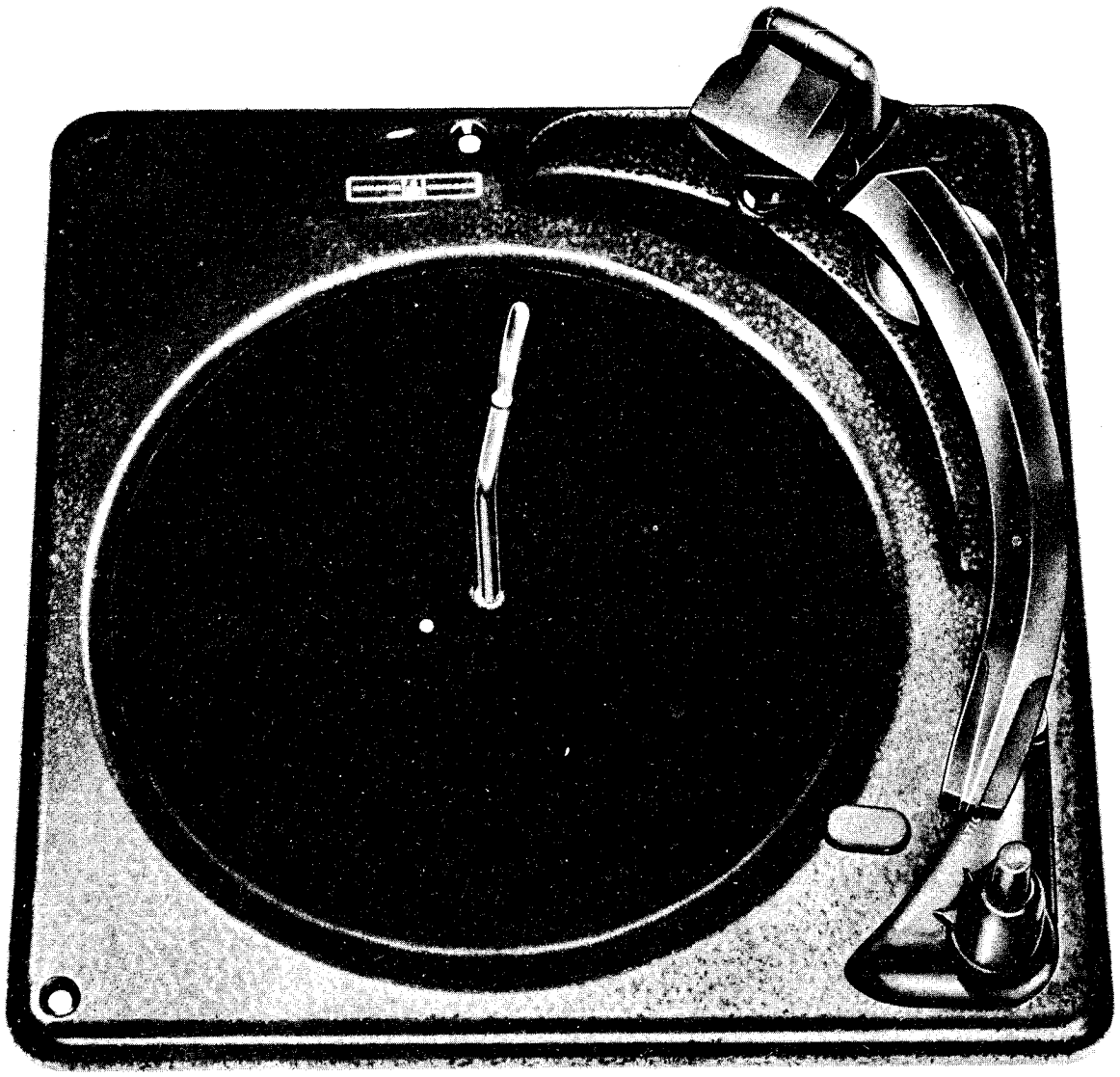

FIG. 1 - MODEL 56 RECORD CHANGER

I MODEL 56 RECORD CHANGER

The Webster Model 56 is a single post, Spring Cushioned Spindle, Automatic Record Changer. Simple in design and operation, it provides manual or automatic playing of standard ten or twelve inch records with a minimum of waiting time between records during automatic operation. Home recording or "Inside Out" records up to the 12 inch size may be played manually. This machine will change warped or rough-edged records, at the same time assuring maximum protection to the finest discs. Model 56 automatically shuts off after the last record has been played.

II OPERATION

A - MOTOR

Connect the motor cord to a source of 105-125 volt 60 cycle current only. For 105-125 volt 50 cycle operation, a special motor pulley (Part 17x412-4) must be used in place of the one supplied with the changer in order to drive the turntable at the required speed of 78 R.P.M.

Do not under any circumstances connect the motor to a source of direct current or alternating current of any other frequencies.

B - PICKUP

The pickup cartridge supplied with this unit is of the high impedance crystal type. This means that it may be connected to the average amplifier, radio set or public address system without using coupling transformers or impedance matching devices. Generally speaking, it is customary to connect the crystal from grid to ground of the first audio tube so that at least two stages of amplification are available. Most modern radio receivers have the volume control in the audio circuit and in such cases, the pickup may be connected directly across the volume control. In radio receivers having other than the audio type control, an auxiliary control will be required to adjust the record volume.

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B - PICKUP - Cont'd.

The crystal supplied with this unit may be of the fixed permanent point or the removable needle type. If it is the latter, use a needle which is not more than 11/16 inches long for most satisfactory results.

The choice of a needle is largely a matter of personal preference since all needles have their good features.

There are many types of permanent point needles available for use with automatic record players. These may be straight shank, offset, solid or hollow shank, floating point, jewell or hard metal point types.

Some desirable qualities of a good needle are faithful reproduction, low surface scratch or hiss, long wearing qualities, minimum record wear and rugged construction.

Do not use single play or cactus needles for Automatic Operation.

C - OPERATION - Automatic

1 - Turn the Record Selector Post to TEN or TWELVE for ten or twelve inch records.

2 - Turn the Selector Switch (sleeve of ON button) to AUTOMATIC.

3 - With the Record Ballast Weight turned back, place up to ten 12" records, or twelve 10" records on the spindle so that the bottom record rests on the step of the spindle and the shelf of the Record Selector Post.

4 - Turn the Record Ballast Weight forward to rest on the top record.

5 - Press the ON button.

To reject any record while playing in the AUTOMATIC position, press the ON button.

NOTE: The OFF button may be pressed during any portion of the change cycle. The Pickup Arm may be moved manually at any time without damage to the mechanism. However, after the last record has been played, the Pickup Arm is automatically locked in position and should not be handled until it has come to rest on the OFF button.

6 - After the last record has been played, the entire stack may be removed from the turntable at one time. The simplest procedure is as follows:

a - Turn the Record Ballast Weight back out of position.

b - Place the fingers of both hands under opposite edges of the bottom record.

c - Do not apply pressure to the top record. (Keep your thumbs free.)

d - Lift the stack of records straight up, following the contours of the spindle. This permits the stack of records to follow the curve of the spindle without binding and greatly facilitates the removal of the stack.

D - OPERATION - Manual

1 - Turn the Record Selector Post to the TWELVE inch position. (This is not essential but permits more clearance in loading and unloading records.)

2 - Turn the Selector Switch (sleeve of ON button) to MANUAL.

3 - Place a record on the turntable. It may facilitate this operation if the record is placed over the spindle at an angle, with the edge of the record held below the level of the Record Selector Post Shelf. Records may be removed in the same manner.

4 - Press the ON button.

5 - Place the needle gently on the edge of the record. Do not lift the pickup arm too high as this will cause it to catch in the Automatic Stop Lock position. Particular care should be exercised if your pickup has a sapphire point needle. Although the sapphire is very hard and long wearing, it is extremely brittle and may be fractured or chipped if dropped on the record.

6 - To stop the mechanism at any time, press the OFF button.

III SERVICE INFORMATION

This unit has been accurately adjusted, lubricated and tested at the factory and should require no further adjusting in the field. If service repairs become necessary, this bulletin should be studied carefully before making any adjustments or replacing parts.

Service parts are available at the factory. All parts must be ordered by Part Number, Model Number and production number stamped on the under side of the main plate.

IV SERVICE REPAIRS

Service repairs and adjustment on the Model 56, listed by the apparent condition are as follows:

A - AUTOMATIC TRIP FAILS TO FUNCTION

When the movement of the pickup arm toward the spindle is greater than 1/8 inch in 1/2 revolution of the turntable, the Automatic Trip Arm trips the Velocity Trip and Roller Assembly. This releases the Actuating Pawl on the Main Cam Assembly, allowing it to engage the Main Cam Actuating Gear and driving the mechanism through the change cycle.

A - AUTOMATIC TRIP FAILS TO FUNCTION - Cont'd.

The automatic trip arm follows the movement of the pickup arm through a spring compression clutch. This clutch must be kept free of oil or grease.

Should it become necessary to clean the clutch, loosen the lock (Point "A" Figure 8) to relieve the spring tension and clean the clutch parts with carbon tetrachloride. Reset the clutch spring tension by setting the lock at least 1/4 inch below the main plate. This tension should be just sufficient to operate the trip mechanism without placing undue drag on the movement of the pickup arm.

Also check for:

1 - Velocity Trip and Roller assembly binding (Illus. 51 Fig. 7).

2 - Actuating pawl stuck. (Part of Main Cam assembly, Illus. 49 Fig. 7, engaged by hook end of Velocity Trip and Roller Assembly.)

3 - Automatic Trip Arm (Illus. 33 Fig. 6) bent and not hitting the Velocity Trip and Roller assembly.

4 - Insufficient compression on clutch spring (Illus. 32 Fig. 6).

5 - Manual Trip Lever binding at rivet (Illus. 36 Fig. 6).

6 - Manual Trip Lever rubbing on switch mounting bracket.

7 - No velocity lead-in groove or eccentric groove in center of record.

8 - Foreign matter in record groove.

9 - Badly worn record.

10 - Badly worn or bent needle.

B - MANUAL TRIP FAILS TO FUNCTION

The manual trip is operated by the ON button. When the button is pressed, the Manual Trip Lever is actuated, tripping the Velocity Trip and Roller Assembly and putting the mechanism in cycle.

1 - Manual Trip Lever (Illus. 36 Fig. 6) hair spring bent or broken.

2 - Velocity Trip and Roller Assembly binding (Illus. 51 Fig. 7).

3 - Actuating pawl stuck.

C - NEEDLE SKIPS GROOVE

With the pickup arm in playing position, the arm is practically free-floating on its pivot. There is no lead-in spring which might drag the needle over the first few grooves of the record or minimum radius device to jam the arm on the inside grooves.

The pressure required to actuate the trip mechanism is negligible.

Should the needle skip grooves at any time, check for:

1 - Record Changer not level.

2 - Pickup Arm binding.

3 - Foreign matter in record groove.

4 - Pickup cord pulled too tight or caught in hinge assembly.

5 - Badly worn record groove.

6 - Badly worn or bent needle.

D - MECHANISM CONTINUES TO CYCLE

At the completion of the change cycle the actuating pawl is engaged by the hook end of the Velocity trip and Roller Assembly which has been returned to its normal position by the reset points on the main cam drive gear. This hook should be adjusted for about .005 - .015 clearance from the bottom of the main cam drive gear. Greater clearance may permit the pawl to bounce past the hook and re-engage. Also check for:

1 - Velocity Trip and Roller Assembly (Illus. 51 Fig. 7.) rubbing on Main Cam Actuating gear (Illus. 50 Fig. 7).

2 - Manual Trip Lever (Illus. 36 Fig. 6.) binding at rivet.

3 - Hook end of Velocity Trip and Roller assembly bent and not engaging pawl.

4 - Bakelite disengage roller broken on Velocity Trip and Roller Assembly.

E - CONTINUES TO PLAY LAST RECORD AND DOES NOT SHUT OFF

1 - Check floating spindle to be sure that it moves up and down freely.

2 - With no records on spindle, check Automatic Shut Off Lock Lever (Point B, Fig. 8.) Hook end of this arm should catch the Pickup Arm Raising Disc at the beginning of the cycle to prevent travel of the arm and to cause it to drop on the OFF button. With no records on the Spindle, this hook should clear the Pickup Arm Raising Disc by 1/32 inch with the mechanism at rest. Bend lip (Point G Fig. 8) if necessary to make this adjustment. Do not attempt to move Pickup Arm Raising Disc up or down.

F - MOTOR DOES NOT SHUT OFF

1 - OFF button stuck.

2 - Defective switch mechanism.

3 - Defective switch.

NOTE - Do not attempt repairs on the Switch Mechanism or the Switch. If either becomes

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defective, the entire assembly should be replaced.

G - PICKUP ARM LIFT TOO HIGH OR TOO LOW

1 - The needle should approach the top record of a full stack on the turntable with approximately 1/8 inch clearance. Adjust by bending the Pickup Arm Raising Lever at Point C., Fig. 8. Do not attempt to move Pickup Arm Raising Disc up or down.

H - NEEDLE LET DOWN INDEXING INCORRECT

The eccentric screw, accessible through the top of the Pickup Arm, should take care of any normal adjustment. Turn this screw clockwise to index the needle in toward the spindle and counter-clockwise to index the needle out away from the spindle.

Should further adjustment be necessary; proceed as follows:

1 - Set the Record Selector Post to the TEN inch position.

2 - Operate the mechanism by revolving the turntable manually until the needle drops to within 1/8 inch of a ten inch record on the turntable.

3 - With a #8 Bristol wrench in each of the set screws (Points D and E, Fig. 8) alternately loosen one and tighten the other until the needle rests above the record lead-in groove at the desired point.

4 - Turn the Record Selector Post to TWELVE and check the needle drop on a twelve inch record.

5 - Be sure that both set screws are tight when this adjustment is completed.

I - PICKUP ARM DROPS OFF "OFF" BUTTON

When the Pickup Arm is indexed to the OFF position, the lip of the Pickup Arm Raising Disc rests in the groove formed by the inside bevel of the lower Pickup Arm Pivot Shaft Bracket touching the Stud post. (Fig. 8) On units prior to Production No. 375614 this function was performed by a chamfered and grooved collar on the stud post.

Adjust the position of the bracket (or collar) so that the lip of the Pickup Arm Raising Disc rests in the groove with the Pickup Arm Pivot Shaft touching the sub plate. When properly adjusted, there should be .010 clearance between the lip of the Pickup Arm Raising Disc and the bottom of the groove. The position of the Pickup Arm on the Off Button is adjusted by bending the lip of the Pickup Arm Raising Disc, so that when the Pickup Arm is resting on the Off Button, the lip of the Pickup Arm Disc rests in the groove formed by the bracket and stud. After making this adjustment, check the set-down of the needle on a 12" record to be certain that the lip of the Pickup Arm Raising Disc does not hit the beveled side of this bracket.

J - RECORD SELECTOR POST ANGLE INCORRECT

The Record Selector Post should be so adjusted that the curve of the shelf matches the curve of the record. To adjust this angle:

1 - Turn the Record Selector Post to the TEN inch position.

2 - Place a ten inch record on spindle in the normal position for automatic playing.

3 - With a #8 Bristol wrench in each of the set screws (Point H and J, Fig. 8) alternately loosen one and tighten the other until the Record Selector post angle is correct. Be sure that both set screws are tight at the completion of this adjustment.

K - SPINDLE DROPS MORE THAN ONE RECORD

The floating latch at the top of the spindle is so spaced that only one record at a time can slide between the heel of the latch and the step of the spindle. The hole in the latch is elongated so that the latch can slip into the spindle recess when records are being removed.

If more than one record is dropped at a time, it will be found to be due to

1 - Foreign matter in spindle recess causing the latch to stick.

2 - Exceptionally thin records. Standard records are 0.070 to 0.100 in thickness.

L - RECORD DROPS ON PICKUP ARM

As the change cycle is started by the needle being on the center lead-in groove of the record, the first motion of the cam causes the Record Selector Post to move toward the spindle about 3/32 inches. This position is maintained until the Pickup Arm has made its full lateral excursion at which time the Record Selector Post again moves toward the spindle, causing the bottom record to drop into playing position.

If the Record Selector Post has been bent back, away from the spindle, it is possible for a standard record to rest on the spindle step with its edge just over the edge of the Record Selector Post shelf. Then as the change cycle is started, the record is pushed off the spindle by the initial movement of the Record Selector Post, so that it drops on the Pickup Arm.

To correct this condition, the Rocker Arm Assembly must be bent so that the Record Selector Post is brought nearer to the spindle.

1 - With the mechanism at rest, wedge the Rocker Arm firmly by inserting a screwdriver between the Rocker Arm and the Sub Plate at a point between the Rocker Arm Pivot (Illus. 43 Fig. 5) and the stud.

2 - With the heel of the hand, press the Record Selector Post toward the spindle, so that a standard record rests

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at least half way over the Record Selector Post ledge when placed on the spindle step.

It is recommended that the distance between the edge of the record and the step of the Record Selector Post be held to 1/32 of an inch so that records with rough or sharply beveled edges will not catch on the outer edge of the Record Selector Post.

CAUTION: Be certain that a standard size record is used in making this adjustment. A standard 10" record measures 9-7/8" ± 1/32" dia. A standard 12" record measures 11-7/8" ± 1/32" dia.

V LUBRICATION

Model 56 Record Changer leaves the factory completely oiled and lubricated. Under normal conditions this should be sufficient for approximately one year or 1,000 hours of operation. When operated under extreme conditions of dust or heat, this operation should be performed more frequently as required.

NOTE: AVOID EXCESSIVE LUBRICATION.

Do not permit any oil or grease to get on the rubber idler drive wheel or the Motor Pulley (Illus. 15 and 29, Fig. 4), on turntable drive rim or on the automatic trip arm clutch. Any oil or grease on these points should be removed using Carbon Tetrachloride.

The recommended lubricants and points of lubrication are as follows:

A - #10 Oil (apply with small oil can or medicine dropper)

1 - Motor Bearings. Saturate top and bottom felts.

2 - Pickup Arm Shaft (Illus. 30 Fig. 6). Apply one drop each to bottom bearing point, bracket hole and hole through Main Base Plate.

3 - Ball Bearing Assembly (Illus. 12 Fig. 4).

4 - Idler Wheel Felt (Illus. 19 Fig. 4).

B - LUBRIPLATE (APPLY WITH SMALL BRUSH)

1 - Idler Wheel Link (Illus. 16 Fig. 4).

2 - Turntable Shaft Stud.

3 - Pickup Arm Hinge Pins (Illus. 7 Fig. 6).

4 - Knife edge of Raising Lever (Illus. 40 Fig. 7).

5 - Main Cam bearing. (It is necessary to remove the sub-plate assembly to lubriplate this bearing. See paragraph VI-C)

C - STA-PUT (APPLY WITH SMALL BRUSH)

1 - Teeth of Main Cam Actuating Gear (Illus. 50 Fig. 7).

2 - Track of Main Cam Gear (Illus. 49. Fig. 7).

3 - Teeth of Large and Small idler Gears (Illus. 13 Fig. 4).

4 - Raising Lever Bracker bearing surfaces (Illus. 39 Fig. 7).

5 - Selector Lever Stop (Illus. 48 Fig. 5).

VI MECHANICAL REPAIRS

A - TO REPLACE A PICKUP CARTRIDGE

A Pickup cartridge can be most easily replaced by first removing the Pickup Arm.

1 - Hold the Pickup Arm firmly with left hand.

2 - Using a tool such as a screwdriver, press in on one of the blue steel Pickup Arm hinge brackets while lifting up on the arm. (Fig. 3). This will release the Pickup Arm Hinge pin.

3 - Repeat on the other pickup arm bracket.

4 - The Pickup Arm, when released from the hinge brackets, may then be turned over and laid on the turntable for easy access to the cartridge.

On the models later than Production No.375614 a spring is inserted between the pins of the Hinge Bracket. This spring must be removed before the hinge can be taken apart.

B - TO REPLACE THE PICKUP ARM

The Pickup Arm may be replaced on its bracket without the use of tools.

1 - Line up the guide slots in the Shaft Bracket; with the pins in the Pickup Arm Bracket.

2 - Hook the roller (on the rear of the hinge assembly) under the Pickup Arm Lift Stop Bracket (under the Crescent Assembly) keeping the guide slots and pins in line.

In performing this operation, be sure that the pickup cord lies outside of the hinge and does not become wedged in the bracket.

3 - Press down firmly on the Pickup Arm base until the hinge pins fall into the bracket holes. On models after Production No. 375614, the hinge should be re-assembled, using a pair of long-nosed pliers to place the Pickup Arm Hinge Bracket over the pins in the Shaft Bracket. The retaining spring need not be replaced unless the unit is to be reshipped.

C - TO REMOVE THE SUB-PLATE ASSEMBLY

In the event that it becomes necessary to replace any of the major parts in the sub-plate assembly (Fig. 7) the entire assembly should first be removed from the main plate.

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C - TO REMOVE THE SUB-PLATE ASSEMBLY - Cont'd.

1 - Remove the spindle which is held in by a cotter pin under the sub-plate.

2 - Remove the Turntable.

3 - Remove the Pickup Arm.

4 - Unhook the Rocker Arm Return Spring.

5 - Remove the Rocker Arm Pivot Pin.

6 - Remove the five #8-32x1/4 screws holding the sub-plate studs and the #8-32x3/8 screw holding the center post to the main plate.

NOTE that one of the 8-32x1/4 screws is accessible through the Pickup Arm hole in the Crescent Assembly.

It should not be necessary to remove the Crescent Assembly except for replacement or to remove the complete Rocker Arm Assembly.

D - TO REPLACE THE SUB-PLATE ASSEMBLY

Reverse the above procedure making certain that all parts fall into their proper positions. Particularly note The Selector Lever and Selector Lever Compression Spring to see that they are in position with the lever through the slot in the Pickup Arm Raising Lever Bracket.

E - TO REMOVE THE RECORD POST AND ROCKER ARM ASSEMBLY

1 - Remove the Pickup Arm Assembly.

2 - Remove the four nuts under the main plate which hold the Crescent Assembly.

3 - Unhook the Rocker Arm Return Spring. (Illus. 44 Fig. 5).

4 - Remove the Rocker Arm Pivot Pin. (Illus. 43 Fig. 5).

5 - Lift out the Selector Post, Rocker Arm and Crescent Assembly as a unit.

6 - In replacing the Rocker Arm assembly, note paragraph VI, D "To Replace Sub-Plate Assembly."

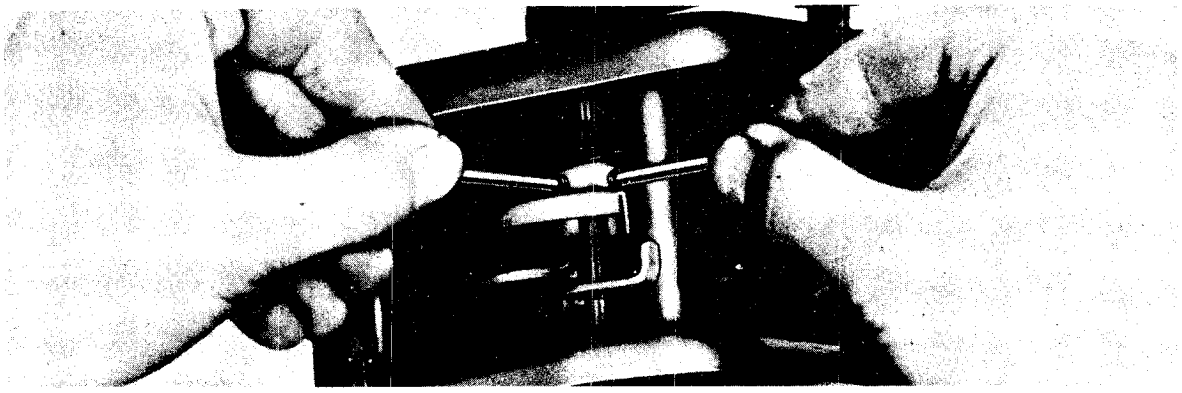

FIG. 2 - ALTERNATE NEEDLE LET DOWN INDEXING ADJUSTMENT

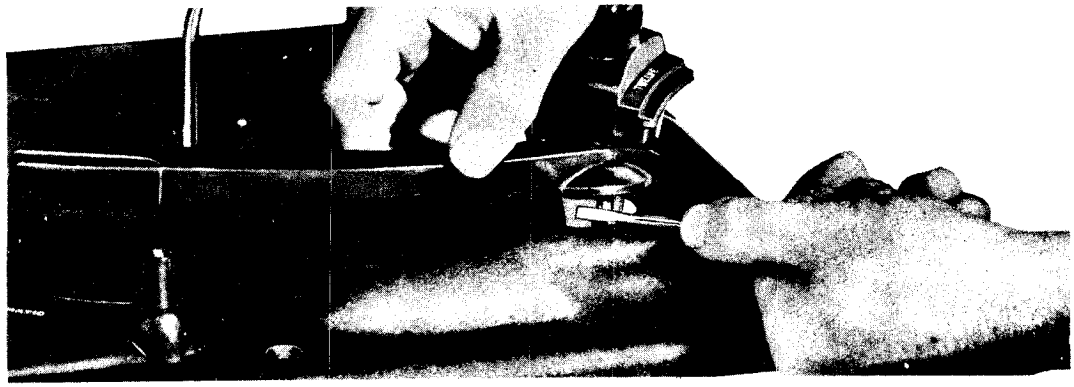

FIG. 3 - REMOVING PICKUP ARM ASSEMBLY

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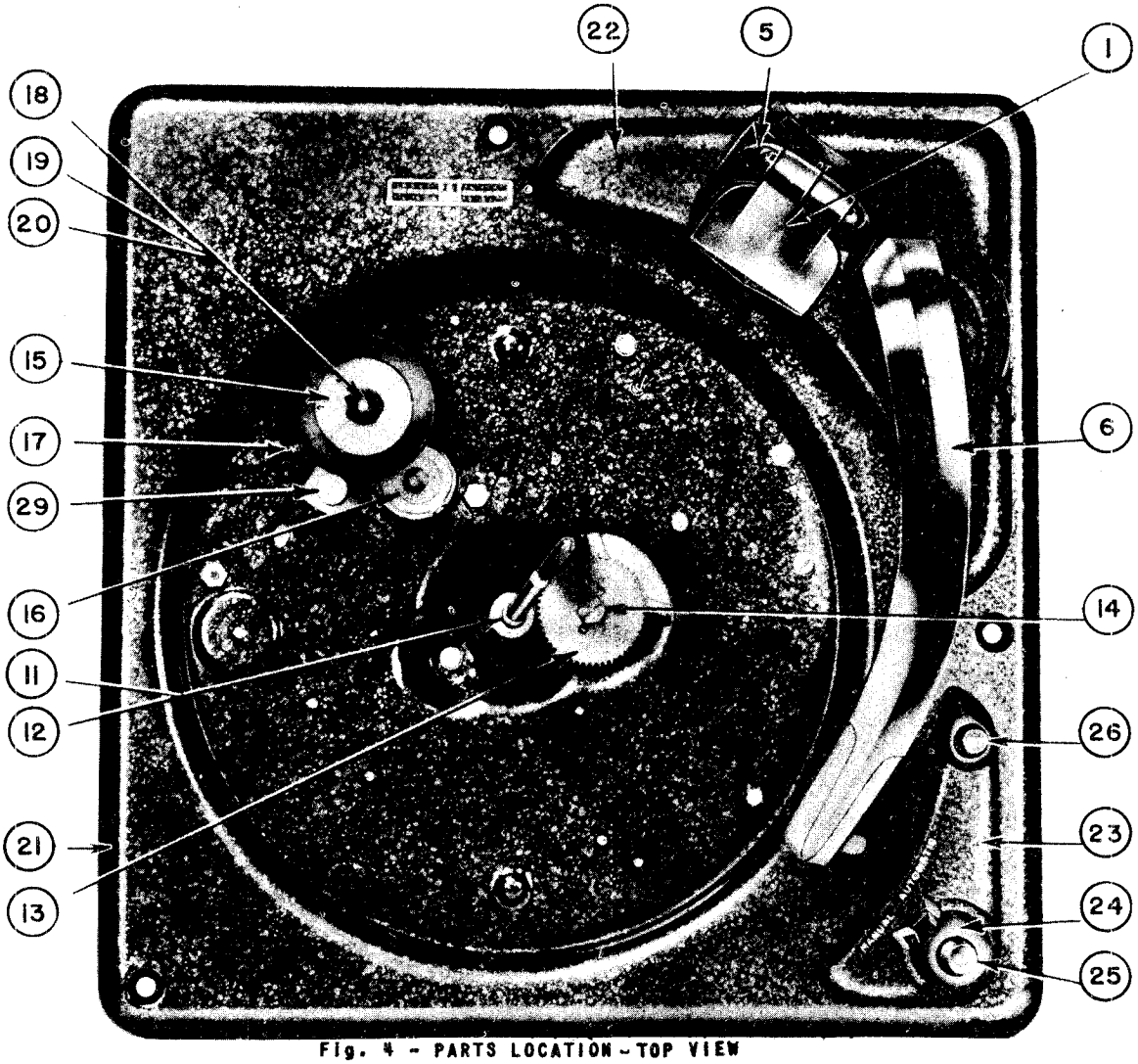

Fig. 4 - PARTS LOCATION - TOP VIEW

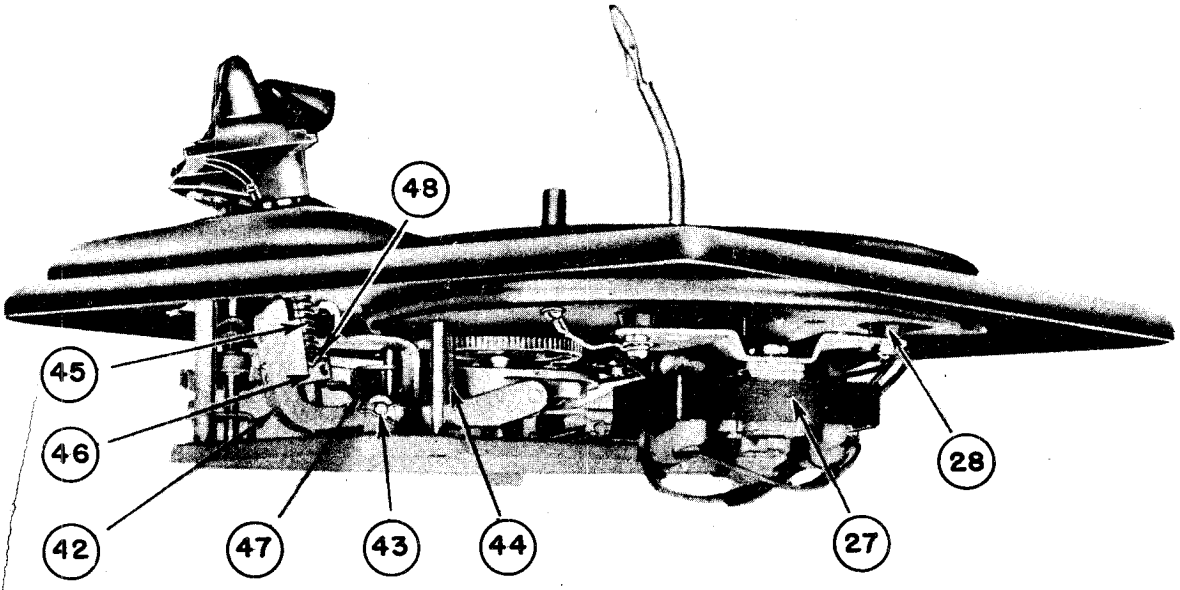

FIG. 5 - PARTS LOCATION -- LEFT SIDE VIEW

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FIG. 6 - PARTS LOCATION -- RIGHT SIDE VIEW

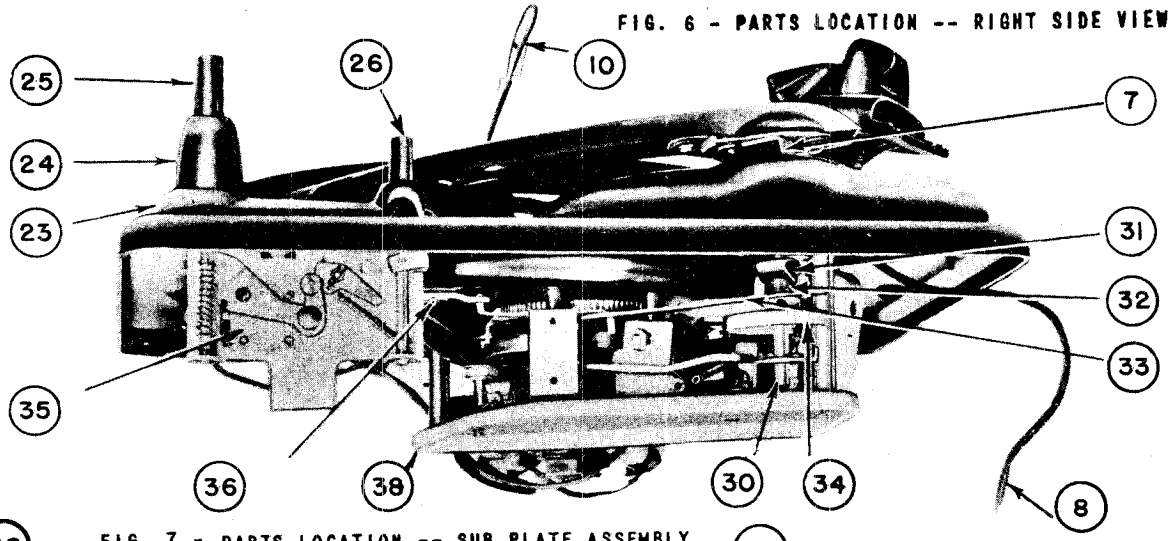


FIG. 7 - PARTS LOCATION -- SUB PLATE ASSEMBLY

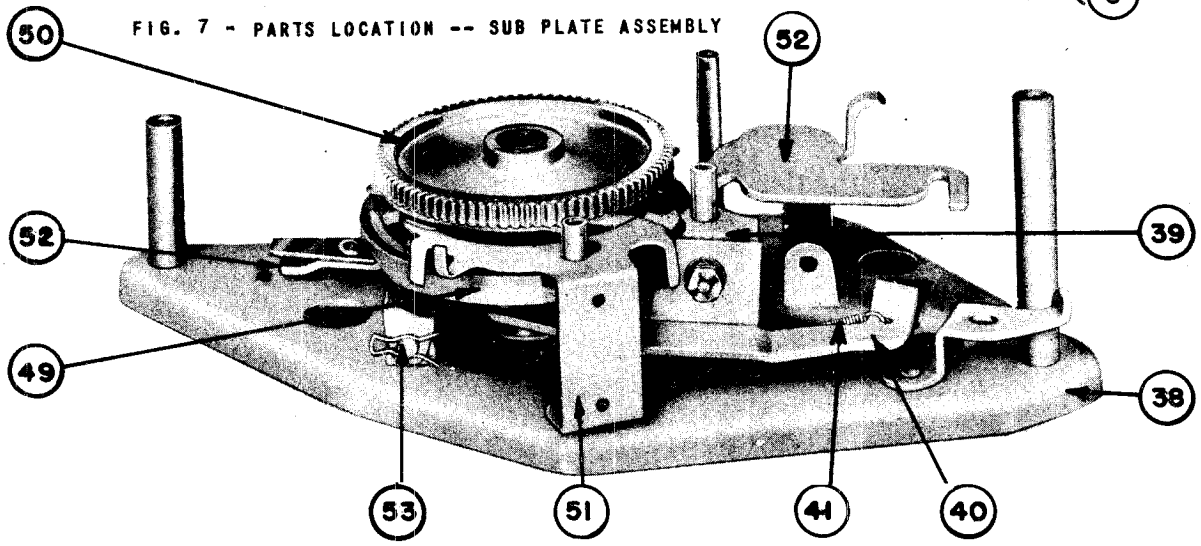
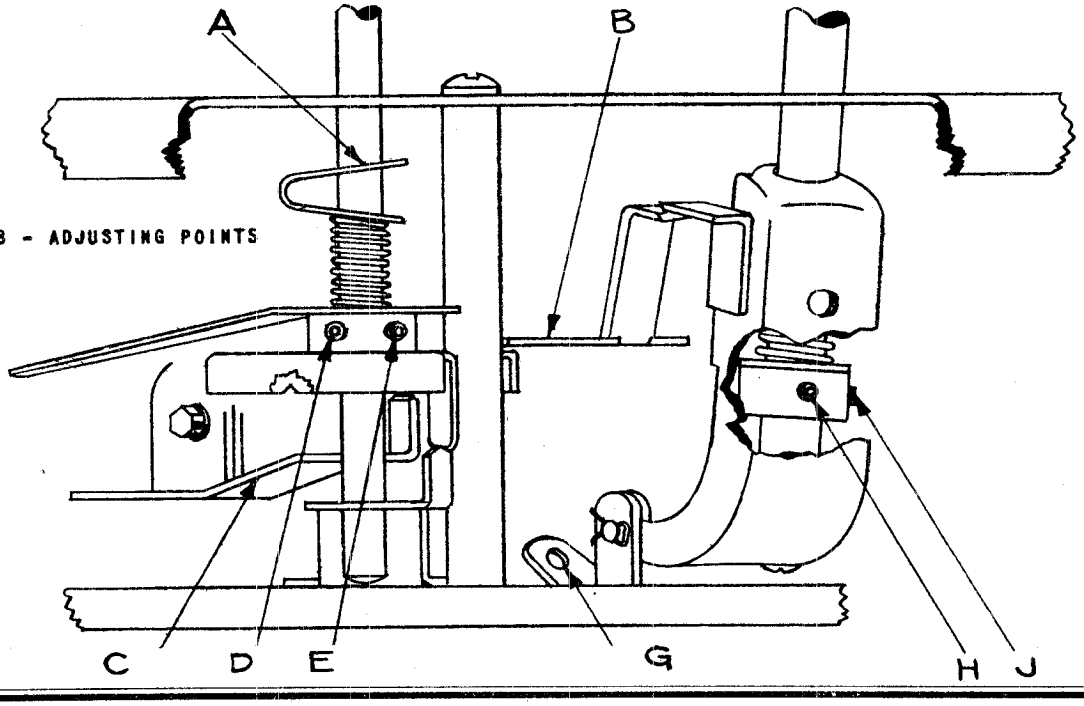


FIG. 8 - ADJUSTING POINTS



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VII SERVICE PARTS LIST

ILLUS. NO.	FIG.	PART NAME	DESCRIPTION	PART NO.
1	4	Weight	Record Stabilizer	49P037-C
		Spring	Stabilizer Weight Tension	46P126
		Pin	Spring Retaining	45P464
5	4	Post	Record Selector	49X029-C
6	4	Pickup Arm	Less Hardware & Cartridge	49X021-2C
		Spring	Hinge Spacing	46P015**
		Hinge	Pickup Arm Mounting	21X199
7	6	Hinge	Pickup Arm Mounting	21X258**
		Cartridge	Crystal Pickup (Use Mfgr. No.)	
8	6	Cord	Pickup Assembly	20X256
		Bracket	Pickup Arm Lift Stop	45P191
10	6	Spindle Assembly	Including Pawl	11X133
11	4	Washer	Bearing Race	25P269
12	4	Bearing	Ball and Retainer Assembly	11X058
		Stud	Turntable Shaft Bearing	41P414
		Nut	Turntable Stud Mounting	26P687
		Turntable	Including Gear	11X138-C
13	4	Gear	Large Idler	47P024
		Gear	Small Idler	47P023
		Coupling	Idler Gear	45P342
14	4	Rivet	Shoulder, Idler Mounting	27P102
15	4	Wheel	Idler Drive Assembly	11X003
16	4	Link	Idler Mounting Assembly	*
17	4	Spring	Idler Tension	46P112
18	4	Washer	Fibre	25P046
19	4	Washer	Felt	25P030
20	4	Clip	Idler Retaining	50P125
21	4	Plate	Main Base Plate	*
22	4	Crescent Assembly	Pickup Arm, Record Post-Base	*
23	4-6	Escutcheon	Control	*
24	4-6	Knob	Control	49P024-C
25	4-6	Button	"ON"	49P026-C
26	4-6	Button	"OFF"	49P025-C
27	5	Motor Assembly	50-60 Cycle 110 Volt	15X084-12
28	5	Mounts	Rubber Shock	25P281
29	4	Pulley	60 Cycle	17X412-1
		Pulley	50 Cycle	17X412-4
30	6	Shaft Assembly	Pickup Arm Base	42X074
		Shaft Assembly	Pickup Arm Base	11X136**
31	6	Lock	Clutch Spring Tension	45P436
32	6	Spring	Clutch Tension	46P127
33	6	Arm	Automatic Trip	45P345
34	6	Disc & Hub Assembly	Pickup Arm Raising	11X031
		Bracket - Hub Assembly	Pickup Arm Raising	45P472ǂ
		Screw	Cone Point Set #8-32 x 1/4	26P629
		Switch	AC Power	32P002
35	6	Switch Assembly	Complete - Less Buttons	11X052
36	6	Manual Trip Lever	Lever & Wire Assembly	11X063
		Rivet	Shoulder - Trip Lever Mtg.	27P102
38	6-7	Plate	Sub Plate & Stud Assembly	*
39	7	Bracket	Pickup Arm Raising Lever	11X044
40	7	Lever	Pickup Arm Raising Lever & Stud	11X045
		Lever Assembly	Pickup Arm Raising Lever & Bracket	11X046+
41	7	Spring	Raising Lever Tension	46P044
42	5	Lever	Rocker Arm Assembly	11X043
43	5	Pin	Rocker Arm Pivot	41P421
44	5	Spring	Rocker Arm Return	46P122
45	5	Spring	Selector Shaft Compression	46P012
46	5	Collar Assembly	Selector Lever	11X049
47	5	Spring	Selector Lever Compression	46P011
48	5	Stop	Selector Lever	45P194
49	7	Cam	Main Cam Assembly	11X033
50	7	Gear	Main Cam Actuating	11X032
51	7	Trip	Velocity Trip & Roller Assembly	11X047
52	7	Lever	Automatic Shut Off Lock	11X079
53	7	Pin	Automatic Shut Off Lock Pivot	41P443

* - Not Stocked for Service
** - Used after Production #375614
ǂ Used after Production #375638
\+ - Used after Production #375622
NOTE: All parts must be ordered by Part Number, Name, Model Number, and Production Number stamped on the under side of the Main Plate.

ZENITH RADIO CORP.

GENERAL

TO THE SERVICE MAN:

This Service Manual has been prepared for the purpose of assisting the Service Man in his work of caring for the Record Changer mechanism, whether he is called to remedy some difficulty, or to insure its continued satisfactory operation. The Zenith Automatic-Record Changers are constructed with a minimum of working parts, and in operation are simple and reliable. However, as is the case with all mechanical units, misalignment and trouble may occasionally develop. The information presented in this book will enable the Service Man to render quick and accurate service. For convenience, the Operating Instructions supplied with each Record Changer are summarized as follows:

The Record Changer will automatically play up to twelve 10 inch or ten 12 inch records at one loading. The Record Stack rests on the Spindle and the Record Shelf. The Selector Sprocket drives the Ejector Plate which pushes the records off the Shelf and Spindle allowing them to drop on the Turntable. To load for automatic operation, set the Record Size Selector Knob to 10 or 12, raise the Pressure Bar, press down lightly and turn the Spindle counter-clockwise to the load position, place the stack of records on the Spindle, lower the Pressure Bar until it rests on the Record Stack. Set the AUTO-MAN-OFF switch to AUTO and press the Record Change button. The Changer will play the entire selection of records and will repeat the last record until it is turned off. For manual operation set the AUTO-MAN-OFF switch to MAN and play the records singly as on a non-automatic record player.

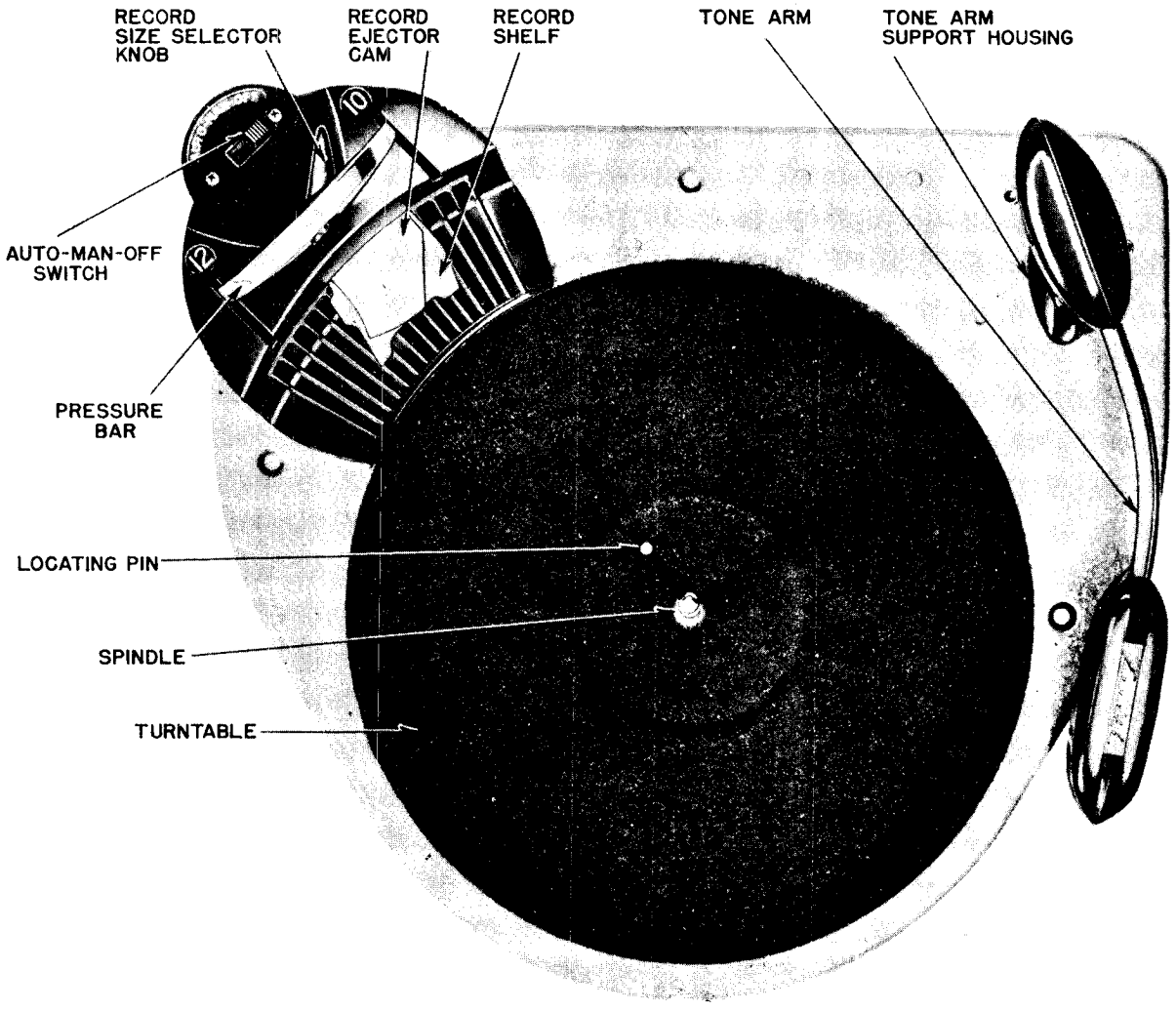

Fig. 1. Top View of Record Changer.

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DESCRIPTION OF CYCLING

The Motor drives an Idler Wheel which rim drives the Turntable and the upper section of the Clutch mechanism. The Spindle is fixed and does not turn with the Turntable.

When the Record Changer button on the receiver panel is pressed, an electric circuit is completed through the Solenoid (the current being supplied by a winding on the motor) causing the solenoid armature to trip. This action engages the lower section of the Clutch with the rotating upper section. (After the Clutch is tripped a cut-out switch in the solenoid circuit is opened, breaking the current flow through it, eliminating chatter.) When the Clutch is engaged the Turntable turns the Drive Sprocket and the Chain. The Chain turns the Timing Sprocket which, due to its construction, pushes the Lift Pin up and raises the Tone Arm off the record. The Locating Bushing Pin on the Timing Sprocket then engages the Tone Arm Control Lever which swings the Tone Arm clear of the record. (The action of the Locating Pin and Bushing against the Tone Arm Control Lever governs the lateral swing of the Tone Arm. For 12 inch records the small diameter Pin rides against the Tone Arm Control Lever and the Bushing drops to the lower end of the pin out of contact with the Tone Arm Control Lever. However, on 10 inch records the landing position of the Tone Arm is one inch nearer the Spindle than for 12 inch records, and the bushing, which has a greater diameter, is pushed upward by the Record Size Lever until it rides against the Tone Arm Control Lever giving the Tone Arm an additional swing for 10 inch records.)

When the Timing Sprocket is turned, the Selector Sprocket, which operates the Record Ejector Cam is also turned, causing the record to be pushed off the Spindle and dropping on the Turntable. After one-half cycle, an emboss on the Timing Sprocket re-sets the clutch trigger mechanism and closes the anti-chatter switch. The Locating Bushing Pin then brings the Tone Arm over the starting groove of the record, and the Lift Pin slides into its groove in the Timing Sprocket, lowering the Tone Arm on the record. At the same time the Lift Pin slides into its groove, a slot in the Timing Sprocket approaches the Clutch Release Lever and when the tip of the Clutch Release Lever drops into this slot the Clutch is disengaged.

As the record is played the Tone Arm is gradually moving toward the center of the record and a Pawl attached to the Tone Arm Control Lever is moving toward the Cycling Switch Trip Lever. When the record has finished its play, the needle enters the eccentric groove and the Pawl engages the Cycling Switch Trip lever. The oscillating action of the Pawl against the Cycling Switch Trip Lever causes the Cycling Switch to close, complete the circuit, and start the cycle over again. If the record does not have an eccentric groove, the Position Trip will close the Cycling Switch and start the next cycle.

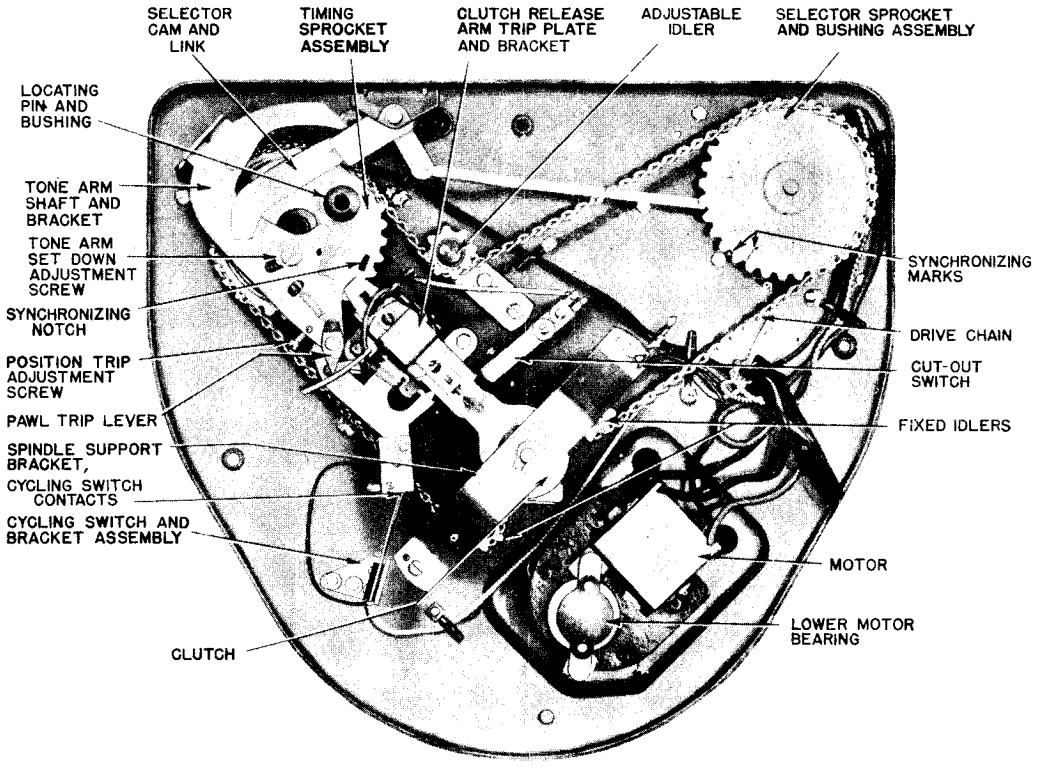

Fig. 2. Bottom View of Record Changer.

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LUBRICATION

Figures 3 and 4 indicate the points to be lubricated and the type of lubricant to use. The Motor has two oil wicks that should be saturated with oil. The Record Spindle Guide Bearing, Idler Wheel Bearing, Lower Drive Shaft Bearing, Drive Shaft Thrust Bearing and the Motor Bearings are of

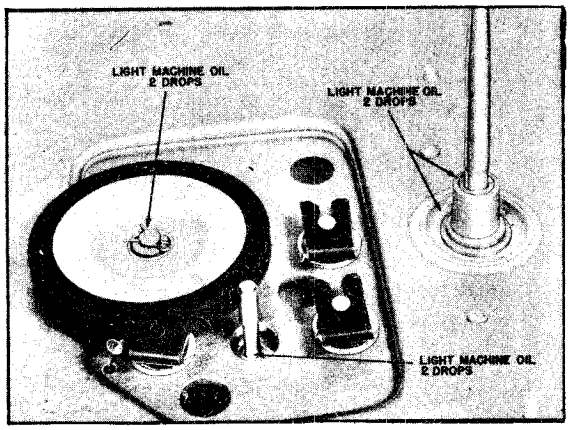

Fig. 3. Lubrication Top of Record Changer.

the OILITE type and require very little attention. If squeaks develop, make certain that they are not caused by friction between the Spindle and records on the Turntable. A thin coat of wax on the Spindle will remedy this condition.

ADJUSTMENTS

1. Tone Arm Set Down Adjustment.

Before the set down adjustment is made, study Figure 5 and proceed as follows:

a. Set the Record Size Selector Knob to 12.

b. Place a standard 12 inch record on the Turntable.

c. Trip the Clutch by hand and turn the turntable clockwise **until** the tone arm just starts to come down on the record.

d. Loosen the Tone Arm Adjustment Lock Screw on the Tone Arm Control Lever "D."

e. Remove the Lift Pin "E."

f. Move the Tone Arm until the Tone Arm Control Lever and the Locating Bushing Pin are in contact "B."

g. While holding the Tone Arm Control Lever against the Locating Bushing Pin, set the needle on the record about

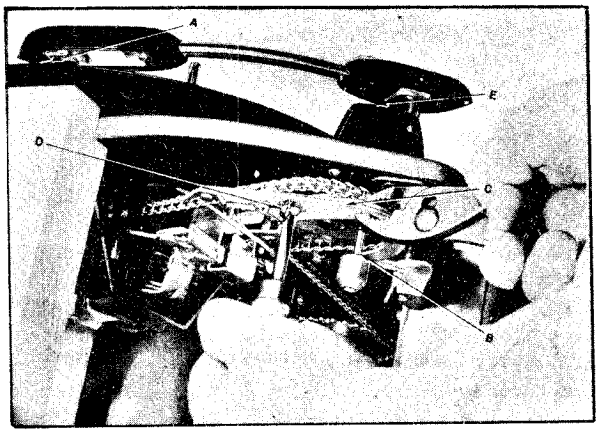

Fig. 5. Tone Arm Set Down Adjustment.

1-32" from where the run-in groove ends and the playing grooves begin "A," grasp the Tone Arm Control Lever with

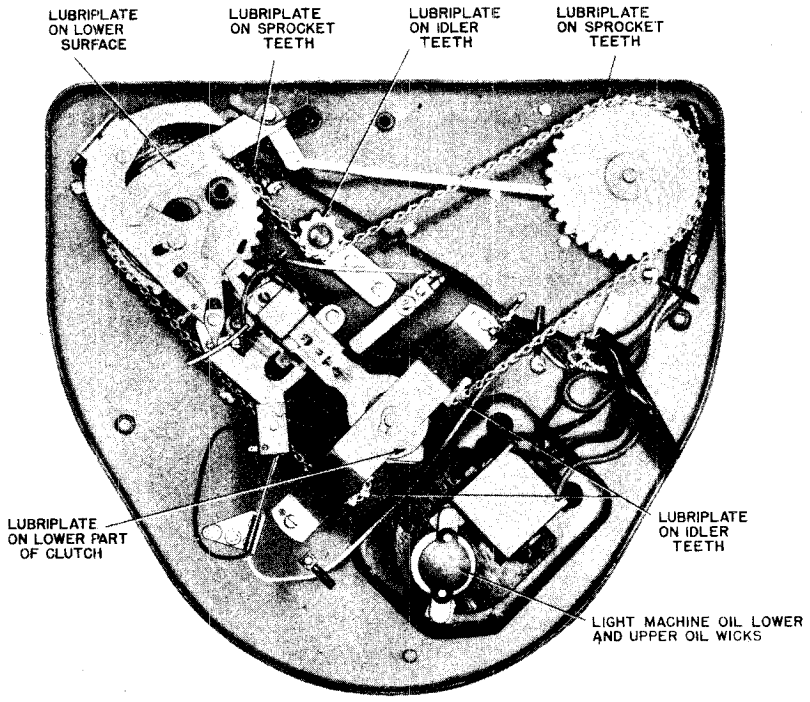
LUBRIPLATE ON LOWER SURFACE
LUBRIPLATE ON SPROCKET TEETH
LUBRIPLATE ON IDLER TEETH
LUBRIPLATE ON SPROCKET TEETH
LUBRIPLATE ON LOWER PART OF CLUTCH
LUBRIPLATE ON IDLER TEETH
LIGHT MACHINE OIL LOWER AND UPPER OIL WICKS

Fig. 4. Lubrication Bottom of Record Changer.

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pliers "C" and tighten the Tone Arm Adjustment Lock Screw "D."

h. Replace Lift Pin and check operation on 10 and 12 inch records.

i. An alternate method for making the adjustment is to loosen and move the Tone Arm Adjustment Lock Screw "D" in its slot inward to bring the Tone Arm in, or outward to bring it out, determining the proper amount experimentally.

2. Tone Arm Height Adjustment.

The Tone Arm vertical rise is governed by the Lift Pin. The Lift Pin is adjustable (see Fig. 6). Too long a Lift Pin will cause the Tone Arm to hit the underside of the records on the Spindle. If the Lift Pin is short the needle will not clear twelve records on the Turntable. To make the proper adjustment, trip the Clutch by hand and rotate the Turntable clockwise until the Tone Arm starts to swing toward the Spindle. Gently push the Tone Arm as close to the Spindle as it will go, place a record on the Spindle and observe the spacing between it and the Tone Arm. The spacing "A" should be approximately the thickness of a record. If the spacing is incorrect, lift the Tone Arm, remove the Lift Pin, loosen the Lock Nut and adjust the Lift Pin to the proper length. Make certain that the Lock Nut is tightened after adjustment.

Fig. 6. Lift Pin.

3. Cycling Switch Adjustment.

When a record has completed its play and the needle enters the eccentric groove, Pawl "C" engages the Trip Plate "D," closing contacts "A" and completing the circuit through the solenoid which trips the record change mechanism.

To adjust the Cycling Switch, move the Tone Arm until Pawl "C" is clear of the Trip Lever Plate "D" (as shown in Fig. 8). Loosen the two Lock Screws "B", move the Cycling Switch bracket until there is approximately .02 inch spacing between contacts "A" and tighten the Lock Screws.

4. Position Trip Adjustment.

The Position Trip does not depend on an eccentric groove in the record to start the record change cycle, but will trip the mechanism whenever the needle comes within a pre-determined distance from the Spindle. Older type records that do not have an eccentric groove can in most cases be played automatically by the proper adjustment of the Position Trip. Under normal conditions with the needle approximately 1¾" from the center of the Spindle adjust "E" (Fig. 8) until the contacts "A" close. This distance is generally satisfactory since no modern record will be cut off before it has completed its play, and none will fail to trip the mechanism at the end. In special cases screw the adjustment "E" clockwise for earlier tripping and counter-clockwise for later tripping as the individual cases may be.

It may be impossible to find an adjustment that will always trip the mechanism and never cut off all type records, and in these special cases the record must be played manually.

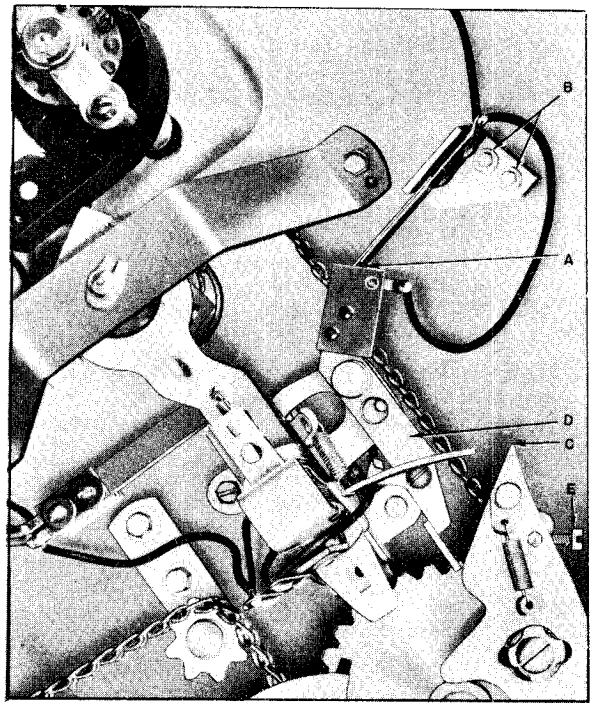

Fig. 8. Cycling Switch and Position Trip Adjustments.

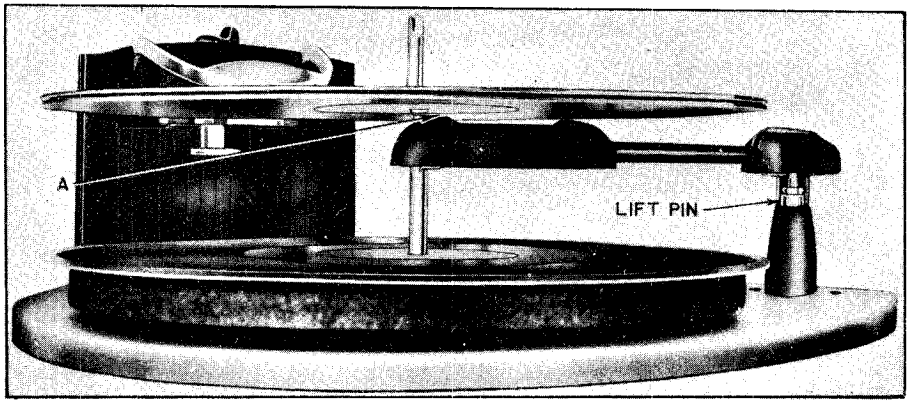

Fig. 7. Tone Arm Height Adjustment.

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REMOVING THE TURNTABLE

To remove the Turntable, hold the Clutch with one hand, and turn the Turntable with the other (see Fig. 9).

To avoid damage when the Turntable is replaced, make certain that the Idler Wheel is pushed inside the rim before the Turntable is seated.

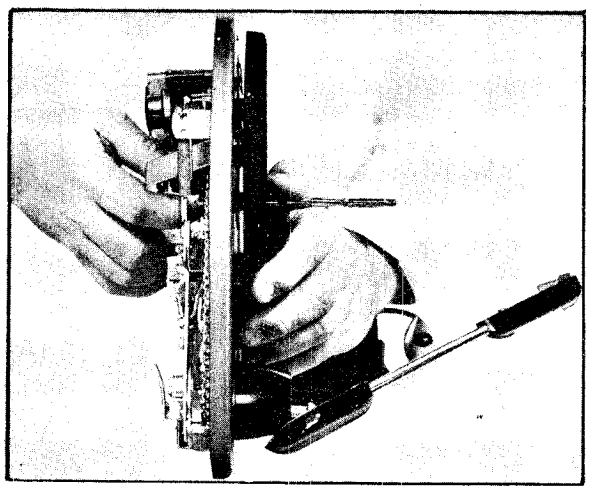

Fig. 9. Removing the Turntable.

REPLACING THE MOTOR

The Motor is designed for operation on 50 or 60 cycle Alternating Current (AC) depending on the spring bushing installed on its shaft. For 50 cycle operation a 80-452 spring bushing is used. For 60 cycle, use a 80-453 bushing. For operation on 25 cycle current a 25 cycle motor must be installed. When a replacement Motor is ordered, make certain that the line voltage and frequency of the receiver are given.

To replace the Motor, unsolder the connecting leads, remove the Turntable, the three spring mounting clips and allow the Motor to drop out. Remove the spring bushing from the shaft of the defective Motor and install it on the new one. When the new Motor is installed do not draw the connecting leads tight as this will prevent the Motor from "floating" on its spring mounts. Make certain that all the leads are securely soldered and taped.

REPLACING THE CHAIN

To replace the Chain, loosen the adjustable idler (see Fig. 10) and remove the Chain. Open a link, and pull the Chain out. Open a link in the replacement Chain and thread it in place making certain that the open ends of the links face outward from the Base Plate (see Fig. 2). (This will prevent the Chain from being installed in reverse.) Carefully close the link in the new Chain and make certain that there is no stiffness in its action. Read the paragraph on synchronization before the Chain is permanently installed.

SYNCHRONIZATION

When the Chain is removed or replaced, the Timing Sprocket and the Selector Sprocket must be synchronized. The Selector Sprocket has a synchronizing mark that must line up with the mark on the Base Plate (see Fig. 2). The Timing Sprocket has a small slot. The Clutch Release Lever Tip must drop into this slot at the same time the Selector Sprocket is lined up with the synchronizing mark on the Base Plate (Fig. 2). To sychcronize hold the Timing Sprocket and Selector Sprocket in position, thread the chain over the Drive Sprocket, two fixed idlers, Timing Sprocket, Selector Sprocket and over the adjustable idler. Set the adjustable idler for medium tension on the Chain and tighten the two holding screws.

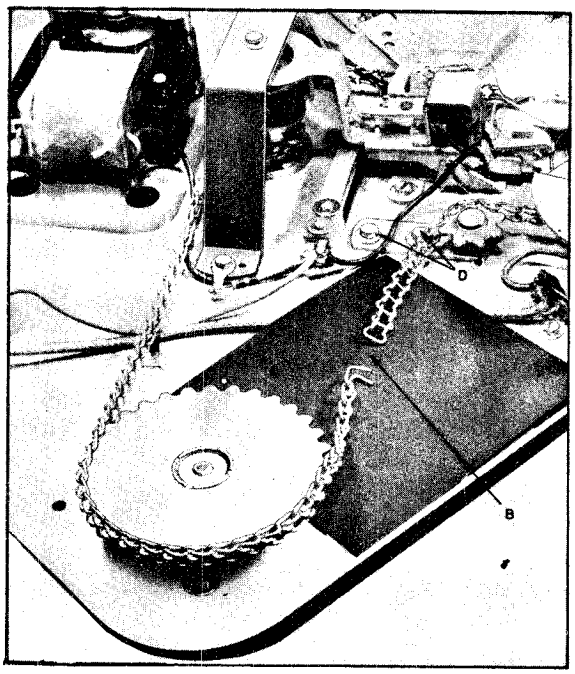

Fig. 10. Replacing the Chain.

TROUBLE SHOOTING

SQUEAKS OR NOISES DURING PLAYING OF RECORDS.

a. Friction between the records on the turntable and the spindle will occasionally cause squeaks. A thin coat of wax applied to the spindle will remedy this condition.

b. Check lubrication.

MECHANISM STARTS SLOWLY AND MOTOR GETS HOT.

a. Check line voltage and frequency.
b. Check lubrication.
c. Motor windings damaged.
d. Toom temperature abnormally low.

PRESSING RECORD CHANGE BUTTON ON RECEIVER PANEL DOES NOT START RECORD CHANGE CYCLE.

a. See that the AUTO-MAN-OFF switch is set to AUTO.
b. Check Record Change Switch.
c. Check Muting Switch.
d. Check electrical continuity of solenoid circuit.
e. Check solenoid energizing voltage on motor.

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MOTOR FAILS TO RUN EVEN WHEN IT IS ENTIRELY DISCONNECTED FROM CHANGER AND PROPER VOLTAGE AND FREQUENCY APPLIED DIRECTLY TO THE TWO INPUT LEADS OF THE WINDING.

a. Open windings.
b. Damaged or frozen bearings.

RUMBLE AND MICROPHONICS DURING REPRODUCTION.

a. Changer not "floated" properly. Loosen mounting bolts.
b. Motor mounting Spring Clips rubbing on the idler wheel.
c. Motor leads pulled tight preventing motor from "floating" freely on its spring.

NEEDLE SETS DOWN PROPERLY ON REORD BUT SLIDES OVER THE RECORD GROOVES.

a. Cabinet tilted.
b. Badly worn needle.

NEEDLE FAILS TO CLEAR MAXIMUM LOAD OF RECORDS ON THE TURNTABLE.

a. Check Tone Arm height adjustment No. 2.

CHANGER CYCLES WITH AUTO-MAN-OFF SWITCH ON MAN.

a. Check AUTO-MAN-OFF switch.

TONE ARM FALLS OFF RECORD.

a. Check Tone Arm set down adjustment screw.
b. Check Tone Arm mounting screws.

RECORD IS NOT HEARD ALTHOUGH CHANGER OPERATES.

a. See that the Phono Radio switch is on Phono.
b. Check receiver audio by listening to radio.
c. Check Crystal Pickup Cartridge.

TONE ARM SETS DOWN TOO FAR IN OR OUT ON RECORD.

a. Check Tone Arm set down adjustment No. 1.

CHANGER CONTINUES TO CYCLE.

a. Check Cycling switch adjustment.
b. Check Record Change switch.
c. Clutch release mechanism sticks.
d. Tight drive chain.

CHANGER WILL NOT CYCLE UPON COMPLETION OF RECORD.

a. See that the AUTO-MAN-OFF switch is set to AUTO.
b. Make certain the record has an eccentric center groove.
c. Check Cycling switch.
d. Check Cut-out switch.
e. Check Clutch Release Arm for freedom of action.

SQUEAKS WHEN CHANGER IS IN CYCLE.

a. Friction between Lift Pin and Timing Sprocket. Apply a thin coat of lubriplate.

FAILS TO EJECT RECORDS ACCOMPANIED BY A CLICKING SOUND.

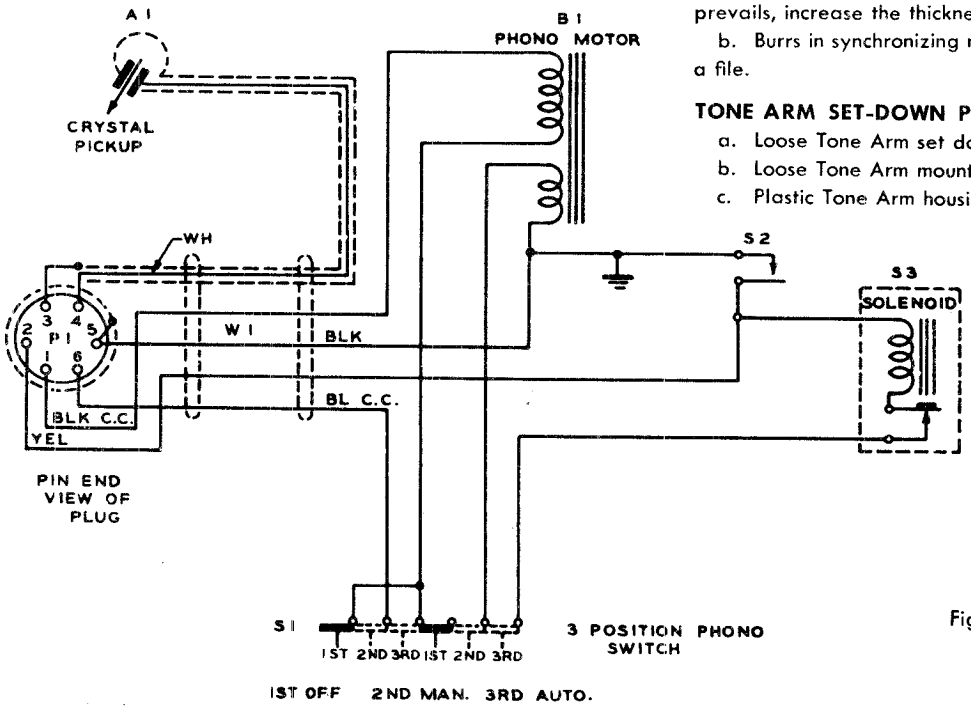
a. Clutch slips. A slight upward bend of the Clutch trip lever will correct this condition.

TONE ARM STICKS OR HANGS UP DURING CYCLE.

a. Clutch Release Lever pressure on Timing Sprocket too great. Loosen the solenoid bracket and insert a very thin shim between it and the base plate. If the condition still prevails, increase the thickness of the shim.
b. Burrs in synchronizing notch or trip lever. Remove with a file.

TONE ARM SET-DOWN POSITION VARIES.

a. Loose Tone Arm set down adjustment lock screw.
b. Loose Tone Arm mounting screw.
c. Plastic Tone Arm housing broken.



DIAG. NO.	PART NO.	DESCRIPTION
A1	142-62	CRYSTAL PICKUP
B1	141-92	PHONO MOTOR
P1	58-132	6 PRONG CONNECTOR
S1	85-371	3 POSITION SWITCH
S2	S11604	TRIP CONTACT ASSY.
S3	S11458	SOLENOID MAGNET
W1	S11951	CABLE & PLUG ASSY.

Fig. 12. Schematic Diagram.

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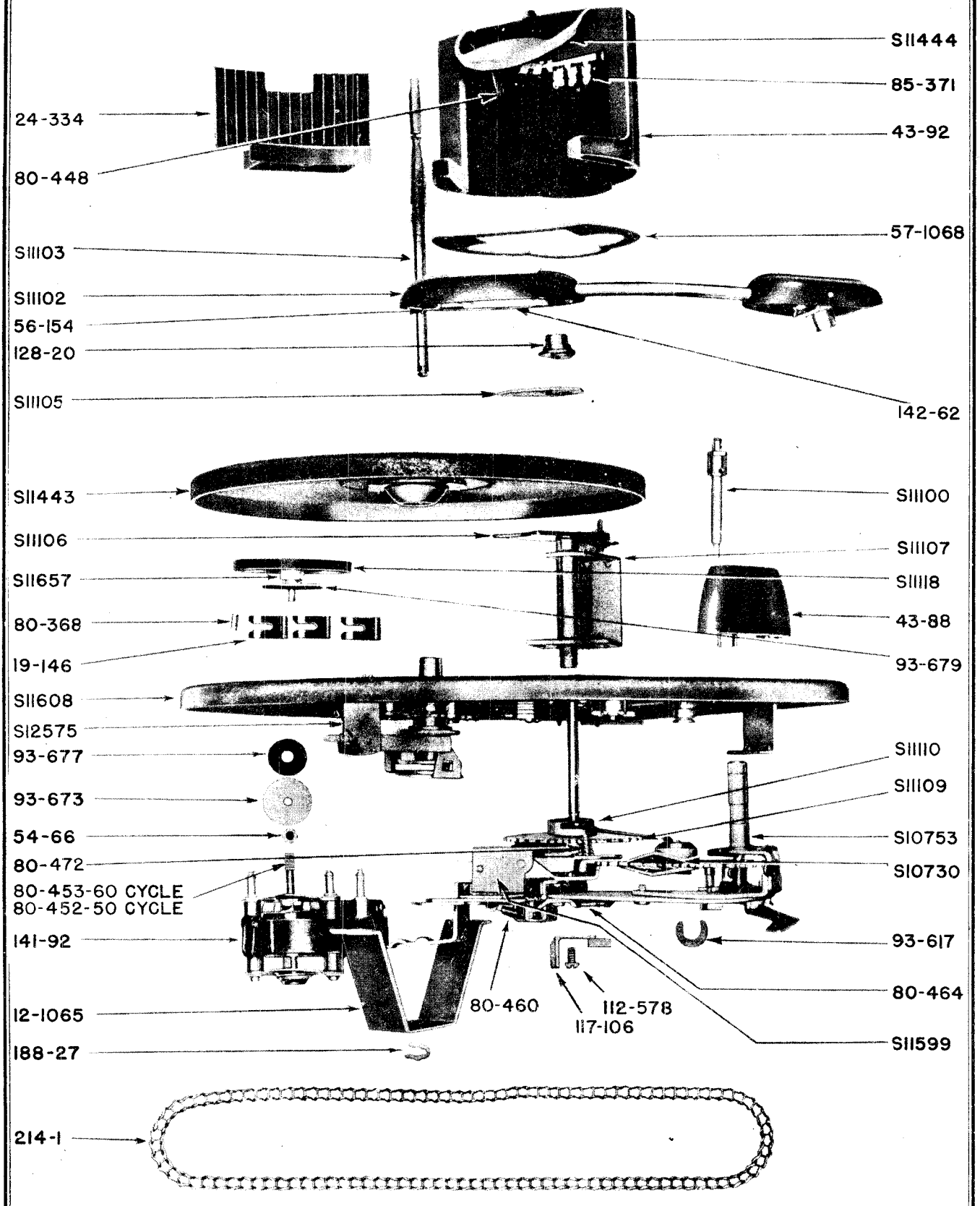

Fig. 11. Exploded View of Record Changer.

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PARTS LIST

S-10730	Timing Sprocket Assembly
S-10753	Tone Arm Pivot Shaft and Bracket Assembly
S-11100	Tone Arm Lift Pin Assembly
S-11102	Tone Arm Assembly
S-11103	Record Spindle Assembly
S-11105	Record Ejector Plate and Pin Assembly
S-11106	Record Support Plate—Shaft and Pin Assembly
S-11107	Record Support and Ejector Bracket Assembly
S-11109	Selector Sprocket and Bushing Assembly
S-11110	Selector Cam and Link Assembly
S-11118	Idler Wheel Assembly
S-11441	Record Changer Lever and Stud Assembly
S-11443	Turntable and Record Locating Stud Assembly
S-11444	Record Pressure Arm Assembly
S-11559	Clutch Release Arm—Trip Plate and Bracket Assembly
S-11608	Base Plate, Sprocket and Drive Shaft Bearing Assembly
S-11657	Idler Stud and Washer Assembly
S-11951	Cable and Plug Assembly
S-12541	Contact Assembly
S-12542	Contact Assembly
S-12575	Trip Contact and Bracket Assembly
12-1065	Record Spindle Support Bracket
19-146	Motor Mounting Clip
24-334	Record Ejector Housing Cover (Black Polystyrene)
43-88	Tone Arm Support Housing (Casting)
43-92	Record—Ejector Housing (Black Polystyrene)
46-563	Record Selector Knob (Black Tenite)
54-66	No. 10-32 x 5/16" x 1/8" Hex Nut—Steel N.P.
56-122	Record Selector Bracket Pin
56-128	Groove Pin (Sprocket Bushing)
56-154	Phono Cartridge Needle
57-1068	Record Ejector Housing Plate
73-24	No. 8-32 x 1/4" Hex Head Set Screw
73-71	No. 8-32 x 5/16" Allen Head Set Screw Steel—Conepoint
73-72	No. 8-32 x 5/8" Allen Head Set Screw Steel—Conepoint
76-409	Record Ejector Cam Shaft
80-138	Idler Wheel Retaining Spring
80-317	Trip Lever Plate Return Spring
80-368	Idler Wheel Tension Spring
80-448	Pressure Arm Spring
80-452	Spring Bushing (50 Cycle Operation)
80-453	Spring Bushing (60 Cycle Operation)
80-460	Trip Lever Tension Spring
80-464	Pawl Spring
80-472	Trip Lever Plate Accuating Spring
85-371	3 Position Slide Switch
93-35	.032 x .144 x 3/8 Flat Washer—N.P.
93-487	1/16 x .144 x 3/8 Washer Steel Cad. Pl.
93-534	.015 x 25/64 x 9/16 Brass or Steel Washer—Cad. Pl. Steel
93-582	.025 x .129 x 5/16 Steel Washer—Cad. Pl.
93-617	Sprocket Shaft Retaining Washer
93-673	Idler Wheel Stud Washer—Threaded
93-677	Idler Wheel Stud Fishpaper Washer (Large)
93-678	Idler Wheel Stud Fishpaper Washer (Small)
93-679	Idler Wheel Stud Felt Washer (Large)
93-719	7/16" x 3/16 x .031" Flat Washer—N.P.
93-752	No. 4 Internal Shakeproof Lockwasher—Steel N.P.
93-764	Spring Washer No. 3759-14
93-770	Spring Washer
94-475	Insulating Bushing (Cutout Contact)
112-413	Weight Lever Pivot Screw
112-415	No. 8-32 x 3/8 Flat Head Shakeproof Type 1 Self Tapping Screw—Steel Cad.
112-450	No. 4-40 x 1/8 Phillips Binding Hd. M.S.—Steel—Cad. Pl.
112-530	4-40 x 5/8 R.H. Self Tapping Screw Steel—Cad Pl.—Stan-Tap
112-578	6-32 x 1/4 Oval Binding H.M.S.—Steel N.P.
112-579	8-32 x 3/8 Round Head Type 1—Self Tapping Screw—Steel—Cad. Pl.
114-200	No. 6-32 x 5/16" Hex Head Slotted Stan-Tap—Thread Forming Screw—Cad. Pl.
114-201	No. 8-32 x 5/16" Hex Head Slotted—Stan-Tap—Thread Forming Screw—Cad. Pl.
114-217	No. 8-32 x 1/4" Hex Head Slotted—Stan-Tap—Thread Forming Screw—Cad. Pl.
114-252	No. 4-40 x 3/16" Hex Acorn Head M.S.—Steel N.P.
114-253	No. 6-20 x 3/8" Hex Head Slotted Shakeproof (Type 25) Self Tapping Screw—Steel—Cad.
117-85	Record Selector Lever
117-106	Position Trip Lever
128-20	Record Ejector Cam
141-92	A.C. Motor
142-62	Crystal Pickup
188-27	Record Spindle Retaining Washer
188-55	Selector Coupling Arm Retaining Washer
214-1	Sprocket Drive Chain

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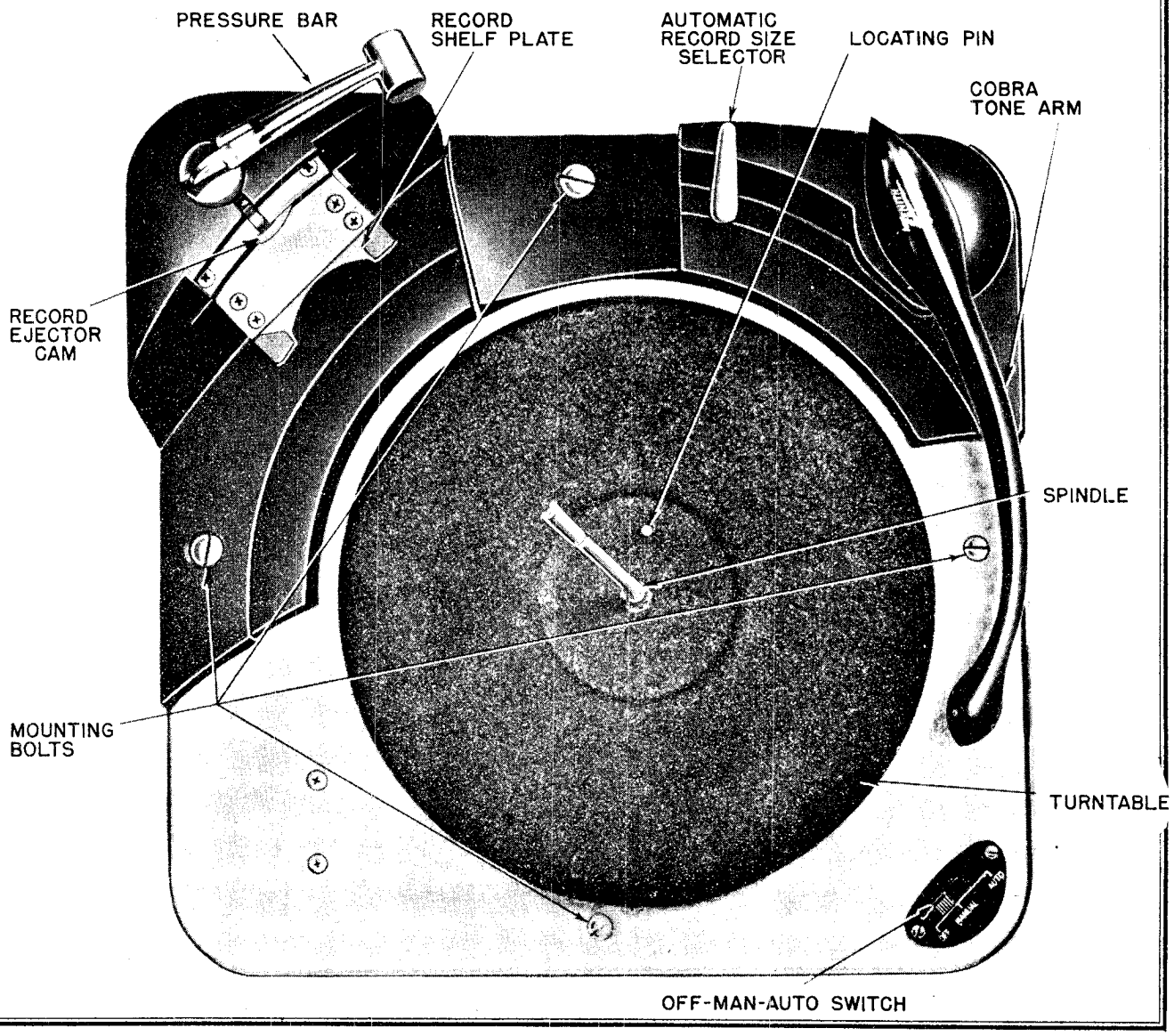
GENERAL

TO THE SERVICE MAN:

This Service Manual has been prepared for the purpose of assisting the Service Man in his work of caring for the Record Changer mechanism, whether he is called to remedy some difficulty, or to insure its continued satisfactory operation. The Zenith Automatic Record Changers are constructed with a minimum of working parts, and in operation are simple and reliable. However, as is the case with all mechanical units, misalignment and trouble may occasionally develop. The information presented in this book will enable the Service Man to render quick and accurate service. For convenience, the Operating Instructions supplied with each Record Changer are summarized as follows:

The Record Changer will automatically play up to fourteen 10 inch or twelve 12 inch records at one loading, or up to twelve 10 and 12 inch records intermixed. The Record Stack rests on the Spindle and the Record Shelf. The Selector Sprocket drives the Ejector Cam which pushes the records off the Shelf and Spindle allowing them to drop on the Turntable. To load for automatic operation, swing the Pressure Bar to the right, place the stack of records on the Spindle, swing the Pressure Bar to the left until it rests on the record stack, set the OFF-MAN-AUTO switch to AUTO and press the Record Change button. The Changer will play the entire selection of records and will repeat the last record until it is turned off. For manual operation set the OFF-MAN-AUTO switch to MAN and play the records singly as on a non-automatic record player.

Fig. 1. Top View of Record Changer.



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MODEL S-11680

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DESCRIPTION OF CYCLING

The Motor drives an Idler Wheel which rim drives the Turntable and the lower section of the Clutch mechanism. The Spindle is fixed and does not turn with the Turntable.

When the Record Change button on the receiver panel is pressed, an electric circuit is completed through the Solenoid (the current being supplied by a winding on the motor) causing the solenoid armature to trip. This action engages the upper section of the Clutch with the rotating lower section. After the Clutch is tripped a cut-out switch in the solenoid circuit is opened breaking the current flow through it, eliminating chatter. When the Clutch is engaged the Turntable turns the Drive Sprocket and the Chain. The Chain turns the Timing Sprocket which, due to its construction, pushes the Lift Pin up and raises the Tone Arm off the record. The Locating Bushing Pin on the Timing Sprocket then engages the Tone Arm Control Lever which swings the Tone Arm clear of the record. (The action of the Locating Pin and Bushing against the Tone Arm Control Lever governs the lateral swing of the Tone Arm. For 12 inch records the small diameter Pin rides against the Tone Arm Control Lever and the Bushing drops to the lower end of the pin out of contact with the Tone Arm Control Lever. However, on 10 inch records the landing position of the Tone Arm is one inch nearer the Spindle than for 12 inch records, and the bushing, which has a greater diameter than the pin, is pushed upward by the Record Size Lever until it rides against the Tone Arm Control Lever giving the Tone Arm an additional swing for 10 inch records.

When the Timing Sprocket is turned, the Selector Sprocket, which operates the Record Ejector Cam is also turned, causing the record to be pushed off the Spindle, and to drop on the Turntable. After one-half cycle an emboss on the Timing Sprocket re-sets the clutch trigger mechanism and closes the cut-out switch. The Locating Bushing Pin brings the Tone Arm over the starting groove of the record and the Lift Pin slides into its groove in the Timing Sprocket, lowering the Tone Arm on the record. At the same time the Lift Pin slides into its groove, a slot in the Timing Sprocket approaches the Clutch Release Arm and when the tip of the Clutch Release Arm drops into this slot the Clutch is disengaged.

As the record is played the Tone Arm is gradually moving toward the center of the record and a Pawl attached to the Tone Arm Control Lever is moving toward the Cycling Switch Trip Lever. When the record has finished its play, the needle enters the eccentric groove and the Pawl engages the Cycling Switch Trip Lever. The oscillating action of the Pawl against the Cycling Switch Trip Lever causes

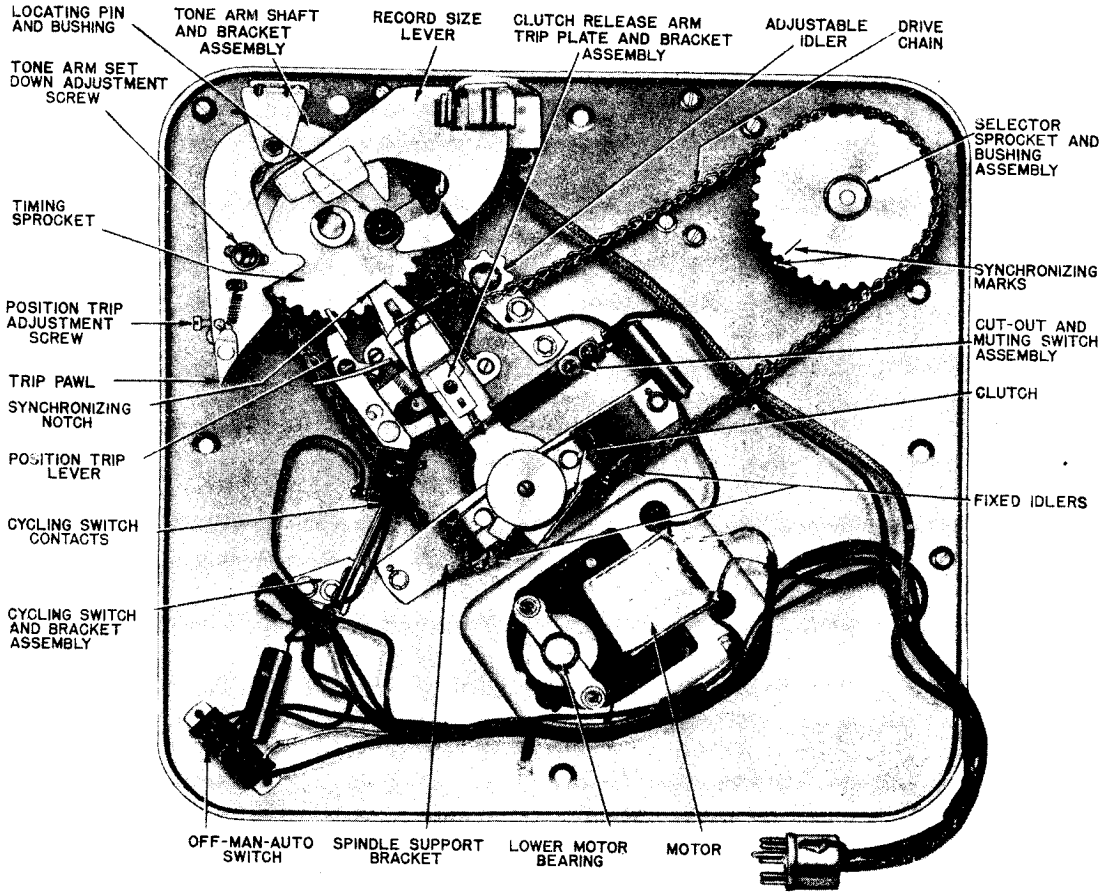

Fig. 2. Bottom View of Record Changer.

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the Cycling Switch to close, completes the circuit, and start the cycle over again. If the record does not have an eccentric groove, the Position Trip will close the Cycling Switch and start the next cycle.

LUBRICATION

Figures 3 and 4 indicate the points to be lubricated and the type of lubricant to use. The Motor has two oil wicks that should be saturated with oil. The Record Spindle Guide Bearing, Idler Wheel Bearing, Lower Drive Shaft Bearing, Drive Shaft Thrust Bearing and the Motor Bearings are of the OILITE type and require very little attention. If squeaks develop, make certain that they are not caused by friction between the Spindle and records on the Turntable. A thin coat of wax on the Spindle will remedy this condition.

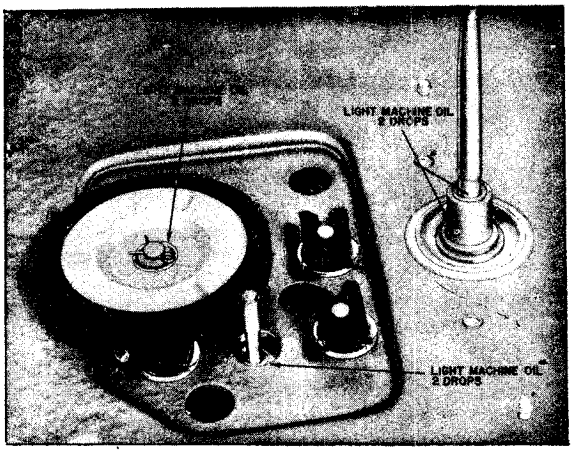

Fig. 3. Lubrication Top of Record Changer.

ADJUSTMENTS

1. TONE ARM SET DOWN ADJUSTMENT

Before the set down adjustment is made, study Figure 5 and proceed as follows:

a. Place a standard 12 inch record on the Turntable.

b. Trip the clutch by hand and turn the Turntable clockwise until the Tone Arm just starts to come down on the record.

c. Loosen the Tone Arm Adjustment Lock Screw on the Tone Arm Control Lever "D."

d. Remove the Lift Pin "E."

e. Move the Tone Arm until the Tone Arm Control Lever "Y" and the Locating Bushing Pin "X" are in contact "B."

f. While holding the Tone Arm Control Lever against the Locating Bushing Pin, set the needle on the record about 1/32" from where the run-in groove ends and the playing grooves begin "A," grasp the Tone Arm Control Lever with pliers "C" and tighten the Tone Arm Adjustment lock Screw "D."

g. Replace Lift Pin and check operation on 10 and 12 inch records.

h. In case the operation is repeated it will be necessary to trip the Automatic Record Size Selector (Fig. 1) by hand,

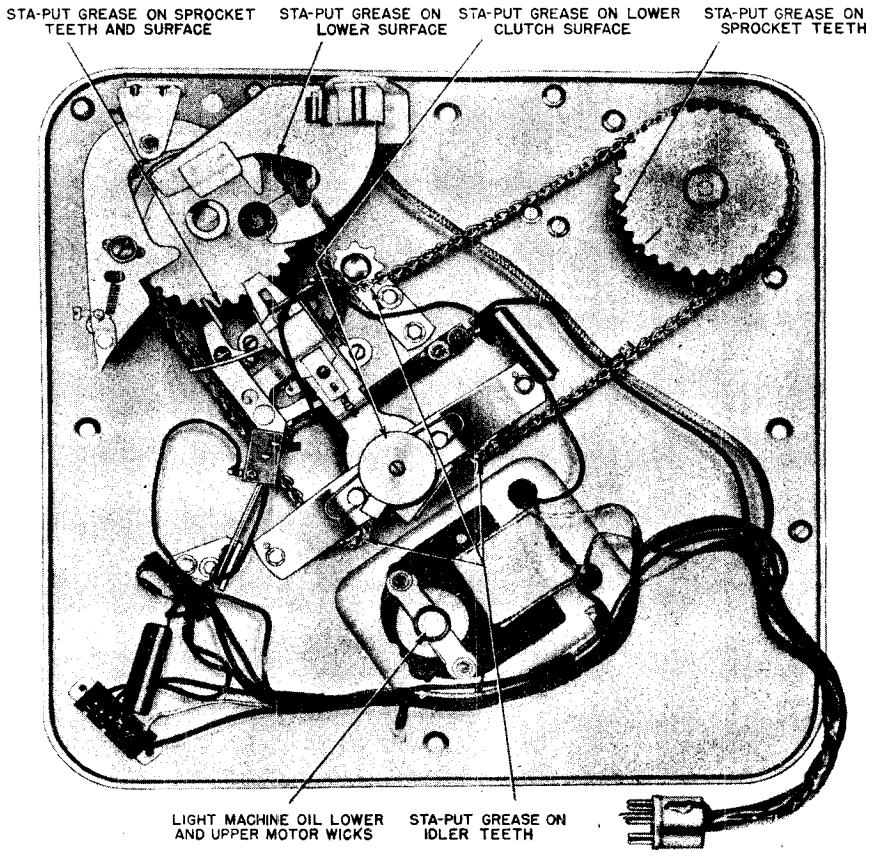
STA-PUT GREASE ON SPROCKET TEETH AND SURFACE
STA-PUT GREASE ON LOWER SURFACE
STA-PUT GREASE ON LOWER CLUTCH SURFACE
STA-PUT GREASE ON SPROCKET TEETH
LIGHT MACHINE OIL LOWER AND UPPER MOTOR WICKS
STA-PUT GREASE ON IDLER TEETH

Fig. 4. Lubrication Bottom of Record Changer.

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otherwise the needle will land in the 10 inch position.

1. An alternate method for making the adjustment is to loosen and move the Tone Arm Lock Screw "D" in its slot inward to bring the Tone Arm in, or outward to bring it out, determining the proper amount experimentally.

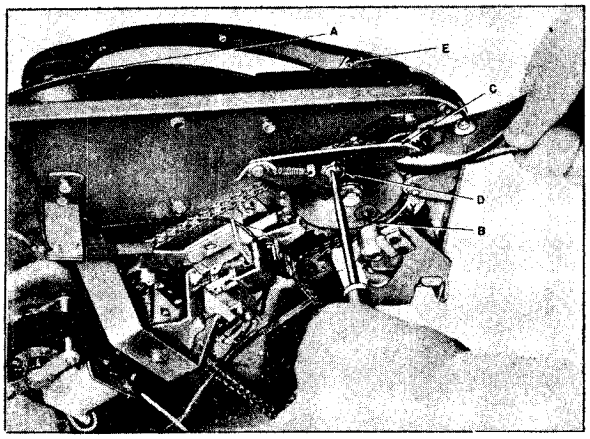

Fig. 5. Tone Arm Set Down Adjustment.

2. TONE ARM HEIGHT ADJUSTMENT

The Tone Arm vertical rise is governed by the Lift Pin. The Lift Pin is adjustable (see Fig. 6). Too long a Lift Pin will cause the Tone Arm to hit the underside of the records on the Spindle. If the Lift Pin is short the needle will not clear fourteen records on the Turntable. To make the proper adjustment, trip the Clutch by hand and rotate the Turntable clockwise until the Tone Arm starts to swing toward the Spindle. Gently push the Tone Arm as close to the Spindle as it will go, place a record on the Spindle and observe the spacing between it and the Tone Arm. The spacing "A" should be approximately the thickness of a record. If the spacing is incorrect, lift the Tone Arm, remove the Lift Pin, loosen the Lock Nut and adjust the Lift Pin to the proper length. Make certain that the Lock Nut is tightened after adjustment.

Fig. 6. Lift Pin.

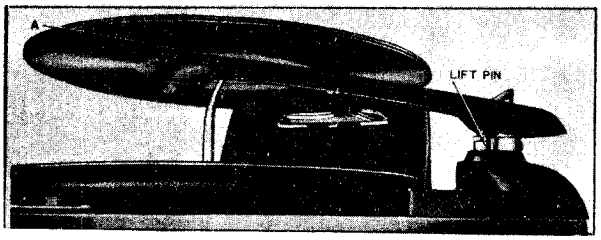

Fig. 7. Tone Arm Height Adjustment.

3. CYCLING SWITCH ADJUSTMENT

When a record has completed its play and the needle enters the eccentric groove, Pawl "C" engages the Trip Plate "D" closing contacts "A" and completing the circuit through the solenoid which trips the record change mechanism.

To adjust the Cycling Switch, move the Tone Arm until Pawl "C" is clear of the Trip Lever Plate "D" (as shown in Fig. 8). Loosen the two Lock Screws "B," move the Cycling Switch bracket until there is approximately .03 inch spacing between contacts "A" and tighten the Lock Screws.

4. POSITION TRIP ADJUSTMENT

The Position Trip does not depend on an eccentric groove in the record to start the record change cycle, but will trip the mechanism whenever the needle comes within a predetermined distance from the Spindle. Older type records that do not have an eccentric groove can in most cases be played automatically by the proper adjustment of the Position Trip. Under normal conditions with the needle approximately 1¾" from the center of the Spindle adjust "E" (Fig. 8) until the contacts "A" close. This distance is generally satisfactory since no modern record will be cut off before it has completed its play, and none will fail to trip the mechanism at the end. In special cases screw the adjustment "E" clockwise for earlier tripping and counterclockwise for later tripping as the individual case may be.

It may be impossible to find an adjustment that will always trip the mechanism and never cut off with all type records, and in these special cases the record must be played manually.

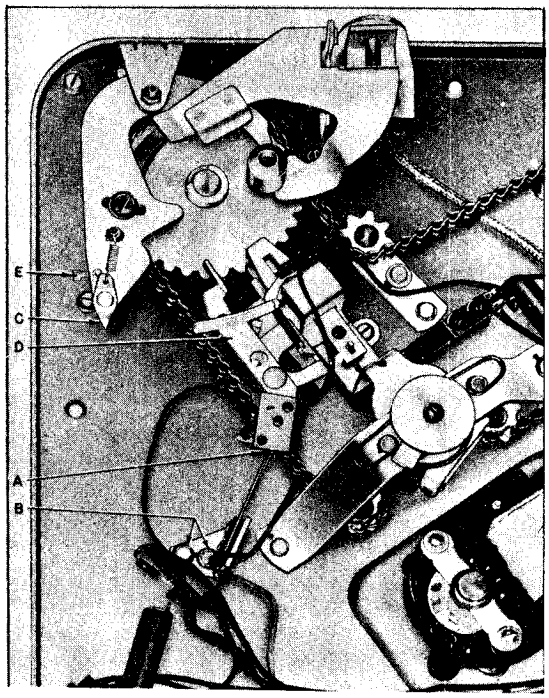

Fig. 8. Cycling Switch and Position Trip Adjustments.

REPLACING THE MOTOR

The Motor is designed for operation on 50 or 60 cycle Alternating Current (AC) depending on the spring bushing installed on its shaft. For 50 cycle operation a 80-452 spring bushing is used. For 60 cycle, use a 80-453 bushing. For operation on 25 cycle current a 25 cycle motor must be installed. When a replacement Motor is ordered, make certain that the line voltage and frequency of the receiver are given.

To replace the Motor, unsolder the connecting leads, remove the Turntable, the three spring mounting clips and allow the Motor to drop out. Remove the spring bushing from the shaft of the defective Motor and install it on the new one. When the new Motor is installed do not draw the connecting leads tight as this will prevent the Motor from "floating" on its spring mounts. Make certain that all the leads are securely soldered and taped.

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REMOVING THE TURNTABLE

To remove the Turntable, hold the Clutch with one hand, and turn the Turntable with the other (see Fig. 9).

To avoid damage when the Turntable is replaced, make certain that the Idler Wheel is pushed inside the rim before the Turntable is seated.

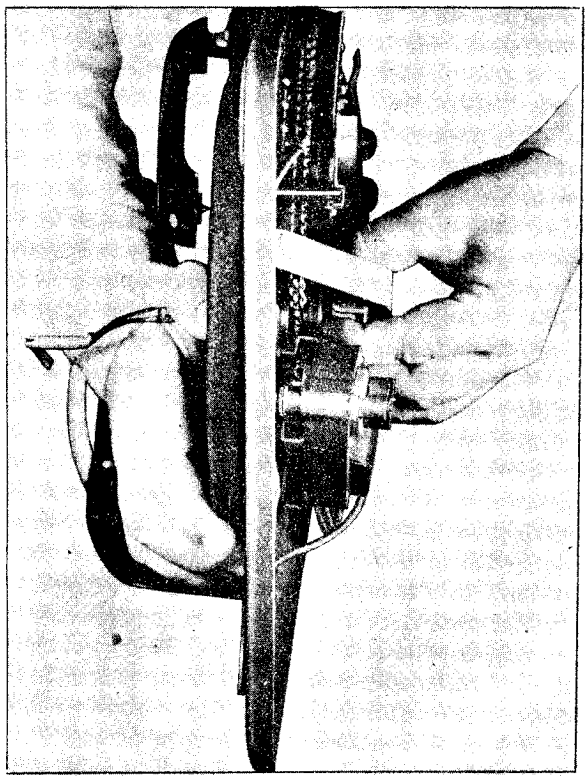

Fig. 9. Removing the Turntable.

REPLACING THE CHAIN

To replace the chain, loosen the adjustable idler (Screws "D," Fig. 10) and remove the chain. Open a link, "B," and pull the chain out. Open a link in the replacement chain and thread it in place. Be certain that the open ends of the links face outward from the Base Plate. (This will prevent the chain from being installed in reverse.) Carefully close the link and make certain that there is no stiffness in its action. Read the paragraph on synchronization before the chain is permanently installed.

SYNCHRONIZATION

When the chain is removed or replaced, the Timing Sprocket and the Selector Sprocket must be synchronized. The Selector Sprocket has a synchronizing mark that must line up with the mark on the Base Plate (see Fig. 2.) The Timing Sprocket has a small slot. The Clutch Release Lever Tip must drop into this slot at the same time the Selector Sprocket Synchronizing Mark is lined up with the mark on the Base Plate (Fig. 2). To synchronize, hold the Timing Sprocket and Selector Sprocket in position, thread the chain over the Drive Sprocket, the two fixed idlers, Timing Sprocket, Selector Sprocket and over the adjustable idler. Set the adjustable idler for medium tension on the chain and tighten the two holding screws.

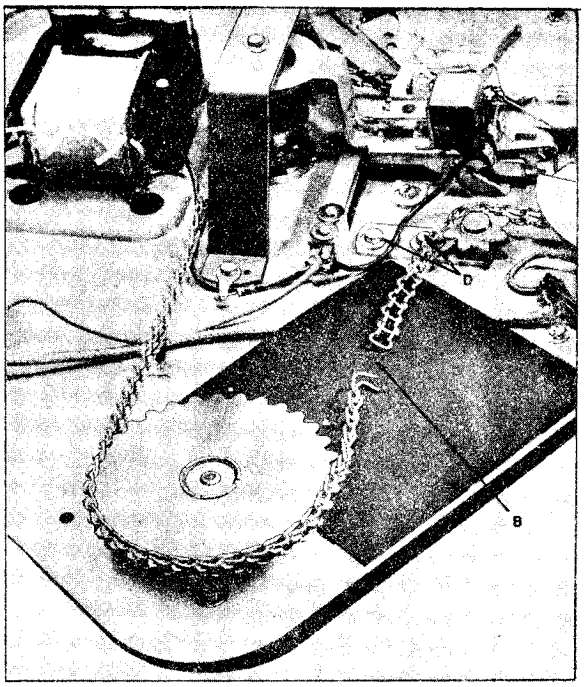

Fig. 10. Replacing the Chain.

THEORY OF THE COBRA RADIONIC PICKUP

The operation of the Cobra pickup is considerably different from Crystal and Dynamic pickups. These pickups generate audio power, while the Cobra controls power generated by a radio frequency oscillator. The 7F7 twin triode tube is a modulated oscillator, detector and audio amplifier. The oscillator operates at a frequency of 2.5 Mc. Modulation is accomplished by changing the energy losses in a tuned circuit. These losses may be represented by an equivalent resistance in series with the reactance of the coil. The ratio of the resistance to the reactance determines the efficiency or Q of the coil. The amplitude of the RF voltage developed across this coil by an oscillator will vary with changes in Q.

The grid coil L_1 and other components of the oscillator are mounted in the oscillator pre-amp chassis, while the plate coil L_2 is in the Needle Cartridge with the vane and needle assembly. The coil is fixed and has 40 turns of No. 40 wire (approximate DC resistance 2½ ohms). The stainless steel vane, which is in the field of the coil, is spot welded to the osmium-iridium tipped stylus.

Any movement of the stylus will cause a corresponding movement of the vane. As the stylus and vane follow the modulations in the record, changes in the mutual inductance between the vane and coil occur (see Fig. 11). In position 2 the vane is at rest; and a constant RF voltage appears across the plate coil. As the vane is set in motion and reaches position 1, it is at its greatest outward swing from the coil, resulting in low mutual inductance, low reflected resistance, higher Q, and a higher RF voltage across the coil. In position 3 it is at its greatest inward swing; resulting in a high mutual inductance, high reflected resistance, lower Q and a lower RF voltage. It can be seen that the amplitude of the RF voltage which appears across the coil will vary with changes in Q, satisfying the condition for amplitude modulation. The position of the vane changes both the Q and L of the coil. Changes in L shift the frequency slightly, and a certain amount of frequency modulation is present, but

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since there is no frequency discrimination it remains undetected.

Since the grid and plate coils are part of a single tuned circuit any variations of amplitude of the RF voltage brought about by the changes in Q across the plate coil will also appear across the grid Coil L_1 causing a shift in the average plate current through the plate load resistor

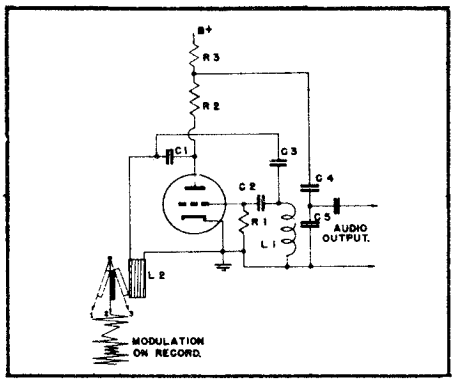

Fig. 11. Simplified Circuit of Oscillator.

across which the audio output voltage is developed. Plate bend detection takes place since only the positive half of the grid swing causes an increase in the average plate current. These changes in the average plate current appear as audio voltage across the plate load resistor.

The 2.5 Mc. RF voltage and the audio voltage both appear at the plate (pin 6) of the oscillator triode. R_2, C_1 and C_3 filter out the RF voltage allowing only the audio component to the grid (pin 4) of the amplifier triode where it is amplified, fed through a shielded lead to the audio amplifier of the receiver and reproduced by the loudspeaker.

TROUBLE SHOOTING

SQUEAKS OR NOISES DURING PLAYING OF RECORDS.

a. Friction between the records on the turntable and the spindle will occasionally cause squeaks. A thin coat of wax applied to the spindle will remedy this condition.

b. Check lubrication.

MECHANISM STARTS SLOWLY AND MOTOR GETS HOT.

a. Check line voltage and frequency.
b. Check lubrication.
c. Motor windings damaged.
d. Room temperature abnormally low.

PRESSING RECORD CHANGE BUTTON ON RECEIVER PANEL DOES NOT START RECORD CHANGE CYCLE.

a. See that the AUTO-MAN-OFF switch is set to AUTO.
b. Check Record Change Switch.
c. Check Cut-Out Switch.
d. Check electrical continuity of solenoid circuit.
e. Check solenoid energizing voltage on motor.

MOTOR FAILS TO RUN EVEN WHEN IT IS ENTIRELY DISCONNECTED FROM CHANGER AND PROPER VOLTAGE AND FREQUENCY APPLIED DIRECTLY TO THE TWO INPUT LEADS OF THE WINDING.

a. Open winding.
b. Damaged or frozen bearings.

RUMBLE AND MICROPHONICS DURING REPRODUCTION.

a. Changer not "floated" properly. Loosen mounting bolts and remove packing block from pre-amp.
b. Motor mounting Spring Clips rubbing on the idler wheel.
c. Motor leads pulled tight preventing motor from "floating" freely on its springs.
d. Noisy 7F7 tube.

NEEDLE SETS DOWN PROPERLY ON RECORD BUT SLIDES OVER THE RECORD GROOVES.

a. Cabinet tilted.
b. Badly worn needle.

NEEDLE FAILS TO CLEAR MAXIMUM LOAD OF RECORDS ON THE TURNTABLE.

a. Check Tone Arm height adjustment No. 2.

CHANGER CYCLES WITH AUTO-MAN-OFF SWITCH ON MAN.

a. Check AUTO-MAN-OFF switch.
b. Chain too tight.

TONE ARM FALLS OFF RECORD.

a. Check Tone Arm set down adjustment No. 1.
b. Check Tone Arm Mounting screws.
c. Changer not level.

TONE ARM SET-DOWN POSITION VARIES.

a. Loose Tone Arm Set-Down adjustment lock screw.
b. Loose Tone Arm mounting screw.
c. Loose needle cartridge socket holding screw.

RECORD IS NOT HEARD ALTHOUGH CHANGER OPERATES.

a. See that the Phono Radio switch is on Phono.
b. Check receiver audio by listening to radio.
c. Check 7F7 tube in Pre-Amp.
d. Check Needle Cartridge.
e. Check Needle Cartridge housing for broken connection.

TONE ARM SETS DOWN TOO FAR IN OR OUT OF RECORD.

a. Check Tone Arm Set Down adjustment No. 1.

CHANGER CONTINUES TO CYCLE.

a. Check Cycling switch adjustment No. 3.
b. Check Record Change switch.
c. Clutch release mechanism sticks.
d. Tight drive chain.

CHANGER WILL NOT CYCLE UPON COMPLETION OF RECORD.

a. See that the AUTO-MAN-OFF switch is set to AUTO.
b. Make certain the record has an eccentric center groove.
c. Check Cycling switch.
d. Check Cut-out switch.
e. Check Clutch Release Arm for freedom of action.

SQUEAKS WHEN CHANGER IS IN CYCLE.

a. Friction between Lift Pin and Timing Sprocket. Apply a thin coat of STA-PUT grease.

FAILS TO EJECT RECORDS ACCOMPANIED BY A CLICKING SOUND.

a. Clutch slips. A slight upward bend of the Clutch Release Arm will correct this condition.

RECORD HANGS BETWEEN SPINDLE AND SHELF.

a. Bent Spindle, or rubber pads on Record Shelf have expanded, causing a decrease in space between Record Shelf and Spindle.

CHANGER DROPS TWO RECORDS.

a. Sharp edge on record. Smooth out with fine sandpaper.
b. Bent Spindle.

TONE ARM STICKS OR HANGS UP DURING CYCLE.

a. Clutch Release Lever pressure on Timing Sprocket too great. Loosen the solenoid bracket and insert a very thin shim between it and the base plate. If the condition still prevails, increase the thickness of the shim.

b. Burrs in synchronizing notch or trip lever. Remove with a file.

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MODEL S-11680

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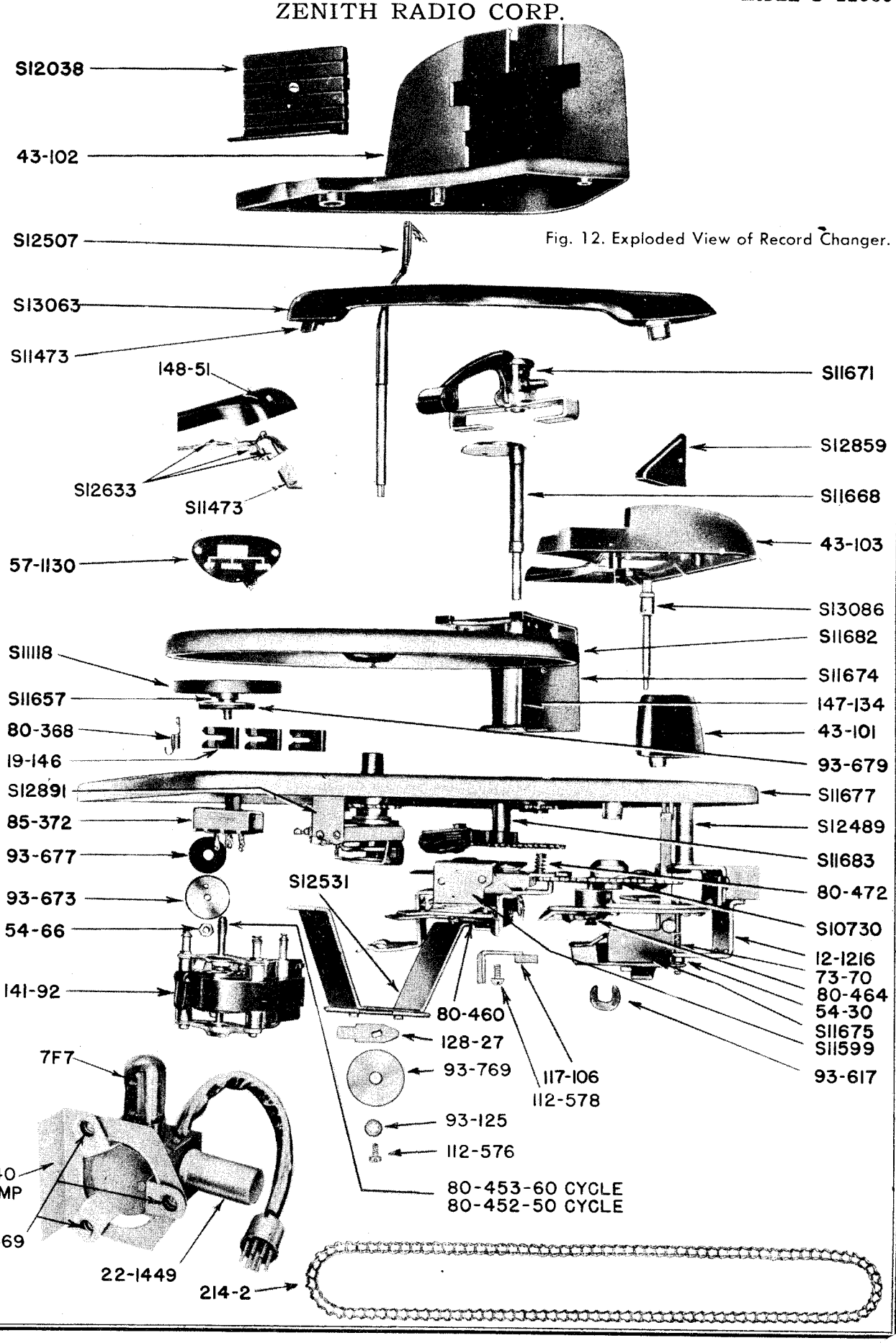

Fig. 12. Exploded View of Record Changer.

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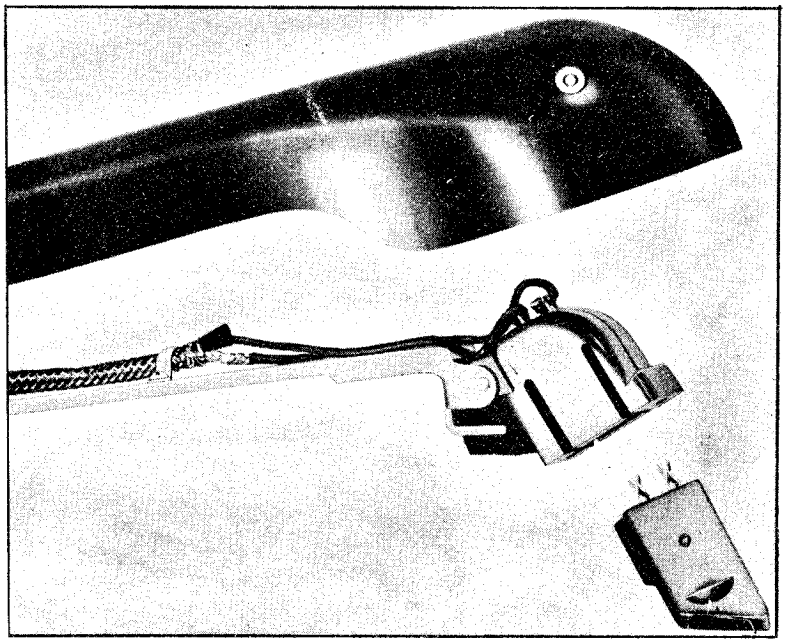
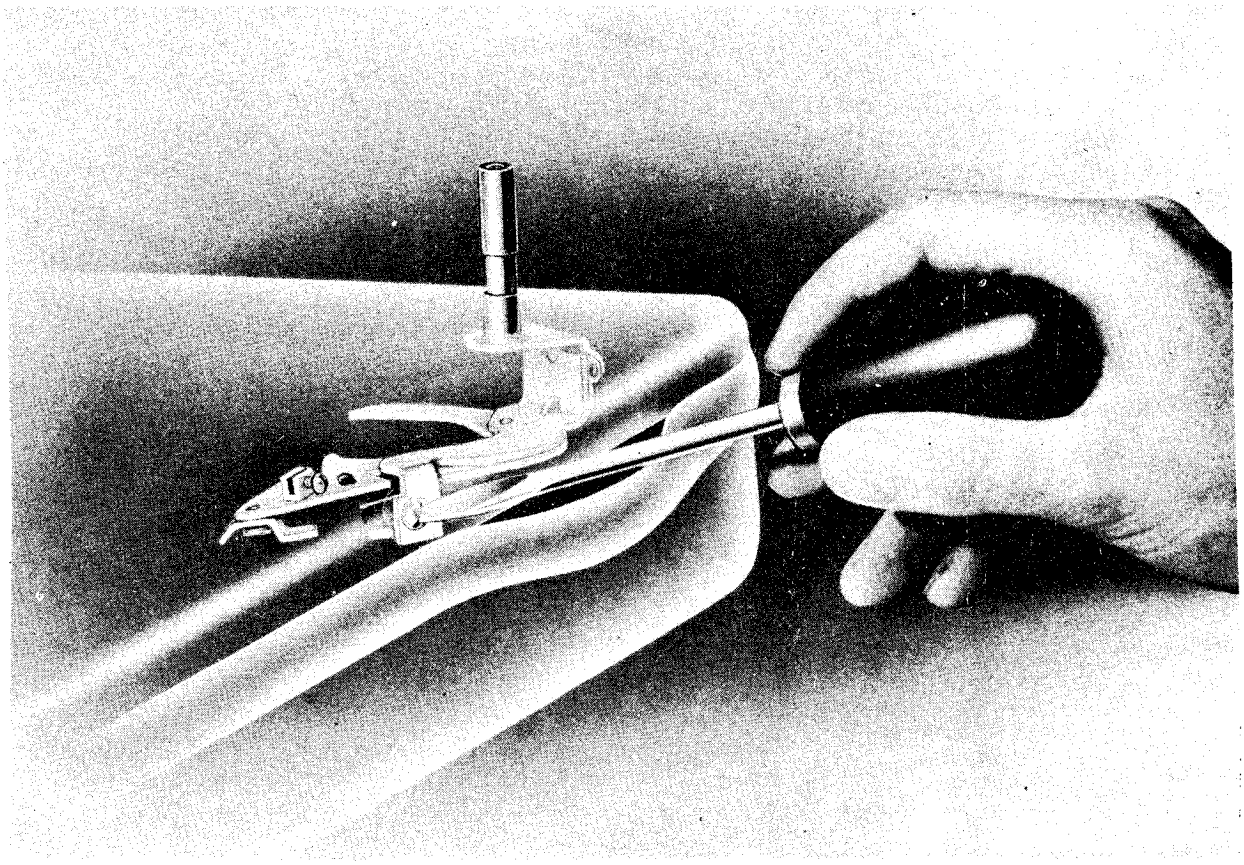
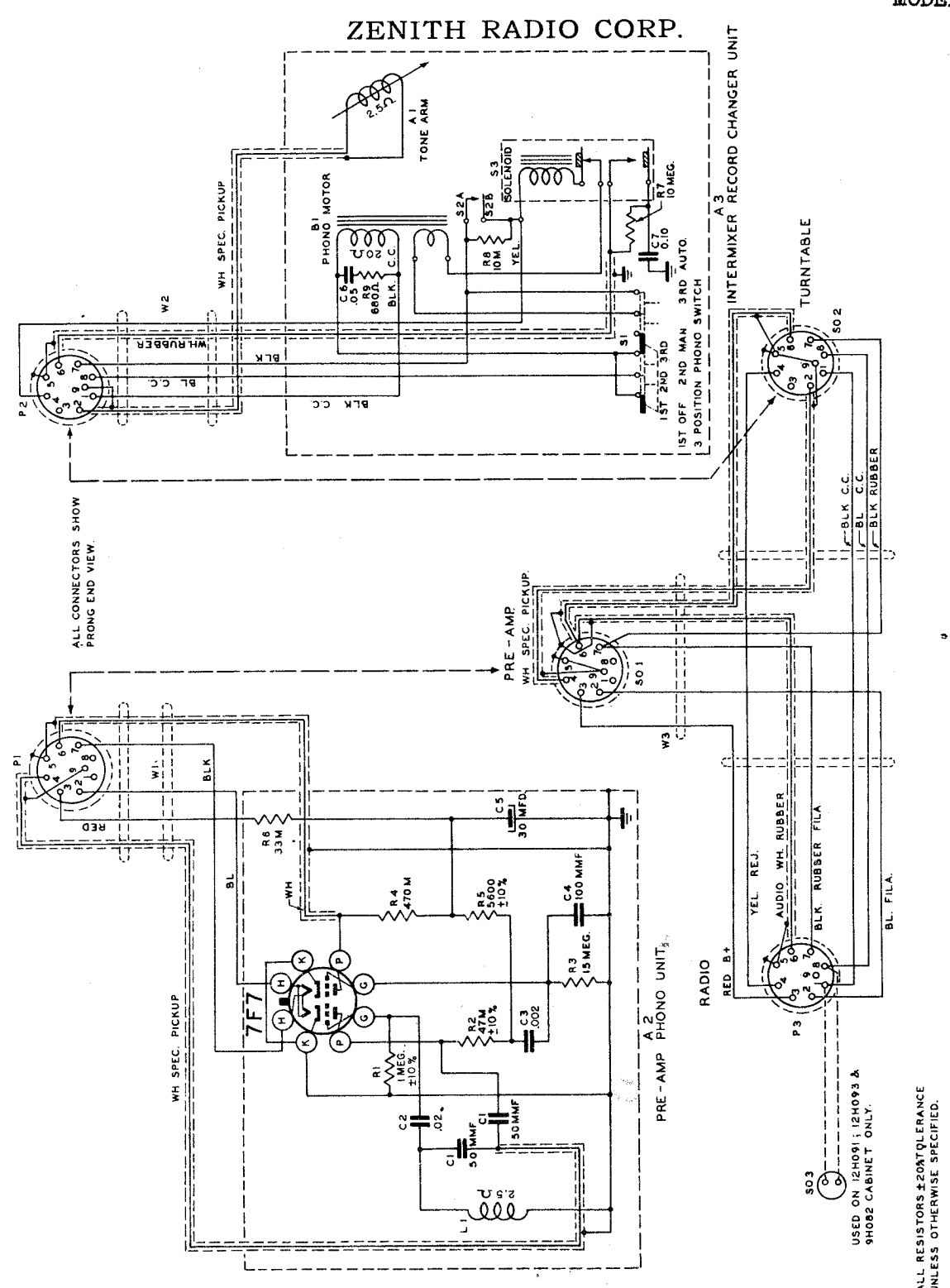


Fig. 14. Exploded View—Needle Cartridge and Socket Assembly.

ADDENDA



For convenience, a screwdriver tone arm set-down adjustment has been added to all later production record changers. The adjustment screw can be reached with a screwdriver by pushing aside the ethocel trim strip. The tone arm must be held in the rest position while the adjustment is made. Clockwise rotation of the screw will move the tone arm in, while counter-clockwise rotation will move it out.



DIAG. NO.	PART NO.	DESCRIPTION	
C1	22-1532	50 MMF	500 V.
C2	22-327	.02 MFD.	200 V.
C3	22-1220	.002 MFD.	600 V.
C4	22-162	100 MMF	600 V.
C5	22-1449	30 MFD. ELECTRO.	300 V.
C6	22-1570	.05 MFD.	400 V.
C7	22-417	.010 MFD.	600 V.
R1	63-441	1 MEGOHM	1/4 W.
R2	63-648	47 M OHM	1/4 W.
R3	63-976	15 MEGOHM	1/4 W.
R4	63-597	470 M OHM	1/4 W.
R5	63-638	5600 OHM	1/4 W.
R6	63-592	33 M OHM	1/4 W.
R7	63-604	10 MEGOHM	1/4 W.
R8	63-589	10 M OHM	1/4 W.
R9	63-582	680 OHM	1/4 W.
A1	S11475	TONE ARM COMPLETE	
A2	S11640	PRE-AMP PHONO UNIT	
A3	S11680	INTERMIXER RECORD CHANGER UNIT	
B1	141-92	PHONO MOTOR	
L1	S12603	42.5 MICRO HENRY	
P1	58-133	PHONO PLUG	
P2			
P3			
SO1	78-582	PHONO SOCKET	
SO2	78-582	PHONO SOCKET	
SO3	52-188	2 PRONG RECEPTACLE	
S1	85-372	3 POS. SWITCH	
S2A,S2B	S12891	TRIP CONTACT ASSY.	
S2B	S12579	INSULATOR STRIP "	
S3	S11458	SOLENOID MAG. "	
W1	S12601	CABLE ASSEMBLY	
W2	S12602	CABLE ASSEMBLY	
W3	S12604	CABLE - USED ON MODELS 12H090; 12H092; 12H094; 9H088	
W3	S12605	CABLE - USED ON MODELS 12H091; 12H093	
W3	S12606	CABLE - USED ON MODELS 9H081; 9H079	
W3	S12607	CABLE - USED ON MODEL 9H082	

Fig. 15. Schematic Diagram of Pre-Amplifier Phono Unit.

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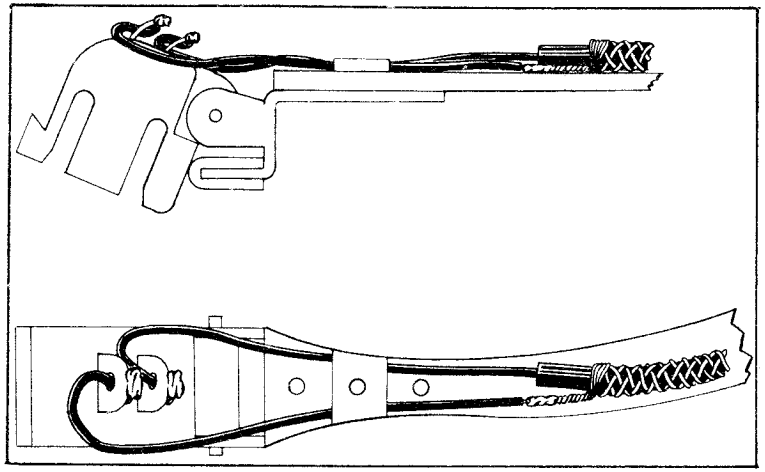

Fig. 13 shows how the leads are connected to the Needle Cartridge Socket. The lead and insulation are run through the hole in the contact and the lead is soldered with a light soldering iron. Great care must be exercised, and very little heat applied as the socket is made of lucite and will burn easily. The complete lead and socket are supplied as S12633.

NUMERICAL PARTS LIST

S-10730	Timing Sprocker Assembly
S-10732	Idler Assembly
S-11118	Idler Wheel Assembly
S-11458	Solenoid and Bracket Assembly
S-11473	Needle Cartridge
S-11580	Trip Contact and Support Strip Assembly
S-11599	Clutch Release Arm—Trip Plate and Bracket Assembly
S-11640	Pre-Amp. Phono Unit Assembly
S-11657	Idler Wheel Stud and Washer Assembly
S-11668	Record Ejector Cam and Shaft Assembly
S-11671	Pressure Arm and Bracket Assembly
S-11674	Record Support Plate and Bracket Assembly
S-11675	Discriminator Lever and Bracket Assembly
S-11677	Base Plate, Sprocket and Drive Shaft Bearing Assembly
S-11682	Turntable and Record Locating Stud Assembly
S-11683	Selector Sprocket and Bushing Assembly
S-12038	Record Ejector Housing Cover Assembly
S-12489	Tone Arm Pivot Shaft and Bracket Assembly
S-12493	Spring Contact and Insulator Assembly
S-12507	Record Spindle Assembly
S-12531	Bracket and Spring Assembly
S-12541	Contact Assembly
S-12542	Contact Assembly
S-12633	"Cobra" Socket and Cable Assembly
S-12859	Discriminator Knob and Plate Assembly.
S-12891	Trip Contact and Bracket Assembly
S-13063	Complete Cobra Tone Arm Assembly with Needle Cartridge
S-13086	Tone Arm Lift Pin Assembly
12-1216	Tone Arm Pivot Bracket
22-417	.1 Mfd. Paper Dielectric Capacitor
22-1449	30 Mfd. Electrolytic Capacitor
22-1570	.05 Mfd. Paper Dielectric Capacitor 400 v.
43-101	Tone Arm Support Housing (Casting)
43-102	Record Ejector Housing (Black Polystyrene)
43-103	Tone Arm Housing (Black Polystyrene)
54-30	8-32 x 5 16 x 7 64 Hex Nut—Steel N.P.
54-34	No. 6-32 x 1 4 Hex Nut—Steel N.P.
54-66	No. 10-32 x 5 16 Hex Nut—Steel N.P.
57-1117	Discriminator Trip Plate
57-1130	Switch Escutcheon
63-582	680 Ohm Carbon Resistor—1 4 W. ± 20%
63-589	10,000 Ohm Carbon Resistor—1 4 W.
63-604	10 Meghohm Carbon Resistor—1 4 W.
69-36	8-32 x 1 4 R.H.M.S.—Steel N.P.
71-71	No. 6-32 x 1 4 Phillips Flat Head M.S. Steel—Bright N.P.
73-59	8-32 x 5 16 Slotted Headless Set Screw—Steel—Cuppoint
73-70	No. 8-32 x 1 2 Allen Head Set Screw
80-138	Idler Wheel Retaining Spring
80-368	Idler Wheel Tension Spring
80-452	Spring (50 cycle Operation)
80-453	Spring (60 cycle Operation)
80-460	Trip Lever Tension Spring
80-464	Pawl Spring
80-472	Trip Lever Plate Return Spring
83-341	Single Lug Terminal Strip
83-420	Three Lug Terminal Strip
83-1091	Insulating Strip
83-1107	Insulator Strip
84-65	Tone Arm Rest
85-372	Slide Switch (3 Position)
86-81	Shakeproof Lug No. 2101-8
93-35	3 8 x .144 x .032 Flat Washer—N.P.
93-125	No. 6 Internal Shakeproof Lockwasher No. 1206
93-126	No. 8 Internal Shakeproof Lockwasher No. 1208
93-415	No. 6 External Shakeproof Lockwasher No. 1106
93-582	5 16 x .129 x .025 Steel Washer—Cad. Pl.
93-617	Sprocket Shaft Retaining Washer
93-673	Idler Wheel Stud Washer—Small
93-677	Idler Wheel Stud Fishpaper Washer—Large
93-678	Idler Wheel Stud Fishpaper Washer—Small
93-679	Idler Wheel Stud Flat Washer—Large
93-719	7 16 x 3 16 x .031 Flat Washer—N.P.
93-754	No. 4 Internal Shakeproof Lockwasher Steel—N.P. No. J204-3
93-767	Cam Spacer Washer (.020 x .385 x 5 8 Steel Cad. Pl.)
93-769	7 8 x .140 x .043 Steel Washer Cad. Pl.
93-819	Motor Mounting Washers (3)
94-334	Mounting Bushing
94-505	Insulating Bushing (Cutout Contact)
112-415	8-32 x 3 8 Flat Head Shakeproof Type 1 Self Tapping Screw Steel—Cad. Pl.
112-548	6-32 x 1 2 Recessed Stove Head M.S. Steel—Bronze
112-562	4-40 x 7 8 P.H. Stan-Tap Thread Forming Screw—Steel—Cad. Pl.
112-576	5-40 x 1 4 Oval B.H.M.S. Steel N.P.
112-578	6-32 x 1 4 Oval B.H.M.S. Steel N.P.
112-579	8-32 x 3 8 R.H. Shakeproof Type Self Tapping Screw—Steel—Cad. Pl.
112-581	6-20 x 3 8 R.H. Self Tapping Screw Steel Cad. Pl.—Shakeproof Type 25
114-89	8-32 x 5 16 Hex Acorn Head M.S. Steel N.P.
114-180	No. 6 x 1 4 Hex Head Slotted Self Tapping Screw—Steel Cad. Pl.
114-199	6 x 3 16 Hex Head Slotted—Stan-Tap Sheet Metal Screw—N.P.
114-200	6-32 x 5 16 Hex Head Slotted—Stan-Tap Thread Forming Screw—Cad. Pl.
114-201	8-32 x 5 16 Hex Head Slotted—Stan-Tap Thread Forming Screw—Cad. Pl.
114-217	8-32 x 1 4 Hex Head Slotted Stan-Tap Thread Forming Screw—Cad. Pl.
114-248	6-20 x 5 16 Hex Head Slotted Shakeproof—Type 25—Self Tapping Screw
115-24	4-40 x 3 16 Fillister H.M.S.—Steel N.P.
117-106	Position Trip Lever
125-16	Gum Rubber Grommet
126-470	Chassis Shield
128-27	Cam
141-92	A.C. Phono Motor
147-134	Cylindrical Spacer (Drive Shaft Bracket)
148-51	Tone Arm Housing
188-27	Record Spindle Retaining Washer
188-32	Motor Mounting Retaining Rings (3)
214-2	Sprocket Drive Chain